MITIGATION PLAN

Final

March 2017

MARTIN DAIRY MITIGATION PLAN

Orange County, NC
NCDEQ Contract No. 6831
DMS ID No. 97087

Neuse River Basin
HUC 03020201

USACE Action ID No. 2016-00874
RFP #: 16-006447

PREPARED FOR:

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

PREPARED BY:

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

- Federal rule for compensatory mitigation project sites as described in the Federal Register Title 33 Navigation and Navigable Waters Volume 3 Chapter 2 Section § 332.8 paragraphs (c)(2) through (c)(14).
- 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.

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TABLE OF CONTENTS

TABLES

FIGURES

APPENDICES

1.0 Introduction

The Martin Dairy Mitigation Site (Site) is located in Orange County approximately eight miles northeast of Hillsborough, NC and eight miles south of Caldwell, NC (Figure 1). The project is located within the NC Division of Mitigation Services (DMS) targeted watershed for the Neuse River Basin Hydrologic Unit (HU) 03020201030030 and NC Division of Water Resources (DWR) Subbasin 03-04-01. The Site was selected by DMS to provide stream mitigation units (SMUs) and buffer credits in the Neuse River Basin 03020201 (Neuse 01). The project involves the restoration of 1,814 existing linear feet of incised and straightened streams from two unnamed tributaries to Buckwater Creek. These streams have been given names by Wildlands to facilitate labeling and communication in this mitigation plan and for the life of the project (Figure 2). The mainstem is hereafter referred to as Martin Dairy and its tributary as UT1. Restoration of these reaches will provide 2,135 SMUs. The project will also restore 10.14 acres of riparian buffer on-site, which will provide 394,742 buffer credits. The Site will be protected by an 11.155-acre conservation easement. The Site Protection Instrument detailing the easement is located in Appendix 1.

Table 1: Project Attribute Table Part 1 – *Martin Dairy Mitigation Site*

Project Information	
Project Name	Martin Dairy Mitigation Site
County	Orange
Project Area (acres)	11.155
Project Coordinates (latitude and longitude)	36° 7' 25.76"N 79° 0' 14.26"W
Planted Acreage (acres of woody stems planted)	10.14

2.0 Watershed Approach and Site Selection

The 2009 Neuse River Basinwide Water Quality Plan lists major stressors in Subbasin 03-04-01 to be total suspended solids (TSS), nutrients, and chlorophyll α. The 2010 Neuse River Basin Restoration Priorities (RBRP) highlights the importance of riparian buffers for stream restoration projects. Riparian buffers retain and remove nutrients and suspended sediments. Of the 123 miles of streams in the Neuse 01 CU, 23% do not have adequate riparian buffers. The RBRP states that "priority [restoration] projects should increase or improve buffers." Another goal of the RBRP for the Neuse 01 HU is to support the Falls Lake watershed plan. Falls Lake is the receiving water supply water body downstream of the Site and is classified as water supply waters (WS-IV) and nutrient sensitive waters (NSW). The RBRP also states that a goal for the Neuse 01 CU is to, "…promote nutrient and sediment reduction in agricultural areas by restoring and preserving wetlands, streams, and riparian buffers." The Martin Dairy Mitigation Site was selected because of its location within the targeted watershed and its potential to address the goals of the RBRP through stream restoration and buffer restoration.

Restoration of streams on the Site will directly and indirectly address stressors identified in the RBRP by creating stable stream banks, restoring meandering pattern, and restoring a forested buffer. The project will slow surface runoff, increase retention times, provide shade to streams, and reconnect the streams to their historic floodplains and riparian wetlands, which should reduce sediment and nutrient loads which contribute to the production of chlorophyll α in downstream waters. In addition, restoration will provide and improve instream and terrestrial (riparian) habitats while improving stream stability and overall hydrology.

3.0 Baseline and Existing Conditions

The Site watershed (Table 2 and Figure 3) is located in a northwestern HU of the Neuse 01 CU. It is situated in the rural countryside in Orange County near Hillsborough, NC, upstream of the intense growth and development pressure associated with the Raleigh-Durham metropolitan area. The following sections describe the existing conditions of the watershed and watershed processes, including disturbance and response.

Table 2: Project Attribute Table Part 2 – *Martin Dairy Mitigation Site*

Project Watershed Summary Information	
Physiographic Province	Piedmont
Ecoregion	Slate Belt
River Basin	Neuse River
USGS HUC (8 digit, 14 digit)	03020201, 03020201030030
NCDWR Sub-basin	03-04-01
Project Drainage Area (acres)	526
Project Drainage Area Percentage of Impervious Area	0.40%
CGIA Land Use Classification	59.0% forested, 40.6% cultivated, 0.4% impervious

3.1 Landscape Characteristics

3.1.1 Physiography and Topography

The Site is located in the Piedmont Physiographic Province of North Carolina. The Piedmont Province is characterized by gently rolling, well rounded hills with long low ridges and elevations ranging from 300-1500 feet above sea level. The Site topography and relief are typical for the region, as illustrated in Figure 4. Martin Dairy has a gentle (0.65%) alluvial valley that transitions from moderately confined at 60 feet wide at the upstream end of the Site to unconfined at over 200 feet wide at the downstream end of the Site. UT1 transitions from a steep (1.81%) confined valley (<50 feet wide) at the upstream project limit to a moderately confined valley (>100 feet wide) as it approaches its confluence with Martin Dairy. Due to the valley shape in conjunction with dredge spoil present along the right bank of Martin Dairy (from when the channel was straightened and deepened), a swath of wetlands developed at the toe of the right valley slope. The wetland position and extents within the landscape has been consistent according to available historic aerial topography dating back to 1938. These wetlands are in danger of draining should Martin Dairy continue to incise.

3.1.2 Geology and Soils

The Site is located in a portion of the Piedmont known as the Carolina Slate Belt (NCGS, 1985). The rocks in this region are primarily volcanic and sedimentary rocks that underwent low-grade metamorphism giving them a slaty cleavage. Coarse-grained intrusive granites comprise the rest of the Slate Belt rocks (Rogers, 2006). The geology of this area has important effects on Site hydrology, hydraulics, geomorphology, and sediment transport. Streams in the Carolina Slate Belt tend to go dry during late summer and early fall as a result of geologic, topographic, and climatic factors. A study by Guise and Mason (1993) states that the, "Carolina slate belt has among the lowest potential for sustaining baseflow in streams" throughout the year as compared to other regions of North Carolina. Median low flows in the Carolina Slate Belt, defined by the study as the 7Q10 (the annual minimum 7-day consecutive low flow), can be as low as 0.005 $ft^3/s/mi^2$ of drainage area (Guise and Mason, 1993). If streambank vegetation is not well established it can die back in late summer when flows are low, leaving banks exposed to erosive storm flows. This process appears to happen during the summer months and

periods of drought along Martin Dairy and UT1. Existing streambank vegetation is dominated by pasture grasses that die back for a portion of the year. The exposed banks lack the roughness necessary to reduce channel velocities. High channel velocities and shear stresses increase bed scour during these times. This has resulted in the process of channel incision followed by widening. There is evidence of bank sloughing along the length of Martin Dairy, forming temporary benches that eventually mobilize through the system. These erosional processes deliver sediment and its adsorbed nutrients downstream. It is likely that these processes are occurring on the livestock operation east of Schley Road, which drains into UT1, and on other unbuffered streams within the watershed. There is currently no evidence that aggradation is occurring in the system.

The Martin Dairy floodplain is dominated by Chewacla loams (Figure 5). While this soil frequently floods and is poorly drained, aiding in the maintenance of wetlands, the loamy soil is greater than 80 inches deep. This depth to bedrock provides no natural grade control within the streambeds. Without intervention, channel incision would likely continue to degrade the Site streams until the channels reach the underlying bedrock.

It is Wildlands' experience that small streams in the Slate Belt are low bedload sediment supply systems. These streams commonly have small gravel and sand bed material that is derived from highly weathered parent material. Largely forested watersheds with low rolling topography will often result in low sediment supply. Without naturally high bedload supply to drive morphologic change, these streams are relatively slow to adjust without manipulation or watershed disturbance.

3.2 Land Use/Land Cover

Land use and land cover were investigated throughout the watershed using historical aerials of the Site and adjacent parcels from 1938-2016 and a watershed reconnaissance survey. The watershed is 60% forested. The most common historical and current land uses in the watershed are silviculture and agriculture. While 40% of the watershed has been previously cleared, recent logging events in the watershed have been infrequent and limited in disturbed acreage. The largest recent event noted on historical aerials was of 3.6 acres cleared between 2009 and 2010. This constitutes less than one percent of the watershed. The Site itself has been used for livestock grazing or maintained as managed herbaceous cover since at least before 1938. The limits of riparian buffers and agricultural land on Site have remained consistent over that time. In recent history, the Site was an active dairy farm. The livestock were removed and the Site transitioned to hay production over three years ago. There are no signs of impending land use changes or development pressure that would impact the project in the Martin Dairy watershed.

This consistency in land use within the project watershed over the past 78 years indicates that watershed processes affecting hydrology, sediment supply, and nutrient and pollutant delivery have not varied widely over time. With a lack of developmental pressure, watershed processes and stressors from outside the project limits are likely to remain consistent throughout the implementation, monitoring, and closeout of this project. These stressors and processes are discussed further in Section 4, below.

Aerial photographs from 1938-present depict the Site in a managed open field condition with the stream maintaining its location. The lack of sinuosity on Martin Dairy, and the presence of dredge spoil material along the top of banks suggests that the channels were straightened for agricultural purposes prior to 1938. Ditches, located along the right floodplain of Martin Dairy, partially drain the riparian wetlands. Both Martin Dairy and UT1 enter the project via culverts. The channel has incised over a foot downstream of the culverts, creating a barrier for aquatic organism passage to upstream reaches within the watershed.

3.3 Existing Vegetation

Streamside vegetation consists primarily of herbaceous plants and grasses such as fescue (*Fescue* spp.) smartweed (*Polygonum* spp.), Johnson grass (*Sorghum halepense*), and purple lovegrass (*Eragrostis eragrostis*) with some broom sedge (*Carex scoparia*), golden rod (*Solidago spp.*), ironweed (*Vernonia altissima*), and cardinal flower (*Lobelia cardinalis*). There are also some young sweet gums (*Liquidambar styraciflua*), red maple (*Acer rubrum*), green ash (*Fraxinus pennsylvanica*), and small black willows (*Salix nigra*) present near the top of the stream bank. Portions of UT1 are choked with cattail (*Typha latifolia)*. Invasive species include multiflora rose (*Rosa multiflora*) and Chinese privet (*Lagustrum sinense*) with Johnson grass and cattail considered nuisance species.

The watershed has likely been logged multiple times since pre-disturbance although recent logging (post 1938) has been limited. Most tree species located in surrounding riparian areas are mid-successional or planted pine. The species in these areas are not necessarily indicative of what would have been on-site pre-disturbance.

3.4 Project Resources

On May 19, 2016, Wildlands investigated on-site jurisdictional waters of the U.S. within the proposed project easement area. Jurisdictional areas were delineated using the US Army Corps of Engineers (USACE) Routine On-Site Determination Method. This method is defined by the 1987 Corps of Engineers Wetlands Delineation Manual and the subsequent Eastern Mountain and Piedmont Regional Supplement. All jurisdictional waters of the U.S. were located by sub-meter GPS. Wetland determination forms representative of on-site jurisdictional areas as well as non-jurisdictional upland areas are included in Appendix 2.

The wetland delineation was confirmed on Site by USACE staff on July 28, 2016 and the jurisdictional determination was approved on December 9, 2016. There are four jurisdictional wetland features located on-site (A-D). These wetland features are classified as seeps using the evaluator's best professional judgement. The wetlands occur in the side slopes and the floodplains that drain to Martin Dairy. These features exhibit a high water table, pockets of shallow inundation, saturation within the upper 12 inches of the soil profile, and a low chroma matrix. Common hydrophytic vegetation includes wild mint (*Mentha arvensis*), longhair sedge (*Carex comosa*), and common rush (*Juncus effuses*). Much of these areas are impacted from farming practices including hay production.

The Site contains two perennial streams: Martin Dairy and UT1. It also contains a short potion of an ephemeral channel (E1) at the downstream end of the Site. This feature was confirmed as ephemeral by staff from the DWR on April 5, 2016. NC DWR Stream Identification Forms (Version 4.11) are in Appendix 3 along with a confirmation letter from DWR regarding the ephemeral reach. US Army Corps of Engineers (USACE) forms are in Appendix 2. Stream features are described in more detail in Section 5. Table 3 provides a summary of water resources within the project limits. Existing conditions are also illustrated in Figure 6.

E1 exhibits little erosion and appears to be relatively stable. The downstream end of the reach holds water for part of the year and it has been delineated as a wetland (Wetland A). Martin Dairy's stream type classification is most nearly described as varying between an incised and straightened E4 and C4 stream type, as the top width widens and narrows along the length of the stream. UT1 is best classified as an incised and straightened E4. The dominant bed material in both reaches is a small gravel. Cross-sections 1-4 are located along Martin Dairy and cross-sections 5 and 6 are on UT1 (Figure 6). Cross-section and reach-wide pebble count results are located in Appendix 5.

Table 3: Project Attribute Table Part 3 – *Martin Dairy Mitigation Site*

Reach Summary Information				
Parameter	**Martin Dairy**	**UT1**	**E1[2]**	
Length of Reach (lf)	1,676	138	128	
Valley Confinement (confined, moderately confined, unconfined)	Moderately Confined to Unconfined	Confined to Moderately Confined	Moderately Confined	
Drainage Area (acres)	526	141	15	
Perennial, Intermittent, Ephemeral	P	P	**E**	
NCDWR Water Quality Classification	WS-IV			
Stream Classification (Existing and Proposed)[1]	Incised/ Straightened C4/E4 (proposed C4/E4)	Incised/ Straightened E4 (proposed C4/E4)	N/A	
Evolutionary Trend (Simon)	IV: Degradation and Widening		N/A	
FEMA Classification	N/A			
Wetland Summary Information				
Parameter	**A**	**B**	**C**	**D**
Size of Wetland (acres)[3]	0.013	1.430	1.283	0.122
Wetland Type (non riparian, riparian riverine or riparian non-riverine)	Riparian Riverine			
Mapped Soil Series	Herndon	Herndon/ Chewacla	Tatum/ Chewacla	Chewacla
Drainage Class	Well Drained	Well to Poorly Drained	Well to Poorly Drained	Poorly Drained
Soil Hydric Status	No	No / Yes	No / Yes	Yes
Source of Hydrology	Hillside Groundwater Seep			
Restoration or enhancement method (hydrologic, vegetative, etc)	N/A			

1. The Rosgen classification system (Rosgen, 1994) is for natural streams. These channels have been heavily manipulated by livestock and man and therefore may not fit the classification category as described by this system. Results of the classification are provided as a basis for discussion of existing channel form.
2. The Ephemeral reach E1 will not be restored for mitigation credit; however, it will be re-aligned as needed to tie in to the new alignment for UT1.
3. Wetland areas are not proposed for restoration or enhancement credit.

4.0 Watershed and Channel Disturbance and Response

As discussed above in Section 3.2, there has been very little change in the watersheds of Martin Dairy and UT1 for several decades. Some clearing of forest has occurred but these minor disturbances are the not the main driver of the degradation of the Site. The primary cause of degradation on the Site was the original clearing of the Site and channelization of Martin Dairy and UT1, which occurred prior to 1938 (the date of the earliest available aerial photo). The channelization involved straightening and deepening of the stream (as indicated by the amount of dredge spoil in the floodplain). This manipulation led to increased shear stresses which caused incision, especially in Martin Dairy where the upstream culvert is now one foot above the channel bed. UT 1 is less incised because its down-cutting was arrested by the base level of the receiving stream. Over time, the incision reduced the overall channel slope in Martin Dairy which resulted in decreases in stream power. As incision slowed the channels began to widen through mass wasting and livestock trampling. Though livestock are no longer

grazed on the Site, signs of on-going bank sloughing are apparent in both channels. Although less incision occurred in UT1 after channelization, both streams are overly deep, widening, sloughing, and devoid of riparian vegetation (other than pasture grass) due to agricultural uses of the Site.

5.0 Functional Uplift Potential

The potential for functional uplift is described in this section according to the Stream Functions Pyramid (Harman, 2012). The Stream Functions Pyramid describes a hierarchy of five stream functions, each of which supports the functions above it on the pyramid (and sometimes reinforces those below it). The five functions in order from bottom to top are hydrology, hydraulics, geomorphology, physicochemical, and biology.

5.1 Hydrology

The major watershed disturbance, prior to 1938, has been deforestation and conversion of 40% of the watershed to agricultural land uses. These alterations in land cover typically result in reductions in rainfall interception and evapotranspiration which lead to increases in runoff and water yield (Dunne and Leopold, 1978). A primary result of these changes is an increase in both peak flows and base flows, though the magnitude of this effect is likely small in watersheds of this size. Initial increases in water yield usually change over time as vegetation regrows and crops are planted. There are no stream gauges within this watershed and, thus, no way to know the degree to which clearing of 40% of the land affected this particular watershed other than to say that water yields have almost certainly increased. However, these changes primarily occurred several decades ago (prior to available aerial photography) and additional clearing in the watershed has been limited. The watershed has adjusted to its hydrologic regime and is stable now. Population growth in this rural area is essentially non-existent. Therefore, future alteration to the land cover and associated effects on hydrology are not expected in the foreseeable future. No measurements of existing conditions in hydrology have been made to date for this project. However, due to the stability of the watershed the Site hydrology is assumed to be functioning (Table 4).

A stream restoration project performed at a specific Site does not often result in uplift to hydrology (Harman, 2012). Even though trees will be planted within the conservation easement, this will not result in improvements to the rainfall-runoff relationship at the watershed scale. Therefore, there is no opportunity to improve the hydrology function. However, it is currently rated as functioning (Table 4).

5.2 Hydraulics

The streams on the Site are channelized and incised and not connected to their floodplains. This has resulted in reduced hydraulic functioning of the channels. The bank height ratios on Martin Dairy range from 1.4 (functioning-at-risk) to 1.9 (not functioning). On UT1, the bank height ratio is 2.1 (not functioning). However, the entrenchment ratios on Martin Dairy range from 14.2 to 14.3 (functioning) and on UT1 the entrenchment ratio is 2.2 (functioning). Estimated bankfull flow velocities for Martin Dairy range from 3.8 to 5 feet per second (functioning) and on UT1 the estimated bankfull velocity is 4.7 (functioning). Because the streams are severely incised but flow dynamics are functional, the overall rating for hydraulics on the Site is functioning-at-risk (Table 4).

The channel will be reconstructed and will be connected to its floodplain so that stream flows above bankfull stage will flood the floodplain. The bank height ratios for both streams on the Site will be 1.0 (functioning). Bankfull flow velocities and shear stress will be maintained at functioning levels and groundwater exchange and adjacent wetland hydrology will be improved as a result of the increased frequency of floodplain inundation. Hydraulics will transition from functioning-at-risk to functioning (Table 4).

Table 4: Summary of Stream Functions – *Martin Dairy Mitigation Site*

Resource	Martin Dairy - R1		Martin Dairy - R2		UT1	
Functional Category	**Existing**	**Proposed**	**Existing**	**Proposed**	**Existing**	**Proposed**
Hydrology	F	F	F	F	F	F
Hydraulics	FAR	F	FAR	F	FAR	F
Geomorphology	NF	F	NF	F	NF	F
Physiochemical	NR	NR	NR	NR	NR	NR
Biology	NR	NR	NR	NR	NR	NR
Overall	FAR	F	FAR	F	FAR	F

5.3 Channel Geomorphology

The past channelization, incision, and on-going sloughing and widening described in Section 4 places the streams on the Site at Stage IV of the Simon Channel Evolution Model which is classified as not functioning. Currently, Martin Dairy exhibits scour along 31% of the reach. Martin Dairy is moderately incised over 75% of its length. Over half of the length of UT1 is incised (54% of the stream length), with bank height ratios averaging 2.1. Nearly half of the streambanks exhibit signs of active scouring (48%). The channel bottom of this straightened tributary is choked with cattail and common rush. The bedform is inconsistent on Martin Dairy and pool to pool spacing ratios (1.6 - 10.6) vary widely over the project length (not functioning). UT1 has more consistent bedform, however the pool to pool spacing ratio (average 6.5) indicates the bedform is functioning-at-risk. There is little to no large woody debris (LWD) in either of the streams on-site (not functioning). Bank migration and lateral stability were not measured for this project due to its straightened status. Overall, the existing geomorphology function on the Site is very poor and is classified as not functioning (Table 4).

There is an opportunity to improve the geomorphology function on the site. The incision and bank erosion will be corrected. Bedform will be diversified and spaced with appropriate design ratios. LWD will be added to the system through construction of instream structures and bank revetments and a riparian buffer will be planted. The geomorphology function will be restored to functioning (Table 4).

5.4 Physicohemical

No water quality sampling has been conducted on the Martin Dairy Site and there are no water quality monitoring stations within the watershed. The 2009 Neuse River Basinwide Water Quality Plan lists major stressors in Subbasin 03-04-01 to be TSS, nutrients, and chlorophyll α. Since the watershed land use is similar to the greater Subbasin, the Site likely has similar physicochemical concerns as those stated in the Basinwide Water Quality Plan. Potential sediment sources in the watershed include streambank erosion, bed scour, and runoff from agricultural fields. Potential sources of nutrients within the watershed are the livestock operation located east of the project along Schley Road, a livestock operation in the northeast quadrant of the watershed, the horse farm located west of the project, and runoff containing fertilizers applied to fields in the northern portion of the watershed. The suspected high nutrient load and lack of shade within the riparian corridor may contribute to elevated levels of chlorophyll α. There are, however, no observed algal blooms present within the project streams to indicate severe degradation in water quality or noticeably high levels of chlorophyll α. Although it is not mentioned in the Water Quality Plan, fecal coliform is another likely source of pollution within the watershed due to livestock operations. Water in UT1 is stagnant because of vegetation on the channel bed that causes ponded water. Because no water quality data are available to evaluate the current level of physicochemical functioning, this function is not rated (Table 4).

There is potential to improve the physicochemical functioning of the project streams. Water will flow over instream structures that will provide aeration, trees will be planted in the riparian zone to eventually shade and cool stream flow and help filter runoff, the stream will be reconnected to its floodplain and adjacent riparian wetlands to provide storage and treatment of overbank flows, and streambank erosion will be greatly reduced to nearly eliminate a source of sediment and nutrients. However, the potential improvements to physicochemical functioning will not happen immediately and some aspects will not occur until a mature canopy is established. Therefore, physicochemical improvements will not be included in the project success criteria for the seven-year monitoring period and the functional uplift potential is not rated (Table 4).

5.5 Biology

There are no available biological data for the Site, however, the habitat conditions on the Site are poor. While the riffle material is well-mixed small gravel and the pools contain fine to coarse sand, the stream contains very little woody debris or organic material necessary to support diverse macroinvertebrate and fish communities. There are no downed trees or larger woody debris masses that would create habitat features. UT1 has some riffle-pool sequences, but the majority of stream length is choked with macrophytes, which results in stagnation and sedimentation, likely lowering dissolved oxygen levels and covering the bed habitat. Additionally, the perched culverts at the upstream limits of both Martin Dairy and UT1 act as a barrier to aquatic organism passage. While the riparian wetlands provide habitat diversity in the floodplain, they are regularly mowed, removing shade and refuge areas. The riparian zone of the project provides little habitat for terrestrial species other than pasture grass. However, because no data on the existing communities are available to evaluate the current level of biologic functioning, this function is not rated (Table 4).

There is opportunity to improve the instream and riparian habitat in addition to the physicochemical function described in Section 5.4. Habitat will be improved by adding instream structures with a variety of rock and woody materials, adding woody bank revetments, reducing the abundance of nuisance macrophytes, providing a riparian buffer to shade the stream and improve terrestrial habitat, creating pools of variable depths, and cutting of sources of fine sediments. The culvert outlets will be addressed to improve aquatic organism passage. The biological response of the system will be tied to the physiochemical response post-restoration. As the physiochemical response may be delayed, the ultimate level of improvement in biology may not occur until after the completion of the seven-year monitoring period and, therefore, the functional uplift potential will be not rated (Table 4).

5.6 Overall Functional Uplift Potential

Overall, the Martin Dairy Mitigation Site can be considered as Functioning-at-Risk but the functional uplift potential is a reclassification as Functioning (Table 4). This change in overall classification is related to improvements in hydraulics and geomorphology between the existing and proposed conditions. The hydrology function will not be improved by the project because watershed-scale reforestation would be required to drive improvement in this function. Physicochemical and biological improvements are a likely result of the project. However, there is no existing basis for classifying the existing condition of these functions and the likely improvements will occur gradually after construction. Therefore, these functions are not rated and not considered in the overall functional rating. Project goals are tied only to hydraulics and geomorphology.

5.7 Site Constraints to Functional Uplift

An overhead electric utility line crosses the Site near the upstream extents of the project. The 30-foot easement associated with the line will be an internal break in the conservation easement. This break is the only one within the project limits. The stream will be restored and stabilized through this break, however no trees will be included in the vegetation plan for this swath to allow maintenance access.

The culverts at the upstream ends of the project are outside of the project limits. Due to this, repairs to hydraulic function and aquatic organism passage can only be addressed from the culvert outlets. There are no other man-made constraints within the project area that affect or reduce uplift potential.

The valley width on the Site will allow for the development of pattern and channel dimensions to restore stable, functioning streams and there are no other known constraints to the functional uplift described above in this section. The degree to which the physicochemical and biology functions can improve on the Site is limited by the watershed conditions beyond the project limits, upstream water quality, and the presence of source communities upstream and downstream of the Site.

6.0 Regulatory Considerations

Table 5, below, is a summary of regulatory considerations for the Site. These considerations are expanded upon in Sections 6.1-6.3.

Table 5: Project Attribute Table Part 4 – *Martin Dairy Mitigation Site*

Regulatory Considerations			
Parameters	**Applicable?**	**Resolved?**	**Supporting Docs?**
Water of the United States - Section 404	Yes	Yes	PCN[1]
Water of the United States - Section 401	Yes	Yes	PCN
Endangered Species Act	Yes	Yes	Appendix 5
Historic Preservation Act	Yes	Yes	Appendix 5
Coastal Zone Management Act	No	No	N/A
FEMA Floodplain Compliance	No	N/A	N/A
Essential Fisheries Habitat	No	N/A	N/A

1. PCN to be provided to DMS with Final Mitigation Plan

6.1 Biological and Cultural Resources

A Categorical Exclusion for the Martin Dairy Mitigation Site was submitted to DMS on May 27, 2016, and approved on June 3, 2016. This document included investigation into the presence of threatened and endangered species on Site protected under The Endangered Species Act of 1973, as well as any historical resources protected under The National Historic Preservation Act of 1966. The biological conclusion for the Site, according to the Categorical Exclusion research and response by US Fish and Wildlife Service, is that the, "proposed action [in this project] is not likely to adversely affect any federally listed endangered or threatened species, their formally designated critical habitat, or species currently proposed for listing under the Act." All correspondence with USFWS and a list of Threatened and Endangered Species in Orange County, NC is included in Appendix 5. The conclusion for cultural resources according to the Categorical Exclusion research and response by the State Historic Preservation Office is that there are no historic resources that would be affected by this project. For additional information and regulatory communications please refer to the Categorical Exclusion document in Appendix 5.

6.2 FEMA Floodplain Compliance and Hydrologic Trespass

Martin Dairy and UT1 are not FEMA mapped streams within the Site, as illustrated on the Orange County Flood Insurance Rate Map Panel 9896 and in Figure 7. Therefore, no modeling will be required for this project. Martin Dairy is mapped downstream of the Site at its confluence with Buckwater Creek.

6.3 401/404

The natural low point in the valley for Martin Dairy is currently a wetland area. The proposed stream channel is re-routed through this area. Any wetlands within the conservation easement and outside of the limits of disturbance will be flagged with safety fence during construction to prevent unintended impacts. This will be denoted in the final construction plans on the Erosion and Sediment Control plan and Detail plan sheets, as well as in the project specifications. The majority of floodplain grading will be considered a temporary impact to wetlands. Wildlands expects a net gain of wetland area, as construction of the new channel will fill the majority of the old channel to the elevation of the existing wetlands and remove the overburden along the right bank of the existing Martin Dairy stream, creating a wider overall floodplain and riparian wetland area. Table 6 estimates the anticipated impacts to wetland areas on this project. The Pre-Construction Notification, including this data, will be provided to DMS in the Final Mitigation Plan.

Table 6: Estimated Impacts to Project Wetlands – *Martin Dairy Mitigation Site*

Jurisdictional Feature	Classification	Acreage	Permanent (P) Impact		Temporary (T) Impact	
			Type of Activity	Impact Area (acres)	Type of Activity	Impact Area (acres)
Wetland A	Riparian Riverine	0.013	Stream Channel Re-alignment	0.003	Floodplain Grading	0.007
Wetland B		1.429		0.155		0.140
Wetland C		1.283		0.226		0.355
Wetland D		0.122	Gravel drive	0.014		0.000
			Total P Impact	**0.399**	**Total T Impact**	**0.502**

7.0 Mitigation Site Goals and Objectives

The project will improve stream functions as described in Section 5 through stream restoration and riparian buffer re-vegetation. Project goals are desired project outcomes and are verifiable through measurement and/or visual assessment. Objectives are activities that will result in the accomplishment of goals. The project will be monitored after construction to evaluate performance as described in Section 11 of this report. The project goals and related objectives are described in Table 7.

Table 7: Mitigation Goals and Objectives – *Martin Dairy Mitigation Site*

Goal	Objective	Expected Outcomes	Function(s) Supported
Reconnect channels with floodplains and riparian wetlands to allow a natural flooding regime.	Reconstruct stream channels with designed bankfull dimensions and depth based on reference reach data. Remove existing dredge spoil to reconnect channel with adjacent wetlands.	Raise water table and hydrate riparian wetlands. Allow more frequent flood flows to disperse on the floodplain. Support geomorphology and higher level functions.	Hydraulic

Goal	Objective	Expected Outcomes	Function(s) Supported
Improve the stability of stream channels.	Construct stream channels that will maintain stable cross-sections, patterns, and profiles over time.	Reduce sediment inputs from bank erosion. Reduce shear stress on channel boundary. Support all stream functions above hydrology.	Geomorphology
Restore and enhance native floodplain and streambank vegetation.	Plant native tree and understory species in riparian zones and plant native shrub and herbaceous species on streambanks.	Reduce sediment inputs from bank erosion and runoff. Increase nutrient cycling and storage in floodplain. Provide riparian habitat. Add a source of LWD and organic material to stream. Support all stream functions.	Hydrology (local), Hydraulic, Geomorphology, Physicochemical, Biology
Improve instream habitat.	Install habitat features such as constructed riffles, lunker logs, and brush toes into restored/enhanced streams. Add woody materials to channel beds. Construct pools of varying depth.	Increase and diversify available habitats for macroinvertebrates, fish, and amphibians leading to colonization and increase in biodiversity over time. Add complexity including LWD to the streams.	Geomorphology (supporting Biology)
Permanently protect the Site from harmful uses.	Establish conservation easements on the Site.	Protect Site from encroachment on the riparian corridor and direct impact to streams and wetlands. Support all stream functions.	Hydrology (local), Hydraulic, Geomorphic, Physicochemical, Biologic

8.0 Design Approach and Mitigation Work Plan

8.1 Design Approach Overview

The design approach for this Site was developed to meet the goals and objectives described in Section 7 which were formulated based on the potential for uplift described in Section 5. The design is also intended to provide the expected outcomes in Section 7, though these are not tied to performance criteria. The project streams will be reconnected with an active floodplain and the channels will be reconstructed with stable dimension, pattern, and profile that will transport the water and sediment delivered to the system. The adjacent floodplain and riparian wetlands will be planted with native tree species. Instream structures will be constructed in the channels to help maintain stable channel morphology and improve aquatic habitat. The entire project area will be protected in perpetuity by a conservation easement.

The design approach for this Site utilized a combination of analog and analytical approaches for stream restoration. Reference reaches were identified to serve as the basis for design parameters. Channels

were sized based on design discharge hydrologic analysis. Designs were then verified and/or modified based on a sediment transport analysis. This approach has been used on many successful Piedmont and Slate Belt restoration projects (Underwood, Foust, Holman Mill, Maney Farm, and Agony Acres Mitigation Sites) and is appropriate for the simple goals and objectives for this Site.

8.2 Reference Streams

Reference streams provide geomorphic parameters of a stable system, which can be used to inform design of stable channels of similar stream types in similar landscapes and watersheds. Five reference reaches were identified for this Site and used to support the design of Martin Dairy and UT1 (Figure 9). These reference reaches were chosen because of their similarities to the Site streams including drainage area, valley slope, morphology, and bed material. The reference reaches are all located within the Carolina Slate Belt region of the Piedmont. Geomorphic parameters for these reference reaches are summarized located in Appendix 4. The references to be used for the specific streams are shown in Table 8. A description of each reference reach is included below.

Table 8: Stream Reference Data Used in Development of Design Parameters – *Martin Dairy Mitigation Site*

	Long Branch	Spencer Creek 2	Foust Creek	UT to Polecat Creek	UT to Varnals Creek	Agony Acres On-Site Reference Reach (UT1-R3)
Stream Type:	**C4/E4**	**E4**	**C4**	**E4**	**C4/E4**	**E4**
Martin Dairy	X	X	X			
UT1				X	X	X

8.2.1 Long Branch

Long Branch is located in Orange County, northwest of Chapel Hill. Long Branch was previously identified as a reference and discussed in the Collins Creek Restoration Plan (KCI Technologies, 2007). The Long Branch watershed is low-density residential, agricultural, and forested land. The valley slope is 0.6% and channel slope is 0.4%. The stream maintains an entrenchment ratio above 2.5. Wildlands visited the reference site to verify the data presented in the KCI report. Two riffles were surveyed during the site visit. These riffles had a width to depth ratio of 9.4 and 8.0 with entrenchment ratios of 11.7 and 12.1, respectively. The cross-sections surveyed are more typical of E stream types, however KCI identified the stream as a C4 in their previous analysis. The stream likely varies between a C4 and E4.

8.2.2 Spencer Creek Reach 2

Spencer Creek Reach 2 is located in western Montgomery County near Ophir, NC, less than two miles from the Spencer Creek reference site (Buck Engineering, 2004). This site was classified as an E4 stream type and has a drainage area of 0.96 square miles. This reach flows through a mature forest and has a valley slope of 1.1% and a channel slope of 0.47%. The morphological parameters reported for the riffle cross-section include a width to depth ratio from 5.8 to 7.1 and an entrenchment ratio of 5.5 and 10.2.

8.2.3 Foust Creek

The Foust Creek reference reach is located approximately 600 feet upstream of the northernmost conservation easement boundary on the Foust Creek Mitigation Site in Alamance County, NC. It was identified by Wildlands in the Foust Creek Mitigation Site 2014 Mitigation Plan (Wildlands Engineering, 2014). Foust Creek has a gravel bed and a valley slope of 0.75%. The Foust Creek reference reach is classified as a Rosgen C4 stream type. This reach flows through a mature forest and although it is stable it lacks sinuosity. It was used in this project to inform the cross-section and profile parameters.

8.2.4 UT to Polecat Creek

The UT to Polecat Creek reference reach is located in northern Randolph County. The site was identified by Wolf Creek Engineering and used as a reference reach for the Holly Grove Restoration Site (Wolf Creek Engineering, 2007). Wildlands conducted a site visit and reference reach survey in March, 2013, to confirm the geomorphic parameters listed in the Holly Grove Restoration Site Plan. The UT to Polecat Creek reference reach is classified as a Rosgen E4 stream type.

8.2.5 UT to Varnals Creek

The UT to Varnals Creek reference reach is located in south central Alamance County, NC near the Cane Creek Mountains. The site was identified by EcoLogic Associates and used as a reference reach for the Reedy Branch Stream Restoration Site (EcoLogic Associates, 2002). Wildlands visited UT to Varnals Creek in September 2014 and visually confirmed that the land use is unchanged from reported conditions and that the stream is laterally and vertically stable. Wildlands conducted a detailed morphological survey in October 2014. UT to Varnals Creek has a drainage area of 0.41 square miles and is classified as a Rosgen B4/E4b stream type for the majority of the reach. UT to Varnals Creek has a similar channel and valley slope to UT1.

8.2.6 Agony Acres On-Site Reference Reach (UT1-Reach 3)

The Agony Acres On-Site Reference Reach (UT1 – Reach 3) is located in northeast Guildford County, NC. It was identified by Wildlands as a high quality preservation component of the nearby Agony Acres Mitigation Site in the March 2014 Mitigation Plan (Wildlands Engineering, 2014) and was used as a reference reach for that project. It was selected as a reference reach due to its similarity in slope and drainage area to UT1. A detailed survey was conducted in March of 2013. UT1 – Reach 3 has a drainage area of 0.3 square miles and classified as an E4 stream type.

8.3 Design Channel Morphological Parameters

Reference reaches were a primary source of information to develop the pattern and profile design parameters for the streams. Ranges of pattern parameters were developed within the reference reach parameter ranges with some exceptions based on best professional judgement and knowledge from previous projects. The full range of reference reach data is located in Appendix 4. We found the lower limit of some of these parameters to be too low to build a stable system. They are likely low in reference reaches due to the presence of a mature forest and root system that both influences and stabilizes channel pattern and profile. For example, radius of curvature ratio in reference data has a lower limit of 1.1 and the meander width ratio had a minimum of 1.0, however we have found that for C/E channels, these ratios should be above 1.8 and 2.4 respectively to naturally dissipate energy through meander bends during high flow events to limit impacts of shear stress on streambanks. The lower limits of the radius of curvature ratio and meander width ratio are based on values used for many years and on many successful designs.

Reference reaches were also used to inform the design of the cross-sections on the streams. The streams were designed with pool widths to be approximately 1.3 times the width of riffles to provide space for point bars and riffle pool transition zones. Designer experience was used for pool design as well. Pool depths were designed to be a minimum of 1.5 times deeper than riffles to provide habitat variation. Cross-section parameters such as area, depth, and width were designed based on the design discharge and stable bank slopes. The width to depth ratio was increased beyond some of the reference parameters for UT1 in order to provide stable bank slopes prior to the development of a fully vegetated streambank. Key morphological parameters for the Site are listed in Tables 9 and 10 for Martin Dairy and UT1 respectively. Complete morphological tables for existing, reference, and proposed conditions are located in Appendix 4.

Table 9: Summary of Morphological Parameters for Martin Dairy – *Martin Dairy Mitigation Site*

Parameter	Existing Parameters		Reference Parameters			Proposed Parameters	
	Reach 1	Reach 2	Long Branch	Spencer Creek 2	Foust Creek	Reach 1	Reach 2
Valley Width (ft)	121	110	-	-	-	121	110
Contributing Drainage Area (acres)	344	525	954	614	883	344	525
Channel/Reach Classification	C4/E4	E4	C4/E4	E4	C4	C4/E4	C4/E4
Design Discharge Width (ft)	8.6	14.0	14.8 - 18.6	10.7 - 11.2	18.5 - 19.4	15.0	16.2
Design Discharge Depth (ft)	1.2	1.2	1.3 – 2.1	1.6 – 1.8	1.3 - 1.4	1.1	1.2
Design Discharge Area (ft^2)	10.0	16.1	25 – 34.6	17.8 – 19.7	23.9 - 24.1	16.8	20
Design Discharge Velocity (ft/s)	5.0	3.8	3.6 – 4	4.9 – 5.4	2.9 - 3.7	2.8	3.2
Design Discharge (cfs)	47	63	101 – 124	97	88	47	63
Water Surface Slope	0.009	0.007	0.0040	0.0047	0.0090	0.005	0.0055
Sinuosity	1.05	1.09	1.3	2.3	1.1	1.25	1.28
Width/Depth Ratio	7.3	12.2	7.9 – 13.8	5.8 – 7.1	13.9 - 14.2	13.4	13.2
Bank Height Ratio	1.5	1.4	1.2 – 1.5	1	1	1	1
Entrenchment Ratio	14.2	14.3+	>3.4	5.5 - >10.2	2.6 - 3.4	2.2 - 5	2.2 - 5
d16 / d35 / d50 / d84 / d95 / dip / disp (mm)	0.13, 1.3, 2.6, 4.6, 7.7, 11, -, -	2.4, 8.1, 11, 15, 33, 54, -, -	-	<0.063, 3, 8.8, 42, 90, -, -	-	D_{50} = 10.6, D_{100} =64, D_i=23-64[3]	D_{50} = 10.6, D_{100} = 88, D_i = 35-87

Table 10: Summary of Morphological Parameters for UT1 – *Martin Dairy Mitigation Site*

Parameter	Existing Parameters	Reference Parameters			Proposed Parameters
	UT1	UT to Polecat	UT to Varnals	Agony Onsite Reference Reach UT1-R3	UT1
Valley Width (ft)	95	-	65	-	95
Contributing Drainage Area (acres)	141	262	262	189	141
Channel/Reach Classification	E4	E4	C4/E4	E4	C4/E4
Design Discharge Width (ft)	5.7	5.3 - 10.9	9.3 - 10.5	9.1 - 10.4	9.4
Design Discharge Depth (ft)	1	1.0 - 1.1	1.1 - 1.2	1.0 - 1.2	0.7
Design Discharge Area (ft^2)	5.7	5.4 - 12.4	10.3 - 12.3	10.7 - 11.3	6.7
Design Discharge Velocity (ft/s)	4.7	2.2 - 3.5	4.4 - 5.2	2.2 - 2.4	3.6
Design Discharge (cfs)	24	20	54	25	24
Water Surface Slope	0.016	0.012	0.017	0.0028 - 0.0039	0.005
Sinuosity	1.05	1.4	1.2	1.35	1.14
Width/Depth Ratio	5.7	5.2 - 9.6	8.1 - 9.3	7.3 - 10.1	13.2
Bank Height Ratio	2.1	1.0 - 1.1	1.0	1	1
Entrenchment Ratio	2.2	3.2 - 8.3	5.7 – 10.0	>3.9	2.2 - 5
d16 / d35 / d50 / d84 / d95 / dip / disp (mm)	0.048, 3, 5.1, 6.7, 8.9, 13, -, -	-	0.095, 0.4, 8, 87, 150, -, -	-	D_{50} = 5, D_{100} = 50, D_i=16-48

Both Martin Dairy and UT1 are incised, actively widening, and lack a natural pattern, habitat diversity, and a forested riparian buffer. These factors have led to the impairments discussed in Sections 3 and 4. To address these impairments and the stressors on the system, restoration is proposed for Martin Dairy and UT1. Both channels were designed to be Rosgen stream type C4/E4, with width-to-depth ratios on the low end of the typical range for that stream type. Narrow and deeper channels are common in slate belt reference reaches; however, the reference channels have established vegetation that maintain stability on steeper streambanks. The design channels will begin with flatter side slopes that will be more stable without established vegetation. Constructing channels with higher width-to-depth ratios and flatter side slopes will allow for sediment deposition on the banks and bank protection as the streambank vegetation establishes. The complete design morphological parameters for Martin Dairy and UT1 are located in Appendix 4 and summaries of key parameters are shown in Tables 9 and 10.

8.4 Design Discharge Analysis

Multiple methods were used to develop bankfull discharge estimates for each of the project restoration reaches: the NC Rural Piedmont Regional Curve (Harman et al., 1999), NC Piedmont/Mountain Regional Curve (Walker, unpublished), a Wildlands Regional USGS Flood Frequency Analysis, a Site Specific Reference Reach Curve, existing bankfull indicators using Manning's Equation, and data from previous successful design projects. The resulting values were compared and best professional judgment was used to determine the specific design discharge for each restoration reach.

8.4.1 Published Regional Curve Data

Discharge was estimated using the published NC Rural Piedmont Curve (Harman et al., 1999) as well as the updated curve for rural Piedmont and mountain streams, also known as the Walker Curve (Walker, unpublished).

8.4.2 Wildlands Regional USGS Flood Frequency Analysis

Wildlands developed a regional flood frequency analysis tool that tailored the USGS 2009 publication *Magnitude and Frequency of Rural Floods in the Southeastern United States, through 2006* to the Piedmont of North Carolina. Of the 103 stations referenced in the publication, 23 were used in the development of the tool. To fill gaps in data, five additional stations were added by Wildlands to represent streams with drainage areas less than one square mile. The Hosking and Walls homogeneity test was performed in R© to identify a selection of hydrologically similar gages based on homogeneity (Hosking and Walls, 1993). The gages used were:

- USGS 02096740 – Gun Branch near Alamance, NC (DA = 4.06 mi^2)
- USGS 02096846 – Cane Creek near Orange Grove, NC (DA = 7.54 mi^2)
- USGS 02097010 – Robeson Creek near Pittsboro, NC (DA = 1.71 mi^2)
- USGS 02101030 – Falls Creek near Bennett, NC (DA = 3.43 mi^2)
- USGS 0210166029 – Rocky River at SR1300 near Crutchfield Crossroads, NC (DA = 7.42 mi^2)

The data from these 28 gage stations were used to develop flood frequency curves for the 1.2-year and 1.5-year recurrence interval discharges. These relationships can be used to estimate discharge of those recurrence intervals for ungauged streams in the same hydrologic region, and were solved for each project reach's discharge with the drainage area as the input.

8.4.3 Site Specific Reference Reach Curve

Six reference reaches were identified for this project (Section 4.2). Each reference reach was surveyed to develop information for analyzing drainage area-discharge relationships as well as development of design parameters. Stable cross-sectional dimensions and channel slopes were used to compute a bankfull discharge with the Manning's equation for each reference reach. The resulting discharge values were plotted with drainage area and compared the other discharge estimation methods.

8.4.4 Existing Bankfull Indicators (Manning's Equation)

A riffle cross-section was surveyed on each design reach on the Site, totaling three cross-sections. In addition to this, three cross-sections were surveyed on the reaches directly upstream of the project. Bankfull indicators were identified in the field during this survey. Manning's equation was used to calculate a corresponding discharge using the pebble count information for roughness and the survey data for channel slope. The upstream cross-sections off the project were used to calibrate bankfull depth. It can be difficult to identify clear bankfull indicators on incised and degraded channels, so the highest quality indicators were used to calibrate others. The highest quality indicators were identified on UT1 and on Martin Dairy upstream of the project site.

8.4.5 Design Discharge Analysis Summary

A design goal of Martin Dairy is to maintain the existing riparian wetlands on the right floodplain while encouraging the development of riparian wetlands on the left floodplain. Removing the existing dredge spoil material within the floodplain is the first step in this process. The second is establishing a design discharge that will support the riparian wetlands.

The results of the design discharge analysis provided a range of discharge values with the NC Rural Piedmont Regional Curve producing the highest and the Walker Curve producing the lowest. The NC Rural Piedmont Regional Curve discharge estimates were higher than the other estimation methods on Martin Dairy. The Walker Curve discharge estimates were lower (up to 29 cubic feet per second (cfs)) than all other estimation methods. For these reasons, the regional curve estimation methods were not considered further in the selection of a design discharge for Martin Dairy. There was concurrence between the Wildlands Regional USGS Flood Frequency Analysis (1.2-year event), the existing bankfull indicators using Manning's Equation, and the Site Specific Reference Reach Curve for Martin Dairy

Reaches 1 and 2. These three values were averaged and then that value was compared to other successful projects in the Slate Belt with similar drainage areas and similar design goals (Agony Acres, Holman Mill, and Maney Farm). Those project values confirmed the selected design discharge.

The design discharge analysis for UT1 produced a fairly even spread of values across the estimation methods and lacked concurrence between any group of methods. Because of this, the aforementioned past projects within the Slate Belt were used for further evaluation. Creating a rating curve from past successful projects of similar drainage area gave a design discharge of 24 cfs for UT1. This value was incredibly close to the average of all estimation methods (26 cfs). For this reason, 24 cfs was chosen as the design discharge. Table 11 gives a summary of the discharge analysis. Figure 10 illustrates the design discharge data.

Table 11: Summary of Design Discharge Analysis – *Martin Dairy Mitigation Site*

		Martin Dairy Reach 1	Martin Dairy Reach 2	UT1
DA (acres)		344	526	141
DA(sq. mi.)		0.54	0.82	0.22
NC Rural Piedmont Regional Curve (cfs)		57	77	30
Alan Walker Curve (cfs)		34	48	17
Wildlands Regional USGS Flood Frequency Analysis (cfs)	**1.2-year event**	49	67	35
	1.5-year event	71	96	51
Site Specific Reference Reach Curve		43	63	19
Manning's Equation from Surveyed XS (cfs)	**XS3**	50		
	XS4		61	
	XS5			27
Prediction from nearby design projects (cfs)		47	64	24
Selected Design Discharge		**47**	**63**	**24**

8.5 Sediment Transport Analysis

As discussed in Section 3.1.2, small Slate Belt streams are generally low bedload sediment supply systems. To confirm that the streams on this Site are low bedload streams, Wildlands performed a qualitative assessment of the sediment load volume and sources in the project watershed. For this project, the watershed was assessed through aerial photography and field reconnaissance to characterize past and current land cover and potential sediment sources. There are two prominent potential sediment sources within the watershed: runoff from agricultural fields and streambank erosion and bed scour. There is evidence of streambank erosion on UT1 upstream of the project on the adjacent farm. However, the pond at the downstream end of the property serves as a sink for the excess sediment and limits the amount of sediment delivered to the Site. There is minimal evidence of streambank erosion from the upstream reaches of Martin Dairy delivering large sediment loads. Ponds on the northwest branch serve as a sink for sediment input and the northeast branch is in a wooded area. On-site streams were visually inspected several times during 2015 and 2016 to qualitatively assess aggradation and degradation within the channels. Streams exhibited evidence of on-going fluvial erosion on stream banks on Martin Dairy and UT1. There was no evidence of sediment deposition and accumulation throughout these reaches, indicating that aggradation within the reaches is not an issue.

Once the project is constructed, on-site sediment sources will be addressed by protecting streambanks and reducing shear stress in the channels.

The watershed assessment indicates that the bedload supply is not high enough to cause the project streams to be capacity limited. The focus of sediment transport analysis for this design was verify that the designed channels will be stable over time and have the ability to pass sediment from the watersheds. A competence analysis was performed on the streams to aid in the development of the final channel designs.

8.5.1 Competence Analysis

Competence analyses were performed iteratively during design for each of the restoration reaches by comparing shear stress associated with the design bankfull discharge, proposed channel dimensions, and proposed channel slopes with the size distribution of the existing bed load. The analysis utilized standard equations based on a methodology using the Shields (1936) curve and Andrews (1984) equation described by Rosgen (2001). Channel slope and design dimensions were varied until the resulting design verified that the stream reach could move the bed load supplied to the stream. The results of the analysis are shown in Table 12.

Table 12: Results of Competence Analysis – *Martin Dairy Mitigation Site*

	Martin Dairy - R1	Martin Dairy - R2	UT1
Dbkf (ft)	1.10	1.20	0.7
Schan (ft/ft)	0.0050	0.0055	0.0140
Bankfull Shear Stress, t (lb/sq ft)	0.33	0.41	0.60
Dmax Bar/Subpavement (mm)	55	75	38
Dcrit (ft)	1.7	2.2	0.4
Scrit (ft/ft)	0.0079	0.0099	0.0078
Movable particle size (mm)	67.9	78.7	104.1
Predicted Shear Stress to move Dmax	0.25	0.38	0.15

The initial competence analysis was based on the size material naturally found in the stream in order to mimic potential bed load. The results were used to inform further design of the reach. The excess shear noted on UT1 influenced the design of rock and wood step structures to provide grade control and increase roughness within the channel. Riffles with larger materials, such as chunky riffles, were also integrated into the design as grade control. A second competence analysis was done to size the proposed D_{50} and D_{100} for the constructed riffles on all stream reaches. Riffles materials was sized so that the reconstructed channels will not produce enough shear stress to entrain the largest particles in these structures. This will ensure a stable pavement while allowing for bed load material to be active within the system.

8.6 Project Implementation

The majority of Martin Dairy will be raised through Priority I restoration (Table 13). This will raise the water table, improve hydrologic connection to the riparian wetlands, allow for frequent inundation of the floodplain, and a reduction of shear stress on the channel. The majority of UT1 will be a Priority II due to restrictions in Site topography and the elevation of the upstream culvert in relation to the floodplain. A floodplain will be graded in at a bankfull elevation. The floodplain will not meander along with the stream pattern but will be relatively straight.

Table 13: Functional Impairments and Restoration Approach – *Martin Dairy Mitigation Site*

Resource	Functional Impairments	Restoration Approach
Martin Dairy	Incision, erosion, lack of riparian vegetation, lack of habitat	Restoration – Priority I
UT1	Incision, erosion, lack of riparian vegetation, lack of habitat	Restoration – Priority II

Martin Dairy has been separated into two reaches for the restoration design, separated by the confluence with UT1. The proposed stream will be realigned to the low point in the existing valley and the top of bank is set at an elevation matching the base of the overburden material on the existing floodplain. The perched culvert at the top of the reach will allow for a Priority 1 restoration approach through this area. The alignment travels through an existing wetland that formed between the toe of the valley slope and the overburden. The overburden material will be removed during construction to fill the old channel it is anticipated that additional wetlands will form across the valley floor creating an interconnected stream and wetland complex on the Site. UT1 will also be relocated into the natural low point in its valley. Due to the upstream culvert elevation, UT1 will follow a Priority II approach. A floodplain will be excavated at a lower level so that the stream bed is not raised for this short reach. A structure will be placed at the top of the reach to hold the bed elevation at that of the culvert invert so as to improve aquatic organism passage on this reach.

Martin Dairy and UT1 will be sinuous (K=1.14) and the beds will be comprised of riffle-pool sequences with some log and rock drop structures. In-stream structures will include various types of constructed riffles, log sills, boulder sills, lunker logs, and j-hooks. The structures will reinforce channel stability and serve as habitat features. The constructed riffles will be comprised of excavated on-site riffle material from the adjacent hillslopes where the presence of Tatum Silt loam soil indicates bedrock is located (Figure 5). The riffles will also incorporate woody brush material and logs. The diverse range of constructed riffle types will provide grade control, diversity of habitat, and will create varied flow vectors. Log -j-hooks will deflect flow vectors away from banks while adding to habitat diversity. Log sills will be used to allow for small grade drops across pools and provide extra grade control. At select outer meander bends, the channel banks will be constructed with brush toe revetments to reduce erosion potential, encourage pool maintenance, and provide varied pool habitat. Lunker logs in combination with sod mats will also be used to provide pool habitat variability. Due to the availability of sod on site, it will be used extensively to provide immediate bank protection. The concept plan for Site restoration is illustrated in Figure 8.

Wildlands has completed several projects within the Slate Belt and has found that riffle grade control material can be harvested from weathered parent material on valley sideslopes to mitigate for the natural lack of grade control. This method, along with the introduction of woody debris, has been successful at providing a heterogeneous mixture of riffle material that increases channel roughness and improves channel hydraulics and geomorphology. The gradation of material provides varied pore spaces within the riffles and structures, which benefits hyporheic exchange processes and habitat niche formation. According to soil descriptions, the Tatum silt loam, located along the right valley wall of Martin Dairy, contains weathered bedrock at a depth of 50 inches. This area will be used to source habitat and grade control structures during construction.

One of the secondary objectives of this project will be to improve aquatic organism passage through the culvert at the upstream end of Martin Dairy by raising the stream bed to elevation of the culvert and eliminating the existing nick point barrier. Also as part of this project, a new culvert is to be added to the Site, downstream of the conservation easement, to allow the landowner access to the back half of their parcel. The culvert will be designed as to not impede aquatic organism passage onto the Site.

The restoration of Martin Dairy is likely to increase the wetland footprint on-site to include the old channel bed and newly created floodplain. This, along with the development of a riparian forest, should increase the Site's ability to cycle and store nutrients. The efficacy of nutrient cycling is likely to increase as the forest matures and develops a seasonal input of organic material into the system. An estimate of the percent reduction in nitrogen (TN) and phosphorus (TP) was made using a simplified version of the Tar-Pamlico Nutrient Calculation Sheet, which estimates typical nutrient loading based on land use. Pre-project conditions reflected managed pasture while post-project conditions modeled the project area as wooded. The area within the channel was not included in either model (calculations in Appendix 4). The worksheet estimated that the land use conversion would result in a 54% reduction in TN and a 77% reduction in TP from on-site sources. This equates to an annual load reduction of 5.3 lbs of TN and 2.3 lbs of TP. These numbers do not include the probable reductions associated with riparian wetlands. Despite the potential increase in the Site's ability to cycle nutrients post-restoration, the Site may still be considered to be functioning-at-Risk with a trend towards Functioning in regards to pollutants. The restoration will not address pollutant sources within the greater watershed, and the Site is not large enough to provide substantial enough nutrient sinks or denitrification from hyporheic exchange.

The Site is connected to a wooded parcel downstream. Once a riparian buffer is established on-site, mammalian and avian species will likely migrate to the newly forested area.

8.7 Vegetation and Planting Plan

The objective of the planting plan is to establish, over time, a thriving riparian buffer composed of native tree species. This restored buffer will improve riparian habitat, help the restored streams stay stable, shade the streams, and provide a source for LWD and organic material to the streams. The Site will also generate Riparian Buffer Credits as well as SMUs for the Neuse 01 CU in accordance with 15A NCAC 02B .0295 (Effective November 1, 2015). The Site will be planted to the extents of the conservation easement, to include the additional buffer areas as shown in Figure 11. Riparian buffers will be seeded and planted with early successional native vegetation (a mixture of trees and shrubs). The specific species composition to be planted was selected based on the community type, observation of occurrence of species in riparian buffers adjacent to the Site, best professional judgement on species establishment and anticipated Site conditions in the early years following project implementation, and the requirement of a minimum of four species according to Rule 0295. Species chosen for the planting plan are listed on Sheet 2.0 of the Draft Plans located in Appendix 6. The Draft Plans also contain additional guidance on planting zones, Site preparation, and Site stabilization during construction.

The riparian buffer areas will be planted with bare root seedlings. In addition, the top of banks will be planted with live stakes and the channel toe will be planted with multiple herbaceous species. Livestakes will not be located on UT1 due to the size of the channel. Permanent herbaceous seed will be spread on streambanks, floodplain areas, and all disturbed areas within the project easement. Permanent herbaceous seed will also be placed within the internal easement break for the utility crossing.

To help ensure tree growth and survival, soil amendments may be added to areas of the floodplain along Martin Dairy where overburden material is removed. Soil tests will be performed in areas of cut and fertilizer and lime will be applied based on the results. Additionally, topsoil will be stockpiled, reapplied, and disked before permanent seeding and planting activities take place.

Species planted as bare roots will be planted a 12-foot by 6-foot spacing (targeted densities after monitoring year 3 are 320 stems per acre). Live stakes will be planted on channel banks at 6-foot spacing. Live stakes will be installed above base flow elevation.

The presence of invasive species on Martin Dairy Mitigation Site is limited to the streambanks on existing streams. The most prevalent species, Chinese privet (*Lagustrum sinese*), is spread throughout

the length of the project. Multiflora rose (*Rosa multiflora*) is also scattered along the existing stream banks, but in much lower quantities. Cattail (*Typha latifolia*) is present in small quantities and is limited to the stagnant area on UT1.

The goal of this project is to treat and remove as much existing invasive species as possible before and during construction. Post construction, the presence and extents of invasive species will be monitored. Treatment of invasive species will continue as necessary throughout the life of the project to ensure project stability and success of the riparian and streambank vegetation. Additional monitoring and maintenance issues regarding vegetation a Sections 9 and 10 and Appendix 7.

8.8 Project Risk and Uncertainties

This project is low risk. The land use surrounding the project is currently in hay production, so there is not a potential for accidental livestock access. There is one break in the easement for the maintenance of an overhead utility line. This area may be mowed or maintained periodically by Piedmont Electric Membership Corporation. It is very unlikely that utility maintenance personnel would cross the stream, as there is access to the western utility pole by the gravel drive located at the north end of the project. A riffle was designed in this easement break to ensure channel bank and bed stability. Due to the rural nature of the area, there is very little risk that changes in land use upstream in the project watershed would alter the hydrology or sediment supply to the degree that the project is put at risk. The easement is excluded from stream credit calculations.

9.0 Performance Standards

The stream and wetland performance standards for the project will follow approved performance standards presented in the DMS Mitigation Plan Template (version 2.3, 12/18/2014), the Annual Monitoring Template (April 2015), and the Stream Mitigation Guidelines issued April 2003 by the USACE and DWR. Annual monitoring and semi-annual site visits will be conducted to assess the condition of the finished project. Specific performance standard components are proposed for stream morphology, hydrology, and vegetation. Performance standards will be evaluated throughout the seven-year post-construction monitoring.

9.1 Streams

9.1.1 Dimension

Riffle cross-sections on the restoration reaches should be stable and should show little change in bankfull area, maximum depth ratio, and width-to-depth ratio. Per DMS guidance, bank height ratios shall not exceed 1.2 and entrenchment ratios shall be at least 2.2 for restored C and E channels to be considered stable. All riffle cross-sections should fall within the parameters defined for channels of the designed stream type. If any changes do occur, these changes will be evaluated to assess whether the stream channel is showing signs of instability. Indicators of instability include a vertically incising thalweg or eroding channel banks. Changes in the channel that indicate a movement toward stability or enhanced habitat include a decrease in the width-to-depth ratio in meandering channels or an increase in pool depth. Remedial action would not be taken if channel changes indicate a movement toward stability.

9.1.2 Pattern and Profile

Visual assessments and photo documentation should indicate that streams are remaining stable and do not indicate a trend toward vertical or lateral instability.

9.1.3 Substrate

Channel substrate materials will be sampled with the pebble count method along Martin Dairy and UT1. Restoration reaches should show maintenance of coarser materials in the riffle features and smaller

particles in the pool features. A reach-wide pebble count will be performed in each restoration reach each monitoring year for classification purposes. A pebble count will be performed at each surveyed riffle to characterize the pavement.

9.1.4 Photo Documentation

Photographs should illustrate the Site's vegetation and morphological stability on an annual basis. Cross-section photos should demonstrate no excessive erosion or degradation of the banks. Longitudinal photos should indicate the absence of persistent of mid-channel bars or vertical incision. Grade control structures should remain stable. Deposition of sediment on the bank side of vane arms is preferable. Maintenance of scour pools on the channel side of vane arms is expected.

9.1.5 Bankfull Events

The occurrence of bankfull events and geomorphically significant events will be documented throughout the monitoring period. Two bankfull flow events must be documented within the seven-year monitoring period. The two bankfull events must occur in separate years. Also, two geomorphically significant events must be documented during the monitoring period as well. For these purposes, a geomorphically significant event is a flow event that is between 66% of the two-year discharge. These events may occur in the same year. Stream monitoring will continue until performance standards in the form of two bankfull events in separate years and two additional geomorphically significant events have been documented.

9.2 Vegetation

Vegetative performance for riparian buffers associated with the stream restoration component of the project (buffer widths 0 – 50ft) will be in accordance with the Stream Mitigation Guidelines issued April 2003 by the USACE and DWR. The success criteria is an interim survival rate of 320 planted stems per acre at the end of monitoring year three (MY3), 260 stems per acre at the end of monitoring year 5 (MY5) and a final vegetation survival rate of 210 stems per acre at the end of monitoring year 7 (MY7).

A separate buffer monitoring report will be submitted to NCDWR no later than December 31 of each year for a minimum of five consecutive years after the first full growing season (MY1, 2, 3, 4, and 5). At the completion of monitoring year 5, DMS will request closeout of the buffer portion of the project, assuming vegetation criteria is met.

Vegetative performance for buffer restoration areas (Figure 11) will be in accordance with 15A NCAC 02B .0295(n)(2)(B), € and (n)(4) (effective November 1, 2015). To meet success, areas generating buffer mitigation credits shall include a minimum of four native hardwood tree species or four native hardwood tree and native shrub species, where no one species is greater than 50 percent of stems, and have a survival of 260 planted stems per acre at the end of the required monitoring period (MY5) (no interim success criteria required). In order for the monitoring to be terminated, DWR must provide a written approval of vegetation success of buffer restoration areas generating buffer credit.

The extent of invasive species coverage will be monitored and controlled as necessary throughout the required monitoring period (MY5 or MY7).

9.3 Visual Assessments

Visual assessments should support the specific performance standards for each metric as described above.

10.0 Monitoring Plan

The Site monitoring plan has been developed to ensure that the required performance standards are met and project goals and objectives are achieved. Annual monitoring data will be reported using the

DMS Annual Monitoring Reporting Template (April 2015). The monitoring report shall provide project data chronology that will facilitate an understanding of project status and trends, ease population of DMS databases for analysis and research purposes, and assist in close-out decision making.

Using the DMS As-Built Baseline Monitoring Report Template (February 2014), a baseline monitoring document and as-built record drawings of the project will be developed within 60 days of the planting completion and monitoring installation on the restored site. Monitoring reports will be prepared in the fall of each monitoring year and submitted to DMS by November 30. These reports will be based on the DMS Annual Monitoring Template (April 2015) and Closeout Report Template (March 2015). DMS monitoring reports will be submitted in monitoring years 1, 2, 3, 4, and 7. Closeout monitoring period will be seven years beyond completion of construction or until performance standards have been met.

A separate buffer monitoring report will be submitted annually to NCDWR as described in section 9.2, in monitoring years 1,2,3,4, and 5. Also, a separate as-built report will be developed within 30 days of the planting completion and submitted to NCDWR. All reports submitted to NCDWR will follow the typical NCDWR format. Closeout monitoring period for buffers will be five years beyond completion of construction or until performance standards have been met.

Table 14, below, describes how the monitoring plan is set up in order to verify project goals and objectives have been achieved.

Table 14: Monitoring Plan – *Martin Dairy Mitigation Site*

Goal	Treatment	Performance Standards	Monitoring Metric	Outcome	Likely Functional Uplift
Reconnect channels with floodplains and riparian wetlands to allow a natural flooding regime.	Reconstruct stream channels with designed bankfull dimensions and depth based on reference reach data. Remove existing berm to reconnect channel with adjacent wetlands.	Two bankfull events and two geomorphically significant events within monitoring period.	Crest gauges and/or pressure transducers on Martin Dairy and UT1 recording flow elevations.	Multiple bankfull and geomorphically significant events within monitoring period.	Dispersion of high flows on the floodplain, increase in biogeochemical cycling within the system, and recharging of riparian wetlands.
Improve stability of stream channels.	Construct stream channels that will maintain stable cross-sections, patterns, and profiles over time.	Entrenchment ratio stays over 2.2 and bank height ratio below 1.2 with visual assessments showing progression towards stability.	Cross-section monitoring and visual inspections.	Stable stream channels with entrenchment ratios over 2.2 and bank height ratios below 1.2.	Reduction in sediment inputs from bank erosion, reduction of shear stress, and improved overall hydraulic function.

Goal	Treatment	Performance Standards	Monitoring Metric	Outcome	Likely Functional Uplift
Restore and enhance native floodplain and streambank vegetation.	Plant native tree and understory species in riparian zones and plant native shrub and herbaceous species on streambanks.	210 planted stems per acre at MY7. Interim survival rate of 320 planted stems per acre at MY3 and 260 at MY5. For buffer credit areas, survival rate of 260 stems per acre at MY5.	One hundred square meter vegetation plots will be placed on 2% of the planted area of the project and monitored annually.	Planted stem densities will be at or above 210 planted stems per acre at MY7, with volunteer trees growing on Site as well.	Reduction in floodplain sediment inputs from runoff, increased bank stability, increased LWD and organic material in streams, increased biogeochemical cycling in floodplain, and improved riparian habitat.
Improve instream habitat.	Install habitat features such as constructed riffles, lunker logs, and brush toes into restored/ enhanced streams. Add woody materials to channel beds. Construct pools of varying depth.	There is no required performance standard for this metric.	Complete a Rapid Stream Assessment Technique (RSAT) score for aquatic instream habitat	The RSAT score for instream aquatic habitat would progress from a poor condition to a good or excellent condition over time.	Increase in available habitat niches for macroinvertebrates and fish leading to an increase in biodiversity over time.
Permanently protect the Site from harmful uses.	Establish conservation easements on the Site.	Prevent easement encroachment.	Visually inspect the perimeter of the Site to ensure no easement encroachment is occurring.	No harmful encroachment into the conservation easement.	Protection of the Site from encroachment into the conservation easement.

10.1 Monitoring Components

Project monitoring components are listed in more detail in Table 15. Approximate locations of the proposed vegetation plots and groundwater gage monitoring components are illustrated in Figure 12.

Table 15: Monitoring Components – *Martin Dairy Mitigation Site*

Parameter	Monitoring Feature	Quantity/ Length by Reach			Frequency	Notes
		Martin Dairy R1	Martin Dairy R2	UT1		
Dimension	Riffle Cross-sections	1	1	1	Year 1, 2, 3, 5, and 7	1
	Pool Cross-sections	1	1	1		
Pattern	Pattern	N/A	N/A	N/A	N/A	2
Profile	Longitudinal Profile	N/A	N/A	N/A	N/A	
Substrate	Reach wide (RW), Riffle (RF) 100 pebble count	1 RW, 1 RF	1 RW, 1 RF	1 RW, 1 RF	Year 1, 2, 3, 5, and 7	
Hydrology	Crest Gage and/or Transducer	1		1	Semi- Annual	3
Vegetation	CVS Level 2	8			Year 1, 2, 3, 5, and 7	4
Visual Assessment		Y	Y	Y	Semi-Annual	
Exotic and nuisance vegetation					Semi-Annual	5
Project Boundary					Semi-Annual	6
Reference Photos	Photographs	8		2	Annual	

1. Cross-sections will be permanently marked with rebar to establish location. Surveys will include points measured at all breaks in slope, including top of bank, bankfull, edge of water, and thalweg.
2. Pattern and profile will be assessed visually during semi-annual site visits. Longitudinal profile will be collected during as-built baseline monitoring survey only, unless observations indicate lack of stability and profile survey is warranted in additional years.
3. Crest gages and/or transducers will be inspected quarterly or semi-annually, evidence of bankfull events will be documented with a photo when possible. Transducers, if used, will be set to record stage once every 2 hours. The transducer will be inspected and downloaded semi-annually.
4. Vegetation monitoring will follow CVS protocols, separate monitoring reports will be submitted to NCDMS and NCDWR.
5. Locations of exotic and nuisance vegetation will be mapped.
6. Locations of vegetation damage, boundary encroachments, etc. will be mapped.

11.0 Long-Term Management Plan

The site will be transferred to the North Carolina Department of Environmental Quality (NCDEQ) Stewardship Program. This party shall serve as conservation easement holder and long-term steward for the property and will conduct periodic inspection of the site to ensure that restrictions required in the conservation easement are upheld. The NCDEQ Stewardship Program is developing an endowment system within the non-reverting, interest-bearing Conservation Lands Conservation Fund Account. The use of funds from the Endowment Account will be governed by North Carolina General Statue GS 113A-232(d)(3). Interest gained by the endowment fund may be used for the purpose of stewardship, monitoring, stewardship administration, and land transaction costs, if applicable.

The Stewardship Program will periodically install signage as needed to identify boundary markings as needed. Any livestock or associated fencing or permanent crossings will be the responsibility the owner of the underlying fee to maintain.

The Site Protection Instrument can be found in Appendix 1.

Table 16: Long-term Management Plan – *Martin Dairy Mitigation Site*

Long-Term Management Activity	Long-Term Manager Responsibility	Landowner Responsibility
Signage will be installed and maintained along the Site boundary to denote the area protected by the recorded conservation easement.	The long-term steward will be responsible for inspecting the Site boundary and for maintaining or replacing signage to ensure that the conservation easement area is clearly marked.	The landowner shall report damaged or missing signs to the long-term manager, as well as contact the long-term manager if a boundary needs to be marked, or clarification is needed regarding a boundary location. If land use changes in future and fencing is required to protect the easement, the landowner is responsible for installing fencing that meets the objectives of the mitigation project.
The Site will be protected in its entirety and managed under the terms outlined in the recorded conservation easement.	The long-term manager will be responsible for conducting annual inspections and for undertaking actions that are reasonably calculated to swiftly correct the conditions constituting a breach. The USACE, and their authorized agents, shall have the right to enter and inspect the Site and to take actions necessary to verify compliance with the conservation easement.	The landowner shall contact the long-term manager if clarification is needed regarding the restrictions associated with the recorded conservation easement.

12.0 Adaptive Management Plan

Upon completion of Site construction, Wildlands will implement the post-construction monitoring defined in Sections 9 and 10. Project maintenance will be performed during the monitoring years to address minor issues as necessary (Appendix 7). If, during the course of annual monitoring it is determined the Site's ability to achieve Site performance standards are jeopardized, Wildlands will notify the DMS of the need to develop a Plan of Corrective Action. Once the Plan of Corrective Action is prepared and finalized Wildlands will:

- Notify the USACE as required by the Nationwide 27 permit general conditions;
- Revise performance standards, maintenance requirements, and monitoring requirements as necessary and/or required by the USACE;
- Obtain other permits as necessary;
- Implement the Corrective Action Plan; and
- Provide the USACE a Record Drawing of Corrective Actions. This document shall depict the extent and nature of the work performed.

13.0 Determination of Credits

The final stream and buffer credits associated with the Site are listed in Tables 17a and 17b respectively. Stream Restoration is at a ratio of 1:1. All buffers meet the minimum 50-foot requirement. The first 100 feet of the buffer is credited at a 1:1 ratio. The next 100 feet is credited at a ratio of 3:1, according to DWR guidelines. The credit release schedule is located in Appendix 8.

Table 17a: Project Stream Asset Table – *Martin Dairy Mitigation Site*

Mitigation Credits							
		Stream		Riparian Wetland		Non-Riparian Wetland	
Type		R	RE	R	RE	R	RE
Totals		2,135	N/A	N/A	N/A	N/A	N/A
Project Components							
Project Component or Reach ID	**Existing Footage/Acreage**	**Proposed Stationing Location**	**Approach (P1, P2, etc)**	**Restoration (R) or Restoration Equivalent (RE)**	**Restoration Footage or Acreage**	**Mitigation Ratio**	**Proposed Credit**
Martin Dairy R1	503	100+13 - 101+38, 101+78 - 107+61	P1	R	708	1	708
Martin Dairy R2	1173	107+61 - 119+71	P1	R	1210	1	1210
UT1	138	200+33 - 202+50	PII	R	217	1	217
Component Summation							
Restoration Level			**Stream (LF)**		**Riparian Wetland (Acres)**	**Non-Riparian Wetland (AC)**	
Restoration			2135		N/A	N/A	

Table 17b: Project Buffer Asset Table – *Martin Dairy Mitigation Site*

Mitigation Credits					
Riparian Buffer					
R		RE			
394,742		N/A			
Project Components					
Project Component or Reach ID	**(P1, P2, etc)**	**Restoration (R) or Restoration Equivalent (RE)**	**Restoration Footage or Acreage**	**Mitigation Ratio**	**Proposed Credit**
Buffer Area A (TOB-100')	planting, CE	R	371,297	1	371,297
Buffer Area B (100-200')	planting, CE	R	70,336	3	23,445
Service Area: HUC 03020201					
Component Summation					
Restoration Level		**Buffer (sq.ft.)**		**Upland (AC)**	
Restoration		441,633		N/A	

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Appendix 1

Site Protection Instrument

1.0 Site Protection Instrument

The land required for construction, management, and stewardship of this mitigation project includes portions of the parcels listed in Table 1. A conservation easement is recorded on the parcels and includes streams being restored along with their corresponding riparian buffers. A temporary construction access easement is also recorded on the parcels. The recorded easement is included in this appendix.

Table 1: Site Protection Instrument – *Martin Dairy Mitigation Site*

Landowner	PIN	County	Site Protection Instrument	Deed Book and Page Number	Acreage to be Protected
Ted H Martin	9896-83-0483	Orange	116	76	10.289
Ted H Martin	9896-83-9111	Orange	116	76	0.866

All site protection instruments require 60-day advance notification to the USACE and or DMS prior to any action to void, amend, or modify the document. No such action shall take place unless approved by the State.

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FILED Mark Chilton
Register of Deeds, Orange Co,NC
Recording Fee: $26.00
NC Real Estate TX: $268.00

STATE OF NORTH CAROLINA

Excise tax : 268.00

ORANGE COUNTY

SPO File Number: 68-DE
DMS Project Number: 97087

DEED OF CONSERVATION EASEMENT AND RIGHT OF ACCESS PROVIDED PURSUANT TO FULL DELIVERY MITIGATION CONTRACT

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9896839111 mab

Prepared by: Office of the Attorney General
Property Control Section
Return to: NC Department of Administration
State Property Office
1321 Mail Service Center
Raleigh, NC 27699-1321

THIS DEED OF CONSERVATION EASEMENT AND RIGHT OF ACCESS, made this 8 day of November, 2016, by **Ted H. Martin and wife Ruby Martin** , ("**Grantor**"), whose mailing address is **7205 Schley Road, Hillsborough, NC**, to the State of North Carolina, ("**Grantee**"), whose mailing address is State of North Carolina, Department of Administration, State Property Office, 1321 Mail Service Center, Raleigh, NC 27699-1321. The designations of Grantor and Grantee as used herein shall include said parties, their heirs, successors, and assigns, and shall include singular, plural, masculine, feminine, or neuter as required by context.

WITNESSETH:

WHEREAS, pursuant to the provisions of N.C. Gen. Stat. § 143-214.8 et seq., the State of North Carolina has established the Division of Mitigation Services (formerly known as the Ecosystem Enhancement Program and Wetlands Restoration Program) within the Department of Environment and Natural Resources for the purposes of acquiring, maintaining, restoring, enhancing, creating and preserving wetland and riparian resources that contribute to the

protection and improvement of water quality, flood prevention, fisheries, aquatic habitat, wildlife habitat, and recreational opportunities; and

WHEREAS, this Conservation Easement from Grantor to Grantee has been negotiated, arranged and provided for as a condition of a full delivery contract between **Wildlands Engineering, Inc.** and the North Carolina Department of Environment and Natural Resources, to provide stream, wetland and/or buffer mitigation pursuant to the North Carolina Department of Environment and Natural Resources Purchase and Services Contract Number **6831**.

WHEREAS, The State of North Carolina is qualified to be the Grantee of a Conservation Easement pursuant to N.C. Gen. Stat. § 121-35; and

WHEREAS, the Department of Environment and Natural Resources and the United States Army Corps of Engineers, Wilmington District entered into a Memorandum of Understanding, (MOU) duly executed by all parties on November 4, 1998. This MOU recognized that the Wetlands Restoration Program was to provide effective compensatory mitigation for authorized impacts to wetlands, streams and other aquatic resources by restoring, enhancing and preserving the wetland and riparian areas of the State; and

WHEREAS, the Department of Environment and Natural Resources, the North Carolina Department of Transportation and the United States Army Corps of Engineers, Wilmington District entered into a Memorandum of Agreement, (MOA) duly executed by all parties in Greensboro, NC on July 22, 2003, which recognizes that the Division of Mitigation Services (formerly Ecosystem Enhancement Program) is to provide for compensatory mitigation by effective protection of the land, water and natural resources of the State by restoring, enhancing and preserving ecosystem functions; and

WHEREAS, the Department of Environment and Natural Resources, the U.S. Army Corps of Engineers, the U.S. Environmental Protection Agency, the U.S. Fish and Wildlife Service, the North Carolina Wildlife Resources Commission, the North Carolina Division of Water Quality, the North Carolina Division of Coastal Management, and the National Marine Fisheries Service entered into an agreement to continue the In-Lieu Fee operations of the North Carolina Department of Natural Resources' Division of Mitigation Services (formerly Ecosystem Enhancement Program) with an effective date of 28 July, 2010, which supersedes and replaces the previously effective MOA and MOU referenced above; and

WHEREAS, the acceptance of this instrument for and on behalf of the State of North Carolina was granted to the Department of Administration by resolution as approved by the Governor and Council of State adopted at a meeting held in the City of Raleigh, North Carolina, on the 8th day of February 2000; and

WHEREAS, the Division of Mitigation Services in the Department of Environment and Natural Resources, which has been delegated the authority authorized by the Governor and Council of State to the Department of Administration, has approved acceptance of this instrument; and

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WHEREAS, Grantor owns in fee simple certain real properties situated, lying, and being in Eno Township, Orange County, North Carolina (the "**Property**"), and being more particularly described as that certain parcel of land containing approximately **42.92** acres and being conveyed to the Grantor by deed as recorded in **Deed Book 4973 at Page 348** and that certain parcel of land containing approximately **3.52** acres and being conveyed to the Grantor by deed as recorded in **Deed Book 197 at Page 783** of the Orange County Registry, North Carolina; and

WHEREAS, Grantor is willing to grant a Conservation Easement and Right of Access over the herein described areas of the Property, thereby restricting and limiting the use of the areas of the Property subject to the Conservation Easement to the terms and conditions and purposes hereinafter set forth, and Grantee is willing to accept said Easement and Access Rights. The Conservation Easement shall be for the protection and benefit of the waters of unnamed tributaries to Buckwater Creek.

NOW, THEREFORE, in consideration of the mutual covenants, terms, conditions, and restrictions hereinafter set forth, Grantor unconditionally and irrevocably hereby grants and conveys unto Grantee, its successors and assigns, forever and in perpetuity, a Conservation Easement along with a general Right of Access.

The Conservation Easement Area consists of the following:

Easement Areas 1 and 2 containing a total of **11.155** acres as shown on the plats of survey entitled "Conservation Easement for the State of North Carolina Division of Mitigation Services, Project Name: Martin Dairy Stream Mitigation, SPO File No. 68-DE, DMS Project Site No. 97087, Property of Ted H. Martin and wife Ruby Y. Martin, dated September 1, 2016 Elisabeth G. Turner PLS Number 4440 and recorded in the Orange County, North Carolina Register of Deeds at Plat Book 116 Page 76.

See attached "**Exhibit A**", Legal Description of area of the Property hereinafter referred to as the "Conservation Easement Area"

The purposes of this Conservation Easement are to maintain, restore, enhance, construct, create and preserve wetland and/or riparian resources in the Conservation Easement Area that contribute to the protection and improvement of water quality, flood prevention, fisheries, aquatic habitat, wildlife habitat, and recreational opportunities; to maintain permanently the Conservation Easement Area in its natural condition, consistent with these purposes; and to prevent any use of the Easement Area that will significantly impair or interfere with these purposes. To achieve these purposes, the following conditions and restrictions are set forth:

I. DURATION OF EASEMENT

Pursuant to law, including the above referenced statutes, this Conservation Easement and Right of Access shall be perpetual and it shall run with, and be a continuing restriction upon the use of, the Property, and it shall be enforceable by the Grantee against the Grantor and against Grantor's heirs, successors and assigns, personal representatives, agents, lessees, and licensees.

II. GRANTOR RESERVED USES AND RESTRICTED ACTIVITIES

The Conservation Easement Area shall be restricted from any development or usage that would impair or interfere with the purposes of this Conservation Easement. Unless expressly reserved as a compatible use herein, any activity in, or use of, the Conservation Easement Area by the Grantor is prohibited as inconsistent with the purposes of this Conservation Easement. Any rights not expressly reserved hereunder by the Grantor have been acquired by the Grantee. Any rights not expressly reserved hereunder by the Grantor, including the rights to all mitigation credits, including, but not limited to, stream, wetland, and riparian buffer mitigation units, derived from each site within the area of the Conservation Easement, are conveyed to and belong to the Grantee. Without limiting the generality of the foregoing, the following specific uses are prohibited, restricted, or reserved as indicated:

A. Recreational Uses. Grantor expressly reserves the right to undeveloped recreational uses, including hiking, bird watching, hunting and fishing, and access to the Conservation Easement Area for the purposes thereof.

B. Motorized Vehicle Use. Motorized vehicle use in the Conservation Easement Area is prohibited except within a Crossing Area(s) or Road or Trail as shown on the recorded survey plat.

C. Educational Uses. The Grantor reserves the right to engage in and permit others to engage in educational uses in the Conservation Easement Area not inconsistent with this Conservation Easement, and the right of access to the Conservation Easement Area for such purposes including organized educational activities such as site visits and observations. Educational uses of the property shall not alter vegetation, hydrology or topography of the site.

D. **Damage to Vegetation.** Except within Crossing Area(s) as shown on the recorded survey plat and as related to the removal of non-native plants, diseased or damaged trees, or vegetation that destabilizes or renders unsafe the Conservation Easement Area to persons or natural habitat, all cutting, removal, mowing, harming, or destruction of any trees and vegetation in the Conservation Easement Area is prohibited.

E. Industrial, Residential and Commercial Uses. All industrial, residential and commercial uses are prohibited in the Conservation Easement Area.

F. Agricultural Use. All agricultural uses are prohibited within the Conservation Easement Area including any use for cropland, waste lagoons, or pastureland.

G. New Construction. There shall be no building, facility, mobile home, antenna, utility pole, tower, or other structure constructed or placed in the Conservation Easement Area.

H. **Roads and Trails.** There shall be no construction or maintenance of new roads, trails, walkways, or paving in the Conservation Easement.

All existing roads, trails and crossings within the Conservation Easement Area shall be shown on the recorded survey plat.

I. **Signs.** No signs shall be permitted in the Conservation Easement Area except interpretive signs describing restoration activities and the conservation values of the Conservation Easement Area, signs identifying the owner of the Property and the holder of the Conservation Easement, signs giving directions, or signs prescribing rules and regulations for the use of the Conservation Easement Area.

J. **Dumping or Storing.** Dumping or storage of soil, trash, ashes, garbage, waste, abandoned vehicles, appliances, machinery, or any other material in the Conservation Easement Area is prohibited.

K. **Grading, Mineral Use, Excavation, Dredging.** There shall be no grading, filling, excavation, dredging, mining, drilling, hydraulic fracturing; removal of topsoil, sand, gravel, rock, peat, minerals, or other materials.

L. **Water Quality and Drainage Patterns.** There shall be no diking, draining, dredging, channeling, filling, leveling, pumping, impounding or diverting, causing, allowing or permitting the diversion of surface or underground water in the Conservation Easement Area. No altering or tampering with water control structures or devices, or disruption or alteration of the restored, enhanced, or created drainage patterns is allowed. All removal of wetlands, polluting or discharging into waters, springs, seeps, or wetlands, or use of pesticide or biocides in the Conservation Easement Area is prohibited. In the event of an emergency interruption or shortage of all other water sources, water from within the Conservation Easement Area may temporarily be withdrawn for good cause shown as needed for the survival of livestock on the Property.

M. **Subdivision and Conveyance.** Grantor voluntarily agrees that no further subdivision, partitioning, or dividing of the Conservation Easement Area portion of the Property owned by the Grantor in fee simple ("fee") that is subject to this Conservation Easement is allowed. Any future transfer of the Property shall be subject to this Conservation Easement and Right of Access and to the Grantee's right of unlimited and repeated ingress and egress over and across the Property to the Conservation Easement Area for the purposes set forth herein.

N. **Development Rights.** All development rights are permanently removed from the Conservation Easement Area and are non-transferrable.

O. **Disturbance of Natural Features**. Any change, disturbance, alteration or impairment of the natural features of the Conservation Easement Area or any intentional introduction of non-native plants, trees and/or animal species by Grantor is prohibited.

The Grantor may request permission to vary from the above restrictions for good cause shown, provided that any such request is not inconsistent with the purposes of this Conservation Easement, and the Grantor obtains advance written approval from the Division of Mitigation Services, 1652 Mail Services Center, Raleigh, NC 27699-1652.

III. GRANTEE RESERVED USES

A. Right of Access, Construction, and Inspection. The Grantee, its employees and agents, successors and assigns, receive a perpetual Right of Access to the Conservation Easement Area over the Property at reasonable times to undertake any activities to restore, construct, manage, maintain, enhance, protect, and monitor the stream, wetland and any other riparian resources in the Conservation Easement Area, in accordance with restoration activities or a long-term management plan. Unless otherwise specifically set forth in this Conservation Easement, the rights granted herein do not include or establish for the public any access rights.

B. Restoration Activities. These activities include planting of trees, shrubs and herbaceous vegetation, installation of monitoring wells, utilization of heavy equipment to grade, fill, and prepare the soil, modification of the hydrology of the site, and installation of natural and manmade materials as needed to direct in-stream, above ground, and subterraneous water flow.

C. Signs. The Grantee, its employees and agents, successors or assigns, shall be permitted to place signs and witness posts on the Property to include any or all of the following: describe the project, prohibited activities within the Conservation Easement, or identify the project boundaries and the holder of the Conservation Easement.

D. Fences. Conservation Easements are purchased to protect the investments by the State (Grantee) in natural resources. Livestock within conservations easements damages the investment and can result in reductions in natural resource value and mitigation credits which would cause financial harm to the State. Therefore, Landowners (Grantor) with livestock are required to restrict livestock access to the Conservation Easement area. Repeated failure to do so may result in the State (Grantee) repairing or installing livestock exclusion devices (fences) within the conservation area for the purpose of restricting livestock access. In such cases, the landowner (Grantor) must provide access to the State (Grantee) to make repairs.

E. Crossing Area(s). The Grantee is not responsible for maintenance of crossing area(s), however, the Grantee, its employees and agents, successors or assigns, reserve the right to repair crossing area(s), at its sole discretion and to recover the cost of such repairs from the Grantor if such repairs are needed as a result of activities of the Grantor, his successors or assigns.

IV. ENFORCEMENT AND REMEDIES

A. Enforcement. To accomplish the purposes of this Conservation Easement, Grantee is allowed to prevent any activity within the Conservation Easement Area that is inconsistent with the purposes of this Conservation Easement and to require the restoration of such areas or features in the Conservation Easement Area that may have been damaged by such unauthorized activity or use. Upon any breach of the terms of this Conservation Easement by Grantor, the Grantee shall, except as provided below, notify the Grantor in writing of such breach and the Grantor shall have ninety (90) days after receipt of such notice to correct the damage caused by such breach. If the breach and damage remains uncured after ninety (90) days, the Grantee may enforce this Conservation Easement by bringing appropriate legal proceedings including an action to recover damages, as well as injunctive and other relief. The Grantee shall also have the

power and authority, consistent with its statutory authority: (a) to prevent any impairment of the Conservation Easement Area by acts which may be unlawful or in violation of this Conservation Easement; (b) to otherwise preserve or protect its interest in the Property; or (c) to seek damages from any appropriate person or entity. Notwithstanding the foregoing, the Grantee reserves the immediate right, without notice, to obtain a temporary restraining order, injunctive or other appropriate relief, if the breach is or would irreversibly or otherwise materially impair the benefits to be derived from this Conservation Easement, and the Grantor and Grantee acknowledge that the damage would be irreparable and remedies at law inadequate. The rights and remedies of the Grantee provided hereunder shall be in addition to, and not in lieu of, all other rights and remedies available to Grantee in connection with this Conservation Easement.

B. Inspection. The Grantee, its employees and agents, successors and assigns, have the right, with reasonable notice, to enter the Conservation Easement Area over the Property at reasonable times for the purpose of inspection to determine whether the Grantor is complying with the terms, conditions and restrictions of this Conservation Easement.

C. Acts Beyond Grantor's Control. Nothing contained in this Conservation Easement shall be construed to entitle Grantee to bring any action against Grantor for any injury or change in the Conservation Easement Area caused by third parties, resulting from causes beyond the Grantor's control, including, without limitation, fire, flood, storm, and earth movement, or from any prudent action taken in good faith by the Grantor under emergency conditions to prevent, abate, or mitigate significant injury to life or damage to the Property resulting from such causes.

D. Costs of Enforcement. Beyond regular and typical monitoring expenses, any costs incurred by Grantee in enforcing the terms of this Conservation Easement against Grantor, including, without limitation, any costs of restoration necessitated by Grantor's acts or omissions in violation of the terms of this Conservation Easement, shall be borne by Grantor.

E. No Waiver. Enforcement of this Easement shall be at the discretion of the Grantee and any forbearance, delay or omission by Grantee to exercise its rights hereunder in the event of any breach of any term set forth herein shall not be construed to be a waiver by Grantee.

V. MISCELLANEOUS

A. This instrument sets forth the entire agreement of the parties with respect to the Conservation Easement and supersedes all prior discussions, negotiations, understandings or agreements relating to the Conservation Easement. If any provision is found to be invalid, the remainder of the provisions of the Conservation Easement, and the application of such provision to persons or circumstances other than those as to which it is found to be invalid, shall not be affected thereby.

B. Grantor is responsible for any real estate taxes, assessments, fees, or charges levied upon the Property. Grantee shall not be responsible for any costs or liability of any kind related to the ownership, operation, insurance, upkeep, or maintenance of the Property, except as expressly provided herein. Upkeep of any constructed bridges, fences, or other amenities on the Property are the sole responsibility of the Grantor. Nothing herein shall relieve the Grantor of the

obligation to comply with federal, state or local laws, regulations and permits that may apply to the exercise of the Reserved Rights.

C. Any notices shall be sent by registered or certified mail, return receipt requested to the parties at their addresses shown herein or to other addresses as either party establishes in writing upon notification to the other.

D. Grantor shall notify Grantee in writing of the name and address and any party to whom the Property or any part thereof is to be transferred at or prior to the time said transfer is made. Grantor further agrees that any subsequent lease, deed, or other legal instrument by which any interest in the Property is conveyed is subject to the Conservation Easement herein created.

E. The Grantor and Grantee agree that the terms of this Conservation Easement shall survive any merger of the fee and easement interests in the Property or any portion thereof.

F. This Conservation Easement and Right of Access may be amended, but only in writing signed by all parties hereto, or their successors or assigns, if such amendment does not affect the qualification of this Conservation Easement or the status of the Grantee under any applicable laws, and is consistent with the purposes of the Conservation Easement. The owner of the Property shall notify the State Property Office and the U.S. Army Corps of Engineers in writing sixty (60) days prior to the initiation of any transfer of all or any part of the Property or of any request to void or modify this Conservation Easement. Such notifications and modification requests shall be addressed to:

Division of Mitigation Services Program Manager
NC State Property Office
1321 Mail Service Center
Raleigh, NC 27699-1321

and

General Counsel
US Army Corps of Engineers
69 Darlington Avenue
Wilmington, NC 28403

G. The parties recognize and agree that the benefits of this Conservation Easement are in gross and assignable provided, however, that the Grantee hereby covenants and agrees, that in the event it transfers or assigns this Conservation Easement, the organization receiving the interest will be a qualified holder under N.C. Gen. Stat. § 121-34 et seq. and § 170(h) of the Internal Revenue Code, and the Grantee further covenants and agrees that the terms of the transfer or assignment will be such that the transferee or assignee will be required to continue in perpetuity the conservation purposes described in this document.

VI. QUIET ENJOYMENT

Grantor reserves all remaining rights accruing from ownership of the Property, including the right to engage in or permit or invite others to engage in only those uses of the Conservation Easement Area that are expressly reserved herein, not prohibited or restricted herein, and are not inconsistent with the purposes of this Conservation Easement. Without limiting the generality of the foregoing, the Grantor expressly reserves to the Grantor, and the Grantor's invitees and licensees, the right of access to the Conservation Easement Area, and the right of quiet enjoyment of the Conservation Easement Area,

TO HAVE AND TO HOLD, the said rights and easements perpetually unto the State of North Carolina for the aforesaid purposes,

AND Grantor covenants that Grantor is seized of said premises in fee and has the right to convey the permanent Conservation Easement herein granted; that the same is free from encumbrances and that Grantor will warrant and defend title to the same against the claims of all persons whomsoever.

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RB6218 279 10/13

IN TESTIMONY WHEREOF, the Grantor has hereunto set his hand and seal, the day and year first above written.

Ted H. Martin (SEAL)

Ruby J Martin (SEAL)

NORTH CAROLINA
COUNTY OF Orange

I, Robert W. Bugg, a Notary Public in and for the County and State aforesaid, do hereby certify that Ted H. Martin, Grantor, personally appeared before me this day and acknowledged the execution of the foregoing instrument.

IN WITNESS WHEREOF, I have hereunto set my hand and Notary Seal this the 8 day of November, 2016

Notary Public

My commission expires:

8-23-21

ROBERT W. BUGG
NOTARY PUBLIC
Mecklenburg County
North Carolina

NORTH CAROLINA
COUNTY OF Orange

I, Robert W. Bugg, a Notary Public in and for the County and State aforesaid, do hereby certify that Buby Y. Martin, Grantor, personally appeared before me this day and acknowledged the execution of the foregoing instrument.

IN WITNESS WHEREOF, I have hereunto set my hand and Notary Seal this the 8 day of November, 2016

Notary Public

My commission expires:

8-23-21

ROBERT W. BUGG
NOTARY PUBLIC
Mecklenburg County
North Carolina

Exhibit A

Description for conservation easement for the State of North Carolina, Division of Mitigation Services on the property of Ted H. Martin and wife, Ruby Y. Martin, located in Eno Township, Orange County, North Carolina. (All references to the Orange County Register of Deeds unless otherwise noted.)

PIN: 9896-83-0483

Easement Area 1

Beginning at a 5/8" rebar with CE cap (Corner #1) within the property of Ted H. Martin and wife, Ruby Y. Martin (now or formerly, see Deed Book 4973, Page 348 and Plat Book 112, Page 51, Lot 1), said rebar being located S 88°42'05" W a distance of 35.53' from a GPS Site Control Point (existing 1/2" rebar) with NCGS Grid Coordinates [NAD83(2011)]
N=864,568.16 usft,
E=1,998,993.46 usft;
thence, from the point of Beginning, S 03°55'46" E the following distances:
60.78' to a 5/8" rebar with CE cap (Corner #2), said rebar being the northeast corner of a 30' wide reserved stream crossing; 30.64' to a 5/8" rebar with CE cap (Corner #3), said rebar being the southeast corner of said crossing; 932.18' to a 5/8" rebar with CE cap (Corner #4);

thence S 85°01'05" W a distance of 133.64' to a 5/8" rebar with CE cap (Corner #5); thence S 04°15'59" E a distance of 112.08' to a 5/8" rebar with CE cap (Corner #6) on the Martin's common line (Deed Book 4973, Page 348 and Deed Book 197, Page 783);
thence, with said common line, S 85°35'56" W a distance of 52.26' to an existing 1½" iron pipe (Corner #14), said pipe being a common corner of the Martin properties;
thence, with the common line, S 02°25'19" E a distance of 141.67' to a calculated point (Corner #15); thence S 20°01'54" W a distance of 134.44' to a calculated point (Corner #16); thence S 35°16'02" W a distance of 192.62' to a calculated point (Corner #9); thence, leaving said common line, S 89°41'23" W a distance of 102.13' to a 5/8" rebar with CE cap (Corner #10); thence N 03°58'37" E the following distances:

1,411.24' to a 5/8" rebar with CE cap (Corner #11), said rebar being the southwest corner of a 30' wide reserved stream crossing; 31.85' to a 5/8" rebar with CE cap (Corner #12), said rebar being the northwest corner of said crossing;140.64' to a 5/8" rebar with CE cap (Corner #13);

thence S 88°42'05" E a distance of 250.39' to the point of Beginning;
containing 10.289 acres, more or less, and shown as Easement Area 1 on a plat by Turner Land Surveying, PLLC (P-0702) of Swannanoa, NC, titled "Conservation Easement for the State of North Carolina, Division of Mitigation Services, Martin Dairy Stream Mitigation" dated October 26, 2016 and recorded in Plat Book 116, Page 76 of the Orange County Register of Deeds.

PIN: 9896-83-9111

Easement Area 2

Beginning at an existing 1½" iron pipe (Corner #14) at the northwest corner of Ted H. Martin and wife, Ruby Y. Martin (now or formerly, see Deed Book 197, Page 783, and Plat Book 13), said pipe being a common corner with Lot 1 of Plat Book 112, Page 51, and located S 07°04'01" W a distance of 1,156.55' from a GPS Site Control Point (existing 1/2" rebar) with NCGS Grid Coordinates [NAD83(2011)] N=864,568.16 usft, E=1,998,993.46 usft;
thence, from the point of Beginning, with the common line, N 85°35'56" E a distance of 52.26' to a 5/8" rebar with CE cap (Corner #6); thence, leaving said common line, S 04°15'59" E a distance of 252.24' to a 5/8" rebar with CE cap (Corner #7); thence S 23°47'27" W a distance of 193.22' to a 5/8" rebar with CE cap (Corner #8); thence S 89°41'23" W a distance of 144.21' to a calculated point (Corner #9) on the Martin's common line; thence, with the common line, N 35°16'02" E a distance of 192.62' to a calculated point (Corner #16);
thence N 20°01'54" E a distance of 134.44' to a calculated point (Corner #15); thence N 02°25'19" W a distance of 141.67' to the point of Beginning;
containing 0.866 acres, more or less, and shown as Easement Area 2 on a plat by Turner Land Surveying, PLLC (P-0702) of Swannanoa, NC, titled "Conservation Easement for the State of North Carolina, Division of Mitigation Services, Martin Dairy Stream Mitigation" dated October 26, 2016 and recorded in Plat Book 116, Page 76 of the Orange County Register of Deeds.

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BML

20161109000236730 S/INS
Bk:RB6218 Pg:283
11/09/2016 09:40:30 AM 1/7

FILED Mark Chilton
Register of Deeds, Orange Co,NC
Recording Fee: $26.00
NC Real Estate TX: $.00

aj

RECORDING REQUESTED BY AND WHEN RECORDED MAIL TO:

Wildlands Engineering, Inc.
1430 S. Mint Street, Suite 104
Charlotte, NC 28203
Attention: Lee Knight Caffery

SPACE ABOVE THIS LINE FOR RECORDER'S USE

TEMPORARY CONSTRUCTION EASEMENT

This temporary construction easement is between is between Ted H. Martin and wife Ruby Martin ("**Grantor**"), individuals, and WILDLANDS ENGINEERING, INC., a North Carolina corporation ("**Grantee**"). This temporary construction easement will become effective when all parties have signed it.

A. Grantor is the owner of certain real property comprised of two parcels located at 7205 Schley Road, in Hillsborough, Orange County, North Carolina and recorded in the Orange County Register of Deeds (the "**Property**"). The Property is also identified as Tax Parcel Numbers 9896830483 and 9896839111.

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B. The North Carolina Division of Mitigation Services has contracted with Grantee to restore and enhance the portions of an unnamed stream located on the Property (the "**Stream Restoration Project**").

C. Grantor has agreed to grant Grantee a temporary construction easement across the Property during the construction of the Stream Restoration Project.

Grantor and Grantee therefore agree as follows:

1. **Grant of Temporary Construction Easement**. In consideration of the sum of $10.00, (the "**Purchase Price**") Grantor grants to Grantee, a temporary construction easement in, upon, over, under and across the Property in two areas shown on the plat titled Conservation Easement for the State of

North Carolina, Division of Mitigation Services, recorded in Orange County, North Carolina in plat book 116, page 96. The temporary construction easement areas are shown on the plat as 0.112 acres on Tax Parcel Number 9896830483, 0.079 acres on Tax Parcel Number 9896830483 and 0.585 acres on Tax Parcel Number 9896839111.

2. **Payment of Purchase Price**. Prior to the commencement of "Construction Activities," as defined, Grantee shall deliver the Purchase Price to the Grantor in immediately available funds.

3. **Construction Activities**. Grantee and its contractors, agents and assigns shall have the right to utilize the temporary construction easement for the purpose of providing a staging area, temporary work space, and construction site access for and during the Stream Restoration Project (the "**Construction Activities**"). Grantee has the right to deposit tools, implements and other materials in the temporary construction easement and to transport fill dirt to be used in the Stream Restoration Project. Construction Activities include building a gravel construction entrance on and over the 0.112 acre and the 0.585 acre temporary construction easement at the south end of the Property off Schley Road, and that gravel construction entrance will remain after the conclusion of the Construction Activities. Construction Activities also include building a gravel construction entrance on and over the 0.079 acre temporary construction easement from Schley Road, on Tax Parcel Number which temporary construction easement will be used to complete restoration of a small tributary and to access the permeant conservation easement from Schley Road during construction. At the conclusion of the Construction Activates, Grantee will remove all gravel and debris from the 0.079 acre temporary construction easement and will seed, fertilize and straw the area.

4. **Indemnification**. Grantee shall indemnify, defend and hold Grantor harmless from any and all damages, claims, liabilities expenses (including reasonable attorneys' fees) arising out of or as a result of the entry onto the Property by Grantee, its contractors, agents and assigns.

5. **Dispute Resolution**. In the event of any dispute, claim, question or disagreement arising out of or relating to this temporary construction easement, Grantor or Grantee may invoke the Dispute Resolution provisions of this section 5 by notifying the other party in writing of the matter in dispute and of the party's intention to resolve the dispute under this section. The parties shall then attempt to resolve the dispute informally for a period of 15 calendar days from the date of the notice. The period of informal negotiations may be extended 15 calendar days by written agreement of the parties to the dispute.

a. **Mediation**. If the parties are unable to resolve the dispute through informal negotiation, any party may invoke formal dispute resolution through mediation. The parties will agree to mediate all disputes in good faith and shall agree on a North Carolina Superior Court Certified Mediator to mediate the dispute. The mediation process shall commence within 60 days of the selection of a mediator and the costs of mediation shall be borne equally by both parties. In the event mediation fails to resolve the dispute between the parties, either party may seek judicial resolution of the dispute in a North Carolina Court.

b. **Attorney's Fees**. If either party institutes any action or proceeding against the other arising out of this temporary construction easement, the non-prevailing party in such action or proceeding shall reimburse the prevailing party for such party's reasonable

attorneys' fees and all costs and disbursements incurred, including any appeal from an action or proceeding.

6. **Termination**. The temporary construction easement shall terminate upon the earlier of (a) the completion of the Construction Activities and the removal of any sedimentation and erosion control measures, (b) or on 12/31/2018. Grantee agrees that the Stream Restoration Project shall be pursued as diligently and as expeditiously as reasonably possible and that upon completion of the Stream Restoration Project, the property shall be evenly graded, stabilized and seeded such that it may be mowed and all construction debris will be removed. Upon the termination of the temporary construction easement, the Grantee shall have no further obligation or liability in connection with the Property.

7. **Assignment**. Grantee may assign Grantee's rights in the temporary construction easement.

8. **Covenants Running with the Land**. This temporary construction easement and covenants created by this temporary construction easement shall be deemed to be covenants running with the land and shall be binding upon and inure to the benefit of the respective heirs, successors and assigns of the parties.

9. **Right to Convey**. Grantor covenants that he has the right to convey this temporary construction easement.

[SIGNATURE PAGE FOLLOWS]

Each party is signing this temporary access and construction agreement on the date stated below that party's signature.

GRANTEE:

WILDLANDS ENGINEERING, INC.,
a North Carolina corporation

By: _____
Shawn D. Wilkerson, President

Date: 11/4/2016

GRANTOR:

TED H. MARTIN and RUBY Y. MARTIN

By: _____
Ted H. Martin

Date: 11-8-16

By: _____
Ruby Y. Martin

Date: 11-8-16

Mecklenburg County, North Carolina

I certify that the following person personally appeared before me this day, acknowledging to me that he or she signed the foregoing document:

Shawn D. Wilkerson.

Name of principal

Date: 11-4-2016

(Official Seal)

ROBERT W. BUGG
NOTARY PUBLIC
Mecklenburg County
North Carolina

Official Signature of Notary

Robert W. Bugg

Notary's printed or typed name

My commission expires: 8-23-2021

Orange County, North Carolina

I certify that the following person personally appeared before me this day, acknowledging to me that he or she signed the foregoing document:

Ted H. Martin.

Name of principal

Date: 11-8-16

(Official Seal)

ROBERT W. BUGG
NOTARY PUBLIC
Mecklenburg County
North Carolina

Official Signature of Notary

Robert W. Bugg

Notary's printed or typed name

My commission expires: 8-23-21

Orange County, North Carolina

I certify that the following person personally appeared before me this day, acknowledging to me that he or she signed the foregoing document:

Ruby Y. Martin.

Name of principal

Date: 11-8-16

(Official Seal)

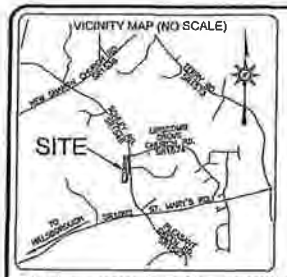
ROBERT W. BUGG
NOTARY PUBLIC
Mecklenburg County
North Carolina

Official Signature of Notary

Robert W. Bugg

Notary's printed or typed name

My commission expires: 8-23-21



REVIEW OFFICER CERTIFICATION

STATE OF NORTH CAROLINA
COUNTY OF ORANGE

I, MICHAEL A. BERG, REVIEW OFFICER OF ORANGE COUNTY, CERTIFY THAT THIS MAP OR PLAT TO WHICH THIS CERTIFICATION IS AFFIXED, MEETS ALL STATUTORY REQUIREMENTS FOR RECORDING FOR WHICH THE REVIEW OFFICER HAS RESPONSIBILITY AS PROVIDED BY LAW.

REVIEW OFFICER — DATE 11/9/2016

I, ELISABETH G. TURNER, CERTIFY THAT THIS MAP WAS DRAWN UNDER MY SUPERVISION FROM AN ACTUAL GPS SURVEY MADE UNDER MY SUPERVISION (DEED DESCRIPTION RECORDED IN BOOK AS, PAGE SHOWN); THAT THE BOUNDARIES NOT SURVEYED ARE CLEARLY INDICATED AS DRAWN FROM INFORMATION SHOWN ON THE FACE OF THIS MAP; THAT THE TRAVERSE RATIO OF PRECISION IS 1:64,945; THAT THE GLOBAL POSITIONING SYSTEM (GPS) SURVEY PERFORMED TO ESTABLISH THE GRID TIE FOR THE TRAVERSE USED THE FOLLOWING INFORMATION:

(1) CLASS OF SURVEY: CLASS A
(2) POSITIONAL ACCURACY AT 95% CONFIDENCE LEVEL:
HORIZONTAL = 0.028 USFT, VERTICAL = 0.062 USFT
(3) TYPE OF GPS FIELD PROCEDURE: REAL-TIME KINEMATIC/VRS
(4) DATES OF SURVEY: APRIL, 2016
(5) DATUM/EPOCH: NAD83 (2011) / 2010
(6) PUBLISHED/FIXED-CONTROL USE: SITE GPS CONTROL POINT #1
NORTHING=664,569.16 USFT, EASTING=1,998,961.46 USFT,
ELEV=312.08 USFT
(7) GEOID MODEL: GEOID18
(8) COMBINED GRID FACTOR: 0.99988555
(9) UNITS: US FEET

THAT THIS PLAT WAS PREPARED IN ACCORDANCE WITH G.S. 47-30 AS AMENDED. WITNESS MY ORIGINAL SIGNATURE, REGISTRATION NUMBER, AND SEAL THIS 28th DAY OF OCTOBER, 2016.

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

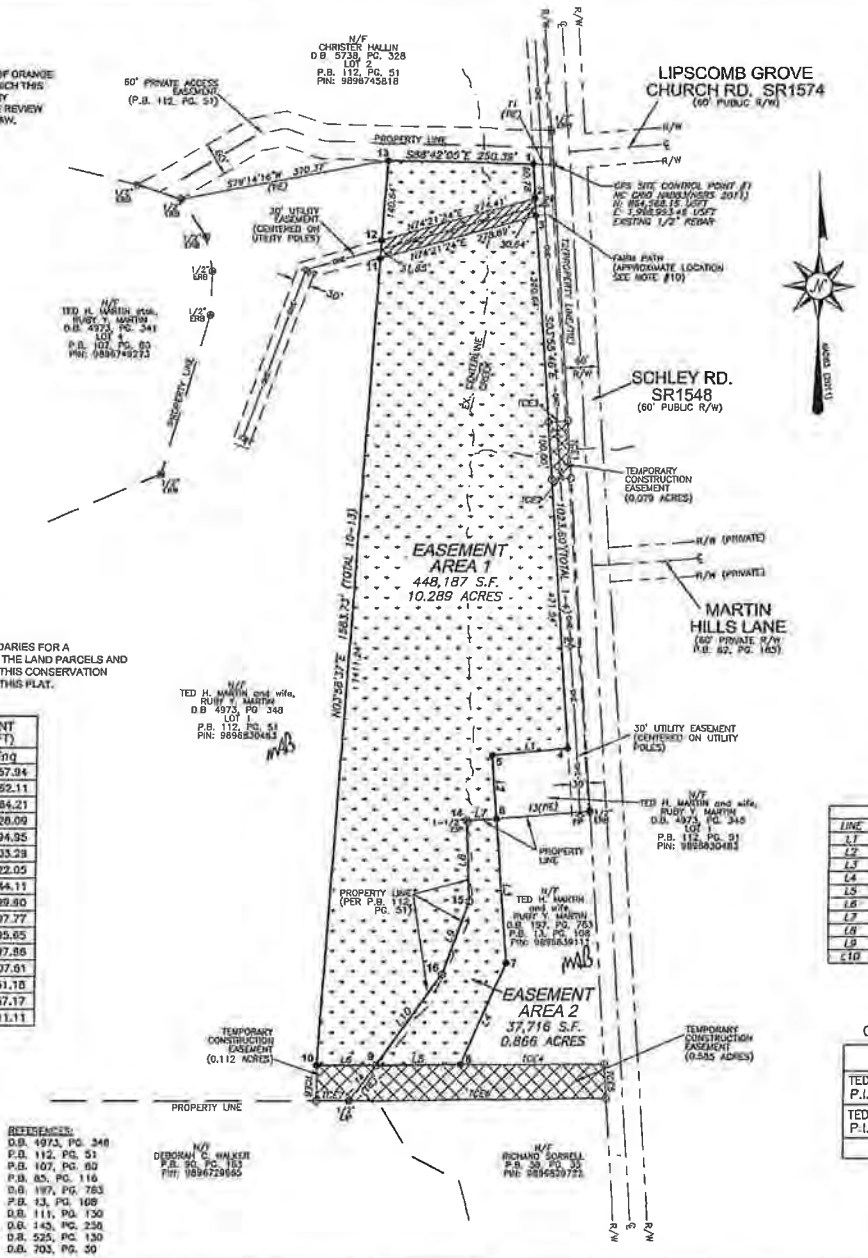
SEAL L-4440 — NORTH CAROLINA PROFESSIONAL LAND SURVEYOR — ELISABETH G. TURNER

I, ELISABETH G. TURNER, PROFESSIONAL LAND SURVEYOR # L-4440, CERTIFY TO ONE OR MORE OF THE FOLLOWING AS INDICATED:

X d. THAT THIS PLAT IS OF A SURVEY OF ANOTHER CATEGORY, SUCH AS THE RECOMBINATION OF EXISTING PARCELS, A COURT ORDERED SURVEY, OR OTHER EXCEPTION TO THE DEFINITION OF SUBDIVISION.

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

NOTE:
THIS SURVEY CREATES THE BOUNDARIES FOR A CONSERVATION EASEMENT ONLY. THE LAND PARCELS AND THEIR BOUNDARIES AFFECTED BY THIS CONSERVATION EASEMENT ARE NOT CHANGED BY THIS PLAT.



CONSERVATION EASEMENT COORDINATE TABLE (USFT)		
CE #	Northing	Easting
1	664,568.97	1,998,957.94
2	664,508.33	1,998,962.11
3	664,477.72	1,998,964.21
4	663,547.76	1,999,026.09
5	663,536.17	1,998,894.95
6	663,424.41	1,998,903.23
7	663,172.86	1,998,922.05
8	662,996.06	1,998,844.11
9	662,995.28	1,998,929.90
10	662,994.73	1,998,597.77
11	664,402.57	1,998,695.65
12	664,434.34	1,998,697.86
13	664,574.64	1,998,707.61
14	663,420.40	1,998,851.18
15	663,278.85	1,998,857.17
16	663,152.55	1,998,811.11

LEGEND:
- CONSERVATION EASEMENT
- PROPERTY LINE
- TIE LINE
- OHU — OVERHEAD UTILITY LINES
- PP-O- POWER POLE
- CORNER# ● CONSERVATION EASEMENT CORNER
- EP ◎ PROPERTY MONUMENT (FOUND & DESCRIBED)
- ○ CALCULATED POINT
- EIP EXISTING IRON PIPE
- ERB EXISTING REBAR
- N/F NOW OR FORMERLY
- R/W RIGHT OF WAY
- ℄ CENTERLINE ROAD
- CONSERVATION EASEMENT AREA
- RESERVED STREAM CROSSING
- TEMPORARY CONSTRUCTION EASEMENT

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 GRID COORDINATES (NAD83/2011) DATUM.
3. THE AREA SHOWN HEREIN WAS COMPUTED USING THE COORDINATE COMPUTATION METHOD.
4. THE PURPOSE OF THIS PLAT IS TO SERVE AS A REFERENCE FOR THE CREATION OF A 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. EASEMENT CORNERS ARE MARKED WITH 5/8" REBAR WITH 3-1/4" ALUMINUM CAPS.
5. LINES NOT SURVEYED ARE SHOWN AS A DASHED LINETYPE AND WERE TAKEN FROM INFORMATION REFERENCED ON THE FACE OF THIS PLAT.
6. THIS SURVEY WAS PREPARED WITHOUT THE BENEFIT OF A TITLE REPORT AND THEREFORE MAY NOT SHOW ALL ENCUMBRANCES UPON THE SUBJECT PROPERTY. A LICENSED ATTORNEY-AT-LAW SHOULD BE CONSULTED REGARDING CORRECT OWNERSHIP, WIDTH, AND LOCATION OF EASEMENTS AND OTHER TITLE QUESTIONS REVEALED BY A TITLE EXAMINATION. THE SURVEYOR HAS MADE NO INVESTIGATION OR INDEPENDENT SEARCH FOR ENCUMBRANCES, RESTRICTIVE COVENANTS, EASEMENTS OF RECORD, OWNERSHIP, TITLE EVIDENCE, OR OTHER FACTS THAT AN ACCURATE AND CURRENT TITLE EXAMINATION MAY DISCLOSE.
7. SUBJECT TO ALL EASEMENTS, RIGHT OF WAYS, AND/OR ENCUMBRANCES THAT MAY AFFECT THE PROPERTY(S).
8. THE SUBJECT PROPERTY IS NOT LOCATED IN A DESIGNATED FEMA FLOOD HAZARD ZONE PER FIRM MAP #3710989600J EFFECTIVE DATE: FEBRUARY 2, 2007.
9. ENVIRONMENTAL AND SUBSURFACE CONDITIONS WERE NOT EXAMINED AS PART OF THIS SURVEY. NO STATEMENT IS MADE TO THE EXISTENCE OF ENVIRONMENTAL OR SUBSURFACE CONDITIONS WHICH WOULD AFFECT THE USE OR DEVELOPMENT OF THE TRACTS SHOWN.
10. THE STATE OF NORTH CAROLINA, ITS EMPLOYEESS AND AGENTS, SUCCESSORS AND ASSIGNS, RECEIVE A PERPETUAL RIGHT OF ACCESS TO THE EASEMENT AREA OVER THE PROPERTY AT REASONABLE TIMES TO UNDERTAKE ANY ACTIVITIES TO RESTORE, CONSTRUCT, MANAGE, MAINTAIN, ENHANCE, AND MONITOR THE STREAM, WETLAND AND ANY OTHER RIPARIAN RESOURCES IN THE EASEMENT AREA, IN ACCORDANCE WITH THE RESTORATION ACTIVITIES OR A LONG-TERM MANAGEMENT PLAN AS DESCRIBED IN SECTION II-A OF THE CONSERVATION EASEMENT AGREEMENT. PREFERRED ACCESS ROUTS ARE SHOWN HEREON IN APPROXIMATE LOCATIONS.
11. THE EXISTENCE OR NON-EXISTENCE OF WETLANDS ON THE SUBJECT PROPERTY HAS NOT BEEN DETERMINED BY THIS SURVEY.

RECORDED IN PLAT BOOK _____, PAGE _____.

REFERENCES:
D.B. 4973, PG. 348
P.B. 112, PG. 51
P.B. 107, PG. 62
P.B. 85, PG. 116
D.B. 197, PG. 763
P.B. 13, PG. 108
D.B. 111, PG. 130
D.B. 143, PG. 236
D.B. 525, PG. 130
D.B. 703, PG. 30

CERTIFICATION OF OWNERSHIP AND DEDICATION

THE UNDERSIGNED OWNER HEREBY CERTIFIES THAT THE LAND SHOWN HEREON IS LOCATED WITHIN THE SUBDIVISION-REGULATION JURISDICTION OF ORANGE COUNTY AND HEREBY FREELY DEDICATE ALL RIGHTS-OF-WAY, EASEMENTS, STREETS, RECREATION AREAS, OPEN SPACES, COMMON AREAS, UTILITIES, AND OTHER IMPROVEMENTS TO PUBLIC OR PRIVATE COMMON USE AS NOTED ON THIS PLAT, AND FURTHER ASSUMES FULL RESPONSIBILITY FOR THE MAINTENANCE AND CONTROL BY AN APPROPRIATE PUBLIC BODY OR BY AN INCORPORATED NEIGHBORHOOD OR HOMEOWNERS ASSOCIATION OR SIMILAR LEGAL ENTITY.

OWNER(S) — DATE 11-8-16
OWNER(S) — DATE 11-9-16

Orange COUNTY, NORTH CAROLINA

I, A NOTARY PUBLIC OF THE COUNTY AND STATE AFORESAID, CERTIFY THAT Ted H Martin & Ruby Y. Martin (OWNER(S)), PERSONALLY APPEARED BEFORE ME THIS DAY AND ACKNOWLEDGED THE EXECUTION OF THE FOREGOING INSTRUMENT. WITNESS MY HAND AND OFFICIAL SEAL THIS THE 9 DAY OF November A.D., 2016.

NOTARY PUBLIC
MY COMMISSION EXPIRES 8-23-21

ROBERT W. BUGG
NOTARY PUBLIC
Mecklenburg County
North Carolina

I HEREBY CERTIFY THAT THIS DIVISION OF PROPERTY SHOWN AND DESCRIBED HEREON IS EXEMPT FROM THE ORANGE COUNTY SUBDIVISION REGULATIONS BY DEFINITION.

PLANNING DIRECTOR OR DESIGNEE — DATE 09 NOV 2016

LINE TABLE		
LINE	BEARING	DISTANCE
L1	S85°01'05"W	133.64'
L2	S04°15'59"E	112.08'
L3	S04°15'59"E	252.34'
L4	S23°47'27"W	193.32'
L5	S89°41'23"W	144.21'
L6	S89°41'23"W	102.13'
L7	S85°35'56"W	52.26'
L8	S02°25'19"E	141.67'
L9	S20°01'54"W	134.44'
L10	S35°15'02"W	192.62'

TIE LINE TABLE		
LINE	BEARING	DISTANCE
T1	S88°42'05"E	18.43'
T2	S03°49'07"E	448.02'
T3	N85°35'56"E	166.16'
T4	S36°18'32"W	78.89'

TCE LINE TABLE		
LINE	BEARING	DISTANCE
TCE1	S03°49'07"E	100.00'
TCE2	S86°04'14"W	34.32'
TCE3	N86°04'14"E	34.32'
TCE4	N89°41'23"E	253.97'
TCE5	S01°49'17"E	28.05'
TCE6	S89°22'08"E	±47.64'
TCE7	S89°49'03"W	56.40'
TCE8	N03°16'57"W	61.59'

CONSERVATION EASEMENT AREA SUMMARY

PROPERTY	EASEMENT AREA #	EASEMENT AREA (S.F.)	EASEMENT AREA (ACRES)
TED & RUBY MARTIN P.I.N. 9896830483	1	448,187	10.289
TED & RUBY MARTIN P.I.N. 9896839111	2	37,716	0.866
	TOTAL	485,903	11.155

150' 0' 150' 300'
SCALE: 1"=150'

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

FIELD SURVEY: APR. 2016 | DRAWN BY: DST/EGT | TLS PROJ.: TLS-16-013
SURVEYED BY: DST | REVIEWED BY: DST/EGT | PLAT DATE: 10/26/2016

CONSERVATION EASEMENT FOR
THE STATE OF NORTH CAROLINA, DIVISION OF MITIGATION SERVICES
(SPO FILE# 68-DE; DMS PROJECT# 97087)

PROJECT NAME: MARTIN DAIRY STREAM MITIGATION
PROPERTY OF: TED H. MARTIN and wife, RUBY Y. MARTIN
OWNER ADDRESS: 7205 SCHLEY RD., HILLSBOROUGH, NC 27278
ENO TOWNSHIP | ORANGE COUNTY | NORTH CAROLINA

CAD FILE: MARTIN DAIRY MITIGATION EASEMENT_F
SCALE: 1"=150'
SHEET 1 of 1

Appendix 2

Approved JD and Supporting USACE Assessment Forms

U.S. ARMY CORPS OF ENGINEERS
WILMINGTON DISTRICT

Action Id. **SAW-2016-00874** County: **Orange** U.S.G.S. Quad: **NC-Caldwell**

NOTIFICATION OF JURISDICTIONAL DETERMINATION

Land Owner:	**Mr. Ted Martin and Ms. Ruby Martin**
Address:	**7205 Schley Road** **Hillsborough, North Carolina 27278**
Applicant/Agent:	**Wildlands Engineering, Inc.** **Mr. Win Taylor**
Address:	**497 Bramson Court, Suite 104** **Mt. Pleasant, South Carolina 29464**

Size (acres)	**9.5**	Nearest Town	**Hillsborough**
Nearest Waterway	**Buckwater Creek**	River Basin	**Neuse**
USGS HUC	**03020201**	Coordinates	Latitude: **36.12329** Longitude: **-79.00402**

Location description: **The Martin Dairy Mitigation Site is located on an approximate 9.5 acre tract of land near Hillsborough in Orange County, North Carolina. Orange County, North Carolina Parcel Index Numbers: 9896830483 and 9896839111. Waters on-site drain into Buckwater Creek, an indirect tributary of the Neuse River.**

Indicate Which of the Following Apply:

A. Preliminary Determination

X There are waters, including wetlands, on the above described project area, that may be subject to Section 404 of the Clean Water Act (CWA)(33 USC § 1344) and/or Section 10 of the Rivers and Harbors Act (RHA) (33 USC § 403). The waters, including wetlands, have been delineated, and the delineation has been verified by the Corps to be sufficiently accurate and reliable. Therefore this preliminary jurisdiction determination may be used in the permit evaluation process, including determining compensatory mitigation. For purposes of computation of impacts, compensatory mitigation requirements, and other resource protection measures, a permit decision made on the basis of a preliminary JD will treat all waters and wetlands that would be affected in any way by the permitted activity on the site as if they are jurisdictional waters of the U.S. This preliminary determination is not an appealable action under the Regulatory Program Administrative Appeal Process (Reference 33 CFR Part 331). However, you may request an approved JD, which is an appealable action, by contacting the Corps district for further instruction.

_ There are wetlands on the above described property, that may be subject to Section 404 of the Clean Water Act (CWA)(33 USC § 1344) and/or Section 10 of the Rivers and Harbors Act (RHA) (33 USC § 403). However, since the waters, including wetlands, have not been properly delineated, this preliminary jurisdiction determination may not be used in the permit evaluation process. Without a verified wetland delineation, this preliminary determination is merely an effective presumption of CWA/RHA jurisdiction over all of the waters, including wetlands, at the project area, which is not sufficiently accurate and reliable to support an enforceable permit decision. We recommend that you have the waters of the U.S. on your property delineated. As the Corps may not be able to accomplish this wetland delineation in a timely manner, you may wish to obtain a consultant to conduct a delineation that can be verified by the Corps.

B. Approved Determination

_ There are Navigable Waters of the United States within the above described property subject to the permit requirements of Section 10 of the Rivers and Harbors Act (RHA) (33 USC § 403) and Section 404 of the Clean Water Act (CWA)(33 USC § 1344). Unless there is a change in law or our published regulations, this determination may be relied upon for a period not to exceed five years from the date of this notification.

_ There are waters of the U.S., including wetlands, on the above described project area subject to the permit requirements of Section 404 of the Clean Water Act (CWA) (33 USC § 1344). Unless there is a change in the law or our published regulations, this determination may be relied upon for a period not to exceed five years from the date of this notification.

_ We recommend you have the waters of the U.S. on your property delineated. As the Corps may not be able to accomplish this wetland delineation in a timely manner, you may wish to obtain a consultant to conduct a delineation that can be verified by the Corps.

_ The waters of the U.S., including wetlands, on your project area have been delineated and the delineation has been verified by the Corps. If you wish to have the delineation surveyed, the Corps can review and verify the survey upon completion. Once verified, this survey will provide an accurate depiction of all areas subject to CWA and/or RHA jurisdiction on your property which, provided there is no change in the law or our published regulations, may be relied upon for a period not to exceed five years.

_ The waters of the U.S., including wetlands, have been delineated and surveyed and are accurately depicted on the plat signed by the Corps Regulatory Official identified below on _____. Unless there is a change in the law or our published regulations, this determination may be relied upon for a period not to exceed five years from the date of this notification.

_ There are no waters of the U.S., to include wetlands, present on the above described project area which are subject to the permit requirements of Section 404 of the Clean Water Act (33 USC 1344). Unless there is a change in the law or our published regulations, this determination may be relied upon for a period not to exceed five years from the date of this notification.

_ The property is located in one of the 20 Coastal Counties subject to regulation under the Coastal Area Management Act (CAMA). You should contact the Division of Coastal Management in Morehead City, NC, at (252) 808-2808 to determine their requirements.

Basis For Determination: **On June 13, 2016, Wildlands Engineering, Inc. submitted a preliminary jurisdictional determination (JD) to our office for review. Representatives from the United States Army Corps of Engineers (Corps) and Wildlands Engineering, Inc. participated in an on-site field verification conducted on July 28, 2016. During this investigation the Corps requested additional information required to accuracy describe and delineate waters within the Martin Dairy Mitigation Site. Final revisions were received by our office on August 5, 2016.**

Based on a review of the June 13, 2016 report submitted to our office, on-site field verification on July 28, 2016, and final revisions received on August 2016, this office has determined that 1,840 linear feet of perennial stream channel and 2.848 acres of emergent wetland are present within the Martin Dairy Mitigation Site project boundary. Refer to the enclosed Preliminary Jurisdictional Determination Form, Aquatic Resource Table, and Figure 3 Site Map for a detailed summary of waters on-site.

E. Attention USDA Program Participants

This delineation/determination has been conducted to identify the limits of Corps' Clean Water Act jurisdiction for the particular site identified in this request. The delineation/determination may not be valid for the wetland conservation provisions of the Food Security Act of 1985. If you or your tenant are USDA Program participants, or anticipate participation in USDA programs, you should request a certified wetland determination from the local office of the Natural Resources Conservation Service, prior to starting work.

F. Appeals Information **(This information applies only to approved jurisdiction determinations as indicated in B and C above).**

This correspondence constitutes an approved jurisdiction determination for the above described site. If you object to this determination, you may request an administrative appeal under Corps regulations at 33 CFR Part 331. Enclosed you will find a Notification of Appeal Process (NAP) fact sheet and request for appeal (RFA) form. If you request to appeal this determination you must submit a completed RFA form to the following address:

US Army Corps of Engineers
South Atlantic Division
Attn: Jason Steele, Review Officer
60 Forsyth Street SW, Room 10M15
Atlanta, Georgia 30303-8801
Phone: (404) 562-5137

In order for an RFA to be accepted by the Corps, the Corps must determine that it is complete, that it meets the criteria for appeal under 33 CFR part 331.5, and that it has been received by the Division Office within 60 days of the date of the NAP. Should you decide to submit an RFA form, it must be received at the above address by _____.
It is not necessary to submit an RFA form to the Division Office if you do not object to the determination in this correspondence.

DAILEY.SAMANTHA.J.1387567948

Digitally signed by DAILEY.SAMANTHA.J.1387567948
DN: c=US, o=U.S. Government, ou=DoD, ou=PKI, ou=USA, cn=DAILEY.SAMANTHA.J.1387567948
Date: 2016.12.13 07:58:46 -05'00'

Corps Regulatory Official: _____

SAMANTHA DAILEY

Date of JD: **12/09/2016**
Expiration Date of JD:

The Wilmington District is committed to providing the highest level of support to the public. To help us ensure we continue to do so, please complete our Customer Satisfaction Survey, located online at http://corpsmapu.usace.army.mil/cm_apex/f?p=136:4:0.

NOTIFICATION OF ADMINISTRATIVE APPEAL OPTIONS AND PROCESS AND REQUEST FOR APPEAL

Applicant: **Wildlands Engineering, Inc.** **Mr. Win Taylor**	File Number: **SAW-2016-00874**	Date: **12/09/2016**

Attached is:	See Section below
☐ INITIAL PROFFERED PERMIT (Standard Permit or Letter of permission)	A
☐ PROFFERED PERMIT (Standard Permit or Letter of permission)	B
☐ PERMIT DENIAL	C
☐ APPROVED JURISDICTIONAL DETERMINATION	D
☒ PRELIMINARY JURISDICTIONAL DETERMINATION	E

SECTION I - The following identifies your rights and options regarding an administrative appeal of the above decision. Additional information may be found at http://www.usace.army.mil/Missions/CivilWorks/RegulatoryProgramandPermits.aspx or Corps regulations at 33 CFR Part 331.

A: INITIAL PROFFERED PERMIT: You may accept or object to the permit.

- ACCEPT: If you received a Standard Permit, you may sign the permit document and return it to the district engineer for final authorization. If you received a Letter of Permission (LOP), you may accept the LOP and your work is authorized. Your signature on the Standard Permit or acceptance of the LOP means that you accept the permit in its entirety, and waive all rights to appeal the permit, including its terms and conditions, and approved jurisdictional determinations associated with the permit.
- OBJECT: If you object to the permit (Standard or LOP) because of certain terms and conditions therein, you may request that the permit be modified accordingly. You must complete Section II of this form and return the form to the district engineer. Your objections must be received by the district engineer within 60 days of the date of this notice, or you will forfeit your right to appeal the permit in the future. Upon receipt of your letter, the district engineer will evaluate your objections and may: (a) modify the permit to address all of your concerns, (b) modify the permit to address some of your objections, or (c) not modify the permit having determined that the permit should be issued as previously written. After evaluating your objections, the district engineer will send you a proffered permit for your reconsideration, as indicated in Section B below.

B: PROFFERED PERMIT: You may accept or appeal the permit

- ACCEPT: If you received a Standard Permit, you may sign the permit document and return it to the district engineer for final authorization. If you received a Letter of Permission (LOP), you may accept the LOP and your work is authorized. Your signature on the Standard Permit or acceptance of the LOP means that you accept the permit in its entirety, and waive all rights to appeal the permit, including its terms and conditions, and approved jurisdictional determinations associated with the permit.
- APPEAL: If you choose to decline the proffered permit (Standard or LOP) because of certain terms and conditions therein, you may appeal the declined permit under the Corps of Engineers Administrative Appeal Process by completing Section II of this form and sending the form to the division engineer. This form must be received by the division engineer within 60 days of the date of this notice.

C: PERMIT DENIAL: You may appeal the denial of a permit under the Corps of Engineers Administrative Appeal Process by completing Section II of this form and sending the form to the division engineer. This form must be received by the division engineer within 60 days of the date of this notice.

D: APPROVED JURISDICTIONAL DETERMINATION: You may accept or appeal the approved JD or provide new information.

- ACCEPT: You do not need to notify the Corps to accept an approved JD. Failure to notify the Corps within 60 days of the date of this notice, means that you accept the approved JD in its entirety, and waive all rights to appeal the approved JD.
- APPEAL: If you disagree with the approved JD, you may appeal the approved JD under the Corps of Engineers Administrative Appeal Process by completing Section II of this form and sending the form to the district engineer. This form must be received by the division engineer within 60 days of the date of this notice.

E: PRELIMINARY JURISDICTIONAL DETERMINATION: You do not need to respond to the Corps regarding the preliminary JD. The Preliminary JD is not appealable. If you wish, you may request an approved JD (which may be appealed), by contacting the Corps district for further instruction. Also you may provide new information for further consideration by the Corps to reevaluate the JD.

SECTION II - REQUEST FOR APPEAL or OBJECTIONS TO AN INITIAL PROFFERED PERMIT

REASONS FOR APPEAL OR OBJECTIONS: (Describe your reasons for appealing the decision or your objections to an initial proffered permit in clear concise statements. You may attach additional information to this form to clarify where your reasons or objections are addressed in the administrative record.)

ADDITIONAL INFORMATION: The appeal is limited to a review of the administrative record, the Corps memorandum for the record of the appeal conference or meeting, and any supplemental information that the review officer has determined is needed to clarify the administrative record. Neither the appellant nor the Corps may add new information or analyses to the record. However, you may provide additional information to clarify the location of information that is already in the administrative record.

POINT OF CONTACT FOR QUESTIONS OR INFORMATION:

If you have questions regarding this decision and/or the appeal process you may contact:	If you only have questions regarding the appeal process you may also contact:
District Engineer, Wilmington Regulatory Division **Raleigh Regulatory Field Office** **Attn: Samantha Dailey** **3331 Heritage Trade Drive, Suite 105** **Wake Forest, North Carolina 27587**	Mr. Jason Steele, Administrative Appeal Review Officer CESAD-PDO U.S. Army Corps of Engineers, South Atlantic Division 60 Forsyth Street, Room 10M15 Atlanta, Georgia 30303-8801 Phone: (404) 562-5137

RIGHT OF ENTRY: Your signature below grants the right of entry to Corps of Engineers personnel, and any government consultants, to conduct investigations of the project site during the course of the appeal process. You will be provided a 15 day notice of any site investigation, and will have the opportunity to participate in all site investigations.

_____ Signature of appellant or agent.	Date:	Telephone number:

For appeals on Initial Proffered Permits send this form to:

District Engineer, Wilmington Regulatory Division, **Attn: Samantha Dailey, 69 Darlington Avenue, Wilmington, North Carolina 28403**

For Permit denials, Proffered Permits and Approved Jurisdictional Determinations send this form to:

Division Engineer, Commander, U.S. Army Engineer Division, South Atlantic, Attn: Mr. Jason Steele, Administrative Appeal Officer, CESAD-PDO, 60 Forsyth Street, Room 10M15, Atlanta, Georgia 30303-8801
Phone: (404) 562-5137

PRELIMINARY JURISDICTIONAL DETERMINATION FORM

BACKGROUND INFORMATION

A. REPORT COMPLETION DATE FOR PRELIMINARY JURISDICTIONAL DETERMINATION (JD): December 9, 2016

B. NAME AND ADDRESS OF PERSON REQUESTING PRELIMINARY JD:

Land Owner: **Mr. Ted Martin and Ms. Ruby Martin**
Address: **7205 Schley Road**
Hillsborough, North Carolina 27278

Applicant/Agent: **Wildlands Engineering, Inc.**
Mr. Win Taylor
Address: **497 Bramson Court, Suite 104**
Mt. Pleasant, South Carolina 29464

C. DISTRICT OFFICE, FILE NAME, AND NUMBER: Wilmington, Martin Dairy Mitigation Site, North Carolina Division of Mitigation Services, Orange County, SAW-2016-00874

D. PROJECT LOCATION(S) AND BACKGROUND INFORMATION:
(USE THE ATTACHED TABLE TO DOCUMENT MULTIPLE WATERBODIES AT DIFFERENT SITES)

State: **NC** County/parish/borough: **Orange** City: **Hillsborough**
Center coordinates of site (lat/long in degree decimal format): Lat. **36.12329°N**, Long. **79.00402° W**.
Universal Transverse Mercator:
Name of nearest water body: **Buckwater Creek**

Identify (estimate) amount of waters in the review area:
Non-wetland waters: **1,840** linear feet: width (ft) and/or acres.
Cowardin Class: **Riverine**
Stream Flow: **Perennial**
Wetlands: **2.848** acres.
Cowardin Class: **PEM**

Name of any water bodies on the site that have been identified as Section 10 waters:
Tidal:
Non-Tidal:

E. REVIEW PERFORMED FOR SITE EVALUATION (CHECK ALL THAT APPLIES):
☒ Office (Desk) Determination. Date: **December 9, 2016**
☒ Field Determination. Date(s): **July 28, 2016**

1. The Corps of Engineers believes that there may be jurisdictional waters of the United States on the subject site, and the permit applicant or other affected party who requested this preliminary JD is hereby advised of his or her option to request and obtain an approved jurisdictional determination (JD) for that site. Nevertheless, the permit applicant or other person who requested this preliminary JD has declined to exercise the option to obtain an approved JD in this instance and at this time.

2. In any circumstance where a permit applicant obtains an individual permit, or a Nationwide General Permit (NWP) or other general permit verification requiring "pre-construction notification" (PCN), or requests verification for a non-reporting NWP or other general permit, and the permit applicant has not requested an approved JD for the activity, the permit applicant is hereby made aware of the following: (1) the permit applicant has elected to seek a permit authorization based on a preliminary JD, which does not make an official determination of jurisdictional waters; (2) that the applicant has the option to request an approved JD before accepting the terms and conditions of the permit authorization, and that basing a permit authorization on an approved JD could possibly result in less compensatory mitigation being required or different special conditions; (3) that the applicant has the right to request an individual permit rather than accepting the terms and conditions of the NWP or other general permit authorization; (4) that the applicant can accept a permit authorization and thereby agree to comply with all the terms and conditions of that permit, including whatever mitigation requirements the Corps has determined to be necessary; (5) that undertaking any activity in reliance upon the subject permit authorization without requesting an approved JD constitutes the applicant's acceptance of the use of the preliminary JD, but that either form of JD will be processed as soon as is practicable;

(6) accepting a permit authorization (e.g., signing a proffered individual permit) or undertaking any activity in reliance on any form of Corps permit authorization based on a preliminary JD constitutes agreement that all wetlands and other water bodies on the site affected in any way by that activity are jurisdictional waters of the United States, and precludes any challenge to such jurisdiction in any administrative or judicial compliance or enforcement action, or in any administrative appeal or in any Federal court; and (7) whether the applicant elects to use either an approved JD or a preliminary JD, that JD will be processed as soon as is practicable. Further, an approved JD, a proffered individual permit (and all terms and conditions contained therein), or individual permit denial can be administratively appealed pursuant to 33 C.F.R. Part 331, and that in any administrative appeal, jurisdictional issues can be raised (see 33 C.F.R. 331.5(a)(2)). If, during that administrative appeal, it becomes necessary to make an official determination whether CWA jurisdiction exists over a site, or to provide an official delineation of jurisdictional waters on the site, the Corps will provide an approved JD to accomplish that result, as soon as is practicable.
This preliminary JD finds that there *"may be"* waters of the United States on the subject project site, and identifies all aquatic features on the site that could be affected by the proposed activity, based on the following information:

SUPPORTING DATA. Data reviewed for preliminary JD (check all that apply - checked items should be included in case file and, where checked and requested, appropriately reference sources below):

- ☒ Maps, plans, plots or plat submitted by or on behalf of the applicant/consultant: **Wildlands Engineering, Inc., submitted a Jurisdictional Determination Request on June 13, 2016, with revisions received on August 5, 2016.**
- ☒ Data sheets prepared/submitted by or on behalf of the applicant/consultant.
  - ☒ Office concurs with data sheets/delineation report.
  - ☐ Office does not concur with data sheets/delineation report.
- ☐ Data sheets prepared by the Corps: .
- ☐ Corps navigable waters' study: .
- ☐ U.S. Geological Survey Hydrologic Atlas: .
  - ☐ USGS NHD data.
  - ☐ USGS 8 and 12 digit HUC maps.
- ☒ U.S. Geological Survey map(s). Cite scale & quad name: **1:24K, NC-Caldwell**
- ☒ USDA Natural Resources Conservation Service Soil Survey. Citation: **Web Soil Survey: October 31, 2016**.
- ☒ National wetlands inventory map(s). Cite name: **Corps of Engineers SimSuite – July 27, 2016**.
- ☐ State/Local wetland inventory map(s): .
- ☐ FEMA/FIRM maps: .
- ☐ 100-year Floodplain Elevation is: (National Geodetic Vertical Datum of 1929)
- ☒ Photographs: ☒ Aerial (Name & Date): **June 13, 2016 Jurisdictional Determination Request**.
  or ☐ Other (Name & Date): .
- ☐ Previous determination(s). File no. and date of response letter: .
- ☐ Other information (please specify): .

IMPORTANT NOTE: The information recorded on this form has not necessarily been verified by the Corps and should not be relied upon for later jurisdictional determinations.

DAILEY.SAMANTHA.J.1387567948

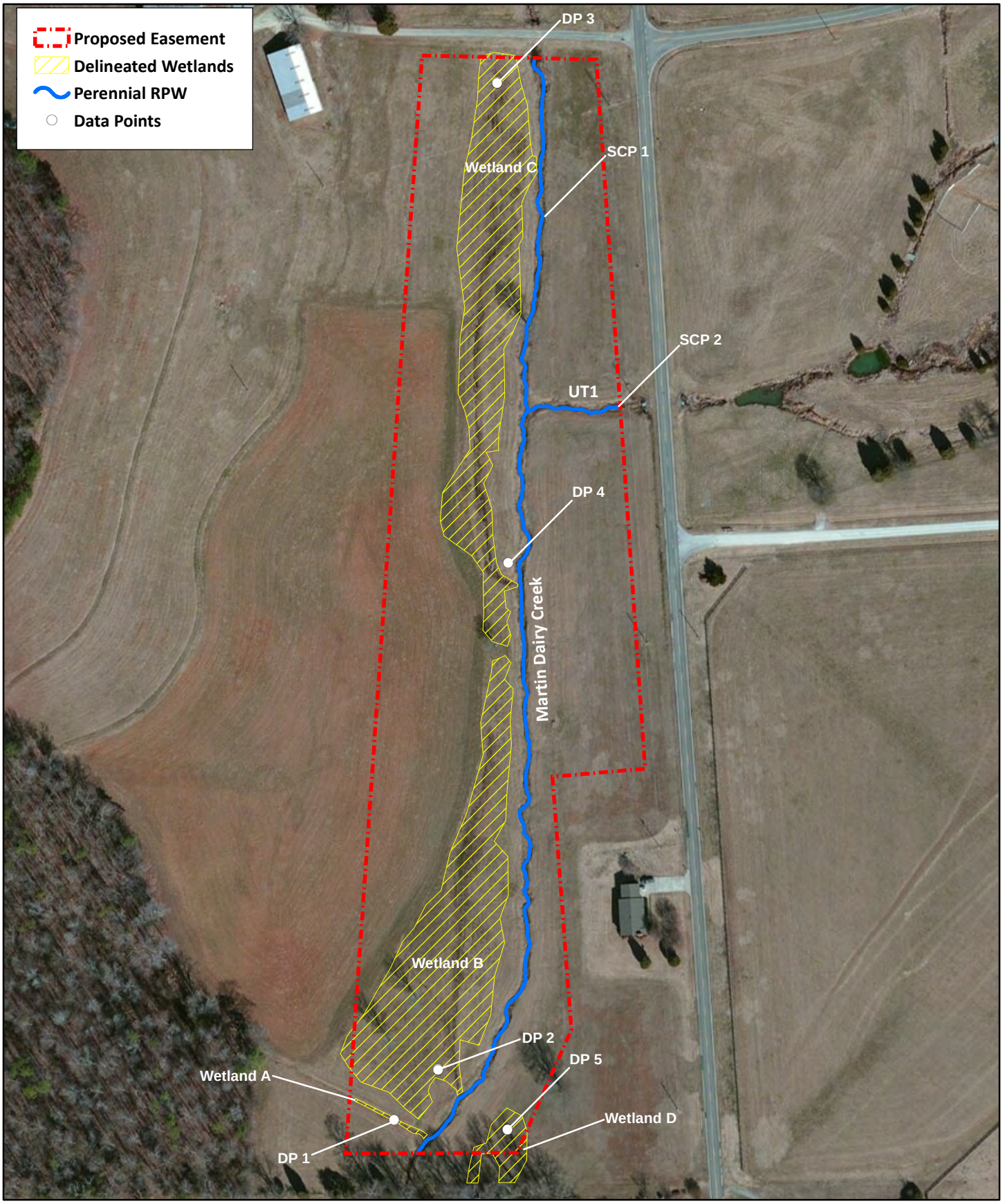
Digitally signed by DAILEY.SAMANTHA.J.1387567948
DN: c=US, o=U.S. Government, ou=DoD, ou=PKI, ou=USA, cn=DAILEY.SAMANTHA.J.1387567948
Date: 2016.12.13 07:56:26 -05'00'

Signature and date of Regulatory Project Manager (REQUIRED)

Signature and date of person requesting preliminary JD (REQUIRED, unless obtaining the signature is Impracticable)

Table 1. On-site Aquatic Resources identified within the Martin Dairy Mitigation Site Wildlands Engineering, Inc. SAW-2016-00874

Site Number	Latitude (°N)	Latitude (°W)	Classification	Estimated Amount of Aquatic Resources in Review Area		Class of Aquatic Resource
				Linear Feet	Acres	
Martin Dairy Creek	36.124811	79.003791	Perennial	1,702	-	non-section 10, non-wetland
UT1	36.124074	79.003574	Perennial	138	-	non-section 10, non-wetland
Wetland A	36.121275	79.004516	Seep	-	0.013	non-section 10, wetland
Wetland B	36.122015	79.004170	Seep	-	1.430	non-section 10, wetland
Wetland C	36.124474	79.004046	Seep	-	1.283	non-section 10, wetland
Wetland D	36.121242	79.003963	Seep	-	0.122	non-section 10, wetland



WILDLANDS ENGINEERING

0 150 300 Feet

N

Figure 3 Site Map
Martin Dairy Mitigation Site
Neuse 03020201

Orange County, NC

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont

Project/Site: Martin Dairy City/County: Hillsborough/Orange Sampling Date: 5/19/2016

Applicant/Owner: Wildlands Engineering State: NC Sampling Point: Wetland A - DP1

Investigator(s): Win Taylor Section, Township, Range:

Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): concave Slope (%): <1

Subregion (LRR or MLRA): MLRA 136 Lat: N 36.121274 Long: W 79.004516 Datum:

Soil Map Unit Name: Herndon Silt Loam (HrC) NWI classification: n/a

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ____ (If no, explain in Remarks.)

Are Vegetation ✓, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ____ No ✓

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No ____	**Is the Sampled Area within a Wetland?** Yes ✓ No ____
Hydric Soil Present?	Yes ✓	No ____	
Wetland Hydrology Present?	Yes ✓	No ____	

Remarks:

Woody, mature vegetation absent within assessment area due to land maintained for hay production. Linear, ditch feature.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ✓ Surface Water (A1)
- ✓ High Water Table (A2)
- ✓ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ✓ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ✓ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ✓ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ✓	No ____	Depth (inches): 1
Water Table Present?	Yes ✓	No ____	Depth (inches): 0 - 12+
Saturation Present? (includes capillary fringe)	Yes ✓	No ____	Depth (inches): 0 - 12+

Wetland Hydrology Present? Yes ✓ No ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: Wetland A - DP1

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	0 = Total Cover		
Sapling/Shrub Stratum (Plot size: 15')			
1. Fraxinus pennsylvanica	1	No	FACW
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	1 = Total Cover		
Herb Stratum (Plot size: 5')			
1. Juncus effusus	40	Yes	FACW
2. Rhynchospora macrostachya	5	No	OBL
3. Persicaria lapathifolia	5	No	FACW
4. Mentha arvensis	2	No	FACW
5. Carex comosa	2	No	OBL
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	54 = Total Cover		
Woody Vine Stratum (Plot size: 30')			
1. Toxicodendron radicans	5	Yes	FAC
2.			
3.			
4.			
5.			
6.			
	5 = Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species	x 1 =
FACW species	x 2 =
FAC species	x 3 =
FACU species	x 4 =
UPL species	x 5 =
Column Totals: (A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- ✓ 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ✓ **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: Wetland A - DP1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-2	2.5Y 4/2	100					Silt Loam	
2-10	2.5Y 5/2	98	10YR 5/6	2	C	PL	Silt Loam	
10-12	2.5Y 5/2	80	10YR 5/6	20	C	PL	Silt Loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **(LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1) **(LRR N, MLRA 147, 148)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **(MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **(MLRA 147, 148)**
- ___ Loamy Gleyed Matrix (F2)
- ✓ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **(LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **(MLRA 136, 122)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 148)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(MLRA 147)**
- ___ Coast Prairie Redox (A16) **(MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✓ **No** _____

Remarks:

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont

Project/Site: Martin Dairy City/County: Hillsborough/Orange Sampling Date: 5/19/2016

Applicant/Owner: Wildlands Engineering State: NC Sampling Point: Wetland B - DP2

Investigator(s): Win Taylor Section, Township, Range:

Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): concave Slope (%): 0

Subregion (LRR or MLRA): MLRA 136 Lat: N 36.121473 Long: W 79.004301 Datum:

Soil Map Unit Name: Herndon Silt Loam (HrC) NWI classification: n/a

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ____ (If no, explain in Remarks.)

Are Vegetation ✓, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ____ No ✓

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No ____	**Is the Sampled Area within a Wetland?** Yes ✓ No ____
Hydric Soil Present?	Yes ✓	No ____	
Wetland Hydrology Present?	Yes ✓	No ____	

Remarks:

Woody, mature vegetation absent within assessment area due to land maintained for hay production.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ✓ Surface Water (A1)
- ✓ High Water Table (A2)
- ✓ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ✓ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ✓	No ____	Depth (inches): 0.5
Water Table Present?	Yes ✓	No ____	Depth (inches): 0 - 12+
Saturation Present? (includes capillary fringe)	Yes ✓	No ____	Depth (inches): 0 - 12+

Wetland Hydrology Present? Yes ✓ No ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: Wetland B - DP2

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	0 = Total Cover		
Sapling/Shrub Stratum (Plot size: 15')			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	0 = Total Cover		
Herb Stratum (Plot size: 5')			
1. Mentha arvensis	35	Yes	FACW
2. Rhynchospora macrostachya	10	No	OBL
3. Juncus effusus	10	No	FACW
4. Saururus cernuus	10	No	OBL
5. Carex comosa	5	No	OBL
6. Vernonia noveboracensis	5	No	FACW
7. Sambucus nigra	5	No	FAC
8. Persicaria lapathifolia	2	No	FACW
9.			
10.			
11.			
12.			
	82 = Total Cover		
Woody Vine Stratum (Plot size: 30')			
1.			
2.			
3.			
4.			
5.			
6.			
	0 = Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: _____ (A)

Total Number of Dominant Species Across All Strata: _____ (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: _____ (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species		x 3 =	
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:	(A)		(B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

✓ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ✓ **No** _____

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: Wetland B - DP2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-2	2.5Y 4/2	100					Silt Loam	
2-4	2.5Y 5/2	95	10YR 5/6	5	C	PL	Silt Loam	
4-10	2.5Y 5/1	95	10YR 4/6	5	C	PL	Silt Loam	
10-12	2.5Y 5/1	80	10YR 4/6	20	C	PL	Silt Loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **(LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1) **(LRR N, MLRA 147, 148)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **(MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **(MLRA 147, 148)**
- ___ Loamy Gleyed Matrix (F2)
- ✓ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **(LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **(MLRA 136, 122)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 148)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(MLRA 147)**
- ___ Coast Prairie Redox (A16) **(MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✓ **No** _____

Remarks:

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont

Project/Site: Martin Dairy City/County: Hillsborough/Orange Sampling Date: 5/19/2016

Applicant/Owner: Wildlands Engineering State: NC Sampling Point: Wetland C - DP3

Investigator(s): Win Taylor Section, Township, Range:

Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): concave Slope (%): 0

Subregion (LRR or MLRA): MLRA 136 Lat: N 36.125367 Long: W 79.004012 Datum:

Soil Map Unit Name: Chewacla Loam (Ch) NWI classification: n/a

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ____ (If no, explain in Remarks.)

Are Vegetation ✓, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ____ No ✓

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No ____	**Is the Sampled Area within a Wetland?** Yes ✓ No ____
Hydric Soil Present?	Yes ✓	No ____	
Wetland Hydrology Present?	Yes ✓	No ____	

Remarks:

Woody, mature vegetation absent within assessment area due to land maintained for hay production.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ✓ High Water Table (A2)
- ✓ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ✓ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ✓ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No ✓	Depth (inches): ____
Water Table Present?	Yes ✓	No ____	Depth (inches): 0 - 12+
Saturation Present? (includes capillary fringe)	Yes ✓	No ____	Depth (inches): 0 - 12+

Wetland Hydrology Present? Yes ✓ No ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: Wetland C - DP3

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	0 = Total Cover		
Sapling/Shrub Stratum (Plot size: 15')			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	0 = Total Cover		
Herb Stratum (Plot size: 5')			
1. Mentha arvensis	60	Yes	FACW
2. Carex comosa	20	No	OBL
3. Juncus effusus	15	No	FACW
4. Carex albolutescens	2	No	FACW
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	97 = Total Cover		
Woody Vine Stratum (Plot size: 30')			
1.			
2.			
3.			
4.			
5.			
6.			
	0 = Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: _____ (A)

Total Number of Dominant Species Across All Strata: _____ (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: _____ (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species		x 3 =	
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:	(A)		(B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

✓ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ✓ **No** _____

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: Wetland C - DP3

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-4	2.5Y 5/1	95	10YR 5/6	5	C	PL	Loam	
4-12	2.5Y 5/2	80	10YR 5/6	20	C	PL	Loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **(LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1) **(LRR N, MLRA 147, 148)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **(MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **(MLRA 147, 148)**
- ___ Loamy Gleyed Matrix (F2)
- ✓ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **(LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **(MLRA 136, 122)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 148)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(MLRA 147)**
- ___ Coast Prairie Redox (A16) **(MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✓ **No** _____

Remarks:

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont

Project/Site: Martin Dairy City/County: Hillsborough/Orange Sampling Date: 7/28/2016

Applicant/Owner: Wildlands Engineering State: NC Sampling Point: Wetland D - DP5

Investigator(s): Win Taylor Section, Township, Range:

Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): concave Slope (%): 0

Subregion (LRR or MLRA): MLRA 136 Lat: N 36.121242 Long: W 79.003963 Datum:

Soil Map Unit Name: Chewacla Loam (Ch) NWI classification: n/a

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ____ (If no, explain in Remarks.)

Are Vegetation ✓, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ____ No ✓

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No ____	**Is the Sampled Area within a Wetland?** **Yes ✓** **No ____**
Hydric Soil Present?	Yes ✓	No ____	
Wetland Hydrology Present?	Yes ✓	No ____	

Remarks:

Woody, mature vegetation absent within assessment area due to land maintained for hay production.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ✓ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ✓ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ✓ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ✓ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No ✓	Depth (inches): ____
Water Table Present?	Yes ____	No ✓	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No ✓	Depth (inches): 10 - 12+

Wetland Hydrology Present? **Yes ✓** **No ____**

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Four Strata) – Use scientific names of plants. Sampling Point: Wetland D - DP5

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	0 = Total Cover		
Sapling/Shrub Stratum (Plot size: 15')			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	0 = Total Cover		
Herb Stratum (Plot size: 5')			
1. Murdannia keisak	30	Yes	OBL
2. Carex comosa	30	No	OBL
3. Juncus effusus	15	No	FACW
4. Cyperus haspan	10	No	OBL
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	85 = Total Cover		
Woody Vine Stratum (Plot size: 30')			
1.			
2.			
3.			
4.			
5.			
6.			
	0 = Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: _____ (A)

Total Number of Dominant Species Across All Strata: _____ (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: _____ (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species		x 3 =	
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:	(A)		(B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

✓ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ✓ **No** _____

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: Wetland D - DP5

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-4	10YR 5/1	98	10YR 5/6	2	C	PL	Loam	
4-12	10YR 5/2	90	10YR 5/6	10	C	PL	Loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **(LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1) **(LRR N, MLRA 147, 148)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **(MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **(MLRA 147, 148)**
- ___ Loamy Gleyed Matrix (F2)
- ✓ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **(LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **(MLRA 136, 122)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 148)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(MLRA 147)**
- ___ Coast Prairie Redox (A16) **(MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✓ **No** _____

Remarks:

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont

Project/Site: Martin Dairy City/County: Hillsborough/Orange Sampling Date: 5/19/2016

Applicant/Owner: Wildlands Engineering State: NC Sampling Point: Upland - DP4

Investigator(s): Win Taylor Section, Township, Range:

Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): none Slope (%): 0

Subregion (LRR or MLRA): MLRA 136 Lat: N 36.123472 Long: W 79.003959 Datum:

Soil Map Unit Name: Chewacla Loam (Ch) NWI classification: n/a

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation ✓, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes _____ No ✓

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No ✓	**Is the Sampled Area within a Wetland?** **Yes** _____ **No** ✓
Hydric Soil Present?	Yes _____	No ✓	
Wetland Hydrology Present?	Yes _____	No ✓	

Remarks:

Woody, mature vegetation absent within assessment area due to land maintained for hay production.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes _____	No ✓	Depth (inches): _____
Water Table Present?	Yes _____	No ✓	Depth (inches): _____
Saturation Present? (includes capillary fringe)	Yes _____	No ✓	Depth (inches): _____

Wetland Hydrology Present? **Yes** _____ **No** ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: Upland - DP4

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	0 = Total Cover		
Sapling/Shrub Stratum (Plot size: 15')			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	0 = Total Cover		
Herb Stratum (Plot size: 5')			
1. Festuca arundinacea	60	Yes	FACU
2. Andropogon virginicus	10	No	FACU
3. Plantago lanceolata	5	No	UPL
4. Amaranthus spinosus	2	No	FACU
5. Rubus arvensis	1	No	FA C
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	78 = Total Cover		
Woody Vine Stratum (Plot size: 30')			
1.			
2.			
3.			
4.			
5.			
6.			
	0 = Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	1	x 3 =	3
FACU species	72	x 4 =	288
UPL species	5	x 5 =	25
Column Totals:	78 (A)		313 (B)

Prevalence Index = B/A = 4.0

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes _____ No ✓

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: Upland - DP4

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-6	10YR 4/4	100					Loam	
6-12	10YR 4/3	100					Loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **(LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1) **(LRR N, MLRA 147, 148)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **(MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **(MLRA 147, 148)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **(LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **(MLRA 136, 122)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 148)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(MLRA 147)**
- ___ Coast Prairie Redox (A16) **(MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** ✓

Remarks:

Appendix 3

DWR Stream Identification Forms

1.0 DWR Stream Classification

The results of the DWR Stream Classification Forms are listed in the table below. DWR forms can be found in this appendix and in the digital submission to DMS. DWR forms were completed by Wildlands for Martin Dairy and UT1. On April 5, 2016 a DWR representative came to the site and classified E1, an ephemeral reach, on the property and provided the total stream score to Wildlands. DWR noted that riparian buffer credit could be applied to this reach during design if so desired. Wildlands has not requested credit for buffer along this reach.

Table 1: DWR Form Summary – *Martin Dairy Mitigation Site*

Stream	Geomorphology Score	Hydrology Score	Biology Score	Total Score
Martin Dairy	15	10.5	8.25	36.75
UT1[1]	15.5	8	7.25	30.75
E1	Not provided	Not provided	Not provided	14.5

1. During the proposal stage for this project and at the time of the DWR stream classification UT1 was named UT2. This was changed in the mitigation plan when the former UT1 was not selected to be part of the project. The original data sheet is named UT2.

NC DWQ Stream Identification Form Version 4.11

DP2

Date: 9/3/2015	**Project/Site:** Marlin	**Latitude:** 36.12761 N
Evaluator: KB	**County:** Orange	**Longitude:** 79.00468 W
Total Points: *Stream is at least intermittent if ≥ 19 or perennial if ≥ 30** 36.75	**Stream Determination (circle one)** Ephemeral Intermittent (Perennial)	**Other** *e.g. Quad Name:* Martin Dairy

A. Geomorphology (Subtotal = 15)	Absent	Weak	Moderate	Strong
1[a]. Continuity of channel bed and bank	0	1	2	(3)
2. Sinuosity of channel along thalweg	0	1	2	(3)
3. In-channel structure: ex. riffle-pool, step-pool, ripple-pool sequence	0	1	(2)	3
4. Particle size of stream substrate	0	1	2	(3)
5. Active/relict floodplain	0	(1)	2	3
6. Depositional bars or benches	0	(1)	2	3
7. Recent alluvial deposits	0	(1)	2	3
8. Headcuts	(0)	1	2	3
9. Grade control	0	0.5	(1)	1.5
10. Natural valley	0	0.5	(1)	1.5
11. Second or greater order channel	No = 0		(Yes = 3)	

[a] artificial ditches are not rated; see discussions in manual

B. Hydrology (Subtotal = 10.5)				
12. Presence of Baseflow	0	1	2	(3)
13. Iron oxidizing bacteria	0	1	(2)	3
14. Leaf litter	1.5	(1)	0.5	0
15. Sediment on plants or debris	0	(0.5)	1	1.5
16. Organic debris lines or piles	0	0.5	(1)	1.5
17. Soil-based evidence of high water table?	No = 0		(Yes = 3)	

C. Biology (Subtotal = 8.25)				
18. Fibrous roots in streambed	(3)	2	1	0
19. Rooted upland plants in streambed	(3)	2	1	0
20. Macrobenthos (note diversity and abundance)	0	(1)	2	3
21. Aquatic Mollusks	(0)	1	2	3
22. Fish	(0)	0.5	1	1.5
23. Crayfish	(0)	0.5	1	1.5
24. Amphibians	0	(0.5)	1	1.5
25. Algae	(0)	0.5	1	1.5
26. Wetland plants in streambed	(FACW = 0.75) OBL = 1.5 Other = 0			

*perennial streams may also be identified using other methods. See p. 35 of manual.

Notes:

Sketch:

NC DWQ Stream Identification Form Version 4.11

Date: 9/3/2015	**Project/Site:** Marsh Dairy	**Latitude:** 36.12751
Evaluator: KB, JH	**County:** Orange	**Longitude:** 79.00427
Total Points: *Stream is at least intermittent if ≥ 19 or perennial if ≥ 30** 19.25	**Stream Determination (circle one)** Ephemeral Intermittent Perennial	**Other** *e.g. Quad Name:* UT1

A. Geomorphology (Subtotal = 12)	Absent	Weak	Moderate	Strong
1[a]. Continuity of channel bed and bank	0	1	2	(3)
2. Sinuosity of channel along thalweg	0	1	(2)	3
3. In-channel structure: ex. riffle-pool, step-pool, ripple-pool sequence	0	(1)	2	3
4. Particle size of stream substrate	0	(1)	2	3
5. Active/relict floodplain	0	(1)	2	3
6. Depositional bars or benches	0	(1)	2	3
7. Recent alluvial deposits	0	(1)	2	3
8. Headcuts	0	(1)	2	3
9. Grade control	(0)	0.5	1	1.5
10. Natural valley	0	0.5	(1)	1.5
11. Second or greater order channel	(No = 0)		Yes = 3	

[a] artificial ditches are not rated; see discussions in manual

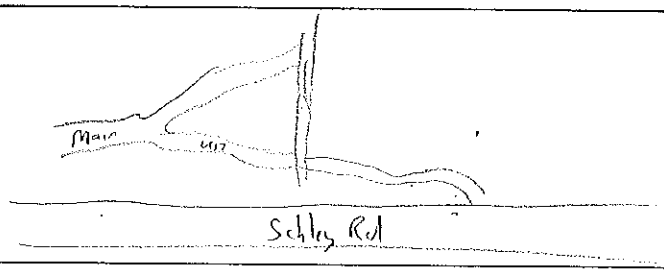
B. Hydrology (Subtotal = 2.5)				
12. Presence of Baseflow	0	(1)	2	3
13. Iron oxidizing bacteria	(0)	1	2	3
14. Leaf litter	1.5	1	(0.5)	0
15. Sediment on plants or debris	0	(0.5)	1	1.5
16. Organic debris lines or piles	0	(0.5)	1	1.5
17. Soil-based evidence of high water table?	(No = 0)		Yes = 3	

C. Biology (Subtotal = 4.75)				
18. Fibrous roots in streambed	3	(2)	1	0
19. Rooted upland plants in streambed	3	(2)	1	0
20. Macrobenthos (note diversity and abundance)	(0)	1	2	3
21. Aquatic Mollusks	(0)	1	2	3
22. Fish	(0)	0.5	1	1.5
23. Crayfish	(0)	0.5	1	1.5
24. Amphibians	(0)	0.5	1	1.5
25. Algae	(0)	0.5	1	1.5
26. Wetland plants in streambed	FACW = 0.75; OBL = 1.5 Other = 0			

*perennial streams may also be identified using other methods. See p. 35 of manual.

Notes:

Sketch:



NC DWQ Stream Identification Form Version 4.11

DP3

Date: 9/3/2015	**Project/Site:** Marks	**Latitude:** 36.12408 N
Evaluator: KB	**County:** Orange	**Longitude:** 79.00341 W
Total Points: *Stream is at least intermittent if ≥ 19 or perennial if ≥ 30** 30.75	**Stream Determination (circle one)** Ephemeral Intermittent (Perennial)	**Other** *e.g. Quad Name:* UT2

A. Geomorphology (Subtotal = 14.5)	Absent	Weak	Moderate	Strong
1[a]. Continuity of channel bed and bank	0	1	2	(3)
2. Sinuosity of channel along thalweg	0	1	(2)	3
3. In-channel structure: ex. riffle-pool, step-pool, ripple-pool sequence	0	1	(2)	3
4. Particle size of stream substrate	0	1	2	(3)
5. Active/relict floodplain	0	(1)	2	3
6. Depositional bars or benches	(0)	1	2	3
7. Recent alluvial deposits	(0)	1	2	3
8. Headcuts	(0)	1	2	3
9. Grade control	0	(0.5)	1	1.5
10. Natural valley	0	0.5	(1)	1.5
11. Second or greater order channel	No = 0		Yes = 3	

[a] artificial ditches are not rated; see discussions in manual

B. Hydrology (Subtotal = 8)				
12. Presence of Baseflow	0	(1)	2	3
13. Iron oxidizing bacteria	0	1	(2)	3
14. Leaf litter	(1.5)	1	0.5	0
15. Sediment on plants or debris	(0)	0.5	1	1.5
16. Organic debris lines or piles	0	(0.5)	1	1.5
17. Soil-based evidence of high water table?	No = 0		Yes = 3	

C. Biology (Subtotal = 7.25)				
18. Fibrous roots in streambed	3	(2)	1	0
19. Rooted upland plants in streambed	(3)	2	1	0
20. Macrobenthos (note diversity and abundance)	(0)	1	2	3
21. Aquatic Mollusks	(0)	1	2	3
22. Fish	(0)	0.5	1	1.5
23. Crayfish	0	(0.5)	1	1.5
24. Amphibians	0	(0.5)	1	1.5
25. Algae	0	(0.5)	1	1.5
26. Wetland plants in streambed	(FACW = 0.75); OBL = 1.5 Other = 0			

*perennial streams may also be identified using other methods. See p. 35 of manual.

Notes:

Sketch:

Water Resources
ENVIRONMENTAL QUALITY

PAT MCCRORY
Governor
DONALD R. VAN DER VAART
Secretary
S. JAY ZIMMERMAN
Director

April 15, 2016

John Hutton
Wildlands Holdings II, LLC
312 West Millbrook Rd, Suite 225
Raleigh, NC 27609
(via electronic mail)

DWR Project #: 2016-0366

Re: Site Viability for Buffer Mitigation & Nutrient Offset – Martin Dairy Creek
Located on Schley Rd across from Martin Hill Ln, Hillsborough, NC
Orange County

Dear John,

On April 5, 2016, Katie Merritt, with the Division of Water Resources (DWR), assisted you and others from Wildlands Engineering Inc. at the proposed Martin Dairy Mitigation Site (Site) in Hillsborough, NC. The Site is located in the Upper Falls Watershed for the Neuse River Basin within the 8-digit Hydrologic Unit Code 03020201. The Site is being proposed as part of a full-delivery stream restoration project for the Division of Mitigation Services (RFP #16-006477). The Interagency Review Team (IRT) was also present onsite. At your request, Ms. Merritt, performed a site assessment of the two features onsite, which are more accurately shown in the attached aerial signed by Ms. Merritt on April 15, 2016. If approved, mitigating this site could provide stream mitigation credits, riparian buffer credits and/or nutrient offset credits.

Ms. Merritt's evaluation of the features for buffer and nutrient offset mitigation pursuant to Rule 15A NCAC 02B .0295 (effective November 1, 2015) and Rule 15A NCAC 02B .0240 is provided below:

Martin Dairy Creek and UT2

- Features are streams.
- Land use within the riparian areas (0 to +/- 200') adjacent to both sides of the streams comprise of managed fescue.
- The riparian areas along the streams are viable for riparian restoration and suitable for buffer mitigation only.
- Stream restoration is proposed on these streams. Therefore, riparian restoration efforts shall occur in conjunction with the stream restoration and not before.
- For nutrient offset viability to be determined, the landowner must provide proof in writing that the land is being used for agriculture or has been used for agriculture previously. Dates supported by photos or other written records must be included to document any uses of the land not observed during the site visit on April 5, 2016.

401 and Buffer Permitting Unit
1617 Mail Service Center, Raleigh, North Carolina 27699-1617
Location: 512 N. Salisbury St. Raleigh, North Carolina 27604
Phone: 919-807-6300 \ FAX: 919-807-6494
Internet: www.ncwaterquality.org

Ephemeral Reach

- The feature is a modified natural channel located within a topographic crenulation indicative of a natural drainage on the 1:24,000 quad topographic map prepared by the U.S. Geologic Survey. Ms. Merritt rated the channel using the NC DWR Stream Identification Form Version 4.11. The rating she received on the form was a 14.5; Therefore, the feature is ephemeral.
- Land use within the riparian areas (0 to +/- 200') adjacent to both sides of the streams comprise of managed fescue.
- The riparian areas along the streams are viable for riparian restoration and suitable for buffer mitigation only.
- For nutrient offset viability to be determined, the landowner must provide proof in writing that the land is being used for agriculture or has been used for agriculture previously. Dates, supported by photos or other written records, must be included to document any uses of the land not observed during the site visit on April 5, 2016.

Maps showing the project site and the features are provided and signed by Ms. Merritt on April 15, 2016. This letter should be provided in all future mitigation plans for this Site. In addition, all vegetative plantings, performance criteria and mitigation requirements for riparian restoration must following the requirements in 15A NCAC 02B .0295 to be eligible for buffer and nutrient offset credits.

For any areas depicted as not being viable for nutrient offset credit, one could propose a different measure other than riparian restoration, along with supporting calculations and sufficient detail to support estimates of load reduction, for review by the DWR to determine viability for nutrient offset according to 15A NCAC 02B .0240.

Please contact Katie Merritt at (919)-807-6371 if you have any questions regarding this correspondence.

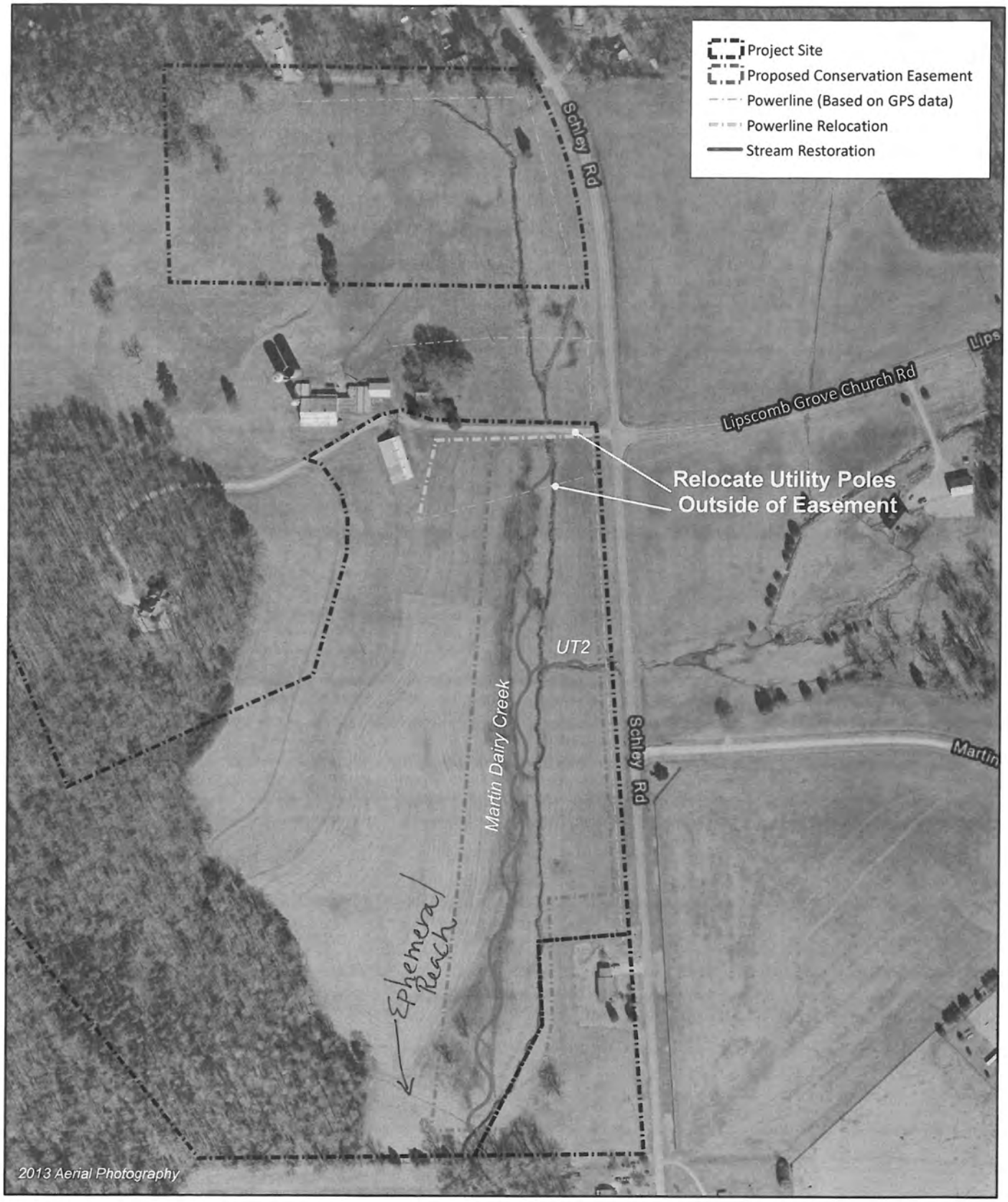
Sincerely,

Karen Higgins

Karen Higgins, Supervisor
401 and Buffer Permitting Branch

KAH/*km*
Attachments: Site Aerial Map and Topographic Map

cc:File Copy (Katie Merritt)
DMS – Jeff Schaffer (via electronic mail)



WILDLANDS ENGINEERING

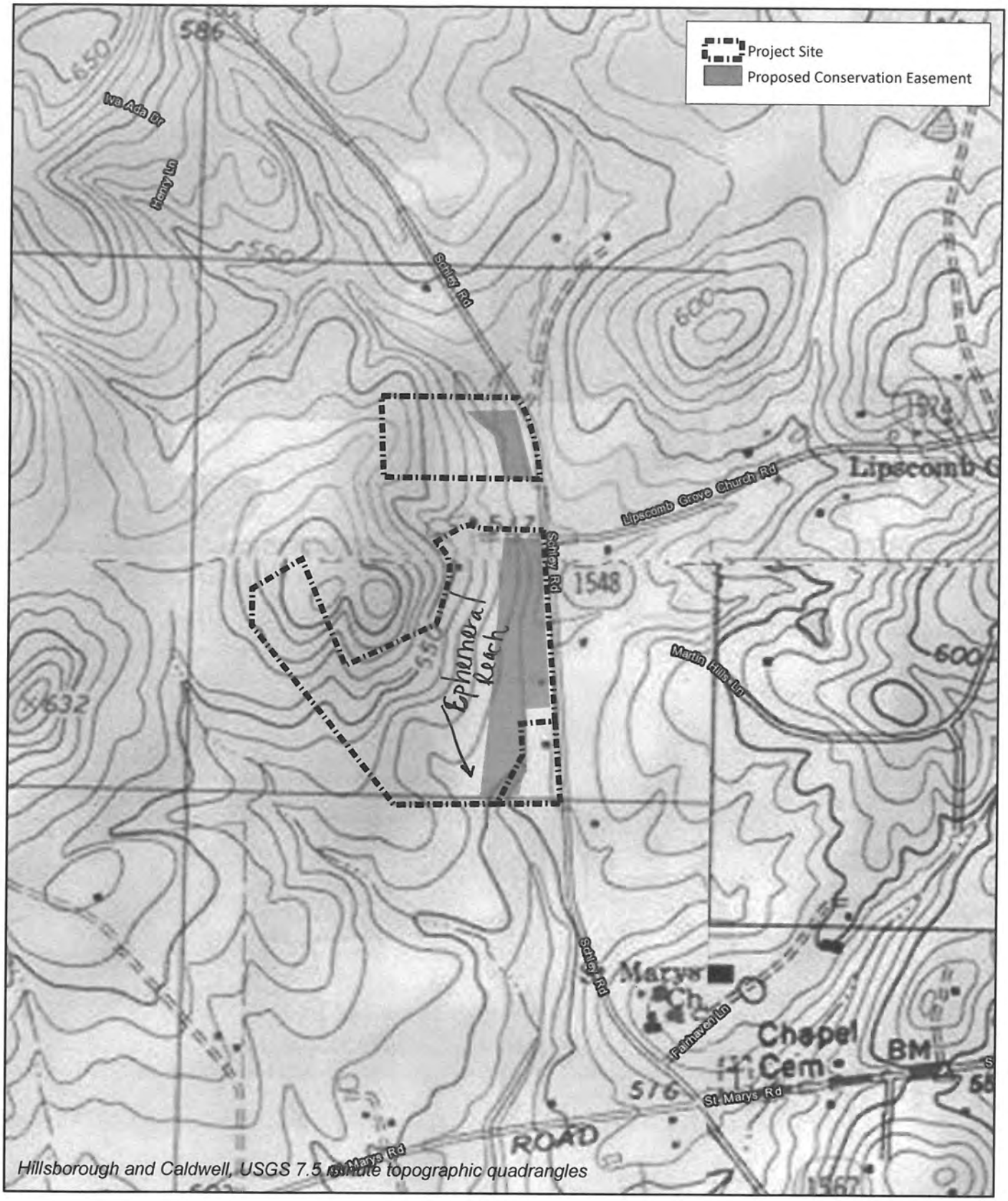
0 300 Feet

N

Figure 7b Concept Map - Option 2
Martin Dairy Mitigation Site
Neuse River Basin 03020201

Orange County, NC

Kym 4/15/14
DWR# 2016-0366



Hillsborough and Caldwell, USGS 7.5 minute topographic quadrangles

WILDLANDS ENGINEERING

0 800 Feet

N

Figure 4 Topographic Map
Martin Dairy Mitigation Site
Neuse River Basin 03020201

Orange County, NC

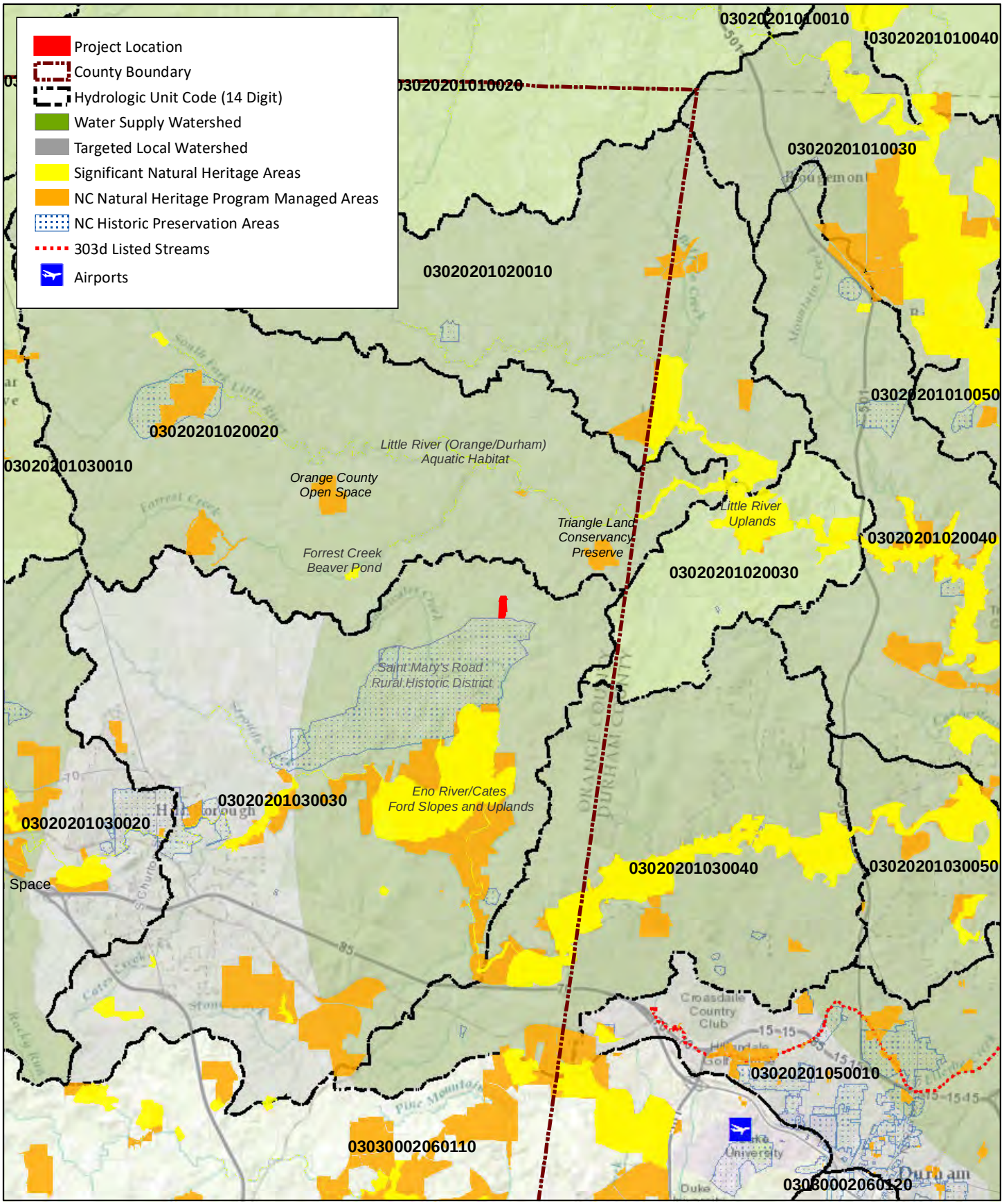
KYM
4/15/14
DWR# 2010-0366

Appendix 4

Data, Analysis, Supplementary Information, Figures, and Maps

Appendix 4 Table

of Contents



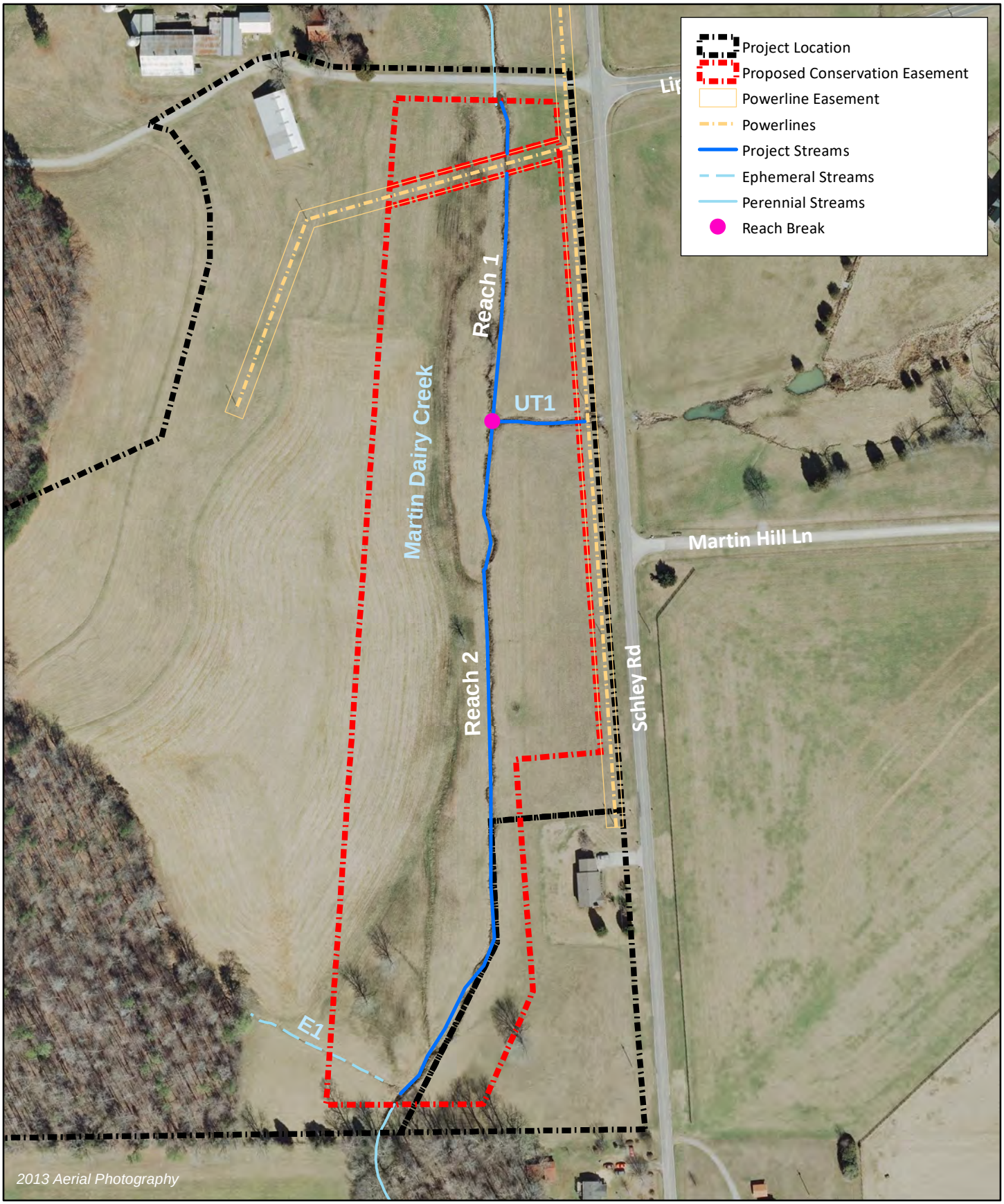
WILDLANDS ENGINEERING

0 2.5 Miles

N

Figure 1 Vicinity Map
Martin Dairy Mitigation Site
Neuse River Basin 03020201

Orange County, NC



WILDLANDS ENGINEERING

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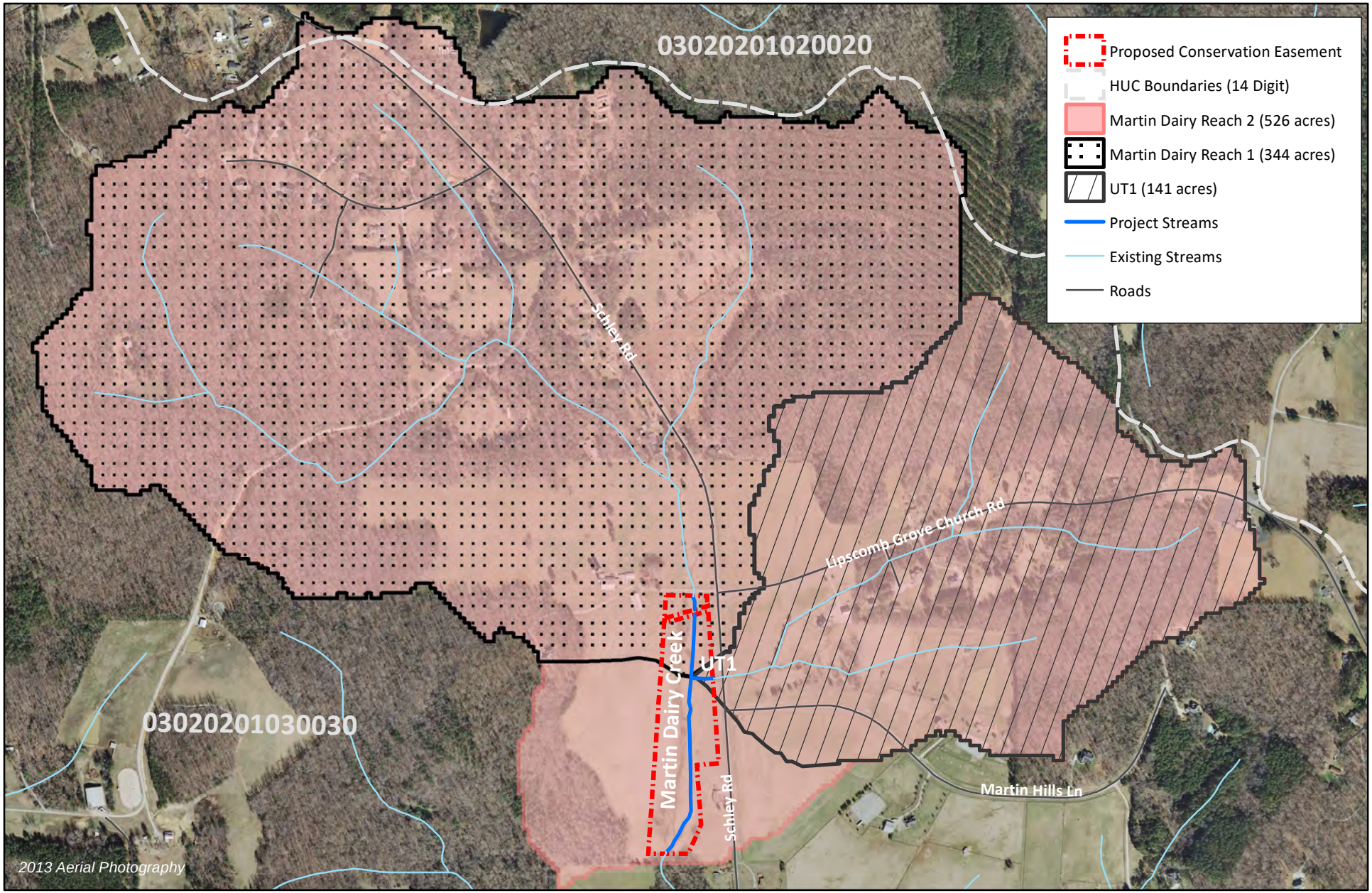
Figure 2 Site Map
Martin Dairy Mitigation Site
Neuse River Basin 03020201

Orange County, NC



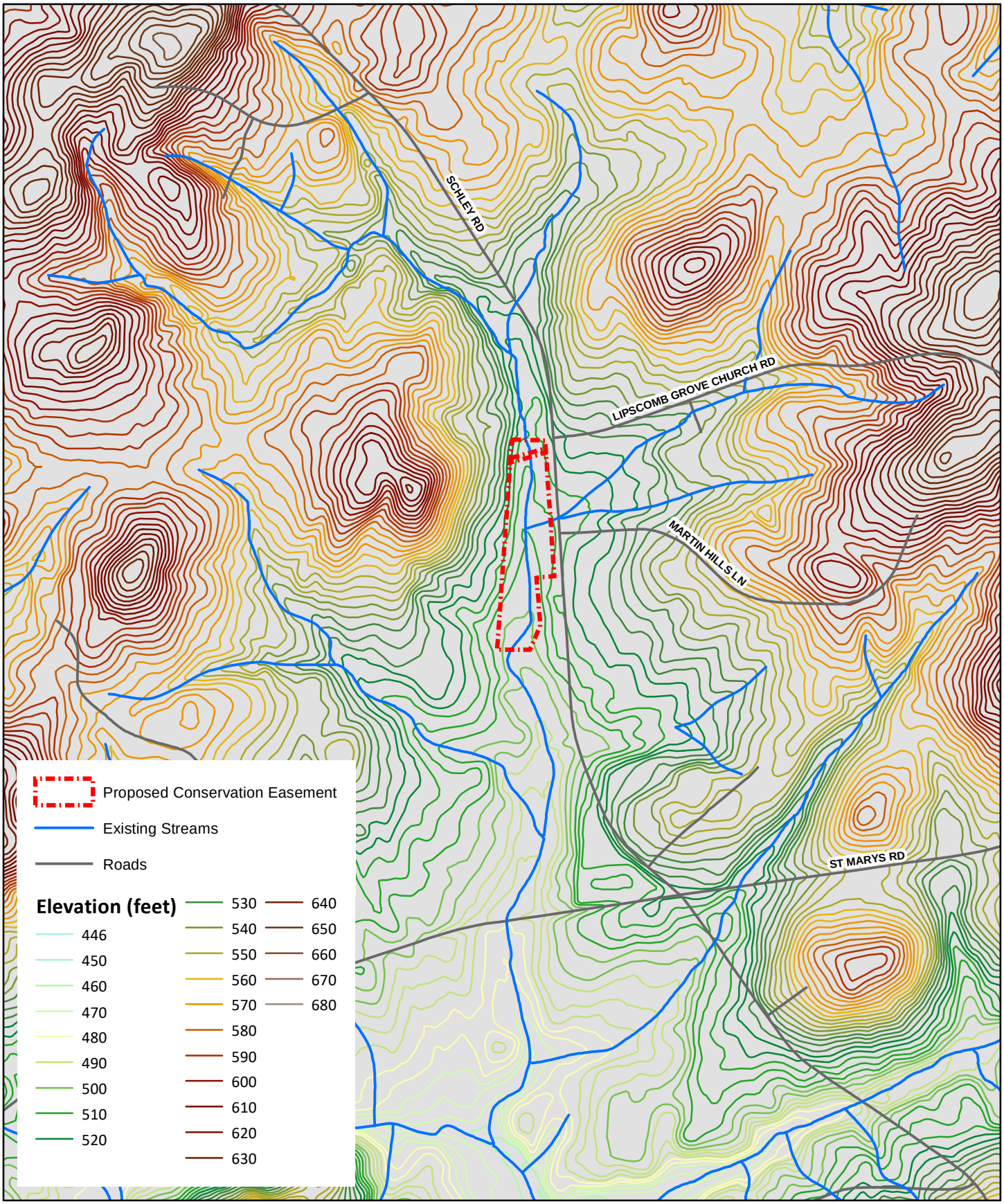
WILDLANDS ENGINEERING

0 500 1,000 1,500 2,000 Feet

N

Figure 3 Watershed Map
Martin Dairy Mitigation Site
Neuse River Basin 03020201

Orange County, NC



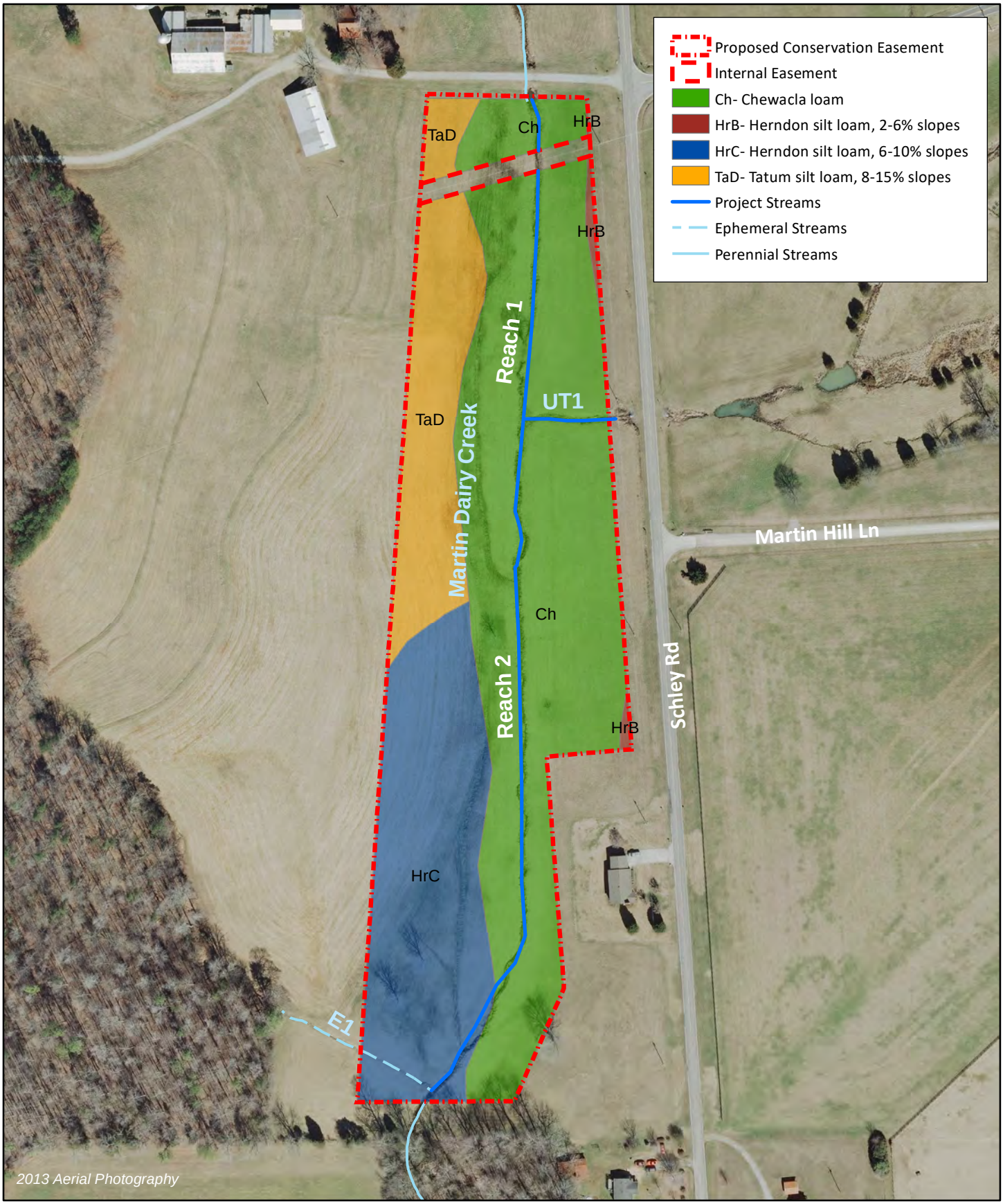
WILDLANDS ENGINEERING

0 1,000 Feet

N

Figure 4 LIDAR Map
Martin Dairy Mitigation Site
Neuse River Basin 03020201

Orange County, NC



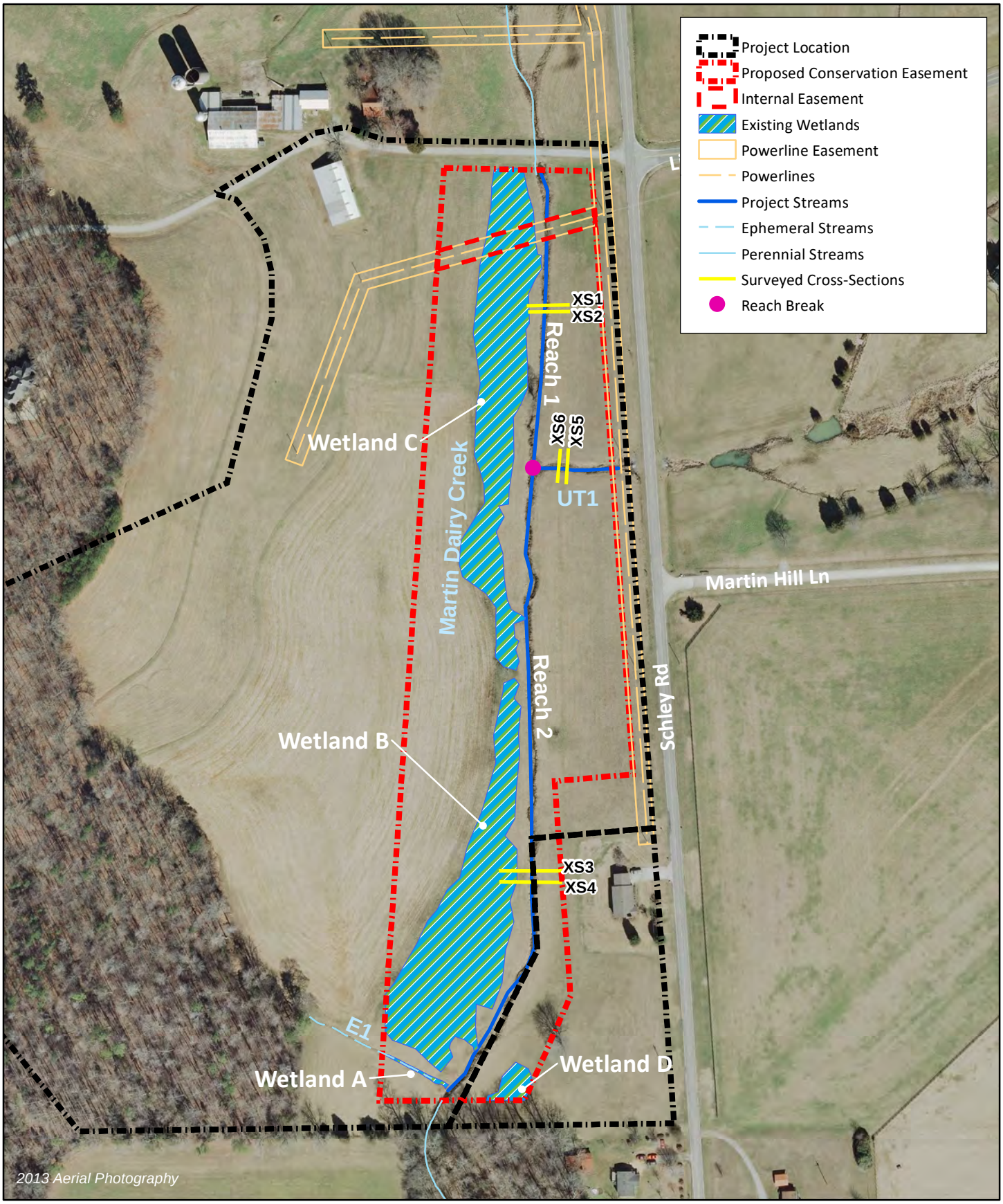
WILDLANDS ENGINEERING

0 300 Feet

N

Figure 5 Soils Map
Martin Dairy Mitigation Site
Neuse River Basin 03020201

Orange County, NC



WILDLANDS ENGINEERING

0 300 Feet

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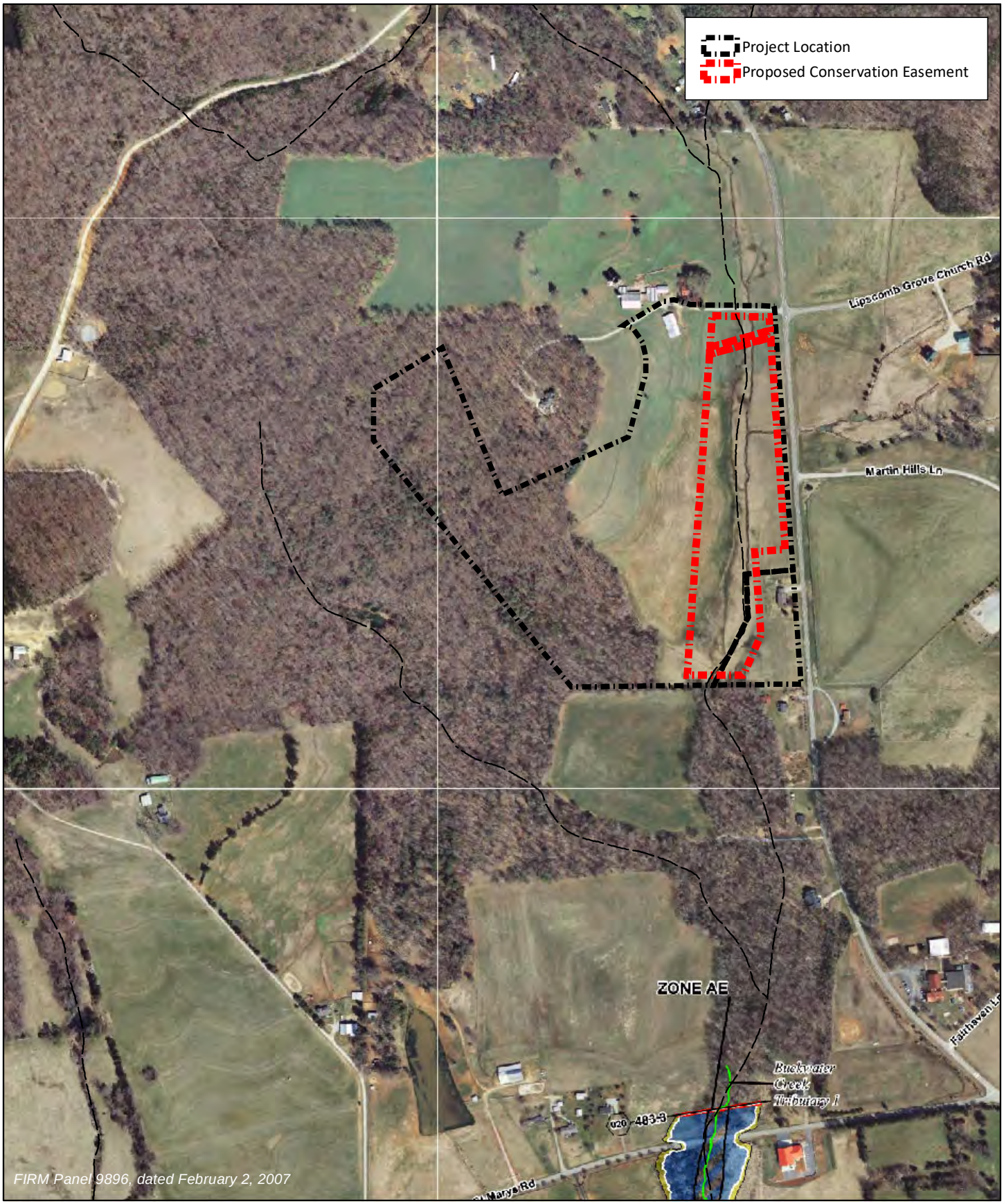
Figure 6 Existing Conditions Map
Martin Dairy Mitigation Site
Neuse River Basin 03020201

Orange County, NC



WILDLANDS ENGINEERING

0 300 Feet

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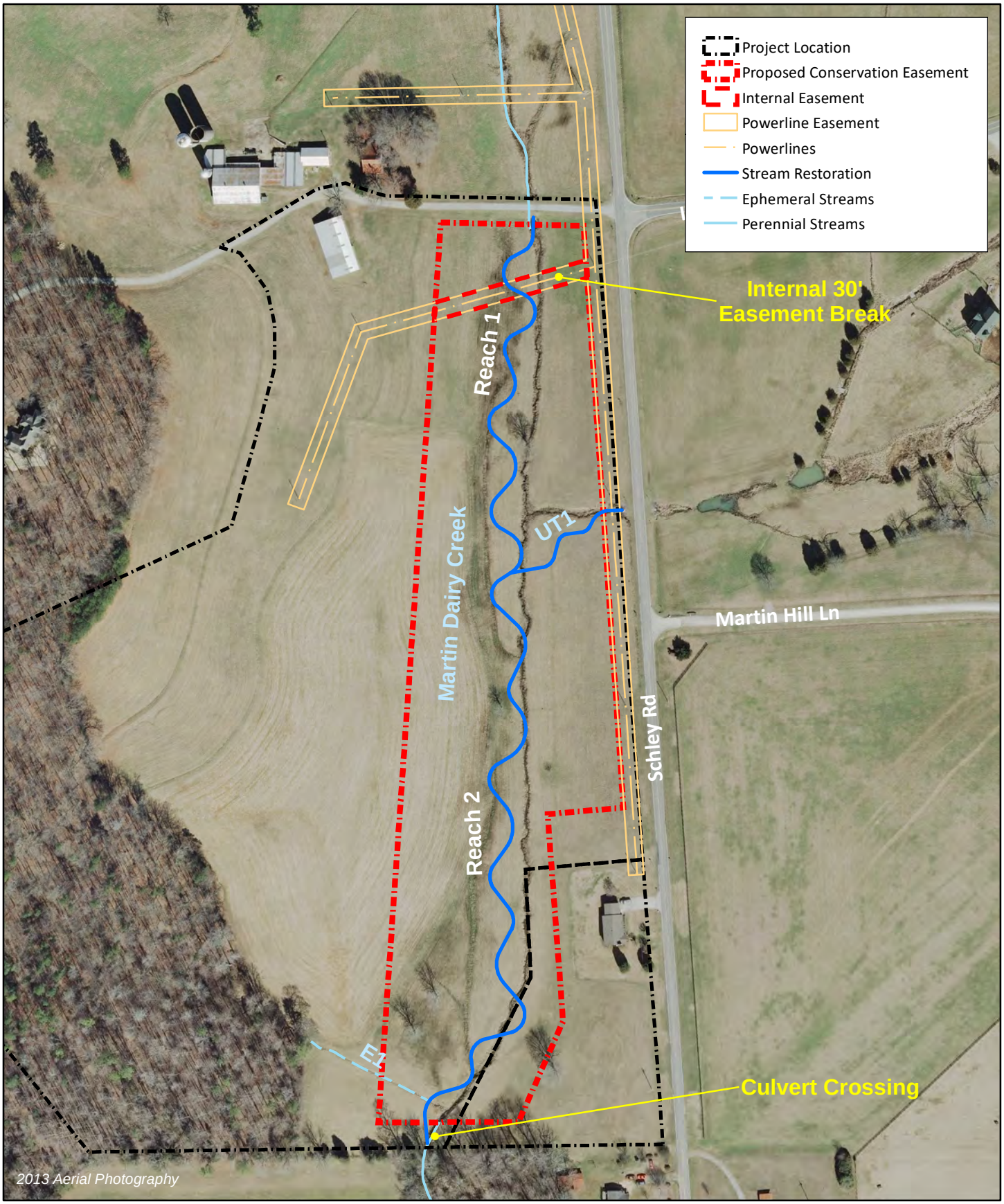
Figure 7 FEMA Map
Martin Dairy Mitigation Site
Neuse River Basin 03020201

Orange County, NC



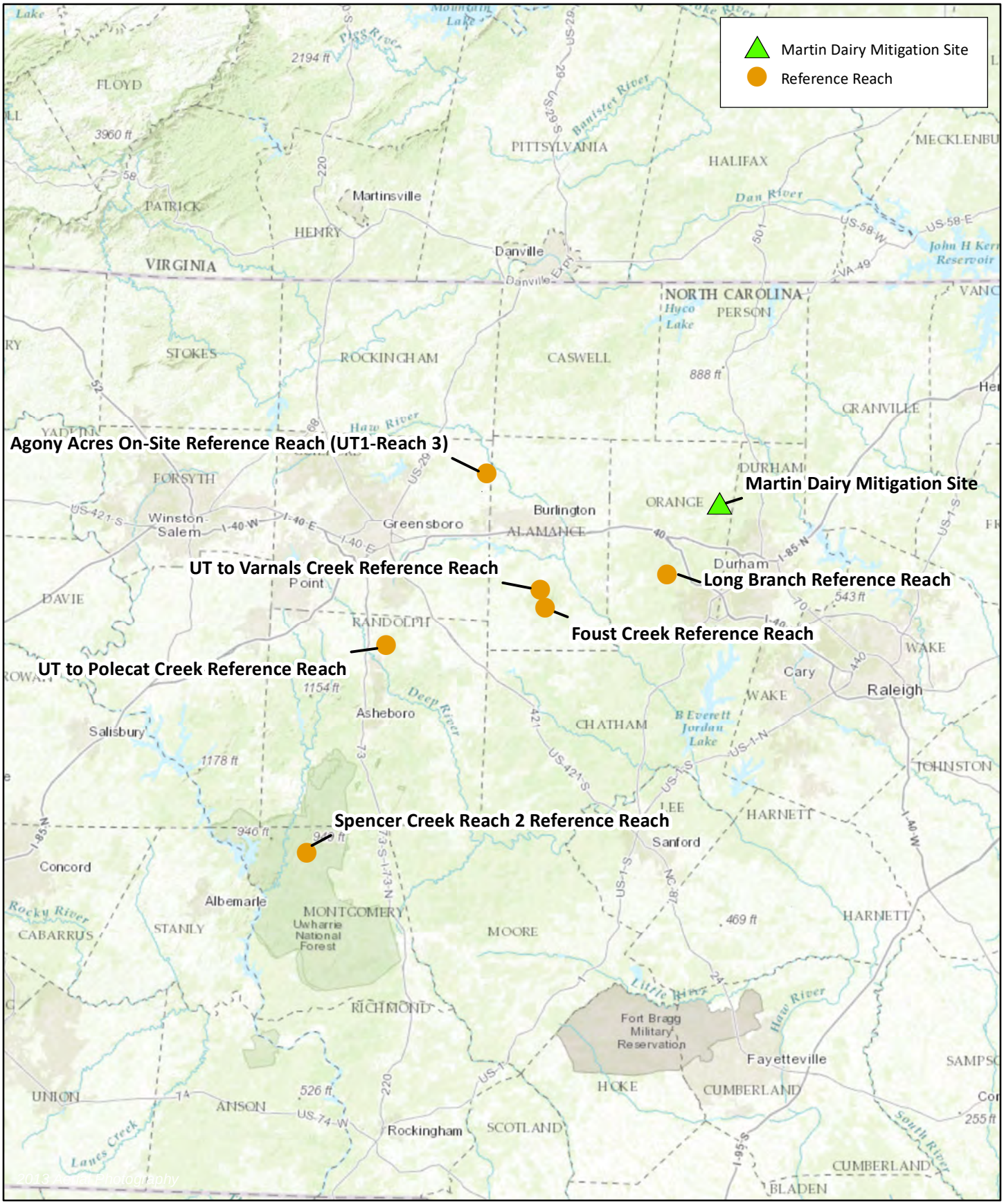
WILDLANDS ENGINEERING

0 300 Feet

N

Figure 8 Concept Design Map
Martin Dairy Mitigation Site
Neuse River Basin 03020201

Orange County, NC



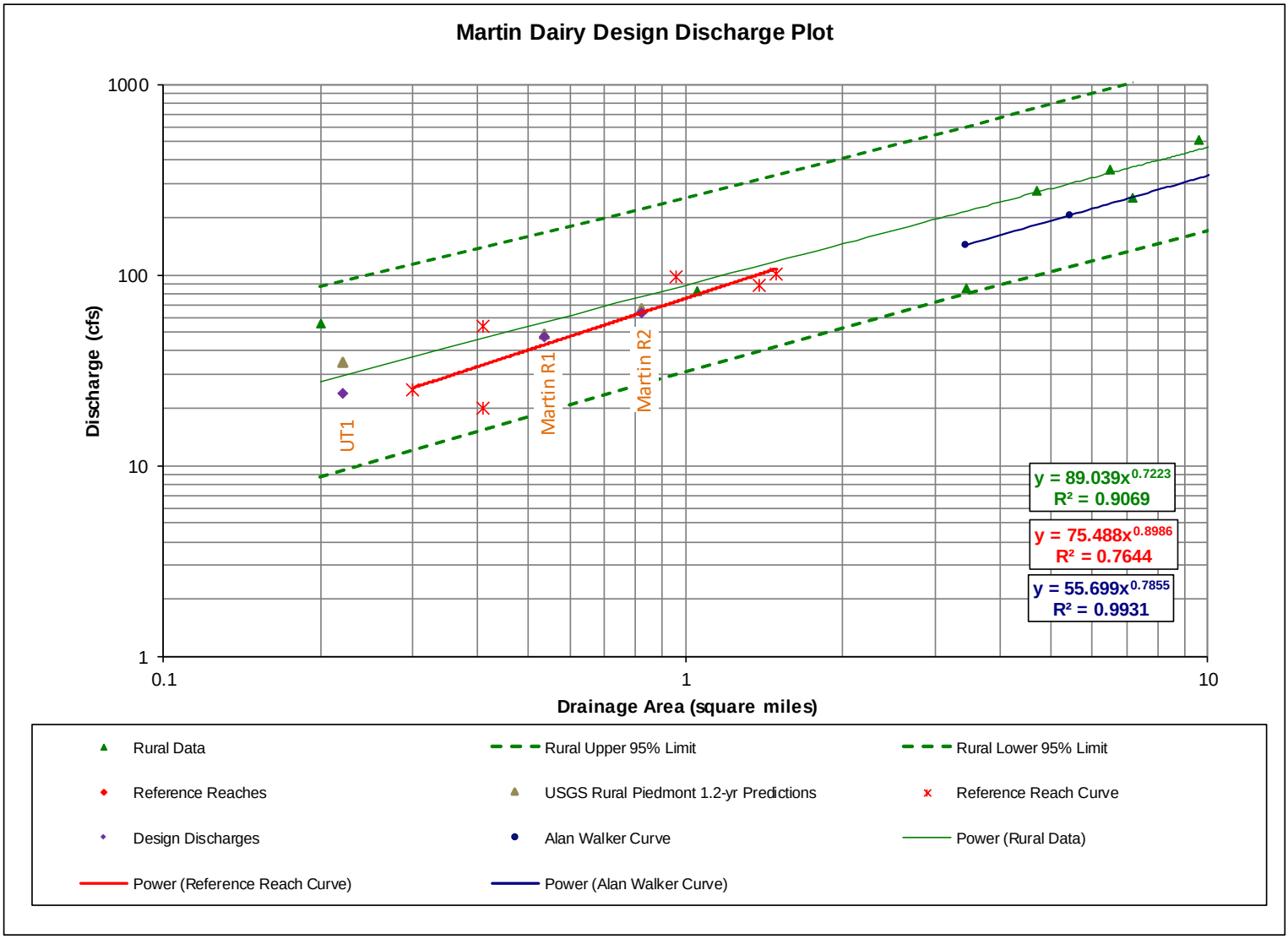
WILDLANDS ENGINEERING

0 10 20 30 Miles

N

Figure 9 Reference Reach Vicinity Map
Martin Dairy Mitigation Site
Neuse River Basin 03020201

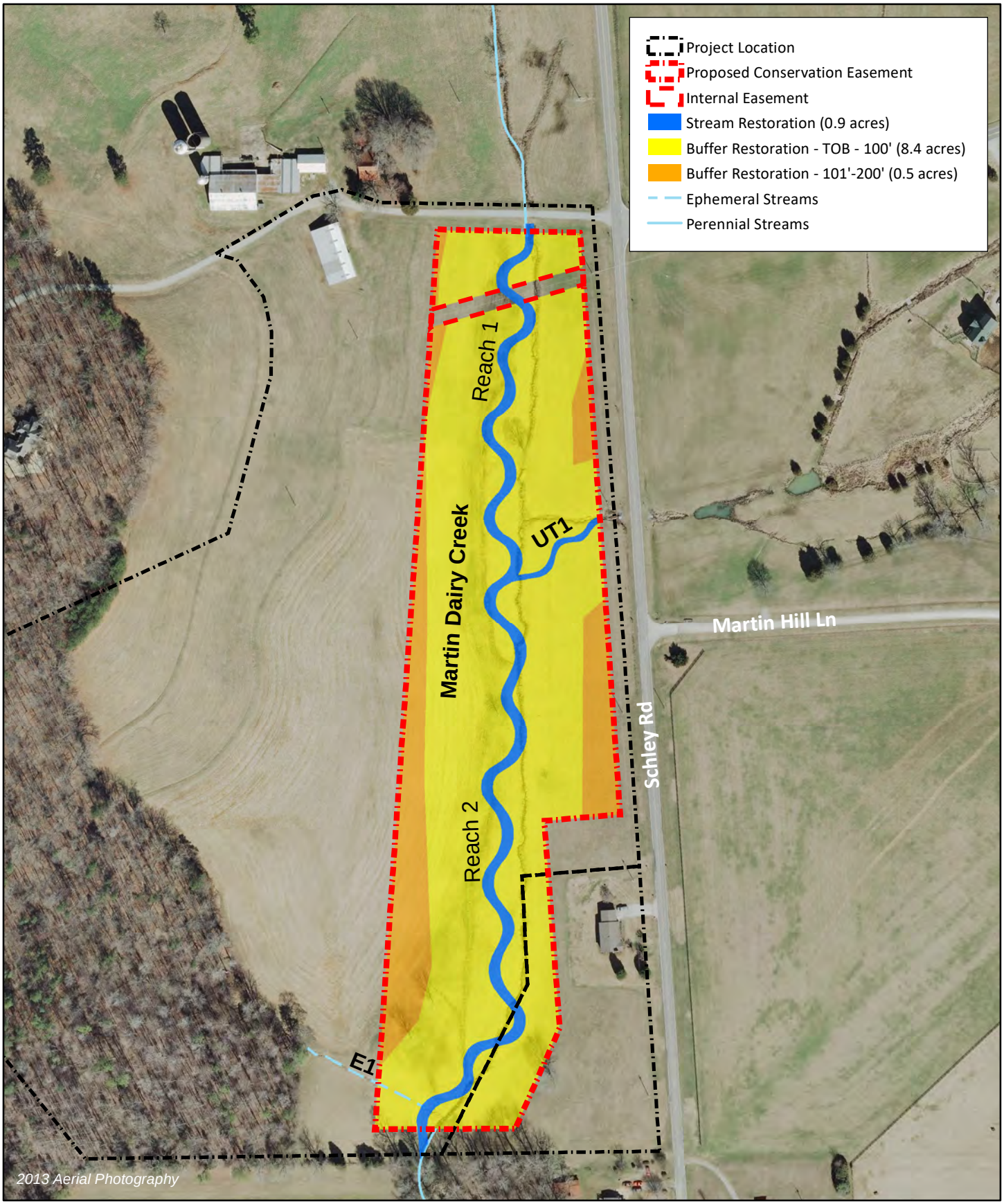
Orange County, NC



WILDLANDS ENGINEERING

Figure 10 Discharge Analysis
Martin Dairy Mitigation Site
Neuse River Basin 03020201

Orange County, NC



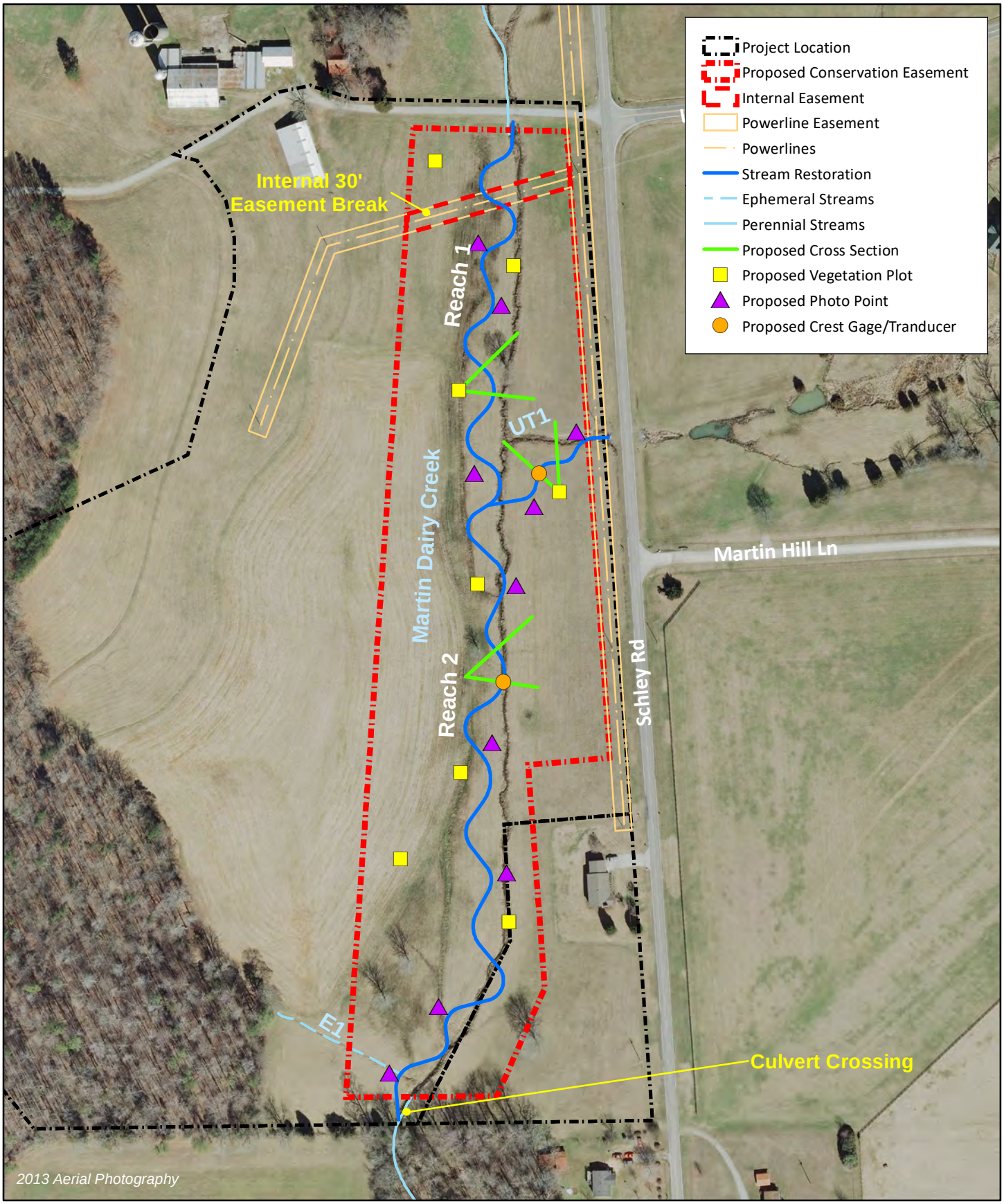
WILDLANDS ENGINEERING

0 300 Feet

N

Figure 11 Riparian Buffer Concept Map
Martin Dairy Mitigation Site
Neuse River Basin 03020201

Orange County, NC



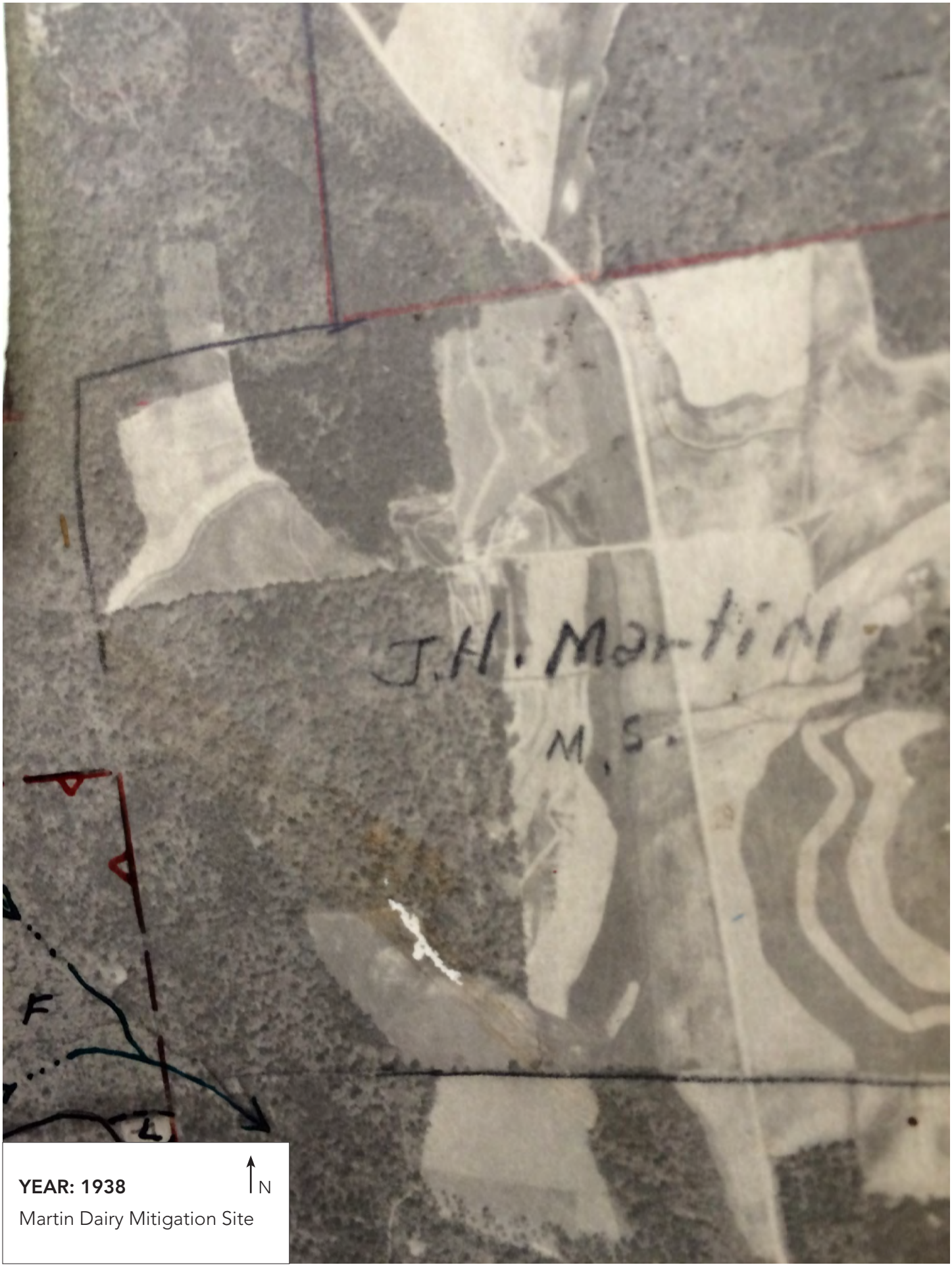
WILDLANDS ENGINEERING

0 300 Feet

N

Figure 12 Monitoring Components Map
Martin Dairy Mitigation Site
Neuse River Basin 03020201

Orange County, NC



YEAR: 1938

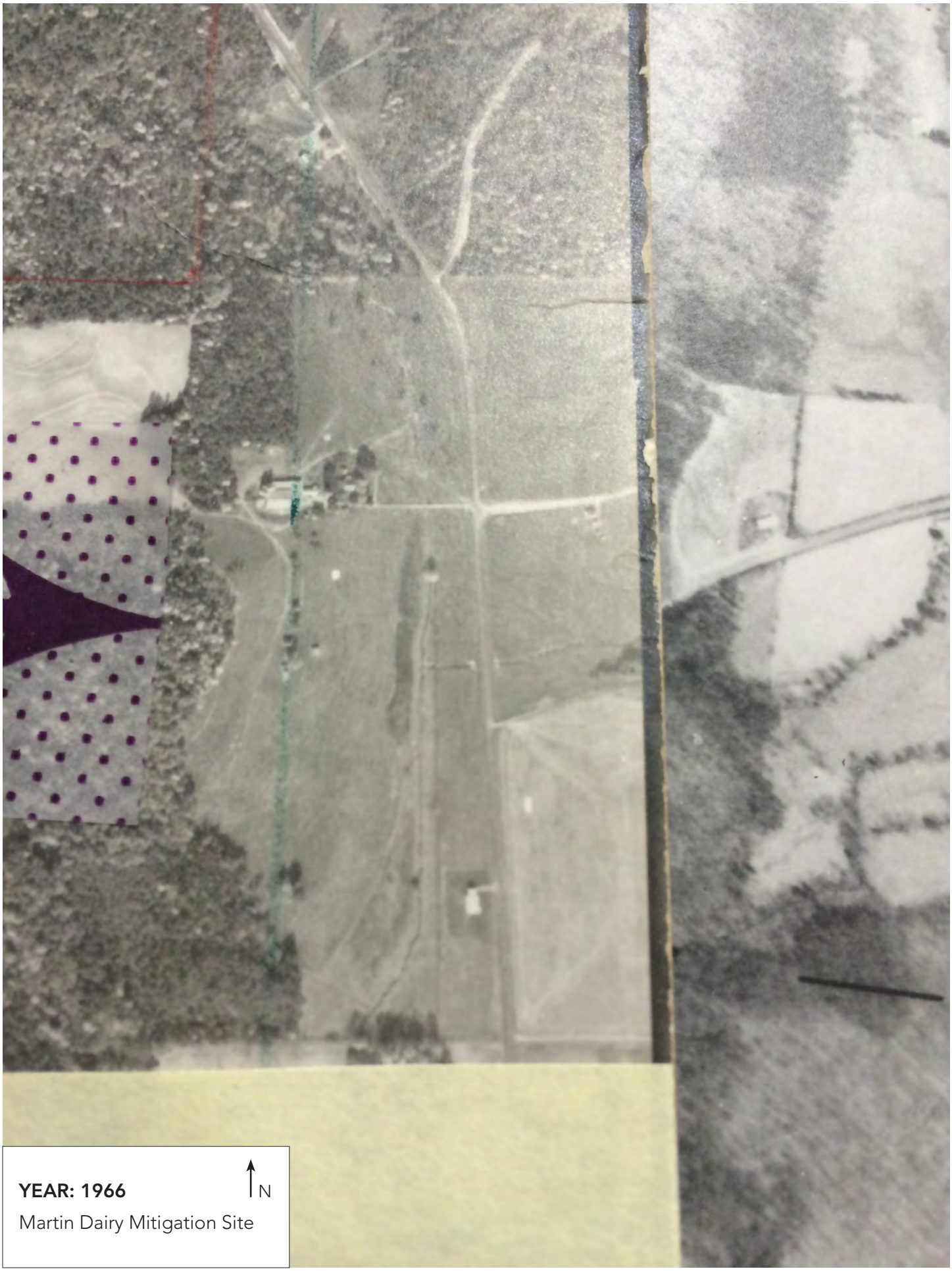
N

Martin Dairy Mitigation Site

YEAR: 1955

N

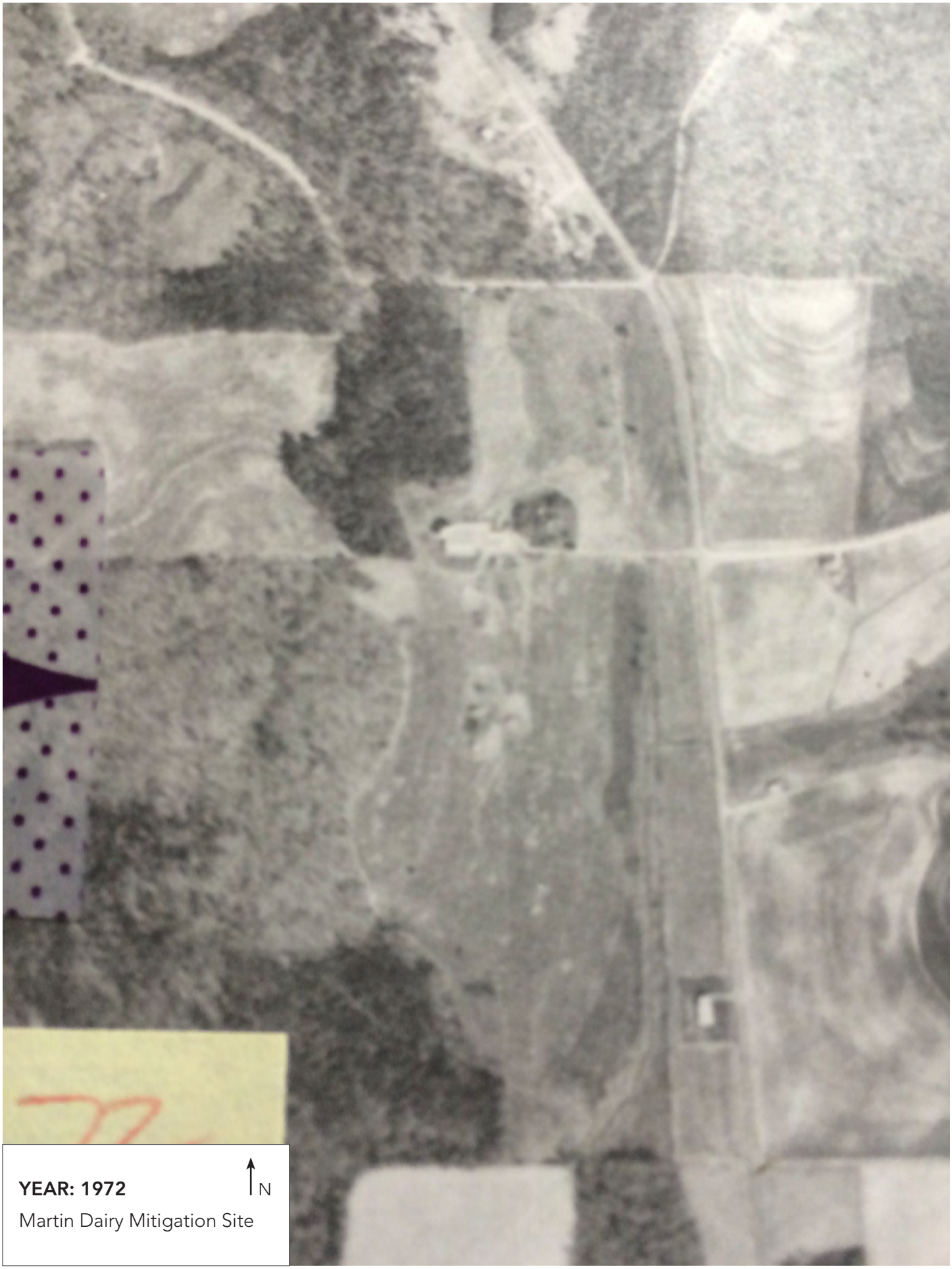
Martin Dairy Mitigation Site



YEAR: 1966

N

Martin Dairy Mitigation Site



YEAR: 1972

N

Martin Dairy Mitigation Site

Martin Dairy Reach 1 and UT1

Martin Dairy Reach 2

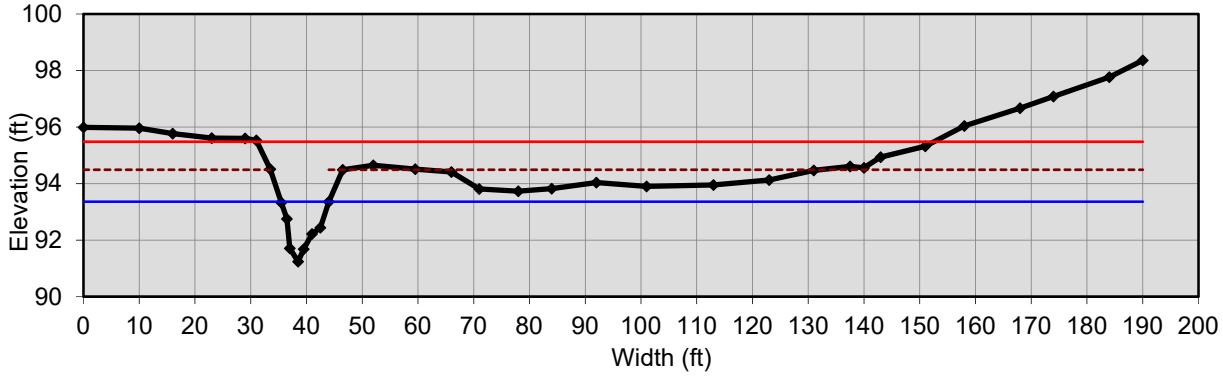
Martin Dairy Reach 2 and Riparian Wetlands

UT1

Existing Conditions Geomorphic Parameters								
Parameter	**Notation**	**Units**	**Martin Dairy R1**		**Martin Dairy R2**		**UT1**	
			min	**max**	**min**	**max**	**min**	**max**
stream type			C4/E4		C4/E4		C4/E4	
drainage area	DA	sq mi	0.54		0.82		0.22	
bankfull cross-sectional area	A_{bkf}	SF	10		16.1		5.7	
avg velocity during bankfull event	v_{bkf}	fps	5		3.8		4.7	
width at bankfull	w_{bkf}	feet	8.6		14.0		5.7	
maximum depth at bankfull	d_{max}	feet	2.1		2.4		1.4	
mean depth at bankfull	d_{bkf}	feet	1.2		1.2		1.0	
bankfull width to depth ratio	w_{bkf}/d_{bkf}		7.3		12.2		5.7	
low bank height		feet	3.3		3.4		3.0	
bank height ratio	BHR		1.5		1.4		2.1	
floodprone area width	w_{fpa}	feet	121.4		200+		12.7	
entrenchment ratio	ER		14.2		14.3+		2.2	
max pool depth at bankfull	d_{pool}	feet	2.7		3.5		2.0	
pool depth ratio	d_{pool}/d_{bkf}		2.3		2.9		2.0	
pool width at bankfull	w_{pool}	feet	13.7		10.9		8.7	
pool width ratio	w_{pool}/w_{bkf}		1.6		0.8		1.5	
Bkf pool cross-sectional area	A_{pool}	SF	18.9		22.8		6.7	
pool area ratio	A_{pool}/A_{bkf}		1.9		1.4		1.2	
pool-pool pacing	p-p	feet	16.0	91.0	22.0	108.0	27.0	44.0
pool-pool spacing ratio	$p\text{-}p/W_{bkf}$		1.9	10.6	1.6	7.7	4.7	7.7
valley slope	S_{valley}	feet/ foot	0.0080		0.0078		0.0181	
channel slope[1]	$S_{channel}$	feet/ foot	0.0090		0.0070		0.0160	
sinuosity	K		1.05		1.09		1.05	
belt width	w_{blt}	feet	15.0	20.0	17.0	28.0	9.0	19.0
meander width ratio	w_{blt}/w_{bkf}		1.7	2.3	1.2	2.0	1.6	3.3
meander length	L_m	feet	46.0	74.0	46.0	114.0	35.0	47.0
meander length ratio	L_m/w_{bkf}		5.3	8.6	3.3	8.1	6.1	8.2
Linear Wavelength	LW		43.0	63.0	45.0	107.0	35.0	40.0
Linear Wavelength	LW/w_{bkf}		5.0	7.3	3.2	7.6	6.1	7.0
radius of curvature	R_c	feet	11.0	32.0	7.0	46.0	4.0	13.0
radius of curvature ratio	R_c/ w_{bkf}		1.3	3.7	0.5	3.3	0.7	2.3
1. Channel slope is steeper than valley slope on Martin Dairy Reach 1 as a result of active incision								

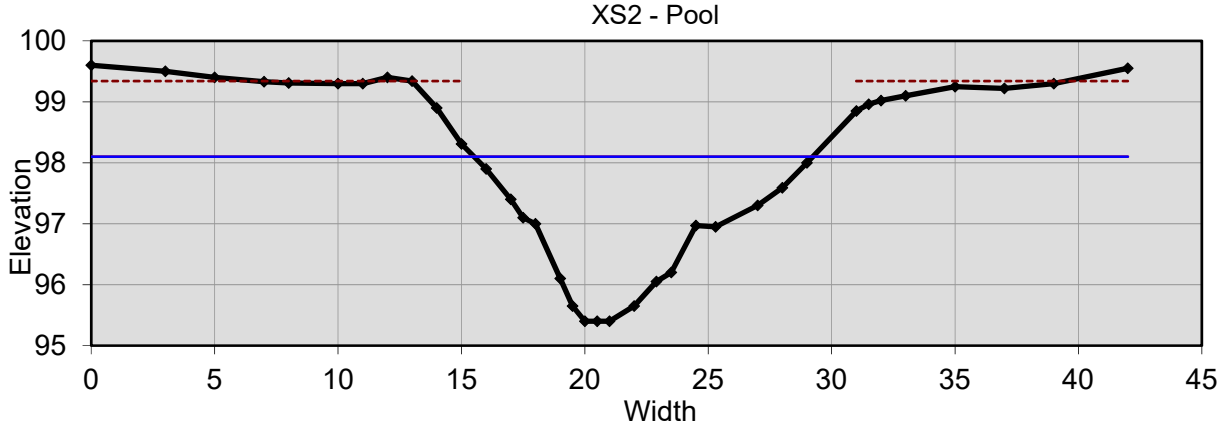
Martin Dairy Reach 1

XS1 - Riffle



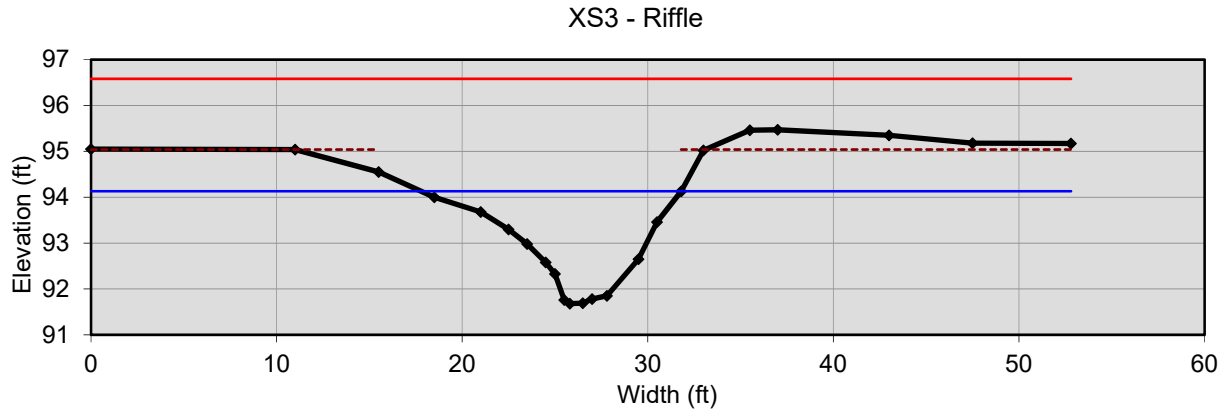
Bankfull Dimensions		Flood Dimensions		Materials	
10.0	x-section area (ft.sq.)	121.4	W flood prone area (ft)	11	D50 Riffle (mm)
8.6	width (ft)	14.2	entrenchment ratio	33	D84 Riffle (mm)
1.2	mean depth (ft)	3.3	low bank height (ft)	37	threshold grain size (mm):
2.1	max depth (ft)	1.5	low bank height ratio		
9.9	wetted parimeter (ft)				
1.0	hydraulic radius (ft)				
7.3	width-depth ratio				

XS2 - Pool

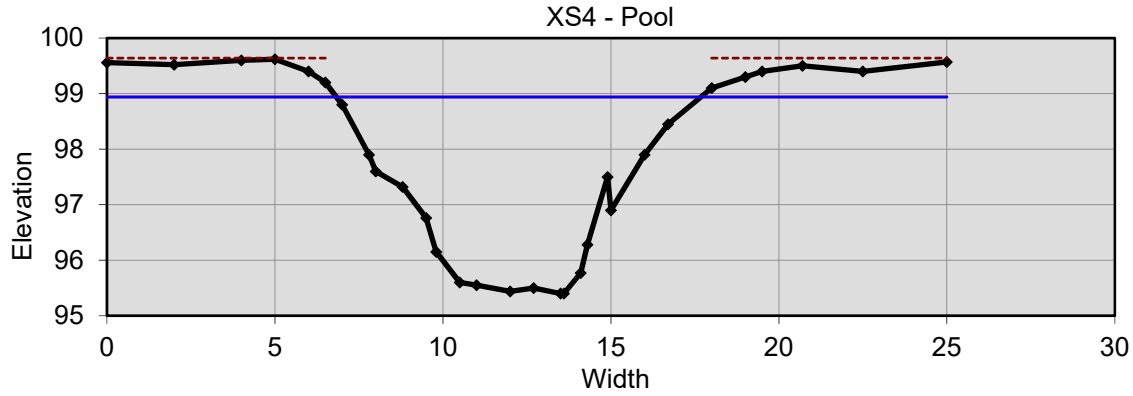


Bankfull Dimensions		Flood Dimensions	
18.9	x-section area (ft.sq.)	-	W flood prone area (ft)
13.7	width (ft)	-	entrenchment ratio
1.4	mean depth (ft)	3.9	low bank height (ft)
2.7	max depth (ft)	1.5	low bank height ratio
15.1	wetted parimeter (ft)		
1.3	hyd radi (ft)		
9.9	width-depth ratio		

Martin Dairy Reach 2

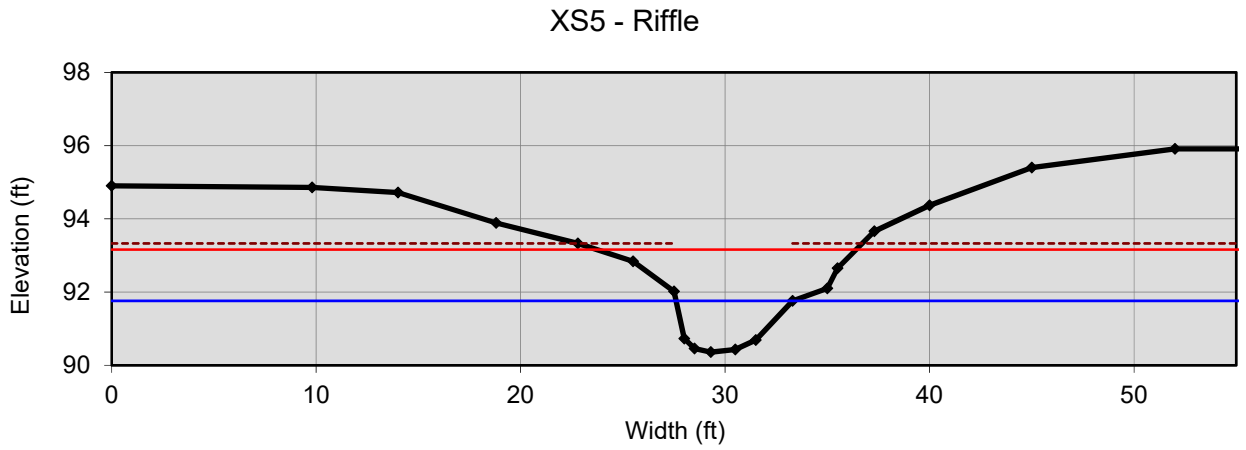


Bankfull Dimensions		Flood Dimensions		Materials	
16.1	x-section area (ft.sq.)	200.0	W flood prone area (ft)	11	D50 Riffle (mm)
14.0	width (ft)	14.3	entrenchment ratio	33	D84 Riffle (mm)
1.2	mean depth (ft)	3.4	low bank height (ft)	22	threshold grain size (mm):
2.4	max depth (ft)	1.4	low bank height ratio		
15.2	wetted parimeter (ft)				
1.1	hydraulic radius (ft)				
12.2	width-depth ratio				

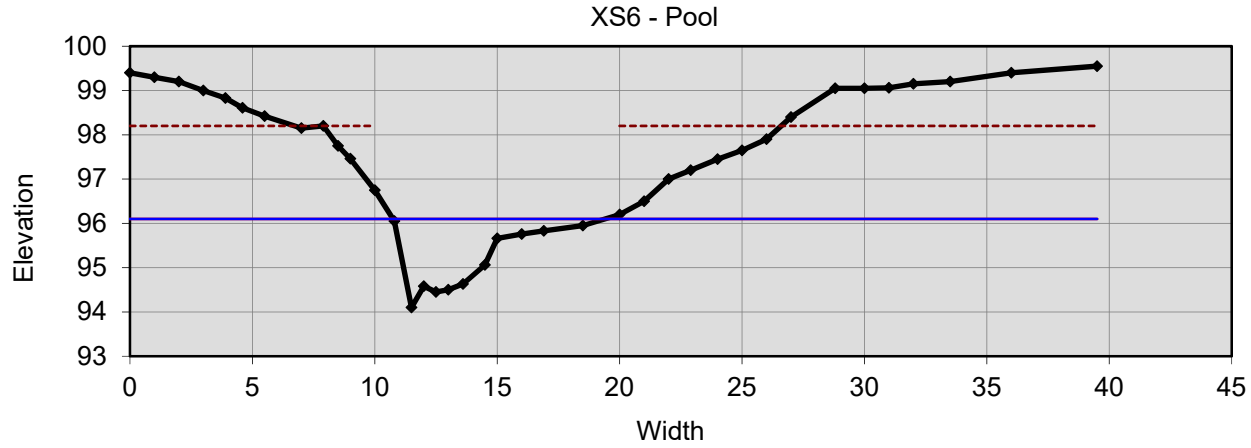


Bankfull Dimensions		Flood Dimensions	
22.8	x-section area (ft.sq.)	-	W flood prone area (ft)
10.9	width (ft)	-	entrenchment ratio
2.1	mean depth (ft)	4.2	low bank height (ft)
3.5	max depth (ft)	1.2	low bank height ratio
14.8	wetted parimeter (ft)		
1.5	hyd radi (ft)		
5.2	width-depth ratio		

UT1

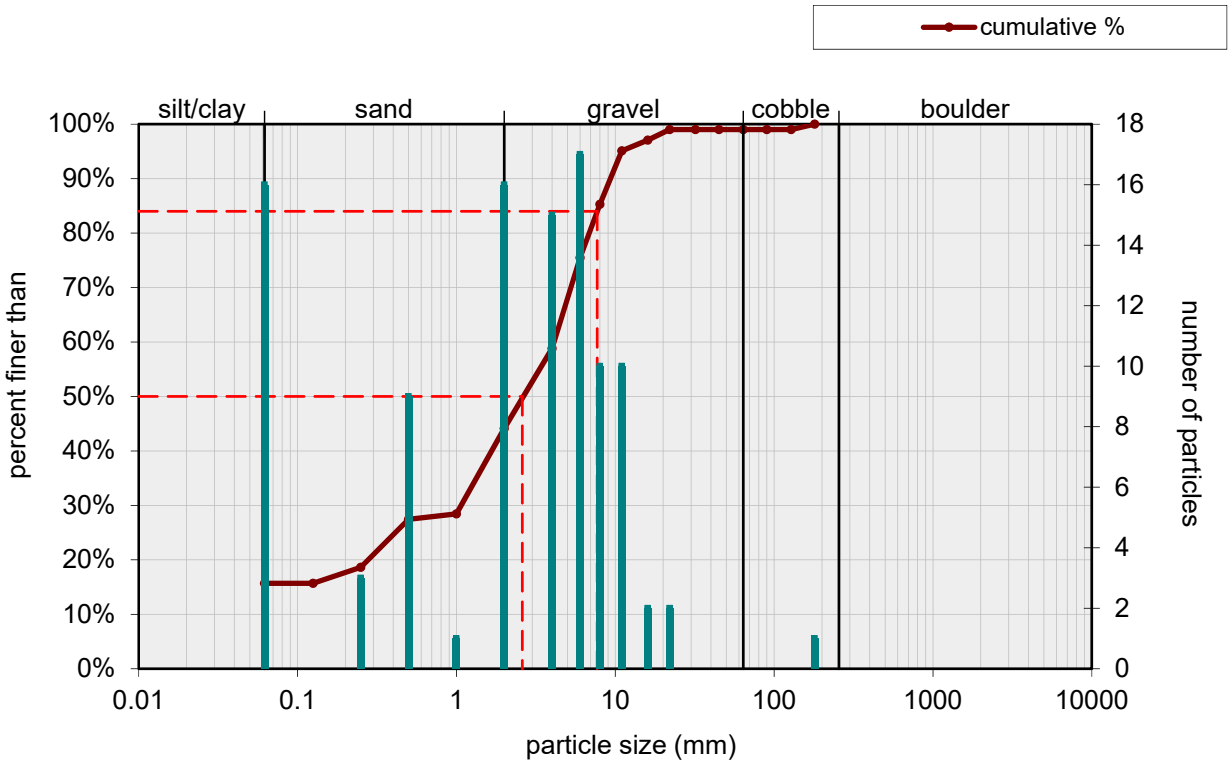


Bankfull Dimensions		Flood Dimensions		Materials	
5.7	x-section area (ft.sq.)	12.7	W flood prone area (ft)	11	D50 Riffle (mm)
5.7	width (ft)	2.2	entrenchment ratio	33	D84 Riffle (mm)
1.0	mean depth (ft)	3.0	low bank height (ft)	37	threshold grain size (mm):
1.4	max depth (ft)	2.1	low bank height ratio		
6.8	wetted parimeter (ft)				
0.8	hydraulic radius (ft)				
5.7	width-depth ratio				



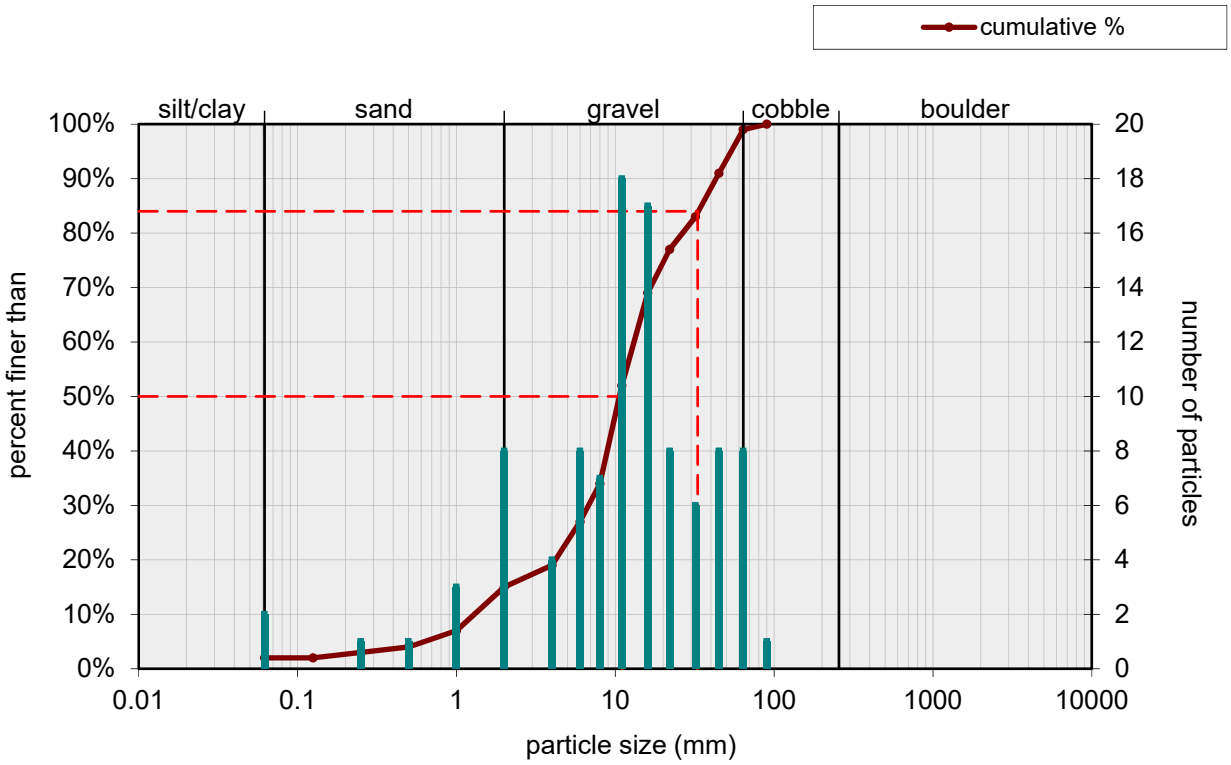
Bankfull Dimensions		Flood Dimensions	
6.7	x-section area (ft.sq.)	-	W flood prone area (ft)
8.7	width (ft)	-	entrenchment ratio
0.8	mean depth (ft)	4.1	low bank height (ft)
2.0	max depth (ft)	2.1	low bank height ratio
10.7	wetted parimeter (ft)		
0.6	hyd radi (ft)		
11.2	width-depth ratio		

Riffle Surface Pebble Count, Martin R1, XS1



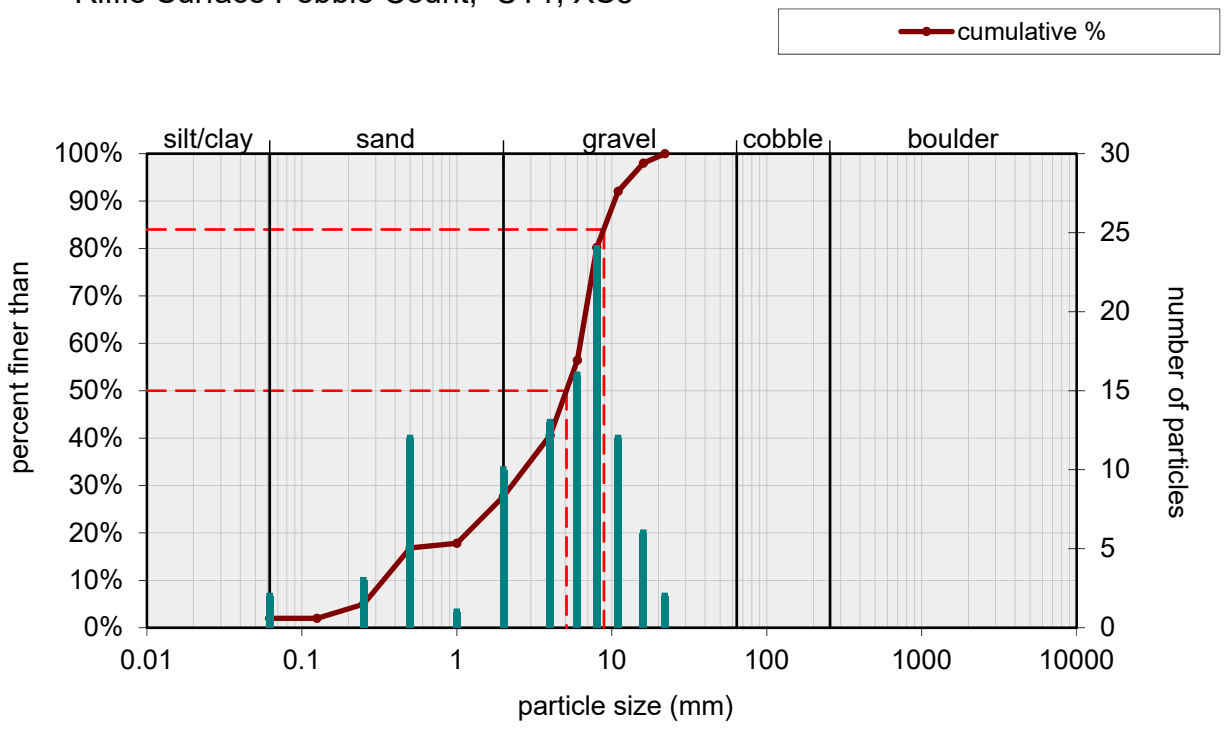
Size (mm)		Type	
D16	0.13	silt/clay	16%
D35	1.3	sand	28%
D50	2.6	gravel	55%
D65	4.6	cobble	1%
D84	7.7	boulder	0%
D95	11		

Riffle Surface Pebble Count, Martin Dairy R2, XS3



Size (mm)		Type	
D16	2.4	silt/clay	2%
D35	8.1	sand	13%
D50	11	gravel	84%
D65	15	cobble	1%
D84	33	boulder	0%
D95	54		

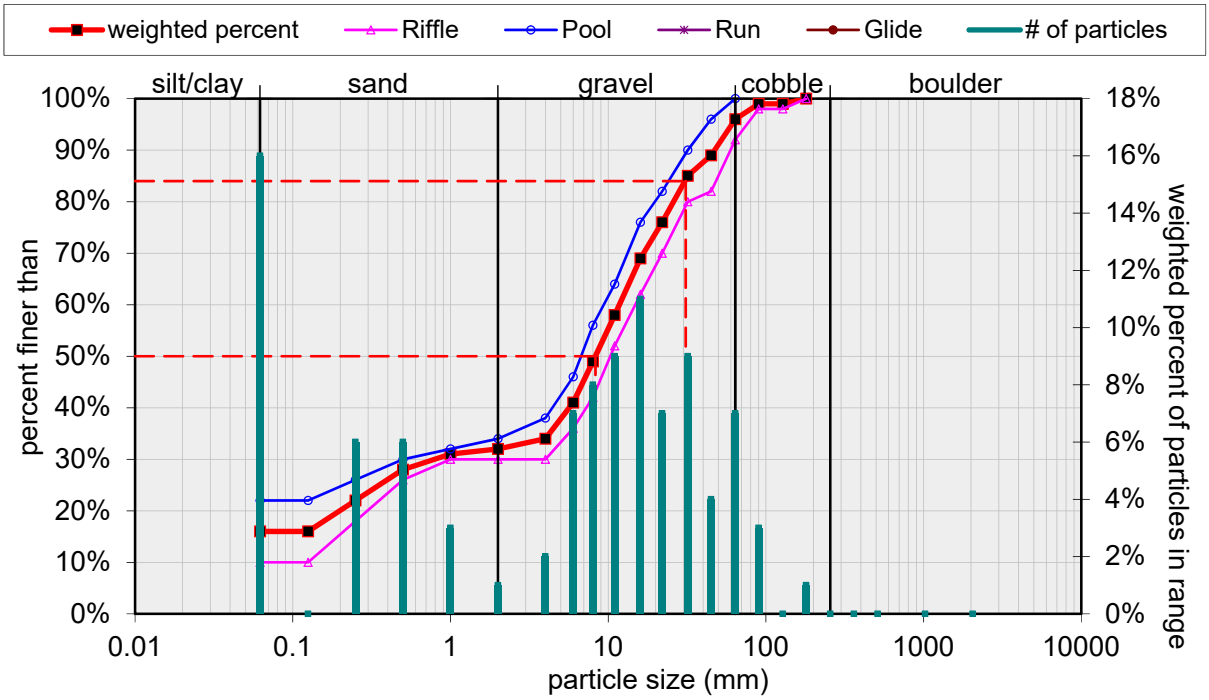
Riffle Surface Pebble Count, UT1, XS5



Size (mm)		Type	
D16	0.48	silt/clay	2%
D35	3	sand	26%
D50	5.1	gravel	72%
D65	6.7	cobble	0%
D84	8.9	boulder	0%
D95	13		

Weighted pebble count by bed features , Martin Dairy Reachwide

50% riffle 50% pool



Size (mm)		Type	
D16	0.062	silt/clay	16%
D35	4.2	sand	16%
D50	8.3	gravel	64%
D65	14	cobble	4%
D84	31	boulder	0%
D95	61		

Proposed Geomorphic Parameters												
	Notation	Units	Martin Dairy R1			Martin Dairy R2			UT1			
			Typical Section Values	Min	Max	Typical Section Values	Min	Max	Typical Section Values	Min	Max	
stream type			C4/E4			C4/E4			C4/E4			
drainage area	DA	*sq mi*	0.54			0.82			0.22			
design discharge	Q	*cfs*	47	-		63			24.0	-		
bankfull cross-sectional area	A_{bkf}	*SF*	16.8	-		20	-		6.7	-		
average velocity during bankfull event	v_{bkf}	*fps*	2.8	-		3.2	-		3.6	-		
Cross-Section												
width at bankfull	w_{bkf}	*feet*	15	-		16.2	-		9.4	-		
maximum depth at bankfull	d_{max}	*feet*	-	1.3	1.7		1.4	1.8	-	0.8	1.3	
mean depth at bankfull	d_{bkf}	*feet*	1.1	-		1.2	-		0.7	-		
bankfull width to depth ratio	w_{bkf}/d_{bkf}		13.4	-		13.2	-		13.2	-		
max depth ratio	d_{max}/d_{bkf}	*feet*	-	1.2	1.5	-	1.2	1.5	-	1.2	1.8	
bank height ratio	BHR		-	1.0	1.0	-	1.0	1.0	-	1.0	1.0	
floodprone area width	w_{fpa}	*feet*	-	33	75	-	36	81	-	21	47	
entrenchment ratio	ER		-	2.2	5.0	-	2.2	5.0	-	2.2	5.0	
Slope												
valley slope	S_{valley}	*feet/ foot*	0.0080			0.0078			0.0136			
channel slope	S_{chnl}	*feet/ foot*	-	0.0048	0.0052		0.0053	0.0057	-	0.005	0.006	
Profile												
riffle slope	S_{riffle}	*feet/ foot*	-	0.006	0.018		0.006	0.019	-	0.006	0.024	
riffle slope ratio	S_{riffle}/S_{chnl}		-	1.2	3.4		1.2	3.4	-	1.2	4	
pool slope	S_p	*feet/ foot*	-	0.000	0.003		0.000	0.003	-	0.000	0.002	
pool slope ratio	S_p/S_{chnl}		-	0.00	0.50		0.00	0.50	-	0.00	0.40	
pool-to-pool spacing	L_{p-p}	*feet*	-	60	105		64.8	113.4	-	37.6	56.4	
pool spacing ratio	L_{p-p}/w_{bkf}		-	4	7		4	7	-	4.0	6.0	
pool cross-sectional area	A_{pool}	*SF*	-	18.5	33.6		22.0	40.0	-	7.4	13.4	
pool area ratio	A_{pool}/A_{bkf}		-	1.1	2		1.1	2	-	1.1	2.0	
maximum pool depth	d_{pool}	*feet*	-	1.3	3.3		1.4	3.6	-	0.8	2.2	
pool depth ratio	d_{pool}/d_{bkf}		-	1.2	3.0		1.2	3.0	-	1.2	3.1	
pool width at bankfull	w_{pool}	*feet*	-	15	24		16.2	25.9	-	9.4	14.1	
pool width ratio	w_{pool}/w_{bkf}		-	1.0	1.6		1.0	1.6	-	1.0	1.5	
Pattern												
sinuosity	K		-	1.25		-	1.28		-	1.14		
belt width	w_{blt}	*feet*	-	36	75	-	38.9	81	-	22.6	65.8	
meander width ratio	w_{blt}/w_{bkf}		-	2.4	5	-	2.4	5	-	2.4	7	
linear wavelength (formerly meander length)	LW	*feet*	-	60	165	-	64.8	178.2	-	47	141	
linear wavelength ratio (formerly meander length ratio)	LW/w_{bkf}		-	4.0	11.0	-	4.0	11.0	-	5.0	15.0	
meander length	L_m	*feet*	-	60	225	-	64.8	243	-	56.4	155.1	
meander length ratio	L_m/W_{bkf}		-	4.0	15.0	-	4.0	15.0	-	6.0	16.5	
radius of curvature	R_c	*feet*	-	27.0	75.0	-	29.2	81.0		16.9	51.7	
radius of curvature ratio	R_c/ w_{bkf}		-	1.8	5.0	-	1.8	5.0		1.8	5.5	

Reference Reach Geomorphic Parameters																
			Martin Dairy Reference						UT1 Reference							
	Notation	Units	Long Branch		Spencer Creek 2		Foust Creek		UT to Polecat Creek		UT to Varnals Creek		Agony On-site Reference Reach - UT1 - Reach 3	
			min	max	min	max	min	max	min	max	Min	Max	min	max
stream type			C/E4		E4		C4		E4		C4/E4		E4	
drainage area	DA	*sq mi*	1.49		0.96		1.38		0.41		0.41		0.30	
design discharge	Q	*cfs*	101	124	97		88		20		54.0		25	
bankfull cross-sectional area	A_{bkf}	*SF*	25	34.6	17.8	19.7	23.9	24.1	5.4	12.4	10.3	12.3	10.7	11.3
average velocity during bankfull event	v_{bkf}	*fps*	3.6	4	4.9	5.4	2.9	3.7	2.2	3.5	4.4	5.2	2.2	2.4
Cross-Section														
width at bankfull	w_{bkf}	*feet*	14.8	18.6	10.7	11.2	18.5	19.4	5.3	10.9	9.3	10.5	9.1	10.4
maximum depth at bankfull	d_{max}	*feet*	1.9	2.9	2.1	2.6	1.8	2.1	1.4	1.7	1.5	1.7	1.8	
mean depth at bankfull	d_{bkf}	*feet*	1.3	2.1	1.6	1.8	1.3	1.4	1.0	1.1	1.1	1.2	1.0	1.2
bankfull width to depth ratio	w_{bkf}/d_{bkf}		7.9	13.8	5.8	7.1	13.9	14.2	5.2	9.6	8.1	9.3	7.3	10.1
depth ratio	d_{max}/d_{bkf}	*feet*	1.4	1.5	1.3	1.4	1.4	1.5	1.4	1.7	1.4	1.4	1.8	
bank height ratio	BHR		1.2	1.5	1.0		1.0		1.0	1.1	1.0		1.0	
floodprone area width	w_{fpa}	*feet*	>50		60	>114	49	63	25	65	60	100	>36	
entrenchment ratio	ER		>3.4		5.5	>10.2	2.6	3.4	3.2	8.3	5.7	10.0	>3.9	
Slope														
valley slope	S_{valley}	*feet/ foot*	0.006		0.0109		0.0095		0.017		0.0200		0.010	0.034
channel slope	S_{chnl}	*feet/ foot*	0.004		0.0047		0.0090		0.012		0.0170		0.0039	0.028
Profile														
riffle slope	S_{riffle}	*feet/ foot*	0.013	0.012	0.013		0.015	0.035	0.004	0.047	0.024	0.057	N/A	N/A
riffle slope ratio	S_{riffle}/S_{chnl}		3.3	3	2.8		1.7	3.9	0.3	4	4.2	10.0	N/A	N/A
pool slope	S_p	*feet/ foot*	0.0003	0.003	0.0007	0.0009	0.0008	0.0034	0.017		0.000	0.015	N/A	N/A
pool slope ratio	S_p/S_{chnl}		0.1	0.8	0.15	0.19	0.09	0.38	1.4		0.00	2.63	N/A	N/A
pool-to-pool spacing	L_{p-p}	*feet*	50	105	71		49	91	34	52	8	82	N/A	N/A
pool spacing ratio	L_{p-p}/w_{bkf}		3.4	7.1	6.3	6.6	2.6	4.7	0.3	3.2	0.5	5.6	N/A	N/A
pool cross-sectional area	A_{pool}	*SF*	25.5	33.4	24.5		29.2	34.9	9.3		22.0	22.7	14.5	
pool area ratio	A_{pool}/A_{bkf}		1	1.3	1.2	1.4	1.2	1.4	0.8	1.7	1.8	1.9	1.3	
maximum pool depth	d_{pool}	*feet*	2.2		3.3		2.5	2.9	1.8		2.5	2.6	2.5	
pool depth ratio	d_{pool}/d_{bkf}		0.8	1.2	1.8	2.0	1.9	2.1	1.6	1.8	3.0	3.1	2.3	
pool width at bankfull	w_{pool}	*feet*	16.2	18.8	17.5		15.3	20.5	8		15.1	18.6	9.4	
pool width ratio	w_{pool}/w_{bkf}		0.9	1.3	1.6		0.8	1.1	0.7	1.5	1.0	1.3	1.0	
Pattern														
sinuosity	K		1.3		2.3		1.1		1.4		1.20		1.35	
belt width	w_{blt}	feet	60		38	41	-	-	28	50	15	45	21	93
meander width ratio	w_{blt}/w_{bkf}		3.2	4.1	3.4	3.6	-	-	3.0	5.3	1.0	3.0	2.3	8.9
linear wavelength (formerly meander length)	L_m	feet	66	191	46	48	-	-	56	85	16	47	121	171
linear wavelength ratio (formerly meander length ratio)	L_m/w_{bkf}		4.5	10.3	4.1	4.4	-	-	6.0	9.0	1.1	3.2	13.3	16.4
meander length		feet	---	---	--	--	-	-	--	--	--	--	--	--
meander length ratio			---	---	--	--	-	-	--	--	--	--	--	--
radius of curvature	R_c	feet	16	87	11	15	-	-	19	50	8	47	14	60
radius of curvature ratio	R_c/w_{bkf}		1.1	4.7	1.3	1.4	-	-	2.0	5.3	0.6	3.2	1.5	5.8
Particle Size Distribution from Reach-wide Pebble Count														
d50 Description					Medium Gravel									
	d_{16}	mm			<0.063						0.095			
	d_{35}	mm			3						0.4			
	d_{50}	mm			8.8						8			
	d_{84}	mm			42						87			
	d_{95}	mm			90						150			
	d_{100}	mm									256			

Pre-Project Nutrient Loading Estimate (Option 2)

(1) Type of Land Cover	(2) Easement Acreage	(3) S.M. Formula (0.46 + 8.3I)	(4) Average EMC of TN (mg/L)	(5) Column (2) * (3) * (4)	(6) Average EMC of TP (mg/L)	(7) Column (2) * (3) * (6)
Transportation impervious	0.00	0.46	2.60	0.00	0.19	0.00
Roof impervious	0.00	0.46	1.95	0.00	0.11	0.00
Managed pervious (lawn/landscape)	0.00	0.46	1.42	0.00	0.28	0.00
Managed pervious (cropland)	0.00	0.46	4.25	0.00	1.23	0.00
Managed pervious (pasture)	10.52	0.46	2.04	9.87	0.62	3.00
Wooded pervious	0.00	0.46	0.94	0.00	0.14	0.00
Area taken up by BMP	0.00	0.46	1.95	0.00	0.11	0.00
Fraction Impervious (I) =	0.00		TN Load (lb/yr) =	9.87	TP Load (lb/yr) =	3.00
Total Project Area =	10.52		TN Export (lb/ac/yr) =	0.94	TP Export (lb/ac/yr) =	0.29

Post-Project Nutrient Loading Estimate (Option 2)

(1) Type of Land Cover	(2) Easement Acreage	(3) S.M. Formula (0.46 + 8.3I)	(4) Average EMC of TN (mg/L)	(5) Column (2) * (3) * (4)	(6) Average EMC of TP (mg/L)	(7) Column (2) * (3) * (6)
Transportation impervious	0.00	0.46	2.60	0.00	0.19	0.00
Roof impervious	0.00	0.46	1.95	0.00	0.11	0.00
Managed pervious (lawn/landscape)	0.00	0.46	1.42	0.00	0.28	0.00
Managed pervious (cropland)	0.00	0.46	4.25	0.00	1.23	0.00
Managed pervious (pasture)	0.18	0.46	2.04	0.17	0.62	0.05
Wooded pervious	10.12	0.46	0.94	4.38	0.14	0.65
Area taken up by BMP	0.00	0.46	1.95	0.00	0.11	0.00
Fraction Impervious (I) =	0.00		TN Load (lb/yr) =	4.54	TP Load (lb/yr) =	0.70
Total Project Area =	10.30		TN Export (lb/ac/yr) =	0.44	TP Export (lb/ac/yr) =	0.07

Nutrient Loading Reduction Summary (Option 2)

	TN (lb/yr)	TP (lb/yr)
Pre-Project	9.87	3.00
Post-Project	4.54	0.70
% Reduction	54%	77%

Note: Project Area varies from Existing to Proposed based on the change in area attributed to the stream from top of bank to top of bank

Appendix 5

Approved FHWA Categorical Exclusion Form

Categorical Exclusion Form for Ecosystem Enhancement Program Projects
Version 1.4

Note: Only Appendix A should to be submitted (along with any supporting documentation) as the environmental document.

Part 1: General Project Information	
Project Name:	Martin Dairy Mitigation Site
County Name:	Orange County
EEP Number:	97087
Project Sponsor:	Wildlands Engineering, Inc
Project Contact Name:	Andrea S. Eckardt
Project Contact Address:	1430 South Mint Street, Suite 104 Charlotte, NC 28203
Project Contact E-mail:	aeckardt@wildlandseng.com
EEP Project Manager:	Jeff Schaffer

Project Description

The Martin Dairy Mitigation Site is a stream mitigation project located in Orange County, NC. The project is located on two unnamed tributaries to Buckwater Creek approximately eight miles northeast of Hillsborough, NC and eight miles south of Caldwell, NC. The project site was previously an active dairy farm. After dairy operations ceased, landuse transitioned to horse pasture and hay production. The project will provide stream mitigation units to the Division of Mitigation Services in the Neuse River Basin (03020201).

For Official Use Only

Reviewed By:

6/3/2016
Date

Jeff Schaffer
EEP Project Manager

Conditional Approved By:

Date

For Division Administrator
FHWA

☐ **Check this box if there are outstanding issues**

Final Approval By:

6-2-16
Date

For Division Administrator
FHWA

Part 2: All Projects Regulation/Question	Response
Coastal Zone Management Act (CZMA)	
1. Is the project located in a CAMA county?	☐ Yes ☑ No
2. Does the project involve ground-disturbing activities within a CAMA Area of Environmental Concern (AEC)?	☐ Yes ☐ No ☑ N/A
3. Has a CAMA permit been secured?	☐ Yes ☐ No ☑ N/A
4. Has NCDCM agreed that the project is consistent with the NC Coastal Management Program?	☐ Yes ☐ No ☑ N/A
Comprehensive Environmental Response, Compensation and Liability Act (CERCLA)	
1. Is this a "full-delivery" project?	☑ Yes ☐ No
2. Has the zoning/land use of the subject property and adjacent properties ever been designated as commercial or industrial?	☐ Yes ☑ No ☐ N/A
3. As a result of a limited Phase I Site Assessment, are there known or potential hazardous waste sites within or adjacent to the project area?	☐ Yes ☑ No ☐ N/A
4. As a result of a Phase I Site Assessment, are there known or potential hazardous waste sites within or adjacent to the project area?	☐ Yes ☐ No ☑ N/A
5. As a result of a Phase II Site Assessment, are there known or potential hazardous waste sites within the project area?	☐ Yes ☐ No ☑ N/A
6. Is there an approved hazardous mitigation plan?	☐ Yes ☐ No ☑ N/A
National Historic Preservation Act (Section 106)	
1. Are there properties listed on, or eligible for listing on, the National Register of Historic Places in the project area?	☐ Yes ☑ No
2. Does the project affect such properties and does the SHPO/THPO concur?	☐ Yes ☐ No ☑ N/A
3. If the effects are adverse, have they been resolved?	☐ Yes ☐ No ☑ N/A
Uniform Relocation Assistance and Real Property Acquisition Policies Act (Uniform Act)	
1. Is this a "full-delivery" project?	☑ Yes ☐ No
2. Does the project require the acquisition of real estate?	☑ Yes ☐ No ☐ N/A
3. Was the property acquisition completed prior to the intent to use federal funds?	☐ Yes ☑ No ☐ N/A
4. Has the owner of the property been informed: * prior to making an offer that the agency does not have condemnation authority; and * what the fair market value is believed to be?	☑ Yes ☐ No ☐ N/A

Part 3: Ground-Disturbing Activities Regulation/Question	Response
American Indian Religious Freedom Act (AIRFA)	
1. Is the project located in a county claimed as "territory" by the Eastern Band of Cherokee Indians?	☐ Yes ☑ No
2. Is the site of religious importance to American Indians?	☐ Yes ☐ No ☑ N/A
3. Is the project listed on, or eligible for listing on, the National Register of Historic Places?	☐ Yes ☐ No ☑ N/A
4. Have the effects of the project on this site been considered?	☐ Yes ☐ No ☑ N/A
Antiquities Act (AA)	
1. Is the project located on Federal lands?	☐ Yes ☑ No
2. Will there be loss or destruction of historic or prehistoric ruins, monuments or objects of antiquity?	☐ Yes ☐ No ☑ N/A
3. Will a permit from the appropriate Federal agency be required?	☐ Yes ☐ No ☑ N/A
4. Has a permit been obtained?	☐ Yes ☐ No ☑ N/A
Archaeological Resources Protection Act (ARPA)	
1. Is the project located on federal or Indian lands (reservation)?	☐ Yes ☑ No
2. Will there be a loss or destruction of archaeological resources?	☐ Yes ☐ No ☑ N/A
3. Will a permit from the appropriate Federal agency be required?	☐ Yes ☐ No ☑ N/A
4. Has a permit been obtained?	☐ Yes ☐ No ☑ N/A
Endangered Species Act (ESA)	
1. Are federal Threatened and Endangered species and/or Designated Critical Habitat listed for the county?	☑ Yes ☐ No
2. Is Designated Critical Habitat or suitable habitat present for listed species?	☐ Yes ☑ No ☐ N/A
3. Are T&E species present or is the project being conducted in Designated Critical Habitat?	☐ Yes ☐ No ☑ N/A
4. Is the project "likely to adversely affect" the species and/or "likely to adversely modify" Designated Critical Habitat?	☐ Yes ☐ No ☑ N/A
5. Does the USFWS/NOAA-Fisheries concur in the effects determination?	☐ Yes ☐ No ☑ N/A
6. Has the USFWS/NOAA-Fisheries rendered a "jeopardy" determination?	☐ Yes ☐ No ☑ N/A

Executive Order 13007 (Indian Sacred Sites)	
1. Is the project located on Federal lands that are within a county claimed as "territory" by the EBCI?	☐ Yes ☑ No
2. Has the EBCI indicated that Indian sacred sites may be impacted by the proposed project?	☐ Yes ☐ No ☑ N/A
3. Have accommodations been made for access to and ceremonial use of Indian sacred sites?	☐ Yes ☐ No ☑ N/A
Farmland Protection Policy Act (FPPA)	
1. Will real estate be acquired?	☑ Yes ☐ No
2. Has NRCS determined that the project contains prime, unique, statewide or locally important farmland?	☑ Yes ☐ No ☐ N/A
3. Has the completed Form AD-1006 been submitted to NRCS?	☑ Yes ☐ No ☐ N/A
Fish and Wildlife Coordination Act (FWCA)	
1. Will the project impound, divert, channel deepen, or otherwise control/modify any water body?	☑ Yes ☐ No
2. Have the USFWS and the NCWRC been consulted?	☑ Yes ☐ No ☐ N/A
Land and Water Conservation Fund Act (Section 6(f))	
1. Will the project require the conversion of such property to a use other than public, outdoor recreation?	☐ Yes ☑ No
2. Has the NPS approved of the conversion?	☐ Yes ☐ No ☑ N/A
Magnuson-Stevens Fishery Conservation and Management Act (Essential Fish Habitat)	
1. Is the project located in an estuarine system?	☐ Yes ☑ No
2. Is suitable habitat present for EFH-protected species?	☐ Yes ☐ No ☑ N/A
3. Is sufficient design information available to make a determination of the effect of the project on EFH?	☐ Yes ☐ No ☑ N/A
4. Will the project adversely affect EFH?	☐ Yes ☐ No ☑ N/A
5. Has consultation with NOAA-Fisheries occurred?	☐ Yes ☐ No ☑ N/A
Migratory Bird Treaty Act (MBTA)	
1. Does the USFWS have any recommendations with the project relative to the MBTA?	☐ Yes ☑ No
2. Have the USFWS recommendations been incorporated?	☐ Yes ☐ No ☑ N/A
Wilderness Act	
1. Is the project in a Wilderness area?	☐ Yes ☑ No
2. Has a special use permit and/or easement been obtained from the maintaining federal agency?	☐ Yes ☐ No ☑ N/A

Martin Dairy Mitigation Site
Categorical Exclusion
SUMMARY

Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)

The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) provides a Federal "Superfund" to clean up uncontrolled or abandoned hazardous-waste sites as well as accidents, spills, and other emergency releases of pollutants and contaminants into the environment.

As the Martin Dairy Mitigation Site is a full-delivery project; an EDR Radius Map Report with Geocheck was ordered for the site through Environmental Data Resources, Inc. on April 14, 2016. Neither the target property, nor immediately adjacent properties, were listed in any of the Federal, State, or Tribal environmental databases searched by EDR. Overall, there was one Leaking Underground Storage Tank (LUST) site and one Underground Storage Tank (UST) sites found in the databases searched. The LUST site is the same physical location as the UST site, 7500 Schley Road. These two locations are approximately 1,500 feet downstream from the specific project area.

Overall, the assessment revealed no evidence of any "recognized environmental conditions" in connection with the target property. The Executive Summary of the EDR report is included in the Appendix. The full report is available if needed.

National Historic Preservation Act (Section 106)

The National Historic Preservation Act declares a national policy of historic preservation to protect, rehabilitate, restore, and reuse districts, sites, buildings, structures, and objects significant in American architecture, history, archaeology, and culture, and Section 106 mandates that federal agencies take into account the effect of an undertaking on a property that is included in, or is eligible for inclusion in, the National Register of Historic Places.

Wildlands Engineering, Inc. (Wildlands) requested review and comment from the State Historic Preservation Office (SHPO) with respect to any archeological and architectural resources related to the Martin Dairy Mitigation Site on April 15, 2016. SHPO responded on May 12, 2016 and stated they were aware of no historic resources that would be affected by the project. All correspondence related to Section 106 is included in the Appendix.

Uniform Relocation Assistance and Real Property Acquisition Policies Act (Uniform Act)

These acts, collectively known as the Uniform Act, provide for uniform and equitable treatment of persons displaced from their homes, businesses, non-profit associations, or farms by federal and federally-assisted programs, and establish uniform and equitable land acquisition policies.

Martin Dairy Mitigation Site is a full-delivery project that includes land acquisition. Notification of the fair market value of the project property and the lack of condemnation authority by Wildlands was included in the signed option agreement for the project property. A copy of the relevant section of the option agreement is included in the Appendix.

Endangered Species Act (ESA)

Section 7 of the ESA requires federal agencies, in consultation with and with the assistance of the Secretary of the Interior or of Commerce, as appropriate, to ensure that actions they authorize, fund or carry out are not likely to jeopardize the continued existence of threatened or endangered species or result in the destruction or adverse modification of critical habitat for these species.

The Orange County listed endangered species include the bald eagle (*Haliaeetus leucocephalus*) (BGPA), dwarf wedgemussel (*Alasmidonta* heterodon), smooth coneflower (*Echinacea laevigata*) and the Michaux's sumac (*Rhus michauxii*). The USFWS does not currently list any Critical Habitat Designations for any of the Federally-listed species within Orange County. Wildlands requested review and comment

from the United States Fish and Wildlife Service (USFWS) on April 15, 2016 in respect to the Martin Dairy Mitigation Site and its potential impacts on threatened or endangered species. USFWS responded on May 5, 2016 and stated the "proposed action is not likely to adversely affect any federally listed endangered or threatened species, their formally designated critical habitat or species currently proposed for listing under the Act". All correspondence with USFWS is included in the Appendix.

As a result of a pedestrian survey conducted on September 3, 2015, no individual species, suitable habitat or critical habitat were found to exist on the site for any of the listed species. It was determined that the project would result in "no effect" on the listed species.

Farmland Protection Policy Act (FPPA)

The FPPA requires that, before taking or approving any federal action that would result in conversion of farmland, the agency must examine the effects of the action using the criteria set forth in the FPPA, and, if there are adverse effects, must consider alternatives to lessen them.

The Martin Dairy Mitigation Site includes the conversion of prime farmland. As such, Form AD-1006 has been completed and submitted to the Natural Resources Conservation Service (NRCS). The completed form and correspondence documenting its submittal is included in the Appendix.

Fish and Wildlife Coordination Act (FWCA)

The FWCA requires consultation with the USFWS and the appropriate state wildlife agency on projects that alter or modify a water body. Reports and recommendations prepared by these agencies document project effects on wildlife and identify measures that may be adopted to prevent loss or damage to wildlife resources.

The Martin Dairy Mitigation Site includes stream restoration. Wildlands requested comment on the project from both the USFWS and the North Carolina Wildlife Resources Commission (NCWRC) on April 15, 2016. NCWRC responded on May 3, 2016 and stated they "do not anticipate the project to result in significant adverse impacts to aquatic and terrestrial wildlife resources". The USFWS responded on May 5, 2016 and had no objections to the project. All correspondence with the two agencies is included in the Appendix.

Migratory Bird Treaty Act (MBTA)

The MBTA makes it unlawful for anyone to kill, capture, collect, possess, buy, sell, trade, ship, import, or export any migratory bird. The indirect killing of birds by destroying their nests and eggs is covered by the MBTA, so construction in nesting areas during nesting seasons can constitute a taking.

Wildlands requested comment on the Martin Dairy Stream Mitigation Site from the USFWS in regards to migratory birds on April 15, 2016. USFWS responded on May 5, 2016, but had no comments regarding migratory birds. All correspondence with USFWS is included in the Appendix.

Martin Dairy Mitigation Site
Categorical Exclusion

APPENDIX

Martin Dairy Mitigation Site
7205 Schley Road
Hillsborough, NC 27278

Inquiry Number: 4592771.2s
April 14, 2016

The EDR Radius Map™ Report with GeoCheck®

EDR® Environmental Data Resources Inc

6 Armstrong Road, 4th floor
Shelton, CT 06484
Toll Free: 800.352.0050
www.edrnet.com

TABLE OF CONTENTS

Thank you for your business.
Please contact EDR at 1-800-352-0050
with any questions or comments.

EXECUTIVE SUMMARY

A search of available environmental records was conducted by Environmental Data Resources, Inc (EDR). The report was designed to assist parties seeking to meet the search requirements of EPA's Standards and Practices for All Appropriate Inquiries (40 CFR Part 312), the ASTM Standard Practice for Environmental Site Assessments (E 1527-13) or custom requirements developed for the evaluation of environmental risk associated with a parcel of real estate.

TARGET PROPERTY INFORMATION

ADDRESS

7205 SCHLEY ROAD
HILLSBOROUGH, NC 27278

COORDINATES

Latitude (North):	36.1235660 - 36° 7' 24.83''
Longitude (West):	79.0039200 - 79° 0' 14.11''
Universal Tranverse Mercator:	Zone 17
UTM X (Meters):	679636.3
UTM Y (Meters):	3999298.2
Elevation:	502 ft. above sea level

USGS TOPOGRAPHIC MAP ASSOCIATED WITH TARGET PROPERTY

Target Property Map:	5947925 HILLSBOROUGH, NC
Version Date:	2013
Northeast Map:	5945265 ROUGEMONT, NC
Version Date:	2013
Southeast Map:	5945261 NORTHWEST DURHAM, NC
Version Date:	2013
Northwest Map:	5947438 CALDWELL, NC
Version Date:	2013

AERIAL PHOTOGRAPHY IN THIS REPORT

Portions of Photo from:	20120531
Source:	USDA

MAPPED SITES SUMMARY

Target Property Address:
7205 SCHLEY ROAD
HILLSBOROUGH, NC 27278

Click on Map ID to see full detail.

MAP ID	SITE NAME	ADDRESS	DATABASE ACRONYMS	RELATIVE ELEVATION	DIST (ft. & mi.) DIRECTION
A1	ST MARY'S SCHOOL	7500 SCHLEY ROAD	LUST, UST	Higher	2317, 0.439, SSE
A2	KANTNER SCHOOL (FORM	7500 SCHLEY ROAD	LUST TRUST, IMD	Higher	2317, 0.439, SSE
A3	ST. MARY'S SCHOOL	7500 SCHLEY ROAD	IMD	Higher	2317, 0.439, SSE

EXECUTIVE SUMMARY

TARGET PROPERTY SEARCH RESULTS

The target property was not listed in any of the databases searched by EDR.

DATABASES WITH NO MAPPED SITES

No mapped sites were found in EDR's search of available ("reasonably ascertainable ") government records either on the target property or within the search radius around the target property for the following databases:

STANDARD ENVIRONMENTAL RECORDS

Federal NPL site list

NPL ---------- National Priority List
Proposed NPL ---------- Proposed National Priority List Sites
NPL LIENS ---------- Federal Superfund Liens

Federal Delisted NPL site list

Delisted NPL ---------- National Priority List Deletions

Federal CERCLIS list

FEDERAL FACILITY ---------- Federal Facility Site Information listing
SEMS ---------- Superfund Enterprise Management System

Federal CERCLIS NFRAP site list

SEMS-ARCHIVE ---------- Superfund Enterprise Management System Archive

Federal RCRA CORRACTS facilities list

CORRACTS ---------- Corrective Action Report

Federal RCRA non-CORRACTS TSD facilities list

RCRA-TSDF ---------- RCRA - Treatment, Storage and Disposal

Federal RCRA generators list

RCRA-LQG ---------- RCRA - Large Quantity Generators
RCRA-SQG ---------- RCRA - Small Quantity Generators
RCRA-CESQG ---------- RCRA - Conditionally Exempt Small Quantity Generator

Federal institutional controls / engineering controls registries

LUCIS ---------- Land Use Control Information System
US ENG CONTROLS ---------- Engineering Controls Sites List

US INST CONTROL ---------- Sites with Institutional Controls

Federal ERNS list

ERNS ---------- Emergency Response Notification System

State- and tribal - equivalent NPL

NC HSDS ---------- Hazardous Substance Disposal Site

State- and tribal - equivalent CERCLIS

SHWS ---------- Inactive Hazardous Sites Inventory

State and tribal landfill and/or solid waste disposal site lists

SWF/LF ---------- List of Solid Waste Facilities
OLI ---------- Old Landfill Inventory

State and tribal leaking storage tank lists

LAST ---------- Leaking Aboveground Storage Tanks
INDIAN LUST ---------- Leaking Underground Storage Tanks on Indian Land

State and tribal registered storage tank lists

FEMA UST ---------- Underground Storage Tank Listing
UST ---------- Petroleum Underground Storage Tank Database
AST ---------- AST Database
INDIAN UST ---------- Underground Storage Tanks on Indian Land

State and tribal institutional control / engineering control registries

INST CONTROL ---------- No Further Action Sites With Land Use Restrictions Monitoring

State and tribal voluntary cleanup sites

INDIAN VCP ---------- Voluntary Cleanup Priority Listing
VCP ---------- Responsible Party Voluntary Action Sites

State and tribal Brownfields sites

BROWNFIELDS ---------- Brownfields Projects Inventory

ADDITIONAL ENVIRONMENTAL RECORDS

Local Brownfield lists

US BROWNFIELDS ---------- A Listing of Brownfields Sites

Local Lists of Landfill / Solid Waste Disposal Sites

HIST LF ---------- Solid Waste Facility Listing
SWRCY ---------- Recycling Center Listing

INDIAN ODI	Report on the Status of Open Dumps on Indian Lands
ODI	Open Dump Inventory
DEBRIS REGION 9	Torres Martinez Reservation Illegal Dump Site Locations

Local Lists of Hazardous waste / Contaminated Sites

US HIST CDL	Delisted National Clandestine Laboratory Register
US CDL	National Clandestine Laboratory Register

Local Land Records

LIENS 2	CERCLA Lien Information

Records of Emergency Release Reports

HMIRS	Hazardous Materials Information Reporting System
SPILLS	Spills Incident Listing
SPILLS 90	SPILLS 90 data from FirstSearch
SPILLS 80	SPILLS 80 data from FirstSearch

Other Ascertainable Records

RCRA NonGen / NLR	RCRA - Non Generators / No Longer Regulated
FUDS	Formerly Used Defense Sites
DOD	Department of Defense Sites
SCRD DRYCLEANERS	State Coalition for Remediation of Drycleaners Listing
US FIN ASSUR	Financial Assurance Information
EPA WATCH LIST	EPA WATCH LIST
2020 COR ACTION	2020 Corrective Action Program List
TSCA	Toxic Substances Control Act
TRIS	Toxic Chemical Release Inventory System
SSTS	Section 7 Tracking Systems
ROD	Records Of Decision
RMP	Risk Management Plans
RAATS	RCRA Administrative Action Tracking System
PRP	Potentially Responsible Parties
PADS	PCB Activity Database System
ICIS	Integrated Compliance Information System
FTTS	FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)
MLTS	Material Licensing Tracking System
COAL ASH DOE	Steam-Electric Plant Operation Data
COAL ASH EPA	Coal Combustion Residues Surface Impoundments List
PCB TRANSFORMER	PCB Transformer Registration Database
RADINFO	Radiation Information Database
HIST FTTS	FIFRA/TSCA Tracking System Administrative Case Listing
DOT OPS	Incident and Accident Data
CONSENT	Superfund (CERCLA) Consent Decrees
INDIAN RESERV	Indian Reservations
FUSRAP	Formerly Utilized Sites Remedial Action Program
UMTRA	Uranium Mill Tailings Sites
LEAD SMELTERS	Lead Smelter Sites
US AIRS	Aerometric Information Retrieval System Facility Subsystem
US MINES	Mines Master Index File
FINDS	Facility Index System/Facility Registry System

COAL ASH - Coal Ash Disposal Sites
DRYCLEANERS - Drycleaning Sites
Financial Assurance - Financial Assurance Information Listing
NPDES - NPDES Facility Location Listing
UIC - Underground Injection Wells Listing
ECHO - Enforcement & Compliance History Information
FUELS PROGRAM - EPA Fuels Program Registered Listing

EDR HIGH RISK HISTORICAL RECORDS

EDR Exclusive Records

EDR MGP - EDR Proprietary Manufactured Gas Plants
EDR Hist Auto - EDR Exclusive Historic Gas Stations
EDR Hist Cleaner - EDR Exclusive Historic Dry Cleaners

EDR RECOVERED GOVERNMENT ARCHIVES

Exclusive Recovered Govt. Archives

RGA HWS - Recovered Government Archive State Hazardous Waste Facilities List
RGA LF - Recovered Government Archive Solid Waste Facilities List
RGA LUST - Recovered Government Archive Leaking Underground Storage Tank

SURROUNDING SITES: SEARCH RESULTS

Surrounding sites were identified in the following databases.

Elevations have been determined from the USGS Digital Elevation Model and should be evaluated on a relative (not an absolute) basis. Relative elevation information between sites of close proximity should be field verified. Sites with an elevation equal to or higher than the target property have been differentiated below from sites with an elevation lower than the target property.
Page numbers and map identification numbers refer to the EDR Radius Map report where detailed data on individual sites can be reviewed.

Sites listed in ***bold italics*** are in multiple databases.

Unmappable (orphan) sites are not considered in the foregoing analysis.

STANDARD ENVIRONMENTAL RECORDS

State and tribal leaking storage tank lists

LUST: The Leaking Underground Storage Tank Incidents Management Database contains an inventory of reported leaking underground storage tank incidents. The data come from the Department of Environment, & Natural Resources' Incidents by Address.

A review of the LUST list, as provided by EDR, and dated 02/05/2016 has revealed that there is 1 LUST site within approximately 0.5 miles of the target property.

Equal/Higher Elevation	Address	Direction / Distance	Map ID	Page
ST MARY'S SCHOOL	***7500 SCHLEY ROAD***	***SSE 1/4 - 1/2 (0.439 mi.)***	***A1***	***8***

Incident Phase: Response
Incident Phase: Closed Out
Incident Number: 23192
Incident Number: 23504
Current Status: File Located in Archives
Current Status: File Located in House

LUST TRUST: This database contains information about claims against the State Trust Funds for reimbursements for expenses incurred while remediating Leaking USTs.

A review of the LUST TRUST list, as provided by EDR, and dated 01/08/2016 has revealed that there is 1 LUST TRUST site within approximately 0.5 miles of the target property.

Equal/Higher Elevation	Address	Direction / Distance	Map ID	Page
KANTNER SCHOOL (FORM	***7500 SCHLEY ROAD***	***SSE 1/4 - 1/2 (0.439 mi.)***	***A2***	***15***
Facility Id: 0-002591				
Site ID: 23192				

ADDITIONAL ENVIRONMENTAL RECORDS

Records of Emergency Release Reports

IMD: Incident Management Database.

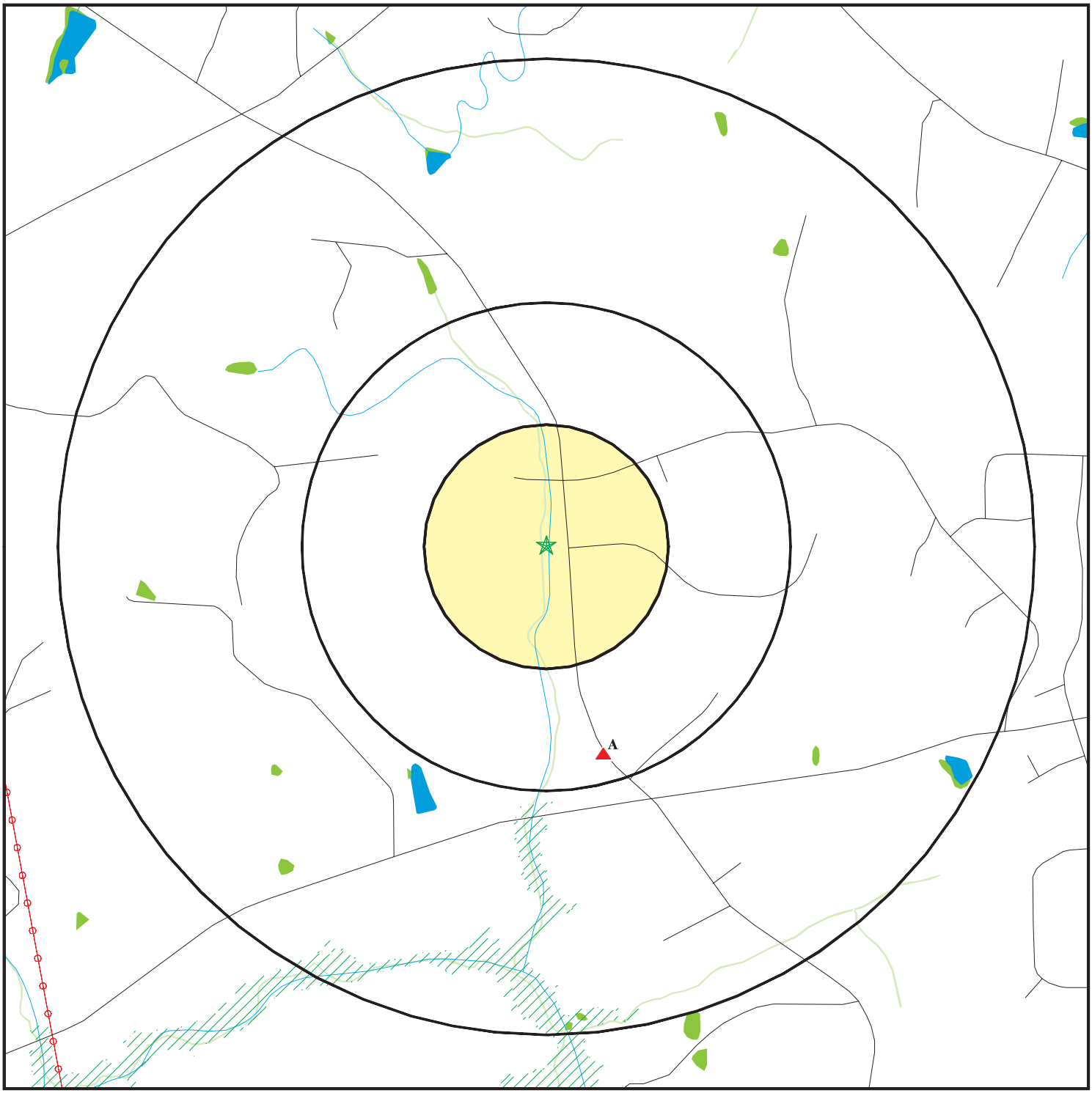
A review of the IMD list, as provided by EDR, and dated 07/21/2006 has revealed that there are 2 IMD sites within approximately 0.5 miles of the target property.

Equal/Higher Elevation	Address	Direction / Distance	Map ID	Page
KANTNER SCHOOL (FORM	***7500 SCHLEY ROAD***	***SSE 1/4 - 1/2 (0.439 mi.)***	***A2***	***15***
Facility Id: 23192				
ST. MARY'S SCHOOL	7500 SCHLEY ROAD	SSE 1/4 - 1/2 (0.439 mi.)	A3	16
Facility Id: 23504				

EXECUTIVE SUMMARY

There were no unmapped sites in this report.

OVERVIEW MAP - 4592771.2S



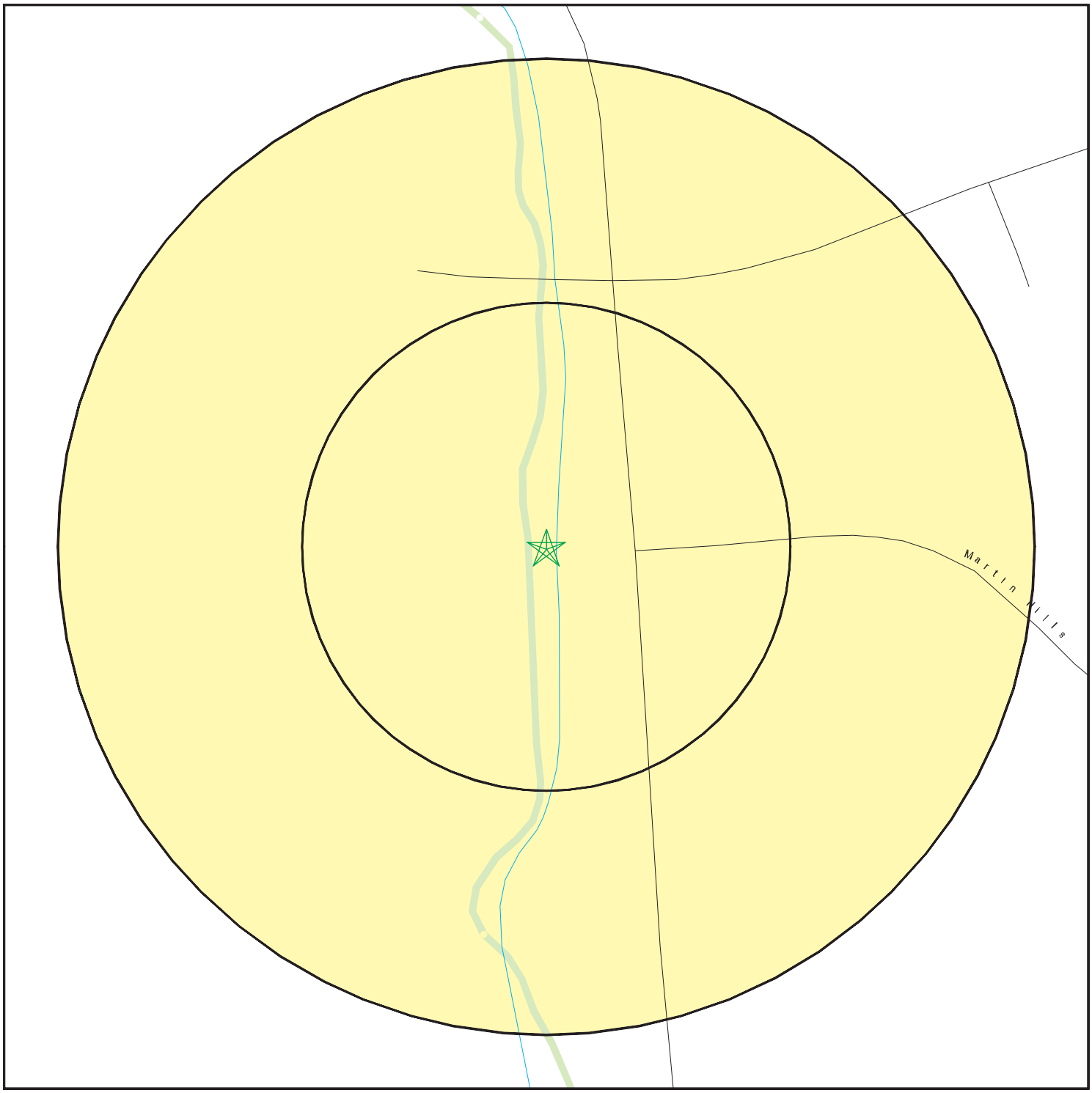
0 1/4 1/2 1 Miles

- Target Property
- Sites at elevations higher than or equal to the target property
- Sites at elevations lower than the target property
- Manufactured Gas Plants
- National Priority List Sites
- Dept. Defense Sites
- Indian Reservations BIA
- Power transmission lines
- 100-year flood zone
- 500-year flood zone
- National Wetland Inventory
- State Wetlands
- Hazardous Substance Disposal Sites

This report includes Interactive Map Layers to display and/or hide map information. The legend includes only those icons for the default map view.

SITE NAME:	Martin Dairy Mitigation Site	CLIENT:	Wildlands Eng, Inc.
ADDRESS:	7205 Schley Road Hillsborough NC 27278	CONTACT:	Ian Eckardt
LAT/LONG:	36.123566 / 79.00392	INQUIRY #:	4592771.2s
		DATE:	April 14, 2016 4:40 pm

DETAIL MAP - 4592771.2S



0 1/16 1/8 1/4 Miles

- Target Property
- Sites at elevations higher than or equal to the target property
- Sites at elevations lower than the target property
- Manufactured Gas Plants
- Sensitive Receptors
- National Priority List Sites
- Dept. Defense Sites
- Indian Reservations BIA
- 100-year flood zone
- 500-year flood zone
- National Wetland Inventory
- State Wetlands
- Hazardous Substance Disposal Sites

N

This report includes Interactive Map Layers to display and/or hide map information. The legend includes only those icons for the default map view.

SITE NAME: Martin Dairy Mitigation Site ADDRESS: 7205 Schley Road Hillsborough NC 27278 LAT/LONG: 36.123566 / 79.00392	CLIENT: Wildlands Eng, Inc. CONTACT: Ian Eckardt INQUIRY #: 4592771.2s DATE: April 14, 2016 4:41 pm

MAP FINDINGS SUMMARY

Database	Search Distance (Miles)	Target Property	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
STANDARD ENVIRONMENTAL RECORDS								
Federal NPL site list								
NPL	1.000		0	0	0	0	NR	0
Proposed NPL	1.000		0	0	0	0	NR	0
NPL LIENS	TP		NR	NR	NR	NR	NR	0
Federal Delisted NPL site list								
Delisted NPL	1.000		0	0	0	0	NR	0
Federal CERCLIS list								
FEDERAL FACILITY	0.500		0	0	0	NR	NR	0
SEMS	0.500		0	0	0	NR	NR	0
Federal CERCLIS NFRAP site list								
SEMS-ARCHIVE	0.500		0	0	0	NR	NR	0
Federal RCRA CORRACTS facilities list								
CORRACTS	1.000		0	0	0	0	NR	0
Federal RCRA non-CORRACTS TSD facilities list								
RCRA-TSDF	0.500		0	0	0	NR	NR	0
Federal RCRA generators list								
RCRA-LQG	0.250		0	0	NR	NR	NR	0
RCRA-SQG	0.250		0	0	NR	NR	NR	0
RCRA-CESQG	0.250		0	0	NR	NR	NR	0
Federal institutional controls / engineering controls registries								
LUCIS	0.500		0	0	0	NR	NR	0
US ENG CONTROLS	0.500		0	0	0	NR	NR	0
US INST CONTROL	0.500		0	0	0	NR	NR	0
Federal ERNS list								
ERNS	TP		NR	NR	NR	NR	NR	0
State- and tribal - equivalent NPL								
NC HSDS	1.000		0	0	0	0	NR	0
State- and tribal - equivalent CERCLIS								
SHWS	1.000		0	0	0	0	NR	0
State and tribal landfill and/or solid waste disposal site lists								
SWF/LF	0.500		0	0	0	NR	NR	0
OLI	0.500		0	0	0	NR	NR	0
State and tribal leaking storage tank lists								
LAST	0.500		0	0	0	NR	NR	0

MAP FINDINGS SUMMARY

Database	Search Distance (Miles)	Target Property	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
LUST	0.500		0	0	1	NR	NR	1
INDIAN LUST	0.500		0	0	0	NR	NR	0
LUST TRUST	0.500		0	0	1	NR	NR	1
State and tribal registered storage tank lists								
FEMA UST	0.250		0	0	NR	NR	NR	0
UST	0.250		0	0	NR	NR	NR	0
AST	0.250		0	0	NR	NR	NR	0
INDIAN UST	0.250		0	0	NR	NR	NR	0
State and tribal institutional control / engineering control registries								
INST CONTROL	0.500		0	0	0	NR	NR	0
State and tribal voluntary cleanup sites								
INDIAN VCP	0.500		0	0	0	NR	NR	0
VCP	0.500		0	0	0	NR	NR	0
State and tribal Brownfields sites								
BROWNFIELDS	0.500		0	0	0	NR	NR	0
ADDITIONAL ENVIRONMENTAL RECORDS								
Local Brownfield lists								
US BROWNFIELDS	0.500		0	0	0	NR	NR	0
Local Lists of Landfill / Solid Waste Disposal Sites								
HIST LF	0.500		0	0	0	NR	NR	0
SWRCY	0.500		0	0	0	NR	NR	0
INDIAN ODI	0.500		0	0	0	NR	NR	0
ODI	0.500		0	0	0	NR	NR	0
DEBRIS REGION 9	0.500		0	0	0	NR	NR	0
Local Lists of Hazardous waste / Contaminated Sites								
US HIST CDL	TP		NR	NR	NR	NR	NR	0
US CDL	TP		NR	NR	NR	NR	NR	0
Local Land Records								
LIENS 2	TP		NR	NR	NR	NR	NR	0
Records of Emergency Release Reports								
HMIRS	TP		NR	NR	NR	NR	NR	0
SPILLS	TP		NR	NR	NR	NR	NR	0
IMD	0.500		0	0	2	NR	NR	2
SPILLS 90	TP		NR	NR	NR	NR	NR	0
SPILLS 80	TP		NR	NR	NR	NR	NR	0
Other Ascertainable Records								
RCRA NonGen / NLR	0.250		0	0	NR	NR	NR	0

MAP FINDINGS SUMMARY

Database	Search Distance (Miles)	Target Property	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
FUDS	1.000		0	0	0	0	NR	0
DOD	1.000		0	0	0	0	NR	0
SCRD DRYCLEANERS	0.500		0	0	0	NR	NR	0
US FIN ASSUR	TP		NR	NR	NR	NR	NR	0
EPA WATCH LIST	TP		NR	NR	NR	NR	NR	0
2020 COR ACTION	0.250		0	0	NR	NR	NR	0
TSCA	TP		NR	NR	NR	NR	NR	0
TRIS	TP		NR	NR	NR	NR	NR	0
SSTS	TP		NR	NR	NR	NR	NR	0
ROD	1.000		0	0	0	0	NR	0
RMP	TP		NR	NR	NR	NR	NR	0
RAATS	TP		NR	NR	NR	NR	NR	0
PRP	TP		NR	NR	NR	NR	NR	0
PADS	TP		NR	NR	NR	NR	NR	0
ICIS	TP		NR	NR	NR	NR	NR	0
FTTS	TP		NR	NR	NR	NR	NR	0
MLTS	TP		NR	NR	NR	NR	NR	0
COAL ASH DOE	TP		NR	NR	NR	NR	NR	0
COAL ASH EPA	0.500		0	0	0	NR	NR	0
PCB TRANSFORMER	TP		NR	NR	NR	NR	NR	0
RADINFO	TP		NR	NR	NR	NR	NR	0
HIST FTTS	TP		NR	NR	NR	NR	NR	0
DOT OPS	TP		NR	NR	NR	NR	NR	0
CONSENT	1.000		0	0	0	0	NR	0
INDIAN RESERV	1.000		0	0	0	0	NR	0
FUSRAP	1.000		0	0	0	0	NR	0
UMTRA	0.500		0	0	0	NR	NR	0
LEAD SMELTERS	TP		NR	NR	NR	NR	NR	0
US AIRS	TP		NR	NR	NR	NR	NR	0
US MINES	0.250		0	0	NR	NR	NR	0
FINDS	TP		NR	NR	NR	NR	NR	0
COAL ASH	0.500		0	0	0	NR	NR	0
DRYCLEANERS	0.250		0	0	NR	NR	NR	0
Financial Assurance	TP		NR	NR	NR	NR	NR	0
NPDES	TP		NR	NR	NR	NR	NR	0
UIC	TP		NR	NR	NR	NR	NR	0
ECHO	TP		NR	NR	NR	NR	NR	0
FUELS PROGRAM	0.250		0	0	NR	NR	NR	0
EDR HIGH RISK HISTORICAL RECORDS								
EDR Exclusive Records								
EDR MGP	1.000		0	0	0	0	NR	0
EDR Hist Auto	0.125		0	NR	NR	NR	NR	0
EDR Hist Cleaner	0.125		0	NR	NR	NR	NR	0
EDR RECOVERED GOVERNMENT ARCHIVES								
Exclusive Recovered Govt. Archives								
RGA HWS	TP		NR	NR	NR	NR	NR	0

MAP FINDINGS SUMMARY

Database	Search Distance (Miles)	Target Property	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
RGA LF	TP		NR	NR	NR	NR	NR	0
RGA LUST	TP		NR	NR	NR	NR	NR	0
- Totals --		0	0	0	4	0	0	4

NOTES:

TP = Target Property

NR = Not Requested at this Search Distance

Sites may be listed in more than one database

WILDLANDS
ENGINEERING

April 15, 2016

Renee Gledhill-Earley
State Historic Preservation Office
4617 Mail Service Center
Raleigh, NC 27699-4617

Subject: Martin Dairy Mitigation Site
Orange County, North Carolina

Dear Ms. Gledhill-Earley,

Wildlands Engineering, Inc. requests review and comment on any possible issues that might emerge with respect to archaeological or cultural resources associated with the Martin Dairy Mitigation Site. A USGS site map and aerial map with approximate project areas are enclosed.

The southern border of the Site is adjacent to the Saint Mary's Road Rural Historic District according to The National Register with the State Historic Preservation Office (SHPO). The Martin Dairy Mitigation Site is being developed to provide in-kind mitigation for unavoidable stream channel impacts. Several sections of channel have been identified as significantly degraded. This will be a stream restoration project only. The site has historically been disturbed due to agricultural use, primarily for livestock production.

We ask that you review this site based on the attached information to determine the presence of any historic properties.

We thank you in advance for your timely response and cooperation. Please feel free to contact us with any questions that you may have concerning the project.

Sincerely,

Ruby M. Davis
Environmental Scientist
rdavis@wildlandseng.com

North Carolina Department of Natural and Cultural Resources

State Historic Preservation Office

Ramona M. Bartos, Administrator

Governor Pat McCrory
Secretary Susan Kluttz

Office of Archives and History
Deputy Secretary Kevin Cherry

May 12, 2016

Ruby Davis
Wildlands Engineering
1430 South Mint Street, Suite 104
Charlotte, NC 28203

Re: Martin Dairy Mitigation Site, Orange County, ER 16-0697

Dear Ms. Davis:

Thank you for your letter of April 15, 2016, concerning the above project.

We have conducted a review of the project and are aware of no historic resources which would be affected by the project. Therefore, we have no comment on the project as proposed.

The above comments are made pursuant to Section 106 of the National Historic Preservation Act and the Advisory Council on Historic Preservation's Regulations for Compliance with Section 106 codified at 36 CFR Part 800.

Thank you for your cooperation and consideration. If you have questions concerning the above comment, contact Renee Gledhill-Earley, environmental review coordinator, at 919-807-6579 or environmental.review@ncdcr.gov. In all future communication concerning this project, please cite the above referenced tracking number.

Sincerely,

Renee Gledhill-Earley

for Ramona M. Bartos

3.3 **Assignment.** Optionee has the right to assign this agreement without the consent of Optionor. No assignment shall be effective unless the assignee has delivered to Optionor a written assumption of Optionee's obligations under this agreement. Optionor hereby releases Optionee from any obligations under this agreement arising after the effective date of any assignment of this agreement by Optionee.

3.4 **Value of Conservation Easement; No Power of Eminent Domain.** In accordance with the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, Optionee hereby notifies Optionor that: (i) Optionee believes that the fair market value of the Conservation Easement is an amount equal to the Purchase Price; and (ii) Optionee does not have the power of eminent domain.

3.5 **Modification; Waiver.** No amendment of this agreement will be effective unless it is in writing and signed by the parties. No waiver of satisfaction of a condition or failure to comply with an obligation under this agreement will be effective unless it is in writing and signed by the party granting the waiver, and no such waiver will constitute a waiver of satisfaction of any other condition or failure to comply with any other obligation.

3.6 **Attorneys' Fees.** If either party commences an action against the other to interpret or enforce any of the terms of this agreement or because of the breach by the other party of any of the terms of this agreement, the losing party shall pay to the prevailing party reasonable attorneys' fees, expenses, court costs, litigation costs and any other expenses incurred in connection with the prosecution or defense of such action, whether or not the action is prosecuted to a final judgment.

3.7 **Memorandum of Option Agreement.** Concurrently with the signing of this agreement, Optionee and Optionor agree to sign a Memorandum of Option which will be recorded against the Property in the Register of Deeds of the County stated in paragraph A within five days after the Effective Date.

3.8 **Landowner Authorization.** Concurrently with the signing of this agreement, Optionor agrees to sign the NCDMS Landowner Authorization Form in the form of exhibit C.

3.9 **Entire Agreement.** Each party acknowledges they are not relying on any statements made by the other party, other than in this agreement, regarding the subject matter of this agreement. Neither party will have a basis for bringing any claim for fraud in connection with any such statements.

3.10 **Mutual Agreement.** This is a mutually negotiated agreement and regardless of which party was more responsible for its preparation, this agreement shall be construed neutrally between the parties.

3.11 **Governing Law.** The laws of the State of North Carolina, without giving effect to its principles of conflicts of law, govern all matters arising out of this agreement.

3.12 **Counterparts.** This agreement may be signed in counterparts, each of which shall be deemed an original, but all of which, together, constitute one and the same instrument. A signed copy of this agreement delivered by electronic mail in portable document format (".pdf" format) shall have the same legal effect as delivery of an original signed copy of this agreement.

[SIGNATURE PAGE FOLLOWS]

JWH Optionee
Optionor MDC Optionor

WILDLANDS
ENGINEERING

April 15, 2016

Dale Suiter
US Fish and Wildlife Service
Raleigh Field Office
PO Box 33726
Raleigh, NC 27636

Subject: Martin Dairy Mitigation Site
Orange County, North Carolina

Dear Mr. Suiter,

Wildlands Engineering, Inc. requests review and comment on any possible issues that might emerge with respect to endangered species, migratory birds or other trust resources associated with the proposed Martin Dairy Mitigation Site. A USGS map and aerial maps showing the approximate project area are enclosed. The topographic figure was prepared from the Hillsborough and Caldwell, 7.5-Minute USGS Topographic Quadrangles.

The Martin Dairy Mitigation Site is being developed to provide in-kind mitigation for unavoidable stream channel impacts. Several sections of channel have been identified as significantly degraded. This will be a stream restoration project only. The site has historically been disturbed due to agricultural use, primarily for livestock production.

According to your website (http://ecos.fws.gov/tess_public/reports/species-by-current-range-county), the bald eagle (*Haliaeetus leucocephalus*), dwarf wedgemussel (*Alasmidonta* heterodon), smooth coneflower (*Echinacea laevigata*) and the Michaux's sumac (*Rhus* michauxii) are the federally-listed species in Orange County. We are requesting that you provide any known information on these species.

If we have not heard from you in 30 days we will assume that you do not have any comments regarding associated laws and that you do not have any information relevant to this projects at the current time.

We thank you in advance for your timely response and cooperation. Please feel free to contact us with any questions that you may have concerning this project.

Sincerely,

Ruby M. Davis
Environmental Scientist

Attachment:
USGS Topographic Map
Aerial Map

United States Department of the Interior
FISH AND WILDLIFE SERVICE
Raleigh ES Field Office
Post Office Box 33726
Raleigh, North Carolina 27636-3726

May 5, 2016

Ruby Davis
Wildlands Engineering
1430 South Mint Street, Suite 104
Charlotte, NC 28203

Re: Martin Dairy Mitigation Site – Orange County, NC

Dear Mrs. Davis:

This letter is to inform you that a list of all federally-protected endangered and threatened species with known occurrences in North Carolina is now available on the U.S. Fish and Wildlife Service's (Service) web page at http://www.fws.gov/raleigh. Therefore, if you have projects that occur within the Raleigh Field Office's area of responsibility (see attached county list), you no longer need to contact the Raleigh Field Office for a list of federally-protected species.

Our web page contains a complete and frequently updated list of all endangered and threatened species protected by the provisions of the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 et seq.)(Act), and a list of federal species of concern[1] that are known to occur in each county in North Carolina.

Section 7 of the Act requires that all federal agencies (or their designated non-federal representative), in consultation with the Service, insure that any action federally authorized, funded, or carried out by such agencies is not likely to jeopardize the continued existence of any federally-listed endangered or threatened species. A biological assessment or evaluation may be prepared to fulfill that requirement and in determining whether additional consultation with the Service is necessary. In addition to the federally-protected species list, information on the species' life histories and habitats and information on completing a biological assessment or evaluation and can be found on our web page at http://www.fws.gov/raleigh. Please check the web site often for updated information or changes.

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[1] The term "federal species of concern" refers to those species which the Service believes might be in need of concentrated conservation actions. Federal species of concern receive no legal protection and their designation does not necessarily imply that the species will eventually be proposed for listing as a federally endangered or threatened species. However, we recommend that all practicable measures be taken to avoid or minimize adverse impacts to federal species of concern.

If your project contains suitable habitat for any of the federally-listed species known to be present within the county where your project occurs, the proposed action has the potential to adversely affect those species. As such, we recommend that surveys be conducted to determine the species' presence or absence within the project area. The use of North Carolina Natural Heritage program data should not be substituted for actual field surveys.

If you determine that the proposed action may affect (i.e., likely to adversely affect or not likely to adversely affect) a federally-protected species, you should notify this office with your determination, the results of your surveys, survey methodologies, and an analysis of the effects of the action on listed species, including consideration of direct, indirect, and cumulative effects, before conducting any activities that might affect the species. If you determine that the proposed action will have no effect (i.e., no beneficial or adverse, direct or indirect effect) on federally listed species, then you are not required to contact our office for concurrence (unless an Environmental Impact Statement is prepared). However, you should maintain a complete record of the assessment, including steps leading to your determination of effect, the qualified personnel conducting the assessment, habitat conditions, site photographs, and any other related articles.

With regard to the above-referenced project, we offer the following remarks. Our comments are submitted pursuant to, and in accordance with, provisions of the Endangered Species Act.

Based on the information provided and other information available, it appears that the proposed action is not likely to adversely affect any federally-listed endangered or threatened species, their formally designated critical habitat, or species currently proposed for listing under the Act at these sites. We believe that the requirements of section 7(a)(2) of the Act have been satisfied for your project. Please remember that obligations under section 7 consultation must be reconsidered if: (1) new information reveals impacts of this identified action that may affect listed species or critical habitat in a manner not previously considered; (2) this action is subsequently modified in a manner that was not considered in this review; or, (3) a new species is listed or critical habitat determined that may be affected by the identified action.

However, the Service is concerned about the potential impacts the proposed action might have on aquatic species. Aquatic resources are highly susceptible to sedimentation. Therefore, we recommend that all practicable measures be taken to avoid adverse impacts to aquatic species, including implementing directional boring methods and stringent sediment and erosion control measures. An erosion and sedimentation control plan should be submitted to and approved by the North Carolina Division of Land Resources, Land Quality Section prior to construction. Erosion and sedimentation controls should be installed and maintained between the construction site and any nearby down-gradient surface waters. In addition, we recommend maintaining natural, vegetated buffers on all streams and creeks adjacent to the project site.

The North Carolina Wildlife Resources Commission has developed a Guidance Memorandum (a copy can be found on our website at (http://www.fws.gov/raleigh) to address and mitigate secondary and cumulative impacts to aquatic and terrestrial wildlife resources and water quality. We recommend that you consider this document in the development of your projects and in completing an initiation package for consultation (if necessary).

We hope you find our web page useful and informative and that following the process described above will reduce the time required, and eliminate the need, for general correspondence for species' lists. If you have any questions or comments, please contact Kathy Matthews of this office at (919) 856-4520 ext. 27.

Sincerely,

for Pete Benjamin
Field Supervisor

List of Counties in the Service's Raleigh Field Office Area of Responsibility

Alamance
Beaufort
Bertie
Bladen
Brunswick
Camden
Carteret
Caswell
Chatham
Chowan
Columbus
Craven
Cumberland
Currituck
Dare
Duplin
Durham
Edgecombe
Franklin
Gates
Granville
Greene
Guilford
Halifax
Harnett
Hertford
Hoke
Hyde
Johnston
Jones
Lee
Lenoir
Martin
Montgomery
Moore
Nash
New Hanover
Northampton
Onslow
Orange
Pamlico
Pasquotank
Pender
Perquimans
Person
Pitt
Randolph
Richmond
Robeson
Rockingham
Sampson
Scotland
Tyrrell
Vance
Wake
Warren
Washington
Wayne
Wilson

Natural Resources
Conservation Service

North Carolina
State Office

4407 Bland Road
Suite 117
Raleigh, NC 27609
Voice 919-873-2171
Fax 844-325-6833

May 23, 2016

Mr. Ian Eckardt
Environmental Scientist
Wildlands Engineering, Inc.
1430 S. Mint St, Suite 104
Charlotte, NC 28203

Dear Mr. Eckardt

Thank you for your letter dated August 4, 2015, Subject: AD1006 Form - Martin Dairy Mitigation Site - Orange County, NC. The following guidance is provided for your information.

Projects are subject to the Farmland Protection Policy Act (FPPA) requirements if they may irreversibly convert farmland (directly or indirectly) to non-agricultural use and are completed by a federal agency or with assistance from a federal agency. Farmland means prime or unique farmlands as defined in section 1540(c)(1) of the FPPA or farmland that is determined by the appropriate state or unit of local government agency or agencies with concurrence of the Secretary of Agriculture to be farmland of statewide local importance.

For the purpose of FPPA, farmland includes prime farmland, unique farmland, and land of statewide or local importance. Farmland subject to FPPA requirements does not have to be currently used for cropland. It can be forestland, pastureland, cropland, or other land, but not water or urban built-up land.

Farmland does not include land already in or committed to urban development or water storage. Farmland *already in* urban development or water storage includes all such land with a density of 30 structures per 40-acre area. Farmland already in urban development also includes lands identified as *urbanized area* (UA) on the Census Bureau Map, or as urban area mapped with a *tint overprint* on the United States Geological Survey (USGS) topographical maps, or as *urban-built-up* on the United States Department of Agriculture (USDA) Important Farmland Maps.

The area in question meets one or more of the above criteria for Farmland. Farmland area will be affected or converted. Enclosed is the Farmland Conversion Impact Rating form AD1006 with PARTS II, IV and V completed by NRCS. The corresponding agency will need to complete the evaluation, according to the Code of Federal Regulation 7CFR 658, Farmland Protection Policy Act.

If you have any questions, please contact Milton Cortes, Assistant State Soil Scientist at 919-873-2171 or by email: milton.cortes@nc.usda.gov.

Again, thank you for inquiry. If we can be of further assistance, please do not hesitate to contact us.

Sincerely,

MILTON CORTES

Digitally signed by MILTON CORTES
DN: c=US, o=U.S. Government, ou=Department of Agriculture, cn=MILTON CORTES, 0.9.2342.19200300.100.1.1=12001000080173
Date: 2016.05.22 12:23:29 -04'00'

Milton Cortes
Assistant State Soil Scientist

cc:
Kent Clary, State Soil Scientist, NRCS, Raleigh, NC

U.S. Department of Agriculture

FARMLAND CONVERSION IMPACT RATING

PART I *(To be completed by Federal Agency)*	Date Of Land Evaluation Request 4/14/16
Name Of Project Martin Dairy Mitigation Site	Federal Agency Involved FHWA - NCDMS
Proposed Land Use Stream Restoration	County And State Orange County, NC
PART II *(To be completed by NRCS)*	Date Request Received By NRCS

Does the site contain prime, unique, statewide or local important farmland? *(If no, the FPPA does not apply -- do not complete additional parts of this form).*	Yes ☑	No ☐	Acres Irrigated - N/A	Average Farm Size 88 acres
Major Crop(s) CORN	Farmable Land In Govt. Jurisdiction Acres: 245, 406	% 96	Amount Of Farmland As Defined in FPPA Acres: 203, 636	% 90
Name Of Land Evaluation System Used Orange Co., LESA	Name Of Local Site Assessment System None		Date Land Evaluation Returned By NRCS May 23, 2016 By email	

PART III *(To be completed by Federal Agency)*	Alternative Site Rating Site A	Site B	Site C	Site D
A. Total Acres To Be Converted Directly	9.5			
B. Total Acres To Be Converted Indirectly				
C. Total Acres In Site	9.5	0.0	0.0	0.0
PART IV *(To be completed by NRCS)* Land Evaluation Information				
A. Total Acres Prime And Unique Farmland	6.1			
B. Total Acres Statewide And Local Important Farmland	3.4			
C. Percentage Of Farmland In County Or Local Govt. Unit To Be Converted	0.0047			
D. Percentage Of Farmland In Govt. Jurisdiction With Same Or Higher Relative Value	61.0			
PART V *(To be completed by NRCS)* Land Evaluation Criterion Relative Value Of Farmland To Be Converted *(Scale of 0 to 100 Points)*	84			

PART VI *(To be completed by Federal Agency)* Site Assessment Criteria *(These criteria are explained in 7 CFR 658.5(b)*	Maximum Points				
1. Area In Nonurban Use	15	14			
2. Perimeter In Nonurban Use	10	10			
3. Percent Of Site Being Farmed	20	20			
4. Protection Provided By State And Local Government	20	20			
5. Distance From Urban Builtup Area	15	0			
6. Distance To Urban Support Services	15	0			
7. Size Of Present Farm Unit Compared To Average	10	10			
8. Creation Of Nonfarmable Farmland	10	0			
9. Availability Of Farm Support Services	5	5			
10. On-Farm Investments	20	15			
11. Effects Of Conversion On Farm Support Services	10	0			
12. Compatibility With Existing Agricultural Use	10	0			
TOTAL SITE ASSESSMENT POINTS	160	94	0	0	0
PART VII *(To be completed by Federal Agency)*					
Relative Value Of Farmland *(From Part V)*	100	84			
Total Site Assessment *(From Part VI above or a local site assessment)*	160	94	0	0	0
TOTAL POINTS *(Total of above 2 lines)*	260	178	0	0	0

Site Selected:	Date Of Selection	Was A Local Site Assessment Used? Yes ☐ No ☐

Reason For Selection:

(See Instructions on reverse side)

This form was electronically produced by National Production Services Staff

Clear Form

Form AD-1006 (10-83)

WILDLANDS
ENGINEERING

April 15, 2016

Shannon Deaton
North Carolina Wildlife Resource Commission
Division of Inland Fisheries
1721 Mail Service Center
Raleigh, NC 27699

Subject: Martin Dairy Mitigation Site
Orange County, North Carolina

Dear Ms. Deaton,

Wildlands Engineering, Inc. requests review and comment on any possible issues that might emerge with respect to fish and wildlife issues associated with the proposed Martin Dairy Mitigation Site. A USGS map and aerial maps showing the approximate project area are enclosed. The topographic figure was prepared from the Hillsborough and Caldwell, 7.5-Minute USGS Topographic Quadrangles.

The Martin Dairy Mitigation Site is being developed to provide in-kind mitigation for unavoidable stream channel impacts. Several sections of channel have been identified as significantly degraded. This will be a stream restoration project only. The site has historically been disturbed due to agricultural use, primarily for livestock production.

We thank you in advance for your timely response and cooperation. Please feel free to contact us with any questions that you may have concerning this project.

Sincerely,

Ruby M. Davis
Environmental Scientist

Attachment:
USGS Topographic Map
Aerial Map

North Carolina Wildlife Resources Commission

Gordon Myers, Executive Director

3 May 2016

Ms. Ruby M. Davis
Wildlands Engineering
1430 South Mint Street, Suite 104
Charlotte, NC 28203

Subject: Martin Dairy Mitigation Site, Orange County, North Carolina

Dear Ms. Davis:

Biologists with the North Carolina Wildlife Resources Commission have reviewed the subject information. Our comments are provided in accordance with provisions of the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661-667e) and North Carolina General Statutes (G.S. 113-131 et seq.).

The proposed project includes stream restoration. Several sections of channel have been identified as significantly degraded. The site has been used primarily for livestock production. The mitigation site will provide in-kind mitigation for unavoidable stream impacts.

The project site includes an unnamed tributary to Buckwater Creek in the Neuse River basin.

Stream restoration projects often improve water quality and aquatic habitat. Establishing native, forested buffers in riparian areas will help protect water quality, improve aquatic and terrestrial habitats, and provide a travel corridor for wildlife species. Provided measures are taken to minimize erosion and sedimentation from construction/restoration activities, we do not anticipate the project to result in significant adverse impacts to aquatic and terrestrial wildlife resources.

Thank you for the opportunity to review this proposed project. If we can provide further assistance, please contact our office at (336) 449-7625 or shari.bryant@ncwildlife.org.

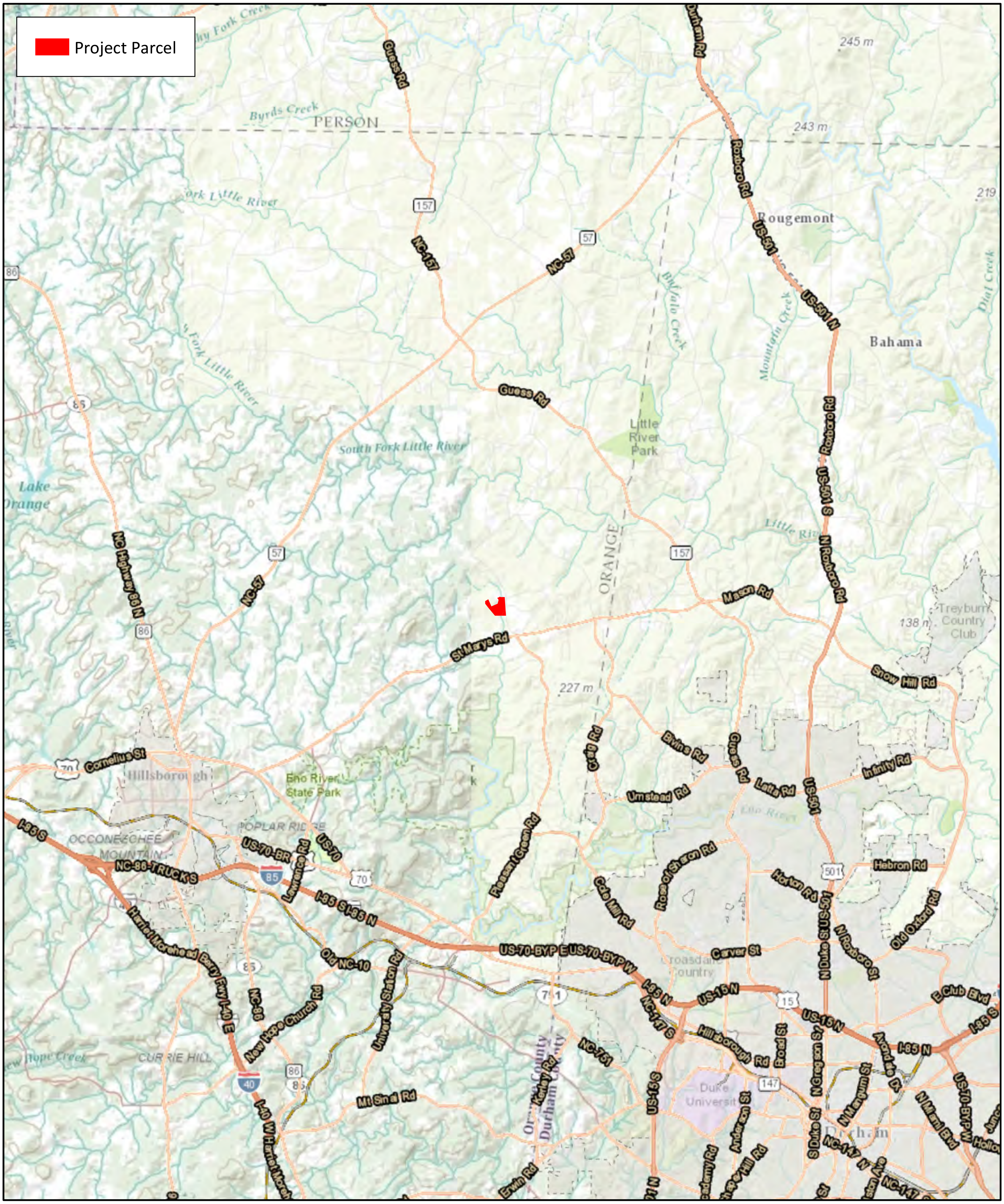
Sincerely,

Shari L. Bryant
Western Piedmont Coordinator
Habitat Conservation Division

Mailing Address: Habitat Conservation • 1721 Mail Service Center • Raleigh, NC 27699-1721
Telephone: (919) 707-0220 • **Fax:** (919) 707-0028

Martin Dairy Mitigation Site
Categorical Exclusion

FIGURES

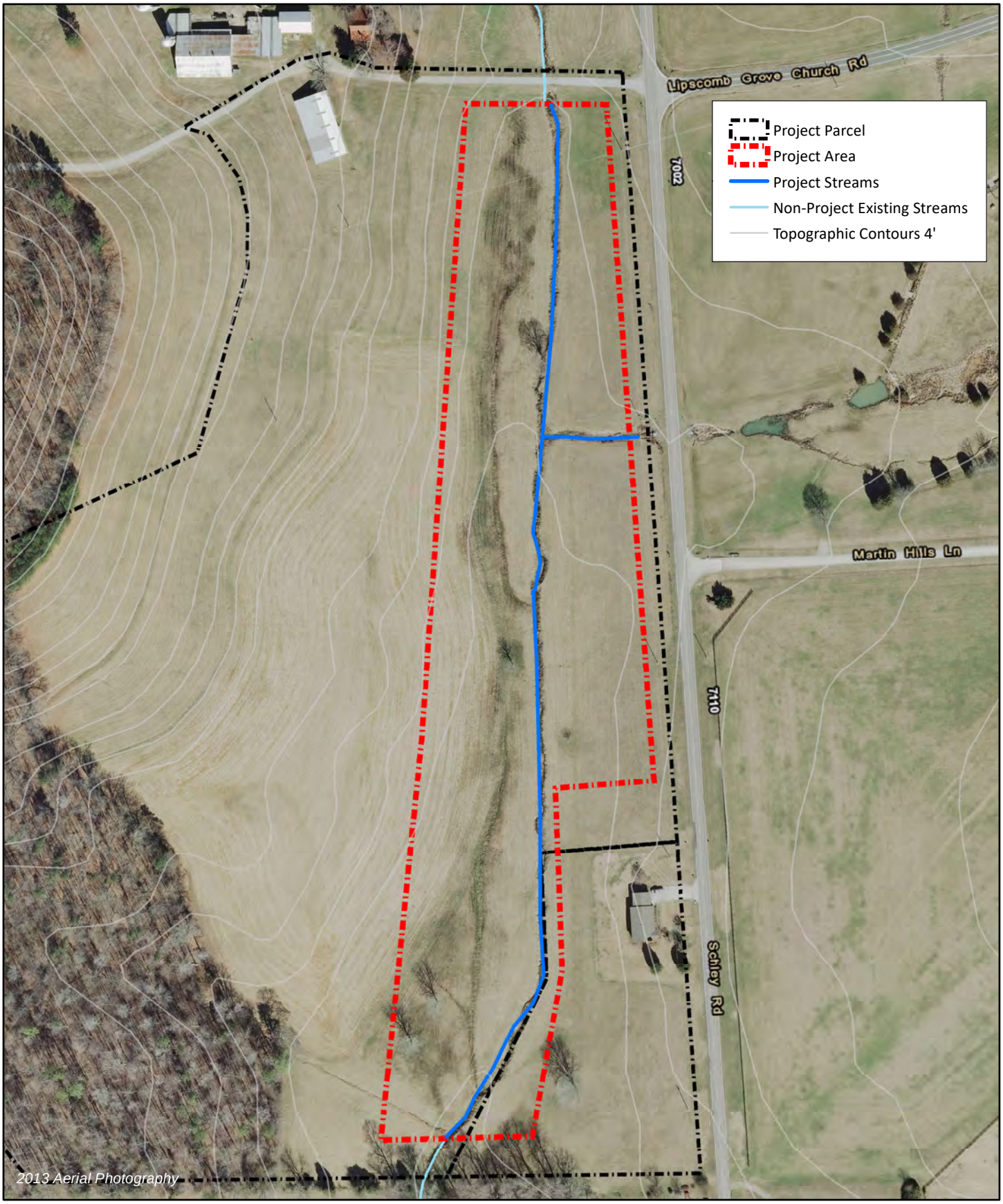


Vicinity Map
Martin Dairy Mitigation Site
Neuse River Basin 03020201

0 2 Miles

N

Orange County, NC



WILDLANDS ENGINEERING

0 200 Feet

N

Overview Site Map
Martin Dairy Mitigation Site
Neuse River Basin 03020201

Orange County, NC

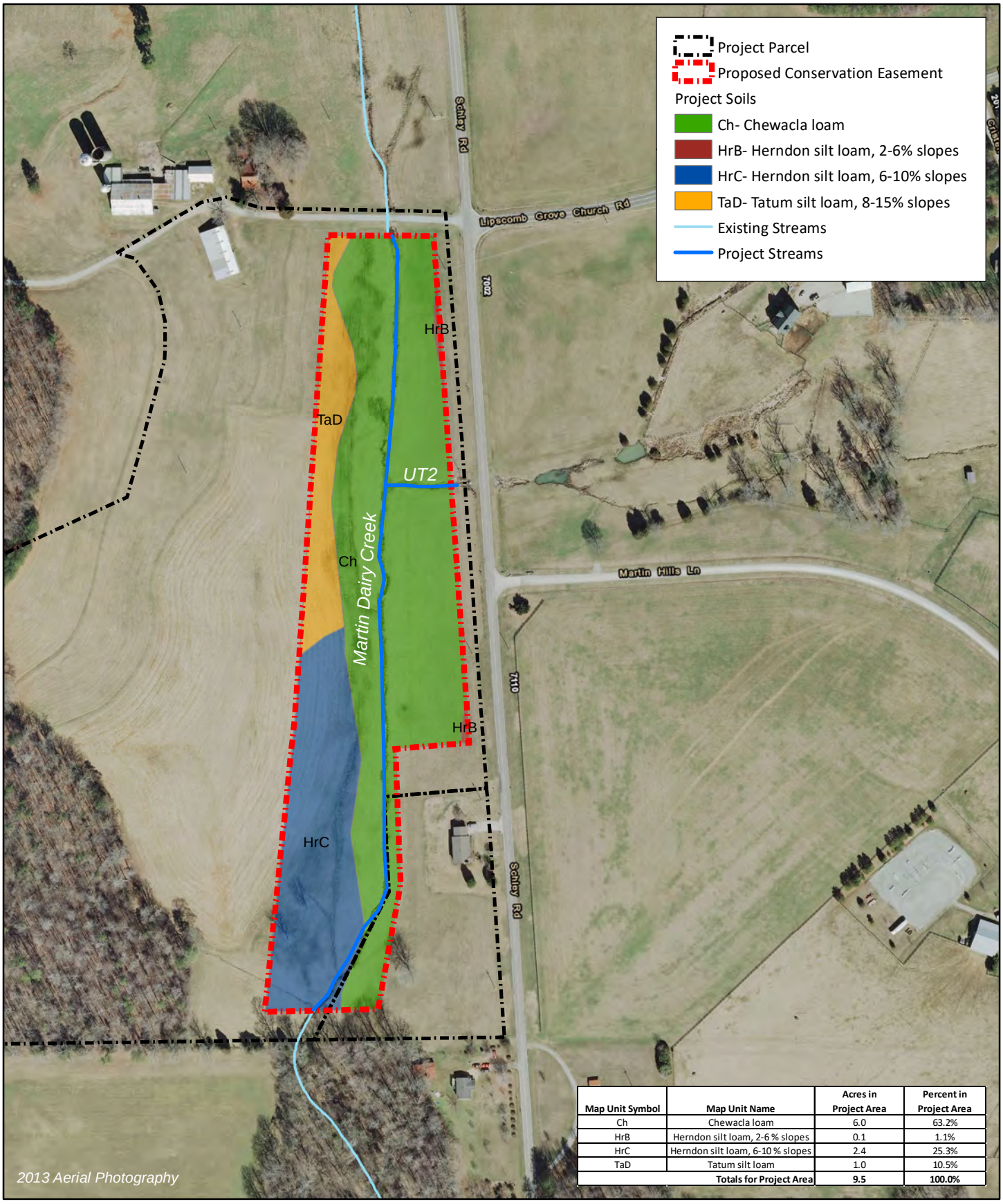
WILDLANDS ENGINEERING

0 800 Feet

N

USGS Topography Map
Martin Dairy Mitigation Site
Neuse River Basin 03020201

Orange County, NC



Map Unit Symbol	Map Unit Name	Acres in Project Area	Percent in Project Area
Ch	Chewacla loam	6.0	63.2%
HrB	Herndon silt loam, 2-6 % slopes	0.1	1.1%
HrC	Herndon silt loam, 6-10 % slopes	2.4	25.3%
TaD	Tatum silt loam	1.0	10.5%
	Totals for Project Area	**9.5**	**100.0%**

WILDLANDS ENGINEERING

0 300 Feet

N

Soils Map
Martin Dairy Mitigation Site
Neuse River Basin 03020201

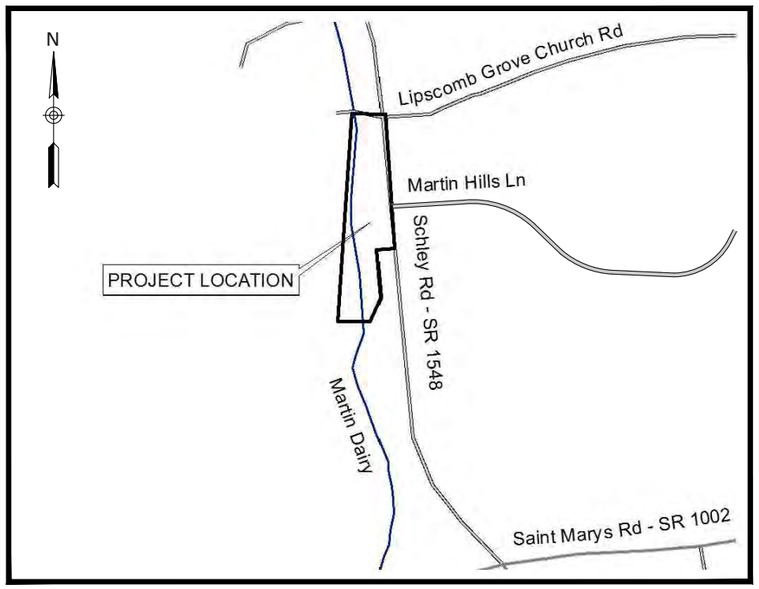
Orange County, NC

Appendix 6

Plan Sheets

Martin Dairy Mitigation Site

Neuse River Basin 03020201
Orange County, North Carolina
for
NCDEQ Division of Mitigation Services



Vicinity Map
Not to Scale

BEFORE YOU DIG!
CALL 1-800-632-4949
N.C. ONE-CALL CENTER
IT'S THE LAW!

CONSTRUCTION PLANS
March 2017

Stream Origins

Stream	Latitude	Longitude
Martin Dairy	N 36° 07' 31.65"	W 79° 00' 13.78"
UT1	N 36° 07' 26.69"	W 79° 00' 12.28"

Sheet Index

Project Directory

Engineering:
Wildlands Engineering, Inc
License No. F-0831
312 West Millbrook Rd, Suite 225
Raleigh, NC 27609
Angela N. Allen, PE
919-851-9986

Surveying:
Turner Land Surveying, PLLC
P.O. Box 148
Swannanoa, NC 28778
919-827-0745

Owner:
NCDEQ Division of
Mitigation Services
1652 Mail Service Center
Raleigh, NC 27699-1652
Jeff Schaffer
919-707-8308

DEQ Contract No. 6831

DMS ID No. 97087

WILDLANDS ENGINEERING
312 W. Millbrook Road, Ste 225
Raleigh, NC 27609
Tel: 919.851.9986
Firm License No. F-0831

Martin Dairy Mitigation Site
Orange County, North Carolina
Title Sheet

Revisions:

Date: 03/13/2017
Job Number: 005-02158
Project Engineer: ANA
Drawn By: ANA
Checked By: NM

Sheet 0.1

March 13, 2017

N

0' 80' 160' 240'
(HORIZONTAL)

LIBSCOMB GROVE CHURCH ROAD

SCHLEY ROAD-NCSR 1548

TEMPORARY CONSTRUCTION ENTRANCE

BEGIN UT1 (RESTORATION) STA. 200+33

MARTIN HILLS LANE

RIGHT-OF-WAY

BEGIN MARTIN DAIRY REACH 1 (RESTORATION) STA. 100+13

PRIVATE DRIVE, PERMANENT ACCESS EASEMENT

UT1

END UT1 (RESTORATION) STA. 202+50

GARAGE

TED H. MARTIN & RUBY Y. MARTIN
PIN: 9896839111
D.B. 13, PG. 108

TEMPORARY CONSTRUCTION ENTRANCE

MARTIN DAIRY

1.1

1.2

1.3

1.4

1.5

1.6

CHRISTER HALLIN
PIN: 9896745818
D.B. 5738, PG. 328

BEGIN INTERNAL EASEMENT BREAK MARTIN DAIRY REACH 1 STA. 101+38

END MARTIN DAIRY REACH 1 (RESTORATION)
BEGIN MARTIN DAIRY REACH 2 (RESTORATION)
STA. 107+61

TED H. MARTIN & RUBY Y. MARTIN
PIN: 9896830483
D.B. 112, PG. 51

END MARTIN DAIRY REACH 2 (RESTORATION) STA. 119+71

END INTERNAL EASEMENT BREAK MARTIN DAIRY REACH 1 STA. 101+78

OVERHEAD POWER LINE AND 30'EASEMENT (TYP.)

TED H. MARTIN & RUBY Y. MARTIN
PIN: 9896749273
D.B. 107, PG. 80

E:\Projects\005-02158 Martin Dairy\Civil\Plans\005-02158 Project Overview.dwg

WILDLANDS ENGINEERING
312 W. Millbrook Road, Ste 225
Raleigh, NC 27609
Tel: 919.851.9986
Firm License No. F-0831

Martin Dairy Mitigation Site
Orange County, North Carolina

Project Overview

Revisions:

Date: 03/13/2017
Job Number: 005-02158
Project Engineer: ANA
Drawn by: ANA
Checked By: NM

Sheet 0.2

March 13, 2017

Stream, wetland, and floodplain grading; channel filling; in-stream structure installation; and bank stabilization work will be completed according to the construction sequence below.

General Construction Notes for All Reaches

1. All erosion and sediment control practices shall comply with the North Carolina Erosion and Sediment Control Planning and Design Manual.
2. Contractor will install pump-around systems to divert flow while working in live, flowing channels. The Contractor shall operate and maintain the pump-around system 24 hours a day until all disturbed areas are stabilized. The disturbed area within the pump around must be stabilized with temporary seeding, mulch and erosion control matting by the end of each work day. Contractor shall not remove pump-around systems and advance to the next work area until the current work area is completed and stabilized.
3. No material from the off-line proposed stream channel excavation may be backfilled into the adjacent existing stream channel until the newly-constructed proposed stream section is completed, stabilized, and the stream flow has been diverted into it, not even if that section of old/ existing stream is being pumped.
4. In areas without a pump-around system, Contractor shall disturb only as much channel bank as can be stabilized with temporary seeding, mulch, and a sod mat or erosion control matting by the end of each work day.
5. Clearing and grubbing activities shall not extend more than 150 linear feet ahead of in-stream work.
6. When crossing an active section of new or old stream channel, a Timber Mat shall be installed according to the details and specifications.
7. All graded areas with slopes steeper than 3:1 will be stabilized within seven (7) working days. All other areas will be stabilized within 14 working days.
8. Locations for staging and stockpile areas and temporary stream crossings have been provided on the Plans. Additional or alternative staging and/or stockpile areas and stream crossings may be used by the Contractor provided that all practices comply with the North Carolina Erosion and Sediment Control Planning and Design Manual and that the areas are approved by the Engineer prior to implementation.
9. Various types of constructed riffles are specified on the plans. Contractor shall build the specific types of constructed riffles at locations shown on the Plans. Changes in constructed riffle type must be approved by the Engineer.
10. Contractor is to make every effort to avoid damaging or removing existing trees.
11. Under no circumstances will the Contractor exceed the limits of disturbance as shown on the Plans.
12. Trees are to be harvested only in the area represented on the plans, west of the easement area. Trees can be harvested from the first 10 feet of the wood line and should be cut as close to the ground as possible. The land owner will mark trees which will NOT be harvested prior to commencement of construction.
13. The construction entrance on the southernmost end of the project should remain in place after construction is completed, per landowner request.

Initial Site Preparation

1. Contact North Carolina "One Call" Center (1.800.632.4949) before any excavation.
2. Contact Division of Energy, Mineral and Land Resources (919-791-4200) before any work begins on the project and notify them of the start date.
3. Mobilize equipment and materials to the Site.
4. Identify and establish construction entrance, staging and stockpile areas, haul roads, silt fence, tree protection fencing, safety fencing, and temporary stream crossings as indicated on the Plans for work areas. Note: Construction access will enter the site from Schley Road using two specified construction entrances. These entrances are within temporary construction entrance easements.
5. All haul roads shall be monitored for sediment loss daily. In the event of sediment loss, silt fence or other acceptable sediment and erosion control practices shall be installed. Silt fence outlets shall be located at points of low elevation or a minimum spacing of 150 ft.
6. Set up temporary facilities, locate equipment within the staging area, and stockpile materials needed for the initial stages of construction within the stockpile area(s).
7. Install and maintain an onsite rain gauge and log book to record the rainfall amounts and dates. Complete the self-inspection as required by NCDEQ permit.

Martin Dairy Creek Reach 1, Martin Dairy Creek Reach 2, and UT1 Construction

8. Perform any necessary clearing and grubbing in phases as work progresses. Bank vegetation and vegetation immediately adjacent to live channels shall be left undisturbed as long as possible. Remove all non-native and invasive vegetation prior to beginning the channel construction. Take care with vegetation marked for transplant from the old channel to new channel. Do not disturb transplant vegetation until time of transplant.
9. Construction of all channels are to be done in the dry. Construction should generally progress from upstream to downstream to prevent sediment runoff from upstream construction affecting completed downstream reaches. Use a pump around as shown on the plans and discussed in the General Notes.
10. Where feasible, more than one offline section may be constructed concurrently. Offline sections shall be tied online sequentially from downstream to upstream.
11. As work progresses, remove and stockpile the top three inches of soil from the active grading area. Stockpiled topsoil shall be kept separate for onsite replacement prior to floodplain seeding.
12. Construct the proposed stream channel to the grade specified in the cross-sections and profile. Transfer coarse material from abandoned channel riffles to new channel riffles utilizing a pump-around when doing so.
13. Grade the adjacent floodplain area according to grades shown on the plan.
14. Install in-stream structures (riffles, angled log sill, log J-hook, lunker log, and boulder sill) and in-bank bioengineering such as brush toe and sod mats after channel grading is completed according to details and specifications.
15. Sod mats should be used in lieu of coir fiber matting to stabilize all stream banks on site as the preferential stabilization method. Sod mats shall be installed according to sod mat detail. Coir fiber matting may be used where sod mats are not available or if coir fiber matting is preferred at the discretion of the Engineer.
16. Seed (with specified temporary seed and permanent seed mix) and straw mulch areas where the coir fiber matting is to be installed.
17. Install coir fiber matting according to plans and specifications.
18. Backfill abandoned channel sections with stockpiled soil according to the grades shown on the Plans. Non-native and invasive vegetation (e.g. Chinese privet and multiflora rose) shall be removed from the existing channel prior to backfilling.
19. Prepare floodplain for seeding by applying stockpiled topsoil to the floodplain between bankfull elevation and the grading limits, ripping, and raking/smoothing. Seed with specified temporary and permanent seed mix and mulch. Any areas within the conservation easement that have not been graded shall be treated according to the planting plan.
20. If at any time circumstances should arise where water has been turned into the new channel and additional work must be done on the floodplain, erosion control devices will be installed to protect the new channel from sedimentation.
21. Once all phases of channel and floodplain construction are complete, prepare the floodplain areas for planting per the specifications.
22. Install livestakes and herbaceous plugs along the stream banks according to the plans and specifications.

Construction Demobilization

23. Remove temporary stream crossings.
24. The Contractor shall ensure that the site is free of trash and leftover materials prior to demobilization of equipment from the site.
25. Complete the removal of any additional stockpiled material from the site.
26. Demobilize grading equipment from the site.
27. All rock and other stockpiled materials must be removed from the limits of disturbance and conservation easement. All areas outside the conservation easement shall be returned to pre-project conditions or better.
28. Seed, mulch, and stabilize staging areas, stockpile areas, haul roads, and construction entrances. Pasture seed mix is to be applied to areas of disturbance outside of the conservation easement.

Existing Features

- Existing Property Boundary
- Existing 5' Major Contour
- Existing 1' Minor Contour
- Existing Thalweg
- Existing Utility Easement
- OHE — Existing Overhead Electric Line
- Existing Edge of Pavement
- Existing Overhead Electric Pole
- Existing Wetlands
- Existing Treeline
- Existing Tree

Proposed Features

- CE — Proposed Conservation Easement
- TCE — Proposed Temporary Construction Entrance
- Proposed Stream Alignment
- Proposed Bankfull
- Proposed 5' Major Contour
- Proposed 1' Minor Contour
- CR-NM — Proposed Native Material Constructed Riffle, See Detail 1, Sheet 4.1
- CR-WD — Proposed Woody Riffle, See Detail 2, Sheet 4.1
- CR-ALR — Proposed Angled Log Riffle, See Detail 3, Sheet 4.1
- CR-CH — Proposed Chunky Riffle, See Detail 1, Sheet 4.2
- Proposed Lunker Log, See Detail 2, Sheet 4.2
- Proposed Angled Log Drop, See Detail 3, Sheet 4.2
- Proposed Boulder Sill, See Detail 4, Sheet 4.2
- Proposed Log J-Hook, See Detail 1, Sheet 4.3
- Proposed Transplanted Sod Mats, See Detail 2, Sheet 4.3
- Proposed Brush Toe, See Details 3, Sheet 4.3
- Proposed Rock Outlet, See Detail 2, Sheet 4.6
- Proposed Permanent Culvert Crossing
- Potential Rock Harvest Area

Erosion Control Features

- Proposed Pump Around, See Detail 3, Sheet 4.4
- Proposed Construction Entrance, See Detail 4, Sheet 4.4
- Proposed Silt Fence, See Detail 1, Sheet 4.5
- Proposed Stone Outlet, See Detail 2, Sheet 4.5
- Proposed Temporary Stream Crossing - Timber Mat, See Detail 3, Sheet 4.5
- Proposed Haul Road
- Proposed Stockpile/ Staging Area
- LOD — Proposed Limits Of Disturbance
- SAF — Proposed Tree Protection Fencing, See Detail 4, Sheet 4.5

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Martin Dairy Mitigation Site
Orange County, North Carolina

General Notes and Symbols

Revisions:

Date: 03/13/2017
Job Number: 005-02158
Project Engineer: ANA
Drawn By: ANA
Checked By: NM

Sheet 0.3

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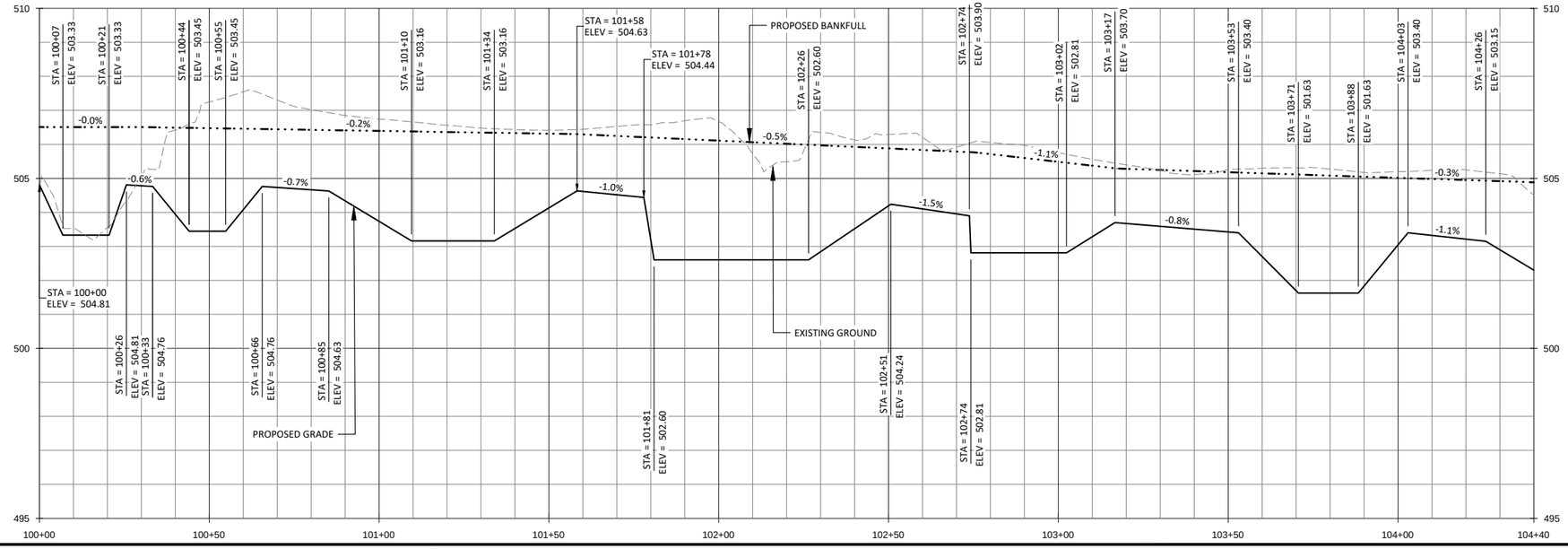
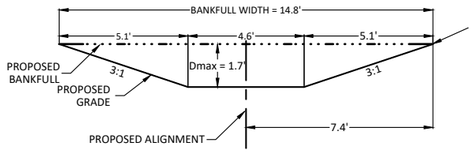
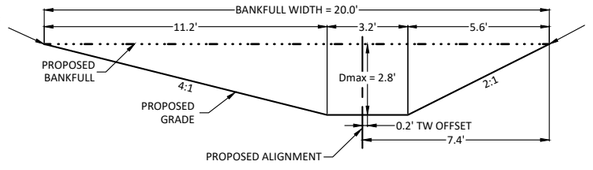
March 13, 2017





MARTIN DAIRY REACH 1 - TYPICAL SECTION: RIFFLE
STA 100+15 TO 107+80



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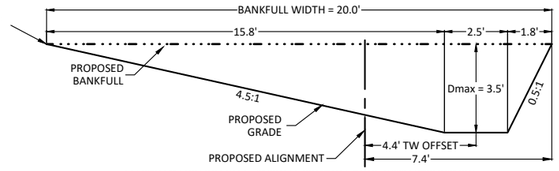

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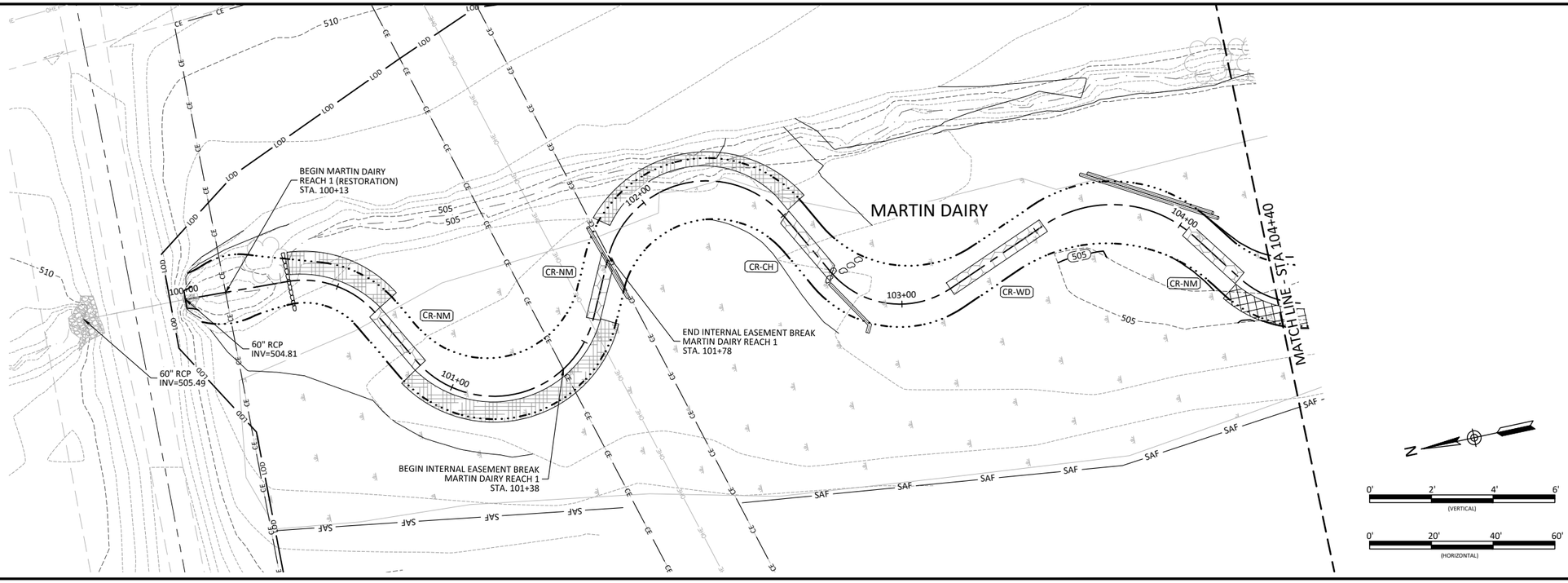
STA 100+15 TO 107+80



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Martin Dairy Mitigation Site
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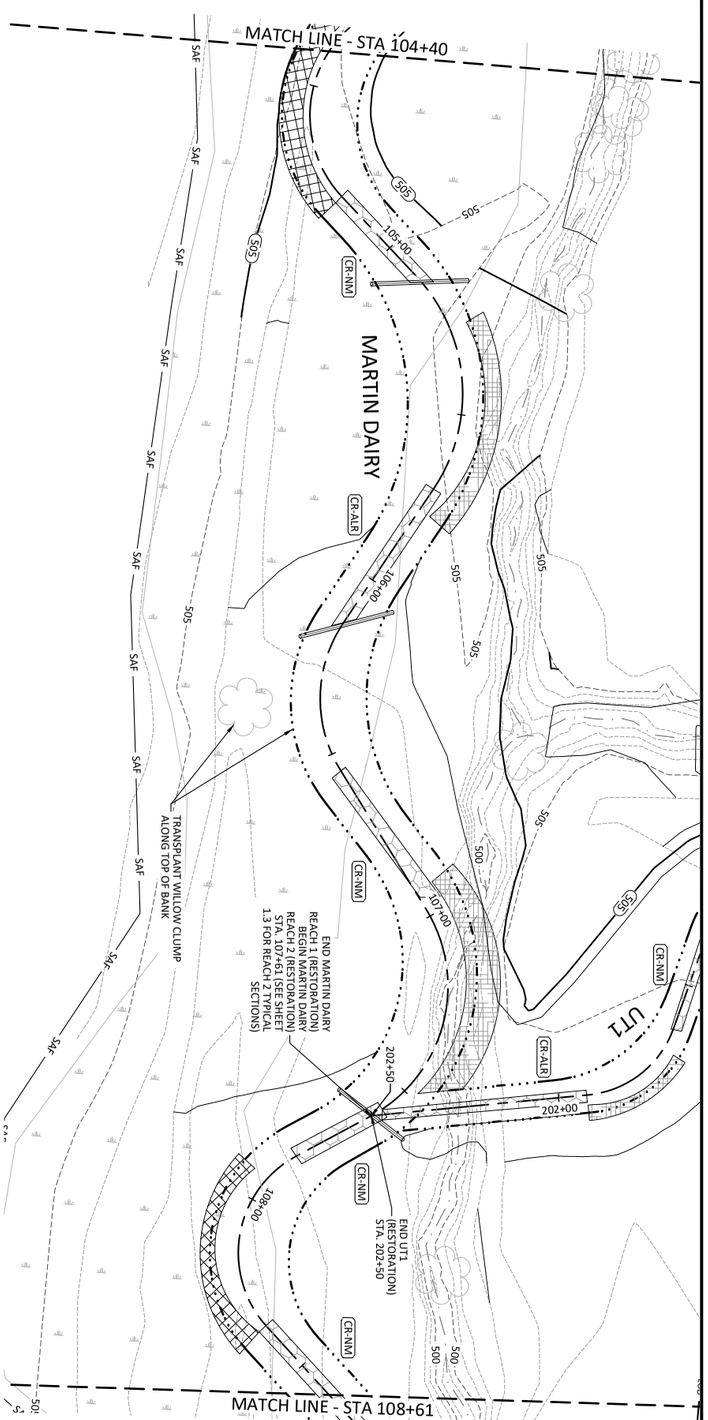
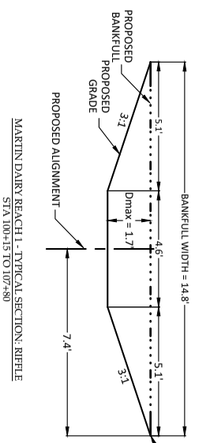
Martin Dairy Reach 1
Stream Plan and Profile

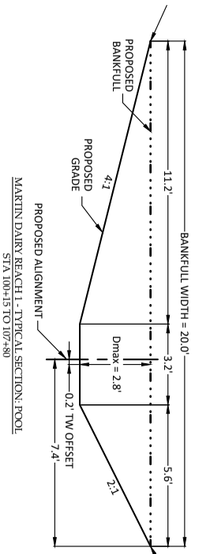
Revisions:

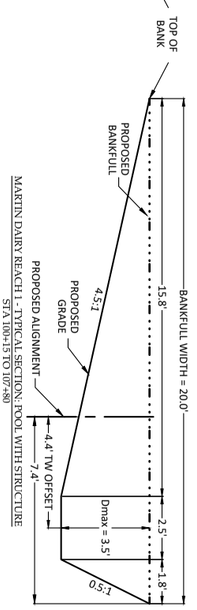
Date: 03/13/2017
Job Number: 005-02158
Project Engineer: ANA
Drawn By: ANA
Checked By: NM

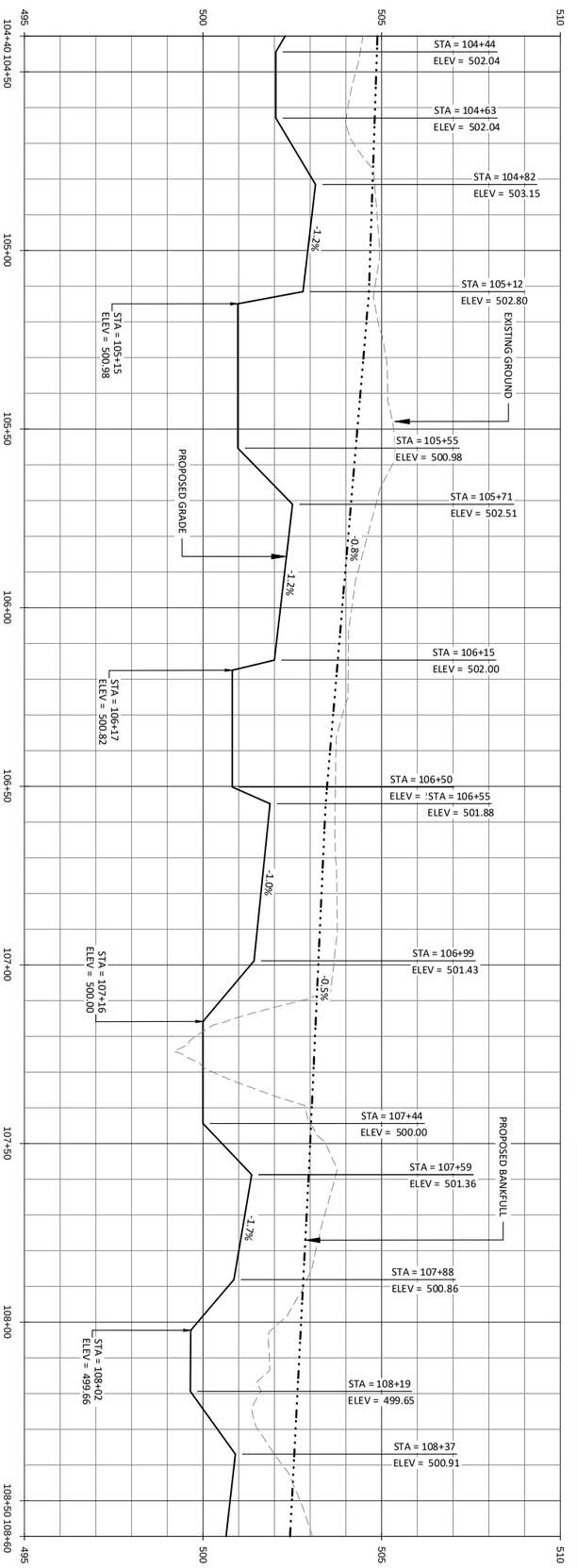
Sheet 1.1

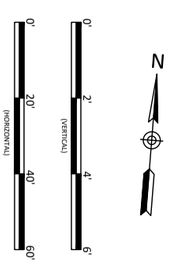


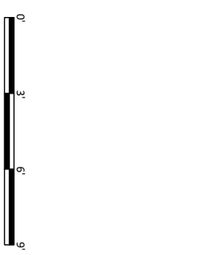












Date:	03/13/2017
Job Number:	005-02158
Project Engineer:	ANA
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Checked By:	NM

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Sheet

Revisions:

Martin Dairy Mitigation Site
Orange County, North Carolina

Martin Dairy Reaches 1 and 2
Stream Plan and Profile

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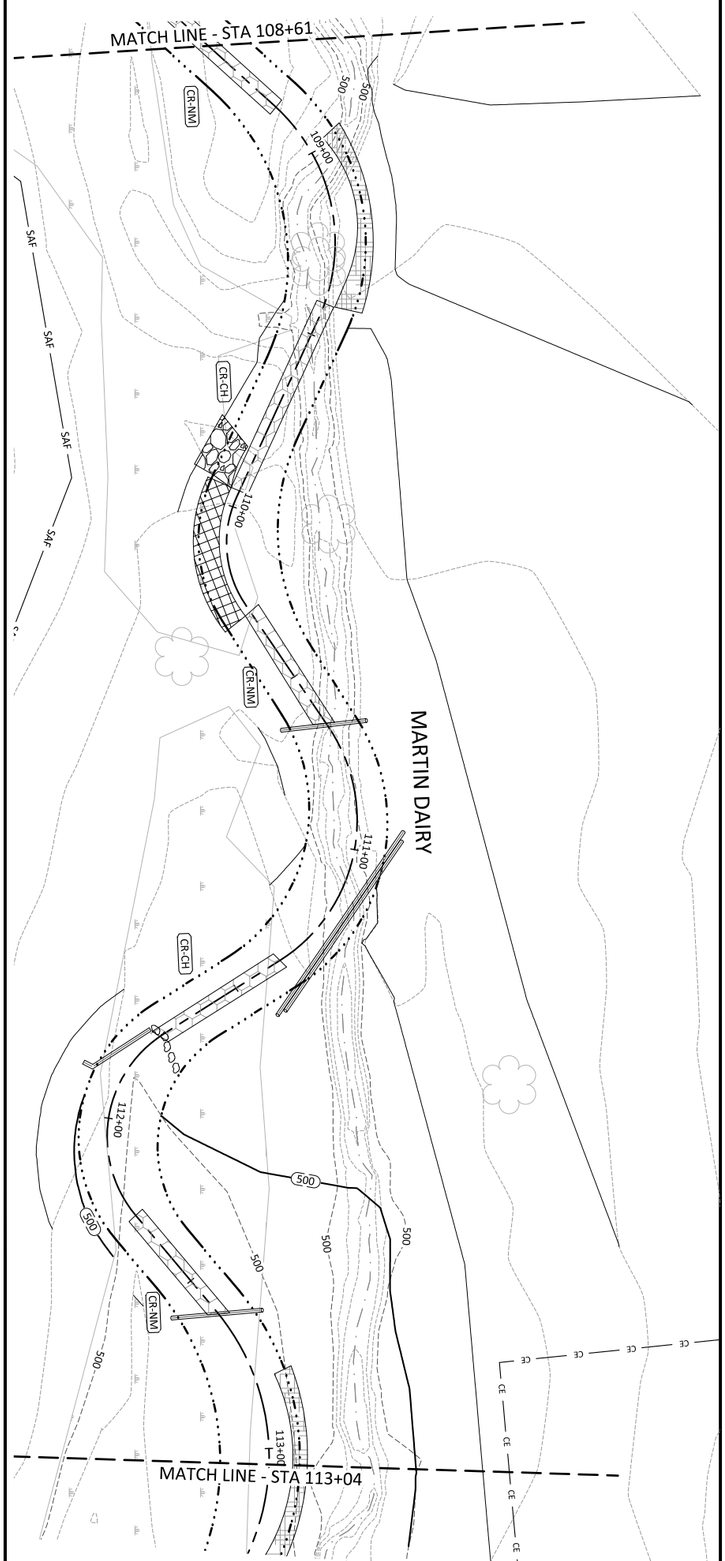

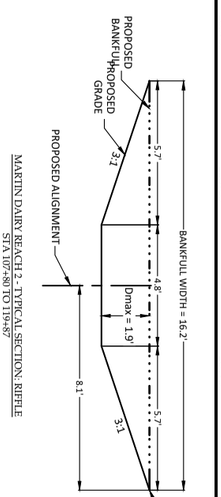

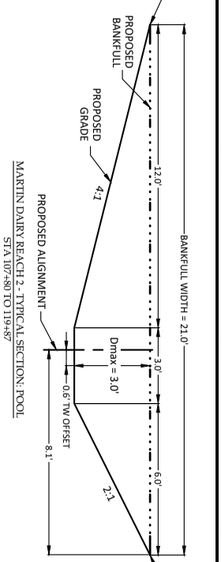

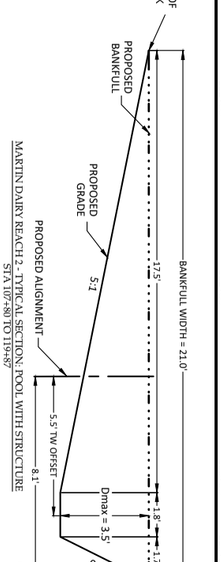

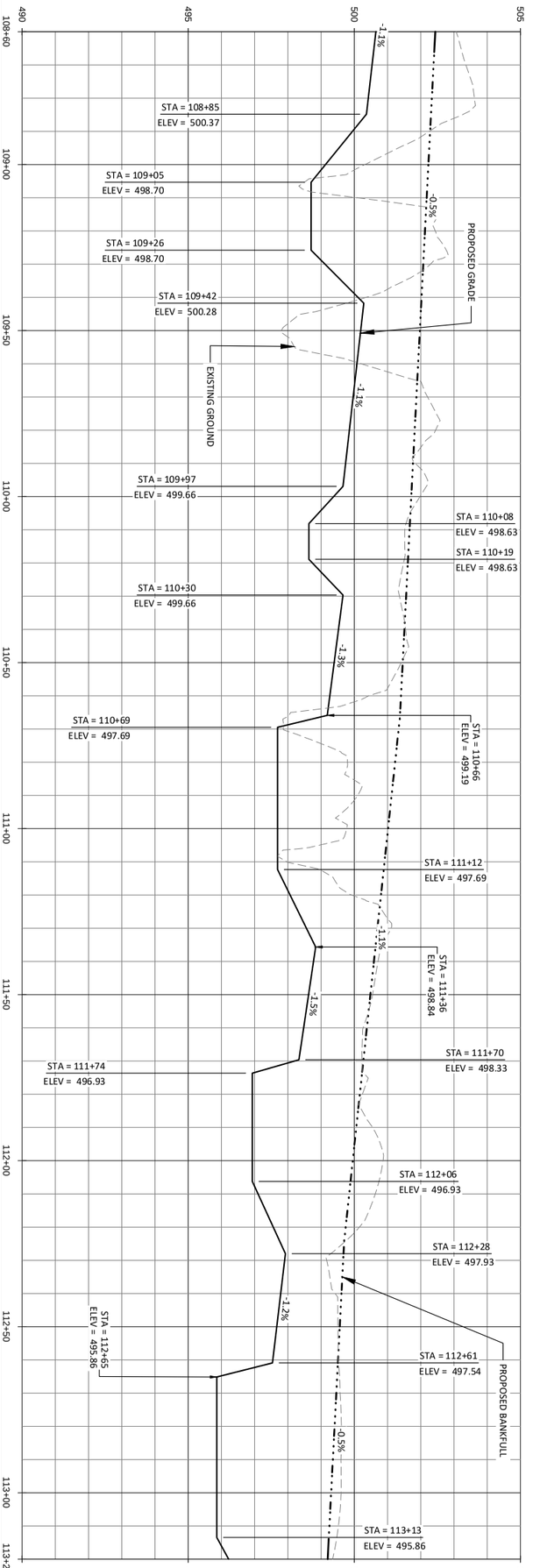

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Checked By:	NM

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Martin Dairy Mitigation Site
Orange County, North Carolina

Martin Dairy Reach 2
Stream Plan and Profile

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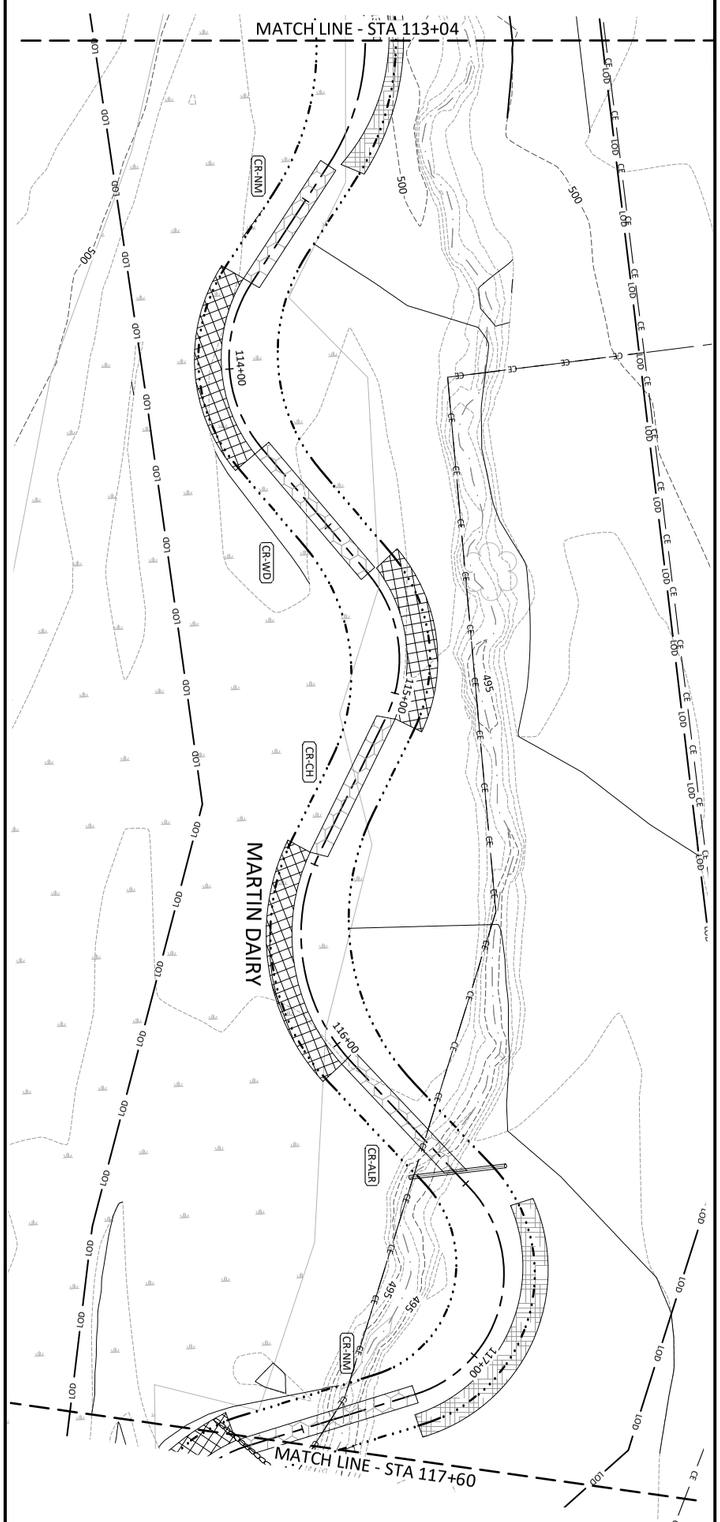

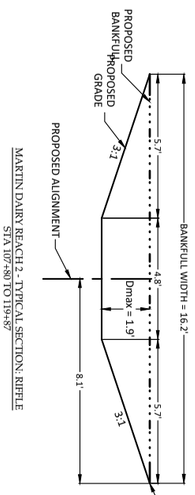

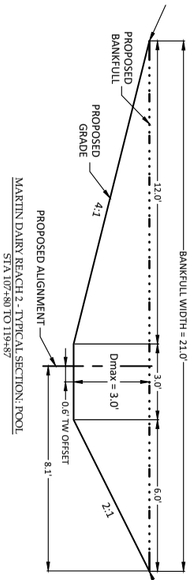

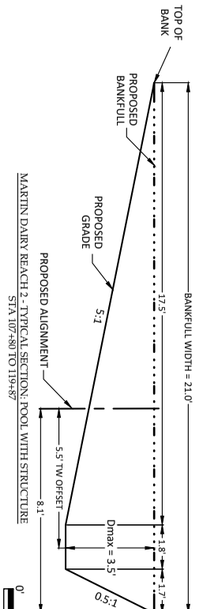

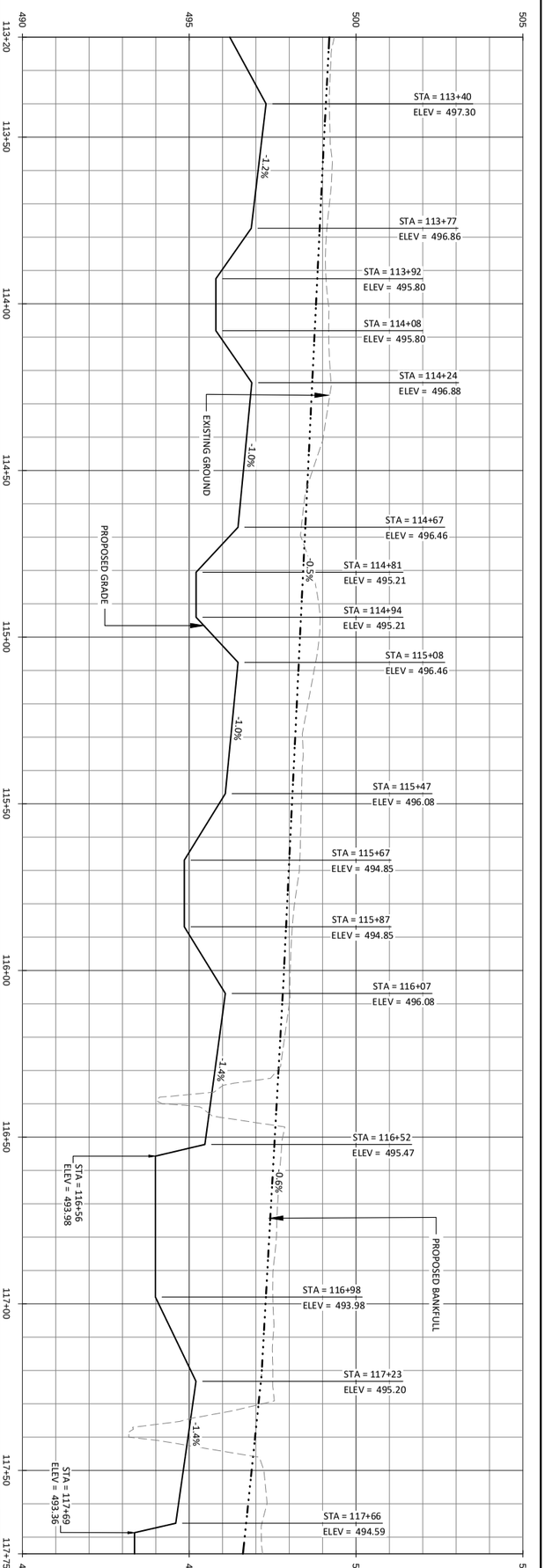

Date:	03/13/2017
Job Number:	005-02158
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1.4
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Revisions:

Martin Dairy Mitigation Site
Orange County, North Carolina

Martin Dairy Reach 2
Stream Plan and Profile

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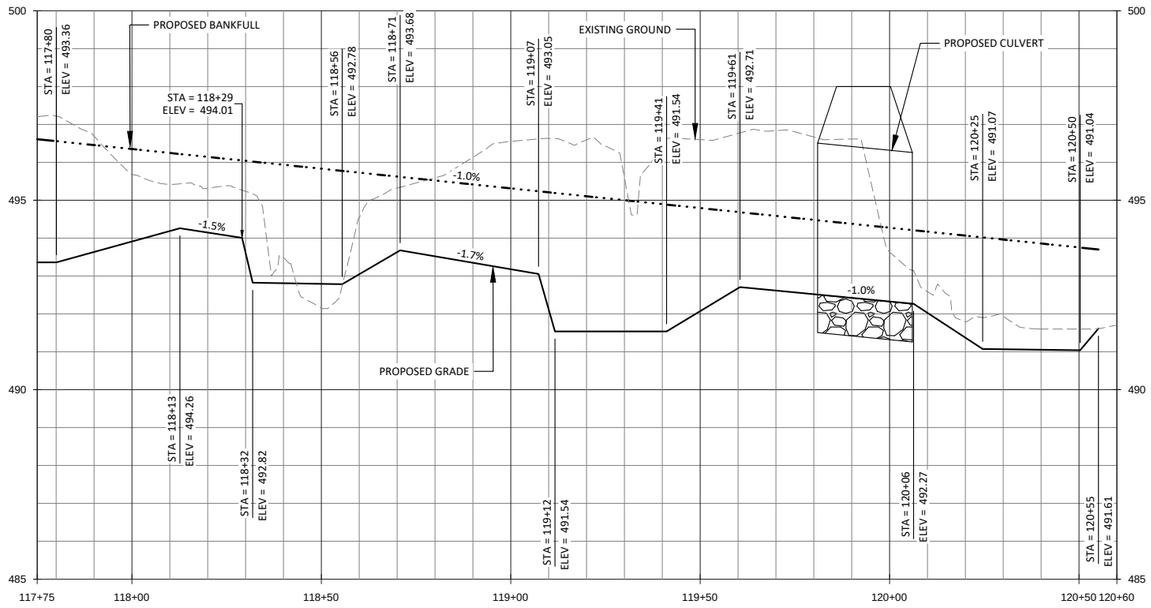
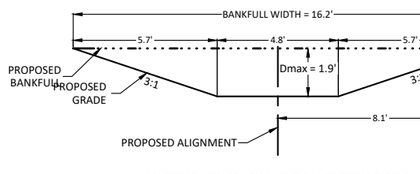
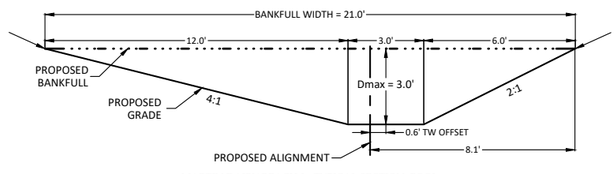




MARTIN DAIRY REACH 2 - TYPICAL SECTION: RIFFLE
STA 107+80 TO 119+87



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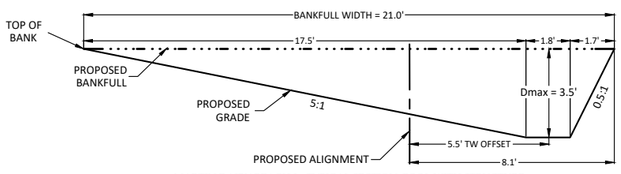
STA 107+80 TO 119+87



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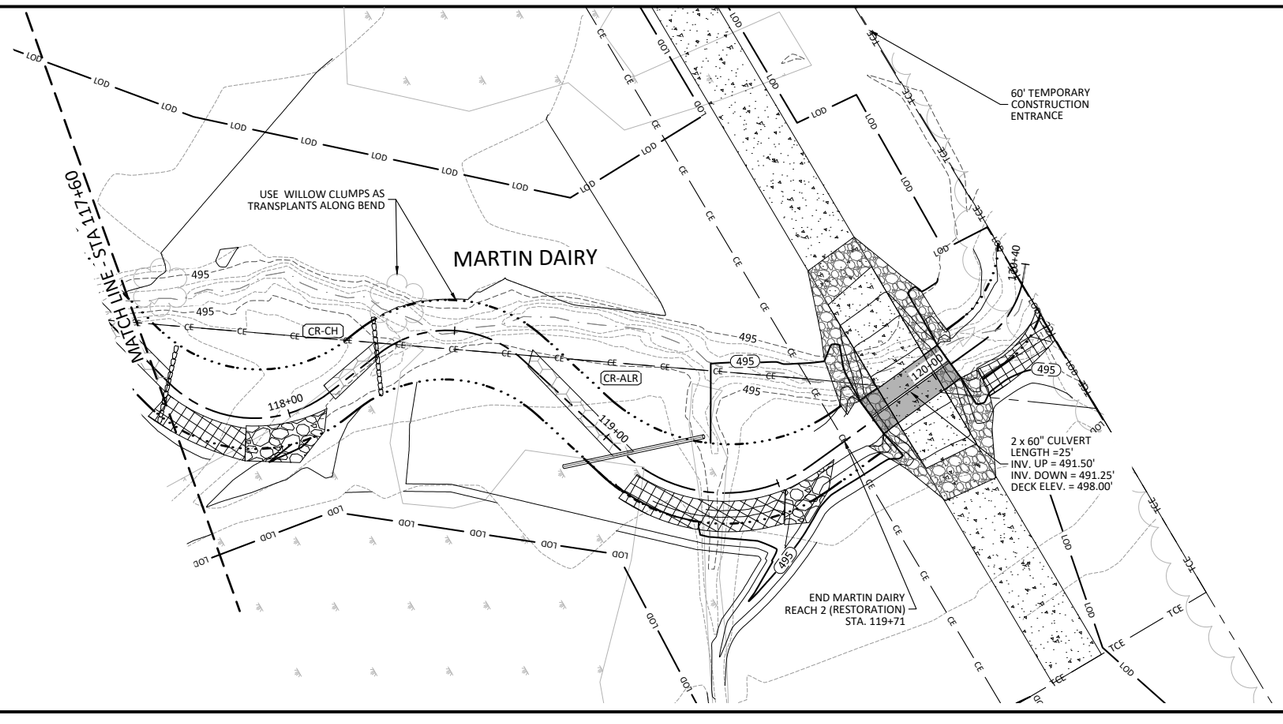
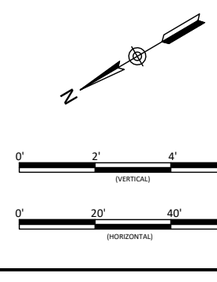
STA 107+80 TO 119+87





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Martin Dairy Mitigation Site
Orange County, North Carolina

Martin Dairy Reach 2
Stream Plan and Profile

Revisions:

Date:	03/13/2017
Job Number:	085-02158
Project Engineer:	ANA
Drawn By:	ANA
Checked By:	NM

Sheet 1.5

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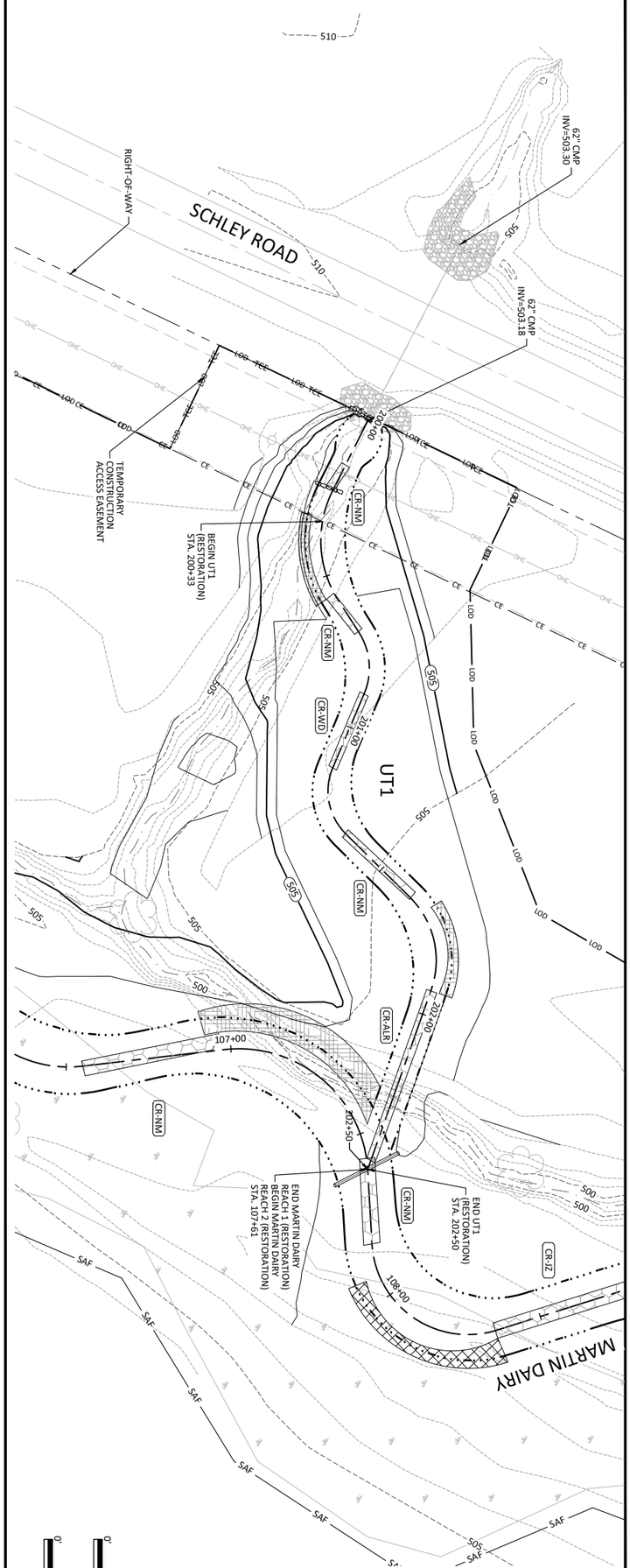

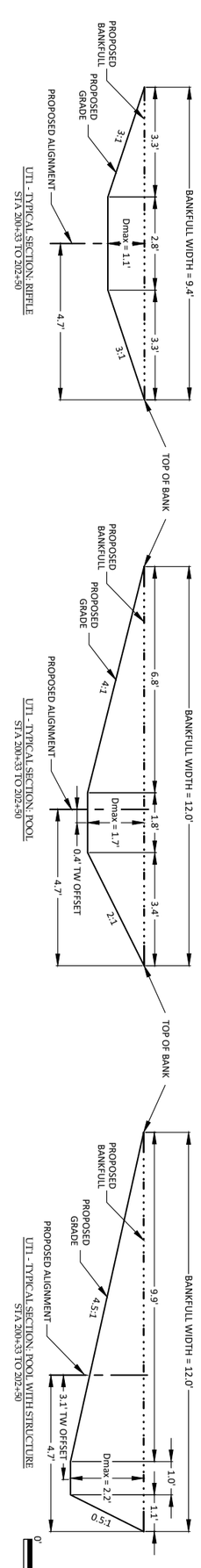

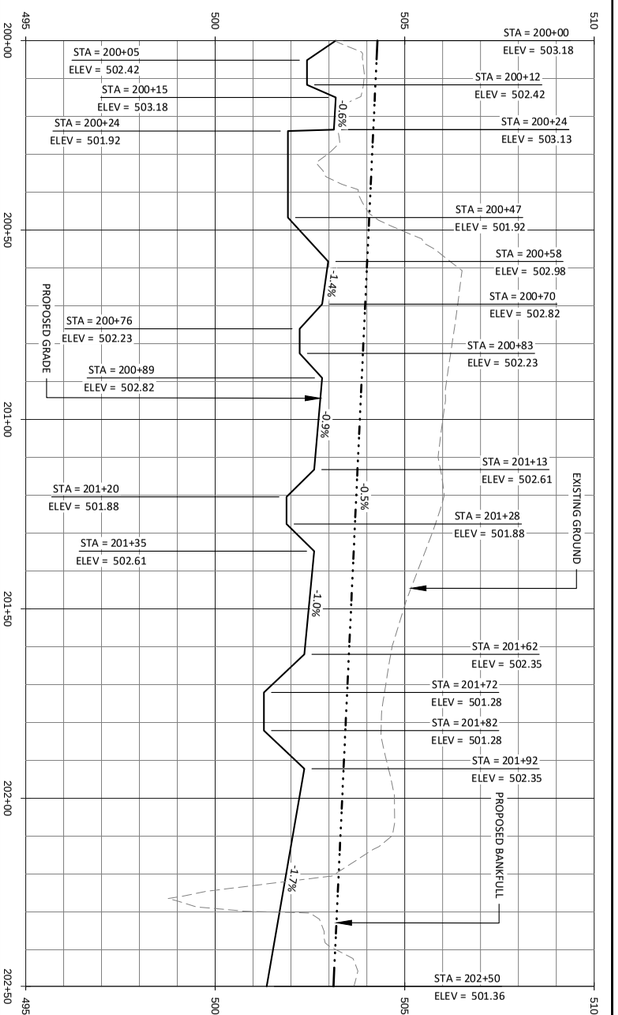

Date:	03/13/2017
Job Number:	005-02158
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1.6

Sheet

Martin Dairy Mitigation Site
Orange County, North Carolina

UT1
Stream Plan and Profile

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March 13, 2017

Streambank Planting Zone
(See Detail 1, Sheet 4.4)

Buffer Planting Zone & Permanent Riparian Seed Mix
(See Detail 2, Sheet 4.4)

Utility Easement Planting Zone
(Permanent Riparian Seed Mix)

Easement Perimeter Additional Planting
1 Gallon Stems
(See Detail 4, Sheet 4.6)

Notes:
1. Utility Easement Planting Zone to be seeded with permanent riparian seed mix. No trees are to be planted in this zone.

2. 10 1-gallon stems of Eastern Redbud and Flowering Dogwood to be spread out along the Easement Perimeter Planting zone. This area is to be interspersed with species from the Buffer Planting Zone to get the appropriate planting density for the Buffer Planting Zone of 6-12 ft. spacing on center.

3. Permanent Seeding Outside Easement to be used in areas outside of the Conservation Easement but within the Limits of Disturbance.

Easement Perimeter Additional Planting

Containerized

Species	Common Name	Max Spacing	Indiv. Spacing	Min. Caliper Size	Stratum	# of Stems
Cercis canadensis	Eastern Redbud	24 ft.	12-24 ft.	3 gallon	Canopy	5
Comus florida	Flowering Dogwood	24 ft.	12-24 ft.	3 gallon	Canopy	5

Streambank Planting Zone

Live Stakes

Species	Common Name	Max Spacing	Indiv. Spacing	Min. Size	Stratum	% of Stems
Salix nigra	Black Willow	8 ft.	2-8 ft.	0.5"-1.5" cal.	Shrub	15%
Cornus ammomum	Silky Dogwood	8 ft.	2-8 ft.	0.5"-1.5" cal.	Shrub	35%
Salix sericea	Silky Willow	8 ft.	2-8 ft.	0.5"-1.5" cal.	Shrub	35%
Physocarpos opulifolius	Ninebark	8 ft.	2-8 ft.	0.5"-1.5" cal.	Shrub	15%
						100%

Herbaceous Plugs

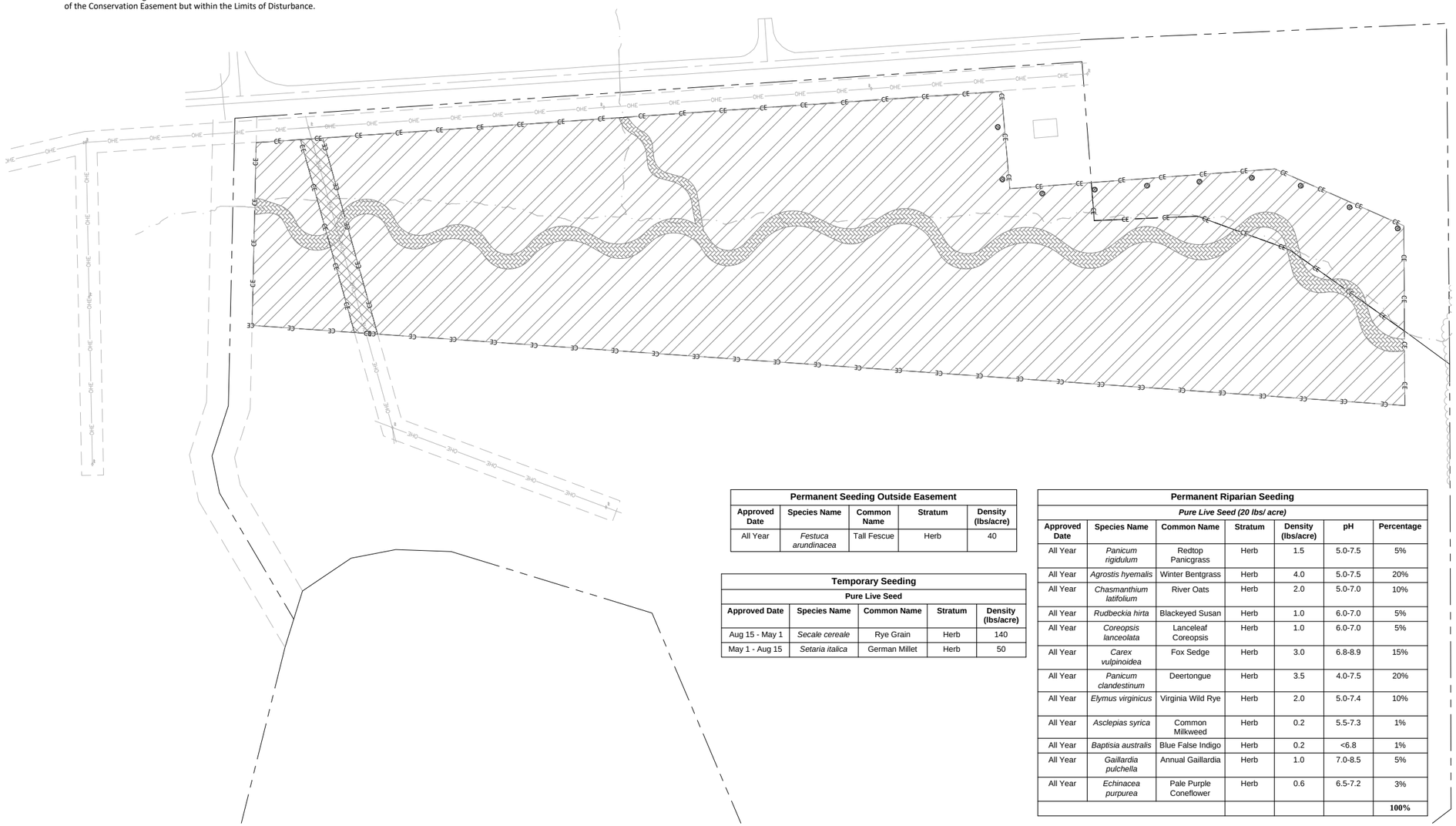
Juncus effusus	Common Rush	5 ft.	3-5 ft.	1.0"- 2.0" plug	Herb	40%
Carex alata	Broadwing Sedge	5 ft.	3-5 ft.	1.0"- 2.0" plug	Herb	40%
Panicum virgatum	Switchgrass	5 ft.	3-5 ft.	1.0"- 2.0" plug	Herb	20%
						100%

Buffer Planting Zone

Bare Root

Species	Common Name	Max Spacing	Indiv. Spacing	Min. Caliper Size	Stratum	# of Stems
Quercus phellos	Willow Oak	12 ft.	6-12 ft.	0.25"-1.0"	Canopy	12%
Platanus occidentalis	Sycamore	12 ft.	6-12 ft.	0.25"-1.0"	Canopy	22%
Betula nigra	River Birch	12 ft.	6-12 ft.	0.25"-1.0"	Canopy	16%
Liriodendron tulipifera	Tulip Poplar	12 ft.	6-12 ft.	0.25"-1.0"	Canopy	16%
Quercus palustris	Pin Oak	12 ft.	6-12 ft.	0.25"-1.0"	Canopy	14%
Fraxinus pennsylvanica	Green Ash	12 ft.	6-12 ft.	0.25"-1.0"	Canopy	18%
**Cercis canadensis*	Eastern Redbud	24 ft.	12-24 ft.	0.25"-1.0"	Canopy	1%
**Comus florida*	Flowering Dogwood	24 ft.	12-24 ft.	0.25"-1.0"	Canopy	1%
						100%

*Note: These species to be planted along easement perimeter only.
Space evenly throughout perimeter, mixing with other above species.



Permanent Seeding Outside Easement

Approved Date	Species Name	Common Name	Stratum	Density (lbs/acre)
All Year	*Festuca arundinacea*	Tall Fescue	Herb	40

Temporary Seeding

Pure Live Seed

Approved Date	Species Name	Common Name	Stratum	Density (lbs/acre)
Aug 15 - May 1	*Secale cereale*	Rye Grain	Herb	140
May 1 - Aug 15	*Setaria italica*	German Millet	Herb	50

Permanent Riparian Seeding

Pure Live Seed (20 lbs/ acre)

Approved Date	Species Name	Common Name	Stratum	Density (lbs/acre)	pH	Percentage
All Year	*Panicum rigidulum*	Redtop Panicgrass	Herb	1.5	5.0-7.5	5%
All Year	*Agrostis hyemalis*	Winter Bentgrass	Herb	4.0	5.0-7.5	20%
All Year	*Chasmanthium latifolium*	River Oats	Herb	2.0	5.0-7.0	10%
All Year	*Rudbeckia hirta*	Blackeyed Susan	Herb	1.0	6.0-7.0	5%
All Year	*Coreopsis lanceolata*	Lanceleaf Coreopsis	Herb	1.0	6.0-7.0	5%
All Year	*Carex vulpinoidea*	Fox Sedge	Herb	3.0	6.8-8.9	15%
All Year	*Panicum clandestinum*	Deertongue	Herb	3.5	4.0-7.5	20%
All Year	*Elymus virginicus*	Virginia Wild Rye	Herb	2.0	5.0-7.4	10%
All Year	*Asclepias syrica*	Common Milkweed	Herb	0.2	5.5-7.3	1%
All Year	*Baptisia australis*	Blue False Indigo	Herb	0.2	<6.8	1%
All Year	*Gaillardia pulchella*	Annual Gaillardia	Herb	1.0	7.0-8.5	5%
All Year	*Echinacea purpurea*	Pale Purple Coneflower	Herb	0.6	6.5-7.2	3%
						100%

N

0' 80' 160' 240'
(HORIZONTAL)

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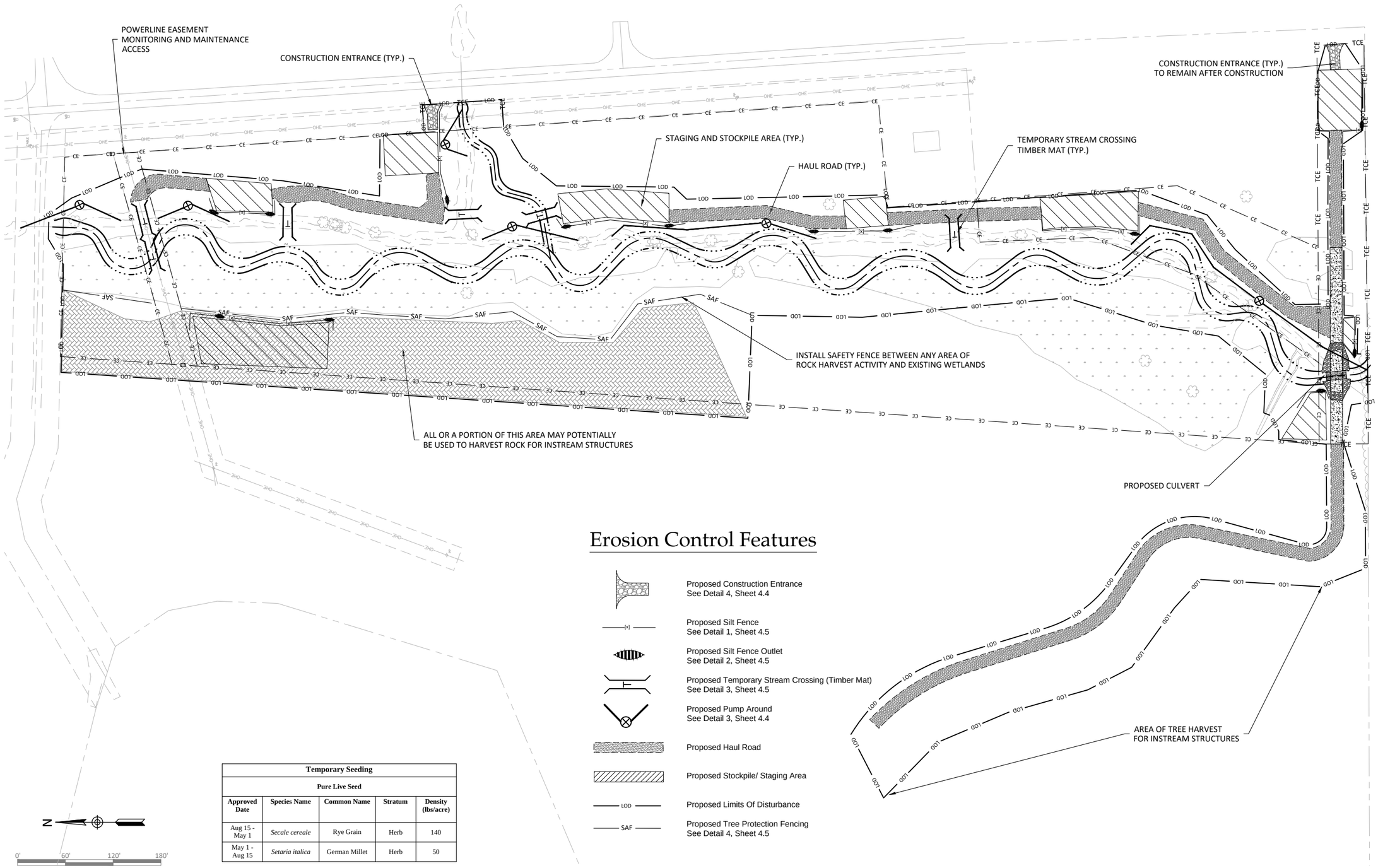
Martin Dairy Mitigation Site
Orange County, North Carolina
Planting Plan

Revisions:

Date: 03/13/2017
Job Number: 005-02158
Project Engineer: ANA
Drawn By: ANA
Checked By: NM

Sheet 2.0

March 13, 2017



Erosion Control Features

- Proposed Construction Entrance — See Detail 4, Sheet 4.4
- Proposed Silt Fence — See Detail 1, Sheet 4.5
- Proposed Silt Fence Outlet — See Detail 2, Sheet 4.5
- Proposed Temporary Stream Crossing (Timber Mat) — See Detail 3, Sheet 4.5
- Proposed Pump Around — See Detail 3, Sheet 4.4
- Proposed Haul Road
- Proposed Stockpile/ Staging Area
- Proposed Limits Of Disturbance (LOD)
- Proposed Tree Protection Fencing (SAF) — See Detail 4, Sheet 4.5

Temporary Seeding				
Pure Live Seed				
Approved Date	**Species Name**	**Common Name**	**Stratum**	**Density (lbs/acre)**
Aug 15 - May 1	*Secale cereale*	Rye Grain	Herb	140
May 1 - Aug 15	*Setaria italica*	German Millet	Herb	50

N

0' 60' 120' 180'
(HORIZONTAL)

DISTURBED ACREAGE = 9.86

LANDOWNER INFORMATION:
TED H. MARTIN AND RUBY Y. MARTIN
7205 SCHLEY ROAD
HILLSBOROUGH, NC
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312 W. Millbrook Road, Ste 225
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Firm License No. F-0831

Martin Dairy Mitigation Site
Orange County, North Carolina

Sediment and Erosion Control Plan
Erosion and Sediment Control

Revisions:

Date: 03/13/2017
Job Number: 005-02158
Project Engineer: ANA
Drawn By: ANA
Checked By: NM

Sheet 3.0

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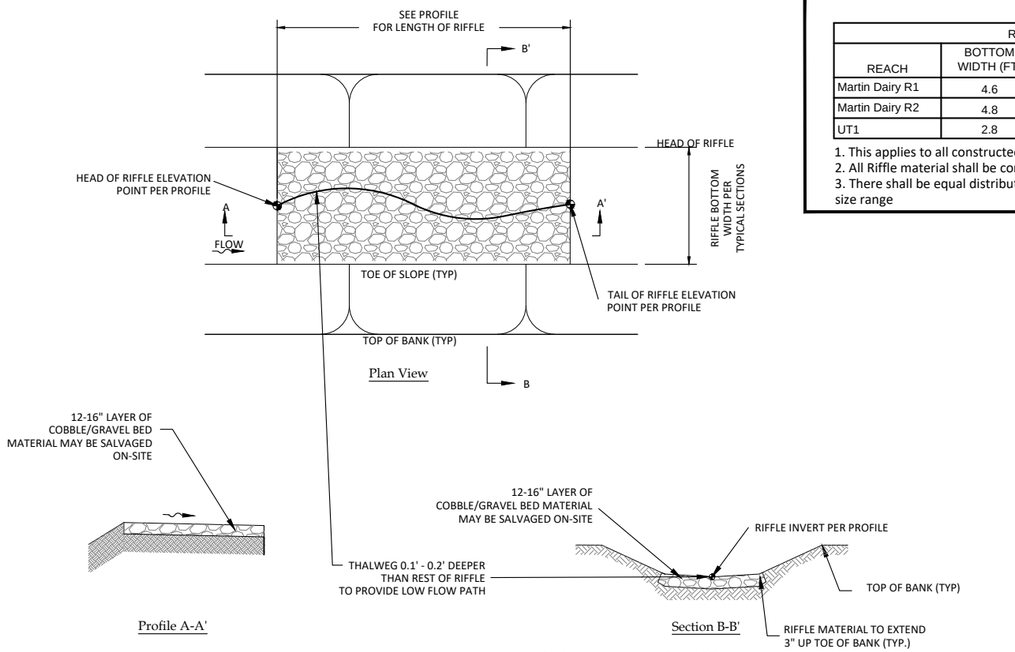
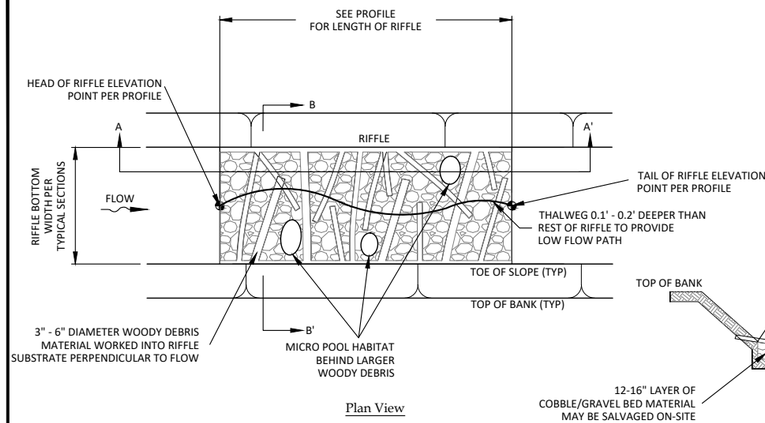
March 7, 2012

RIFFLE MATERIALS TABLE			
REACH	BOTTOM WIDTH (FT)	RIFFLE THICKNESS (IN)	RIFFLE MATERIAL STONE SIZE (% OF MATRIX)
Martin Dairy R1	4.6	16	Class A (50%), Class B (50%)
Martin Dairy R2	4.8	16	Class A (50%), Class B (50%)
UT1	2.8	12	Class A (50%), Class B (50%)

1. This applies to all constructed riffles in the plans.
2. All Riffle material shall be compacted in lifts at a thickness not to exceed Dmax.
3. There shall be equal distribution of the various stone sizes within the required size range

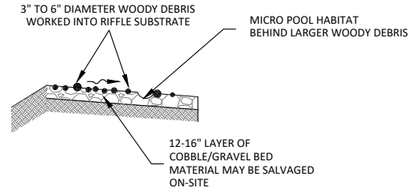


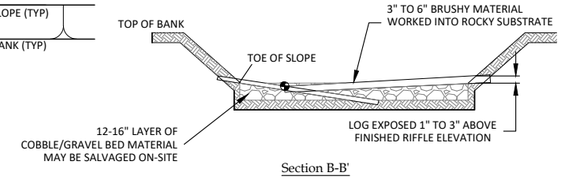
1 / 4.1 Native Material Constructed Riffle
Not to Scale



NOTES:

1. NO WOOD SHALL BE INSTALLED PARALLEL TO FLOW DIRECTION
2. INSTALL WOOD FIRST AND THEN BACKFILL WITH CHANNEL GRAVEL AND COBBLE
3. WOODY MATERIAL AND SNAGS SHOULD NOT PROTRUDE MORE THAN 4" INTO THE CHANNEL CROSS-SECTION ABOVE PROPOSED GRADE.



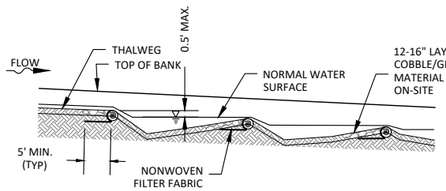


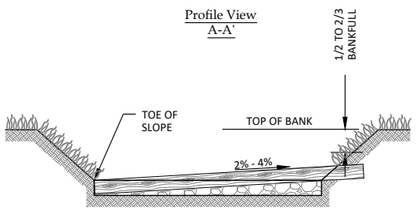
2 / 4.1 Woody Riffle
Not to Scale

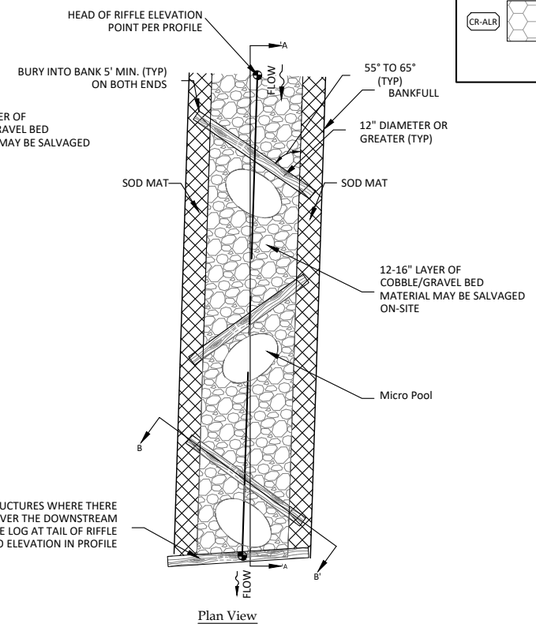
CR-NM

CR-WD

CR-ALR







NOTE:

1. BOULDER MATERIAL CAN BE SUBSTITUTED IN PLACE OF ANGLED LOGS WITH APPROVAL OF ENGINEER.
2. MINIMUM LOG DIAMETER 12".
3. MINIMUM ONE LOG PER 10 LF OF RIFFLE LENGTH OR ONE LOG PER 0.3' OF DROP, WHICHEVER IS LESSER DISTANCE.

4 / 4.1 Angled Log Riffle
Not to Scale

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Checked By:	NM

Sheet 4.1

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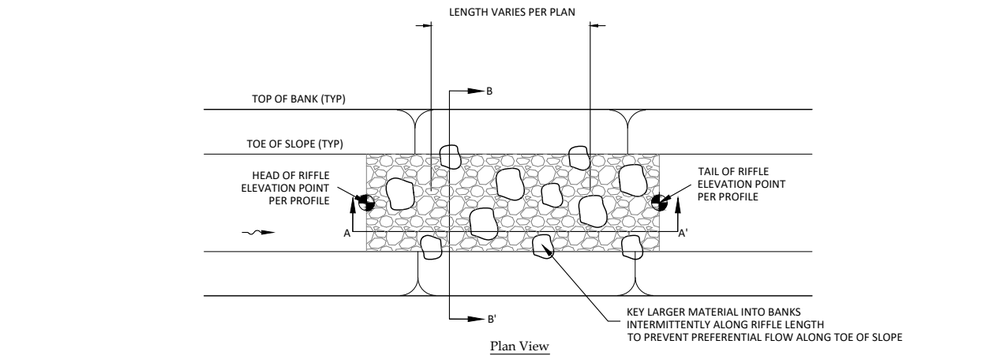
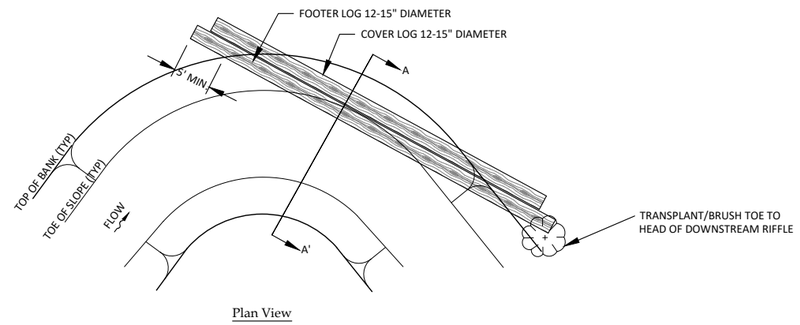
March 7, 2012

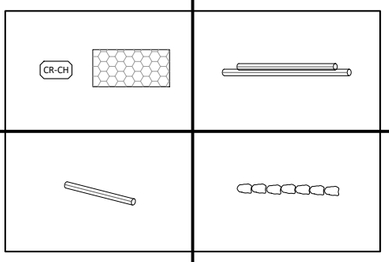


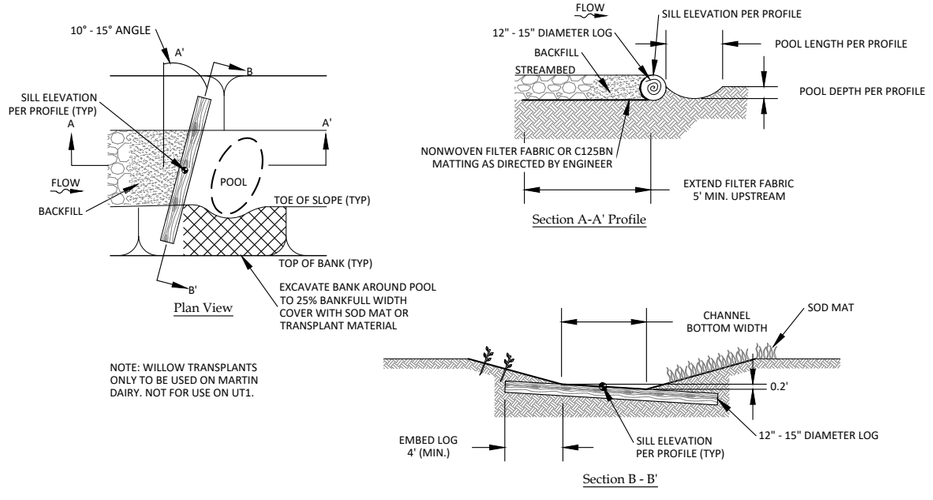
NOTE: CHUNKY MATERIAL ELEVATION SHALL BE 0" TO 8" ABOVE RIFFLE MATERIAL BASED ON ENGINEER'S DISCRETION.

1 / 4.2 Chunky Riffle
Not to Scale



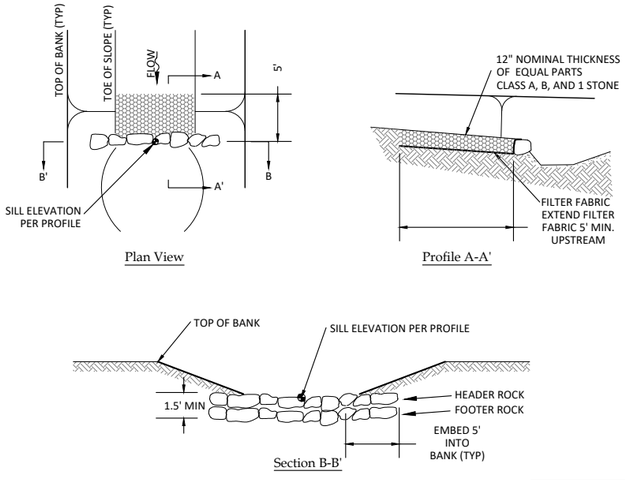
2 / 4.2 Lunker Log
Not to Scale





NOTE: WILLOW TRANSPLANTS ONLY TO BE USED ON MARTIN DAIRY. NOT FOR USE ON UT1.

3 / 4.2 Angled Log Drop
Not to Scale



NOTES:
1. MINIMUM SILL MATERIAL IS CLASS 1.
2. FOOTERS NOT NECESSARY IF ROCK IS CLASS 2 OR GREATER.

BOULDER SIZE TABLE	
REACH	MIN. BOULDER DIMENSIONS (FT)
Martin Dairy R1	2.5 x 2.0 x 1.0
Martin Dairy R2	2.5 x 2.0 x 1.0
UT1	1.5 x 1.5 x 1.0

Boulders shall be relatively flat on the long dimension sides

4 / 4.2 Boulder Sill
Not to Scale

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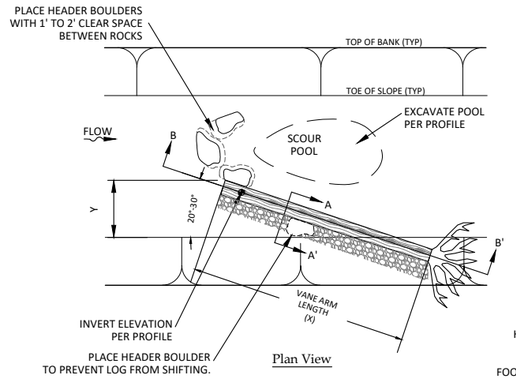
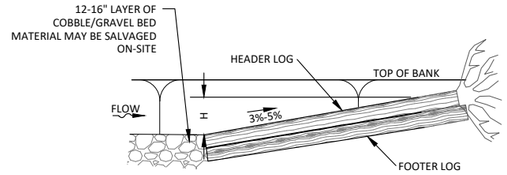
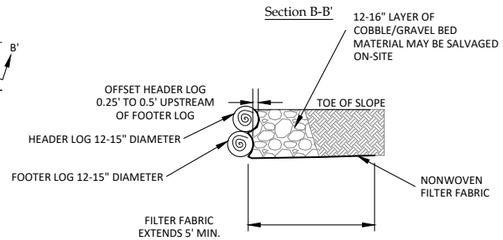


Plan View



Section B-B'



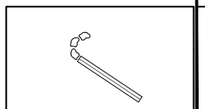
Section A-A'

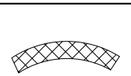
VANE STRUCTURE TABLE					
REACH	W (FT)	H (FT)	Y (FT)	Θ (°)	S (%)
Martin Dairy R1	1.5	0.9	11.1	25.0	0.1
Martin Dairy R2	1.6	1.0	12.1	25.0	0.1
UT1	0.9	0.6	7.0	25.0	0.1

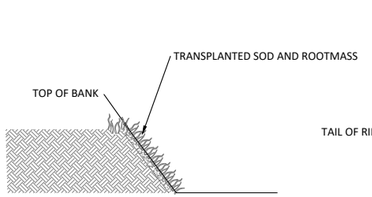
BOULDER SIZE TABLE	
REACH	MIN. BOULDER DIMENSIONS (FT)
Martin Dairy R1	2.5 x 2.0 x 1.0
Martin Dairy R2	2.5 x 2.0 x 1.0
UT1	1.5 x 1.5 x 1.0

BOULDERS SHALL BE RELATIVELY FLAT ON THE LONG DIMENSION SIDES

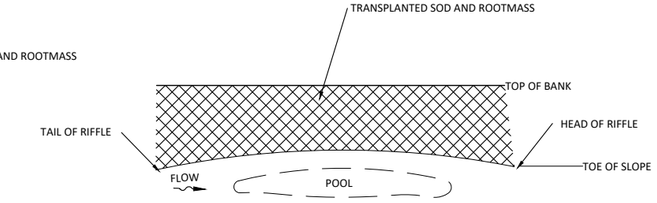
1/4.3 Log J-Hook
Not to Scale







Section View
Riffle Installation



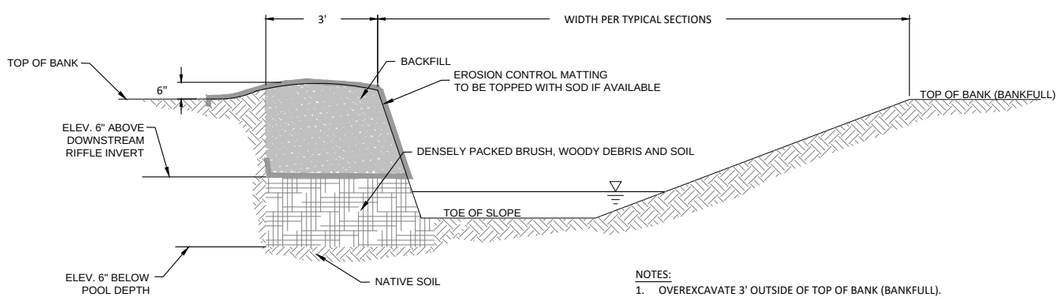
Plan View
Pool Installation

NOTES:

1. PREPARE THE BANK WHERE THE SOD MAT WILL BE TRANSPLANTED BY RAKING & FERTILIZING.
2. EXCAVATE TRANSPLANT SOD MATS WITH A WIDE BUCKET AND AS MUCH ADDITIONAL SOIL MATERIAL AS POSSIBLE.
3. OVER EXCAVATE PROPOSED BANK SO THAT SOD MAT WILL BE PLACED TO ACHIEVE FINAL GRADE SHOWN ON PLANS.
4. PLACE TRANSPLANT ON THE BANK TO BE STABILIZED.
5. SECURE WITH SOD STAPLES.
6. FILL IN ANY HOLES AROUND THE TRANSPLANT AND COMPACT.
7. ANY LOOSE SOIL LEFT IN THE STREAM SHOULD BE REMOVED.
8. PLACE MULTIPLE TRANSPLANTS CLOSE TOGETHER SUCH THAT THEY TOUCH.

2/4.3 Transplanted Sod Mats
Not to Scale

Plan View



Section A-A'

NOTES:

1. OVEREXCAVATE 3' OUTSIDE OF TOP OF BANK (BANKFULL).
2. INSTALL A DENSE LAYER OF BRUSH/WOODY DEBRIS, WHICH SHALL CONSIST OF SMALL BRANCHES AND ROOTS COLLECTED ON-SITE AND SOIL TO FILL ANY VOID SPACE. LIGHTLY COMPACT BRUSH/WOODY DEBRIS LAYER.
3. BRUSH SHOULD BE ALIGNED SO STEMS ARE ROUGHLY PARALLEL AND IS INSTALLED POINTING SLIGHTLY UPSTREAM.
4. INSTALL EROSION CONTROL MATTING OVER BRUSH/WOODY DEBRIS.
5. INSTALL EARTH BACKFILL EROSION CONTROL MATTING ACCORDING TO TYPICAL SECTION DIMENSIONS.
6. SEED, MULCH AND WRAP EROSION CONTROL MATTING. STABILIZE EROSION CONTROL MATTING WITH STAKES.

4/4.3 Brush Toe - UT1
Not to Scale

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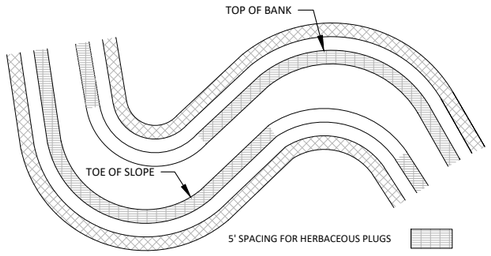
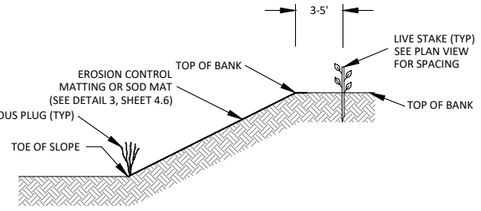
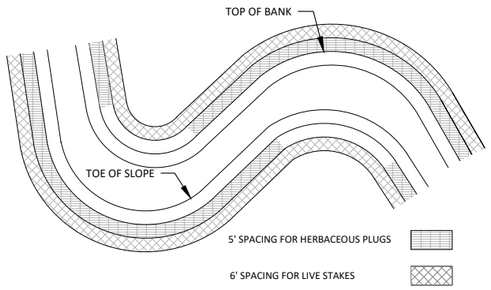


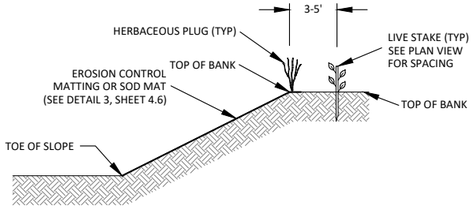
Plan View - Martin Dairy



Section View - Martin Dairy



Plan View - UT1

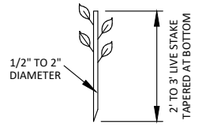


Section View - UT1

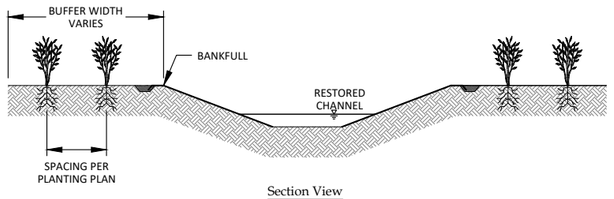
NOTE:

1. LIVE STAKES TO BE PLANTED IN AREAS AS SHOWN ON PLANS AND AS DIRECTED BY THE ENGINEER.

1/4.4 Live Staking & Herbaceous Plugs
Not to Scale



Live Stake Detail



Section View

DIBBLE BAR

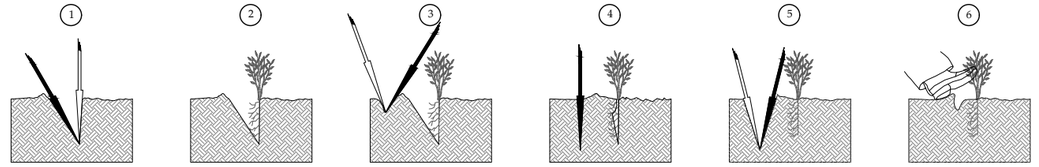
DIBBLE BAR SHALL HAVE A BLADE WITH A TRIANGULAR CROSS-SECTION, AND SHALL BE 12 INCHES LONG, 4 INCHES WIDE AND 1 INCH THICK AT CENTER.

ROOTING PRUNING

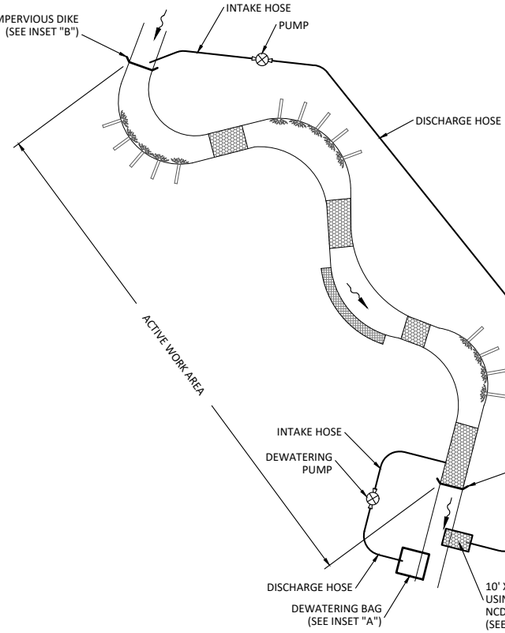
ALL ROOTS SHALL BE PRUNED TO AN APPORIATE LENGTH TO PREVENT J-ROOTING.

NOTES:

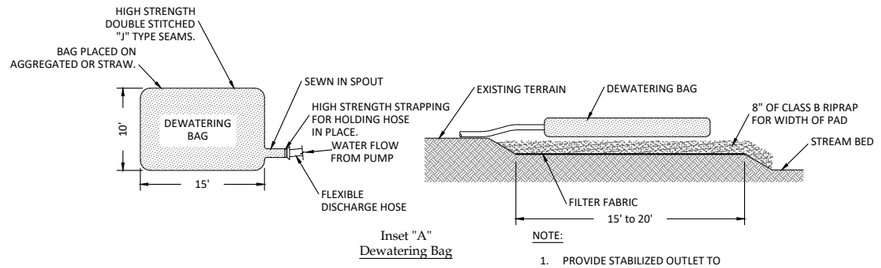
1. ALL SOILS WITHIN THE BUFFER PLANTING AREA SHALL BE DISKED, AS REQUIRED, PRIOR TO PLANTING.
2. ALL PLANTS SHALL BE PROPERLY HANDLED PRIOR TO INSTALLATION TO ENSURE SURVIVAL.



2/4.4 Bare Root Planting
Not to Scale



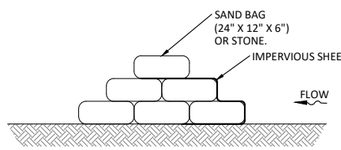
Plan View



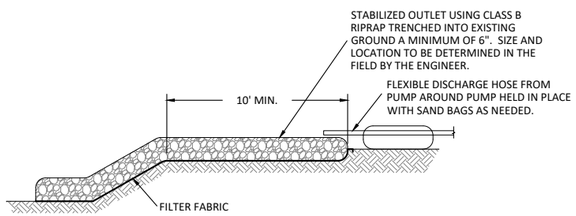
Inset "A"
Dewatering Bag

NOTE:

1. PROVIDE STABILIZED OUTLET TO STREAMBED.

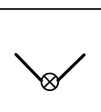


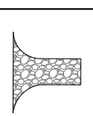
Inset "B"
Impervious Dike

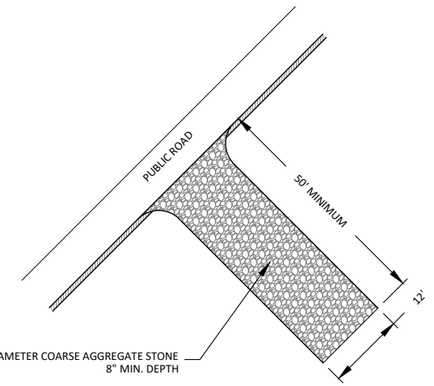


Inset "C"
Stabilized Outlet

3/4.4 Pump Around System
Not to Scale







NOTES:

1. PROVIDE TURNING RADIUS SUFFICIENT TO ACCOMMODATE LARGE TRUCKS.
2. LOCATE CONSTRUCTION ENTRANCE AT ALL POINTS OF INGRESS AND EGRESS UNTIL SITE IS STABILIZED. PROVIDE FREQUENT CHECKS OF THE DEVICE AND TIMELY MAINTENANCE.
3. MUST BE MAINTAINED IN A CONDITION WHICH WILL PREVENT TRACKING OR DIRECT FLOW OF MUD ONTO STREETS. PERIODIC TOP DRESSING WITH STONE WILL BE NECESSARY.
4. ENTRANCE WILL BE EXTENDED AS NEEDED TO PROVIDE ADEQUATE SEDIMENT REMOVAL.
5. ANY MATERIAL TRACKED ONTO THE ROADWAY MUST BE CLEANED IMMEDIATELY.
6. USE 2"-3" DIAMETER COARSE AGGREGATE STONE APPROVED BY THE ENGINEER.
7. PLACE FILTER FABRIC BENEATH STONE.

4/4.4 Construction Entrance
Not to Scale

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Sheet 4.4

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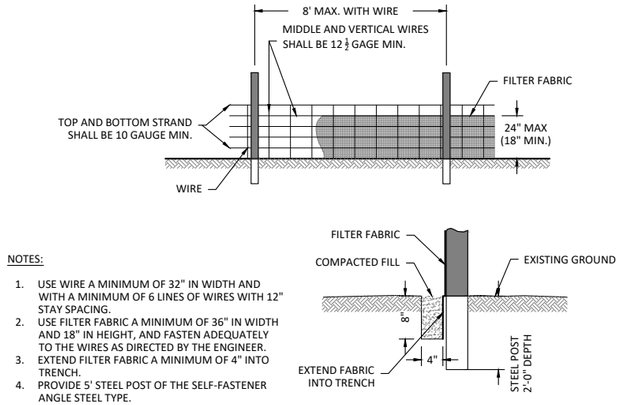


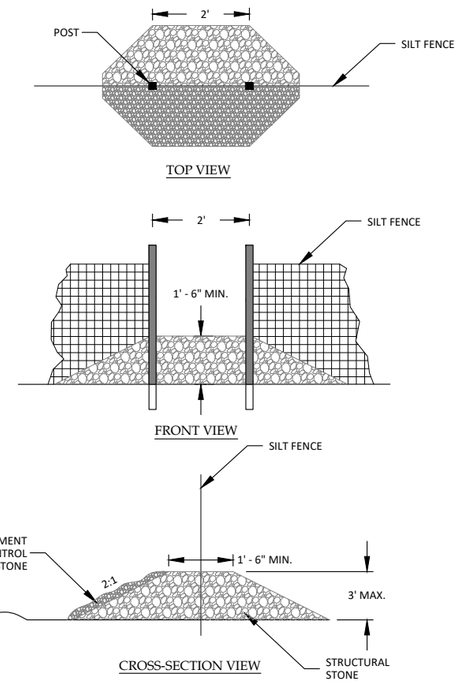
NOTES:

1. USE WIRE A MINIMUM OF 32" IN WIDTH AND WITH A MINIMUM OF 6 LINES OF WIRES WITH 12" STAY SPACING.
2. USE FILTER FABRIC A MINIMUM OF 36" IN WIDTH AND 18" IN HEIGHT, AND FASTEN ADEQUATELY TO THE WIRES AS DIRECTED BY THE ENGINEER.
3. EXTEND FILTER FABRIC A MINIMUM OF 4" INTO TRENCH.
4. PROVIDE 5' STEEL POST OF THE SELF-FASTENER ANGLE STEEL TYPE.

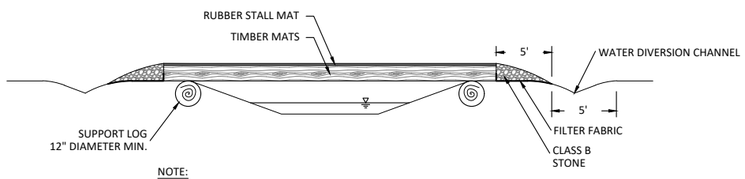
1/4.5 Temporary Silt Fence
Not to Scale

NOTES:

1. STRUCTURAL STONE SHALL BE (CLASS "B") STONE FOR EROSION CONTROL PURPOSES.
2. SEDIMENT CONTROL STONE SHALL BE NO. 5 OR NO. 57 STONE.



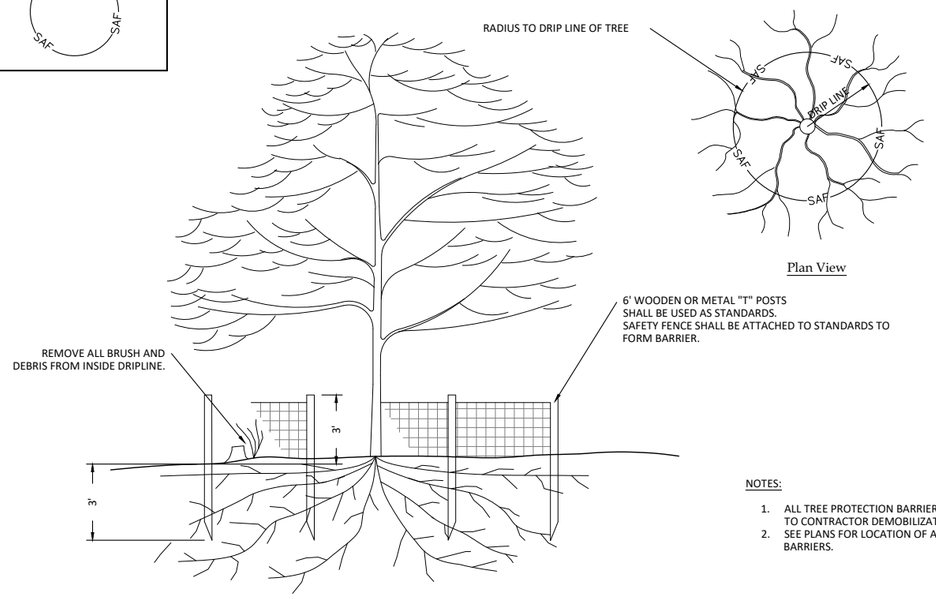
2/4.5 Stone Outlet
Not to Scale



NOTE:

1. CONSTRUCT STREAM CROSSING WHEN FLOW IS AT NORMAL BASEFLOW.
2. MINIMIZE CLEARING AND EXCAVATION OF STREAMBANKS. DO NOT EXCAVATE CHANNEL BOTTOM.
3. INSTALL STREAM CROSSING PERPENDICULAR TO THE FLOW.
4. MAINTAIN CROSSING SO THAT RUNOFF IN THE CONSTRUCTION ROAD DOES NOT ENTER EXISTING CHANNEL.
5. STABILIZE AN ACCESS RAMP OF CLASS B STONE TO THE EDGE OF THE MUD MAT.
6. CONTRACTOR SHALL DETERMINE AN APPROPRIATE RAMP ANGLE ACCORDING TO EQUIPMENT UTILIZED.
7. THERE SHALL BE NO SPACES BETWEEN LOGS ON TIMBER MAT.
8. SILT FENCE TO BE INSTALLED AT 45° ANGLE TO THE ROAD WITH STONE OUTLET AT EACH CORNER OF THE TEMPORARY CROSSING TO FILTER ANY SEDIMENT AND DEBRIS FROM HAUL ROAD FROM ENTERING THE STREAM.

3/4.5 Temporary Stream Crossing - Timber Mat
Not to Scale



NOTES:

1. ALL TREE PROTECTION BARRIERS SHALL BE REMOVED PRIOR TO CONTRACTOR DEMOBILIZATION.
2. SEE PLANS FOR LOCATION OF ALL TREE PROTECTION BARRIERS.

4/4.5 Tree Protection Fencing
Not to Scale

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Firm License No. F-0831

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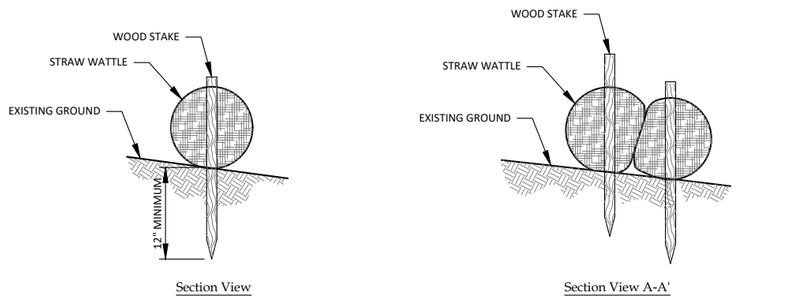
Orange County, North Carolina
Details

Revisions:

Date: 03/13/2017
Job Number: 085-021R
Project Engineer: ANA
Drawn By: ANA
Checked By: NM

Sheet 4.5

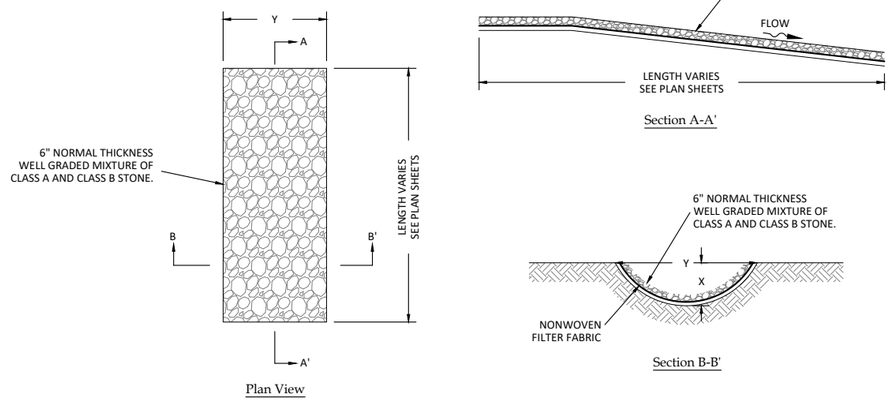
March 7, 2012



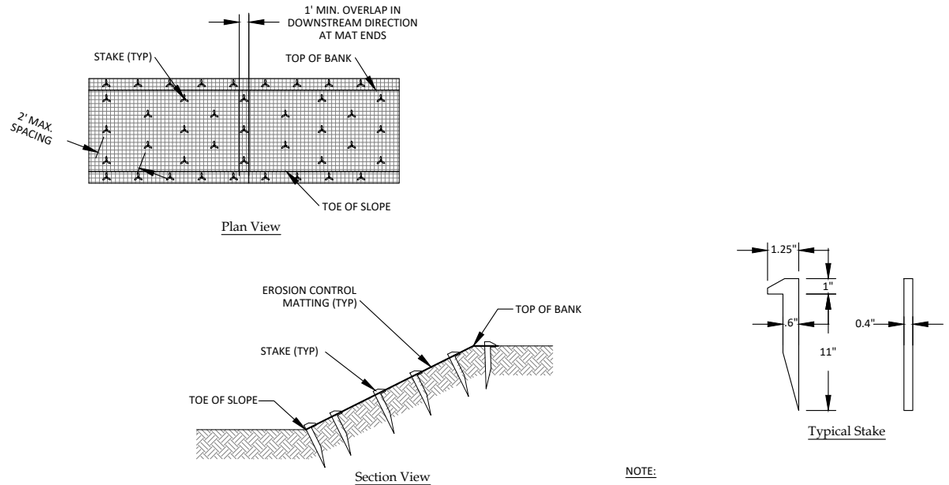
NOTE:

1. SECURE THE WATTLE WITH 24" STAKES EVERY 3'-4' AND WITH A STAKE ON EACH END. STAKES SHOULD BE DRIVEN THROUGH THE MIDDLE OF THE WATTLE LEAVING AT LEAST 2"-3" OF STAKE EXTENDING ABOVE THE WATTLE. STAKES SHOULD BE DRIVEN PERPENDICULAR TO SLOPE FACE.

1/4.6 Temporary Straw Wattle
Not to Scale



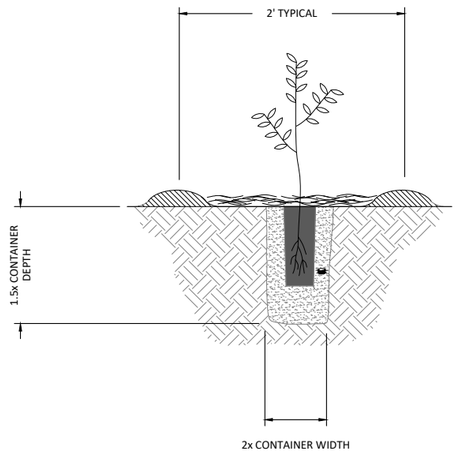
2/4.6 Rock Outlet
Not to Scale



NOTE:

1. PER SPECIFICATIONS, ALL EROSION CONTROL MATTING SHALL BE COMPOSED OF NATURAL FIBERS.

3/4.6 Erosion Control Matting
Not to Scale



4/4.6 Containerized Planting
Not to Scale

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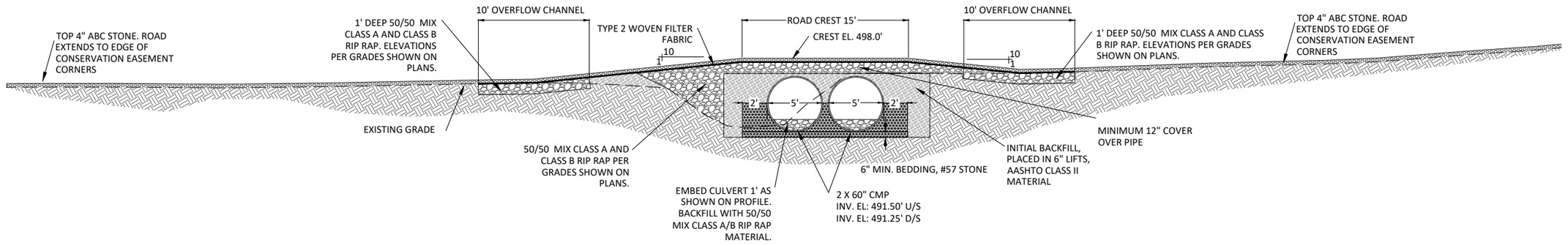
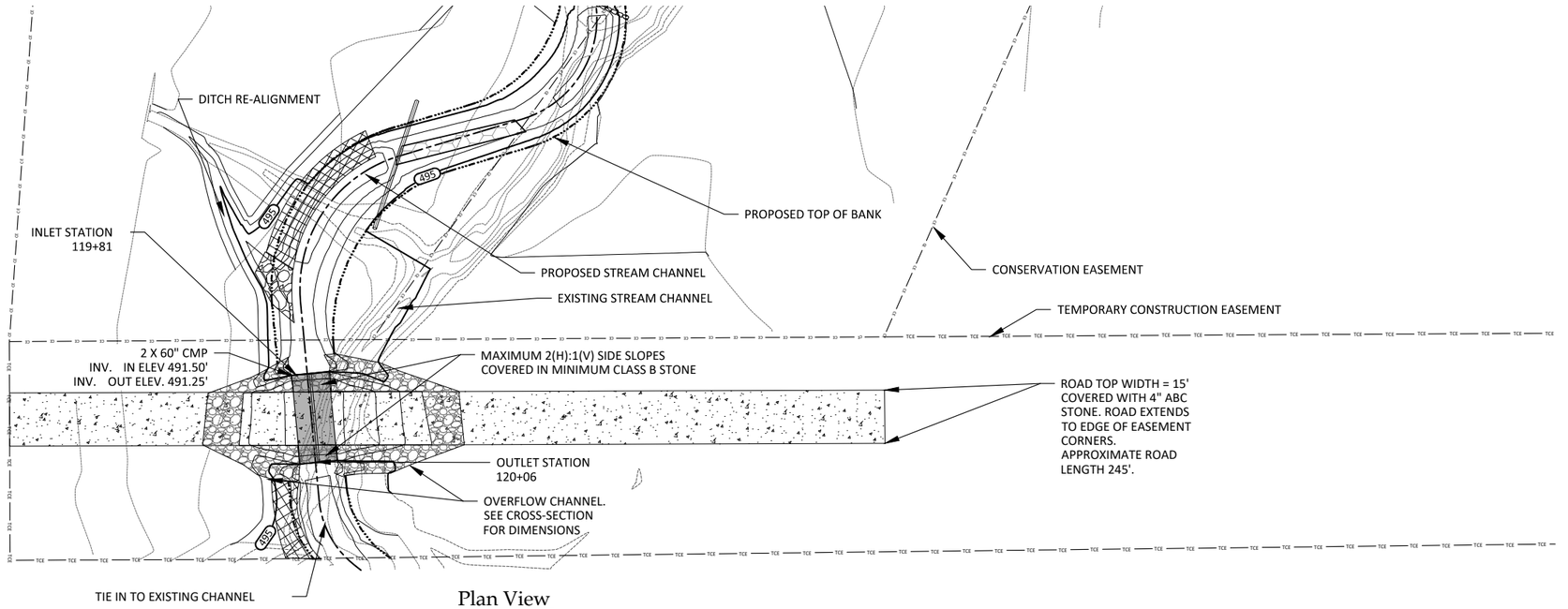


Cross-Section View
SCALE: 1" = 5'



Plan View
SCALE: 1" = 20'

1/4.7 Martin Dairy Culvert Crossing Station 119+81

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Checked By: NM

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Sheet

Appendix 7

Maintenance Plan

1.0 Maintenance Plan

The site shall be monitored on a regular basis and a physical inspection of the site shall be conducted a minimum of once per year throughout the post-construction monitoring period until performance standards are met. These site inspections may identify site components and features that require routine maintenance. Routine maintenance should be expected most often in the first two (2) years following site construction and may include the following:

Table1: Maintenance Plan – *Martin Dairy Mitigation Site*

Component/Feature	Maintenance through project close-out
Stream	Routine channel maintenance and repair activities may include chinking of in-stream structures to prevent piping, securing of loose coir matting, and supplemental installations of live stakes and other target vegetation along the channel. Areas where storm water and floodplain flows intercept the channel may also require maintenance to prevent bank erosion. Beaver dams that inundate the stream channels shall be removed and the beaver shall be trapped if deemed necessary.
Vegetation	Vegetation shall be maintained to ensure the health and vigor of the targeted community. Routine vegetation maintenance and repair activities may include supplemental planting, pruning, mulching, and fertilizing. Exotic invasive plant species shall be controlled by mechanical and/or chemical methods. Any vegetation control requiring herbicide application will be performed in accordance with NC Department of Agriculture (NCDA) rules and regulations.
Site boundary	Site boundaries shall be identified in the field to ensure clear distinction between the mitigation site and adjacent properties. Boundaries may be identified by fence, marker, bollard, post, tree-blazing, or other means as allowed by site conditions and/or conservation easement. Boundary markers disturbed, damaged, or destroyed will be repaired and/or replaced on an as-needed basis.

Appendix 8

Credit Release Schedule

1.0 Credit Release Schedule

All credit releases will be based on the total credit generated as reported by the as-built survey of the mitigation site. Under no circumstances shall any mitigation project be debited until the necessary DA authorization has been received for its construction or the District Engineer (DE) has otherwise provided written approval for the project in the case where no DA authorization is required for construction of the mitigation project. The DE, in consultation with the Interagency Review Team (IRT), will determine if performance standards have been satisfied sufficiently to meet the requirements of the release schedules below. In cases where some performance standards have not been met, credits may still be released depending on the specifics of the case. Monitoring may be required to restart or be extended, depending on the extent to which the site fails to meet the specified performance standard. The release of project credits will be subject to the criteria described as follows:

Table A: Credit Release Schedule – Stream Credits – *Martin Dairy Mitigation Site*

Monitoring Year	Credit Release Activity	Interim Release	Total Released
0	Initial Allocation – see requirements below	30%	30%
1	First year monitoring report demonstrates performance standards are being met	10%	40%
2	Second year monitoring report demonstrates performance standards are being met (additional 10% released at second bankfull event in a separate year)	10%	50% (60%)
3	Third year monitoring report demonstrates performance standards are being met	10%	60% (70%)
4	Fourth year monitoring report demonstrates performance standards are being met	5%	65% (75%)
5	Fifth year monitoring report demonstrates performance standards are being met	10%	75% (85%)
6	Sixth year monitoring report demonstrates performance standards are being met	5%	80% (90%)
7	Seventh year monitoring report demonstrates performance standards are being met and project has received closeout approval	10%	90% (100%)

1.1 Initial Allocation of Released Credits

The initial allocation of released credits, as specified in the mitigation plan can be released by DMS without prior written approval of the DE upon satisfactory completion of the following activities:

a. Approval of the final Mitigation Plan.
b. Recordation of the preservation mechanism, as well as a title opinion acceptable to the USACE covering the property.
c. Completion of project construction (the initial physical and biological improvements to the mitigation site) pursuant to the mitigation plan; per the DMS Instrument, construction means that a mitigation site has been constructed in its entirety, to include planting, and an as-built report has been produced. As-built reports must be sealed by an engineer prior to project closeout, if appropriate but not prior to the initial allocation of released credits.
d. Receipt of necessary DA permit authorization or written DA approval for projects where DA permit issuance is not required.

1.2 Subsequent Credit Releases

All subsequent credit releases must be approved by the DE, in consultation with the IRT, based on a determination that required performance standards have been achieved. For stream projects a reserve of 10% of a site's total stream credits shall be released after two bankfull events have occurred, in separate years, provided the channel is stable and all other performance standards are met. In the event that less than two bankfull events occur during the monitoring period, release of these reserve credits shall be at the discretion of the IRT. As projects approach milestones associated with credit release, the DMS will submit a request for credit release to the DE along with documentation substantiating achievement of criteria required for release to occur. This documentation will be included with the annual monitoring report.

Appendix 9

Financial Assurance

1.0 Financial Assurances

Pursuant to Section IV H and Appendix III of the Division of Mitigation Service's In-Lieu Fee Instrument dated July 28, 2010, the North Carolina Department of Environment and Natural Resources has provided the US Army Corps of Engineers Wilmington District with a formal commitment to fund projects to satisfy mitigation requirements assumed by DMS. This commitment provides financial assurance for all mitigation projects implemented by the program.