

**CHARLES WILLIAMS STREAM, WETLAND, AND BUFFER SITE**  
**DMS Project No. 80**

**MONITORING YEAR 6 – VEGETATION ONLY (2018)**  
**Construction Completed February 2013**  
**Planting Completed February 2014**

**Randolph County, NC**  
**State Construction Project No. 07-07125-01A**



**Prepared for the**  
**NC Department of Environmental Quality**  
**Division of Mitigation Services**

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**February 2019**

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A handwritten signature in blue ink, appearing to read "G. Lane Sauls Jr.", written over a horizontal line.

G. Lane Sauls Jr., Natural Resources Manager

Under Contract With:



*This assessment and report are consistent with NCDEQ Division of Mitigation Services  
Template Version 1.4 (11/07/11) for Monitoring Reports, as applicable.*

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## 1.0 EXECUTIVE SUMMARY/ PROJECT ABSTRACT

The Charles Williams Stream, Wetland and Buffer Site, hereinafter referred to as the “Project Site” or “Site,” is located in Randolph County, North Carolina, within US Geological Survey (USGS) 8-digit Hydrologic Unit Code (HUC) 03030003 and NC Division of Water Resources (NCDWR) sub-basin 03-06-09 of the Cape Fear River Basin (Figure 1). The project involved the enhancement of 1,753 linear feet of an unnamed tributary (UT) to Sandy Creek, 1.95 acres of wetlands and 8.9 acres of riparian buffer. The Site is protected for perpetuity under a conservation easement purchased from Mr. Charles Williams in 2006. Project restoration components, activity and reporting history, contacts and attribute data are all provided in Appendix A.

### 1.1 Goals and Objectives

The Project’s goals were to:

- reduce nutrient and sediment water quality stressors;
- provide for uplift in water quality functions;
- improve instream and wetland aquatic habitats, including riparian terrestrial habitats; and,
- provide for greater overall instream and wetland habitat complexity and quality.

Stream enhancement, the primary component, served as the dominant input for achieving this goal.

No restoration goals were identified in the Cape Fear River Basinwide Management Plan (NCDWQ, 2005) with regard to the Sandy Creek watershed. There were no sources or stressors listed for the watershed area associated with the Project Site. The NC Department of Environmental Quality (NCDEQ) Division of Mitigation Services (DMS) develops River Basin Restoration Priorities (RBRP) to guide its restoration activities within each of the state’s 54 cataloging units. RBRPs delineate specific watersheds that exhibit both the need and opportunity for wetland, stream and riparian buffer restoration. These watersheds are called Targeted Local Watersheds (TLWs) and receive priority for DMS planning and restoration project funds. The 2009 Draft Cape Fear River RBRP identified HUC 03030003020010, which includes the Project Site, as a Targeted Local Watershed. The following information is taken directly from the RBRP. “...This is a largely rural hydrologic unit (HU). The main stream, Sandy Creek, flows through Randolph County to Sandy Creek Reservoir, a drinking water supply for Ramseur and Franklinville. As of 2006, the HU had no streams on DWQ’s list of impaired waters; however, the reservoir shows indications of high nutrient levels, likely related to the large number of animal operations in the HU. The HU is a Water Supply Watershed and a long portion of Sandy Creek is recognized by the State’s Natural Heritage Program as a Significant Natural Heritage Area. DMS has been active in the HU with five projects that include components of preserving wetlands (3 acres) and streams (5,100 linear feet) and restoring wetlands (15 acres) and streams (15,000 linear feet). Piedmont Land Conservancy has also been active in protecting streamside buffers in the HU. Continued implementation of practices to reduce nutrient inputs to Sandy Creek Reservoir is recommended for this HU.”

### 1.2 Background Summary

The Project Site is situated in northeastern Randolph County, approximately four miles west of Liberty and six miles north of Ramseur (Figure 1). It is bordered to the north and west by undeveloped land, to the east by SR 2442 (Ramseur-Julian Road), and to the south by Sandy Creek. Northeastern Randolph Middle School is on the property opposite of Sandy Creek, to the south. The Project Site can be accessed by using the following directions from US Highway 64.



- Turn north on US 421 in Siler City, towards the Town of Liberty.
- Proceed approximately 9.5 miles and turn south (left) onto NC 49.
- Proceed approximately 0.7 miles along NC 49 and turn north (right) onto SR 2459 (Sandy Creek Church Road).
- Follow Sandy Creek Church Road approximately 4.5 miles until it intersects with Ramseur-Julian Road and turn north (right),
- Follow Ramseur-Julian Road approximately 0.3 miles, crossing over Sandy Creek. The Charles Williams Site is on the west (left) side of the roadway, immediately north of Sandy Creek.

Situated in the Piedmont physiographic province and the Cape Fear River Basin, the Project Site encompasses 18 acres of former pasture and existing riparian forest. Elevations across the Site range between approximately 550 and 560 feet above Mean Sea Level. The following chart depicts pre-implementation existing condition information regarding the Site.

<b>Physiographic Province</b>	Piedmont	<b>County</b>	Randolph
<b>River Basin Name</b>	Cape Fear	<b>Property Owner Name</b>	Charles Williams
<b>USGS 8-digit HUC</b>	03030003	<b>Stream #1 Name</b>	UT to Sandy Creek
<b>USGS 14-digit HUC</b>	03030002020010	<b>Drainage Area</b>	4.9 sq. mi.
<b>NCDWQ Subbasin</b>	03-06-09	<b>NCDWQ Score</b>	(Perennial)
<b>Underlying Mapped Soil(s)</b>	Chewacla loam	<b>Rosgen Classification</b>	C5
<b>Drainage Class</b>	Somewhat poorly drained		
<b>Hydric Status</b>	B		
<b>Slope</b>	0-2 %		
<b>Available Water Capacity</b>	Moderate to High		
<b>FEMA Classification</b>	Zone AE		
<b>Invasive Vegetation Observed</b>	Multiflora rose ( <i>Rosa multiflora</i> ) Chinese privet ( <i>Ligustrum sinense</i> )		

### 1.3 Vegetation Condition and Comparison to Success Criteria

While stream construction was completed in 2013, final planting was not completed until February, 2014. For this reason, stream monitoring objectives have met the 5-year requirement, while vegetation monitoring is in its fifth year. This report summarizes the results of the 2018 (Year 5) vegetation monitoring assessment.

Vegetation success criteria are consistent with the US Army Corps of Engineers (USACE) Wilmington Regulatory District's guidance for stream and wetland mitigation and the NCDWR guidance for riparian buffer credit. The USACE guidance requires the survival of a minimum of 320 planted woody stems/acre after Monitoring Year 3 (MY3). A mortality rate of 10% is allowed after MY4 assessments (288 stems/acre) and, correspondingly, after MY5 assessments (260 stems/acre). The NCDWR guidance requires survival of at least 320 native, planted, hardwood stems/acre (trees only) at the end of the MY 5 to successfully earn riparian buffer credit.

Vegetation is currently being assessed using plot layouts consistent with the Carolina Vegetation Survey (CVS) Level II Vegetation Protocol. Stem count data is obtained from 12 permanently placed 10-meter<sup>2</sup> vegetation plots (Figures 3a and 3b). Assessments include counts of both planted and natural stems. Due to low stem counts during MY2, supplemental planting of species in the original planting list at approximately 300 stems per acre was performed between December 2014 and March 2015. Additional supplemental planting of 230 total stems was also performed on February 6, 2017. Based on

the current monitoring effort, seven of eight vegetation plots met the minimum success criteria established for MY5 stream/wetland mitigation criteria and eight of 12 plots met the criteria for riparian buffer credit. Appendices B and C depict more detailed information regarding the vegetation condition, including annual photograph comparisons.

Due to the random placement of vegetation plots, only one of the eight plots associated with stream/wetland credit is currently placed within the wetland enhancement area (Vegetation Plot #6). The remaining seven plots are situated in areas not originally proposed as wetland enhancement.

#### **1.4 Stream Stability/Condition and Comparison to Success Criteria**

Enhancement (Level I) of the UT utilized natural channel design methodologies consistent with Priority Level IV stream restoration protocols. These protocols specifically include the stabilization of the existing channel in place. To document successful stabilization, a minimum of two bankfull events must be documented within the standard five-year monitoring period. In order for the hydrology-based monitoring to be considered complete, the two events must occur in separate monitoring years.

Evidence of overbank events was observed during the 2018 vegetation assessment in September and consisted of wrack material and sediment staining above the bankfull indicators along the channel, alluvial deposits outside the channel, debris along the fence associated with the stream crossing, and flattened vegetation far into the floodplain. The crest gauge had been adversely impacted by debris and was leaning downstream at nearly 45 degrees. As a result, any readings were not deemed valid. Hydrologic data associated with this year's monitoring assessment are provided in Appendix E and serves only as a comparison.

#### **1.5 Wetland Condition and Performance Relative to Success Criteria**

Wetland enhancement work was performed throughout the existing wetland areas. Prior to enhancement, these wetlands were severely degraded as a result of continuous soil compaction and grazing from livestock. The enhancement work included livestock removal via exclusion fencing and supplemental plantings. Benefits of the enhancement include water quality improvement by trapping nutrients such as nitrogen and phosphorous, toxic substances, and disease-causing microorganisms. Wetlands also slow and intercept surface runoff, protect stream banks from erosion, protect upland areas from flooding, and provide valuable habitat for wildlife.

#### **1.6 Other Information**

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

During MY2 monitoring, a newly constructed beaver dam was observed within the channel at approximately station 14+34.75, near Cross-Section 1. In May of 2015 during MY3 monitoring, another beaver dam was observed immediately upstream of the culverted road crossing at approximately Station 19+51.50. During June of 2015, these dams were removed by hand and beaver trapping was conducted by APHIS. No additional beaver activity was observed within the easement area until October 4, 2016, at which time the beaver dam upstream of the road crossing was observed to have been reconstructed. During 2017/MY5 monitoring, the beaver dam upstream of the road crossing was

gone again, but the dam near Cross-Section 1 had been reconstructed as of September 8, 2017. This dam was again removed in November, 2017 and was not observed during 2018. No beaver dams or evidence of beaver were noted during the September 2018 vegetation reconnaissance.

During late MY3 or early MY4, the large beaver impoundment at the upstream end of the project area was breached. It is not clear whether the breach was intentional, or whether the dam naturally breached as a result of a storm event. In February 2016, evidence of very high water and strong overbank flow was observed, likely from this breach, but a full assessment of the channel was not possible at the time due to high water and turbidity. Banks were observed to be generally stable and vegetated, and no structure instability or failure was observed. No evidence of dam reconstruction or beaver was observed in this area during 2018.

*Rosa multiflora* (multiflora rose) and *Ligustrum sinense* (Chinese privet) within the entire conservation easement were treated on November 19-20, 2018.

## 2.0 METHODOLOGY

This monitoring report follows methodology consistent with DMS's Procedural Guidance and Content Requirements for Monitoring Reports (Version 1.4, dated 11/07/11), available at the DMS website (<http://portal.ncdenr.org/web/eep>), as applicable.

Vegetation assessments were conducted using the CVS protocol (Version 4.2). As part of this protocol, vegetation is assessed using 100-meter<sup>2</sup> plots, or modules. The scientific method requires that measurements be as unbiased as possible, and that they be repeatable. Plots are designed to achieve both of these objectives; in particular, different people should be able to inventory the same plot and produce similar data (Lee et. al., 2006). According to Lee et. al. (2006), there are many different goals in recording vegetation, and both time and resources for collecting plot data are extremely variable. To provide appropriate flexibility in project design, the CVS protocol supports five distinct types of vegetation plot records, which are referred to as levels in recognition of the increasing level of detail and complexity across the sequence. The lower levels require less detail and fewer types of information about both vegetation and environment, and thus are generally sampled with less time and effort (Lee et. al., 2006). Level 1 (Planted Stem Inventory Plots) and Level 2 (Total Woody Stem Inventory Plots) inventories were completed on all 12 of the vegetation plots at the Project Site.

A crest gauge was installed near the downstream end of the Site along the UT to verify the on-site occurrences of bankfull events. In addition to the crest gage, observations of recently deposited overbank wrack and/or sediment serve to validate gauge observations, as necessary. Documentation of the highest stage during the monitoring interval is assessed during each site visit and the gauge is reset. However, this year the gauge was disturbed by debris and the data was not reliable.

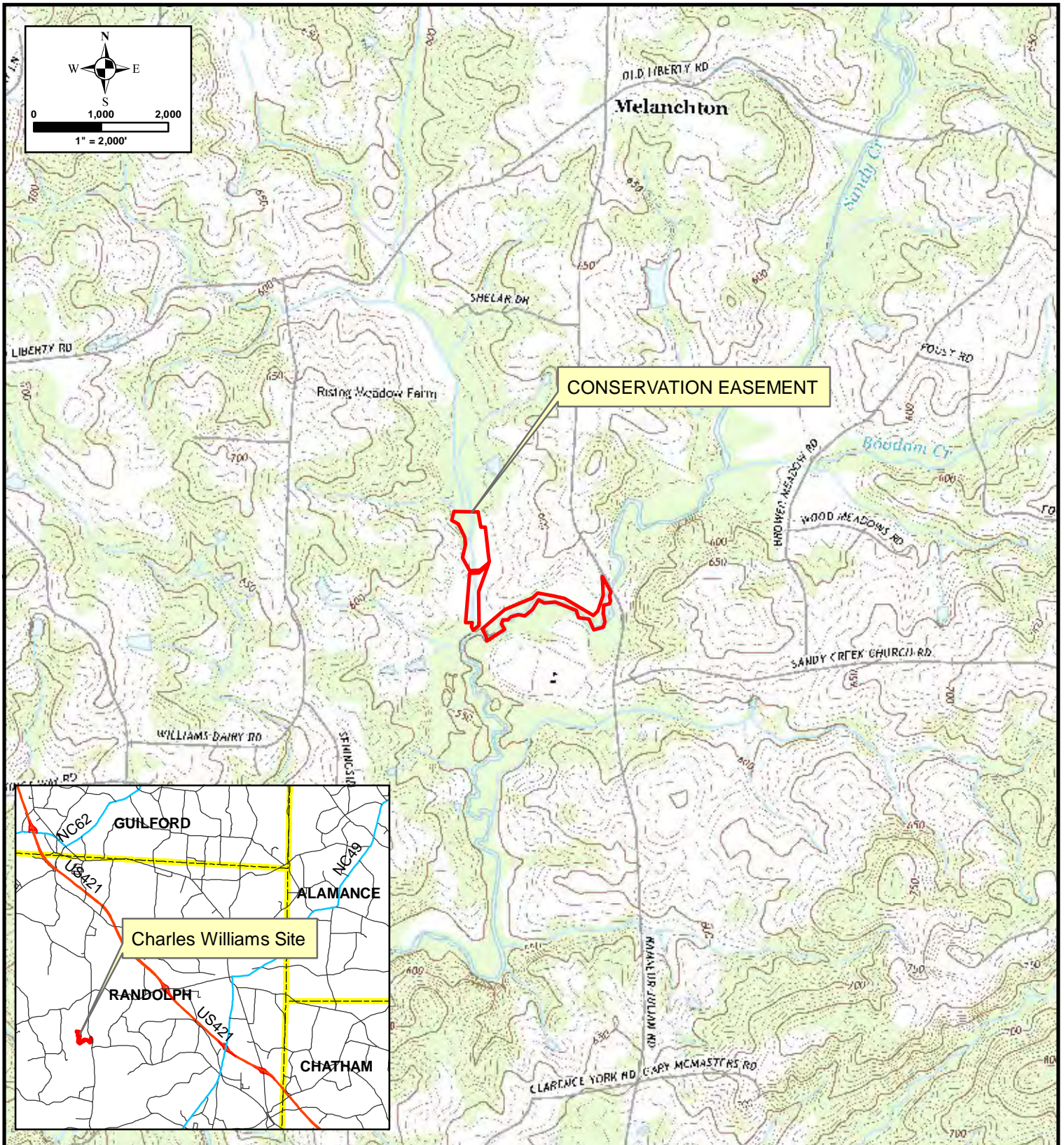
### 3.0 REFERENCES

- Lee, Michael T., R.K. Peet, S.D. Roberts and T.R. Wentworth, 2006. CVS Protocol for Recording Vegetation, Version 4.0 (<http://cvs.bio.unc.edu/methods.htm>).
- NCDENR Division of Water Quality (NCDWQ) , 2005. Cape Fear River Basinwide Management Plan. Available at: <http://portal.ncdenr.org/web/wq/ps/bpu/basin/capefear>.
- NCDEQ Division of Mitigation Services, 2017. Charles Williams Stream, Wetland, and Buffer Site Monitoring Year 5 Final Report. Prepared by Ecological Engineering, LLP.
- NCDEQ Division of Mitigation Services, 2016. Charles Williams Stream, Wetland, and Buffer Site Monitoring Year 4 Final Report. Prepared by Ecological Engineering, LLP.
- NCDEQ Division of Mitigation Services, 2015. Charles Williams Stream, Wetland, and Buffer Site Monitoring Year 3 Final Report. Prepared by Ecological Engineering, LLP.
- NCDENR Ecosystem Enhancement Program, 2014. Charles Williams Stream, Wetland, and Buffer Site Monitoring Year 2 Final Report. Prepared by Ecological Engineering, LLP.
- NCDENR Ecosystem Enhancement Program, 2013. Charles Williams Stream, Wetland, and Buffer Site Monitoring Year 1 Final Report. Prepared by Ecological Engineering, LLP.
- NCDENR Ecosystem Enhancement Program, 2013. Charles Williams Stream, Wetland, and Buffer Site Baseline Monitoring Document and As-built Baseline Report. Prepared by Ecological Engineering, LLP.
- NC State Climate Office, 2018. Daily Precipitation Data from Siler City Airport (SILR), Chatham County ([www.nc-climate.ncsu.edu](http://www.nc-climate.ncsu.edu)).
- US Army Corps of Engineers, US Environmental Protection Agency, NC Wildlife Resources Commission and NC Department of Environment Division of Water Quality, 2003. Stream Mitigation Guidelines.



## **APPENDIX A**

Project Vicinity Map and Background Tables



DIRECTIONS FROM US HWY 64 IN SILER CITY, NC: Turn north on US 421 in Siler City, towards the Town of Liberty. Proceed approximately 9.5 miles, then turn left onto NC 49. Proceed approximately 0.7 miles, then turn right onto SR 2459 (Sandy Creek Church Road). Proceed approximately 4.5 miles, then turn right onto SR 2442 (Ramseur-Julian Road). Proceed approximately 0.3 miles, crossing over Sandy Creek. The Charles Williams site is on the west (left) side of the roadway, immediately north of Sandy Creek.



**PROJECT SITE VICINITY MAP**  
**Charles Williams Site -**  
**DMS Project No. 80**

Randolph Co., NC

January 2019

Map Source:

2013 Grays Chapel and  
 Liberty USGS Quadrangles

**FIGURE 1**



**Table 1. Project Components and Mitigation Credits**

Charles Williams Stream, Wetland and Buffer Site / 80

Mitigation Credits									
	Stream		Riparian Wetland		Non-riparian wetland		Buffer	Nitrogen Nutrient Offset	Phosphorus Nutrient Offset
Type	R	RE	R	RE	R	RE			
Totals		1,168		0.98			386,847		
Project Components									
Project Component	Stationing/Location		Existing Footage/ Acreage		Approach	Restoration or Restoration Equivalent	Restoration Footage or Acreage	Mitigation Ratio	
Stream Enhancement	10+00 to 27+53		1,753 linear feet		EI	RE	1,168	1.5 : 1	
Riparian Wetland Enhancement	areas east and west of UT to Sandy Creek		1.95 acres		E	RE	0.98	2 : 1	
Buffer Restoration (TOB - 50')	Sandy Creek and UT to Sandy Creek		193,090 square feet		R	R	193,090	1 : 1	
Buffer Restoration (50' - 200')	Sandy Creek and UT to Sandy Creek		193,757 square feet		R	R	193,757	1 : 1	
Component Summation									
Restoration Level	Stream (linear feet)	Riparian Wetland (acres)		Non-riparian Wetland (acres)	Buffer (square feet)	Upland (acres)			
		Riverine	Non-riverine						
Restoration					386,847				
Enhancement		1.95							
Enhancement I	1,753								
Enhancement II									
Creation									
Preservation									
HQ Preservation									
BMP Elements									
Element	Location	Purpose/Function			Notes				
<b>BMP Elements</b>									
BR = Bioretention Cell; SF = Sand Filter; SW = Stormwater Wetland; WDP = Wet Detention Pond; DDP = Dry Detention Pond; FS = Filter Strip; S = Grassed Swale; LS = Level Spreader; NI = Natural Infiltration Area; FB = Forested Buffer.									

**Table 2. Project Activity and Reporting History****Charles Williams Stream Wetland and Buffer Site / 80**

Elapsed Time Since Grading Complete (Feb 2013): 5 years, 7 months

Elapsed Time Since Planting Complete (Feb 2014): 4 years, 7 months

Number of Reporting Years: 6

Activity or Report	Data Collection Complete	Completion or Delivery
Mitigation Plan	September-08	May-09
Final Design - Construction Plans	November-09	April-12
Construction		February-13
Temporary S&E Mix Applied to Entire Project Area		January-13
Permanent Seed Mix Applied to Entire Project Area		January-13
Live Stake Plantings Applied		January-13
Baseline Monitoring Document	June-13	July-13
Bare-rooted Planting Applied		February-14
Year 1 Monitoring	March-14	May-14
Year 2 Monitoring	September-14	November-14
Year 3 Monitoring	June-15	November-15
Year 4 Monitoring	July-16	November-16
Year 5 Monitoring	July/Sept.-17	November-17
Year 6 Monitoring (vegetation only)	September-18	November-18
Invasive Treatment		November-18

**Table 3. Project Contact Table****Charles Williams Stream Wetland and Buffer Site / 80**

<b>Designer</b> VHB Jenny S. Fleming, PE	<b>Firm Information/ Address</b> Venture 1 - 940 Main Campus Dr. Suite 500, Raleigh, NC 27606 (919) 829-0328
<b>Construction Contractor</b> Riverworks, Inc. Bill Wright	<b>Firm Information/ Address</b> 8000 Regency Parkway, Suite 800, Cary, NC 27518 (919) 459-9001
<b>Hauling Contractor</b> Strader Fencing, Inc.	<b>Firm Information/ Address</b> 5434 Amick Road, Julian, NC 27283 (336) 697-7005
<b>Planting Contractor(s)</b> Carolina Silvics, Inc. (bare-rooted & containerized) Mary-Margaret S. McKinney, RF, PWS  Riverworks, Inc. (livestakes only) George Morris	<b>Firm Information/ Address</b> 908 Indian Trail Road, Edenton, NC 27932 (252) 482.8491  8000 Regency Parkway, Suite 800, Cary, NC 27518 (919) 459-9001
<b>Seeding Contractor</b> Strader Fencing, Inc. Kenneth L. Strader	<b>Firm Information/ Address</b> 5434 Amick Road, Julian, NC 27283 (336) 697-7005
<b>Seed Mix Sources</b>	Green Resource, LLC (336) 855-6363
<b>Nursery Stock Suppliers (live stakes only)</b>	Native Roots Nursery (910) 385-8385 NC Forest Service Tree Nursery (919) 731-7988 Foggy Mountain Nursery (336) 384-5323 Mellow Marsh Farm (919) 742-1200
<b>Monitoring Performer</b> VHB David Cooper, Heather Smith, Lane Sauls (vegetation only)	<b>Firm Information/ Address</b> Venture 1 - 940 Main Campus Dr. Suite 500, Raleigh, NC 27606 (919) 829-0328
<b>Invasive Contractor</b> Carolina Silvics, Inc. (bare-rooted & containerized) Mary-Margaret S. McKinney, RF, PWS	<b>Firm Information/ Address</b> 908 Indian Trail Road, Edenton, NC 27932 (252) 482.8491

**Table 4. Project Baseline Information and Attributes**

**Charles Williams Stream Wetland and Buffer Site / 80**

Project Information			
Project Name		Charles Williams Stream Wetland and Buffer Site	
County		Randolph	
Project Area		18 acres	
Project Coordinates (latitude and longitude)		35°49'31.95" North/ 79°39'02.64" West	
Project Watershed Summary Information			
Physiographic Province		Piedmont	
River Basin		Cape Fear	
USGS Hydrologic Unit 8-digit	03030003	USGS Hydrologic Unit 14-digit	03030003020010
DWQ Subbasin		03-06-09	
Project Drainage Area		4.9 sq. mi.	
Project Drainage Area Percentage of Impervious Area		5 to 6%	
CGIA Land Use Classification		Agricultural Land	
Reach Summary Information			
Length of Reach		1,753 linear feet	
Valley Classification		Valley Type VIII	
Drainage Area		4.9 sq. mi.	
NCDWQ Stream ID Score		>50	
NCDWQ Water Quality Classification		WS-III	
Morphological Description (stream type)		C5	
Evolutionary Trend		C-G-F-E-C	
Underlying Mapped Soils		Chewacla loam	
Drainage Classification		Poorly drained	
Soil Hydric Status		Hydric B	
Slope		0 to 2%	
FEMA Classification		Zone AE	
Native Vegetation Community		Piedmont Alluvial Forest	
Percent Composition of Exotic Invasive Species		Less than 5%	
Wetland Summary Information			
Size of Wetland		1.95 acres	
Wetland Type		Riverine	
Mapped Soil Series		Chewacla loam	
Drainage Classification		Somewhat poorly drained	
Soil Hydric Status		Hydric B	
Source of Hydrology		Overbank flooding	
Hydrologic Impairment		None	
Native Vegetation Community		Piedmont Alluvial Forest	
Percent Composition of Exotic Invasive Species		Less than 5%	
Regulatory Considerations			
Waters of the United States - Section 404		Resolved	
Waters of the United States - Section 401		Resolved	
Endangered Species Act		Resolved	
Historic Preservation Act		Resolved	
Coastal Zone/Area Management Acts (CZMA/CAMA)		Not Applicable	
FEMA Floodplain Compliance		Resolved	
Essential Fisheries Habitat		Not Applicable	









## **APPENDIX B**

Visual Assessment Data



**Legend**

-  Easement Boundary
-  As-built wetland
-  Stream Enhancement
-  Buffer Restoration Credit, TOB - 50'
-  Buffer Restoration Credit, 50' - 100'
-  Buffer Restoration Credit, 100' - 200'



**MITIGATION COMPONENTS**  
Charles Williams Site -  
DMS Project No. 80

Randolph Co., NC

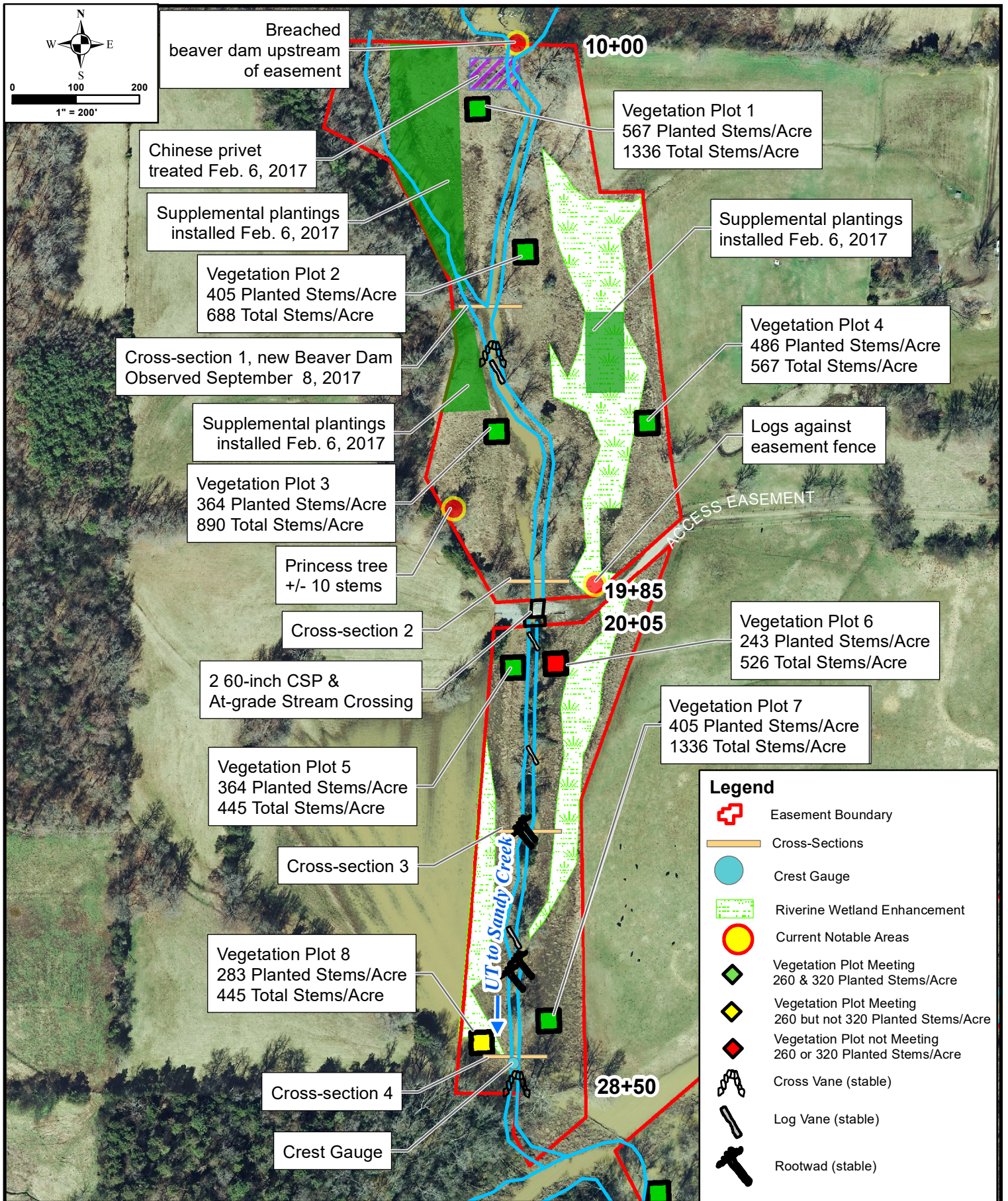
February 2019

Map Source:

2018 Aerial from  
NCOneMap.com

**FIGURE 2**





**CURRENT CONDITIONS PLAN VIEW**  
**Charles Williams Site -**  
**DMS Project No. 80**

Randolph Co., NC

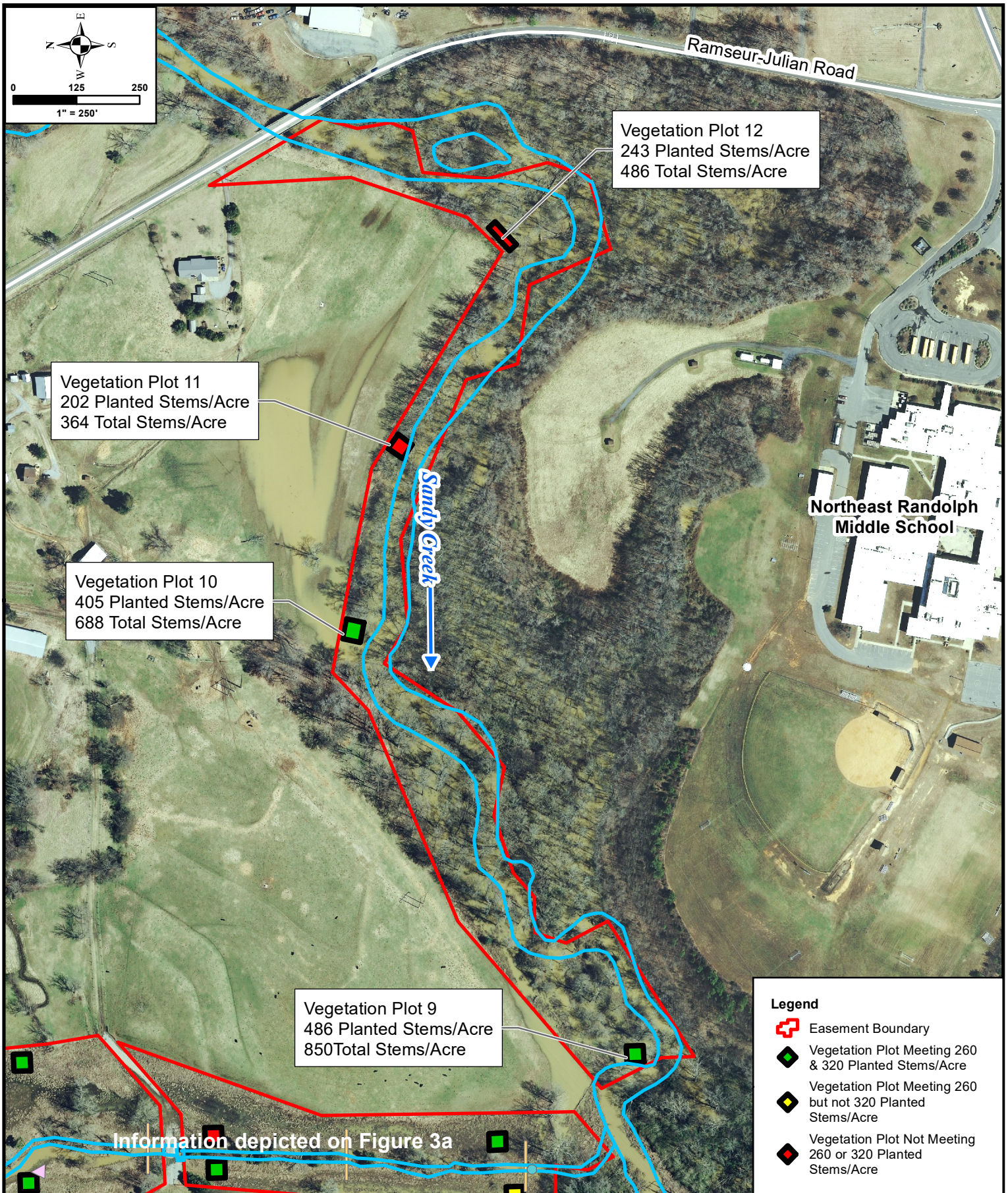
January 2019

Map Source:

2014 Aerial from  
 NCOneMap.com

**FIGURE 3a**





**CURRENT CONDITIONS PLAN VIEW**  
Charles Williams Site -  
DMS Project No. 80

Randolph Co., NC

January 2019

Map Source:

2014 Aerial from  
NCOneMap.com

**FIGURE 3b**



**Table 6. Vegetation Condition Assessment**  
**Charles Williams Stream, Wetland, and Buffer Site / 80**

Planted Acreage: 16 acres							
Vegetation Category	Definitions	Mapping Threshold	CCPV Depiction	Number of Polygons	Combined Acreage	% of Planted Acreage	
Bare Areas	Very limited cover of both woody and herbaceous material.	0.1 acres	n/a	0	n/a	n/a	
Low Stem Density Areas	Woody stem densities clearly below target levels based on MY 3, 4, or 5 stem count criteria.	0.1 acres	Not depicted - natural woody stems bring woody stems up to target levels for veg. plots where planted stem survival is low.	0	n/a	0%	
				<b>Total</b>	0	0	1%
Areas of Poor Growth Rates or Vigor	Areas with woody stems of a size class that are obviously small given the monitoring year.	0.25 acres	n/a	0	n/a	n/a	
				<b>Cumulative Total</b>	0	0	0%
Estimated Acreage: 18 acres							
Vegetation Category	Definitions	Mapping Threshold	CCPV Depiction	Number of Polygons	Combined Acreage	% of Planted Acreage	
Invasive Areas of Concern	Areas or points (if too small to render as polygons at map scale).	<1,000 SF	See CCPV	2	<.1 acres	<1 %	
Easement Encroachment Areas	Areas or points (if too small to render as polygons at map scale).	1,000 SF	See CCPV	1	0.3 acres	1%	



# Charles Williams Stream, Wetland, and Buffer Site / 80 - Annual Photograph Comparison

Baseline MY0 (June 2013)

MY1 (March 2014)

MY2 (September 2014)

MY3 (June 2015)

MY4 (June 2016)

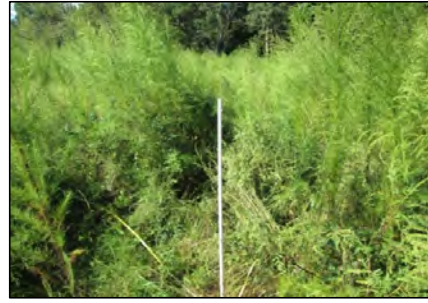
MY5 (September 2017)

MY 6 (September 2018)

Vegetation Plot 1 Facing Southwest



Vegetation Plot 2 Facing Southwest



Vegetation Plot 3 Facing Southwest



Vegetation Plot 4 Facing Southwest



Vegetation Plot 5 Facing Southwest





Charles Williams Stream, Wetland, and Buffer Site / 80 - Annual Photograph Comparison (Con't)

Baseline MY0 (June 2013)

MY1 (March 2014)

MY2 (September 2014)

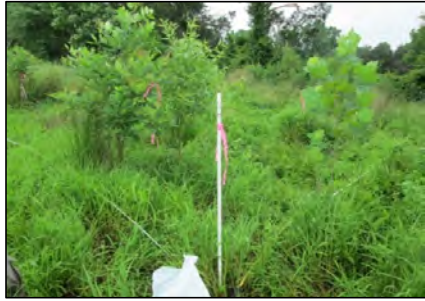
MY3 (June 2015)

MY4 (June 2016)

MY5 (September 2017)

MY 6 (September 2018)

Vegetation Plot 6 Facing Southwest



Vegetation Plot 7 Facing Southwest



Vegetation Plot 8 Facing Southwest



Vegetation Plot 9 Facing Southwest



Vegetation Plot 10 Facing Southwest





Charles Williams Stream, Wetland, and Buffer Site / 80 - Annual Photograph Comparison (Con't)

Baseline MY0 (June 2013)

MY1 (March 2014)

MY2 (September 2014)

MY3 (June 2015)

MY4 (June 2016)

MY5 (September 2017)

MY 6 (September 2018)

Vegetation Plot 11 Facing Southwest



Vegetation Plot 12 Facing Southwest





## Additional Photographs



Crest Gage Current Condition Sept. 2018



Wrack on fence wire indicating overbank flow



Water stained vegetation within floodplain



Sediment laden vegetation along Sandy Creek

## **APPENDIX C**

### **Vegetation Plot Data**



## Planted Vegetation Summary

During MY3 monitoring, new stems were documented from a supplemental planting performed by Carolina Silvics in early 2015. Stem density was observed to be adequate in 12 of the 12 vegetation plots. Please refer to the letter and tables below.

### Proposed Supplemental Planting Letter



October 6, 2014

Mr. Jeff Schaffer  
NC Ecosystem Enhancement Program  
217 West Jones Street, Suite 3000A  
Raleigh, North Carolina 27603

Re: D13002S  
*Site: Sandy Creek (Charlie Williams), EEP# 80*  
*Randolph County, NC*

Dear Mr. Schaffer:

This letter serves as our Site Maintenance Report the above referenced project site and proposes replanting activities at the site.

Messrs. William Skinner and Perry Sugg of Carolina Silvics, Inc. last visited the project site on September 9, 2014. Herbicide applications were performed at this time to control privet (*Ligustrum* spp.) and air yam (*Dioscorea bulbifera*). While on-site they observed many areas of the site where herbaceous vegetation was extremely thick and possibly outcompeting the planted stems. They also observed many dead stems and that the tops of many planted stems appeared to have died-back but were resprouting.

The Fall monitoring data and baseline monitoring data that you have provided shows approximately 65% survival at this site and correlates with what we observed on-site.

Carolina Silvics, Inc. proposes to replant the site between December 15, 2014 and March 15, 2015 with approximately 3,450 stems (an average of 300 stems per acre) from the original planting list for the site. These stems will distributed throughout the site as needed based upon the Fall monitoring report and observed conditions on site. Seedling orders are being finalized now and will be forwarded to you for approval within the next week.

Since survival percentage of stems is less than we would like, we feel that both soil amelioration and competition control measures are needed at this site. Within portions of the site where competition seems particularly heavy, we will manually cut paths several feet wide low to the ground in the existing herbaceous competition and apply Oust® XP (sulfometuron methyl) herbicide to the paths. Herbicide will not be applied to areas of standing water or areas along the channel. Stems

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will then be replanted into these paths. Conversely, in areas where general vegetative growth is sparse, we will apply a slow release fertilizer at time of planting to improve general soil fertility in those areas.

We will notify you in advance of our replanting and maintenance activities on this site. We request that a member of your staff be onsite with us as we begin these activities so that proper distribution of the seedlings can be agreed-upon in the field by all parties.

Please know that Carolina Silvics, Inc. is committed to the success of this project and will take the measures necessary to ensure that we remain in contract compliance. If you have any questions regarding this report or our proposed replanting and maintenance activities, please contact me at (252) 482-8491 or [mary-margaret@carolinasilvics.com](mailto:mary-margaret@carolinasilvics.com).

Respectfully,

CAROLINA SILVICS, INC.

Mary-Margaret McKinney, RF  
President

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## Original Planting List from DMS

Sandy Creek (Charles Williams)						
Species	Type	Riparian		Wetland		Nursery
		Qty	%	Qty	%	
<i>Betula nigra</i>	2-0 BR	300	10%	100	11%	NCFS
<i>Carya glabra</i>	2-0 BR	100	3%			NCFS
<i>Carya tomentosa</i>	2-0 BR	200	7%			NCFS
<i>Fraxinus pennsylvanica</i>	2-0 BR	275	9%	100	11%	NCFS
<i>Liriodendron tulipifera</i>	2-0 BR	400	13%			NCFS
<i>Platanus occidentalis</i>	2-0 BR	225	7%	200	23%	NCFS
<i>Quercus falcata</i> var. <i>pagodifolia</i>	2-0 BR	300	10%	100	11%	NCFS
<i>Quercus nigra</i>	2-0 BR			100	11%	NCFS
<i>Quercus phellos</i>	2-0 BR	600	20%	200	23%	NCFS
<i>Quercus rubra</i>	2-0 BR	300	10%			NCFS
<i>Amelanchier arborea</i>	1-gal	25	1%			Native Roots
<i>Carpinus caroliniana</i>	1-gal	85	3%			Native Roots
<i>Chionanthus virginicus</i>	1-gal	64	2%			Native Roots
<i>Diospyros virginiana</i>	2-0 BR	200	7%			NCFS
<i>Ilex verticillata</i>	1-gal			37	4%	Native Roots
<i>Magnolia virginiana</i>	1-gal			38	4%	Native Roots
		3,074	100%	875	100%	

Vegetation Plot ID	Stream/Wetland	Buffer Vegetation	Tract Mean
	Vegetation Survival	Survival Threshold Met?	
1	Yes	Yes	Stream/Wetland Veg. = 87.5% Buffer Vegetation = 67%
2	Yes	Yes	
3	Yes	Yes	
4	Yes	Yes	
5	Yes	Yes	
6	No	No	
7	Yes	Yes	
8	Yes	No	
9	n/a	Yes	
10	n/a	Yes	
11	n/a	No	
12	n/a	No	

**Notes:**

Supplemental planting at approximately 300 stems per acre was performed between December 2014 and March 2015. An additional 230 stems were planted outside of the existing vegetation plots on February 6, 2017.

**Table 8. CVS Vegetation Plot Metadata**  
**Charles Williams Stream, Wetland, and Buffer Site / 80**

Report Prepared By	Lane Sauls
Date Prepared	9/12/2018 10:12
database name	Backup (2) of SandyCreekCharlesWilliams_80_RandolphCounty_Year 5.mdb
database location	P:\10000 Consultants\10227 Sungate\10227-017_Charles Williams Monitoring\CVS Database
computer name	LSAULS
file size	36962304

**DESCRIPTION OF WORKSHEETS IN THIS DOCUMENT -----**

Metadata	Description of database file, the report worksheets, and a summary of project(s) and project data.
Proj, planted	Each project is listed with its PLANTED stems per acre, for each year. This excludes live stakes.
Proj, total stems	Each project is listed with its TOTAL stems per acre, for each year. This includes live stakes, all planted stems, and all natural/volunteer stems.
Plots	List of plots surveyed with location and summary data (live stems, dead stems, missing, etc.).
Vigor	Frequency distribution of vigor classes for stems for all plots.
Vigor by Spp	Frequency distribution of vigor classes listed by species.
Damage	List of most frequent damage classes with number of occurrences and percent of total stems impacted by each.
Damage by Spp	Damage values tallied by type for each species.
Damage by Plot	Damage values tallied by type for each plot.
Planted Stems by Plot and Sp	A matrix of the count of PLANTED living stems of each species for each plot; dead and missing stems are excluded.
ALL Stems by Plot and spp	natural volunteers combined) for each plot; dead and missing stems are excluded.

**PROJECT SUMMARY-----**

Project Code	80
project Name	Sandy Creek - Charles Williams
Description	Stream, Wetland and Buffer
River Basin	Cape Fear
length(ft)	1,753
stream-to-edge width (ft)	5 to 12
area (sq m)	1,302
Required Plots (calculated)	12
Sampled Plots	12





## **APPENDIX E**

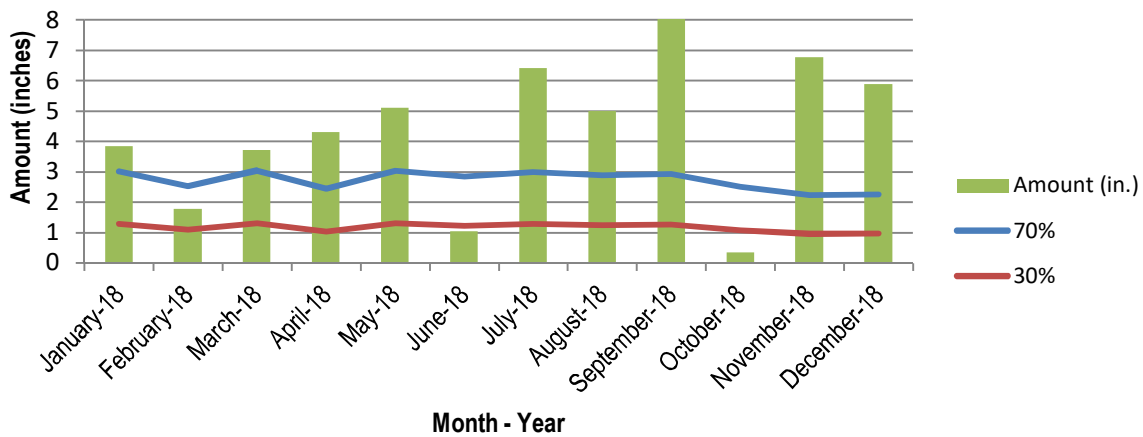
### **Hydrology Data**

**Table 12. Verification of Bankfull Events**

**Charles Williams Stream, Wetland, and Buffer Site / 80 - UT to Sandy Creek: 1,753 linear feet**

Date of Data Collection	Date of Occurrence	Method	Photo # (if available)
11/6/2013	unknown	Crest Gage	Not Available
3/6/2014	unknown	Visual On-site (wrack)	Not Available
9/16/2014	unknown	Crest Gage	Not Available
4/17/2015	4/17/2015	Visual On-site (active overbank event)	Not Available
6/30/2015	unknown	Visual On-site (wrack, sediment staining, alluvial deposits)	Not Available
2/18/2016	unknown - likely caused by beaver dam breach	Visual On-site (wrack, sediment staining, alluvial deposits, flattened vegetation)	Not Available
7/20/2016	unknown	Visual On-site (log jam from previous high flow event)	Not Available
2/10/2017	unknown	Crest Gage	Not Available
7/20/2017	Between 2/10/2017 and 7/17/2017	Crest Gage, Visual On-site (wrack, sediment on saplings in floodplain)	Overbank 1, 2, 3
9/8/2018	Between April 2018 and August 2018	Crest Gage damage, Visual On-site (wrack, evidence of inundation throughout floodplain)	Crest Gage 1, Overbank 1, 2, 3

**Charles Williams Stream, Wetland, and Buffer Site / 80  
2018 Precipitation Data through October, 2018**



Note: September 2018: 11.08 inches recorded.