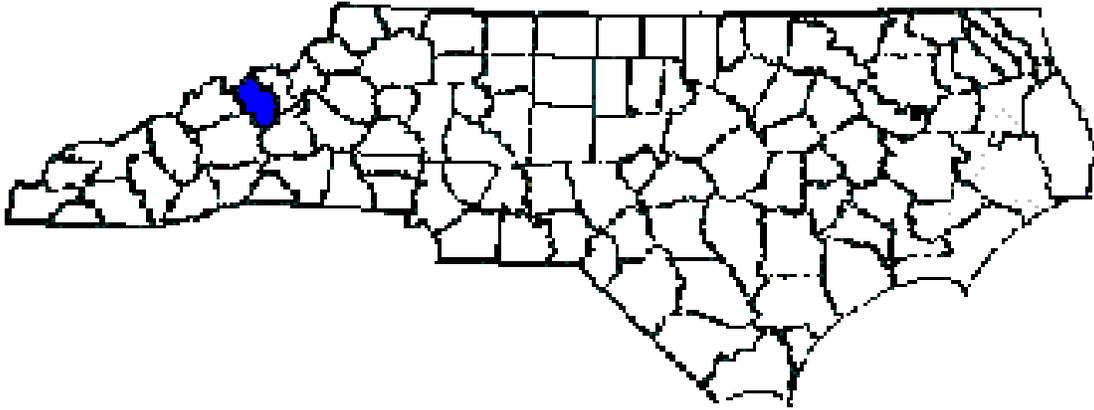


ANNUAL REPORT FOR 2016



**UT to Cane River Site #12 Mitigation Site
Yancey County
TIP No. R-2518B
COE Action ID: SAW-2007-2197-357/300
DWR #: 20071134**



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SUMMARY

The following report summarizes the stream monitoring activities that have occurred during the Year 2016 at the UT to Cane River Site #12 Mitigation Site in Yancey County. The North Carolina Department of Transportation (NCDOT) completed this project in March 2013. This report provides the monitoring results for the fifth formal year of monitoring (Year 2016). The Year 2016 monitoring period was the fifth of five scheduled years of monitoring on the UT to Cane River Site #12 Mitigation Site (See Success Criteria Section 2.1).

Based on the overall conclusions of monitoring at UT to Cane River Site #12, it has met the required monitoring protocols for the fifth formal year of monitoring on the stream and the planted vegetation. The ACOE and NCDWR agreed with NCDOT to not complete the longitudinal profile survey for the remainder of the five year monitoring period due to mature hardwood vegetation along the channel and not to survey the cross sections for the fifth year of monitoring. In lieu of doing the survey, visual inspection of the channel stability throughout the reach and photo documentation at the permanent photo point locations would be completed. All other monitoring activities will continue to be completed throughout the five year monitoring period. The channel throughout the stream enhancement site is stable at this time. The streambank was planted with live stakes in March 2012 and the buffer was planted with bareroot seedlings in April 2012. The planted vegetation is surviving at this time.

NCDOT proposes to discontinue stream and vegetation monitoring at the UT to Cane River Site #12 Mitigation Site.

1.0 INTRODUCTION

1.1 Project Description

The following report summarizes the stream monitoring activities that have occurred during the Year 2016 at the UT to Cane River Site #12 Mitigation Site. Site #12 is located on US 19 in Yancey County at Sta. 223+66 to Sta. 225+46 -L- (Figure 1). The UT to Cane River Site #12 was constructed to provide mitigation for stream impacts associated with Transportation Improvement Program (TIP) number R-2518B in Yancey County.

The mitigation site provided approximately 584 linear feet of stream enhancement. Construction was completed during March 2012 by the NCDOT. Stream enhancement involved installing several in-stream cross vane structures and planting the riparian buffer zone.

1.2 Purpose

In order for a mitigation site to be considered successful, the site must meet the success criteria. This report details the monitoring in 2016 at the UT to Cane River Site #12 Mitigation Site. Hydrologic monitoring was not required for this site.

1.3 Project History

March 2012	Construction Completed
March 2012	Site Planted (Type I Only)
April 2012	Site Planted (Type II Only)
April 2012	As-Built Survey Completed
September 2012	Vegetation Monitoring (Year 1)
November 2012	Stream Channel Monitoring (Year 1)
March 2013	Bankfull Monitoring Gauge Installed
August 2013	Vegetation Monitoring (Year 2)
November 2013	Stream Channel Monitoring (Year 2)
July 2014	Vegetation Monitoring (Year 3)
November 2014	Stream Channel Monitoring (Year 3)
July 2015	Vegetation Monitoring (Year 4)
November 2015	Stream Channel Monitoring (Year 4)
July 2016	Vegetation Monitoring (Year 5)
November 2016	Visual Stream Channel Monitoring (Year 5)

1.4 Debit Ledger

The entire 584 linear feet of UT to Cane River Site #12 stream mitigation site was used at a 2:1 ratio for the R-2518B project to compensate for unavoidable stream impacts.

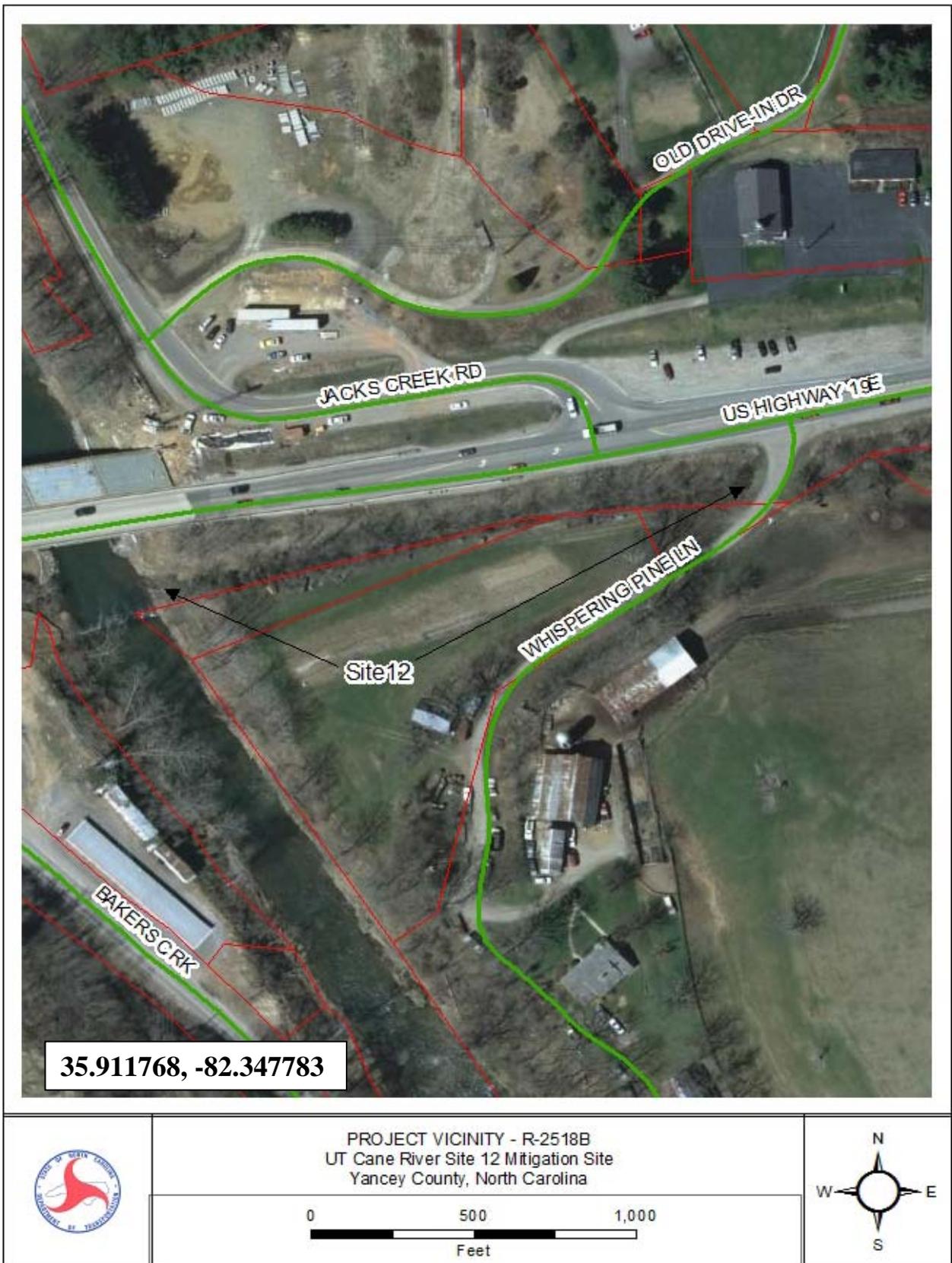


Figure 1. Vicinity Map



PROJECT REFERENCE NO.	SHEET NO.
R-2518B	RF-9
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

STREAMBANK REFORESTATION FOR SITE 12

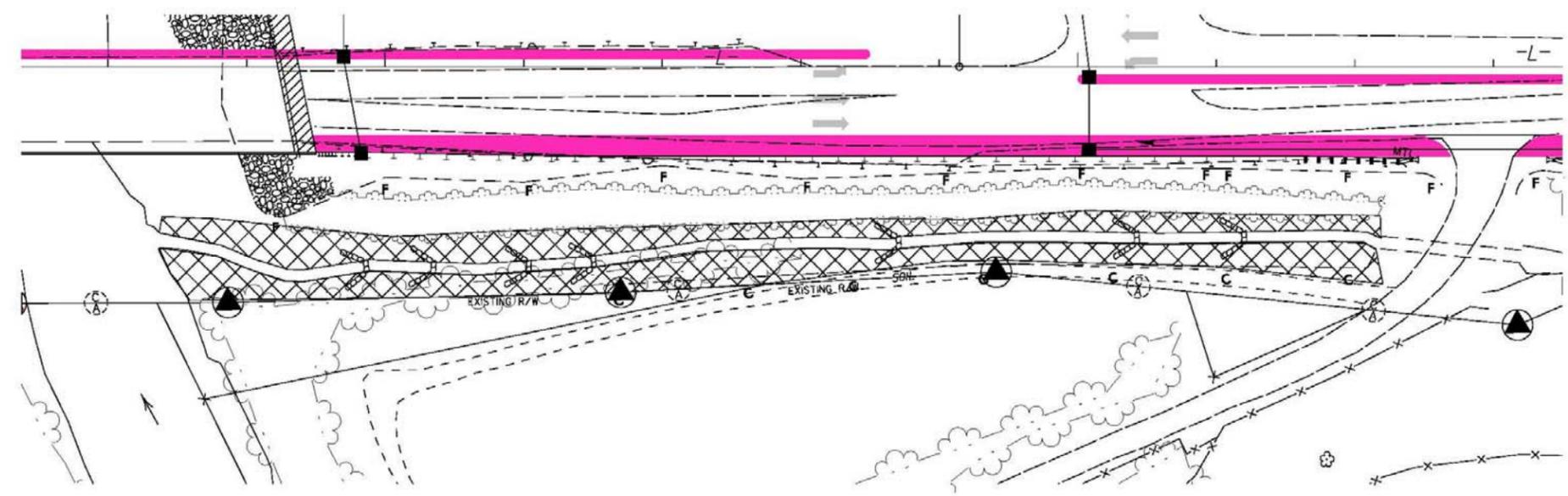


Figure 3. Site #12 Reforestation Plan

2.0 STREAM ASSESSMENT

2.1 Success Criteria

The permittee shall monitor the restoration and enhancement mitigation sites following the Level 1 protocols outlined in the "Stream Mitigation Guidelines," dated April 2003 with the following exceptions:

1. Pebble counts shall not be conducted.
2. Two cross sections shall be conducted for streams less than 500 linear feet and five (5) cross sections shall be conducted for streams greater than 500 linear feet.
3. Riparian success shall be by visual inspection of plant survival. Photos will be taken and comments noted on plant survival.

The permittee shall monitor the preservation sites by visual inspection. Photos will be taken and comments noted on plant survival. The monitoring shall be conducted annually for a minimum of five (5) years after final planting. The monitoring results shall be submitted to DWR in a final report within sixty (60) days after completing monitoring. After 5 years the NCDOT shall contact the DWR to schedule a site visit to "close out" the mitigation site.

2.2 Stream Description

2.2.1 Post-Construction Conditions

The enhancement of UT to Cane River Site #12 Mitigation Site involved installing several in-stream cross vane structures and planting the riparian buffer zone.

2.2.2 Monitoring Conditions

The objective of the UT to Cane River Site #12 stream enhancement was to enhance a B4 stream as identified in Rosgen's Applied River Morphology. A total of two cross sections (one riffle and one pool) were surveyed. For this report, only cross sections containing riffles were used in the comparison of channel morphology which can be found in the 2012 to 2015 monitoring reports in Table 1.

2.3 Results of the Stream Assessment

2.3.1 Site Data

The assessment included the survey of two cross sections of the UT to Cane River Site #12 established by NCDOT after construction. Two cross sections were established during the as-built monitoring year. Cross section locations were subsequently based on the stationing of the longitudinal profile and are presented below. The locations of the cross sections are shown in the 2012 to 2015 monitoring reports Appendix A.

UT to Cane River Site #12 Cross-Sections:

- ◆ Cross-Section #1: UT to Cane River Site #12, Sta. 237+00, midpoint of pool
- ◆ Cross-Section #2: UT to Cane River Site #12, Sta. 397+00 midpoint of riffle

Based on comparisons of the As-Built to the monitoring data, all of the cross sections appear stable with little or no active bank erosion. Graphs of the cross sections are presented in the 2012 to 2015 monitoring reports Appendix A.

The ACOE and NCDWR agreed with NCDOT to not complete the longitudinal profile survey for the remainder of the five year monitoring period due to mature hardwood vegetation along the channel and also not to survey the cross sections in the fifth year of monitoring. In lieu of doing the survey, visual inspection of the channel stability throughout the reach and photo documentation at the permanent photo point locations would be completed. All other monitoring activities will continue to be completed throughout the five year monitoring period. Photo points 1 through 3 showed the mature hardwood vegetation along the channel. The channel bed is stable throughout the stream site at this time. A cross vane located at Photo Point #3 had water piping under the structure but this area remains stable at this time. Pebble counts were not required per the permit conditions and therefore were not completed. Multiple bankfull events were documented by a surface water gauge at Site 12 during the 2013 and 2014 monitoring years.

3.0 VEGETATION: UT to Cane River Site #12

3.1 Description of Species

The following tree species were planted on the streambank:

Salix nigra, Black Willow

Cornus amomum, Silky Dogwood

The following tree species were planted in the buffer area:

Liriodendron tulipifera, Yellow Poplar

Platanus occidentalis, Sycamore

Fraxinus pennsylvanica, Green Ash

Quercus alba, White Oak

3.2 Results of Vegetation Monitoring

Streambank & Buffer Vegetation: The streambank reforestation was completed in March and April 2012. The Year 5 vegetation monitoring evaluation noted: Type I: Black Willow, Silky Dogwood and Type II: Green Ash were surviving at the time of the monitoring evaluation. The existing vegetation is already providing a canopy of hardwood vegetation along the reach.

3.3 Conclusions

NCDOT proposes to discontinue monitoring the planted vegetation.

4.0 OVERALL CONCLUSIONS/RECOMMENDATIONS

The UT to Cane River Site #12 Mitigation Site has met the required monitoring protocols for the fifth formal year of monitoring on the stream and the planted vegetation. The channel throughout the stream enhancement site is stable at this time. The planted vegetation is surviving at this time.

NCDOT proposes to discontinue stream and vegetation monitoring at the UT to Cane River Site #12 Mitigation Site.

5.0 REFERENCES

Stream Mitigation Plan, US Highway 19, R-2518B On-Site Mitigation
Yancey County, North Carolina, February 2007.

Design Plans for R-2518B, US 19 from east of the Madison County line to SR
1336, Stream Mitigation (Preservation, Enhancement, and Restoration),
Buck Engineering.

North Carolina Department of Transportation (NCDOT), April 29, 2008. 404 and
401 Individual Permits for R-2518A and R-2518B (ACOE Permit No. 2007-
2197-357/300 and DWR Project No. 20071134, Individual Certification No.
3706).

Rosgen, D.L, 1996. Applied River Morphology. Wildland Hydrology, Pagosa
Springs, Colorado.

US Army Corps of Engineers (USACE), 2003. Stream Mitigation Guidelines.
Prepared with cooperation from the US Environmental Protection Agency,
NC Wildlife Resources Commission, and the NC Division of Water Quality.

APPENDIX A
SITE PHOTOGRAPHS

UT to Cane River Site #12



Photo Point #1 (Upstream)



Photo Point #1 (Downstream)



Photo Point #2 (Upstream)



Photo Point #2 (Downstream)



Photo Point #3 (Upstream)
(water piping under crossvane)
November 2016

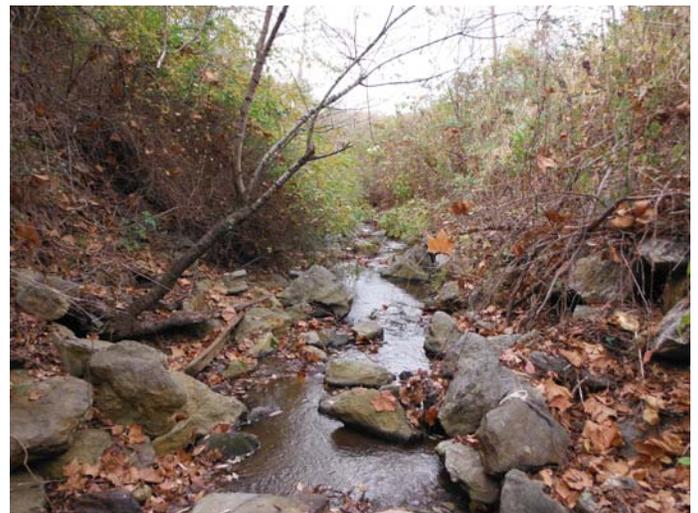


Photo Point #3 (Downstream)

UT to Cane River Site #12



Vegetation Overview Photo (North Buffer)



Vegetation Overview Photo (South Buffer)

July 2016