

Baseline Monitoring Report FINAL

Stanley's Slough Stream and Wetland Restoration Site

EEP Contract 004635

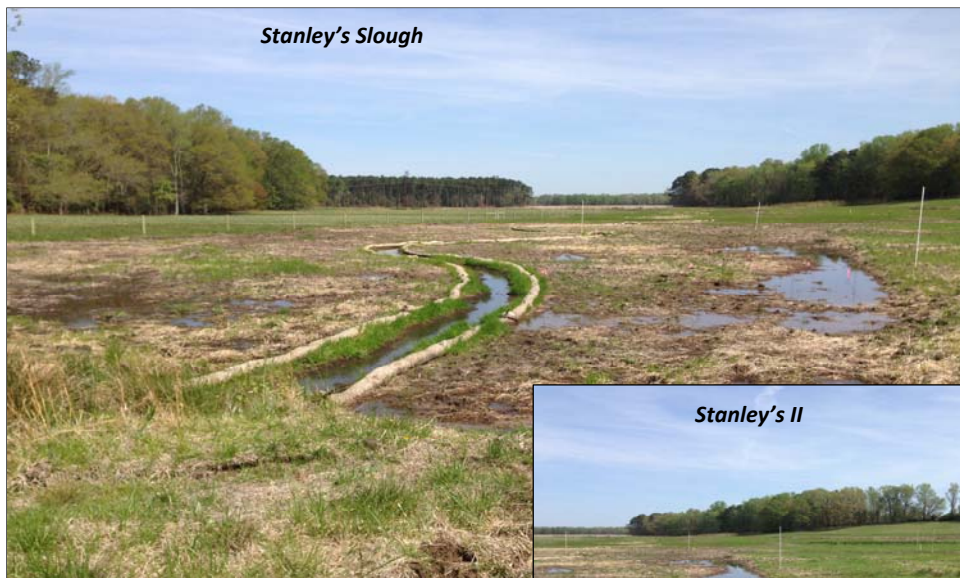
EEP Project Number 95356

Stanley's II Wetland Restoration Site

EEP Contract 5151

EEP Project Number 95838

Northampton County, North Carolina



Prepared for:



NCEEP, 1652 Mail Service Center, Raleigh, NC 27699-1652

Monitoring Data Collected: April/May 2014

Date Submitted: July 2014

Monitoring and Design Firm

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July 2014

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EXECUTIVE SUMMARY

The Stanley's Slough Stream and Wetland Restoration Site (SSS) was completed in April 2014 and restored a total of 4,274 linear feet of headwater stream along with restoring 3.6 acres of riparian wetlands. The SSS is a headwater stream and riparian wetland system in the Chowan River Basin (03010204 8-digit HUC) in northern Northampton County, North Carolina, that had been substantially modified to maximize agricultural production. The completed project will restore impacted agricultural lands to riparian wetland and headwater stream habitat. The Stanley's II Wetland Restoration Site (SII) is located directly adjacent to SSS and was also completed in April 2014, restoring a total of 7.6 acres of riparian wetland restoration. The completed SII project will restore, enhance, and protect wetlands within a productive headwater stream/wetland system.

The SSS is protected by a 17.6-acre permanent conservation easement, while SII is protected by a 9.4-acre permanent conservation easement, both held by the State of North Carolina. Both sites are located on two parcels located off of Margarettsville Road, approximately 0.3 mile north of Margarettsville, North Carolina. The project sites are bounded by NC 186 to the south and by agricultural land on all other sides. The sites have a long history of hydrologic modification in order to allow for farming to take place on the property.

The Chowan River Basin Restoration Priorities state the goals for the SSS and SII's 14-digit HUC are to protect and improve water quality throughout the Basin by reducing sediment and nutrient inputs into streams and rivers and to support efforts to restore local watersheds (NCDENR EEP, 2009). The project goals for SSS and SII are in line with the basin priorities and include the following:

- Restore streams and riparian buffers to provide shade and temperature control and increase instream woody debris for habitat.
- Restore and protect sensitive aquatic resources to improve habitat and species diversity through the restoration of wetlands, streams, and riparian buffers.
- Implement wetland and stream restoration projects that reduce sources of nutrient pollution and surface runoff by restoring hydrology and vegetation, stabilizing banks, and restoring natural geomorphology where appropriate.

Additional goals for the project include:

- Increase the local hydroperiod by encouraging both surface and subsurface storage and retention.
- Restore and establish a functional and diverse headwater stream/wetland community.

The project goals will be addressed through the following objectives:

- Restore a headwater stream/wetland vegetation community through maintenance and germination of volunteer wetland vegetation from adjacent seed sources, planting of native trees and shrubs, and incorporation of a custom native seed mix.
- Elevate the local groundwater table through the elimination of lateral drainage ditches and modification of existing channelized streams.
- Reconnect site hydrology to historic flow paths.

Project planting and construction were completed in April 2014. SSS involved the restoration of approximately 4,274 linear feet of stream restoration and 3.6 acres of riparian wetlands. SII involved the restoration of 7.6 acres of riparian wetlands. Both SSS and SII were constructed as designed with only two modifications made to the design plan during construction. A shallow swale was installed on T1 near Station 15+25, and T1 was extended approximately 50 linear feet to connect to the relic forested headwater stream/wetland complex near Station 28+30.

The monitoring components were installed in April 2014 for both sites. Twelve monitoring gauges were installed to evaluate the attainment of jurisdictional wetland hydrology for both sites. Six additional monitoring gauges were installed in the headwater stream/wetland areas to document the presence of surface water. To determine the success of the planted mitigation areas, twenty permanent vegetation monitoring plots were established according to the CVS-EEP Level 2 protocol. Ten permanent photo points have been established with a total of twenty-two photos to be taken annually. The site will be monitored for at least seven years or until the success criteria are achieved. Reports will be submitted to the EEP each year. The first year of monitoring will take place in 2014.

The success criteria for the sites state that the planted wetlands must meet the success criteria of a site average of 320 stems/acre after three years, 288 stems/acre after four years, 260 stems/acre after five years, and 210 stems/acre after seven years to be considered successful. In addition to density requirements, plant height will be monitored within the monitoring plots to ensure that trees average 10 feet in height after seven years. The baseline monitoring counted an average of 1,044 stems/acre in the 20 vegetation monitoring plots.

Wetland hydrology will be monitored with the series of twelve automatic gauges described above that record water table depth. To meet the success criterion, the upper 12 inches of the soil profile must have continuously saturated or inundated conditions for at least 9.0% of the growing season for riparian mitigation areas during normal weather conditions based on a conservative estimate. In the headwater stream/wetland areas, the six automatic recording gauges will document the presence of surface water. In addition to the presence of surface water, physical flow indicators will also be documented to demonstrate any surface flows through the stream/wetland valley.

1.0 PROJECT GOALS, BACKGROUND, AND ATTRIBUTES

1.1 Location and Setting

The North Carolina Ecosystem Enhancement Program (NCEEP) has completed the restoration of 4,274 linear feet of stream and 3.6 acres of wetland restoration at SSS, as well as 7.6 acres of wetland restoration at SII. SII is located directly adjacent to SSS and both sites assist in fulfilling stream and wetland mitigation goals in the area.

SSS is protected by a 17.6-acre permanent conservation easement, while SII is protected by a 9.4-acre permanent conservation easement, both held by the State of North Carolina. Both projects are situated in Northampton County in the Rolling Coastal Plains (Level IV 65m) ecoregion of the Coastal Plain physiographic province. The sites are located on two parcels off of Margarettsville Road approximately 0.3 miles north of Margarettsville, North Carolina (Figure 1, Appendix A).

The Site is within the 03010204 (8-digit Cataloging Unit) Meherrin Watershed located within the Chowan River Basin and the 03010204180040 Cypress Creek Local Watershed Unit (14-digit Cataloging Unit), which has been identified as a Targeted Local Watershed (NCDENR, EEP 2009). The populations of the counties within the watershed are stable or minimally declining and land use is predominately agricultural. For this reason, the restoration priorities laid out by EEP focus on mitigating impact to streams and wetlands from agricultural use (NCDENR EEP, 2009). The SSS and SII were both selected by KCI as stream and wetland opportunities to improve habitat within the TLW.

1.2 Project Goals and Objectives

The project goals address stressors identified in the TLW and include the following:

- Restore streams and riparian buffers to provide shade and temperature control and increase instream woody debris for habitat.
- Restore and protect sensitive aquatic resources to improve habitat and species diversity through the restoration of wetlands, streams, and riparian buffers.
- Implement wetland and stream restoration projects that reduce sources of nutrient pollution and surface runoff by restoring hydrology and vegetation, stabilizing banks, and restoring natural geomorphology where appropriate.

Additional goals for the project include:

- Increase the local hydroperiod by encouraging both surface and subsurface storage and retention.
- Restore and establish a functional and diverse headwater stream/wetland community.

The project goals will be addressed through the following objectives:

- Restore a headwater stream/wetland vegetation community through maintenance and germination of volunteer wetland vegetation from adjacent seed sources, planting of native trees and shrubs, and incorporation of a custom native seed mix.
- Elevate the local groundwater table through the elimination of lateral drainage ditches and modification of existing channelized streams.
- Reconnect site hydrology to historic flow paths.

1.3 Project Structure, Restoration Type and Approach

1.3.1 Project Structure

The mitigation work at SSS included approximately 4,274 linear feet of stream restoration, 3.6 acres of riparian wetland restoration, and 0.5 acre of wetland preservation for a total of 4,274 Stream Mitigation Units and 3.1 Wetland Mitigation Units as shown in Figure 2 and described in Table 1 in Appendix A. Planting occurred at SSS within 8.74 acres of the 17.6-acre conservation easement. The target natural community for the wetland consists of Headwater Forest Community and the upland was planted as a transitional zone (NCWAM, v. 4.1 2010).

The mitigation work at SII included approximately 7.6 acres of riparian wetland restoration for a total of 6.9 Wetland Mitigation Units as shown in Figure 2 and described in Table 1 in Appendix A. Planting occurred at SII within 8.57 acres of the 9.4-acre conservation easement. The target natural community for the stream consists of Headwater Forest Community (NCWAM, v. 4.1 2010).

1.3.2 Project Restoration Type and Approach

Stanley's Slough

Prior to construction, the site had a long history of hydrologic modification in order for farming to take place on the property. The streams at the SSS were historically impacted by channelization, surrounding row crop production, and cattle grazing. Two separate streams exist on the site: Tributary 1 (T1) begins in the southwestern project corner and flows north. Tributary 2 (T2) flows east to join T1 and comes onto the site from the west. T1 was ditched and contained numerous surficial field drains to drain T1. T1 continued to flow east and then north through a relic forested headwater stream/wetland complex, where the flow was braided. T2 was channelized with hydrology coming from surface flows from a swale that drained from a forested area to the west, as well as surface flows from the surrounding fields, and groundwater. Small areas of wetland existed along the relic channel in the forested portion of the site as well as throughout the banks of T1 and T2. The project focused on joining these areas to a larger whole with a braided stream/wetland complex.

The modifications at the SSS focused on restoring the mitigation site to create a shallow braided headwater stream/wetland complex. This was achieved by removing the anthropogenic modifications that were previously implemented across the site. The primary restoration action involved filling the existing dredged channels. The channels were redeveloped into a gently sloping headwater stream valley to place shallow diffuse flow at the surface, creating a braided stream system. Surface roughness variations were installed throughout the SSS to alleviate soil compaction and to enhance surface water storage. T1 was reconnected to the relic forested headwater stream/wetland complex, which in turn will restore hydrology to the adjacent drained riparian wetlands. Hydrology in T2 will continue to be driven by groundwater and precipitation inputs upstream of the ditch. Wetland hydrology was restored to the drained hydric soils when T1 was redirected to the existing relic channel, raising the groundwater elevations and providing overbank flow.

A suitable reference wetland was found approximately 900 feet north of the northeastern edge of the SSS. The reference wetland is comprised of deciduous hardwoods over a shrub layer and is consistent with the Headwater Forest Community that is the target wetland type at the project site. A groundwater monitoring well has been installed to document the reference wetland hydrology during the course of monitoring.

Stanley's II

Prior to construction SII has been impacted by a history of ditching, surrounding row crop production, and cattle grazing. Despite efforts to effectively drain wetlands on the property, several small areas of existing wetland exist within the SII. The existing wetlands were generally located in depressions or along man-made drainage features created to drain the adjacent pastureland. The project focused on joining these areas to a larger whole with the stream/wetland complex of the SSS.

Three ditched channels were located within the southern portion of the SII easement. These ditches served to drain the surrounding areas along T1. The northern portion of the SII was a soybean field that showed evidence of prolonged exposure to inundation in many areas of the field. The northern portion of SII was drained by a tributary that ran to the north of the site as well as by a ditch that ran to the east of the field.

Mitigation actions focused on filling ditches, developing and redirecting productive seeps, enhancing soil structure through targeted surface manipulation, and integrating the wetland area into the adjacent headwater stream/wetland complex. After construction, the site was stabilized with a native seed mix and planted with woody species typically found in a Headwater Forest community.

The same reference wetland used for the SSS is also being used as a reference site for the SII.

1.4 Project History, Contacts and Attribute Data

The project was first identified as a full-delivery mitigation project for the North Carolina Ecosystem Enhancement Program (EEP) by KCI Associates of NC, PA. This project began in the planning phase in 2011 with the final mitigation plan completed in August 2013. Construction began in early 2014. SSS and SSII was completed and planted in April 2014. Completed project activities, reporting history, completion dates, project contacts, and background information are summarized in Tables 2-4 (Appendix A).

2.0 SUCCESS CRITERIA

SSS and SII will be monitored to determine if the development of the wetland indicators on-site meet the standards for mitigation credit production as presented in Table 1. The sites will also be monitored to document the development of the headwater stream system. The credits will be validated upon confirmation that the success criteria described below are met. The sites will be monitored for performance standards for seven years after completion of construction.

2.1 Headwater Stream Performance

Stream hydrology monitoring will be conducted to determine if the restored headwater streams meet the proposed performance criteria for headwater stream hydrology and form. The headwater stream will have continuous surface water flow within the valley, for at least 30 consecutive days annually. Additionally, the stream must show signs of supporting the restored channel form as documented with photos. These indicators may include evidence of scour, sediment deposition and sorting, multiple flow events, wrack lines and flow over vegetation, leaf litter, or water staining.

2.2 Wetland Vegetation

SSS and SII must demonstrate the re-establishment of the targeted vegetative community based on the survival and growth of planted species and volunteer colonization, with an average stem density of 320 stems/acre required after three years, 288 stems/acre after four years, 260 stems/acre after five years, and 210 stems/acre after 7 years. In addition to density requirements, plant height will be monitored within the monitoring plots to ensure that trees average 10 feet in height after seven years.

Permanent monitoring plots (10 by 10 meters) have been established in the mitigation areas at a density that statistically represents the total mitigation acreage. The average density of these plots will determine whether both sites meet the success criteria.

2.3 Wetland Hydrology

SSS and SSII must present continuous saturated or inundated hydrologic conditions for at least 9% of the growing season for riparian mitigation areas (2.8 acres for SSS and 6.4 acres for SII) during normal weather conditions based on a conservative estimate. A “normal” year is based on NRCS climatological data for Northampton County, and using the 30th to 70th percentile thresholds as the range of normal, as documented in the USACE Technical Report “Assessing and Using Meteorological Data to Evaluate Wetland Hydrology, April 2000.” The soil survey for Northampton County estimates that the growing season begins March 11 and ends November 20 (254 days). The water table of the restored wetlands must be within 12” of the soils surface continuously for at least 9% (22 days) of the 254-day growing season.

3.0 MONITORING PLAN

Annual monitoring will be conducted during the first full growing season following project completion. Monitoring of SSS and SII restoration efforts will be performed for stream, vegetation, and hydrology components for at least seven years or until the success criteria are fulfilled. The establishment, collection, and summarization of monitoring data shall be conducted in accordance with the most current version of the EEP document entitled *Procedural Guidance and Content Requirements for EEP Monitoring Reports (version 1.5)*. Permanent monuments, marking monitoring feature locations, were established on-site in April 2014. The locations of these monitoring features are marked in Figure 3 (see Appendix A).

3.1 Wetland Hydrology

Twelve groundwater monitoring gauges were installed in the wetland mitigation areas to evaluate the attainment of jurisdictional wetland hydrology. Verification of wetland hydrology will be determined by automatic recording well data collected within the project area and reference wetland. The wetland gauges will be checked and/or downloaded every other month. Daily data will be collected from the automatic gauges over the 7-year monitoring period following wetland construction. The nearby reference wetland will also be monitored using the same procedures for comparative analysis. (see Figure 4 in Appendix A).

3.2 Stream Hydrology

In the headwater stream/wetland areas, six automatic recording gauges were installed to document the presence of surface water. In addition to the presence of surface water, flow indicators, will also be documented to demonstrate that there are surface flows through the stream/wetland valley.

3.3 Vegetation

Twenty vegetation plots were set up and assessed for the baseline vegetation monitoring. The plots were installed with flagged metal conduit at each corner and a flagged PVC pipe was installed at the photo corner. Vegetation data collection must follow the CVS-EEP Protocol for Recording Vegetation (Lee *et al.* 2008). The baseline vegetation monitoring was conducted as Level 1: Inventory of Planted Stems, as will the first-year monitoring. Beginning in Year Two and continuing throughout the rest of the monitoring period, the SSS and SSII will both be monitored using the Level 2 protocol. Baseline vegetation plot information can be found in Appendix B.

3.4 Visual Assessment

A visual assessment of the stream will include an assessment of the bank (lateral stability), bed (vertical stability), the easement boundary, and the buffer vegetation will be completed each year to document the necessary parameters required for the EEP monitoring report.

3.5 Digital Photos

Ten photograph reference points (PRPs) with a total of twenty-one photos have been established as part of the baseline monitoring to assist in characterizing SSS and SSII to allow qualitative evaluation of both sites' conditions. Starting in the first monitoring year, these photos will be taken in late summer, so that vegetative conditions are similar between monitoring years.

3.6 Watershed Conditions

Yearly monitoring will document any evident changes in the watershed. Any large hydrologic events in the watershed, such as tropical storms or hurricanes, will also be documented in the yearly monitoring reports.

3.7 Monitoring Guidelines

The first scheduled monitoring will be conducted during the first full growing season following project completion. Monitoring shall subsequently be conducted annually for a total period of seven years or until the projects meet their success criteria. Annual monitoring reports will be prepared and submitted after all monitoring tasks for each year are completed. The report will document the monitored components and include all collected data, analyses, and photographs. Each report will provide the new monitoring data and compare the most recent results against previous findings. The monitoring report format will be similar to that set out in the most recent EEP monitoring protocol.

3.8 Maintenance and Contingency

KCI will monitor SSS and SSII on a regular basis and conduct a physical inspection of the sites 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 years following site construction and may include reinstallation of waddles, removal of debris from the channel, evaluating and repairing floodplain scour areas, constructed outlets and flow dispersment from seepage areas. Areas where stormwater and floodplain flows intercept the wetland may also require maintenance to prevent scour. Any maintenance activities will be documented in the yearly monitoring reports.

4.0 BASELINE CONDITIONS

Baseline monitoring data were collected in April/May 2014. Any changes made to the design during construction are shown on the As-Built Site Plan in Appendix D. Both SSS and SII were constructed as designed with only two modifications made to the design plan during construction. A shallow swale was installed on T1 near Station 15+25, and T1 was extended approximately 50 linear feet to connect to the relic forested headwater stream/wetland complex near Station 28+30.

SSS and SII were planted with a total of twelve different species of bare root trees in April 2014. Baseline vegetation monitoring data were collected in May 2014. The Level 1 CVS-EEP protocol was used to collect vegetation data. Plot photos from all the vegetation plots can be found in Appendix B.

The results of the vegetation baseline monitoring show an average of 1,044 stems per acre in the planted restoration area (Table 5 in Appendix B). Additionally, stem counts within each individual plot were well-above the required 320 stems per acre. An attempt to identify all trees was made, but since monitoring was conducted while the trees were dormant, many were unidentifiable. All trees will be positively identified during the first year of monitoring.

5.0 REFERENCES

Lee, M.T., R.K. Peet, S.D. Roberts, and T.R. Wentworth. 2008. CVS-EEP Protocol for Recording Vegetation, Version 4.2 (<http://cvs.bio.unc.edu/methods.htm>)

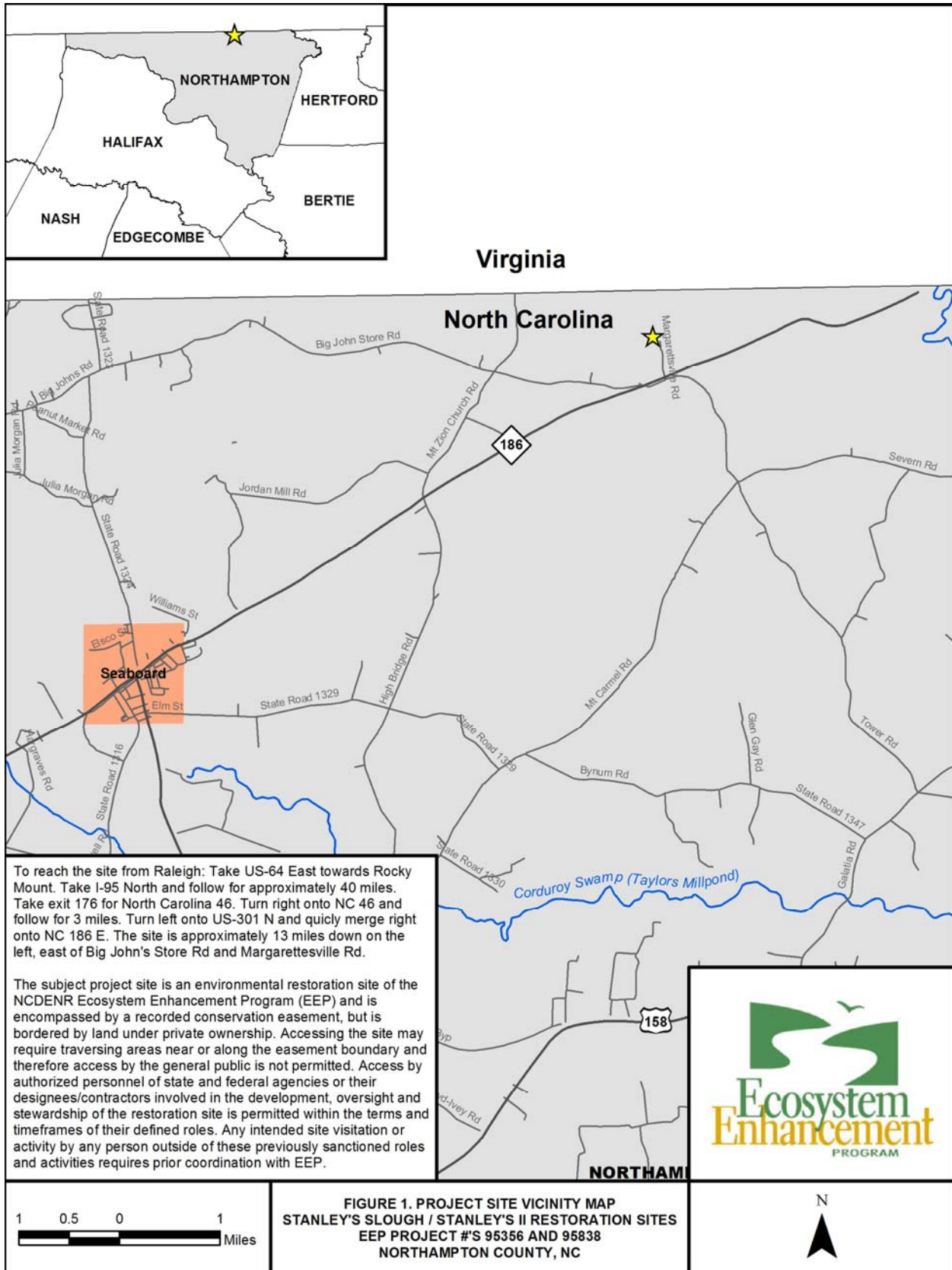
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NCDENR, Ecosystem Enhancement Program. 2009. Lower Yadkin Pee-Dee River Basin Priorities 2009. Raleigh, NC.
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NC Wetland Functional Assessment Team. 2010. NC Wetland Assessment Method (NC WAM) User Manual, version 4.1. Last accessed 11/2012 at:
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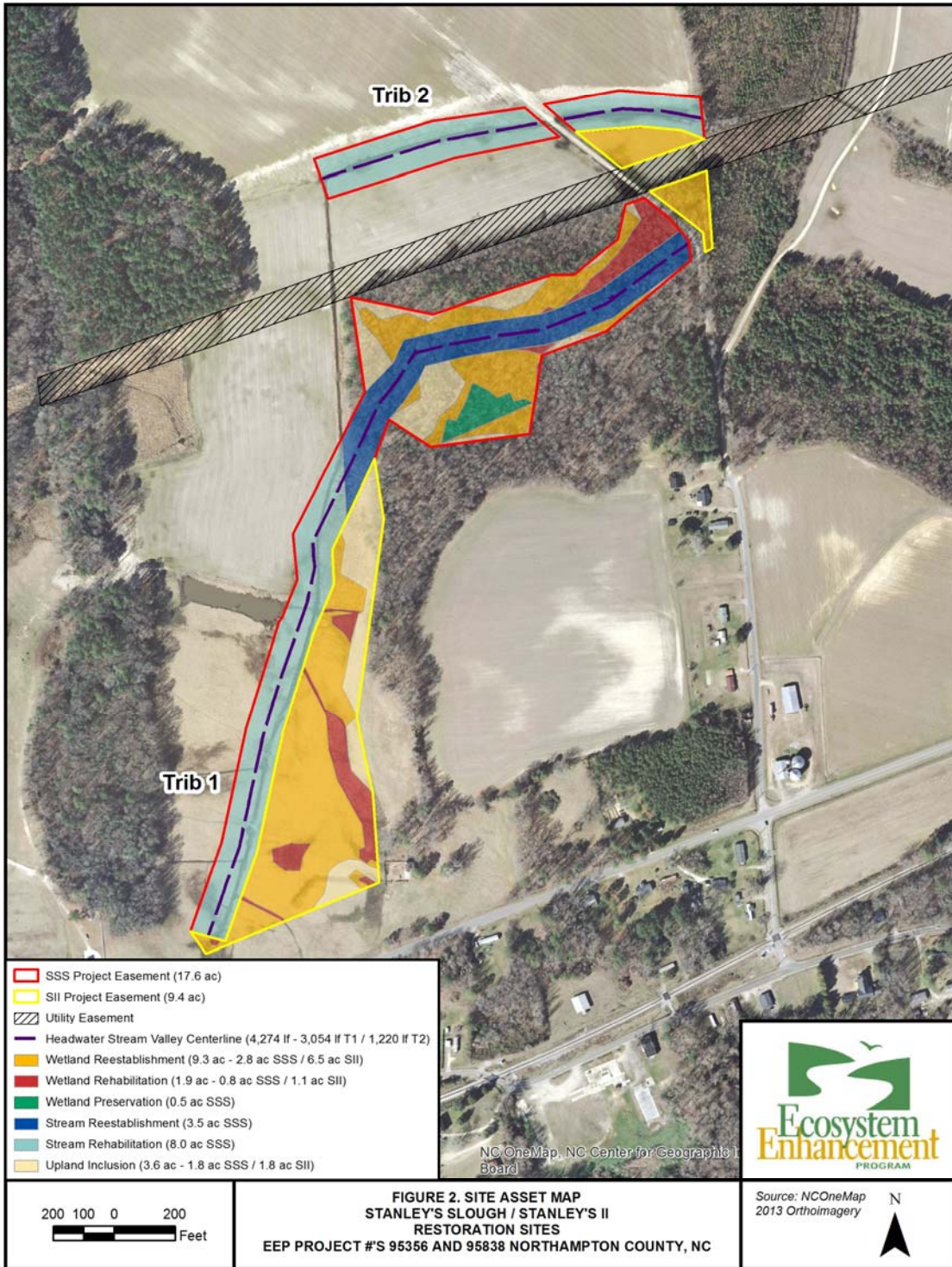
APPENDIX A

General Tables and Figures



To reach the site from Raleigh: Take US-64 East towards Rocky Mount. Take I-95 North and follow for approximately 40 miles. Take exit 176 for North Carolina 46. Turn right onto NC 46 and follow for 3 miles. Turn left onto US-301 N and quickly merge right onto NC 186 E. The site is approximately 13 miles down on the left, east of Big John's Store Rd and Margarettsville Rd.

The subject project site is an environmental restoration site of the NCDENR Ecosystem Enhancement Program (EEP) and is encompassed by a recorded conservation easement, but is bordered by land under private ownership. Accessing the site may require traversing areas near or along the easement boundary and therefore access by the general public is not permitted. Access by authorized personnel of state and federal agencies or their designees/contractors involved in the development, oversight and stewardship of the restoration site is permitted within the terms and timeframes of their defined roles. Any intended site visitation or activity by any person outside of these previously sanctioned roles and activities requires prior coordination with EEP.



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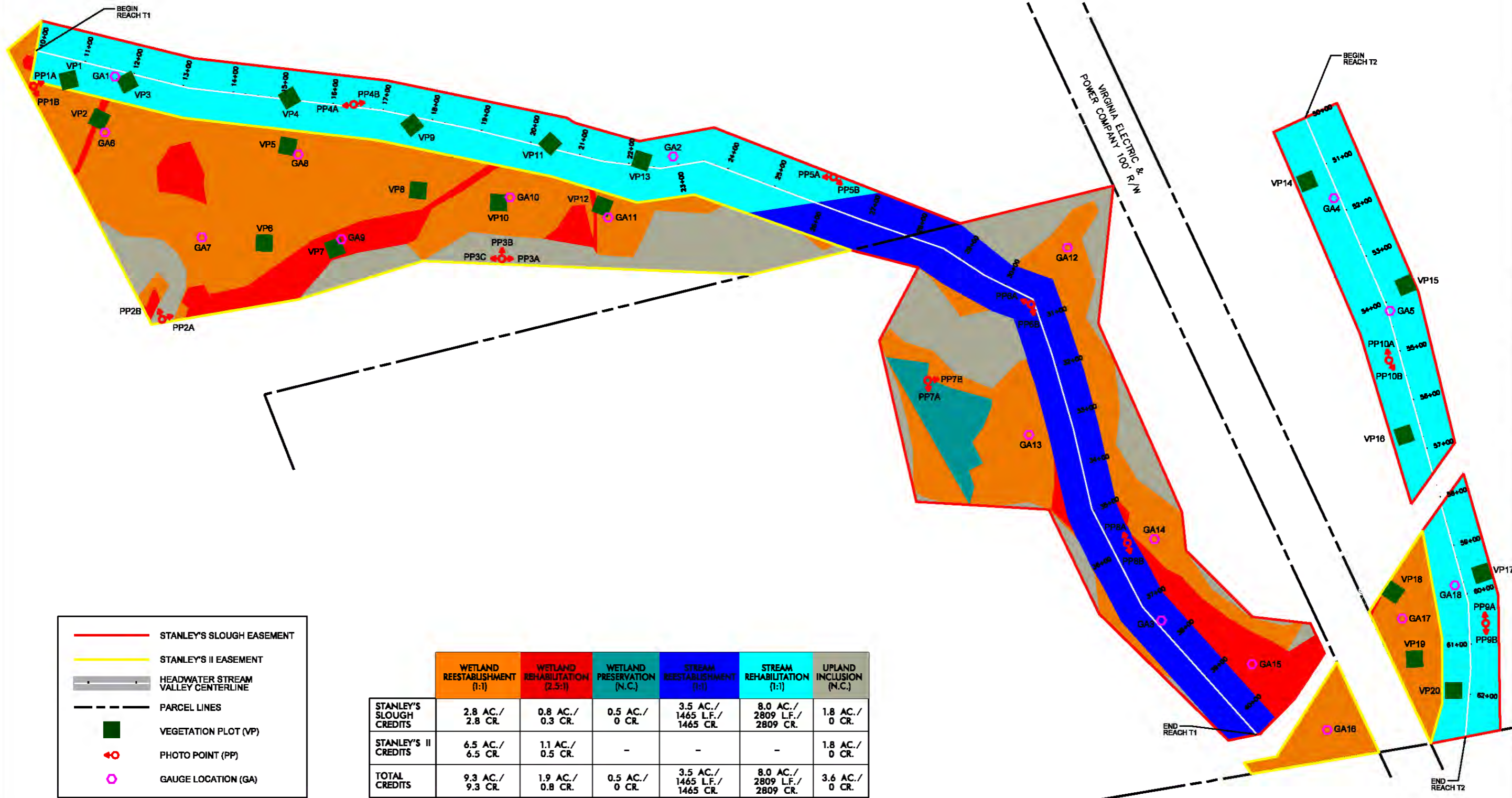
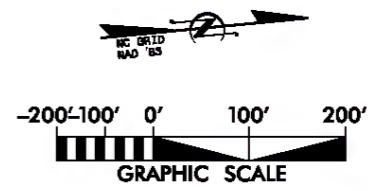
Table 1a. Project Components and Mitigation Credits									
Stanley's Slough Restoration Site, EEP Project #95356									
Mitigation Credits									
	Stream		Riparian Wetland		Non-riparian Wetland		Buffer	Nitrogen Nutrient Offset	Phosphorous Nutrient Offset
Type	R	RE	R	RE	R	RE			
Length	4,274		3.6						
Credits	4,274		3.1						
TOTAL CREDITS	4,274		3.1						
Project Components									
Project Component -or- Reach ID	Stationing/ Location	Existing Footage/ Acreage	Approach (PI, PII etc.)	Restoration -or- Restoration Equivalent	Restoration Footage/Acreage	Mitigation Ratio			
T1	10+00 – 41+55	2,600	Headwater Stream Valley	Restoration	3,054	1:1			
T2	50+00 – 62+85	1,220	N/A	Restoration	1,220	1:1			
Wetland Reestablishment				Restoration	2.8	1:1			
Wetland Rehabilitation				Restoration	0.8	2.5:1			
Wetland Preservation				N/A	0.5	NA			
Component Summation									
Restoration Level	Stream (linear feet)	Riparian Wetlands (Acres)		Non-Riparian Wetlands (Acres)	Buffer (square feet)	Upland (Acres)			
Restoration	4,274		3.1						
Enhancement I									
Enhancement II									
TOTAL SMU	4,274								
TOTAL WMU			3.1						

R= Restoration RE= Restoration Equivalent of Creation or Enhancement

**Table 1b. Project Components and Mitigation Credits
Stanley's Slough II Restoration Site, EEP Project #95838**

Mitigation Credits									
	Stream		Riparian Wetland		Non-riparian Wetland		Buffer	Nitrogen Nutrient Offset	Phosphorous Nutrient Offset
Type	R	RE	R	RE	R	RE			
Length			7.6						
Credits			6.9						
TOTAL CREDITS									
Project Components									
Project Component -or- Reach ID	Stationing/ Location	Existing Footage/ Acreage	Approach (PI, PII etc.)	Restoration -or- Restoration Equivalent	Restoration Footage/Acreage	Mitigation Ratio			
Wetland Reestablishment				Restoration	6.5	1:1			
Wetland Rehabilitation				Restoration	1.1	2.5:1			
Component Summation									
Restoration Level	Stream (linear feet)	Riparian Wetlands (Acres)		Non-Riparian Wetlands (Acres)	Buffer (square feet)	Upland (Acres)			
		Riverine	Non-Riverine						
Restoration		-	6.9						
Enhancement I									
Enhancement II									
TOTAL WMU			6.9						

R= Restoration RE= Restoration Equivalent of Creation or Enhancement



- STANLEY'S SLOUGH EASEMENT
- STANLEY'S II EASEMENT
- HEADWATER STREAM VALLEY CENTERLINE
- - - PARCEL LINES
- VEGETATION PLOT (VP)
- ⊙ PHOTO POINT (PP)
- GAUGE LOCATION (GA)

	WETLAND REESTABLISHMENT (1:1)	WETLAND REHABILITATION (2.5:1)	WETLAND PRESERVATION (N.C.)	STREAM REESTABLISHMENT (1:1)	STREAM REHABILITATION (1:1)	UPLAND INCLUSION (N.C.)
STANLEY'S SLOUGH CREDITS	2.8 AC./ 2.8 CR.	0.8 AC./ 0.3 CR.	0.5 AC./ 0 CR.	3.5 AC./ 1465 L.F./ 1465 CR.	8.0 AC./ 2809 L.F./ 2809 CR.	1.8 AC./ 0 CR.
STANLEY'S II CREDITS	6.5 AC./ 6.5 CR.	1.1 AC./ 0.5 CR.	-	-	-	1.8 AC./ 0 CR.
TOTAL CREDITS	9.3 AC./ 9.3 CR.	1.9 AC./ 0.8 CR.	0.5 AC./ 0 CR.	3.5 AC./ 1465 L.F./ 1465 CR.	8.0 AC./ 2809 L.F./ 2809 CR.	3.6 AC./ 0 CR.

NO.	DESCRIPTION	DATE



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STANLEY'S SLOUGH / STANLEY'S II RESTORATION SITES
NORTHAMPTON COUNTY, NORTH CAROLINA

DATE: MAY 2014
SCALE: GRAPHIC

MONITORING PLAN VIEW

FIGURE 3

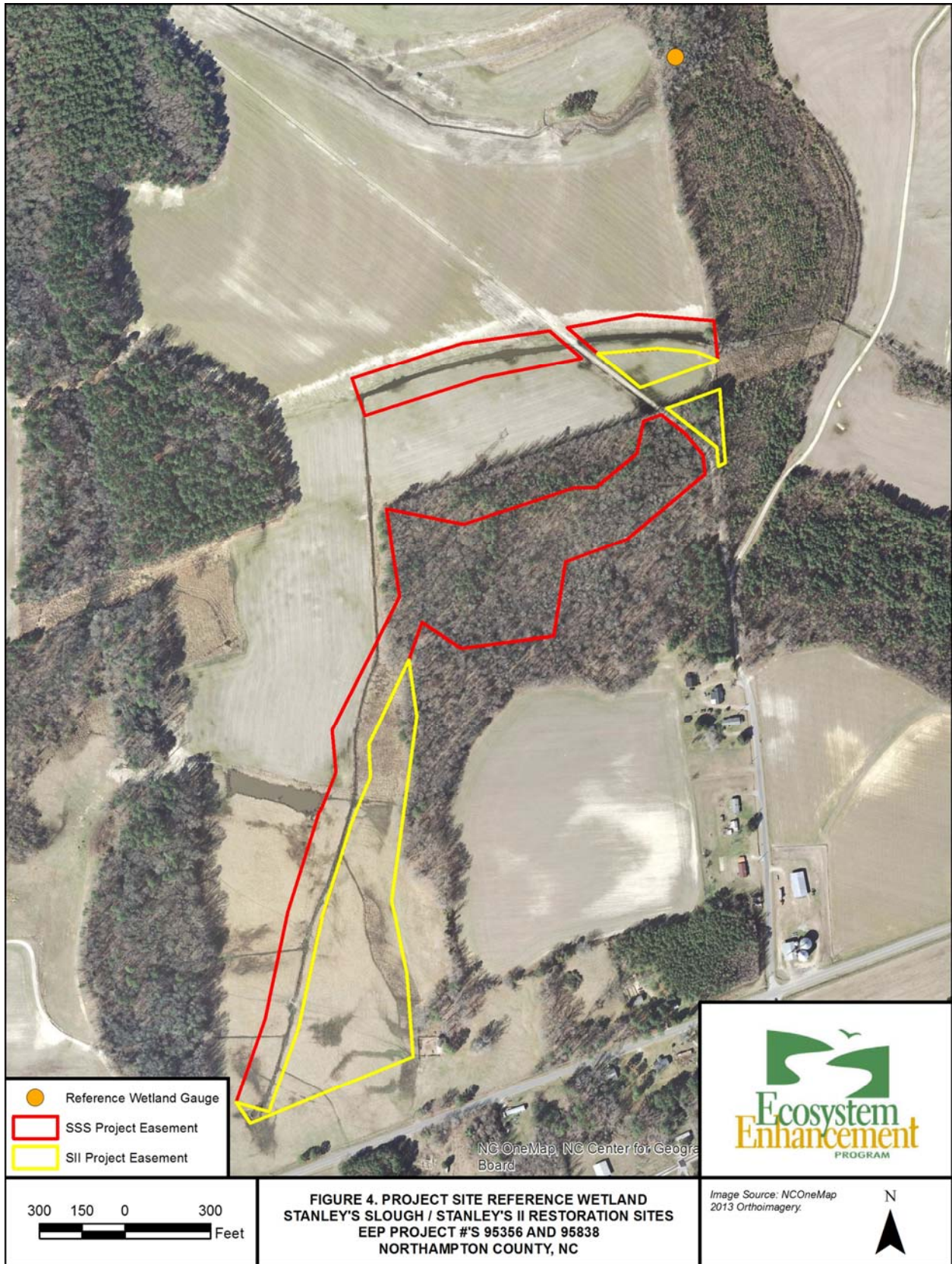


Table 2. Project Activity & Reporting History Stanley's Slough & Stanley's II Restoration Sites		
Activity or Report	Data Collection Complete	Actual Completion or Delivery
Mitigation Plan		Aug 13
Final Design - Construction Plans		Oct 13
Construction		April 14
Planting		April 14
Baseline Monitoring/Report	April/May 14	May 14

Table 3. Project Contacts Stanley's Slough & Stanley's Slough II Restoration Sites	
Design Firm	KCI Associates of North Carolina, PC Landmark Center II, Suite 220 4601 Six Forks Rd. Raleigh, NC 27609 Contact: Mr. Tim Morris Phone: (919) 278-2512 Fax: (919) 783-9266
Construction Contractor	Wright Contracting, LLC 160 Walker Road Lawndale, NC 28090 Contact: Mr. Stephen James Phone: (704) 692-4633
Planting Contractor	Forestree Management Co. 1280 Maudis Road Bailey, NC 27807 Contact: Mr. Tony Cortez Phone: (252) 243-2513
Monitoring Performers	
MY-00	KCI Associates of North Carolina, PC Landmark Center II, Suite 220 4601 Six Forks Rd. Raleigh, NC 27609 Contact: Mr. Adam Spiller Phone: (919) 278-2514 Fax: (919) 783-9266

Table 4a. Project Information			
Stanley's Slough Restoration Site, EEP Project #95356			
Project Name	Stanley's Slough Restoration Site		
County	Northampton County		
Project Area (acres)	17.6 acres		
Project Coordinates (lat. and long.)	36.539006 N, -77.348222 W		
Project Watershed Summary Information			
Physiographic Province	Coastal Plain		
River Basin	Chowan		
USGS Hydrologic Unit 8-digit	03010204	USGS Hydrologic Unit 14-digit	03010204180040
DWQ Sub-basin	03-01-02		
Project Drainage Area (acres)	113 acres		
Project Drainage Area Percentage of Impervious Area	<1%		
CGIA Land Use Classification	43.7% forested land, 33.8% rangeland, 22.5% agriculture		
Reach Summary Information (Post Restoration)			
Parameters	T1	T2	
Length of reach (linear feet)	3,054	1,220	
Valley classification	Valley Type X	Valley Type X	
Drainage area (acres)	84 acres	29 acres	
NCDWQ Water Quality Classification	Project Reach Not Classified; Receiving water = Meherrin River (C; NSW)	Project Reach Not Classified; Receiving water = Meherrin River (C; NSW)	
Morphological Description (stream type)	Headwater Stream Valley	Headwater Stream Valley	
Evolutionary trend	Channelized	Channelized	
Mapped Soil Series	Tomotley, Roanoke, Altavista, Wehadkee	Altavista, Roanoke	
Drainage class	Poorly drained, poorly drained, moderately well drained, poorly drained	Moderately well drained, poorly drained	
Soil Hydric status	Hydric	Hydric	
Slope	0.2%	0.06%	
FEMA classification	Zone X, parts in Zone AE(backwater of Meherrin River)	Zone X, parts in Zone AE (backwater of Meherrin River)	
Native vegetation community	Headwater Forest Community	Headwater Forest Community	
Percent composition of exotic invasive vegetation	0%	0%	
Wetland Summary Information (Post Restoration)			
Parameters			
Size of Wetland (acres)	3.6 acres		
Wetland Type	Riparian		
Mapped Soil Series	Roanoke and Tomotley		
Drainage class	Poorly drained		
Soil Hydric Status	Hydric		
Source of Hydrology	Hillside seepage and precipitation		
Hydrologic Impairment	Ditching and Cattle damage		
Native vegetation community	Headwater Forest Community		
Percent composition of exotic invasive vegetation	0%		

Project Information continued - Stanley's Slough Restoration Site Restoration Site

Regulatory Considerations

Regulation	Applicable?	Resolved?	Supporting Documentation
Waters of the United States – Section 404	Yes	Yes	Jurisdictional Determination
Waters of the United States – Section 401	Yes	Yes	Jurisdictional Determination
Endangered Species Act**	No	N/A	N/A
Historic Preservation Act**	No	N/A	N/A
Coastal Zone Management Act ** (CZMA)/ Coastal Area Management Act (CAMA)	No	N/A	N/A
FEMA Floodplain Compliance	Yes	Yes	FEMA Floodplain Checklist
Essential Fisheries Habitat**	No	N/A	N/A

Table 4b. Project Information			
Stanley's II Restoration Site, EEP Project #95838			
Project Name	Stanley's II Restoration Site		
County	Northampton County		
Project Area (acres)	9.4 acres		
Project Coordinates (lat. and long.)	34.922569 N , -77.319871 W		
Project Watershed Summary Information			
Physiographic Province	Coastal Plain		
River Basin	Chowan		
USGS Hydrologic Unit 8-digit	03010204	USGS Hydrologic Unit 14-digit	03010204180040
DWQ Sub-basin	03-01-02		
Project Drainage Area (acres)	80 acres		
Project Drainage Area Percentage of Impervious Area	<1%		
CGIA Land Use Classification	53.0% forested land, 34.9% rangeland, 12.1% agriculture		
Wetland Summary Information (Post Restoration)			
Parameters			
Size of Wetland (acres)	7.6 acres		
Wetland Type	Riparian		
Mapped Soil Series	Tomotley, Roanoke		
Drainage class	Poorly Drained		
Soil Hydric Status	Hydric		
Source of Hydrology	Hillside seepage and precipitation		
Hydrologic Impairment	Ditching and Crops		
Native vegetation community	Headwater Forest Community		
Percent composition of exotic invasive vegetation	0%		
Regulatory Considerations			
Regulation	Applicable?	Resolved?	Supporting Documentation
Waters of the United States – Section 404	Yes	Yes	Jurisdictional Determination
Waters of the United States – Section 401	Yes	Yes	Jurisdictional Determination
Endangered Species Act**	No	N/A	N/A
Historic Preservation Act**	No	N/A	N/A
Coastal Zone Management Act ** (CZMA)/ Coastal Area Management Act (CAMA)	No	N/A	N/A
FEMA Floodplain Compliance	Yes	Yes	FEMA Floodplain Checklist
Essential Fisheries Habitat**	No	N/A	N/A

APPENDIX B

Baseline Data

Table 5. CVS Stem Count Total and Planted by Plot and Species (EEP Project Code 95356. Project Name: Stanley's Slough and Stanley's II)

Scientific Name	Common Name	Species Type	95356-01-0001			95356-01-0002			95356-01-0003			95356-01-0004			95356-01-0005			95356-01-0006			95356-01-0007			95356-01-0008			95356-01-0009			95356-01-0010			95356-01-0011				
			PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T		
Acer rubrum	red maple	Tree										1	1	1				5	5	5											5	5	5				
Betula nigra	river birch	Tree				5	5	5	4	4	4	3	3	3				5	5	5	1	1	1	8	8	8	10	10	10	3	3	3	4	4	4		
Fraxinus pennsylvanica	green ash	Tree				2	2	2				23	23	23	10	10	10	15	15	15	4	4	4	6	6	6				7	7	7	6	6	6		
Magnolia virginiana	sweetbay	Tree													1	1	1				1	1	1														
Nyssa biflora	swamp tupelo	Tree				7	7	7															1	1	1				3	3	3			1	1	1	
Platanus occidentalis	American sycamore	Tree																																			
Quercus falcata	southern red oak	Tree	7	7	7	1	1	1	1	1	1												1	1	1				7	7	7			2	2	2	
Quercus michauxii	swamp chestnut oak	Tree	2	2	2							8	8	8									2	2	2	4	4	4	3	3	3	2	2	2	3	3	3
Quercus nigra	water oak	Tree	1	1	1																																
Quercus phellos	willow oak	Tree	2	2	2	1	1	1							8	8	8	4	4	4	5	5	5	4	4	4	1	1	1	9	9	9					
Taxodium distichum	bald cypress	Tree	4	4	4							11	11	11	4	4	4												2	2	2			1	1	1	
Unknown		Shrub or Tree	3	3	3	10	10	10	1	1	1				4	4	4	1	1	1	1	1	1	3	3	3	3	3	3	2	2	2	3	3	3		
Stem count			19	19	19	26	26	26	25	25	25	31	31	31	23	23	23	30	30	30	16	16	16	25	25	25	29	29	29	24	24	24	25	25	25		
size (ares)			1			1			1			1			1			1			1			1			1			1			1				
size (ACRES)			0.02			0.02			0.02			0.02			0.02			0.02			0.02			0.02			0.02			0.02			0.02				
Species count			6	6	6	6	6	6	5	5	5	4	4	4	4	4	4	5	5	5	8	8	8	5	5	5	7	7	7	6	6	6	8	8	8		
Stems per ACRE			769	769	769	1052	1052	1052	1012	1012	1012	1255	1255	1255	931	931	931	1214	1214	1214	647	647	647	1012	1012	1012	1174	1174	1174	971	971	971	1012	1012	1012		

Table 5 continued. CVS Stem Count Total and Planted by Plot and Species (EEP Project Code 95356. Project Name: Stanley's Slough and Stanley's II)

Scientific Name	Common Name	Species Type	95356-01-0012			95356-01-0013			95356-01-0014			95356-01-0015			95356-01-0016			95356-01-0017			95356-01-0018			95356-01-0019			95356-01-0020			Annual Means							
			PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T					
Acer rubrum	red maple	Tree																																	11	11	11
Betula nigra	river birch	Tree										9	9	9	3	3	3				10	10	10				5	5	5	3	3	3	73	73	73		
Fraxinus pennsylvanica	green ash	Tree	11	11	11	1	1	1				5	5	5	9	9	9	2	2	2	6	6	6	9	9	9	1	1	1	117	117	117					
Magnolia virginiana	sweetbay	Tree	1	1	1							2	2	2	4	4	4	5	5	5	4	4	4	1	1	1				19	19	19					
Nyssa biflora	swamp tupelo	Tree	1	1	1	15	15	15							6	6	6	1	1	1	2	2	2				9	9	9	46	46	46					
Platanus occidentalis	American sycamore	Tree	3	3	3	1	1	1	6	6	6	1	1	1	2	2	2	2	2	2				2	2	2	1	1	1	19	19	19					
Quercus falcata	southern red oak	Tree				3	3	3	1	1	1				2	2	2	3	3	3							2	2	2	30	30	30					
Quercus michauxii	swamp chestnut oak	Tree				3	3	3	6	6	6	3	3	3	3	3	3	1	1	1	6	6	6	3	3	3	1	1	1	50	50	50					
Quercus nigra	water oak	Tree																																1	1	1	
Quercus phellos	willow oak	Tree	4	4	4	1	1	1	2	2	2	1	1	1	3	3	3	2	2	2	8	8	8	7	7	7	3	3	3	65	65	65					
Taxodium distichum	bald cypress	Tree				5	5	5	1	1	1	1	1	1				2	2	2							2	2	2	33	33	33					
Unknown		Shrub or Tree	2	2	2	2	2	2	1	1	1	3	3	3	1	1	1	4	4	4				1	1	1	7	7	7	52	52	52					
Stem count			22	22	22	31	31	31	26	26	26	19	19	19	30	30	30	32	32	32	26	26	26	28	28	28	29	29	29	516	516	516					
size (ares)			1			1			1			1			1			1			1			1			1			20							
size (ACRES)			0.02			0.02			0.02			0.02			0.02			0.02			0.02			0.02			0.02			0.49							
Species count			6	6	6	8	8	8	7	7	7	8	8	8	8	8	8	10	10	10	5	5	5	7	7	7	9	9	9	12	12	12					
Stems per ACRE			890	890	890	1255	1255	1255	1052	1052	1052	769	769	769	1214	1214	1214	1295	1295	1295	1052	1052	1052	1133	1133	1133	1174	1174	1174	1044	1044	1044					

Photo Reference Photos



PP1a – MY-00 – 4/17/14



PP1b – MY-00 – 4/17/14



PP2a – MY-00 – 4/17/14



PP2b – MY-00 – 4/17/14



PP3a Tributary – MY-00 – 4/17/14



PP3b Tributary – MY-00 – 4/17/14



PP3c Tributary – MY-00 – 4/17/14



PP4a – MY-00 – 4/17/14



PP4b – MY-00 – 4/17/14



PP5a – MY-00 – 4/17/14



PP5b – MY-00 – 4/17/14



PP6a – MY-00 – 4/17/14



PP6b – MY-00 – 4/17/14



PP7a – MY-00 – 4/17/14



PP7b – MY-00 – 4/17/14



PP8a – MY-00 – 4/17/14



PP8b – MY-00 – 4/17/14



PP9a – MY-00 – 4/17/14



PP9b – MY-00 – 4/17/14



PP10a – MY-00 – 4/17/14



PP10b – MY-00 – 4/17/14

APPENDIX C

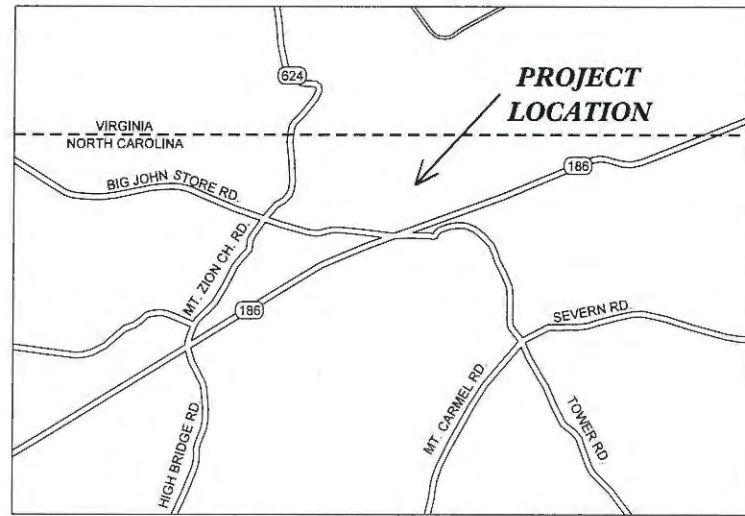
As-Built Plan Sheets

KCI JOB# : 20122005

CONTRACT #: STANLEY'S SLOUGH = 4635
STANLEY'S II = 5151

STATE	EOP PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
N.C.	STANLEY'S SLOUGH=95356 STANLEY'S II=95838	1	7

REVISIONS	



VICINITY MAP
NOT TO SCALE

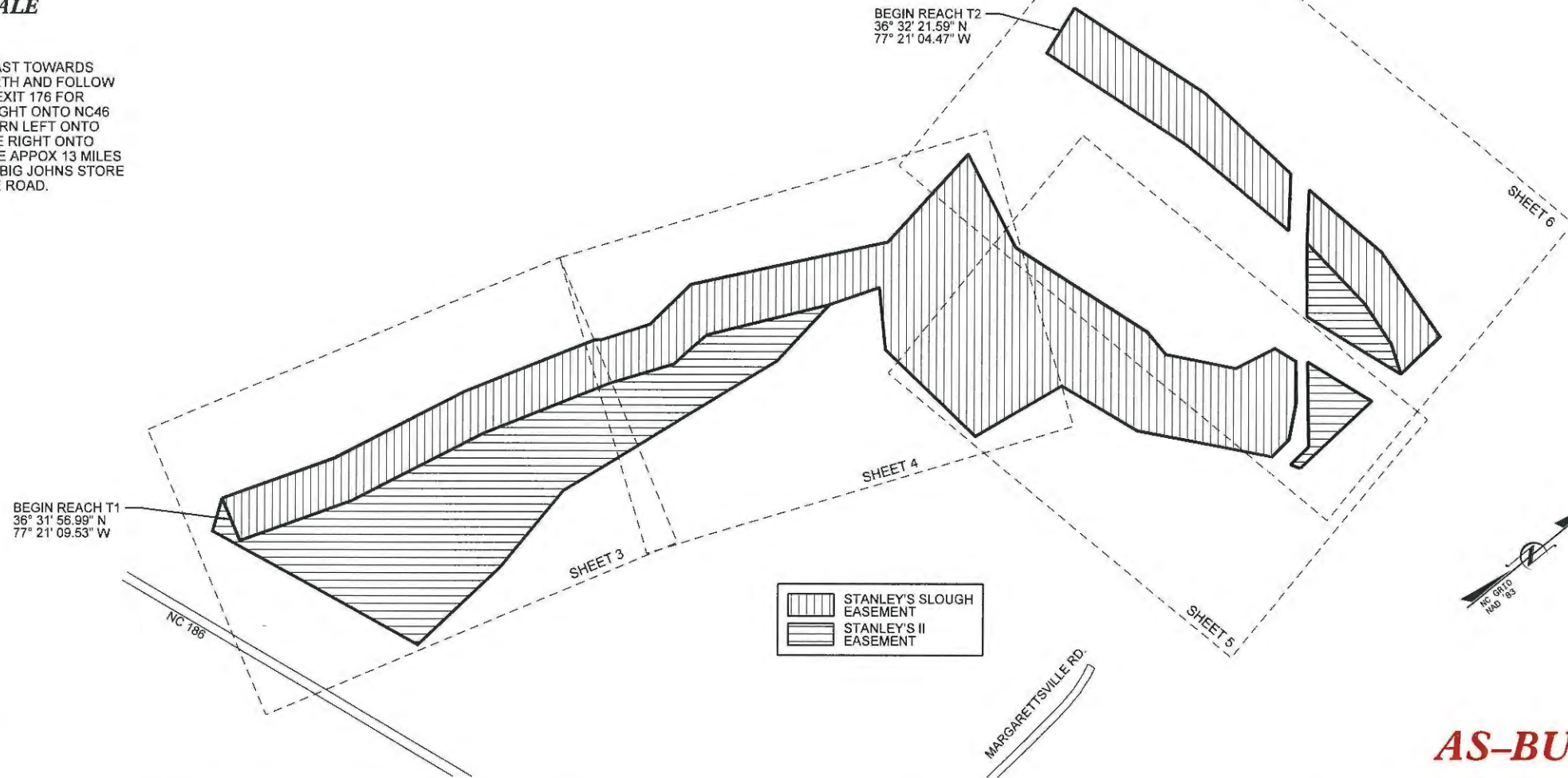
FROM RALEIGH TAKE US-64 EAST TOWARDS ROCKY MOUNT. TAKE I-95 NORTH AND FOLLOW FOR APPROX 40 MILES. TAKE EXIT 176 FOR NORTH CAROLINA 46. TURN RIGHT ONTO NC46 AND FOLLOW FOR 3 MILES. TURN LEFT ONTO US-301 N AND QUICKLY MERGE RIGHT ONTO NC 186 EAST. THE SITE WILL BE APPROX 13 MILES DOWN ON THE LEFT, EAST OF BIG JOHNS STORE ROAD AND MARGARETTSVILLE ROAD.

STATE OF NORTH CAROLINA ECOSYSTEM ENHANCEMENT PROGRAM

STANLEY'S SLOUGH /STANLEY'S II RESTORATION SITES

NORTHAMPTON COUNTY, NORTH CAROLINA
CHOWAN RIVER BASIN

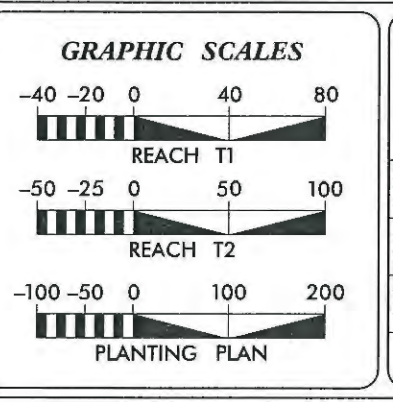
CHOWAN WATERSHED
03010204180040



INDEX OF SHEETS

1	TITLE SHEET
2	GENERAL NOTES & PROJECT LEGEND
3 - 6	AS-BUILT SITE PLAN
7	PLANTING PLAN

AS-BUILT PLANS



PROJECT DATA

	WETLAND REESTABLISHMENT (1:1)	WETLAND REHABILITATION (2.5:1)	WETLAND PRESERVATION (N.C.)	STREAM REESTABLISHMENT (1:1)	STREAM REHABILITATION (1:1)	UPLAND INCLUSION (N.C.)
STANLEY'S SLOUGH CREDITS	2.8 AC./ 2.8 CR.	0.8 AC./ 0.3 CR.	0.5 AC./ 0 CR.	3.5 AC./ 1465 L.F./ 1465 CR.	8.0 AC./ 2809 L.F./ 2809 CR.	1.8 AC./ 0 CR.
STANLEY'S II CREDITS	6.5 AC./ 6.5 CR.	1.1 AC./ 0.5 CR.	-	-	-	1.8 AC./ 0 CR.
TOTAL CREDITS	9.3 AC./ 9.3 CR.	1.9 AC./ 0.8 CR.	0.5 AC./ 0 CR.	3.5 AC./ 1465 L.F./ 1465 CR.	8.0 AC./ 2809 L.F./ 2809 CR.	3.7 AC./ 0 CR.

Prepared in the Office of:

KCI Associates
of North Carolina, P.A.
SUITE 220 LANDMARK CENTER II, 4601 SIX FORKS RD., RALEIGH, NC 27609
ENGINEERS • PLANNERS • ECOLOGISTS

GARY M. MRYNCZA, P.E.
PROJECT ENGINEER

ALEX FRENCH / TIM MORRIS
STREAM / WETLAND DESIGN

PROJECT ENGINEER
07.01.14

SIGNATURE P.E.

Prepared for:

JEFF JUREK
CONTRACT ADMINISTRATOR

GENERAL NOTES:

DISTANCES SHOWN ARE HORIZONTAL GROUND DISTANCES IN U.S. SURVEY FEET UNLESS OTHERWISE NOTED.

THE BASIS OF THE MERIDIANS AND COORDINATES FOR THIS PLAT IS THE NORTH CAROLINA STATE PLANE COORDINATE SYSTEM, NORTH AMERICAN DATUM 1983 (NAD 83), BASED ON DIFFERENTIAL GPS OBSERVATIONS PERFORMED IN AUGUST 2012. ALL DISTANCES ARE GROUND UNLESS OTHERWISE NOTED.

DEED REFERENCES: DB 875 PG 760, DB 366 PG 148

SUBJECT PROPERTIES KNOWN AS TAX NUMBER:
PIN 4081-49-0166, PIN 4081-58-2207

NO UNDERGROUND UTILITY LOCATING PERFORMED DURING THE COURSE OF THIS SURVEY.

CONTROL:

NAME	NORTHING	EASTING	ELEV.
KCI#1	1016720.93	2484608.74	57.91
KCI#3	1019481.32	2485120.13	45.15
KCI#4	1019310.06	2485382.05	45.13
KCI#6	1019084.72	2485651.46	46.48
KCI#7	1019042.88	2485242.23	46.39
KCI#8	1018912.52	2484912.50	46.94
KCI#9	1018851.22	2485361.74	45.21
KCI#10	1018757.42	2485093.29	45.52
KCI#11	1018753.50	2484753.72	45.96
KCI#12	1018588.72	2484677.15	47.00
KCI#13	1018462.81	2484569.90	47.61
KCI#14	1018856.12	2485685.87	50.98
KCI#15	1019391.62	2485748.55	44.27
KCI#16	1019474.14	2485792.29	44.58
KCI#17	1016535.09	2484118.26	63.17
KCI#18	1018586.87	2485169.82	50.87
KCI#19	1019249.87	2484417.07	45.99
KCI#21	1016989.95	2484843.11	72.67
KCI#30	1017598.27	2485864.81	67.03
KCI#31	1017838.59	2485845.29	71.83
KCI#32	1017838.60	2485845.29	71.87
KCI#33	1018254.84	2483927.24	47.32
KCI#32	1017838.60	2485845.29	71.87
KCI#33	1018254.84	2483927.24	47.32



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STANLEY'S SLOUGH / STANLEY'S II
RESTORATION SITES
NORTHAMPTON COUNTY, NORTH CAROLINA

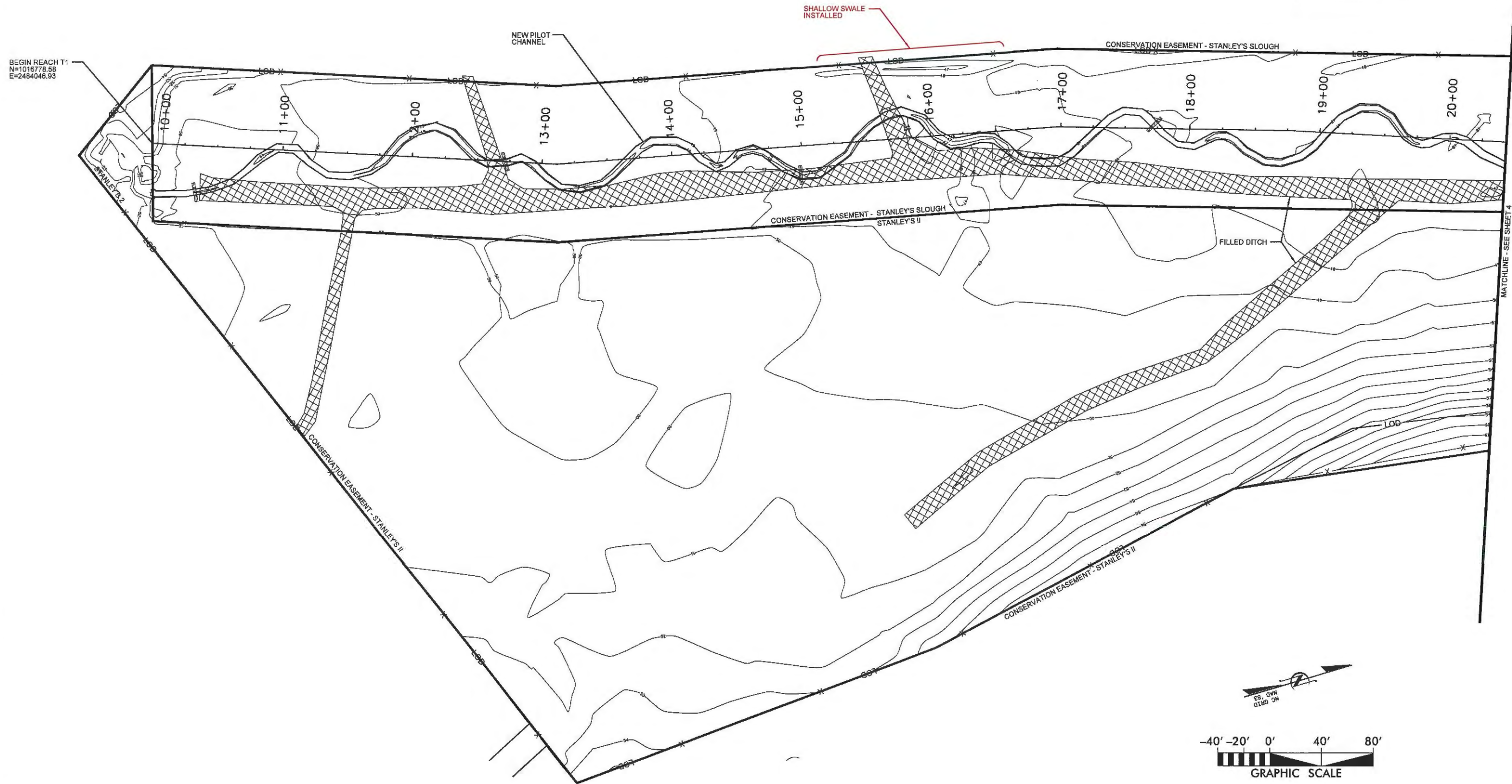
PROJECT LEGEND:

Stream Valley Centerline		Existing Woods Line	
Filled Ditches		Contour Line	
Stabilized Drainage Outfall		New Woven Wire Fence	
Log Sill		Limits of Disturbance	

DATE: JULY 2014
SCALE: N.T.S.

GENERAL
NOTES &
PROJECT
LEGEND

SHEET 2 OF 7



NO.	DESCRIPTION	DATE



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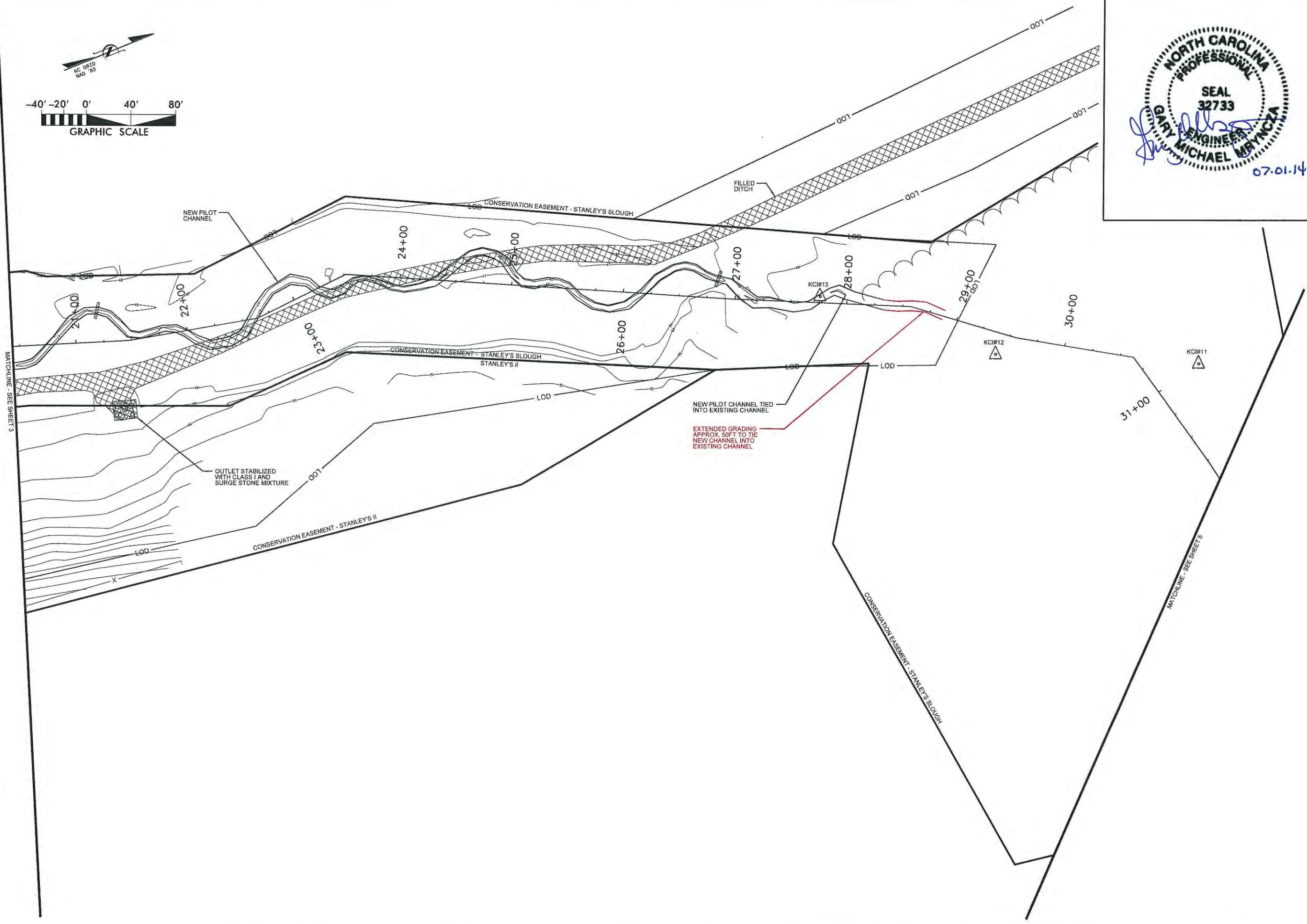
**STANLEY'S SLOUGH / STANLEY'S II
RESTORATION SITES**
NORTHAMPTON COUNTY, NORTH CAROLINA

DATE: JULY 2014
SCALE: GRAPHIC

AS-BUILT
SITE PLAN

REVISIONS

REACH T1



NO.	DESCRIPTION

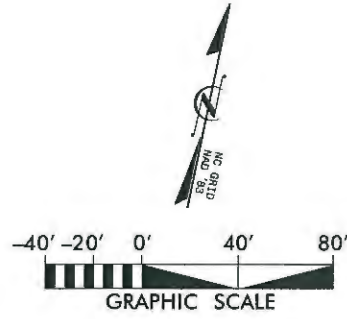


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STANLEY'S SLOUGH / STANLEY'S II
RESTORATION SITES
NORTHAMPTON COUNTY, NORTH CAROLINA
REACH T1

DATE: JULY 2014
SCALE: GRAPHIC

AS-BUILT
SITE PLAN



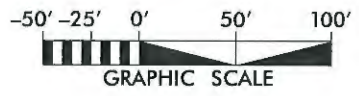
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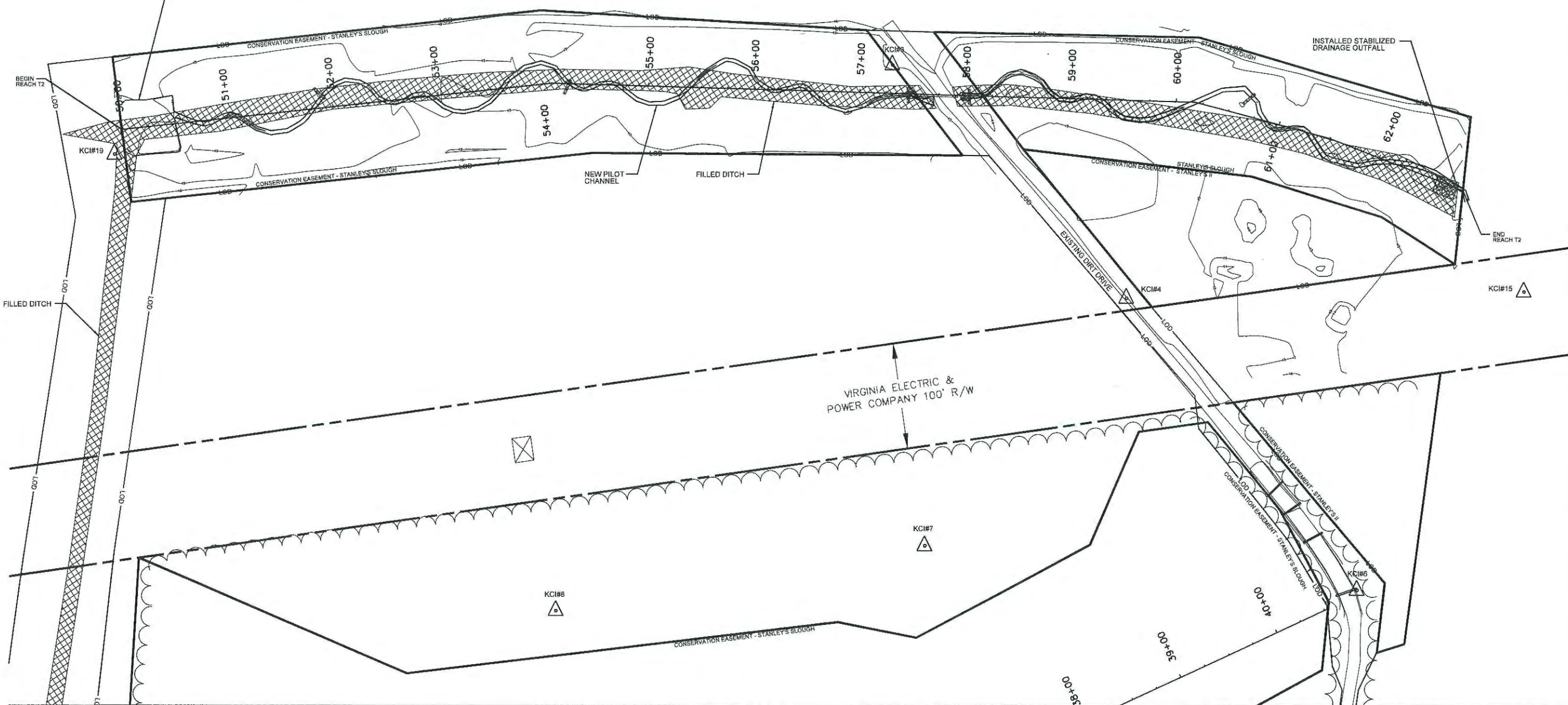
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STANLEY'S SLOUGH / STANLEY'S II
RESTORATION SITES
NORTHAMPTON COUNTY, NORTH CAROLINA
REACH T1

DATE: JULY 2014
SCALE: GRAPHIC
AS-BUILT
SITE PLAN
SHEET 5 OF 7



WATER QUALITY BMP:
 A 50' BY 50' WATER QUALITY BMP WAS INSTALLED IN THIS AREA TO MAXIMIZE SEEP PRODUCTION AND TREAT AGRICULTURAL RUNOFF PRIOR TO ENTERING THE STREAM. THIS BMP WAS CREATED BY UNDERCUTTING APPROXIMATELY 2' OF EXISTING SUBSOIL AND REPLACING THAT MATERIAL WITH A 6" LAYER OF STONE OVER FILTER FABRIC. THE STONE WAS COVERED BY 1" LIFT OF A CERTIFIED COMPOST PRODUCT COVERED BY 6" OF WOOD CHIPS. LOG SILLS WERE USED TO LOCK THE BMP IN PLACE.



MATCHLINE - SEE SHEETS 3-5 FOR REACH T1

NO.	DESCRIPTION	DATE



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**STANLEY'S SLOUGH / STANLEY'S II
 RESTORATION SITES**
 NORTHAMPTON COUNTY, NORTH CAROLINA

DATE: JULY 2014
 SCALE: GRAPHIC
**AS-BUILT
 SITE PLAN**

SHEET 6 OF 7

REVISIONS

REACH T2

