

RESTORATION PLAN
COLUMBUS SWAMP WETLAND RESTORATION SITE
ROBESON/COLUMBUS COUNTIES, NORTH CAROLINA

(RFP #16-D07033)
FULL DELIVERY PROJECT
TO PROVIDE RIPARIAN WETLAND MITIGATION
IN THE LUMBER RIVER BASIN
CATALOGING UNIT 03040203

Prepared for:

NORTH CAROLINA DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES
RALEIGH, NORTH CAROLINA



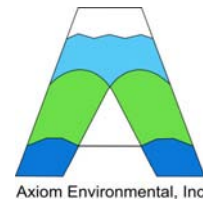
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EXECUTIVE SUMMARY

Restoration Systems, L.L.C. (Restoration Systems) is developing plans for riparian wetland restoration at the Columbus Swamp Wetland Restoration Site (Site) located approximately 11 miles southeast of Lumberton, on the Robeson and Columbus County line. The Columbus Swamp Restoration Site encompasses approximately 40 acres of land that is used for agricultural row crop production and silviculture. The Site has been cleared of native forest vegetation, ditched for agricultural/silvicultural purposes, and planted in agricultural row crops and loblolly pine. Based on detailed soil mapping conducted by licensed soil scientists, the entire 40 acre Site is underlain by Class A hydric soil, which was previously cleared and drained in support of Site land uses.

The Site is located within the Lumber River Basin in 14-digit USGS Cataloging Unit 03040203170020 of the South Atlantic/Gulf Region (North Carolina Division of Water Quality subbasin number 03-07-53). Brier Creek, the major drainage feature on Site, has been assigned Stream Index Number 14-22-17 and has received a Best Usage Classification of **C Sw**.

This document details existing Site conditions and proposed wetland restoration procedures at the Site. A 40-acre conservation easement has been conveyed to the State that will incorporate all planned restoration activities. The Site encompasses approximately 40 acres of drained, hydric soil; of which approximately 33.5 acres are suitable for wetland restoration. An additional 2.5 acres of ditches and hydric soil within the Site are suitable for wetland enhancement.

Wetland restoration activities have been designed to restore wetland functions similar to those exhibited by reference wetlands in the region. Site alterations designed to restore characteristic wetland soil features and groundwater wetland hydrology includes the introduction of microtopographic variability, impervious ditch plug construction, ditch backfilling, berm removal, and scarification of wetland soil surfaces. Subsequently, trees and shrubs will be planted throughout the Site to establish native forest species' characteristic of Coastal Plain Bottomland Hardwoods (brownwater subtype). Planting of the Site will provide diversity and secondary benefits such as enhanced foraging, nesting, and refuge opportunities for mammals, birds, amphibians, and reptiles.

After implementation, the Site is expected to support 36 acres of restored/enhanced riparian wetlands and 4.0 acres of upland forest. Monitoring of Site restoration efforts will be performed until success criteria are fulfilled. Monitoring is proposed for wetland components of hydrology and vegetation.

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**DETAILED RESTORATION PLAN
COLUMBUS SWAMP WETLAND RESTORATION SITE
ROBESON/COLUMBUS COUNTIES, NORTH CAROLINA**

1.0 INTRODUCTION

Restoration Systems, L.L.C. (Restoration Systems) is developing plans for riparian wetland restoration at the Columbus Swamp Wetland Restoration Site (Site) located approximately 11 miles southeast of Lumberton (34.4597°N, 78.9002°W NAD 83/WGS84), on the Robeson and Columbus County line. (Figures 1 and 2, Appendix A). The Columbus Swamp Restoration Site encompasses approximately 40 acres of land that is used for agricultural row crop production and silviculture. The Site has been cleared of native forest vegetation, ditched for agricultural/silvicultural purposes, and planted in agricultural row crops and loblolly pine. Based on detailed soil mapping conducted by licensed soil scientists, the entire 40 acre Site is underlain by Class A hydric soil, which was previously cleared and drained in support of Site land uses.

The Site is encompassed within two parcels owned by the Fields family. The Site is situated at the outer floodplain edge of Big Swamp at the confluence of Big Swamp and a smaller tributary, Brier Creek (Figure 3, Appendix A). Brier Creek changes from a single thread, bank-to-bank system into a braided channel as it descends off the slopes south of Big Swamp. The braided channel contributes overland, surface flow to the vast swamps adjacent to the Site. Big Swamp serves as the primary hydrologic feature at the Site. The Big Swamp floodplain is approximately three quarters of a mile in width, extending to timber tracts on the northern rim of the drainage feature.

An extensive ditch system has been excavated to drain the Site for agricultural land uses (Figure 4, Appendix A). Interfield ditches have been excavated to a depth of approximately 4 to 5 feet. Spoil from ditch excavation has been used to construct a berm/road that borders Site agricultural fields. The berm hinders surface water from Big Swamp accessing agricultural fields during wetter portions of the year. Site ditches drain to a central ditch at the northern edge of the Site. The central ditch drains under the berm/peripheral road through a culvert. The ditch then extends towards Big Swamp north of the Site.

Brier Creek extends along the southwestern margins of the Site in a roadside ditch. The road serves as a driveway for a cabin situated next to the Site. The driveway also services farm fields and silviculture stands in Big Swamp. Brier Creek has been ditched and channelized and is routed around the Site.

Due to its position in the landscape, the Site provides important storage benefits to Big Swamp and other downstream aquatic systems. The dominant presence of hydric soils, an extensive ditch network, and a disturbed vegetation structure/composition highlight the potential for an exceptional wetland restoration opportunity at the Site.

1.1 Project Goals

The purpose of this study is to establish a cohesive restoration plan outlining methods for riparian wetland restoration.. The primary goals of this riparian wetland restoration project focus on improving water quality and biological diversity in the Lumber River watershed and will be accomplished by:

1. Removal of nonpoint and point sources of pollution associated with agricultural practices including cessation of broadcast fertilizers, pesticides, and other agricultural chemicals onto the Site
2. Restoration of Site hydrology by filling approximately 8000 linear feet of existing drainage ditches, thereby promoting flood storage, nutrient cycling, and aquatic wildlife habitat.
3. Restoration of soil structure through appropriate soil modifications and physical alteration (grading, discing, etc.).
4. Reforestation of a native wetland community with subsequent reestablishment of habitat diversity and functional continuity.
5. Enhancing and protecting the Site's full potential of wetland functions and values in perpetuity.

These goals will be achieved by:

- Providing a minimum of 32 Riparian Wetland Mitigation Units, as calculated in accordance with the requirements stipulated in RFP #16-D07033.
 - Restoring approximately 33.5 acres of wetland through filling agricultural ditches, removal of a berm and spoil castings, eliminating row crop production activities, and planting with native forest vegetation.
 - Enhancing approximately 0.5 acre of wetland by eliminating row crop production activities and planting with native forest vegetation.
 - Enhancing 2.0 acres of wetlands associated with onsite ditches by filling the ditches and planting with native forest vegetation.
- Protecting the Site in perpetuity with a conservation easement.

This document represents a detailed restoration plan summarizing activities proposed within the Site. The plan includes 1) descriptions of existing conditions, 2) groundwater model applications, 3) reference studies, 4) restoration plans, and 4) Site monitoring and success criteria. Upon approval of this plan by regulatory agencies, activities will be implemented as outlined. Minor modifications to the restoration game-plan may be necessitated by one of several contingencies such as access issues, sediment-erosion control measures, drainage needs, etc..

2.0 METHODS

Natural resource information was obtained from available sources. United States Geological Survey (USGS) 7.5-minute topographic quadrangle (Evergreen, North Carolina), United States Fish and Wildlife Service (USFWS) National Wetlands Inventory (NWI) mapping, Natural Resource Conservation Service (NRCS) soils mapping for Columbus County (USDA 1990), and recent Robeson/Columbus County aerial photography were utilized to evaluate existing landscape, wetland, and soil information prior to onsite inspection.

Current (2006) aerial photography was utilized to determine primary hydrologic features and to map relevant environmental features (Figure 4, Appendix A). Subsequently, fields, reference wetland surfaces, agricultural field ditch cross-sections, and profiles were measured to quantify elevational gradients affecting hydrologic parameters and to predict wetland restoration potential.

North Carolina Natural Heritage Program (NCNHP) databases were evaluated for the presence of protected species and designated natural areas, which may serve as reference wetland communities for restoration design purposes. A listing of federally protected species whose ranges extend into Robeson and Columbus County was also obtained from the USFWS (<http://nc-es.fws.gov/es/countyfr.html>). State Historic Preservation Office (SHPO) records were evaluated for the presence of significant cultural resources in the Site vicinity. Results of these database reviews have been presented to the State of North Carolina in a Categorical Exclusion (CE) document (Appendix B). The CE document did not identify any issues that may hinder Site development for wetland restoration.

Areas located adjacent to the Site were evaluated for reference use (Figure 5, Appendix A); identified sites were evaluated to provide information on target (post-restoration) wetland conditions. Characteristic and target natural community patterns were classified according to Schafale and Weakley's *Classification of the Natural Communities of North Carolina* (1990).

Detailed field investigations were performed in January 2008, and consisted of hydrological measurements, soil surveys, and mapping of onsite resources. Project scientists evaluated hydrology, vegetation, and soil parameters to map hydric soils and open waters, conduct detailed soil measurements, and collected data for groundwater models. Existing plant communities were also delineated, mapped, and described by structure and composition.

Detailed soil mapping was conducted by licensed soil scientists to verify NRCS soil mapping units. Soil mapping was subsequently modified to determine the upland areas to eliminate from the easement and to quantify wetland restoration acreage. Detailed soil profiles were collected during the mapping effort for use in groundwater modeling and taxonomic classification.

Groundwater conditions were modeled using the Boussinesq Equation. The Boussinesq Equation represents a two-dimensional general flow equation for unconfined aquifers. The equation has been successfully used repeatedly in the past to predict the decline in elevation of

the water table near a pumping well as time progresses. The equation is based primarily on hydraulic conductivity, drainable porosity, and the saturated thickness of the aquifer. The model was utilized to predict historic hydroperiods, the extent of wetland degradation due to ditching, and the potential for wetland restoration through effective removal of the drainage network.

Field survey information was plotted and compiled within Geographic Information System (GIS) base mapping and analyzed to evaluate the Site under existing conditions. Based on field investigations and data analyses, a wetland restoration plan has been developed for review and approval prior to onsite implementation, based substantially on such field investigations and data analysis.

3.0 EXISTING CONDITIONS

3.1 Physiography, Topography, and Land Use

The Site is located in the Southeastern Floodplains and Low Terraces portion of the Southeastern Plains ecoregion of North Carolina within USGS Cataloging Unit 03040203, Subbasin 03-07-53 of the Lumber River Basin. Regional physiography is characterized as major river floodplains and associated low terraces, and low gradient streams with sandy/silty substrate, oxbow lakes, ponds, and swamps (Griffith 2002). Elevations within the Site are nearly level averaging approximately 85 feet National Geodetic Vertical Datum (USGS Evergreen, North Carolina 7.5-minute topographic quadrangle).

The Site includes approximately 40 acres of land located on the outer margins of the Big Swamp floodplain. The area is characterized by extensive expanses of swamps, braided stream channels, and oxbow depressions (Figure 5, Appendix A). In addition, a significant portion of the floodplain has been timbered in the past during dry climatic periods and is revegetating with an early successional scrub-shrub hardwood assemblage.

The Site is utilized for agricultural row crop production, silviculture, and recreation (Figure 4, Appendix A). During field visits remnants of corn, soybeans, and sorghum were evident throughout the Site. The eastern portions of the fields were planted in loblolly pine (*Pinus taeda*) approximately 3 years ago. Based on conversations with the landowner, additional species were planted at the Site with excessive mortality due to drought.

An extensive ditch system has been excavated to drain the Site for intended land uses. Ditches drain in a northwesterly direction towards Big Swamp. The ditches are approximately 5 feet in depth and 20 feet in width through the majority of the Site. As the ditches reach the northwestern periphery of the Site, ditches increase to approximately 40 feet in width.

Spoil from ditch excavation was used to construct an earth berm on the northern margins of the Site to inhibit flow from Big Swamp from entering agricultural fields. The berm system also serves as an elevated road embankment that circumnavigates the agricultural fields. A primitive agricultural road system also traverses the interior of the Site, primarily for access of farm machinery and hunting vehicles.

Due to its position in the landscape, the Site provides important benefits to Big Swamp and ultimately the Lumber River. The dominant presence of hydric soils, an extensive ditch network, and lack of forested vegetation structure/composition highlight the potential for an exceptional riparian wetland restoration opportunity at the Site.

3.2 Water Quality

The Site is located within the Lumber River Basin in 14-digit USGS Cataloging Unit 03040203170020 of the South Atlantic/Gulf Region (North Carolina Division of Water Quality [NCDWQ] subbasin number 03-07-53) [Figure 2, Appendix A]. Brier Creek, the main drainage feature within the Site has been assigned Stream Index Number 14-22-17 and has received a Best Usage Classification of **C Sw**. Streams with a best usage designation of **C** are suitable for aquatic life propagation and survival, fishing, wildlife, secondary recreation, and agriculture. Secondary recreation includes wading, boating, and other uses not involving human body contact with waters on an organized or frequent basis. **Sw** is a supplemental surface water classification denoting swamp waters that have naturally occurring low pH, low dissolved oxygen, and low velocities.

Brier Creek is not listed on the NCDWQ final 2006 or draft 2008 Section 303(d) lists (NCDWQ 2007a, 2007b) and the Site is not located within a Targeted Local Watershed (NCWRP 2003).

3.3 Soils

Soils that occur within the Site, according to the *Soil Survey of Robeson County, North Carolina* (USDA 1978) and the *Soil Survey of Columbus County, North Carolina* (USDA 1990), are depicted in Figure 6 (Appendix A) and consist entirely of Johnston soils. The Johnston soil series (*Cumulic Humaquepts*) consists of nearly level, very poorly drained, Class A hydric soils on floodplains of major drainageways. The seasonal high water table typically occurs at or above the ground surface.

Detailed soil mapping for the Site, prepared based on landscape position and hydric versus nonhydric soil characteristics, verify that the entire Site is underlain by hydric soils. Hydric soils are defined as "soils that are saturated, flooded, or ponded long enough during the growing season to develop anaerobic conditions in the upper soil layer" (SCS 1987). As depicted in Figure 6 (Appendix A), the only hydric soil mapped within the Site has been identified as the Johnston soil series.

Johnston Soils

Hydric soils of the Johnston series underlie 100 percent of the 40 acre Site. Johnston soils are characterized by a black, loamy surface over a very dark grayish brown sandy loam subsurface (Figure 7, Appendix A). These soils are located in broad, expansive river floodplains that are very poorly drained, with a seasonal high water table at or above the ground surface for much of the growing season. In general, areas of Johnston soils are woodland, with wetness being the main limitation affecting alternative land uses. Based on preliminary studies, onsite hydric soils appear to be drained by agricultural ditching; however, the soils also exhibit signs of groundwater saturation prior to ditching activities.

Currently, onsite hydric soils do not support hydrophytic vegetation and/or wetland hydrology. Areas targeted for wetland restoration historically supported jurisdictional wetlands. Restoration of wetland hydrology and replanting with native hydrophytic vegetation will occur in these areas. See Section 3.6 for more information on jurisdictional wetlands and Section 6.0 for detailed wetland restoration information.

3.4 Plant Communities

The Site is composed of agricultural land utilized for row crop production consisting of corn, soybeans, and sorghum with a few mature swamp chestnut oaks (*Quercus michauxii*) in the center of the Site. Primary successional herbaceous vegetation includes dog fennel (*Eupatorium capillifolium*), broomsedge (*Andropogon* sp.), blackberry (*Rubus* spp), baccharis (*Baccharis halimifolia*), and annual bluegrass (*Poa annua*). Species found along the ditch margins include giant cane (*Arundinaria gigantea*), bulrush (*Scirpus* sp.), and plumegrass (*Saccharum* sp.). In addition, the eastern portions of the fields were planted in loblolly pine (*Pinus taeda*) approximately 3 years ago. Based on conversations with the landowner, additional species were planted at the Site with excessive mortality due to drought.

3.5 Hydrology

Under historic conditions, hydrology within the Site was most likely defined by the presence of surface water flows, groundwater migration into open water conveyances, groundwater seepage onto floodplain surfaces, and, to a lesser extent, precipitation. Surface water flows result primarily from upstream drainage basin catchment, discharge into upstream feeder tributaries, and surface water flows into and through the Site. Currently, groundwater migration has been accelerated in crop lands by the leveled soil surface, increased permeability within the plow layer, and potential removal of subsurface impediments to flow (rooting functions and B horizon surface complexity). The induced groundwater migration is intercepted by a network of inter-field ditches, which effectively drain farmed portions of the Site. Approximately 8000 linear feet of ditches exist within the Site. The ditches are approximately 5 feet in depth and 20 feet in width through the majority of the Site. As the ditches reach the northwestern periphery of the Site, ditches increase to approximately 40 feet in width.

3.6 Jurisdictional Wetlands

Jurisdictional wetland limits are defined using criteria set forth in the *Corps of Engineers Wetlands Delineation Manual* (Environmental Laboratory 1987). As stipulated in this manual, the presence of three clearly defined parameters (hydrophytic vegetation, hydric soils, and evidence of wetland hydrology) are required for a wetland jurisdictional determination.

Hydric soil limits were confirmed within the Site by a licensed soil scientist. Based on filed surveys and groundwater modeling discussed below, jurisdictional wetland hydrology has been effectively removed from 37.6 acres of the 40-acre tract (Figure 8, Appendix A). Approximately 0.4 acre of hydric soils lies beyond the drainage effect of onsite ditches and is currently characterized by jurisdictional wetland hydrology. An additional 2 acres of jurisdictional wetland is confined to ditches excavated across the Site.

Onsite ditches have been excavated through hydric soils, characterized by a prevalence of hydric vegetation, and are saturated/ponded for greater than 12.5 percent of the growing season. During field investigations, ditches were ponded to a depth of approximately 0.5 feet; however, ponding to approximately 4 feet in depth may occur during wetter times of the year. Ditches range in width from approximately 20 to 40 feet and account for 2 acres of jurisdictional wetland within the Site (Figure 8, Appendix A).

Historically, onsite wetlands may have supported a Coastal Plain Bottomland Hardwoods community (Schafale and Weakley 1990). The area was seasonally saturated or flooded by high water tables, poor drainage, and overbank flow from the adjacent Brier Creek. The forest was dominated by various hardwood species of oak (*Quercus* spp.), cypress (*Taxodium distichum*), and gum (*Nyssa biflora*).

Disturbance to onsite jurisdictional wetlands may have collectively reduced the functionality of these systems including reduced hydrologic functions, biogeochemical functions, and plant and animal habitat interactions.

3.7 Categorical Exclusion Document

A Categorical Exclusion (CE) document has been prepared and submitted for this project. The full document is provided in Appendix B. A summary of issues associated with the CE document includes the following.

- CZMA – Not applicable; the project is not in a CAMA County
- CERCLA – A limited Phase I assessment has been conducted
- National Historic Preservation Act – Concurrence received
- Uniform Act – Letter sent to landowner
- American Indian Religious Freedom Act – Not applicable; the project is not in a county claimed by the Eastern Band of Cherokee Indians
- Antiquities Act – Not applicable; the project is not on Federal lands
- Archaeological Resources Protection Act – Not applicable; the project is not on Federal or Indian lands
- Endangered Species Act – No habitat for federally protected species within or adjacent to the Site
- Executive Order 13007 – Not applicable; the project is not in a county claimed by the Eastern Band of Cherokee Indians
- Farmland Protection Policy Act – Concurrence received
- Fish and Wildlife Coordination Act – Letters mailed with no reply from agencies
- Land and Water Conservation Fund Act – Not applicable, the project will not convert recreational lands
- Magnuson-Stevens Fishery Conservation and Management Act – Concurrence not required
- Migratory Bird Treaty Act - Letters mailed with no reply from agencies

4.0 GROUNDWATER MODELING

Groundwater modeling was performed to characterize water table elevations under historic (reference), existing, and post-restoration conditions. Specifically, the study utilized output from the Boussinesq Equation to estimate the linear distance from the edge of agricultural field ditches where the potential exists for drainage impacts to occur within jurisdictional wetlands.

4.1 Groundwater Model Descriptions

The Boussinesq Equation represents a two-dimensional general flow equation for unconfined aquifers. The equation has been applied in the past to predict the decline in elevation of the water table near a pumping well as time progresses. The equation is based primarily on hydraulic conductivity, drainable porosity, and the saturated thickness of the aquifer. One form of the equation is as follows:

$$X = (K h_0 t/f)^{1/2} F(D,H)$$

Where:

K = hydraulic conductivity (in/hr)

h_0 = depth to aquiclude (in)

t = duration (hours)

f = drainable porosity (dimensionless ratio)

F(D,H) = profiles (graphs) relating ditch depth, water table depth, and depth to the aquiclude (h_0)

X = wetland impact distance (in)

4.1.1 Model Application – Boussinesq Equation

In this study, the Boussinesq Equation was applied to agricultural field ditches to predict where the linear distance of drawdown in the groundwater exceeds 1 foot for 5 percent and 12.5 percent of the growing season. These percentages were selected based upon guidance from the *Corps of Engineers Wetland Delineation Manual* (Environmental Laboratory 1987). The equation is solved for the wetland impact distance with data for the following variables: 1) equivalent hydraulic conductivity, 2) drainable porosity, 3) an estimated depth to the impermeable layer or aquiclude, 4) the time duration of the drawdown, 5) target water table depth (1 foot below the soil surface), and 6) minimum ditch depth.

Hydraulic conductivity (K) values were estimated using values published in the *Soil Survey of Columbus County, North Carolina* (USDA 1990). The soil layer depths were obtained from descriptions in the Columbus County soil survey and verified in the field. Drainable porosity was determined using published data (Skaggs et al. 1986). The drainable porosities were cross-referenced with water depth to drained-volume relationship provided by MUUF for depths between 0 and 1 foot for the Johnston series. The depth to the aquiclude was obtained from published values for the Johnston series (USDA 1990).

The time variable, t , is based on 5 and 12.5 percent of the Robeson County growing season, 12 and 31 days, respectively. For the purpose of this study, the growing season is defined as the period between March 14 and November 14 (USDA 1978). Values for the function $F(D,H)$, defined as a function of ditch depth, water table depth, and depth to the aquiclude, were taken from plotted numerical solutions to the Boussinesq Equation (Figure 2j, Skaggs 1976), where $D=d/h_0$ and $H=h/h_0$. The variable d is defined as the ditch elevation above the aquiclude. The variable h_0 is the distance from the soil surface to the aquiclude. The variable h is equal to the height after drawdown for the water above the aquiclude at distance X from the ditch. For the purposes of this analysis, h was defined as the distance between the aquiclude and a point 1 foot below the surface. Minimum ditch depths were determined during cross-sectional analysis of agricultural field ditches.

4.2 Groundwater Model Results

The groundwater model was utilized to forecast the maximum zone of ditch influence on jurisdictional wetland hydroperiods. The maximum zone of influence may be used to predict the area of wetland hydrological restoration that may result due to effective ditch removal. Ditch depths and spacing were varied in the model until wetland hydroperiods were reduced relative to the jurisdictional wetland hydroperiods outlined by the *Corps of Engineers Wetland Delineation Manual* (Environmental Laboratory 1987).

The Boussinesq Equation has the ability to support different ditch morphology and features, suggesting that use of the model in evaluation of drainage impacts from agricultural field ditches are applicable with proper data inputs. Groundwater model results are presented in Table 1.

The Boussinesq Equation predicts an influence on the jurisdictional wetland hydroperiod (12.5 percent of growing season) of 185 feet for a 3-foot ditch (Table 1). Figure 8 provides a depiction of modeled wetland hydroperiods based on ditch depths and spacing under existing conditions. As the Site succeeds towards steady state forest conditions, the zone of potential wetland is expected to be reduced due to projected, lower infiltration and runoff rates.

Table 1. Groundwater Model Results for the Zone of Wetland Loss (Johnston Soils)

Ditch Depth (feet)	Ditch Impact (feet) 5 % of Growing Season	Ditch Impact (feet) 12.5 % of Growing Season
2	79	125
3	117	185
4	131	206
5	137	217

* Zone of influence equal to ½ of the modeled ditch spacing

Groundwater model simulations for existing conditions indicate that portions of the Site are forecast to meet hydrology criteria at distances of 125 to 217 feet from the existing drainage ditches (Table 1). Under existing conditions Johnston soils are considered effectively drained throughout approximately 37.6 acres of the Site for hydrologic criteria of 12.5 percent of the growing season due to the groundwater drawdown from the agricultural field drainage ditch network (Figure 8, Appendix A).

5.0 REFERENCE STUDIES

Reference wetland systems were utilized as the primary method for development of this wetland restoration plan. Reference areas are located approximately 1 mile northeast of the Site in less disturbed portions of Big Swamp (Figure 5, Appendix A). Hydrologic reference areas will be utilized to develop post-project hydrologic parameters for success criteria. Reference vegetative community areas will be utilized to supplement Schafale and Weakley's *Classification of the Natural Communities of North Carolina* (1990) vegetative community descriptions for Coastal Plain Bottomland Hardwoods (brownwater subtype).

5.1 Reference Forest Ecosystems

According to Mitigation Site Classification (MiST) guidelines (EPA 1990), Reference Forest Ecosystems (RFEs) must be established for restoration sites. RFEs are forested areas on which to model restoration efforts of the restoration site in relation to soils, hydrology, and vegetation. RFEs should be ecologically stable climax communities and should represent believed historical (predisturbance) conditions of the restoration site. Data describing plant community composition and structure are collected at the RFEs and subsequently applied as reference data for design of the restoration site.

Reference vegetative communities for this project are located in undisturbed portions of Big Swamp northeast of the Site boundaries (Figure 5, Appendix A). Tree and shrub species identified in this area are listed in Table 2 and will be utilized to supplement community descriptions for Coastal Plain Bottomland Hardwoods (brownwater subtype).

Table 2. Reference Forest Ecosystem

Coastal Plain Bottomland Hardwoods	
Canopy Species	Understory Species
<i>Acer rubrum</i>	<i>Persea borbonia</i>
<i>Nyssa biflora</i>	<i>Magnolia virginiana</i>
<i>Quercus laurifolia</i>	<i>Ilex opaca</i>
<i>Quercus michauxii</i>	
<i>Quercus phellos</i>	
<i>Taxodium distichum</i>	

5.2 Soil Surface Characterization

Wetland surface microtopography was evaluated in reference wetlands by estimating changes in relief across local reaches of the landscape. In Johnston soils, depressional storage associated with microtopography appears to play an important role in wetland hydrology and function. Surface topography varies from approximately 0.5 to 1.0 foot across the soil surface. Within the interior reference hydrology area, depressional areas are generally spaced at

distances ranging from 30 to 100 feet between hummocks and flats. The depressions ranged from 20 to 70 feet in width and averaged approximately 0.5 foot in maximum depth.

6.0 RESTORATION PLAN

Site alterations designed to restore characteristic wetland soil features and groundwater wetland hydrology include: 1) ditch cleaning prior to backfill, 2) depression construction, 3) impervious ditch plug construction, 4) ditch backfilling, 5) berm removal, 6) floodplain soil scarification, and 7) plant community restoration. Restoration plans depicted in Figure 9 (Appendix A) are expected to restore 33.5 acres and enhance 2.5 acre of forested riverine wetlands.

6.1 Ditch Cleaning Prior to Backfill

Ditches identified for backfilling in Figure 9 (Appendix A) will be cleaned, as needed, to remove unconsolidated sediments within the lower portion of the cross-section. Accumulated sediment within the ditches is relatively high permeability material that may act as a conduit for continued drainage after restoration. The unconsolidated sediments will be lifted from the channel to expose the underlying, relatively impermeable clay substrate along the ditch invert. The sediment will be temporarily placed on adjacent surfaces during depression construction and ditch backfilling. Subsequently, the unconsolidated sediment will be incorporated into top soils graded during soil preparation for planting.

6.2 Shallow Marsh Excavation

Shallow freshwater marsh pools will be constructed in the primary floodplain along portions of ditches and used for additional fill material as needed. The pools will be constructed by excavating shallow, irregularly shaped (oblong) depressions placed perpendicular to land slope. The depressions will range to a maximum of 0.75-foot below the existing surface elevation in the center of the depression. Depressional areas will extend over a radius of 50 to 75 feet (long axis). The location and attributes of oval depressions will be constructed to mimic backwater slough depressions and other depressional features found in the reference wetlands. Ditches located within depressional areas will be backfilled to the maximum 0.75-foot depth below the ground elevation.

6.3 Depression Construction

Based on volume calculations for ditch-backfill material, approximately 30,500 cubic yards of material must be borrowed from the Site. If borrow material derived from shallow depression excavation results in insufficient quantities of ditch backfill material, depressions may be excavated throughout the Site landscape. The primary purpose of these depressions is to provide suitable, low permeability material for ditch plugs and backfilling, to increase water storage potential within the wetland restoration area, and to increase potential for biological diversity within the complex. A conceptual model of the constructed depression, after restoration is complete, is depicted in Figure 10 (Appendix A).

The depression will be constructed by excavating and stockpiling top soils overlying the B horizon (clay layer) surface. Subsequently, clay from the B horizon will be excavated as

individual pockets approximately 2 to 3 feet in width and 2 to 3 feet in depth, such that the landscape is “pockmarked” with small, groundwater storage depressions. Clays excavated from the depressions will be utilized as backfill material on adjacent ditch sections. Top soils and sediment removed from ditch cleaning efforts will be utilized to backfill the depression to within 0.3 foot of the surface.

The location, depth, and configuration of each depression will be modified during construction to maximize landscape diversity, provide varying depths throughout the Site, and to balance cut and fill needs for ditch backfilling and plug construction.

6.4 Ditch Plugs

Ditch plugs will be installed along onsite ditches at locations conceptually depicted in Figure 9 (Appendix A). In addition, all Site outfall locations will be effectively plugged to prevent migration of surface water to and from the Site. The plugs will represent low density material designed to withstand erosive forces associated with concentrated surface water or groundwater flows. If earthen material is used, each plug will consist of earthen material backfilled in 2-foot lifts of vegetation free material and compacted into the bottom of the ditch. Earthen plugs may be reinforced by incorporation of filter cloth into the plug to minimize preferential flow of groundwater through fill material. Earthen material may be obtained from upland borrow pits or through excavation of groundwater storage depressions within the Site.

6.5 Ditch Backfilling

Ditches will be backfilled using onsite, earthen material from excavated depressions as depicted in Figure 9 (Appendix A). Based on cut-fill estimates for this project, approximately 30,500 cubic yards of ditch backfill material will be required to effectively fill all onsite ditches. Material excavated from the groundwater storage depressions will be stockpiled adjacent to the ditches to be backfilled. Ditch backfill locations will be filled, compacted, and graded to the approximate elevation of the adjacent wetland surface. Certain, non-critical ditch sections may remain open to provide habitat and hydrologic storage. Open ditch sections will be isolated between effectively backfilled reaches to reduce potential for long-term, preferential groundwater migration.

6.6 Berm Removal

Spoil from ditch excavation used to construct a berm/road that borders Site agricultural fields will be removed to restore hydrology contributed to the Site by Big Swamp. Currently the berm hinders surface water from Big Swamp from accessing the Site during overbank events.

6.7 Floodplain Soil Scarification

Microtopography and differential drainage rates within localized areas represent important components of interstream flat functions. Reference hydrology areas north of the Site exhibit complex surface microtopography. Small concavities, swales, exposed root systems, seasonal pools, oxbows, and hummocks associated with vegetative growth and hydrological patterns are scattered throughout these systems. Efforts to advance the development of characteristic surface microtopography will be implemented.

In areas where soil surfaces have been compacted, ripping or scarification will be performed. After construction, the soil surface is expected to exhibit complex microtopography ranging to 1 foot in vertical asymmetry. Subsequently, community restoration will be initiated.

6.8 Plant Community Restoration

Restoration of hardwood forest allows for development and expansion of characteristic species across the landscape and will contribute to diversity and provide secondary benefits, such as enhanced feeding and nesting opportunities for mammals, birds, amphibians, and other wildlife.

Reference Forest Ecosystem (RFE) data, onsite observations, and community descriptions from *Classification of the Natural Communities of North Carolina* (Schafale and Weakley 1990) were used to develop the primary plant community associations that will be promoted during community restoration activities. Based on Schafale and Weakley (1990) community descriptions, the Site was historically characterized by Coastal Plain Bottomland Hardwoods. These areas occur on flat or rolling Coastal Plain sediments with a significant seasonal high water table.

6.8.1 Planting Plan

Deep-rooted, riparian vegetation will be restored over the entire 40-acre Site. Planting vegetation is proposed to reestablish vegetation community patterns within the Site. Revegetating is expected to provide soil stability, provide habitat for area wildlife, and filter pollutants prior to entering the groundwater table. Scarification of floodplain surfaces may be required prior to planting.

Variations in vegetative planting may occur based on topographic locations and hydraulic conditions of the soil. Vegetative species composition should mimic reference forest data and onsite observations. Species expected for this project are characteristic of the Coastal Plain Bottomland Hardwoods vegetative community as described in *Classification of the Natural Communities of North Carolina* (Schafale and Weakley 1990) and may include the following elements.

swamp chestnut oak (<i>Quercus michauxii</i>)	laurel oak (<i>Quercus laurifolia</i>)
water oak (<i>Quercus nigra</i>)	bald cypress (<i>Taxodium distichum</i>)
willow oak (<i>Quercus phellos</i>)	sweet bay (<i>Magnolia virginiana</i>)
ironwood (<i>Carpinus caroliniana</i>)	American holly (<i>Ilex opaca</i>)

Bare-root seedlings of tree and shrub species may be planted within the Site at a density up to 1000 stems per acre (6.6-foot centers). Planting should be performed between December 1 and March 15 to allow plants to stabilize during the dormant period and set root during the spring season. Bare-root seedlings should be hand planted to minimize Site soil disturbance, thereby minimizing potential for sedimentation/siltation into Site receiving streams. A total of 40,000 diagnostic tree and shrub seedlings may be planted in support of Site wetland restoration (Table 3). The entire 40-acre Site is expected to be revegetated during implementation of this plan.

6.8.2 Nuisance Species Management

No nuisance species were observed in the Site; therefore, no nuisance species controls are proposed at this time. Potential for other nuisance species including nonnative floral species will be monitored over the course of the 5-year monitoring period. Appropriate actions may be taken to ameliorate negative impacts regarding vegetation development and/or water management on an as-needed basis.

Table 3. Planting Plan

Vegetation Association (Planting Area)	Coastal Plain Bottomland Harwoods	
Area (acres)	40	
SPECIES	Total Number Planted ¹	Percentage of Total ²
Ironwood (<i>Carpinus caroliniana</i>)	5000	12.5
American Holly (<i>Ilex opaca</i>)	5000	12.5
Sweet Bay (<i>Magnolia virginiana</i>)	5000	12.5
Swamp Chestnut Oak (<i>Quercus michauxii</i>)	5000	12.5
Laurel Oak (<i>Quercus laurifolia</i>)	5000	12.5
Water Oak (<i>Quercus nigra</i>)	5000	12.5
Willow Oak (<i>Quercus phellos</i>)	5000	12.5
Bald Cypress (<i>Taxodium distichum</i>)	5000	12.5
TOTAL	40,000	100

1. Planting densities comprise 1000 trees per acre.
2. Some noncommercial elements may not be locally available at the time of planting. The stem count for unavailable species should be distributed among other target species based on the percent (%) distribution. One year of advance notice to forest nurseries will promote availability of some noncommercial elements. However, reproductive failure in the nursery may occur.

7.0 MONITORING PLAN

Monitoring of Site restoration efforts will be performed until success criteria are fulfilled. Monitoring is proposed for wetland components of hydrology and vegetation. A general Site monitoring plan is depicted in Figure 11 (Appendix A).

7.1 Hydrology Monitoring

After hydrological modifications are performed, continuous reading, groundwater monitoring gauges will be installed at the Site in accordance with specifications in *Installing Monitoring Wells/Piezometers in Wetlands* (NCWRP 1993). Approximately nine groundwater monitoring gauges (two gauges within reference and seven gauges onsite) will be installed at the Site as conceptually depicted in Figure 11 (Appendix A). Monitoring gauges will be set to a minimum

depth of 12 inches below the soil surface. Hydrological sampling will continue throughout the growing season at intervals necessary to satisfy the hydrology success criteria (EPA 1990).

7.2 Hydrology Success Criteria

Target hydrological characteristics include a minimum regulatory wetland hydrology criteria based upon reference groundwater modeling. Evaluation of success criteria will also be supplemented by sampling and data comparison between restoration areas and the reference wetland site. Hydrology success criteria for the five-year monitoring period will include a minimum regulatory criterion, comprising saturation (free water) within one foot of the soil surface for 5 percent of the growing season.

Reference Wetland Sites

Two monitoring gauges will be placed in reference wetlands located northwest of the Site. Wetland hydroperiods measured by groundwater gauges located within the reference areas will be compared to the hydroperiods exhibited by groundwater gauges in the restoration area to further evaluate restoration success. Success criteria outlined by the groundwater model indicates that the wetland restoration area should maintain saturation within one foot of the soil surface for at least 74 percent of the hydroperiod exhibited by the reference wetland gauges in any given year.

7.3 Vegetation Monitoring

Restoration monitoring procedures for vegetation are designed in accordance with guidelines set forth in 2006 *CVS-EEP Protocol for Recording Vegetation (Levels 1 and 2 only)* (Lee et. al. 2006). A general discussion of the restoration monitoring program is provided. A photographic record of plant growth should be included in each annual monitoring report.

After planting has been completed in winter or early spring, an initial evaluation will be performed to verify planting methods and to determine initial species composition and density. Supplemental planting and additional Site modifications will be implemented, if necessary.

During the first year, vegetation will receive visual evaluation on a periodic basis to ascertain the degree of overtopping of planted elements by nuisance species. Subsequently, quantitative sampling of vegetation will be performed between June 1 and October 30, until the vegetation success criteria are achieved.

During quantitative vegetation sampling in early fall of the first year, up to ten sample plots will be randomly placed within the Site. Sample-plot distributions are expected to resemble locations depicted in Figure 11 (Appendix A); however, best professional judgment may be necessary to establish vegetative monitoring plots upon completion of construction activities. In each sample plot, vegetation parameters to be monitored include species composition and species density.

7.4 Vegetation Success Criteria

Success criteria have been established to verify that the vegetation component supports community elements necessary for floodplain forest development. Success criteria are dependent upon the density and growth of characteristic forest species. Additional success criteria are dependent upon density and growth of "Character Tree Species." Character Tree Species include planted species, species identified through inventory of an approved reference (relatively undisturbed) forest community used to orient the planting plan, and species outlined in an appropriate plant community as described in *Classification of Natural Communities of North Carolina* (Schafale and Weakley 1990).

An average density of 320 stems per acre of Character Tree Species must be surviving in the first three monitoring years. Subsequently, 290 Character Tree Species per acre must be surviving in year 4 and 260 Character Tree Species per acre in year 5.

If vegetation success criteria are not achieved based on average density calculations from combined plots over the entire restoration area, supplemental planting may be performed with tree species approved by regulatory agencies. Supplemental planting will be performed as needed until achievement of vegetation success criteria.

No quantitative sampling requirements are proposed for herb assemblages as part of the vegetation success criteria. Development of floodplain forests over several decades will dictate the success in migration and establishment of desired understory and groundcover populations.

7.5 Report Submittal

An "as-built" mitigation plan of the area, including initial species compositions by community type, and sample plot and well locations, will be provided after completion of planting. A discussion of the planting design, including the types of species planted, species densities, and number of stems planted will be included. The report will be provided within 90 days of completion of all work.

Subsequently, reports will be submitted yearly no later than December 31 to appropriate permitting agencies following each annual monitoring assessment. Reports will document the sample plot locations, along with photographs which illustrate Site conditions. Groundwater monitoring gauge data will be analyzed to determine the duration of wetland hydrology during the growing season. In addition, the survival and density of planted and naturally recruited stems will be reported and evaluated relative to the success criteria.

7.6 Contingency

In the event that vegetation or hydrology success criteria are not fulfilled, a mechanism for contingency will be implemented. For vegetation contingency, replanting and extended monitoring periods will be implemented if community restoration does not fulfill minimum species density and distribution requirements.

Hydrological contingency will require consultation with hydrologists and regulatory agencies if wetland hydrology restoration is not achieved during the monitoring period. Recommendations for contingency to establish wetland hydrology will be implemented and monitored until hydrology success criteria are achieved.

8.0 REFERENCES

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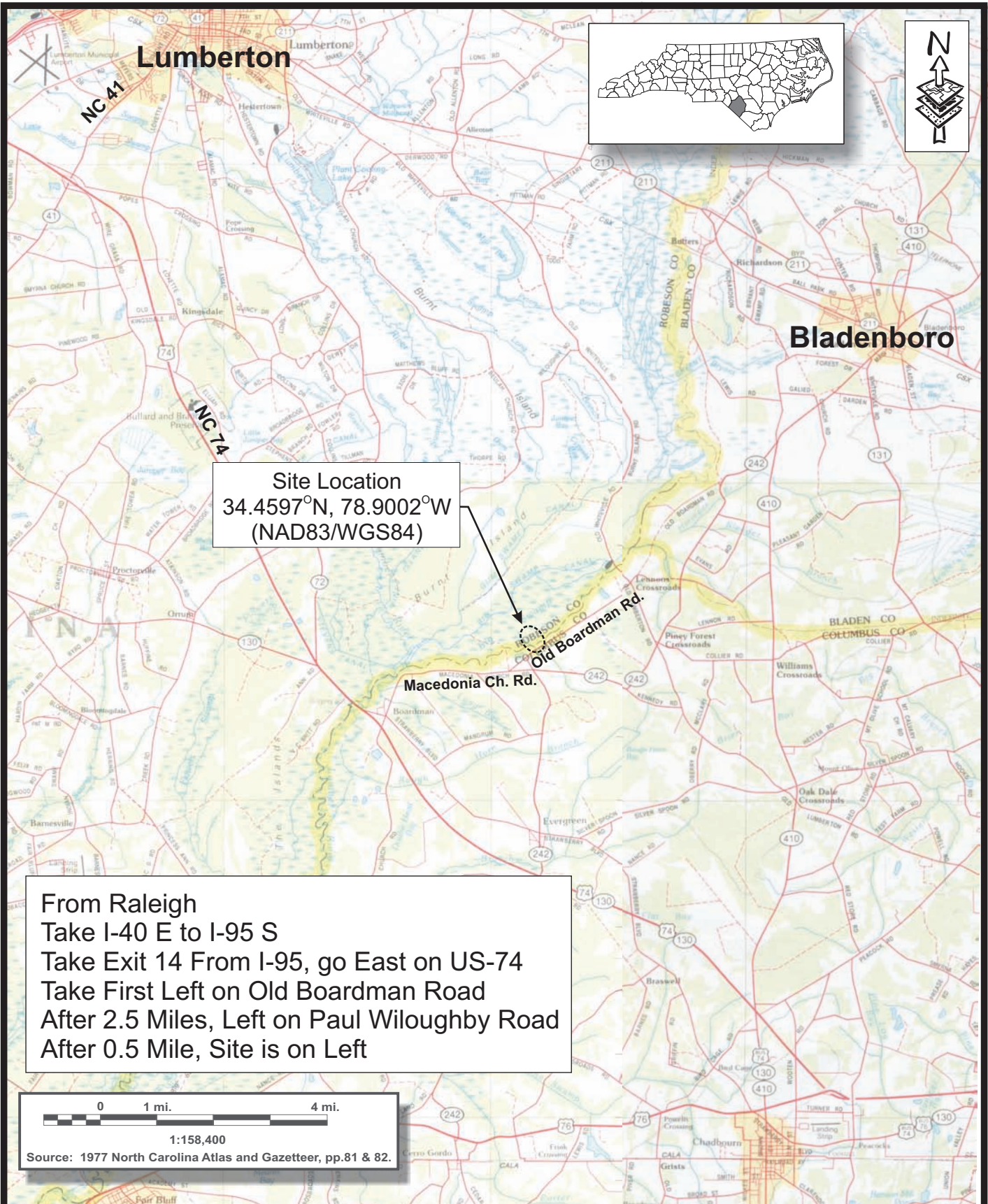
Skaggs, R. W., and A. Tabrizi. 1986. Design Drainage Rates for Estimating Drain Spacings in North Carolina. ASAE Paper Number: 84-2055.

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United States Department of Agriculture (USDA). 1990. Soil Survey of Columbus County, North Carolina. United States Department of Agriculture, Natural Resource Conservation Service.

APPENDIX A: FIGURES



Site Location
 34.4597°N, 78.9002°W
 (NAD83/WGS84)

From Raleigh
 Take I-40 E to I-95 S
 Take Exit 14 From I-95, go East on US-74
 Take First Left on Old Boardman Road
 After 2.5 Miles, Left on Paul Wiloughby Road
 After 0.5 Mile, Site is on Left

0 1 mi. 4 mi.
 1:158,400
 Source: 1977 North Carolina Atlas and Gazetteer, pp.81 & 82.

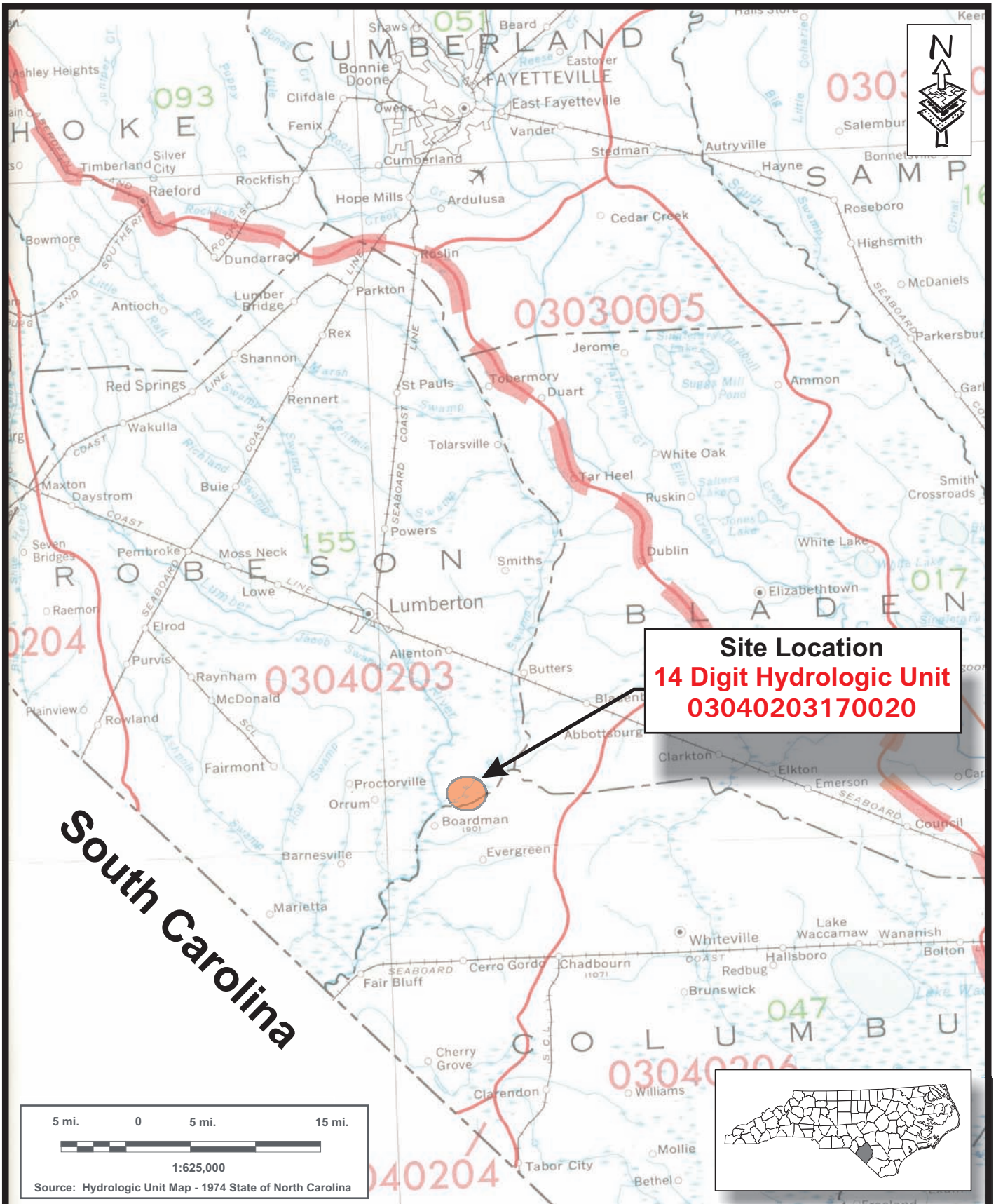


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 (919) 341-3839 fax

SITE LOCATION
COLUMBUS SWAMP WETLAND RESTORATION SITE
 Robeson County, North Carolina

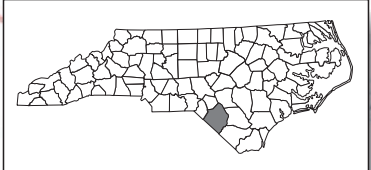
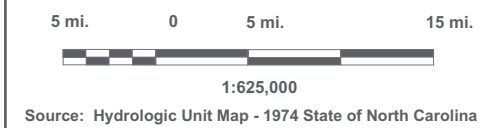
Dwn. by: CLF
 Ckd by: WGL
 Date: January 2008
 Project: 08-003

FIGURE
1



Site Location
14 Digit Hydrologic Unit
03040203170020

South Carolina




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HYDROLOGIC UNIT MAP
COLUMBUS SWAMP WETLAND RESTORATION SITE
Robeson County, North Carolina

Dwn. by:	CLF	FIGURE 2
Ckd by:	WGL	
Date:	January 2008	
Project:	08-003	



BIG SWAMPS WAMP

BIG

Brier Creek

ROBESON CO
COLUMBUS CO

BOUNDARY

Lumber River
2 Miles Downstream

INDEFINITE

Cem



Cem

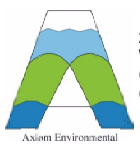
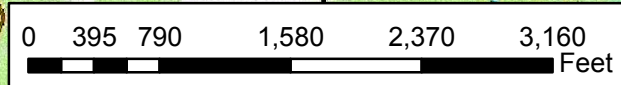
BM 102

1506

242

Legend

-  Easement = 40 ac
-  County Line

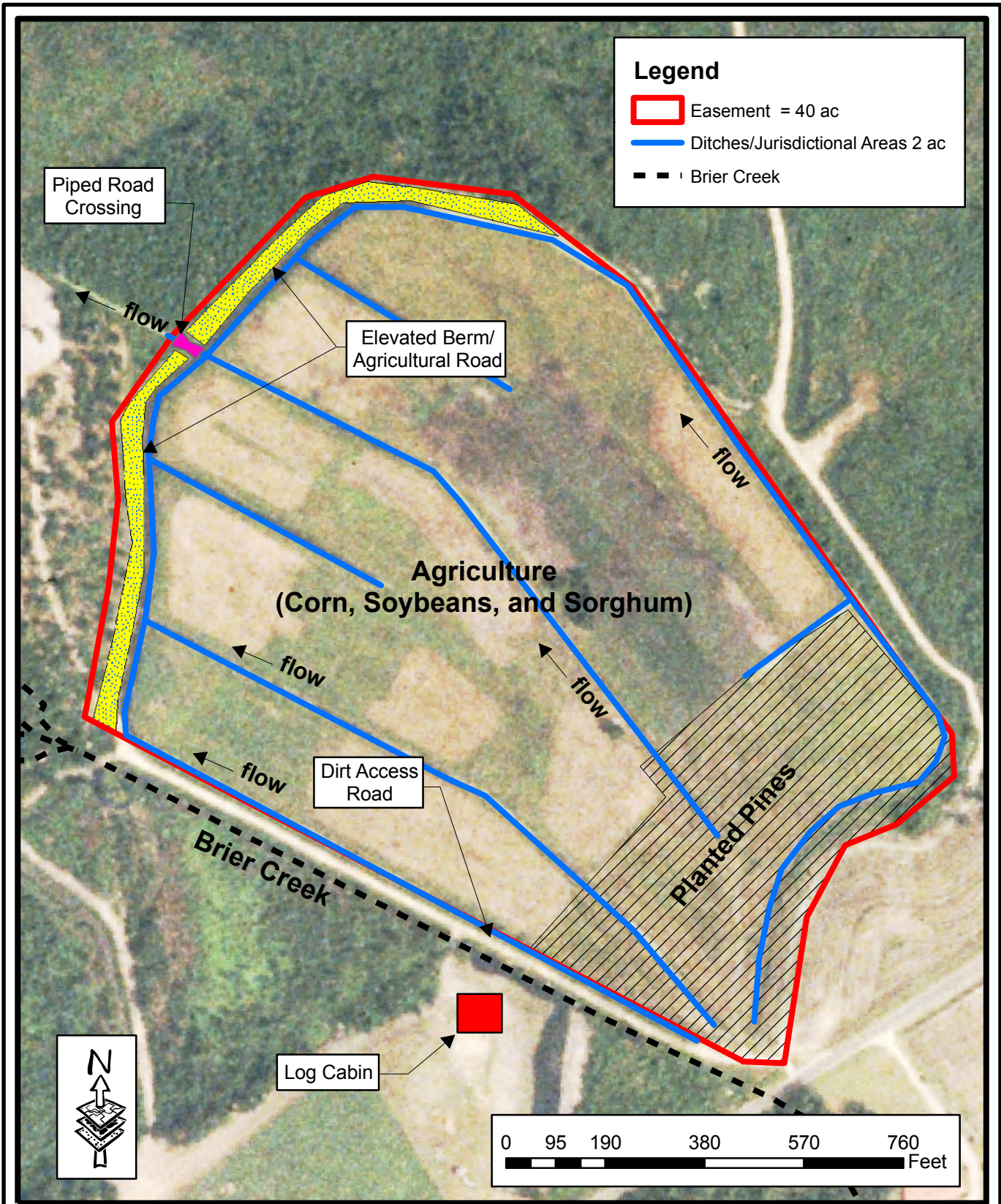


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TOPOGRAPHY
COLUMBUS SWAMP WETLAND RESTORATION SITE
Robeson County, North Carolina

Dwn. By: WGL
Date: January 2008
Project: 08-003

FIGURE
3

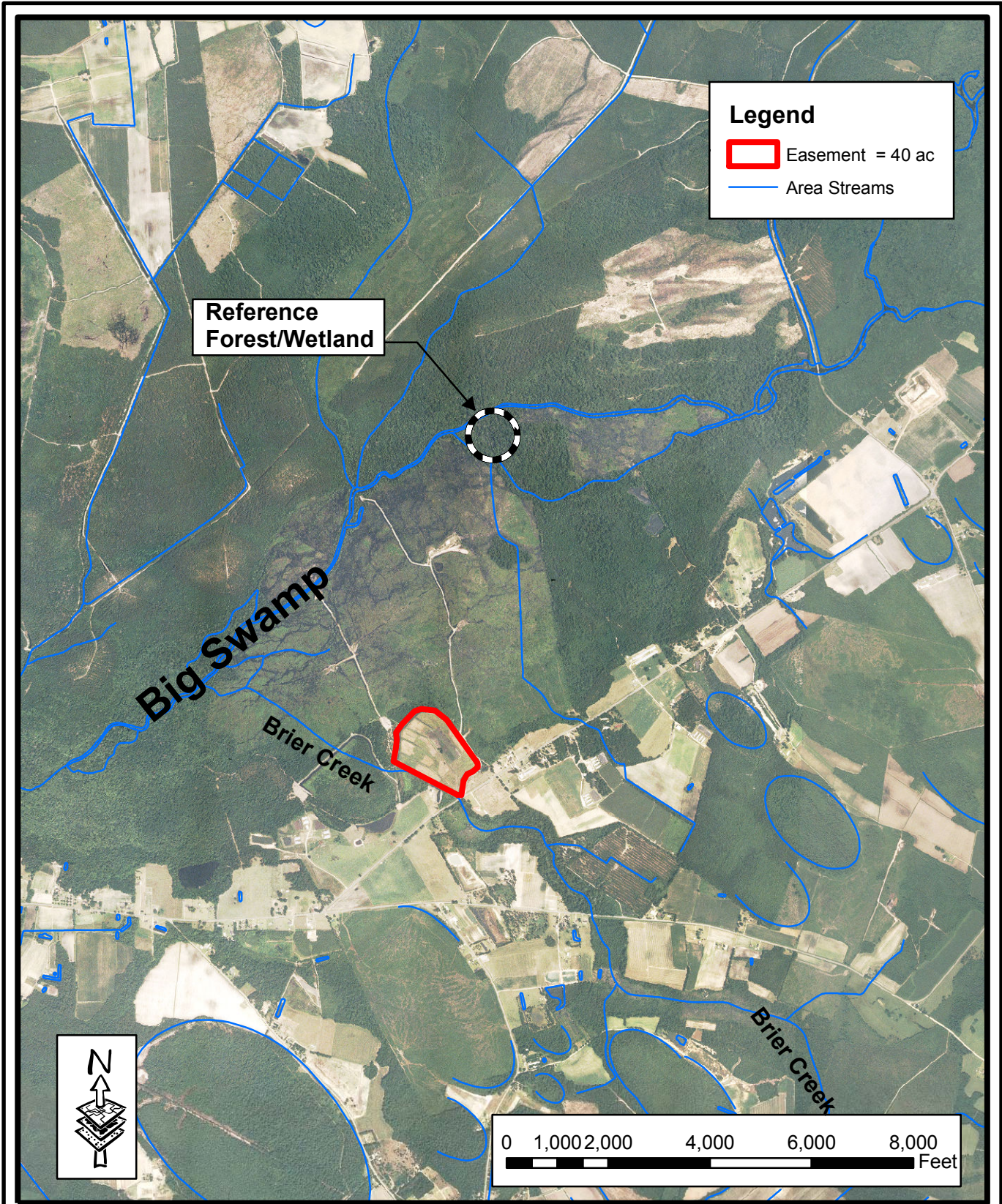



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ONSITE LAND USE
COLUMBUS SWAMP WETLAND RESTORATION SITE
 Robeson County, North Carolina

Dwn. By: WGL
 Date: January 2008
 Project: 08-003

FIGURE
4



Legend

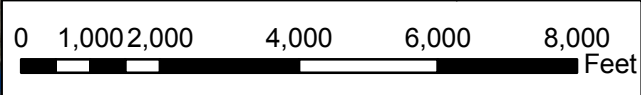
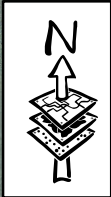
- Easement = 40 ac
- Area Streams

**Reference
Forest/Wetland**

Big Swamp

Brier Creek

Brier Creek



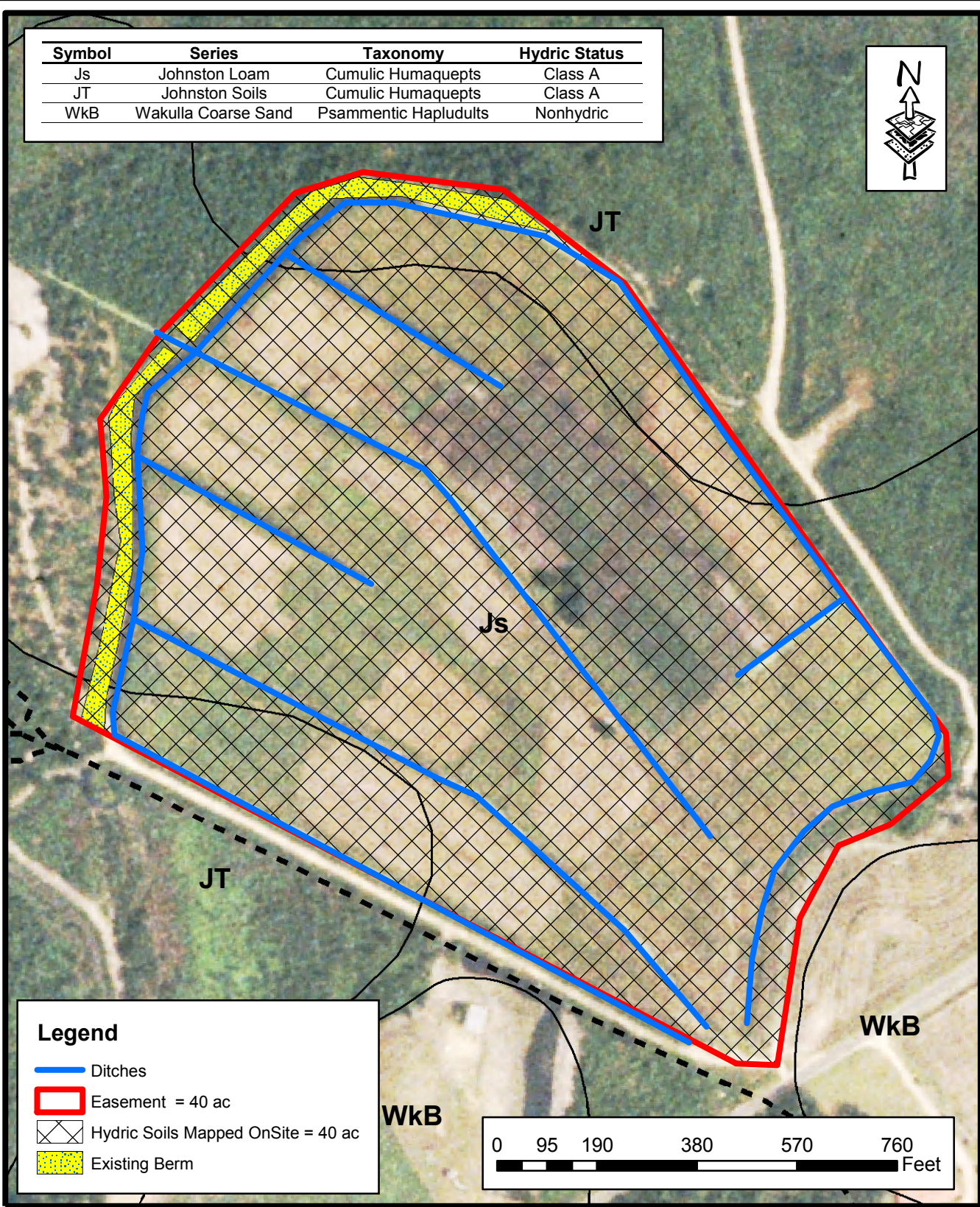

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**AREA LAND USE
COLUMBUS SWAMP WETLAND RESTORATION SITE
Robeson County, North Carolina**





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Date: January 2008
Project: 08-003

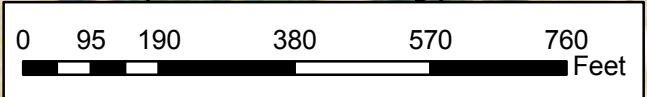
FIGURE
5

Symbol	Series	Taxonomy	Hydric Status
Js	Johnston Loam	Cumulic Humaquepts	Class A
JT	Johnston Soils	Cumulic Humaquepts	Class A
WkB	Wakulla Coarse Sand	Psammentic Hapludults	Nonhydric



Legend

-  Ditches
-  Easement = 40 ac
-  Hydric Soils Mapped OnSite = 40 ac
-  Existing Berm




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NRCS SOILS
COLUMBUS SWAMP WETLAND RESTORATION SITE
 Robeson County, North Carolina

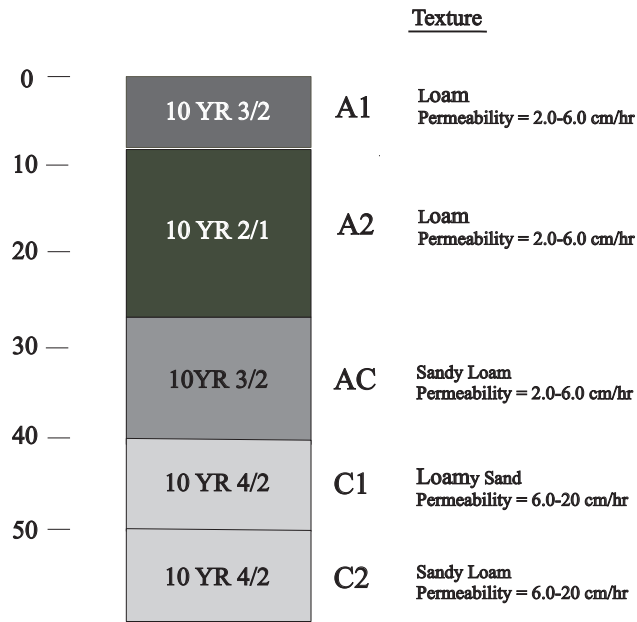
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 Date: January 2008
 Project: 08-003

FIGURE
6

SOIL PROFILES

Johnston Soils

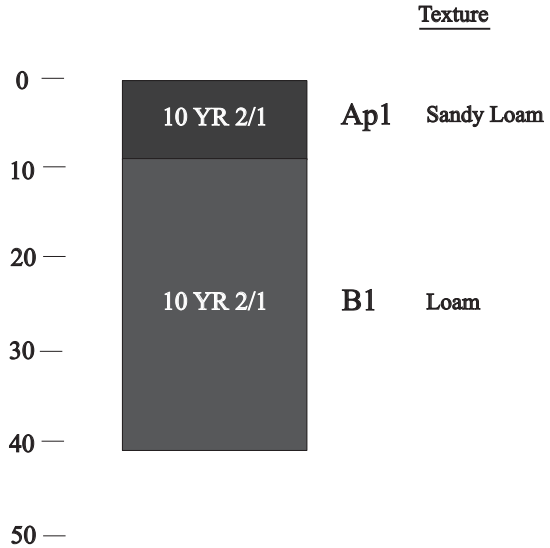
Typical Pedon as Depicted in NRCS 1990
Soil Survey of Columbus County, North Carolina



Depth in inches

Johnston Soils

Hydric Soil as Observed in the Field



Depth in inches



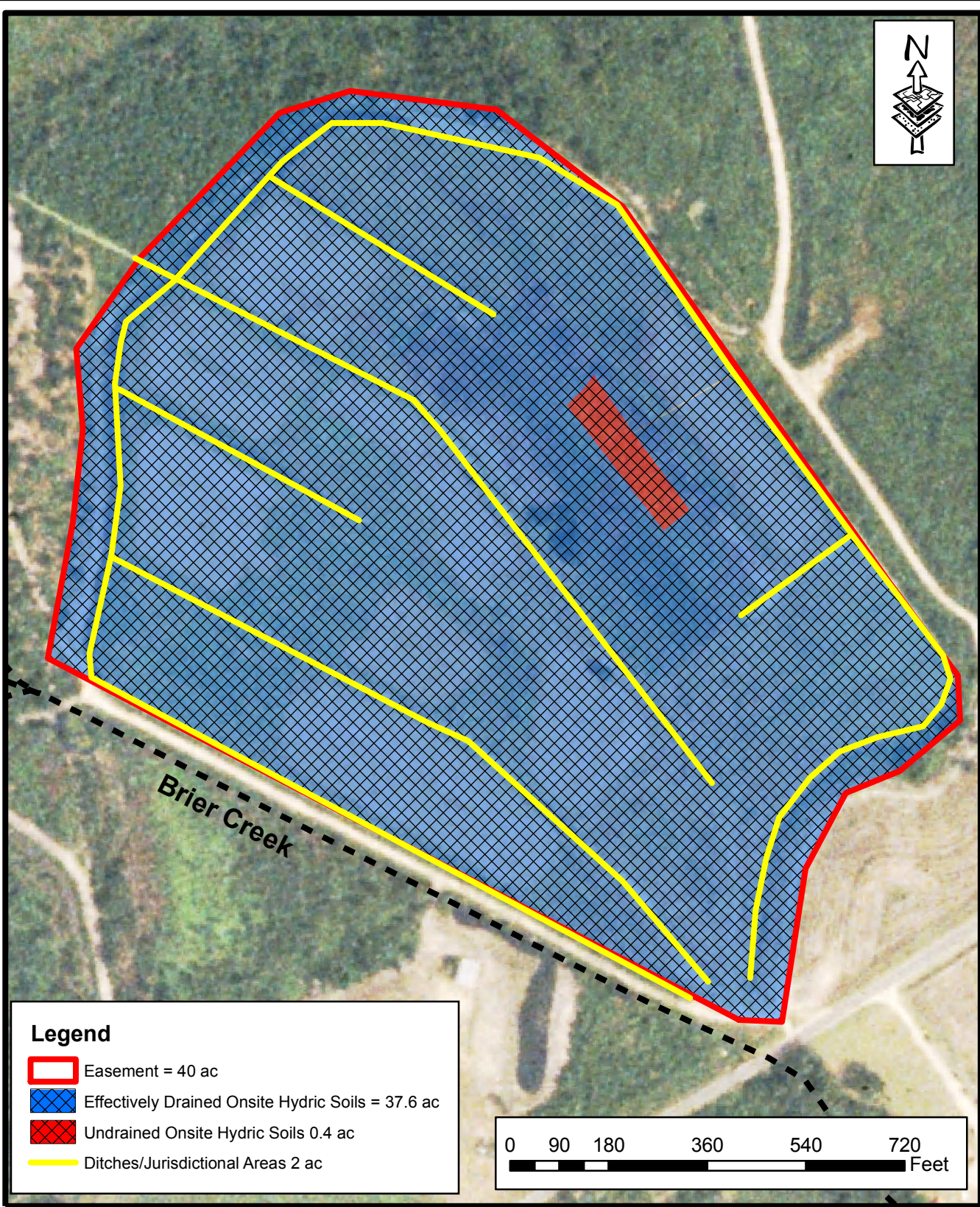
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SOIL PROFILES
COLUMBUS SWAMP WETLAND RESTORATION SITE
Robeson County, North Carolina





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Date: January 2008
Project: 08-003

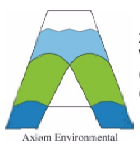
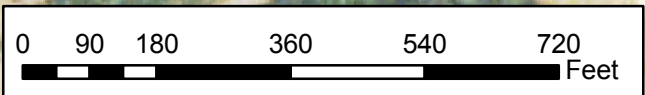
FIGURE

7



Legend

-  Easement = 40 ac
-  Effectively Drained Onsite Hydric Soils = 37.6 ac
-  Undrained Onsite Hydric Soils 0.4 ac
-  Ditches/Jurisdictional Areas 2 ac

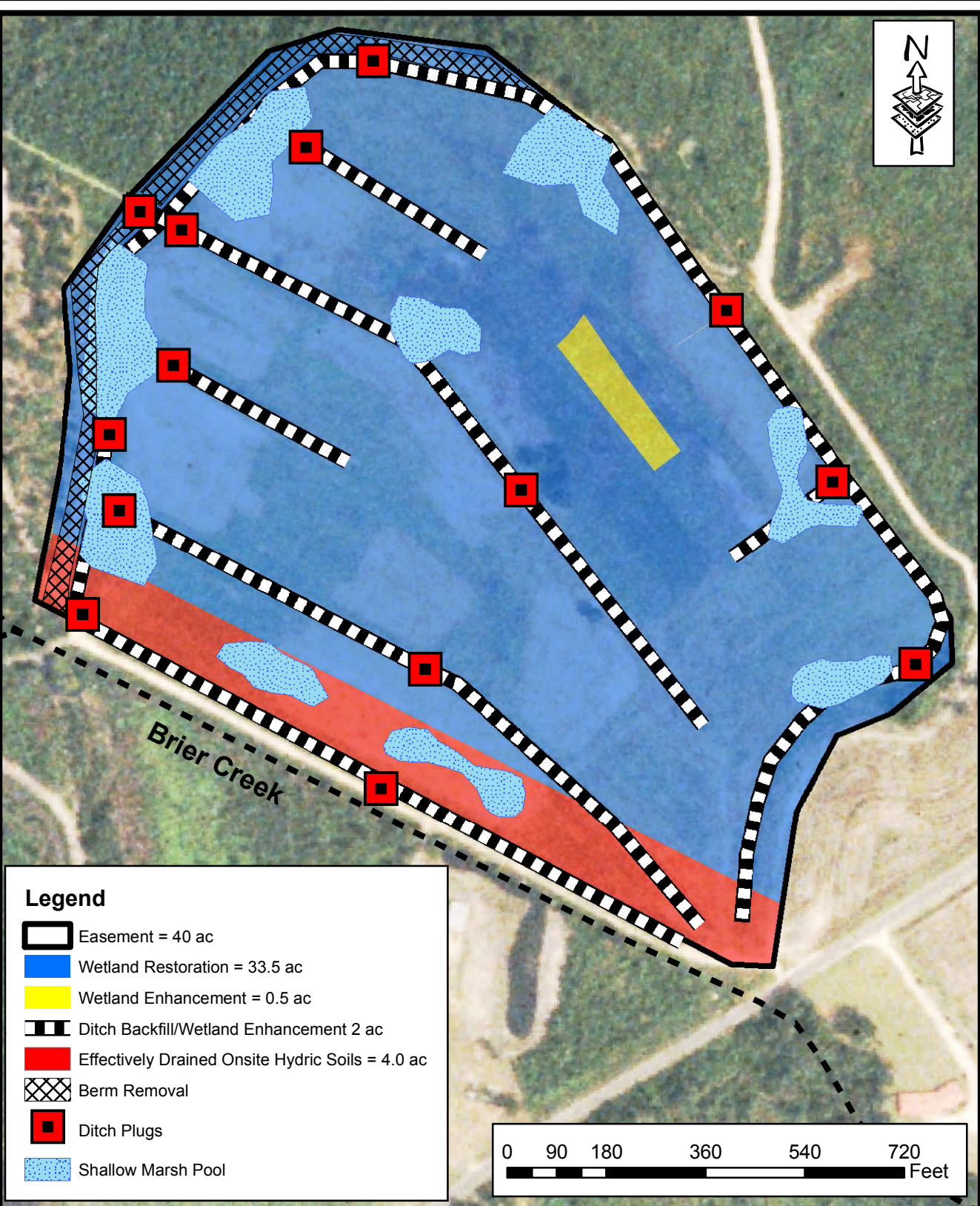


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**GROUNDWATER MODEL EXISTING CONDITIONS
COLUMBUS SWAMP WETLAND RESTORATION SITE
Robeson County, North Carolina**

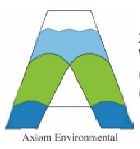
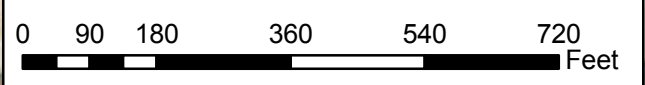
Dwn. By: WGL
Date: January 2008
Project: 08-003

FIGURE
8



Legend

-  Easement = 40 ac
-  Wetland Restoration = 33.5 ac
-  Wetland Enhancement = 0.5 ac
-  Ditch Backfill/Wetland Enhancement 2 ac
-  Effectively Drained Onsite Hydric Soils = 4.0 ac
-  Berm Removal
-  Ditch Plugs
-  Shallow Marsh Pool



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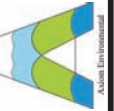
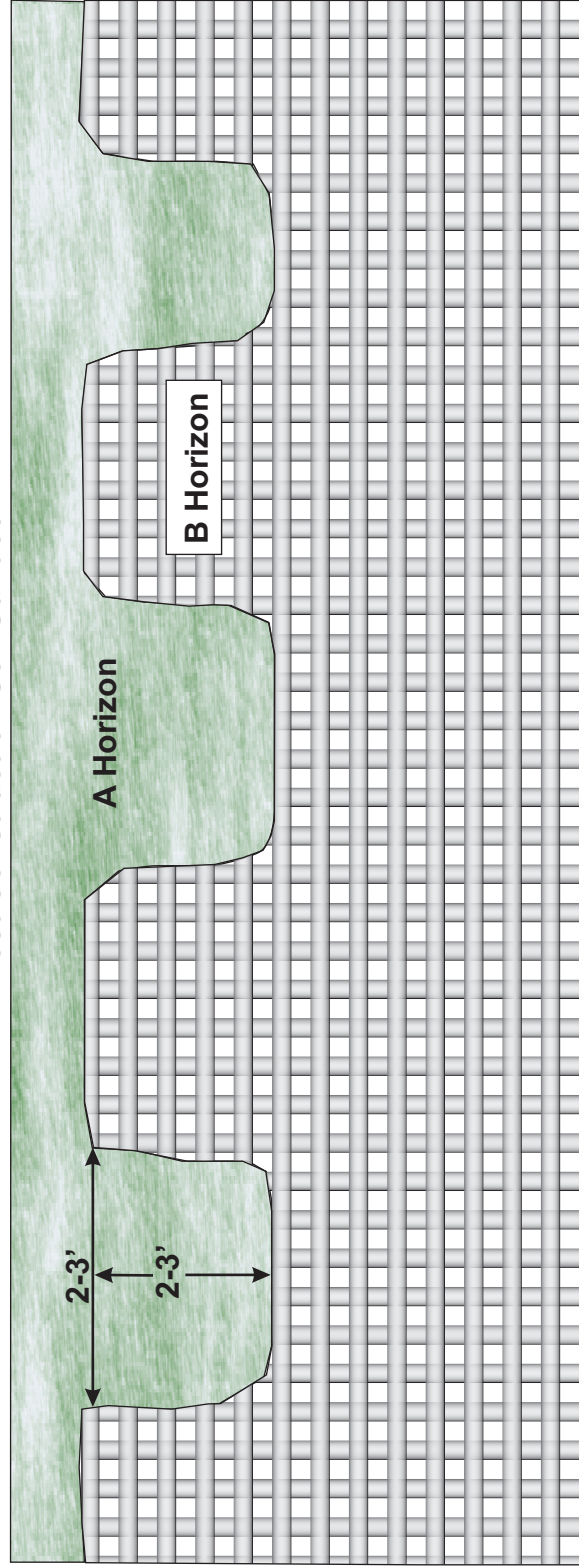
**WETLAND RESTORATION PLAN
COLUMBUS SWAMP WETLAND RESTORATION SITE
Robeson County, North Carolina**

Dwn. By: WGL
Date: January 2008
Project: 08-003

FIGURE
9

Preconstruction Soil Surface

Post Construction Soil Surface



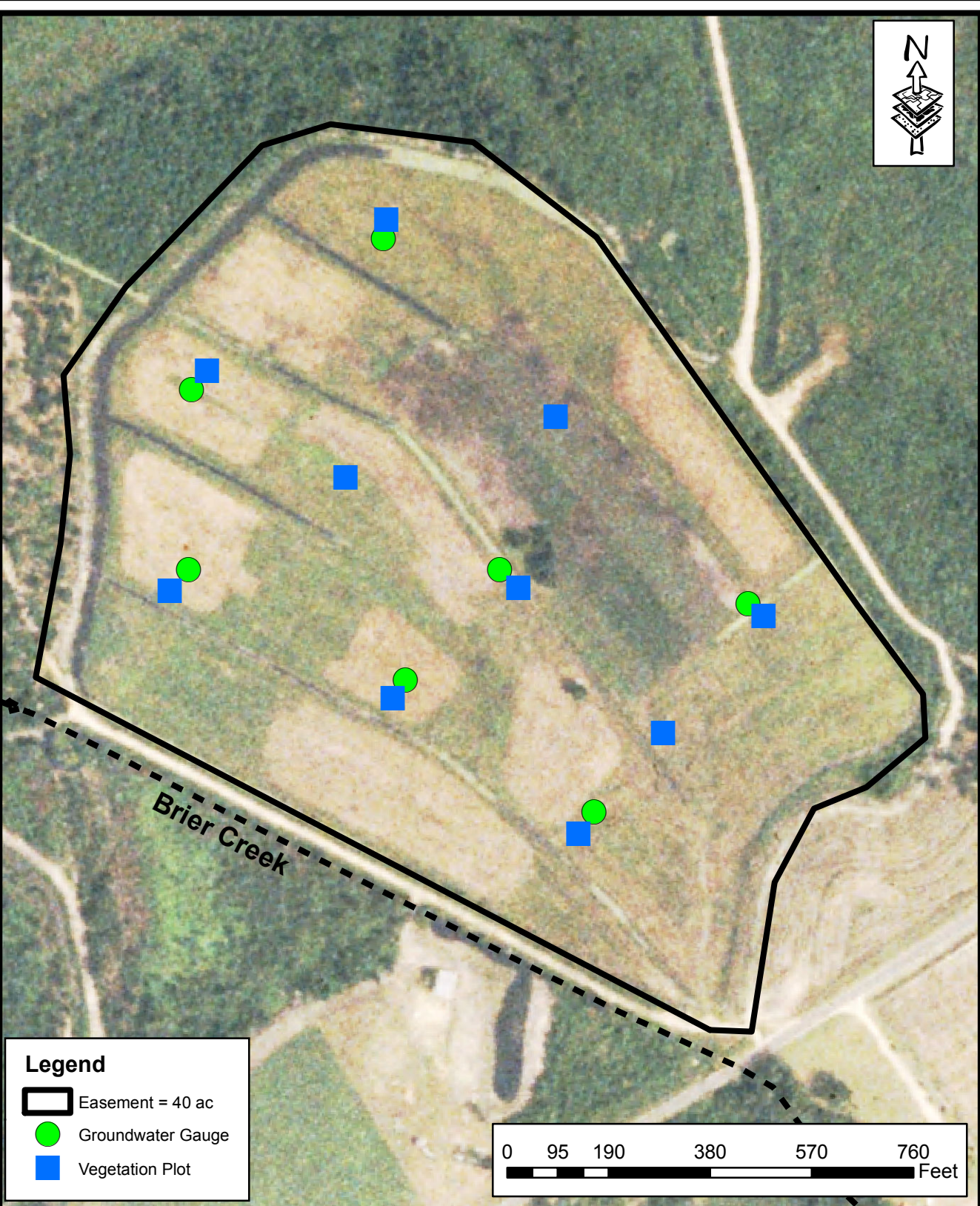
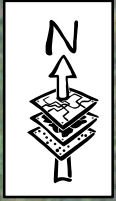
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DEPRESSION CONSTRUCTION
COLUMBUS SWAMP WETLAND RESTORATION SITE
Robeson County, North Carolina




FIGURE

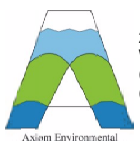
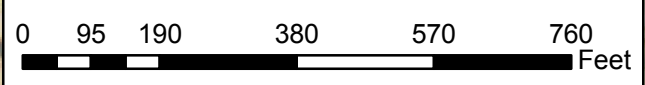
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Cr'd by:	WGL
Date:	January 2008
Project:	08-003



Legend

-  Easement = 40 ac
-  Groundwater Gauge
-  Vegetation Plot



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MONITORING PLAN
COLUMBUS SWAMP WETLAND RESTORATION SITE
Robeson County, North Carolina

Dwn. By: WGL
Date: January 2008
Project: 08-003

FIGURE
11

APPENDIX B: CE DOCUMENT

Environmental Documentation
for
Columbus Swamp Wetland Restoration Site
EEP Contract Number 000619

Categorical Exclusion Form Items

CZMA

Not applicable, as the project is not in a CAMA County

CERCLA

See the attached Executive Summary of the limited Phase 1 Site Assessment.

National Historic Preservation Act (Section 106)

See the attached letters to and from the State Historic Preservation Office.

Uniform Act

See the attached letter that was sent to the landowner.

American Indian Religious Freedom Act

Not applicable, as the project is not located in a county claimed by the Eastern Band of Cherokee Indians.

Antiquities Act

Not applicable, as the project is not located on Federal lands.

Archaeological Resources Protection Act

Not applicable, as the project is not located on Federal or Indian lands.

Endangered Species Act

See attached internal memo related to protected species. Based upon the absence of suitable nesting or foraging habitat within the conservation easement of the subject project, it is reasonable to conclude the project will have **No Effect** on any of the listed species.

Executive Order 13007

Not applicable, as the project is not located in a county claimed by the Eastern Band of Cherokee Indians.

Farmland Protection Policy Act

No unique or prime farmland will be converted. See the attached letter to USDA and Form AD-1006.

Fish and Wildlife Coordination Act

See the attached letters to the NCWRC and the USFWS. Neither agency commented on the project.

Land and Water Conservation Fund Act

Not applicable. The project will not convert recreation lands.

Magnuson-Stevens Fishery Conservation and Management Act

Not applicable. The project is not located in an estuarine system.

Migratory Bird Treaty Act

See the attached letters to the NCWRC and the USFWS. Neither agency commented on the project.

Wilderness Act

Not applicable. The project is not located in a wilderness area.

Other Miscellaneous Items

Public Notice

See the attached Affidavit of Publication of a Public Notice in the Jacksonville Daily News.

Appendix A

COPY

Categorical Exclusion Form for Ecosystem Enhancement Program Projects Version 1.3

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

Part A: General Project Information	
Project Name:	Columbus Swamp Wetland Restoration Site
EEP Number:	Contract # 000619
Project Sponsor:	Restoration Systems, L.L.C.
Project Contact Name:	Preston Steele
Project Contact Address:	1101 Haynes Street, Suite 211 - Raleigh, NC 27604
Project Contact E-mail:	psteele@restorationsystems.com
EEP Project Manager:	Jeff Jurek
Project Description	
<p>The Columbus Swamp Site is located in southeastern Robeson County within the floodplain of the Lumber River in Cataloging Unit 03030203. The Site, a previously drained (ditched) wetland, encompasses approximately 37.5 acres of mixed use agricultural land. Site restoration will include the removal of fill materials, filling drainage ditches, reforestation of native wetland species, and the reestablishment of soil structure and microtopographic variations over approximately 32 acres of the Site. The Site is expected to support a Coastal Plain, Bottomland Hardwood Forest, as well as a Cypress-Gum Swamp Forest in depressions. 32 Wetland Mitigation Units will be implemented at the Site.</p>	
For Official Use Only	
Reviewed By:	
Date	<u>Guy C. Pearce</u> EEP Project Manager
Conditional Approved By:	
Date	For Division Administrator FHWA
<input type="checkbox"/> Check this box if there are outstanding issues	
Final Approval By:	
<u>2-11-08</u>	<u>Dale L. [Signature]</u> For Division Administrator FHWA
Date	

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

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

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



EDR® Environmental
Data Resources Inc

The EDR Radius Map with GeoCheck®

**Columbus Swamp
704 Paul Willoughby Road
Evergreen, NC 28358**

Inquiry Number: 2097837.2s

December 11, 2007

The Standard in Environmental Risk Information

440 Wheelers Farms Road
Milford, Connecticut 06461

Nationwide Customer Service

Telephone: 1-800-352-0050
Fax: 1-800-231-6802
Internet: www.edrnet.com

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

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EXECUTIVE SUMMARY

A search of available environmental records was conducted by Environmental Data Resources, Inc (EDR). The report was designed to assist parties seeking to meet the search requirements of EPA's Standards and Practices for All Appropriate Inquiries (40 CFR Part 312), the ASTM Standard Practice for Environmental Site Assessments (E 1527-05) or custom requirements developed for the evaluation of environmental risk associated with a parcel of real estate.

TARGET PROPERTY INFORMATION

ADDRESS

704 PAUL WILLOUGHBY ROAD
EVERGREEN, NC 28358

COORDINATES

Latitude (North): 34.459220 - 34° 27' 33.2"
Longitude (West): 78.903400 - 78° 54' 12.2"
Universal Transverse Mercator: Zone 17
UTM X (Meters): 692588.3
UTM Y (Meters): 3814873.8
Elevation: 84 ft. above sea level

USGS TOPOGRAPHIC MAP ASSOCIATED WITH TARGET PROPERTY

Target Property Map: 34078-D8 EVERGREEN, NC
Most Recent Revision: 1986

TARGET PROPERTY SEARCH RESULTS

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

DATABASES WITH NO MAPPED SITES

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

FEDERAL RECORDS

NPL..... National Priority List
Proposed NPL..... Proposed National Priority List Sites
Delisted NPL..... National Priority List Deletions
NPL LIENS..... Federal Superfund Liens
CERCLIS..... Comprehensive Environmental Response, Compensation, and Liability Information System
CERC-NFRAP..... CERCLIS No Further Remedial Action Planned
CORRACTS..... Corrective Action Report
RCRA-TSDF..... Resource Conservation and Recovery Act Information
RCRA-LQG..... Resource Conservation and Recovery Act Information
RCRA-SQG..... Resource Conservation and Recovery Act Information

EXECUTIVE SUMMARY

ERNS	Emergency Response Notification System
HMIRS	Hazardous Materials Information Reporting System
US ENG CONTROLS	Engineering Controls Sites List
US INST CONTROL	Sites with Institutional Controls
DOD	Department of Defense Sites
FUDS	Formerly Used Defense Sites
US BROWNFIELDS	A Listing of Brownfields Sites
CONSENT	Superfund (CERCLA) Consent Decrees
ROD	Records Of Decision
UMTRA	Uranium Mill Tailings Sites
ODI	Open Dump Inventory
TRIS	Toxic Chemical Release Inventory System
TSCA	Toxic Substances Control Act
FTTS	FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)
SSTS	Section 7 Tracking Systems
LUCIS	Land Use Control Information System
DOT OPS	Incident and Accident Data
ICIS	Integrated Compliance Information System
DEBRIS REGION 9	Torres Martinez Reservation Illegal Dump Site Locations
HIST FTTS	FIFRA/TSCA Tracking System Administrative Case Listing
US CDL	Clandestine Drug Labs
RADINFO	Radiation Information Database
LIENS 2	CERCLA Lien Information
PADS	PCB Activity Database System
MLTS	Material Licensing Tracking System
MINES	Mines Master Index File
FINDS	Facility Index System/Facility Registry System
RAATS	RCRA Administrative Action Tracking System

STATE AND LOCAL RECORDS

SHWS	Inactive Hazardous Sites Inventory
NC HSDS	Hazardous Substance Disposal Site
IMD	Incident Management Database
SWF/LF	List of Solid Waste Facilities
OLI	Old Landfill Inventory
HIST LF	Solid Waste Facility Listing
LUST	Regional UST Database
LUST TRUST	State Trust Fund Database
UST	Petroleum Underground Storage Tank Database
AST	AST Database
INST CONTROL	No Further Action Sites With Land Use Restrictions Monitoring
VCP	Responsible Party Voluntary Action Sites
DRYCLEANERS	Drycleaning Sites
BROWNFIELDS	Brownfields Projects Inventory
NPDES	NPDES Facility Location Listing

TRIBAL RECORDS

INDIAN RESERV	Indian Reservations
INDIAN LUST	Leaking Underground Storage Tanks on Indian Land
INDIAN UST	Underground Storage Tanks on Indian Land

EDR PROPRIETARY RECORDS

Manufactured Gas Plants	EDR Proprietary Manufactured Gas Plants
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EXECUTIVE SUMMARY

SURROUNDING SITES: SEARCH RESULTS

Surrounding sites were not identified.

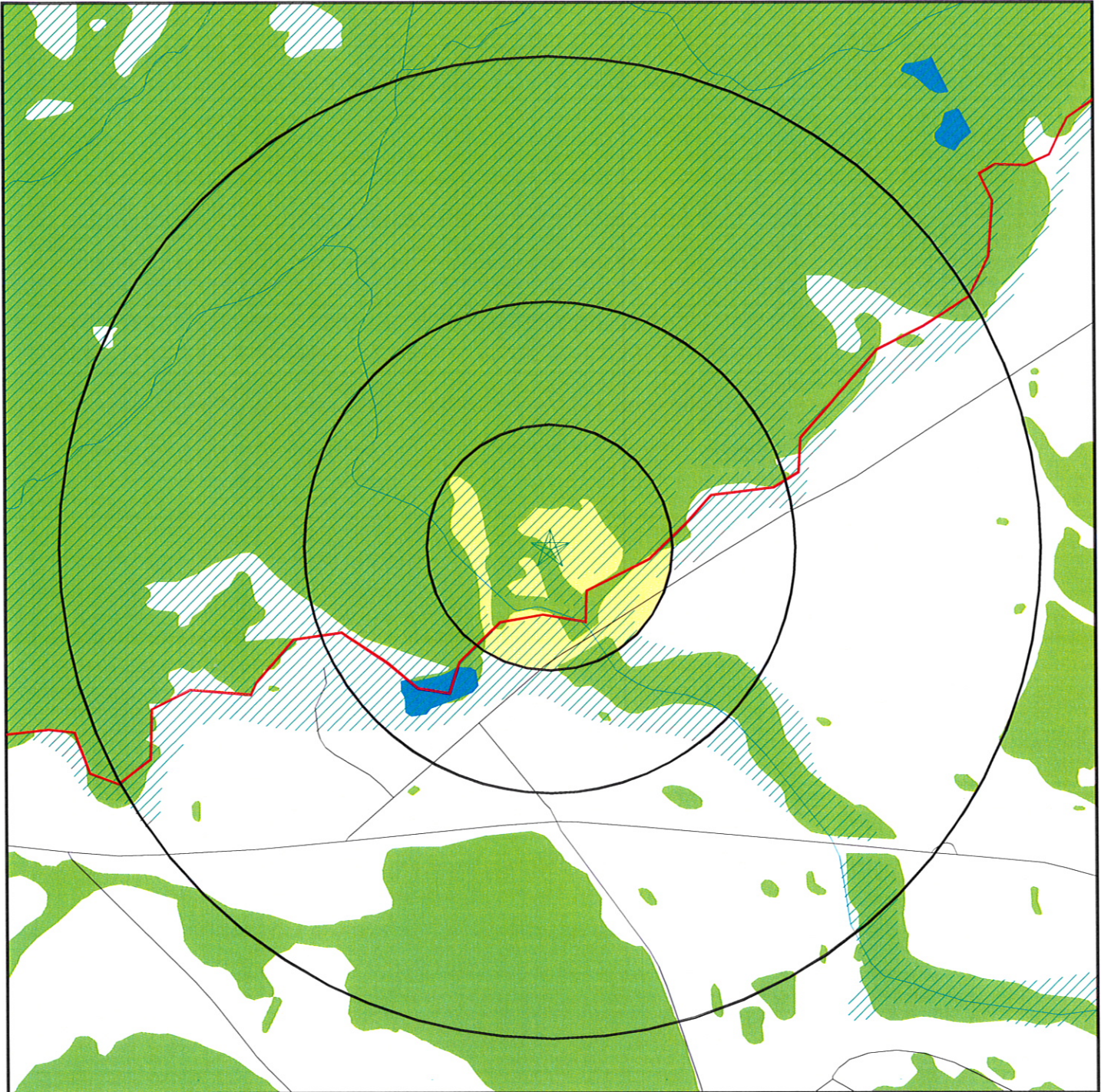
Unmappable (orphan) sites are not considered in the foregoing analysis.

EXECUTIVE SUMMARY

Due to poor or inadequate address information, the following sites were not mapped:

<u>Site Name</u>	<u>Database(s)</u>
EVERGREEN SERVICE CENTER	LUST, IMD
ALLENTON GROCERY	LUST, UST, LUST TRUST, IMD
BRITT'S GROCERY	UST
TYNDALL'S GROCERY	UST
EVERGREEN SERVICE CENTER	UST
OLD 74 GROCERY	UST
OSCAR BAXLEY GROCERY	UST
SMITHS/ALLENTON	UST
SCOTT'S 76	UST
211 QUICK MART	UST
TRAVEL LODGE	UST
REGINA HARDIN	UST
ROBESON CO WATER DEPT	UST
AMERICAN REFUSE SYSTEMS INC	UST
R & J MINI MART	UST
KNOX OLDS-PONTIAC	UST
BILLY COX GROC.	UST
ROBESON CORRECTIONAL CENTER	UST
LONG BRANCH GROCERY	UST
BOISE CASCADE	UST
THE OSTERNECK COMPANY INC.	UST
M. & J. STATION 1	UST
RAFT SWAMP GROCERY	UST
KWIK SHOP 14	UST
BILLY'S AUTO TEXACO	UST
MINUTEMAN 2	UST
SUN DO-KWIK SHOP E.TOWN(BP)	UST
MINUTE MAN 23 (FORM TWIN MART	UST
#56-9131-101	UST
FOX'S HOLSUM BAKERY INC	UST
SOUTHERN STATES	UST
CAROLINA DIV OF CONVERSE RUBBER	AST
FLAIR FOLD CORPORATION	RCRA-SQG, FINDS
COOPERATIVE WAREHOUSE	RCRA-SQG, FINDS
NOBBS AUTO & TRUCK PARTS	RCRA-SQG, FINDS
NASH FINCH CO	RCRA-SQG, FINDS

OVERVIEW MAP - 2097837.2s



- ★ Target Property
- ▲ Sites at elevations higher than or equal to the target property
- ◆ Sites at elevations lower than the target property
- ▲ Manufactured Gas Plants
- ▨ National Priority List Sites
- ▨ Dept. Defense Sites

- ▨ Indian Reservations BIA
- County Boundary
- Oil & Gas pipelines
- ▨ 100-year flood zone
- ▨ 500-year flood zone
- ▨ National Wetland Inventory
- ▨ State Wetlands

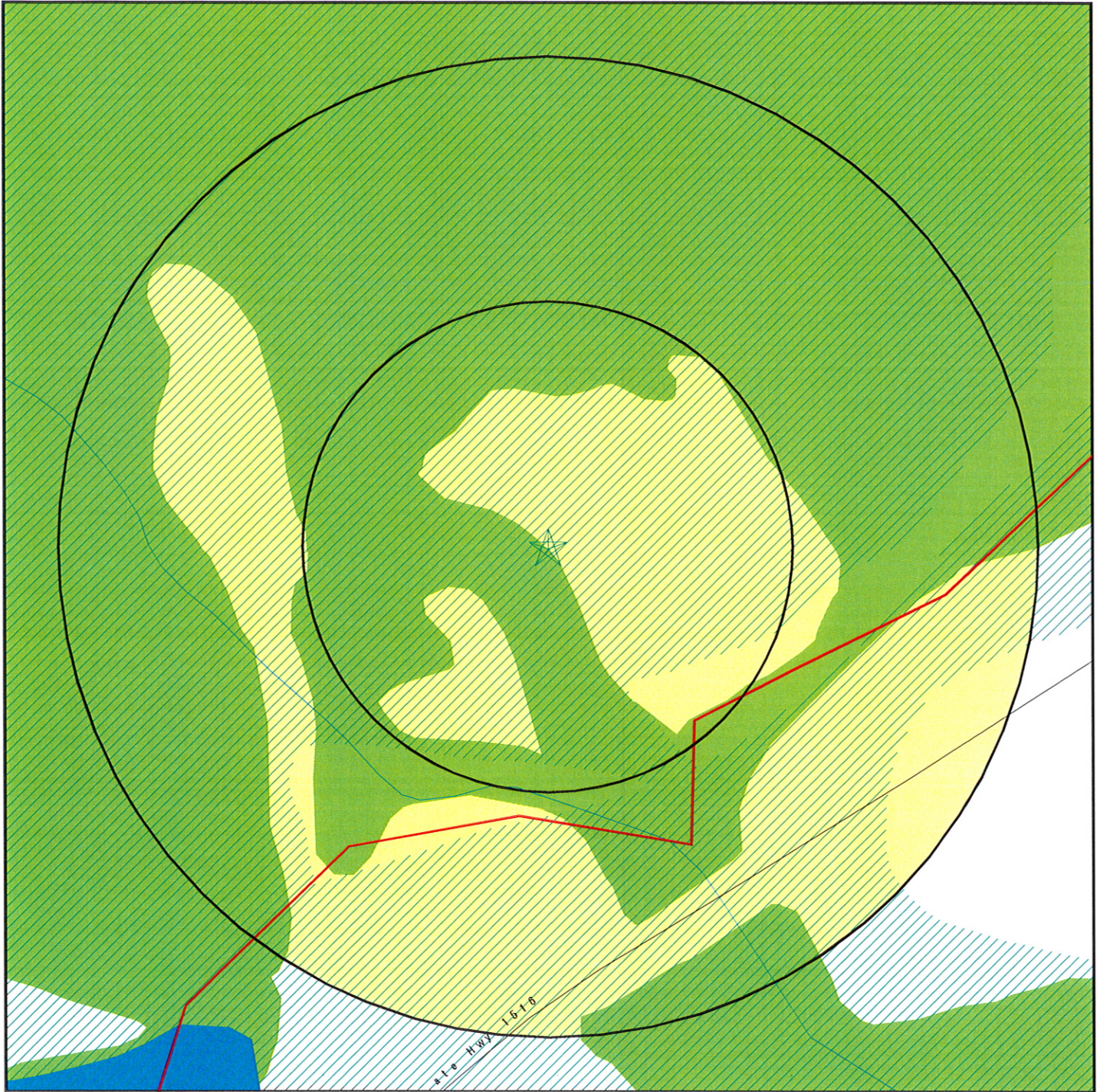
- ▨ Hazardous Substance Disposal Sites

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

SITE NAME: Columbus Swamp
 ADDRESS: 704 Paul Willoughby Road
 Evergreen NC 28358
 LAT/LONG: 34.4592 / 78.9034

CLIENT: Restoration Systems, LLC
 CONTACT: Dave Schiller
 INQUIRY #: 2097837.2s
 DATE: December 11, 2007 1:23 pm

DETAIL MAP - 2097837.2s



- | | | |
|---|------------------------------|------------------------------------|
| ★ Target Property | Indian Reservations BIA | Hazardous Substance Disposal Sites |
| ▲ Sites at elevations higher than or equal to the target property | ↘ County Boundary | |
| ◆ Sites at elevations lower than the target property | ↘ Oil & Gas pipelines | |
| ▲ Manufactured Gas Plants | ▨ 100-year flood zone | |
| ⚡ Sensitive Receptors | ▨ 500-year flood zone | |
| ⚡ National Priority List Sites | ▨ National Wetland Inventory | |
| ⚡ Dept. Defense Sites | ▨ State Wetlands | |

<p>SITE NAME: Columbus Swamp ADDRESS: 704 Paul Willoughby Road Evergreen NC 28358 LAT/LONG: 34.4592 / 78.9034</p>	<p>CLIENT: Restoration Systems, LLC CONTACT: Dave Schiller INQUIRY #: 2097837.2s DATE: December 11, 2007 1:23 pm</p>
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MAP FINDINGS SUMMARY

<u>Database</u>	<u>Target Property</u>	<u>Search Distance (Miles)</u>	<u>< 1/8</u>	<u>1/8 - 1/4</u>	<u>1/4 - 1/2</u>	<u>1/2 - 1</u>	<u>> 1</u>	<u>Total Plotted</u>
<u>FEDERAL RECORDS</u>								
NPL		1.000	0	0	0	0	NR	0
Proposed NPL		1.000	0	0	0	0	NR	0
Delisted NPL		1.000	0	0	0	0	NR	0
NPL LIENS	TP		NR	NR	NR	NR	NR	0
CERCLIS		0.500	0	0	0	NR	NR	0
CERC-NFRAP		0.500	0	0	0	NR	NR	0
CORRACTS		1.000	0	0	0	0	NR	0
RCRA TSD		0.500	0	0	0	NR	NR	0
RCRA Lg. Quan. Gen.		0.250	0	0	NR	NR	NR	0
RCRA Sm. Quan. Gen.		0.250	0	0	NR	NR	NR	0
ERNS	TP		NR	NR	NR	NR	NR	0
HMIRS	TP		NR	NR	NR	NR	NR	0
US ENG CONTROLS		0.500	0	0	0	NR	NR	0
US INST CONTROL		0.500	0	0	0	NR	NR	0
DOD		1.000	0	0	0	0	NR	0
FUDS		1.000	0	0	0	0	NR	0
US BROWNFIELDS		0.500	0	0	0	NR	NR	0
CONSENT		1.000	0	0	0	0	NR	0
ROD		1.000	0	0	0	0	NR	0
UMTRA		0.500	0	0	0	NR	NR	0
ODI		0.500	0	0	0	NR	NR	0
TRIS	TP		NR	NR	NR	NR	NR	0
TSCA	TP		NR	NR	NR	NR	NR	0
FTTS	TP		NR	NR	NR	NR	NR	0
SSTS	TP		NR	NR	NR	NR	NR	0
LUCIS		0.500	0	0	0	NR	NR	0
DOT OPS	TP		NR	NR	NR	NR	NR	0
ICIS	TP		NR	NR	NR	NR	NR	0
DEBRIS REGION 9		0.500	0	0	0	NR	NR	0
HIST FTTS	TP		NR	NR	NR	NR	NR	0
CDL	TP		NR	NR	NR	NR	NR	0
RADINFO	TP		NR	NR	NR	NR	NR	0
LIENS 2	TP		NR	NR	NR	NR	NR	0
PADS	TP		NR	NR	NR	NR	NR	0
MLTS	TP		NR	NR	NR	NR	NR	0
MINES		0.250	0	0	NR	NR	NR	0
FINDS	TP		NR	NR	NR	NR	NR	0
RAATS	TP		NR	NR	NR	NR	NR	0
<u>STATE AND LOCAL RECORDS</u>								
State Haz. Waste		1.000	0	0	0	0	NR	0
NC HSDS		1.000	0	0	0	0	NR	0
IMD		0.500	0	0	0	NR	NR	0
State Landfill		0.500	0	0	0	NR	NR	0
OLI		0.500	0	0	0	NR	NR	0
HIST LF		0.500	0	0	0	NR	NR	0
LUST		0.500	0	0	0	NR	NR	0

MAP FINDINGS SUMMARY

<u>Database</u>	<u>Target Property</u>	<u>Search Distance (Miles)</u>	<u>< 1/8</u>	<u>1/8 - 1/4</u>	<u>1/4 - 1/2</u>	<u>1/2 - 1</u>	<u>> 1</u>	<u>Total Plotted</u>
LUST TRUST		0.500	0	0	0	NR	NR	0
UST		0.250	0	0	NR	NR	NR	0
AST		0.250	0	0	NR	NR	NR	0
INST CONTROL		0.500	0	0	0	NR	NR	0
VCP		0.500	0	0	0	NR	NR	0
DRYCLEANERS		0.250	0	0	NR	NR	NR	0
BROWNFIELDS		0.500	0	0	0	NR	NR	0
NPDES		TP	NR	NR	NR	NR	NR	0
<u>TRIBAL RECORDS</u>								
INDIAN RESERV		1.000	0	0	0	0	NR	0
INDIAN LUST		0.500	0	0	0	NR	NR	0
INDIAN UST		0.250	0	0	NR	NR	NR	0
<u>EDR PROPRIETARY RECORDS</u>								
Manufactured Gas Plants		1.000	0	0	0	0	NR	0

NOTES:

TP = Target Property

NR = Not Requested at this Search Distance

Sites may be listed in more than one database

Map ID
Direction
Distance
Distance (ft.)
Elevation

MAP FINDINGS

Site

Database(s)

EDR ID Number
EPA ID Number

NO SITES FOUND



Natural Resource
Restoration & Conservation

November 14, 2007

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

Subject: EEP-Columbus Swamp Wetland Restoration Site, Contract Number 000619

Dear Ms. Gledhill-Earley,

Restoration Systems, LLC (RS) has been awarded a contract by the Ecosystem Enhancement Program (EEP) to implement the Columbus Swamp wetland restoration project in Robeson County. As required by the contract, RS requests your review of the project and any comments that you may have with respect to archaeological or historical resources associated with it. The location of the project is shown on the attached maps (Figures 1 and 2).

The Columbus Swamp Wetland Restoration site has been identified for the purpose of providing in-kind mitigation for unavoidable wetland impacts. The Site, a previously drained (ditched) wetland, currently encompasses approximately 32 acres of mixed use agricultural land (Figure 3). No architectural structures or archeological artifacts have been observed or noted during preliminary surveys of the site for restoration purposes. In addition, the majority of this site has historically been disturbed due to agricultural purposes such as hay and row crop production. The ground disturbance activities required to complete this project will only impact those areas that have previously been impacted due to these agricultural practices.

The site is located in southeastern Robeson County within the floodplain of the Lumber River (Figure 2). More specifically, the Site lies within a tributary of the Lumber River known as 'Big Swamp', an expansive Coastal Plain, Bottomland Hardwood Forest containing inclusions of Cypress-Gum swamp in sloughs. The site is approximately 3.5 miles due north of Evergreen, NC. More precisely, the Site is located due north of Paul Willoughby Road (SR 1519) and can be accessed through dirt farm roads (Figures 3). The project involves the restoration of the hydrology of the site by filling in approximately 8,000 linear feet of existing drainage ditches. The property is owned by Mr. and Mrs. Corbett Fields.

We request that you review this site based on the information provided to determine if you know of any existing resources that we need to know about. In addition, please provide us with your comments regarding the proposed project.

Thank you in advance for your timely response and cooperation. Please feel free to contact me at the office (919) 755-9490 or on my cell phone (919) 609-9711 if you have any questions.

Best Regards,

A handwritten signature in cursive script, appearing to read "P. Steele".

Preston Steele, Project Manager

Attachments: 3 maps



North Carolina Department of Cultural Resources
State Historic Preservation Office

Peter B. Sandbeck, Administrator

Michael F. Easley, Governor
Lisbeth C. Evans, Secretary
Jeffrey J. Crow, Deputy Secretary

Office of Archives and History
Division of Historical Resources
David Brook, Director

November 27, 2007

Preston Steele
Restoration Systems, LLC
1101 Haynes Street
Suite 107
Raleigh, NC 27604

Re: Columbus Swamp Wetland Restoration, Contract Number 000619, Robeson County, ER 07-2441

Dear Mr. Steele:

Thank you for your letter of November 14, 2007, concerning the above project.

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

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

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

Sincerely,

Peter Sandbeck

RECEIVED
DEC 03 2007

BY:.....

March 1, 2007

Mr. Corbet Fields
704 Paul Willoughby Rd.
Evergreen, NC
28438

Dear Mr. Fields:

The purpose of this letter is to notify you that Restoration Systems, LLC, in offering to purchase your property in Robeson County, North Carolina, does not have the power to acquire it by eminent domain. Also, Restoration Systems' offer to purchase your property is based on what we believe to be its fair market.

If you have any questions, please feel free to call me at 919-755-9490

Sincerely,

A handwritten signature in black ink, appearing to read "P. Steele". The signature is written in a cursive style with a large initial "P" and a long, sweeping underline.

Preston Steele
Project Manager

February 6, 2008

MEMO TO: Preston Steele, Project Manager
 FROM: Randy Turner *RT*
 SUBJECT: Columbus Swamp Mitigation Site: Biological Conclusions for Federally Listed Species documented For Columbus and Robeson Counties

Based on the most recently updated (01/31/08) county-by-county database of federally listed species in North Carolina as posted by the United States Fish and Wildlife Service (USFWS) at <http://nc-es.fws.gov/es/countyfr.html>, Seven (7) federally protected species are listed for Columbus County and three (3) for Robeson County. Table 1 lists the federally protected species for both counties and indicates if potential habitat exists within the Site for each species.

Table 1. Federally Protected Species for Columbus and Robeson Counties

Common Name	County (C or R)	Scientific Name	Status*	Habitat Present	Biological Conclusion
American alligator	C and R	<i>Alligator mississippiensis</i>	T S/A	Yes	N/A
Bald eagle	C	<i>Haliaeetus leucocephalus</i>	Bald and Golden Eagle Protection Act	No	No Effect
Wood stork	C	<i>Mycteria americana</i>	Endangered	No	No Effect
Red-cockaded woodpecker	C and R	<i>Picoides borealis</i>	Endangered	No	No Effect
Short-nosed sturgeon	C	<i>Acipenser brevirostrum</i>	Endangered	No	No Effect
Waccamaw silverside	C	<i>Menidia extensa</i>	Threatened	No	No Effect
Rough-leaved loosestrife	C	<i>Lysimachia asperulaefolia</i>	Endangered	No	No Effect
Michaux's sumac	R	<i>Rhus michauxii</i>	Endangered	No	No Effect

*Endangered = a taxon "in danger of extinction throughout all or a significant portion of its range"; Threatened = a taxon "likely to become endangered within the foreseeable future throughout all or a significant portion of its range"; Threatened (S/A) = a species that is threatened due to similarity of appearance with other rare species and is listed for its protection; these species (T S/A) are not biologically endangered or threatened and are not subject to Section 7 consultation.

The analyses conducted on behalf of each species listed above includes:

- Review of each listed species' natural history including bloom window, soil relationships, general habitat requirements; elevation restrictions, etc.
- Thorough evaluation of all habitats within the conservation easement of the project, not just areas likely to be disturbed by construction;
- Formulation of conclusions about Site availability of suitable habitat for each species;
- Development of biological conclusions.

Field evaluations were conducted in May 2007 and January 2008. Of the eight (8) listed species, only one (1), the American alligator has any reasonable chance of occurring within or near the project conservation easement. The other seven listed species, including the bald eagle, the wood stork, the red-cockaded woodpecker, the short-nosed sturgeon, the Waccamaw silverside (a minnow endemic to Lake Waccamaw and related drainages), and two rare plants, rough-leaved loosestrife and Michaux's sumac, will not occur within or adjacent to the Site conservation easement because of the absence of suitable habitat.

- **Bald eagle:** Although, adequate nesting and foraging habitat occurs adjacent to the Lumber River, located 5-10 miles northwest and at Lake Waccamaw, more than five miles to the southeast, Big Swamp, which is located along the north side of the project conservation easement does not provide enough open water to constitute foraging habitat for this species. A review of the National Bald Eagle Management Guidelines (USFWS, 2007) confirms that the project's activities will not constitute a disturbance, or "take" of the bald eagle.
- **Wood Stork:** Storks are birds of freshwater and brackish wetlands, primarily nesting in cypress or mangrove swamps. They feed in freshwater marshes, narrow tidal creeks, or flooded tidal pools. Particularly attractive feeding sites are depressions in marshes or swamps where fish become concentrated during periods of falling water levels. Post breeding storks from Florida disperse as far north as North Carolina. For more than 20 years, Yellow counties indicate an obscure data reference to the species in the county. a colony of wood storks ranging from 15-100 individuals frequent Sunset Beach during early June through mid September. This colony represents the northernmost extent of this Federally-endangered species' migration. No other such colony is known to occur in North Carolina.
- **Red-cockaded woodpecker:** This endangered bird occurs only in forested areas dominated by coniferous trees, primarily long leaf pine. Pines must be at least 30 years old to provide adequate forage, and at least 60 years old, on the average, to provide suitable nesting habitat. No pine, or cypress-dominated forest stands occur within the project's conservation easement.
- **Short-nosed sturgeon:** This endangered fish is anadromous and moves upstream along the Atlantic coast during seasonal spawning migrations. Its migratory streams must have deep channels. No streams occur within the project conservation easement.
- **Waccamaw silverside:** This small fish is known only from Lake Waccamaw and the upper Waccamaw River drainage in Columbus County, North Carolina. The silverside is found in the upper Waccamaw River only during periods of high water and is not a permanent resident. The project watershed lies in Lumber 03, while the silverside is endemic to Lumber 06.

- **Rough-leaved loosestrife:** This species generally occurs in the ecotones or edges between longleaf pine uplands and pond pine pocosins (areas of dense shrub and vine growth usually on a wet, peaty, poorly drained soil) on moist to seasonally saturated sands and on shallow organic soils overlaying sand. The principle habitat matrix associated with this species is pine, which is substantially absent from the lands adjacent to the project conservation easement.
- **Michaux's sumac:** grows in sandy or rocky open woods in association with basic soils. Apparently, this plant survives best in areas where some form of disturbance has provided an open area. At least twelve of the plant's populations in North Carolina are on highway rights-of way, roadsides, or on the edges of artificially maintained clearings. Two other populations are in areas with periodic fires, and two populations exist on sites undergoing natural succession. The project site and its surrounding area is typically PC lands, or existing hardwood wetland without basic soils.

American alligator

Although alligators may occasionally occur in the inflow canal from the Lumber River and its bottomland drainages, this canal will be plugged during ditch filling activities within the project's conservation easement. Their mobility and avoidance behavior will ensure that any local specimens will stay outside the project area during ditch filling activities. Since the species' status is "T S/A", consultation with the Fish and wildlife Service is not required.

Biological Conclusions

Based upon the absence of suitable nesting or foraging habitat within the conservation easement of the subject project, it is reasonable to conclude the project will have **No Effect** on any of the listed species.



Natural Resource
Restoration & Conservation

November 14, 2007

USDA/NRCS
Lumberton Field Office
County Office Hwy. 72
440 A Canton Rd.
Lumberton, NC
28360

ATTN: Doug Wassum

SUBJECT: Completion of NRCS Form AD-1006 for Columbus Swamp Wetland Restoration Full Delivery Project (Contract Number 000619) in compliance with the Farmland Protection Policy Act.

Mr. Wassum,

Restoration Systems, LLC (RS), of Raleigh, NC has been awarded a contract by the EEP to provide 32 Wetland Mitigation Units at the Columbus Swamp Wetland Restoration Site in Robeson County, North Carolina.

One of the earliest tasks to be performed by RS is completion of an environmental screening and preparation/submittal of a Categorical Exclusion (CE) document. This document is specifically required by the Federal Highway Administration (FHWA) to ensure compliance with various federal environmental laws and regulations. The EEP must demonstrate that its projects comply with federal mandates as a precondition to FHWA reimbursement of compensatory mitigation costs borne by the North Carolina Department of Transportation to offset its projects' unavoidable impacts to streams and wetlands.

In order for the project to proceed, RS is obligated to coordinate with the NRCS to complete Form AD-1006 in compliance with the Farmland Protection Policy Act on behalf of the FHWA. The purpose of this letter is to request your assistance in completion of the Form.

The 32 acre Columbus Swamp Wetland Restoration Site is located in southeastern Robeson County within the floodplain of the Lumber River. More specifically, the Site lies within a tributary of the Lumber River known as 'Big Swamp', an expansive Coastal Plain, Bottomland Hardwood Forest containing inclusions of Cypress-Gum swamp in

sloughs. The site is approximately 3.5 miles due north of Evergreen, NC. More precisely, the Site is located north of Paul Willoughby Road (SR 1519) and can be accessed through dirt farm roads (Figures 1 and 2). The project involves the restoration of the hydrology of the site by filling in approximately 8,000 linear feet of existing drainage ditches. A map (Figure 3) depicting the type of soils within the area of restoration as well as the total acreage is included.

The Columbus Swamp Wetland Restoration site has been identified for the purpose of providing in-kind mitigation for unavoidable wetland impacts. The Site, a previously drained (ditched) wetland, currently encompasses approximately 32 acres of mixed use agricultural land (Figure 3). The majority of this site has been used for agricultural purposes such as hay and row crop production.

Should you have any questions or if any additional information is needed to complete the Form, please feel free to contact me at the office (919) 755-9490 or on my cell phone (919) 609-9711. Your valuable time and cooperation are much appreciated.

ext. 9122

Best Regards,



Preston Steele, Project Manager

Attachments: 3 maps

*Preston Steele
1101 Haynes St.
Ste 211
Raleigh NC 27604*

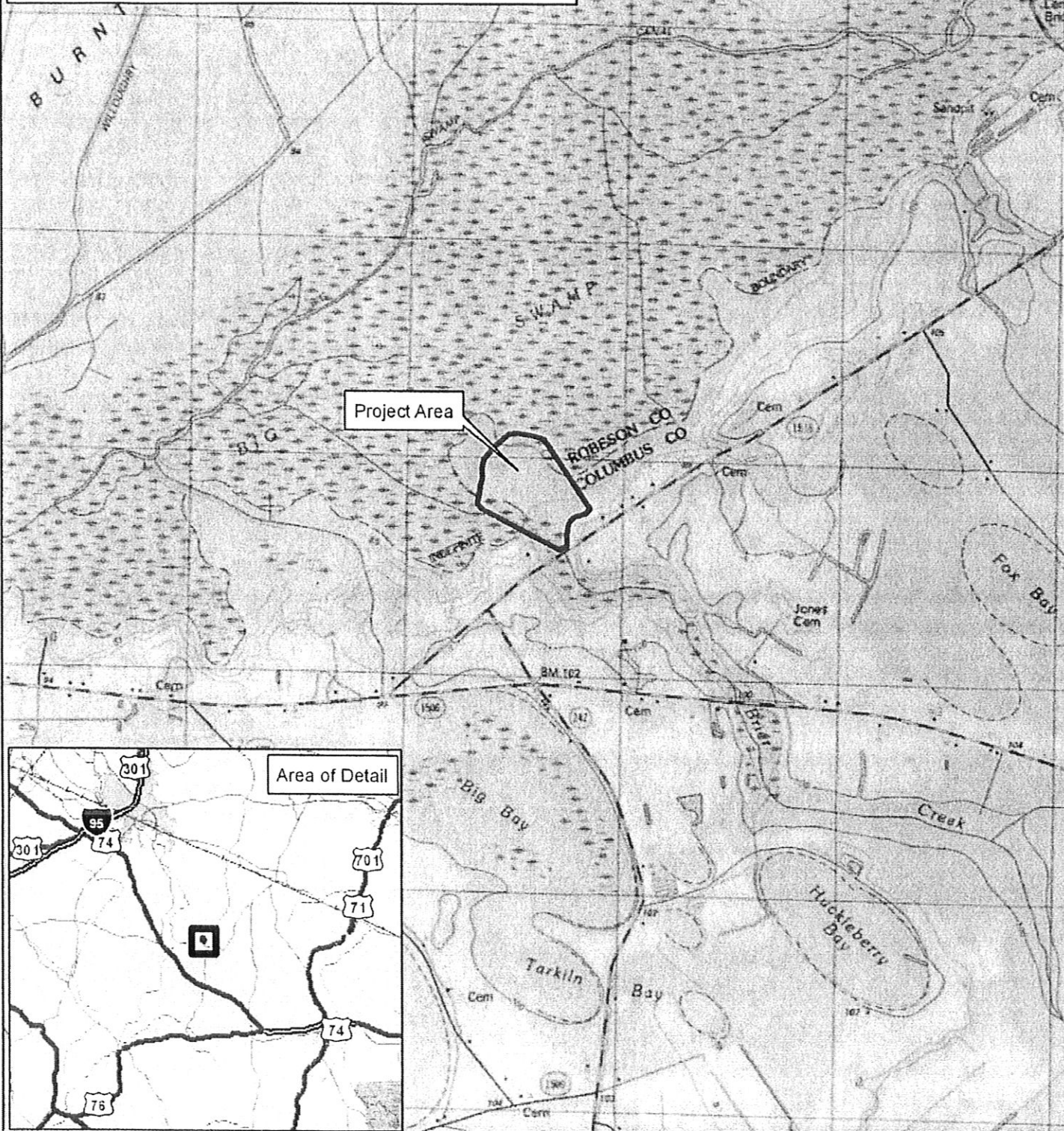
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NOV 30 2007

BY:

FARMLAND CONVERSION IMPACT RATING

PART I (To be completed by Federal Agency)		Date Of Land Evaluation Request 11-14-07			
Name Of Project Columbus Swamp Wetland Restoration		Federal Agency Involved			
Proposed Land Use Wetland Mitigation		County And State Robeson Co., NC			
PART II (To be completed by NRCS)		Date Request Received By NRCS			
Does the site contain prime, unique, statewide or local important farmland? <i>(If no, the FPPA does not apply -- do not complete additional parts of this form).</i>		Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>	Acres Irrigated	Average Farm Size
Major Crop(s) Corn	Farmable Land In Govt. Jurisdiction Acres: 493,220	% 89.2		Amount Of Farmland As Defined in FPPA Acres: 469,352	% 77.3
Name Of Land Evaluation System Used Robeson	Name Of Local Site Assessment System NONE	Date Land Evaluation Returned By NRCS			
PART III (To be completed by Federal Agency)		Alternative Site Rating			
		Site A	Site B	Site C	Site D
A. Total Acres To Be Converted Directly		32			
B. Total Acres To Be Converted Indirectly		0			
C. Total Acres In Site		0.0 32	0.0	0.0	0.0
PART IV (To be completed by NRCS) Land Evaluation Information					
A. Total Acres Prime And Unique Farmland		0			
B. Total Acres Statewide And Local Important Farmland		0			
C. Percentage Of Farmland In County Or Local Govt. Unit To Be Converted		0			
D. Percentage Of Farmland In Govt. Jurisdiction With Same Or Higher Relative Value		0			
PART V (To be completed by NRCS) Land Evaluation Criterion Relative Value Of Farmland To Be Converted (Scale of 0 to 100 Points)		0	N/A	0	0
PART VI (To be completed by Federal Agency) Site Assessment Criteria (These criteria are explained in 7 CFR 658.5(b))		Maximum Points			
1. Area In Nonurban Use					
2. Perimeter In Nonurban Use					
3. Percent Of Site Being Farmed					
4. Protection Provided By State And Local Government					
5. Distance From Urban Builtup Area					
6. Distance To Urban Support Services					
7. Size Of Present Farm Unit Compared To Average					
8. Creation Of Nonfarmable Farmland					
9. Availability Of Farm Support Services					
10. On-Farm Investments					
11. Effects Of Conversion On Farm Support Services					
12. Compatibility With Existing Agricultural Use					
TOTAL SITE ASSESSMENT POINTS		160	0	0	0
PART VII (To be completed by Federal Agency)					
Relative Value Of Farmland (From Part V)		100	0	0	0
Total Site Assessment (From Part VI above or a local site assessment)		160	0	0	0
TOTAL POINTS (Total of above 2 lines)		260	0	0	0
Site Selected:		Date Of Selection		Was A Local Site Assessment Used? Yes <input type="checkbox"/> No <input type="checkbox"/>	
Reason For Selection:					

- Directions from I-95 (Heading South):
1. Take US-74 (Exit 14)- Turn left onto US-74 East.
 2. Travel 15.2 Miles and then take sharp left onto Old Boardman Rd.
(Note: Old Boardman Rd. becomes Old Boardman Hwy.)
 3. Travel 2.8 Miles and turn left onto Paul Willoughby Rd.
 4. Travel 0.6 Miles to site on left.

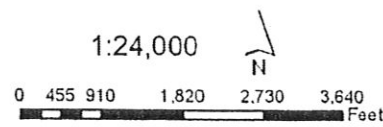


RS
RESTORATION
SYSTEMS, LLC

Restoration Systems, LLC
1101 Haynes St. Suite 211
Raleigh, NC 27604
tel: 919.755.9490

Figure 1:
Project
Location

Columbus Swamp Restoration
Project
Robeson County, NC





Natural Resource
Restoration & Conservation

November 14, 2007

U. S. Department of the Interior
Fish and Wildlife Service
Raleigh Field Office
P.O. Box 33726
Raleigh, NC
27636-3726

ATTN: Dale Suiter, Fish and Wildlife Biologist

SUBJECT: Coordination with the U.S. Fish and Wildlife Service on Behalf of (1) Fish and Wildlife Coordination Act and (2) Migratory Bird Treaty Act for the Brown Marsh Swamp.

Mr. Suiter,

Restoration Systems, LLC (RS), of Raleigh, NC has been awarded a contract by the EEP to provide 32 acres of wetland mitigation at the Columbus Swamp Wetland Restoration Site. One of the earliest tasks to be performed by RS is completion of an environmental screening and preparation/submittal of a Categorical Exclusion (CE) document. This document is specifically required by the Federal Highway Administration (FHWA) to ensure compliance with various federal environmental laws and regulations. The EEP must demonstrate that its projects comply with federal mandates as a precondition to FHWA reimbursement of compensatory mitigation costs borne by the North Carolina Department of Transportation to offset its projects' unavoidable impacts to streams and wetlands.

In order for the project to proceed, RS is obligated to coordinate with your office on behalf of the Fish and Wildlife Coordination Act (FWCA) and the Migratory Bird Treaty Act (MBTA). This letter provides you with certain details of the Columbus Swamp Wetland Restoration Site, including the project's location, a general description of its physiography, hydrography and existing land uses, as well as the intended modifications to the site proposed by RS. You are encouraged to determine if the actions proposed by RS may be inimical to any resources embraced by the FWCA, or the MBTA and provide comments to RS based on your evaluation. It is reasonable to assume that the Service will comment if the actions proposed by RS are, in the Service's opinion, likely to result in harm to resources embraced by the FWCA or the MBTA.

Project Location & Description

The 32 acre Columbus Swamp Wetland Restoration Site is located in southeastern Robeson County within the floodplain of the Lumber River. More specifically, the Site lies within a tributary of the Lumber River known as 'Big Swamp', an expansive Coastal Plain, Bottomland Hardwood Forest containing inclusions of Cypress-Gum swamp in sloughs. The site is approximately 3.5 miles due north of Evergreen, NC. More precisely, the Site is located north of Paul Willoughby Road (SR 1519) and can be accessed through dirt farm roads (Figures 1 and 2). The project involves the restoration of the hydrology of the site by filling in approximately 8,000 linear feet of existing drainage ditches. The Site is located on a single parcel consisting of agricultural fields utilized primarily for row crop production (Figure 3, Appendix A). The site has been historically drained by a ditch system as depicted on Figure 3. The ditch system consists of a perimeter ditch that borders the Site to the north and west, and five ditches that traverse the Site. The smaller ditches drain into the perimeter ditch, which empties into Brier Creek. Brier Creek then travels northward into Big Swamp.

Restoration Means & Methods

The primary goals of this riparian wetland restoration project focus on improving wildlife habitat and restoring vital wetland functions to an area that has been functioning as an agricultural area for decades. Restoration on the Site will focus on the restoration of vegetative communities, elevating groundwater tables to replicate jurisdictional hydrological conditions, and the reestablishment of soil structure and topographic variations within the existing floodplain.

Restoration of wetland hydrology and wetland soil attributes will involve 1) ditch cleaning prior to backfill, 2) ditch plug installation, 3) ditch backfill, and 4) scarification of soils prior to planting. In addition, the construction of (or provisions for) surface water storage depressions (ephemeral pools) also adds an important component to groundwater restoration activities. These activities will restore 32 acres of wetland at the Site (Figure 3).

Summary of Anticipated Effects

We anticipate that the immediate effects of this project (construction phase) will cause ground disturbance within the project area due to the use of heavy machinery to complete construction. Again, this site has historically received extensive ground disturbance due to agricultural operations. The long term effects of this project (post construction) will result in an overall enhancement to the integrity of the immediate ecosystems and result in long term beneficial effects to fish or wildlife. This site will also be protected in perpetuity with a conservation easement.

Dale Suiter, USFWS

Page 3

Date: 11/14/2007

Should you have any questions or if any additional information is needed to complete your review, please feel free to contact me at the office (919) 755-9490 or on my cell phone (919) 609-9711. Your valuable time and cooperation are much appreciated.

Sincerely,

Preston Steele, Project Manager

Attachments: 2 maps



Natural Resource Restoration & Conservation

November 14, 2007

North Carolina Wildlife Resources Commission
Division of Inland Fisheries
Falls Lake Office
1 142 1-85 Service Road
Creedmoor, NC 27522

ATTN: David Cox, Technical Guidance Supervisor

SUBJECT: Coordination with the North Carolina Wildlife Resources Commission on Behalf of the Fish and Wildlife Coordination Act for the Columbus Swamp Wetland Restoration Site (Contract Number : 000619)

Mr. Cox:

Restoration Systems, LLC (RS), of Raleigh, NC has been awarded a contract by the EEP to provide 32 acres of riparian wetland restoration at the Columbus Swamp Wetland Restoration Site. One of the earliest tasks to be performed by RS is completion of an environmental screening and preparation/submittal of a Categorical Exclusion (CE) document. This document is specifically required by the Federal Highway Administration (FHWA) to ensure compliance with various federal environmental laws and regulations. The EEP must demonstrate that its projects comply with federal mandates as a precondition to FHWA reimbursement of compensatory mitigation costs borne by the North Carolina Department of Transportation to offset its projects' unavoidable impacts to streams and wetlands.

In order for the project to proceed, RS is obligated to coordinate with your office on behalf of the Fish and Wildlife Coordination Act (FWCA). This letter provides you with certain details of the Columbus Swamp Wetland Restoration Site, including the project's location, a general description of its physiography, hydrography and existing land uses, as well as the intended modifications to the site proposed by RS. You are encouraged to determine if the actions proposed by RS may be inimical to any resources embraced by the FWCA, and provide comments to RS based on your evaluation. It is reasonable to assume that you will comment if the actions proposed by RS are, in your opinion, likely to result in harm to resources embraced by the FWCA.

Project Location & Description

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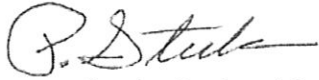
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Should you have any questions or if any additional information is needed to complete your review, please feel free to contact me at the office (919) 755-9490 or on my cell phone (919) 609-9711. Your valuable time and cooperation are much appreciated.

Sincerely,

A handwritten signature in cursive script, appearing to read "P. Steele".

Preston Steele, Project Manager

Attachments: 3 maps

Advertising Receipt

The Robesonian
P.O. Box 1028
Lumberton, NC 28359
Phone: 910-739-4322
Fax: 910-739-6553

Restoration Systems LLC
1101 Haynes St
Suite 211
RALEIGH, NC 27604

Cust#: 02104825-000
Ad#: 03540752
Phone: (919)755-9490
Date: 11/19/07

Ad taker: 12 Salesperson: Classification: 230

Description	Start	Stop	Ins.	Cost/Day	Surcharges	Total
01 Robesonian	11/20/07	11/20/07	1	46.64		46.64

Payment Reference:

Total: 46.64
Tax: 0.00
Net: 46.64
Prepaid: 46.64

Public Notice of Opportunity for an Informational Public Meeting on the Purchase and/or Use of Property for the Restoration of Wetlands

Robeson County – Restoration Systems, L.L.C. proposes to purchase and/or use a 37+/- acre tract of land in Robeson County, North Carolina. The purpose of acquiring and/or using this property is to provide mitigation for impacts to wetlands that will result from existing or future development in this area. Anyone desiring that an informational public meeting be held for this proposed action may make such a request by registered letter c/o Preston Steele to Restoration Systems located at 1101 Haynes Street (Suite 211), Raleigh, NC 27604. Request must be made by December 20, 2007. If additional information is required, please contact Preston Steele at (919) 755-9490. The NC Ecosystem Enhancement Program reserves the right to determine if a public meeting will be held.

Total Due	0.00
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**PUBLIC NOTICE of
Opportunity for an In-
formational Public
Meeting on the Pur-
chase and/or Use of
Property for the Re-
storation of Wetlands**

Robeson County – Restoration Systems, L.L.C. proposes to purchase and/or use a 37+/- acre tract of land in Robeson County, North Carolina. The purpose of acquiring and/or using this property is to provide mitigation for impacts to wetlands that will result from existing or future development in this area. Anyone desiring that an informational public meeting be held for this proposed action may make such a request by registered letter c/o Preston Steele to Restoration Systems located at 1101 Haynes Street (Suite 211), Raleigh, NC 27604. Request must be made by December 20, 2007. If additional information is required, please contact Preston Steele at (919) 755-9490. The NC Ecosystem Enhancement Program reserves the right to determine if a public meeting will be held.