"Simpson Tract"
Non-Riverine Wetland Restoration Project

Beaufort County, NC
Tar-Pamlico River Basin
(Cataloging Unit #03020104)

Site-Specific Restoration Plan
(Task 3)

NC EEP Contract #D05027-1

Prepared For:

North Carolina Department of Environment and Natural Resources
Ecosystem Enhancement Program
1652 Mail Service Center
Raleigh, NC 27699-1652

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Submitted By:

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EXECUTIVE SUMMARY

The proposed restoration project at the Simpson Tract Property is intended to provide suitable, high-quality non-riverine wetland restoration as compensatory mitigation for wetland impacts authorized through the North Carolina Ecosystem Enhancement Program (EEP). The objective of the project is to provide for the functional restoration of non-riverine swamp forest via the re-establishment of a characteristic vegetative community and hydrologic regime. Anticipated functions and values resulting from the restoration project include increased nutrient retention, nutrient cycling, floodwater storage, and flood abatement In addition, the project will provide ancillary benefits to aquatic and wildlife habitat via enhanced niche habitat, microclimate modification and shade, and increased food-web support.

The Simpson Tract Property is currently managed for silvicultural production. The project site consists entirely of monoculture pine stands with sparse hardwood colonization. Under contract with the EEP, Wetland Resource Center, LLC (WRC) will restore 30.0 acres of non-riverine wetland which drain south into the Pungo Canal (a tributary of the Pungo River) in Beaufort County, NC.

The following site-specific restoration plan provides site information related to existing conditions and watershed characteristics. In addition, more specific information regarding project implementation and monitoring is enclosed.

1.0 PROJECT SITE IDENTIFICATION AND LOCATION

As approved by the EEP, WRC has targeted 30.0 acres of land currently managed for silvicultural production located at the headwaters of Pungo Creek, a fourth-order tributary of the Pungo River within the Tar-Pamlico River Basin (USGS 8-digit Hydrologic Unit 03020104; DWQ Subbasin 03-03-07). The project site is located west of NC Route 32 in Beaufort County, NC (Figure 1.).

Directions to the project site from Raleigh (NC) are provided below:

> *From Raleigh (NC), take Highway 64 East to Washington. Out of Washington, take NC 32 north towards Plymouth. Continue north on NC 32 for 16 miles . Rodman Road will be on your left .Continue down Rodman Road until it dead ends. The restoration site is located to the north of the dead end road.*

2.0 WATERSHED CHARACTERIZATION

Non-riverine wetlands in the Outer Coastal Plain provide a number of functions necessary to support adequate water quality parameters in the region. These wetlands provide for flood retention and abatement, nutrient transformation, and habitat. As these systems are typically located in the headwaters area, the value of these functions is even greater due to the potential for increased residence time. At the present time, these functions have been compromised through the extensive silvicultural management of the site (ditching, bedding, clear-cutting, etc.). The Pungo River and its tributaries, in particular, have exhibited significant water quality impairments associated with low dissolved oxygen (DO), high total nitrogen (TN), and high total phosphorus (TP). High nutrient concentrations originate from non-point source loading associated with intensive agricultural and silvicultural practices common throughout the watershed. These impairments are likely exacerbated by channelization of local streams, resulting in diminished nutrient uptake in riparian areas. Furthermore, hypoxic/anoxic conditions and toxic algal blooms have contributed to various fish kills reported in the Pungo River over the past 10 years.

The tract consists of Dare muck (Typic Medisaprist) and Croatan muck (Terric Medisaprist) (Figure 2). The Dare series consists of nearly level, very poorly drained soils with organic muck to 60” below the soil surface. The Croatan series consists of very poorly drained soils of shallow depressions of headwater swamps. The organic surface is typically to 24 inches and is underlain by clay loam. Both soil series were formed in marine sediments and typically occur along broad flats of interstream divides. Under natural conditions (i.e. not drained), the seasonal high water table is at or near the surface, and permeability is slow.

Elevations of the project area range from 37.0 ft to 40.0 ft above mean sea level (MSL). Several large “blueline” ditches drain the site towards the Pungo Canal (Figure 3).

3.0 EXISTING CONDITIONS

The 30-acre restoration area is part of a larger tract of land (1,391 acres). Approximately 950 acres have been determined to be non-jurisdictional ("non-wetlands") by the NRCS (USACE concurrence of this determination has also been provided). The remaining acreage has been confirmed to be jurisdictional wetlands. The predominant land use of the tract (both jurisdictional and non-jurisdictional areas) is silvicultural production. Prior land use practices (including herbicide, pesticide, and fertilizer application) serve as potential contributors to decreased water quality of adjacent surface waters (i.e. ditches and 'blue-line' streams). The natural vegetative assemblage of the tract has been modified over the years via prescribed drainage improvements (i.e. ditching), bedding, and planting of loblolly pine (*Pinus taeda*). These silvicultural practices have resulted in a community dominated by pine in more mature stands outside of the proposed wetland restoration area. Hardwood species characteristic of headwater swamp communities of the Coastal Plain are either absent entirely or occur only in sparse locations. Typical canopy species of an undisturbed area would include swamp tupelo (*Nyssa biflora*), bald cypress (*Taxodium distichum*), pond pine (*Pinus serotina*), and Atlantic white cedar (*Chamaecyparis thyoides*). Understory species typical of non-riverine swamp forest communities include American titi (*Cyrilla racemiflora*), sweet bay (*Magnolia virginiana*), red bay (*Persea borbonia*), fetterbush (*Lyonia lucida*), red maple (*Acer rubrum*), and catbrier (*Smilax* species). Photographs documenting pre-project conditions are provided in Appendix A.

Threatened and Endangered Species: A review of threatened and endangered species potentially occurring on the site was conducted at the North Carolina Heritage Program office. The Simpson Tract project is located within the Hoke quadrangle. A review of this area revealed two threatened or endangered species within a 1 $mi.^2$ area. Several state listed species were found to the northeast, within the Van Swamp Gameland. The Black-throated Green Warbler (*Dendroica virens waynei*) is listed as a significantly rare species. The Red-cockaded Woodpecker (*Picoides borealis)* is listed as an endangered species due to deterioration of suitable habitat. Each of these species utilizes habitats (cypress swamps and long-leaf pine savannahs) not occurring within the immediate vicinity of the wetland restoration area. Therefore, no impact to these listed species is anticipated.

Cultural Resources: The project will not have an effect on any structures/properties eligible or listed on the National Register of Historic Places. Based upon a review of maps at the North Carolina Office of Archives and History, there are no known significant archaeological resources on the buffer restoration site.

Potential Constraints: Current ownership of the property resides with Thomas D. Simpson. A copy of the recorded conservation easement deed is included as Appendix B.

The site is situated within a large 1,391 acres and is unencumbered for ingress and egress for restoration, monitoring, and management activities. There are no known utilities within the conservation easement area. Based upon drainage influence of interior ditches, ditch modifications will affect the hydrology of those areas contained within the restoration site. Beyond these areas, hydrology is influenced by ditches and/or canals to be left undisturbed. Therefore, there will be no hydrologic trespass issues for adjacent properties.

4.0 PROJECT SITE RESTORATION PLAN

Based upon site assessments, 30.0 acres of non-riverine wetland habitat will be restored on-site. The proposed restoration project is intended to provide suitable, high-quality non-riverine wetland restoration as compensatory mitigation for wetland impacts authorized through the EEP. The objective of the project is to restore wetland vegetation and hydrologic conditions characteristic of headwater swamp forests. The enclosed site plan (Figure 4) depicts areas targeted for non-riverine wetland restoration.

The area located within the proposed 30-acre site will be restored via plugging of ditches and vegetative plantings. Initial site preparation will include grubbing and herbicide application for control of invasive and/or noxious species. A water-soluble herbicide mixture (e.g. Accord, Rodeo, Chopper, Garlon 4, or equivalent) will be applied with standard rates and methodology suitable for wetland mitigation site development. Herbicide application will be conducted during a period considered optimum for treatment (i.e. August) to allow for planted species to have a competitive edge during early growth and development.

Plugging of ditches/canals and associated grading activities will restore the natural wetland hydroperiod of the headwater wetland system. Initial grading work will focus on the filling of interior ditches on the tract. Plugs consisting of finer, compacted material will be used at prescribed intervals to reduce potential subsurface drainage within the larger backfilled ditches. In addition, earthen berms (approximately 12" to 18") will be installed perpendicular to filled ditches to prevent gully erosion of former drainageways during periods of increased surface runoff. These berms will be spaced approximately 300 to 400 ft apart from each other.

The plant community of the restored non-riverine swamp forest will be fairly uniform across the site due to similar landscape position and restored hydrologic conditions. As defined by Schafale and Weakley (1990), non-riverine swamp forests of the Coastal Plain are typically dominated by swamp tupelo (Nyssa biflora) and bald cypress (*Taxodium distichum*). In addition to the swamp tupelo and bald cypress, other species will include Atlantic white cedar (*Chamaemycyparis thyoides*), red bay (*Persea borbonia*), sweetbay (*Magnolia virginiana*), and elderberry (*Sambucus canadensis*).

Tree species will be planted on 10-ft spacings, corresponding to 435 trees per acre. (Refer to Table 1 for a list of plant species and quantities targeted for the wetland restoration). Listed shrub species will be planted on 8-ft centers, corresponding to 680 shrubs/acre. Planting will be conducted during the winter or early spring (i.e. January 15 to March 15). It is expected that other characteristic species will recruit naturally into these restored areas upon successful hydrologic restoration.

The recorded conservation easement deed will ensure the protection of the wetland restoration area in perpetuity. The easement will prohibit any activities (e.g. timbering, farming, building, etc.) that would alter the environmental state of the restoration project. The conservation easement deed has been conveyed to the State Property Office (SPO).

5.0 PERFORMANCE CRITERIA

Upon completion of the non-riverine wetland restoration, an 'as-built' report will be prepared and submitted to the EEP to document the extent of wetland restoration. Subsequent annual monitoring will be conducted near the end of each growing season for a period of five years.

Vegetative monitoring will include the establishment of fifteen (15) 0.10-acre permanent plots corresponding to a total of 1.5 acres (equivalent to 5% of the restoration area). Vegetative planting will be deemed successful if survivorship of plantings and volunteers of desirable species[1] meets or exceeds a target stem density of 320 stems/acre.

Shallow groundwater hydrology and surface inundation will be monitored via six (6) automated wells (RDS, Inc. Ecotone-20s) located within the restoration area and paired with vegetation plots. Wells will be installed in accordance with installation methods outlined in the Wetlands Regulatory Assistance Program (WRAP) Technical Note 00-02 (Sprecher 2000). Water levels will be recorded once daily. Data will be downloaded from the wells every three months (i.e. once quarterly). Data from well downloads will be compiled and graphically displayed to demonstrate hydroperiods of monitored areas.

As stated above, the primary hydrologic success criteria will be the establishment of a static water table at, or within, 12" of the soil surface for 12.5% of the growing season (equivalent to 32 days based upon SCS-established growing season dates) during periods of normal rainfall.

Three (3) permanent reference wells will be installed within non-riverine wetlands just north of the project site. This area consists of relatively undisturbed jurisdictional wetlands subject to seasonal inundation from high groundwater levels.

Monitoring reports will be submitted annually to the EEP (by January 1 of each year). These reports will include results of vegetative monitoring and photographic documentation of site conditions. Monitoring reports will also identify any contingency measures that may need to be employed to remedy any site deficiencies. For instance, deer browse tubes and fencing may need to be used if evidence of significant herbivory or deer browse is observed. In addition, supplemental planting may be necessary in areas of reduced survivorship.

[1] Desirable species are considered as noninvasive species characteristic of non-riverine wetland habitats.

6.0 CONCLUSION

WRC will be initiating site restoration activities that will culminate in the restoration of 30.0 acres of non-riverine wetland located in TAR-7 of the Tar-Pamlico Basin. Reversion of silvicultural land to wetland habitat will decrease source nutrient loading and concurrently increase nutrient removal capacity. In addition, the project will provide ancillary benefits to aquatic and wildlife habitat via enhanced niche habitat, microclimate modification and shade, and increased food-web support. By doing so, the proposed project will help to effectively mitigate for authorized loss of non-riverine wetland habitat within the Tar-Pamlico Basin.

Table 1. Proposed Buffer Plant List

Non-riverine Wetland	**Zone 1 (Trees)**	
Stem Target:	**435/ac**	
Species	**# planted**	**(% of total)**
Bald cypress (*Taxodium distichum*)	3,915	22.58%
White Cedar (*Chamaemycyparis thyoides*)	2,610	15.05%
Swamp tupelo (*Nyssa biflora*)	3,915	22.58%
	Zone 2 (Shrubs)	
	680/ac	
Red Bay (*Persea borbonia*)	2,300	13.26%
Elderberry (*Sambucus canadensis*)	2,300	13.26%
Sweet Bay (*Magnolia virginiana*)	2,300	13.26%
Total Plants	**17,340**	

SOURCES OF INFORMATION

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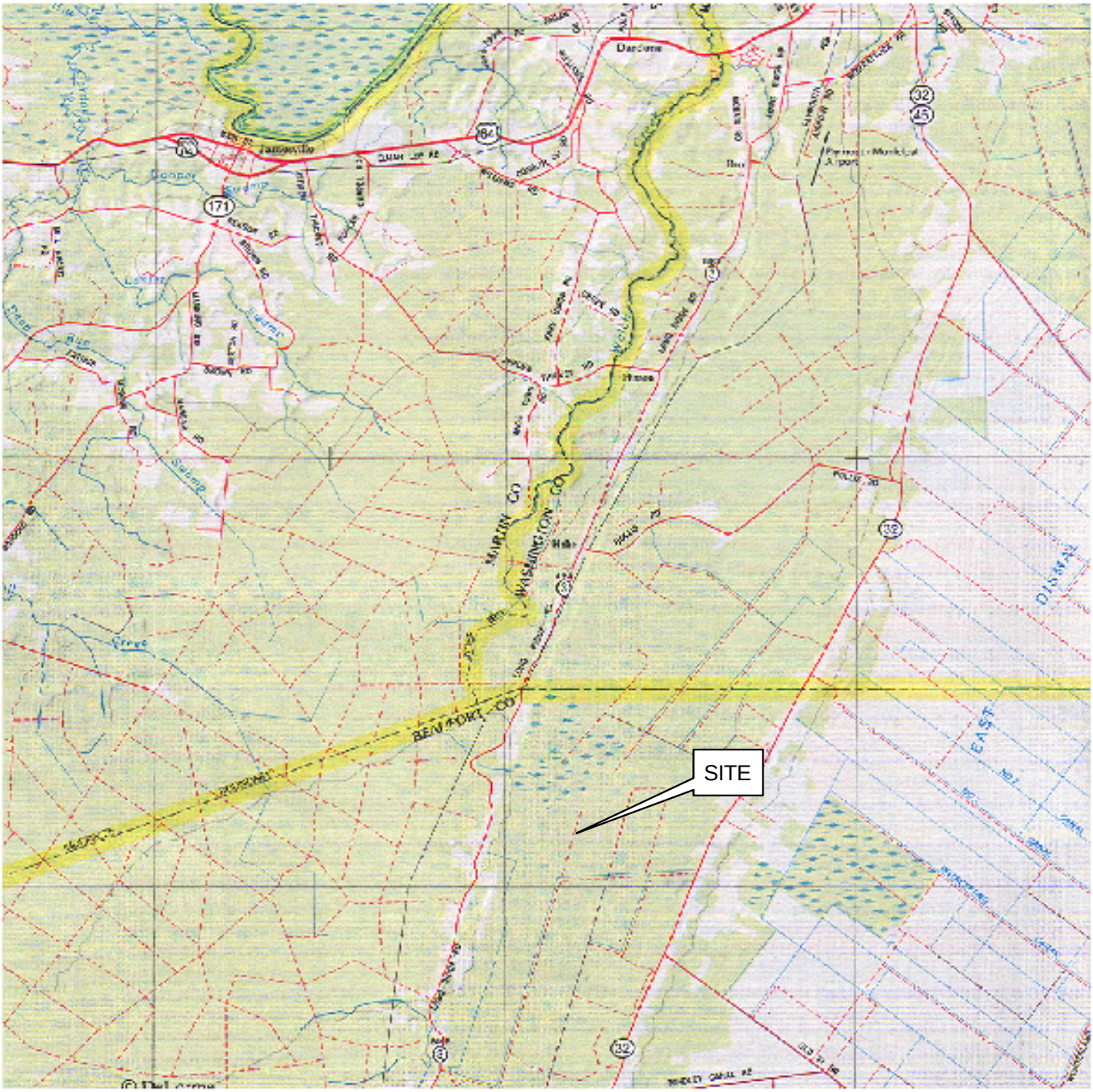
Walbridge, M.R. 1993. Functions and values of forested wetlands in the southern United States. Journal of Forestry 91: 15-19.

Walton, W.C. 1989. Analytical Groundwater Modeling. Lewis Publishers: Chelsea, Michigan. 173 pp.



SCALE: 1" = 2 miles

Simpson Tract
Tar-Pamlico River Basin
HUC: 03020104
Subbasin:03-03-07

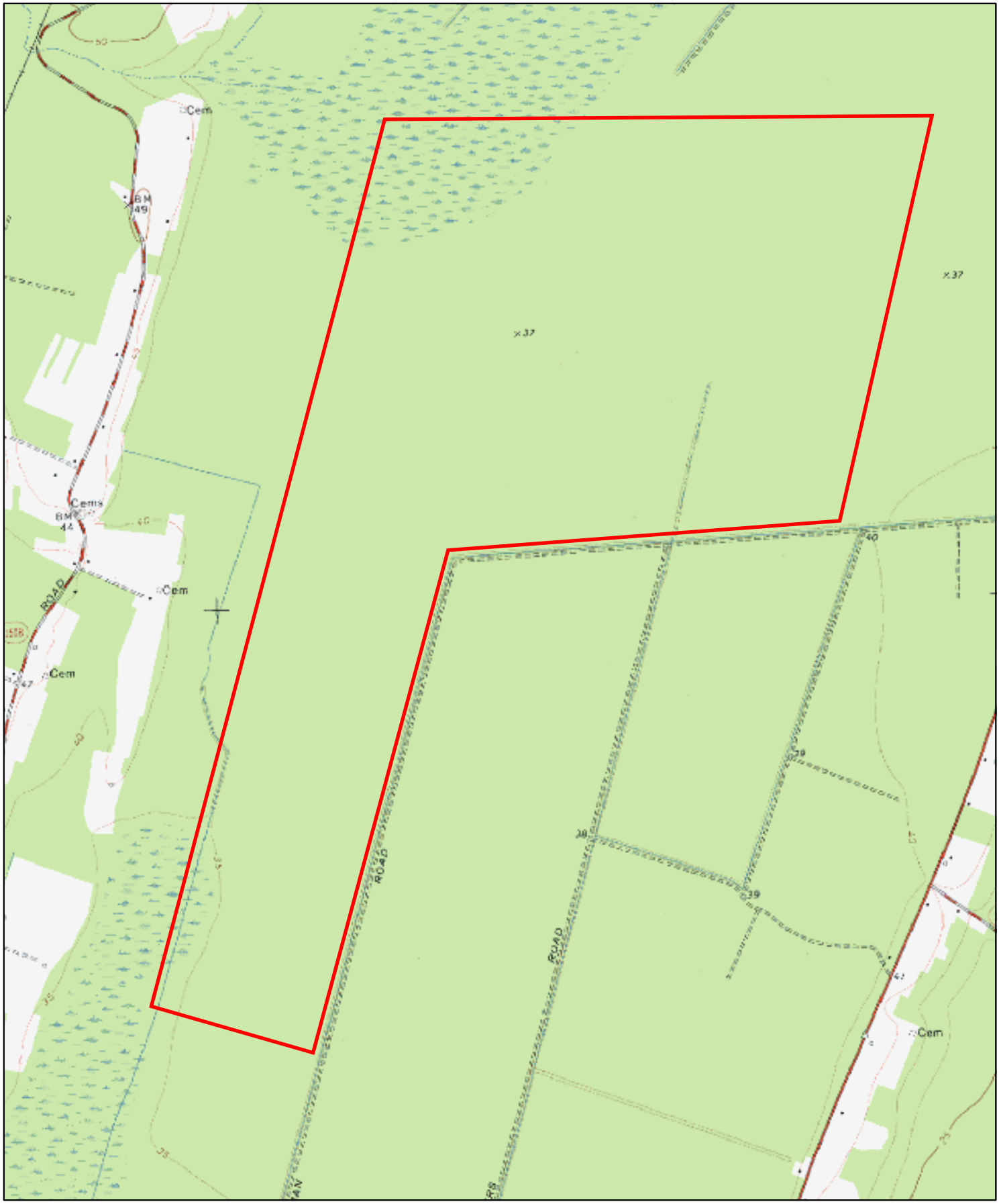
Figure 1.
Vicinity Map

Delorme Gazetteer
Land Management Group, Inc.

Simpson Tract
Tar-Pamlico River Basin
HUC: 03020104
Subbasin:03-03-07

Figure 2.
USDA Soil Survey

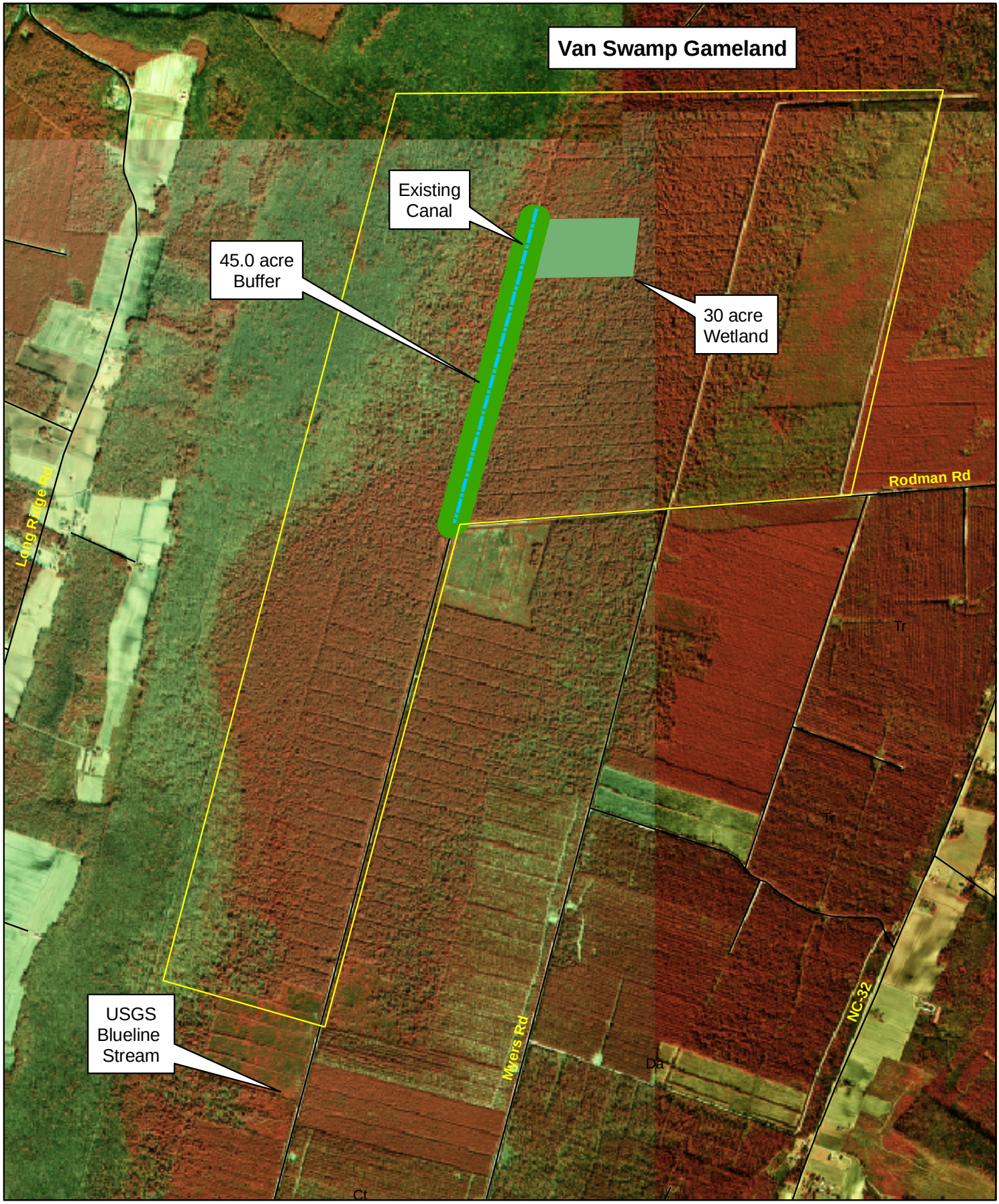
Beaufort County
Land Management Group, Inc.



Simpson Tract
Tar-Pamlico River Basin
HUC: 03020104
Subbasin:03-03-07

Figure 3.
USGS Topographic Map
Hoke, NC

Land Management Group, Inc.



0 2,000 4,000 ft

Simpson Tract
Tar-Pamlico River Basin
HUC: 03020104
Subbasin:03-03-07

Figure 4.
Proposed Site Design

Land Management Group, Inc.

Appendix A. Site Photographs (Pre-Construction)

Large drainage canal adjacent to Rodman Road

Clear-cut zone located within proposed restoration area

NC EEP Simpson Tract Beaufort County, NC	***Land Management Group, Inc.*** **Environmental Consultants** Wilmington, N.C. March 2006	**Appendix A.** **Current Site Conditions**

Van Swamp Gamelands located north of project site

Logging deck located within proposed project boundary

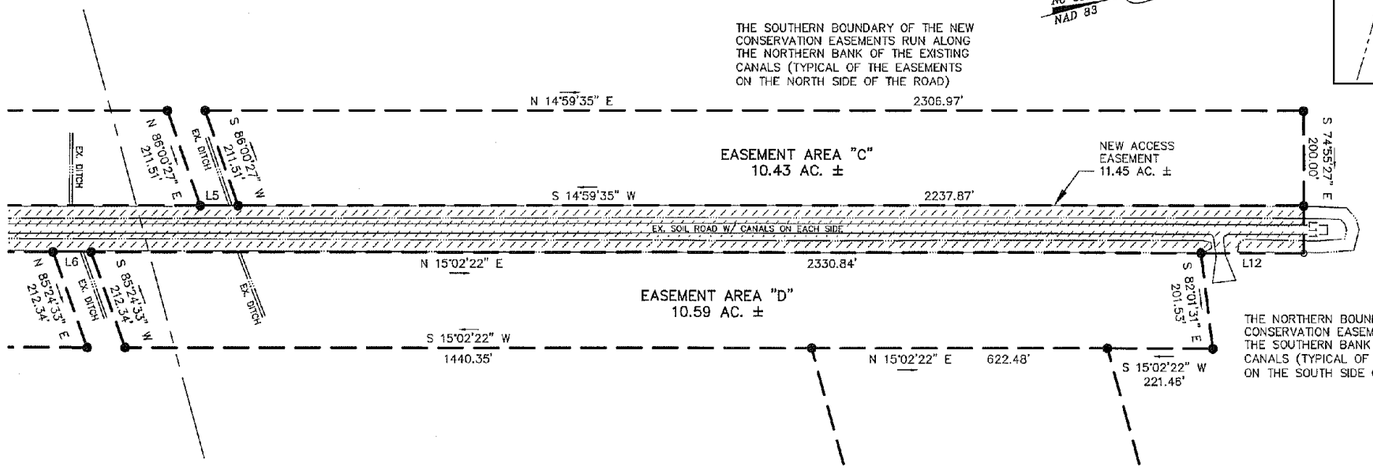
NC EEP Simpson Tract Beaufort County, NC	***Land Management Group, Inc.*** **Environmental Consultants** Wilmington, N.C. March 2006	**Appendix A.** **Current Site Conditions**

Appendix B. Conservation Easement

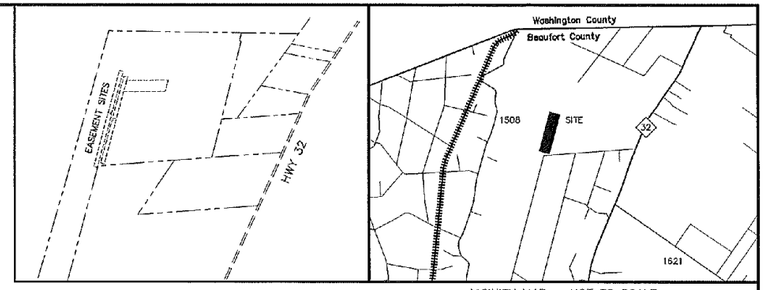
THOMAS D. SIMPSON
DB 1418 PG 558
PLAT CAB. "F" SLIDE 23-4

NC GRID
NAD 83

THE SOUTHERN BOUNDARY OF THE NEW CONSERVATION EASEMENTS RUN ALONG THE NORTHERN BANK OF THE EXISTING CANALS (TYPICAL OF THE EASEMENTS ON THE NORTH SIDE OF THE ROAD)



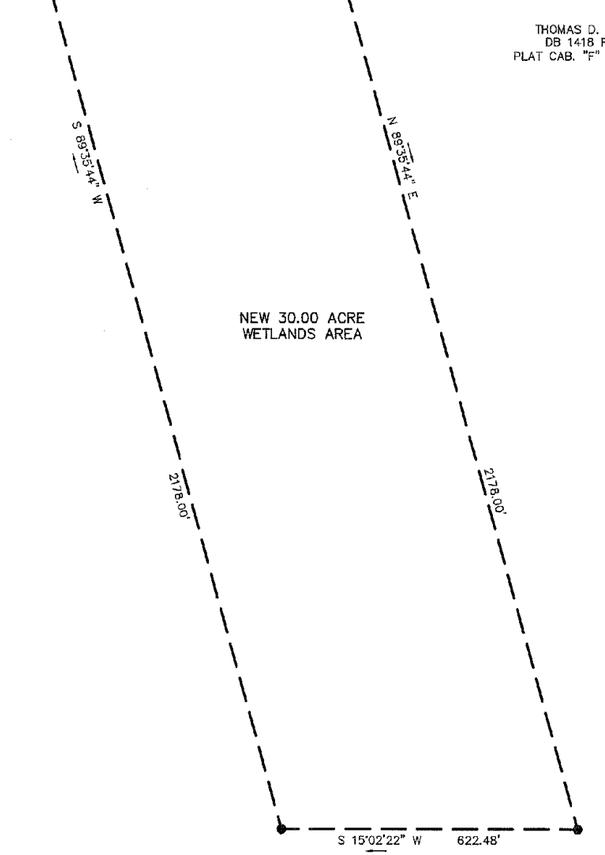
THE NORTHERN BOUNDARY OF THE NEW CONSERVATION EASEMENTS RUN ALONG THE SOUTHERN BANK OF THE EXISTING CANALS (TYPICAL OF THE EASEMENTS ON THE SOUTH SIDE OF THE ROAD)



VICINITY MAP – NOT TO SCALE

LINE TABLE		
LINE	LENGTH	BEARING
L5	79.31	N14°59'35"E
L6	79.63	S15°02'23"W
L11	99.25	S74°55'27"E
L12	215.41	S15°02'22"W

THOMAS D. SIMPSON
DB 1418 PG 558
PLAT CAB. "F" SLIDE 23-4



THOMAS D. SIMPSON
DB 1418 PG 558
PLAT CAB. "F" SLIDE 23-4

LEGEND

- ● NIP = NEW IRON PIPE
  EPK = EXISTING PK NAIL
  EIP = EXISTING IRON PIPE
- = NOT TO SCALE
- P.L. = PROPERTY LINE

NOTES:

1) THE SURVEYOR MADE NO ATTEMPT TO DELINEATE OR LOCATE ANY WETLANDS ON THE PROPERTY.
2) THIS MAP DOES NOT REPRESENT A SUBDIVISION OF LAND. IT IS FOR THE PURPOSE OF ESTABLISHING A CONSERVATION EASEMENT ONLY.
3) PROPERTY LINES SHOWN AS DASHED REPRESENT LINES NOT SURVEYED.
4) FOR PROPERTY TIE DOWN SEE MAP RECORDED IN PC "F" SL 23-4.
5) NORTH CAROLINA STATE PLANE COORDINATES (NAD 1983) WERE ESTABLISHED USING A TRIMBLE 5800 GPS UNIT, STATIC FIELD PROCEDURES AND PROCESSED BY THE NATIONAL GEODETIC SURVEY ON-LINE PROCESSING SERVICE.
6) THIS MAP SUPERSEDES THE MAP RECORDED IN PLAT CABINET "G" SLIDE 78-8 & 78-9.

200 100 0 200

GRAPHIC SCALE: 1" = 200'

I, WILLIAM B. HILLIARD, PROFESSIONAL LAND SURVEYOR NO. L-4509, CERTIFY TO ONE OR MORE OF THE FOLLOWING AS INDICATED THUS, ☒ OR ☑:

☐ A. THAT THIS PLAT IS OF A SURVEY THAT CREATES A SUBDIVISION OF LAND WITHIN THE AREA OF A COUNTY OR MUNICIPALITY THAT HAS AN ORDINANCE THAT REGULATES PARCELS OF LAND;

☐ B. THAT THIS PLAT IS OF A SURVEY THAT IS LOCATED IN SUCH PORTION OF A COUNTY OR MUNICIPALITY THAT IS UNREGULATED AS TO AN ORDINANCE THAT REGULATES PARCELS OF LAND;

☐ C. ANY OF THE FOLLOWING:
1. THAT THE SURVEY IS OF AN EXISTING PARCEL OR PARCELS OF LAND AND DOES NOT CREATE A NEW STREET OR CHANGE AN EXISTING STREET;
2. THAT THE SURVEY IS OF AN EXISTING BUILDING OR OTHER STRUCTURE, OR NATURAL FEATURE, SUCH AS A WATERCOURSE; OR
3. THAT THE SURVEY IS A CONTROL SURVEY.

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

☐ E. THAT THE INFORMATION AVAILABLE TO THIS SURVEYOR IS SUCH THAT I AM UNABLE TO MAKE A DETERMINATION TO THE BEST OF MY PROFESSIONAL ABILITY AS TO PROVISIONS CONTAINED IN (A) THROUGH (D) ABOVE.

William B. Hilliard 8/16/06
SURVEYOR DATE

STATE OF NORTH CAROLINA PITT COUNTY

I, WILLIAM B. HILLIARD, CERTIFY THAT THIS PLAT WAS DRAWN UNDER MY SUPERVISION FROM AN ACTUAL SURVEY MADE UNDER MY SUPERVISION; (DEED DESCRIPTION RECORDED IN BOOK -- PAGE --); THAT THE BOUNDARIES NOT SURVEYED ARE CLEARLY INDICATED AS DRAWN FROM INFORMATION FOUND IN BOOK -- PAGE --; THAT THE RATIO OF PRECISION AS CALCULATED IS 1:10,000+; THAT THIS PLAT WAS PREPARED IN ACCORDANCE WITH G.S. 47-30 AS AMENDED. WITNESS MY OWNIGINAL SIGNATURE, LICENSE NUMBER AND SEAL THIS 12th DAY OF DECEMBER, 2005.

NORTH CAROLINA PROFESSIONAL SEAL L-4509 LAND SURVEYOR WILLIAM B. HILLIARD

William B. Hilliard
L – 4509

I, _____, REVIEW OFFICER OF BEAUFORT COUNTY, CERTIFY THAT THE MAP OR PLAT TO WHICH THIS CERTIFICATION IS AFFIXED MEETS ALL STATUTORY REQUIREMENTS FOR RECORDING.

_____
REVIEW OFFICER

_____
DATE

REVISION	DATE	INIT.
ADDED NOTE	7/31/06	WBH
ADDED ACCESS EASEMENT	8/16/06	WBH

SHEET 2 OF 2

CONSERVATION EASEMENT SURVEY FOR THE STATE OF NORTH CAROLINA ECOSYSTEM ENHANCEMENT PROGRAM SIMPSON SITE

LONG ACRE TOWNSHIP
BEAUFORT COUNTY

DECEMBER 12, 2005
NORTH CAROLINA

THE EAST GROUP
▪ Engineering ▪ Architecture ▪ Surveying ▪ Technology
324 S. EVANS ST. ▪ BOX 7305
GREENVILLE, NC 27834
252-758-3746

DRAWN BY: WBH	PROJECT NO.: 20050259
SURVEYED BY: GDF	DATE: DECEMBER 12, 2005
SCALE: SHOWN HEREON	DRAWING NAME: simpson.dwg