AS-BUILT MITIGATION PLAN

COLUMBUS SWAMP WELTAND RESTORATION SITE
ROBESON/COLUMBUS COUNTIES, NORTH CAROLINA
(Contract 000619)

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

Prepared by:

RESTORATION SYSTEMS, LLC
Natural Resources Restoration & Conservation

And

Axiom Environmental, Inc.

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1101 Haynes Street, Suite 211
Raleigh, North Carolina 27604

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20 Enterprise Street, Suite 7
Raleigh, North Carolina 27607

February 2009

EXECUTIVE SUMMARY

Restoration Systems, L.L.C. (Restoration Systems) has completed restoration of riparian wetlands at the Columbus Swamp Wetland Restoration Site (hereafter referred to as the "Site") to assist the North Carolina Ecosystem Enhancement Program (NCEEP) in fulfilling wetland mitigation goals. The Site, located approximately 11 miles southeast of Lumberton (34.4597°N, 78.9002°W NAD 83/WGS84), on the Robeson and Columbus County line, provides 32 riparian wetland mitigation units as outlined in the April 2007 Technical Proposal and calculated as stipulated in RFP #16-D07033. The Site is located in United States Geological Survey (USGS) Hydrologic Unit 03040203170020 (North Carolina Division of Water Quality Subbasin 03-07-53) of the Lumber River Basin.

A Detailed Wetland Restoration Plan was completed for the Site in April 2008. The plan outlined methods to complete riparian wetland restoration activities at the Site. An approximately 40-acre conservation easement was placed on the Site to incorporate all restoration activities. The Site is situated at the outer floodplain edge of Big Swamp at the confluence of Big Swamp and a smaller tributary, Brier Creek. 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. Prior to construction, an extensive ditch system had been excavated to drain the Site for agricultural land uses. Interfield ditches had been excavated to a depth of approximately 4 to 5 feet and resulting spoil was used to construct a berm/road that bordered Site agricultural fields. The berm hindered surface water from Big Swamp from accessing agricultural fields during wetter periods of the year.

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 highlighted the potential for an exceptional wetland restoration opportunity at the Site.

Restoration of Site wetlands will result in positive benefits for water quality and biological diversity in the watershed. Targeted mitigation efforts, which focused on improving water quality, enhancing flood attenuation, restoring aquatic and riparian habitat and improving biological diversity in the Lumber River watershed, were accomplished by:

1. Removing nonpoint and point sources of pollution associated with agricultural practices including a) cessation of broadcasting fertilizer, pesticides, and other agricultural chemicals into and adjacent to the Site and b) provide a forested riparian buffer to treat surface runoff.
2. Restoring Site hydrology by filling approximately 8000 linear feet of existing drainage ditches, thereby promoting flood storage, nutrient cycling, and aquatic wildlife habitat.
3. Restoring soil structure through appropriate soil modifications and physical alteration (grading, ripping, etc.).
4. Reforesting a native wetland community, thereby reestablishing habitat diversity and functional continuity.
5. Enhancing and protecting the Site's full potential of wetland functions and values in perpetuity.
6. Providing a terrestrial wildlife corridor and refuge in an area segmented for agricultural production.

As constructed, the Site restored historic wetland functions, which existed onsite prior to ditching, agricultural impacts, and vegetation removal. Site construction resulted in 33.5 acres of riparian wetland restoration and 2.5 acres of riparian wetland enhancement.

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COLUMBUS SWAMP WETLAND RESTORATION SITE
AS-BUILT MITIGATION PLAN
ROBESON/COLUMBUS COUNTIES

1.0 INTRODUCTION

1.1 Location and Setting

Restoration Systems, L.L.C. (Restoration Systems) has completed restoration of riparian wetlands at the Columbus Swamp Wetland Restoration Site (hereafter referred to as the "Site") to assist the North Carolina Ecosystem Enhancement Program (NCEEP) in fulfilling wetland mitigation goals. The Site, located approximately 11 miles southeast of Lumberton (34.4597°N, 78.9002°W NAD 83/WGS84), on the Robeson and Columbus County line, provides 32 riparian wetland mitigation units as outlined in the April 2007 Technical Proposal and calculated as stipulated in RFP #16-D07033 (Figure 1, Appendix A). The Site is located in United States Geological Survey (USGS) Hydrologic Unit 03040203170020 (North Carolina Division of Water Quality Subbasin 03-07-53) of the Lumber River Basin.

Directions to the Site:

- From Raleigh, take I-40 east to I-95 south
- Take exit 14 from I-95 and travel east on US-74
- Take the first left on Old Boardman Road
- After approximately 2.5 miles, turn left on Paul Wiloughby Road
- Travel approximately 0.5 mile, the Site is on the left
- Latitude, Longitude of Site: 34.4597°N, 78.9002°W (NAD83/WGS84)

1.2 Project Goals and Objectives

The goals of the Columbus Swamp Wetland Restoration Site are to provide positive benefits for water quality and biological diversity within the watershed. Targeted mitigation efforts, which focused on improving water quality, enhancing flood attenuation, restoring aquatic and riparian habitat and improving biological diversity in the Lumber River watershed, were accomplished by:

1. Removing nonpoint and point sources of pollution associated with agricultural practices including a) cessation of broadcasting fertilizer, pesticides, and other agricultural chemicals into and adjacent to the Site and b) provide a forested riparian buffer to treat surface runoff.
2. Restoring Site hydrology by filling approximately 8000 linear feet of existing drainage ditches, thereby promoting flood storage, nutrient cycling, and aquatic wildlife habitat.
3. Restoring soil structure through appropriate soil modifications and physical alteration (grading, ripping, etc.).
4. Reforesting a native wetland community, thereby reestablishing habitat diversity and functional continuity.
5. Enhancing and protecting the Site's full potential of wetland functions and values in perpetuity.

1.3 Project Structure, Restoration Type, and Approach

A Detailed Wetland Restoration Plan was completed for the Site in April 2008. The plan outlined methods to complete riparian wetland restoration activities at the Site. An approximately 40-acre conservation easement was placed on the Site to incorporate all restoration activities. The Site is situated at the outer floodplain edge of Big Swamp at the confluence of Big Swamp and a smaller tributary, Brier Creek. 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. Prior to construction, an extensive ditch system had been excavated to drain the Site for agricultural land

uses (Figure 2, Appendix A). Interfield ditches had been excavated to a depth of approximately 4 to 5 feet and resulting spoil was used to construct a berm/road that bordered Site agricultural fields. The berm hindered surface water from Big Swamp from accessing agricultural fields during wetter periods of the year.

As constructed, the Site restored historic wetland functions, which existed onsite prior to ditching, agricultural impacts, and vegetation removal. The Site restoration design mimicked a nearby reference wetland (Figure 3, Appendix A). Site construction resulted in 33.5 acres of riparian wetland restoration and 2.5 acres of riparian wetland enhancement (Table 1).

Table 1. Site Restoration Structures and Objectives

Restoration Segment/ Reach ID	Station Range	Mitigation Type	Priority Approach	Existing Linear Footage/ Acreage	Designed Linear Footage/ Acreage	Comment
Riparian/ Riverine Wetlands	--	Restoration	--	--	33.5	Filling agricultural ditches, removing a berm and spoil castings, eliminating row crop production, rehydrating floodplain soils, and planting with native forest vegetation.
	--	Enhancement	--	--	2.5	Filling agricultural ditches, eliminating row crop production, and planting with native forest vegetation.

1.4 Project History

Completed project activities, reporting history, completion dates, project contacts, and background information are summarized in Tables 2-4.

Table 2. Project Activity and Reporting History

Activity or Report	Data Collection Completion	Actual Completion or Delivery
Restoration Plan	April 2008	April 2008
Construction Completion	NA	December 2008
Site Planting	NA	January 2009
Mitigation Plan/As-builts	February 2009	February 2009

Table 3. Project Contacts Table

Full Delivery Provider	Restoration Systems 1101 Haynes Street, Suite 211 Raleigh, North Carolina 27604 George Howard and John Preyer (919) 755-9490
Designer	Axiom Environmental, Inc. 20 Enterprise Street, Suite 7 Raleigh, North Carolina 27607 Grant Lewis (919) 215-1693
Construction Contractor	Land Mechanics Designs, Inc. 126 Circle G Lane Willow Spring, North Carolina 27592 Lloyd Glover (919) 422-3392
Planting Contractor	Carolina Silvics 908 Indian Trail Road Edenton, North Carolina 27932 Dwight McKinney (919) 523-4375

Table 4. Project Background Table

Project County	Columbus/Robeson County, North Carolina
Drainage impervious cover estimate (%)	< 1
Physiographic Region	Coastal Plain
Ecoregion	Southeastern Plains
Dominant Soil Types	Johnston
Reference Site ID	Big Swamp
USGS HUC	03040203170020
NCDWQ Subbasin	03-07-53
NCDWQ Classification	C Sw (Stream Index # 14-22-17)
Any portion of any project segment 303d listed?	No
Any portion of any project segment upstream of a 303d listed segment?	No
Reasons for 303d listing or stressor	Not Applicable
% of project easement fenced	0%

2.0 RESTORATION ACTIVITIES

Site alterations designed to restore characteristic wetland soil features and groundwater wetland hydrology included 1) ditch cleaning prior to backfill, 2) impervious ditch plug construction, 3) ditch backfilling, 4) berm removal, 5) floodplain soil ripping, and 6) plant community restoration. Restoration plans depicted in Figure 4 (Appendix A) indicate restoration of 33.5 acres and enhancement of 2.5 acres of riparian wetlands.

2.1 Ditch Cleaning Prior to Backfill

Ditches identified for backfilling were cleaned, as needed, to remove unconsolidated sediments within the lower portion of the cross-section. Accumulated sediments within Site ditches consisted of relatively high permeability material that could have acted as conduits for continued drainage after restoration. Therefore, unconsolidated sediments were lifted from the ditch to expose the underlying, relatively impermeable clay substrate along the ditch invert. The sediments were temporarily placed on adjacent surfaces during ditch backfilling. Subsequently, the unconsolidated sediment were incorporated into top soils graded during soil preparation for planting.

2.2 Ditch Plugs

Ditch plugs were installed along onsite ditches at locations depicted in Figure 4 (Appendix A). In addition, all Site outfall locations were effectively plugged to prevent migration of surface water to and from the Site. The plugs represent high density material designed to withstand erosive forces associated with concentrated surface water or groundwater flows. Where earthen material was used, the plugs consisted of earthen material backfilled in 2-foot lifts of vegetation-free material and compacted into the bottom of the ditch. Earthen plugs were reinforced by incorporation of filter cloth into the plug to minimize preferential flow of groundwater through fill material. Earthen material was obtained from berms/spoil and through scraping the top three to six inches of soil off the surface of portions of the Site.

2.3 Ditch Backfilling

Ditches were backfilled using onsite, earthen material obtained by scraping surface soils, storing material adjacent to Site ditches, and backfilling behind soil plugs. Based on cut-fill estimates for this project, approximately 30,500 cubic yards of ditch backfill material were required to effectively fill all onsite ditches. Ditch backfill locations were filled, compacted, and graded to the approximate elevation of the adjacent wetland surface. All onsite ditches were filled across the entire Site.

2.4 Berm Removal

Spoil from prior ditch excavation used to construct a berm/road that bordered Site agricultural fields was removed to restore hydrology contributed to the Site by overbanking of Big Swamp. Prior to construction, the berm hindered surface water from Big Swamp from accessing the Site during overbank events.

2.5 Floodplain Soil Scarification

Microtopography and differential drainage rates within localized areas represent important components of riparian wetland functions. Reference hydrology areas 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 were implemented at the Site. In areas where soil surfaces were compacted, ripping or scarification was performed. After construction, the soil surface exhibited complex microtopography ranging to 1 foot in vertical asymmetry.

3.0 PLANT COMMUNITY RESTORATION

The Site was planted with native tree species in January 2009. Onsite observations, reference forest, and pertinent community descriptions from *Classification of the Natural Communities of North Carolina* (Schafale and Weakley 1990) were used to develop the primary plant community association promoted during restoration efforts. Before plant community restoration was implemented, compacted soils within the Site were scarified. Scarification was performed as linear bands directed perpendicular to the land slope. Subsequently, community restoration was initiated on scarified surfaces. The Site was planted with species characteristic of a Coastal Plain Bottomland Hardwoods community.

Bare-root seedlings of canopy and understory tree species were planted within the Site at a density of approximately 988 stems per acre. Bare-root seedlings were hand planted to minimize wetland soil disturbance. A total of 39,550 diagnostic tree and shrub seedlings were planted in support of Site restoration; they are as shown in Table 5.

Table 5. Planted Tree Species

Vegetation Association	**Coastal Plain Bottomland Hardwoods**	
Area (acres)	**40**	
Species	**Number planted**	**% of total**
River birch (*Betula nigra*)	3750	9.5
Ironwood (*Carpinus caroliniana*)	1450	3.7
Atlantic white cedar (*Chamaecyparis thyoides*)	1750	4.4
Laurel oak (*Quercus laurifolia*)	5000	12.6
Overcup oak (*Quercus lyrata*)	4100	10.4
Swamp chestnut oak (*Quercus michauxii*)	5000	12.6
Water oak (*Quercus nigra*)	6300	15.9
Willow oak (*Quercus phellos*)	6300	15.9
Shumard oak (*Quercus shumardii*)	900	2.3
Bald cypress (*Taxodium distichum*)	5000	12.6
TOTAL	**39,550**	**100**

4.0 MONITORING PLAN

Monitoring activities will entail analysis of hydrology and vegetation. Monitoring of restoration efforts will be performed for a minimum of 5 years or until success criteria are fulfilled. The detailed monitoring plan is depicted in Figure 5 (Appendix A).

4.1 Hydrology

After hydrological modifications were completed at the Site, continuously recording, surficial monitoring gauges were installed in accordance with specifications in *Installing Monitoring Wells/Piezometers in Wetlands* (NCWRP 1993). Monitoring gauges were set to a depth of approximately 24 inches below the soil surface. Screened portions of each gauge were surrounded by filter fabric, buried in screened well sand, and sealed with a bentonite cap to prevent siltation and surface flow infiltration during floods.

Seven groundwater gauges were installed in wetland restoration areas to provide representative coverage of the Site (Figure 5, Appendix A). One additional gauge was placed in a reference wetland area for comparison with onsite conditions. Hydrological sampling will be performed in restoration and reference areas during the growing season (March 16 to November 12) at daily intervals necessary to satisfy the hydrology success criteria within each physiographic landscape area (USEPA 1990).

4.2 Vegetation

Following Site planting, ten (10-meter by 10-meter) vegetation monitoring plots were established within the Site (Figure 5, Appendix A). During the first year, vegetation will receive a cursory, 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 each year using the *CVS-EEP Protocol for Recording Vegetation Level 1-2 Plot Sampling Only* (Version 4.0) (Lee et al. 2006) in September of the first monitoring year and between June 1 and September 30 for each subsequent year until the vegetation success criteria are achieved. A photographic record of plant growth will be included in each annual monitoring report.

5.0 SUCCESS CRITERIA

5.1 Hydrologic 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 at least 10 percent of the growing season (March 16 – November 12).

Should hydrological success criteria not be met, wetland hydroperiods measured by a groundwater gauge located within the reference area will be compared to the hydroperiods exhibited by groundwater gauges in the restoration area to further evaluate 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 75 percent of the hydroperiod exhibited by the reference wetland gauges in any given year.

5.2 Vegetation Success Criteria

Success criteria have been established to verify that the vegetation component supports community elements necessary for 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 "Characteristic Tree Species." Characteristic Tree Species include planted species, species identified through inventory of a reference (relatively undisturbed) forest community used to orient the planting plan, and appropriate Schafale and Weakley (1990) community descriptions. All species planted and identified in the reference forest will be utilized to define “Characteristic Tree Species” as termed in the success criteria (Table 6).

Table 6. Characteristic Tree Species

Planted Species	**Reference Species**
River birch (*Betula nigra*)	Red maple (*Acer rubrum*)
Ironwood (*Carpinus caroliniana*)	American holly (*Ilex opaca*)
Atlantic white cedar (*Chamaecyparis thyoides*)	Sweetbay magnolia (*Magnolia virginiana*)
Laurel oak (*Quercus laurifolia*)	Swamp blackgum (*Nyssa biflora*)
Overcup oak (*Quercus lyrata*)	Red bay (*Persea borbonia*)
Swamp chestnut oak (*Quercus michauxii*)	Laurel oak (*Quercus laurifolia*)
Water oak (*Quercus nigra*)	Swamp chestnut oak (*Quercus michauxii*)
Willow oak (*Quercus phellos*)	Willow oak (*Quercus phellos*)
Shumard oak (*Quercus shumardii*)	Bald cypress (*Taxodium distichum*)

Bald cypress (*Taxodium distichum*)	

An average density of 320 stems per acre of Characteristic Tree Species must be surviving at the end of the third monitoring year. Subsequently, 290 Characteristic Tree Species per acre must be surviving at the end of year 4 and 260 Characteristic Tree Species per acre at the end of year 5.

6.0 MONITORING REPORT SUBMITTAL

An Annual Wetland Monitoring Report will be prepared at the end of each monitoring year (growing season). The monitoring report will depict the sample plot and quadrant locations and include photographs which illustrate Site conditions. Data compilation and analyses will be presented including graphic and tabular format, where practicable.

7.0 CONTINGENCY

In the event that success criteria are not fulfilled, a mechanism for contingency will be implemented.

Hydrology

Hydrological contingency will require consultation with hydrologists and regulatory agencies if wetland hydrology enhancement is not achieved. Floodplain surface modifications, including construction of ephemeral pools, represent a likely mechanism to increase the floodplain area in support of jurisdictional wetlands. Recommendations for contingency to establish wetland hydrology will be implemented and monitored until Hydrology Success Criteria are achieved.

Vegetation

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.

8.0 REFERENCES

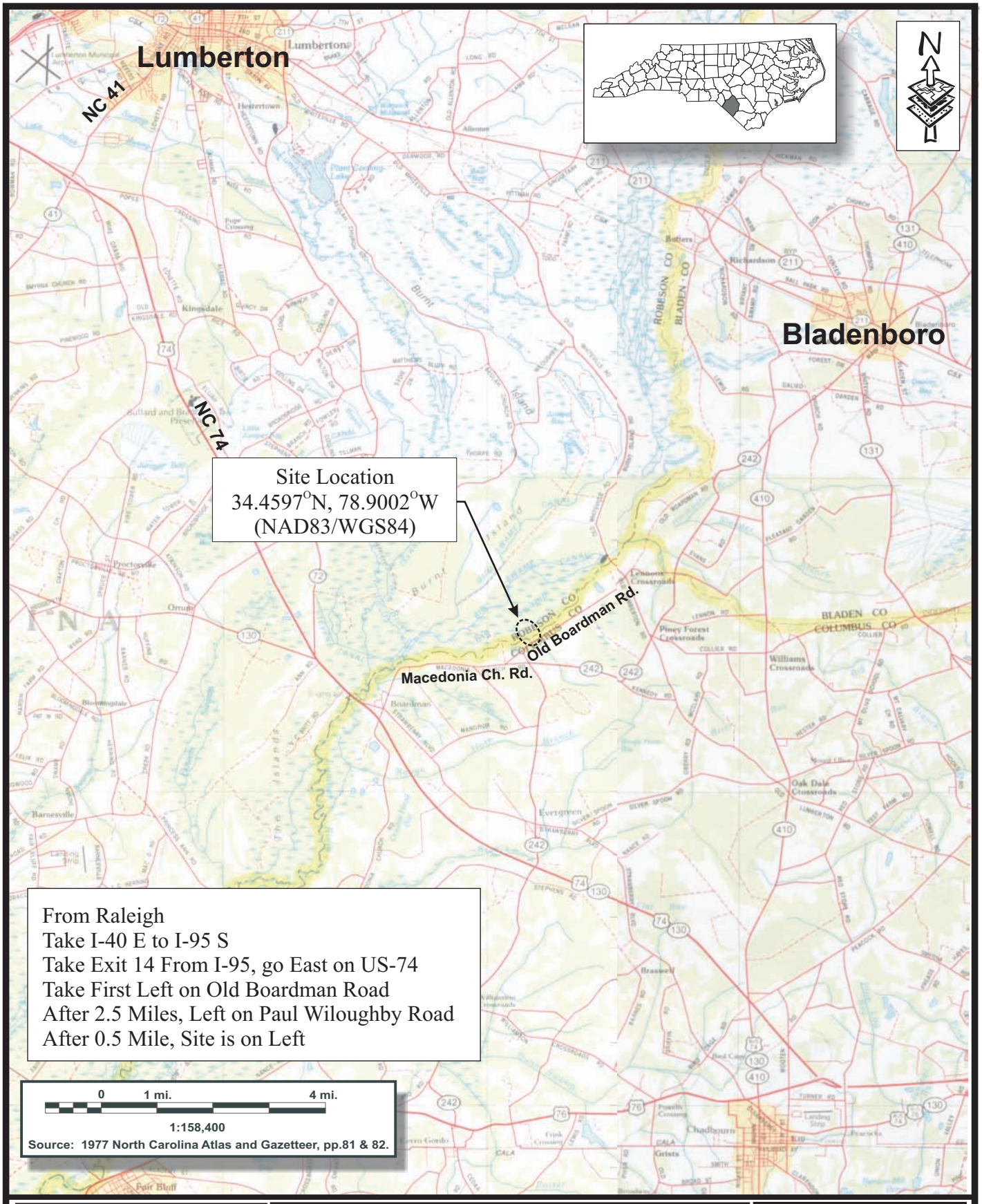
Lee, M.T., R.K. Peet, S.D. Roberts, and T.R. Wentworth. 2006. CVS-EEP Protocol for Recording Vegetation. Version 4.0. North Carolina Department of Environment and Natural Resources, Ecosystem Enhancement Program. Raleigh, North Carolina.

North Carolina Wetlands Restoration Program (NCWRP). 1993. Installing Monitoring Wells/Piezometers in Wetlands (WRP Technical Note HY-IA-3.1). North Carolina Department of Environment, Health, and Natural Resources, Raleigh, North Carolina

Schafale, M.P. and A.S. Weakley. 1990. Classification of the Natural Communities of North Carolina: Third Approximation. North Carolina Natural Heritage Program, Division of Parks and Recreation, North Carolina Department of Environment, Health, and Natural Resources. Raleigh, North Carolina.

United States Environmental Protection Agency (USEPA). 1990. Mitigation Site Type Classification (MiST). USEPA Workshop, August 13-15, 1989. USEPA Region IV and Hardwood Research Cooperative, NCSU, Raleigh, North Carolina.

Appendix A.
Figures

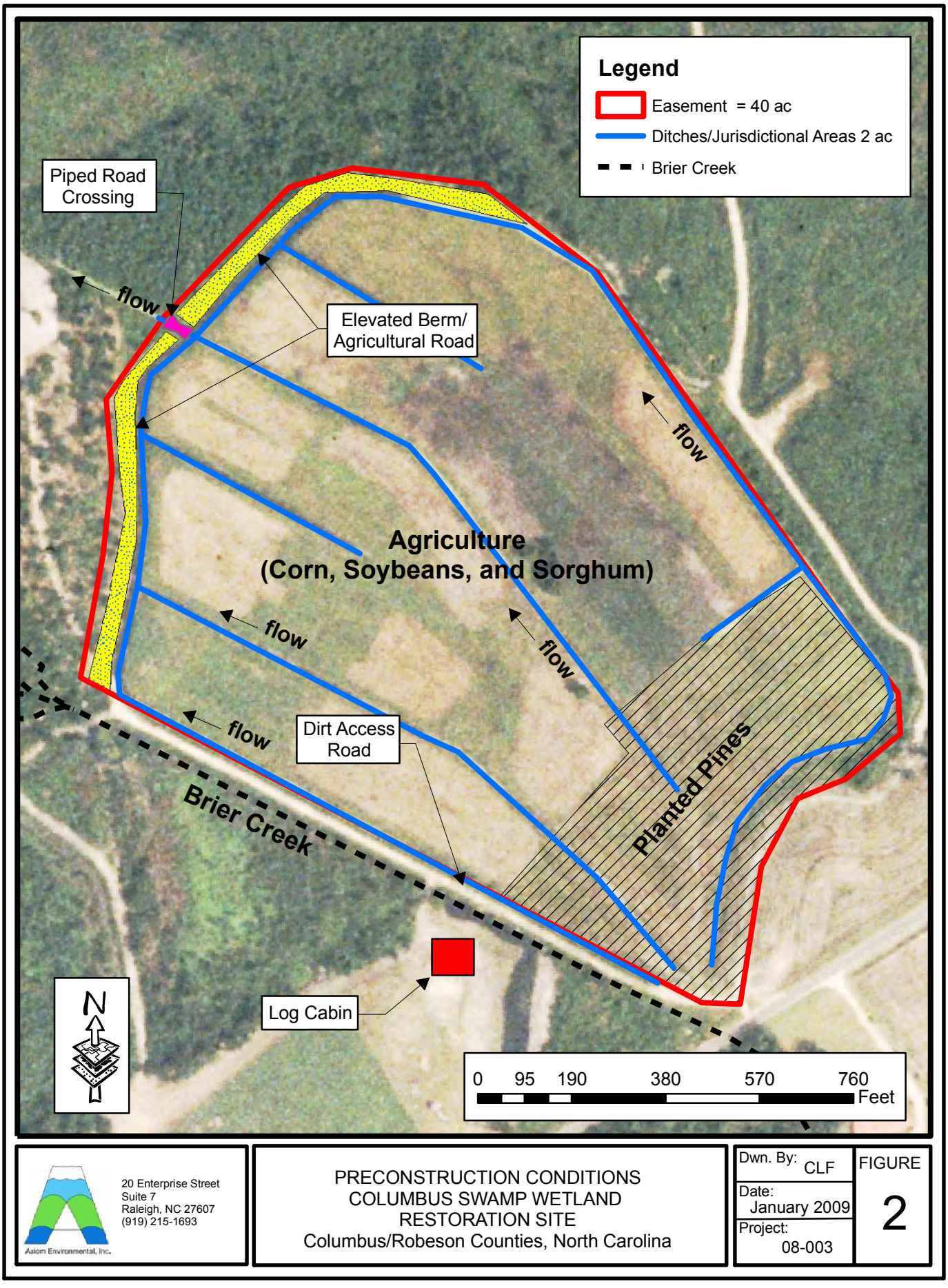


Axiom Environmental, Inc.
20 Enterprise Street
Suite 7
Raleigh, NC 27607
(919) 215-1693

SITE LOCATION
COLUMBUS SWAMP WETLAND
RESTORATION SITE
Robeson/Columbus Counties, North Carolina

Dwn. by:	CLF
Ckd by:	WGL
Date:	January 2009
Project:	08-003

FIGURE
1



Axiom Environmental, Inc.
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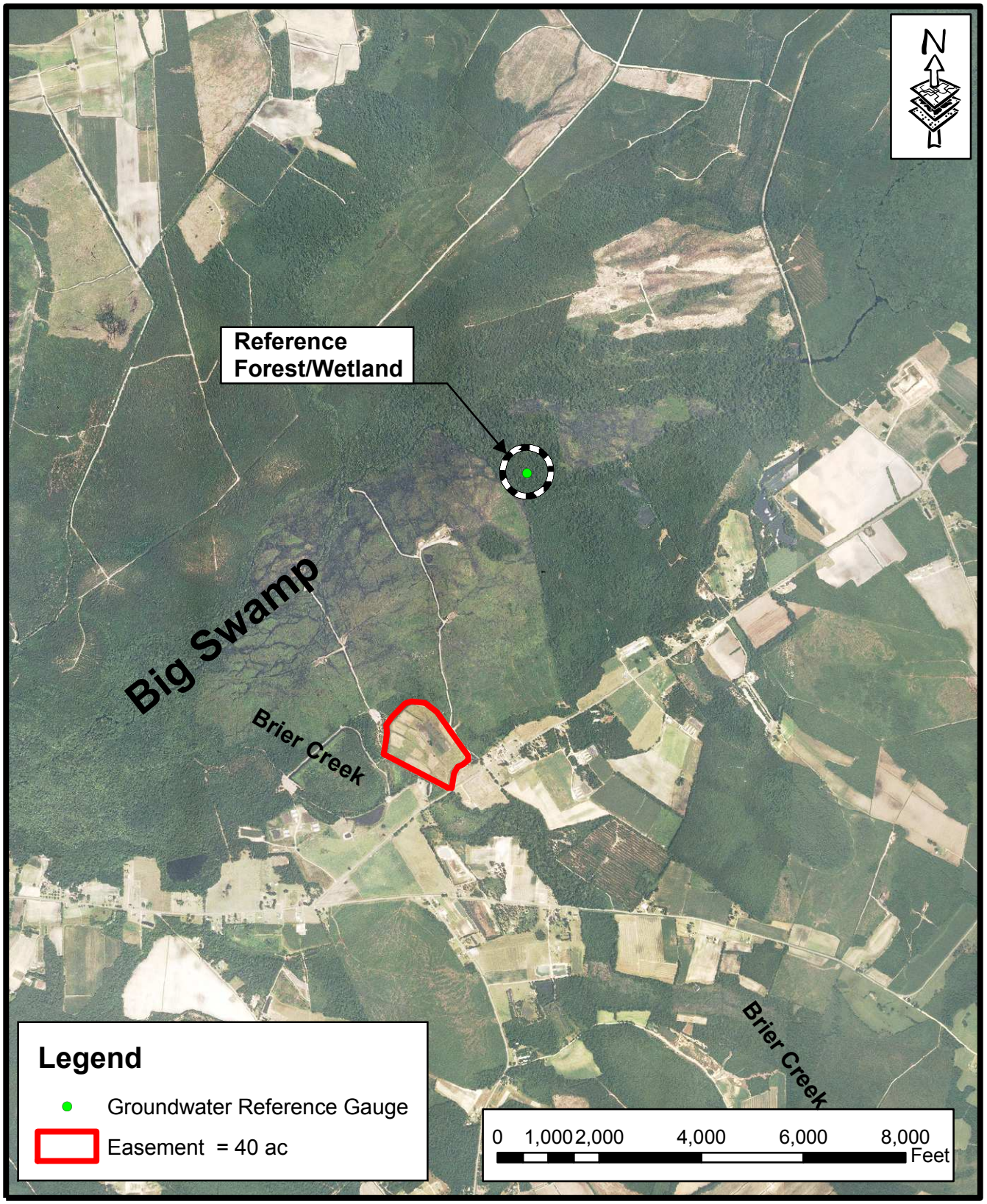
Suite 7
Raleigh, NC 27607
(919) 215-1693

PRECONSTRUCTION CONDITIONS
COLUMBUS SWAMP WETLAND
RESTORATION SITE
Columbus/Robeson Counties, North Carolina

Dwn. By: CLF
Date: January 2009
Project: 08-003

FIGURE
2



Axiom Environmental, Inc.
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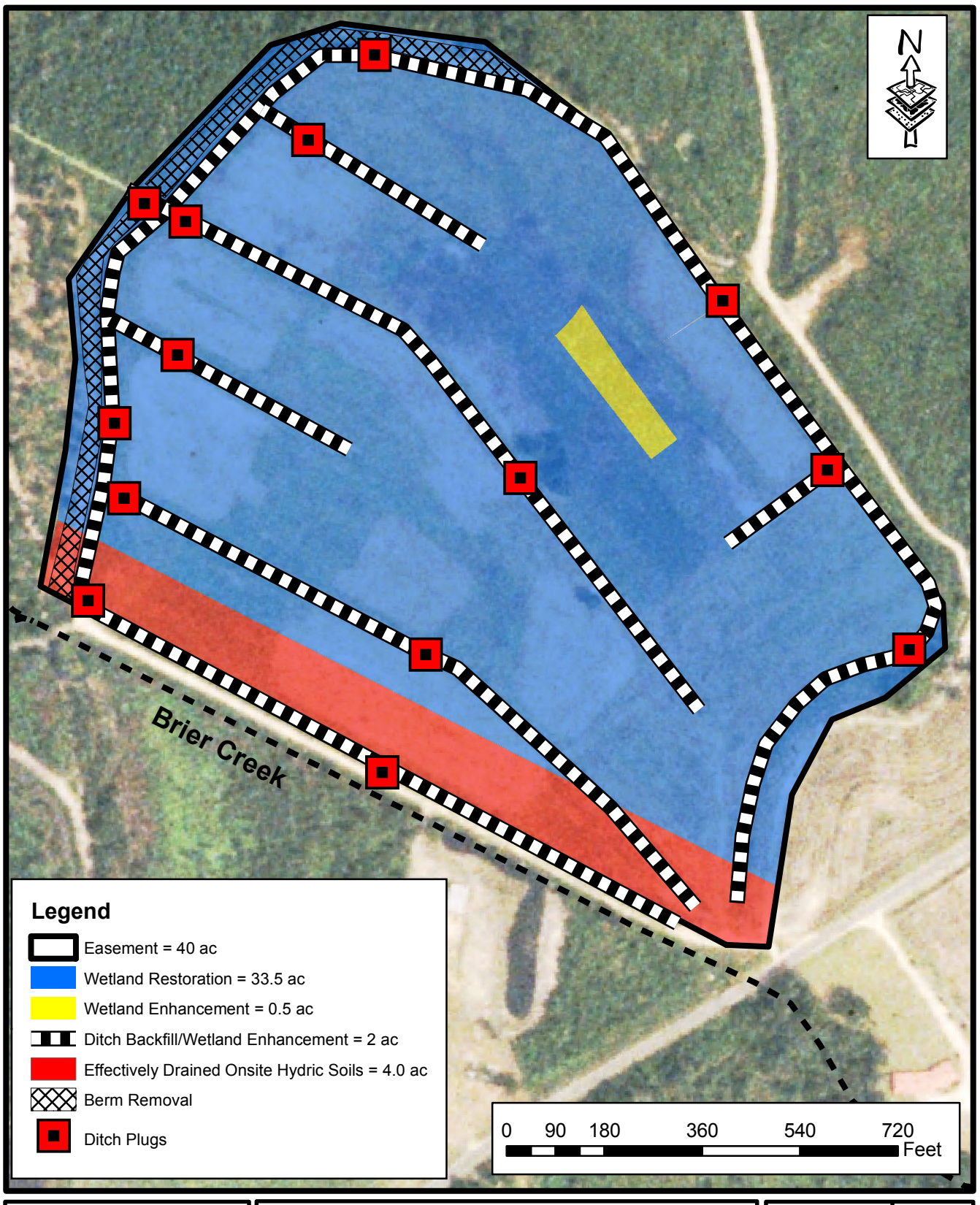
(919) 215-1693

REFERENCE WETLAND
COLUMBUS SWAMP WETLAND
RESTORATION SITE
Columbus/Robeson Counties, North Carolina

Dwn. By: WGL
Date: January 2009
Project: 08-003

FIGURE 3



Axiom Environmental
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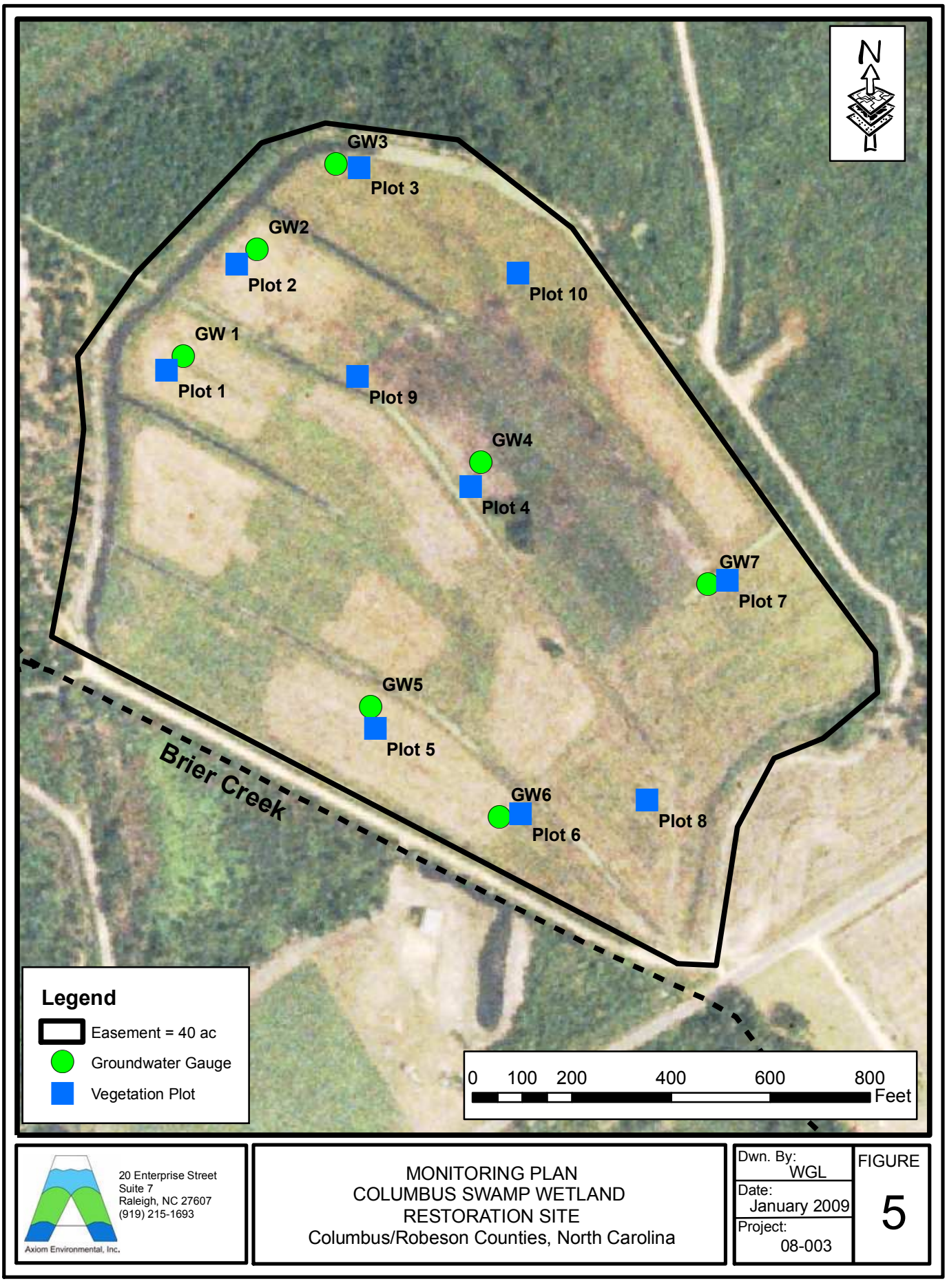
Raleigh, NC 27607
(919) 215-1693

RESTORATION PLAN
COLUMBUS SWAMP WETLAND
RESTORATION SITE
Columbus/Robeson County, North Carolina

Dwn. By: WGL
Date: January 2009
Project: 08-003

FIGURE
4



20 Enterprise Street
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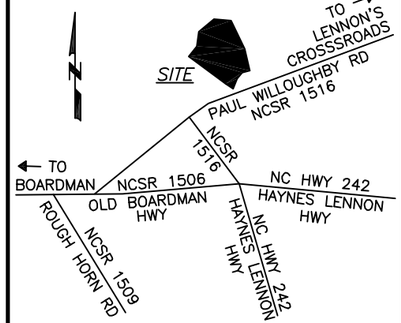
Axiom Environmental, Inc.

MONITORING PLAN
COLUMBUS SWAMP WETLAND
RESTORATION SITE
Columbus/Robeson Counties, North Carolina

Dwn. By:	WGL
Date:	January 2009
Project:	08-003

FIGURE
5

Appendix B.
Topographic Survey



VICINITY MAP (NTS)

DEED REFERENCE(S):

BEING ALL OF THE PROPERTY RECORDED IN D.B. 883, PG. 283–287 OF THE COLUMBUS COUNTY REGISTRY. (MEMORANDUM OF AGREEMENT FOR PURCHASE AND SALE OF CONSERVATION EASEMENT)

BEING A PORTION OF THE PROPERTY RECORDED IN D.B. 265, PG. 607 OF THE COLUMBUS COUNTY REGISTRY.

BEING A PORTION OF THE PROPERTY RECORDED IN D.B. 264, PG. 001 OF THE COLUMBUS COUNTY REGISTRY.

MAP REFERENCE(S):

M.B. 19, PG. 13 (ROBESON COUNTY REGISTRY)

FEMA FLOOD STATEMENT:

ALL OF THE AREA REPRESENTED BY THIS PLAT IS LOCATED IN A FLOOD HAZARD BOUNDARY ACCORDING TO FEMA MAP NUMBER(S) 3720022400K, ZONE(S): AE DATED: JUNE 2, 2006.

"PRELIMINARY PLAT - NOT FOR RECORDATION, CONVEYANCES, OR SALES"

LEGEND:

EIS	–	*Existing Iron Stake*
EIP	–	*Existing Iron Pipe*
NMC	–	*Non Monumented Corner*
ECM	–	*Existing Concrete Monument*
R/W	–	*Right–Of–Way*
D.B.	–	*Deed Book*
PG.	–	*Page*
NCSR	–	*North Carolina Secondary Road*
EOP	–	*Edge Of Pavement*
•		*Iron Stake Set (No. 5 Rebar with Plastic Cap Inscribed with "BOUNDARY MARKER") unless Otherwise Noted. Driven Flush with Grade Unless Otherwise Noted*
PPS	–	*Pump Pipe Set (3" O.D.) 2' Above Grade*
ISS	–	*Iron Stake Set (No. 5 Rebar)*
	–	*Groundwater Gauge*
		Vegetative Plot Area

SURVEYOR'S CERTIFICATION(S):

Surveyor's disclaimer: No attempt was made to locate any cemeteries, wetlands, hazardous material sites, underground utilities or any other features above, or below ground other than those shown.

I certify that the elevations shown on said plat, meet the requirements of a Class C topographic survey in the State of North Carolina.

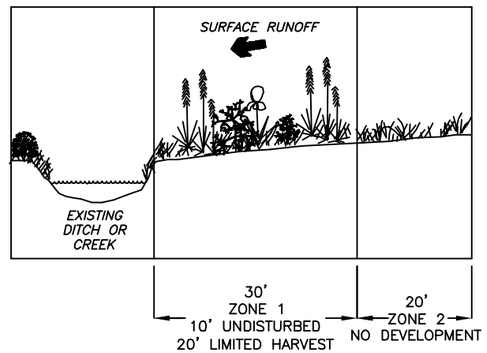
I certify that the survey is of another category (conservation easement), such as the recombination of existing parcels, a court–ordered survey, or other exception to the definition of a subdivision.

I JOHN A. RUDOLPH , certify that this plat was drawn under my supervision from (an actual survey made under my supervision) (deed description recorded in Book SEE , Page REFS., etc.) (other); that the ratio of precision as calculated by latitudes and departures is 1/5,000+ ; that the boundaries not surveyed are shown as broken lines plotted from information found in D.B. 689 , Page 587 ; that this plat was prepared in accordance with G.S. 47–30 as amended. Witness my original signature, registration number, and seal this 30th day of January A.D. 2009.

SEAL OR STAMP

Surveyor L–4194

RIPARIAN AREA DIAGRAM:



ZONE 1

A.) CURRENTLY CONSISTS OF WOODLAND, AGRICULTURAL LAND & SOIL ROAD.

B.) NATURAL REGENERATION OF FOREST VEGETATION AND PLANTING OF VEGETATION TO ENHANCE THE RIPARIAN AREA IF DISTURBANCE IS MINIMIZED. ANY PLANTINGS SHOULD CONSISTS OF LOCALLY NATIVE TREES AND SHRUBS.

ZONE 2

A.) CURRENTLY CONSISTS OF WOODLAND, AGRICULTURAL LAND & SOIL ROAD.

B.) (NOTE: NO PLACEMENT OF FILL OR LAND DISTURBING ACTIVITY IS ALLOWED.)

GENERAL NOTES:

1) *NOTE: NO ABSTRACT TITLE, NOR TITLE COMMITMENT, NOR RESULTS OF TITLE SEARCH WERE FURNISHED TO THE SURVEYOR. ALL DOCUMENTS OF RECORD REVIEWED ARE NOTED HERON (SEE REFERENCES). THERE MAY EXIST OTHER DOCUMENTS OF RECORD THAT MAY AFFECT THIS SURVEYED PARCEL.*
2) *NO HORIZONTAL CONTROL WITHIN 2000 FT.*
3) *COLUMBUS COUNTY GIS SHOWS THE COUNTY LINE IN A DIFFERENT LOCATION (NOT SHOWN ON THIS PLAT).*
4) *RIPARIAN DATA TAKEN FROM U.S. GEOLOGICAL SURVEY QUAD MAPS.*
5) *FOR COMPLETE BOUNDARY INFORMATION SEE PLAT RECORDED IN M.B. 40, PG.'S 217–220 BY K2 DESIGN GROUP, P.A.*
6) *ELEVATIONS ARE ASSUMED ELEVATIONS.*

ACREAGE DATA

THE AREA OF THE CONSERVATION EASEMENT = 40.10 ACRE± EXCLUDING THE NEW 20' INGRESS, EGRESS & REGRESS EASEMENT BY COMPUTER

SHEET 1 OF 2

AS–BUILT FOR

RESTORATION SYSTEMS, LLC

COLUMBUS SWAMP RESTORATON SITE

Natural Resources
Restoration & Conservation

TATUMS TOWNSHIP COLUMBUS COUNTY NORTH CAROLINA

200 100 0 200 400 600

GRAPHIC SCALE 1" =200'

DRAWN BY: FGR
DATE: 1/30/09
DWG. NO.: RSS994AB09
SURVEYED BY: J.A.R.

DESIGN GROUP, P.A.
5688 U.S. Hwy. 70 East
Goldsboro, NC 27534
Tel.: (919) 751-0075
Fax: (919) 778-9087
k2design@suddenlink.net

S82°59'33"E
398.87'

S44°17'48"E
242.67'

S22°34'48"W
4851.64'
(TIE DOWN
N.T.S.)

ROBESON COUNTY
COLUMBUS COUNTY

GW8

FIELDS
D.B. 307, PG. 588

N48°24'15"E
567.32'

EXISTING DITCH

EXISTING POOL

(INVERTED RAILROAD TRACK)

EIS

S81°18'32"E
658.98'
(TIE DOWN)

ROCK OUTLET STRUCTURE

GW3
PLOT 3
GW2
PLOT 2
PLOT 10
GW1
PLOT 1
PLOT 9
GW4
PLOT 4
PLOT 7
GW7

EXISTING WOODLINE

FIELDS
TRACT II
D.B. 689, PG. 587
(COLUMBUS COUNTY)
T.A.M. STEVENSON TRACT
M.B. 19, PG. 13
(ROBESON COUNTY)
TRACT II
D.B. 1228, PG. 456
(ROBESON COUNTY)

S32°43'40"E
1068.55'

EIS (No. 4 REBAR)
WITNESSED
BY A 8" CHOPPED
PINE. SAID PINE
ALSO BEING
THE CORNER
POST OF AN OLD
WIRE FENCE

N/F
WILLOUGHBY
D.B. 910, PG. 590
COLUMBUS COUNTY

EIS

S06°56'13"W
218.56'
(TIE DOWN)

FIELDS
TRACT III
D.B. 689, PG. 587
(COLUMBUS COUNTY)
TRACT III
D.B. 1228, PG. 456
(ROBESON COUNTY)

FIELDS
D.B. 307, PG. 588

FIELDS
D.B. 307, PG. 588

N04°12'37"E
450.83'

N18°15'55"E
220.14'

COLUMBUS COUNTY
ROBESON COUNTY

EXISTING INDEFINITE COUNTY LINE BETWEEN ROBESON COUNTY & COLUMBUS COUNTY TAKEN FROM ROBESON COUNTY GIS MAP, ALSO SHOWN ON FEMA FLOOD MAP NUMBER 3720022400K. NO FIELD SURVEY WAS PERFORMED ON SAID COUNTY LINE. (SEE GENERAL NOTE 3).

N60°15'31"W
780.65'

GW5
PLOT 5
PLOT 6
GW6
PLOT 8

EXISTING FLOOD CONTROL STRUCTURE WITH PIPE AND VALVE HAS BEEN REMOVED

EXISTING SOIL ROAD

EXISTING BRIDGE

BRIER CREEK
BLUE LINE STREAM. SEE RIPARIAN AREA DIAGRAM ON THIS SHEET.

N60°17'58"W
617.57'

FIELDS
D.B. 307, PG. 588

S84°07'40"W
86.34'

NEW 20' INGRESS, EGRESS & REGRESS EASEMENT
(0.01 ACRES± BY COMPUTER)

S09°45'56"E
96.57'

S63°37'04"W
179.54'

S60°20'21"W
44.04'

S54°45'22"W
67.85'

S32°31'58"W
139.64'

S08°28'16"W
245.43'

S84°07'40"W
20.00'

N04°49'06"W
23.29'
(TIE DOWN)

N04°49'06"W
32.96'
(TIE DOWN)

N61°13'22"E
91.41'
(TIE DOWN)

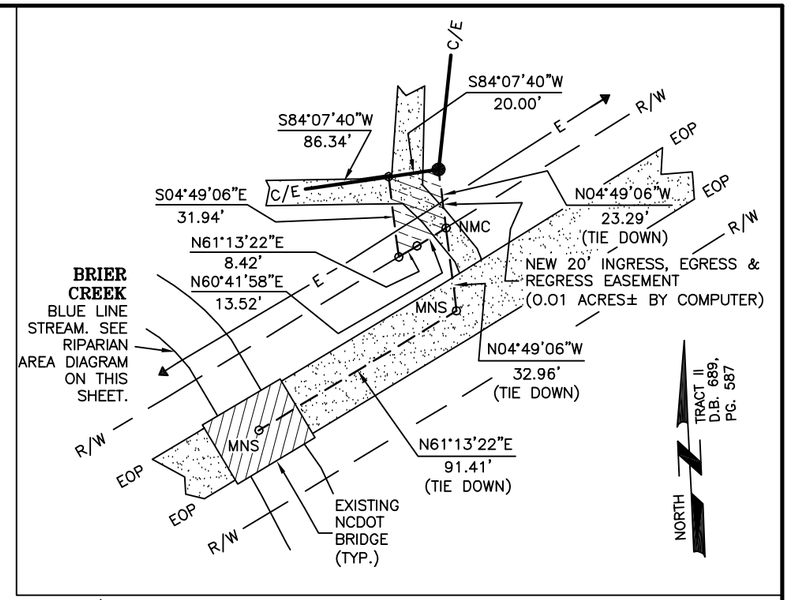
EXISTING NCDOT BRIDGE (TYP.)

INSET "A"
SEE DETAIL
ON THIS SHEET

BLANKET EASEMENT EXISTS ALONG OVERHEAD POWERLINES. NO DEFINED WIDTH.
BRUNSWICK ELECTRIC MEMBERSHIP CORPORATION
D.B. 864, PG. 676
(COLUMBUS COUNTY)

N.C.S.R. 1516
PAUL WILLOUGHBY ROAD
(60' R/W PAVED PUBLIC)

"PRELIMINARY PLAT - NOT FOR RECORDATION, CONVEYANCES, OR SALES"



SHEET 2 OF 2

AS-BUILT FOR

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200 100 0 200 400 600

GRAPHIC SCALE 1" =200'

Appendix C.
Preconstruction and
Construction Photographs

Columbus Swamp Preconstruction Conditions
Taken January 2008

Columbus Swamp During Construction
Taken October 2008