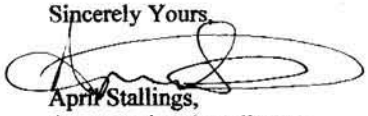
a) Turbidity – ASC accepts that the one-time disturbance of Goodbys Swamp will increase turbidity levels on a temporary basis. As the projected impact on water quality is a single occurrence ASC feels that this impact is acceptable

b) Biological Resources – ASC would like to see baseline sampling conducted of the macroinvertebrate community of Goodbys Swamp where the proposed wastewater line will cross. ASC would request follow-up sampling after construction of the wastewater line to determine if recolonization has indeed occurred in a timely manner. ASC has thirty years experience in the sampling of Four Holes Swamp's macroinvertebrate populations and would offer its services to conduct such sampling.

Thank you for the opportunity to submit comments on this proposed project.

Sincerely Yours,



April Stallings,
Conservation Coordinator
Audubon South Carolina

Exhibit C.21(2)

Exhibit C.22 (1)

South Carolina Archives & History Center
History & Heritage For All Generations

6 November 2002

Ms. Shelby Ozburn LeBron
Project Engineer
BP Barber and Associates
PO Box 1116
Columbia, SC 29202-1116

Re: Orangeburg County EID
BPB Project No. 02123

Dear Ms. LeBron:

Thank you for your letter of October 21, which we received on October 23, regarding the proposed water line extension in Orangeburg County, SC.

Our office knows of no properties included in or eligible for inclusion in the National Register of Historic Places that will be affected by this project. We do not require a cultural resources survey for this project.

We do request that our office be notified immediately if archaeological materials are encountered. Archaeological materials consist of any items, fifty years old or older, which were made or used by man. These items include, but are not limited to, stone projectile points (arrowheads), ceramic sherds, bricks, worked wood, bone and stone, metal and glass objects, and human skeletal materials.

For future projects, I have enclosed a Section 106 Project Review Form. A completed form will ensure that you have submitted all the required information to our office for review. If you would like an electronic copy, please send me an e-mail message at matthews@state.sc.us.

These comments may be provided to the appropriate federal agency as evidence of your consultation with the State Historic Preservation Office. If you have questions, please call me at (803) 896-6169.

Sincerely,

Marta Matthews
Review and Compliance Coordinator
State Historic Preservation Office

encl.

Exhibit C.22 (2)

02123

RECEIVED

B. P. BARBER & ASSOCIATES

ENGINEERS - PLANNERS - SURVEYORS

101 RESEARCH DRIVE (29203-9389)
P. O. BOX 1116
COLUMBIA, SOUTH CAROLINA 29202-1116
TELEPHONE 803 254-4400 FACSIMILE 803 771-6676

US Department of the Interior
Fish and Wildlife Service
Mr. Lori Duncan
Endangered Species Biologist
176 Croghan Spur Road
Suite 200
Charleston, SC 29407

The U.S. Fish and Wildlife Service (USFWS) has reviewed the plans for this proposed project.

☒ It is our opinion that the proposed action is not likely to have reasonably foreseeable adverse effects on resources under the jurisdiction of the USFWS that are currently protected by the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 et. seq.)(Act). Therefore, no further action is required under Section 7(a)(2) of the Act.

☐ It is our opinion that the proposed action is not likely to have significant adverse wetland impacts. Please contact the Corps of Engineers for more information.

U.S. Fish and Wildlife Service, 176 Croghan Spur Road, Suite 200, Charleston, SC 29407, (843) 727-4707

FWS Log No. 4-6-03-I-032 Date 10/8/02

acting Field Supervisor Sandy Abbott

RE: Orangeburg County EID
BPB Project No. 02123

Dear Mr. Duncan:

Orangeburg County is preparing an Environmental Information Document (EID) for a proposed project which mainly consists of a water line extension to be constructed in existing highway rights-of-way.. The water line extension will extend along US Highway 301 in the vicinity of I-26 to I-95. Distribution piping would also be installed in the vicinity of the intersection of US Highway 176 and US Highway 301 as well as along SC Highway 36 from US Highway 301 to I-26. The proposed water mains would be 12" lines, but an alternative bid for 16" water mains will also be considered. Two (2) 1 MG elevated water storage tanks are proposed. One (1) tank would be located in the vicinity of the intersection of US Highway 301 and I-26 and the other tank in the vicinity of the intersection of US Highway 301 and I-95. Two (2) meters are also proposed. One (1) would be located in the vicinity of the intersection of US Highway 301 and I-26 and the other in the vicinity of the intersection of US Highway 301 and I-95. The County is required to evaluate the environmental effects of the proposed project. Therefore, a map of the overall project is enclosed for your review.

Please comment on this project with respect to your department's concerns regarding known sensitive resources in the project area. Please provide information on endangered species in the project area as well, so the project can be developed to avoid affecting these species. We would greatly appreciate your prompt attention to this matter, and request that any response be made within the next 30 days. Should you have any questions or require additional information concerning this project, please do not hesitate to contact me.

Very truly yours,

B.P. BARBER & ASSOCIATES, INC.

Shelby O. LeBron

Shelby Ozburn LeBron, P.E.
Project Engineer

Exhibit C.22 (3)

South Carolina Department of
Natural Resources

Paul A. Sandifer, Ph.D.
Director
Alfred H. Vang
Deputy Director for
Land, Water & Conservation Division

November 8, 2002

Shelby Ozburn LeBron, PE
B. P. Barber & Associates, Inc.
101 Reasearch Drive
Columbia SC 29203-9389

RE: Orangeburg County EID, BPB Project No. 02123

Dear Ms. LeBron:

We have reviewed the information you provided us concerning the subject project. There appears to be no floodplain management concerns as far as the location of the proposed water towers. Make sure that the water line does not cause an obstruction in the floodplain when it crosses any channels in the mapped floodplain.

If you have any questions or comments, please contact Daryle Fontenot of our office at 803-734-9493.

Sincerely,

Land, Water and Conservation Division

Lisa S. Holland

Lisa S. Holland, Coordinator
Flood Mitigation Program

df

Exhibit C.22 (4)

DEPARTMENT OF THE ARMY
CHARLESTON DISTRICT, CORPS OF ENGINEERS
69A Hagood Avenue
CHARLESTON, SOUTH CAROLINA 29403-5107

REPLY TO
ATTENTION OF

July 16, 2003

Regulatory Division

Mr. George O. Whatley
B. P. Barber & Associates
Post Office Box 1116
Columbia, South Carolina 29202-1116

Dear Mr. Whatley:

This letter is in response to a Pre-Construction Notification (PCN) dated April 2, 2003, which was received on April 4, 2003. By submittal of the PCN, you requested verification that the proposed project is authorized by a Department of the Army Nationwide Permit.

The PCN contains the following identifying information for this project. The work affecting waters of the United States is part of an overall project known as "Orangeburg County Water Main – Hwy 301 Area". The project involves impacts to not more than 0.04 acres of waters of the United States, including wetlands, for the purpose of installing 18.68 miles of 12" water main. The project site is located within existing highway right-of-ways along Bonner Avenue, U.S. Highway 301, Homestead Road, and Big Buck Road, in Orangeburg County, South Carolina. The PCN also includes the following supplemental information:

a. Drawing sheets 1-37 of 37 titled "Proposed Construction of 12" Water Main" and dated May 28, 2003.

b. A delineation of special aquatic sites (SAC-80-2003-0099(Q)).

Based on a review of the PCN, including the supplemental information indicated above, it has been determined that the proposed activity will result in minimal individual and cumulative adverse environmental effects and is not contrary to the public interest. Furthermore, the activity meets the terms and conditions of Department of the Army Nationwide Permit #12.

The terms and conditions of the above listed Nationwide Permit are enclosed for your information. For this authorization to remain valid, the project must comply with the enclosed terms and conditions as well as the following special conditions:

1. That impacts to aquatic areas do not exceed those specified in the above mentioned PCN, including any supplemental drawings and mitigation plan, any subsequent revisions and/or those conditions required for certification from the S.C. Department of Health and Environmental Control;

2. That construction, use, and maintenance of the authorized activity is in accordance with the information given in the PCN, including the supplemental information listed above, subject to any modifying conditions or restrictions imposed by this letter;

3. That the permittee shall submit the attached signed compliance certification to the Corps within 30 days following completion of the authorized work and any required mitigation.

This verification is valid until the Nationwide Permit (NWP) expires or for two (2) years, whichever comes first. The time specified for this authorization will remain valid if the Nationwide Permit is reissued without modification, or the activity complies with any subsequent modification; however, the provisions of 33 CFR 330.6(b) will apply if the Nationwide Permit expires, is suspended or revoked, or is modified such that the activity no longer complies with the original terms and conditions. In general, these provisions provide that if the work authorized by this letter has commenced in accordance with the requisite terms and conditions or you, acting in reliance of this Nationwide Permit, have entered into a contract to have the work performed prior to such date, this authorization will remain in effect if the work can be completed within twelve months of the date of the Nationwide Permit's expiration, modification or revocation unless discretionary authority has been exercised in accordance with 33 CFR 330.4(c) or (d).

Your cooperation in the protection and preservation of our navigable waters and natural resources is appreciated. In all future correspondence concerning this matter, please refer to our file number SAC-12-2003-0536. A copy of this letter is being forwarded to certain State and/or Federal agencies for their information. If you have any questions concerning this matter, please contact Mr. Larry Hanford at 843-329-8044, or toll free at 1-866-329-8187.

Respectfully,

Robert H. Riggs
Chief, Regulatory Division

Enclosures:
Permit Drawings
Charleston District Regional Conditions
Nationwide Permit Conditions
Compliance Certification Form

Copy Furnished:

S.C. Dept. of Health and Environmental Control
Bureau of Water Pollution Control
Attn: Mr. Quinton Epps
2600 Bull Street
Columbia, South Carolina 29201

Exhibit C.22 (6)

United States Depart[illegible] of Agriculture

USDA

NRCS Natural Resources Conservation Service

1550 Henley Street, Room 103
Orangeburg, South Carolina 29115
(803) 534-2409 ext.3
(803) 536-5827 FAX

November 1, 2002

Shelby O. LeBron, P.E.
B.P. Barber & Associates, Inc.
101 Research Drive
Columbia, SC 29203-9389

Dear Ms. LeBron,

I am writing in response to your letter concerning a water line extension along US Highway 301, dated October 28, 2002.

The soils in the proposed project area consist of Goldsboro, Dothan, Lynchburg and Nobocco series. These soils are listed as prime farmland, which means that they are best suited for producing food, feed, fiber, or oilseed crops. They have good soil qualities, are favorable for all major crops common to the area, and have a favorable growing season.

Your proposed project would take these prime farmland acres out of production, however, the amount of acres that would be affected are insignificant on a large scale.

Thank you for allowing me to comment on your project. If you have any questions or require any additional information, please feel free to give me a call.

Sincerely,

Kellee M. Melton

Kellee M. Melton
Soil Conservationist

United States Department of the Interior

FISH AND WILDLIFE SERVICE
176 Croghan Spur Road, Suite 200
Charleston, South Carolina 29407

August 2, 2006

Mr. Joseph A. Jones
Chief, Planning Branch
U.S. Army Corps of Engineers
69A Hagood Avenue
Charleston, SC 29403-5107

Dear Mr. Jones:

The U.S. Fish and Wildlife Service has reviewed the Draft Environmental Assessment (DEA) and Finding of No Significant Impact, received with your letter of July 19, 2006, for construction of potable water and wastewater infrastructure at a proposed industrial park (Matthews Industrial Park) in Orangeburg County, South Carolina. The project includes construction of a one million gallon elevated potable water storage tank and a 500,000 gallon per day wastewater treatment facility.

The DEA is generally adequate in its description of the existing fish and wildlife resources and the evaluation of project impacts. In order to reduce impacts to forested wetlands, we recommend that the directional drilling alternative be used for the wastewater line crossing of Goodbys Swamp. As stated in the document, consultation under Section 7 the Endangered Species Act, as amended (16 U.S.C. 1531-1543), will be completed after design of the wastewater treatment plant and before construction activities are initiated.

We appreciate the opportunity to provide these comments. Please contact Ed EuDaly at 843-727-4707 extension 227 if you have any questions.

Sincerely,

Timothy N. Hall
Field Supervisor

TNH/EME

Exhibit C.23

D H E C
PROMOTE PROTECT PROSPER
2600 Bull Street
Columbia, SC 29201-1708

BUREAU OF WATER

August 6, 2003

Mr. Chris Hively, P.E.
Santee Cooper Regional Water System
817 Water Plant Road
Moncks Corner, SC 29461

Re: Lake Marion Regional Water Treatment Plant and System

Dear Mr. Hively:

This letter is to provide you with information concerning the position of the South Carolina Department of Health and Environmental Control (SCDHEC) with regard to Lake Marion Regional Water System project. As you are aware, SCDHEC has been a proponent of a regionalized approach for water treatment for many years. We have, unfortunately, seen many of our rural towns, counties and communities succumb to the ever-increasing cost of water system operation and to the complexity of new regulatory requirements. New viability requirements have been instituted to help identify these problems before they become a crisis situation. While many of the municipalities included in this project have not yet reached such a crisis, many have experienced both financial and operational challenges in the recent past. It is our position that addressing these challenges through the development of a regional system is proactive and will keep these crisis situations at bay.

The municipalities that are to be served by this regional system rely solely on ground water for their water supplies. Their existing wells are approaching or exceeding their projected life expectancy and many may have to be replaced in the coming years. In addition to the expense of drilling new wells and the challenge of finding suitable land, this brings up an additional SCDHEC concern. While most of these areas are not within the existing Capacity Use Area, they are within an area that is being closely monitored and which may be regulated in coming years. This would mean that groundwater withdrawals would become regulated and may eventually be limited to designated capacities, such as what is now required in coastal areas of South Carolina. While we continue to consider ground water as a suitable public water supply source, we believe that regional supplies, such as that presented by this Lake Marion project, may present a more effective and efficient means of delivering water in the future. As has been demonstrated with other similar projects, these entities working as group can be more viable and effective than they could working alone.

Exhibit C.24 (1)

Several midland and low country counties are also included as future beneficiaries of the Lake Marion Regional Water System. The majority of these counties do not have extensive public water systems; therefore, the majority of these county residents depend on private ground water wells. Individual ground water wells can be a drinking water source; however, when the wells are not installed properly, when they are installed in extremely shallow aquifers or when they are constructed in areas with localized water quality concerns, they become an unreliable or even unsafe water source. Our private well inspection and sampling program has identified many such instances within the included counties as well as across the state. Making a public water supply available to a rural community, where it is feasible, will improve the overall quality of life and health of that community.

As a final point, SCDHEC recognizes the significant economic boost that could occur with a regional water system in this area of the state. Many of the existing systems in this area do not have the capacity to serve additional industries nor do these systems extend into surrounding areas where industries may want to locate. A regional water system would encourage planned industrial development along identified corridors, such as along I-95. This in turn would spur the economies of these distressed areas as well as the state as a whole.

In summary, SCDHEC supports the intent of regional infrastructure projects, as is proposed with the Lake Marion Regional Water System. Such projects can address the viability concerns that invariably arise with many smaller water systems; they generally provide a more effective and efficient use of water resources; they work to serve rural areas in need of a public water supply to improve the quality of life and health; and, they can often spur economic development in distressed areas. We thank you for your effort on the Lake Marion Regional Water System project and your continued work with the Lake Moultrie Regional Water System. We look forward to working with you and your staff throughout the construction and future operation of this new system. Please don't hesitate to contact me at (803) 898-3543 should you have any questions or need additional information.

Sincerely,

Douglas B. Kinard, P.E., Manager
Drinking Water & Recreational Waters Compliance Section
Bureau of Water

Bob Freeman

From: Jeff_Duncan@nps.gov
Sent: Wednesday, March 03, 2010 2:35 PM
To: Smith, George - Aiken, SC
Cc: 'Jeff_Duncan@nps.gov'; Bob Freeman
Subject: Re: Orangeburg County - Four Holes Swamp

Follow Up Flag: Follow up
Flag Status: Yellow

Attachments: pic10365.jpg; Orangeburg Water Project Descriptions.pdf; Water Project Aerial Photo.JPG; Water Project Hwy Map.JPG


pic10365.jpg (4 KB)


Orangeburg Water Project Descr...


Water Project Aerial Photo.JPG...


Water Project Hwy Map.JPG (3 M...

I concur.

Jeffrey R. Duncan, Ph.D.
Fisheries, Wild and Scenic Rivers, Hydropower Southeast Region National Park Service
175 Hamm Rd. Suite C, Chattanooga, TN 37405 Ph. (423) 987-6127 Fax. (888) 854-2849

"Smith, George - Aiken, SC" <George.Smith@sc.usda.gov>
02/04/2010 09:30 AM

To: "'Jeff_Duncan@nps.gov'" <'Jeff_Duncan@nps.gov'>
cc: "'Bob Freeman'" <BFreeman@alliancece.com>
Subject: Orangeburg County - Four Holes Swamp

Jeffrey R. Duncan, Ph.D.
Southeastern Rivers Program
National Park Service
175 Hamm Rd. Suite C, Chattanooga, TN 37405

Mr. Duncan,

USDA/Rural Development in South Carolina anticipates the receipt of an environmental assessment from Orangeburg County, South Carolina that involves the construction of approximately twenty-two (22) miles of water distribution mains and two (2) 300,000 gallon elevated water storage tanks.
It is noted that a portion of the water distribution mains is located in the vicinity of Four Holes Swamp (river or segment having been designated for inclusion in the Nationwide

Rivers Inventory (NRI). The closest of the two elevated storage tanks is approximately three (3) miles from the protected resource while some of the proposed water mains are adjacent to the protected resource. These water mains, however; will be constructed within the South Carolina Department of Transportations existing . right of way embankment where possible. Other areas (i.e. bridged wetlands) will have construction accomplished via trenchless technologies utilizing "directional boring".
I have reviewed the proposal (see attached mapping and project description) and have made a determination of "No Impact" to this resource. Based on my review the proposal will not adversely affect the outstanding river value
(ORV) of this segment nor will it impact the quality of the waters therein.
The action, as proposed, should not diminish the potential for designation as a "Wild and Scenic" river. I base my decision on the following.

1. Construction will occur without adverse impact to the river bank.
2. Construction in the area will occur within the raised embankment of the existing Department of Transportation Right of Way to the extent possible.
3. In circumstances where the above may not be accomplished due to bridged crossings, construction will be accomplished via trenchless technology utilizing directional boring.
4. Best Management Practices (BMPs)will be incorporated within the contract documents requiring silt fencing and other protective measures limiting potential for non-point source pollution.

Should you have any question or comment regarding the above, please advise within fifteen (15) days of this transmittal. I apologize for the short time frame but we are ambitiously pursuing the utilization of American Recovery and Reinvestment Act (ARRA) funding A/K/A stimulus funds.

(Embedded image moved to file: pic10365.jpg) images[2]	George T. Smith State Environmental Coordinator 1555 E. Richland Avenue, Room 100 Aiken, South Carolina 29801 Phone: (803) 649-4221 Ext. 115 Fax: (803) 642-0732

(See attached file: Orangeburg Water Project Descriptions.pdf)(See attached file: Water Project Aerial Photo.JPG)(See attached file: Water Project Hwy Map.JPG)

Exhibit C.25 (2)

Appendix D

MACTEC

engineering and constructing a better tomorrow

September 11, 2008

Mr. Kevin Strickland
Alliance Consulting Engineers, Inc.
Post Office Box 8147
Columbia, South Carolina 29202-8147

Subject: **Draft Results of Phase I Cultural Resources Survey**
Goodbys Creek Regional Wastewater Treatment Plant
Orangeburg County, South Carolina
MACTEC Project 6671-08-0637.02

Dear Mr. Strickland:

MACTEC Engineering and Consulting, Inc. (MACTEC) is pleased to submit the attached Draft Report of Phase I Cultural Resources Survey for the Goodbys Creek Regional Wastewater Treatment Plant. The site is located generally west of the intersection of U.S. Highway 176 and Woolbright Road in Orangeburg County, South Carolina. The approximate 226-acre site was identified on preliminary property maps provided to MACTEC by Alliance Consulting Engineers, Inc. (Alliance). The survey was conducted on August 20 through August 22, 2008.

SUMMARY AND RECOMMENDATIONS

A compliance level survey was conducted of the approximate 226-acre site by TRC, under subcontract to MACTEC. The project area is generally characterized as 130 acres of uplands and approximately 90 acres of wetland areas.

The upland areas were surveyed with transect and shovel tests spaced at 30 meter intervals. The survey resulted in the discovery of three archaeological sites. Two of the sites consisted of small artifact scatters lacking in subsurface integrity and therefore were deemed not eligible for inclusion in the National Registration of Historic Places (NRHP). The remaining site consisted of a prehistoric scatter with a Mississippian component and a possible Woodland component. Artifacts were recovered at this site from a heavily disturbed plow zone and from intact deposits beneath the plow zone. Because of the possibility of intact features at this site, this site is recommended as potentially eligible for inclusion in the NRHP.

This report is currently in draft form and has been sent to the State Historic Preservation Office (SHPO) for their concurrence. The SHPO has 30 days from receipt of this draft report to issue their position regarding the results of this report. When we receive the SHPO's comments regarding this report, we will finalize the report and submit a copy to you at that time.

MACTEC Engineering and Consulting, Inc.
720 Gracern Road, Suite 132 • Columbia, SC 29210 • Phone: 803.798.1200 • Fax: 803.750.1303
www.mactec.com

CLOSING

MACTEC is pleased to submit this report of findings to Alliance. Should you have any questions regarding this document, please contact Mr. Shaun Rankin at (803) 798-1200.

Sincerely,

MACTEC ENGINEERING AND CONSULTING, INC.

Karl Matthew Rains
Project Professional

Shaun C. Rankin, CHMM
Principal Scientist

Attachments: TRC Draft Cultural Resources Survey, Goodbys Creek Regional Wastewater Treatment Plant, Orangeburg County, South Carolina.

CULTURAL RESOURCES SURVEY OF THE GOODBYS CREEK REGIONAL WASTEWATER TREATMENT PLANT, ORANGEBURG COUNTY, SOUTH CAROLINA

DRAFT REPORT

September 2008

CULTURAL RESOURCES SURVEY OF THE GOODBYS CREEK REGIONAL WASTEWATER TREATMENT PLANT, ORANGEBURG COUNTY, SOUTH CAROLINA

DRAFT REPORT

Submitted to:
MACTEC Inc.
720 Gracern Road
Suite 132
Columbia, South Carolina 29210

Submitted by:
TRC Garrow Associates, Inc.
621 Chatham Avenue
Columbia, South Carolina 29205

September 2008

TABLE OF CONTENTS

FIGURES

TABLES

I. INTRODUCTION

TRC conducted a Phase I cultural resources survey of approximately 220 acres at the proposed Goodbys Creek Regional Wastewater Treatment Plant in Orangeburg County, South Carolina (Figure 1), on behalf of MACTEC, Inc. Sean Norris served as the as Principal Investigator, and was assisted by archaeologist Ramona Grunden.

The project tract is located at the confluence of Goodbys Swamp and Four Hole Swamp, bound to the east by US Highway 176 and to the west by Four Hole Swamp. Goodbys Swamp lies to the north and private property forms the southern boundary. Vegetation consists of a "black water" hardwood forest in Four Hole Swamp and a mixed pine/hardwood with moderate to dense underbrush on the uplands. Based on vegetation, topography, and the nature of the undertaking, the Area of Potential Effects (APE) is considered to be a 0.50-mile radius around the project tract.

During the survey, three newly identified sites and three isolated finds were discovered (Figure 2). The sites have been designated 38OR303, 38OR304, and 38OR305. Two of the sites, 38OR304 and 38OR305, and the isolated finds are recommended ineligible for inclusion for the National Register of Historic Places (NRHP). One site, 38OR303, is recommended as potentially eligible for inclusion in the NRHP.

Table 1. Archaeological Sites in the Project Area.

Site Number	Description	NRHP Eligibility
38OR303	Woodland/Mississippian Scatter	Potentially Eligible
38OR304	Woodland Scatter; 20th c. Scatter	Not Eligible
38OR305	Woodland Scatter	Not Eligible

All work for this project was performed in accordance with the National Historic Preservation Act of 1966 (as amended) and has met the qualifications specified in the Interior's *Standards and Guidelines for Archaeology and Historic Preservation* (FR 48;44716-44742) and the *South Carolina Standards and Guidelines for Archaeological Investigations* (SHPO et al. 2005).

This report continues with a discussion of the natural setting and cultural context of the project area in Chapter II, and an overview of the investigation methods in Chapter III. Chapter IV presents the results of the survey, and Chapter V contains a summary of the investigations and presents recommendations concerning NRHP eligibility and other management concerns.

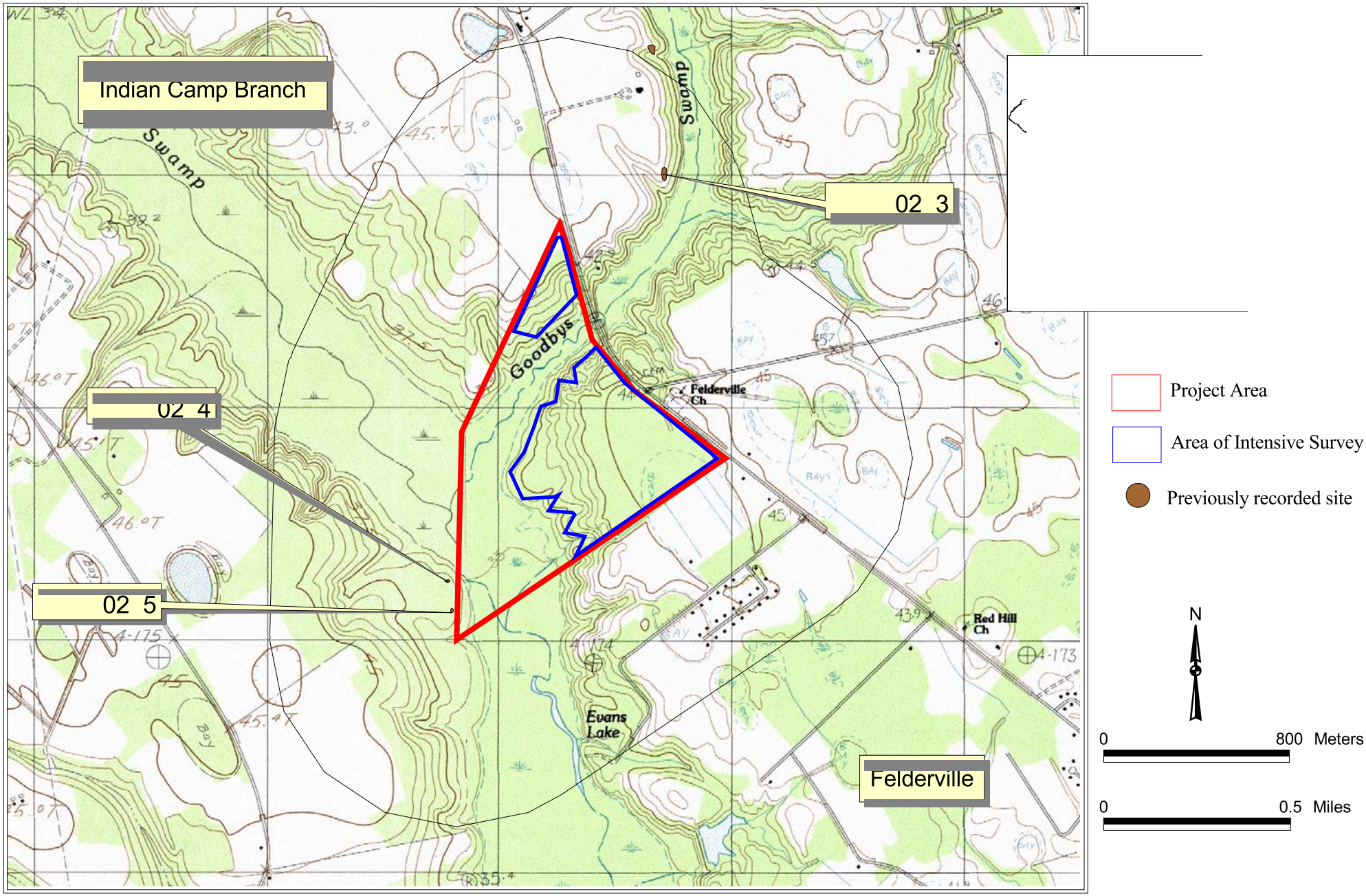


Figure 1. Project area and previously recorded resources withing a 0.5-mile radius on base maps 1982 Indian Camp Branch and Felderville USGS quadrangles.

II. NATURAL AND CULTURAL CONTEXT

PROJECT SETTING

The project area is located in an inter-riverine portion of South Carolina's Middle Coastal Plain region. The dominating features of this area are swamps, such as Four Hole and Goodbys Swamp. Soil types encountered during the survey include the Ailey, Bonneau, Coxville, Troup, Noboco, Dothan and Mouzon soil series. In addition there is an area of Udorthents on the tract. Soils classified as Udorthents are found in areas that have been highly disturbed, such as construction sites and borrow pits. Ailey, Bonneau, Troup, Dothan, and Noboco soils consist of well drained to excessively drained sand and loamy sand and are generally found on upland landforms and river terraces. The Coxville series consists of very deep, poorly-drained sandy loam found on flats and Carolina Bays. Mouzon soils are poorly drained fine sandy loams usually found on low-lying stream terraces.

Commonly found vegetation in the uplands of the project tract consists of a mixture of pines and hardwoods, including loblolly pine, turkey and post oak, as well as dogwood and hickory. The understory is moderate to dense and includes muscadine, bay myrtle, holly, and smilax. Cypress and tupelo dominate in the swamps. The average annual temperature is 63.5 degrees F, and yearly precipitation is approximately 48 inches (USDA NRCS n.d.).

PREHISTORIC OVERVIEW

The prehistory of South Carolina begins sometime prior to 12,500 B.P. and ends with the arrival of the first European explorers in the mid-sixteenth century. A general discussion of the prehistoric occupations and material culture are presented below.

Paleoindian Period (12,500–10,000 B.P.)

The arrival of humans in eastern North America is currently the subject of much debate, with suggested dates starting as much as 35,000 years ago (Dillehay 1989). Ongoing investigations along the Savannah River are focused on addressing this issue; however, in terms of known occupations, the earliest inhabitants of the area are generally accepted as arriving ca. 12,500 years ago (radiocarbon years before present). The Paleoindian period is marked by the cessation of the Pleistocene geological era and the beginning of the Holocene, a period of climatic and environmental change in much of the country (Anderson and O'Steen 1992). The Paleoindians in the eastern United States are thought to have formed small bands of hunter-gatherers who foraged the woodlands and, to a lesser extent, exploited the megafauna of the period (Lepper and Meltzer 1991). Evidence for Paleoindian occupation in the Coastal Plain is scant and limited to surface finds of diagnostic lanceolate projectile points (Goodyear et al 1989). Sea levels were as much as 9 m lower than at the present time, and it is generally believed that most evidence for Paleoindian occupations along the South Carolina coast is now submerged (Brooks et al 1989).

Archaic Period (10,000–3,000 B.P.)

A warming climate and changing environment led to changes in subsistence patterns and technology over time. These changes signal the Archaic period (ca. 10,000 to 3,500 B.P.), which is better understood than the Paleoindian period. Sea levels, however, were still much lower than at present and Archaic sites are not well represented in the area.

Much of the Archaic sequence for South Carolina is based on work in the North Carolina Piedmont conducted by Joffre Coe (1964). Research in South Carolina since that time has focused on regional adaptations to the changing environment (Anderson 1992, Sassaman 1993), and while duplication of Coe's Piedmont sequence has not been possible (Blanton and Sassaman 1989:58), his chronology still provides the basic framework for interpretation of Archaic sites in South Carolina.

The Late Paleoindian/Early Archaic transition is marked by the presence of Hardaway and Dalton points, with distinctive concave bases and side notches (Coe 1964). Locally, the Taylor Point is recognized as a Hardaway-Dalton equivalent and is found primarily in the southern part of the state (Sassaman 1992, Michie 1992). Corner-notched Palmers and Kirks are firmly placed as Early Archaic types, along with a variety of bifurcates (e.g., Lecroy and St. Albans), few of which are found outside the Carolina Piedmont (Anderson 1992). Instead, the corner-notched tradition appears to continue into the Middle Archaic period, which sees the advent of more expedient types such as Stanly, Guilford and Morrow Mountain, with Morrow Mountain points predominate across the state (Coe 1964; Blanton and Sassaman 1989).

Early and Middle Archaic lifestyles continued to focus on hunting and foraging, with settlement patterns focused on river floodplains. Population is thought to have increased substantially during these periods (Goodyear et al 1989). By the time of the Late Archaic, the expedient tools of the preceding subperiod were giving way to stemmed bifaces, most notably he ubiquitous Savannah River point which is found under various names from Florida to Canada. During the Late Archaic, settlement patterns begin to change and the there is an increase in repeated, intensive occupations of a seasonal nature (Sassaman 1993).

The terminal Late Archaic marks the introduction of fired clay pottery. A few researchers reason that the technology heralds a new period of adaptation (Trinkley 1990:2), while most others suggest that the introduction of ceramics did not result in a change in settlement or subsistence patterns (Sassaman and Anderson 1994:30). Regardless, around 4,500 B.P. ceramics were beginning to appear in the middle and lower Savannah River Valley and along coast. Fiber-tempered Stallings wares are the first to appear and are found throughout the Coastal Plain (Sassaman 1993:20). Subsequent to and somewhat coeval with Stallings is Thom's Creek, which marks the transition from the Archaic to the Woodland periods (Anderson et al. 1982; DePratter 1979; Trinkley 1990; Williams 1968). Thom's Creek, like Stallings, is found throughout the Coastal Plain of South Carolina, including Orangeburg County (Poplin et al 1992:26).

In addition to pottery, assemblages from Late Archaic sites in the area include Savannah River and small Savannah River stemmed projectile points, soapstone cooking discs, and occasionally shell tools and worked bone (Trinkley 1980; Williams 1968).

Woodland Period (ca. 1050 B.C.–A.D. 1150)

Although Thom's Creek pottery is found on Early Woodland sites, the appearance of Refuge wares is often used to denote the beginning of the period (ca. 3,000 B.P.). Refuge is characterized by coarse sand temper and surface treatments including simple stamping, punctate, plain, and dentate stamping (DePratter 1979; Williams 1968). Deptford-type ceramics (check- and linear check-stamped with coarse sand temper) make an appearance toward the end of the period and are found on sites throughout the Middle and Late Woodland periods. Diagnostic lithics are similar to the small-stemmed bifaces of the Late Archaic.

Most researchers agree that during this period there was an increase in population, with an attendant movement by small groups into settings previously under-utilized (Anderson and Joseph 1988:218; Hanson 1982). Investigations on the interior Coastal Plain suggest that along the Savannah and Congaree Rivers there was a shift away from the floodplains to upland settings along tributaries (Anderson and Joseph 1988; Sassaman et al. 1990), and it is unlikely that circumstances were different in the project area. Subsistence patterns were similar to those of the Late Archaic, with less reliance on coastal resources and an increasingly circumscribed range (Anderson and Joseph 1988, Oliver 1981).

The Deptford series, originally defined on the lower Savannah River (DePratter 1979; Williams 1968), serves as the bridge from the Early to the Middle Woodland (ca. 2,300–1,000 B.P.) throughout the coastal regions. The hallmark of the series is check and linear check stamping, with simple-stamped and cordmarked types as less common surface treatments. Although the Deptford tradition was originally thought to be a coastal tradition, the discovery of Deptford and Deptford-related ceramic types at non-coastal sites has suggested that the Deptford tradition has a larger geographic distribution (Stephenson et al. 2002). Sites discovered within the interior Coastal Plain of South Carolina with large amounts of Deptford ceramics, such as the Sable site, suggest that there were significant, non-coastal occupations (Anderson 1975a, 1975b, 1979; Ryan 1972; Trinkley 1980).

Toward the latter end of the Middle Woodland period, typology becomes more confused and there is no established regional sequence. Ceramics with either sand or grog temper (or both) and cordmarked or fabric-impressed surfaces dominate all Woodland assemblages, with cordmarked sherds more common in the south, shifting towards an emphasis on fabric-impressed to the north (Anderson et al. 1996). Thus, Late Woodland ceramic technologies are a continuation of the Middle Woodland, with no clear transitional type. Subsistence patterns also appear to have evolved slowly. Late Woodland settlements are small, dispersed, and less integrated than those associated with the Deptford phase (Sassaman et al. 1990:14; Stoltman 1974). Subsistence was based on generalized hunting, fishing, and gathering, and although cultigens such as squash and maize had been introduced into the region by this time, they were not a significant food source (Wood et al. 1986).

Mississippian Period (ca. A.D. 1150–1550)

The post-Woodland Mississippian period is marked by social, economic, and technological changes resulting in cultural complexity not found previously in prehistoric Southeastern societies. Complicated-stamped pottery and small triangular projectile points are the diagnostic

elements of Mississippian material culture. Increasing reliance on agriculture and construction of large ceremonial complexes are the social hallmarks of the period.

Mississippian mound centers are located along major river drainages, and in South Carolina they are found in the Savannah River valley and along the Wateree River. There is continuing debate on how and how far a given center's influence extended (Anderson 1989; Hally 1996; Blitz; 1999). Cultural and political influences aside, Mississippian sites can be found along any drainage with a floodplain in the region. Away from the ceremonial complexes these tend to be somewhat isolated "farms".

According to Anderson et al. (1982), the Santee pottery series is the initial Mississippian manifestation on the Coastal Plain, with a range from the Lower Santee River in the Coastal Plain to the Santee-Wateree basin on the Fall Line, north of the project area. To the south, along the Savannah River, Savannah and Irene components appear to have a more localized distribution (Braley 1990). There are no recorded ceremonial complexes along the Edisto River drainage, and it is not known if Mississippian influences were derived from Savannah River or Wateree-Santee cultures. It has been suggested that this region is a "buffer zone" between major provinces, namely Cofitachequi on the Wateree River and Ocute on the Oconee River in Georgia, which is thought to be the parent of the Savannah River occupations (Anderson 1989:119; DePratter 1989:142).

HISTORIC OVERVIEW

Religious conflicts and the desire to find new avenues of trade and economic wealth prompted the movement of Europeans across the Atlantic Ocean in the sixteenth century. Spain and Portugal were the first European nations to establish overseas empires. In 1514 Lucas Vasquez de Ayllon sent an expedition north of the Bahama Islands to find native people to replenish the labor force that was dwindling from disease in the Caribbean. The expedition report prompted Ayllon to return to South Carolina in 1521, where natives were put aboard ships headed for Hispaniola. In 1925 Ayllon returned again to the coast of South Carolina and set up a small colony named San Miguel de Gualdape (Edgar 1998:21–22).

The French in 1562 began attempts at starting a settlement along the coast of South Carolina. They set up a fort named Port Royal on present-day Parris Island. Neither San Miguel de Gualdape nor Port Royal lasted more than a year after their founding. Poor relations with the Native Americans, swampy environment, and limited supplies caused both settlements to fail (Edgar 1998:26–27).

Though Spain and France made other attempts to set up colonies on the South Carolina coast none were successful. In 1672 a colonizing party from England established a settlement on the Ashley River, named Charleston. Charleston was successful and opened the door to further settlement in South Carolina (Edgar 1998:48–51; Mills 1972:172).

Settlement by Europeans in Orangeburg County was minimal before 1735. Henry Sterling, an Indian trader and the first European settler to this area, obtained land in 1704 by Lyon's Creek (Salley 1969:18). Sterling's daughter Mary and her husband Richard Heath moved to the Santee River area in 1719 (Chaplin 1981:4).

Early English and Scots-Irish settlers lived along the Edisto River in the Amelia Township, which was located along the Cherokee Path. There was little initial support of heavy settlement of this township because a military garrison was located up the Santee River. This garrison was thought sufficient to protect the colonists' trade interest along the Cherokee path, since Amelia was originally considered a place for Indians and traders to conduct business (Meriwether 1940:42).

During the 1730s German and Swiss families, mostly farmers, settled in Orangeburg County in considerable numbers. These German settlers gave Orangeburg its name in honor of William IV, Prince of Orange (Salley 1969:34–35). Though the German immigrants focused their settlement in the location of present-day Orangeburg, they also occupied and farmed land as far out as Four Hole Swamp (Salley 1969:46). By 1737, German settlers were exporting wheat and corn as well as producing rice, hemp and indigo. Their industriousness and the fertility of the soil facilitated their agricultural success (Culler 1995:25; Mills 1972:659).

During the Revolutionary War, Orangeburg County experienced a few minor skirmishes. When the British took control of Orangeburg, General Sumter besieged and took over the city jail. On September 5, 1781 the British lost to patriot forces in a battle at Eutaw Springs, which lies on the shore of Lake Marion (Mills 1972:662).

In the late 1700s Orangeburg County went through a series of boundary changes. The Orangeburg District originally encompassed present day Bamberg, Barnwell, Lexington, Calhoun, and Orangeburg counties, along with the Orangeburg, Amelia, and Saxe-Gotha (Lexington) townships established in 1730 (Culler 1995:7; Edgar 1998:52). A 1785 act split the Orangeburg district into Orange, Lexington, Lewisburg, and Winton (along the Savannah River) counties. Though the Orangeburg district was re-established when these four counties were eliminated in 1791, the district was divided again in 1804 into Lexington, Barnwell and Orangeburg counties (Trinkley 2003:12).

After the 1770s, when the threat of Indian attacks was gone, Orangeburg County grew considerably. By 1840, the City of Orangeburg had a jail, courthouse, several churches, taverns, stores and a railroad connecting the city to Charleston (Culler 1995:104; Trinkley 2003:12). As Orangeburg County began to flourish the number of slaves increased as well. As the production of cotton became more important, the use of slave labor became widely used. By the 1860s the population of whites in the county was 8,000 while the slave population was more than twice that. At this time, Orangeburg was ranked sixth out of the 30 districts in regard to cash value of its farms and plantations (Culler 1995:435).

For most of the Civil War, Orangeburg County was largely unaffected; however, toward the end of the war, Sherman burned the City of Orangeburg as he marched through South Carolina (Edgar 1998:371). After the war, attempts to increase cotton production and the widespread adoption of sharecropping led to increasing landlessness among the state's farm producers. By 1900, six out of every ten farmers in South Carolina were either sharecroppers or tenants. Out of this group of landless farmers, 78 percent were black (Edgar 1998:430, 450–451). In 1900, Orangeburg County ranked first in the state in cotton and corn production.

As cotton prices fell from 1920 through the 1940s, Orangeburg County suffered more than the rest of the state. Two-fifths of the farms in the county were mortgaged (Trinkley 2003:16). When cotton was no longer a profitable crop, farmers in Orangeburg began focusing production on corn, soybeans, and other specialty crops. This move away from cotton allowed Orangeburg County to maintain its large number of farms, which in 1945 totaled almost 7,000 (South Carolina Department of Agriculture 1948:224).

III. METHODS

LITERATURE REVIEW

Prior to fieldwork, TRC conducted background research at the South Carolina Department of Archives and History (SCDAH) in Columbia, and at the South Carolina Institute of Archaeology and Anthropology (SCIAA) in Columbia. The records examined at SCDAH included a review of their GIS-based Cultural Resource Information System (CRIS) for sites listed in or eligible for inclusion in the National Register of Historic Places (NRHP), and a review of CRIS and the SCDAH Finding Aid for previous architectural surveys near the project area. The records examined at SCIAA include the master archaeological site maps, state archaeological site files, and any associated archaeological reports.

FIELD INVESTIGATIONS

Archaeological investigations for this project included a Phase I survey of approximately 220 acres at the proposed Goodby Creek Regional Wastewater Treatment Plant. The project area includes approximately 90 acres of wetlands associated with Goodby Swamp and Four Hole Swamp that were not subject to transect survey.

All sites and isolated finds were documented with maps and photographs. Detailed field notes were maintained concerning sites located during the survey. This information included site size, site depth, soil type, and other relevant information. All site locations were recorded using a Trimble receiver (sub-meter accuracy) and plotted on USGS 7.5-minute topographic maps and project plans.

In addition to the archaeological survey, a windshield reconnaissance of the APE surrounding the two proposed pump station locations was conducted to determine whether the construction of the pump stations would affect any above-ground National Register listed or eligible properties.

LABORATORY METHODS

All artifacts recovered were cleaned, identified, and analyzed using analytical techniques summarized below. Following analysis all artifacts were bagged according to site, provenience, and specimen number. Following the South Carolina interim guidelines established for artifact curation, only acid-free plastic bags and artifact tags were used.

Lithics were initially identified as either debitage or tools. Debitage was sorted by raw material type and size graded using the mass analysis method advocated by Ahler (1989); each flake was also examined for use-wear. Formal tools were classified by type when possible, and attribute data (e.g., thickness, length, weight) was recorded for all tools. Projectile point typology generally followed that contained in Coe (1964) and Justice (1987).

Ceramics greater than 1 cm^2 were sorted first by sherd type (i.e., rim, body), surface treatment, and temper (using the Wentworth scale). These groups were further analyzed for other diagnostic attributes, such as paste texture, interior treatment, rim form, and rim/lip decoration. The data gathered at this level of analysis were used to place the sherds within established regional types (where possible). Information on the ceramic typology of the project area was derived primarily from Anderson et al. (1996), DePratter (1979), Trinkley (1990), and Williams (1968). Sherds less than 1 cm^2 were classified as "residual sherds" and only their frequency and weight were recorded.

Historic artifacts were washed or otherwise cleaned as appropriate. They were separated by material type and further sorted into functional groups, for example glass was further sorted into window, bottle, or other glass. Temporal assignments were based on the chronologically sensitive attributes (i.e., maker's marks; glass color) using established references for historic materials, including Noel Hume (1970), South (1977), and Miller (1991), among others.

The artifacts, field notes, maps, photographs, and other technical materials generated as a result of this project will be temporarily curated at the TRC office in Columbia. All of the materials will be delivered to SCIAA for final curation upon conclusion of the project.

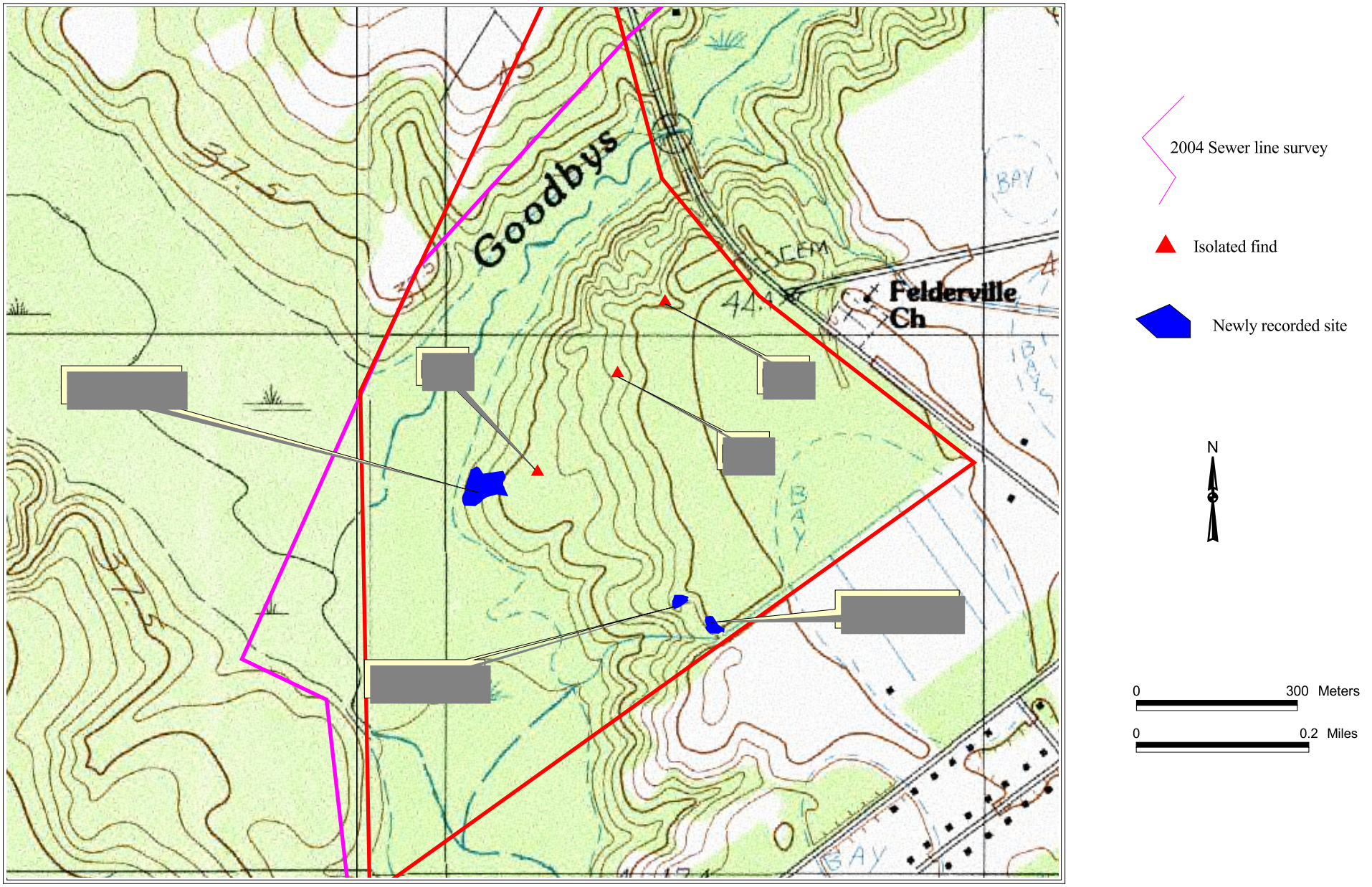


Figure 2. Newly reocorded sites and isolated finds in the project area.

IV. RESULTS OF INVESTIGATIONS

LITERATURE REVIEW

A search of the files and records at SCIAA revealed there are three previously recorded archaeological sites within a 0.50-mile radius of the project area (Table 2, see Figure 1).

Table 2. Previously recorded archaeological sites within a 0.25-mile radius.

Site Number	Description	NRHP Eligibility
38OR263	Early/Middle Woodland scatter	Not Eligible
38OR264	Early/Mid Woodland scatter, Unknown Prehistoric	Not Eligible
38OR265	Woodland (?)/ Mississippian scatter	Not Eligible

All three sites were recorded in 2004 as the result of a survey of a proposed sewer line along the west side of Goodby Swamp and the south side of Four Hole Swamp (Figure 2). The sites are recommended not eligible for the NRHP (Kloss 2004).

ARCHAEOLOGICAL SURVEY

The project area contains approximately 220 acres, including 90 acres of wetlands. The 110 acres of uplands were surveyed with transects and shovel tests spaced at 30 m intervals (Figure 1). All exposed surfaces (roads, logging decks) were visually examined for evidence of human occupation, as were tree tips and push piles. The survey resulted in the discovery of three archaeological sites (38O303, 38OR304, 38OR305), and three isolated finds (Figure 2).

Figure 3. Four Hole Swamp at 38OR303, facing west.

38OR303

Site Number: 38OR303	**NRHP Recommendation:** Potentially Eligible
Site Type: Prehistoric Scatter	**Elevation:** 150 feet AMSL
Components: Woodland (?); Mississippian	**Landform:** Ridge Side Slope
UTM Coordinates: E535063, N3699687	**Soil Type:** Troup Sand
Site Dimensions: 60 × 60 m	**Vegetation:** Hardwoods, Pine

Site 38OR303 is located at the eastern edge of Four Hole Swamp (Figure 2, Figure 3). Vegetation consists of hardwoods and dense underbrush. There is dirt road to the south and the site is bound by negative shovel tests on the north and east (Figure 4). A modern dump, push piles, and logging ruts have impacted the area.

The site was discovered with the excavation of two positive shovel tests. Site delineation shovel tests excavated at 10 m intervals resulted in seven additional positive tests (Figure 3). In total, 17 shovel tests were excavated at the site, resulting in nine positive shovel tests. The overall size of the site is approximately 60 by 60 m.

The soil strata found at 38OR303 included three distinct horizons: Stratum I (0–10 cmbs), a humus/overburden zone consisting of dark brown (7.5YR4/3) sand; Stratum II (10–50 cmbs), a strong brown (7.5YR4/6) sand; and Stratum III (50–60+ cmbs), a strong brown (7.5Y5/8) clay sand. Artifacts were recovered from the surface and from shovel tests at 10-50 cmbs. No features were encountered. Recovered artifacts include two complicated stamp sherds, seven plain sherds, six eroded sherds and ten chert flakes. The complicated stamp sherds are indicative of Mississippian occupation; the plain sherds could be either Woodland or Mississippian in origin. No diagnostic lithics were recovered.

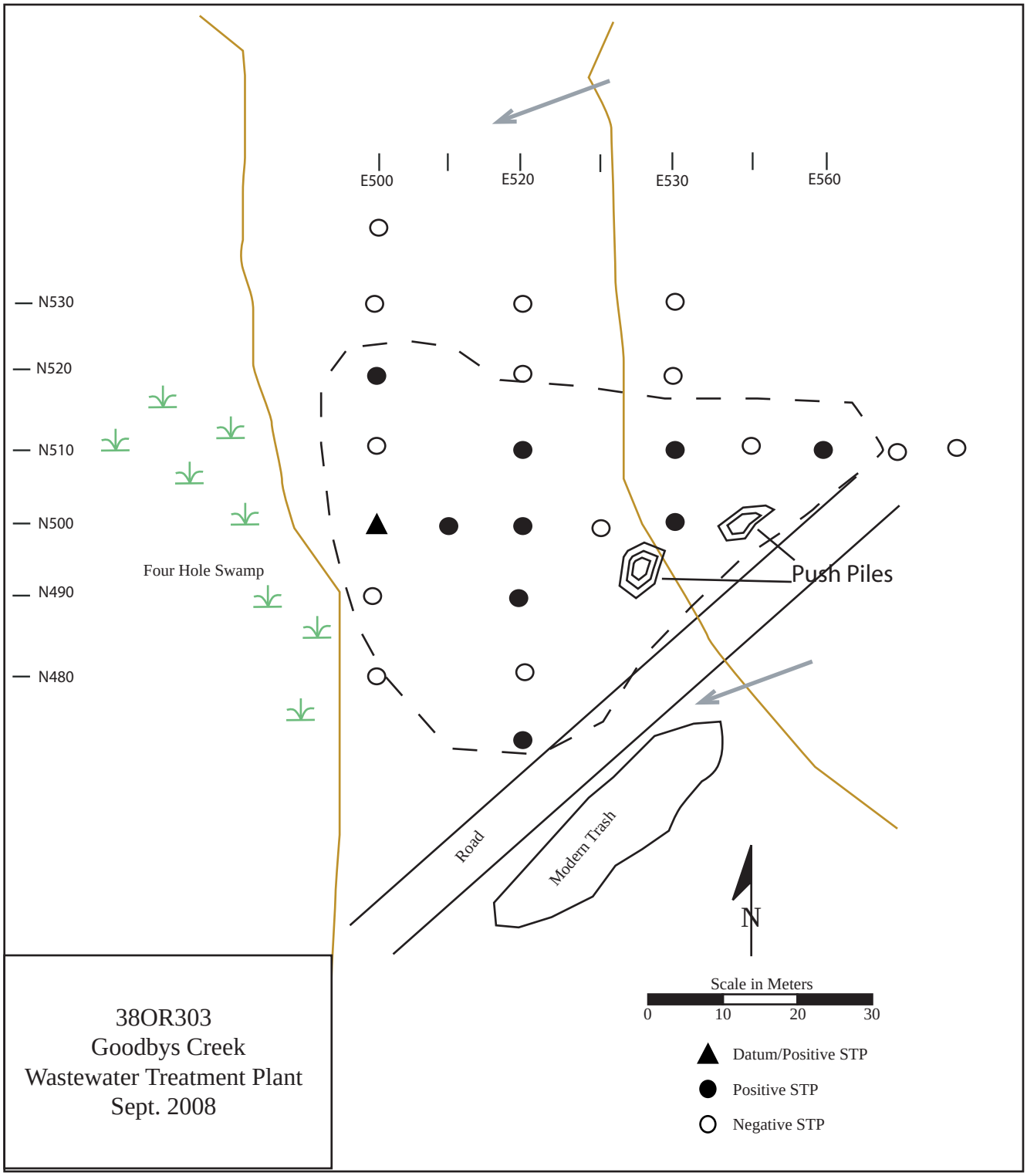


Figure 4. Sketch Plan, 38OR303.

Investigations at site 38OR303 yielded Mississippian and possibly Woodland period artifacts from surface and subsurface contexts. The site has been impacted by logging activity and there are areas of disturbance. However, artifacts were recovered from undisturbed contexts and the site may retain subsurface integrity. Further investigations could reveal intra-site patterning and shed light on late prehistoric small-scale occupations in the project area and therefore 38OR303 is recommended potentially eligible for the NRHP.

38OR304

Site Number: 38OR304	**NRHP Recommendation:** Not Eligible
Site Type: Prehistoric Scatter, Historic Scatter	**Elevation:** 150 feet AMSL
Components: Early/Middle Woodland	**Landform:** Side slope
UTM Coordinates: E535494, N3699454	**Soil Type:** Troup Sand
Site Dimensions: 35 × 15 m	**Vegetation:** Grasses

Site 38OR304 is located in a clearing and dirt road above (east of) an unnamed drainage feeding into Four Hole Swamp (Figure 2). A planted pine forest is to the west and drainage ditch marking the property line is to the south. The area has been heavily impacted by logging, erosion, and road maintenance. Vegetation on the site consists of grass and brush, and there was 75–100 percent surface visibility (Figure 5).

The site was discovered as a surface scatter in the clearing and road (Figure 6). A total of six shovel tests were excavated to delineate the scatter and one contained subsurface material, producing a chert flake in the upper 20 cm of the test. Site size is based on the extent of the scatter. Recovered artifacts include two sherds of yellow ware, two eroded prehistoric sherds, and four chert flakes.

Shovel tests revealed disturbed and mixed soils. Typical deposition included 7.5YR3/4 dark brown sand from 0–30 or 40 cmbs over 7.5YR5/8 strong brown clay sand.

Figure 5. 38OR304, facing south.

Site 38OR263 is a prehistoric and historic artifact scatter in a disturbed context. No above ground historic features were located, and subsurface integrity is lacking. The site retains little integrity and will not add to our understanding of occupation in the project area, and 38OR304 is recommended not eligible for the NRHP.

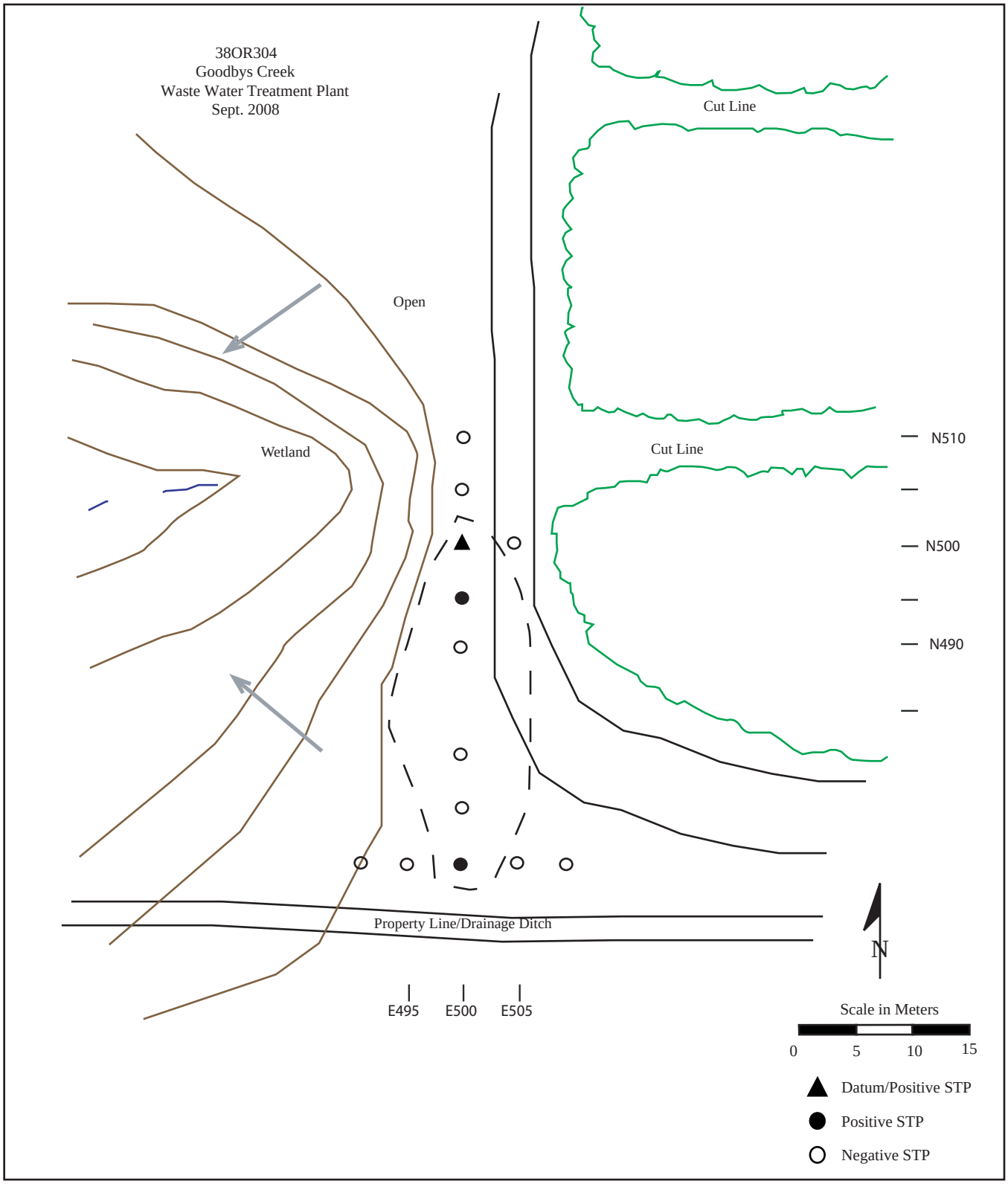


Figure 6. Sketch Plan, 38OR304.

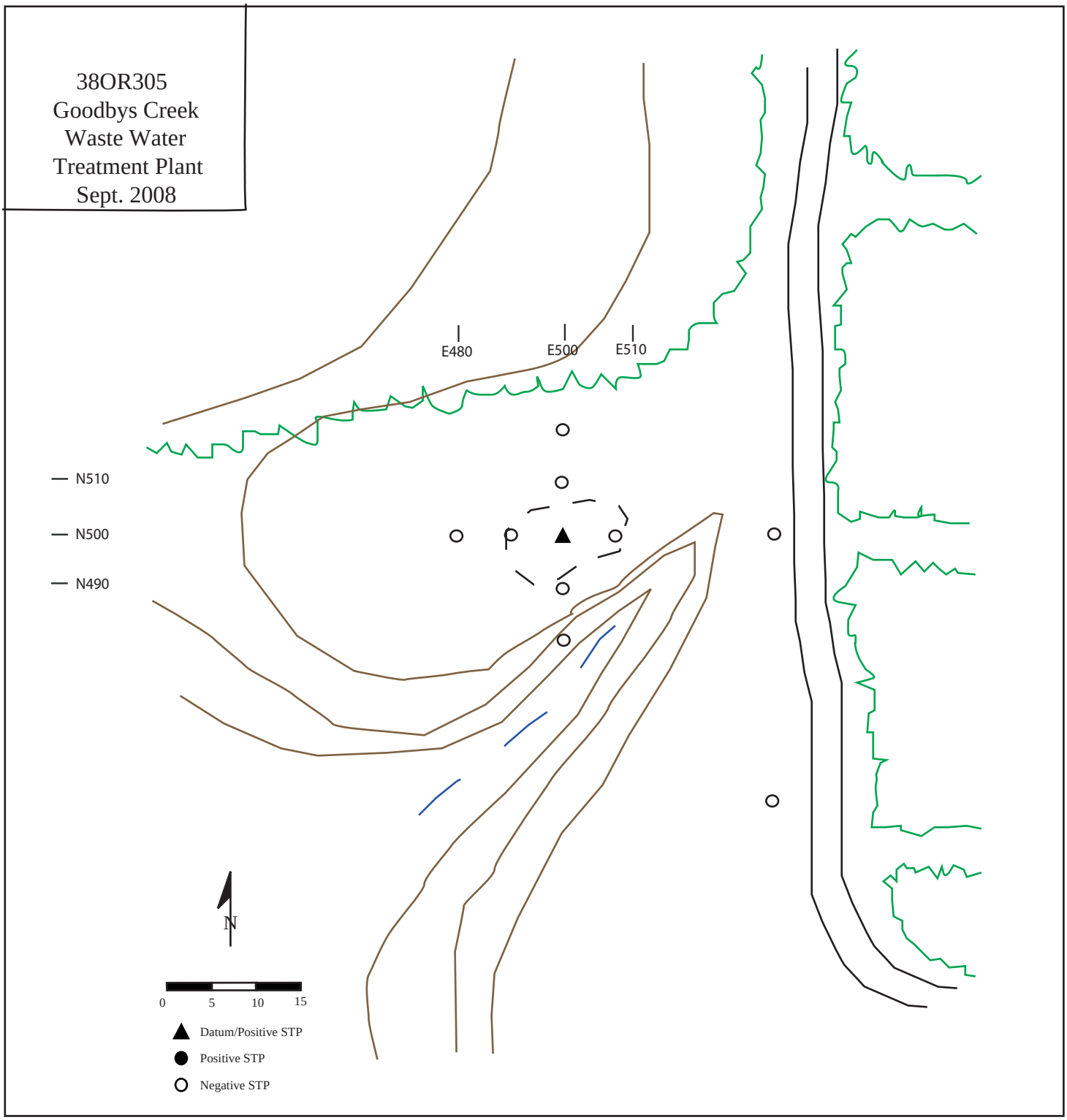


Figure 7. Sketch Plan, 38OR305.

38OR305

Site Number: 38OR305	**NRHP Recommendation:** Not Eligible
Site Type: Prehistoric Scatter	**Elevation:** 150 feet AMSL
Components: Woodland	**Landform:** Ridge Side Slope
UTM Coordinates: E535434, N3699504	**Soil Type:** Troup Sand
Site Dimensions: 15 × 20 m	**Vegetation:** Grasses

Site 38OR305 is located in and old clear-cut approximately 200 m east of Four Hole Swamp (Figure 2). The area has been heavily impacted by logging, and vegetation consists mainly of grass and brush, with 75–100 percent surface visibility at the time of the survey.

The site was discovered with the excavation of one positive shovel test. Site delineation shovel tests did not produce subsurface material, and site size is based on the extent of the surface scatter (Figure 7). Recovered artifacts include three chert flakes, and one plain sherd. The soil strata found at 38OR305 consists of mixed dark brown (7.5YR3/4) and strong brown (7.5YR4/6) sand from 0–30 or 40 cmbs over strong brown (7.5YR5/8) clay sand.

Investigations at site 38OR305 yielded four artifacts recovered from a heavily disturbed land form. Because of the low artifact density and high level of disturbance, the site is recommended as ineligible for inclusion in the NRHP.

Isolated Finds

Isolate 1 is located immediately south of a dirt road approximately 150 m east of Four Hole Swamp (Figure 2). It was found with a positive transect shovel test containing two plain prehistoric sherds recovered at 0–20 cmbs. Delineation shovel tests excavated at 5 m intervals did not contain artifacts, and no material was found on the surface. This find is recommended not eligible for the NRHP.

Isolate 2 is located in an erosion gully approximately 180 m southeast of Goodby Swamp (Figure 2). The area was used as a dump and contains modern beverage bottle glass, plastic, and concrete. A sherd of hand-painted blue whiteware was found on the surface. Delineation shovel tests excavated at 5 m intervals did not contain artifacts, and no other historic artifacts were found on the surface. This find is recommended not eligible for the NRHP.

Isolate 3 was discovered with a positive shovel test containing one plain prehistoric sherd on a terrace of planted pine approximately 200 m east of Goodby Swamp (Figure 2). Delineating shovel tests did not contain artifacts, and none were recovered from the surface. This find is recommended not eligible for the NRHP.

V. SUMMARY AND RECOMMENDATIONS

TRC conducted a Phase I cultural resources survey of approximately 220 acres at the proposed Goodbys Creek Regional Wastewater Treatment Plant in Orangeburg County, South Carolina. The archaeological investigations resulted in the discovery of three archaeological sites (38OR303, 38OR304, and 38OR305) and three isolated finds.

Sites 38OR304 and 38OR305 are small artifact scatters in lacking subsurface integrity. Site 38OR303 is a prehistoric scatter with a Mississippian component and a possible Woodland component. Artifacts were recovered from a heavily disturbed plow zone and from intact deposits beneath the plow zone. Because of the possibility for intact features site 38OR305 is recommended as potentially eligible for inclusion in the NRHP. This site should either be avoided by all ground disturbing activities, or additional investigations should be conducted to determine its definitive NRHP status. Additional investigations, if required should include close interval shovel tests or 50×50 cm test units with excavation proceeding by levels to record artifact deposition and mapping of artifact deposition by type and by depth to demonstrate vertical and horizontal integrity.

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INTENSIVE ARCHAEOLOGICAL SURVEY OF APPROXIMATELY 47 ACRES AT THE SANDERS POINTE FARM TRACT

ORANGEBURG COUNTY, SOUTH CAROLINA

Draft Report

November 2009

INTENSIVE ARCHAEOLOGICAL SURVEY OF THE SANDERS POINTE FARM TRACT, ORANGEBURG COUNTY, SOUTH CAROLINA

DRAFT REPORT

Submitted to:
Alliance Consulting Engineers, Inc.
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November 2009

TABLE OF CONTENTS

FIGURES

TABLES

I. INTRODUCTION

TRC conducted a cultural resources survey of approximately 47 acres at the Sanders Pointe Farm tract in Orangeburg County, South Carolina (Figures 1 and 2), on behalf of Alliance Consulting Engineers, Inc. Sean Norris served as the as Principal Investigator, and was assisted by archaeologist Ramona Grunden.

The project tract is located west of US Highway 176, approximately 0.3 miles south of US Highway 301. Goodbys Swamp bounds the property on the east and south and Cleveland Street is the north boundary. Vegetation consists of fallow fields and abandoned pastures, with a fringe of hardwoods along the swamp margin. The project tract is being considered for use as subsurface drip fields. Based on vegetation, topography, and the nature of the undertaking, the Area of Potential Effects (APE) is considered to be a 0.50-mile radius around the project tract.

During the survey, two newly identified sites and one isolated find were discovered (Figure 1, Table 1). The sites have been designated 38OR316, and 38OR317. All are recommended not eligible for the National Register of Historic Places (NRHP).

Table 1. Archaeological Sites in the Project Area.

Site Number	Description	NRHP Eligibility
38OR316	Early/Middle Woodland Scatter	Not Eligible
38OR317	20th c. Scatter	Not Eligible

All work for this project was performed in accordance with the National Historic Preservation Act of 1966 (as amended) and has met the qualifications specified in the Interior's *Standards and Guidelines for Archaeology and Historic Preservation* (FR 48;44716-44742) and the *South Carolina Standards and Guidelines for Archaeological Investigations* (SHPO et al. 2005).

This report continues with a discussion of the natural setting and cultural context of the project area in Chapter II, and an overview of the investigation methods in Chapter III. Chapter IV presents the results of the survey, and Chapter V contains a summary of the investigations and presents recommendations concerning NRHP eligibility and other management concerns.

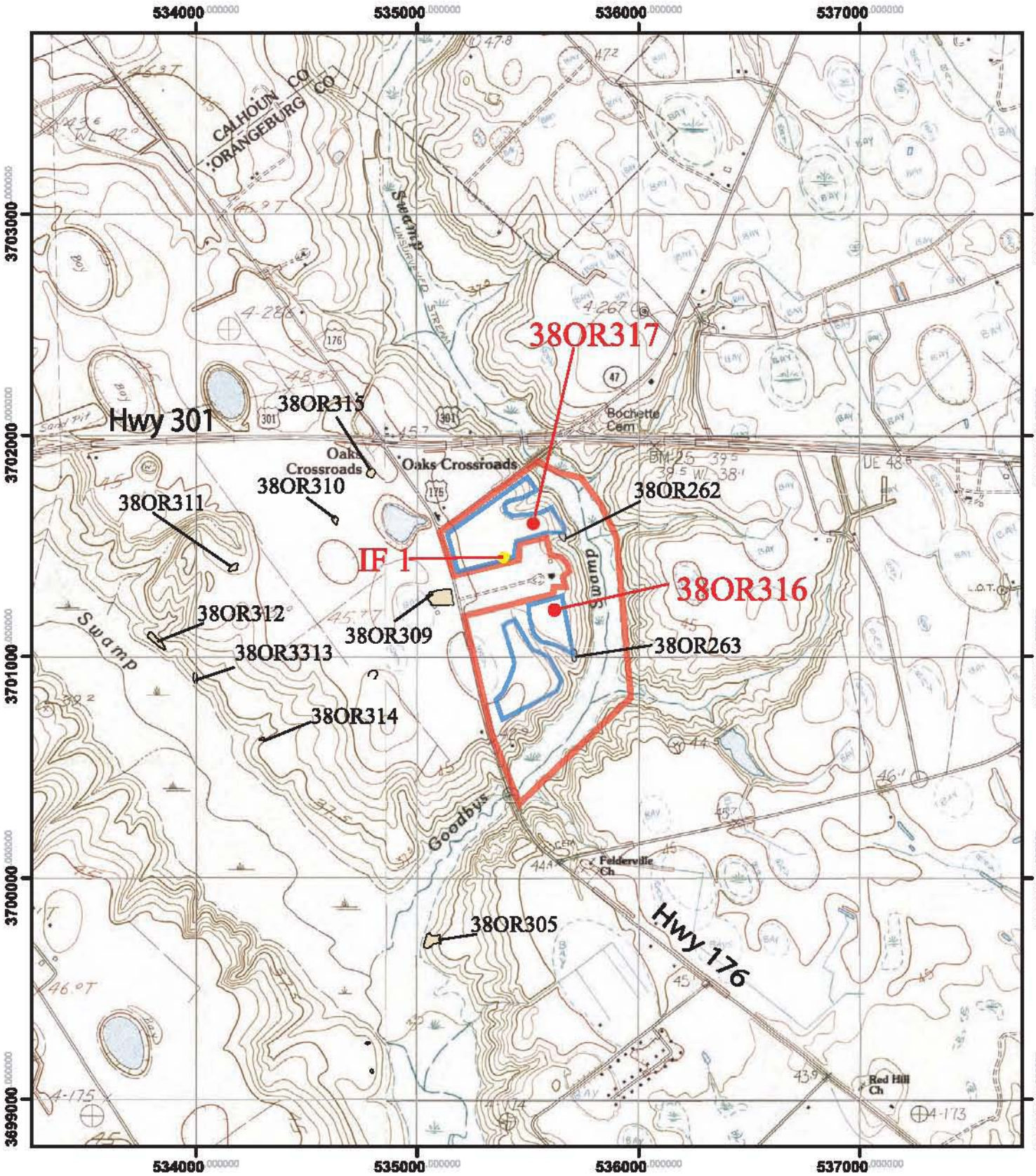


Figure 1.
Sanders Pointe Farm
Project area overview

Base Map: Indian Camp Branch and Felderville USGS Topographic Quadrangles
Scale 1:24,000

Project Tract
Surveyed Areas
Newly Recorded
Previously Recorded

N

0 0.25 0.5 Miles
0 0.5 1 Kilometers

II. NATURAL AND CULTURAL CONTEXT

PROJECT SETTING

The project area is located in an inter-riverine portion of South Carolina's Middle Coastal Plain region. The dominating features of this area are swamps, such as Four Hole and Goodbys Swamp. Soil types encountered during the survey include the Ailey, Bonneau, and Noboco. All three types consist of well drained to excessively drained sand and loamy sand and are generally found on upland landforms and river terraces.

PREHISTORIC OVERVIEW

The prehistory of South Carolina begins sometime prior to 12,500 B.P. and ends with the arrival of the first European explorers in the mid-sixteenth century. A general discussion of the prehistoric occupations and material culture are presented below.

Paleoindian Period (12,500–10,000 B.P.)

The arrival of humans in eastern North America is currently the subject of much debate, with suggested dates starting as much as 35,000 years ago (Dillehay 1989). Ongoing investigations along the Savannah River are focused on addressing this issue; however, in terms of known occupations, the earliest inhabitants of the area are generally accepted as arriving ca. 12,500 years ago (radiocarbon years before present). The Paleoindian period is marked by the cessation of the Pleistocene geological era and the beginning of the Holocene, a period of climatic and environmental change in much of the country (Anderson and O'Steen 1992). The Paleoindians in the eastern United States are thought to have formed small bands of hunter-gatherers who foraged the woodlands and, to a lesser extent, exploited the megafauna of the period (Lepper and Meltzer 1991). Evidence for Paleoindian occupation in the Coastal Plain is scant and limited to surface finds of diagnostic lanceolate projectile points (Goodyear et al 1989). Sea levels were as much as 9 m lower than at the present time, and it is generally believed that most evidence for Paleoindian occupations along the South Carolina coast is now submerged (Brooks et al 1989).

Archaic Period (10,000–3,000 B.P.)

A warming climate and changing environment led to changes in subsistence patterns and technology over time. These changes signal the Archaic period (ca. 10,000 to 3,500 B.P.), which is better understood than the Paleoindian period. Sea levels, however, were still much lower than at present and Archaic sites are not well represented in the area.

Much of the Archaic sequence for South Carolina is based on work in the North Carolina Piedmont conducted by Joffre Coe (1964). Research in South Carolina since that time has focused on regional adaptations to the changing environment (Anderson 1992, Sassaman 1993), and while duplication of Coe's Piedmont sequence has not been possible (Blanton and Sassaman

1989), his chronology still provides the basic framework for interpretation of Archaic sites in South Carolina.

The Late Paleoindian/Early Archaic transition is marked by the presence of Hardaway and Dalton points, with distinctive concave bases and side notches (Coe 1964). Locally, the Taylor Point is recognized as a Hardaway-Dalton equivalent and is found primarily in the southern part of the state (Sassaman 1992, Michie 1992). Corner-notched Palmers and Kirks are firmly placed as Early Archaic types, along with a variety of bifurcates (e.g., LeCroy and St. Albans), few of which are found outside the Carolina Piedmont (Anderson 1992). Instead, the corner-notched tradition appears to continue into the Middle Archaic period, which sees the advent of more expedient types such as Stanly, Guilford and Morrow Mountain, with Morrow Mountain points predominating across the state (Coe 1964; Blanton and Sassaman 1989).

Early and Middle Archaic lifestyles continued to focus on hunting and foraging, with settlement patterns focused on river floodplains. Population is thought to have increased substantially during these periods (Goodyear et al 1989). By the time of the Late Archaic, the expedient tools of the preceding subperiod were giving way to stemmed bifaces, most notably the ubiquitous Savannah River point which is found under various names from Florida to Canada. During the Late Archaic, settlement patterns begin to change and the there is an increase in repeated, intensive occupations of a seasonal nature (Sassaman 1993).

The terminal Late Archaic marks the introduction of fired clay pottery. A few researchers reason that the technology heralds a new period of adaptation (Trinkley 1990), while most others suggest that the introduction of ceramics did not result in a change in settlement or subsistence patterns (Sassaman and Anderson 1994). Regardless, around 4,500 B.P. ceramics were beginning to appear in the middle and lower Savannah River Valley and along coast. Fiber-tempered Stallings wares are the first to appear and are found throughout the Coastal Plain (Sassaman 1993). Subsequent to and somewhat coeval with Stallings is Thom's Creek, which marks the transition from the Archaic to the Woodland periods (Anderson et al. 1982; DePratter 1979; Trinkley 1990; Williams 1968). Thom's Creek, like Stallings, is found throughout the Coastal Plain of South Carolina, including Orangeburg County (Poplin 1992).

In addition to pottery, assemblages from Late Archaic sites in the area include Savannah River and small Savannah River stemmed projectile points, soapstone cooking discs, and occasionally shell tools and worked bone (Trinkley 1980; Williams 1968).

Woodland Period (ca. 1050 B.C.–A.D. 1150)

Although Thom's Creek pottery is found on Early Woodland sites, the appearance of Refuge wares is often used to denote the beginning of the period (ca. 3,000 B.P.). Refuge is characterized by coarse sand temper and surface treatments including simple stamping, punctate, plain, and dentate stamping (DePratter 1979; Williams 1968). Deptford-type ceramics (check- and linear check-stamped with coarse sand temper) make an appearance toward the end of the period and are found on sites throughout the Middle and Late Woodland periods. Diagnostic lithics are similar to the small-stemmed bifaces of the Late Archaic.

Most researchers agree that during this period there was an increase in population, with an attendant movement by small groups into settings previously under-utilized (Anderson and Joseph 1988:218; Hanson 1982). Investigations on the interior Coastal Plain suggest that along the Savannah and Congaree Rivers there was a shift away from the floodplains to upland settings along tributaries (Anderson and Joseph 1988; Sassaman et al. 1990), and it is unlikely that circumstances were different in the project area. Subsistence patterns were similar to those of the Late Archaic, with less reliance on coastal resources and an increasingly circumscribed range (Anderson and Joseph 1988, Oliver 1981).

The Deptford series, originally defined on the lower Savannah River (DePratter 1979; Williams 1968), serves as the bridge from the Early to the Middle Woodland (ca. 2,300–1,000 B.P.) throughout the coastal regions. The hallmark of the series is check and linear check stamping, with simple-stamped and cord marked types as less common surface treatments. Although the Deptford tradition was originally thought to be a coastal tradition, the discovery of Deptford and Deptford-related ceramic types at non-coastal sites has suggested that the Deptford tradition has a larger geographic distribution (Stephenson et al. 2002). Sites discovered within the interior Coastal Plain of South Carolina with large amounts of Deptford ceramics, such as the Sable site, suggest that there were significant, non-coastal occupations (Anderson 1975a, 1975b, 1979; Ryan 1972; Trinkley 1980).

Toward the latter end of the Middle Woodland period, typology becomes more confused and there is no established regional sequence. Ceramics with either sand or grog temper (or both) and cord marked or fabric-impressed surfaces dominate all Woodland assemblages, with cord marked sherds more common in the south, shifting towards an emphasis on fabric-impressed to the north (Anderson et al. 1996). Thus, Late Woodland ceramic technologies are a continuation of the Middle Woodland, with no clear transitional type. Subsistence patterns also appear to have evolved slowly. Late Woodland settlements are small, dispersed, and less integrated than those associated with the Deptford phase (Sassaman et al. 1990; Stoltman 1974). Subsistence was based on generalized hunting, fishing, and gathering, and although cultigens such as squash and maize had been introduced into the region by this time, they were not a significant food source (Wood et al. 1986).

Mississippian Period (ca. A.D. 1150–1550)

The post-Woodland Mississippian period is marked by social, economic, and technological changes resulting in cultural complexity not found previously in prehistoric Southeastern societies. Complicated-stamped pottery and small triangular projectile points are the diagnostic elements of Mississippian material culture. Increasing reliance on agriculture and construction of large ceremonial complexes are the social hallmarks of the period.

Mississippian mound centers are located along major river drainages, and in South Carolina they are found in the Savannah River valley and along the Wateree River. There is continuing debate on how and how far a given center's influence extended (Anderson 1989; Hally 1996; Blitz; 1999). Cultural and political influences aside, Mississippian sites can be found along any drainage with a floodplain in the region. Away from the ceremonial complexes these tend to be somewhat isolated "farms".

According to Anderson et al. (1982), the Santee pottery series is the initial Mississippian manifestation on the Coastal Plain, with a range from the Lower Santee River in the Coastal Plain to the Santee-Wateree basin on the Fall Line, north of the project area. To the south, along the Savannah River, Savannah and Irene components appear to have a more localized distribution (Braley 1990). There are no recorded ceremonial complexes along the Edisto River drainage, and it is not known if Mississippian influences were derived from Savannah River or Wateree-Santee cultures. It has been suggested that this region is a "buffer zone" between major provinces, namely Cofitachequi on the Wateree River and Ocute on the Oconee River in Georgia, which is thought to be the parent of the Savannah River occupations (Anderson 1989; DePratter 1989).

HISTORIC OVERVIEW

Religious conflicts and the desire to find new avenues of trade and economic wealth prompted the movement of Europeans across the Atlantic Ocean in the sixteenth century. Spain and Portugal were the first European nations to establish overseas empires. In 1514 Lucas Vasquez de Ayllon sent an expedition north of the Bahama Islands to find native people to replenish the labor force that was dwindling from disease in the Caribbean. The expedition report prompted Ayllon to visit to South Carolina in 1521, where natives were put aboard ships headed for Hispaniola. In 1525 Ayllon returned again to the coast of South Carolina and set up a small colony named San Miguel de Gualdape (Edgar 1998).

The French in 1562 began attempts at starting a settlement along the coast of South Carolina. They set up a fort named Port Royal on present-day Parris Island. Neither San Miguel de Gualdape nor Port Royal lasted more than a year after their founding. Poor relations with the Native Americans, swampy environment, and limited supplies caused both settlements to fail (Edgar 1998).

Though Spain and France made other attempts to set up colonies on the South Carolina coast none were successful. In 1672 a colonizing party from England established a settlement on the Ashley River, named Charles Town. Ultimately Charleston, it was successful and opened the door to further settlement in South Carolina (Edgar 1998; Mills 1972).

Settlement by Europeans in Orangeburg County was minimal before 1735. Henry Sterling, an Indian trader and the first European settler to this area, obtained land in 1704 by Lyon's Creek (Salley 1969). Sterling's daughter Mary and her husband Richard Heath moved to the Santee River area in 1719 (Chaplin 1981).

During the 1730s German and Swiss families, mostly farmers, settled in Orangeburg County in considerable numbers. These German settlers gave Orangeburg its name in honor of William IV, Prince of Orange (Salley 1969). Though the German immigrants focused their settlement in the location of present-day Orangeburg, they also occupied and farmed land as far out as Four Hole Swamp (Salley 1969). By 1737, German settlers were exporting wheat and corn as well as producing rice, hemp and indigo. Their industriousness and the fertility of the soil facilitated their agricultural success (Culler 1995; Mills 1972). It was during this period that Goodbys

Swamp received that name, but it is not known where Goodby settled. German names appear on the 1825 Mills map of the area, along with English of Anglicized names (Figure 3).

During the Revolutionary War, Orangeburg County experienced a few minor skirmishes. When the British took control of Orangeburg, General Sumter besieged and took over the city jail. On September 5, 1781 the British lost to patriot forces in a battle at Eutaw Springs, which lies on the shore of Lake Marion (Mills 1972).

In the late 1700s Orangeburg County went through a series of boundary changes. The Orangeburg District originally encompassed present day Bamberg, Barnwell, Lexington, Calhoun, and Orangeburg counties, along with the Orangeburg, Amelia, and Saxe-Gotha (Lexington) townships established in the 1730s (Culler 1995; Edgar 1998). A 1785 act split the Orangeburg district into Orange, Lexington, Lewisburg, and Winton (along the Savannah River) counties. Though the Orangeburg district was re-established when these four counties were eliminated in 1791, the district was divided again in 1804 into Lexington, Barnwell and Orangeburg counties (Trinkley 2003).

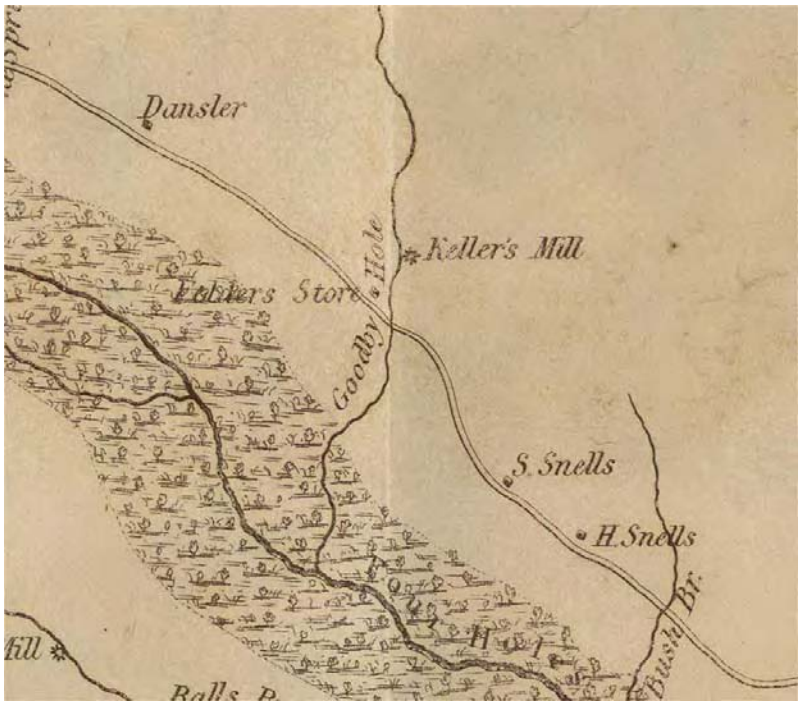


Figure 2. Goodbys Swamp in 1825 (Mills 1972).

After the 1770s, when the threat of Indian attacks was gone, Orangeburg County grew considerably. By 1840, the City of Orangeburg had a jail, courthouse, several churches, taverns, stores and a railroad connecting the city to Charleston (Culler 1995; Trinkley 2003). As Orangeburg County began to flourish the number of slaves increased as well. As the production of cotton became more important, the use of slave labor became widely used. By the 1860s the population of whites in the county was 8,000 while the slave population was more than twice that. At this time, Orangeburg was ranked sixth out of the 30 districts in regard to cash value of its farms and plantations (Culler 1995).

For most of the Civil War, Orangeburg County was largely unaffected; however, toward the end of the war, Sherman burned the City of Orangeburg as he marched through South Carolina (Edgar 1998). After the war, attempts to increase cotton production and the widespread adoption of sharecropping led to increasing landlessness among the state's farm producers. By 1900, six out of every ten farmers in South Carolina were either sharecroppers or tenants. Out of this group of landless farmers, 78 percent were black (Edgar 1998).

As cotton prices fell from 1920 through the 1940s, Orangeburg County suffered more than the rest of the state. Two-fifths of the farms in the county were mortgaged (Trinkley 2003). When cotton was no longer a profitable crop, farmers in Orangeburg began focusing production on corn, soybeans, and other specialty crops. This move away from cotton allowed Orangeburg County to maintain its large number of farms, which in 1945 totaled almost 7,000 (South Carolina Department of Agriculture 1948).

III. METHODS

LITERATURE REVIEW

Prior to fieldwork, TRC conducted background research at the South Carolina Department of Archives and History (SCDAH) in Columbia, and at the South Carolina Institute of Archaeology and Anthropology (SCIAA) in Columbia. The records examined at SCDAH included a review of their GIS-based Cultural Resource Information System (CRIS) for sites listed in or eligible for inclusion in the National Register of Historic Places (NRHP), and a review of CRIS and the SCDAH Finding Aid for previous architectural surveys near the project area. The records examined at SCIAA include the master archaeological site maps, state archaeological site files, and any associated archaeological reports.

FIELD INVESTIGATIONS

Archaeological investigations for this project included an intensive archaeological survey of approximately 47 acres at the Sanders Pointe Farm Tract. Archaeological investigations included the excavation of shovel tests and examination of all exposed surfaces including roads, and disturbed areas. For purposes of this investigation, the definitions of an archaeological site and isolated find followed those contained in the *South Carolina Standards and Guidelines for Archaeological Investigations* (SHPO et al. 2005). An archaeological site is defined as an area yielding three or more historic or prehistoric artifacts within a 30-m radius and/or an area with visible or historically recorded cultural features (e.g., shell middens, cemeteries, rockshelters, chimney falls, brick walls, piers, earthworks, etc). An isolated find is defined as no more than two historic or prehistoric artifacts found within a 30-meter (m) radius.

Archaeological survey was carried out using a combination of pedestrian survey and shovel testing techniques. Pedestrian survey was conducted along all roads, drainages and other areas with good ground surface exposure. Systematic shovel testing was conducted at 30-m intervals along transects spaced 30-m apart across the entire project area. To delineate site boundaries, shovel tests were excavated at 15-m intervals in four cardinal directions radiating out from each positive shovel test.

All shovel tests were approximately 30 centimeters (cm) in diameter and excavated to sterile subsoil, the water table, or at least 80 cm below surface. Soil was screened through ¼-inch hardware mesh, and artifacts, if encountered, were bagged according to provenience. Notes were kept in a field journal and on standard TRC site forms. Shovel test location and depth, soil conditions, and the number and types of artifacts recovered from each test were recorded in a field book. All shovel tests were backfilled upon completion.

All sites and isolated finds were documented with maps and photographs. Detailed field notes were maintained concerning sites located during the survey. This information included site size, site depth, soil type, and other relevant information. All site locations were recorded using a Trimble receiver (sub-meter accuracy) and plotted on USGS 7.5-minute topographic maps and project plans.

LABORATORY METHODS

All artifacts recovered were cleaned, identified, and analyzed using analytical techniques summarized below. Following analysis all artifacts were bagged according to site, provenience, and specimen number. Following the South Carolina interim guidelines established for artifact curation, only acid-free plastic bags and artifact tags were used.

Lithics were initially identified as either debitage or tools. Debitage was sorted by raw material type and size graded using the mass analysis method advocated by Ahler (1989); each flake was also examined for use-wear. Formal tools were classified by type when possible, and attribute data (e.g., thickness, length, weight) was recorded for all tools. Projectile point typology generally followed that contained in Coe (1964) and Justice (1987).

Ceramics greater than 1 cm^2 were sorted first by sherd type (i.e., rim, body), surface treatment, and temper (using the Wentworth scale). These groups were further analyzed for other diagnostic attributes, such as paste texture, interior treatment, rim form, and rim/lip decoration. The data gathered at this level of analysis were used to place the sherds within established regional types (where possible). Information on the ceramic typology of the project area was derived primarily from Anderson et al. (1996), DePratter (1979), Trinkley (1990), and Williams (1968). Sherds less than 1 cm^2 were classified as "residual sherds" and only their frequency and weight were recorded.

Historic artifacts were washed or otherwise cleaned as appropriate. They were separated by material type and further sorted into functional groups, for example glass was further sorted into window, bottle, or other glass. Temporal assignments were based on the chronologically sensitive attributes (i.e., maker's marks; glass color) using established references for historic materials, including Noel Hume (1970), South (1977), and Miller (1991), among others.

The artifacts, field notes, maps, photographs, and other technical materials generated as a result of this project will be temporarily curated at the TRC office in Columbia.

IV. RESULTS OF INVESTIGATIONS

LITERATURE REVIEW

A search of the files and records at SCIAA revealed there are five previously recorded archaeological sites within a 0.50-mile radius of the project area (Table 2, see Figure 1).

Table 2. Previously recorded archaeological sites within a 0.50-mile radius.

Site Number	Description	NRHP Eligibility
38OR262	Early/Middle Woodland Scatter	Not Eligible
38OR263	Early/Middle Woodland scatter	Not Eligible
38OR303	Woodland/Mississippian Scatter	Potentially Eligible
38OR309	20th c. Scatter	Not Eligible
38OR310	20th c. Scatter	Not Eligible
38OR315	20th c. Scatter	Not Eligible

Two sites (38OR262 and 38OR263) were recorded in 2004 as the result of a survey of a proposed sewer line along the west side of Goodbys Swamp and the south side of Four Hole Swamp. The sites are recommended not eligible for the NRHP (Kloss 2004). Site 38OR303 was recorded in 2008 as the result of a survey on a parcel of land immediately south of Goodbys Swamp, and was recommended potentially eligible (Grunden 2008). The remaining sites were recorded in 2009 as the result of a reconnaissance level survey on the John Mathews, Jr. Tract, immediately west of the Sanders Pointe Farm Tract on the opposite side of US Highway 176.

ARCHAEOLOGICAL SURVEY

The project area consists of three parcels of land containing a total of 47 acres within the larger Sanders Pointe Farm (Figure 2). The largest parcel (Area 1) contains approximately 27 acres, bound to the north by Cleveland Street, to the west by a US Highway 176, and to the south by private property. On the east, Area 1 is bound by wetlands and woods (Figures 1 and 2). Areas 2 and 3 contain seven and 17 acres respectively, divided by an unnamed drainage of Goodbys Swamp (Figures 1 and 2). The drainage has been dammed and a pond created within the last ten years.

The 47 acres were surveyed with transects and shovel tests spaced at 30 m intervals. All exposed surfaces (farm roads, recently tilled areas) were examined visually for evidence of human occupation, and areas adjacent to water or Carolina Bays were investigated with additional shovel tests placed judgmentally or at 15 m intervals.

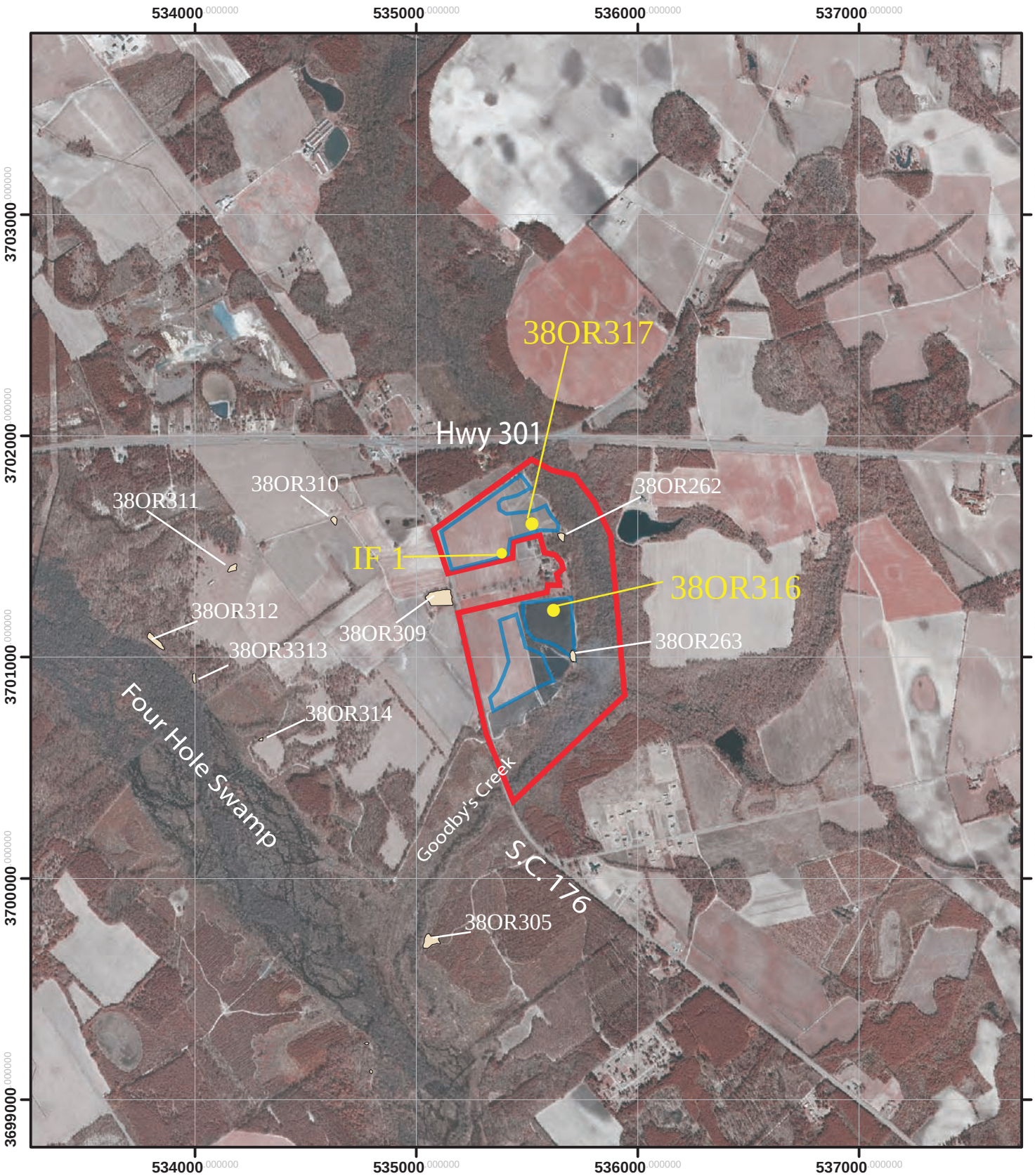


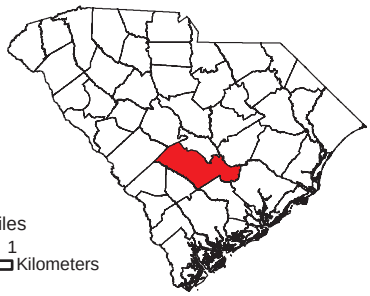
Figure 2.
Sanders Pointe Farm
Aerial Overview

Base Map: 2006 Digital Orthophotograph
Scale 1:24,000

Project Tract
Surveyed Areas
Newly Recorded
Previously Recorded

N

0 0.25 0.5 Miles
0 0.5 1 Kilometers



38OR316

Site Number: 38OR316	**NRHP Recommendation:** Not Eligible
Site Type: Historic Scatter	**Elevation:** 45 feet AMSL
Components: 20th c	**Landform:** Terrace
UTM Coordinates: E535620, N3701212	**Soil Type:** Noboco loamy sand
Site Dimensions: 30 × 15 m	**Vegetation:** Grass

Site 38OR316 lies 170 m west of Goodbys Swamp (Figures 1 and 3), in a field (Figure 4). A farm road is present east of the site and the area contains numerous ruts and trails from recreational vehicles. There are no above-ground features and there was no surface visibility at the time of the survey.

Figure 4. 38OR316, facing north.

The site was discovered with the excavation of a positive shovel test. A total of 15 delineation shovel tests were excavated at 15 m intervals resulting in three additional positive tests and a site size of 30 m x 15 m (Figure 5). Soils in shovel tests consisted of dark grayish brown (10YR 4/2) loamy sand from 0–35 cmbs, yellowish brown (10YR 5/4) sandy loam from 35–45 cmbs, and strong brown (7.5YR 5/8) clay subsoil.

Artifacts were recovered from the surface and from shovel tests at 0–35 cmbs. No features were encountered. Recovered artifacts include one sherd of yellow ware, one sherd of burnt whiteware, three fragments of amber glass, one fragment of solarized (amethyst) glass, one square nail and two wire nails. The artifacts are consistent with a late nineteenth–early twentieth century occupation.

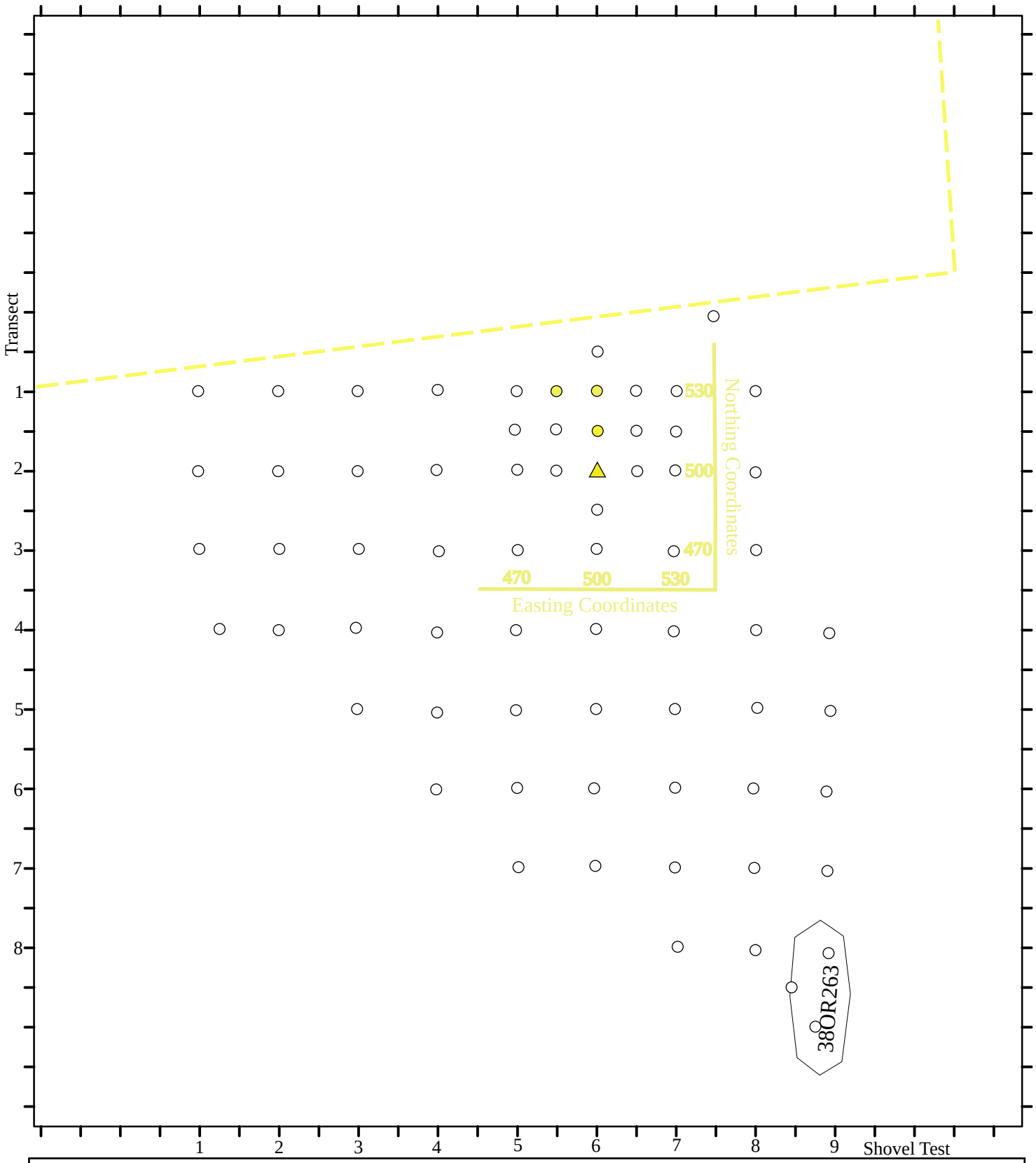


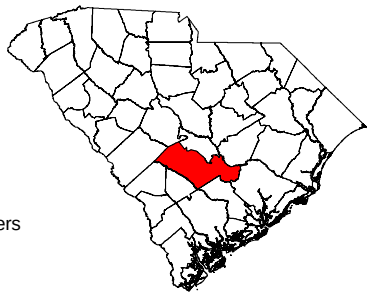
Figure 5.
Site 38OR316
Plan Map.

Base Map: 2006 digital orthophotograph
Scale 1:2,000

Datum/Positive STP
Positive STP
Negative STP
Site Boundary
Previously Recorded

N

0 30 60 Meters
0 100 200 Feet



Site 38OR316 is a sparse historic scatter in a field. There are no above ground features and recovered artifacts were found in the plow zone, suggesting that subsurface feature preservation is not likely. Additional investigations will not add to our understanding of rural life in Orangeburg County and 38OR316 is recommended not eligible for the NRHP.

38OR317

Site Number: 38OR317	**NRHP Recommendation:** Not Eligible
Site Type: Historic Scatter	**Elevation:** 45 feet AMSL
Components: 20th century	**Landform:** ridge
UTM Coordinates: E535523, N3701603	**Soil Type:** Ailey sand
Site Dimensions: 30 × 30 m	**Vegetation:** Grasses

Site 38OR317 is located in a field 220 m west of Goodbys Swamp (Figures 1 and 3). A power line corridor passes west of the site and a fence crosses the site to the east (Figure 6). The site is on a ridge with steep slopes to the north. Vegetation on the site consists of grass and there was little surface visibility at the time of the survey.

The site was discovered with two positive transect shovel tests. Delineation shovel tests excavated along a grid at 15 m intervals resulted in three additional positive tests (Figure 7). Soils in shovel tests consisted of dark grayish brown (10YR 4/2) sand from 0–30 or 40 cmbs, yellowish brown (10YR 5/4) sand to 40–60 cmbs, and strong brown (7.5YR5/8) clay sand.

Artifacts were recovered from the first stratum (0–40 cmbs) and include one sherd of plain whiteware, one sherd of transfer printed whiteware, one fragment of milk glass, four wire nails, one square nail, and three fragments of clear glass. Noted but not collected were machine-made brick fragments.

Figure 6. 38OR317, facing east.

Site 38OR317 is an historic artifact scatter in a field. No above ground historic features or associated vegetation is present. The site retains little integrity and will not add to our understanding of occupation in the project area, and 38OR317 is recommended not eligible for the NRHP.

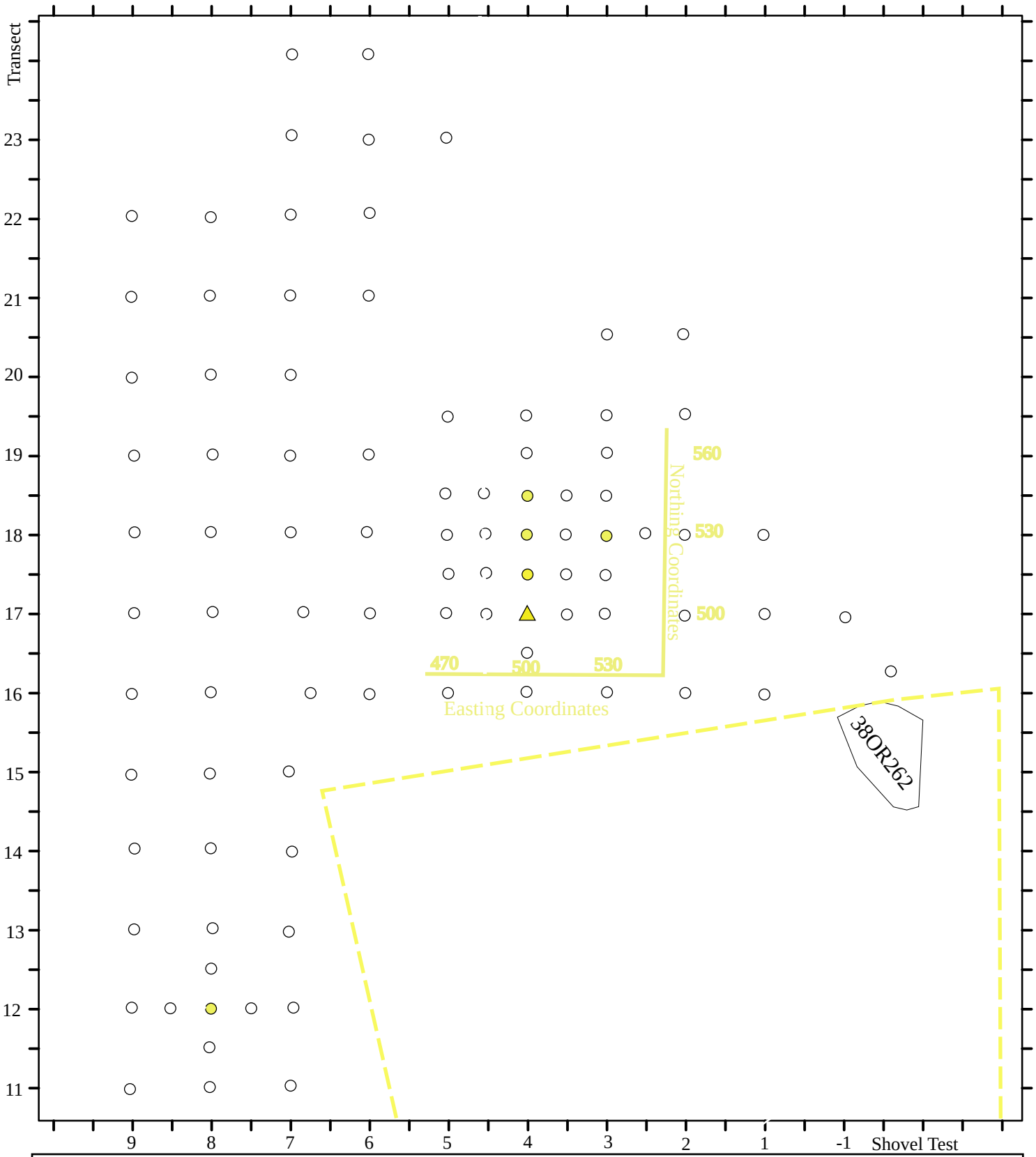


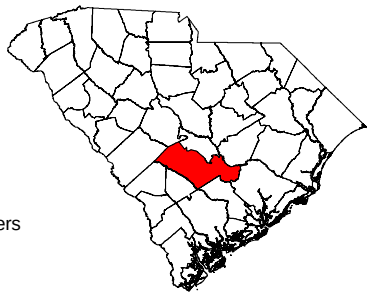
Figure 7.
Site 38OR317 and IF 1
Plan Map.

Base Map: 2006 digital orthophotograph
Scale 1:2,000

Datum/Positive STP
Positive STP
Negative STP
Site Boundary
Previously Recorded

N

0 30 60 Meters
0 100 200 Feet



Isolated Finds

Isolate 1 is located in a field 30 m north of the property line in Area 1 (Figures 1 and 3). Vegetation consists of grass and the area is furrowed and rutted from plowing. A sherd of green shell-edged whiteware was found on the surface in a plow furrow. Delineation shovel tests excavated at 10 and 15 m intervals did not contain artifacts and no other material was found on the surface. This isolated find is recommended not eligible for the NRHP

Not Relocated

Located southeast of Area 1 is site 38OR262 (Figures 1 and 3). This is an Early/Middle Woodland scatter recorded in 2004 during a survey for a proposed sewer line (Kloss 2004), and recommended not eligible for the NRHP at that time. Shovel tests excavated in the site vicinity did not contain artifacts, and it does not appear that 38OR262 extends into the project area.

Situated at the southern edge of Area 2 is site 38OR263 (Figures 1 and 3). This is an Early/Middle Woodland scatter recorded in 2004 during a survey for a proposed sewer line (Kloss 2004), and recommended not eligible for the NRHP at that time. Construction of a dam/levee for the impounded drainage dividing Areas 2 and 3 may have impacted the site. A series of shovel tests were excavated at 10 m intervals on the terraces behind the levee and none contained artifacts, nor were artifacts discovered on the surface or in the exposed earth slopes of the levee.

V. SUMMARY AND RECOMMENDATIONS

TRC conducted a Phase I cultural resources survey of approximately 47 acres at the Sanders Pointe Farm Tract in Orangeburg County, South Carolina. The archaeological investigations resulted in the discovery of two archaeological sites (38OR316, 38OR317) and one isolated find. Historic maps of the area depict structures along the entrance road and in the fields of Sanders Pointe Farm (Figure 7). Most of these appear to fall outside the surveyed areas but plowing and demolition have likely caused a fairly broad spread of materials throughout Sanders Pointe Farm.

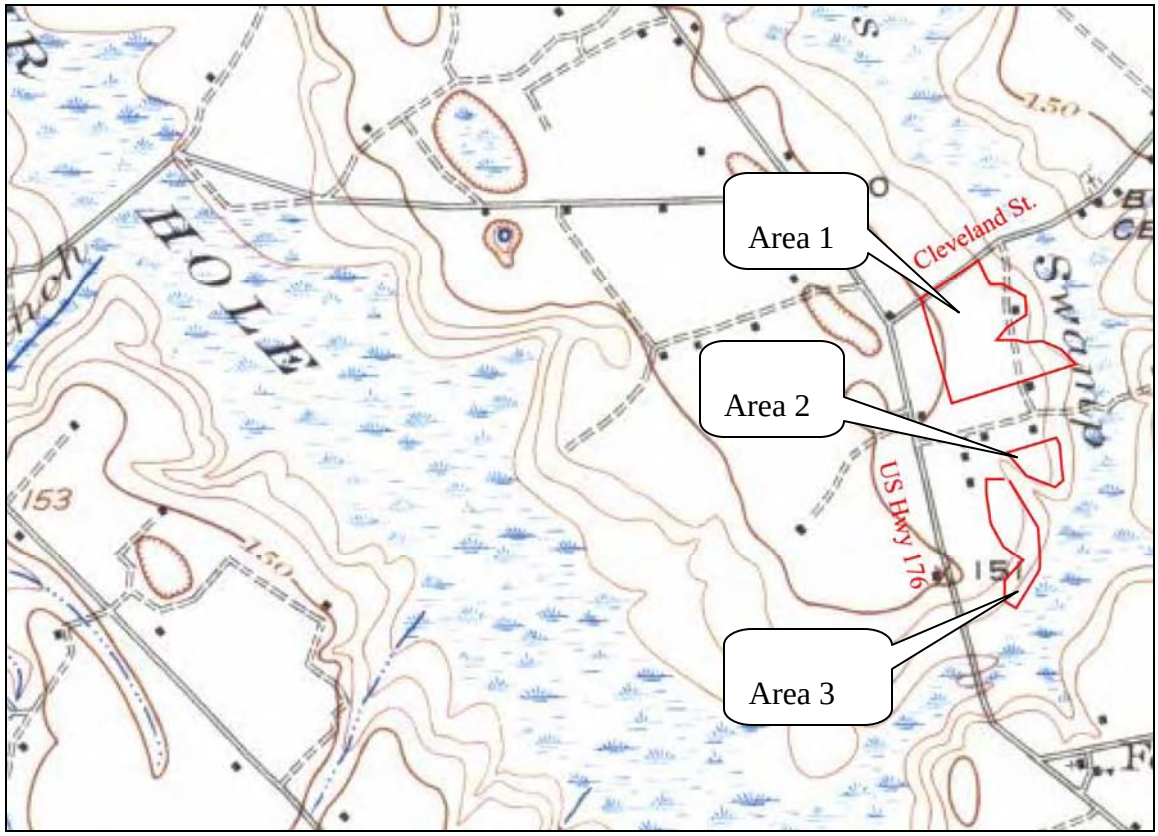


Figure 8. Project area in 1920.

Sites 38OR316 and 38OR317 are small scatters of historic artifacts located in fields. No evidence for structures, such as chimney falls or piers were discovered. The sites do not retain sufficient horizontal or stratigraphic integrity to warrant additional excavations and both are recommended not eligible for the NRHP. Site 38OR263, located just outside the project boundary was not relocated. This site has been recommended not eligible for the NRHP and requires no further investigations.

Based on these results, it is TRCs recommendation that no cultural resources will be affected by the planned undertaking and that construction may proceed.

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MACTEC

engineering and constructing a better tomorrow

September 2, 2008

Mr. Stewart Hill
Alliance Consulting Engineers, Inc.
Post Office Box 8147
Columbia, South Carolina 29202-8147

Subject: **Results of Preliminary Protected Species Assessment**
Goodbys Creek Wastewater Treatment Plant
Orangeburg County, South Carolina
MACTEC Project No. 6671-08-0637

Mr. Hill:

MACTEC Engineering and Consulting, Inc. (MACTEC) is pleased to submit this report of preliminary protected species assessment for the Goodbys Creek Wastewater Treatment Plant property generally located west of the intersection of U.S. Highway 176 and Woolbright Road in Orangeburg County, South Carolina. The approximately 226-acre site is identified on the preliminary property maps provided to MACTEC by Alliance Consulting Engineers, Inc. The field work for this protected species report was conducted on August 20, 2008.

METHODOLOGY

MACTEC personnel reviewed the South Carolina Department of Natural Resources' (SCDNR) South Carolina Rare, Threatened, and Endangered Species Inventory database for the Felderville USGS topographic quadrangle map (SCDNR 2008) to determine the presence of any known federally-protected species occurrences within or near the proposed project site. This information was cross-referenced with the U.S. Fish and Wildlife Service (USFWS) Endangered species list for South Carolina by County (USFWS 2008) and current protected species data available on the SCDNR internet site (SCDNR 2008). The SCDNR database does not list any known occurrences of federally-protected species were located within two miles of the site.

The following threatened and endangered species have been listed for Orangeburg County:

Shortnose sturgeon (*Acipenser brevirostrum*) – endangered
Flatwoods salamander (*Ambystoma cingulatum*) - threatened
Red-cockaded woodpecker (*Picoides borealis*) - endangered
Canby's Dropwort (*Oxypolis canbyi*) - endangered

MACTEC is not aware of any additional listings by the USFWS or the SCDNR–Heritage Trust Database at this time.

A literature search and an on-site habitat assessment were conducted to determine the likelihood of the presence or absence of each of the above-listed species. Protected species data from the SCDNR Rare, Threatened and Endangered Species Inventory (SCDNR 2008) and the USFWS were used as the baseline for the on-site habitat assessment and preliminary surveys. Aerial photography (2006 Infrared Aerial Photography provided by SCDNR) was used to locate general

habitat types on the site. Habitat descriptions follow Nelson (1986) and Schafale and Weakley (1990). Nomenclature for vascular plants observed follows Kartesz (1994). The site was traversed on foot to ground-truth the aerial photography and to locate any suitable habitat for the above-listed species on August 20, 2008 by MACTEC personnel.

HABITAT DESCRIPTION

Bottomland Hardwood Forest

An alluvial bottomland hardwood forest associated with a small perennial stream is present along the western site boundary of Goodbys Creek Wastewater Treatment Plant project site. This habitat is contiguous with off-site forests downstream and flows directly into Four Hole Swamp which is a major tributary of the Edisto River. The forest canopy includes sweet gum (*Liquidambar styraciflua*), loblolly pine (*Pinus taeda*), swamp black gum (*Nyssa biflora*), red maple, (*Acer rubrum*), tulip poplar (*Liriodendron tulipifera*), and American elm (*Ulmus Americana*). Understory species include ironwood (*Carpinus caroliniana*), swamp chestnut oak (*Quercus michauxii*), black willow (*Salix nigra*), tag alder (*Alnus serrulata*), and redbay (*Persea borbonia*). Some representative ground cover species are netted chain fern (*Woodwardia areolata*), cinnamon fern (*Osmunda cinnamomea*), lizard's tail (*Saururus cernuus*), soft needlerush (*Juncus effusus*). Dense thickets of Japanese honeysuckle (*Lonicera japonica*), smilax (*Smilax spp.*) and grape (*Vitis spp.*) occur along the wetland and upland boundary (Appendix A, Photos 1 and 2).

Pine-Mixed Hardwood Forest

A stand of pine-mixed hardwoods occurs along the southeastern boundary of the Goodbys Creek Wastewater Treatment Plant site along an existing logging road. The canopy consists of approximately 50% loblolly pine and 50% hardwoods. Hardwood species include red maple, southern red oak (*Quercus falcata*), post oak (*Quercus stellata*), water oak (*Quercus nigra*), black cherry (*Prunus serotina*), sweet gum, and black gum (*Nyssa sylvatica*). Dominant shrub and herbaceous ground cover include American holly (*Ilex opaca*), sparkleberry (*Vaccinium arboreum*), wax myrtle (*Myrica cerifera*), brackenfern (*Pteridium gleditsch*), poison ivy (*Toxicodendron radicans*), and muscadine (*Vitis rotundifolia*) (Appendix A, Photos 3 and 4).

Pine Plantation

The majority of the 226-acre Goodbys Creek Wastewater Treatment Plant site is planted loblolly pine. Infrared aerial photography (SCDNR 2006) indicated that portions of the site had been recently harvested (logged) prior to 2006 and subsequently planted in pine. Upland portions of the pine plantation exhibit xeric conditions with sparse vegetation. Some hardwood encroachment has occurred within the pine plantation with sweet gum and black cherry being the dominant hardwood species. As the pine plantation grades down into the bottomland hardwood wetland described above, the vegetation forms dense tickets of blackberry (*Rubus spp.*), greenbrier, and grapevine (Appendix A, Photos 5 – 8).

DETERMINATION OF EFFECT

Shortnose Sturgeon – Endangered

The shortnose sturgeon was listed as endangered on March 11, 1967 (USFWS 1967). Adult males and females range from 45 to 55 centimeters in length. The coloration of the body is usually yellowish-brown to almost black on the head, back and to the middle region on the sides and whitish to yellowish below.

It is an anadromous fish that spawns in the coastal rivers along the South Carolina coast. The shortnose sturgeon prefers the nearshore marine, estuarine and riverine habitat of large river systems (NMFS/NOAA 2005). No suitable habitat occurs at the site. According to the SCDNR protected species database, the closest known location of shortnose sturgeon is approximately 10.5 miles to the northeast in Lake Marion (SCDNR 2006). A determination of "no effect" has been made for the shortnose sturgeon.

Flatwoods Salamander - Endangered

The flatwoods salamander was listed as threatened on April 1, 1999 (USFWS 1999a). However, due to a change in taxonomy, as of August 13, 2008 the U.S. Fish and Wildlife Service has proposed to split the flatwoods salamander into two distinct species: frosted flatwoods salamander (*Ambystoma cingulatum*) and reticulated flatwoods salamander (*Ambystoma bishopi*). The frosted flatwoods salamander will retain the status of threatened while the reticulated flatwoods salamander will be given the status of endangered (USFWS 2008).

The flatwoods salamander is a slender, small-headed mole salamander. Adult dorsal color ranges from dark black to chocolate black with grayish or silvery network (sometimes reticulate) pattern or frosted appearance running along the lateral and dorsal surfaces. The belly is often spotted with equal amounts of black and gray pigments, producing a somewhat "salt and pepper" image. Aquatic larvae are long and slender, broad-headed and bushy-gilled, with white bellies and yellow stripes on the sides (Moulis undated, Palis 1995).

The flatwoods salamander occurs in isolated populations scattered across the lower southeastern Coastal Plain in Florida, Georgia, and South Carolina (USFWS 1999b). Adult and subadult flatwoods salamanders live in underground burrows. The flatwoods salamander is an "obligate wetland breeder" (S. Bennett pers. com.). Typical breeding sites are isolated wetland depressions, which dry completely on a cyclic basis, thus eliminating fish species. These ponds are generally dominated by pond cypress (*Taxodium ascendens*) and swamp gum (*Nyssa biflora*). The groundcover is typically made up of clumps of sedges and grasses and other herbaceous species. Growing season fires through the breeding ponds are thought to improve breeding habitat for this species. No suitable habitat for this species occurs at the site. A determination of "no effect" has been made for the flatwoods salamander.

Red-cockaded Woodpecker (RCW) - Endangered

The U.S. Department of the Interior identified the RCW as a rare and endangered species in 1968 (USDOI 1968). In 1970, the RCW was officially listed as endangered (USFWS 2003). With passage of the Endangered Species Act (ESA) in 1973, the RCW received the protection afforded listed species under the ESA.

RCWs are black and white with a ladder back and large white cheek patches. The RCW is endemic to pine forests of the southeastern United States (Ligon 1970). RCWs are territorial, non-migratory, cooperative breeders (Lennartz et al. 1987). RCWs are unique in that they excavate cavities for roosting and nesting in living pines (USFWS 2003) and use living pines almost exclusively for foraging substrate, preferring longleaf pine when available (Walters 1991). RCWs require open pine woodlands and savannahs with large old pines for nesting and roosting habitat (i.e., cavity trees). Cavity trees must be in open pine stands with little or no hardwood midstory and few or no overstory hardwoods. Hardwood encroachment resulting from fire suppression is a well-known cause of cluster abandonment. RCWs also require abundant foraging habitat. Suitable foraging habitat consists of mature pines with an open canopy, low densities of small pines, little or no hardwood or pine midstory, few or no overstory hardwoods, and abundant native bunchgrass and forb groundcovers (USFWS 2003). Suitable foraging habitat for this species occurs at the site, but suitable nesting habitat does not occur on site. For the RCW to use potential foraging habitat the foraging habitat must be within a half mile radius of an active cavity tree cluster. According to the SCDNR protected species database, the closest known location of suitable nesting habitat with active cavity trees is located approximately 5.5 miles to the northeast near the town of Elloree, SC (SCDNR 2006). A determination of "no effect" has been made for the RCW.

Canby's dropwort - Endangered

Canby's dropwort was listed as endangered on February 25, 1991 (USFWS 1991). It is a perennial herb with erect, hollow stems, aromatic foliage and elongate, stoloniferous rhizomes. It has minute white flowers produced in terminal or axillary umbels; sepals may be tinged red. The fruit is a strongly-winged schizocarp. The species flowers from late May through early August and fruits in early fall.

This species occurs in pond cypress savannas, shallows and edges of cypress/pond pine sloughs, and wet pine savannas. The groundwater table must not be altered to maintain this species (USFWS 1990). No suitable habitat for this species occurs at the site. A determination of "no effect" has been made for Canby's dropwort.

CONCLUSION

The SCDNR database suggests that no federally endangered or threatened species are known to occur within the Felderville USGS topographic quadrangle map which includes the site. The USFWS list for Orangeburg County includes shortnose sturgeon, bald eagle, red-cockaded woodpecker, flatwoods salamander, and Canby's dropwort. However, as of August 8, 2007, the bald eagle is no longer listed on the U.S. Fish and Wildlife Endangered and Threatened species list for the coterminous United States (USFWS 2007a). The bald eagle is still federally protected by the Bald and Golden Eagle Protection Act (USFWS 1940) and the Migratory Bird Treaty Act (USFWS 1972). Our field observations revealed no direct evidence of, or suitable habitat for these federally listed species. Based on the results of this investigation, a determination of "no effect" has been made for shortnose sturgeon, red-cockaded woodpecker, flatwoods salamander and Canby's dropwort.

CLOSING

We appreciate the opportunity to conduct preliminary protected species assessment for Orangeburg County Development Commission and Alliance Consulting Engineers. Please contact Allen Conger at (803) 798-1200 if you have any questions regarding this information.

Sincerely,

MACTEC ENGINEERING AND CONSULTING, INC.

William L. Medlin
Staff Scientist

Allen W. Conger
Senior Principal Scientist

Attachments:
References
Figure 1. Aerial Location Map
Appendix A – Site Photographs

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APPENDIX A

PHOTO APPENDIX

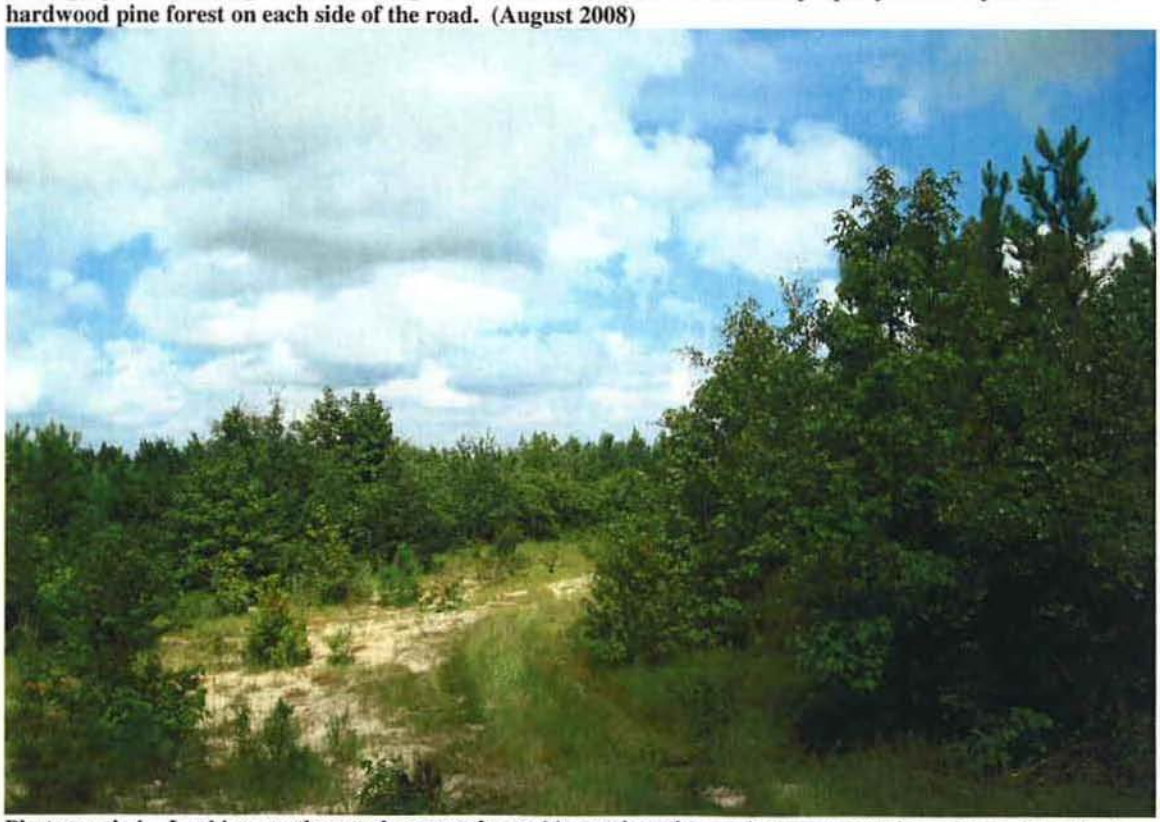
September 2, 2008

Goodbys Creek Regional Wastewater Treatment Plant
MACTEC Project No. 6671-08-0637

Photograph 1 – Looking northwest into bottomland hardwood swamp forest located on the western boundary of the Goodbys Creek WWTP project site. (August 2008)

Photograph 2 – Looking west at perennial stream flowing through bottomland hardwood swamp forest located on the western boundary of the Goodbys Creek WWTP project site. (August 2008)

Photograph 3 – Looking northeast along woods road located on the southern property boundary with mixed hardwood pine forest on each side of the road. (August 2008)



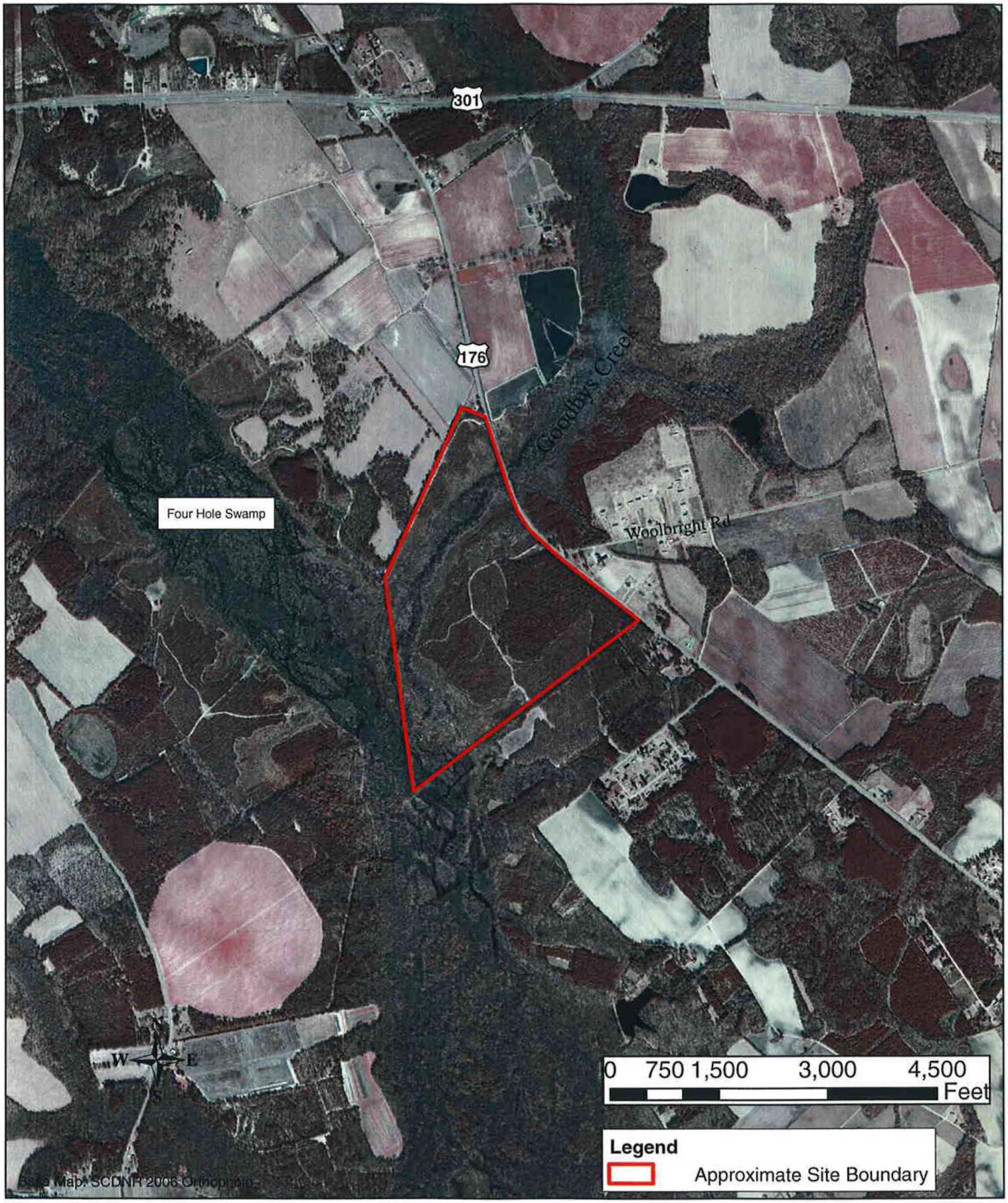
Photograph 4 – Looking northwest along woods road located on the southern property boundary with mixed hardwood pine forest on each side of the road. (August 2008)

Photograph 5 – Looking northeast within loblolly pine plantation (~10 – 15 yrs old) on the southeastern portion of the project site. (August 2008)

Photograph 6 – Looking east within loblolly pine plantation (~10 – 15 yrs old) on the southeastern portion of the project site. (August 2008)

Photograph 7 – Looking north within loblolly pine plantation (~ 30 – 35 yrs old) on the northeastern portion of the project site. (August 2008)

Photograph 8 – Looking east within loblolly pine plantation (~ 30 – 35 yrs old) on the northeastern portion of the project site. (August 2008)



ALLIANCE CONSULTING ENGINEERS

Prepared For:
Alliance Consulting Engineers
P.O. Box 8147
Columbia, SC 29202-8147

MACTEC
720 Gracern Road, Suite 132
Columbia, SC 29210

Aerial Location Map
Goodbys Creek WWTP Site
Orangeburg County, SC

Prepared By/Date: WLM 9/2/2008

Checked By/Date: AWC 9-2-08

MACTEC Project # 6671-08-0637

November 10, 2009

Alliance Consulting Engineers, Inc.
Post Office Box 8147
Columbia, South Carolina 29202-8147

Attention: Mr. Bob Freeman

Reference: **Protected Species Assessment**
Sanders Pointe Farm Site – 189.36 Acres
Orangeburg County, South Carolina
S&ME Project No. 1614-09-402

Dear Mr. Freeman:

S&ME, Inc. (S&ME) is pleased to submit our Protected Species Assessment for the above-referenced site located in Orangeburg County, South Carolina. This work was performed in general accordance with S&ME Proposal No. 1616-7098-09, dated October 9, 2009 and the Master Services Agreement between Alliance Consulting Engineers and S&ME dated January 15, 2007.

1.0 PROJECT BACKGROUND

The site consists of a 189.36-acre tract located southeast of the intersection of U.S. Highway 176 (Old State Road) and Cleveland Street in Orangeburg County, South Carolina (Figure 1 in Appendix A). The site is identified on a portion of the Indian Camp Branch and Felderville USGS 7.5-minute topographic quadrangle maps, both dated 1982 (Figure 2 in Appendix A). This Protected Species Assessment has been conducted to assess the potential for the presence of protected species within the site in preparation for proposed sprayfield application areas associated with the Goodby's Creek Regional Wastewater Treatment Plant (Figure 4 in Appendix A).

2.0 SITE/HABITAT DESCRIPTIONS

The site is located in eastern Orangeburg County within the Southeastern Plains/Atlantic Southern Loam Plains ecoregion of South Carolina. A majority of the site is used as pastureland by the Sanders Pointe Cattle Ranch. The properties adjacent to the site consist of forestland, farmland, single-family residences, buildings associated with the cattle ranch, and several abandoned commercial businesses to the northwest.

The site primarily consists of four habitat types: pastureland, a pond, bottomland hardwood wetlands, and pine mixed-hardwood upland forest. Refer to the Aerial Map (Figure 3) and site photographs in Appendix A for the locations and depictions of the various habitats.

Pastureland (Photographs 1-3)
A majority of the site consisted of pastureland for cattle. Species observed in the pastureland include a mix of grasses and weedy herbaceous vegetation including broomsedge (*Andropogon virginicus*), bahia grass (*Paspalum notatum*), dogfennel (*Eupatorium capillifolium*), horseweed (*Conyza canadensis*), and Brazilian verbena (*Verbena braziliensis*). The more open, maintained portions of the fields consisted primarily of coastal bermudagrass (*Cynodon dactylon*) and bahia grass.

Pond (Photograph 4)
A small pond was observed on the southeastern portion of the site. Species observed surrounding the pond included black willow (*Salix nigra*) and soft rush (*Juncus effusus*).

Bottomland Hardwood Wetlands (Photographs 5-7)
Goodby's Creek forms the eastern boundary of the site. Some portions of the bottomland hardwood wetlands were inundated during our site reconnaissance. Beaver activity causing large backups of Goodby's Creek was observed in several locations. Goodby's Creek was observed to be a low flow, stagnant system. Canopy and subcanopy species observed included swamp tupelo (*Nyssa biflora*), water oak (*Quercus nigra*), tulip poplar *(Liriodendron tulipifera*), sweet-gum (*Liquidambar styraciflua*), red maple (*Acer rubrum*), occasional bald cypress (*Taxodium distichum*), red bay (*Persea borbonia*), and American holly (*Ilex opaca*). Shrub, woody vine and herbaceous species included Chinese privet (*Ligustrum sinense*), doghobble (*Leucothoe axillaris*), laurel-leaf greenbrier (*Smilax laurifolia*), netted chainfern (*Woodwardia areolata*), cinnamon fern (*Osmunda cinnamomea),* lizard tail (*Saururus cernuus*), false nettle (*Boehmeria cylindrica*), and peat moss (*Sphagnum* spp.). A layer of duckweed (*Lemna* and *Spirodela* spp.) on the surface of some inundated portions of the wetlands.

Mixed-Hardwood Forestland (Photograph 8)
Pine-mixed hardwood forest was observed between the bottomland hardwood and pastureland. Canopy and subcanopy species observed included hickory (*Carya* spp.), black cherry (*Prunus serotina*), sweetgum, water oak, southern red oak, (*Q. falcata*), live oak (*Q. virginiana*), and occasional loblolly pine (*Pinus taeda*). Shrub, woody vine and herbaceous species included American beautyberry (*Callicarpa americana*), American holly, blackberry (*Rubus* spp.), yellow jessamine (*Gelsemium sempervirens),* muscadine (*Vitis rotundifolia*), and ebony spleenwort (*Asplenium platyneuron*).

3.0 METHODOLOGY

The South Carolina Department of Natural Resources (SCDNR) Rare, Threatened, and Endangered Species Inventory and the U.S. Fish and Wildlife Service (USFWS) websites were reviewed regarding current federal and state listed species known to occur in Orangeburg County. The purpose of the database search was to identify current and historic documented occurrences of federally protected species located within this county. Additionally, S&ME personnel reviewed available supporting information including the USGS Indian Camp Branch

and Felderville Topographic Quadrangles and applicable soil survey sheets. The purpose of reviewing this supporting information was to identify drainage features and soil types in the study area. During the field reconnaissance, S&ME personnel integrated the information obtained from this supporting documentation with the field evaluation for the presence of protected species or potential protected species habitat. Portions of the site that matched descriptions of preferred habitat for protected species listed in Table 1 were considered to be potential habitat for the respective protected species. These areas were subsequently field reviewed to confirm the presence/absence of the respective species.

The SCDNR database records did not identify the presence of known federally protected species (threatened or endangered) occurrences on or immediately adjacent to the site. A field survey was performed for the protected species in suitable habitats within the site on November 4, 2009. Biologist Chris Daves of S&ME performed the field survey.

4.0 PROTECTED SPECIES

Descriptions of the species and their respective federal and state status are identified in Table 1 and in Appendix B. The SCDNR and USFWS websites identified the following federally listed species for Orangeburg County:

TABLE 1: PROTECTED FLORA & FAUNA SUMMARY
SANDERS POINTE FARM SITE – ORANGEBURG COUNTY

Species	Federal Status	Habitat Description
Bald Eagle *Haliaeetus leucocephalus*	BGEPA	Coastlines, rivers, large lakes which provide adequate feeding grounds.
Red-Cockaded Woodpecker *Picoides borealis*	E	Open pine stands with minimum age of 60 years; Nests in live pines with red-heart disease.
Flatwoods Salamander *Ambystoma cingulatum*	T	Found in open mesic pine/ wiregrass flatwoods dominated by longleaf or slash pine and maintained by frequent fire. During breeding period, move to isolated, shallow, small depressions.
Shortnose Sturgeon *Acipenser brevirostrum*	E	Brackish water of large rivers & estuaries; Spawns in freshwater areas.
Canby's Dropwort *Oxypolis canbyi*	E	Wet pineland ponds, savannas, wet meadows, & around edges of open cypress ponds; Prefers habitat with little or no canopy closure.

BGEPA = Bald & Golden Eagle Protection Act T = Threatened E = Endangered

Bald Eagle – Protected Under the Bald & Golden Eagle Protection Act
BIOLOGICAL OPINION: NO EFFECT

This large raptor has characteristic adult plumage consisting of a white head and tail with a dark brown body. Juvenile eagles are completely dark brown and do not fully develop the majestic white head and tail until the fifth or sixth year. Adults average about three feet from head to tail, weigh approximately 10 to 12 pounds and have a wingspread that can reach seven feet.

Generally, female bald eagles are somewhat larger than the males. The typical nest is constructed of large sticks and is lined with soft materials such as pine needles and grasses. The nests are very large, measuring up to six feet across and weighing hundreds of pounds. Nesting and feeding sites are generally in the vicinity of large bodies of open water (coastlines, rivers, large lakes).

Although abundant wetlands are located on the eastern portion of site, these areas are primarily forested with a closed canopy. Therefore, the site does not contain suitable nesting habitat for the bald eagle. There are no coastlines, rivers, or large lakes/streams on or adjacent to the site considered suitable habitat for the bald eagle. Accordingly, future development of the site is not expected to impact this species. Please note that the bald eagle was removed from the federally threatened list in 2007. The bald eagle still has protection under Bald and Golden Eagle Protection Act.

Red-Cockaded Woodpecker – Federally Listed Endangered, State Listed Endangered
BIOLOGICAL OPINION: NO EFFECT

The red-cockaded woodpecker is a black and white bird measuring approximately seven inches long. The bird displays black and white horizontal stripes on its back. The cheeks and underparts are white and the sides are streaked in black. The cap and stripe on the throat and neck of the bird are black. Male individuals of the species have a small red spot on each side of the black cap and display a red crown patch after the first post-fledgling molt.
The red-cockaded woodpecker's range is closely linked to the distribution of southern pines. Loblolly and longleaf pines that are 60-plus years old are generally selected for nesting sites. However, other species of southern pines are occasionally used for nesting. The woodpecker usually excavates nest cavities in trees infected with a fungus that produces red-heart disease. Preferred nesting sites generally include relatively open, mature pine stands with an undeveloped or low understory layer. Foraging habitat is frequently limited to pine or pine-hardwood stands that are 30 years or older, with a preference for pine trees with a diameter of 10 inches or larger. The USFWS indicates that the maximum foraging range for the red-cockaded woodpecker is approximately one-half mile.

The site does not contain suitable nesting habitat for the red-cockaded woodpecker. There are no relatively open pine stands of proper age to be considered suitable habitat for the red-cockaded woodpecker located within the site. Accordingly, future development of the site is not expected to impact this species.

Flatwoods Salamander – Federally Listed Threatened, State Listed Endangered
BIOLOGICAL OPINION: NO EFFECT

The flatwoods salamander is a small amphibian growing to a length of up to five inches. This species is black in color with a cross-pattern of irregular, gray lines on the back. The belly of the flatwoods salamander is gray to black with whitish to gray spots. This species prefers fire-maintained, seasonally wet, pine savannas and pine flatwoods located within the southeastern portion of the United States. These areas consist predominantly of longleaf pine or slash pine with a low percentage of canopy cover. Additionally, this species may be found in the vicinity of cypress ponds. During breeding period, which coincides with heavy rains from October to

December, the flatwoods salamander moves to isolated, shallow, small depressions (forested with emergent vegetation) that dry completely on a cyclic basis. Shallow water wetland habitat is required for laying eggs.

The site does not contain suitable habitat for the flatwoods salamander. There are no longleaf pine or slash pine flatwoods or cypress ponds located within the site. Accordingly, future development of the site is not expected to impact this species.

Shortnose Sturgeon – Federally Listed Endangered, State Listed Endangered
BIOLOGICAL OPINION: NO EFFECT

The shortnose sturgeon is a bony, anadromous fish growing to a length of up to four feet. Shortnose sturgeon exhibit five rows of plates along the body, with olive to black coloring along the back, and yellow to white coloring on the belly. Four barbels are located in front of the mouth are used to locate food along the river bottom. The shortnose sturgeon migrates from salt water to freshwater to spawn from April to May. The shortnose sturgeon's habitat consists of tidal river systems along the Atlantic coast of North America. This species typically occupies the channels and deeper holes within the river, while feeding in shallow areas at night.

The site does not contain suitable habitat for shortnose sturgeon. There are no rivers or large streams within the site. Goodby's Creek and its associated floodplain were observed to be primarily an inundated swamp with low flow. Please note this assessment did not include a fish survey. Development is not proposed in Goodby's Creek or the wetland areas of the site. Accordingly, future development of the site is not expected to impact this species.

Canby's Dropwort – Federally Listed Endangered, State Listed Endangered
BIOLOGICAL OPINION: NO EFFECT

Canby's dropwort is a perennial herb growing from elongate, stoloniferous rhizomes to a height of 2.5 to 4 feet in height. The stems are hollow and erect with slender leaves. The species is aromatic, smelling like dill. The flowering period is from mid-August through October. The flowers of Canby's dropwort have white petals and pale green sepals and are five-parted. The leaves are round in cross-section, thin, and divided by partitions. The primary habitats of Canby's dropwort are wet pineland ponds and savannas, wet meadows, and around the edges of open cypress ponds. The species prefers habitat with little or no canopy closure. Canby's dropwort prefers soils with a high water table.

The site does not contain suitable habitat for Canby's dropwort. There are no wet pineland ponds, savannas, wet meadows, or cypress ponds on the site. Accordingly, future development of the site is not expected to impact this species.

5.0 QUALIFICATIONS

The field survey was lead by Chris Daves of S&ME. Mr. Daves is a biologist and natural resources project manager with over eight years experience in environmental consulting. Mr. Daves is proficient in conducting wetland delineations, environmental permitting activities, and habitat assessments, including protected species surveys. He is a Professional Wetland Scientist (PWS) and holds a B.S. degree in Biology from Wofford College and a Master's degree in Earth & Environmental Resources Management from the University of South Carolina.

6.0 REFRENCES CITED

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U.S. Fish and Wildlife Service. 2009. Listed Endangered Species in South Carolina - http://www.fws.gov/charleston/countyLists.html#Listed%20Species%20in%20Orangeburg%20County.

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7.0 SUMMARY AND CONCLUSIONS

Based on the literature review, habitat assessment, and pedestrian field review of the site, it is our opinion that the site does not provide suitable habitat for listed protected species with documented populations in Orangeburg County. No further action is recommended at this time. This Protected Species Assessment will be forwarded to the USFWS for review and comment. The USFWS comments will be provided to you as soon as S&ME receives them.

S&ME appreciates the opportunity to be of service to you by performing this Protected Species Assessment for the site. Please contact us at (803) 561-9024 with questions regarding this report or if you require any additional information.

Sincerely,

S&ME, Inc.

Amanda White
Biologist

Chris Daves, P.W.S.
Biologist

Tom Behnke, P.G.
Environmental Department Manager

Appendix A
Figures
Site Photographs

Appendix B
County Species Lists from USFWS and SCDNR

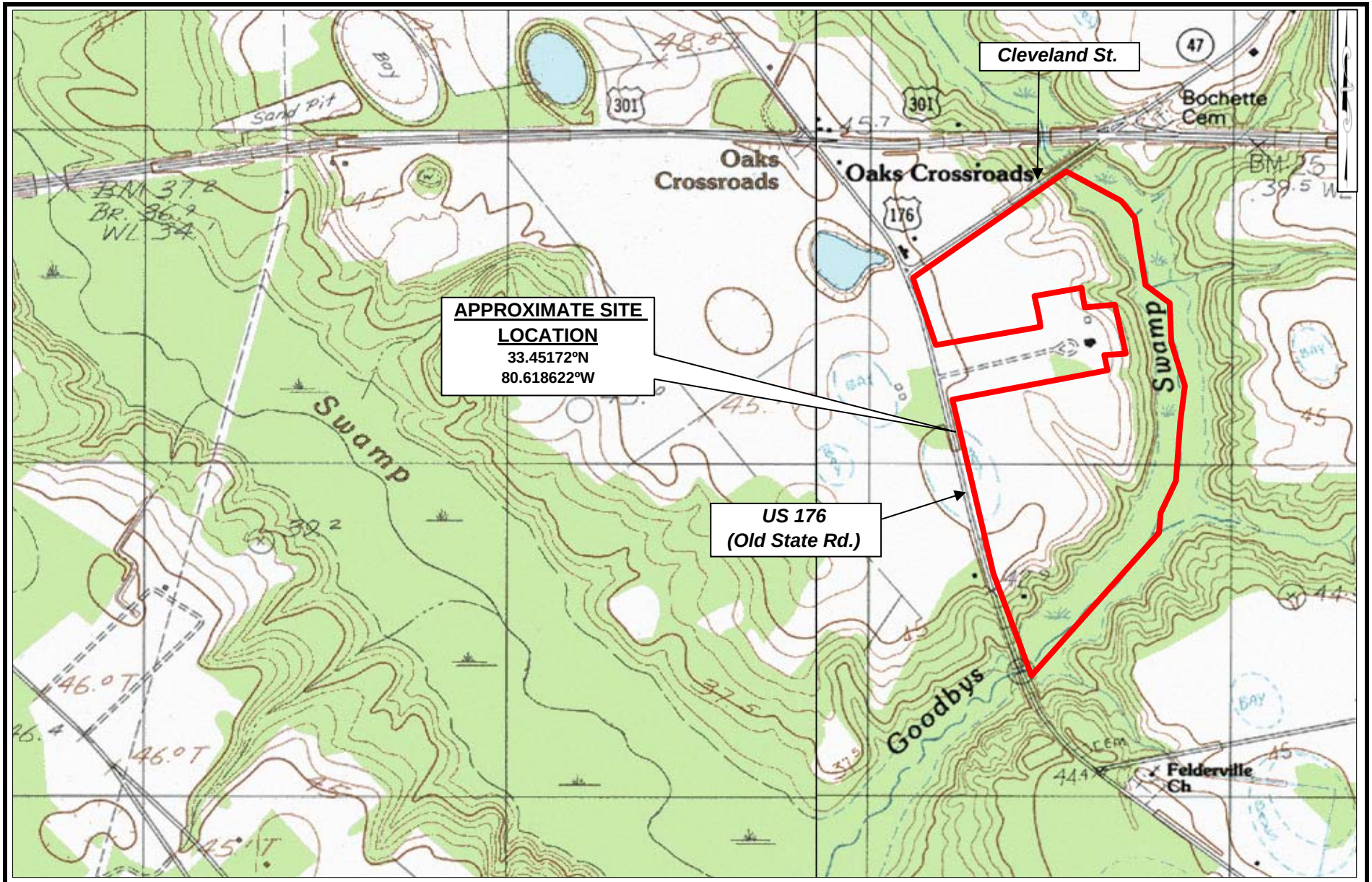
APPENDIX A

Figure 1 – Vicinity Map
Figure 2 – USGS Topographic Map
Figure 3 – Aerial Map
Figure 4 – Site Plan

Site Photographs

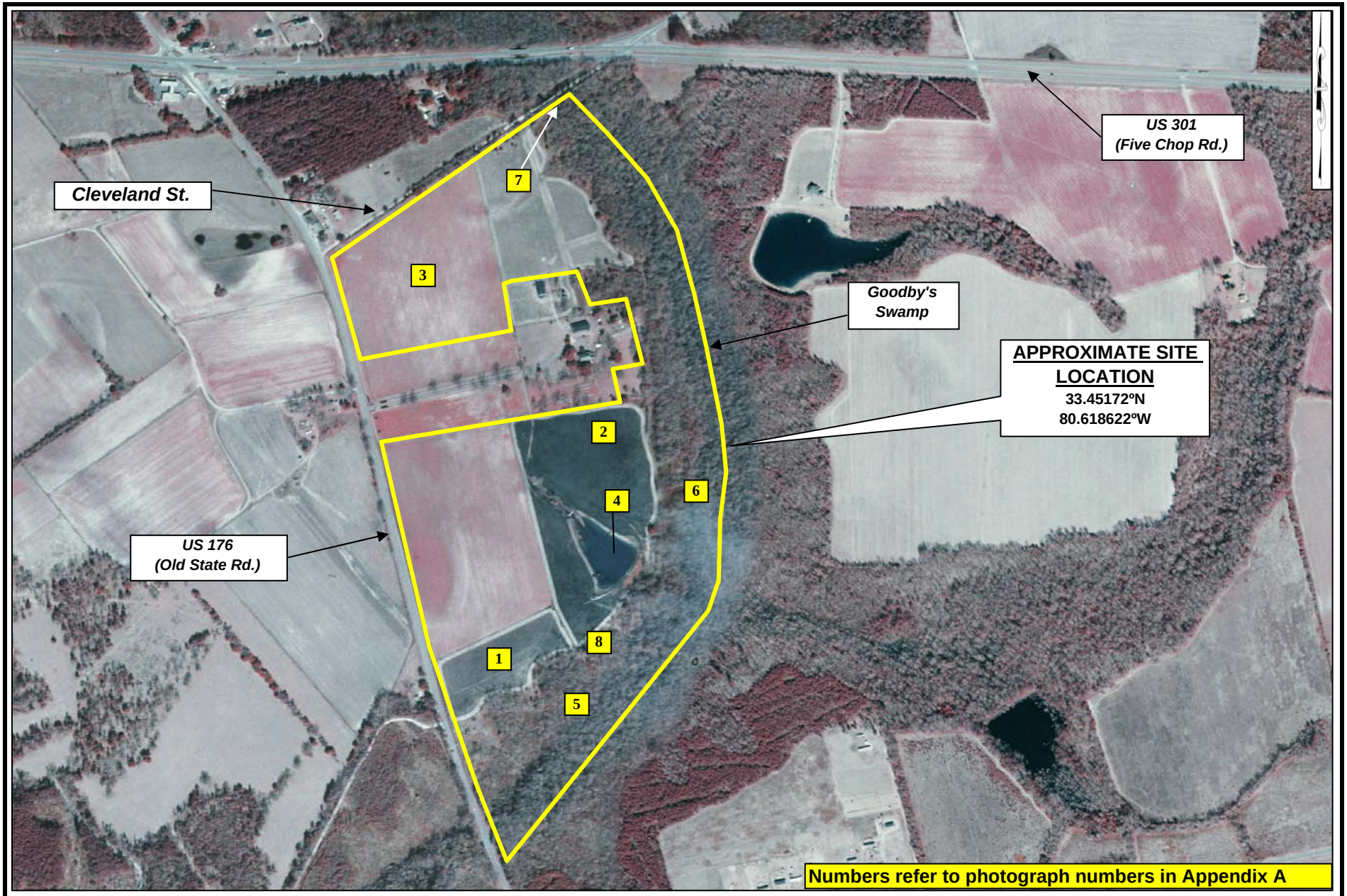
SOURCE: ***GOOGLE MAPS***

SCALE:	NTS	S&ME	**VICINITY MAP**	**FIGURE NO.**
CHECKED BY:	TB		SANDERS POINTE FARM TRACT - 189.36 ACRES	**1**
DRAWN BY:	WCD		NEAR ELLOREE, ORANGEBURG COUNTY, SC	
DATE:	11/10/2009		**S&ME PROJECT NO.** 1614-09-402	



SOURCE: ***USGS 7.5 - minute quadrangle maps***
Felderville, SC - 1982 and Indian Camp Branch, SC - 1982

SCALE: NTS CHECKED BY: TB DRAWN BY: WCD DATE: 11/10/2009	S&ME	**TOPOGRAPHIC MAP** SANDERS POINTE FARM TRACT - 189.36 ACRES NEAR ELLOREE, ORANGEBURG COUNTY, SC **S&ME PROJECT NO.** 1614-09-402	**FIGURE NO.** **2**



SOURCE: *NAPP Aerial Photograph - 2006*

SCALE:	NTS
CHECKED BY:	TB
DRAWN BY:	WCD
DATE:	11/10/2009

S&ME

AERIAL MAP

SANDERS POINTE FARM TRACT - 189.36 ACRES

NEAR ELLOREE, ORANGEBURG COUNTY, SC

S&ME PROJECT NO. 1614-09-402

FIGURE NO. 3

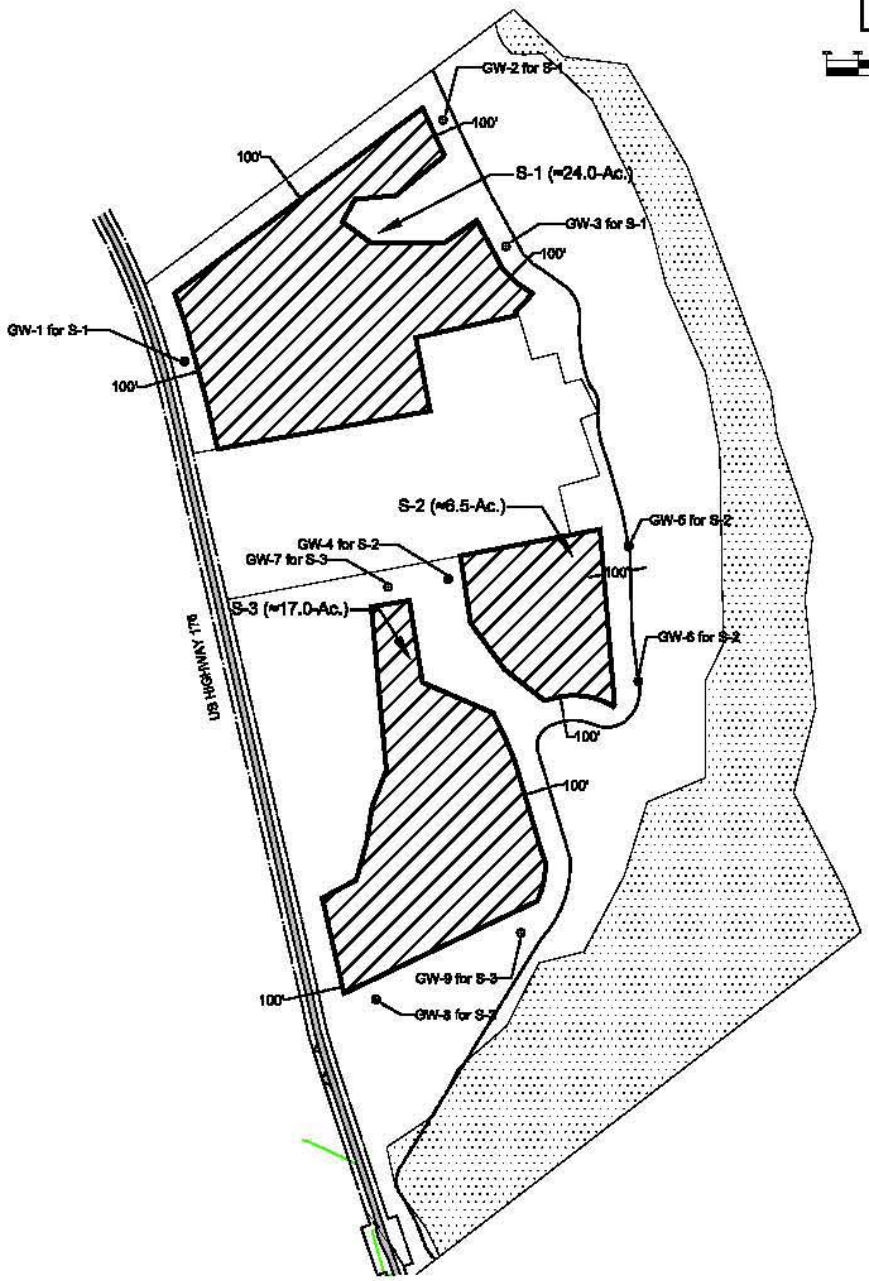
References:

1. Reference is made to a Topographical and Wetlands Survey conducted by Nesbitt Surveying Co., Inc. dated March 14, 2008 for Alliance Consulting Engineers, Inc.
2. Reference is made to a Topographic and Wetlands Survey conducted by B. F. Barber and Associates, Inc. dated July 30, 2002.
3. Reference is made to a Wetlands Survey conducted by B. F. Barber and Associates, Inc. dated July 11, 2002.

LEGEND

- Existing 100-year Flood Line
- Existing Wetlands
- Existing Asphalt
- Proposed Application Area

(IN FEET)



PROPOSED GROUNDWATER MONITORING WELL MAP FOR THE SANDERS POINTE FARM

FIGURE 4 - SITE PLAN

Project No. 05121-38
March 2008 (Revised September 2008)

ALLIANCE CONSULTING ENGINEERS

Prepared by: Alliance Consulting Engineers, Inc.

Photo #1 Pastureland on the southern portion of site.

Photo #2 Transition zone between active and fallow pastureland on central portion of site.

Photo #3 Pastureland on the northern portion of site.

Photo #4 Pond on southeastern portion of the site (facing south).

Photo #5 Bottomland hardwood wetlands on the eastern portion of the site.

Photo #6 Inundated portion of bottomland hardwoods wetlands at Goodby's Creek. Note surface layer of duckweed.

Photo #7 Stagnant pool of Goodby's Creek. Photo taken from Cleveland St. bridge at northwestern portion of site.

Photo #8 Mixed hardwood forestland between pastureland and wetlands. Photo taken on southeastern portion of site

APPENDIX B

County Species Lists from USFWS and SCDNR For Orangeburg County

USFWS LIST

Listed Species in Orangeburg County				
Species	**Federal Status**	**State Status**	**Habitat**	**Threats**
Birds				
Bald eagle *Haliaeetus leucocephalus*	BGEPA	BGEPA	Coastlines, rivers, large lakes or streams which provide adequate feeding grounds; typically nest in SC between late October and late May; tend to return year after year to the same nest tree, once they have successfully established a nest	Human activities that can cause them to abandon nest, or to not properly incubate eggs, or care for young
Red-cockaded woodpecker *Picoides borealis*	E	E	Nest in mature pine with low understory vegetation (<1.5m); forage in pine and pine hardwood stands > 30 years of age, preferably > 10" dbh	Reduction of older age pine stands and to encroachment of hardwood midstory in older age pine stands due to fire suppression
Amphibians				
Flatwoods salamander *Ambystoma cingulatum*	T	E	Adults and subadults are fossorial; found in open mesic pine/ wiregrass flatwoods dominated by longleaf or slash pine and maintained by frequent fire. During breeding period, which coincides with heavy rains from October to December, move to isolated, shallow, small depressions (forested with emergent vegetation) that dry completely on a cyclic basis	Habitat destruction as a result of agricultural and silvicultural practices (e.g., clearcutting, mechanical site preparation), fire suppresion and residential and commercial development
Fishes				
Shortnose sturgeon *Acipenser brevirostrum*	E	E	Occur in most major river systems along the eastern seaboard	Habitat alterations from discharges, dredging or disposal of material into rivers, or related development activities involving estuarine/riverine mudflats and marshes; commercial exploitation up until the 1950s
Plants				
Canby's dropwort *Oxypolis canbyi*	E	E	Found in pond-cypress savannahs in Carolina Bay formations dominated by grasses and sedges or ditches next to bays; prefer borders and shallows of cypress-pond pine ponds and sloughs	Loss or alteration of wetland habitats

Source: http://www.fws.gov/charleston/countyLists.html#Listed%20Species%20in%20Orangeburg%20County

SCDNR Rare, Threatened, & Endangered Species Inventory
Species Found In Orangeburg County
Data Last Updated January 17th, 2006

SCIENTIFIC NAME	COMMON NAME	GLOBAL RANK	STATE RANK	LEGAL STATUS
ACIPENSER BREVIROSTRUM	SHORTNOSE STURGEON	G3	S3	FE/SE
AGRIMONIA INCISA	INCISED GROOVEBUR	G3	S1	NC
AMPHICARPUM MUEHLENBERGIANUM	BLUE MAIDEN-CANE	G4	S?	SC
ARISTIDA CONDENSATA	PIEDMONT THREE-AWNED GRASS	G4?	S?	SC
ASPLENIUM HETERORESILIENS	WAGNER'S SPLEENWORT	G2Q	S1	NC
ASPLENIUM RESILIENS	BLACK-STEM SPLEENWORT	G5	S1S2	SC
BACOPA CYCLOPHYLLA	COASTAL-PLAIN WATER-HYSSOP	G3G5	S1	SC
CAREX AMPHIBOLA	NARROWLEAF SEDGE	G5	S?	SC
CAREX BASIANTHA		G5	SR	SC
CAREX DECOMPOSITA	CYPRESS-KNEE SEDGE	G3	S?	SC
CAREX GRANULARIS	MEADOW SEDGE	G5	S?	SC
CAROLINA BAY		G?	S?	SC
COLONIAL WATERBIRD		G?	S?	SC
CORYNORHINUS RAFINESQUII	RAFINESQUE'S BIG-EARED BAT	G3G4	S2?	SE
ELLIPTIO CONGARAEA	CAROLINA SLABSHELL	G4	S?	SC
HALIAEETUS LEUCOCEPHALUS	BALD EAGLE	G4	S2	FT/SE
HELENIUM PINNATIFIDUM	SOUTHEASTERN SNEEZEWEED	G4	S?	SC
ILEX AMELANCHIER	SARVIS HOLLY	G4	S3	SC
ISOETES RIPARIA	RIVER BANK QUILLWORT	G5?	S1	SC
LITSEA AESTIVALIS	PONDSPICE	G3	S3	SC
LOBELIA BOYKINII	BOYKIN'S LOBELIA	G2G3	S?	SC
MYOTIS AUSTRORIPARIUS	SOUTHEASTERN MYOTIS	G3G4	S1	SC
MYRIOPHYLLUM LAXUM	PIEDMONT WATER-MILFOIL	G3	S2	RC
NOLINA GEORGIANA	GEORGIA BEARGRASS	G3G5	S?	SC
OXYPOLIS CANBYI	CANBY'S DROPWORT	G2	S1	FE/SE
PICOIDES BOREALIS	RED-COCKADED WOODPECKER	G3	S2	FE/SE
PITUOPHIS MELANOLEUCUS	PINE OR GOPHER SNAKE	G4	S3S4	SC
POTAMOGETON FOLIOSUS	LEAFY PONDWEED	G5	S?	SC
PSEUDOBRANCHUS STRIATUS	DWARF SIREN	G5	S2	ST
PYGANODON CATARACTA	EASTERN FLOATER	G5	S?	SC
QUERCUS SIMILIS	BOTTOM-LAND POST OAK	G4Q	S1	SC
RANA CAPITO	GOPHER FROG	G3	S1	SE

RHEXIA ARISTOSA	AWNED MEADOWBEAUTY	G3	S2	SC
RHODODENDRON FLAMMEUM	PIEDMONT AZALEA	G3	S2	SC
RHYNCHOSPORA HARPERI	HARPER BEAKRUSH	G4?	S?	SC
RHYNCHOSPORA TRACYI	TRACY BEAKRUSH	G4	S?	SC
SCIRPUS ERISMANAE	A BULRUSH	G?Q	S?	SC
SCIURUS NIGER	EASTERN FOX SQUIRREL	G5	S4	SC
SCLERIA BALDWINII	BALDWIN NUTRUSH	G4	S1S2	SC
TOXOLASMA PULLUS	SAVANNAH LILLIPUT	G2	S1S3	SC
TRADESCANTIA VIRGINIANA	VIRGINIA SPIDERWORT	G5	S?	SC
TRIDENS CAROLINIANUS	CAROLINA FLUFF GRASS	G3	S?	SC
UTRICULARIA OLIVACEA	PIEDMONT BLADDERWORT	G4	S1	SC
UTTERBACKIA IMBECILLIS	PAPER PONDSHELL	G5	S?	SC
VILLOSA DELUMBIS	EASTERN CREEKSHELL	G4	S?	SC

Source:
https://www.dnr.sc.gov/pls/heritage/county_species.list?pcounty=orangeburg

December 15, 2009

Alliance Consulting Engineers, Inc.
Post Office Box 8147
Columbia, South Carolina 29202-8147

Attention: Mr. Bob Freeman

Reference: **Limited Wetland Approximation Report**
Orangeburg County Waste Water System Expansion Project
Orangeburg County, South Carolina
S&ME Project No. 1614-09-439

Dear Mr. Freeman:

S&ME, Inc. (S&ME) is pleased to submit our Limited Wetland Approximation Report for the above-referenced project located in Orangeburg County, South Carolina. This work was performed in general accordance with S&ME Proposal No. 1616-7192-09, dated November 25, 2009 and the Master Services Agreement between Alliance Consulting Engineers and S&ME dated January 15, 2007.

PROJECT INFORMATION

This assessment has been conducted to assess the potential for jurisdictional and non-jurisdictional wetlands and other Waters of the U.S. within the project area in preparation for proposed utility improvements.

Information regarding the boundaries of the proposed pump stations sites was provided by Alliance Consulting Engineers. Two pump stations are proposed in two separate locations. Pump Station Location 1 (Figures 1-3) is located just north of the intersection of Bass Drive (U.S Highway 15) and Interstate 95. Pump Station Location 2 (Figures 4-6) is located southeast of the intersection of Old State Road (U.S. Highway 176) and Interstate 26 just west of Farmfield Road. Each site is approximately one acre in size.

Prior to conducting a site reconnaissance, S&ME reviewed the following sources:

- U.S. Geological Service (USGS) 7.5-Minute topographic quadrangle maps;
- U.S. Department of Agriculture (USDA) soil maps;
- U.S. Fish & Wildlife Service (USFWS) National Wetland Inventory (NWI) maps; and
- South Carolina Department of Natural Resources (SCDNR) – NAPP infrared aerial photographs.

After reviewing the above-referenced sources, a field visit was conducted on November 30 and December 1 and 15, 2009 to verify the presence or absence of wetlands or streams in the project area. Areas with suspected wetland or stream features were examined for evidence of wetland vegetation, wetland hydrology, and hydric soils (wetlands) and proper geomorphological, hydrological and biological factors (streams).

FINDINGS AND OPINIONS

Pump Station Location 1

Vegetation
Location 1 consisted of a secondary growth area just south of an abandoned school. A portion of Location 1 consists of the former entrance corridor to the old school. Species observed included loblolly pine (*Pinus taeda*), sweet-gum (*Liquidambar styraciflua*), wax myrtle (*Morella cerifera*), Chinese privet (*Ligustrum sinense*), blackberry (*Rubus* spp.), goldenrod (*Solidago* spp.), and bahia grass. This vegetative community does not contain dominant hydrophytic vegetation associated with wetlands.

Soils
According to the *Soil Survey of Orangeburg County*, Location 1 is underlain by Dothan soils. These soils are generally well-drained and are typically associated with upland areas on broad smooth ridges and gentle side slopes. Dothan soils are not listed hydric soils in South Carolina or the United States. The project area consisted of brown to brownish-yellow (10YR 5/6) sands. Hydric soils characteristics were not observed.

Hydrology
Indicators of wetland hydrology were not observed during the site reconnaissance. Stream channels were not observed.

Opinion
Wetlands or streams were not observed within Location 1.

Pump Station Location 2

S&ME did not have permission to physically access and examine Location 2. Visual observations were made from Farmfield Road located immediately east of Location 2.

Vegetation
Location 2 consisted of an active cow pasture. Species observed included fescue (*Festuca* spp.), common dandelion (*Taraxacum officinale*), henbit (*Lamium amplexicaule*), dogfennel (*Eupatorium capillifolium*), and various other grasses and forbs. This vegetative community did not appear to contain dominant hydrophytic vegetation associated with wetlands.

Soils
According to the *Soil Survey of Orangeburg County*, Location 2 is underlain by Ocilla and Coxville soils. Ocilla soils are generally somewhat poorly drained and are typically associated

with broad, flat interstream divides and rims of Carolina bays. Ocilla soils are not listed hydric soils in South Carolina or the United States. Coxville soils are generally poorly drained and are typically associated depressional bays. Coxville soils are listed hydric soils in South Carolina or the United States.

Hydrology
Indicators of wetland hydrology were not observed during the site reconnaissance. Stream channels were not observed.

Opinion
Based on visual observations from nearby Farmfield Road, it does not appear Location 2 contains wetlands or streams. Location 2 is currently used as cow pasture has a low likelihood of containing wetlands or streams.

LIMITATIONS

Our findings have been developed in accordance with generally accepted standards of practice in the Charleston District of the United States Army Corps of Engineers (USACE). No other warranty is expressed or implied. The client should recognize that the USACE is the sole authority responsible from certifying the presence or absence of jurisdictional and non-jurisdictional wetland and future changes in their regulations/guidelines may affect the findings in this letter. Also, the boundaries of the two proposed sites were not staked or marked in the field.

This effort is only to provide a representation of the approximate locations of potential wetlands or streams and the actual boundaries may differ. The boundary between upland and wetland areas was not flagged or marked (delineated) by S&ME. This information should be used only for planning purposes. This report was not submitted to the USACE for verification.

CLOSURE

S&ME appreciates the opportunity to be of service to you by performing this Limited Wetland Approximation Report for the above-referenced project. Please contact us at (803) 561-9024 with questions regarding this report or if you require additional information.

Sincerely,

S&ME, Inc.

Amanda White
Biologist

Chris Daves, P.W.S.
Biologist

Tom Behnke, P.G.
Environmental Department Manager

Appendix A - Figures

APPENDIX A

Figures

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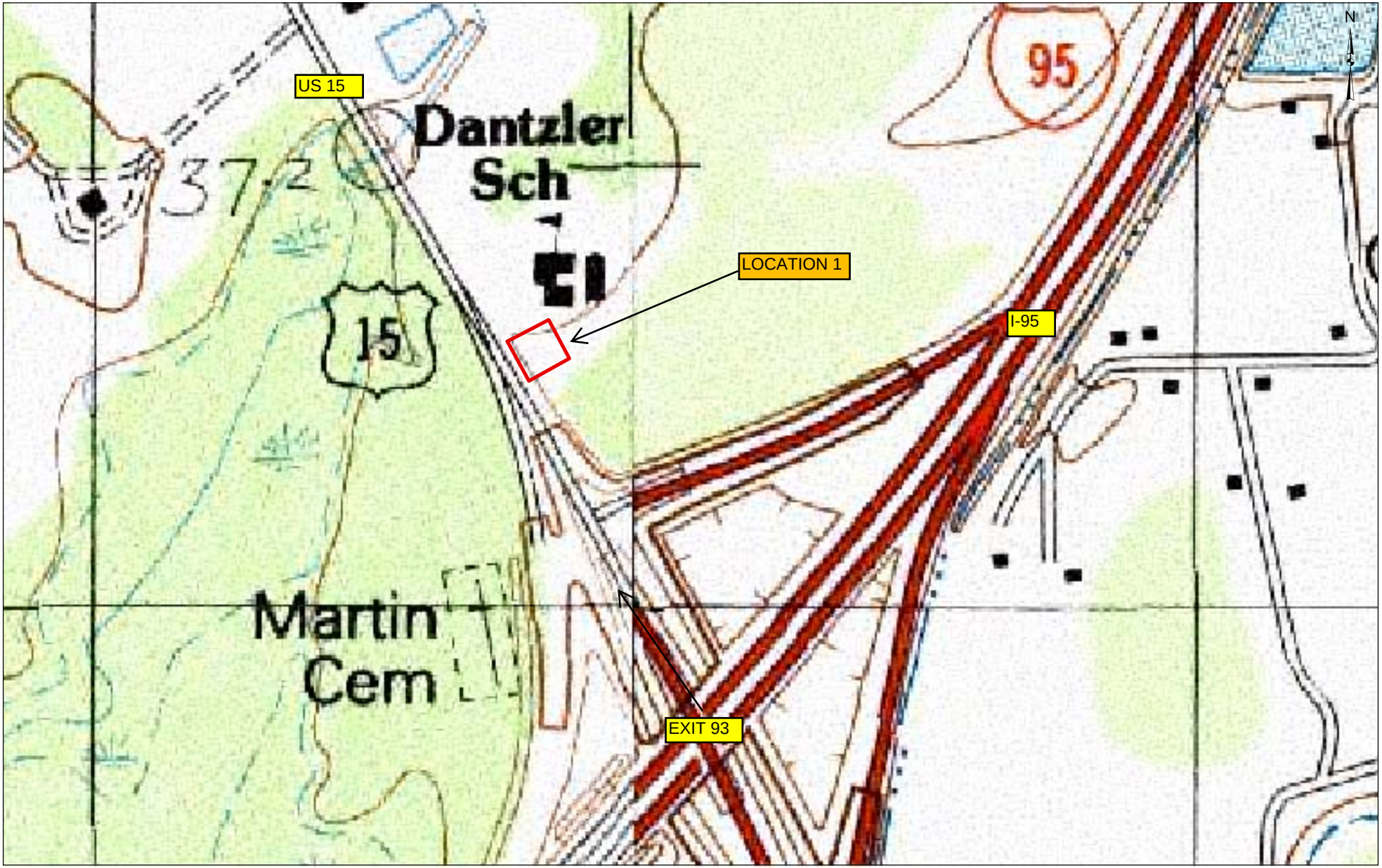

SOURCE: USGS 7.5 - Minute Quadrangle Map
Felderville - 1982, Vance - 1979

0 200 400 800 1,200 1,600 Feet

SCALE:	1 inch = 400 feet
CHECKED BY:	WCD
DRAWN BY:	ADW
DATE:	12/10/2009

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Topographic Map
Orangeburg County Waste Water System Expansion Project - Location 1
Bowman, Orangeburg County, South Carolina

S&ME PROJECT NO. 1614-09-439

FIGURE NO. 1

SOURCE: NAPP Aerial Photograph - 2006
USFWS National Wetland Inventory Data

0 200 400 800 1,200 1,600 Feet

SCALE:	1 inch = 400 feet
CHECKED BY:	WCD
DRAWN BY:	ADW
DATE:	12/10/2009

S&ME

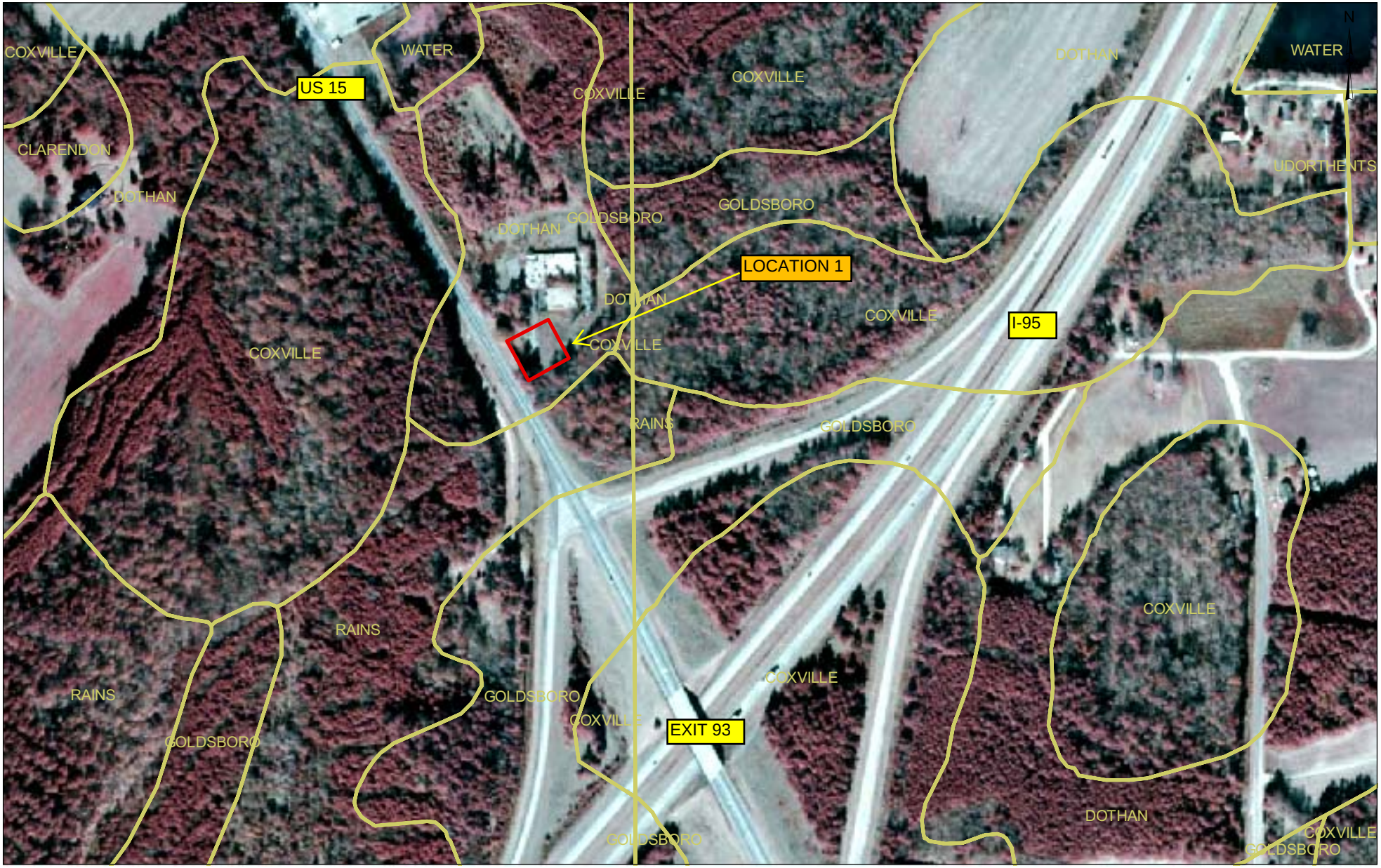
Aerial and NWI Map

Orangeburg County Waste Water System Expansion Project - Location 1

Bowman, Orangeburg County, South Carolina

S&ME PROJECT NO. 1614-09-439

FIGURE NO. 2



SOURCE: NAPP Aerial Photograph - 2006
USDA Soil Survey Data - 1993

Feet
0 200 400 800 1,200 1,600

SCALE:	1 inch = 400 feet
CHECKED BY:	WCD
DRAWN BY:	ADW
DATE:	12/10/2009

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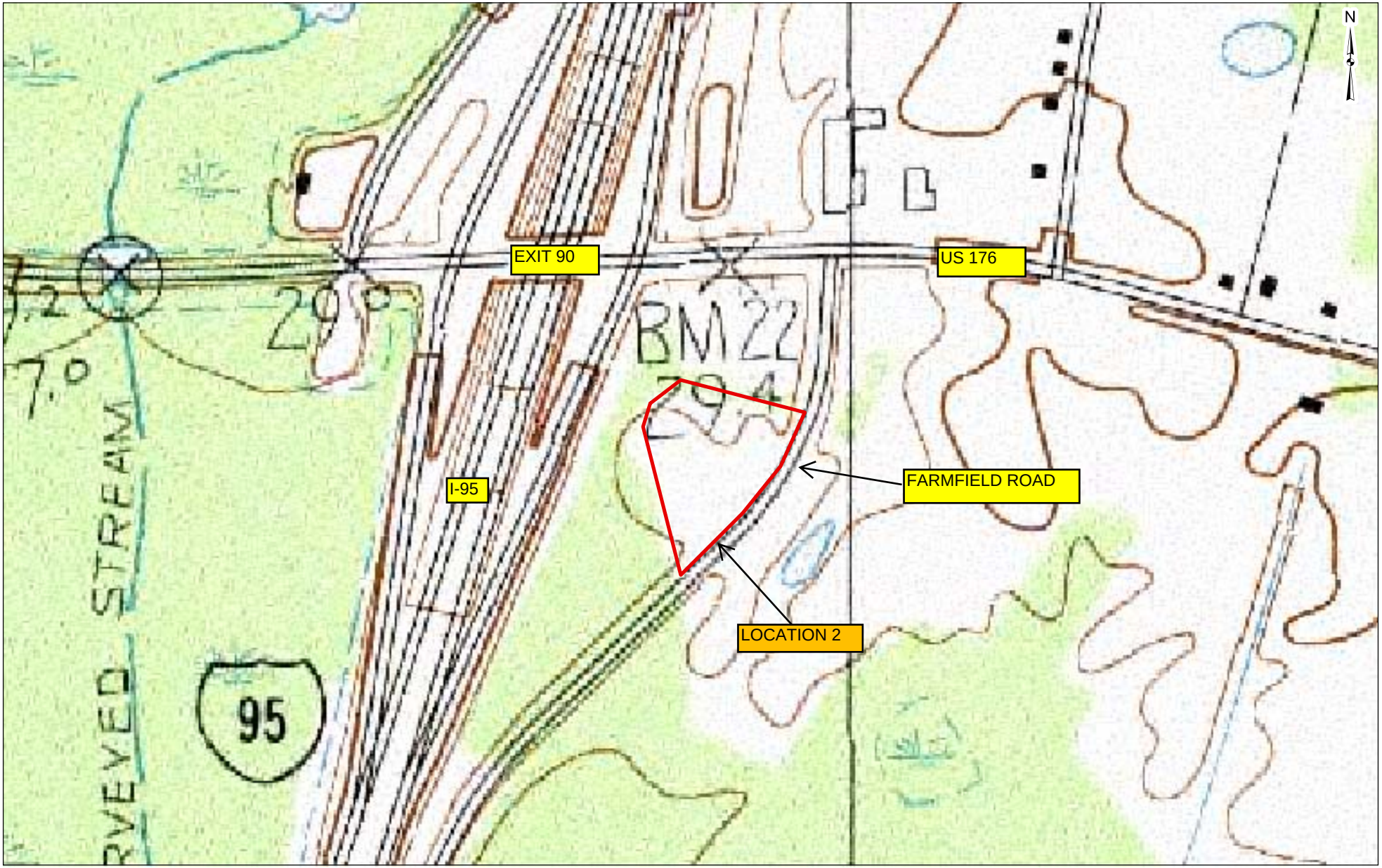
Aerial and Soils Map

Orangeburg County Waste Water System Expansion Project - Location 1

Bowman, Orangeburg County, South Carolina

S&ME PROJECT NO. 1614-09-439

FIGURE NO. 3



SOURCE: USGS 7.5 - Minute Quadrangle Map
Felderville - 1982

SCALE:	1 inch = 400 feet
CHECKED BY:	WCD
DRAWN BY:	ADW
DATE:	12/10/2009

S&ME

Topographic Map

Orangeburg County Waste Water System Expansion Project - Location 2

Bowman, Orangeburg County, South Carolina

S&ME PROJECT NO. 1614-09-439

FIGURE NO. 4

SOURCE: ***NAPP Aerial Photograph - 2006***
USFWS National Wetland Inventory Data

SCALE:	1 inch = 400 feet
CHECKED BY:	WCD
DRAWN BY:	ADW
DATE:	12/10/2009

S&ME

Aerial and NWI Map

Orangeburg County Waste Water System Expansion Project - Location 2
Bowman, Orangeburg County, South Carolina

S&ME PROJECT NO. 1614-09-439

FIGURE NO. 5