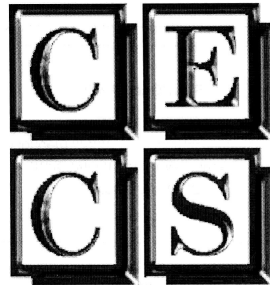


NATURAL RESOURCES TECHNICAL REPORT

**SC 41 BRIDGE REPLACEMENT
WANDO RIVER**

**CHARLESTON AND BERKELEY COUNTIES
SOUTH CAROLINA**

Prepared for:



Civil Engineering Consulting Services, Inc.

And



South Carolina Department of Transportation

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NATURAL RESOURCES TECHNICAL REPORT

SC 41 BRIDGE REPLACEMENT WANDO RIVER

1.0 INTRODUCTION

1.1 Project Description

The South Carolina Department of Transportation (SCDOT) is proposing to improve approximately two miles of SC 41, including the replacement of the SC 41 bridge over the Wando River in Berkeley and Charleston Counties. The existing bridge is a 1,690-foot by 22-foot structural steel and reinforced concrete bridge. The new bridge will be approximately 2,700 feet long and approximately 82 feet wide, which can accommodate future roadway widening if later required. The new structure will be initially striped to provide for two 12-foot travel lanes, one in each direction with 10-foot shoulders. Bike lanes are also being considered. These improvements will enhance safety and increase traffic capacity along SC 41.

The project consists of relocating the bridge to the east along the existing alignment with detour bridging during construction (staged construction will also be considered). The project will begin approximately 2,300 feet south of the existing bridge and continue through the SC 41/Clements Ferry Road (SSR 33) intersection for approximately 3,000 feet along SC 41; relocation of the current intersection is anticipated. The study corridor includes 150 feet outside of the existing right-of-way (ROW) along both sides of the existing alignment and widens beyond the SC 41/Clements Ferry intersection. A 150 foot wide ROW extends for 1,650 feet along Clements Ferry Road. The project study area extends for approximately 1.5 miles along SC 41 and encompasses approximately 73 acres (Figures 1 and 2, Appendix A).

The project study area includes portions of the Wando River and associated drainages and wetlands. This report describes natural features within the project study area including soils, water resources, plant communities, wildlife, Section 404 jurisdictional areas, and pertinent protected species issues. In addition, this report provides a preliminary evaluation of permit needs. An estimate of jurisdictional area impacts due to excavation or fill in streams and wetlands is included.

1.2 Project Field Tasks

The goals of this study are as follows.

- Generally evaluate natural resources within the approximately 73-acre project study area.
- Conduct an investigation of federally protected species habitat and occurrence.
- Describe water resources, topography, soils, and plant communities within the project study area.
- Delineate wetlands and streams and map delineation flags with GPS technology.
- Complete U.S. Army Corps of Engineers (USACE) data forms for jurisdictional systems.

- Request resource agency concurrence with the delineation.

1.3 Methods

Materials and research data in support of this investigation were derived before field investigations from a number of sources including the Soil Conservation Service (SCS; now the Natural Resource Conservation Service) Charleston County (SCS 1971) and Berkeley County (SCS 1980) soil surveys, U.S. Geological Survey (USGS) topographic mapping (Cainhoy [1971], SC 7.5-minute quadrangle), U.S. Fish and Wildlife Service (USFWS) National Wetlands Inventory (NWI) mapping (Cainhoy [1996], SC 7.5-minute quadrangle), South Carolina Department of Health and Environmental Control (SCDHEC) documents, and recent aerial photography.

Vascular plant names follow nomenclature found in Radford et al. (1968), with adjustments for updated nomenclature (Kartesz 1998). Wildlife and aquatic life distribution and habitat use were determined through field observations, evaluation of habitat type distributions, and available supportive documentation (Hamel 1992, Martof et al. 1980, Menhinick 1991, Palmer and Braswell 1995, Potter et al. 1980, Rohde et al. 1994, and Webster et al. 1985).

Jurisdictional areas were evaluated using the three-parameter approach following USACE delineation guidelines (Environmental Laboratory 1987). Wetland jurisdictional areas were characterized according to a classification scheme established by Cowardin et al. (1979). USACE forms were utilized to document evidence of jurisdictional status and jurisdictional area characteristics. The completed data forms are available in Appendix B.

A list of federally protected species whose ranges extend into Charleston and Berkeley Counties (as of March 2008) was obtained from the USFWS (USFWS 2008). State-listed species lists were obtained from the South Carolina Department of Natural Resources (SCDNR) as of January 2006 (SCDNR 2008). In addition, files maintained by the S.C. Heritage Trust Program (SCHTP) were reviewed for documented sightings of state or federally listed species. Field surveys for protected species focused on identification of potential habitat areas and detailed searches of those areas.

The project study area was visited on March 9-11, 15-17, and August 9-10, 2005. The project study area was walked and visually evaluated for significant environmental features. Stream and wetland determinations were made and jurisdictional boundaries were flagged with sequentially numbered flagging tape. These jurisdictional boundaries were subsequently mapped using Trimble XRS Differential Global Positioning System (DGPS) technology with reported sub-meter accuracy. The data were later corrected using Pathfinder software and exported in exchange format.

1.4 Qualifications

The field work for this investigation was conducted by EcoScience Corporation (ESC) biologists Elizabeth Scherrer, Matt Thomas, Brad Allen, Kendrick Weeks, Scott Davis, and Heather Saunders.

Ms. Scherrer is a Senior Scientist with nine years of experience in the environmental field. She has a master of science in forestry from North Carolina State University, with minors in botany and ecology. Professional expertise includes wetland and jurisdictional area delineations, stream characterization, plant and wildlife identification and community mapping, plant community ecology, protected species surveys, and environmental document preparation.

Mr. Thomas is a Project Scientist with five years of experience in the environmental field. Mr. Thomas holds a bachelor's degree in environmental science with a concentration in ecology from North Carolina State University. Professional expertise includes jurisdictional area delineation, plant and wildlife identification, groundwater modeling, stream assessment, plant community mapping, and environmental document preparation.

Mr. Allen is a Senior Scientist with four years of experience in the environmental field. He holds a bachelor's degree in Environmental Science from the University of Florida and a master's degree in Environmental Engineering from the State University of New York College of Environmental Science and Forestry. Mr. Allen's graduate research focused on the improvement of stochastic techniques for predicting low streamflows. Professional expertise includes statistical analysis, computer modeling, stream and wetland delineation, habitat assessment, and environmental document preparation.

Mr. Weeks is a Project Scientist with eight years of experience in the environmental field. He earned a bachelor of science in biology from Appalachian State University and a master of science in zoology from North Carolina State University. Professional expertise includes ecological relationships, plant and wildlife identification, protected species surveys, wetland and jurisdictional area delineations, and environmental document preparation.

Mr. Davis is a Senior Scientist with five years of experience in the environmental field. He holds a bachelor's degree in environmental science with a concentration in ecology from North Carolina State University. He is proficient in the identification of eastern woody tree and shrub species and in the identification of southeastern wetland flora. Professional expertise includes jurisdictional area delineation, benthic macroinvertebrate sampling, community mapping, and environmental document preparation.

Ms. Saunders is a Project Scientist and holds a bachelor of science in natural resources (ecosystem assessment) from North Carolina State University. She has conducted field research for forest health assessments, habitat suitability indices for various wildlife species, and watershed and wetland delineation. She is proficient in the identification of eastern woody tree and shrub species and in the identification of southeastern wetland flora. Professional expertise includes stream and wetland delineation, habitat assessment, and environmental document preparation.

1.5 Definitions

Definitions for terms used in this report are as follows. The **Project Study Area** describes an area of varying width surrounding SC 41 for approximately 1.5 miles and extending along Clements Ferry Road for 1,650 feet. The project study area encompasses approximately 73 acres (Figure 2). The **Construction Limits** describes a subset of the project study area that is an estimation of the area that may be affected by the project. The construction limits are in three sections, defined by proposed cut-fill limits, and encompass approximately 16.9 acres (Figures 4A-4C). The **Project Vicinity** describes an area extending 0.5 mile on all sides of the project study area, encompassing approximately 2.6 square miles. The **Project Region** is equivalent to an area represented by a 7.5-minute USGS topographic quadrangle map with the project occupying the central position, an area of approximately 61 square miles.

2.0 PHYSICAL RESOURCES

2.1 Physiography, Topography, and Land Use

The project study area is situated in the Floodplains and Low Terraces sub region within the Southern Coastal Plain ecoregion within South Carolina. This sub region consists of low-elevation, often wet soils composed of stream alluvium and terrace deposits of sand, silt, clay, and gravel, along with some organic muck and swamp deposits. The region includes large sluggish rivers and backwaters with ponds, swamps, and oxbow lakes. River swamps of cypress and tupelo and oak-dominated hardwood forests comprise a large portion of the natural vegetation (Griffith et al. 2002).

Elevations within the project study area range from a low of approximately 5 feet above sea level near the Wando River channel and other drainages (especially at the southern end of the project study area), to 15 feet at the northern end of the project study area, as land elevations slowly rise north of the Wando River (Cainhoy, SC 7.5-minute quadrangle). Land use within the project vicinity is characterized by low density residential development, scattered industrial development including marina and shipyard operations, sand mining, and storage facilities, and by pine- and oak-dominated forests. The project study area includes areas dominated by maintained highway rights-of-way and disturbed plant communities, with less developed and disturbed communities along the corridor edges (Figure 2).

2.2 Geology and Soils

According to the Berkeley County soil survey (SCS 1980), the project vicinity consists of broad areas of nearly level to gently sloping soils subject to frequent flooding. The soils are poorly drained and have a loamy surface and clayey subsoil. The project study area extends through 7 mapped soil series as well as approximately 1.4 acres designated as tidal marsh (SCS 1971, 1980) (Figure 3). Soil characteristics are listed in Table 1 and described in detail below.

Table 1: Project Study Area Soils

Map Unit Symbol	Series and Phase	Percentage of Project Study Area	Acres	Hydric Status*	Taxonomy
CP	Capers association	4	3.2	Hydric A	Typic Sulfaquents
GoA	Goldsboro loamy sand	20	14.3	Hydric B	Aquic Paleudults
HoA	Hockley loamy fine sand	1	0.4	Hydric B	Plinthic Paleudalfs
Ly	Lynchburg fine sandy loam	30	21.7	Hydric B	Aeric Paleaquults
Mg	Meggett loam	4	3.0	Hydric A	Typic Albaqualfs
Ts	Tidal marsh	2	1.4	--	--
Wt	Witherbee fine sand	0.08	0.06	Hydric B	Entic Haplaquods
Yo	Yonges loamy fine sand	19	13.9	Hydric A	Typic Endoaqualfs
--	open water	20	14.7	--	--
TOTAL		100	72.79		

* Hydric Status:

Hydric Class A = Soils considered hydric in Charleston or Berkeley Counties.

Hydric Class B = Non-hydric soils that may contain hydric inclusions.

Upland Soils = Not classified as hydric in Charleston or Berkeley Counties.

Capers association soils (*Typic Sulfaquents*) consist of deep, very slowly permeable, very poorly drained soils on nearly level tidal flats that extend inland along the Wando and Cooper Rivers. They formed in clayey marine sediments on level tidal flats. Surface runoff is ponded, and the seasonal high water table ranges from 1 foot above the soil surface to 1 foot below the surface. Capers association soils are considered hydric in Berkeley County. Within the project study area, approximately 3.2 acres of Capers association soils occur north of the Wando River in low areas and sloughs near the river channel.

Goldsboro loamy sand (*Aquic Paleudults*) is a nearly level, deep, and moderately well drained series that formed on broad flats in loamy Coastal Plain sediment. Permeability is moderate, and surface runoff is slow. Depth to the seasonal high water table ranges from 18 to 30 inches below the soil surface. Although Goldsboro soils are considered non-hydric in Berkeley County, they may contain hydric inclusions in depressions. Within the project study area, approximately 14.3 acres of Goldsboro soils occur north of the Wando River in low to gently sloping areas.

The Hockley loamy fine sand series (*Plinthic Paleudalfs*) consists of very deep, well drained, moderately permeable soils that formed in loamy sediments. These nearly level to gently sloping soils are on uplands. Surface runoff is negligible. Hockley soils are considered non-hydric in Charleston County, but may contain hydric inclusions of Yonges, Meggett, or Stono soils in low lying areas. A small area (0.4 acre) of Hockley loamy fine sand occurs south of the Wando River on a gently sloping bank.

Lynchburg fine sandy loam (*Aeric Paleaquults*) are nearly level, deep, and somewhat poorly drained. They formed in loamy Coastal Plain sediment and occur on marine terraces and flats. Permeability is moderate, surface runoff is slow, and depth to the seasonal high water table is 6 to 18 inches. Lynchburg soils are considered non-hydric in Berkeley County, but may contain hydric inclusions of Rains soils in low lying areas. Large areas (21.7 acres) of Lynchburg soils occur on the gently sloping northern end of the project study area.

Meggett loam (*Typic Albaqualfs*) are nearly level, deep, and poorly drained. They formed in clayey Coastal Plain sediment and occur in low, flat areas. Permeability is slow, surface runoff is very slow, and depth to the seasonal high water table is 0 to 12 inches. Meggett loam is considered hydric in Berkeley County. Approximately 3.0 acres of Meggett loam occurs along a slough that traverses the project study area near the SC 41 – Clements Ferry Road split.

The Witherbee fine sand series (*Entic Haplaquods*) consists of very deep, somewhat poorly drained, rapidly permeable soils that formed in sandy marine sediments. They are typically found on interstream divides and flats. Witherbee sand exhibits slow runoff. The seasonal high water table ranges from 1 to 2 feet below the soil surface. Witherbee fine sand is considered non-hydric in Berkeley county, but may contain hydric inclusions of Leon, Pamlico, or Pinckney soils in low lying areas. A vary small area (0.06 acre) of this series occurs on the northwestern tip of the project study area, along Clements Ferry Road, and extends in to the sloping uplands northward.

Yonges loamy fine sand (*Typic Endoaqualfs*) consists of very deep, poorly drained, moderately slowly permeable soils that formed in thick loamy sediments on the lower Coastal Plain. These soils occur on nearly level areas of the lower Coastal Plains from 5 to 25 feet above sea level. Surface runoff is very slow, and the seasonal high water table is within 10 inches of the soil surface. Yonges loamy fine sand is considered hydric in Charleston County. This series occurs on approximately 13.9 acres south of the Wando river along SC 41 and other higher-elevation areas.

2.3 Water Resources

The Santee River Basin incorporates 11 watersheds and some 1,280 square miles within the State of South Carolina (SCDHEC 2005). The project study area lies within the Ashley River/Cooper River Basin (USGS Hydrologic Unit 03050201), within subbasin 080. Watershed 03050201-080 extends through Berkeley and Charleston Counties and consists primarily of the Wando River and its tributaries (SCDHEC 2005). The project study area includes portions of the Wando River and associated drainages and wetlands.

2.3.1 Stream Characteristics

Project study area streams are depicted on Figures 4A-4C and summarized in Table 2. Rivers and streams within the project study area are considered riverine systems, as defined by Cowardin et al. (1979). A detailed description of each stream is provided below. Stream classifications are defined based on guidelines provided by Cowardin et al. (1979).

Table 2: Stream Characteristics

System	Name	Cowardin Classification	Drainage Area ¹ (square miles)	On Quad ²	On Soil Survey ³	Avg. Width (feet)	Length Within Project Study Area (feet)	Length Within Construction Limits (feet)
Stream 1	UT to Wando River	R2UB1	0.1	No	No	4	125	0
Stream 2	UT to Stream 3	R4SB4	0.01	No	No	2.5	219	0
Stream 3	UT to Wando River	R2UB2	0.07	No	Yes	4.5	119	0

System	Name	Cowardin Classification	Drainage Area ¹ (square miles)	On Quad ²	On Soil Survey ³	Avg. Width (feet)	Length Within Project Study Area (feet)	Length Within Construction Limits (feet)
Stream 4	UT to Wando River	R2UB1/2	0.05	No	Yes	3	55	0
Wando River	Wando River	E1UBL	59	Yes	Yes	1695	300	0
						TOTAL	818	0

¹ Drainage areas given are bounded by the downstream edge of the project study area.

² Stream represented on the USGS 7.5-minute topographic quadrangle (Cainhoy, SC quadrangle) (see Figure 1)

³ Stream represented on the Charleston County or Berkeley County SCS soil survey (see Figure 3a)

Stream 1

This perennial stream flows west out of the project study area at the western terminus of the project study area, draining southward to the Wando River (Figure 4A). At the time of the field visit, water depth ranged between 2 and 6 inches and the stream had a moderate flow over a substrate of sand, gravel, and cobble. The stream is moderately straight and water clarity was moderate at the time of the field visit. The stream is approximately 4 feet wide and the banks are approximately 3 feet high. Riparian vegetation includes wax myrtle, black willow, and red maple. This stream may be classified as a riverine, lower perennial system with an unconsolidated bottom of cobble and gravel (R2UB1) (Cowardin et al. 1979).

Stream 2

This intermittent stream flows east out of the project study area at its eastern terminus (Figure 4A). Stream 2 flows into Stream 3 southeast of the project study area. At the time of the field visit, water depth ranged between 6 and 12 inches and the stream had a low flow over a substrate of sand and silt. The stream has been channelized and water clarity was moderate at the time of the field visit. The stream is approximately 2 to 3 feet wide and the banks are approximately 1 to 2 feet high. Riparian vegetation includes loblolly pine, water oak, red maple, and sweetgum. This stream may be classified as a riverine, intermittent streambed system with a substrate of sand and mud (R4SB4) (Cowardin et al. 1979).

Stream 3

This perennial stream flows east out of the project study area, originating at the eastern edge of SC 41 (Figures 4A and 4B). Both Stream 3 and Stream 2 originate at culverts under SC 41. At the time of the field visit, water depth ranged between 1 and 2 feet and the stream had a moderate flow over a substrate of sand and pebble. The stream is moderately straight and water clarity was moderate at the time of the field visit. The stream is approximately 4 to 5 feet wide and the banks are approximately 2 feet high. Riparian vegetation includes live oak, loblolly pine, and palmetto. This stream may be classified as a riverine, lower perennial system with an unconsolidated bottom of sand (R2UB2) (Cowardin et al. 1979).

Stream 4

This perennial stream flows parallel to SC 41 on the southwest side of the Wando River Bridge for approximately 55 feet before exiting into salt marsh (Figure 4B). At the time of the field visit, water depth ranged between 0 and 6 inches and the stream had slow flow over a substrate of sand and gravel. The stream is straight, serving as a roadside depression, and water clarity was moderate at the time of the field visit. The stream is approximately 3 feet wide and the

banks are approximately 2.5 feet high. Riparian vegetation includes wax myrtle, groundsel-tree, and loblolly pine. This stream may be classified as a riverine, lower perennial system with an unconsolidated bottom of gravel and sand (R2UB1/2) (Cowardin et al. 1979).

Wando River

NWI mapping indicates, and field investigations confirm, that within the project study area, the Wando River (Figures 4B and 4C) may be classified as an estuarine, sub-tidal system with an unconsolidated bottom that has a sub-tidal water regime (E1UBL) (Cowardin et al. 1979).

2.3.2 Water Quality Classifications

All stream reaches contained within the project study area have been classified as SFH (SCDHEC 2005). Class SFH, or Shellfish Harvesting Waters are tidal saltwaters protected for shellfish harvesting and uses listed in Class SA and Class SB. Class SA and SB waters are suitable for primary and secondary contact recreation, crabbing, and fishing, and for the survival and propagation of a balanced indigenous aquatic community of marine fauna and flora. However, SCDHEC may designate prohibited areas where shellfish harvesting for market purposes or human consumption shall not be allowed (SCDHEC 2004).

A shellfish monitoring station (09B-03) and an ambient water quality monitoring site (MD-115) are located on the Wando River at the SC 41 bridge. At this site, aquatic life uses are impaired due to copper contamination (SCDHEC 2006). Station 09B-17, approximately 0.8 mile upstream of the project study area, has been listed as impaired in shellfish due to fecal coliform bacteria (SCDHEC 2006). The reach of the Wando River included in the project study area has been listed as impaired on the SCDHEC (2006) 303(d) list (SCDHEC 2006).

One NPDES discharger is located near the project study area: Detyens Shipyards (at the Wando River Bridge) is permitted to discharge 0.025 million gallons of effluent per day (NPDES number SC0033022) (SCDHEC 2005).

No designated Outstanding National Resource Waters or Trout Waters occur within subbasin 03050201-080 (SCDHEC 2005).

2.4 Anticipated Impacts to Water Resources

Impacts to water resources in the project study area are not likely to result from activities associated with project construction. Direct impacts as a result of project construction would be limited to the area within the construction limits. No direct stream impacts are anticipated as a result of project construction. Activities that would result in indirect impacts are clearing and grubbing near streambanks, riparian canopy removal, construction near streams, sediment flowing into streams, and fertilizers and pesticides used in revegetation. The following impacts to surface water resources could result from the construction activities mentioned above.

- Increased sedimentation and siltation downstream of road crossings and increased erosion in the project study area.
- Alteration of stream discharge due to silt loading and changes in surface and groundwater drainage patterns.

- Changes in light incidence and water clarity due to increased sedimentation and vegetation removal.
- Changes in and destabilization of water temperature due to vegetation removal.
- Alteration of water levels and flows due to interruptions and/or additions to surface and ground water flow from construction.
- Increased nutrient loading during construction via runoff from exposed areas.
- Increased concentrations of toxic compounds in roadway runoff.
- Increased potential for release of toxic compounds such as fuel and oil from construction equipment and other vehicles.

Impacts to stream reaches adjacent to the facility footprint will be temporary and localized during construction. Temporary construction impacts due to erosion and sedimentation will be minimized through implementation of a stringent erosion-control schedule and the use of Best Management Practices (BMPs). Long-term impacts to adjacent reaches resulting from construction are expected to be negligible.

3.0 BIOTIC RESOURCES

3.1 Terrestrial Communities

The project study area is located in a region of low-density residential, industrial, and forested land use. Impervious surfaces such as road pavement, driveways, and building footprints occupy approximately 14 percent (8.9 acres) of the 73-acre project study area. Open waters of the Wando River occupy another 12.6 acres (19 percent). Within the remainder of project study area, five classifications of plant communities are recognized. In order of their predominance within the project study area, they are disturbed land (24.7 acres), Maritime Forest (10.2 acres), Salt Shrub Thicket (5.0 acres), Brackish Marsh (1.9 acres), and Bottomland Hardwoods (1.6 acres).

Plant communities and associated wildlife are described briefly below. Wildlife directly observed in a plant community or determined to be present through evidence (tracks, scat) during field investigations are indicated with an asterisk (*).

Disturbed land – Due to the project study area’s location along a highway corridor, various types of disturbed land constitute the dominant land use. Disturbed land occupies the edges of SC 41, utility easements, and commercial and residential clearings. Paved surfaces and building footprints are included within this category. A large area occurs at the junction of SC 41 and Clements Ferry Road, where one or more buildings have been recently removed. Habitats for plant communities are sometimes harsh and intensively maintained, and the low diversity of woody plant species reflects this fact. Stunted or isolated specimens of hardy species such as tulip poplar (*Liriodendron tulipifera*), loblolly pine (*Pinus taeda*), sweetgum (*Liquidambar styraciflua*), and eastern red cedar (*Juniperus virginiana*) occur within the disturbed communities. Shrub and vine species include exotics such as bush clover (*Lespedeza bicolor*), glossy privet (*Ligustrum lucidum*), Chinese privet (*L. sinense*), Japanese honeysuckle (*Lonicera japonica*), Japanese climbing fern (*Lygodium japonicum*), multiflora rose (*Rosa multiflora*), and tallow tree (*Sapium sebiferum*). Blackberries and dewberries (*Rubus* spp.), wax myrtle (*Morella*

cerifera), greenbrier (*Smilax rotundifolia*), and poison ivy (*Toxicodendron radicans*) complete the list of woody species commonly found in the disturbed communities. Due to periodic maintenance, disturbed land is dominated by herbaceous species such as wild onion (*Allium canadense*), pasture thistle (*Carduus pumilus*), bull thistle (*Cirsium vulgare*), dog fennel (*Eupatorium capillifolium*), morning glory (*Ipomoea* sp.), plantain (*Plantago* sp.), lyre-leaved sage (*Salvia lyrata*), butterweed (*Senecio glabellus*), goldenrod (*Solidago* sp.), common dandelion (*Taraxacum officinale*), white clover (*Trifolium repens*), vervain (*Verbena* sp.), and vetch (*Vicia* sp.). Planted and volunteer grasses include fescue (*Festuca* sp.), ryegrass (*Lolium* sp.), broomsedge (*Andropogon virginicus*), bamboo grass (*Dichanthelium scoparium*), and panic grass (*Panicum* sp.).

Faunal elements are expected to include adaptable, opportunistic species that may find food resources near human habitations and commercial establishments. These opportunists might include raccoon* (*Procyon lotor*), Norway rat (*Rattus norvegicus*), house mouse (*Mus musculus*), European starling (*Sturnus vulgaris*), fish crow* (*Corvus ossifragus*), ruby-throated hummingbird (*Archilochus colubris*), and house sparrow (*Passer domesticus*). The barn swallow (*Hirundo rustica*) and purple martin (*Progne subis*) commonly utilize human-provided habitations and also feed on flying insects in nearby fields. Species that find optimal foraging conditions in open, grassy areas, whether in disturbed or natural habitats, include American kestrel (*Falco sparverius*), American robin (*Turdus migratorius*), eastern meadowlark (*Sturnella magna*), Canada goose* (*Branta canadensis*), cattle egret (*Bubulcus ibis*), eastern bluebird (*Sialia sialis*), killdeer (*Charadrius vociferus*), mourning dove* (*Zenaida macroura*), red-tailed hawk (*Buteo jamaicensis*), turkey vulture* (*Cathartes aura*), and red bat (*Lasiurus borealis*). Small mammals such as eastern mole (*Scalopus aquaticus*), eastern harvest mouse (*Reithrodontomys humulis*), and hispid cotton rat (*Sigmodon hispidus*), and reptiles such as slender grass lizard (*Ophisaurus attenuatus*) can find both food and cover in grasslands and herbaceous fields. The American woodcock (*Scolopax minor*) performs mating displays in open fields adjacent to the moist bottomlands where it forages for earthworms.

Maritime Forest – This community occurs near the Wando River, usually buffered from open water by Salt Shrub Thicket. It grades into Bottomland Hardwoods in the northern portion of the project study area, as distance from the influence of salt water increases. The canopy of this plant community is dominated by evergreen and near-evergreen species such as loblolly pine, laurel oak (*Quercus laurifolia*), water oak (*Q. nigra*), live oak (*Q. virginiana*), sand live oak (*Q. geminata*) and southern magnolia (*Magnolia grandiflora*), but also includes other species adapted to the characteristic sandy, droughty soil such as post oak (*Q. stellata*). The subcanopy and shrub layer also hosts evergreen species such as eastern red cedar, yaupon holly (*Ilex vomitoria*), wax myrtle, red bay (*Persea borbonia*), palmetto (*Sabal palmetto*) and dwarf palmetto (*Sabal minor*). Other shrubs include groundsel bush (*Baccharis halimifolia*), sweet bay (*Magnolia virginiana*), and marsh elder (*Iva frutescens*). Typical vines include poison ivy, greenbrier, and cross vine (*Bignonia capreolata*). Herbs at the lowland edges of maritime forest, bordering Brackish Marsh, are represented by salt-tolerant species such as sea oxeye (*Borrchia frutescens*), marsh pennywort (*Hydrocotyle umbellata*), and black needlerush (*Juncus roemerianus*). Farther away from the marsh, herbs include bushy broomsedge (*Andropogon glomeratus*), soft rush (*J. effusus*), cinnamon fern (*Osmunda cinnamomea*), and meadow beauty (*Rhexia* sp.).

Faunal species that may find food and cover in Maritime Forest include habitat generalists, such as southern flying squirrel (*Glaucomys volans*), white-tailed deer* (*Odocoileus virginianus*), and red-bellied woodpecker (*Melanerpes carolinus*), which benefit from the oak mast that is plentiful in these forests. The golden mouse (*Ochrotomys nuttalli*) nests in thickets and vine-draped trees and shrubs, and the eastern woodrat (*Neotoma floridana*) utilizes the forest and may enter adjacent buildings. The gray fox (*Urocyon cinereoargenteus*) preys largely on these rodent species. The chuck-will's widow (*Caprimulgus carolinensis*) and squirrel treefrog (*Hyla squirella*) inhabit open forests, including Maritime Forests. Other species that are more adaptable in their habitat preferences include Carolina chickadee (*Poecile carolinensis*), oak toad (*Bufo quercicus*), ground skink (*Scincella lateralis*), and black racer (*Coluber constrictor*). Species specializing in pine forests find resources for food, nesting, cover, and roosting in these habitats and include brown-headed nuthatch (*Sitta pusilla*) and pine warbler (*Dendroica pinus*), which glean pine seeds and insects from pine bark and branches, and southeastern crowned snake (*Tantilla coronata*), and pine snake (*Pituophis melanoleucus*), which find cover in fallen needles and debris.

Salt Shrub Thicket – This plant community occurs at the outer edges of Maritime Forest habitats, and also borders the forest at the edges of highways and other clearings. The absence of canopy trees is due to fire and wind influences, or, in some cases, sporadic mowing or bush-hogging. The presence of salt and the sandy, droughty soils typical of this habitat are important influences in floral species composition. Salt shrub thicket is composed of a number of salt-tolerant species as well as those which are adapted to drought through leathery or waxy leaves that retard water loss. Like the Maritime Forest, which contains many of the same species, this habitat contains many evergreen or near-evergreen species including greenbrier, eastern red cedar, wax myrtle, palmetto and dwarf palmetto, and groundsel bush. Salt Shrub Thicket also shares many herbaceous species with Maritime Forest, including marsh elder, bushy broomsedge, sea oxeye, soft rush, and black needlerush, but also includes sedges (*Carex* spp.), spikerushes (*Eleocharis* spp.), plume grass (*Erianthus* sp.), and seedbox (*Ludwigia alternifolia*).

Many bird species are especially well-adapted to shrubby habitats. These include blue jay (*Cyanocitta cristata*) and northern cardinal (*Cardinalis cardinalis*), familiar in suburban yards, downy woodpecker (*Picoides pubescens*), which forages on smaller branches and even herb stems, and gray catbird* (*Dumetella carolinensis*) and white-eyed vireo (*Vireo griseus*), which nest in the dense cover afforded by shrub thickets. The white-throated sparrow (*Zonotrichia albicollis*) is one of many sparrow species that prefer shrubby areas for foraging and cover. The common yellowthroat (*Geothlypis trichas*) nests in shrub thickets near open water, and the yellow-rumped warbler (*Dendroica coronata*) feeds avidly on wax myrtle berries. The eastern cottontail (*Sylvilagus floridanus*) also finds cover in thickets and briers, and the red fox (*Vulpes vulpes*) and long-tailed weasel (*Mustela frenata*) prey on the rabbits, birds, herptiles, and rodents inhabiting Salt Shrub Thickets. The southern leopard frog (*Rana utricularia*) and eastern mud turtle (*Kinosternon subrubrum*) may inhabit ditches within shrubby areas. The eastern mud turtle is adapted to brackish water that may inundate ditches adjacent to Brackish Marsh. Other, more generalist herptile species include southern toad (*Bufo terrestris*) and southern cricket frog (*Acris gryllus*).

Brackish Marsh – This habitat occurs in approximately 1.9 acres of the project study area, along the edges of the Wando River, along the causeway south of the bridge, and in two sloughs crossed by SC 41. This plant community lacks canopy trees but contains a few shrubs, at the upper edges, including wax myrtle, marsh elder, and groundsel bush. At slightly higher elevations in the marsh, vegetation consists of a near-monoculture of black needlerush. At lower elevations, and grading to open water, are marsh hay (*Spartina patens*) and smooth cordgrass (*Spartina alterniflora*). A few other plants may be represented in low numbers, including bushy broomsedge, sea oxeye, marsh pennywort, and yellow-eyed grass (*Xyris* sp.).

Brackish Marsh supports a suite of specialized faunal species including mammals such as marsh rabbit (*Sylvilagus palustris*), marsh rice rat (*Oryzomys palustris*), and southern short-tailed shrew (*Blarina carolinensis*), which build and utilize runways through the grasses and rushes of the marsh; and mink (*Mustela vison*), which hunts small mammals and birds in aquatic habitats. Birds include marsh wren (*Cistothorus palustris*), boat-tailed grackle* (*Quiscalus major*), and red-winged blackbird (*Agelaius phoeniceus*), which weave nests in marsh grass; and great blue heron* (*Ardea herodias*), great egret* (*Casmerodius albus*), yellow-crowned night-heron (*Nyctanassa violacea*), American bittern (*Botaurus lentiginosus*), white ibis (*Eudocimus albus*), clapper rail (*Rallus longirostris*), and sora (*Porzana carolina*) which stalk aquatic prey in the shallows. The osprey (*Pandion haliaetus*), laughing gull (*Larus atricilla*), common tern (*Sterna hirundo*), and black skimmer (*Rynchops niger*) are aerial predators that utilize aquatic prey resources. Birds that swim and dive for prey include pied-billed grebe (*Podilymbus podiceps*), double-crested cormorant (*Phalacrocorax auritus*), bufflehead (*Bucephala albeola*), and hooded merganser (*Lophodytes cucullatus*), while the American wigeon (*Anas americana*) dives for the aquatic plants on which it feeds. The rainbow snake (*Farancia erytrogramma*) is a semi-aquatic reptile which is known to inhabit brackish waters, and the diamondback terrapin (*Malaclemys terrapin*) extends its range into salt waters. Finally, the open habitat of the marsh provides ideal hunting conditions for barn owl (*Tyto alba*) and short-eared owl (*Asio flammeus*).

Bottomland Hardwoods – This habitat is the least common within the project study area, occupying approximately 1.6 acres within the northern, upland reaches of the project study area. Characteristic vegetative species in this plant community might be found in a variety of inland forested habitats. Canopy tree species include loblolly pine and a variety of oaks including white oak (*Quercus alba*), laurel oak, water oak, cherrybark oak (*Q. pagoda*), and occasionally live oak. American beech (*Fagus grandifolia*) is typical of mesic habitats, while sweetgum and red maple (*Acer rubrum*) can thrive in a variety of moisture conditions. Shrubs do not form a diverse forest layer, as canopy closure in this community type is well-developed. Shrubs and subcanopy trees occur mainly in gaps and may include sweet bay, black willow (*Salix nigra*), elderberry (*Sambucus canadensis*), Chinese privet, deerberry (*Vaccinium stamineum*), and giant cane (*Arundinaria gigantea*). Vines are more diverse, finding substrate on trees and shrubs at edges, gaps, and in the forest interior. They include rattan vine (*Berchemia scandens*), Carolina jessamine (*Gelsemium sempervirens*), greenbrier, poison ivy, and muscadine (*Vitis rotundifolia*). Herbs are restricted to sunny areas, and include cranesbill (*Geranium carolinianum*), sedges, bamboo grass, Japanese stilt grass (*Microstegium vimineum*), cinnamon fern, butterweed, and sphagnum moss (*Sphagnum* sp.).

Faunal diversity is high in Bottomland Hardwoods, as many animals find abundant food and cover resources in forested areas. Some animals that are particularly well adapted to moist forests and bottomlands are star-nosed mole (*Condylura cristata*), which burrows in soft moist earth and is a capable swimmer, Mississippi kite (*Ictinia mississippiensis*), which nests in bottomland forests and forages in nearby fields for insects, red-shouldered hawk (*Buteo lineatus*), which is an adept flier within the confines of the forest, northern parula (*Parula americana*), which nests along stream margins, and northern water snake (*Nerodia sipedon*), which ventures into fresh to brackish waters. Other likely moist forest inhabitants are southeastern shrew (*Sorex longirostris*), cotton mouse (*Peromyscus gossypinus*), blue-gray gnatcatcher (*Polioptila caerulea*), and copperhead (*Agkistrodon contortrix*). Faunal elements that use both upland and bottomland forests include evening bat (*Nycticeius humeralis*), which roosts in tree snags and under bark, wild pig (*Sus scrofa*), which feeds on roots, acorns, and fruit, white-breasted nuthatch (*Sitta carolinensis*) and Carolina wren (*Thryothorus ludovicianus*), which both use tree cavities for nesting, the secretive bobcat (*Felis rufus*), turkey (*Meleagris gallopavo*), woodland vole (*Microtus pinetorum*), and gray treefrog (*Hyla versicolor*). Animals that are adapted to edge habitats would also spend parts of their life cycles in the forest. These include gray squirrel (*Sciurus carolinensis*), Carolina anole (*Anolis carolinensis*), southeastern five-lined skink (*Eumeces inexpectatus*), and eastern kingsnake (*Lampropeltis getulus*), all of which may occur in disturbed habitats.

3.2 Aquatic Communities

Streams within the project study area include the large Wando River system and unnamed drainages associated with bottomlands and swamps draining into the Wando River. Aquatic habitats also include larger ditches that flow between streams or wetlands. The small stream drainages and ditches can be expected to support a largely distinct aquatic community from those inhabiting the Wando River, due to waterbody size, flow, substrate, and salinity differences.

Fish species that may occur in open waters of the Wando River within the project region include species that are largely freshwater inhabitants but which also occur in brackish or salt waters. Some of these are sea lamprey (*Petromyzon marinus*), American eel (*Anguilla rostrata*), hickory shad (*Alosa mediocris*), white catfish (*Ameiurus catus*), sailfin molly (*Poecilia latipinna*), inland silverside (*Menidia beryllina*), striped bass (*Morone saxatilis*), and warmouth (*Lepomis gulosus*). Many warm-temperate saltwater species are likely to occur in the Wando River at some stage in their life cycles and include such well-known gamefish as cobia (*Rachycentron canadum*), spottail bass (*Sciaenops ocellatus*), summer flounder (*Paralichthys dentatus*), bluefish (*Pomatomus saltatrix*), spotted seatrout (*Cynoscion nebulosus*), and jack crevalle (*Caranx hippos*).

Fishes inhabiting smaller streams or ditches, where flow is slower and vegetated edges and debris provide a greater proportion of cover, include bowfin (*Amia calva*), yellow bullhead (*Ameiurus natalis*), chain pickerel (*Esox niger*), pirate perch (*Aphredoderus sayanus*), blackbanded sunfish (*Enneacanthus chaetodon*), dollar sunfish (*Lepomis marginatus*), white crappie (*Pomoxis annularis*), banded pygmy sunfish (*Elassoma zonatum*), and yellow perch

(*Perca flavescens*). Sloughs, and guts with warm, still waters and abundant cover might harbor longnose gar (*Lepisosteus osseus*), gizzard shad (*Dorosoma cepedianum*), grass carp (*Ctenopharyngodon idella*), redbfin pickerel (*Esox americanus*), eastern mudminnow (*Umbra pygmaea*), swampfish (*Chologaster cornuta*), lined topminnow (*Fundulus lineolatus*), eastern mosquitofish* (*Gambusia holbrooki*), flier (*Centrarchus macropterus*), and swamp darter (*Etheostoma fusiforme*).

3.3 Rare and Unique Natural Areas

According to SCHTP records, no South Carolina Heritage Preserves are located within 5 miles of the project study area. No water bodies are deserving of special attention as denoted under the federal Wild and Scenic Rivers Act of 1968 (Pub. L. No. 90-542, 82 Stat. 906; codified and amended at 16 U.S.C. 1217-1287 (1982)) or under the Natural and Scenic Rivers Act of 1971 (G.S. 113A-30). If road construction is limited to the highway right-of-way, no adverse impacts are anticipated.

3.4 Summary of Anticipated Impacts

3.4.1 Anticipated Plant Community Impacts

Potential impacts to plant communities resulting from bridge construction reflect the relative abundance of communities within the project study area. Much of the project study area is within highway rights-of-way and, therefore, disturbed land comprises the majority of mapped plant community acreage (Table 3). Impacts to plant communities are expected to be limited to cut-fill boundaries within the right-of-way limits. Since this project involves improvements to existing roadways, no fragmentation of plant communities is expected.

Table 3: Plant communities present within the project study area

Type	Acres within Project Study Area	Percentage	Acres Within Cut-Fill Limits
disturbed land	24.7	38.1	8.4
Maritime Forest	10.2	15.7	2.7
Salt Shrub Thicket	5.0	7.8	1.5
Brackish Marsh	1.9	2.9	0.5
Bottomland Hardwoods	1.6	2.4	0.2
Wando River	12.6	19.4	0.005
impervious surfaces	8.9	13.7	3.2
TOTALS	64.9	100	16.505

3.4.2 Anticipated Impacts to Wildlife

Fragmentation and loss of wildlife habitat is an unavoidable consequence of highway development. However, the proposed project is not expected to result in adverse impacts to wildlife due to the existing developed nature of the project study area. Short-term displacement of local wildlife populations will occur during initial construction. Most local species are

habituated to anthropogenic disturbances and are expected to move back into the vicinity of the construction area upon project completion.

4.0 JURISDICTIONAL TOPICS

4.1 Waters of the United States

Section 404 of the Clean Water Act (CWA) requires regulation of discharge into "waters of the United States." Although the principal administrative agency of the CWA is the U.S. Environmental Protection Agency, the USACE has major responsibility for implementation, permitting, and enforcement of provisions of the CWA. The USACE regulatory program is defined in 33 CFR parts 320-330.

Water bodies such as rivers, lakes, and streams are subject to jurisdictional consideration under the Section 404 program. However, by regulation, wetlands are also considered "waters of the United States." Wetlands are described by (33 CFR 328.3(b) [1986]) as:

Those areas that are inundated or saturated by groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas.

Wetlands are defined by the presence of three criteria: hydrophytic vegetation, hydric soils, and evidence of wetland hydrology during the growing season (Environmental Laboratory 1987). Open water systems and wetlands receive similar treatment and consideration with respect to Section 404 review.

Jurisdictional areas within the project study area were delineated and located using Global Positioning System (GPS) technology during the period of March 9-11 and 15-17, 2005. The delineation was reviewed by the USACE Charleston District and by SCDHEC-OCRM for concurrence. The USACE verified the delineations on March 6, 2006, and SCDHEC-OCRM verified them on March 16, 2006 (Appendix D). The locations of jurisdictional areas within the project study area are indicated in Figures 4A-4C. Characteristics of stream systems are shown in Table 2 (Section 2.3.1). Characteristics of vegetated wetlands are given below in Table 4. USACE Routine Wetland Determination Data Forms describing wetland characteristics are included in Appendix B.

Project study area wetlands are considered palustrine or estuarine systems, as defined by Cowardin et al. (1979). Palustrine systems occur in low depressions or in floodplains adjacent to streams and vary in plant community composition as a result of hydrology and/or level of disturbance. Estuarine systems comprise saltwater or brackish waters of the Wando River and adjacent marshes and drainages. Wetlands listed in Table 4 are often connected hydrologically, but have been separated into logical units where possible based on vegetation and landscape characteristics. Photographs of project study area wetlands are provided in Appendix C.

Table 4: Vegetated Wetlands within the Project Study Area and Construction Limits

Wetland Number	Freshwater / Saltwater	Cowardin Classification	Associated Stream	Acres within Project Study Area	Acres within Construction Limits
1	Freshwater	PFO1A/B	Stream 1	0.001	0
2	Freshwater	PEM1J	non-riverine	0.011	0.009
3	Freshwater	PEM1C	Stream 4	0.031	0.018
4	Freshwater	PEM1J	non-riverine	0.011	0.011
5	Freshwater	PEM1C	non-riverine	0.259	0.064
6	Freshwater	PEM1J	Stream 4	0.186	0.147
7	Freshwater	PEM1J	non-riverine	0.003	0.003
8	Freshwater	PEM1J	non-riverine	0.119	0.041
9	Freshwater	PSS1C	Stream 4	0.080	0.026
10	Freshwater	PEM1J	non-riverine	0.054	0.054
11	Freshwater	PEM1J	non-riverine	0.037	0
12	Freshwater	PEM1J	Stream 3	0.005	0
13	Freshwater	PEM1J	non-riverine	0.093	0
14	Freshwater	PEM1J	non-riverine	0.011	0
15	Freshwater	PEM1J	Stream 2	0.002	0
16	Freshwater	PEM1J	Stream 2	0.012	0
17	Freshwater	PFO4J	Stream 2	0.010	0
18	Freshwater	PFO4A	Stream 2	0.031	0
19	Freshwater	PFO4A	Stream 2	0.004	0
20	Freshwater	PFO4A	Stream 2	0.003	0
21	Freshwater	PFO4A	Stream 2	0	0
22	Freshwater	PEM1A	Stream 2	0.175	0
23	Freshwater	PEM1F/H	Stream 3	0.991	0.176
24	Freshwater	PFO4J, PFO6J	Stream 2	0.339	0
25	Freshwater	PEM1J	Stream 3	0.017	0.017
26	Freshwater	PEM1J	Stream 3	0.007	0.007
27	Freshwater	PEM1J	Stream 3	0.015	0.015
28	Freshwater	PFO6A	Stream 3	0.144	0
29	Saltwater	E2EM1N	Stream 3	0.028	0
30	Freshwater	PFO6A	Stream 3	0.749	0
31	Freshwater	PSS6A	Wando River	0	0
32	Freshwater	PEM1J	non-riverine	0.004	0
33	Freshwater	PEM1J	non-riverine	0.015	0
34	Freshwater	PEM1J	Stream 4	0.102	0.102
35	Freshwater	PEM1J	Stream 4	0.014	0
36	Freshwater	PEM1J	Stream 4	0.005	0.005
37	Saltwater	E2EM1N	Wando River	1.057	0.370
38	Saltwater	E2EM1N	Wando River	2.267	0
39	Freshwater	PFO4A	Wando River	0.109	0.044
40	Freshwater	PFO4A	Wando River	0.025	0.025
41	Saltwater	E2EM1N	Wando River	9.563	0
42	Freshwater	PEM1C	non-riverine	0	0.010
43	Freshwater	PEM1C	non-riverine	0.197	0.097
44	Freshwater	PEM1J	Wando River	0.538	0.347
45	Freshwater	PEM1J	Wando River	0.150	0.137

Wetland Number	Freshwater / Saltwater	Cowardin Classification	Associated Stream	Acres within Project Study Area	Acres within Construction Limits
46	Freshwater	PEM1C	Wando River	0.147	0.137
47	Saltwater	E2EM1N	Wando River	0.829	0.201
48	Freshwater	PEM1J	Wando River	0.070	0.011
49	Freshwater	PFO6A	Wando River	0	0
50	Freshwater	PFO3Y	Wando River	0.064	0.012
51	Saltwater	E2EM1N	Wando River	0.251	0.136
TOTALS				18.835	2.222

Freshwater Wetland 1

This freshwater wetland consists of a depressional area located in the floodplain of Stream 1 (Figure 4A and Photo 1). This wetland exhibits saturation to the soil surface, with free water occurring at a depth of one inch. Dominant vegetation consists of hydrophytic species such as wax myrtle, black willow, red maple, and sphagnum moss, with some encroachment of Japanese honeysuckle. This wetland may be classified as a palustrine, broad-leaved deciduous system that is temporarily flooded to saturated (PFO1A/B) (Cowardin et al. 1979).

Freshwater Wetlands 2, 4, 7, and 33

These freshwater wetlands exist as linear depressions adjacent to SC 41 north of the Wando River Bridge (Figures 4A and 4B and Photos 2, 4, 7, and 33). These wetlands are inundated, with water depths ranging from 0 to 4 inches. Soils are saturated to the surface and dominant vegetation species include rush, sedges, broadleaf cattail (*Typha latifolia*), wax myrtle, and groundsel-tree. These wetlands may be classified as palustrine, persistent emergent systems that are intermittently flooded or have temporary surface water (PEM1J) (Cowardin et al. 1979).

Freshwater Wetland 3

This freshwater wetland exists as a linear depression and lies parallel to and south of Clements Ferry Road with a short reach running perpendicular to Clements Ferry Road (Figure 4A and Photo 3). This wetland is inundated with water depth ranging between 0 and 6 inches. Soils are saturated to the surface and dominant vegetation species include rush, groundsel-tree, broomsedge, and blackberry. This wetland may be classified as a palustrine, persistent emergent system that is seasonally flooded or inundated (PEM1C) (Cowardin et al. 1979).

Freshwater Wetland 5

This freshwater wetland occurs on the north side of Clements Ferry Road (Figure 4A and Photo 5). This wetland is inundated with water depth ranging between 0 and 6 inches. Soils are saturated to the surface and dominant vegetation species include rush, black willow, sweetgum, broadleaf cattail, broomsedge, seedbox, and woolgrass (*Scirpus cyperinus*). This wetland may be classified as a palustrine, persistent emergent system that is seasonally flooded or inundated (PEM1C) (Cowardin et al. 1979).

Freshwater Wetland 6

This freshwater wetland lays parallel to and south of Clements Ferry Road (Figures 4A and 4B and Photo 6). This linear wetland is approximately 4 feet wide and is inundated, with water depth ranging between 0 and 5 inches. Soils are saturated to the surface and dominant

vegetation species include rush, sedge, wax myrtle, and groundsel-tree. This wetland may be classified as a palustrine, persistent emergent system that is intermittently flooded or has temporary surface water (PEM1J) (Cowardin et al. 1979).

Freshwater Wetland 8

This freshwater wetland occurs between Clements Ferry Road and SC 41 along the project study area boundary (Figure 4A and Photo 8). This wetland occurs as a scrub/shrub linear depression for approximately 75 feet. As it moves north and out of the project study area, vegetation is more representative of a maritime forest. This wetland is inundated in some areas with water depth ranging between 0 and 4 inches. Soils are saturated to the surface. Dominant vegetation species includes rush, wax myrtle, and loblolly pine. This wetland may be classified as a palustrine, persistent emergent system that is intermittently flooded or has temporary surface water (PEM1J), grading to a scrub shrub system (needle-leaved evergreen) that is saturated (PSS4B) (Cowardin et al. 1979).

Freshwater Wetland 9

This freshwater wetland occurs on the south side of Clements Ferry Road and extends out of the project study area (Figure 4A and Photo 9). Soils are saturated to the surface and standing water was found at 6 inches from the surface. Dominant vegetation species include woolgrass, broadleaf cattail, rush, giant cane, wax myrtle, loblolly pine, blackberry (*Rubus argutus*), laurel oak, sweetgum, and black willow. This wetland may be classified as a palustrine, scrub-shrub, broad-leaved deciduous system that is seasonally flooded or inundated (PSS1C) (Cowardin et al. 1979).

Freshwater Wetlands 10, 11, 12, and 14

These four small wetlands pockets are part of a complex located between SC 41 and Clements Ferry Road (Figure 4A and Photos 10, 11, 12, and 14). The area has been ditched, but small wet pockets remain. Vegetation has been mowed and consists of elderberry, soft rush (*Juncus effusus*), sedges (*Carex* spp.), dwarf primrose (*Ludwigia repens*), groundsel-tree, and greenbrier. These wetlands may be classified as palustrine, persistent emergent systems that are intermittently flooded or have temporary surface water (PEM1J) (Cowardin et al. 1979).

Freshwater Wetland 13

This isolated freshwater marsh is situated in the large open area between SC 41 and Clements Ferry Road (Figure 4A and Photo 13). This wetland is inundated, with water depth ranging between 0 and 3 inches. Soils are saturated to the surface and the dominant vegetative species is soft rush. This wetland may be classified as a palustrine, persistent emergent system that is intermittently flooded or has temporary surface water (PEM1J) (Cowardin et al. 1979).

Freshwater Wetland 15

This fresh freshwater wetland is a 4-foot wide, 2-foot deep linear ditch that parallels SC 41 (Figure 4A and Photo 15). The wetland originates at a culvert underlying a driveway and drains southward before entering another culvert that outlets to Freshwater Wetland 16. Hydrology is primarily derived from rainwater. At the time of field investigations, the northern portion of the wetland was saturated to the surface, while the portion near the southern terminus was inundated with 2 inches of water. Vegetation consists of rush, sedge, and cranesbill throughout,

with seedbox occurring in inundated areas. This wetland may be classified as a palustrine, persistent emergent system that is intermittently flooded or has temporary surface water (PEM1J) (Cowardin et al. 1979).

Freshwater Wetland 16

This freshwater wetland runs along the eastern side of SC 41 before curving to the southeast and paralleling the northern side of Tuxbury Farm Road (Figure 4A and Photo 16). The wetland originates at a culvert that conveys drainage from Freshwater Wetland 15. Hydrology is primarily derived from rainwater. The portion of the wetland that parallels SC 41 is a 4-foot wide, 2-foot deep linear ditch. This portion of the wetland was inundated with 4 inches of water. Vegetation consisting of rush, sedge, seedbox, and cranesbill was observed. As the wetland turns to the southeast and runs along Tuxbury Farm Road, the ditch becomes shallower and less defined. This portion of the wetland was not inundated, but rather saturated to the surface. Vegetation here includes groundsel-tree and wax myrtle as well as the species listed. This wetland may be classified as a palustrine, persistent emergent system that is intermittently flooded or has temporary surface water (PEM1J) (Cowardin et al. 1979).

Freshwater Wetland 17

This freshwater wetland is a 4-foot wide, 2-foot deep linear ditch that parallels the southern side of Tuxbury Farm Road (Figure 4A and Photo 17). The ditch conveys water southward to Freshwater Wetland 18. Hydrology is primarily derived from rainwater. At the time of field investigations, the wetland was inundated with 6 inches of water. Vegetation varied over the length of the wetland. The northernmost 70 feet of the wetland occurs in a maintained roadside shoulder. Vegetation here consists of blackberry, Japanese honeysuckle, giant cane, and groundsel-tree. This portion of the wetland may be classified as a palustrine, persistent emergent system that is temporarily flooded surface water (PEM1J) (Cowardin et al. 1979). The remainder of the wetland abruptly transitions to a forest consisting of loblolly pine, water oak (*Quercus nigra*), giant cane, and wax myrtle. The forested portion of the wetland may be classified as a palustrine, forested, needle-leaved evergreen, system that is intermittently flooded or has temporary surface water (PFO4J) (Cowardin et al. 1979).

Freshwater Wetland 18

This freshwater wetland is a depressional area located between SC 41 and Tuxbury Farm Road (Figure 4A and Photo 18). Hydrology is primarily derived from rainwater. Rainwater runoff is captured in Freshwater Wetland 17 and collects in Wetland 18. During field investigations, the water table was found to be 6 inches deep. Vegetation noted includes: red maple, loblolly pine, giant cane, Japanese honeysuckle, water oak, and greenbrier. This wetland may be classified as a palustrine, forested, needle-leaved evergreen, system that is temporarily flooded (PFO4A) (Cowardin et al. 1979).

Freshwater Wetland 19

This freshwater wetland is a 1-foot wide, 1-foot deep linear ditch draining the area between SC 41 and Tuxbury Farm Road (Figure 4A and Photo 19). It appears the linear depression might have been a relict agriculture row in which loblolly pines have succeeded. Hydrology is primarily derived from rainwater. Water captured by the ditch is conveyed to Freshwater Wetland 22. At the time of field investigations, the wetland contained pools of water 1 inch

deep. Vegetation consists mainly of loblolly pine, with scattered Japanese honeysuckle, sweetgum, and greenbrier making up the understory. This wetland may be classified as a palustrine, forested, needle-leaved evergreen, system that is temporarily flooded (PFO4A) (Cowardin et al. 1979).

Freshwater Wetland 20

This freshwater wetland is a 3-foot wide, 2-foot deep linear ditch drains the area between SC 41 and Tuxbury Farm Road (Figure 4A and Photo 20). Hydrology is primarily derived from rainwater. Water captured by the ditch is conveyed to Freshwater Wetland 22. At the time of field investigations, the wetland contained pools of water 4 inches deep. Vegetation consists of loblolly pine, water oak, laurel oak, giant cane, Japanese honeysuckle, and greenbrier. This wetland may be classified as a palustrine, forested, needle-leaved evergreen, system that is temporarily flooded (PFO4A) (Cowardin et al. 1979).

Freshwater Wetland 21

This freshwater wetland is a 2-foot wide, 2-foot deep linear ditch that drains a loblolly stand between SC 41 and Tuxbury Farm Road (Figure 4A and Photo 21). Hydrology is primarily derived from rainwater. Water captured in the ditch is conveyed to Stream 2. At the time of field investigations, the wetland contained pools of water 3 inches deep. The vegetative canopy is dominated by loblolly pine. Shrub layer vegetation includes red maple, sweetgum, red bay, and water oak. This wetland may be classified as a palustrine, forested, needle-leaved evergreen, system that is temporarily flooded (PFO4A) (Cowardin et al. 1979).

Freshwater Wetland 22

This freshwater wetland is 6-inch deep linear ditch that parallels the eastern side of SC 41 and drains to Stream 2 (Figure 4A and Photo 22). The ditch is subtly defined by gradually sloping walls; there is no distinct, excavated channel. The wetland narrows and widens over its length, but is generally 11 feet wide. Hydrology is primarily derived from rainwater. Pools of water 4 inches deep are scattered throughout. The majority of the wetland contains vegetation characteristic of maintained roadside shoulders including rush, sedge, and various grasses. A small portion of the wetland does, however, extend into the adjacent loblolly pine-dominated forest. The portion of the wetland occurring in the maintained roadside shoulder may be classified as a palustrine, persistent emergent system that is temporarily flooded (PEM1A), while the forested portion may be classified as a palustrine, forested, needle-leaved evergreen, system that is temporarily flooded (PFO4A) (Cowardin et al. 1979).

Freshwater Wetland 23

This wetland is a large complex of ditches draining the area between SC 41 and Clements Ferry Road (Figures 4A and 4B and Photo 23). The area apparently once contained structures that have been removed, and vegetation is maintained by infrequent mowing. The ditches are overgrown and not completely effective in draining the area. Hydrology is derived from rainwater, and standing water to two feet in depth is contained in the ditches. The ditch system eventually drains across SC 41 into Stream 3. Vegetation consists of black willow, groundsel-tree, soft rush, elderberry, sedges, greenbrier, and dwarf primrose. This wetland may be

classified as a palustrine, persistent emergent system with persistent vegetation that is semipermanently to permanently flooded (PEM1F/H) (Cowardin et al. 1979).

Freshwater Wetland 24

This medium quality freshwater wetland exhibits some characteristics of a coastal plain bottomland hardwood forest. Wetland 24 is located east of SC 41 and west of Tuxbury Farm Road (Figure 4A and Photo 24). Hydrology is primarily derived by rainwater, with some occasional flooding from a stream located outside of the project study area. Vegetation consists of loblolly pine, sweetgum, red maple, greenbrier, sweet bay, and palmetto. This wetland may be classified as a palustrine, forested, needle-leaved evergreen, deciduous, system that is intermittently flooded (PFO4J, PFO6J) (Cowardin et al. 1979).

Freshwater Wetland 25, 26, 27, and 32

These wetlands are part of the same complex as Wetland 23, and occur in the area between SC 41 and Clements Ferry Road (Figure 4A and Photos 25, 26, 27, and 32). These small pockets occur near the large complex of ditches that does not completely drain the area. Vegetation is similar to that in the ditch system in Wetland 23, with black willow, groundsel-tree, soft rush, elderberry, and sedges. These wetlands may be classified as palustrine, persistent emergent systems that are intermittently flooded or have temporary surface water (PEM1J) (Cowardin et al. 1979).

Freshwater Wetlands 28 and 30

This freshwater wetland complex is associated with the riverine system (Stream 4) that intersects Wetland 28 and Wetland 30 (Figures 4A and 4B and Photos 28 and 30). Stream 4 is fed by Wetland 23 on the east side of SC 41. Hydrology of this wetland is influenced by groundwater and rainwater. Water-stained leaves found during site visit indicate temporary flooding of the wetland. Vegetation consists of live oak (*Quercus virginiana*), sweetgum, red maple, loblolly pine, palmetto, and black needlerush. Wetlands 28 and 30 may be classified as palustrine, forested, deciduous, systems that are temporarily flooded (PFO6A).

Saltwater Wetlands 29 and 37 (Critical Area)

Salt marsh occurs as an estuarine, inter-tidal, and regularly flooded community along the margins of the Wando River and its associated tributaries within the project study area. Wetlands 29 and 37 occur as fingers of salt marsh that encroach into uplands and adjacent freshwater wetland areas (Figure 4B and Photos 29 and 37). This community is usually dominated by smooth cordgrass. Strong zonation often occurs in the higher parts of the marsh, with a definitive zone of black needlerush, as well as marsh hay and other brackish marsh species. Within the project study area, the high-water extent of salt marsh is denoted by a well-defined vegetation break. Vegetation above the salt marsh includes palmetto, wax myrtle, groundsel-tree, and yaupon holly.

Salt marsh within the project study area is considered to be a critical area by the Ocean and Coastal Resource Management (ORCM) and may be classified as an estuarine, inter-tidal, persistent emergent system that is regularly flooded (E2EM1N) (Cowardin et al. 1979).

Freshwater Wetland 31

This freshwater wetland grades from upland to wetland on three sides, with the wetland center containing no canopy trees and scattered shrubs (Figure 4B and Photo 31). Hydrology is primarily derived from groundwater. Water appears to seep from adjacent uplands into the wetland. At the time of field investigations, the wetland contained standing water 8 inches deep. Vegetation consists of scattered red maple and sweetgum in the center, with loblolly pine occurring as the wetland grades into the upland. Other dominant herbaceous species found within the wetland include sedges, greenbrier, palmetto, and plume grass. This wetland may be classified as a palustrine, scrub-shrub, deciduous, system that is temporarily flooded (PSS6A) (Cowardin et al. 1979).

Freshwater Wetland 34 and 36

These two wetlands are impounded by SC 41, Clement Ferry Road, and two unpaved cut-through roads that extend between them (Figure 4A and Photos 34 and 36). Hydrology is derived from rainwater, and standing water reaches 6 inches in depth. The wetlands support some shrubby vegetation including yaupon holly, wax myrtle, groundsel-tree, and loblolly pine. Herbaceous vegetation includes black needlerush, spikerush, bushy broomsedge, and meadow beauty. These wetlands may be classified as palustrine, persistent emergent systems that are intermittently flooded or have temporary surface water (PEM1J) (Cowardin et al. 1979).

Freshwater Wetland 35

This freshwater wetland is a depressional wetland located just east of SC 41, within a powerline corridor (Figure 4B and Photo 35). Hydrology is primarily derived from rainwater. Water captured by the depressional area may be conveyed to Saltwater Wetland 37 through groundwater flow. At the time of field investigations, the wetland contained pools of water 1 inch deep. Herbaceous vegetation includes black needlerush, spikerush, bushy broomsedge, and meadow beauty. Routine maintenance prevents species from succeeding to a shrub layer. These wetlands may be classified as palustrine, persistent emergent systems that are intermittently flooded or have temporary surface water (PEM1J) (Cowardin et al. 1979).

Saltwater Wetlands 38, 41, 47, and 51 (Critical Area)

Salt marsh occurs as an estuarine, inter-tidal, and regularly flooded community along the margins of the Wando River within the project study area (Figures 4B and 4C and Photos 38, 41, 47, and 51). According to Nelson (1986), this community usually occurs on mineral soils; within the project study area, salt marsh occurs on the Capers series (*Typic Sulfaquents*). This community is usually dominated by smooth cordgrass. Strong zonation often occurs in the higher parts of the marsh, with a definitive zone of black needlerush, as well as marsh hay and other brackish marsh species. Within the project study area, the high-water extent of salt marsh is denoted by a well-defined vegetation break. Vegetation above the salt marsh includes palmetto, wax myrtle, groundsel-tree, and yaupon holly. These wetlands may be classified as estuarine, inter-tidal, persistent emergent systems that are regularly flooded (E2EM1N) (Cowardin et al. 1979).

Freshwater Wetland 39 and 40

This freshwater wetland is a 1 foot deep linear ditch that parallels the eastern side of SC 41 until it drains under the road to Saltwater Wetland 38 (Figure 4B and Photos 39 and 40). The ditch

varies in width from 1 foot to 3 feet. Hydrology is primarily derived from rainwater. Pools of water 6 inches deep are scattered throughout. The majority of the wetland contains vegetation characteristic of maintained roadside shoulders including rush, sedge, and various grasses. A small portion of the wetland does, however, extend into the adjacent loblolly pine-dominated forest. The portion of the wetland occurring in the maintained roadside shoulder may be classified as a palustrine, persistent emergent system that is temporarily flooded (PEM1A), while the forested portion may be classified as a palustrine, forested, needle-leaved evergreen, system that is temporarily flooded (PFO4A) (Cowardin et al. 1979).

Freshwater Wetland 42

This freshwater wetland exists as an isolated linear depression that is situated perpendicular to SC 41, just west of Detyens Shipyard (Figure 4C and Photo 42). This wetland is inundated and water depth ranges from 0 to 12 inches. Soils are saturated to the surface and dominant vegetation includes wax myrtle, Japanese honeysuckle, and Chinese tallow tree. This wetland may be classified as a palustrine, persistent emergent system that is seasonally flooded or inundated (PEM1C) (Cowardin et al. 1979).

Freshwater Wetland 43

This wetlands occurs as a drainage ditch along SC 41 (Figure 4C and Photo 43). Hydrology appears derived from rainwater, with some overflow possibly coming from Wetland 42. The wetland is partially mowed near the highway. Shrubby vegetation includes groundsel and red maple, with plume grass, vervain, broadleaf cattail, black needlerush, spikerush, and marsh pennywort in the herb layer. This wetland may be classified as a palustrine, persistent emergent system that is seasonally flooded or inundated (PEM1C) (Cowardin et al. 1979).

Freshwater Wetland 44

This freshwater wetland is situated partially within a utility corridor that runs east and parallel to SC 41 on the south side of the Wando River Bridge (Figure 4C and Photo 44). This wetland is inundated, with water depths ranging between 0 and 4 inches. Soils are saturated to the surface and dominant vegetation includes black needlerush, groundsel-tree, wax myrtle, loblolly pine, broomsedge, and panic-grass. This wetland may be classified as a palustrine, persistent emergent system that is intermittently flooded or has temporary surface water (PEM1J) (Cowardin et al. 1979).

Freshwater Wetland 45

This freshwater wetland exists as a linear depression that runs parallel to SC 41, south of the Wando River bridge (Figure 4C and Photo 45). It includes an adjacent wetland pocket. This wetland is inundated, with water depths ranging from 0 to 3 inches. Soils are saturated to the surface and dominant vegetation includes groundsel-tree, broadleaf cattail, spikerush, red maple, black needlerush, and marsh pennywort. This wetland may be classified as a palustrine, persistent emergent system that is intermittently flooded or has temporary surface water (PEM1J) (Cowardin et al. 1979).

Freshwater Wetland 46

This wetland occurs as a drainage ditch along SC 41 and extends eastward into a mixed pine-hardwood forest (Figure 4C and Photo 46). Hydrology appears derived from rainwater, with

some overflow possibly coming from Wetland 45. The canopy is dominated by loblolly pine, with a mixed subcanopy of red maple and water oak. Giant cane, Japanese honeysuckle, common greenbrier, and sweet bay can be found in the understory. This wetland may be classified as a palustrine, persistent emergent system that is seasonally flooded or inundated (PEM1C) (Cowardin et al. 1979).

Freshwater Wetland 48

This freshwater marsh is situated between the salt marsh area (Wetland 47) and SC 41, south of the Wando River Bridge (Figure 4C and Photo 48). This wetland is inundated, with water depths ranging from 0 to 2 inches. Soils are saturated to the surface and dominant vegetation includes groundsel-tree, black needlerush, and panic-grass. This wetland may be classified as a palustrine, persistent emergent system that is intermittently flooded or has temporary surface water (PEM1J) (Cowardin et al. 1979).

Freshwater Wetland 49

This wetland occurs as a depression in a mesic mixed pine-hardwood forest east of SC 41 (Figure 4C and Photo 49). Hydrology appears to be derived mostly from groundwater. The canopy is dominated by water oak and red maple, with some scattered loblolly pine around the boundary. Where flooding occurs, pickerelweed (*Pontederia cordata*) can be found, while the boundaries are dominated by giant cane and palmetto. This wetland may be classified as a palustrine, forested, deciduous, system that is seasonally flooded (PFO6A) (Cowardin et al. 1979).

Freshwater Wetland 50

Freshwater Wetland 50 occurs east of SC 41 between upland and Saltwater Wetland 51 (Figure 4C and Photo 50). Hydrology appears to be derived mostly from groundwater flow. Canopy species found during site visit include water oak, live oak, and palmetto. Shrubby species included giant cane, and herbs include black needlerush and sedges. This wetland may be classified as a palustrine, forested, broad-leaved evergreen, system that is seasonally saturated (PFO3Y) (Cowardin et al. 1979).

Permanent impacts to vegetated wetlands may be expected due to the extension of cut-fill slopes adjacent to the new alignment. Temporary cut-fill impacts may be due to the placement of fill for construction access, or to mechanized clearing in vegetated wetlands. All impacts are expected to be limited to the area within the construction limits. Cleared areas will receive temporary seeding during construction and will be permanently reseeded after construction.

Wetlands in this landscape function as receptors of upland runoff, intercepting runoff prior to entering stream systems. The wetlands also function as buffers during times of flooding, by reducing runoff rates and allowing for increased absorption and infiltration.

4.2 Permit Issues

4.2.1 Permits

Due to the location of the existing roadways over streams and adjacent to wetlands, permits will be required for encroachment into jurisdictional areas. However, a final permitting strategy

cannot be developed until a project footprint has been finalized and construction impacts are firmly quantified.

In 1977, the South Carolina Coastal Tidelands and Wetlands Act (Coastal Zone Management Act) was passed which gives the South Carolina Office of Ocean and Coastal Resource Management (SC OCRM) the duty to protect the quality of the coastal environment and to promote the economic and social improvement of the coastal zone. The proposed project will occur in two of the eight counties designated by the Act as containing Critical Areas, including coastal waters and tidelands.

Because the project study area contains coastal waters and tidelands within a designated county, an SC OCRM representative was consulted to verify the presence or absence of Critical Areas (a copy of the approval is included in Appendix D). If Critical Areas or Waters of the United States are proposed to be affected or impacted, a joint federal and state permit will be required [SCCL Section 48-39-10 et Seq.]. The joint application process coordinates most required state and federal permit authorizations. These permits include 401 Water Quality Certification, Coastal Zone Consistency Certification, Critical Area Permit (DHEC Regulation R.61-101), South Carolina permit for construction in navigable waters (DHEC Regulation R.19-450), and an Individual Section 404 permit (33 U.S.C. Section 1344).

Section 401 of the CWA requires each state to certify that state water quality standards will not be violated for activities which: 1) involve issuance of a federal permit or license, or 2) require discharges to “waters of the United States.” The USACE cannot issue a Section 404 permit until a 401 certification is issued. Therefore, SCDOT must apply to SC OCRM for Section 401 certification as part of the permit process.

The U.S. Coast Guard (USCG) will likely consider this reach of the Wando River navigable for bridge administration purposes under Section 9 of the Rivers and Harbors Act of 1899 and the General Bridge Act of 1946. Coordination with the USCG will be required in order to obtain a Bridge Permit for the replacement of the SC 41 bridge (33 CFR Parts 114 and 115).

As the Wando River has potential as travel corridors for migratory fish, in-water work may be restricted by fish moratorium periods associated with fish migration, spawning, and nursery areas. SCDOT will coordinate with various resource agencies during project planning to ensure that all concerns regarding bridge demolition and construction are resolved. The final decision for this determination lies with the SCDNR’s Marine Resources Division and the NOAA National Marine Fisheries Service.

4.2.2 Mitigation

The USACE has adopted through the Council on Environmental Quality (CEQ) a wetland mitigation policy that embraces the concept of “no net loss of wetlands” and sequencing. The purpose of this policy is to restore and maintain the chemical, biological, and physical integrity of waters of the United States, and specifically wetlands. Mitigation of wetland impacts has been defined by the CEQ to include avoiding impacts (to wetlands), minimizing impacts, rectifying impacts, reducing impacts over time, and compensating for impacts (40 CFR 1508.20). Each of

these three aspects (avoidance, minimization, and compensatory mitigation) must be considered sequentially.

Avoidance mitigation examines all appropriate and practicable possibilities of averting impacts to waters of the United States. According to a 1990 Memorandum of Agreement (MOA) between the Environmental Protection Agency and the USACE, in determining “appropriate and practicable” measures to offset unavoidable impacts, such measures should be appropriate to the scope and degree of those impacts and practicable in terms of cost, existing technology and logistics in light of overall project purposes. Impacts to streams are expected due to the nature of the project, since not all sediment can be prevented from entering waters of the United States. Likewise, impacts to wetlands adjacent to the roadway are unavoidable. However, use of appropriate BMPs will be utilized to prevent those impacts which are avoidable.

Minimization includes the examination of appropriate and practicable steps to reduce the adverse impacts to waters of the United States. Implementation of these steps will be required through project modifications and permit conditions. Minimization typically focuses on decreasing the footprint of the proposed project through the reduction of median widths, right-of-way widths, fill slopes, and/or road shoulder widths. As work on SC 41 will involve improving and realigning the existing roadway, multiple opportunities may occur to reduce fill slope ratios. All efforts will be made to decrease impacts to surface waters.

Compensatory mitigation is not normally considered until anticipated impacts to waters of the United States have been avoided and minimized to the maximum extent possible. It is recognized that “no net loss of wetlands” functions and values may not be achieved in each and every permit action. In accordance with 67 FR 2020, 2092; January 15, 2002, the USACE requires compensatory mitigation when necessary to ensure that adverse effects to the aquatic environment are minimal. The size and type of the proposed project impact and the function and value of the impacted aquatic resource are factors considered in determining acceptability of appropriate and practicable compensatory mitigation. Appropriate and practicable compensatory mitigation is required for unavoidable adverse impacts which remain after all appropriate and practicable avoidance and minimization opportunities have been implemented. Compensatory actions often include restoration, preservation and enhancement, and creation of waters of the United States. Such actions should be undertaken first in areas adjacent to or contiguous to the discharge site.

Compensatory mitigation for Section 404 jurisdictional area impacts may need to be proposed for this project due to project impacts. Utilization of BMPs is recommended in an effort to minimize impacts. A final determination regarding mitigation rests with the USACE and SCDHEC.

Opportunities for compensatory mitigation are limited within the project study area. Temporary impacts to wetlands associated with construction activities could be mitigated by replanting disturbed areas with native riparian species and removal of temporary fill material upon project completion.

4.2.3 Essential Fish Habitat

The Magnuson-Stevens Fishery Conservation and Management Act, as amended (PL 94-265), defines Essential Fish Habitat as “those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity” (16 USC 1820[10]). The South Atlantic and Mid-Atlantic Fishery Management Councils, in cooperation with the National Marine Fisheries Service, identify a variety of Essential Fish Habitat (EFH) types that may occur at the project study area. These consist of estuarine emergent wetlands, oyster reefs, intertidal flats, mud bottoms, the estuarine water column, and palustrine emergent and forested wetlands. Estuarine emergent wetlands consist of *Spartina* and *Juncus* saltwater to brackish marsh areas occurring in the Wando River and associated sloughs and drainages, generally within 2,000 feet of the river channel. Oyster reefs occur sporadically within the Wando River channel. Intertidal flats and mud bottoms occupy all of the salt to brackish wetland areas not covered by vegetation. Palustrine emergent and forested wetlands occur throughout the upland portions of the project study area, sometimes in close association with salt and brackish systems (see Section 4.1 and Figures 4A-4C). No submerged aquatic vegetation (SAV) was observed at the project study area during the March and August, 2005 field visits.

Referral to *Essential Fish Habitat: A Marine Fish Habitat Conservation Mandate for Federal Agencies* (NMFS 2004) indicated that EFH for eleven species may occur within or near the project study area. These species are managed by the South Atlantic and Mid-Atlantic Fishery Management Councils under the Magnuson-Stevens Fishery Conservation and Management Act, as amended (PL 94-265). The species names, life stages, and corresponding EFH that may occur on or near the project study area are listed in Table 5. No geographically defined Habitat Areas of Particular Concern (HAPC) occur in or near the project study area. However, the South Atlantic Habitat and Ecosystem Internet Map Server (SAFMC 2008) defines EFH-HAPC for shrimp, red drum, and the snapper-grouper complex within the project study area in the form of coastal inlets.

Table 5: Managed Marine Species and Essential Fish Habitat

Species	Life Stages	EFH
brown shrimp (<i>Farfantepenaeus aztecus</i>)	postlarvae/juvenile subadults	estuarine tidal creeks estuarine marsh edge estuarine inner marsh estuarine mud bottoms estuarine marsh edge
white shrimp (<i>Litopenaeus setiferus</i>)	postlarvae/juvenile subadults	estuarine mud/peat marsh edge estuarine marsh ponds, inner marsh estuarine mud/peat marsh edge estuarine marsh ponds, inner marsh
red drum (<i>Sciaenops ocellatus</i>)	postlarvae/juvenile subadults adults	estuarine mud bottoms estuarine marsh/water interface estuarine mud bottoms, oyster reef marine/estuarine mud bottoms marine/estuarine oyster reefs
gray snapper (<i>Lutjanus buccanella</i>)	postlarvae/juvenile adults	estuarine mud marine/estuarine riverine
Spanish mackerel (<i>Scomberomorus cavalla</i>)	juvenile	marine/estuarine estuarine

Species	Life Stages	EFH
cobia (<i>Rachycentron canadum</i>)	larvae postlarvae/juvenile	marine/estuarine estuarine & shelf marine/estuarine estuarine & shelf
bluefish (<i>Pomatomus saltatrix</i>)	juveniles adults	estuarine/marine estuaries estuarine/marine estuaries
summer flounder (<i>Paralichthys dentatus</i>)	larvae/juvenile adult	estuarine/marine estuaries estuarine/marine shelf estuarine/marine estuaries estuarine/marine shelf
lemon shark (<i>Negaprion brevirostris</i>)	juvenile adult	inlets, estuaries, waters < 25 meters inlets, estuaries, waters < 25 meters
dusky shark (<i>Carcharhinus obscurus</i>)	juvenile	inlets, estuaries, waters < 200 meters
bonnethead shark (<i>Sphyrna tiburo</i>)	juvenile	inlets, estuaries, waters < 25 meters

4.3 Protected Species

Species with Federal classifications of Endangered (E) or Threatened (T) are protected under the Endangered Species Act of 1973 (ESA), as amended (16 U.S.C. 1531 *et seq.*). Endangered status refers to “any species which is in danger of extinction throughout all or a significant portion of its range”, and Threatened status refers to “any species which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range” (16 U.S.C. 1532). The federally protected species listed for Berkeley and Charleston Counties by the USFWS as of March 2008 (USFWS 2008) are depicted in Table 6. Additional species listed by the USFWS as of 1999 (USFWS 1999) are included in Table 6. These species are briefly described below.

Table 6: Federally Protected Species listed for Berkeley and Charleston Counties

Scientific Name	Common Name	Status	County*	Biological Conclusion
<i>Acipenser brevirostrum</i>	Shortnose sturgeon	Endangered	B, C	MAY AFFECT, NOT LIKELY TO ADVERSELY AFFECT
<i>Amaranthus pumilus</i>	Seabeach amaranth	Threatened	C	NO EFFECT
<i>Ambystoma cingulatum</i>	Flatwoods salamander	Threatened	B, C	NO EFFECT
<i>Caretta caretta</i>	Loggerhead sea turtle	Threatened	B, C	NO EFFECT
<i>Charadrius melodus</i>	Piping plover	Threatened	C	NO EFFECT
<i>Chelonia mydas</i>	Green sea turtle	Threatened	C	NO EFFECT
<i>Dendroica kirtlandii</i>	Kirtland's warbler	Endangered	C	MAY AFFECT, NOT LIKELY TO ADVERSELY AFFECT
<i>Dermochelys coriacea</i>	Leatherback sea turtle	Endangered	C	NO EFFECT
<i>Lepidochelys kempi</i>	Kemp's ridley sea turtle	Endangered	C	NO EFFECT
<i>Lindera melissifolia</i>	Pondberry	Endangered	B, C**	NO EFFECT
<i>Mycteria americana</i>	Wood stork	Endangered	B, C	MAY AFFECT, NOT LIKELY TO ADVERSELY AFFECT
<i>Oxypolis canbyi</i>	Canby's dropwort	Endangered	B, C	NO EFFECT
<i>Picoides borealis</i>	Red-cockaded woodpecker	Endangered	B, C	NO EFFECT
<i>Schwalbea americana</i>	American chaffseed	Endangered	B, C	NO EFFECT
<i>Trichechus manatus</i>	West Indian manatee	Endangered	B**, C	MAY AFFECT, NOT LIKELY

Scientific Name	Common Name	Status	County*	Biological Conclusion
				TO ADVERSELY AFFECT
<i>Vermivora bachmanii</i>	Bachman's warbler	Endangered	C	MAY AFFECT, NOT LIKELY TO ADVERSELY AFFECT

* County: B: Berkeley; C: Charleston

** Occurrence in County listed as "Possible"

***Acipenser brevirostrum* (Shortnose sturgeon)**

Endangered

Family: Acipenseridae

Date Listed: March 11, 1967

The shortnose sturgeon is a bottom-feeding fish that rarely exceeds 3 feet in length. This species has a heterocercal tail, an inferior, protrusible mouth preceded by barbels, and a body covered with rows of bony scutes (Ross 1997). Adults have a short, blunt snout; the body is brown to blackish dorsally, yellowish on the sides, and white ventrally (USFWS 1993a). The usual habitat is estuaries and lower sections of large rivers. The sturgeon is anadromous, spending most of the year in brackish estuarine environments and moving into fresh water only when spawning (Gilbert 1989). This species occurs in Atlantic seaboard rivers from the St. Johns River, Florida, to eastern Canada.

BIOLOGICAL CONCLUSION: MAY AFFECT, NOT LIKELY TO ADVERSELY AFFECT

The proposed SC 41 bridge replacement over the Wando River occurs over waters that may provide important foraging habitat for shortnose sturgeon during the winter months. The National Marine Fisheries Service may recommend that construction of the Wando River bridge should not take place during the winter. Regarding the shortnose sturgeon, the best period for in-water construction would be the spring spawning season (February 1 to June 15), when the fish are more likely to be upstream of the project study area. No surveys for shortnose sturgeon were undertaken during the field studies. The SCHTP documents no occurrence of shortnose sturgeon within 5 miles of the project study area. If in-water bridge construction occurs during the summer months, the project is unlikely to affect shortnose sturgeon.

***Amaranthus pumilus* (Seabeach amaranth)**

Threatened

Family: Amaranthaceae

Date Listed: April 7, 1993

Seabeach amaranth is a low-growing, fleshy, annual herb. The spatula-shaped leaves are pink and range from 0.5 to 1.0 inch in diameter. The leaves are clustered near the end of the stem and are notched apically. Flowers and fruits are inconspicuous, and occur along the stem. This plant is primarily found on foredunes and sand spits of Atlantic coast barrier beaches and inlets in areas where periodic overwash eliminate vegetative competition. Some of the largest remaining populations of this species occur in North Carolina (USFWS 1993b). This species has been documented on sand spits on both sides of Beaufort Inlet and on Bird Shoal (NHP records). The preferred habitat of this plant does not occur within the project area as beach slopes are too steep for inland overwash except on rare occasions and there are no nearby accreting spits.

BIOLOGICAL CONCLUSION: NO EFFECT

The SCHTP documents no occurrence of seabeach amaranth within 5 miles of the project study area. No habitat for seabeach amaranth occurs in or near the project study area, as sandy, eroded shorelines and dunes are absent. Shorelines are composed of mud, marsh, or wooded fringes, or are armored. No specimens of seabeach amaranth were noted during the field visits to the project study area. This project will not affect seabeach amaranth.

***Ambystoma cingulatum* (Flatwoods salamander)**

Threatened

Family: Ambystomatidae

Date Listed: April 1, 1999

The flatwoods salamander is a 3.5- to 5-inch dark salamander with grayish reticulations on the back and sides. Light flecks mark the underside. It differs from other *Ambystoma* salamanders by its small size, slender body, relatively small head, distinct markings, and 15 costal grooves rather than 11 to 13 (Martof et al. 1980). Breeding occurs in November, when an average of 150 eggs is laid in small groups under the ground. The unattended eggs hatch a few weeks later when flooded by rain. The larvae are very conspicuous with a black ground and light longitudinal stripes. Metamorphosis occurs in March or April. This salamander occurs from the southern half of the coastal plain of South Carolina through Georgia, Florida, and westward to Alabama. Its principal habitat is sandy, seasonally wet pine flatwoods with a wiregrass (*Aristida* spp.) understory (Petranka 1998). These salamanders may be found beneath logs near cypress ponds, swamps, and pitcher plant bogs. This salamander burrows near water or moves about under debris on the forest floor. It is nocturnal and most likely to be seen during the fall courtship and breeding period (Martof et al. 1980).

BIOLOGICAL CONCLUSION:

NO EFFECT

Suitable habitat for flatwoods salamander does not occur within the project study area. Wet pine flatwoods, cypress ponds, swamps and bogs do not occur within this disturbed area. The SCHTP documents several occurrences of flatwoods salamander within 5 miles of the project study area. Two records, approximately 0.1 mile west near a sand borrow area and 1.5 miles west, were last observed in 1953. Other records note occurrences within the Francis Marion National Forest, 2.5 to 3 miles north, and 3.5 miles northeast, which were recorded in 1987, 1995, and 1997. This project is not expected to affect the flatwoods salamander.

***Caretta caretta* (Loggerhead sea turtle)**

Threatened

Family: Cheloniidae

Date Listed: July 28, 1978

The loggerhead sea turtle is the most common sea turtle on the coast of the Carolinas. This species averages 79 to 120 centimeters (31 to 47 inches) in length and weighs from 77 to 227 kilograms (170 to 500 pounds) (Martof et al. 1980). The loggerhead is basically temperate or subtropical in nature, and is primarily oceanic, but may also be found in estuarine bays, sounds, and large coastal rivers. This species occurs along the coast of North Carolina from late April to October. Preferred nesting habitat is ocean beaches, generally south of Cape Lookout. Traditionally, the largest concentration of loggerhead nests each year is on Smith Island, at the mouth of the Cape Fear River (Palmer and Braswell 1995).

BIOLOGICAL CONCLUSION:**NO EFFECT**

The project study area contains no nesting or foraging habitat for the loggerhead sea turtle. Shoreline areas are comprised of either salt marsh or riprap. The estuarine waters in this section of the Wando River are unsuited to the turtle's marine habitat preferences. The SCHTP documents no occurrence of the loggerhead sea turtle within 5 miles of the project study area. This project will not affect the loggerhead sea turtle.

***Charadrius melodus* (Piping plover)**

Threatened

Family: Charadriidae

Date Listed: December 11, 1985

Piping plovers are the smallest of the plovers found in the Carolinas, measuring only 6 to 8 inches in length (Golder and Parnell 1987). This species is characterized by a white head and back and white breast and belly, yellow legs, narrow black neck band and a narrow band above the eyes, and a black bill in the winter and yellow and black bill in the summer (Potter et al. 1980). These small Nearctic birds occur along beaches above the high tide line, sand flats at the ends of sand spits and barrier islands, gently sloping foredunes, blowout areas behind primary dunes, and washover areas cut into or between dunes (Dyer et al. 1987). Nests are most often on open, wide, sandy stretches of beach similar to those associated with inlets and capes.

BIOLOGICAL CONCLUSION:**NO EFFECT**

No habitat for piping plover occurs within the project study area. Shoreline areas consist of marshes, bulkheads, and wooded fringes, and no sandy beaches or dunes are present. The SCHTP documents no occurrence of the piping plover within 5 miles of the project study area. No piping plovers were observed during the field studies. This project will not affect the piping plover.

***Chelonia mydas* (Green sea turtle)**

Threatened

Family: Cheloniidae

Date Listed: July 28, 1978

The green sea turtle is a medium to large turtle (30 to 60 inches long, 220 to 650 pounds in weight) with a smooth, heart-shaped shell (Martof *et al.* 1980). Adults are believed to be primarily herbivorous (including jelly fish) while the young are believed to be primarily carnivorous. The green sea turtle is most commonly found in the Caribbean where it breeds, although individuals, usually immatures, are occasionally found as far north as the North Carolina coast. Preferred nesting habitat is ocean-fronting beaches.

BIOLOGICAL CONCLUSION:**NO EFFECT**

The project study area contains no nesting or foraging habitat for the green sea turtle. Shoreline areas are comprised of either salt marsh or riprap, and do not offer nesting habitat. Additionally, the estuarine waters in this section of the Wando River are unsuited to the turtle's marine foraging habitat preferences. The SCHTP documents no occurrence of the green sea turtle within 5 miles of the project study area. This project will not affect the green sea turtle.

***Dendroica kirtlandii* (Kirtland's warbler)**

Endangered

Family: Emberizidae

Date Listed: March 11, 1967

Kirtland's Warbler is a 5.5- to 6-inch songbird that is gray above and predominantly yellow below. They have black streaks on the back and sides, two white wing bars, white tail spots, a white belly, and a white eye ring. The warbler is extremely tame and habitually wags its tail. Kirtland's warbler nests in jack pines of central Michigan and winters in the Bahaman islands. They are very rare transients in the Carolinas in spring and fall. Sightings are most often recorded in the spring, when the males are singing. The birds frequent thickets and woodland edges on uplands adjacent to the wet margins of lakes and swamps (Potter et al. 1980, Dunn and Garrett 1997).

BIOLOGICAL CONCLUSION: MAY AFFECT, NOT LIKELY TO ADVERSELY AFFECT

Suitable habitat for Kirtland's warblers may exist within the project study area during migration periods in spring and fall. Forested edges and thickets bordering salt marshes and freshwater wetlands may provide stopover feeding and resting areas for the warblers. If construction minimizes the disturbance of these areas, the project is unlikely to affect the Kirtland's warbler. The SCHTP documents no occurrence of Kirtland's warbler within 5 miles of the project study area.

***Dermochelys coriacea* (Leatherback sea turtle)**

Endangered

Family: Cheloniidae

Date Listed: June 2, 1970

The leatherback turtle is distinguished by its large size (46- to 70-inch carapace, 650 to 1,500 lbs) and a shell of soft, leathery skin. This species is primarily tropical in nature, but the range may extend to Nova Scotia and Newfoundland (Palmer and Braswell 1995, Martof *et al.* 1980). The leatherback is a powerful swimmer, often seen far from land; however, it sometimes moves into shallow bays, estuaries, and even river mouths. Its preferred food is jellyfish, although the diet includes other sea animals and seaweed. The leatherback generally nests on sandy, tropical beaches.

BIOLOGICAL CONCLUSION: NO EFFECT

The project study area occurs in estuarine waters that are incompatible with the marine habitat that the leatherback sea turtle requires for foraging. Shorelines in the area are unsuitable for nesting, as they consist of salt marsh and riprap. The SCHTP documents no occurrence of the leatherback sea turtle within 5 miles of the project study area. This project will not affect the leatherback sea turtle.

***Lepidochelys kemp* (Kemp's ridley sea turtle)**

Endangered

Family: Cheloniidae

Date Listed: December 2, 1970

The Kemp's ridley sea turtle is the smallest of the sea turtles (23- to 30-inch carapace, 79 to 110 lbs) and is generally considered the most endangered species of sea turtle in the world (Palmer and Braswell 1995). This species ranges from the Gulf of Mexico and the east coast, to Nova Scotia and Europe. In addition to its small size, this species is discernible by the heart shaped carapace and gray coloration. Kemp's ridley prefers shallow coastal waters, including sounds and the lower portions of large rivers, where it feeds on crabs, shrimp, snails, clams, and some saltwater plants. Nearly all members of this species are believed to nest on a short strand of ocean beach in the state of Tamaulipas, Mexico.

BIOLOGICAL CONCLUSION:

NO EFFECT

No nesting or foraging habitat for the Kemp's ridley sea turtle occurs within the project study area. The estuarine waters edged by salt marsh and armored banks do not offer the marine environment and sandy beaches required by the turtle. The SCHTP documents no occurrence of the Kemp's ridley sea turtle within 5 miles of the project study area. This project will not affect the Kemp's ridley sea turtle.

***Lindera melissifolia* (Pondberry or southern spicebush)**

Endangered

Family: Lauraceae

Date Listed: July 31, 1986

Pondberry is a deciduous shrub with a limited distribution occurring in two portions of the southeastern United States, the Mississippi Valley and the coastal plain of the Carolinas (USFWS 1993c). Within the two portions of its range, pondberry is known to occupy different habitats. While pondberry is known from hardwood depressional areas with perched water tables in the Mississippi Valley, in the Carolinas pondberry occurs along margins of sink holes, ponds, and depressions in pinelands (USFWS 1993c). Within the Carolinas, potential habitat for pondberry is described as: 1) shallow ponds with a sandy substrate, especially sites containing the shrub pondspice (*Litsea aestivalis*); and 2) Carolina bays containing a combination of pond cypress (*Taxodium ascendens*) with loblolly pine and red maple (Leonard 1995). Generally, pondberry is adapted to margins of sinks, ponds and other depressions in the more coastal sites. The plants generally grow in shaded areas but may also be found in full sun.

BIOLOGICAL CONCLUSION:

NO EFFECT

The fringes of freshwater wetlands may provide pondberry habitat within the project study area. However, detailed surveys for pondberry were conducted during the March field visits, and no specimens of pondberry were found. The SCHTP documents six occurrences of pondberry within 5 miles of the project study area. These occurrences are all within the Francis Marion National Forest near SC 41, from 1.7 to 4.5 miles north of the project study area. This project will not affect pondberry.

***Mycteria americana* (Wood stork)**

Endangered

Family: Ciconiidae

Date Listed: February 28, 1984

Wood storks are strong winged birds that fly with their necks stretched straight ahead and their long legs trailing behind. Adult wood storks are predominantly white with black flight feathers, dark legs and bill, and dark unfeathered heads. Immature wood storks are similar in color; however, they may have a yellow bill (Potter *et al.* 1980). Adult birds are tall, measuring approximately 50 inches, with a wingspan of 60 to 65 inches. Typical foraging habitat includes shallow salt or brackish water, shallow water of bays, tidal creeks, ponds, or other bodies of water (Hamel 1992). Wood storks usually feed in 6 to 10 inches of water, and typically feed on fish, but also prey on amphibians, crustaceans, and reptiles. Nesting habitat consists of flooded cypress or other wooded swamps.

BIOLOGICAL CONCLUSION: MAY AFFECT, NOT LIKELY TO ADVERSELY AFFECT

The SCHTP documents no occurrence of wood storks within 5 miles of the project study area, and the USFWS has no record of nesting colonies in or near the project study area. No suitable nesting habitat occurs in or near the project study area. However, foraging habitat may occur in the Wando River and its associated tidal saltwater marshes. A detailed survey for foraging wood storks was conducted for a minimum of 300 feet outward from the project study area on August 10, 2005. No sightings of wood storks were recorded. The proposed project will avoid extensive alterations to natural shorelines. Based on observations, habitat requirements, and project parameters, this project is unlikely to affect the wood stork.

***Oxypolis canbyi* (Canby's dropwort)**

Endangered

Family: Apiaceae

Date Listed: February 25, 1986

Canby's dropwort is an erect perennial (30 to 47 inches tall) and has slender, quill-like leaves. The plant has compound umbels of small white flowers that have pale green sepals, possibly with a tint of red (USFWS 1992). Flowering takes place from May to early August. The plant can reproduce vegetatively by numerous pale, fleshy rhizomes. This species grows in coastal plain habitats with little or no canopy cover such as wet meadows, wet pine savannas, ditches, sloughs, and edges of cypress ponds. Canby's dropwort also grows best in acidic, deep, poorly-drained soils with a high organic content.

BIOLOGICAL CONCLUSION: NO EFFECT

The SCHTP documents no occurrence of Canby's dropwort within 5 miles of the project study area. However, ditches and other open freshwater wetlands may provide habitat for Canby's dropwort within the project study area. Detailed surveys for the plant were conducted on August 9, 2005 by walking systematic transects of suitable and marginal habitat areas. No occurrences of Canby's dropwort were recorded. This project will not affect Canby's dropwort.

***Picoides borealis* (Red-cockaded woodpecker)**

Endangered

Family: Picidae

Date Listed: October 13, 1970

This small woodpecker (7 to 8.5 inches long) has a black head, prominent white cheek patches, and a black-and-white barred back. Males often have red markings (cockades) behind the eye, but the cockades may be absent or difficult to see (Potter *et al.* 1980). Primary habitat consists of mature to over-mature southern pine forests dominated by loblolly, long-leaf (*Pinus palustris*), slash (*P. elliotii*), and pond (*P. serotina*) pines (Thompson and Baker 1971). Nest cavities are constructed in the heartwood of living pines, generally older than 70 years, that have been infected with red-heart disease. Nest cavity trees tend to occur in clusters, which are referred to as colonies (USFWS 1985). The woodpecker drills holes into the bark around the cavity entrance, resulting in a shiny, resinous buildup around the entrance that allows for easy detection of active nest trees. Pine flatwoods or pine-dominated savannas which have been maintained by frequent natural or prescribed fires serve as ideal nesting and foraging sites for this woodpecker. Development of a thick understory may result in abandonment of cavity trees.

BIOLOGICAL CONCLUSION:**NO EFFECT**

The SCHTP documents two occurrences of the red-cockaded woodpecker within 5 miles of the project study area. One is approximately 4 miles northwest, at the border of the Francis Marion National Forest; the other is approximately 4.5 miles east of the project study area. No foraging or nesting habitat for red-cockaded woodpecker occurs within the project study area. Wooded sections within the project study area consist of pine and pine-hardwood stands with well-developed shrub layers containing wax myrtle, groundsel bush, and other species. Few mature pines occur in or near the project study area, and no pure stands are located in or near the project study area. No evidence of red-cockaded woodpecker presence, including foraging birds, was noted during the field studies. This project will not affect the red-cockaded woodpecker.

***Schwalbea americana* (American chaffseed)**

Endangered

Family: Scrophulariaceae

Date Listed: September 29, 1992

American chaffseed is a perennial pubescent herb (Family Scrophulariaceae) that stands 12-24 inches tall. It is semi-parasitic, without host specificity. The alternately-leaved plant is erect and simple, or branched only at the base. The fleshy leaves are lanceolate, sessile, yellow-green or dull green with red undertones, and become smaller and narrower from the base of the plant to the top (Kral 1983). Flowers are purplish-yellow, tubular, bilaterally symmetrical and showy. They are arranged on a spike-like terminal raceme and bloom from April to June. The fruit is a narrow capsule approximately 0.5 inches (1.3 centimeters) long which matures in early summer. Seeds are enclosed in a sac-like structure that provides the common name. American chaffseed occurs in open grass/sedge assemblages with seasonally moist to dry acidic sandy loams or sandy peat loams. These assemblages typically exist in moist pine flatwoods, savannas, bog borders, ecotones of streamhead pocosins, pine/scrub oak sandhills, and open

oak woods. Frequent fires maintain a strong dominance and high diversity of herbs in what were historically fire-dominated communities (USFWS 1995).

BIOLOGICAL CONCLUSION:

NO EFFECT

Suitable habitat for American chaffseed may occur within the project study area in ditches and other open wetlands areas, as well as undisturbed open fringes of these areas. The SCHTP documents American chaffseed at four locations within 5 miles of the project study area, within the Francis Marion National Forest. These occur near SC 41 approximately 2.2 miles, 4.0 miles, and 4.5 miles north of the project study area. Detailed surveys for the plant were conducted on August 9, 2005 by walking systematic transects of suitable and marginal habitat areas. No occurrences of American chaffseed were recorded. This project will not affect American chaffseed.

***Trichechus manatus* (West Indian manatee)**

Endangered

Family: Trichechidae

Date Listed: March 11, 1967

The manatee is a large, gray or brown aquatic mammal that averages 10 to 13 feet in length and weighs up to 1,000 pounds. This species occurs from Brazil to the West Indies to the east coast of the United States. During summer months manatees migrate from their Florida wintering areas as far north as coastal Virginia. These mammals inhabit warm waters, both fresh and salt, where their diet consists mostly of aquatic vegetation (Linzey 1998, Clark 1987, Webster et al. 1985).

The USFWS has developed recommendations for general construction activities in aquatic areas which may be used by the manatee (USFWS memo dated June 2003 [USFWS 2003]; Appendix E). The USFWS directs that construction which can be completed in several months be scheduled during the seven month period of November through May. The USFWS also makes a series of recommendations pertaining to construction and the manatee, some of which are summarized as follows: 1) construction managers should advise all construction personnel to be aware of the possibility of manatee appearance and the legal obligation to avoid harassment of the species; 2) construction personnel will watch for manatee sightings and be prepared to shut down equipment if one is made; 3) any sightings or contact with manatees will be reported to the appropriate natural resource agencies (USFWS, SCDNR); 4) a sign will be posted providing instructions to equipment operators in case a manatee is sighted; 5) special steps will be taken on site concerning operations during the no-blast moratorium period, such as guidelines for operating water craft and placement of siltation barriers.

BIOLOGICAL CONCLUSION: MAY AFFECT, NOT LIKELY TO ADVERSELY AFFECT

The SCHTP documents no occurrence of West Indian manatee within 5 miles of the project study area. No West Indian manatees were sighted during field studies in March. However, the project study area may provide habitat for West Indian manatee during the summer months. The USFWS has recommended that in-water construction activities, such as pile driving, be conducted during the fall, winter, or early spring. If recommendations to avoid disturbance to the manatee are followed, this project is unlikely to affect the West Indian manatee.

***Vermivora bachmanii* (Bachman's warbler)**

Endangered

Family: Emberizidae

Date Listed: March 11, 1967

Bachman's warbler is a small (4.25- to 4.50-inch) wood warbler that exhibits a uniquely thin and decurved bill; males show a yellow chin with a black bib, a yellow to yellow-olive forehead, and a black cap. The back is olive to olive gray, and the underparts are yellow. The sexes are strongly dimorphic, with the females mostly lacking the black markings (Dunn and Garrett 1997). Bachman's warbler is thought to be a habitat specialist, frequenting canebrakes and thickets within and near mature hardwood swamp forests. Sightings in South Carolina have occurred from March to July; sightings in North Carolina are presumed to be accidental (Potter et al. 1980). The warbler may be extinct; the last certain sightings were in the Charleston, South Carolina region in 1962 (Dunn and Garrett 1997).

BIOLOGICAL CONCLUSION: MAY AFFECT, NOT LIKELY TO ADVERSELY AFFECT

The SCHTP documents no occurrence of Bachman's warbler within 5 miles of the project study area. Marginal habitat for migrating Bachman's warblers may occur within the project study area in thickets and forested areas adjoining wetlands. The USFWS recommends that disturbances to these areas be minimized to avoid adversely impacting Bachman's warbler habitat. If such disturbances are minimized, this project is not likely to affect the Bachman's warbler.

***Haliaeetus leucocephalus* (Bald eagle)**

In the July 9, 2007 Federal Register (72:37346-37372), the bald eagle was declared recovered, and removed (de-listed) from the Federal List of Threatened and Endangered wildlife. This delisting took effect August 8, 2007. After delisting, the Bald and Golden Eagle Protection Act (16 U.S.C. 668-668d) became the primary law protecting bald eagles. The Act prohibits take of bald and golden eagles and provides a statutory definition of "take" that includes "disturb". The USFWS has developed National Bald Eagle Management Guidelines (USFWS 2007) to provide guidance to land managers, landowners, and others as to how to avoid disturbing bald eagles.

Surveys for the bald eagle were recently completed by the SCDNR. According to these surveys and a letter from Charlotte Hope of the SCDNR dated April 26, 2005, no bald eagle nests occur within 1500 feet of the project study area. However, a bald eagle was sighted twice over the project study area during field studies in March. The SCHTP documents one occurrence of the bald eagle approximately 3.3 miles east of the project study area in the Francis Marion National Forest, and one occurrence 4.6 miles southwest of the project study area on the Wando River. No other occurrence is recorded within 5 miles of the project study area. The Wando River may provide foraging and perching habitat for the bald eagle, and the USFWS may require that construction activities be avoided during the nesting period (approximately December through February in South Carolina).

Additional species listed by the National Marine Fisheries as federally protected are listed in Table 7 (USFWS 1999). No habitat for any of these species is present in or near the project study area, and no occurrences are recorded by the SCHTP within five miles of the project study area. The biological conclusion is **No Effect**.

Table 7: Species under Federal Protection by the National Marine Fisheries Service

Scientific Name	Common Name	Status	County	Biological Conclusion
<i>Balaenoptera borealis</i>	Sei whale	Endangered	Charleston	NO EFFECT
<i>Balaenoptera physalus</i>	Finback whale	Endangered	Charleston	NO EFFECT
<i>Eubaleana glacialis</i>	Northern right whale	Endangered	Charleston	NO EFFECT
<i>Megaptera novaeangliae</i>	Humpback whale	Endangered	Charleston	NO EFFECT
<i>Physeter catodon</i>	Sperm whale	Endangered	Charleston	NO EFFECT

Candidate species are also noted by the USFWS (1999; 2008) and are listed in Table 8. Candidate species are plants and animals for which the USFWS has sufficient information on their biological status and threats to propose them as endangered or threatened under the ESA, but for which development of a proposed listing regulation is precluded by other higher priority listing activities. Candidate species are not protected under the ESA until they are officially proposed for listing. These species are managed by the National Marine Fisheries Service, with the exception of the red knot. No records of these species are noted by the SCHTP within five miles of the project study area.

Table 8: Candidate Species

Scientific Name	Common Name	Status	County
<i>Calidris canutus</i>	Red knot	Candidate	Charleston
<i>Carcharhinus obscurus</i>	Dusky shark	Candidate	Charleston
<i>Carcharhinus signatus</i>	Night shark	Candidate	Charleston
<i>Epinephelus drummondhayi</i>	Speckled hind	Candidate	Charleston
<i>Epinephelus itajara</i>	Jewfish	Candidate	Charleston
<i>Epinephelus nigritus</i>	Warsaw grouper	Candidate	Charleston
<i>Epinephelus striatus</i>	Nassau grouper	Candidate	Charleston
<i>Odontaspis taurus</i>	Sand tiger shark	Candidate	Charleston

4.4 Federal Species Of Concern

Thirty-eight Federal Species of Concern (FSC) are listed by the USFWS for Berkeley and Charleston Counties (March 2008 list; USFWS 2008). Federal Species of Concern are not afforded federal protection under the Endangered Species Act of 1973, as amended, and are not subject to any of its provisions, including Section 7, until they are formally proposed or listed as Threatened or Endangered. An FSC is defined as a species that is under consideration for listing for which there is insufficient information to support listing. Table 9 summarizes Federal Species of Concern listed for Berkeley and Charleston Counties.

Table 9: Federal Species of Concern listed for Berkeley and Charleston Counties.

Scientific Name	Common Name	County*
<i>Agrimonia incisa</i>	Incised groovebur	B C
<i>Aimophila aestivalis</i>	Bachman's sparrow	B C
<i>Ammodramus henslowii</i>	Henslow's sparrow	B C**
<i>Asplenium heteroresiliens</i>	Wagner's spleenwort	B

Scientific Name	Common Name	County*
<i>Carex chapmanii</i>	Chapman's sedge	B
<i>Coreopsis integrifolia</i>	Ciliate-leaf tickseed	B
<i>Corynorhinus rafinesquii</i>	Rafinesque's big-eared bat	B C
<i>Dendroica virens</i>	Black-throated green warbler	B C
<i>Desmognathus auriculatus</i>	Southern Dusky Salamander	B** C
<i>Dionaea muscipula</i>	Venus' fly-trap	C
<i>Elanoides forficatus forficatus</i>	Swallow-tailed kite	B C
<i>Elytraria caroliniensis</i>	Angiosperm (no common name)	B C
<i>Falco sparverius</i>	American kestrel	B** C
<i>Forestiera godfreyi</i>	Godfrey's privet	C
<i>Haematopus palliatus</i>	American oystercatcher	C
<i>Heterodon simus</i>	Southern hognose snake	B C
<i>Hypericum adpressum</i>	Creeping St. John's wort	C
<i>Lanius ludovicianus</i>	Loggerhead shrike	B** C**
<i>Laterallus jamaicensis</i>	Black rail	C
<i>Limnothlypis swainsonii</i>	Swainson's warbler	C
<i>Litsea aestivalis</i>	Pondspice	B C
<i>Lobelia boykinii</i>	Boykin's lobelia	B C
<i>Monotropsis odorata</i>	Sweet pinesap	C
<i>Myotis austroriparius</i>	Southeastern myotis	B C
<i>Odocoileus virginianus taurinsulae</i>	Bull's Island white-tail deer	C
<i>Ophisaurus compressus</i>	Island glass lizard	C
<i>Oxypolis ternata</i>	Savannah or Piedmont cowbane	C
<i>Passerina ciris ciris</i>	Painted bunting	B C
<i>Plantago sparsiflora</i>	Pineland plantain	B C
<i>Pteroglossaspis ecristata</i>	Crested plume orchid	B C
<i>Rana capito</i>	Gopher frog	B C
<i>Rhexia aristosa</i>	Awed meadowbeauty	B C
<i>Rhynchospora pleiantha</i>	Brown beaked-rush	B
<i>Rudbeckia heliopsisidis</i>	Sun-facing coneflower	B
<i>Smilax biltmoreana</i>	Biltmore green briar	B
<i>Sterna nilotica</i>	Gull-billed tern	C
<i>Thalictrum subrotundum</i>	Reclined meadow-rue	B
<i>Trillium pusillum var. pusillum</i>	Least trillium	B

County: B = Berkeley; C = Charleston

** Occurrence in County listed as "Possible"

Records of the SCHTP indicate that five of the FSC species are recorded within 5 miles of the project study area. These are: incised groovebur at 1.8 miles northwest of the project study area; five occurrences of pondspice at 2.0 to 4.5 miles north; Boykin's lobelia at 2.5 miles north; crested plume orchid at 1.5 miles west and 2.5 to 4.5 miles north; and 9 occurrences of gopher frog at the northern end of the project study area as well as 2.0 to 4.5 miles north. The northern and northeastern occurrences of these species are located within the Francis Marion National Forest.

4.5 State Listed Species

As of January 17, 2006, the SCHTP lists 113 species with official status ranging from imperiled to secure (SCDNR 2008). These species are listed in Table 10.

Table 10: State listed species for Berkeley and Charleston Counties

Scientific Name	Common Name	State Rank*	Listed County**
<i>Accipiter cooperii</i>	Cooper's hawk	S3?	C
<i>Acris crepitans crepitans</i>	Northern cricket frog	S5	C
<i>Agalinis aphylla</i>	Coastal plain false-foxglove	S?	B
<i>Ambystoma tigrinum tigrinum</i>	Eastern tiger salamander	S2S3	B C
<i>Amphicarpum muehlenbergianum</i>	Blue maiden-cane	S?	B C
<i>Andropogon mohrii</i>	Broomsedge	S?	B
<i>Andropogon perangustatus</i>	Narrow leaved bluestem	S1	B
<i>Anthaenaria rufa</i>	Purple silkyscale	S?	B C
<i>Aristida beyrichiana</i>	Beyrich's three-awn	S?	B
<i>Asclepias pedicellata</i>	Savannah milkweed	S1	C
<i>Asplenium resiliens</i>	Black-stem spleenwort	S1S2	B
<i>Bacopa cyclophylla</i>	Coastal-plain water-hyssop	S1	B
<i>Botrychium lunarioides</i>	Winter grape-fern	S?	C
<i>Burmannia biflora</i>	Northern burmannia	S?	B
<i>Calopogon barbatus</i>	Bearded grass-pink	S?	B C
<i>Calopogon multiflorus</i>	Many-flower grass-pink	S?	B
<i>Canna flaccida</i>	Bandana-of-the-everglades	S4	C
<i>Carex basiantha</i>	Willdenow's sedge	SR	B
<i>Carex cherokeensis</i>	Cherokee sedge	SR	B
<i>Carex crus-corvi</i>	Ravenfoot sedge	S?	B
<i>Carex decomposita</i>	Cypress-knee sedge	S?	C
<i>Carex elliotii</i>	Elliott's sedge	S?	B
<i>Carex granularis</i>	Meadow sedge	S?	B
<i>Carya myristiciformis</i>	Nutmeg hickory	S1	B
<i>Castilleja coccinea</i>	Scarlet indian-paintbrush	S2	B
<i>Chamaedaphne calyculata</i>	Leatherleaf	S?	B
<i>Charadrius wilsonia</i>	Wilson's plover	S3?	C
<i>Chasmanthium nitidum</i>	Shiny spikegrass	S?	C
<i>Clemmys guttata</i>	Spotted turtle	S5	B C
<i>Condylura cristata</i>	Star-nosed mole	S3?	C
<i>Coreopsis gladiata</i>	Southeastern tickseed	S?	B C
<i>Crotalus horridus</i>	Timber rattlesnake	S?	C
<i>Cyperus tetragonus</i>	Piedmont flatsedge	S1	C
<i>Eleocharis robbinsii</i>	Robbins spikerush	S?	B
<i>Eleocharis tricostata</i>	Three-angle spikerush	SR	B C
<i>Eleocharis vivipara</i>	Viviparous spike-rush	S?	C
<i>Epidendrum conopseum</i>	Green-fly orchid	S?	B
<i>Eryngium aquaticum</i> var. <i>ravenelii</i>	Marsh eryngo	S?	B C
<i>Eupatorium anomalum</i>	Florida thorough-wort	SR	C
<i>Eupatorium fistulosum</i>	Hollow joe-pye weed	S?	C
<i>Eupatorium recurvans</i>	Coastal-plain thorough-wort	SR	B
<i>Galactia elliotii</i>	Elliott's milkpea	SR	C
<i>Habenaria quinqueseta</i>	Long-horn orchid	S?	B
<i>Helenium pinnatifidum</i>	Southeastern sneezeweed	S?	B C
<i>Hypericum nitidum</i>	Carolina St. John's-wort	S?	C
<i>Ictinia mississippiensis</i>	Mississippi kite	S4	C
<i>Ipomoea macrorhiza</i>	Large-stem morning-glory	S1?	C
<i>Ipomoea stolonifera</i>	Beach morning-glory	S?	C

Scientific Name	Common Name	State Rank*	Listed County**
<i>Iris hexagona</i>	Walter's iris	S?	B C
<i>Lachnocaulon minus</i>	Small's bog button	SR	B
<i>Lasiurus cinereus</i>	Hoary bat	S?	C
<i>Lepuropetalon spathulatum</i>	Southern lepuropetalon	S?	C
<i>Listera australis</i>	Southern twayblade	S?	B C
<i>Ludwigia lanceolata</i>	Lance-leaf seedbox	SR	C
<i>Lysimachia hybrida</i>	Lance-leaf loosestrife	S1	B C
<i>Melanerpes erythrocephalus</i>	Red-headed woodpecker	S?	C
<i>Melanthium virginicum</i>	Virginia bunchflower	S?	B
<i>Menispermum canadense</i>	Canada moonseed	S?	B
<i>Microtus pennsylvanicus</i>	Meadow vole	S?	C
<i>Micrurus fulvius</i>	Eastern coral snake	S2	C
<i>Muhlenbergia filipes</i>	Bentgrass; hairgrass	S?	C
<i>Myriophyllum laxum</i>	Piedmont water-milfoil	S2	B
<i>Neotoma floridana</i>	Eastern woodrat	S3S4	C
<i>Neotoma floridana floridana</i>	Eastern woodrat	S3S4	B C
<i>Nerodia cyclopion</i>	Green water snake	S2	B
<i>Nerodia floridana</i>	Florida green water snake	S2	B
<i>Ophioglossum petiolatum</i>	Longstem adder's-tongue fern	S?	B
<i>Orobanche uniflora</i>	One-flowered broomrape	S?	C
<i>Paspalum bifidum</i>	Bead-grass	S?	C
<i>Pelecanus occidentalis</i>	Brown pelican	S1S2	C
<i>Peltandra sagittifolia</i>	Spoon-flower	S?	B C
<i>Phoca vitulina</i>	Harbor seal	SA	C
<i>Physostegia leptophylla</i>	Slender-leaved dragon-head	S?	B C
<i>Pieris phillyreifolia</i>	Climbing fetter-bush	S?	C
<i>Pilea fontana</i>	Springs clearweed	S?	B
<i>Pituophis melanoleucus</i>	Pine or gopher snake	S3S4	B
<i>Platanthera integra</i>	Yellow fringeless orchid	S2	B C
<i>Platanthera lacera</i>	Green-fringe orchis	S1	B
<i>Plegadis falcinellus</i>	Glossy ibis	S?	C
<i>Ponthieva racemosa</i>	Shadow-witch orchid	S?	B
<i>Pseudobranchius striatus</i>	Dwarf siren	S2	C
<i>Psilotum nudum</i>	Whisk fern	S1S2	C
<i>Quercus austrina</i>	Bluff oak	S?	C
<i>Quercus similis</i>	Bottom-land post oak	S1	B
<i>Rhynchospora breviseta</i>	Short-bristle baldrush	S?	B C
<i>Rhynchospora careyana</i>	Horned beakrush	SR	B C
<i>Rhynchospora cephalantha</i> var. <i>attenuata</i>	Bunched beaksedge	SR	B
<i>Rhynchospora globularis</i> var. <i>pinetorum</i>	Beakrush	S?	C
<i>Rhynchospora harperi</i>	Harper beakrush	S?	B C
<i>Rhynchospora inundata</i>	Drowned hornedrush	S?	B C
<i>Rhynchospora oligantha</i>	Few-flowered beaked-rush	S?	B
<i>Rhynchospora stenophylla</i>	Chapman beakrush	S?	B
<i>Rhynchospora tracyi</i>	Tracy beakrush	S?	B
<i>Sageretia minutiflora</i>	Tiny-leaved buckthorn	S2	C
<i>Sarracenia rubra</i>	Sweet pitcher-plant	S4	B C
<i>Sciurus niger</i>	Eastern fox squirrel	S4	C
<i>Scleria baldwinii</i>	Baldwin nutrush	S1S2	B C

Scientific Name	Common Name	State Rank*	Listed County**
<i>Seminatrix pygaea</i>	Black swamp snake	S?	B C
<i>Spiranthes laciniata</i>	Lace-lip ladies'-tresses	S1	B C
<i>Sporobolus curtissii</i>	Pineland dropseed	SR	B
<i>Sporobolus pinetorum</i>	Carolina dropseed	SR	B
<i>Sterna antillarum</i>	Least tern	S3	B C
<i>Tridens carolinianus</i>	Carolina fluff grass	S?	B C
<i>Tridens chapmanii</i>	Chapman's redtop	S?	C
<i>Triphora trianthophora</i>	Nodding pogonia	S2	B C
<i>Tyto alba</i>	Barn-owl	S4	C
<i>Ursus americanus</i>	Black bear	S3?	C
<i>Utricularia macrorhiza</i>	Greater bladderwort	SR	B
<i>Xyris brevifolia</i>	Short-leaved yellow-eyed grass	S?	B
<i>Xyris difformis</i> var. <i>floridana</i>	Florida yellow-eyed grass	SR	B C
<i>Xyris elliotii</i>	Elliott yellow-eyed grass	S2	B C
<i>Xyris flabelliformis</i>	Savannah yellow-eyed grass	SR	B
<i>Xyris stricta</i>	Pineland yellow-eyed grass	SR	C

* State Rank - the Nature Conservancy rating of degree of endangerment in South Carolina:

S1 - Critically imperiled state-wide because of extreme rarity or because of some factor(s) making it especially vulnerable to extirpation

S2 - Imperiled state-wide because of rarity or factor(s) making it vulnerable

S3 - Rare or uncommon in state

S4 - Apparently secure in state

S5 - Demonstrably secure in state

SA - Accidental in state (usually birds or butterflies that are far outside normal range)

SR - Reported in state, but without good documentation

S? - Status unknown

** County: B = Berkeley; C = Charleston

Recorded occurrences of these species consist of: eastern tiger salamander at 3.6 miles north of the project study area; northern burmannia at 3.0 miles northwest; southeastern tickseed at 4.7 miles north; southern twayblade 4.5 miles southeast; longstem adder's-tongue fern at the northern end of the project study area; yellow fringeless orchid at 4.7 miles north; sweet pitcher-plant at 2.0 to 2.5 miles north; black swamp snake at 2.0 miles north; least tern at 4.5 miles northwest; and Elliott yellow-eyed grass at 2 to 3 miles north.

SCHTP records indicate that no state-listed species has been recorded to occur within the project study area. At this time, no further action is warranted.

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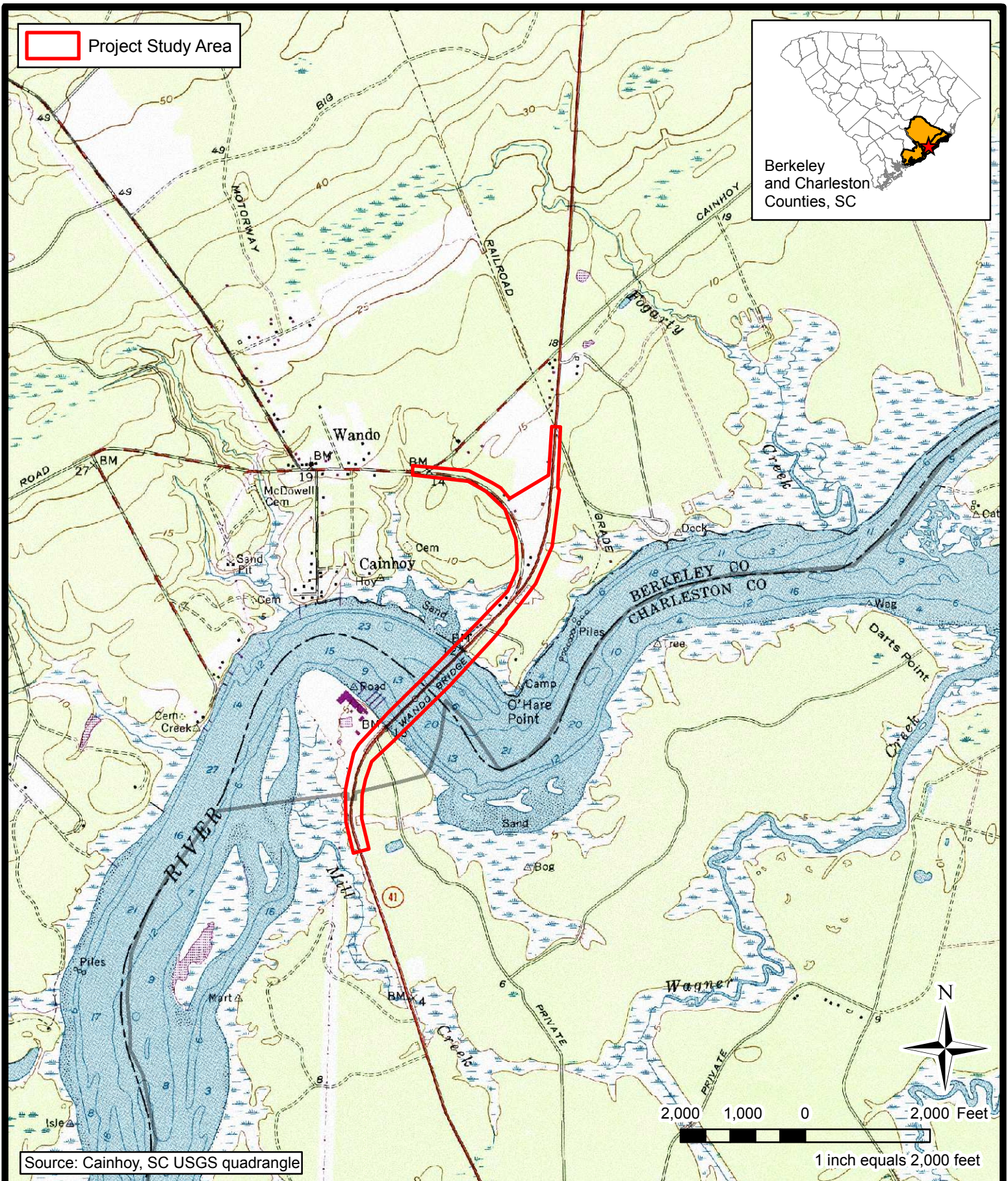
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APPENDIX A

FIGURES



PROJECT LOCATION

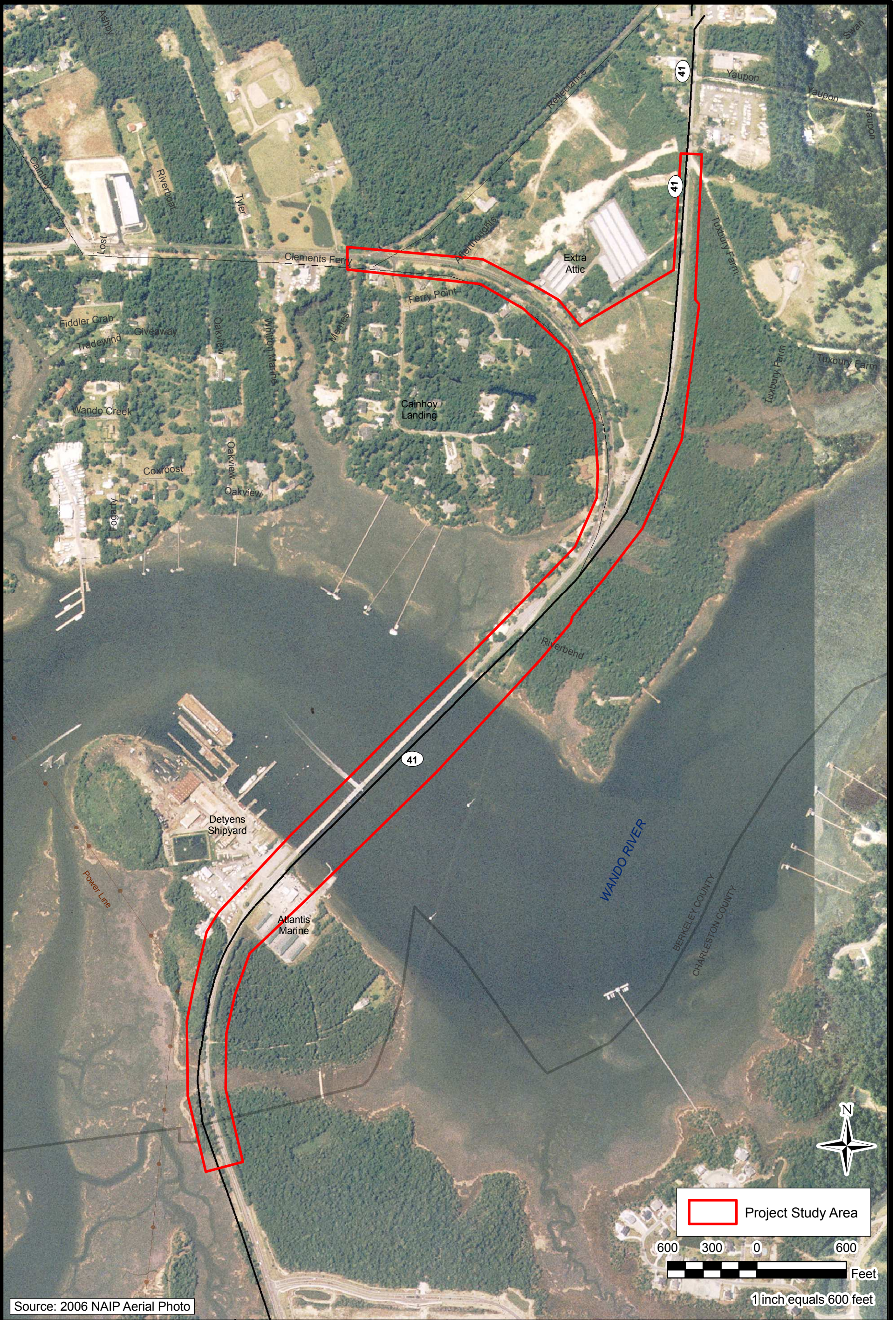
SC 41 Bridge Replacement
over the Wando River


Berkeley and Charleston Counties, South Carolina

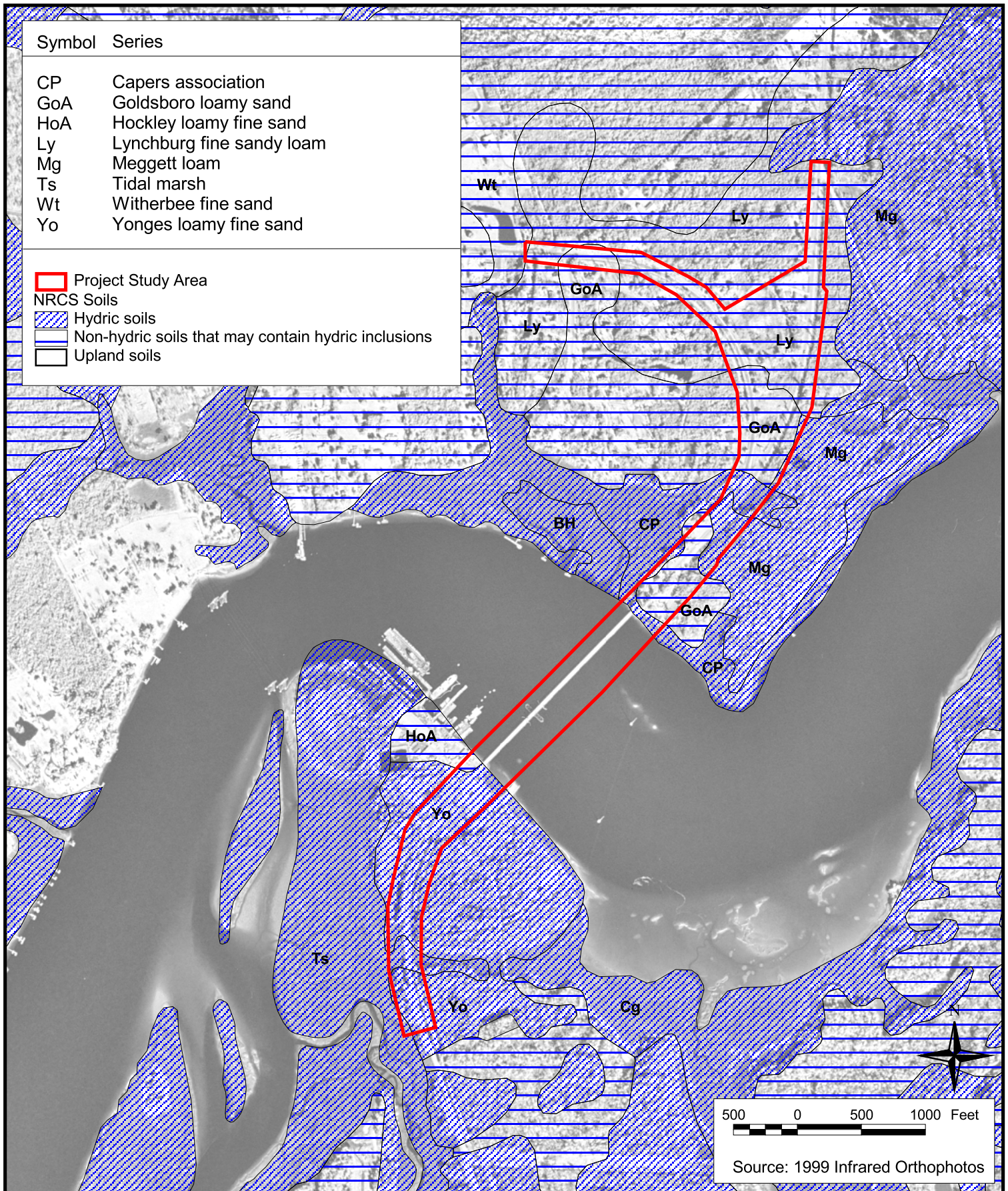
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ESC Project No.:	05-224		

FIGURE

1



	Project:	SC 41 Bridge Replacement over the Wando River Berkeley and Charleston Counties, South Carolina	Title:	EXISTING CONDITIONS	Dwn By:	Ckd By:	FIGURE 2
			ES		ES		
	Date:		Scale:				
	APR 2008		As Shown				
	ESC Project No.:				05-224		



NRCS SOILS

SC 41 Bridge Replacement
over the Wando River (River Mile 10)
Charleston and Berkeley Counties, South Carolina

Drawn By:

ES

Scale:

1" = 1000'

Date:

DEC 2005

ESC Project:

05-224

FIGURE

3

Client:



SCDOT

Project:

SC 41
Bridge
Replacement
over the
Wando
River

Berkeley
and
Charleston
Counties,
South Carolina

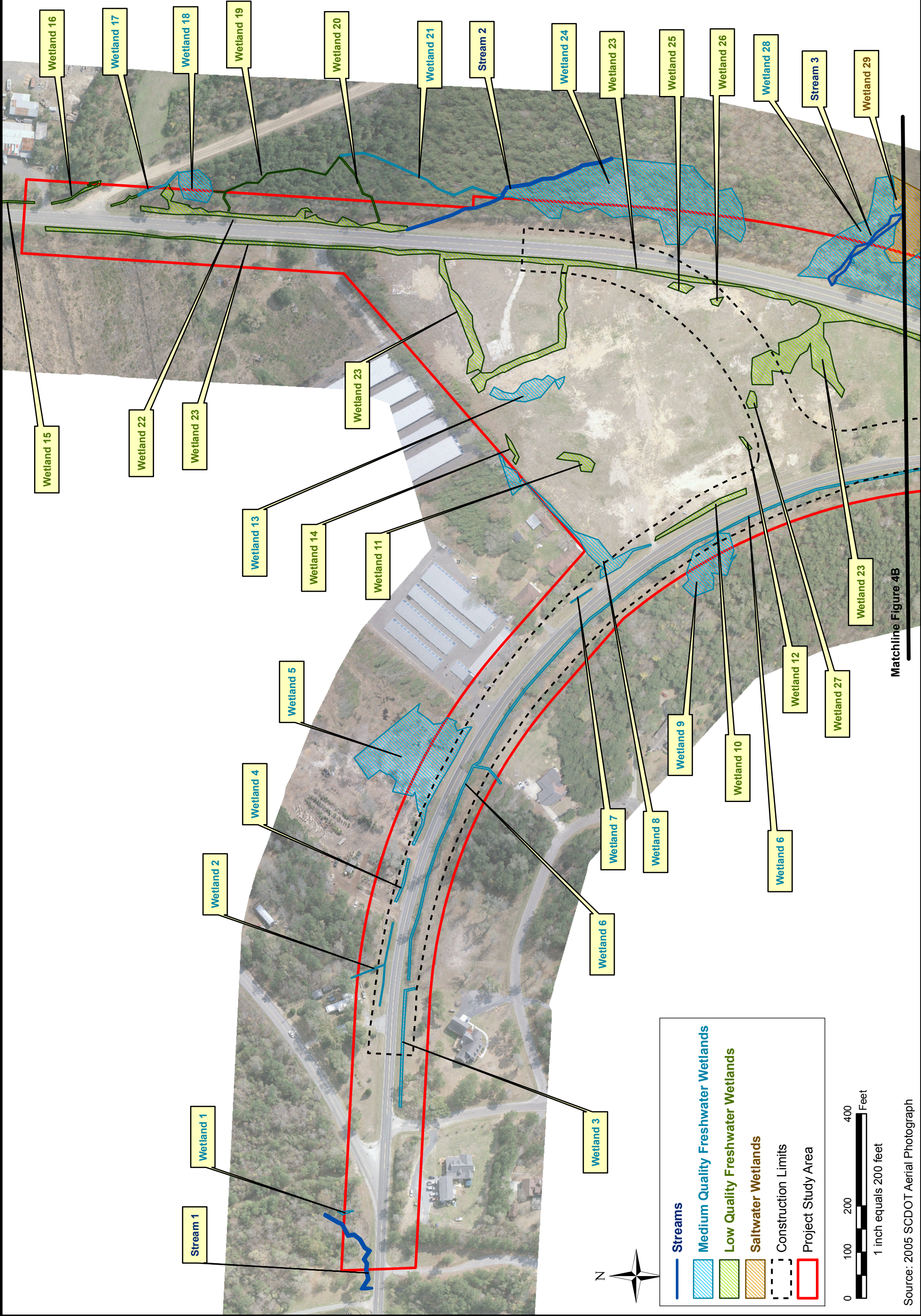
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JURISDICTIONAL
AREAS

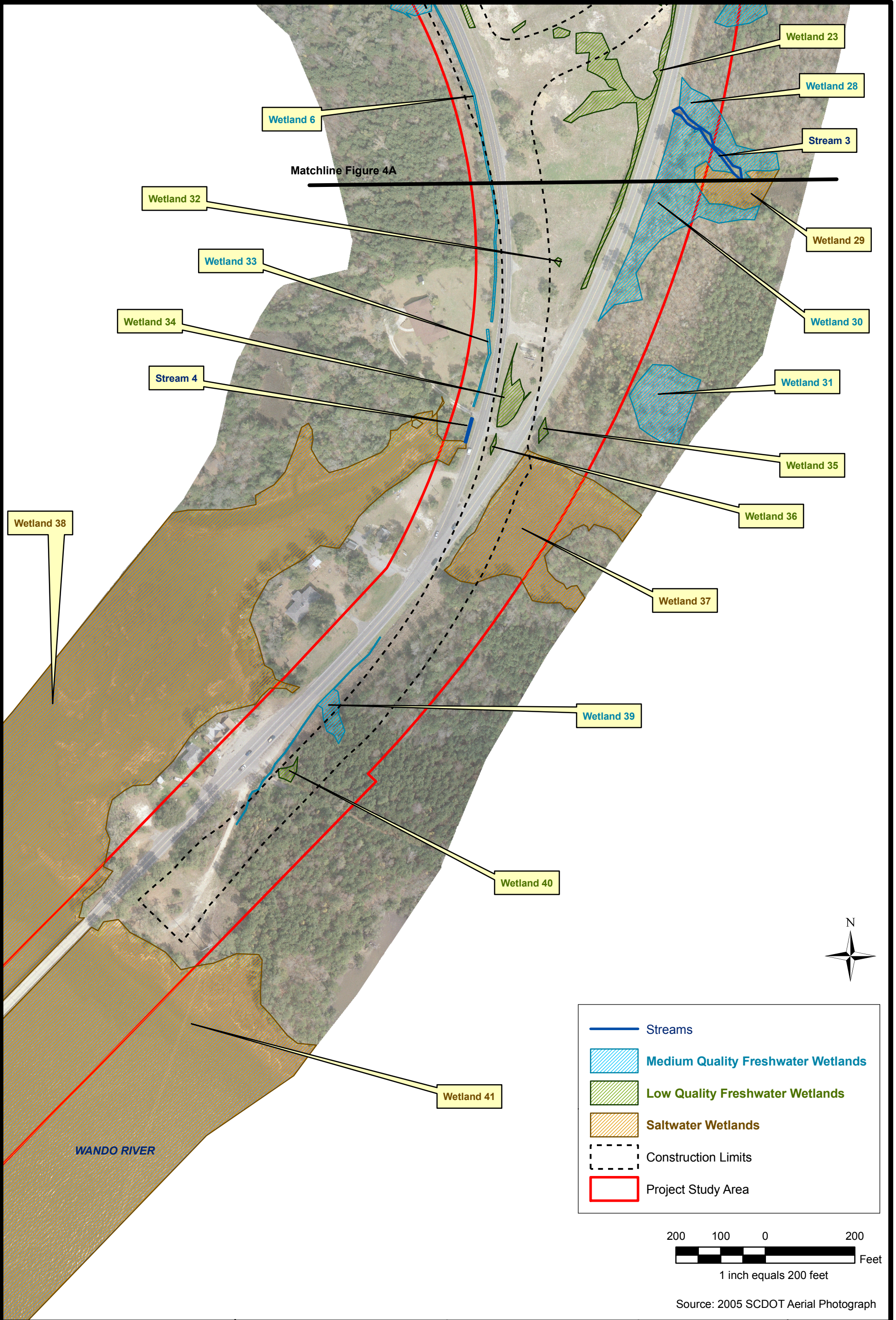
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Date:	APR 2008	Scale:	As Shown
ESC Project No.:		05-224	


FIGURE

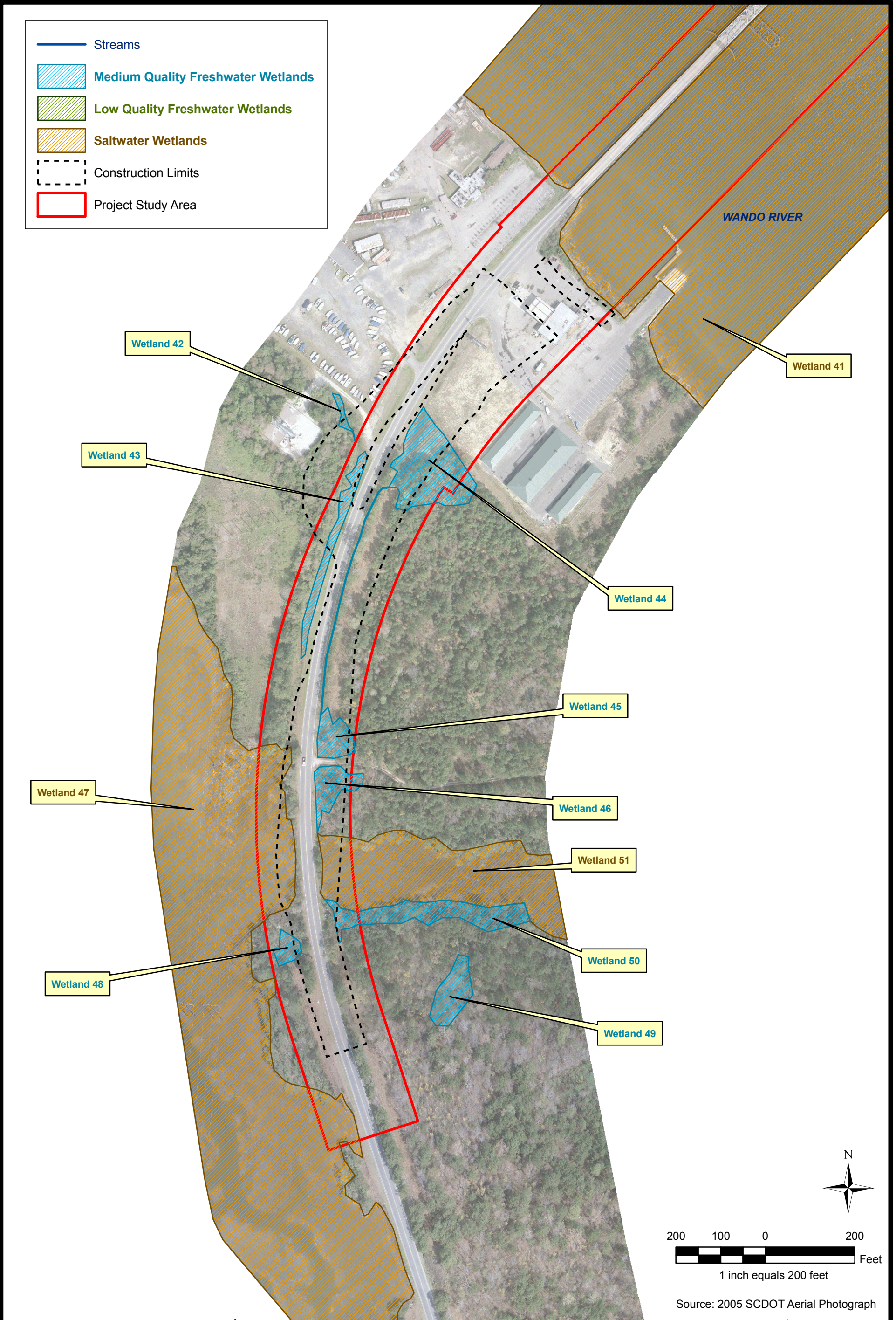
4A




Source: 2005 SCDOT Aerial Photograph



	Project: SC 41 Bridge Replacement over the Wando River Berkeley and Charleston Counties, South Carolina	Title: JURISDICTIONAL AREAS	Dwn By:	Ckd By:	FIGURE 4B
			ES	ES	
			Date:	Scale:	
			APR 2008	As Shown	
			ESC Project No.:		
			05-224		



	Project:	SC 41	Title:	JURISDICTIONAL AREAS	Dwn By:	Ckd By:	FIGURE 4C
		Bridge Replacement over the Wando River			ES	ES	
					Date:	Scale:	
		Berkeley and Charleston Counties, South Carolina			APR 2008	As Shown	
					ESC Project No.:		
					05-224		

APPENDIX B

COMPLETED U.S. ARMY CORPS OF ENGINEERS ROUTINE WETLAND DETERMINATION FORMS

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: <u>SC 41</u>	Date: <u>3/09/05</u>
Applicant/Owner: <u>SCDOT</u>	County: <u>Berkeley</u>
Investigator: <u>EcoScience Corporation / Davis</u>	State: <u>SC</u>
Do Normal Circumstances exist on the site? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Community ID: <u>Disturbed/Maintained</u>
Is the site significantly disturbed (Atypical Situation)? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Transect ID: <u>SE04</u>
Is the area a potential Problem Area? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No (If needed, explain on reverse.)	Plot ID: <u>upland</u>

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. <u>Morella cerifera</u>	<u>S</u>	<u>FAC+</u>	9. _____	_____	_____
2. <u>Lonicera japonica</u>	<u>V</u>	<u>FAC-</u>	10. _____	_____	_____
3. <u>Magnolia grandiflora</u>	<u>S</u>	<u>FAC+</u>	11. _____	_____	_____
4. _____	_____	_____	12. _____	_____	_____
5. _____	_____	_____	13. _____	_____	_____
6. _____	_____	_____	14. _____	_____	_____
7. _____	_____	_____	15. _____	_____	_____
8. _____	_____	_____	16. _____	_____	_____

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-). 67%

Remarks:

HYDROLOGY

<input type="checkbox"/> Recorded Data (Describe in Remarks): <input type="checkbox"/> Stream, Lake, or Tide Gauge <input type="checkbox"/> Aerial Photographs <input type="checkbox"/> Other <input checked="" type="checkbox"/> No Recorded Data Available	Wetland Hydrology Indicators: Primary Indicators: <input type="checkbox"/> Inundated <input type="checkbox"/> Saturated in Upper 12 Inches <input type="checkbox"/> Water Marks <input type="checkbox"/> Drift Lines <input type="checkbox"/> Sediment Deposits <input type="checkbox"/> Drainage Patterns in Wetlands Secondary Indicators (2 or more required): <input type="checkbox"/> Oxidized Root Channels in Upper 12 Inches <input type="checkbox"/> Water-Stained Leaves <input type="checkbox"/> Local Soil Survey Data <input checked="" type="checkbox"/> FAC-Neutral Test <input type="checkbox"/> Other (Explain in Remarks)
Field Observations: Depth of Surface Water: <u> </u> - <u> </u> (in.) Depth to Free Water in Pit: <u> </u> 12+ <u> </u> (in.) Depth to Saturated Soil: <u> </u> 12+ <u> </u> (in.)	Remarks:

SOILS

Map Unit Name (Series and Phase): _____		Drainage Class: _____	
Taxonomy (Subgroup): _____		Field Observations Confirm Mapped Type? <input type="checkbox"/> Yes <input type="checkbox"/> No	

Profile Descriptions: Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/ Size/Contrast	Texture, Concretions, Structure, etc,
0-12		10yr 2/1			clay loam

Hydric Soil Indicators:

<input type="checkbox"/> Histosol <input type="checkbox"/> Histic Epipedon <input type="checkbox"/> Sulfidic Odor <input type="checkbox"/> Aquic Moisture Regime <input type="checkbox"/> Reducing Conditions <input type="checkbox"/> Gleyed or Low-Chroma Colors	<input type="checkbox"/> Concretions <input type="checkbox"/> High Organic Content in Surface Layer in Sandy Soils <input type="checkbox"/> Organic Streaking in Sandy Soils <input type="checkbox"/> Listed on Local Hydric Soils List <input type="checkbox"/> Listed on National Hydric Soils List <input type="checkbox"/> Other (Explain in Remarks)
---	--

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No (Check) Wetland Hydrology Present? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Hydric Soils Present? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	(Check) Is this Sampling Point Within a Wetland? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Remarks	

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: <u>SC 41</u>	Date: <u>3/09/05</u>
Applicant/Owner: <u>SCDOT</u>	County: <u>Berkeley</u>
Investigator: <u>EcoScience Corporation / Davis</u>	State: <u>SC</u>
Do Normal Circumstances exist on the site? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Community ID: <u>Disturbed/Maintained</u>
Is the site significantly disturbed (Atypical Situation)? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Transect ID: <u>SE04</u>
Is the area a potential Problem Area? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No (If needed, explain on reverse.)	Plot ID: <u>wetland</u>

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. <u>Morella cerifera</u>	<u>S</u>	<u>FAC+</u>	9. _____	_____	_____
2. <u>Salix nigra</u>	<u>S</u>	<u>OBL</u>	10. _____	_____	_____
3. <u>Acer rubrum</u>	<u>C</u>	<u>FAC</u>	11. _____	_____	_____
4. <u>Sphagnum sp.</u>	<u>H</u>	<u>-</u>	12. _____	_____	_____
5. <u>Lonicera japonica</u>	<u>V</u>	<u>FAC-</u>	13. _____	_____	_____
6. _____	_____	_____	14. _____	_____	_____
7. _____	_____	_____	15. _____	_____	_____
8. _____	_____	_____	16. _____	_____	_____

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-). 60-80%

Remarks:

HYDROLOGY

<input type="checkbox"/> Recorded Data (Describe in Remarks): <input type="checkbox"/> Stream, Lake, or Tide Gauge <input type="checkbox"/> Aerial Photographs <input type="checkbox"/> Other <input checked="" type="checkbox"/> No Recorded Data Available	Wetland Hydrology Indicators: Primary Indicators: <input type="checkbox"/> Inundated <input checked="" type="checkbox"/> Saturated in Upper 12 Inches <input type="checkbox"/> Water Marks <input type="checkbox"/> Drift Lines <input type="checkbox"/> Sediment Deposits <input type="checkbox"/> Drainage Patterns in Wetlands Secondary Indicators (2 or more required): <input type="checkbox"/> Oxidized Root Channels in Upper 12 Inches <input checked="" type="checkbox"/> Water-Stained Leaves <input type="checkbox"/> Local Soil Survey Data <input checked="" type="checkbox"/> FAC-Neutral Test <input type="checkbox"/> Other (Explain in Remarks)
Field Observations: Depth of Surface Water: _____ (in.) Depth to Free Water in Pit: <u>1</u> (in.) Depth to Saturated Soil: <u>0</u> (in.)	
Remarks:	

SOILS

Map Unit Name (Series and Phase): _____		Drainage Class: _____	
Taxonomy (Subgroup): _____		Field Observations Confirm Mapped Type? <input type="checkbox"/> Yes <input type="checkbox"/> No	

Profile Descriptions: Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/ Size/Contrast	Texture, Concretions, Structure, etc,
0-5		10yr 2/1			clay loam
5-9		10yr 3/1			sandy clay loam
9-12		2.5y 4/2			sand

Hydric Soil Indicators:

<input type="checkbox"/> Histosol <input type="checkbox"/> Histic Epipedon <input type="checkbox"/> Sulfidic Odor <input type="checkbox"/> Aquic Moisture Regime <input checked="" type="checkbox"/> Reducing Conditions <input checked="" type="checkbox"/> Gleyed or Low-Chroma Colors	<input type="checkbox"/> Concretions <input type="checkbox"/> High Organic Content in Surface Layer in Sandy Soils <input type="checkbox"/> Organic Streaking in Sandy Soils <input type="checkbox"/> Listed on Local Hydric Soils List <input type="checkbox"/> Listed on National Hydric Soils List <input type="checkbox"/> Other (Explain in Remarks)
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Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No (Check) Wetland Hydrology Present? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Hydric Soils Present? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	(Check) Is this Sampling Point Within a Wetland? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Remarks: Medium quality freshwater wetland	

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: <u>SC 41</u>	Date: <u>3/9/05</u>
Applicant/Owner: <u>SCDOT</u>	County: <u>Berkeley</u>
Investigator: <u>EcoScience Corporation / Saunders</u>	State: <u>South Carolina</u>
Do Normal Circumstances exist on the site? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Community ID: <u>Upland</u>
Is the site significantly disturbed (Atypical Situation)? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Transect ID: <u>SJ</u>
Is the area a potential Problem Area? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No (If needed, explain on reverse.)	Plot ID: _____

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. <u>Andropogon virginicus</u>	<u>herb</u>	<u>FAC-</u>	9. _____	_____	_____
2. <u>Quercus laurifolia</u>	<u>tree</u>	<u>FACW</u>	10. _____	_____	_____
3. <u>Lespedeza sp.</u>	<u>herb</u>	<u>N/A</u>	11. _____	_____	_____
4. <u>Festuca sp.</u>	<u>herb</u>	<u>N/A</u>	12. _____	_____	_____
5. _____	_____	_____	13. _____	_____	_____
6. _____	_____	_____	14. _____	_____	_____
7. _____	_____	_____	15. _____	_____	_____
8. _____	_____	_____	16. _____	_____	_____

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-). 50

Remarks: _____

HYDROLOGY

<input type="checkbox"/> Recorded Data (Describe in Remarks): <input type="checkbox"/> Stream, Lake, or Tide Gauge <input type="checkbox"/> Aerial Photographs <input type="checkbox"/> Other <input type="checkbox"/> No Recorded Data Available	Wetland Hydrology Indicators: Primary Indicators: <input type="checkbox"/> Inundated <input type="checkbox"/> Saturated in Upper 12 Inches <input type="checkbox"/> Water Marks <input type="checkbox"/> Drift Lines <input type="checkbox"/> Sediment Deposits <input type="checkbox"/> Drainage Patterns in Wetlands Secondary Indicators (2 or more required): <input type="checkbox"/> Oxidized Root Channels in Upper 12 Inches <input type="checkbox"/> Water-Stained Leaves <input type="checkbox"/> Local Soil Survey Data <input checked="" type="checkbox"/> FAC-Neutral Test <input type="checkbox"/> Other (Explain in Remarks)
Field Observations: Depth of Surface Water: <u>N/A</u> (in.) Depth to Free Water in Pit: <u>N/A</u> (in.) Depth to Saturated Soil: <u>N/A</u> (in.)	
Remarks: <u>No Hydrologic Indicators!</u>	

SOILS

Map Unit Name (Series and Phase):		<u>Lynchburg Fine Sandy Loam</u>		Drainage Class:	<u>Somewhat poorly-drained</u>
Taxonomy (Subgroup):		<u>Aeric Paleaquults</u>		Field Observations	Confirm Mapped Type? <input type="checkbox"/> Yes <input type="checkbox"/> No

Profile Descriptions: Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/ Size/Contrast	Texture, Concretions, Structure, etc,
0-12+		2.5Y 2.5/1	8		sandy clay loam

Hydric Soil Indicators:

<input type="checkbox"/> Histosol <input type="checkbox"/> Histic Epipedon <input type="checkbox"/> Sulfidic Odor <input type="checkbox"/> Aquic Moisture Regime <input type="checkbox"/> Reducing Conditions <input type="checkbox"/> Gleyed or Low-Chroma Colors	<input type="checkbox"/> Concretions <input type="checkbox"/> High Organic Content in Surface Layer in Sandy Soils <input type="checkbox"/> Organic Streaking in Sandy Soils <input type="checkbox"/> Listed on Local Hydric Soils List <input type="checkbox"/> Listed on National Hydric Soils List <input type="checkbox"/> Other (Explain in Remarks)
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Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No (Check) Wetland Hydrology Present? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Hydric Soils Present? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	(Check) Is this Sampling Point Within a Wetland? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Remarks	

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: <u>SC 41</u>	Date: <u>3/9/05</u>
Applicant/Owner: <u>SCDOT</u>	County: <u>Berkeley</u>
Investigator: <u>EcoScience Corporation / Saunders</u>	State: <u>South Carolina</u>
Do Normal Circumstances exist on the site? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Community ID: <u>Wetland</u>
Is the site significantly disturbed (Atypical Situation)? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Transect ID: <u>SJ</u>
Is the area a potential Problem Area? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No (If needed, explain on reverse.)	Plot ID: _____

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. <u>Andropogon spp.</u>	<u>herb</u>	<u>N/A</u>	9. _____	_____	_____
2. <u>Juncus sp.</u>	<u>herb</u>	<u>N/A</u>	10. _____	_____	_____
3. <u>Salix nigra</u>	<u>tree</u>	<u>OBL</u>	11. _____	_____	_____
4. <u>Liquidambar styraciflua</u>	<u>tree</u>	<u>FAC+</u>	12. _____	_____	_____
5. <u>Typha sp.</u>	<u>herb</u>	<u>N/A</u>	13. _____	_____	_____
6. <u>Scripus cyperinus</u>	<u>herb</u>	<u>OBL</u>	14. _____	_____	_____
7. <u>Ludwigia alternifolia</u>	<u>herb</u>	<u>OBL</u>	15. _____	_____	_____
8. _____	_____	_____	16. _____	_____	_____

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-). 100

Remarks:

HYDROLOGY

<input type="checkbox"/> Recorded Data (Describe in Remarks): <input type="checkbox"/> Stream, Lake, or Tide Gauge <input type="checkbox"/> Aerial Photographs <input type="checkbox"/> Other <input type="checkbox"/> No Recorded Data Available	Wetland Hydrology Indicators: Primary Indicators: <input checked="" type="checkbox"/> Inundated <input checked="" type="checkbox"/> Saturated in Upper 12 Inches <input type="checkbox"/> Water Marks <input type="checkbox"/> Drift Lines <input type="checkbox"/> Sediment Deposits <input checked="" type="checkbox"/> Drainage Patterns in Wetlands Secondary Indicators (2 or more required): <input type="checkbox"/> Oxidized Root Channels in Upper 12 Inches <input type="checkbox"/> Water-Stained Leaves <input type="checkbox"/> Local Soil Survey Data <input checked="" type="checkbox"/> FAC-Neutral Test <input type="checkbox"/> Other (Explain in Remarks)
Field Observations: Depth of Surface Water: <u>0-6</u> (in.) Depth to Free Water in Pit: <u>N/A</u> (in.) Depth to Saturated Soil: <u>N/A</u> (in.)	
Remarks:	

SOILS

Map Unit Name (Series and Phase):		<u>Lynchburg Fine Sandy Loam</u>		Drainage Class:	<u>Somewhat poorly-drained</u>
Taxonomy (Subgroup):		<u>Aeric Paleaquults</u>		Field Observations	Confirm Mapped Type? <input type="checkbox"/> Yes <input type="checkbox"/> No

Profile Descriptions: Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/ Size/Contrast	Texture, Concretions, Structure, etc,
0-8		2.5Y 2.5/1			clay loam
8-12+		2.5Y 6/1	2.5Y 6/6		sandy clay loam

Hydric Soil Indicators:

<input type="checkbox"/> Histosol <input type="checkbox"/> Histic Epipedon <input type="checkbox"/> Sulfidic Odor <input type="checkbox"/> Aquic Moisture Regime <input type="checkbox"/> Reducing Conditions <input type="checkbox"/> Gleyed or Low-Chroma Colors	<input type="checkbox"/> Concretions <input type="checkbox"/> High Organic Content in Surface Layer in Sandy Soils <input type="checkbox"/> Organic Streaking in Sandy Soils <input type="checkbox"/> Listed on Local Hydric Soils List <input type="checkbox"/> Listed on National Hydric Soils List <input type="checkbox"/> Other (Explain in Remarks)
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Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No (Check) Wetland Hydrology Present? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Hydric Soils Present? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	(Check) Is this Sampling Point Within a Wetland? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Remarks: Medium quality freshwater wetland	

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: <u>SC 41</u>	Date: <u>3/09/05</u>
Applicant/Owner: <u>SCDOT</u>	County: <u>Berkeley</u>
Investigator: <u>EcoScience Corporation / Davis</u>	State: <u>SC</u>
Do Normal Circumstances exist on the site? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Community ID: <u>Disturbed/Maintained</u>
Is the site significantly disturbed (Atypical Situation)? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Transect ID: <u>SM04</u>
Is the area a potential Problem Area? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No (If needed, explain on reverse.)	Plot ID: <u>upland</u>

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. <u>Morella cerifera</u>	<u>S</u>	<u>FAC+</u>	9. _____	_____	_____
2. <u>Smilax rotundifolia</u>	<u>V</u>	<u>FAC</u>	10. _____	_____	_____
3. <u>Sabal minor</u>	<u>S</u>	<u>FACW</u>	11. _____	_____	_____
4. <u>Rubus sp.</u>	<u>S</u>	<u>-</u>	12. _____	_____	_____
5. _____	_____	_____	13. _____	_____	_____
6. _____	_____	_____	14. _____	_____	_____
7. _____	_____	_____	15. _____	_____	_____
8. _____	_____	_____	16. _____	_____	_____

Percent of Dominant Species that are OBL, FACW or FAC
(excluding FAC-). 75-100%

Remarks:

HYDROLOGY

<input type="checkbox"/> Recorded Data (Describe in Remarks): <input type="checkbox"/> Stream, Lake, or Tide Gauge <input type="checkbox"/> Aerial Photographs <input type="checkbox"/> Other <input checked="" type="checkbox"/> No Recorded Data Available	Wetland Hydrology Indicators: Primary Indicators: <input type="checkbox"/> Inundated <input type="checkbox"/> Saturated in Upper 12 Inches <input type="checkbox"/> Water Marks <input type="checkbox"/> Drift Lines <input type="checkbox"/> Sediment Deposits <input type="checkbox"/> Drainage Patterns in Wetlands Secondary Indicators (2 or more required): <input type="checkbox"/> Oxidized Root Channels in Upper 12 Inches <input type="checkbox"/> Water-Stained Leaves <input type="checkbox"/> Local Soil Survey Data <input checked="" type="checkbox"/> FAC-Neutral Test <input type="checkbox"/> Other (Explain in Remarks)
Field Observations: Depth of Surface Water: <u> - </u> (in.) Depth to Free Water in Pit: <u> 12+ </u> (in.) Depth to Saturated Soil: <u> 12+ </u> (in.)	
Remarks:	

SOILS

Map Unit Name (Series and Phase): _____		Drainage Class: _____	
Taxonomy (Subgroup): _____		Field Observations Confirm Mapped Type? <input type="checkbox"/> Yes <input type="checkbox"/> No	

Profile Descriptions: Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/ Size/Contrast	Texture, Concretions, Structure, etc,
0-3		10yr 3/1			sandy loam
3-9		10yr 3/2			sandy loam
9-12		2.5y 3/2	2.5y 6/6	30%	sandy loam

Hydric Soil Indicators:

<input type="checkbox"/> Histosol <input type="checkbox"/> Histic Epipedon <input type="checkbox"/> Sulfidic Odor <input type="checkbox"/> Aquic Moisture Regime <input type="checkbox"/> Reducing Conditions <input checked="" type="checkbox"/> Gleyed or Low-Chroma Colors	<input type="checkbox"/> Concretions <input type="checkbox"/> High Organic Content in Surface Layer in Sandy Soils <input type="checkbox"/> Organic Streaking in Sandy Soils <input type="checkbox"/> Listed on Local Hydric Soils List <input type="checkbox"/> Listed on National Hydric Soils List <input type="checkbox"/> Other (Explain in Remarks)
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Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No (Check) Wetland Hydrology Present? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Hydric Soils Present? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	(Check) Is this Sampling Point Within a Wetland? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Remarks:	

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: <u>SC 41</u>	Date: <u>3/09/05</u>
Applicant/Owner: <u>SCDOT</u>	County: <u>Berkeley</u>
Investigator: <u>EcoScience Corporation / Davis</u>	State: <u>SC</u>
Do Normal Circumstances exist on the site? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Community ID: <u>Disturbed/Maintained</u>
Is the site significantly disturbed (Atypical Situation)? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Transect ID: <u>SM04</u>
Is the area a potential Problem Area? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No (If needed, explain on reverse.)	Plot ID: <u>wetland</u>

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. <u>Morella cerifera</u>	<u>S</u>	<u>FAC+</u>	9. _____	_____	_____
2. <u>Scirpus cyperinus</u>	<u>S</u>	<u>OBL</u>	10. _____	_____	_____
3. <u>Typha latifolia</u>	<u>S</u>	<u>OBL</u>	11. _____	_____	_____
4. <u>Liquidambar styraciflua</u>	<u>S</u>	<u>FAC+</u>	12. _____	_____	_____
5. <u>Juncus effusus</u>	<u>H</u>	<u>FACW+</u>	13. _____	_____	_____
6. <u>Arundinaria gigantea</u>	<u>S</u>	<u>FACW</u>	14. _____	_____	_____
7. <u>Quercus laurifolia</u>	<u>C</u>	<u>FACW</u>	15. _____	_____	_____
8. <u>Salix nigra</u>	<u>S</u>	<u>OBL</u>	16. _____	_____	_____
Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-). 100%					
Remarks:					

HYDROLOGY

<input type="checkbox"/> Recorded Data (Describe in Remarks): <input type="checkbox"/> Stream, Lake, or Tide Gauge <input type="checkbox"/> Aerial Photographs <input type="checkbox"/> Other <input checked="" type="checkbox"/> No Recorded Data Available	Wetland Hydrology Indicators: Primary Indicators: <input type="checkbox"/> Inundated <input checked="" type="checkbox"/> Saturated in Upper 12 Inches <input type="checkbox"/> Water Marks <input type="checkbox"/> Drift Lines <input type="checkbox"/> Sediment Deposits <input checked="" type="checkbox"/> Drainage Patterns in Wetlands Secondary Indicators (2 or more required): <input type="checkbox"/> Oxidized Root Channels in Upper 12 Inches <input type="checkbox"/> Water-Stained Leaves <input type="checkbox"/> Local Soil Survey Data <input checked="" type="checkbox"/> FAC-Neutral Test <input type="checkbox"/> Other (Explain in Remarks)
Field Observations: Depth of Surface Water: _____ (in.) Depth to Free Water in Pit: <u>6</u> (in.) Depth to Saturated Soil: <u>0</u> (in.)	
Remarks:	

SOILS

Map Unit Name (Series and Phase): _____		Drainage Class: _____	
Taxonomy (Subgroup): _____		Field Observations Confirm Mapped Type? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	

Profile Descriptions: Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/ Size/Contrast	Texture, Concretions, Structure, etc,
0-6		10yr 2/1			sandy loam
6-12		2.5y 4/1			sandy loam

Hydric Soil Indicators:

<input type="checkbox"/> Histosol <input type="checkbox"/> Histic Epipedon <input type="checkbox"/> Sulfidic Odor <input type="checkbox"/> Aquic Moisture Regime <input type="checkbox"/> Reducing Conditions <input checked="" type="checkbox"/> Gleyed or Low-Chroma Colors	<input type="checkbox"/> Concretions <input type="checkbox"/> High Organic Content in Surface Layer in Sandy Soils <input type="checkbox"/> Organic Streaking in Sandy Soils <input type="checkbox"/> Listed on Local Hydric Soils List <input type="checkbox"/> Listed on National Hydric Soils List <input type="checkbox"/> Other (Explain in Remarks)
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Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No (Check) Wetland Hydrology Present? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Hydric Soils Present? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	(Check) Is this Sampling Point Within a Wetland? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Remarks: Medium quality freshwater wetland	

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: SC 41 – Wando Bridge	Date: 3/15/05
Applicant/Owner: SCDOT	County: Berkeley/Charleston
Investigator: Allen - EcoScience	State: SC
Do Normal Circumstances Exist on the Site? Yes No	Community ID: Disturbed
Is the site significantly disturbed (Atypical)? Yes No	Transect ID: BA02
Is the area a potential problem area? Yes No	Plot ID: Upland

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. <i>Pinus taeda</i>	Tree	FAC	9. _____	_____	_____
2. <i>Morella cerifera</i>	Shrub	FAC+	10. _____	_____	_____
3. <i>Festuca sp.</i>	Herb	-	11. _____	_____	_____
4. _____	_____	_____	12. _____	_____	_____
5. _____	_____	_____	13. _____	_____	_____
6. _____	_____	_____	14. _____	_____	_____
7. _____	_____	_____	15. _____	_____	_____
8. _____	_____	_____	16. _____	_____	_____

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-) 100%

Remarks:

HYDROLOGY

<p>_____ Recorded Data (Describe in Remarks)</p> <p>_____ Stream, Lake or Tide Gauge</p> <p>_____ Aerial Photographs</p> <p>_____ Other</p> <p><u> x </u> No Recorded Data Available</p> <p><i>Field Observations:</i></p> <p>Depth of Surface Water: <u> 0 </u> (in.)</p> <p>Depth to Free Water in Pit: <u> 0 </u> (in.)</p> <p>Depth to Saturated Soil: <u> > 12 </u> (in.)</p>	<p><i>Primary Wetland Hydrology Indicators:</i></p> <p>_____ Inundated</p> <p>_____ Saturated in Upper 12 Inches</p> <p>_____ Water Marks</p> <p>_____ Drift Lines</p> <p>_____ Sediment Deposits</p> <p>_____ Drainage Patterns in Wetlands</p> <p><i>Secondary Indicators: (2 or more required):</i></p> <p>_____ Oxidized Root Channels in Upper 12 Inches</p> <p>_____ Water-Stained Leaves</p> <p>_____ Local Soil Survey Data</p> <p><u> x </u> FAC-Neutral Test</p> <p>_____ Other (Explain in Remarks)</p>
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Remarks:

SOILSMap Unit Name (Series and Phase): Meggett LoamTaxonomy (Subgroup): Typic AlbaqualfsDrainage Class: PDField Observations Confirm Mapped Type: Yes **No**

Profile Description:

<u>Depth</u> (inches)	<u>Horizon</u>	<u>Matrix Color</u> (Munsell Moist)	<u>Mottle Colors</u> (Munsell Moist)	<u>Mottle</u> <u>Abundance/Contrast</u>	<u>Texture, Concretions</u> <u>Structure, etc.</u>
0-5		10YR 3/2			sand
5-12		2.5YR 4/4	7.5YR 4/6	40%	sand

Hydric Soil Indicators:

<input type="checkbox"/> Histosol	<input type="checkbox"/> Concretions
<input type="checkbox"/> Histic Epipedon	<input type="checkbox"/> High Organic Content in Surface layer in Sandy Soils
<input type="checkbox"/> Sulfidic Odor	<input type="checkbox"/> Organic Streaking in Sandy Soils
<input type="checkbox"/> Aquic Moisture Regime	<input type="checkbox"/> Listed on Local Hydric Soils List
<input type="checkbox"/> Reducing Conditions	<input type="checkbox"/> Listed on National Hydric Soils List
<input type="checkbox"/> Gleyed or Low-Chroma Colors	<input type="checkbox"/> Other (Explain in Remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes	No	Is this Sampling Point Within a Wetland?
Wetland Hydrology Present?	Yes	No	
Hydric Soils Present?	Yes	No	
<div style="text-align: right;">Yes No</div>			
Remarks:			

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: SC 41 – Wando Bridge	Date: 3/15/05
Applicant/Owner: SCDOT	County: Berkeley/Charleston
Investigator: Allen – EcoScience	State: SC
Do Normal Circumstances Exist on the Site? Yes No	Community ID: Disturbed
Is the site significantly disturbed (Atypical)? Yes No	Transect ID: BA02
Is the area a potential problem area? Yes No	Plot ID: Wetland

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. <i>Juncus effusus</i>	H	FACW+	9. _____	_____	_____
2. <i>Carex</i> (Spp.)	H	--	10. _____	_____	_____
3. <i>Ludwigia</i> spp.	H	--	11. _____	_____	_____
4. _____	_____	_____	12. _____	_____	_____
5. _____	_____	_____	13. _____	_____	_____
6. _____	_____	_____	14. _____	_____	_____
7. _____	_____	_____	15. _____	_____	_____
8. _____	_____	_____	16. _____	_____	_____

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-) 100%

Remarks:

HYDROLOGY

<p>_____ Recorded Data (Describe in Remarks)</p> <p>_____ Stream, Lake or Tide Gauge</p> <p>_____ Aerial Photographs</p> <p>_____ Other</p> <p><input checked="" type="checkbox"/> No Recorded Data Available</p> <p>Field Observations:</p> <p>Depth of Surface Water: _____ (in.)</p> <p>Depth to Free Water in Pit: <u>0</u> (in.)</p> <p>Depth to Saturated Soil: <u>0</u> (in.)</p>	<p>Primary Wetland Hydrology Indicators:</p> <p>_____ Inundated</p> <p><input checked="" type="checkbox"/> Saturated in Upper 12 Inches</p> <p>_____ Water Marks</p> <p>_____ Drift Lines</p> <p>_____ Sediment Deposits</p> <p>_____ Drainage Patterns in Wetlands</p> <p>Secondary Indicators: (2 or more required):</p> <p><input checked="" type="checkbox"/> Oxidized Root Channels in Upper 12 Inches</p> <p><input checked="" type="checkbox"/> Water-Stained Leaves</p> <p>_____ Local Soil Survey Data</p> <p><input checked="" type="checkbox"/> FAC-Neutral Test</p> <p>_____ Other (Explain in Remarks)</p>
Remarks:	

SOILSMap Unit Name (Series and Phase): Meggett loamTaxonomy (Subgroup): Typic AlbaqualfsDrainage Class: PDField Observations Confirm Mapped Type: Yes **No**

Profile Description:

<u>Depth (inches)</u>	<u>Horizon</u>	<u>Matrix Color (Munsell Moist)</u>	<u>Mottle Colors (Munsell Moist)</u>	<u>Mottle Abundance/Contrast</u>	<u>Texture, Concretions Structure, etc.</u>
0 - 8		2.5Y 3/1			silty loam
8 - 12+		2.5Y 4/1	10YR 4/6	20%	clay

Hydric Soil Indicators:

<input type="checkbox"/> Histosol	<input type="checkbox"/> Concretions
<input type="checkbox"/> Histic Epipedon	<input type="checkbox"/> High Organic Content in Surface layer in Sandy Soils
<input type="checkbox"/> Sulfidic Odor	<input type="checkbox"/> Organic Streaking in Sandy Soils
<input type="checkbox"/> Aquic Moisture Regime	<input checked="" type="checkbox"/> Listed on Local Hydric Soils List
<input checked="" type="checkbox"/> Reducing Conditions	<input type="checkbox"/> Listed on National Hydric Soils List
<input checked="" type="checkbox"/> Gleyed or Low-Chroma Colors	<input type="checkbox"/> Other (Explain in Remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes	No	Is this Sampling Point Within a Wetland?
Wetland Hydrology Present?	Yes	No	
Hydric Soils Present?	Yes	No	
Remarks: Low quality freshwater wetland			Yes No

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	SC 41 – Wando Bridge	Date:	3/15/05
Applicant/Owner:	SCDOT	County:	Berkeley/Charleston
Investigator:	Allen - EcoScience	State:	SC
Do Normal Circumstances Exist on the Site?	Yes No	Community ID:	Disturbed
Is the site significantly disturbed (Atypical)?	Yes No	Transect ID:	BB03
Is the area a potential problem area?	Yes No	Plot ID:	Upland

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. <i>Pinus taeda</i>	tree	FAC	9. _____	_____	_____
2. <i>Morella cerifera</i>	shrub	FAC+	10. _____	_____	_____
3. <i>Ilex sp.</i>	shrub	--	11. _____	_____	_____
4. <i>Lonicera japonica</i>	vine	FAC-	12. _____	_____	_____
5. <i>Festuca sp.</i>	herb	--	13. _____	_____	_____
6. <i>Andropogon virginicus</i>	herb	FAC-	14. _____	_____	_____
7. _____	_____	_____	15. _____	_____	_____
8. _____	_____	_____	16. _____	_____	_____

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-) 50%

Remarks:

HYDROLOGY

<p>_____ Recorded Data (Describe in Remarks)</p> <p>_____ Stream, Lake or Tide Gauge</p> <p>_____ Aerial Photographs</p> <p>_____ Other</p> <p><u> x </u> No Recorded Data Available</p> <p>Field Observations:</p> <p>Depth of Surface Water: <u> 0 </u> (in.)</p> <p>Depth to Free Water in Pit: <u> > 12 </u> (in.)</p> <p>Depth to Saturated Soil: <u> > 12 </u> (in.)</p>	<p>Primary Wetland Hydrology Indicators:</p> <p>_____ Inundated</p> <p>_____ Saturated in Upper 12 Inches</p> <p>_____ Water Marks</p> <p>_____ Drift Lines</p> <p>_____ Sediment Deposits</p> <p>_____ Drainage Patterns in Wetlands</p> <p>Secondary Indicators: (2 or more required):</p> <p>_____ Oxidized Root Channels in Upper 12 Inches</p> <p>_____ Water-Stained Leaves</p> <p>_____ Local Soil Survey Data</p> <p><u> x </u> FAC-Neutral Test</p> <p>_____ Other (Explain in Remarks)</p>
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Remarks:

SOILS

[illegible]

WETLAND DETERMINATION

WETLAND DETERMINATION			
Hydrophytic Vegetation Present?	Yes	No	Is this Sampling Point Within a Wetland? Yes No
Wetland Hydrology Present?	Yes	No	
Hydric Soils Present?	Yes	No	
Remarks:			

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: SC 41 – Wando Bridge	Date: 3/15/05
Applicant/Owner: SCDOT	County: Berkeley/Charleston
Investigator: Allen – EcoScience	State: SC
Do Normal Circumstances Exist on the Site? Yes No	Community ID: Disturbed
Is the site significantly disturbed (Atypical)? Yes No	Transect ID: BB03
Is the area a potential problem area? Yes No	Plot ID: Wetland

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. <i>Baccharis halimifolia</i>	shrub	FAC	9. _____	_____	_____
2. <i>Morella cerifera</i>	shrub	FAC+	10. _____	_____	_____
3. <i>Juncus effusus</i>	herb	OBL	11. _____	_____	_____
4. <i>Carex sp.</i>	herb	--	12. _____	_____	_____
5. _____	_____	_____	13. _____	_____	_____
6. _____	_____	_____	14. _____	_____	_____
7. _____	_____	_____	15. _____	_____	_____
8. _____	_____	_____	16. _____	_____	_____

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-) 100%

Remarks:

HYDROLOGY

<p>_____ Recorded Data (Describe in Remarks)</p> <p>_____ Stream, Lake or Tide Gauge</p> <p>_____ Aerial Photographs</p> <p>_____ Other</p> <p><u> x </u> No Recorded Data Available</p> <p>Field Observations:</p> <p>Depth of Surface Water: <u> 0 </u> (in.)</p> <p>Depth to Free Water in Pit: <u> 0 </u> (in.)</p> <p>Depth to Saturated Soil: <u> 0 </u> (in.)</p>	<p>Primary Wetland Hydrology Indicators:</p> <p>_____ Inundated</p> <p><u> x </u> Saturated in Upper 12 Inches</p> <p>_____ Water Marks</p> <p>_____ Drift Lines</p> <p>_____ Sediment Deposits</p> <p>_____ Drainage Patterns in Wetlands</p> <p>Secondary Indicators: (2 or more required):</p> <p><u> x </u> Oxidized Root Channels in Upper 12 Inches</p> <p><u> x </u> Water-Stained Leaves</p> <p>_____ Local Soil Survey Data</p> <p><u> x </u> FAC-Neutral Test</p> <p>_____ Other (Explain in Remarks)</p>
Remarks:	

SOILSMap Unit Name (Series and Phase): Lynchburg fine sandy loamTaxonomy (Subgroup): Aeric PaleaquultsDrainage Class: SPDField Observations Confirm Mapped Type: Yes **No**

Profile Description:

<u>Depth (inches)</u>	<u>Horizon</u>	<u>Matrix Color (Munsell Moist)</u>	<u>Mottle Colors (Munsell Moist)</u>	<u>Mottle Abundance/Contrast</u>	<u>Texture, Concretions Structure, etc.</u>
0 - 8		2.5Y 3/1			silty loam
8 - 12+		2.5Y 4/1	10YR 4/6	20%	clay

Hydric Soil Indicators:

<input type="checkbox"/> Histosol	<input type="checkbox"/> Concretions
<input type="checkbox"/> Histic Epipedon	<input type="checkbox"/> High Organic Content in Surface layer in Sandy Soils
<input type="checkbox"/> Sulfidic Odor	<input type="checkbox"/> Organic Streaking in Sandy Soils
<input type="checkbox"/> Aquic Moisture Regime	<input checked="" type="checkbox"/> Listed on Local Hydric Soils List
<input checked="" type="checkbox"/> Reducing Conditions	<input type="checkbox"/> Listed on National Hydric Soils List
<input checked="" type="checkbox"/> Gleyed or Low-Chroma Colors	<input type="checkbox"/> Other (Explain in Remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes	No	Is this Sampling Point Within a Wetland?
Wetland Hydrology Present?	Yes	No	
Hydric Soils Present?	Yes	No	
			Yes No

Remarks: Low quality freshwater wetland

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	SC 41 – Wando Bridge	Date:	3/17/05
Applicant/Owner:	SCDOT	County:	Berkeley/Charleston
Investigator:	Allen - EcoScience	State:	SC
Do Normal Circumstances Exist on the Site?	Yes No	Community ID:	Disturbed
Is the site significantly disturbed (Atypical)?	Yes No	Transect ID:	BE02
Is the area a potential problem area?	Yes No	Plot ID:	Upland

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. <i>Pinus taeda</i>	tree	FAC	9. _____	_____	_____
2. <i>Cirsium vulgare</i>	herb	FAC	10. _____	_____	_____
3. <i>Andropogon virginicus</i>	herb	FAC-	11. _____	_____	_____
4. <i>Geranium maculatum</i>	herb	FACU	12. _____	_____	_____
5. <i>Festuca sp.</i>	herb	--	13. _____	_____	_____
6. _____	_____	_____	14. _____	_____	_____
7. _____	_____	_____	15. _____	_____	_____
8. _____	_____	_____	16. _____	_____	_____

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-) 50%

Remarks:

HYDROLOGY

<p>_____ Recorded Data (Describe in Remarks)</p> <p>_____ Stream, Lake or Tide Gauge</p> <p>_____ Aerial Photographs</p> <p>_____ Other</p> <p><u> x </u> No Recorded Data Available</p> <p><i>Field Observations:</i></p> <p>Depth of Surface Water: <u> 0 </u> (in.)</p> <p>Depth to Free Water in Pit: <u> > 12 </u> (in.)</p> <p>Depth to Saturated Soil: <u> > 12 </u> (in.)</p>	<p><i>Primary Wetland Hydrology Indicators:</i></p> <p>_____ Inundated</p> <p>_____ Saturated in Upper 12 Inches</p> <p>_____ Water Marks</p> <p>_____ Drift Lines</p> <p>_____ Sediment Deposits</p> <p>_____ Drainage Patterns in Wetlands</p> <p><i>Secondary Indicators: (2 or more required):</i></p> <p>_____ Oxidized Root Channels in Upper 12 Inches</p> <p>_____ Water-Stained Leaves</p> <p>_____ Local Soil Survey Data</p> <p><u> x </u> FAC-Neutral Test</p> <p>_____ Other (Explain in Remarks)</p>
Remarks:	

SOILS

[illegible]

WETLAND DETERMINATION

WETLAND DETERMINATION			
Hydrophytic Vegetation Present?	Yes	No	Is this Sampling Point Within a Wetland? Yes No
Wetland Hydrology Present?	Yes	No	
Hydric Soils Present?	Yes	No	
Remarks:			

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: SC 41 – Wando Bridge	Date: 3/17/05
Applicant/Owner: SCDOT	County: Berkeley/Charleston
Investigator: Allen – EcoScience	State: SC
Do Normal Circumstances Exist on the Site? Yes No	Community ID: Disturbed
Is the site significantly disturbed (Atypical)? Yes No	Transect ID: BE02
Is the area a potential problem area? Yes No	Plot ID: Wetland

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. <i>Baccharis halimifolia</i>	shrub	FAC	9. _____	_____	_____
2. <i>Rubus sp.</i>	shrub	--	10. _____	_____	_____
3. <i>Arundinaria gigantea</i>	shrub	FACW	11. _____	_____	_____
4. <i>Lonicera japonica</i>	vine	FAC-	12. _____	_____	_____
5. _____	_____	_____	13. _____	_____	_____
6. _____	_____	_____	14. _____	_____	_____
7. _____	_____	_____	15. _____	_____	_____
8. _____	_____	_____	16. _____	_____	_____

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-) 66%

Remarks:

HYDROLOGY

<p>_____ Recorded Data (Describe in Remarks)</p> <p>_____ Stream, Lake or Tide Gauge</p> <p>_____ Aerial Photographs</p> <p>_____ Other</p> <p><u> x </u> No Recorded Data Available</p>	<p><i>Primary Wetland Hydrology Indicators:</i></p> <p><u> x </u> Inundated</p> <p><u> x </u> Saturated in Upper 12 Inches</p> <p>_____ Water Marks</p> <p>_____ Drift Lines</p> <p>_____ Sediment Deposits</p> <p>_____ Drainage Patterns in Wetlands</p> <p><i>Secondary Indicators: (2 or more required):</i></p> <p><u> x </u> Oxidized Root Channels in Upper 12 Inches</p> <p><u> x </u> Water-Stained Leaves</p> <p>_____ Local Soil Survey Data</p> <p><u> x </u> FAC-Neutral Test</p> <p>_____ Other (Explain in Remarks)</p>
<p><i>Field Observations:</i></p> <p>Depth of Surface Water: <u> 6 </u> (in.)</p> <p>Depth to Free Water in Pit: <u> 0 </u> (in.)</p> <p>Depth to Saturated Soil: <u> 0 </u> (in.)</p>	
Remarks:	

SOILS

[illegible]

WETLAND DETERMINATION

WETLAND DETERMINATION				
Hydrophytic Vegetation Present?	Yes	No	Is this Sampling Point Within a Wetland?	
Wetland Hydrology Present?	Yes	No		
Hydric Soils Present?	Yes	No		
Remarks: Medium to low quality freshwater wetland			Yes	No

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: SC 41 – Wando Bridge	Date: 3/16/05
Applicant/Owner: SCDOT	County: Berkeley/Charleston
Investigator: M. Thomas - EcoScience	State: SC
Do Normal Circumstances Exist on the Site? Yes No	Community ID: PFO1
Is the site significantly disturbed (Atypical)? Yes No	Transect ID: TAA04
Is the area a potential problem area? Yes No	Plot ID: Upland TAA

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. <i>Acer rubrum</i>	C	FAC	9. _____	_____	_____
2. <i>Lonicera japonica</i>	V	FAC-	10. _____	_____	_____
3. <i>Persea borbonia</i>	S	FACW	11. _____	_____	_____
4. <i>Liquidambar styraciflua</i>	C	FAC+	12. _____	_____	_____
5. <i>Smilax rotundifolia</i>	V	FAC	13. _____	_____	_____
6. _____	_____	_____	14. _____	_____	_____
7. _____	_____	_____	15. _____	_____	_____
8. _____	_____	_____	16. _____	_____	_____

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-) 100%

Remarks:

HYDROLOGY

<p>_____ Recorded Data (Describe in Remarks)</p> <p>_____ Stream, Lake or Tide Gauge</p> <p>_____ Aerial Photographs</p> <p>_____ Other</p> <p><u> x </u> No Recorded Data Available</p> <p>Field Observations:</p> <p>Depth of Surface Water: _____ (in.)</p> <p>Depth to Free Water in Pit: _____ (in.)</p> <p>Depth to Saturated Soil: <u> 10 </u> (in.)</p>	<p>Primary Wetland Hydrology Indicators:</p> <p>_____ Inundated</p> <p><u> x </u> Saturated in Upper 12 Inches</p> <p>_____ Water Marks</p> <p>_____ Drift Lines</p> <p>_____ Sediment Deposits</p> <p>_____ Drainage Patterns in Wetlands</p> <p>Secondary Indicators: (2 or more required):</p> <p>_____ Oxidized Root Channels in Upper 12 Inches</p> <p>_____ Water-Stained Leaves</p> <p>_____ Local Soil Survey Data</p> <p><u> x </u> FAC-Neutral Test</p> <p>_____ Other (Explain in Remarks)</p>
Remarks:	

SOILSMap Unit Name (Series and Phase): Lynchburg Fine Sandy LoamTaxonomy (Subgroup): Aeric PaleaquultsDrainage Class: SWPDField Observations Confirm Mapped Type: Yes **No**

Profile Description:

<u>Depth (inches)</u>	<u>Horizon</u>	<u>Matrix Color (Munsell Moist)</u>	<u>Mottle Colors (Munsell Moist)</u>	<u>Mottle Abundance/Contrast</u>	<u>Texture, Concretions Structure, etc.</u>
0 - 2	A	2.5Y 4/1			Fine, sandy loam
2 -12+	B	2.5Y 5/2			Fine, sandy loam

Hydric Soil Indicators:

<input type="checkbox"/> Histosol	<input type="checkbox"/> Concretions
<input type="checkbox"/> Histic Epipedon	<input type="checkbox"/> High Organic Content in Surface layer in Sandy Soils
<input type="checkbox"/> Sulfidic Odor	<input type="checkbox"/> Organic Streaking in Sandy Soils
<input checked="" type="checkbox"/> Aquic Moisture Regime	<input type="checkbox"/> Listed on Local Hydric Soils List
<input type="checkbox"/> Reducing Conditions	<input type="checkbox"/> Listed on National Hydric Soils List
<input type="checkbox"/> Gleyed or Low-Chroma Colors	<input type="checkbox"/> Other (Explain in Remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes	No	Is this Sampling Point Within a Wetland?
Wetland Hydrology Present?	Yes	No	
Hydric Soils Present?	Yes	No	
			Yes No

Remarks: Area has lost hydric soils due to network or drainage ditches/farm rows.

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	SC 41 – Wando Bridge	Date:	3/16/05
Applicant/Owner:	SCDOT	County:	Berkeley/Charleston
Investigator:	M. Thomas - EcoScience	State:	SC
Do Normal Circumstances Exist on the Site?	Yes No	Community ID:	PFO1
Is the site significantly disturbed (Atypical)?	Yes No	Transect ID:	TAA04
Is the area a potential problem area?	Yes No	Plot ID:	Wetland TAA

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. <i>Acer rubrum</i>	C	FAC	9. _____	_____	_____
2. <i>Pinus taeda</i>	C	FAC	10. _____	_____	_____
3. <i>Arundinaria gigantea</i>	S	FACW	11. _____	_____	_____
4. <i>Lonicera japonica</i>	V	FAC-	12. _____	_____	_____
5. <i>Quercus nigra</i>	C	FAC	13. _____	_____	_____
6. <i>Smilax rotundifolia</i>	V	FAC	14. _____	_____	_____
7. _____	_____	_____	15. _____	_____	_____
8. _____	_____	_____	16. _____	_____	_____

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-) 100%

Remarks:

HYDROLOGY

<p>_____ Recorded Data (Describe in Remarks)</p> <p>_____ Stream, Lake or Tide Gauge</p> <p>_____ Aerial Photographs</p> <p>_____ Other</p> <p><u> x </u> No Recorded Data Available</p> <p><i>Field Observations:</i></p> <p>Depth of Surface Water: _____ (in.)</p> <p>Depth to Free Water in Pit: <u> 6 </u> (in.)</p> <p>Depth to Saturated Soil: <u> 5 </u> (in.)</p>	<p><i>Primary Wetland Hydrology Indicators:</i></p> <p>_____ Inundated</p> <p><u> x </u> Saturated in Upper 12 Inches</p> <p>_____ Water Marks</p> <p>_____ Drift Lines</p> <p>_____ Sediment Deposits</p> <p>_____ Drainage Patterns in Wetlands</p> <p><i>Secondary Indicators: (2 or more required):</i></p> <p>_____ Oxidized Root Channels in Upper 12 Inches</p> <p>_____ Water-Stained Leaves</p> <p>_____ Local Soil Survey Data</p> <p><u> x </u> FAC-Neutral Test</p> <p>_____ Other (Explain in Remarks)</p>
Remarks:	

SOILSMap Unit Name (Series and Phase): Lynchburg Fine Sandy LoamTaxonomy (Subgroup): Aeric PaleaquultsDrainage Class: SWPDField Observations Confirm Mapped Type: Yes **No**

Profile Description:

<u>Depth (inches)</u>	<u>Horizon</u>	<u>Matrix Color (Munsell Moist)</u>	<u>Mottle Colors (Munsell Moist)</u>	<u>Mottle Abundance/Contrast</u>	<u>Texture, Concretions Structure, etc.</u>
0 - 10	A	2.5Y 4/1			Fine, sandy loam
10 -12+	B	2.5Y 6/2	10YR 6/8	20%	Fine, sandy loam

Hydric Soil Indicators:

<input type="checkbox"/> Histosol	<input type="checkbox"/> Concretions
<input type="checkbox"/> Histic Epipedon	<input type="checkbox"/> High Organic Content in Surface layer in Sandy Soils
<input type="checkbox"/> Sulfidic Odor	<input type="checkbox"/> Organic Streaking in Sandy Soils
<input checked="" type="checkbox"/> Aquic Moisture Regime	<input type="checkbox"/> Listed on Local Hydric Soils List
<input type="checkbox"/> Reducing Conditions	<input type="checkbox"/> Listed on National Hydric Soils List
<input checked="" type="checkbox"/> Gleyed or Low-Chroma Colors	<input type="checkbox"/> Other (Explain in Remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes	No	Is this Sampling Point Within a Wetland?
Wetland Hydrology Present?	Yes	No	
Hydric Soils Present?	Yes	No	
			Yes No

Remarks: drainage ditch marks northern extent of wetlands.

Medium quality freshwater wetland

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	SC 41 – Wando Bridge	Date:	3/16/05
Applicant/Owner:	SCDOT	County:	Berkeley/Charleston
Investigator:	M. Thomas - EcoScience	State:	SC
Do Normal Circumstances Exist on the Site?	Yes No	Community ID:	PFO4
Is the site significantly disturbed (Atypical)?	Yes No	Transect ID:	BH08=TY08
Is the area a potential problem area?	Yes No	Plot ID:	Upland TY-TW-TX-TAB

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. <i>Pinus taeda</i>	C	FAC	9. _____	_____	_____
2. <i>Acer rubrum</i>	C	FAC	10. _____	_____	_____
3. <i>Liquidambar styraciflua</i>	C	FAC+	11. _____	_____	_____
4. <i>Magnolia virginiana</i>	S	FACW+	12. _____	_____	_____
5. <i>Lonicera japonica</i>	V	FAC-	13. _____	_____	_____
6. <i>Quercus nigra</i>	C	FAC	14. _____	_____	_____
7. _____	_____	_____	15. _____	_____	_____
8. _____	_____	_____	16. _____	_____	_____

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-) 100%

Remarks:

HYDROLOGY

<p>_____ Recorded Data (Describe in Remarks)</p> <p>_____ Stream, Lake or Tide Gauge</p> <p>_____ Aerial Photographs</p> <p>_____ Other</p> <p><u> x </u> No Recorded Data Available</p> <p>Field Observations:</p> <p>Depth of Surface Water: _____ (in.)</p> <p>Depth to Free Water in Pit: _____ (in.)</p> <p>Depth to Saturated Soil: <u> > 12 </u> (in.)</p>	<p>Primary Wetland Hydrology Indicators:</p> <p>_____ Inundated</p> <p>_____ Saturated in Upper 12 Inches</p> <p>_____ Water Marks</p> <p>_____ Drift Lines</p> <p>_____ Sediment Deposits</p> <p>_____ Drainage Patterns in Wetlands</p> <p>Secondary Indicators: (2 or more required):</p> <p>_____ Oxidized Root Channels in Upper 12 Inches</p> <p>_____ Water-Stained Leaves</p> <p>_____ Local Soil Survey Data</p> <p><u> x </u> FAC-Neutral Test</p> <p>_____ Other (Explain in Remarks)</p>
Remarks:	

SOILS

[illegible]

WETLAND DETERMINATION

WETLAND DETERMINATION			
Hydrophytic Vegetation Present?	Yes	No	Is this Sampling Point Within a Wetland? Yes No
Wetland Hydrology Present?	Yes	No	
Hydric Soils Present?	Yes	No	
Remarks: Pine dominate stand with hardwoods growing in; old agriculture rows within forested area; wetland only occurs within rows, possible old farm field or ditched to allow for forestry			

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	SC 41 – Wando Bridge	Date:	3/16/05
Applicant/Owner:	SCDOT	County:	Berkeley/Charleston
Investigator:	M. Thomas - EcoScience	State:	SC
Do Normal Circumstances Exist on the Site?	Yes No	Community ID:	PFO4
Is the site significantly disturbed (Atypical)?	Yes No	Transect ID:	BH08=TY08
Is the area a potential problem area?	Yes No	Plot ID:	Wetland TY-TW-TX-TAB

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. <i>Pinus taeda</i>	C	FAC	9. _____	_____	_____
2. <i>Acer rubrum</i>	C	FAC	10. _____	_____	_____
3. <i>Liquidambar styraciflua</i>	C	FAC+	11. _____	_____	_____
4. <i>Magnolia virginiana</i>	S	FACW+	12. _____	_____	_____
5. <i>Lonicera japonica</i>	V	FAC-	13. _____	_____	_____
6. <i>Quercus nigra</i>	C	FAC	14. _____	_____	_____
7. _____	_____	_____	15. _____	_____	_____
8. _____	_____	_____	16. _____	_____	_____

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-) 100%

Remarks:

HYDROLOGY

<p>_____ Recorded Data (Describe in Remarks)</p> <p>_____ Stream, Lake or Tide Gauge</p> <p>_____ Aerial Photographs</p> <p>_____ Other</p> <p><u> x </u> No Recorded Data Available</p> <p><i>Field Observations:</i></p> <p>Depth of Surface Water: <u> 3 </u> (in.)</p> <p>Depth to Free Water in Pit: <u> </u> (in.)</p> <p>Depth to Saturated Soil: <u> </u> (in.)</p>	<p><i>Primary Wetland Hydrology Indicators:</i></p> <p><u> x </u> Inundated</p> <p>_____ Saturated in Upper 12 Inches</p> <p>_____ Water Marks</p> <p>_____ Drift Lines</p> <p>_____ Sediment Deposits</p> <p>_____ Drainage Patterns in Wetlands</p> <p><i>Secondary Indicators: (2 or more required):</i></p> <p><u> x </u> Oxidized Root Channels in Upper 12 Inches</p> <p><u> x </u> Water-Stained Leaves</p> <p>_____ Local Soil Survey Data</p> <p><u> x </u> FAC-Neutral Test</p> <p>_____ Other (Explain in Remarks)</p>
Remarks:	

SOILSMap Unit Name (Series and Phase): Lynchburg Fine Sandy LoamTaxonomy (Subgroup): Aeric PaleaquultsDrainage Class: SWPDField Observations Confirm Mapped Type: Yes **No**

Profile Description:

<u>Depth (inches)</u>	<u>Horizon</u>	<u>Matrix Color (Munsell Moist)</u>	<u>Mottle Colors (Munsell Moist)</u>	<u>Mottle Abundance/Contrast</u>	<u>Texture, Concretions Structure, etc.</u>
0 - 2	A	10YR 5/1			Fine, sandy loam
2 -12+	B	2.5Y 6/1	10YR 4/6	30%	Fine, sandy clay loam

Hydric Soil Indicators:

<input type="checkbox"/> Histosol	<input type="checkbox"/> Concretions
<input type="checkbox"/> Histic Epipedon	<input type="checkbox"/> High Organic Content in Surface layer in Sandy Soils
<input type="checkbox"/> Sulfidic Odor	<input type="checkbox"/> Organic Streaking in Sandy Soils
<input checked="" type="checkbox"/> Aquic Moisture Regime	<input type="checkbox"/> Listed on Local Hydric Soils List
<input type="checkbox"/> Reducing Conditions	<input type="checkbox"/> Listed on National Hydric Soils List
<input checked="" type="checkbox"/> Gleyed or Low-Chroma Colors	<input type="checkbox"/> Other (Explain in Remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes	No	Is this Sampling Point Within a Wetland?
Wetland Hydrology Present?	Yes	No	
Hydric Soils Present?	Yes	No	
			Yes No

Remarks: Low quality freshwater wetland

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: SC 41 – Wando Bridge	Date: 3/16/05
Applicant/Owner: SCDOT	County: Berkeley/Charleston
Investigator: Allen - EcoScience	State: SC
Do Normal Circumstances Exist on the Site? Yes No	Community ID: Disturbed
Is the site significantly disturbed (Atypical)? Yes No	Transect ID: BF06
Is the area a potential problem area? Yes No	Plot ID: Upland

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. <i>Pinus taeda</i>	tree	FAC	9. _____	_____	_____
2. <i>Cirsium vulgare</i>	herb	FAC	10. _____	_____	_____
3. <i>Andropogon virginicus</i>	herb	FAC-	11. _____	_____	_____
4. <i>Arundinaria gigantea</i>	shrub	FACW	12. _____	_____	_____
5. _____	_____	_____	13. _____	_____	_____
6. _____	_____	_____	14. _____	_____	_____
7. _____	_____	_____	15. _____	_____	_____
8. _____	_____	_____	16. _____	_____	_____

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-) 75%

Remarks:

HYDROLOGY

<p>_____ Recorded Data (Describe in Remarks)</p> <p>_____ Stream, Lake or Tide Gauge</p> <p>_____ Aerial Photographs</p> <p>_____ Other</p> <p><u> x </u> No Recorded Data Available</p> <p><i>Field Observations:</i></p> <p>Depth of Surface Water: <u> 0 </u> (in.)</p> <p>Depth to Free Water in Pit: <u> > 12 </u> (in.)</p> <p>Depth to Saturated Soil: <u> > 12 </u> (in.)</p>	<p><i>Primary Wetland Hydrology Indicators:</i></p> <p>_____ Inundated</p> <p>_____ Saturated in Upper 12 Inches</p> <p>_____ Water Marks</p> <p>_____ Drift Lines</p> <p>_____ Sediment Deposits</p> <p>_____ Drainage Patterns in Wetlands</p> <p><i>Secondary Indicators: (2 or more required):</i></p> <p>_____ Oxidized Root Channels in Upper 12 Inches</p> <p>_____ Water-Stained Leaves</p> <p>_____ Local Soil Survey Data</p> <p><u> x </u> FAC-Neutral Test</p> <p>_____ Other (Explain in Remarks)</p>
<p>Remarks:</p>	

SOILS

Map Unit Name (Series and Phase): Lynchburg fine sandy loam					
Taxonomy (Subgroup): Aeric Paleaquults					
Drainage Class: SPD					
Field Observations Confirm Mapped Type: Yes No					
Profile Description:					
<u>Depth (inches)</u>	<u>Horizon</u>	<u>Matrix Color (Munsell Moist)</u>	<u>Mottle Colors (Munsell Moist)</u>	<u>Mottle Abundance/Contrast</u>	<u>Texture, Concretions Structure, etc.</u>
0-6		2.5YR 4/1			sandy loam
6-12		2.5YR 5/2			sandy loam
Hydric Soil Indicators:					
<input type="checkbox"/> Histosol				<input type="checkbox"/> Concretions	
<input type="checkbox"/> Histic Epipedon				<input type="checkbox"/> High Organic Content in Surface layer in Sandy Soils	
<input type="checkbox"/> Sulfidic Odor				<input type="checkbox"/> Organic Streaking in Sandy Soils	
<input type="checkbox"/> Aquic Moisture Regime				<input type="checkbox"/> Listed on Local Hydric Soils List	
<input type="checkbox"/> Reducing Conditions				<input type="checkbox"/> Listed on National Hydric Soils List	
<input type="checkbox"/> Gleyed or Low-Chroma Colors				<input type="checkbox"/> Other (Explain in Remarks)	
Remarks:					

WETLAND DETERMINATION

WETLAND DETERMINATION			
Hydrophytic Vegetation Present?	Yes	No	Is this Sampling Point Within a Wetland? Yes No
Wetland Hydrology Present?	Yes	No	
Hydric Soils Present?	Yes	No	
Remarks:			

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: SC 41 – Wando Bridge	Date: 3/16/05
Applicant/Owner: SCDOT	County: Berkeley/Charleston
Investigator: Allen – EcoScience	State: SC
Do Normal Circumstances Exist on the Site? Yes No	Community ID: Disturbed
Is the site significantly disturbed (Atypical)? Yes No	Transect ID: BF06
Is the area a potential problem area? Yes No	Plot ID: Wetland

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. <i>Festuca sp.</i>	herb	--	9. _____	_____	_____
2. <i>Carex sp.</i>	herb	--	10. _____	_____	_____
3. _____	_____	_____	11. _____	_____	_____
4. _____	_____	_____	12. _____	_____	_____
5. _____	_____	_____	13. _____	_____	_____
6. _____	_____	_____	14. _____	_____	_____
7. _____	_____	_____	15. _____	_____	_____
8. _____	_____	_____	16. _____	_____	_____

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-) 50%

Remarks: Contains species characteristic to disturbed, roadside areas

HYDROLOGY

<p>____ Recorded Data (Describe in Remarks)</p> <p>____ Stream, Lake or Tide Gauge</p> <p>____ Aerial Photographs</p> <p>____ Other</p> <p><input checked="" type="checkbox"/> No Recorded Data Available</p>	<p><i>Primary Wetland Hydrology Indicators:</i></p> <p><input checked="" type="checkbox"/> Inundated</p> <p><input checked="" type="checkbox"/> Saturated in Upper 12 Inches</p> <p>____ Water Marks</p> <p>____ Drift Lines</p> <p>____ Sediment Deposits</p> <p>____ Drainage Patterns in Wetlands</p> <p><i>Secondary Indicators: (2 or more required):</i></p> <p><input checked="" type="checkbox"/> Oxidized Root Channels in Upper 12 Inches</p> <p><input checked="" type="checkbox"/> Water-Stained Leaves</p> <p>____ Local Soil Survey Data</p> <p>____ FAC-Neutral Test</p> <p>____ Other (Explain in Remarks)</p>
<p><i>Field Observations:</i></p> <p>Depth of Surface Water: <u>3</u> (in.)</p> <p>Depth to Free Water in Pit: <u>0</u> (in.)</p> <p>Depth to Saturated Soil: <u>0</u> (in.)</p>	
<p>Remarks:</p>	

SOILSMap Unit Name (Series and Phase): Lynchburg fine sandy loamTaxonomy (Subgroup): Aeric PaleaquultsDrainage Class: SPDField Observations Confirm Mapped Type: Yes **No**

Profile Description:

<u>Depth (inches)</u>	<u>Horizon</u>	<u>Matrix Color (Munsell Moist)</u>	<u>Mottle Colors (Munsell Moist)</u>	<u>Mottle Abundance/Contrast</u>	<u>Texture, Concretions Structure, etc.</u>
0-2		2.5Y 6/2			sand
2-12		5Y 6/1	10YR 5/8	50%	sandy clay

Hydric Soil Indicators:

<input type="checkbox"/> Histosol	<input type="checkbox"/> Concretions
<input type="checkbox"/> Histic Epipedon	<input type="checkbox"/> High Organic Content in Surface layer in Sandy Soils
<input type="checkbox"/> Sulfidic Odor	<input type="checkbox"/> Organic Streaking in Sandy Soils
<input type="checkbox"/> Aquic Moisture Regime	<input type="checkbox"/> Listed on Local Hydric Soils List
<input checked="" type="checkbox"/> Reducing Conditions	<input type="checkbox"/> Listed on National Hydric Soils List
<input checked="" type="checkbox"/> Gleyed or Low-Chroma Colors	<input type="checkbox"/> Other (Explain in Remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes	No	Is this Sampling Point Within a Wetland?
Wetland Hydrology Present?	Yes	No	
Hydric Soils Present?	Yes	No	
			Yes No

Remarks: Low quality freshwater wetland

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: SC 41 – Wando Bridge	Date: 3/16/05
Applicant/Owner: SCDOT	County: Berkeley/Charleston
Investigator: M. Thomas - EcoScience	State: SC
Do Normal Circumstances Exist on the Site? Yes No	Community ID: PFO1/PF04
Is the site significantly disturbed (Atypical)? Yes No	Transect ID: TV11
Is the area a potential problem area? Yes No	Plot ID: Upland TV/TW

VEGETATION

<i>Dominant Plant Species</i>	<i>Stratum</i>	<i>Indicator</i>	<i>Dominant Plant Species</i>	<i>Stratum</i>	<i>Indicator</i>
1. <i>Magnolia virginiana</i>	S	FACW+	9. _____	_____	_____
2. <i>Liquidambar styraciflua</i>	C	FAC+	10. _____	_____	_____
3. <i>Andropogon virginicus</i>	H	FAC-	11. _____	_____	_____
4. <i>Pinus taeda</i>	C	FAC	12. _____	_____	_____
5. _____	_____	_____	13. _____	_____	_____
6. _____	_____	_____	14. _____	_____	_____
7. _____	_____	_____	15. _____	_____	_____
8. _____	_____	_____	16. _____	_____	_____

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-) 100%

Remarks:

HYDROLOGY

<p>____ Recorded Data (Describe in Remarks)</p> <p>____ Stream, Lake or Tide Gauge</p> <p>____ Aerial Photographs</p> <p>____ Other</p> <p><u> x </u> No Recorded Data Available</p> <p><i>Field Observations:</i></p> <p>Depth of Surface Water: _____ (in.)</p> <p>Depth to Free Water in Pit: _____ (in.)</p> <p>Depth to Saturated Soil: <u> < 12 </u> (in.)</p>	<p><i>Primary Wetland Hydrology Indicators:</i></p> <p>____ Inundated</p> <p>____ Saturated in Upper 12 Inches</p> <p>____ Water Marks</p> <p>____ Drift Lines</p> <p>____ Sediment Deposits</p> <p>____ Drainage Patterns in Wetlands</p> <p><i>Secondary Indicators: (2 or more required):</i></p> <p>____ Oxidized Root Channels in Upper 12 Inches</p> <p>____ Water-Stained Leaves</p> <p>____ Local Soil Survey Data</p> <p><u> x </u> FAC-Neutral Test</p> <p>____ Other (Explain in Remarks)</p>
Remarks:	

SOILSMap Unit Name (Series and Phase): Lynchburg Fine Sandy Loam/Meggett LoamTaxonomy (Subgroup): Aeric Paleaquults/Typic AlbaqualfsDrainage Class: SWPD/PDField Observations Confirm Mapped Type: Yes **No**

Profile Description:

<u>Depth (inches)</u>	<u>Horizon</u>	<u>Matrix Color (Munsell Moist)</u>	<u>Mottle Colors (Munsell Moist)</u>	<u>Mottle Abundance/Contrast</u>	<u>Texture, Concretions Structure, etc.</u>
0 - 8	A	10YR 4/2			Fine, sandy loam
8 - 12+	B	2.5Y 6/3			Fine, sandy loam

Hydric Soil Indicators:

<input type="checkbox"/> Histosol	<input type="checkbox"/> Concretions
<input type="checkbox"/> Histic Epipedon	<input type="checkbox"/> High Organic Content in Surface layer in Sandy Soils
<input type="checkbox"/> Sulfidic Odor	<input type="checkbox"/> Organic Streaking in Sandy Soils
<input checked="" type="checkbox"/> Aquic Moisture Regime	<input type="checkbox"/> Listed on Local Hydric Soils List
<input type="checkbox"/> Reducing Conditions	<input type="checkbox"/> Listed on National Hydric Soils List
<input type="checkbox"/> Gleyed or Low-Chroma Colors	<input type="checkbox"/> Other (Explain in Remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes	No	Is this Sampling Point Within a Wetland?
Wetland Hydrology Present?	Yes	No	
Hydric Soils Present?	Yes	No	
Remarks: possible old agriculture field; ruts noted in woods			Yes No

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: SC 41 – Wando Bridge	Date: 3/16/05
Applicant/Owner: SCDOT	County: Berkeley/Charleston
Investigator: M. Thomas - EcoScience	State: SC
Do Normal Circumstances Exist on the Site? Yes No	Community ID: PFO1/PF04
Is the site significantly disturbed (Atypical)? Yes No	Transect ID: TV11
Is the area a potential problem area? Yes No	Plot ID: Wetland TV/TW

VEGETATION

<i>Dominant Plant Species</i>	<i>Stratum</i>	<i>Indicator</i>	<i>Dominant Plant Species</i>	<i>Stratum</i>	<i>Indicator</i>
1. <i>Pinus taeda</i>	C	FAC	9. _____	_____	_____
2. <i>Smilax rotundifolia</i>	V	FAC	10. _____	_____	_____
3. <i>Magnolia virginiana</i>	S	FACW+	11. _____	_____	_____
4. <i>Liquidambar styraciflua</i>	C	FAC+	12. _____	_____	_____
5. <i>Acer rubrum</i>	C	FAC	13. _____	_____	_____
6. <i>Sabal palmetto</i>	C	FAC	14. _____	_____	_____
7. _____	_____	_____	15. _____	_____	_____
8. _____	_____	_____	16. _____	_____	_____

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-) 100%

Remarks:

HYDROLOGY

<p>_____ Recorded Data (Describe in Remarks)</p> <p>_____ Stream, Lake or Tide Gauge</p> <p>_____ Aerial Photographs</p> <p>_____ Other</p> <p><u> x </u> No Recorded Data Available</p> <p><i>Field Observations:</i></p> <p>Depth of Surface Water: _____ (in.)</p> <p>Depth to Free Water in Pit: <u> 1 </u> (in.)</p> <p>Depth to Saturated Soil: <u> 0 </u> (in.)</p>	<p><i>Primary Wetland Hydrology Indicators:</i></p> <p>_____ Inundated</p> <p><u> x </u> Saturated in Upper 12 Inches</p> <p>_____ Water Marks</p> <p>_____ Drift Lines</p> <p>_____ Sediment Deposits</p> <p>_____ Drainage Patterns in Wetlands</p> <p><i>Secondary Indicators: (2 or more required):</i></p> <p>_____ Oxidized Root Channels in Upper 12 Inches</p> <p>_____ Water-Stained Leaves</p> <p>_____ Local Soil Survey Data</p> <p><u> x </u> FAC-Neutral Test</p> <p>_____ Other (Explain in Remarks)</p>
Remarks:	

SOILS

Map Unit Name (Series and Phase): Lynchburg Fine Sandy Loam/Meggett Loam					
Taxonomy (Subgroup): Aerice Paleaquults/Typic Albaqualfs					
Drainage Class: SWPD/PD					
Field Observations Confirm Mapped Type: Yes No					
Profile Description:					
Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions Structure, etc.
0 - 10	A	10YR 5/1	10YR 5/4	10%	Fine, sandy loam
10 -12+	B	2.5Y 7/2			Course, sand
Hydric Soil Indicators:					
<input type="checkbox"/> Histosol			<input type="checkbox"/> Concretions		
<input type="checkbox"/> Histic Epipedon			<input type="checkbox"/> High Organic Content in Surface layer in Sandy Soils		
<input type="checkbox"/> Sulfidic Odor			<input type="checkbox"/> Organic Streaking in Sandy Soils		
<input checked="" type="checkbox"/> Aquic Moisture Regime			<input type="checkbox"/> Listed on Local Hydric Soils List		
<input type="checkbox"/> Reducing Conditions			<input type="checkbox"/> Listed on National Hydric Soils List		
<input checked="" type="checkbox"/> Gleyed or Low-Chroma Colors			<input type="checkbox"/> Other (Explain in Remarks)		
Remarks:					

WETLAND DETERMINATION

WETLAND DETERMINATION			
Hydrophytic Vegetation Present?	Yes	No	Is this Sampling Point Within a Wetland? Yes No
Wetland Hydrology Present?	Yes	No	
Hydric Soils Present?	Yes	No	
Remarks: Medium quality freshwater wetland			

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: SC 41 – Wando Bridge	Date: 3/15/05
Applicant/Owner: SCDOT	County: Berkeley/Charleston
Investigator: M. Thomas - EcoScience	State: SC
Do Normal Circumstances Exist on the Site? Yes No	Community ID: PFO1/PF04
Is the site significantly disturbed (Atypical)? Yes No	Transect ID: TP09
Is the area a potential problem area? Yes No	Plot ID: Upland

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. <i>Quercus falcate</i>	C	FACU-	9. _____	_____	_____
2. <i>Acer rubrum</i>	C	FAC	10. _____	_____	_____
3. <i>Magnolia tripetala</i>	SC	FAC	11. _____	_____	_____
4. <i>Quercus nigra</i>	C	FAC	12. _____	_____	_____
5. <i>Lonicera japonica</i>	V	FAC-	13. _____	_____	_____
6. <i>Pinus taeda</i>	C	FAC	14. _____	_____	_____
7. _____	_____	_____	15. _____	_____	_____
8. _____	_____	_____	16. _____	_____	_____

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-) 80%

Remarks:

HYDROLOGY

<p>_____ Recorded Data (Describe in Remarks)</p> <p>_____ Stream, Lake or Tide Gauge</p> <p>_____ Aerial Photographs</p> <p>_____ Other</p> <p><u> x </u> No Recorded Data Available</p> <p>Field Observations:</p> <p>Depth of Surface Water: _____ (in.)</p> <p>Depth to Free Water in Pit: _____ (in.)</p> <p>Depth to Saturated Soil: <u> < 12 </u> (in.)</p>	<p>Primary Wetland Hydrology Indicators:</p> <p>_____ Inundated</p> <p>_____ Saturated in Upper 12 Inches</p> <p>_____ Water Marks</p> <p>_____ Drift Lines</p> <p>_____ Sediment Deposits</p> <p>_____ Drainage Patterns in Wetlands</p> <p>Secondary Indicators: (2 or more required):</p> <p>_____ Oxidized Root Channels in Upper 12 Inches</p> <p>_____ Water-Stained Leaves</p> <p>_____ Local Soil Survey Data</p> <p><u> x </u> FAC-Neutral Test</p> <p>_____ Other (Explain in Remarks)</p>
Remarks:	

SOILS

[illegible]

WETLAND DETERMINATION

WETLAND DETERMINATION			
Hydrophytic Vegetation Present?	Yes	No	Is this Sampling Point Within a Wetland? Yes No
Wetland Hydrology Present?	Yes	No	
Hydric Soils Present?	Yes	No	
Remarks:			

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: SC 41 – Wando Bridge	Date: 3/15/05
Applicant/Owner: SCDOT	County: Berkeley/Charleston
Investigator: M. Thomas - EcoScience	State: SC
Do Normal Circumstances Exist on the Site? Yes No	Community ID: PFO1/PF04
Is the site significantly disturbed (Atypical)? Yes No	Transect ID: TP09
Is the area a potential problem area? Yes No	Plot ID: Wetland

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. <i>Quercus virginiana</i>	C	FACU+	9. _____	_____	_____
2. <i>Sabal palmetto</i>	C	FAC	10. _____	_____	_____
3. <i>Liquidambar styraciflua</i>	C	FAC+	11. _____	_____	_____
4. <i>Acer rubrum</i>	C	FAC	12. _____	_____	_____
5. <i>Juncus roemerianus</i>	H	OBL	13. _____	_____	_____
6. <i>Pinus taeda</i>	C	FAC	14. _____	_____	_____
7. _____	_____	_____	15. _____	_____	_____
8. _____	_____	_____	16. _____	_____	_____

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-) 83%

Remarks:

HYDROLOGY

<p>____ Recorded Data (Describe in Remarks)</p> <p>____ Stream, Lake or Tide Gauge</p> <p>____ Aerial Photographs</p> <p>____ Other</p> <p><u> x </u> No Recorded Data Available</p> <p>Field Observations:</p> <p>Depth of Surface Water: _____ (in.)</p> <p>Depth to Free Water in Pit: <u> 10 </u> (in.)</p> <p>Depth to Saturated Soil: <u> 6 </u> (in.)</p>	<p>Primary Wetland Hydrology Indicators:</p> <p>____ Inundated</p> <p><u> x </u> Saturated in Upper 12 Inches</p> <p>____ Water Marks</p> <p>____ Drift Lines</p> <p>____ Sediment Deposits</p> <p>____ Drainage Patterns in Wetlands</p> <p>Secondary Indicators: (2 or more required):</p> <p>____ Oxidized Root Channels in Upper 12 Inches</p> <p><u> x </u> Water-Stained Leaves</p> <p>____ Local Soil Survey Data</p> <p><u> x </u> FAC-Neutral Test</p> <p>____ Other (Explain in Remarks)</p>
Remarks:	

SOILSMap Unit Name (Series and Phase): Lynchburg Fine Sandy LoamTaxonomy (Subgroup): Aeric PaleaquultsDrainage Class: SWPDField Observations Confirm Mapped Type: Yes **No**

Profile Description:

<u>Depth (inches)</u>	<u>Horizon</u>	<u>Matrix Color (Munsell Moist)</u>	<u>Mottle Colors (Munsell Moist)</u>	<u>Mottle Abundance/Contrast</u>	<u>Texture, Concretions Structure, etc.</u>
1 - 0	O	10YR 3/1			Humic
0 - 1	A	10YR 2/1			Fine, sandy loam
1 - 3	AB	10YR 5/1			Fine, sandy loam
3 - 12+	B	10YR 6/2	10YR 4/6	20%	Course, sand

Hydric Soil Indicators:

<input type="checkbox"/> Histosol	<input type="checkbox"/> Concretions
<input type="checkbox"/> Histic Epipedon	<input type="checkbox"/> High Organic Content in Surface layer in Sandy Soils
<input type="checkbox"/> Sulfidic Odor	<input type="checkbox"/> Organic Streaking in Sandy Soils
<input checked="" type="checkbox"/> Aquic Moisture Regime	<input type="checkbox"/> Listed on Local Hydric Soils List
<input type="checkbox"/> Reducing Conditions	<input type="checkbox"/> Listed on National Hydric Soils List
<input checked="" type="checkbox"/> Gleyed or Low-Chroma Colors	<input type="checkbox"/> Other (Explain in Remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes	No	Is this Sampling Point Within a Wetland?
Wetland Hydrology Present?	Yes	No	
Hydric Soils Present?	Yes	No	
Remarks: Medium quality freshwater wetland			Yes No

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	SC 41 – Wando Bridge	Date:	3/15/05
Applicant/Owner:	SCDOT	County:	Berkeley/Charleston
Investigator:	M. Thomas - EcoScience	State:	SC
Do Normal Circumstances Exist on the Site?	Yes No	Community ID:	PSS1/PFO4
Is the site significantly disturbed (Atypical)?	Yes No	Transect ID:	TN07
Is the area a potential problem area?	Yes No	Plot ID:	Upland

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. <i>Pinus taeda</i>	C	FAC	9. _____	_____	_____
2. <i>Quercus alba</i>	C	FACU	10. _____	_____	_____
3. <i>Acer rubrum</i>	C	FAC	11. _____	_____	_____
4. <i>Lonicera japonica</i>	V	FAC-	12. _____	_____	_____
5. <i>Ligustrum sinense</i>	S	FAC	13. _____	_____	_____
6. <i>Smilax rotundifolia</i>	V	FAC	14. _____	_____	_____
7. <i>Magnolia tripetala</i>	S	FAC	15. _____	_____	_____
8. _____	_____	_____	16. _____	_____	_____

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-) 83%

Remarks:

HYDROLOGY

<p>_____ Recorded Data (Describe in Remarks)</p> <p>_____ Stream, Lake or Tide Gauge</p> <p>_____ Aerial Photographs</p> <p>_____ Other</p> <p><input checked="" type="checkbox"/> No Recorded Data Available</p> <p>Field Observations:</p> <p>Depth of Surface Water: _____ (in.)</p> <p>Depth to Free Water in Pit: _____ (in.)</p> <p>Depth to Saturated Soil: <u>10</u> (in.)</p>	<p>Primary Wetland Hydrology Indicators:</p> <p>_____ Inundated</p> <p><input checked="" type="checkbox"/> Saturated in Upper 12 Inches</p> <p>_____ Water Marks</p> <p>_____ Drift Lines</p> <p>_____ Sediment Deposits</p> <p>_____ Drainage Patterns in Wetlands</p> <p>Secondary Indicators: (2 or more required):</p> <p>_____ Oxidized Root Channels in Upper 12 Inches</p> <p>_____ Water-Stained Leaves</p> <p>_____ Local Soil Survey Data</p> <p><input checked="" type="checkbox"/> FAC-Neutral Test</p> <p>_____ Other (Explain in Remarks)</p>
Remarks:	

SOILSMap Unit Name (Series and Phase): Meggett LoamTaxonomy (Subgroup): Typic AlbaqualfsDrainage Class: PDField Observations Confirm Mapped Type: Yes **No**

Profile Description:

<u>Depth (inches)</u>	<u>Horizon</u>	<u>Matrix Color (Munsell Moist)</u>	<u>Mottle Colors (Munsell Moist)</u>	<u>Mottle Abundance/Contrast</u>	<u>Texture, Concretions Structure, etc.</u>
1 - 0	O	10YR 2/1			Fabric
0 - 1	A	10YR 4/2			Fine, sandy loam
1 - 12+	B	2.5Y 5/4	10YR 5/6	20%	Fine, sandy loam

Hydric Soil Indicators:

<input type="checkbox"/> Histosol	<input type="checkbox"/> Concretions
<input type="checkbox"/> Histic Epipedon	<input type="checkbox"/> High Organic Content in Surface layer in Sandy Soils
<input type="checkbox"/> Sulfidic Odor	<input type="checkbox"/> Organic Streaking in Sandy Soils
<input type="checkbox"/> Aquic Moisture Regime	<input type="checkbox"/> Listed on Local Hydric Soils List
<input type="checkbox"/> Reducing Conditions	<input checked="" type="checkbox"/> Listed on National Hydric Soils List
<input type="checkbox"/> Gleyed or Low-Chroma Colors	<input type="checkbox"/> Other (Explain in Remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes	No	Is this Sampling Point Within a Wetland?
Wetland Hydrology Present?	Yes	No	
Hydric Soils Present?	Yes	No	
			Yes No

Remarks:

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	SC 41 – Wando Bridge	Date:	3/15/05
Applicant/Owner:	SCDOT	County:	Berkeley/Charleston
Investigator:	M. Thomas - EcoScience	State:	SC
Do Normal Circumstances Exist on the Site?	Yes No	Community ID:	PSS1/PFO4
Is the site significantly disturbed (Atypical)?	Yes No	Transect ID:	TN07
Is the area a potential problem area?	Yes No	Plot ID:	Wetland

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. <i>Acer rubrum</i>	C	FAC	9. _____	_____	_____
2. <i>Liquidambar styraciflua</i>	C	FAC+	10. _____	_____	_____
3. <i>Pinus taeda</i>	C	FAC	11. _____	_____	_____
4. <i>Carex</i> (Spp.)	H	_____	12. _____	_____	_____
5. <i>Simalix rotundifolia</i>	V	FAC	13. _____	_____	_____
6. <i>Sabal palmetto</i>	T	FAC	14. _____	_____	_____
7. <i>Erianthus giganteus</i>	H	FACW	15. _____	_____	_____
8. _____	_____	_____	16. _____	_____	_____

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-) 100%

Remarks:

HYDROLOGY

<p>_____ Recorded Data (Describe in Remarks)</p> <p>_____ Stream, Lake or Tide Gauge</p> <p>_____ Aerial Photographs</p> <p>_____ Other</p> <p><u> x </u> No Recorded Data Available</p> <p>Field Observations:</p> <p>Depth of Surface Water: _____ (in.)</p> <p>Depth to Free Water in Pit: <u> 8 </u> (in.)</p> <p>Depth to Saturated Soil: <u> 7 </u> (in.)</p>	<p>Primary Wetland Hydrology Indicators:</p> <p>_____ Inundated</p> <p><u> x </u> Saturated in Upper 12 Inches</p> <p>_____ Water Marks</p> <p>_____ Drift Lines</p> <p>_____ Sediment Deposits</p> <p>_____ Drainage Patterns in Wetlands</p> <p>Secondary Indicators: (2 or more required):</p> <p>_____ Oxidized Root Channels in Upper 12 Inches</p> <p>_____ Water-Stained Leaves</p> <p>_____ Local Soil Survey Data</p> <p><u> x </u> FAC-Neutral Test</p> <p>_____ Other (Explain in Remarks)</p>
Remarks:	

SOILSMap Unit Name (Series and Phase): Meggett LoamTaxonomy (Subgroup): Typic AlbaqualfsDrainage Class: PDField Observations Confirm Mapped Type: Yes **No**

Profile Description:

<u>Depth (inches)</u>	<u>Horizon</u>	<u>Matrix Color (Munsell Moist)</u>	<u>Mottle Colors (Munsell Moist)</u>	<u>Mottle Abundance/Contrast</u>	<u>Texture, Concretions Structure, etc.</u>
0 - 2	A	2.5Y 3/1			Fine, sandy loam
2 - 12+	B	10YR 6/1	2.5Y 6/6	10%	Course sand

Hydric Soil Indicators:

<input type="checkbox"/> Histosol	<input type="checkbox"/> Concretions
<input type="checkbox"/> Histic Epipedon	<input type="checkbox"/> High Organic Content in Surface layer in Sandy Soils
<input type="checkbox"/> Sulfidic Odor	<input type="checkbox"/> Organic Streaking in Sandy Soils
<input checked="" type="checkbox"/> Aquic Moisture Regime	<input type="checkbox"/> Listed on Local Hydric Soils List
<input type="checkbox"/> Reducing Conditions	<input checked="" type="checkbox"/> Listed on National Hydric Soils List
<input checked="" type="checkbox"/> Gleyed or Low-Chroma Colors	<input type="checkbox"/> Other (Explain in Remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present? Yes No	Is this Sampling Point Within a Wetland? Yes No
Wetland Hydrology Present? Yes No	
Hydric Soils Present? Yes No	
Remarks: Medium quality freshwater wetland	

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: <u>SC 41</u>	Date: <u>3/10/05</u>
Applicant/Owner: <u>SCDOT</u>	County: <u>Berkeley</u>
Investigator: <u>EcoScience Corporation / Saunders</u>	State: <u>South Carolina</u>
Do Normal Circumstances exist on the site? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Community ID: <u>Upland</u>
Is the site significantly disturbed (Atypical Situation)? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Transect ID: <u>HD</u>
Is the area a potential Problem Area? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No (If needed, explain on reverse.)	Plot ID: _____

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. <u>Morella cerifera</u>	<u>shrub</u>	<u>FAC+</u>	9. _____	_____	_____
2. <u>Sabal palmetto</u>	<u>tree</u>	<u>FAC+</u>	10. _____	_____	_____
3. <u>Pinus taeda</u>	<u>tree</u>	<u>FAC</u>	11. _____	_____	_____
4. <u>Festuca sp.</u>	<u>herb</u>	<u>N/A</u>	12. _____	_____	_____
5. <u>Trifolium repens</u>	<u>herb</u>	<u>FACU</u>	13. _____	_____	_____
6. _____	_____	_____	14. _____	_____	_____
7. _____	_____	_____	15. _____	_____	_____
8. _____	_____	_____	16. _____	_____	_____

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-). 75

Remarks: _____

HYDROLOGY

<input type="checkbox"/> Recorded Data (Describe in Remarks): <input type="checkbox"/> Stream, Lake, or Tide Gauge <input type="checkbox"/> Aerial Photographs <input type="checkbox"/> Other <input type="checkbox"/> No Recorded Data Available	Wetland Hydrology Indicators: Primary Indicators: <input type="checkbox"/> Inundated <input type="checkbox"/> Saturated in Upper 12 Inches <input type="checkbox"/> Water Marks <input type="checkbox"/> Drift Lines <input type="checkbox"/> Sediment Deposits <input type="checkbox"/> Drainage Patterns in Wetlands Secondary Indicators (2 or more required): <input type="checkbox"/> Oxidized Root Channels in Upper 12 Inches <input type="checkbox"/> Water-Stained Leaves <input type="checkbox"/> Local Soil Survey Data <input checked="" type="checkbox"/> FAC-Neutral Test <input type="checkbox"/> Other (Explain in Remarks)
Field Observations: Depth of Surface Water: <u>N/A</u> (in.) Depth to Free Water in Pit: <u>N/A</u> (in.) Depth to Saturated Soil: <u>N/A</u> (in.)	
Remarks: <u>No Hydrologic Indicators!</u>	

SOILS

Map Unit Name (Series and Phase):		<u>Goldsboro Loamy Sand</u>		Drainage Class: <u>Mod. well drained</u>	
Taxonomy (Subgroup):		<u>Aquic Paleudults</u>		Field Observations Confirm Mapped Type? <input type="checkbox"/> Yes <input type="checkbox"/> No	

Profile Descriptions:					
Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/ Size/Contrast	Texture, Concretions, Structure, etc,
0-2		10YR 3/3			sandy loam
5-12+		10 YR 5/6			sandy loam

Hydric Soil Indicators:

<input type="checkbox"/> Histosol <input type="checkbox"/> Histic Epipedon <input type="checkbox"/> Sulfidic Odor <input type="checkbox"/> Aquic Moisture Regime <input type="checkbox"/> Reducing Conditions <input type="checkbox"/> Gleyed or Low-Chroma Colors	<input type="checkbox"/> Concretions <input type="checkbox"/> High Organic Content in Surface Layer in Sandy Soils <input type="checkbox"/> Organic Streaking in Sandy Soils <input type="checkbox"/> Listed on Local Hydric Soils List <input type="checkbox"/> Listed on National Hydric Soils List <input type="checkbox"/> Other (Explain in Remarks)
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Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No (Check) Wetland Hydrology Present? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Hydric Soils Present? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	(Check) Is this Sampling Point Within a Wetland? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Remarks	

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: <u>SC 41</u>	Date: <u>3/10/05</u>
Applicant/Owner: <u>SCDOT</u>	County: <u>Berkeley</u>
Investigator: <u>EcoScience Corporation / Saunders</u>	State: <u>South Carolina</u>
Do Normal Circumstances exist on the site? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Community ID: <u>Wetland</u>
Is the site significantly disturbed (Atypical Situation)? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Transect ID: <u>HD</u>
Is the area a potential Problem Area? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No (If needed, explain on reverse.)	Plot ID: _____

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. <u>Juncus sp.</u>	<u>herb</u>	<u>N/A</u>	9. _____	_____	_____
2. <u>Carex sp.</u>	<u>herb</u>	<u>N/A</u>	10. _____	_____	_____
3. <u>Typha sp.</u>	<u>herb</u>	<u>OBL</u>	11. _____	_____	_____
4. <u>Baccharis halimifolia</u>	<u>shrub</u>	<u>FAC</u>	12. _____	_____	_____
5. _____	_____	_____	13. _____	_____	_____
6. _____	_____	_____	14. _____	_____	_____
7. _____	_____	_____	15. _____	_____	_____
8. _____	_____	_____	16. _____	_____	_____

Percent of Dominant Species that are OBL, FACW or FAC
(excluding FAC-). 100

Remarks:

HYDROLOGY

<input type="checkbox"/> Recorded Data (Describe in Remarks): <input type="checkbox"/> Stream, Lake, or Tide Gauge <input type="checkbox"/> Aerial Photographs <input type="checkbox"/> Other <input type="checkbox"/> No Recorded Data Available	Wetland Hydrology Indicators: Primary Indicators: <input checked="" type="checkbox"/> Inundated <input checked="" type="checkbox"/> Saturated in Upper 12 Inches <input type="checkbox"/> Water Marks <input type="checkbox"/> Drift Lines <input type="checkbox"/> Sediment Deposits <input type="checkbox"/> Drainage Patterns in Wetlands Secondary Indicators (2 or more required): <input type="checkbox"/> Oxidized Root Channels in Upper 12 Inches <input type="checkbox"/> Water-Stained Leaves <input type="checkbox"/> Local Soil Survey Data <input checked="" type="checkbox"/> FAC-Neutral Test <input type="checkbox"/> Other (Explain in Remarks)
Field Observations: Depth of Surface Water: <u>0-4</u> (in.) Depth to Free Water in Pit: <u>N/A</u> (in.) Depth to Saturated Soil: <u>0</u> (in.)	
Remarks:	

SOILS

Map Unit Name (Series and Phase):		<u>Goldsboro Loamy Sand</u>		Drainage Class:	<u>Mod. well drained</u>
Taxonomy (Subgroup):		<u>Aquic Paleudults</u>		Field Observations Confirm Mapped Type?	<input type="checkbox"/> Yes <input type="checkbox"/> No

Profile Descriptions:					
Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/ Size/Contrast	Texture, Concretions, Structure, etc,
<u>0-5</u>		<u>10YR 4/2</u>			<u>sandy loam</u>
<u>5-12+</u>		<u>2.5Y 3/1</u>			<u>sandy clay loam</u>

Hydric Soil Indicators:

<input type="checkbox"/> Histosol	<input type="checkbox"/> Concretions
<input type="checkbox"/> Histic Epipedon	<input type="checkbox"/> High Organic Content in Surface Layer in Sandy Soils
<input type="checkbox"/> Sulfidic Odor	<input type="checkbox"/> Organic Streaking in Sandy Soils
<input type="checkbox"/> Aquic Moisture Regime	<input type="checkbox"/> Listed on Local Hydric Soils List
<input type="checkbox"/> Reducing Conditions	<input type="checkbox"/> Listed on National Hydric Soils List
<input type="checkbox"/> Gleyed or Low-Chroma Colors	<input type="checkbox"/> Other (Explain in Remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No (Check)	(Check)
Wetland Hydrology Present? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
Hydric Soils Present? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Is this Sampling Point Within a Wetland? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No

Remarks: Medium quality freshwater wetland

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: <u>SC 41</u>	Date: <u>3/09/05</u>
Applicant/Owner: <u>SCDOT</u>	County: <u>Berkeley</u>
Investigator: <u>EcoScience Corporation / O'Loughlin</u>	State: <u>SC</u>
Do Normal Circumstances exist on the site? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Community ID: <u>Disturbed/Maintained</u>
Is the site significantly disturbed (Atypical Situation)? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Transect ID: <u>DA14</u>
Is the area a potential Problem Area? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No (If needed, explain on reverse.)	Plot ID: <u>upland</u>

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. <u>Gelsemium sempervirens</u>	<u>S</u>	<u>FAC</u>	9. _____	_____	_____
2. <u>Liquidambar styraciflua</u>	<u>S</u>	<u>FAC+</u>	10. _____	_____	_____
3. <u>Pinus taeda</u>	<u>S</u>	<u>FAC</u>	11. _____	_____	_____
4. <u>Morella cerifera</u>	<u>S</u>	<u>FAC+</u>	12. _____	_____	_____
5. _____	_____	_____	13. _____	_____	_____
6. _____	_____	_____	14. _____	_____	_____
7. _____	_____	_____	15. _____	_____	_____
8. _____	_____	_____	16. _____	_____	_____

Percent of Dominant Species that are OBL, FACW or FAC
(excluding FAC-). 50%

Remarks:

HYDROLOGY

<input type="checkbox"/> Recorded Data (Describe in Remarks): <input type="checkbox"/> Stream, Lake, or Tide Gauge <input type="checkbox"/> Aerial Photographs <input type="checkbox"/> Other <input checked="" type="checkbox"/> No Recorded Data Available	Wetland Hydrology Indicators: Primary Indicators: <input type="checkbox"/> Inundated <input type="checkbox"/> Saturated in Upper 12 Inches <input type="checkbox"/> Water Marks <input type="checkbox"/> Drift Lines <input type="checkbox"/> Sediment Deposits <input type="checkbox"/> Drainage Patterns in Wetlands Secondary Indicators (2 or more required): <input type="checkbox"/> Oxidized Root Channels in Upper 12 Inches <input type="checkbox"/> Water-Stained Leaves <input type="checkbox"/> Local Soil Survey Data <input checked="" type="checkbox"/> FAC-Neutral Test <input type="checkbox"/> Other (Explain in Remarks)
Field Observations: Depth of Surface Water: _____ (in.) Depth to Free Water in Pit: <u>>12</u> (in.) Depth to Saturated Soil: <u>>12</u> (in.)	
Remarks:	

SOILS

Map Unit Name (Series and Phase): _____		Drainage Class: _____	
Taxonomy (Subgroup): _____		Field Observations Confirm Mapped Type? <input type="checkbox"/> Yes <input type="checkbox"/> No	

Profile Descriptions: Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/ Size/Contrast	Texture, Concretions, Structure, etc,
0-8		10YR 3/3	10YR 4/4	>10%	sandy loam
8+		10YR 4/3	10YR 4/6	>10%	sandy clay loam

Hydric Soil Indicators:

<input type="checkbox"/> Histosol <input type="checkbox"/> Histic Epipedon <input type="checkbox"/> Sulfidic Odor <input type="checkbox"/> Aquic Moisture Regime <input type="checkbox"/> Reducing Conditions <input type="checkbox"/> Gleyed or Low-Chroma Colors	<input type="checkbox"/> Concretions <input type="checkbox"/> High Organic Content in Surface Layer in Sandy Soils <input type="checkbox"/> Organic Streaking in Sandy Soils <input type="checkbox"/> Listed on Local Hydric Soils List <input type="checkbox"/> Listed on National Hydric Soils List <input type="checkbox"/> Other (Explain in Remarks)
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Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No (Check) Wetland Hydrology Present? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Hydric Soils Present? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	(Check) Is this Sampling Point Within a Wetland? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Remarks	

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: <u>SC 41</u>	Date: <u>3/09/05</u>
Applicant/Owner: <u>SCDOT</u>	County: <u>Berkeley</u>
Investigator: <u>EcoScience Corporation / O'Loughlin</u>	State: <u>SC</u>
Do Normal Circumstances exist on the site? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Community ID: <u>Disturbed/Maintained</u>
Is the site significantly disturbed (Atypical Situation)? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Transect ID: <u>DA14</u>
Is the area a potential Problem Area? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No (If needed, explain on reverse.)	Plot ID: <u>wetland</u>

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. <u>Juncus roemerianus</u>	<u>S</u>	<u>OBL</u>	9. _____	_____	_____
2. <u>Ilex vomitoria</u>	<u>S</u>	<u>FAC</u>	10. _____	_____	_____
3. <u>Eleocharis sp</u>	<u>H</u>	<u>-</u>	11. _____	_____	_____
4. <u>Andropogon glomeratus</u>	<u>H</u>	<u>FACW+</u>	12. _____	_____	_____
5. <u>Rhexia sp.</u>	<u>H</u>	<u>-</u>	13. _____	_____	_____
6. _____	_____	_____	14. _____	_____	_____
7. _____	_____	_____	15. _____	_____	_____
8. _____	_____	_____	16. _____	_____	_____

Percent of Dominant Species that are OBL, FACW or FAC
(excluding FAC-). 60%

Remarks:

HYDROLOGY

<input type="checkbox"/> Recorded Data (Describe in Remarks): <input type="checkbox"/> Stream, Lake, or Tide Gauge <input type="checkbox"/> Aerial Photographs <input type="checkbox"/> Other <input checked="" type="checkbox"/> No Recorded Data Available	Wetland Hydrology Indicators: Primary Indicators: <input checked="" type="checkbox"/> Inundated <input type="checkbox"/> Saturated in Upper 12 Inches <input type="checkbox"/> Water Marks <input type="checkbox"/> Drift Lines <input type="checkbox"/> Sediment Deposits <input type="checkbox"/> Drainage Patterns in Wetlands Secondary Indicators (2 or more required): <input checked="" type="checkbox"/> Oxidized Root Channels in Upper 12 Inches <input type="checkbox"/> Water-Stained Leaves <input type="checkbox"/> Local Soil Survey Data <input checked="" type="checkbox"/> FAC-Neutral Test <input type="checkbox"/> Other (Explain in Remarks)
Field Observations: Depth of Surface Water: <u>1</u> (in.) Depth to Free Water in Pit: <u>-</u> (in.) Depth to Saturated Soil: <u>0</u> (in.)	
Remarks:	

SOILS

Map Unit Name (Series and Phase): _____		Drainage Class: _____	
Taxonomy (Subgroup): _____		Field Observations Confirm Mapped Type? <input type="checkbox"/> Yes <input type="checkbox"/> No	

Profile Descriptions: Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/ Size/Contrast	Texture, Concretions, Structure, etc.
0-4		10yr 3/2			loamy sand
4+		GL1 6/10Y	10YR 5/4 and 5YR 4/6	>10% and > 10%	sandy clay loam

Hydric Soil Indicators:

<input type="checkbox"/> Histosol <input type="checkbox"/> Histic Epipedon <input type="checkbox"/> Sulfidic Odor <input type="checkbox"/> Aquic Moisture Regime <input checked="" type="checkbox"/> Reducing Conditions <input checked="" type="checkbox"/> Gleyed or Low-Chroma Colors	<input type="checkbox"/> Concretions <input type="checkbox"/> High Organic Content in Surface Layer in Sandy Soils <input type="checkbox"/> Organic Streaking in Sandy Soils <input type="checkbox"/> Listed on Local Hydric Soils List <input type="checkbox"/> Listed on National Hydric Soils List <input type="checkbox"/> Other (Explain in Remarks)
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Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No (Check) Wetland Hydrology Present? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Hydric Soils Present? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	(Check) Is this Sampling Point Within a Wetland? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Remarks: Low quality freshwater wetland	

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: SC 41 – Wando Bridge	Date: 3/10/05
Applicant/Owner: SCDOT	County: Berkeley/Charleston
Investigator: M. Thomas - EcoScience	State: SC
Do Normal Circumstances Exist on the Site? Yes No	Community ID: PEM1
Is the site significantly disturbed (Atypical)? Yes No	Transect ID: TK05
Is the area a potential problem area? Yes No	Plot ID: Upland

VEGETATION

<i>Dominant Plant Species</i>	<i>Stratum</i>	<i>Indicator</i>	<i>Dominant Plant Species</i>	<i>Stratum</i>	<i>Indicator</i>
1. <i>Eupatorium capillifolium</i>	H	FACU	9. _____	_____	_____
2. <i>Fescue</i> (Spp.)	H	_____	10. _____	_____	_____
3. _____	_____	_____	11. _____	_____	_____
4. _____	_____	_____	12. _____	_____	_____
5. _____	_____	_____	13. _____	_____	_____
6. _____	_____	_____	14. _____	_____	_____
7. _____	_____	_____	15. _____	_____	_____
8. _____	_____	_____	16. _____	_____	_____

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-) 0%

Remarks:

HYDROLOGY

<p>_____ Recorded Data (Describe in Remarks)</p> <p>_____ Stream, Lake or Tide Gauge</p> <p>_____ Aerial Photographs</p> <p>_____ Other</p> <p><u> x </u> No Recorded Data Available</p> <p><i>Field Observations:</i></p> <p>Depth of Surface Water: _____ (in.)</p> <p>Depth to Free Water in Pit: _____ (in.)</p> <p>Depth to Saturated Soil: <u> > 12 </u> (in.)</p>	<p><i>Primary Wetland Hydrology Indicators:</i></p> <p>_____ Inundated</p> <p>_____ Saturated in Upper 12 Inches</p> <p>_____ Water Marks</p> <p>_____ Drift Lines</p> <p>_____ Sediment Deposits</p> <p>_____ Drainage Patterns in Wetlands</p> <p><i>Secondary Indicators: (2 or more required):</i></p> <p>_____ Oxidized Root Channels in Upper 12 Inches</p> <p>_____ Water-Stained Leaves</p> <p>_____ Local Soil Survey Data</p> <p>_____ FAC-Neutral Test</p> <p>_____ Other (Explain in Remarks)</p>
Remarks:	

SOILS

Map Unit Name (Series and Phase): Meggett Loam					
Taxonomy (Subgroup): Typic Albaqualfs					
Drainage Class: PD					
Field Observations Confirm Mapped Type: Yes No					
Profile Description:					
Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions Structure, etc.
0 – 12+	A	2.5Y 5/3	7.5 YR 5/8	20%	Fine, sandy loam
Hydric Soil Indicators:					
<input type="checkbox"/> Histosol			<input type="checkbox"/> Concretions		
<input type="checkbox"/> Histic Epipedon			<input type="checkbox"/> High Organic Content in Surface layer in Sandy Soils		
<input type="checkbox"/> Sulfidic Odor			<input type="checkbox"/> Organic Streaking in Sandy Soils		
<input type="checkbox"/> Aquic Moisture Regime			<input type="checkbox"/> Listed on Local Hydric Soils List		
<input type="checkbox"/> Reducing Conditions			<input checked="" type="checkbox"/> x Listed on National Hydric Soils List		
<input type="checkbox"/> Gleyed or Low-Chroma Colors			<input type="checkbox"/> Other (Explain in Remarks)		
Remarks:					

WETLAND DETERMINATION

WETLAND DETERMINATION			
Hydrophytic Vegetation Present?	Yes	No	Is this Sampling Point Within a Wetland? Yes No
Wetland Hydrology Present?	Yes	No	
Hydric Soils Present?	Yes	No	
Remarks:			

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	SC 41 – Wando Bridge	Date:	3/10/05
Applicant/Owner:	SCDOT	County:	Berkeley/Charleston
Investigator:	M. Thomas - EcoScience	State:	SC
Do Normal Circumstances Exist on the Site?	Yes No	Community ID:	PEM1
Is the site significantly disturbed (Atypical)?	Yes No	Transect ID:	TK05
Is the area a potential problem area?	Yes No	Plot ID:	Wetland

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. <i>Juncus roemerianus</i>	H	OBL	9. _____	_____	_____
2. <i>Ipomoea purpurea</i>	H	FACU	10. _____	_____	_____
3. <i>Andropogon virginicus</i>	H	FAC-	11. _____	_____	_____
4. <i>Senecio glabellus</i>	H	FACW+	12. _____	_____	_____
5. _____	_____	_____	13. _____	_____	_____
6. _____	_____	_____	14. _____	_____	_____
7. _____	_____	_____	15. _____	_____	_____
8. _____	_____	_____	16. _____	_____	_____

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-) 66%

Remarks:

HYDROLOGY

<p>_____ Recorded Data (Describe in Remarks)</p> <p>_____ Stream, Lake or Tide Gauge</p> <p>_____ Aerial Photographs</p> <p>_____ Other</p> <p><input checked="" type="checkbox"/> No Recorded Data Available</p>	<p><i>Primary Wetland Hydrology Indicators:</i></p> <p><input checked="" type="checkbox"/> Inundated</p> <p>_____ Saturated in Upper 12 Inches</p> <p>_____ Water Marks</p> <p>_____ Drift Lines</p> <p>_____ Sediment Deposits</p> <p>_____ Drainage Patterns in Wetlands</p> <p><i>Secondary Indicators: (2 or more required):</i></p> <p>_____ Oxidized Root Channels in Upper 12 Inches</p> <p><input checked="" type="checkbox"/> Water-Stained Leaves</p> <p>_____ Local Soil Survey Data</p> <p><input checked="" type="checkbox"/> FAC-Neutral Test</p> <p>_____ Other (Explain in Remarks)</p>
<p><i>Field Observations:</i></p> <p>Depth of Surface Water: <u>1</u> (in.)</p> <p>Depth to Free Water in Pit: _____ (in.)</p> <p>Depth to Saturated Soil: _____ (in.)</p>	
<p>Remarks:</p>	

SOILSMap Unit Name (Series and Phase): Meggett LoamTaxonomy (Subgroup): Typic AlbaqualfsDrainage Class: PDField Observations Confirm Mapped Type: Yes No

Profile Description:

<u>Depth (inches)</u>	<u>Horizon</u>	<u>Matrix Color (Munsell Moist)</u>	<u>Mottle Colors (Munsell Moist)</u>	<u>Mottle Abundance/Contrast</u>	<u>Texture, Concretions Structure, etc.</u>
0 - 4	A	10YR 4/1			Fine, sandy loam
4 -12+	B	2.5Y 6/2	10YR 5/6	20%	Fine, sandy loam

Hydric Soil Indicators:

<input type="checkbox"/> Histosol	<input type="checkbox"/> Concretions
<input type="checkbox"/> Histic Epipedon	<input type="checkbox"/> High Organic Content in Surface layer in Sandy Soils
<input type="checkbox"/> Sulfidic Odor	<input type="checkbox"/> Organic Streaking in Sandy Soils
<input type="checkbox"/> Aquic Moisture Regime	<input type="checkbox"/> Listed on Local Hydric Soils List
<input type="checkbox"/> Reducing Conditions	<input checked="" type="checkbox"/> Listed on National Hydric Soils List
<input checked="" type="checkbox"/> Gleyed or Low-Chroma Colors	<input type="checkbox"/> Other (Explain in Remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes	No	Is this Sampling Point Within a Wetland?
Wetland Hydrology Present?	Yes	No	
Hydric Soils Present?	Yes	No	
Remarks: Medium quality freshwater wetland			Yes No

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: <u>SC 41</u>	Date: <u>3/9/05</u>
Applicant/Owner: <u>SCDOT</u>	County: <u>Charleston</u>
Investigator: <u>EcoScience Corporation / Scherrer</u>	State: <u>South Carolina</u>
Do Normal Circumstances exist on the site? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Community ID: <u>Upland</u>
Is the site significantly disturbed (Atypical Situation)? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Transect ID: <u>ED</u>
Is the area a potential Problem Area? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No (If needed, explain on reverse.)	Plot ID: _____

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. <u>Pinus taeda</u>	<u>tree</u>	<u>FAC</u>	9. _____	_____	_____
2. <u>Juniperus virginiana</u>	<u>shrub</u>	<u>FACU-</u>	10. _____	_____	_____
3. <u>Morella cerifera</u>	<u>shrub</u>	<u>FAC+</u>	11. _____	_____	_____
4. <u>Quercus nigra</u>	<u>tree</u>	<u>FAC</u>	12. _____	_____	_____
5. _____	_____	_____	13. _____	_____	_____
6. _____	_____	_____	14. _____	_____	_____
7. _____	_____	_____	15. _____	_____	_____
8. _____	_____	_____	16. _____	_____	_____

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-). 75

Remarks: _____

HYDROLOGY

<input type="checkbox"/> Recorded Data (Describe in Remarks): <input type="checkbox"/> Stream, Lake, or Tide Gauge <input type="checkbox"/> Aerial Photographs <input type="checkbox"/> Other <input type="checkbox"/> No Recorded Data Available	Wetland Hydrology Indicators: Primary Indicators: <input type="checkbox"/> Inundated <input type="checkbox"/> Saturated in Upper 12 Inches <input type="checkbox"/> Water Marks <input type="checkbox"/> Drift Lines <input type="checkbox"/> Sediment Deposits <input type="checkbox"/> Drainage Patterns in Wetlands Secondary Indicators (2 or more required): <input type="checkbox"/> Oxidized Root Channels in Upper 12 Inches <input type="checkbox"/> Water-Stained Leaves <input type="checkbox"/> Local Soil Survey Data <input checked="" type="checkbox"/> FAC-Neutral Test <input type="checkbox"/> Other (Explain in Remarks)
Field Observations: Depth of Surface Water: <u>N/A</u> (in.) Depth to Free Water in Pit: <u>N/A</u> (in.) Depth to Saturated Soil: <u>N/A</u> (in.)	
Remarks: <u>No Hydrologic Indicators!</u>	

SOILS

Map Unit Name (Series and Phase):		<u>Yonges Loamy Fine Sand</u>		Drainage Class: <u>Poorly-drained</u>	
Taxonomy (Subgroup):		<u>Typic Endoaqualfs</u>		Field Observations Confirm Mapped Type? <input type="checkbox"/> Yes <input type="checkbox"/> No	

Profile Descriptions:					
Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/ Size/Contrast	Texture, Concretions, Structure, etc,
0-3		10YR 2/3			sandy loam
3-12+		10YR 5/3	10YR 5/8		sandy loam

Hydric Soil Indicators:

<input type="checkbox"/> Histosol <input type="checkbox"/> Histic Epipedon <input type="checkbox"/> Sulfidic Odor <input type="checkbox"/> Aquic Moisture Regime <input type="checkbox"/> Reducing Conditions <input type="checkbox"/> Gleyed or Low-Chroma Colors	<input type="checkbox"/> Concretions <input type="checkbox"/> High Organic Content in Surface Layer in Sandy Soils <input type="checkbox"/> Organic Streaking in Sandy Soils <input type="checkbox"/> Listed on Local Hydric Soils List <input type="checkbox"/> Listed on National Hydric Soils List <input type="checkbox"/> Other (Explain in Remarks)
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Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No (Check) Wetland Hydrology Present? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Hydric Soils Present? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	(Check) Is this Sampling Point Within a Wetland? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Remarks	

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: <u>SC 41</u>	Date: <u>3/9/05</u>
Applicant/Owner: <u>SCDOT</u>	County: <u>Charleston</u>
Investigator: <u>EcoScience Corporation / Scherrer</u>	State: <u>South Carolina</u>
Do Normal Circumstances exist on the site? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Community ID: <u>Wetland</u>
Is the site significantly disturbed (Atypical Situation)? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Transect ID: <u>ED</u>
Is the area a potential Problem Area? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No (If needed, explain on reverse.)	Plot ID: _____

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. <u>Morella cerifera</u>	<u>shrub</u>	<u>FAC+</u>	9. _____	_____	_____
2. <u>Lonicera japonica</u>	<u>vine</u>	<u>FAC-</u>	10. _____	_____	_____
3. <u>Juniperus virginiana</u>	<u>shrub</u>	<u>FACU-</u>	11. _____	_____	_____
4. <u>Sapium sebiferum</u>	<u>tree</u>	<u>FAC</u>	12. _____	_____	_____
5. _____	_____	_____	13. _____	_____	_____
6. _____	_____	_____	14. _____	_____	_____
7. _____	_____	_____	15. _____	_____	_____
8. _____	_____	_____	16. _____	_____	_____

Percent of Dominant Species that are OBL, FACW or FAC
(excluding FAC-). 50

Remarks:

HYDROLOGY

<input type="checkbox"/> Recorded Data (Describe in Remarks): <input type="checkbox"/> Stream, Lake, or Tide Gauge <input type="checkbox"/> Aerial Photographs <input type="checkbox"/> Other <input type="checkbox"/> No Recorded Data Available	Wetland Hydrology Indicators: Primary Indicators: <input checked="" type="checkbox"/> Inundated <input checked="" type="checkbox"/> Saturated in Upper 12 Inches <input type="checkbox"/> Water Marks <input type="checkbox"/> Drift Lines <input type="checkbox"/> Sediment Deposits <input checked="" type="checkbox"/> Drainage Patterns in Wetlands Secondary Indicators (2 or more required): <input type="checkbox"/> Oxidized Root Channels in Upper 12 Inches <input type="checkbox"/> Water-Stained Leaves <input type="checkbox"/> Local Soil Survey Data <input checked="" type="checkbox"/> FAC-Neutral Test <input type="checkbox"/> Other (Explain in Remarks)
Field Observations: Depth of Surface Water: <u>0-4</u> (in.) Depth to Free Water in Pit: <u>N/A</u> (in.) Depth to Saturated Soil: <u>0</u> (in.)	
Remarks:	

SOILS

Map Unit Name (Series and Phase):		<u>Yonges Loamy Fine Sand</u>		Drainage Class: <u>Poorly-drained</u>	
Taxonomy (Subgroup):		<u>Typic Endoaqualfs</u>		Field Observations Confirm Mapped Type? <input type="checkbox"/> Yes <input type="checkbox"/> No	

Profile Descriptions:					
Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/ Size/Contrast	Texture, Concretions, Structure, etc,
0-12+		10YR 4/1	10YR 4/6		sandy loam

Hydric Soil Indicators:

<input type="checkbox"/> Histosol <input type="checkbox"/> Histic Epipedon <input type="checkbox"/> Sulfidic Odor <input type="checkbox"/> Aquic Moisture Regime <input type="checkbox"/> Reducing Conditions <input type="checkbox"/> Gleyed or Low-Chroma Colors	<input type="checkbox"/> Concretions <input type="checkbox"/> High Organic Content in Surface Layer in Sandy Soils <input type="checkbox"/> Organic Streaking in Sandy Soils <input type="checkbox"/> Listed on Local Hydric Soils List <input type="checkbox"/> Listed on National Hydric Soils List <input type="checkbox"/> Other (Explain in Remarks)
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Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No (Check) Wetland Hydrology Present? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Hydric Soils Present? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	(Check) Is this Sampling Point Within a Wetland? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Remarks: Medium quality freshwater wetland	

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: <u>SC 41</u>	Date: <u>3/9/05</u>
Applicant/Owner: <u>SCDOT</u>	County: <u>Charleston</u>
Investigator: <u>EcoScience Corporation / Scherrer</u>	State: <u>South Carolina</u>
Do Normal Circumstances exist on the site? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Community ID: <u>Upland</u>
Is the site significantly disturbed (Atypical Situation)? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Transect ID: <u>EE</u>
Is the area a potential Problem Area? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No (If needed, explain on reverse.)	Plot ID: _____

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. <u>Pinus taeda</u>	<u>tree</u>	<u>FAC</u>	9. _____	_____	_____
2. <u>Lonicera japonica</u>	<u>vine</u>	<u>FAC-</u>	10. _____	_____	_____
3. <u>Sabal palmetto</u>	<u>tree</u>	<u>FAC+</u>	11. _____	_____	_____
4. <u>Baccharis halimifolia</u>	<u>shrub</u>	<u>FAC</u>	12. _____	_____	_____
5. <u>Acer rubrum</u>	<u>shrub</u>	<u>FAC</u>	13. _____	_____	_____
6. _____	_____	_____	14. _____	_____	_____
7. _____	_____	_____	15. _____	_____	_____
8. _____	_____	_____	16. _____	_____	_____

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-). 80

Remarks: _____

HYDROLOGY

<input type="checkbox"/> Recorded Data (Describe in Remarks): <input type="checkbox"/> Stream, Lake, or Tide Gauge <input type="checkbox"/> Aerial Photographs <input type="checkbox"/> Other <input type="checkbox"/> No Recorded Data Available	Wetland Hydrology Indicators: Primary Indicators: <input type="checkbox"/> Inundated <input type="checkbox"/> Saturated in Upper 12 Inches <input type="checkbox"/> Water Marks <input type="checkbox"/> Drift Lines <input type="checkbox"/> Sediment Deposits <input type="checkbox"/> Drainage Patterns in Wetlands Secondary Indicators (2 or more required): <input type="checkbox"/> Oxidized Root Channels in Upper 12 Inches <input type="checkbox"/> Water-Stained Leaves <input type="checkbox"/> Local Soil Survey Data <input checked="" type="checkbox"/> FAC-Neutral Test <input type="checkbox"/> Other (Explain in Remarks)
Field Observations: Depth of Surface Water: <u>NA</u> (in.) Depth to Free Water in Pit: <u>N/A</u> (in.) Depth to Saturated Soil: <u>N/A</u> (in.)	
Remarks: <u>No Hydrologic Indicators!</u>	

SOILS

Map Unit Name (Series and Phase):		<u>Yonges Loamy Fine Sand</u>		Drainage Class: <u>Poorly-drained</u>	
Taxonomy (Subgroup):		<u>Typic Endoaqualfs</u>		Field Observations Confirm Mapped Type? <input type="checkbox"/> Yes <input type="checkbox"/> No	

Profile Descriptions:					
Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/ Size/Contrast	Texture, Concretions, Structure, etc,
0-12+		10YR 2/2	2.5YR 2/2		sandy loam

Hydric Soil Indicators:

<input type="checkbox"/> Histosol <input type="checkbox"/> Histic Epipedon <input type="checkbox"/> Sulfidic Odor <input type="checkbox"/> Aquic Moisture Regime <input type="checkbox"/> Reducing Conditions <input type="checkbox"/> Gleyed or Low-Chroma Colors	<input type="checkbox"/> Concretions <input type="checkbox"/> High Organic Content in Surface Layer in Sandy Soils <input type="checkbox"/> Organic Streaking in Sandy Soils <input type="checkbox"/> Listed on Local Hydric Soils List <input type="checkbox"/> Listed on National Hydric Soils List <input type="checkbox"/> Other (Explain in Remarks)
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Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No (Check) Wetland Hydrology Present? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Hydric Soils Present? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	(Check) Is this Sampling Point Within a Wetland? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Remarks	

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: <u>SC 41</u>	Date: <u>3/9/05</u>
Applicant/Owner: <u>SCDOT</u>	County: <u>Charleston</u>
Investigator: <u>EcoScience Corporation / Scherrer</u>	State: <u>South Carolina</u>
Do Normal Circumstances exist on the site? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Community ID: <u>Wetland</u>
Is the site significantly disturbed (Atypical Situation)? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Transect ID: <u>EE</u>
Is the area a potential Problem Area? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No (If needed, explain on reverse.)	Plot ID: _____

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. <u>Baccharis halimifolia</u>	<u>shrub</u>	<u>FAC</u>	9. _____	_____	_____
2. <u>Typha sp.</u>	<u>herb</u>	<u>N/A</u>	10. _____	_____	_____
3. <u>Eleocharis sp.</u>	<u>herb</u>	<u>N/A</u>	11. _____	_____	_____
4. <u>Acer rubrum</u>	<u>shrub</u>	<u>FAC</u>	12. _____	_____	_____
5. <u>Hydrocotyle sp.</u>	<u>herb</u>	<u>OBL</u>	13. _____	_____	_____
6. <u>Juncus roemarianus</u>	<u>herb</u>	<u>OBL</u>	14. _____	_____	_____
7. _____	_____	_____	15. _____	_____	_____
8. _____	_____	_____	16. _____	_____	_____

Percent of Dominant Species that are OBL, FACW or FAC
(excluding FAC-). 100

Remarks:

HYDROLOGY

<input type="checkbox"/> Recorded Data (Describe in Remarks): <input type="checkbox"/> Stream, Lake, or Tide Gauge <input type="checkbox"/> Aerial Photographs <input type="checkbox"/> Other <input type="checkbox"/> No Recorded Data Available	Wetland Hydrology Indicators: Primary Indicators: <input checked="" type="checkbox"/> Inundated <input checked="" type="checkbox"/> Saturated in Upper 12 Inches <input type="checkbox"/> Water Marks <input type="checkbox"/> Drift Lines <input type="checkbox"/> Sediment Deposits <input type="checkbox"/> Drainage Patterns in Wetlands Secondary Indicators (2 or more required): <input type="checkbox"/> Oxidized Root Channels in Upper 12 Inches <input type="checkbox"/> Water-Stained Leaves <input type="checkbox"/> Local Soil Survey Data <input checked="" type="checkbox"/> FAC-Neutral Test <input type="checkbox"/> Other (Explain in Remarks)
Field Observations: Depth of Surface Water: <u>0-3</u> (in.) Depth to Free Water in Pit: <u>N/A</u> (in.) Depth to Saturated Soil: <u>0</u> (in.)	Remarks:

SOILS

Map Unit Name (Series and Phase):		<u>Yonges Loamy Fine Sand</u>		Drainage Class: <u>Poorly-drained</u>	
Taxonomy (Subgroup):		<u>Typic Endoaqualfs</u>		Field Observations Confirm Mapped Type? <input type="checkbox"/> Yes <input type="checkbox"/> No	

Profile Descriptions: Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/ Size/Contrast	Texture, Concretions, Structure, etc,
0-8		10YR 3/2	10YR 3/6	few mottles	sandy loam
8-12+		10YR 5/2	10YR 4/4	few mottles	loamy sand

Hydric Soil Indicators:

<input type="checkbox"/> Histosol <input type="checkbox"/> Histic Epipedon <input type="checkbox"/> Sulfidic Odor <input type="checkbox"/> Aquic Moisture Regime <input type="checkbox"/> Reducing Conditions <input type="checkbox"/> Gleyed or Low-Chroma Colors	<input type="checkbox"/> Concretions <input type="checkbox"/> High Organic Content in Surface Layer in Sandy Soils <input type="checkbox"/> Organic Streaking in Sandy Soils <input type="checkbox"/> Listed on Local Hydric Soils List <input type="checkbox"/> Listed on National Hydric Soils List <input type="checkbox"/> Other (Explain in Remarks)
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Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No (Check) Wetland Hydrology Present? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Hydric Soils Present? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	(Check) Is this Sampling Point Within a Wetland? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Remarks: Saltwater wetland (Critical Area)	

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: <u>SC 41</u>	Date: <u>3/9/05</u>
Applicant/Owner: <u>SCDOT</u>	County: <u>Charleston</u>
Investigator: <u>EcoScience Corporation / Scherrer</u>	State: <u>South Carolina</u>
Do Normal Circumstances exist on the site? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Community ID: <u>Upland</u>
Is the site significantly disturbed (Atypical Situation)? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Transect ID: <u>EH/TE</u>
Is the area a potential Problem Area? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No (If needed, explain on reverse.)	Plot ID: _____

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. <u>Ligustrum sinense</u>	<u>shrub</u>	<u>FAC</u>	9. _____	_____	_____
2. <u>Smilax sp.</u>	<u>vine</u>	<u>N/A</u>	10. _____	_____	_____
3. <u>Juncus sp.</u>	<u>herb</u>	<u>N/A</u>	11. _____	_____	_____
4. <u>Morella cerifera</u>	<u>shrub</u>	<u>FAC+</u>	12. _____	_____	_____
5. <u>Pinus taeda</u>	<u>tree</u>	<u>FAC</u>	13. _____	_____	_____
6. <u>Vaccinium stamineum</u>	<u>shrub</u>	<u>FACU</u>	14. _____	_____	_____
7. <u>Quercus nigra</u>	<u>tree</u>	<u>FAC</u>	15. _____	_____	_____
8. <u>Sabal palmetto</u>	<u>tre</u>	<u>FAC+</u>	16. _____	_____	_____

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-). 71

Remarks:

HYDROLOGY

<input type="checkbox"/> Recorded Data (Describe in Remarks): <input type="checkbox"/> Stream, Lake, or Tide Gauge <input type="checkbox"/> Aerial Photographs <input type="checkbox"/> Other <input type="checkbox"/> No Recorded Data Available	Wetland Hydrology Indicators: Primary Indicators: <input type="checkbox"/> Inundated <input type="checkbox"/> Saturated in Upper 12 Inches <input type="checkbox"/> Water Marks <input type="checkbox"/> Drift Lines <input type="checkbox"/> Sediment Deposits <input type="checkbox"/> Drainage Patterns in Wetlands Secondary Indicators (2 or more required): <input type="checkbox"/> Oxidized Root Channels in Upper 12 Inches <input type="checkbox"/> Water-Stained Leaves <input type="checkbox"/> Local Soil Survey Data <input checked="" type="checkbox"/> FAC-Neutral Test <input type="checkbox"/> Other (Explain in Remarks)
Field Observations: Depth of Surface Water: <u>N/A</u> (in.) Depth to Free Water in Pit: <u>N/A</u> (in.) Depth to Saturated Soil: <u>N/A</u> (in.)	
Remarks: No Hydrologic Indicators!	

SOILS

Map Unit Name (Series and Phase):		<u>Yonges Loamy Fine Sand</u>		Drainage Class: <u>Poorly-drained</u>	
Taxonomy (Subgroup):		<u>Typic Endoaqualfs</u>		Field Observations Confirm Mapped Type? <input type="checkbox"/> Yes <input type="checkbox"/> No	

Profile Descriptions:					
Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/ Size/Contrast	Texture, Concretions, Structure, etc,
0-12+		10YR 5/6	10YR 6/1		clay loam

Hydric Soil Indicators:

<input type="checkbox"/> Histosol <input type="checkbox"/> Histic Epipedon <input type="checkbox"/> Sulfidic Odor <input type="checkbox"/> Aquic Moisture Regime <input type="checkbox"/> Reducing Conditions <input type="checkbox"/> Gleyed or Low-Chroma Colors	<input type="checkbox"/> Concretions <input type="checkbox"/> High Organic Content in Surface Layer in Sandy Soils <input type="checkbox"/> Organic Streaking in Sandy Soils <input type="checkbox"/> Listed on Local Hydric Soils List <input type="checkbox"/> Listed on National Hydric Soils List <input type="checkbox"/> Other (Explain in Remarks)
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Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No (Check) Wetland Hydrology Present? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Hydric Soils Present? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	(Check) Is this Sampling Point Within a Wetland? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Remarks	

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: <u>SC 41</u>	Date: <u>3/9/05</u>
Applicant/Owner: <u>SCDOT</u>	County: <u>Charleston</u>
Investigator: <u>EcoScience Corporation / Scherrer</u>	State: <u>South Carolina</u>
Do Normal Circumstances exist on the site? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Community ID: <u>Wetland</u>
Is the site significantly disturbed (Atypical Situation)? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Transect ID: <u>EH/TE</u>
Is the area a potential Problem Area? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No (If needed, explain on reverse.)	Plot ID: _____

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. <u>Baccharis halimifolia</u>	<u>shrub</u>	<u>FAC</u>	9. _____	_____	_____
2. <u>Andropogon sp.</u>	<u>herb</u>	<u>N/A</u>	10. _____	_____	_____
3. <u>Juncus sp.</u>	<u>herb</u>	<u>N/A</u>	11. _____	_____	_____
4. <u>Morella cerifera</u>	<u>shrub</u>	<u>FAC+</u>	12. _____	_____	_____
5. <u>Pinus taeda</u>	<u>tree</u>	<u>FAC</u>	13. _____	_____	_____
6. <u>Dicanthelium scoparium</u>	<u>herb</u>	<u>FACW</u>	14. _____	_____	_____
7. _____	_____	_____	15. _____	_____	_____
8. _____	_____	_____	16. _____	_____	_____

Percent of Dominant Species that are OBL, FACW or FAC
(excluding FAC-). 100

Remarks:

HYDROLOGY

<input type="checkbox"/> Recorded Data (Describe in Remarks): <input type="checkbox"/> Stream, Lake, or Tide Gauge <input type="checkbox"/> Aerial Photographs <input type="checkbox"/> Other <input type="checkbox"/> No Recorded Data Available	Wetland Hydrology Indicators: Primary Indicators: <input checked="" type="checkbox"/> Inundated <input checked="" type="checkbox"/> Saturated in Upper 12 Inches <input type="checkbox"/> Water Marks <input type="checkbox"/> Drift Lines <input type="checkbox"/> Sediment Deposits <input type="checkbox"/> Drainage Patterns in Wetlands Secondary Indicators (2 or more required): <input type="checkbox"/> Oxidized Root Channels in Upper 12 Inches <input type="checkbox"/> Water-Stained Leaves <input type="checkbox"/> Local Soil Survey Data <input checked="" type="checkbox"/> FAC-Neutral Test <input type="checkbox"/> Other (Explain in Remarks)
Field Observations: Depth of Surface Water: <u>0-4</u> (in.) Depth to Free Water in Pit: <u>N/A</u> (in.) Depth to Saturated Soil: <u>0</u> (in.)	
Remarks:	

SOILS

Map Unit Name (Series and Phase):		<u>Yonges Loamy Fine Sand</u>		Drainage Class: <u>Poorly-drained</u>	
Taxonomy (Subgroup):		<u>Typic Endoaqualfs</u>		Field Observations Confirm Mapped Type? <input type="checkbox"/> Yes <input type="checkbox"/> No	

Profile Descriptions:					
Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/ Size/Contrast	Texture, Concretions, Structure, etc,
0-6		10YR 5/1	10YR 5/8		sandy loam
6-10		10YR 5/1	10YR 5/8	less mottling	sandy loam
10-12+		Gley 2 6/10BG			clay

Hydric Soil Indicators:

<input type="checkbox"/> Histosol <input type="checkbox"/> Histic Epipedon <input type="checkbox"/> Sulfidic Odor <input type="checkbox"/> Aquic Moisture Regime <input type="checkbox"/> Reducing Conditions <input type="checkbox"/> Gleyed or Low-Chroma Colors	<input type="checkbox"/> Concretions <input type="checkbox"/> High Organic Content in Surface Layer in Sandy Soils <input type="checkbox"/> Organic Streaking in Sandy Soils <input type="checkbox"/> Listed on Local Hydric Soils List <input type="checkbox"/> Listed on National Hydric Soils List <input type="checkbox"/> Other (Explain in Remarks)
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Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No (Check) Wetland Hydrology Present? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Hydric Soils Present? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	(Check) Is this Sampling Point Within a Wetland? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Remarks: Medium quality freshwater wetland	

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: <u>SC 41</u>	Date: <u>3/9/05</u>
Applicant/Owner: <u>SCDOT</u>	County: <u>Charleston</u>
Investigator: <u>EcoScience Corporation / Scherrer</u>	State: <u>South Carolina</u>
Do Normal Circumstances exist on the site? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Community ID: <u>Upland</u>
Is the site significantly disturbed (Atypical Situation)? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Transect ID: <u>EF</u>
Is the area a potential Problem Area? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No (If needed, explain on reverse.)	Plot ID: _____

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. <u>Pinus taeda</u>	<u>tree</u>	<u>FAC</u>	9. _____	_____	_____
2. <u>Quercus virginiana</u>	<u>tree</u>	<u>FACU+</u>	10. _____	_____	_____
3. <u>Sabal palmetto</u>	<u>tree</u>	<u>FAC+</u>	11. _____	_____	_____
4. <u>Ilex vomitoria</u>	<u>shrub</u>	<u>FAC</u>	12. _____	_____	_____
5. <u>Andropogon sp.</u>	<u>herb</u>	<u>N/A</u>	13. _____	_____	_____
6. _____	_____	_____	14. _____	_____	_____
7. _____	_____	_____	15. _____	_____	_____
8. _____	_____	_____	16. _____	_____	_____

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-). 75

Remarks: _____

HYDROLOGY

<input type="checkbox"/> Recorded Data (Describe in Remarks): <input type="checkbox"/> Stream, Lake, or Tide Gauge <input type="checkbox"/> Aerial Photographs <input type="checkbox"/> Other <input type="checkbox"/> No Recorded Data Available	Wetland Hydrology Indicators: Primary Indicators: <input type="checkbox"/> Inundated <input type="checkbox"/> Saturated in Upper 12 Inches <input type="checkbox"/> Water Marks <input type="checkbox"/> Drift Lines <input type="checkbox"/> Sediment Deposits <input type="checkbox"/> Drainage Patterns in Wetlands Secondary Indicators (2 or more required): <input type="checkbox"/> Oxidized Root Channels in Upper 12 Inches <input type="checkbox"/> Water-Stained Leaves <input type="checkbox"/> Local Soil Survey Data <input checked="" type="checkbox"/> FAC-Neutral Test <input type="checkbox"/> Other (Explain in Remarks)
Field Observations: Depth of Surface Water: <u>NA</u> (in.) Depth to Free Water in Pit: <u>N/A</u> (in.) Depth to Saturated Soil: <u>N/A</u> (in.)	
Remarks: <u>No Hydrologic Indicators!</u>	

SOILS

Map Unit Name (Series and Phase):		<u>Yonges Loamy Fine Sand</u>		Drainage Class: <u>Poorly-drained</u>	
Taxonomy (Subgroup):		<u>Typic Endoaqualfs</u>		Field Observations Confirm Mapped Type? <input type="checkbox"/> Yes <input type="checkbox"/> No	

Profile Descriptions:					
Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/ Size/Contrast	Texture, Concretions, Structure, etc,
0-3		10YR 3/2	10YR 3/4		sandy loam
3-12+		10YR 5/2	10YR 4/4		loamy sand

Hydric Soil Indicators:

<input type="checkbox"/> Histosol <input type="checkbox"/> Histic Epipedon <input type="checkbox"/> Sulfidic Odor <input type="checkbox"/> Aquic Moisture Regime <input type="checkbox"/> Reducing Conditions <input type="checkbox"/> Gleyed or Low-Chroma Colors	<input type="checkbox"/> Concretions <input type="checkbox"/> High Organic Content in Surface Layer in Sandy Soils <input type="checkbox"/> Organic Streaking in Sandy Soils <input type="checkbox"/> Listed on Local Hydric Soils List <input type="checkbox"/> Listed on National Hydric Soils List <input type="checkbox"/> Other (Explain in Remarks)
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Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No (Check) Wetland Hydrology Present? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Hydric Soils Present? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	(Check) Is this Sampling Point Within a Wetland? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Remarks:	

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: <u>SC 41</u>	Date: <u>3/9/05</u>
Applicant/Owner: <u>SCDOT</u>	County: <u>Charleston</u>
Investigator: <u>EcoScience Corporation / Scherrer</u>	State: <u>South Carolina</u>
Do Normal Circumstances exist on the site? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Community ID: <u>Wetland</u>
Is the site significantly disturbed (Atypical Situation)? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Transect ID: <u>EF</u>
Is the area a potential Problem Area? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No (If needed, explain on reverse.)	Plot ID: _____

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. <u>Baccharis halimifolia</u>	<u>shrub</u>	<u>FAC</u>	9. _____	_____	_____
2. <u>Panicum spp.</u>	<u>herb</u>	<u>N/A</u>	10. _____	_____	_____
3. <u>Juncus effusus</u>	<u>herb</u>	<u>OBL</u>	11. _____	_____	_____
4. _____	_____	_____	12. _____	_____	_____
5. _____	_____	_____	13. _____	_____	_____
6. _____	_____	_____	14. _____	_____	_____
7. _____	_____	_____	15. _____	_____	_____
8. _____	_____	_____	16. _____	_____	_____

Percent of Dominant Species that are OBL, FACW or FAC
(excluding FAC-). 100

Remarks:

HYDROLOGY

<input type="checkbox"/> Recorded Data (Describe in Remarks): <input type="checkbox"/> Stream, Lake, or Tide Gauge <input type="checkbox"/> Aerial Photographs <input type="checkbox"/> Other <input type="checkbox"/> No Recorded Data Available	Wetland Hydrology Indicators: Primary Indicators: <input checked="" type="checkbox"/> Inundated <input checked="" type="checkbox"/> Saturated in Upper 12 Inches <input type="checkbox"/> Water Marks <input type="checkbox"/> Drift Lines <input type="checkbox"/> Sediment Deposits <input type="checkbox"/> Drainage Patterns in Wetlands Secondary Indicators (2 or more required): <input type="checkbox"/> Oxidized Root Channels in Upper 12 Inches <input type="checkbox"/> Water-Stained Leaves <input type="checkbox"/> Local Soil Survey Data <input checked="" type="checkbox"/> FAC-Neutral Test <input type="checkbox"/> Other (Explain in Remarks)
Field Observations: Depth of Surface Water: <u>0-2</u> (in.) Depth to Free Water in Pit: <u>N/A</u> (in.) Depth to Saturated Soil: <u>0</u> (in.)	
Remarks:	

SOILS

Map Unit Name (Series and Phase):		<u>Yonges Loamy Fine Sand</u>		Drainage Class: <u>Poorly-drained</u>	
Taxonomy (Subgroup):		<u>Typic Endoaqualfs</u>		Field Observations Confirm Mapped Type? <input type="checkbox"/> Yes <input type="checkbox"/> No	

Profile Descriptions:					
Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/ Size/Contrast	Texture, Concretions, Structure, etc,
0-3		10YR 3/2	10YR 3/4		sandy loam
3-12+		10YR 5/2	10YR 4/4		loamy sand

Hydric Soil Indicators:

<input type="checkbox"/> Histosol <input type="checkbox"/> Histic Epipedon <input type="checkbox"/> Sulfidic Odor <input type="checkbox"/> Aquic Moisture Regime <input type="checkbox"/> Reducing Conditions <input type="checkbox"/> Gleyed or Low-Chroma Colors	<input type="checkbox"/> Concretions <input type="checkbox"/> High Organic Content in Surface Layer in Sandy Soils <input type="checkbox"/> Organic Streaking in Sandy Soils <input type="checkbox"/> Listed on Local Hydric Soils List <input type="checkbox"/> Listed on National Hydric Soils List <input type="checkbox"/> Other (Explain in Remarks)
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Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No (Check) Wetland Hydrology Present? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Hydric Soils Present? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	(Check) Is this Sampling Point Within a Wetland? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Remarks: Saltwater wetland (Critical Area)	

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: SC 41 – Wando Bridge	Date: 3/17/05
Applicant/Owner: SCDOT	County: Berkeley/Charleston
Investigator: M. Thomas - EcoScience	State: SC
Do Normal Circumstances Exist on the Site? Yes No	Community ID: PFO3
Is the site significantly disturbed (Atypical)? Yes No	Transect ID: TAF13
Is the area a potential problem area? Yes No	Plot ID: Upland TAF

VEGETATION

<i>Dominant Plant Species</i>	<i>Stratum</i>	<i>Indicator</i>	<i>Dominant Plant Species</i>	<i>Stratum</i>	<i>Indicator</i>
1. <i>Fescue</i> (Spp.)	H		9. _____		
2. <i>Geranium maculatum</i>	H	FACU	10. _____		
3. <i>Trifolium repens</i>	H	FACU	11. _____		
4. <i>Allium canadense</i>	H	FACU-	12. _____		
5. <i>Carduus pumilis</i>	H		13. _____		
6. <i>Taraxacum officinale</i>	H	FACU	14. _____		
7. _____			15. _____		
8. _____			16. _____		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-) 0%

Remarks:

HYDROLOGY

<p>_____ Recorded Data (Describe in Remarks)</p> <p>_____ Stream, Lake or Tide Gauge</p> <p>_____ Aerial Photographs</p> <p>_____ Other</p> <p><u> x </u> No Recorded Data Available</p> <p><i>Field Observations:</i></p> <p>Depth of Surface Water: _____ (in.)</p> <p>Depth to Free Water in Pit: _____ (in.)</p> <p>Depth to Saturated Soil: <u> > 12 </u> (in.)</p>	<p><i>Primary Wetland Hydrology Indicators:</i></p> <p>_____ Inundated</p> <p>_____ Saturated in Upper 12 Inches</p> <p>_____ Water Marks</p> <p>_____ Drift Lines</p> <p>_____ Sediment Deposits</p> <p>_____ Drainage Patterns in Wetlands</p> <p><i>Secondary Indicators: (2 or more required):</i></p> <p>_____ Oxidized Root Channels in Upper 12 Inches</p> <p>_____ Water-Stained Leaves</p> <p>_____ Local Soil Survey Data</p> <p>_____ FAC-Neutral Test</p> <p>_____ Other (Explain in Remarks)</p>
Remarks:	

SOILS

Map Unit Name (Series and Phase): Yonges Loamy Fine Sand					
Taxonomy (Subgroup): Typic Endoaqualfs					
Drainage Class: PD					
Field Observations Confirm Mapped Type: Yes No					
Profile Description:					
<u>Depth (inches)</u>	<u>Horizon</u>	<u>Matrix Color (Munsell Moist)</u>	<u>Mottle Colors (Munsell Moist)</u>	<u>Mottle Abundance/Contrast</u>	<u>Texture, Concretions Structure, etc.</u>
0 – 12+	Ad	10YR 4/3	10YR 6/4	10%	Fine, sandy clay
			7.5YR 5/8	10%	
Hydric Soil Indicators:					
<input type="checkbox"/>	Histosol			<input type="checkbox"/>	Concretions
<input type="checkbox"/>	Histic Epipedon			<input type="checkbox"/>	High Organic Content in Surface layer in Sandy Soils
<input type="checkbox"/>	Sulfidic Odor			<input type="checkbox"/>	Organic Streaking in Sandy Soils
<input checked="" type="checkbox"/>	Aquic Moisture Regime			<input type="checkbox"/>	Listed on Local Hydric Soils List
<input type="checkbox"/>	Reducing Conditions			<input checked="" type="checkbox"/>	Listed on National Hydric Soils List
<input type="checkbox"/>	Gleyed or Low-Chroma Colors			<input type="checkbox"/>	Other (Explain in Remarks)
Remarks:					

WETLAND DETERMINATION

WETLAND DETERMINATION			
Hydrophytic Vegetation Present?	Yes	No	Is this Sampling Point Within a Wetland? Yes No
Wetland Hydrology Present?	Yes	No	
Hydric Soils Present?	Yes	No	
Remarks: Disturbed soil/vegetation do to gas easement/power line corridor.			

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: SC 41 – Wando Bridge	Date: 3/17/05
Applicant/Owner: SCDOT	County: Berkeley/Charleston
Investigator: M. Thomas – EcoScience	State: SC
Do Normal Circumstances Exist on the Site? Yes No	Community ID: PFO3
Is the site significantly disturbed (Atypical)? Yes No	Transect ID: TAF13
Is the area a potential problem area? Yes No	Plot ID: Wetland TAF

VEGETATION

<i>Dominant Plant Species</i>	<i>Stratum</i>	<i>Indicator</i>	<i>Dominant Plant Species</i>	<i>Stratum</i>	<i>Indicator</i>
1. <i>Pinus taeda</i>	C	FAC	9. _____	_____	_____
2. <i>Carex</i> (Spp.)	H	_____	10. _____	_____	_____
3. <i>Fescue</i> (Spp.)	H	_____	11. _____	_____	_____
4. <i>Sabal palmetto</i>	C	FAC	12. _____	_____	_____
5. <i>Juncus effusus</i>	H	FACW+	13. _____	_____	_____
6. _____	_____	_____	14. _____	_____	_____
7. _____	_____	_____	15. _____	_____	_____
8. _____	_____	_____	16. _____	_____	_____

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-) 100%

Remarks:

HYDROLOGY

<p>_____ Recorded Data (Describe in Remarks)</p> <p>_____ Stream, Lake or Tide Gauge</p> <p>_____ Aerial Photographs</p> <p>_____ Other</p> <p><u> x </u> No Recorded Data Available</p> <p><i>Field Observations:</i></p> <p>Depth of Surface Water: _____ (in.)</p> <p>Depth to Free Water in Pit: <u> 0 </u> (in.)</p> <p>Depth to Saturated Soil: <u> 0 </u> (in.)</p>	<p><i>Primary Wetland Hydrology Indicators:</i></p> <p>_____ Inundated</p> <p><u> x </u> Saturated in Upper 12 Inches</p> <p>_____ Water Marks</p> <p>_____ Drift Lines</p> <p>_____ Sediment Deposits</p> <p>_____ Drainage Patterns in Wetlands</p> <p><i>Secondary Indicators: (2 or more required):</i></p> <p>_____ Oxidized Root Channels in Upper 12 Inches</p> <p><u> x </u> Water-Stained Leaves</p> <p><u> x </u> Local Soil Survey Data</p> <p><u> x </u> FAC-Neutral Test</p> <p>_____ Other (Explain in Remarks)</p>
Remarks:	

SOILS

[illegible]

WETLAND DETERMINATION

WETLAND DETERMINATION				
Hydrophytic Vegetation Present?	Yes	No	Is this Sampling Point Within a Wetland?	
Wetland Hydrology Present?	Yes	No		
Hydric Soils Present?	Yes	No		
			Yes	No
Remarks: Medium quality freshwater wetland				

APPENDIX C

PHOTOGRAPHS OF PROJECT STUDY AREA WETLANDS



Photo 1 Wetland 1



Photo 2 Wetland 2



Photo 3 Wetland 3



Photo 4 Wetland 4



Photo 5 Wetland 5



Photo 6 Wetland 6



Photo 7 Wetland 7



Photo 8 Wetland 8



Photo 9 Wetland 9



Photo 10 Wetland 10



Photo 11 Wetland 11



Photo 12 Wetland 12



Photo 13 Wetland 13



Photo 14 Wetland 14



Photo 15 Wetland 15



Photo 16 Wetland 16



Photo 17 Wetland 17



Photo 18 Wetland 18



Photo 19 Wetland 19



Photo 20 Wetland 20



Photo 21 Wetland 21



Photo 22 Wetland 22



Photo 23 Wetland 23



Photo 24 Wetland 24



Photo 25 Wetland 25



Photo 26 Wetland 26



Photo 27 Wetland 27



Photo 28 Wetland 28



Photo 29 Wetland 29



Photo 30 Wetland 30



Photo 31 Wetland 31



Photo 32 Wetland 32



Photo 33 Wetland 33



Photo 34 Wetland 34



Photo 35 Wetland 35



Photo 36 Wetland 36



Photo 37 Wetland 37



Photo 38 Wetland 38



Photo 39 Wetland 39



Photo 40 Wetland 40



Photo 41 Wetland 41



Photo 42 Wetland 42



Photo 43 Wetland 43



Photo 44 Wetland 44



Photo 45 Wetland 45



Photo 46 Wetland 46



Photo 47 Wetland 47



Photo 48 Wetland 48



Photo 49 Wetland 49



Photo 50 Wetland 50



Photo 51 Wetland 51



Photo 52 Stream 1



Photo 53 Stream 2



Photo 54 Stream 3



Photo 55 Stream 4

APPENDIX D

AGENCY VERIFICATIONS OF JURISDICTIONAL DELINEATIONS



REPLY TO
ATTENTION OF

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

RECEIVED
ECOSCIENCE

MAR 04 2006

Approved: _____
Project # _____

March 1, 2006

Regulatory Division

Gerald R. McCrain
EcoScience Corporation
1101 Haynes Street, Suite 101
Raleigh, North Carolina 27604

Re: 80-2005-1664
Berkeley/Charleston County

Dear Mr. McCrain:

This is in response to your letter of August 4, 2005, requesting a wetland determination, on behalf of South Carolina Department of Transportation, for a 64.9 acre tract located at the US 41 crossing of the Wando River in Berkeley and Charleston Counties, South Carolina. The project area is depicted on the drawings you submitted which was prepared by EcoScience Corporation, dated July 2005, and entitled "Jurisdictional Areas SC 41 Bridge Replacement over the Wando River (River Mile 10) Berkeley and Charleston Counties, South Carolina".

The drawings depict "Critical Area" boundaries as established by your office and/or the South Carolina Department of Health and Environmental Control, Office of Ocean and Coastal Resource Management (OCRM). They also depict the approximate boundaries of freshwater wetlands and/or other waters of the United States as established by your office. You have requested that this office verify the accuracy of this mapping as an approximate representation of areas within the regulatory authority of this office. The location and configuration of these areas are reflected on the drawings referenced above.

Based on an on-site inspection and a review of aerial photography and soil survey information, it has been determined that the boundaries of saltwater "critical areas" and freshwater wetlands or other waters of the United States shown on the referenced drawings are a reasonable approximation of the location and boundaries of such areas found on this site. However, you are cautioned that this delineation is approximate, subject to change, and should be used for planning purposes only. This office should be contacted prior to performing any work in or around any of these jurisdictional areas. In order for a more accurate determination to be provided, the freshwater wetlands or other waters of the United States should be surveyed and platted. Upon receipt of such a plat, this office can then issue a letter verifying the accuracy of the actual jurisdictional boundaries.

You should be aware that the areas identified as jurisdictional may be subject to restrictions or requirements of other state or local government entities. This office should be contacted prior to performing any work in these areas.

Please be advised that this determination is valid for five (5) years from the date of this letter unless new information warrants revision of the delineation before the expiration date. All actions concerning this determination must be complete within this time frame, or an additional delineation must be conducted. Further, be advised that this **preliminary** jurisdictional

determination is **not** an appealable action under the Corps of Engineers administrative appeal procedures defined at 33 CFR 331.

In future correspondence concerning this matter, please refer to SAC 80-2005-1664. Prior to performing any work, you should contact the South Carolina Department of Health and Environmental Control, Office of Ocean and Coastal Resource Management (OCRM). A copy of this letter is being forwarded to them for their information.

If you have any questions concerning this matter, please contact me at 843-329-8044 or toll-free (outside of the Charleston area) at 1-866-329-8187.

Respectfully,

A handwritten signature in dark ink, appearing to read "Richard Darden", with a stylized, flowing script.

Richard L. Darden, Ph.D.
Biologist

Enclosures:
Basis for Jurisdiction
Customer Service Survey

Copy Furnished:

Mr. H. Stephen Snyder
S.C. Department of Health
and Environmental Control
Office of Ocean and Coastal
Resource Management
1362 McMillan Avenue, Suite 400
Charleston, South Carolina 29405

JURISDICTIONAL DETERMINATION
U.S. Army Corps of Engineers

Revised 8/13/04

DISTRICT OFFICE: SAC
FILE NUMBER: 80-2005-1664

PROJECT LOCATION INFORMATION:

State: South Carolina
County: Berkeley and Charleston
Center coordinates of site (latitude/longitude): 32.92530 N, 79.82373 W
Approximate size of area (parcel) reviewed, including uplands: 64.9 acres.
Name of nearest waterway: Wando River
Name of watershed: Cooper

JURISDICTIONAL DETERMINATION

Completed: Desktop determination ☒ Date: March 1, 2006
Site visit(s) ☒ Date(s): February 28, 2006

Jurisdictional Determination (JD):

- ☒ Preliminary JD - Based on available information, ☒ *there appear to be* (or) ☐ *there appear to be no* "waters of the United States" and/or "navigable waters of the United States" on the project site. A preliminary JD is not appealable (Reference 33 CFR part 331).
- ☐ Approved JD - An approved JD is an appealable action (Reference 33 CFR part 331).
Check all that apply:
- ☐ *There are* "navigable waters of the United States" (as defined by 33 CFR part 329 and associated guidance) within the reviewed area. Approximate size of jurisdictional area: .
- ☐ *There are* "waters of the United States" (as defined by 33 CFR part 328 and associated guidance) within the reviewed area. Approximate size of jurisdictional area: .
- ☐ *There are* "isolated, non-navigable, intra-state waters or wetlands" within the reviewed area.
☐ Decision supported by SWANCC/Migratory Bird Rule Information Sheet for Determination of No Jurisdiction.

BASIS OF JURISDICTIONAL DETERMINATION:

A. Waters defined under 33 CFR part 329 as "navigable waters of the United States":

- ☒ The presence of waters that are subject to the ebb and flow of the tide and/or are presently used, or have been used in the past, or may be susceptible for use to transport interstate or foreign commerce.

B. Waters defined under 33 CFR part 328.3(a) as "waters of the United States":

- ☒ (1) The presence of waters, which are currently used, or were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters which are subject to the ebb and flow of the tide.
- ☐ (2) The presence of interstate waters including interstate wetlands¹.
- ☒ (3) The presence of other waters such as intrastate lakes, rivers, streams (including intermittent streams), mudflats, sandflats, wetlands, sloughs, prairie potholes, wet meadows, playa lakes, or natural ponds, the use, degradation or destruction of which could affect interstate commerce including any such waters (check all that apply):
- ☒ (i) which are or could be used by interstate or foreign travelers for recreational or other purposes.
- ☐ (ii) from which fish or shellfish are or could be taken and sold in interstate or foreign commerce.
- ☐ (iii) which are or could be used for industrial purposes by industries in interstate commerce.
- ☐ (4) Impoundments of waters otherwise defined as waters of the US.
- ☒ (5) The presence of a tributary to a water identified in (1) - (4) above.
- ☐ (6) The presence of territorial seas.
- ☒ (7) The presence of wetlands adjacent² to other waters of the US, except for those wetlands adjacent to other wetlands.

Rationale for the Basis of Jurisdictional Determination (applies to any boxes checked above). *If the jurisdictional water or wetland is not itself a navigable water of the United States, describe connection(s) to the downstream navigable waters. If B(1) or B(3) is used as the Basis of Jurisdiction, document navigability and/or interstate commerce connection (i.e., discuss site conditions, including why the waterbody is navigable and/or how the destruction of the waterbody could affect interstate or foreign commerce). If B(2, 4, 5 or 6) is used as the Basis of Jurisdiction, document the rationale used to make the determination. If B(7) is used as the Basis of Jurisdiction, document the rationale used to make adjacency determination:* Wetlands and other waters of the United States which occur in the project area include the commercially navigable and tidally influenced Wando River and the numerous adjacent and tributary freshwater waters of the United States. Navigability of the Wando River is based on the federally regulated navigation channel in this portion of the river, including presence of a manned drawbridge on US 41 crossing the river.

Lateral Extent of Jurisdiction: (Reference: 33 CFR parts 328 and 329)

- | | |
|--|---|
| <input checked="" type="checkbox"/> Ordinary High Water Mark indicated by:
<input type="checkbox"/> clear, natural line impressed on the bank
<input type="checkbox"/> the presence of litter and debris
<input checked="" type="checkbox"/> changes in the character of soil
<input type="checkbox"/> destruction of terrestrial vegetation
<input type="checkbox"/> shelving
<input type="checkbox"/> other: | <input checked="" type="checkbox"/> High Tide Line indicated by:
<input type="checkbox"/> oil or scum line along shore objects
<input type="checkbox"/> fine shell or debris deposits (foreshore)
<input checked="" type="checkbox"/> physical markings/characteristics
<input type="checkbox"/> tidal gages
<input type="checkbox"/> other: |
|--|---|
- ☐ Mean High Water Mark indicated by:
☐ survey to available datum; ☐ physical markings; ☐ vegetation lines/changes in vegetation types.
- ☒ Wetland boundaries, as shown on the attached wetland delineation map and/or in a delineation report prepared by: EcoScience Corporation

Basis For Not Asserting Jurisdiction:

- ☐ The reviewed area consists entirely of uplands.
- ☐ Unable to confirm the presence of waters in 33 CFR part 328(a)(1, 2, or 4-7).
- ☐ Headquarters declined to approve jurisdiction on the basis of 33 CFR part 328.3(a)(3).
- ☒ **The Corps has made a case-specific determination that the following waters present on the site are not Waters of the United States:**
- ☐ **Waste treatment systems, including treatment ponds or lagoons, pursuant to 33 CFR part 328.3.**
- ☐ **Artificially irrigated areas, which would revert to upland if the irrigation ceased.**
- ☐ **Artificial lakes and ponds created by excavating and/or diking dry land to collect and retain water and which are used exclusively for such purposes as stock watering, irrigation, settling basins, or rice growing.**
- ☐ **Artificial reflecting or swimming pools or other small ornamental bodies of water created by excavating and/or diking dry land to retain water for primarily aesthetic reasons.**
- ☐ **Water-filled depressions created in dry land incidental to construction activity and pits excavated in dry land for the purpose of obtaining fill, sand, or gravel unless and until the construction or excavation operation is abandoned and the resulting body of water meets the definition of waters of the United States found at 33 CFR 328.3(a).**
- ☐ **Isolated, intrastate wetland with no nexus to interstate commerce.**
- ☐ **Prior converted cropland, as determined by the Natural Resources Conservation Service.**
- Explain rationale:**
- ☐ **Non-tidal drainage or irrigation ditches excavated on dry land. Explain rationale:**
- ☐ **Other (explain):**

DATA REVIEWED FOR JURISDICTIONAL DETERMINATION (mark all that apply):

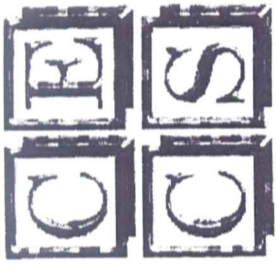
- ☒ Maps, plans, plots or plat submitted by or on behalf of the applicant.
- ☒ Data sheets prepared/submitted by or on behalf of the applicant.
- ☒ This office concurs with the delineation report, dated August 4, 2005, prepared by (company):
EcoScience Corporation
- ☐ This office does not concur with the delineation report, dated _____, prepared by (company):
- ☐ Data sheets prepared by the Corps.
- ☐ Corps' navigable waters' studies:
- ☐ U.S. Geological Survey Hydrologic Atlas:
- ☒ U.S. Geological Survey 7.5 Minute Topographic maps: Cainhoy, SC
- ☐ U.S. Geological Survey 7.5 Minute Historic quadrangles:
- ☐ U.S. Geological Survey 15 Minute Historic quadrangles:
- ☒ USDA Natural Resources Conservation Service Soil Survey: Berkeley and Charleston Counties
- ☒ National wetlands inventory maps:
- ☐ State/Local wetland inventory maps:
- ☐ FEMA/FIRM maps (Map Name & Date):
- ☐ 100-year Floodplain Elevation is: _____ (NGVD)
- ☒ Aerial Photographs (Name & Date): 1999 DOQQ, 11227:157
- ☒ Other photographs (Date): Site photos submitted by the applicant
- ☐ Advanced Identification Wetland maps:
- ☒ Site visit/determination conducted on: February 28, 2006
- ☐ Applicable/supporting case law:
- ☐ Other information (please specify):

Signature: Project Manager



¹Wetlands are identified and delineated using the methods and criteria established in the Corps Wetland Delineation Manual (87 Manual) (i.e., occurrence of hydrophytic vegetation, hydric soils and wetland hydrology).

²The term "adjacent" means bordering, contiguous, or neighboring. Wetlands separated from other waters of the U.S. by man-made dikes or barriers, natural river berms, beach dunes, and the like are also adjacent.



JURISDICTIONAL AREAS

**SC 41
Bridge Replacement
over the Wando River
(River Mile 10)**

**Berkeley and
Charleston Counties,
South Carolina**

FIGURE



4A

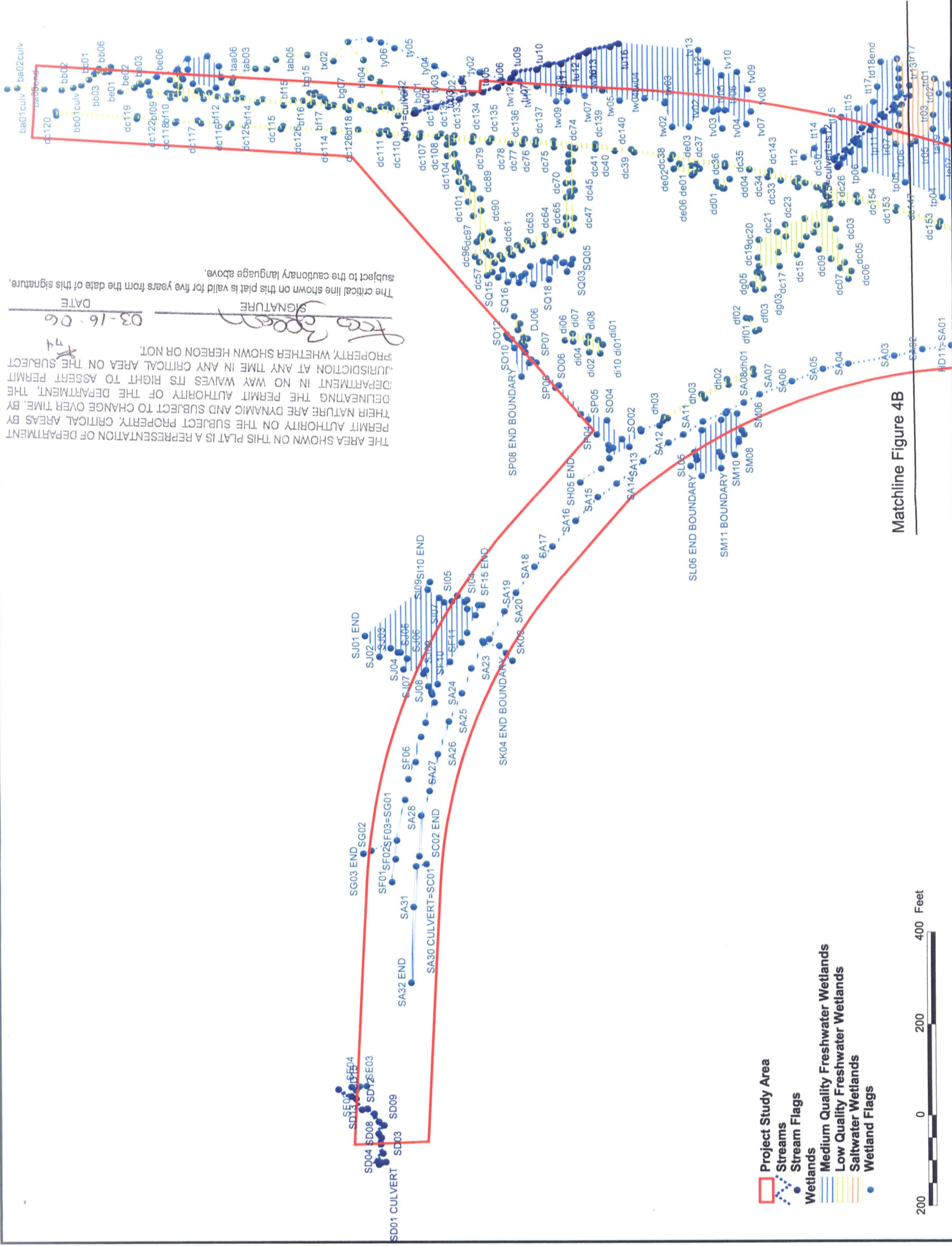
Client: CECs

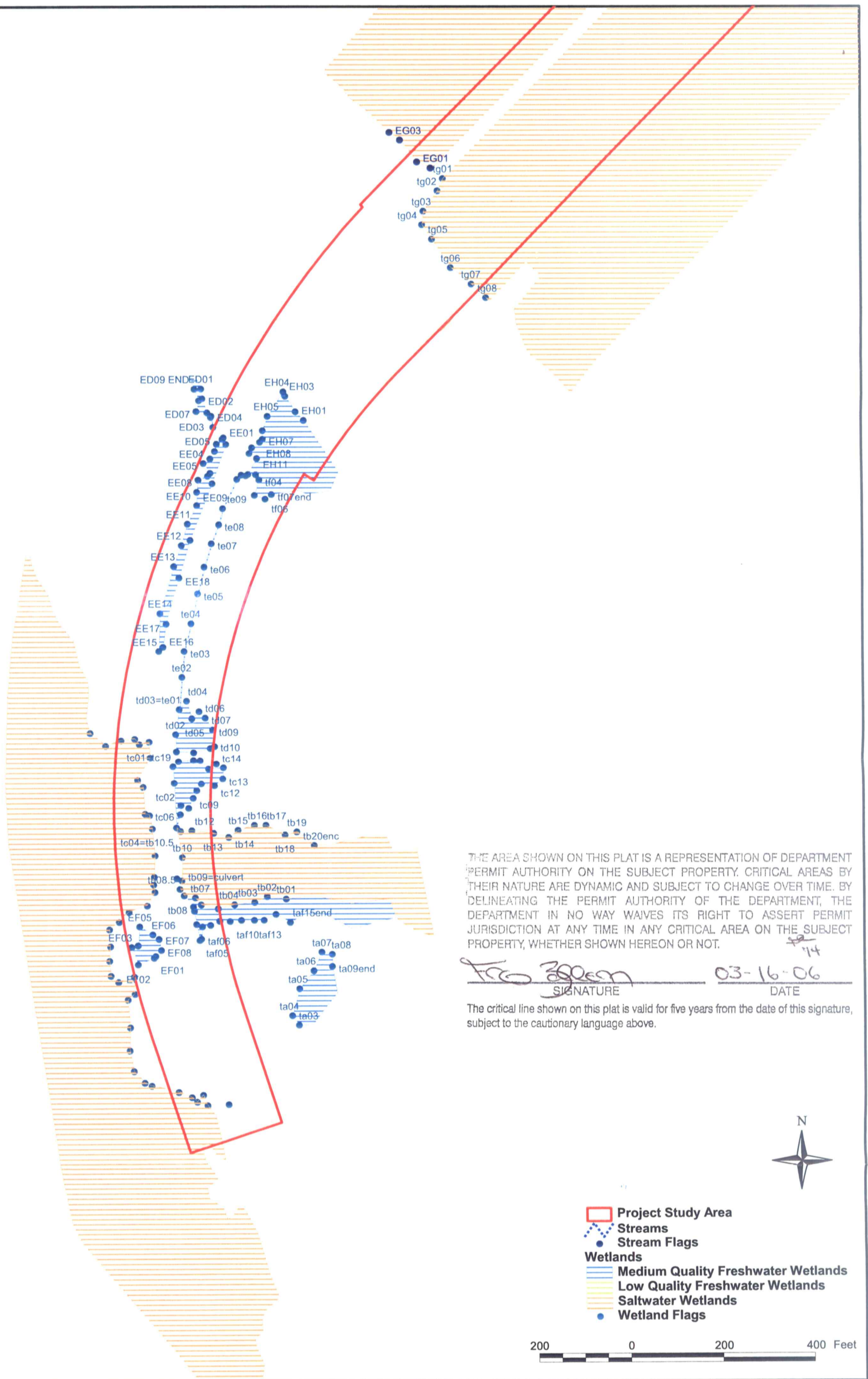
Project: 05-224

Date: JUL 2005

Drawn By: ES

Scale: 1" = 200'





JURISDICTIONAL AREAS

SC 41 Bridge Replacement
over the Wando River (River Mile 10)
Charleston and Berkeley Counties, South Carolina

Drawn by:	ES	FIGURE 4C
Scale:	1" = 200'	
Date:	JUN 2005	
Project:	05-224	

APPENDIX E

GUIDELINES FOR AVOIDING IMPACTS TO THE WEST INDIAN MANATEE



United States Department of the Interior

FISH AND WILDLIFE SERVICE

Raleigh Field Office
Post Office Box 33726
Raleigh, North Carolina 27636-3726

GUIDELINES FOR AVOIDING IMPACTS TO THE WEST INDIAN MANATEE

Precautionary Measures for Construction Activities in North Carolina Waters

The West Indian manatee (*Trichechus manatus*), also known as the Florida manatee, is a Federally-listed endangered aquatic mammal protected under the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 *et seq.*) and the Marine Mammal Protection Act of 1972, as amended (16 U.S.C. 1461 *et seq.*). The manatee is also listed as endangered under the North Carolina Endangered Species Act of 1987 (Article 25 of Chapter 113 of the General Statutes). The U.S. Fish and Wildlife Service (Service) is the lead Federal agency responsible for the protection and recovery of the West Indian manatee under the provisions of the Endangered Species Act.

Adult manatees average 10 feet long and weigh about 2,200 pounds, although some individuals have been recorded at lengths greater than 13 feet and weighing as much as 3,500 pounds. Manatees are commonly found in fresh, brackish, or marine water habitats, including shallow coastal bays, lagoons, estuaries, and inland rivers of varying salinity extremes. Manatees spend much of their time underwater or partly submerged, making them difficult to detect even in shallow water. While the manatee's principal stronghold in the United States is Florida, the species is considered a seasonal inhabitant of North Carolina with most occurrences reported from June through October.

To protect manatees in North Carolina, the Service's Raleigh Field Office has prepared precautionary measures for general construction activities in waters used by the species. Implementation of these measures will allow in-water projects which do not require blasting to proceed without adverse impacts to manatees. In addition, inclusion of these guidelines as conservation measures in a Biological Assessment or Biological Evaluation, or as part of the determination of impacts on the manatee in an environmental document prepared pursuant to the National Environmental Policy Act, will expedite the Service's review of the document for the fulfillment of requirements under Section 7 of the Endangered Species Act. These measures include:

1. The project manager and/or contractor will inform all personnel associated with the project that manatees may be present in the project area, and the need to avoid any harm to these endangered mammals. The project manager will ensure that all construction personnel know the general appearance of the species and their habit of moving about completely or partially submerged in shallow water. All construction personnel will be informed that they are responsible for observing water-related activities for the presence of manatees.

2. The project manager and/or the contractor will advise all construction personnel that there are civil and criminal penalties for harming, harassing, or killing manatees which are protected under the Marine Mammal Protection Act and the Endangered Species Act.

3. If a manatee is seen within 100 yards of the active construction and/or dredging operation or vessel movement, all appropriate precautions will be implemented to ensure protection of the manatee. These precautions will include the immediate shutdown of moving equipment if a manatee comes within 50 feet of the operational area of the equipment. Activities will not resume until the manatee has departed the project area on its own volition (i.e., it may not be herded or harassed from the area).

4. Any collision with and/or injury to a manatee will be reported immediately. The report must be made to the U.S. Fish and Wildlife Service (ph. 919.856.4520 ext. 16), the National Marine Fisheries Service (ph. 252.728.8762), and the North Carolina Wildlife Resources Commission (ph. 252.448.1546).

5. A sign will be posted in all vessels associated with the project where it is clearly visible to the vessel operator. The sign should state:

CAUTION: The endangered manatee may occur in these waters during the warmer months, primarily from June through October. Idle speed is required if operating this vessel in shallow water during these months. All equipment must be shut down if a manatee comes within 50 feet of the vessel or operating equipment. A collision with and/or injury to the manatee must be reported immediately to the U.S. Fish and Wildlife Service (919-856-4520 ext. 16), the National Marine Fisheries Service (252.728.8762), and the North Carolina Wildlife Resources Commission (252.448.1546).

6. The contractor will maintain a log detailing sightings, collisions, and/or injuries to manatees during project activities. Upon completion of the action, the project manager will prepare a report which summarizes all information on manatees encountered and submit the report to the Service's Raleigh Field Office.

7. All vessels associated with the construction project will operate at "no wake/idle" speeds at all times while in water where the draft of the vessel provides less than a four foot clearance from the bottom. All vessels will follow routes of deep water whenever possible.

8. If siltation barriers must be placed in shallow water, these barriers will be: (a) made of material in which manatees cannot become entangled; (b) secured in a manner that they cannot break free and entangle manatees; and, (c) regularly monitored to ensure that manatees have not become entangled. Barriers will be placed in a manner to allow manatees entry to or exit from essential habitat.

Prepared by (rev. 06/2003):
U.S. Fish and Wildlife Service
Raleigh Field Office
Post Office Box 33726
Raleigh, North Carolina 27636-3726
919/856-4520

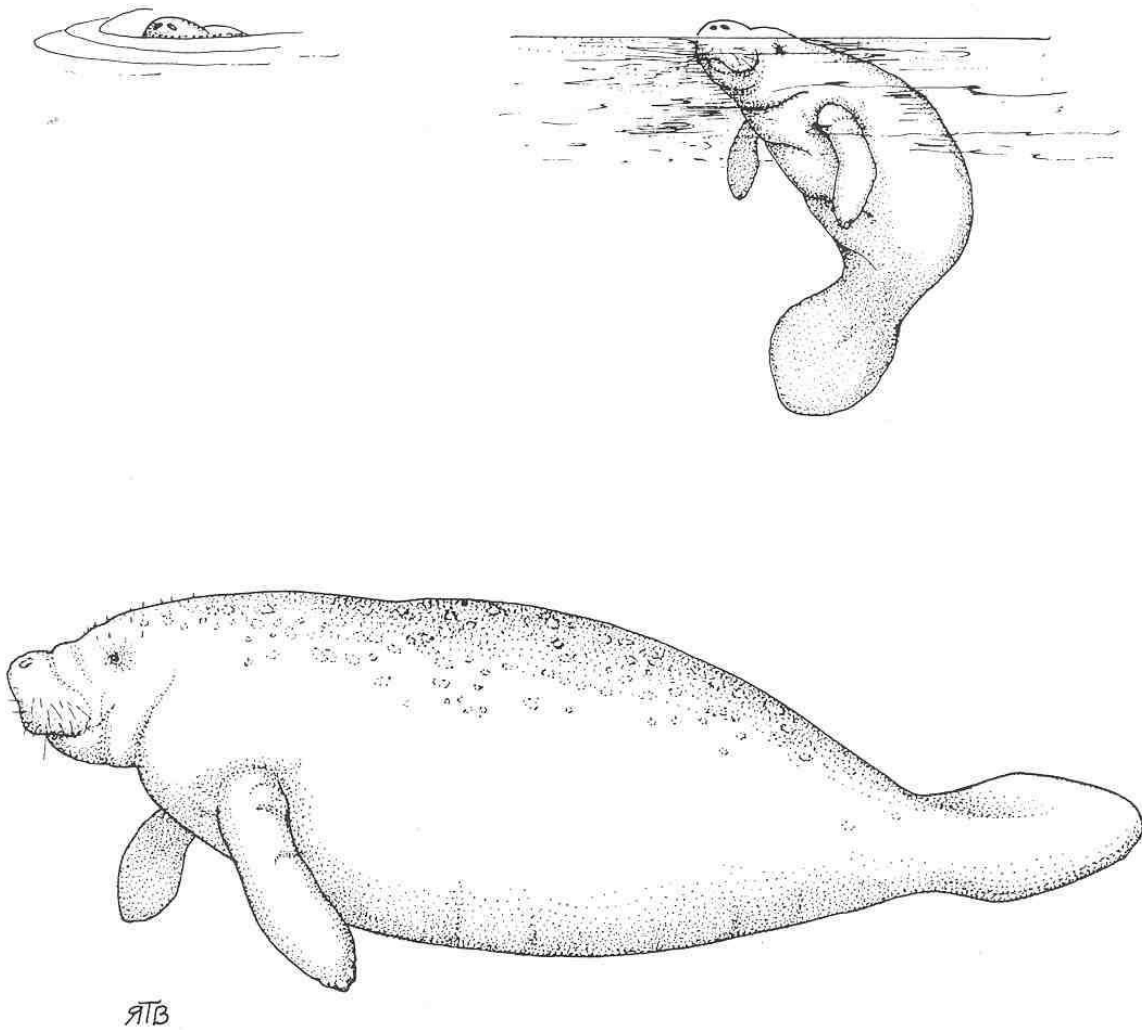


Figure 1. The whole body of the West Indian manatee may be visible in clear water; but in the dark and muddy waters of coastal North Carolina, one normally sees only a small part of the head when the manatee raises its nose to breathe.

Illustration used with the permission of the North Carolina State Museum of Natural Sciences.
Source: Clark, M. K. 1987. Endangered, Threatened, and Rare Fauna of North Carolina: Part I.
A re-evaluation of the mammals. Occasional Papers of the North Carolina Biological Survey 1987-3.
North Carolina State Museum of Natural Sciences. Raleigh, NC. pp. 52.