

**ENVIRONMENTAL ASSESSMENT
FOR THE PROPOSED GOODBY'S REGIONAL WASTEWATER
TREATMENT PLANT AND ASSOCIATED PIPELINES
ORANGEBURG COUNTY, SOUTH CAROLINA**



Prepared For:
Orangeburg County
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APPENDICES

APPENDIX A: Overall regional mapping and additional supporting mapping

- Exhibit A.1: Wastewater Systems in Orangeburg County, South Carolina; Topographic Map (2 pages)
- Exhibit A.2: Water Systems in Orangeburg County, South Carolina; Topographic Map (1 of 2)
- Exhibit A.3: Water Systems in Orangeburg County, South Carolina; Topographic Map (2 of 2)
- Exhibit A.4: Jafza Logistics and Distribution Park; Projected Peak Hour Peak Direction Volumes Near Site- Phase 3 (2030)
- Exhibit A.5: Goodby's Creek Regional WWTP, Preliminary Site Plan
- Exhibit A.6: Newly Recorded Sites and Isolated Finds in the Project Area
- Exhibit A.7: Project Areas and Cultural Resources; Jafza South Carolina, LLC
- Exhibit A.8: Lake Marion Regional Water Agency Distribution System Master Plan
- Exhibit A.9: Orangeburg County Future Land Use Map
- Exhibit A.10: Bowman – Branchville Water System Connector FEMA Map
- Exhibit A.11: Bowman – Branchville Water System Connector NWI Map
- Exhibit A.12: Cultural Resources along the Central Portions of Routes 1, 2, 3, and 4 (Brockington and Associates)
- Exhibit A.13: Location of Proposed Routes and Bonner Avenue Area for the Goodby's Wastewater Treatment Plant (Brockington and Associates)
- Exhibit A.14: Sanders Point Farm Land Application Site, Preliminary Site Plan

APPENDIX B: USDA-RD Wastewater project related mapping

- Exhibit B.1: Proposed Goodbys Regional Wastewater System Orangeburg, South Carolina Vicinity Map
- Exhibit B.2: Proposed Goodbys Regional Wastewater System Orangeburg, South Carolina Wastewater Systems Improvements Map, Site Location Map (2 pages)
- Exhibit B.3: Proposed Goodbys Regional Wastewater System Orangeburg, South Carolina Wastewater Systems Improvements Map, Topographic Map (2 pages)
- Exhibit B.4: Proposed Goodbys Regional Wastewater System Orangeburg, South Carolina Wastewater Systems Improvements Map, Aerial Map (2 pages)
- Exhibit B.5: Proposed Goodbys Regional Wastewater System Orangeburg, South Carolina Wastewater Systems Improvements Map, Soils Map (2 pages)
- Exhibit B.6: Proposed Goodbys Regional Wastewater System Orangeburg, South Carolina Wastewater Systems Improvements Map, NWI Map (2 pages)
- Exhibit B.7: Proposed Goodbys Regional Wastewater System Orangeburg, South Carolina Wastewater Systems Improvements Map, FEMA Map (2 pages)



- Exhibit B.8: Proposed Wastewater Treatment Plant and Land Application Site Orangeburg, South Carolina, Site Location Map
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- Exhibit B.10: Proposed Wastewater Treatment Plant and Land Application Site Orangeburg, South Carolina, Topographic Map
- Exhibit B.11: Proposed Wastewater Treatment Plant and Land Application Site Orangeburg, South Carolina, Soils Map
- Exhibit B.12: Proposed Wastewater Treatment Plant and Land Application Site Orangeburg, South Carolina, FEMA Map
- Exhibit B.13: Proposed Wastewater Treatment Plant and Land Application Site Orangeburg, South Carolina, NWI Map
- Exhibit B.14: Proposed Goodbys Regional Wastewater Pumping Station Sites Orangeburg County, South Carolina, Aerial Map (4 pages)
- Exhibit B.15: Proposed Goodbys Regional Wastewater Pumping Station Sites Orangeburg County, South Carolina, Topographic Map (4 pages)
- Exhibit B.16: Proposed Goodbys Regional Wastewater Pumping Station Sites Orangeburg County, South Carolina, Soils Map (4 pages)
- Exhibit B.17: Proposed Goodbys Regional Wastewater Pumping Station Sites Orangeburg County, South Carolina, Site Selection Map

APPENDIX C: Related Environmental Correspondences

- Exhibit C.1: USDA, Natural Resources Conservation Service Correspondence (email), dated May 6, 2010
- Exhibit C.2: USDA, Natural Resources Conservation Service Correspondence, dated April 20, 2010 and November 1, 2010
- Exhibit C.3: USDA Farmland Conversion Impact Rating Form AD-1006, dated December 23, 2009 and November 1, 2010
- Exhibit C.4: South Carolina Archives & History Center Correspondence, dated October 7, 2008; Goodby's Creek Regional Wastewater Treatment Plant, Orangeburg County, South Carolina, SHPO Project No. 08-CC0105
- Exhibit C.5: South Carolina Archives & History Center Correspondence, dated December 2, 2008; Goodby's Creek Regional WWTP, Sander's Pointe Farm Tract, SHPO Project No. 08-CC0105
- Exhibit C.6: South Carolina Archives & History Center Correspondence, dated January 27, 2010; Proposed Wastewater System for Jafza Logistics Center, Orangeburg, South Carolina, SHPO #: 09CW0839
- Exhibit C.7: Catawba Indian Nation, Tribal Historic Preservation Office Correspondence, dated February 16, 2010; THPO # 2010-339-6; Proposed Orangeburg Co. Wastewater System in Orangeburg Co., SC



- Exhibit C.8: Eastern Shawnee Tribe Cultural Preservation Department Correspondence, dated December 28, 2009; Orangeburg County Water System Expansion Project/Orangeburg, SC; Project #09151-38
- Exhibit C.9: USDA Correspondence from Mr. George Smith to Ms. Caroline Dover Wilson, SHPO, dated March 3, 2010; Orangeburg County Wastewater Treatment Plant, Goodby's Creek
- Exhibit C.10: USDA Correspondence from Mr. George Smith to Mr. Russ Townsend, Deputy THPO, dated March 3, 2010; Orangeburg County Wastewater Treatment Plant, Goodby's Creek
- Exhibit C.11: USDA Correspondence from Mr. George Smith to Ms. Robin Dushane, Eastern Shawnee Tribe of Oklahoma, dated March 3, 2010; Orangeburg County Wastewater Treatment Plant, Goodby's Creek
- Exhibit C.12: USDA Correspondence from Mr. George Smith to Dr. Wenonah Haire, THPO, Catawba Indian Nation, dated March 3, 2010; Orangeburg County Wastewater Treatment Plant, Goodby's Creek
- Exhibit C.13: United States Department of the Interior, Fish and Wildlife Service, dated January 12, 2010; Protected Species Assessment
- Exhibit C.14: U.S. Army Corps of Engineers Correspondence, dated March 23, 2010
- Exhibit C.15: Correspondence from Michael Chappell, Regional Health Director of the South Carolina Department of Health and Environmental Control Public Health Region 5 to The USDA-Rural Development, dated March 23, 2010; Public Sewer Expansion In Orangeburg County
- Exhibit C.16: Correspondence from Colin Covington, General Manager, Three Rivers Solid Waste Authority to Mr. J. William "Bill" Clark, Orangeburg County Administrator, dated February 6, 2008; Goodby's Creek Regional WWTP
- Exhibit C.17: Correspondence from Nancy Vinson, Program Director, Coastal Conservation League to Lieutenant Colonel J. Richard Jordan, III, Commander, United States Army Corps of Engineers, dated May 1, 2009
- Exhibit C.18: Correspondence from Heinz J. Mueller, Chief, NEPA Program Office, United States Environmental Protection Agency to Joseph A. Jones, Chief, United States Army Corps of Engineers, dated April 22, 2009
- Exhibit C.19: Correspondence from Timothy N. Hall, Field Supervisor, United States Fish and Wildlife Service to Joseph A. Jones, Chief, United States Army Corps of Engineers, dated July 29, 2008
- Exhibit C.20: Correspondence from Timothy N. Hall, Field Supervisor, United States Fish and Wildlife Service to Joseph A. Jones, Chief, United States Army Corps of Engineers, dated April 23, 2009
- Exhibit C.21: Correspondence from April Stallings, Conservation Coordinator, Audubon South Carolina to Mr. Alan Shirey, United States Army Corps of Engineers, dated August 19, 2006
- Exhibit C. 22 Correspondence to Ms. Shelby Ozburn LeBron regarding Orangeburg County Environmental Information Document (EID)



- Exhibit C.23: Correspondence from Timothy N. Hall, Field Supervisor, United States Fish and Wildlife Service to Joseph A. Jones, Chief, United States Army Corps of Engineers, dated August 2, 2006
- Exhibit C.24: Correspondence from Douglas Kinard, P.E., South Carolina Department of Health and Environmental Control Public Health to Chris Hively, P.E., Santee Cooper Regional Water System dated August 6, 2003; Public Sewer Expansion In Orangeburg County
- Exhibit C.25: Correspondence from Jeff Duncan, National Parks Service to George Smith, USDA dated March 3, 2010; Orangeburg County – Four Holes Swamp

APPENDIX D: Cultural Resources Studies and Wetland Studies

- Exhibit D.1: Draft results of Phase I Cultural Resources Survey for Goodby's Creek Regional Wastewater Treatment Plant in Orangeburg County, South Carolina Authored by: MACTEC, dated September 11, 2008 (30 Pages)
- Exhibit D.2: Intensive Archeological Survey of Approximately 47 Acres at The Sanders Pointe Farm Tract in Orangeburg County, South Carolina Conducted by: TRC, dated November 2009 (27 Pages)
- Exhibit D.3: Results of Preliminary Protected Species Assessment for Goodby's Creek Regional Wastewater Treatment Plant in Orangeburg County, South Carolina Conducted by: MACTEC, dated September 2, 2008 (13 Pages)
- Exhibit D.4: Protected Species Assessment for Sander's Pointe Farm Site in Orangeburg County, South Carolina Conducted by: S&ME, dated November 10, 2009 (18 Pages)
- Exhibit D.5: Limited Wetland Approximation Report for Orangeburg County Wastewater System in Orangeburg County, South Carolina Authored by: S&ME, dated November 10, 2009 (10 Pages)
- Exhibit D.6: Cultural Resources Assessment of the Proposed Routes and Bonner Avenue Area for the Goodby's Wastewater Treatment Plant Calhoun and Orangeburg Counties by Brockington and Associates, dated August 2008
- Exhibit D.7: Goodby's Regional Wastewater Collection and Conveyance Line Corridors on US 301 and Tee Vee Road Conducted by: Sabine & Waters, dated August 4, 2008

APPENDIX E: Additional Environmental Supporting Information

- Exhibit E.1: Francis Marion and Sumter National Forests Map
- Exhibit E.2: National Parks, Battlefields, Monuments, Sites, Trails, and Corridors Map and List
- Exhibit E.3: Orangeburg County Trails Map



- Exhibit E.4: List of National Rivers Inventory
- Exhibit E.5: List of Wild and Scenic Rivers in South Carolina
- Exhibit E.6: Location Map of State Parks in South Carolina
- Exhibit E.7: Location Map of National Wildlife Refuges in South Carolina
- Exhibit E.8: Location Map of National Wildernesses in South Carolina
- Exhibit E.9: FEMA Form 81-93; Goodby's Regional Wastewater Treatment Plant (WWTP) Site
- Exhibit E.10: FEMA Form 81-93; Sander's Pointe Farm Land Application Site
- Exhibit E.11: FEMA Form 81-93; I-95 & U.S. Highway 15 Wastewater Pumping Station Site
- Exhibit E.12: FEMA Form 81-93; I-95 & U.S. Highway 176 Wastewater Pumping Station Site
- Exhibit E.13: FEMA Form 81-93; Tee Vee Road / County Line Wastewater Pumping Station Site
- Exhibit E.14: FEMA Form 81-93; Ellore Wastewater Treatment Plant Wastewater Pumping Station Site
- Exhibit E.15: FEMA Form 81-93; Tee Vee Road / Highway 6 Wastewater Pumping Station Site
- Exhibit E.16: FEMA Form 81-93; Jafza Wastewater Pumping Station Site
- Exhibit E.17: FEMA Form 81-93; White Cane Branch Wastewater Pumping Station Site
- Exhibit E.18: FEMA Form Providence Swamp Wastewater Pumping Station Site
- Exhibit E.19: FEMA Form 81-93; Felderville Wastewater Pumping Station Site
- Exhibit E.20: FEMA Form 81-93; Woolbright Road Wastewater Pumping Station Site
- Exhibit E.21: Custom Soil Resource Report (8 Pages)
- Exhibit E.22: Orangeburg County Flood Damage Prevention Ordinance (14 Pages)

APPENDIX F: Referenced Reports

APPENDIX G: Environmental Justice (EJ) and Civil Rights Analysis (CRIA)

- Exhibit G.1: USDA - Rural Development Environmental Justice (EJ) and Civil Rights Impact Analysis (CRIA) Certification and associated mapping (9 pages); Orangeburg County Water System dated March 2, 2010
- Exhibit G.2: USDA - Rural Development Environmental Justice (EJ) and Civil Rights Impact Analysis (CRIA) Certification and associated mapping (7 pages); Goodbys Regional Wastewater System Expansion and associated mapping dated October 4, 2010

APPENDIX H: County of Orangeburg Comprehensive Plan

APPENDIX I: Jafza Logistics and Distribution Park Design Traffic and Technical Report



APPENDIX J: Draft Finding of No Significant Impacts Comments

- Exhibit J.1: Correspondence from Mr. L. Nelson Roberts, Manager, South Carolina Department of Health and Environmental Control - Bureau of Air Quality, to Mr. Alan Shirey, United States Army Corps of Engineers, dated March 9, 2011.
- Exhibit J.2: Correspondence from Mr. Norman L. Burnswig, Executive Director, South Carolina Audubon Society to Mr. Alan Shirey, United States Army Corps of Engineers, dated March 14, 2011.
- Exhibit J.3: Correspondence from Mr. Jay B. Herrington, Field Supervisor, United States Fish and Wildlife Service to Joseph A. Jones, Chief, United States Army Corps of Engineers, dated March 14, 2011.
- Exhibit J.4: Correspondence from Jodi Barnes, PhD, Staff Archaeologist/GIS Coordinator, South Carolina Historic Preservation Office to Mr. Patrick E. O'Donnell, Chief, United States Army Corps of Engineers, dated March 31, 2011.
- Exhibit J.5: Correspondence from Carolina Dover Wilson, Review and Compliance Coordinator, South Carolina Historic Preservation Office to Mr. George T. Smith, State Environmental Coordinator, United States Department of Agriculture Rural Development, dated May 16, 2011.
- Exhibit J.6: Correspondence from Mr. Greg Mixon, Inland Environmental Coordinator, South Carolina Department of Natural Resources to Mr. Alan Shirey, United States Army Corps of Engineers, dated April 5, 2011.
- Exhibit J.7: Correspondence from Mr. Heinz J. Mueller, Chief, United States Environmental Protection Agency to Mr. Patrick E. O'Donnell, Chief, United States Army Corps of Engineers, dated April 4, 2011.
- Exhibit J.8: Correspondence from Kim Jumper, Tribal Historic Preservation Officer, Shawnee Tribe to Mr. Alan Shirey, United States Army Corps of Engineers, dated April 15, 2011.
- Exhibit J.9: Correspondence from D'Anne Hayde, County Attorney, Orangeburg County to Mr. J. William Clark, Administrator, Orangeburg County, United States Army Corps of Engineers, dated April 15, 2011.



1.0 PURPOSE AND NEED

1.1 Summary of Description of the Goodby's Regional Wastewater Treatment Plant

Orangeburg County's highest priority for facilitating economic growth in the industrial sector is the development of the John W. Matthew's Industrial Park (MIP) at the intersection of US 301 and US 176 in Orangeburg County, South Carolina. Potable water is already available through the distribution infrastructure constructed in the right-of-way of US 301 from the water treatment plant owned and operated by the Lake Marion Regional Water Agency (LMRWA) on the south shore of Lake Marion. However, to facilitate its development, the MIP still requires a 1.0 million gallon elevated water storage tank connected to the existing 12-inch water distribution system, as well as wastewater service. The proposed Goodby's Regional wastewater treatment plant (WWTP) and the water tank would be constructed near the intersection of US 301 and US 176 adjacent to the MIP and would be managed and operated under the authority of Orangeburg County. The WWTP would occupy approximately 10 acres of the 542-acre site, completely outside of all the on-site wetlands and the 100-year floodplain. The wastewater treatment system would have a capacity of 1.5 mgd (average daily flow) and would serve the wastewater needs of the adjacent MIP, the proposed Jafza International logistics/distribution center near Santee (Jafza park), anticipated residential development in unincorporated areas along the southern shore of Lake Marion in Calhoun County, anticipated commercial development at the I-95/US 15 intersection and the I-95/US 176 intersection, and some of the wastewater needs for the Towns of Elloree and Santee. The facility would use a membrane bioreactor treatment system to achieve tertiary treatment standards (including biologics in the effluent). This level of treatment facilitates re-use of the water for industrial process and cooling uses at the MIP as needed by tenants, decreasing operating costs for tenants and reducing the need for effluent disposal. Any treated effluent that is not re-used would be discharged onto upland fields. The proposed project includes thirty-one miles of wastewater collection and conveyances lines (proposed 10-inch force mains along the major routes and proposed 12-inch gravity lines to the I-95 exits). These lines would be constructed in rights-of-way along US 301 paralleling the existing water pipelines, along Woolbright Road from US 301 to the WWTP, along US 176 from the proposed WWTP to Exit 90 on I-95, from US 176 to US 15 across Providence Swamp to Exit 93 of I-95, and along Tee Vee Road (SC Highway 267) past the Town of Elloree to Little Poplar Creek on the Calhoun County Line. The system is expected to be constructed in phases, with Phase I treating wastewater from the MIP, Phase II treating wastewater from the Jafza Park and any excess wastewater treatment needs from the Town of Santee, and Phase III treating wastewater from the expected residential development along the southern shore of Lake Marion and any excess wastewater treatment needs from the Town of Elloree. See Exhibits B.2 through B.17 for maps and figures depicting the scope of the proposed project.



A 189-acre tract of land across US 176 from the MIP, called Sanders Pointe Farm, will be used for land application of effluent from the WWTP via underground drip tubing sprinkler system on approximately 60-acres of the tract. The initial treatment capacity for the Goodby's Regional WWTP would be 0.251 mgd based on initially-approved South Carolina Department of Health and Environmental Control (SCDHEC) land irrigation rates determined in conjunction with the No Discharge (ND) permit currently being considered by SCDHEC. It is expected that this capacity will be gradually increased as other users come on-line and after initial pilot testing of the irrigation rates at the Sanders Pointe land application site occurs. SCDHEC has issued an ND permit (ND0086461) that includes provisions to increase to 0.518 mgd after pilot testing. The 0.518 mgd effluent disposal capacity will be sufficient to treat Phase I effluent from the MIP. As the Goodby's Regional WWTP becomes fully operational, it is possible that tenants of the MIP may use proportions of the tertiary-treated volumes created by the WWTP. If this does not occur, additional land may be needed nearby for land application of effluent above that disposed of at the Sanders Pointe Farm.

1.2 Scope of Analysis and Decisions

This Environmental Assessment (EA) focuses on the impacts associated with the Goodby's Regional WWTP and its 31 miles of collection and conveyance lines, pump stations, and appurtenances. However, the scope of environmental and socio-economic analyses includes potential cumulative impacts associated with the proposed Goodby's Regional WWTP and other existing and proposed water and wastewater systems and associated projects in the following areas: portions of Orangeburg and Calhoun County on the south side of Lake Marion (Towns of Elloree, Santee, Holly Hill, Bowman, Branchville, Vance, and Eutawville in Orangeburg County, generally considered within the scope of the Global Logistics Triangle). Section 3.2 includes an analysis of the potential for the existing and proposed water and wastewater projects and other industrial and residential projects in and near the GLT to induce development, and any potential impacts associated with induced development are included in the cumulative impact analysis for each resource.

The US Army Corps of Engineers (USACE) and USDA Rural Development (RD) are joint lead agencies for this EA prepared per the National Environmental Policy Act (NEPA). Both USACE and USDA RD are working in direct coordination with Orangeburg County in planning, design, and evaluation of impacts for the proposed action. LMRWA is the non-Federal sponsor for any USACE-funded portions of the proposed project and Orangeburg County is the applicant to the USDA RD for any USDA-funded portions of the project. Calhoun County, to the north of Orangeburg County, is indirectly involved through a proposed residential development in the early stages of planning on the southern shore of Lake Marion (partially in Orangeburg County and partially in Calhoun County) that would be served by the Goodby's Regional wastewater system.



As described in Section 1.3, many water utility infrastructure projects have been implemented, are near final approval, or have been proposed for the Global Logistics Triangle (GLT) within the area encompassed by US 301, I-95 and I-26 in Orangeburg County. These projects are intended to support and facilitate industrial and commercial development and limited residential growth within the GLT. The Town of Bowman also has proposed sewer infrastructure to support existing and future growth needs. The proposed Goodby's Regional WWTP and water storage tank and other existing and proposed water and wastewater utility infrastructure within the GLT are described in further detail in Section 2.

To date, only one industrial entity has proposed to use the MIP. Green Energy Holding, LLC proposes to construct an electrical energy generation plant using waste wood and woodchips from logging operations in the area. The company proposes to use wastewater effluent treated to tertiary standards by the Goodby's Regional WWTP for non-contact cooling purposes, returning the remaining effluent back to the WWTP for further treatment and effluent disposal. This proposed plant is still in the preliminary planning stages and requires a Federal Financing Bank Loan guarantee from the USDA Rural Development (USDA RD) and a purchaser for the electricity generated by the plant. Any other uses of the MIP are entirely speculative at this point and will not be considered within the cumulative impact analyses conducted in this EA.

The geographic scope and proposed action does NOT include:

- Any potential wastewater infrastructure to the residences in existing communities that are proposed to be served by the water distribution loop system extending off US 15 north of its intersection with Vance Road (SC 210).
- Wastewater infrastructure to the area between US 301 and the existing water and wastewater pipelines on SC 267 (Tee Vee Road) serving the Lake Marion High School and the US 15 area, as Orangeburg County does not foresee expanding this system to support residential development in the future, based on priorities, current trends, and environmental constraints caused by Providence Swamp and White Cane Creek.
- Crossing Lake Marion from the south with wastewater collection pipelines to serve the area north of the lake would not be proposed by Orangeburg County because it is neither practical nor cost-effective, and those areas north of the lake would most likely be served by Clarendon County before Orangeburg could provide infrastructure.
- Any other proposed water and wastewater projects in the area described in Section 1.3 and Section 2 of this EA, as these other projects are covered under other NEPA documents and associated Preliminary Engineering Reports (PERs). Any future projects not proposed at this time will require compliance with NEPA and other pertinent Federal, state, and county laws and regulations.

This EA supersedes a draft EA for the proposed Goodby's Regional WWTP project prepared by the US Army Corps of Engineers in April 2009 that was never finalized.



However, agency comments and information included in the April 2009 draft EA are included in Section 1.4.

The proposed elevated water storage tank for the MIP was already evaluated and approved by the US Army Corps of Engineers in the Finding of No Significant Impact (FONSI) dated January 9, 2007.

1.3 Need for Action for Goodby's Regional Wastewater Treatment Plant

1.3.1 Population and Economic Trends and Environmental Justice

Historically and to the present, this area of South Carolina within which the GLT is located is rural, characterized by primarily agricultural land use and timber management, with scattered small residential areas outside of the municipalities.

For the nearly 50 years prior to 1970, there was limited change in the population in Orangeburg County, with a slight decrease during the Depression Era, a relatively significant increase during the 1940s, probably due to the increase in birth rates after WWII, then relatively little change until the beginning of the 1970s. Because of lack of significant job opportunities during the 1950s and 1960s, many high school graduates who obtained post-secondary education elsewhere did not return. Much of the population increase during the 1970s was due to a significant portion of minorities who had previously left the region returning because of increased availability to education, manufacturing job opportunities, and social changes that positively affected minority access to jobs.

In the latter part of the 1990s, populations in Calhoun County increased 9% while the Orangeburg County population grew more slowly at 4.4%, probably because Calhoun County is the primary expansion area for the Columbia metropolitan area, unlike Orangeburg County, and also has good access to the interstate system. Orangeburg County has experienced a slight decrease in recent years in in-migration. If not for recent increases in retirees moving into the county, primarily in the Lake Marion area, out-migration may have been greater.

Between 1950 and 2000, the number of people living within corporate city limits of the majority of the towns in the county has decreased, primarily because corporate limits of most towns have changed little over the years (the towns have chosen not to annex adjacent lands) and because most new residential development has occurred outside city limits in areas having more land available for expansion and subdivisions. In addition, aging populations and smaller households have been naturally occurring within city limits, with younger people and families moving into rural areas outside city limits.

Orangeburg County ranks in the bottom 25th percentile among all South Carolina counties in population growth since 1980, according to US Census Bureau records (See Appendix F, Exhibit F.29). The population of Orangeburg County is expected to increase less than 2% every 5 years until it reaches 95,100 in 2015, an increase of 8.5% since 1995, in contrast to the rate of growth for the state of South Carolina, which is projected to be 23% (Orangeburg County Comprehensive Land Use Plan revision 2002).



Calhoun, Clarendon, Dorchester, Orangeburg and Berkeley Counties are among the poorest counties in South Carolina, and are included in one of the persistently underdeveloped regions in the United States. Unemployment rates ranged between 4.6% and 7.9% in 2000, with an average of 6%. Rates have been high in Orangeburg County since 2001, averaging over 8% with high degree of monthly variability, indicating that steady jobs are difficult to find for the low-skilled population. In December 2008, after the economic recession occurred, unemployment rates were at 13.6%. Approx 23% of the population lives in poverty across the county, with a trend in increasing poverty between 2000 and 2005 (19% to 24%). The proportion of the population of working age is over 60%, indicating that unemployment rates are seriously problematic. Of those employed in Orangeburg County, 22% are employed outside the county and 1% is employed outside of South Carolina. In comparison, in 2000, 61% of the population of Dorchester County was employed outside the county and 2% employed out-of-state. Median household income in Orangeburg County in 1997 was \$26,554, compared to the South Carolina median household income of \$33,325. Adjacent Calhoun County had a slightly higher level of \$32,200 median income. In general, areas that are more rural tend to have lower household incomes and more populated urban areas have generally higher incomes because of more white collar and high tech industries in the urban areas. In 2005, almost 70% of the Orangeburg County population lived in rural areas outside of municipal boundaries.

Per the South Carolina Budget and Control Board Office of Research and Statistics Community Profile utilizing the 2000 Census from the United States Census Bureau, the population of Orangeburg County (91,582 people in 2000) is predominantly black (55,736 or 60.8%), with 37.2% white. Approximately 27% of the population lives below the poverty level, which increases to 29% for children under the age of 18. Orangeburg County is classified as a chronically poverty-stricken county. The median income in 1999 was \$15,057, which is approximately 72% of the US median income (See Appendix F, Exhibit F.29).

South Carolina has one of the highest rates of ninth graders failing to complete high school, ranking 50 of 50 states, and the corridor along I-95 has a higher average than the state. In Orangeburg County, the proportion of adults lacking basic prose literacy skills is 21%, and 18% of the students in grades 9 through 12 do not graduate. Ten percent of students do not continue their education past ninth grade. The recent documentary "*Corridor of Shame: The neglect of South Carolina's rural schools*" highlighted the extent to which low property values, unemployment, and poverty along the I-95 corridor from North Carolina to Georgia, including eastern portions of the GLT, create the conditions for chronically poor education systems within this corridor. Thirty-six school districts have sued the State of South Carolina for better funding for schools in this area. The case was originally heard in the Clarendon County courthouse, and the case is currently under appeal to the South Carolina Supreme Court, where the decision is still pending two years after final arguments. Evidence presented in court showed that 75% of the schools in the plaintiff districts were rated either unsatisfactory or below average, compared to 17% for South Carolina as a whole. To further emphasize the



persistence of systemic poor quality educational opportunities in this corridor, parents in Clarendon County sued the state for adequate funding for schools in 1949. This case ultimately led to the *Brown v. Board of Education of Topeka* that decided that the policy of "separate but equal" school systems was unconstitutional. However, the funding situation along the I-95 corridor remains unresolved to this day.

Within this context of poverty, unemployment, and lack of growth, the intent of the regional water system and the proposed wastewater systems is to increase the number of jobs in the area by removing constraints to industrial and commercial development from lack of wastewater and water utility services and to provide reliable and healthy drinking water throughout the rural areas of Orangeburg, Calhoun, Dorchester, Berkeley, and Clarendon Counties. In a study conducted in 2009 for Francis Marion University and South Carolina State University by RTI International (*Creating Greater Opportunity in South Carolina's I-95 corridor: A Human Needs Assessment Report*, RTI Proj. No. 0211544.000.002), interviews of county managers and economic developers indicated a strong belief that the lack of water and wastewater infrastructure was their biggest challenge for promoting economic development in the region. The primary issue was not overall capacity, but making that capacity available to support industrial development. The SCDOT identified that, until the late 1990s, the only two interstate interchanges that had significant development (I-26/US 601 Exit 145 and I-95/Santee Exit 98) were also the only interchanges linked to water and wastewater services.

As many residents of these communities and rural areas in the five-county area are primarily low income and minority, compared to South Carolina statewide, they are disproportionately impacted by the lack of functioning water and wastewater treatment compared to other higher-income communities. Executive Order 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low Income Populations*, requires "each Federal agency, whenever practicable and appropriate, to collect, maintain, and analyze information regarding risks borne by populations identified by race, national origin, or income. To the extent practicable and appropriate, Federal agencies shall use this information to determine whether their programs, policies, and activities have disproportionately high and adverse human health or environmental effects on minority populations and low-income populations" (Section 3-302a)."

Therefore, all of these communities within the GLT area are both low income and minority populations, subject to the executive order, and both the existing and proposed water systems and proposed Goodby's Regional wastewater system would beneficially effect these populations by providing infrastructure for industrial and commercial entities that would provide jobs and by improving existing health concerns associated with use of failing on-site septic systems and groundwater wells.

1.3.2 Need for Economic Growth

The mission statement for the County of Orangeburg is: "*The County of Orangeburg exists for the purpose of providing a prosperous and healthy environment for its citizens. It seeks to create a positive quality of life and economic opportunity for its citizens through progressive leadership and the development of policies consistent*



with the present and future needs of the community. The County strives to be accountable to its citizens by providing the most effective and efficient service possible."

The Orangeburg County Development Commission (OCDC) is actively involved in recruiting industrial and commercial development to Orangeburg County to address these economic concerns. The Commission has identified the need for new businesses, industry and manufacturing growth and service-oriented jobs in the county and in nearly all of the communities outside of the greater Orangeburg County and Santee areas (*Orangeburg County Comprehensive Land Use Plan* revision 2002). The purpose of the Orangeburg County Land Development regulations is to establish procedures and standards for the development and subdivision of real estate in the county by providing for the orderly development of land.

The regulations were established for the following specific purposes:

- *to encourage the development of an economically sound and stable county;*
- *to assure the timely provision of required streets, utilities, and other facilities and services to new land developments;*
- *to assure the adequate provision of safe and convenient traffic access and circulation in and through new land developments; and*
- *to assure, in general, the wise and timely development of new areas in the county in harmony with the comprehensive plan of the county.*

Audubon South Carolina (letter dated August 19, 2006; See Appendix C, Exhibit C.21) also supports well-planned, appropriately-sited and environmentally-protective economic growth as a means to improve the quality of life of the residents of Orangeburg County: *"Orangeburg County's intent to cluster its industrial and commercial development, rather than allow those activities to create sprawl, is to be complimented. The clustering of the infrastructure and future businesses for this primarily rural agricultural landscape protects the surrounding communities and natural resources of Four Hole Swamp."*

This area of South Carolina has many conditions that increase its suitability for industrial and commercial growth. Orangeburg County has access to major interstate highways, including I-95 connecting the East Coast megalopolis (Boston to Washington, D.C.); I-26; I-20; and I-77; US 301; US 15; the Ports of Charleston and Savannah; the future port at Jasper; and major east coast ports that are ranked 5th and 6th as the busiest ports nationwide. The area also has access to two rail lines owned by independent rail companies. The five counties have shown a strong commitment to economic development that has attracted a significant volume of capital investment in the last 10 years. In addition to the economic assets, the area has the most affordable housing in the state, and potential homeowners can choose to live in a variety of environments ranging from small urban areas, quaint small town neighborhoods, and scenic rural settings.

Orangeburg County has recognized the high potential for industrial and commercial development in the triangle made up of US 301, I-95 and I-26, dubbed the



Global Logistics Triangle (GLT), and has been actively marketing this area for industrial and commercial development. The area surrounding the interchange at I-26 and I-95, at the southern apex of the GLT, is one of the least-developed major interchanges on the east coast (Study and Preliminary Design of Infrastructure in the Vicinity of I-26 and I-95 in Orangeburg and Dorchester Counties, July 2008). One of the primary reasons for lack of industrial and commercial development along these major routes and their associated interchanges is lack of water and sewer service; the I-26/I-95 interchange has the added constraints of being surrounded by major wetlands and lack of direct access to the site.

Lack of water and wastewater service has also limited growth in the rural areas outside the municipalities. Because most of the population in the five-county area including Orangeburg, Dorchester, Berkeley, Clarendon, and Calhoun Counties is clustered within town limits, most of the population receives public water service from one of the municipalities. The remaining population outside the municipalities receives its drinking water primarily from private wells and has no public wastewater service. Trends seen in recent census data show that the residential growth in the rural areas of the planning region continue to increase, while growth in some of the municipal areas is flat or may even be decreasing for the reasons stated earlier. Therefore, demand for public water and wastewater services may increase in the future.

In order to understand the need for the Goodby's Regional wastewater system, it is important to understand the overall public water and wastewater utility services in the area. Sections 1.3.3 and 1.3.4 describe the need for public water systems and briefly describe the existing and proposed systems in the area. Sections 1.3.5 and 1.3.6 describe the need for public wastewater services, including the proposed Goodby's Regional wastewater system within the context of overall economic need for industrial and commercial development in the area.

1.3.3 Need for Public Water Service in the Area

The eventual goal of the counties of Orangeburg, Berkeley, Clarendon, Calhoun, and Dorchester is to provide water service throughout the five-county area where currently most drinking water is obtained from private wells. Due to the cost of drilling a well, most wells are shallow and have an abundance of water quality problems, with the predominance being bacteria (*E. coli*) from improper well construction and shallow aquifer contamination from septic tank drainfields and other surface waters. Leaking petroleum underground storage tanks also contribute to contaminated drinking water, to a lesser degree. Within Calhoun and Orangeburg Counties, many private wells also have documented high iron and manganese levels, with residents complaining about red water (Final EID Proposed Lake Marion Regional Water System for Calhoun, Clarendon, Dorchester, Orangeburg, and Sumter Counties, South Carolina, USACE, Dated October 2003). Shallow private wells also are not monitored or regulated by SCDHEC, US Environmental Protection Agency or the counties. Residents are also concerned about potential contamination by farm chemicals, dropping water levels in wells from aquifer overuse, high drinking water turbidity, and water shortages. Many of the residents cannot



afford to purchase water treatment devices and are forced to continue to use the contaminated water, which may impact their health and quality of life.

Municipal systems and areas served by private wells outside of the municipalities that are not part of the LMRWA mainly draw water from the Middendorf and Black Creek aquifers. These aquifers have high mineral content, especially iron and manganese, causing high-cost water treatment challenges for public water supplies and typically more advanced treatment. Increasing regulatory requirements for public water systems, particularly those using groundwater, will impose stricter limits in the near future. Recent federal regulatory modifications have decreased maximum contaminant levels (MCLs) for common groundwater contaminants like arsenic and radionuclides, increasing treatment requirements. In addition to implementation of stricter MCLs, the reauthorization of the Safe Drinking Water Act also requires that source water assessments be conducted on all public water systems as a means identifying where drinking water sources are vulnerable to contamination.

In 2008, Orangeburg County ranked eleventh of 46 South Carolina counties in the number of groundwater contamination sites (*Groundwater Contamination Inventory Report* SCDHEC October 2008). Since 1980, Orangeburg County has ranked in the bottom twenty-fifth percentile among all South Carolina counties in having high levels of pollution in their groundwater, according to US Census Bureau records.

To better service industrial, commercial, and residential users in the five-county area, the Lake Marion Regional Water Authority (LMRWA) was established in 1995 to provide a regional uniform and secure supply of potable water that is in full compliance with safe drinking water regulations. The source of the water is 100,000-acre Lake Marion, the largest freshwater reservoir in the Southeast, constructed in the mid-1930s. The LMRWA 8-mgd capacity water treatment plant (with the capability of being upgraded to 12 mgd) near Santee became operational in 2008. The purpose of the LMRWA was to develop a regional water system at a cost that would not burden the existing customers of the smaller municipal systems and yet be cost-effectively expandable in order to accommodate the future development of the region. System operation and maintenance by the LMRWA, rather than individual municipalities, and a sufficient source of reliable water within an expandable system at fixed and acceptable costs (which may decrease over time as more areas are added to the regional system) are the key benefits of the regional water system for the future of the economic development in the five-county area. Continuing to withdraw groundwater for potable water supply and using existing water plants and systems would result in a decrease in available groundwater supply and a serious future water deficit (Final EID Proposed Lake Marion Regional Water System for Calhoun, Clarendon, Dorchester, Orangeburg, and Sumter Counties, South Carolina, USACE, Dated October 2003). The water supply would also not be adequately distributed, resulting in a continued dependence on individual private wells for many industrial and municipal uses, which is highly cost-ineffective.

The reservoir system has more than adequate capacity for this area of South Carolina. The withdrawal from Lake Marion is approximately 18 cubic feet per second



(cfs), compared to the normal average lake inflow of 15,000 cfs. The quality of the raw water from the reservoir is excellent, decreasing the costs of treatment. The LMRWA infrastructure priorities are largely directed towards developing public water systems where both residential and economic development needs are most critical. However, the LMRWA also provides a new, cost-effective supply for the existing municipality systems. The centralized source helps the LMRWA member counties and municipalities to better plan and direct residential and industrial growth resulting in a controlled and sustained pattern of development that makes sense.

SCDHEC recognizes the importance of a regional water system in a letter dated August 6, 2003 (see Appendix C, Exhibit C.24): *"While we continue to consider groundwater as a suitable public water supply source, we believe that regional supplies, such as the Lake Marion project, may present a more effective and efficient means of delivering water in the future, and entities working as a group can be more viable and effective than they could working alone. Individual groundwater wells can be a drinking water source; however, when not installed properly, when installed in extremely shallow aquifers, when or constructed in areas with localized water quality concerns, they become an unreliable or even unsafe water source. SCDHEC recognizes the significant economic boost that would occur with a regional water system in this area of the state. Many of the existing systems in this area do not have the capacity to serve additional industries nor do these systems extend into surrounding areas where industries may want to locate. A regional water system would encourage planned industrial development along identified corridors, such as along I-95. This in turn would spur the economies of these distressed areas as well as the state as a whole. In summary, SCDHEC supports the intent of regional infrastructure projects, as is proposed with the Lake Marion Regional Water system. Such projects can address the viability concerns that invariably arise with many smaller water systems, generally provide a more effective and efficient use of water resources, work to serve rural areas in need of a public water supply to improve the quality of life and health, and can often spur economic development in distressed areas."*

1.3.4 Existing and Proposed Public Water Systems in the Area

Water mains have been recently constructed along US 301 from its intersection to I-95 and the Town of Santee to the City of Orangeburg water system as part of the regionalization envisioned by the LMRWA.

USDA RD has approved a project for expanding the LMWRA infrastructure throughout the GLT and rural areas of Orangeburg County to provide safe, reliable drinking water and fire protection supply to a large portion of Orangeburg County. The water system expansion project effectively allows LMRWA to supply the Orangeburg County water system, City of Orangeburg DPU, Town of Santee water system, and Town of Bowman water system with drinking water regulated by SCDHEC. It also provides Orangeburg County the greatest flexibility and reliability to obtain water at wholesale rates with operation and maintenance provided by the LMRWA.



The Town of Bowman recognizes that as industrial and commercial growth occurs in the GLT area, residential growth will also increase, primarily in the rural areas surrounding Bowman. The Town of Bowman is currently seeking funding for expansion of the water system to support projected growth in the area and to encourage future residents to settle in or near Bowman to make it a stronger community. The project would connect Bowman to the LMRWA with a distribution system along Homestead Road. This would continue the regionalization of the system, provide redundancy, and increase available capacity to support projected and desired growth, especially outside the Bowman town limits. Using water supplied by the LMRWA would eliminate health risks, poor groundwater quality, and low water pressure, support future development in designated growth areas, and supply rural fire departments with a reliable water source.

The town of Vance is also pursuing a water system for quality drinking water and fire protection via extension to the Town of Santee public water system as part of the regionalization of the LMRWA system. Vance currently depends entirely on private shallow wells for all drinking water.

Calhoun County owns and operates two potable water supply and distribution systems in the northwestern section of the county, north of Lake Marion, primarily serving the Sandy Run and Belleville areas and the I-26 industrial corridor near the Calhoun County/Lexington County line. The southern portion of the county near Lake Marion needs water service, including areas north of Elloree along the southern shore of the lake. Lake Marion is a premier recreational area in South Carolina, which has resulted in the development of tracts of land, primarily for residential use, in the vicinity of the lake. Two sites in Orangeburg and Calhoun County along the south side of the lake are already in active planning processes (Blackwater Plantation and Lakewilde Plantation near Santee State Park) and the availability of a reliable water source will encourage additional development in the area. In the case of water systems tied to potential future large residential subdivisions in the area of the south shore of Lake Marion, the infrastructure would need to be installed by private developers in accordance with standards developed by the service providers and then dedicated to the service providers. This would result in the expansion of the system and addition of customers at a very low cost.

1.3.5 Proposed Public Wastewater Systems, Including the Proposed Goodby's Regional WWTP and Collection System

Wastewater treatment and collection systems are needed within the GLT to support industrial and commercial growth for the economic development of the area and limited residential growth for employees and retirees. At present, individual septic systems for residential, industrial, and commercial users are the only options available outside of the existing wastewater treatment systems operated by the municipalities of Orangeburg Department of Public Utilities (DPU), Elloree, Santee, and Bowman, which provide service only to their localized areas. Generally, the extension of water lines into rural areas is much more feasible than the extension of wastewater collection lines. It is expected that rural areas that are not served by wastewater systems will continue to rely



on septic tanks for wastewater treatment for many years to come. As these individual septic systems are generally reaching their life cycle end and many residents are not properly maintaining their on-site systems, it is highly probable that most are failing and contributing contaminants to groundwater, the drinking water source for the private shallow wells. Most importantly, large-scale septic systems are neither cost-effective nor sustainable for large industrial and commercial facilities.

The Town of Bowman wants to expand their existing system to portions of Bowman that do not currently have wastewater service and to the adjacent unincorporated areas of Orangeburg County east of Bowman toward I-26. Bowman wants to support future commercial and industrial development at Exits 159 and 165 on I-26 and in nearby residential growth areas by increasing the capacity of its wastewater treatment facility from a peak capacity of 0.236 mgd to 1.0 mgd. This would reduce the number of individual septic systems and therefore health risks and environmental concerns caused by failing on-site septic systems while increasing the potential for jobs in the area. Bowman wants to protect nearby Cow Castle Creek and Four Hole Swamp from nonpoint source pollution from failing systems.

Orangeburg County has proposed to construct the 1.5 mgd Goodby's Regional Wastewater Treatment Facility, which would serve the MIP at the intersection of US 176 and US 301, the Jafza Logistics and Distribution Park at the intersection of US 301 and I-95, the interchanges of I-95/US 176 and I-95/US 15 (via SC Highway 210) at I-95 Exits 90 and 93, and to supplement the capacities of the existing wastewater treatment systems of the Towns of Santee and Elloree. The wastewater collection proposed for installation in the US 176 right-of-way from the WWTP to I-95 Exits 90 and 93 would not only support industrial development at those exits, but pump stations on the proposed collection system at the existing communities at Branch Creek and Providence Swamp would provide service to those residences to replace old failing septic systems, improving the water quality of the area and reducing potential for polluting Four Hole Swamp. The original Goodby's Regional WWTP build-out capacity was planned for 1.0 mgd, with 0.5 mgd each for the MIP and the Towns of Elloree and Santee. This build-out capacity was then increased to 1.5 mgd to include the needs of the proposed Jafza Park. Effluent from Phase I of the plant would be applied via underground pipes to the Sanders Pointe Farm that currently uses the land for agricultural purposes.

1.3.6 Conclusion Regarding Need for the Goodby's Regional WWTP System

Within the context of the need for economic development, especially in the industrial and commercial sectors for creating jobs in this chronically poverty-stricken county, the limiting factors have primarily been the availability of public water and wastewater services. Orangeburg County is extremely active in supporting the expansion of the potable water system for the GLT area under the authority of the LMRWA for commercial and non-commercial purposes and in developing and marketing designated sites for concentrated industrial development within the GLT. The designated sites at the MIP and the Jafza Park have water infrastructure but are lacking wastewater infrastructure. Potable water infrastructure was recently funded for the site at Exit 90 on



I-95 (water for Exit 93 is planned but not yet funded). Existing wastewater systems at Elloree and Santee are at maximum capacity and are lacking sufficient effluent disposal and treatment capacities. Connecting to the wastewater system for the Orangeburg DPU would be extremely expensive, including multiple complicated crossings of highways and natural water systems, and has the potential for high environmental impacts associated with crossing of Four Hole Swamp and Goodby's Swamp. Therefore, this option has not been considered in detail, in favor of the Goodby's Regional WWTP (Section 2.2.4.2).

Providing sufficient and readily expandable wastewater infrastructure for the industrial development at the sites designated and regulated by the County would substantially increase the ability of the County to market those sites and for industry to find them attractive for use. In addition, replacing failing septic systems at existing communities at Branch Creek and Providence Swamp on US 176 would improve groundwater quality and reduce the potential for discharging pollutants into Four Hole Swamp.

Therefore, supplementing the existing and proposed water infrastructure with the necessary wastewater infrastructure for these sites, while assisting the municipalities of Santee and Elloree with their wastewater capacity shortfalls, will fully support Orangeburg County's mission and improve the quality of life for all Orangeburg County residents. Supporting industrial and commercial growth within the GLT and surrounding areas would substantially increase the number and quality of jobs for local residents, providing a sustainable foundation for improving the overall economic viability of the area, improving the long-term economic trends of this chronically impoverished area.

1.4 Comments on Proposed Goodby's Regional WWTP

1.4.1 US Fish and Wildlife Service

US Fish and Wildlife Service encouraged the agency to consider the following mitigation (letter dated July 29, 2008, See Appendix C, Exhibit C.19):

- Use of directional drilling for crossing Goodby's Swamp with pipeline systems
- Means to increase efficiency in nutrient removal from effluent
- Tertiary treatment standards for the WWTP
- Suitability of soil types for effluent disposal at proposed land disposal sites
- Placing all pipelines in existing road rights-of-way
- Predicting WWTP capacity needs for planned development projects
- Description and evaluation of proposed upland discharge areas and potential impacts from land-based discharges
- Evaluation of potential impacts to wetlands adjacent to proposed spray fields.



Subsequently, the Service stated (letter dated April 23, 2009, See Appendix C, Exhibit C.20):

- The Service applauds the use of directional drilling under wetlands, including Goodby's Creek, and the placement of all pipelines within road rights-of-way. *This comment has been addressed in Section 2 of this EA.*
- The EA needs a stronger purpose and need, explaining the needs for wastewater treatment and collection systems in terms of current deficiencies and treatment capabilities and necessary capacities for existing and future wastewater collection and treatment systems. *This comment has been addressed in Section 1.3 of this report.*
- Description and evaluation of proposed upland discharge areas and potential impacts from land-based discharges. *This comment has been addressed in Sections 3.4, 3.5, and 3.6.*

USFWS further commented on the Goodby's Regional WWTP project (letter dated January 12, 2010, See Appendix C, Exhibit C.13):

- The Service is concerned about residential and commercial development that will result from the installation of centralized water services. Increased development impairs water quality through direct construction runoff, altered hydrology from increased impervious surface area, nutrient loading from wastewater treatment effluent, and water temperature increases due to deforestation of the watershed, among others. *This comment is addressed in Section 3.2.*
- A nearby water monitoring station on Providence Swamp at East Frontage Road is currently listed on the South Carolina DHEC 303(d) list of impaired waters for aquatic life and recreational use due to high fecal coliform. *This comment is addressed in Section 3.6.*
- The relationship between the proposed project and the planned Goodby's Regional Wastewater Treatment Plant means that project activities have the ability to degrade water quality in Four Hole Swamp, a vitally important ecosystem for Trust resources, including migratory birds, federally listed species, and aquatic species. *This comment is addressed in Section 3.6.*
- We recommend utilizing best management practices with regard to soil erosion prevention during construction of collection lines. Minimizing soil disturbance and using silt fences will reduce sediment loads from entering waterways and thus reduce potential negative impacts to aquatic resources. *This comment is addressed in Section 3.4.*
- Any required stream crossings should be achieved by either attaching the new line to an existing structure such as a bridge, or by directional drilling to avoid open trenching of the stream. *This comment is addressed in Section 3.5.*



- No fill should be placed in wetlands or streams, and adjacent access roads and drainage ditches should not alter natural flow regimes through these areas. *This comment is addressed in Section 3.5.*
- Where lines will be placed in trenches, the natural pre-project elevations should be maintained. *This comment is addressed in Section 3.5.*
- All lines constructed in wetland or riparian areas should be re-vegetated in native plant species. *This comment is addressed in Section 3.5.*
- Compensatory mitigation should be provided for all adverse impacts. *This comment is addressed in Section 3.5.*
- Construction and maintenance activities in forested communities should take place outside of the breeding season for migratory birds (March through August). *This comment is addressed in Section 3.5.*
- We recommend that project plans be developed to avoid wetland areas and reserve the right to review any required federal or state permits at the time of public notice issuance. All unavoidable impacts [to jurisdictional] wetlands, including temporary ones, must be mitigated for under the revised US Army Corps of Engineers Regulatory Division Standard Operating Procedures (RD-SOP-01-01). *This comment has been addressed in Section 3.5.*

1.4.2 US Environmental Protection Agency

US Environmental Protection Agency (USEPA; letter dated April 22, 2009, See Appendix C, Exhibit C.18) stated:

EPA Region 4 concurs with the proposed Wastewater Infrastructure Project, as evaluated in the draft EA and FONSI, provided that:

- All temporarily impacted wetlands will be fully restored to their original grade and condition following completion of the project, and that the proposed project will not result in any long term adverse environmental impacts. Any unavoidable wetlands impacts will be fully mitigated. *This comment is addressed in Section 3.5.*
- The proposed action will not adversely affect any threatened or endangered species. *This comment is addressed in Section 3.8.*
- The proposed action will not adversely affect any cultural resources. *This comment is addressed in Section 3.9.*
- The proposed action will not adversely affect air quality. *This comment is addressed in Section 3.12.*
- The proposed action will fully comply with Executive order 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-*



Income Populations. This comment is addressed in Section 1.3.1 and Section 3.10.

- No unacceptable adverse cumulative or secondary impacts will result from the implementation of the proposed action. *This comment is addressed in Chapter 3 for each resource.*
- Goodby's Swamp at US 176, about 6 miles SW of the Town of Elloree, (Station RS-01036), has had waterbody segments listed in the past on the State of South Carolina's 303(d) Impaired Waters List. This waterbody has recreational (swimming) and aquatic life designated use classifications in various places. Goodby's Swamp has had an impaired macroinvertebrate community, as well as having a pathogens problem (fecal coliform bacteria). This Wastewater Infrastructure Project should not cause or contribute to any further impairment(s) of waterbodies in the Goodby's Watershed. *This comment is addressed in Section 3.6.*
- The site grading, excavation, and construction plans should include effective (and enforceable) measures that will be implemented to prevent erosion and sediment runoff from the project site both during and after construction. *This comment is addressed in Section 3.6.*
- A local land use disturbance/construction permit and an NPDES stormwater permit will also be required, and these should be referenced in the plans and in the specifications. *This comment is addressed in Section 3.6.*
- EPA also recommends that any Total Maximum Daily Load (TMDL) studies that have been prepared and approved for any downstream waterbodies (or other streams impacted by the project) be reviewed by the Project Engineer to ensure that the proposed action will not impede TMDL implementation activities. *This comment has been addressed in Sections 3.5.*

1.4.3 Audubon South Carolina

Audubon South Carolina (letter dated August 19, 2006, See Appendix C, Exhibit C.21):

- Audubon South Carolina has worked for over 30 years to protect and preserve Four Holes Swamp, one of the most intact and undisturbed hydrological systems in South Carolina. Audubon South Carolina's efforts have included the acquisition and permanent conservation of nearly 15,000 acres in the watershed of the Four Hole Swamp downstream of the MIP. Audubon submits these comments as significant landowners and in the best interests of wildlife and communities of Four Hole Swamp regarding impacts downstream of the proposed WWTP site. Audubon South Carolina supports economic development in the greater Orangeburg County area to improve the quality of life of residents of Orangeburg County. Audubon is pleased to see that the innovative potable water and wastewater treatment solutions as proposed by Audubon South Carolina have been adopted for the MIP. Orangeburg County's intent to cluster its



industrial/commercial development, rather than to allow the creation of sprawl is to be complimented. Clustering of the infrastructure and future businesses for the primarily rural, agricultural landscape protects the surrounding communities and natural resources of Four Hole Swamp. *This comment is addressed in Chapter 1.*

- Audubon South Carolina accepts the one-time disturbance of Goodby's Swamp that would increase turbidity on a temporary basis. *This comment has been addressed in Section 3.5.*

1.4.4 South Carolina Coastal Conservation League

South Carolina Coastal Conservation League (CCL; letter dated April 1, 2009, See Appendix C, Exhibit C.17):

The draft Environmental Assessment and associated draft Finding of No Significant Impact (FONSI) are inadequate because they fail to disclose the full extent of impacts to air quality and wetlands, including cumulative effects and therefore the FONSI does not have the necessary impact analyses to support rationale for the finding:

- Potential impacts to air quality: The EA considers emissions only from stationary sources, not emissions from 50,000 daily truck trips from Jafza Park (from Wilbur-Smith state rail plan 2008 updated March 2009). NO_x, SO_x, VOCs (primary precursors to ozone), particulate matter, and toxins from diesel-burning engines such as formaldehyde, acetaldehyde, acroelin, benzene, 1,3-butadiene, polycyclic aromatic hydrocarbons and nitrohydrocarbons are emitted from diesel engines, all of which are likely carcinogenic to humans. *This issue has been addressed in Section 3.12.*
- Potential impacts to wetlands: CCL is particularly concerned with the inter-riverine portions of swamps such as Four Hole and Goodby's Swamps. Goodby's Swamp is on the Nationwide Rivers Inventory (NRI), a listing based on scenery, recreational opportunities, fish populations and habitat, wildlife populations and habitat, historical significance, and outstanding cultural resources. The immediate area of the proposed project overlaps Providence Swamp, White Cane Branch Swamp, Little Poplar Creek and Big Poplar Creek. The EA states that the direct impact wetlands would be less than ½ an acre, with only short-term increases in turbidity where the wastewater lines cross streams and wetlands. EA masks full extent of project's wetland impacts with promises of future mitigation. The EA must disclose total number of acres impacted before mitigation, with the priority on considering actions that avoid and minimize, then compensate for impacts. Please consider the question of whether impacts occur in areas that would be difficult to mitigate and if mitigation mandated by binding authority, or simply expected to occur, as the basis for a FONSI. Many Carolina Bays are located in area, which are difficult to restore. Because of potential impacts to wetlands, an EIS should be prepared for this proposed project. *This issue has been addressed in Section 3.7.*



- Potential for induced growth and associated cumulative impacts: Due to its role in facilitating and spurring further conversion of agricultural and forested land into commercial/industrial uses, the proposed project has the potential for numerous and significant cumulative impacts. The EA briefly notes that anticipated land use changes will further impact wetlands and may also impact water quality, cultural resources, threatened and endangered species, biological resources, and human health and welfare, with precise impacts unknown. Provision of sewer service could usher in dramatic changes in the character of the surrounding area, and the EA must analyze and disclose the significant and far-reaching effects of the anticipated alteration in land use in an EIS so that the effects can be considered and understood prior to implementation. *This comment is addressed in Section 3.2 and in the cumulative impact sections for each resource.*



2.0 ALTERNATIVES

2.1 Introduction

This section includes:

- descriptions of the existing and proposed water and wastewater systems within the planning area,
- description of the proposed Goodby's Regional WWTP system
- descriptions of other proposed projects within the planning area
- Descriptions of alternatives not considered in detail for the Goodby's Regional wastewater system within the planning area.

Environmental impacts of components of these systems are evaluated in Chapter 3 in the particular impact analyses for each resource, as appropriate. These impact analyses include cumulative impacts of other existing and proposed water and wastewater projects in the area and other proposed industrial facilities served by these public systems, incorporating impacts from growth potentially induced by the water and wastewater projects within the area.

The Affected Environment/No Action Alternative (Section 2.2) describes the existing and proposed public water systems and existing and proposed public wastewater systems, in order to understand the interrelationships of the public utility systems, potentially-induced growth, and associated traffic patterns for the analysis of cumulative impacts for the various resources. It also includes reasonably foreseeable proposed projects associated with industrial development that are not highly speculative at this point in time. See Appendix A, Exhibit A.2 and A.3 for a map of existing and proposed public water systems and Appendix A, Exhibit A.1 for a map of proposed public wastewater systems, including the Goodby's Regional WWTP and its associated collection and conveyance system.

The proposed Goodby's Regional wastewater treatment system that is the subject of this EA is described in Section 2.3.

2.2 Affected Environment/No Action Alternative: Description of the GLT and Existing Water and Wastewater Systems

2.2.1 Existing Public Water Systems

2.2.1.1 Lake Marion Regional Water Authority (LMRWA) Potable Water Treatment Plant and Distribution System

The LMRWA was created to provide a healthy reliable source of drinking water to the five-county region made up of portions of Clarendon, Dorchester, Orangeburg, Berkeley, and Calhoun Counties. The water treatment plant is located on the southern shore of Lake Marion.



The system includes an 8 mgd drinking water treatment plant that is expandable to 12 mgd, with approximately 65 miles of water transmission pipeline (including five separate reaches) installed along existing road, railroad, and electrical transmission line rights-of-way. The water treatment plant is located on a 26-acre site adjacent to the Bluffs subdivision near the Town of Santee. The plant currently has a rated capacity of 8 mgd, with capability for expansion up to 12 mgd. The reach north of Lake Marion will ultimately serve the Town of Summerton and the City of Manning with potential for future expansion to the Town of Sumter and other parts of Clarendon County. The four reaches south of Lake Marion will serve the Towns of St. George, Elloree, Santee, and Holly Hill with potential for future expansion into Calhoun and Berkeley Counties and other parts of Orangeburg and Dorchester counties.

The plant has an interbasin transfer permit from DHEC for transferring water from the Santee watershed to the Edisto watershed. While this is a requirement, no impacts are expected as a result of this interbasin transfer of water. The amount of water being withdrawn (8 mgd of raw water at less than 0.5ft/sec) makes up an extremely small portion of the total inflow of water into Lake Marion; therefore, the impact is negligible to both the lake and to downstream waters. In addition, the withdrawal does not impact Santee-Cooper's hydrogeneration facility or the recreational uses and aesthetic qualities of the lake itself. Therefore, this issue will not be considered further in Chapter 3.

The water treatment plant uses a Zenon Zeeweed Ultrafiltration membrane system that is readily expandable in a cost-effective manner and treats the water to tertiary standards (physical, chemical, and biological). The raw water intake structure is located in Lake Marion within the old Santee River channel approximately 1,500 feet from the lake shore and approximately 18 feet below the normal water level of the lake.

Phase I included the installation of water mains within the US 301 right-of-way between the Town of Santee and the City of Orangeburg, the installation of an elevated water storage tank off I-26 to serve the County/City Industrial Park, the installation of an elevated tank along I-95 providing hydraulic control for the system, and an interconnection between the I-95 elevated storage tank and the master meter vault. This is complete.

Under Phase II, water is pumped to each municipality's existing water distribution system. The current water systems of each municipality continue to remain in operation and serve their customers with existing waterlines and tanks. Customers continue to receive bills from their present water providers, which continue to set water rates, approve extensions and manage their own distribution systems. The current municipal water systems purchase their water wholesale from the LMRWA. As each municipal system expands, citizens can choose to connect to the systems or stay on private wells. It is expected that there will be an initial group that connects immediately to the system to get away from their present ground water supply and associated concerns with drinking water quality. A gradual connection to the system by residents is expected to occur as wells or pumping equipment fails. It is anticipated that at least 60% of the residents that have access to the system will connect within the first 10 years, increasing to 80% over



20 years. The 8 mgd capacity should be sufficient through 2015, with expansion to 12 mgd necessary sometime between 2015 and 2025 for peak daily capacity.

The construction of the Lake Marion water treatment plant and the Santee distribution system is completed. Holly Hill and Ellore distribution systems are currently under construction. Remaining systems are either in the planning and/or design stage. Initially, the Phase II project would serve approximately 10,000 residential customers and various industrial/commercial customers. By 2025, the system is expected to serve approximately 125,000 residential customers and various industrial/commercial customers. This expansion of the customer base is expected to occur by connection to areas in Dorchester, Calhoun, Orangeburg, Clarendon, and Berkeley Counties to the system and is expected to occur over a 20-year period.

The Phase III distribution system would interconnect the towns and communities of Santee, Ellore, St. George, Harleyville, Holly Hill, Summerton, Manning, and areas of Orangeburg, Dorchester, Calhoun, Berkeley (Jedberg area), and Clarendon Counties and connections along US 301. Two hundred miles of pipelines may be ultimately funded in Phase III. The new water treatment plant and associated transmission lines provide the source water requirements and infrastructure backbone to allow existing systems to expand beyond current municipal boundaries to areas of demand. These future expansions would not add substantially to municipal debt because the treatment plant and distribution systems are already in place and the municipalities can purchase water at wholesale rates. As evaluated in Section 3.2, residential development along Lake Marion is foreseen because this area is a premier recreational area in South Carolina, several areas are already proposed for development (Lakewilde Plantation and Blackwater Plantation, Section 2.4) and a reliable water source is available at reasonable cost. For new developments in the area of Lake Marion, water infrastructure would be installed by public or private developers and dedicated to service providers at lower cost to customers.

This project has been and continues to involve funding from the Federal government (USACE and US EPA to date) and the LMRWA.

2.2.1.2 Water Distribution/Transmission Pipeline from I-95 to I-26 Along US 301

A new 12-inch potable water main was installed in 2005 in the right-of-way along US 301 from I-95 to its intersection with I-26, which provides back-up service for the County/City Industrial Park at the intersection of US 301 and I-26. Water is provided by the LMRWA treatment plant. This extension provides the opportunity for eastern GLT to connect to the western end, including the MIP, serves the intersection of Exit 159 (Homestead Road) with I-26, and connects the Town of Bowman to the LMRWA system through an existing 12-inch waterline along Homestead Road.

2.2.1.3 Ellore Water System

The town of Ellore is located in the northeastern portion of Orangeburg County approximately 8 miles northwest of the I-95 bridge over Lake Marion. In 2000, the



population of the town of Elloree was 742 people. The town's water supply is from three active groundwater wells, providing a total supply capacity of 840 gpm (1.25 mgd). The water is pumped directly from groundwater into the transmission lines consisting of 6 inch, 8 inch, 10 inch, and 12 inch water mains and two elevated storage tanks, with the active storage tank holding 500,000 gallons and the inactive backup storage tank holding 70,000 gallons. The plant is generally well maintained and serves over 700 customers. The only water treatment process is chlorination (primary treatment).

2.2.1.4 Holly Hill Water System

The town of Holly Hill is located in the southeastern area of Orangeburg County, with a 2000 population of 1,281. The town's water supply is from two active groundwater wells, which provide a total supply capacity of 1,165 gpm (1.68 mgd). The water is pumped from groundwater directly into the transmission lines consisting of 6 inch, 8 inch, 10 inch, and 12 inch water mains and one elevated storage tank, which holds 500,000 gallons. The plant is generally well maintained and serves over 1,200 customers. The only water treatment process is chlorination (primary treatment).

2.2.1.5 Santee Water System

The town of Santee is located in Orangeburg County and is on the west side of I-95 near the shore of Lake Marion, with a 2000 population of 740. The town's water supply is from the LMRWA system, with two backup groundwater wells for emergencies. The existing elevated storage tank capacities are 300,000 and 500,000 gallons, with water distributed by 6 inch, 8 inch, 10 inch, and 12 inch water mains.

2.2.1.6 City of Orangeburg DPU

The City of Orangeburg DPU water treatment plant obtains its raw water from the North Fork of the Edisto River. The DPU is currently investigating options for a future water supply, including an alternative raw water source. The existing system consists of nearly 500 miles of pipe in approximately 300 square miles of Orangeburg and Calhoun Counties, serving over 60,000 customers. The current plant capacity is 19 mgd and Orangeburg DPU is planning additional expansions to plant capacity. The water is treated to secondary standards and meets and exceeds US EPA and state water quality standards.

2.2.1.7 Town of Bowman Water System

The Town of Bowman owns and operates a water distribution system that serves residents within town limits and portions of outlying areas adjacent to Bowman. This system includes approximately 22 miles of pipelines, a 100,000 gallon elevated storage tank, and 1,250 gpm well to supply the system, and a 225 gpm backup well. Bowman will soon get water from LMRWA via a 12-inch water main that was recently constructed along Homestead Road connecting the town of Bowman and Orangeburg County water systems. The current system currently serves a total of 472 residential customers and 51 commercial customers.



2.2.1.8 Orangeburg County Water System Expansion

Currently, residents and small commercial businesses within the rural areas of the GLT rely on private shallow wells for potable water. The proposed Orangeburg County expansion of the existing public water system includes 32 miles of water mains within SCDOT and Orangeburg County road rights-of-way to provide regionalization of water service between Bowman, Santee, and the City of Orangeburg DPU from the LMRWA system, and two 300,000 gallon tanks on I-95 to provide water service to approximately 350 users in a 30-square mile area in eastern Orangeburg County. This project furthers the objectives of the LMRWA regarding regionalization of water service to rural areas. The public system will also provide water for fire hydrants in areas not currently served by fire protection. See Appendix A, Exhibit A.2 and Exhibit A.3.

Expansion of the Orangeburg County water system was evaluated in a separate NEPA document and a Finding of No Significant Impact executed on August 11, 2010.

2.2.1.9 Town of Bowman Water System Expansion

The Town of Bowman has identified eleven areas of expansion to provide local water service to the north, east, west, and within the town limits by providing residents the option for public water service. The areas of expansion would provide water service to the northern region of Bowman and provide a connection between the water systems of Bowman and Branchville (See Appendix A, Exhibits A.10 and A.11), and an interconnection with the Orangeburg County water system at the intersection of SC 210 and I-26, which connects to the LMRWA water system. The system expansion is intended to service small communities, individual residences and a small number of commercial properties and to regionalize the Bowman and Branchville water systems. The existing wells will be maintained for emergency purposes.

The project consists of approximately 35 miles of water mains and service connections constructed within existing road rights-of-way and two one million gallon elevated storage tanks. New easements would be required along private roads and for the two 1-acre sites for the elevated storage tanks on SC 210 and Homestead Road. Most of area 1 (SC 210/Vance Road between Bowman and I-26, including a water storage tank and pipelines along SC 210) has been designed and permitted and is waiting for funding. This water system would serve a total of approximately 900 customers (See Appendix A, Exhibit A.2 and Exhibit A.3).

Expansion of the Bowman water system was evaluated in a separate NEPA document and a Finding of No Significant Impact executed on August 11, 2010.

2.2.1.10 Town of Vance Water System

Vance does not currently have a public water system, so residents depend on private shallow wells for drinking water. Vance wants to connect to the LMRWA water system via an extension of the Town of Santee's distribution system, with the system operated and maintained by the Town of Santee. This water system would include



30,600 linear feet of 10-inch water mains constructed within existing road rights-of-way (SC 6, US 310 and local roads), installation of 32 hydrants, and approximately 200 service connections.

Expansion of the Vance water system was evaluated in a separate NEPA document and a Finding of No Significant Impact executed on April 29, 2010.

2.2.1.11 Southern Calhoun County Water System Expansion Phase I

This expansion of the Calhoun County public water system involves the installation of water distribution lines in the area in three phases, because of the large geographic scope and to distribute cost to customers over time. Water would be provided by the LMRWA, with a wholesale connection on Tee Vee Road at the Calhoun/Orangeburg County line. Phase I is the extension of service to the area along the southern shore of Lake Marion (690 customers), where large-scale residential development is proposed. Phase II will expand toward St. Matthews and the US 601 corridor (299 customers), eventually interconnecting with the Calhoun County existing system in the Belleville portion of the county (119 customers). Water storage would be provided by a 250,000 gallon elevated storage tank located at Old River Road/Tee Vee Road intersection. Calhoun County is also considering an extension along US 176 north of US 301 to the Orangeburg/Calhoun County line.

Expansion of the Southern Calhoun County water system was evaluated in a separate NEPA document and a Finding of No Significant Impact executed on June 3, 2010.

2.2.1.12 Berkeley County Water System

The Berkeley County Water and Sanitation Authority is within the Lake Moultrie Regional Water System and has installed over 200 miles of water distribution pipeline by 2003. The system includes a 24 mgd water treatment plant that can be readily increased to 36 mgd capacity, a million-gallon elevated water storage tank, pump stations, and 26 miles of pipeline. The Lake Moultrie regional system serves the Berkeley County Water and Sanitation Authority, and the communities of Moncks Corner, Goose Creek, City of Summerville, and Charleston CPW.

2.2.2 Existing Public Wastewater Systems

2.2.2.1 Town of Bowman Wastewater System

Bowman owns approximately 44,000 linear feet (approximately eight miles) of gravity wastewater lines and wastewater force mains, four wastewater pumping stations, and a 0.236 mgd WWTP, which pumps at an average flow of 0.159 mgd and a peak rate of 0.198 mgd. The system currently serves 336 customers.

The WWTP was designed in 1983 for 0.15 mgd secondary treatment, with discharge to Cow Castle Creek. The WWTP was expanded from 0.15 mgd to 0.236 mgd in 1995.



2.2.2.2 City of Orangeburg Department of Public Utilities (DPU) Wastewater Treatment System

The wastewater system serves approximately 9,000 residential, commercial, and industrial customers. The wastewater treatment plant has a design capacity of 9.0 mgd, with a current operating capacity of 4.0 mgd. Wastewater is treated to secondary treatment standards. All biosolids are dewatered and dried and meet quality standards for use in local agricultural operations. All biosolids are recycled, eliminating the need for landfill disposal.

2.2.2.3 Town of Santee Wastewater Treatment System

The Town of Santee's wastewater treatment plant uses an aerated lagoon treatment system with effluent disposal by spray irrigation onto two nearby golf courses. The plant treats wastewater to secondary treatment standards and has a permitted treatment capacity of 0.713 mgd. The plant is operating near its treatment capacity and it has limited additional effluent disposal options.

2.2.2.4 Town of Ellore Wastewater Treatment System

The Town of Ellore's wastewater treatment plant uses an aerated lagoon treatment system with effluent disposal by spray irrigation onto a nearby golf course. The plant treats wastewater to secondary treatment standards and has a permitted treatment capacity of 0.28 mgd. The plant is operating near its capacity and has limited additional effluent disposal options.

2.2.3 Proposed Wastewater Systems

2.2.3.1 Town of Bowman Expansion of Wastewater Infrastructure

The Town of Bowman proposes to expand its existing wastewater infrastructure in phases, including a WWTP upgrade, to better serve needs both within the town and in rural areas adjacent to the town. Ten improvement areas have been identified that would initially service 155 customers, with a future service to 256 new customers.

The proposed expansion includes five wastewater pump stations to support gravity lines, fifteen miles of force main and gravity lines, with associated service connections, and 0.764 mgd expansion to the existing 0.236 mgd WWTP for a total capacity of 1.0 mgd. Ten miles of force main would be installed in rights-of-way along SC 210 and Homestead Road east of the town limits to two exits on I-26 (Exits 159 and 165). All collection lines would be installed in rights-of-way of SCDOT, Orangeburg County, and private roads and utility easements. Five new easements would be required for installation of collection pipelines along private roads and for the pump stations. In the event that wetlands cannot be avoided, directional drilling would be done. The WWTP upgrade would have a longer sludge age than other aerobic systems, which dramatically lowers biological oxygen demand and ammonia levels before discharge into



Cow Castle Creek. The proposed expansion would serve approximately 521 customers total (See Appendix A, Exhibit A.1).

This action is being evaluated in a separate NEPA document.

2.2.4 Proposed Industrial and Residential Development in the GLT Area

2.2.4.1 Jafza Logistics and Distribution Park

Jafza (Jebel Ali Free Zone) is a developer from the country of Dubai that has purchased over 1,300 acres at the intersection of I-95 and US 301 in Orangeburg County for developing a phased warehousing and distribution center at an anchor intersection of the GLT (See Appendix A, Exhibit A.1 (1)). The development is intended to provide rapid access to national and regional markets between New York and Miami, the nearby Port of Charleston (capable of serving vessels using the Panama Canal) and rail lines from two different carriers. As presently proposed, the site would be developed based on market demand, and would include warehousing and distribution units, light manufacturing units, commercial office space, leased industrial units, an intermodal yard with access to rail, and supporting commercial facilities and utilities. The company projects approximately 8,000 to 10,000 jobs for the area, and is already working with the local colleges to ensure training for the types of jobs expected, and fully intends to hire local employees as much as possible.

As described in Section 3.2.4.2, SCDOT proposes to construct an extension of US 301 through the site to connect to SC 6 to the east with a full interchange to serve the facility. In addition to infrastructure directly related to the industrial use, the site also plans for recreation, open space and wetland mitigation areas, and to use energy-efficient building design. More detail on its operation is located in Section 3.2.4.2, and integrated into resource impact analyses in Section 3.

2.2.4.2 Proposed Tenant in Matthews Industrial Park – Green Energy Holding, LLC Biomass Electricity Generating Plant

Green Energy Holding, LLC proposes to construct a biomass electrical generating plant at the Matthews Industrial Park, using residue from local timber harvest activities. This proposal is still in the early planning stages and has yet to find purchasers for the electricity generated at the plant.

As presently proposed, the facility would have a turbine generator, a 50-foot cooling tower, a 150 foot emission stack, a wood storage yard, an electric switch yard, a short electric line, to connect to the grid, associated ancillary equipment, a paved entrance drive and parking area to accommodate visitors and working personnel, and trucks hauling wood chips to and ash from the plant. The site would be 55 acres in size, with 75% of the site actually used by the project.

As presently proposed, the plant would use 450,000 tons of wood chips per year, storing a 30-day supply on-site. Wood chips would be delivered to the plant 5 days per week, 10 hours per day from wood lots and logging operations within 60 mile radius.



Makeup water for the cooling tower would require approximately 1.0 mgd, proposed to be provided by the Goodby's Regional WWTP. A short interconnection from the WWTP to the electrical generating plant would be needed. If non-contact cooling water is not available from the Goodby's Regional WWTP, water would be required from the LMRWA water treatment plant. A 115 kV electricity transmission line would be required to the substation approximately 3 miles from the MIP.

Approximately 40 tons of ash would be created per day, collected and stored in a silo having at least 7 days of storage capacity. The ash would be trucked off-site and either disposed of at a permitted landfill or sold for beneficial uses, such as soil additive.

2.2.4.3 Proposed Residential Developments Along the Southern Shore of Lake Marion

Private developers have proposed and are in the preliminary planning stages for two large-scale residential developments along the southern shore of Lake Marion in Orangeburg and Calhoun Counties. Master plans for these developments have been prepared and the developers are seeking funding, and one development has initiated limited construction. Both proposed developments overlook Lake Marion and are within one hour of the cities of Columbia, Charleston, and Florence/Darlington. The intent is for a broad mix of retirees and primary and secondary home buyers interested in living on Lake Marion. However, the expected influx of new businesses, including the MIP and Jafza Park, in addition to existing businesses such as Google, Boeing, Honda USA, Starbucks Regional Plant, DuPont, Bose Sound Systems, Force Protection Systems, Alcoa, America LaFrance, and Sumitomo are expected to create a demand for housing in the area. The area has low property taxes and cost-effective utilities, with full water service from the LMRWA. The proposed Goodby's Regional WWTP system would also serve this area.

Lakewilde is a 350-acre property in Calhoun and Orangeburg Counties near Ellore, already acquired in fee simple by the LLC. The master plan approved by Calhoun County includes a mix of 798 cottage homes, townhouses, condominiums, and single family home sites. Water would be provided by LMWRA, with wastewater service provided by the proposed Goodby's Regional WWTP. The Phase I environmental site assessment for hazardous materials, the soils and geotechnical studies, and cultural resources and endangered species studies all found no concerns. The USACE conducted a wetlands determination and found a total of 4 acres of wetlands clustered in one area. All these wetland sites would be protected from development and buffered with vegetation, according to the master plan map (<http://lakewilde.com>, accessed July 2010).

Also near Ellore and directly adjacent to the proposed Lakewilde development, construction began in 2001 on Blackwater Plantation, a 650-acre golf and waterfront community on the southern shore of Lake Marion. This development is planned for approximately 1,300 residential units at full build-out, including apartments and condominiums. Less than ten homes and some access roads have been constructed, and the developers are waiting for development of wastewater service before progressing



further with development. As with Lakewilde, public water service would be provided by the LMRWA and wastewater service by the proposed Goodby's Regional WWTP. Unlike Lakewilde, this development is more focused on workers immigrating for work at Jafza Park and other industrial development in the area, rather than retirees and primary and second home buyers.

2.3 Goodby's Regional WWTP and Collection and Conveyance Infrastructure (Proposed Action)

The proposed Goodby's Regional wastewater project is comprised of a regional WWTP (See Appendix A, Exhibit A.5) and wastewater force main extensions (See Appendix A, Exhibit A.1 (1) and Exhibit A.1 (2)) serving areas designated as future development in the Orangeburg County Comprehensive Plan Future Land Use Map (See Appendix A, Exhibit A.9). These areas include US 301, Exit 90 at the intersection of I-95 and US 176, and Exit 93 at the intersection of I-95 and US 15 and expanded residential development in southern Calhoun County (SC 276 between the Town of Ellore and US 301). The force main extension from US 301 is proposed to be extended from a wastewater pumping station at Jafza Park at I-95 along US 301 and Woolbright Road to the proposed WWTP. Another force main would extent from US 301 north along SC 276 to the Town of Ellore area. At Exit 93, a gravity system is proposed from the east side of I-95 to approximately 2,000 feet west of I-95 into a proposed wastewater pumping station. From this pumping station, a force main extension is proposed to extend approximately 2.5 miles from SC 210 west to another force main at US 176. At Exit 90, a proposed pumping station would be located on the east side of I-95 and approximately 3,000 feet of gravity line would serve the immediate area of the intersection of I-95 and US 176. From the proposed wastewater pumping station, approximately 7.5 miles of force main would extend along US 176 to connect to the proposed WWTP. Additional wastewater connections to the force main along US 176 are proposed to serve the existing communities near Bush Branch, the Providence community, and other residences that can connect cost-effectively to the pump stations along the proposed US 176 route (approximately 120 residences along US 176). As discussed in Section 3.2, additional pump stations at the force main along US 176 would be needed for new development, which would be extremely expensive for developers and would be in areas designated as Forest/Agriculture on the Orangeburg County Comprehensive Plan Future Land Use map. See Section 3.2 for discussion of the potential for future growth for restrictions on new development in Orangeburg and Calhoun Counties and the Town of Bowman.

The Goodby's Regional WWTP is proposed for approximately 10 acres of a 542-acre site next to the MIP on US 176. The WWTP would have an ultimate capacity of 1.5 mgd to service the MIP, the Santee/Jafza Park wastewater system, and Ellore/Calhoun County wastewater system. Goodby's Regional WWTP would serve the MIP and the Jafza Park directly. Both Santee and Ellore WWTPs would continue operation and use Goodby's Regional WWTP for additional capacity as needed. Santee effluent would continue to be applied to the nearby golf course at 0.265 mgd; Ellore effluent would continue to be applied to two nearby tracts of land at 0.35 mgd.



Wastewater from the MIP would be collected by a gravity line and conveyed to the Goodby's Regional WWTP. The gravity line would be constructed within the SCDOT right-of-way and parallel US 176 (from the northwest to the southeast) until reaching the Goodby's Regional WWTP. The proposed gravity line from the MIP would not cross any wetlands before reaching the proposed WWTP. Wastewater would also be conveyed along US 176 (from the southeast to the northwest) via a force main that would be directionally drilled under Goodby's Swamp.

The associated collection system would include 17 miles of wastewater collection and conveyance lines constructed within the same right-of-way along US 301 from I-95 to Woolbright Road, where the pipeline would diverge from US 301 along Woolbright Road to the WWTP. As the WWTP is actually located on US 176, Woolbright Road is a more direct route than placing the line to the intersection of US 301 and US 176. Collection lines would also follow Tee Vee Road (SC 276) to the Elloree WWTP. The route to the Santee WWTP is still being determined. It is anticipated that all collection pipelines would be placed in existing road rights-of-way and road shoulders, mostly along SCDOT roads. All crossings of wetlands would use directional boring to minimize impacts. If costs for directional drilling over a particular wetland or stream is cost-prohibitive and the limited and temporary impacts are acceptable, US Army Corps of Engineers Nationwide Permit 12 (NWP 12) may be used if all terms and conditions are met (Section 3.5.1) and the USACE concurs with issuing the permit. If possible, such crossings would be constructed during low water to further minimize impacts. The WWTP would not be located in any wetlands and no Clean Water Act 404 permit is needed for the plant. See Appendix A, Exhibit A.5, Appendix B, Exhibit B.13, Appendix C, Exhibit C.14, Appendix D, Exhibit D.5.

Two pump stations connected to the 16-inch force main would be constructed along US 301, one at Providence Swamp at the intersection with Tee Vee Road and one at Woolbright Road, each with capacities of 0.5 mgd and pump rate of 1,150 gpm (See Appendix B, Exhibits B.14 thru Exhibit B.16). The pipeline from the SC 6 pump station would be 11,000 to 20,000 feet of 12-inch force main, terminating at US 301, then 3,000 feet of 16-inch gravity line along US 301 to White Cane Branch pump station to the WWTP. Eight thousand feet of 12-inch force main would leave the pump station at Jafza Park, cross I-95, then connect to 6,000 feet of 16-inch gravity line at the intersection of US 301/I-15 to the White Cane Branch pump station via US 301, where it flows to the WWTP. An interim pump station would be located at Felderville. The 14,000 feet of 12-inch force main connecting to Jafza would have the capacity of 0.5 mgd flow and pump rate of 1,150 gpm. The White Cane Branch pump station would handle the combined capacity of 1.0 mgd from Elloree and Santee transmitted to the WWTP via US 301 and Woolbright Road. The capacities of the White Cane Branch and Felderville pump stations would be 1,600 gpm (0.7 mgd capacity) with 17,000 and 19,000 feet of force main respectively. All pump sites would be in close proximity to road corridors.

Wastewater service would also be provided to Exit 90 on I-95 by the construction of 8,400 linear feet of 12-inch gravity lines, 15,500 linear feet of 8-inch wastewater force main, and one 460,000 gpd pumping station installed in the right-of-way of US 176. In



addition, Exit 93 on I-95 would be served by the construction of 7,500 linear feet of 12-inch gravity lines, 42,000 linear feet of 10-inch wastewater force main, and one 720,000 gpd pumping station installed in the right-of-way of US 210 from US 176. One pump station would be located at the intersection of US 176 and I-95 (Exit 90); the other pump station would be located at the intersection of US 15 and I-95 (Exit 93) (see Appendix B, Exhibits B.14 thru B.16). The potential residential customers of this section of the proposed action would be 123 existing residences near Bush Branch and Providence Swamp.

The treated effluent would then be discharged via underground irrigation piping to upland sprayfields near and outside the confluence of Goodby's and Four Hole Swamp directly east of the WWTP site at the Sanders Pointe Farm effluent discharge site. Approximately 60 acres of upland fields at Sanders Pointe Farm would be used for effluent discharge. This land is practically level livestock pasture and hayfields surrounding the farmhouse and associated personal property. The project site is located adjacent to floodplains or wetlands whose indirect impact will be protected through Best Management Practices (BMPs) required through the contract documents. It has been determined that Sanders Pointe site would have the capacity to dispose of 0.25 mgd, with a study to determine the potential to increase the disposal capacity to 0.518 mgd, which would be sufficient for Phase I. Either additional effluent application land would be needed for Phases II and III, or treated effluent would be provided to tenants of the MIP for industrial process use, substantially reducing the amount of effluent requiring ultimate disposal. It is estimated that proposed use of treated effluent by the Green Energy Holding, LLC biomass electricity generating plant that has been proposed for the MIP (discussed in Section 2.4.2) would reduce effluent disposal needs by 50%.

The disposal site is covered by SCDHEC Water Pollution Control Permits per Regulation 61-9. Five monitoring wells are proposed in the permit for the Sanders Pointe Farm disposal site. Biosolids from the WWTP would be deposited in the Three Rivers Solid Waste facility landfill (letter of acceptance from Three Rivers Solid Waste Authority dated February 6, 2008 (See Appendix C, Exhibit C.16).

The initial permitted WWTP (See Appendix A, Exhibit A.5 and Appendix B, Exhibit B.1 thru Exhibit B.12) treatment capacity of 0.250 mgd is based on that initially approved by SCDHEC for land irrigation rates in conjunction with the No Discharge Permit currently considered for final approval. The final ND permit may include provisions for the total of 0.518 mgd as outlined in *Working Plan for Monitoring Irrigation Rates and Soil Responses* as outlined in the Preliminary Engineering Report (PER).

It is also possible that tenants at the MIP may be willing to use effluent treated to tertiary standards for process water. This is the ultimate intent of Orangeburg County, and, to date, the only potential tenant of the MIP is requesting use of this treated effluent for use in its industrial processes (Section 2.4.2).

After construction of the WWTP, Phase I of the collection system would collect and treat wastewater from the Jafza/Santee area. Then, the collection system would be



constructed for the MIP in Phase II. As the proposed residential developments along the southern shore of Lake Marion develop later, Phase III would collect and treat wastewater from those areas. Development of collection systems along US 176 to the exits on I-95 would be considered as planning, design, and funding become feasible.

In addition to the WWTP and associated infrastructure to serve the intended customers, an elevated water storage tank connected (See Appendix A, Exhibit A.2) to the 12-inch water main recently constructed along US 301 between I-95 and I-26, would be required to supply water to the MIP. This storage tank was approved for funding by the USACE in January 2007 and is designed and ready for construction.

2.4 Wastewater Management Alternatives Not Considered in Detail with Rationale

2.4.1 Use of Septic Systems or On-site Wastewater Storage and Pumping

It is highly likely that potential tenants of the Matthews Industrial Park and developers at the I-95 Exits 90 and 93, I-26 at Exits 159 and 165, or along the US 301 growth corridor would not consider these sites as viable business options if large-scale septic systems or store-pump-haul systems were required. Therefore, these alternatives are not considered in detail. For residential purposes, septic systems are a viable alternative; however once gravity lines with pump stations are constructed in highly localized areas, the cost to each existing homeowner for connecting to the public wastewater system will decrease significantly. Additionally, by allowing residents to connect to the proposed wastewater system, the risk of groundwater contamination becomes significantly less pronounced. This applies primarily to the existing villages at Bush Branch and Providence Creek along US 176.

2.4.2 Construction of Collection Lines from Jafza Park/Santee to the City of Orangeburg DPU WWTP

This alternative would involve the construction of gravity wastewater lines, a wastewater pump station, and a wastewater force main to pump wastewater to the existing City of Orangeburg DPU WWTP along US 301. Initially, this was the original plan for serving the MIP in 2005 and is a technically feasible alternative. The existing DPU plant has the necessary capacity to support the needs of the proposed system, but SCDOT had concerns with constructing an 18-inch to 20-inch wastewater line within the ROW of US 301 from its intersection with US 176 to the City of Orangeburg DPU WWTP. Therefore, any pipeline would have to cross undeveloped land, highways and roadways, and several wetlands and traverse residential areas for almost 30 miles, with additional wastewater pumping stations to move the wastewater that distance. Crossing Four Hole Swamp and Goodby's Swamp would either be by cut and trench, with a 50-foot wide de-vegetated area, or directional drilling that would be extremely costly for the required distance.

Connecting the MIP to the City of Orangeburg DPU would cost approximately the same amount as constructing the Goodby's Regional WWTP (approximately \$18



million), without considering the additional cost of pumping from US 176 to the North Fork of the Edisto River. It would be even more costly to pump from the Santee area along US 301 to the WWTP.

Therefore, this alternative was eliminated from consideration.

2.4.3 Santee, Elloree, and Orangeburg County Expand Individual Municipal Wastewater Infrastructures

Under this option, each major municipality would develop individual wastewater infrastructure to serve new developments within the planning area. Prior to the Jafza Park requesting wastewater service, this approach may have been the most feasible. However, Santee and Elloree both requested assistance from Orangeburg County in developing wastewater infrastructure to support growth of new residential, commercial and industrial facilities that may be developed in conjunction with the 1,324-acre Jafza facility. Both towns currently use land application approved by SCDHEC, and both have had difficulty in finding additional suitable land for expanding their land application options. Suitable streams to receive discharge of treated wastewater in the area would not be approved by SCDHEC due to proximity to Lake Marion.

The Santee WWTP capacity is 0.713 mgd, which does not provide sufficient capacity to treat the expected 0.5 mgd volume expected from Jafza Park. The Elloree WWTP capacity is 0.28 mgd, which does not have sufficient capacity to treat the additional 0.5 mgd from proposed residential development along the southern shore of Lake Marion. Both WWTPs would require additional treatment lagoons and additional land for effluent disposal. Therefore, the costs have been determined by the governmental entities to be prohibitive and, to date, obtaining additional land for effluent disposal has not proven feasible.

This strategy would also require approval under SCDHEC Interbasin Transfer of Water Permitting Regulation 121-12 for transferring water from the Santee River Basin to Edisto River Basin. This is required because the LMRWA water system draws water from Santee River Basin, would then supply water to Orangeburg County. Orangeburg County would then supply potable water to the MIP. The wastewater would then be conveyed to the City of Orangeburg DPU WWTP, which discharges wastewater effluent into the North Fork of the Edisto River. Interbasin transfers can affect the overall ecology, natural beauty, fish populations, and in some cases, may potentially change the interface of the river basins with the Atlantic Ocean.

Santee, Elloree, and Orangeburg County believe that by pooling their resources and developing a regional wastewater system for supporting industrial, commercial, and residential development, a scale of economy can be achieved that may not be possible with each agency developing its own infrastructure. This alternative is therefore not considered in detail because of high estimated construction costs for expansion of individual wastewater systems, potential environmental impacts associated with interbasin transfers of water, and considerably high operational and maintenance costs of pumping wastewater approximately 28 miles across Orangeburg County.



2.4.4 Discharge of Treated Effluent to Surface Waters

Assuming the Goodby's Regional WWTP is constructed, this alternative considers discharging the effluent to surface waters rather than to the Sanders Point Farm effluent discharge site. The only adjacent surface waters available for discharge of effluent created by the Goodby's Regional WWTP would be Four Hole Swamp and Goodby's Creek. Four Hole Swamp is on the SCDHEC 303(d) list as impaired for mercury and fecal coliform and Goodby's Swamp is listed as impaired for macroinvertebrates and fecal coliform. Before SCDHEC would grant a surface water discharge permit, the antidegradation provisions of SCDHEC's water pollution control permitting regulation 61-9 must be met, which requires a more detailed investigation regarding possible acquisition of additional land application sites, if available, before granting a permit for surface water discharge. It is highly unlikely that SCDHEC would grant surface water discharge for effluent from the Goodby's Regional WWTP.

Therefore, this alternative will not be considered in detail.



3.0 ENVIRONMENTAL CONSEQUENCES AND AFFECTED ENVIRONMENT

3.1 General Description of the GLT and LMWRA Area (Affected Environment)

The area within which the proposed Goodby's Regional WWTP is located (the GLT) is in the southern part of the Atlantic coastal plain. This area is characterized by meandering rivers, streams, wetlands, and Carolina bays through flat rural agricultural and timber lands (See Appendix B for maps to support these descriptions). The existing and proposed public water and wastewater projects encompass a five-county area (LMWRA service area), and the Goodby's Regional WWTP and associated infrastructure are entirely within Orangeburg County (See Appendix B, Exhibit B.2, and Exhibit B.8). Calhoun County is located in the upper and middle coastal plain and occupies approximately 380 square miles (about 241,000 acres) with a population of 15,185 people. Clarendon County is located in the middle coastal plain and occupies approximately 600 square miles (about 383,000 acres) with a population of 32,502 people. Dorchester County is in the Atlantic coast flatwoods area, encompassing approximately 570 square miles (364,000 acres) with a population of 96,413 people. Orangeburg County is located in three coastal plain provinces and occupies approximately 1,100 square miles (704,000 acres) with a population of 91,582 people. Berkeley County, the southernmost county in this area, occupies approximately 1,228 square miles with a population of 142,651 (all population data from the 2000 U.S. Census included in Appendix F, Exhibit F.29).

The average annual maximum temperature is 76°F and the average annual minimum temperature is 52°F. Rainfall averages 48 inches annually, with the heaviest occurring in the late summer and early fall months. The prevailing winds are predominantly from the southeast however, the prevailing winds in autumn are northeast. The surface waters in the greater GLT area include freshwaters located in the southern portion of the Pee Dee watershed, the central portion of the Catawba-Santee watershed, and central/southern portion of Edisto watershed. The surface waters for the GLT itself (including the Goodby's Regional WWTP service area) include only the Edisto and Santee watersheds (See Appendix A, Exhibit A.2, and A.3 for watershed boundary).

Some of the more common mammals frequenting the area include the white-tailed deer, fox, mink, muskrat, opossum, and the otter. Other possible mammals included the rabbit, raccoon, skunk, gray squirrel and American beaver.

The common fish species in Lake Marion and/or creek areas include channel catfish, largemouth bass, striped bass, American shad, blueback herring, pumpkinseed sunfish, redbreast sunfish, redbfin pickerel, and white sucker. Other fish species include minnows, shiners, chubs, and carp.

The birds and waterfowl likely found in the area are the great blue heron, the Canada goose, wood duck, mallard duck, mourning dove, wild turkey, wintering loons, red-tailed hawk, and Cooper's hawk. Other birds included a variety of warblers, songbirds, and other neotropical migratory birds.



The various reptiles and amphibians that can be found include the American toad, Fowler's toad, bullfrog, southern leopard frog, green anole, five-lined skink, common snapping turtle, eastern box turtle, and the eastern painted turtle. Other reptiles include the rat snake, black racer, and the common garter snake.

The plants most likely to be found in the area include the bald cypress, pond pine, longleaf pine, loblolly pine, swamp cottonwood, yellow poplar, water tupelo, and the sweet gum. Understory plants include broomsedge bluestem, giant cane, rabbit tobacco, ferns, honeysuckle, and various other annuals and perennials (See Appendix D, Exhibit D.3 and D.4, and Appendix C, Exhibit C.13)

Further details are found at the beginning of the impact analysis area for each resource.

3.2 Analysis of Potential for Induced Growth

3.2.1 Context of Analysis

Issues are impacts (synonymous with "effects" and "environmental consequences") to identified resources that may occur if the proposed action were to be implemented. These impacts to identified resources need to be considered during the evaluation of the proposed action and for development of mitigation plans. Issues are cause-and-effect relationships that define the specific resources, in time and space, which will be analyzed for adverse and beneficial impacts. The CEQ regulations (40 CFR §§1508.7-1508.8) define direct, indirect, and cumulative effects as the following:

- Direct effects, which are caused by the action and occur at the same time and/or place.
- Indirect effects, which are caused by the action and are later in time and farther removed in distance, but are still reasonably foreseeable. Indirect effects may include growth inducing effects and other effects related to induced changes in the pattern of land use, population density, or growth rate, and the related effects on air and water and other natural systems, including ecosystems.
- Cumulative impacts, the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.

It is important not to confuse *actions* that cause direct impacts to a particular resource, (whether those actions are a component of the proposed action or alternative, or actions taken in response to the proposed action by other entities) with the indirect *impacts* on those resources. Generally, the effects caused by specific actions induced by



proposed Federal actions in time and space would be incorporated into the cumulative impact analysis for each resource as appropriate, as they are in this EA.

3.2.2 Proposed Strategy for Consideration of Cumulative Impacts and Effects Related to Induced Growth

The issues evaluated in this EA are based on data and information available to date and the assumptions described below. Each resource issue evaluated in detail may be directly or indirectly impacted by just the proposed project itself (Goodby's Regional WWTP) or cumulatively impacted by the proposed WWTP and collection systems and other actions over time (past, present, and reasonably foreseeable future actions). The cumulative impact analyses in this EA focus on the Goodby's Regional WWTP and other existing and proposed public water and wastewater systems, and the potential impacts of actions that might be induced by these systems. In addition, the cumulative impact analyses include limited available information for the Jafza Park, the only proposed tenant for the MIP (the biofuels plant), and the proposed residential developments on the south shore of Lake Marion (Lakewilde and Blackwater developments; Section 2.2.5)

In some cases, such as for federally listed species, the resource is already adversely impacted by many actions unrelated to the proposed action taken over time and throughout the species' ranges, and actions related to the proposed WWTP and collection system may or may not add to those impacts. In other cases, such as potential for discharge of pollutants into adjacent wetlands from, let's say, land application of effluent, the accumulation of pollutants over time when added to existing nutrient and pollutant loads in groundwater may create a cumulative impact on the quality of the water. Growth induced by the existing and proposed water systems and the proposed WWTP and collection and conveyance system, especially along roadways between intersections and at proposed interchanges, may also contribute to adverse cumulative impacts on certain resources.

Each issue is evaluated in terms of site-specific impacts that have been identified in existing engineering and other reports associated with documents prepared in compliance with NEPA for the existing and proposed water and wastewater systems in the area, as well as the NEPA documents themselves and independent information. This approach provides for a comprehensive evaluation of the potential for cumulative effects on each resource.

This section describes and evaluates the potential for the existing and proposed water and proposed Goodby's Regional wastewater system to induce commercial, industrial, and residential growth outside of designated industrial/commercial growth areas (MIP, Jafza Park, and identified interchanges on I-26 and I-95). As clearly described in Chapter 1, the regional water systems and the wastewater system for the Town of Bowman are intended to facilitate and support growth at the designated industrial/commercial sites (Exits 159 and 165 on I-26), and support existing residential areas. Only limited capacity would be available to support new residential growth in and adjacent to existing municipalities and industrial growth outside of the designated sites.



The proposed Goodby's Regional wastewater treatment plant and associated collection and conveyance pipelines are intended to facilitate the development of industrial and commercial uses at the Matthew's Industrial Park and Exits 90 and 93 on I-95, and supplement the capacities of the existing systems managed by the Town of Elloree for proposed residential development along the southern shore of Lake Marion and by the Town of Santee for the Jafza Park. Therefore, the primary concern with the proposed Goodby's Regional wastewater system is the potential for inducing growth along the roadways in between the intended service sites, especially along US 176, SC 267/US 15 from US 301 to I-95, and SC 210 (Vance Road) from US 176 to US 15. The concern for development along US 301 is not as strong, as this area has a high potential for commercial development in support of both the MIP and the Jafza Park and is a major connector between I-95 and I-26 on the northern boundary of the GLT. Replacement of old and failing on-site septic systems is an additional benefit, but this opportunity is extremely limited for the Goodby's Regional wastewater system because the wastewater system is not intended to support new residential growth outside of the designated industrial areas.

3.2.3 Assumptions for Predictions of Baseline and Induced Growth

The following assumptions provide the basis for the analysis of potential growth that would occur regardless of the provision of water and wastewater infrastructure in the area, as well as any development that could potentially be induced by the infrastructure. As each of the public water projects are part of the larger LMWRA and the Goodby's Regional and Town of Bowman wastewater projects contribute to the economic development of the GLT area, it is important to evaluate the potential to support intended and induced growth and the contribution of this intended and induced growth to cumulative impacts on resources within the area.

The overarching assumption is that developing wastewater systems is more difficult than developing water systems, especially with the LMRWA water treatment plant constructed and in operation on the south shore of Lake Marion; therefore, wastewater is the limiting factor for restricting industrial/commercial and, to a lesser degree, residential growth. Generally, people considering moving into rural areas do not perceive lack of public wastewater service as a limiting factor, as long as the soils support on-site septic systems as permitted by SCDHEC.

In the past, South Carolina's goal was to attract heavy industry based on the state's characteristically low taxes, inexpensive land and power, and management-favored labor policies. However, international trade agreements and related "off-shoring" of manufacturing have undermined South Carolina's campaign to attract and retain industrial plants. Current policies promote the value of the state's skilled and productive work force.

South Carolina is now being recognized for its logistic strengths for warehousing and distribution businesses because of the low cost of land, access to intermodal transportation routes (interconnected highway, rail, and large deepwater ports), and proximity to East Coast markets. Within 1,000 miles, distribution companies have access



to 35 states and roughly 75% of the total US population. Many companies are also electing to keep several weeks of inventory on hand, rather than several days of inventory (the "just in time" approach), which requires an increased reliance on logistically-effective warehouse and distribution centers.

Container volume to the deep-water Port of Charleston is expected to increase substantially after the year 2014 when the Panama Canal widening project is completed and the canal can support larger Panamax cargo ships. Proximity to the large ports that will serve these larger cargo ships will make industrial and distribution/warehousing industries in the GLT more viable.

3.2.3.1 Assumptions Regarding the Geographic Scope of the Intended and Induced Growth Analysis Area

- The LMRWA regional water system is intended to serve the five-county area encompassing portions of Orangeburg, Dorchester, Clarendon, Berkeley, and Calhoun counties. The expansion of the public water service provided by the LMRWA focuses on areas identified as priorities by the various municipalities, especially areas designated for industrial/commercial development and residential areas within and adjacent to municipal boundaries. The Lake Marion Regional Water Agency Distribution System Master Plan Map is included in Appendix A, Exhibit A.8.
- Crossing Lake Marion with water distribution pipelines to serve towns like Summerton and Manning north of Lake Marion in Clarendon County will be extended into the future (primarily because of cost) and will not be considered within the scope of this analysis.
- Crossing Lake Marion from the south with wastewater collection pipelines is neither practical nor cost-effective, and those areas will most likely be served by Clarendon County and therefore will not be considered within the scope of this analysis.
- The geographic scope of this analysis will include portions of Orangeburg and Calhoun County on the south side of Lake Marion, including the towns of Ellore, Santee, Holly Hill, Bowman, Branchville, Vance, and Eutawville in Orangeburg County, generally considered within the scope of the Global Logistics Triangle.
- Any provision of wastewater infrastructure to the I-26/I-95 interchange will most likely come from the Dorchester County system, not the Orangeburg County system (which includes the Goodby's Regional WWTP) and therefore will not be included within the scope of this analysis. However, the LMRWA, through Orangeburg County, could probably provide water to the interchange more quickly than Dorchester County could, as the closest connection to the Orangeburg County system is only 3 or 4 miles away and the elevated water



storage tank assists with water service to the interchange. Therefore, providing public water to this area is included within the scope of the analysis.

- The Bowman system expansions would provide water and wastewater to facilitate site-specific commercial development at I-26 only at the interchanges at Exits 159 and 165, and would not be extended further along I-26 in any direction. This is partially due to cost and partially due to the lack of road infrastructure for installation of pipelines in rights-of-way. Therefore, only public services to the two exits are included within the scope of the analysis. The expansion of both water and wastewater would also serve residences and limited development within and adjacent to the Town of Bowman municipal boundaries.
- Orangeburg County has no plans to extend wastewater collection infrastructure to the City of Orangeburg DPU wastewater system for the reasons stated in Section 2.3. Orangeburg County also has no plans to connect the Town of Bowman wastewater system along Homestead Road to the Goodby's Regional WWTP because of the expense associated with the need to cross Four Hole Swamp. However, the County could foresee wastewater connections along SC 6 to Vance, as well as the proposed expansion of service via the Goodby's Regional wastewater system to Santee and Elloree to serve existing communities and residential development.
- SCDHEC (letter to USDA-RD dated March 23, 2010, included in Appendix C, Exhibit C.15) has "expressed support for public sewer expansion in three areas of Orangeburg County: The Edisto Drive area [note: this area is outside the scope of this EA], the Town of Bowman area, and the Town of Vance area. All three areas have marginal soils that are challenging for septic tank systems to perform properly. In addition, our office has experienced a history of complaints involving very old septic systems in these areas that have failed over time. We therefore support any resources that can be directed towards the expansion of a public sewer system to serve in these impacted areas." As stated in the previous assumptions, this analysis assumes that Vance would be served by public wastewater via the Goodby's Regional wastewater system and the Bowman wastewater system is already in the planning process and therefore both areas are within the scope of this analysis.
- The proposed water distribution loop system extending off US 15 north of its intersection with Vance Road (SC 210) serves existing residences in older communities. Orangeburg County does not intend to supply public wastewater infrastructure to these residences, requiring continued dependence on on-site septic systems. Therefore, this will not be included within the scope of the analysis.
- Orangeburg County has no plans for extending wastewater between US 301 and the existing water and wastewater pipelines on SC 267 (Tee Vee Road) serving the Lake Marion High School. The high school is served by the



Santee water and wastewater systems. This area is primarily rural farmland. The existing infrastructure to the high school is sized for the school and a limited number of existing residences and therefore does not have the capacity to encourage or facilitate new residential development along Tee Vee Road from US 301 as far as the high school. Orangeburg County does not foresee expanding this system to support residential development in the future, based on priorities, current trends, and environmental constraints caused by Providence Swamp and White Cane Creek. Therefore, this will not be included within the scope of the analysis.

3.2.3.2 Assumptions Regarding the Actions Included in the Scope of the Intended and Induced Growth Analysis

- All the existing and proposed expansions of the LMWRA public water systems are included within the scope of the induced growth analysis.
- Existing wastewater systems at Bowman, City of Orangeburg, Ellore, and Santee will remain in operation, with supplementation of the Ellore and Santee systems by the Goodby's Regional WWTP and supplementation of the Bowman system by an expansion of the existing Bowman wastewater system. Therefore, this infrastructure is included within the scope of the analysis.
- The leg of the wastewater system to Ellore to service the proposed residential developments on the south side of Lake Marion in Calhoun and Orangeburg Counties (Blackwater and Lakewilde Plantations) is preliminary, as the potential for development of those sites depends on the local and national economies (considering local employees working at nearby new industrial sites or retirees from out-of-state). Therefore, leg of the collection system serving these proposed residential developments will be a lower priority than providing service to the MIP and Jafza Park.
- The Town of Bowman is connected to the LMWRA regional water system to the north via Homestead Road.
- Two lift stations connected to the wastewater force main proposed along US 176 would most likely be installed near the existing older small low- to moderate-income residential communities on the east and west side of US 176 near Bush Branch and Providence Swamp that have reported failing septic systems, have chronically poor septic system maintenance, and potentially have poor drinking water quality. The lift station at Providence Swamp will also support future development of the two designated interchanges on I-95.

3.2.3.3 Assumptions Regarding Predicted Areas of Residential Growth and Potential for Population Growth

- Currently, outside of towns, the vast majority of Orangeburg County is rural and largely undeveloped except for scattered home sites and small supporting



commercial uses. Concentrations of development occur around Santee, Vance, Eutawville, the City of Orangeburg, and along the southern shore of Lake Marion.

- Projected population growth in the Santee-Cooper Lake Region is at a rate of 2.1% annually, using the current rate of growth based on the 2000 Census and South Carolina Office of Research and Statistics data (See Appendix F) (not considering any increase in population as a result of the construction of the water system). The population located within the localized Goodby's Regional wastewater system project area is estimated to be approximately 41% of the total population of the five-county area, which is 115,700 residents. This is projected to increase to 155,800 residents in 2025.
- Orangeburg County net population increase between 2010 and 2030 is estimated to be 15,550 without Jafza development (2000 Census and South Carolina Office of Research and Statistics data included in Appendix F, Exhibit F.29) and 19,941 with Jafza development based upon the *Jafza Logistics and Distribution Park Design Traffic Technical Report* dated June 25, 2009 - See Appendix I, Exhibit I.1.
- Current rates of population growth of the municipalities under current economic conditions in the areas are relatively low, and most residential growth under current conditions is occurring in unincorporated areas adjacent to existing municipalities. New development in rural areas outside of municipalities depend primarily on new drinking water wells and almost entirely on on-site septic systems.
- Residential growth rates will increase primarily in response to industrial and commercial development in the area, especially associated with the MIP and Jafza Park employment opportunities. Jafza in particular is coordinating with the many local technical and community colleges in the area to provide training and education necessary for the types of employment that would be generated by the Park in order to hire locally as much as possible. Orangeburg County will encourage tenants of the Matthews Industrial Park to do the same.
- The interchange at I-95/SC 6 in Santee, which is connected to both water and wastewater infrastructure, has led to considerable local development because of the large amount of north-south tourist traffic traveling through the area to access Lake Marion. The interchange at I-26/US 301 will likely see increased development activity because of its proximity to the City/County Industrial Park. The County industrial park has attracted five companies since it opened in 1999. Additional mixed-use development, including commercial, residential and other types, is likely to occur along 301 from the interchange to the City of Orangeburg. The interchange at I-95/US 176 has experienced little development due to lack of water/wastewater service and constraints caused by wetlands and hydric soils, causing little of the land to be



developable. The interchange at US 301 and I-95 should see substantial development due to the Jafza Park proposed for that location.

- As stated above, the primary areas of potential residential growth in the area in response to increased employment opportunities are assumed to be the roadways between the designated industrial/commercial points, especially US 176, SC 267/US 15 (Bass Drive) from US 301 to I-95, and SC 210 (Vance Road). The concern for residential development along US 301 is not as strong, as this area has a high potential for commercial development in support of both the MIP and the Jafza Park and out to the County/City Industrial Park, and is a major connector between I-95 and I-26 on the northern boundary of the GLT. US 301 is identified on the Orangeburg County Future Land Use map in the Comprehensive Plan as residential/mixed use, so the County plans for development along this route. US 301 already has water distribution pipelines in place and only minor concerns with wetlands and water quality. This highway crosses narrow portions of Providence Swamp and its tributary of White Cane Creek, and small isolated wetlands elsewhere along the corridor. Commercial development along US 301 is also constrained by hydric soils and wetlands associated with Providence Swamp, Four Hole Swamp, and Goodby's Creek. The opening of I-95 in 1969 had a detrimental effect on commercial activity along US 301, as hotels, restaurants, and service stations serving tourist traffic closed in favor of establishments at the I-95/Santee interchange and Santee receiving increased tourist business. It should be possible for this highway to accommodate a mix of residential, commercial and some industrial uses, if development is properly sited and planned. Residential development along SC 210 is also constrained by Providence Creek. The south side of US 176 is highly constrained by Four Hole Swamp and its associated tributaries and wetlands.
- Residential development along US 176, SC 210, and US 15 is also constrained by Orangeburg County zoning and planned future land uses except near intersections with the interstate highways. Most of the area is zoned Forest and Agriculture along these roads, and the Orangeburg County Future Land Use map shows the area remaining primarily Agriculture/Forest land. Only US 301 and its intersections with major highways are planned for Industrial/Mixed Use and Residential/Mixed Use.
- US 15 north from its junction with SC 267 already has small older communities associated with agricultural lands and timber stands (and a Carolina bay that is apparently managed for silvicultural purposes) and does not have the wetland constraints of the northern Tee Vee Road area.
- The Santee area, including Vance (which serves as the crossroads between Santee, Eutawville, and Holly Hill), should experience additional residential and some service commercial development continuing south along SC 210,



particularly as the interaction between the Santee area and the City of Orangeburg increases. As growth continues in the corridor along the southern shore of Lake Marion, there should be expanded development. This development is expected to be mainly a mix of residential and service commercial around Eutawville, primarily attributed to increased tourism and sports activities (which does not involve increases in population), which is likely to continue eastward of Eutawville as it has in recent years. Increases in retirement communities along the south shore of the lake is also expected to occur.

- Commuters to the MIP and Jafza Park would most likely be clustered around the Towns of Ellore and Santee, unless property values in that area near the Lake increase substantially. Some commuters may choose to live along US 301, depending on the other land uses that develop there, in Vance, or even Clarendon and Dorchester Counties. For those living to the south, the main commuting routes would most likely be US 301, US 176 and, possibly SC 210. It is also possible that commuters may use I-95 and I-26 to a lesser degree.

3.2.4 Land Use Ordinances and Their Role in Controlling Growth in Orangeburg County

Audubon South Carolina expressed concerns during public involvement for the Goodby's Regional wastewater system regarding protecting the water quality of Four Hole Swamp from sediment and pollution that might be caused by development near the swamp and its tributaries. Their concern is localized to the areas along SC 210 and US 15, and especially along US 176, which parallels Four Hole Swamp between US 301 and I-95. All these roads cross tributaries to Four Hole Swamp, including Providence Swamp (See Appendix B, Exhibits B.6, and B.13,). This concern has resulted in the following analysis of land use and development controls in Orangeburg County and what additional controls may be needed for specific areas within the GLT.

3.2.4.1 Assumptions Regarding Land Use Control

Orangeburg County has recently implemented land use and zoning plans and ordinances to manage the extent, type, and location of industrial/commercial and residential growth. These plans have designated specific areas for industrial/commercial growth within the much larger area designated as agricultural. The existing County/City Industrial Park at the intersection of I-26 and US 301, the actively-marketed Matthews Industrial Park at the intersection of US 301 and US 176, and the Jafza Logistics and Distribution Center at the intersection of I-95 and US 301 provide a strong basis for concentrating industrial development in areas readily served by water and wastewater infrastructure. Appendix A, Exhibit A.9 illustrates Orangeburg County's Future Land Use and Appendix H includes Orangeburg County's Comprehensive Plan.



Any new development in areas served by either water or wastewater infrastructure or both would be required by SCDHEC to connect to the infrastructure. New residential subdivision development would be required to adhere to the Orangeburg County Land Use Planning ordinances and, where available, would be required to connect to existing public water and wastewater infrastructure if connections are cost-effective. Such connections to infrastructure would be at the expense of the developer, with operation and management of the public portion under the authority of Orangeburg County. Regarding cost-effectiveness, SCDHEC considers factors such as soil suitability for on-site septic systems or on-site alternative treatment systems, need to acquire easements, whether connections would require boring under existing roads, and other factors on a case-by-case basis.

Existing residences could choose whether to connect to public wastewater and water systems.

In areas not currently served by infrastructure, SCDHEC regulations would regulate the approval and installation of new on-site drinking water wells and septic systems. Residences outside of service areas would continue to use on-site individual septic systems and unregulated private wells.

Orangeburg County would limit the number of interconnections with the wastewater force mains and water lines in the ROWs of US 176, US 15, and SC 210 to both control the operating efficiencies of the wastewater force main and to control unplanned growth along these two-lane roads. Any such requests for connections would be reviewed through the Orangeburg County Review process on a case-by-case basis.

The designated land use in the GLT area is primarily Forest and Agriculture (FA) along US 301, US 176, US 15, and SC 210. However, the Orangeburg County Comprehensive Plan Future Land Use map (See Appendix A, Exhibit A.9) identifies US 301 and its intersection with I-95 and I-26 as Commercial/Mixed Use and Industrial/Mixed Use. US 176, US 15, and SC 210 are still identified as Agriculture/Forest land. Therefore, it is expected that future development of US 176, US 15, and SC 210 would remain agricultural in nature with limited residential use. Any larger-scale proposed residential uses are prohibited by the current designation and would be subject to Section 7.4 of the Orangeburg County Zoning Ordinance and restrictive covenants as stated in Section 3.2.4.

Exit 93 on I-95 is currently designated as Commercial General. Exit 90 on I-95 is currently designated as Agricultural/Forest land; however, Exit 90 is also planned for future commercial/mixed use by Orangeburg County planning officials and will require a zoning waiver for such use.

3.2.4.2 Existing Orangeburg County Land Use Ordinances

The Orangeburg County Comprehensive Land Use Plan and associated zoning and development ordinances control the development and use of land within the county. These ordinances and plans provide the necessary framework for developing binding



covenants for controlling induced growth and potential associated development sprawl within this rural agricultural area.

The framework provided by the county land use plan, zoning and development ordinances includes the following restrictions that were used for developing the language of the binding covenants. Orangeburg County commits for further defining the restrictions in relation to the Goodby's Regional wastewater system through a proposed binding covenant, which would be instituted as part of either the USDA RD loan agreement or the USACE Project Partnership Agreement (Section 3.2.4.4). The following items were a basis for the covenant that is intended to control induced growth on undeveloped forested and agricultural lands in the GLT:

1. All possible agricultural uses are permitted under the FA (Forest and Agriculture) Zoning Designation.
2. Section 7.4 of the Zoning Ordinance, page 88, Paragraph 2 indicates that: "As many as five residential uses may be permitted on a lot in the FA."
3. Section 2.4 Table 2 [of the ordinance] allows only "small subdivisions" in FA-zoned properties, and those properties can be no less than one acre in size. A maximum impervious area of only 15% is permitted on each lot.
4. Section 36-83(j) on p. CD36:14 of the Subdivision and Land Development Regulations designates a "small subdivision" as:
 - a. Contains no required new roads or changes to existing roads
 - b. Resultant lots all have legal access
 - c. Has no new [stormwater] drainage, water, or sewer system
 - d. Is no larger than 10 acres in size and contains not more than 5 lots.
5. Section 36-125 (a) on page CD36:22 of the Subdivision and Land Development Regulations states that the general standards for lots include:
 - a. All lots shall have direct access to and frontage on a public or private street unless a specific variance is granted by the planning commission.
 - b. Lots facing or backing on a major thoroughfare or backing on a railroad shall have a minimum depth of 150 feet.
6. Section 36-127 (a, c) on page CD36:24 of the Subdivision and Land Development Regulations has the following requirements for water and sewer systems:
 - a. When a proposed subdivision or development lies adjacent to or near an existing public or private community water and/or sewer system, the subdivider or developer shall be required to service the subdivision with this system, provided that the public or private agency having authority over the system has agreed to provide service.



- b. Sanitary waste disposal and/or water supply systems shall be installed according to plans approved by both the waste disposal [authority] and the State Department of Health and Environmental Control. Public water mains and fire hydrants shall be of ample size and in no case smaller than six inches.

All proposed development must be reviewed and approved by the Orangeburg County Planning and Land Use Office, which involves a zoning review, a review by the E-911 Addressing Office (the authority for ensuring that all valid addresses are recorded for effective emergency response), an environmental review, and a permit from the County Building Official. If a subdivision is proposed, it must also have review and approval by the Orangeburg County Planning Commission.

To better understand the restrictions regarding the number of residences allowed per lot (Section 7.4 of the Orangeburg County Zoning Ordinance), it is necessary to understand the technical requirements regarding how the size of wastewater lines controls the number of residences that can be supported by a collection and conveyance system. The smaller the diameter of the pipeline, the fewer number of residences that can be supported by the pipeline. Therefore, the diameter of the pipeline is an effective control on the level of development that can be supported in an area. The following pipeline diameters can support the associated residential densities per lot:

- For wastewater, a 6-inch gravity-fed wastewater tap-in can provide adequate capacity to serve the demands of up to five combined residential service connections (assuming 1,500 gpd wastewater; 300 gallons/residential unit/day) on the same lot at the proper slope, whereas a 4-inch wastewater service would not be sufficient for a 1,500 gpd average wastewater demand.
- For water, a 1.5-inch water tap-in provides five times the volume of flow than a ¾-inch line (which is the smallest line for a single residence) provides and has adequate capacity to serve five combined residential service connections.

Orangeburg County protections for wetlands and floodplains are addressed by the Orangeburg County Flood Damage Prevention Ordinance (See Appendix E, Exhibit E.22, 2009-07-20-05) and incorporated into this proposed action through county ordinance and mitigation measures in Section 3.2.4 and Chapter 4 of this EA.

Therefore, land shown in the Comprehensive Land Use Plan - Future Land Use Map as agricultural and forested land will be protected through existing regulations shown above. These include restrictions on future public infrastructure extensions, a restriction on developed impervious area to no greater than 15% of the total developed area, and a restriction on new subdivisions no greater than ten (10) acres in size. Secondly, Orangeburg County has a multi-step building review process to enforce County regulations. Furthermore, subdivisions may only be 5 parcels or less, with each parcel no smaller than 1 acre in size. Additionally, Orangeburg County is committed to limiting growth outside of planned urban areas by the use of a binding covenant (Section 3.2.4.4). This will limit any service connection to no greater than 1,500 gallons per day



via grinder pump and force main, or a 6-inch gravity wastewater service and will deter induced growth and indirect impacts to existing forested and agricultural areas in the GLT.

3.2.4.3 Existing Covenants for Water and Wastewater Systems in Orangeburg and Calhoun Counties

Previously, Orangeburg County has agreed to the following binding covenants for the Town of Bowman and Orangeburg County Regional Water System Expansions that have been approved by USDA-RD as part of the loan guarantees for these systems, setting clear precedent for a binding covenant for the Goodby's Regional wastewater system to control induced growth:

In an effort to mitigate indirect impacts on important farmlands in accordance with FPPA, Orangeburg Co. Water and Sewer Authority and Town of Bowman are willing to enter into binding covenants and/or agreements that limit tap size of potential customers to a minimum of 1.5 inches per lot within areas designated as Agricultural/forest land (FA) use as zoned in the Orangeburg County Comprehensive Land Use Plan through a binding covenant at the time of execution of the Letter of Condition of the USDA Loan Guarantee. This would not include future lot splits under the "small subdivision" provision of Section 36-83(j) of the Subdivision and Land Development regulations. As five residential uses are permitted per lot size per the current Orangeburg Co. Zoning Ordinance, the proposed water tap limit size was derived to support continued agricultural uses that would support up to 5 residential taps per lot based on equivalent line size of approximately five ¾-inch residential taps or one 1.5-inch tap. Furthermore, subdivisions within areas shown as Agricultural in the Comprehensive Land Use Plan that do not qualify as a "small subdivision" in accordance with Section 36-83(j) of the Orangeburg Co. Subdivision and Land development regulations shall still be considered one lot with regards to this restriction and be limited to 1.5-inch for the entire proposed subdivision. Further, Orangeburg County Water and Sewer Authority will affirm and adhere to the Orangeburg Co. Comprehensive Land Use Plan as it pertains to these proposed water improvements and their respective corridors. It should be noted that the Orangeburg Co. Comprehensive Land Use Plan includes protection and preservation of farmlands as one of its goals in order to preserve the rural agricultural nature of Orangeburg Co. The above tap restriction shall not apply to Planned Development Uses (PUDs) identified in the Orangeburg Co. Comprehensive Land Use map. Additionally, the customer tap restriction will be waived for all businesses that support agricultural practices and for all existing industrial sites considered as "prior converted farmlands" due to their land use. The customer tap restriction and compliance with the Orangeburg Co. Comprehensive Land Use Plan will be executed as a binding covenant and/or agreement which will be attached to the USDA-RD Loan Resolution. The customer tap restriction will apply to all Agricultural designated lands shown on



the Orangeburg Co. Comprehensive Plan Future Land Use Map within the service area and along project corridors.

The Calhoun County binding covenant for expansion of the water system to protect Important Farmland states:

As a condition of funding provided by USDA's Rural Utilities Service (RUS) for a project to upgrade the Calhoun County water system, and to mitigate the potential adverse impact of both the project and growth which may follow to prime and important farmland, jurisdictional wetlands and floodplains, Calhoun County hereby resolves the following:

- 1. The county will not provide any taps or services for any new structure that will lie within the designated 100-year floodplain and/or areas recognized as jurisdictional wetlands.*
- 2. To mitigate indirect impact upon soils classified as prime or important farmland, the county will restrict service to new development on classified soils within its water service area. New taps or services made within areas so classified shall be limited to 1-inch or smaller unless (a) the service is to be provided to development which is classified as agriculture, agribusiness or the agricultural processing industry, (b) it can be documented that the property to be served is either already urban development or committed to urban development in accordance to the Farmland Protection Policy Act (FPPA), or (c) approval is granted by RUS.*
- 3. Calhoun County has identified development zones within its service area which comprise areas that are already developed or designated to develop for urban uses such as commercial or industrial purposes. These areas are detailed on the attached service area map and description. The restrictions outlined in number 2 above will not be placed upon developments which area served within the designated development zones.*

Designated Development Zones Description: Development zones designated by Calhoun County and shown on the attached service map area are:

- 1. A corridor from the northern-most Calhoun/Lexington County line to Calhoun/Orangeburg County line 2,500 feet either side of Interstate 26 including all interchanges within Calhoun County.*
- 2. An area along the eastern side of US Highway 176 1,000 feet in width from the Calhoun/Lexington County line to the existing 150,000 gallon elevated tank serving Sandy Run.*
- 3. Five hundred feet either side of US Highway 176 from the end of the area identified in No. 2 above to Murph Mill Road.*



3.2.4.4 Proposed Orangeburg County Binding Covenant for the Goodby's Regional Wastewater System

Orangeburg County proposes the following language for application to wastewater tap-ins related to the proposed Goodby's Regional wastewater system along US 176, US 15, and SC 210 to mitigate indirect impacts with induced growth as a binding covenant in either the USDA RD Loan agreement or the USACE Project Partnership Agreement (PPA):

In an effort to mitigate the indirect impacts on Important Farmlands in accordance with Farmland Protection Policy Act Final Rule, Orangeburg County will enter into a binding covenant that will limit potential customers service connection to a maximum of 6-inch gravity service line per lot or equivalent service of no more than 1,500 gallons per day per lot via a grinder pump and force main service connection in areas with a designated land use of Forest and Agriculture, per the Orangeburg County Comprehensive Land Use Plan. This mitigation will be enforced through a binding covenant at the time of execution of the loan agreement or the USACE PPA, not including future lot splits under the "Small Subdivision" provision in Section 36-83(j) of the Subdivision and Land Development Regulations. As five (5) residential uses are permitted per lot by the current Orangeburg County Zoning Ordinance, the proposed service connection limit size was derived to support continued agricultural uses that would support up to five (5) residential services per lot, and would not allow connections of multiple lots to one service later according to current South Carolina Department of Health and Environmental Control regulations for wastewater distribution lines. Furthermore, subdivisions within areas shown as Agricultural in the Comprehensive Land Use Plan that do not qualify as a "Small Subdivision" in accordance with Section 36-83(j) of the Orangeburg County Subdivision and Land Development Regulations shall still be considered one lot with regards to this restrictions and be limited to 6-inch gravity service line or equivalent grinder pump and force main connection for the entire proposed subdivision. Additionally, Orangeburg County will affirm and adhere to the Orangeburg County's Comprehensive Land Use Plan as it pertains to the proposed wastewater improvements project and their respective corridors. It should be noted that Orangeburg County's Comprehensive Land Use Plan includes protection and preservation of farmlands as one of its goals in order to preserve the rural agriculture nature of Orangeburg County. Additionally, the customer tap restriction will be waived for all businesses that support agricultural practices and for all existing industrial sites considered as "prior converted farmlands" per the Farmland Protection Policy Act. The above wastewater service connection restriction shall not apply to Planned Development Uses (PUDs) identified in Orangeburg County's Comprehensive Plan Future Land Use Map. Additionally, the customer wastewater service restriction will be waived for all businesses that support agriculture practices, for existing subdivisions and structures that have obtained a building permit prior to execution of the restrictive covenant, and for all existing industrial sites considered as prior converted farmlands due to their planned land use. The customer wastewater service restriction and compliance to the Orangeburg County's Comprehensive Land Use Plan will be executed by the



Orangeburg County as a binding agreement and/or covenant which will be attached to either the USDA-RD Loan Resolution or the USACE Project Partnership Agreement. The customer service restriction will apply to Agriculture/Forest-designated lands shown on the Orangeburg County's Comprehensive Plan Future Land Use Map along the project corridors along US 176, US 15, and SC 210.

3.2.5 Potential Growth and Management of Traffic Volumes in the GLT Area

3.2.5.1 Existing State and Federal Highways

Interstate 26 and I-95 are four-lane fully controlled access highways, and US 301 is a four-lane access roadway. I-95 travels north-south through Florence to North Carolina and the Mid-Atlantic States, and south to Savannah, Georgia and on to Miami. I-26 runs north-south, crossing the tri-county region, intersecting with I-95 in the southeastern portion of Orangeburg County near the boundary with Dorchester County, terminating at US 17 in Charleston. I-26 provides a high-speed connection to I-20 and I-77 in Columbia and other points west. US 301 is a four-lane highway that intersects I-95 in the Town of Santee, roughly paralleling I-95 to the North Carolina border. US 301 travels west from Santee to Orangeburg, then runs southwesterly, crossing into Georgia. US 15, a two-lane full access road, crosses over I-95 connecting from I-95/US 301 to parallel I-95 east of the highway outside of the GLT. US 176 (Old State Road) is a two-lane full access rural road that is crossed over by I-95, paralleling I-26 and Four Hole Swamp to the east from south of Columbia to north of Charleston, bisecting the GLT. SC 210 (Vance Road) is a two-lane rural road that crosses over I-26 with a narrow bridge. SC 6 connects the Towns of Vance and Santee and provides access to the southern shore of Lake Marion and the Town of Eutawville to the east. To the west, SC 6 goes through the Towns of Elloree and St. Matthews and intersects with I-26 northwest of the planning area.

The area surrounding the I-26/I-95 intersection is one of the least developed interchanges on the eastern interstate system, primarily because of lack of direct access and major wetlands (30%), farmlands held by families for generations, and lands not suitable for development. Tracts near this intersection are also separated by power lines, roads, or other parcels.

3.2.5.2 Traffic Management during Construction Activities

During placement of wastewater collection lines in road rights-of-way, some minor traffic disruptions, slow-downs, congestion, delays or detours may be required for efficiency and worker safety. However, these problems would be minimized by following the requirements of the SCDOT safety and traffic control plan associated with Encroachment Permits and inserted into construction contract documents. The areas of most concern for the Goodby's Regional wastewater system are secondary two-lane roads such as US 176, SC 210, and SC 267, as the main arteries, such as I-26, I-95 and US 301 can continue to operate with lane closures. Therefore, no further mitigation is



required beyond following the requirements of the approved SCDOT safety and traffic control plan for these three roadways.

3.2.5.3 Potential for Increase in Traffic Volumes on Major Roads in the Study Area from the Jafza Park Development

The primary contributors to increases in traffic during construction and operation, especially truck traffic, would be the Jafza Park; industries locating in the Matthews Industrial Park; and, to a lesser degree, commuter traffic to and from these two locations. Exhibit A.1 and Exhibit A.2 in Appendix A illustrate the location of the Matthews Industrial Park. Exhibits A.1, A.2, and A.4 in Appendix A illustrate the location of the Jafza Logistics and Distribution Park. Any industrial development occurring on the four designated interchanges on I-26 and I-95 serviced with water and wastewater utilities would contribute substantially less traffic.

Officials with the Jafza Park estimated truck and car traffic that would be generated by employees and users of the Park (*Jafza Logistics and Distribution Park Design Traffic Technical Report* dated June 25, 2009 - See Appendix I, Exhibit I.1). These estimates include the following assumptions:

- Background traffic (non-Jafza generated traffic) is expected to increase at 1.5%/year on all main segments (I-95, US 301 and extension, SC 6 and SC210) except I-26 west of US 310 and east of I-95, which is projected to grow at a rate of 2.5%-2.83% annually.
- SCDOT extends US 301 easterly through the center of the Park to SC 6 to improve Park access with an interchange at US 301/I-95 (proposed by SCDOT after 2012 to be ready before the Panama Canal is widened in 2014);
- The original development phases proposed by Jafza International South Carolina are followed; however, with potential delays in extending US 301, the strategy for phasing development of the Park has shifted to using areas accessible by existing roadways, rather than developing from the center out to the boundaries; and
- Use of rail for commercial cargo does not decrease traffic volumes.

The following estimations of Jafza-generated traffic were made by Jafza South Carolina in the *Technical Report* (remaining traffic would be existing and projected background traffic not related to the development of the Jafza Park facility; Tables 2, 4, 5, and 6):

- Jafza-generated PM peak hour traffic out of the site (assuming that truck traffic being 20% and non-truck traffic being 80% of the total) in 2014 (Phase 1A) would increase a total of 82%, and into the site 18%.
- Cumulative traffic for Phase 1C (2020) would increase 76% in and 24% out of the facility (truck and non-truck proportions the same as for 2014).
- Cumulative traffic for Phase 3 (2030) would increase 62% for truck traffic out and 38% for truck traffic in, and 90% for non-truck traffic out and 22% for non-truck traffic into the facility.



Using the Port of Charleston as a model, Table 1 shows the following road segments would get the following inbound/outbound truck and non-truck traffic distributions for Phase IC (using cumulative numbers for Phase IC in 2020) and Phase III (cumulative numbers through 2030, with US 301 extension constructed; Figures 4 through 9 of the *Technical Report*):

Table 1: Projected Jafza-Generated Traffic

| Road Segment | Truck Traffic Inbound Phase IC | Truck Traffic Outbound Phase IC | Truck Traffic Inbound Phase III | Truck Traffic Outbound Phase III | Non-Truck Traffic Phase I/Phase III |
|---------------------------------------|--------------------------------|---------------------------------|---------------------------------|----------------------------------|-------------------------------------|
| I-95 N of site btw SC 6 and US 301 | 83% | 95% | NA | NA | 70%/15% |
| I-95 N of SC 6 | 17% | 5% | 17% | 5% | 10/10% |
| US 301 west of the Jafza site to I-26 | 53% | 54% | 53% | 54% | 25%/25% |
| US 301 west of I-26 to Orangeburg | 12% | 33% | 12% | 33% | 10%/10% |
| I-26 west of US 301 | 41% | 21% | 41% | 21% | 15%/15% |
| I-26 east of I-95 | 25% | 28% | 25% | 28% | 40%/40% |
| I-95 south of Jafza Park to I-26 | 30% | 41% | 30% | 41% | 45%/45% (5% on SC 210) |
| I-95 south of I-26 | 5% | 13% | 5% | 13% | 5%/5% |
| SC 6 east and west of site | NA | NA | NA | NA | 10%/10% |

Truck and non-truck traffic volume distributions were combined with background traffic projections (based on SCDOT 2008 average daily traffic (ADT) from the SCDOT website). Appropriate traffic growth rates were determined after reviewing trend growth rates calculated using historic traffic volumes from SCDOT. The growth rates selected for use generally represent conservative values that are greater than the trends projected using historic traffic counts. The effect of the proposed US 301 extension from I-95 to SC 6 along with the US 301 and I-95 interchange on background traffic volumes in 2030 was estimated using sound engineering judgment based on current traffic patterns and volumes and the anticipated shift in traffic with the proposed roadway improvements.

Table 2 shows the following road segments would get the following inbound/outbound truck and non-truck traffic proportions for Phase IC (2020) and Phase III (2030) (average daily traffic, ADT; Figures 14 through 19 of the *Technical Report*¹). The projected daily volumes equation is the projected background traffic (not bold) plus the projected Jafza-generated traffic (bold) equaling total traffic. These numbers were submitted to SCDOT, who derived the associated Level of Service (LOS) for each road



segment (see FN 2 for traffic volume: roadway capacity ratio values for each LOS). The last column uses SCDOT-generated projected 2030 traffic volumes (June 25, 2009) that were submitted to the SCDOT for generation of associated LOS values.



Table 2: Projected Daily Traffic for Phase IC (2020) and Phase III (with US 301 extension, 2030)

| Road Segment | Projected Daily Volumes Phase IC ¹ /SCDOT Predicted LOS ² | Projected Peak Volumes Phase IC ¹ | Projected Daily Volumes Phase III ¹ /SCDOT Predicted LOS ² | Projected Peak Volumes Phase III ¹ | SCDOT Projected 2030 Traffic Volumes ^{1,3} /SCDOT Predicted LOS ² |
|---|---|--|--|---|---|
| I-95 N of site btw SC 6 and US 301 | 35,001+(2682)=37,683/ LOS B | 1,522+(64)=1,586 | No data | No data | 58,700/ LOS D |
| I-95 N of SC 6 | 35,474+(371)=35,845/ LOS B | 1,496+(26)=1,522 | 40,042+(1,057)=41,099/ LOS B | 1,689+(53)=1,742 | 54,400/ LOS C |
| US 301 west of the Jafza site to I-26 (assuming major arterial) | 13,007+(1,107)=14,114/ LOS A | 701+(81)=782 | 14,682+(3,195)=17,877/ LOS B | 791+(49)=334 | 16,500/ LOS A |
| US 301 west of I-26 | 16,437+(450)=16,887/ LOS B | 886+(9)=895 | 18,533+(1,302)=19,835/ LOS B | 1,000+(18)=1,018 | 26,500/ LOS B |
| I-26 west of US 301 | 54,889+(656)=55,545/ LOS C | 2,211+(45)=2,256 | 65,651+(1,893)=67,544/ LOS E | 2,644+(91)=2,735 | 66,000/ LOS D |
| I-26 east of I-95 | 39,900+(1,366)=41,266/ LOS B | 1,554+(34)=1,588 | 47,832+(3,851)=51,683/ LOS C | 1,858+(65)=1,923 | 76,700/ LOS E |
| I-95 south of Jafza to I-26 | 30,390+(1,576)=31,966/ LOS B | 1,321+(38)=1,359 | 34,303+(4,454)=38,757/ LOS B | 1,491+(74)=1,565 | 43,600/ LOS B |
| I-95 south of I-26 | 45,526+(210)=45,736/ LOS C | 1,967+(5)=1,972 | 51,388+(603)=51,991/ LOS C | 2,220+(9)=2,229 | 64,950/ LOS D |
| SC 6 north of Jafza (assuming 3 lanes) | 8,750+(3,350)=12,100/ LOS C | 476+(82)=558 | 8,203+(411)=8,614/ LOS C | 439+(7)=446 | 12,200/ LOS C |
| SC 6 west of Jafza (assuming 2 lanes) | 4,730+(296)=5,026/ LOS A | 252+(24)=276 | 5,339+(822)=6,161/ LOS B | 285+(49)=334 | 7,000/ LOS B |
| SC 210 btw I-26 and I-95 | 1,478+(148)=1,626/ LOS A | 79+(12)=91 | No data | No data | No data |

¹ Background volume+(Projected Jafza Volume)=Total Volume for all rows/columns

² Level of Service (LOS) indicates the level of congestion on a particular road, as evaluated in terms of the volume to capacity (V/C) ratio: Level A=0-0.49; Level B= 0.50-0.74; Level C=0.75-1.00; Level D=1.01-1.15; Level E=1.16-1.34; and Level F: <1.35. All LOS of Level D or above indicate traffic is above the capacity of the road and congestion would occur. The V/C is determined based on the type of roadway (freeway, expressway, ramps, principal arterial, minor arterial, and collector) and the total number of lanes.

³ SCDOT estimates are generally higher/more conservative based on more regionalized projections



3.2.5.4 Conclusions

Using the Jafza-generated traffic volumes and associated SCDOT-generated LOS capacities as documented in Table 2, the only road segments projected to exceed capacities outside of the GLT, include I-95 between US 301 and SC 6 and south of its intersection with I-26, and I-26 west of US 301 and east of its intersection with I-95.

However, using the Jafza-generated data in Table 1, slightly over half of the traffic on US 301 between I-95 and I-26 would be Jafza traffic. Based on data in Table 1 from the *Technical Report*, it appears that US 301 would have higher Jafza-generated traffic volumes than is indicated in Table 2. Using the total projected traffic volume in Table 2 for this road segment, regardless of the source of the traffic, the worst-case LOS is level B (Phase III projected daily volumes), which is still acceptable. Even assuming that 54% of the traffic on US 301 between I-95 and I-26 was Jafza-generated traffic, the projected daily traffic volumes in Phase IC and Phase III would range between 20629 (Phase IC) and 24,336 (Phase III). These calculations uses 54% of the total daily traffic volumes for each phase, subtracts the traffic volumes already attributed to Jafza, and adds the result to the total traffic volumes. Comparing the resulting daily traffic volumes to the LOS figures calculated by SCDOT for US 301 west of I-26 (Table 2) of 16,887 (Phase IC) and 19,855 (Phase III), each with an LOS Level B, the resulting total LOS for US 301 between I-95 and I-26 on US 301 would not be worse than LOS C, and probably closer to LOS B. Therefore, traffic volumes on US 301 would still be acceptable. Traffic volumes on this segment are expected to decrease substantially with the proposed extension of US 301 through the Jafza Park to SC 6.

The *Technical Report* made the following conclusions based on the information provided in Tables 1 and 2 of this EA:

- Truck traffic into and out of the site is oriented toward the interstate highways with ultimate origins and destinations similar to those of the Port of Charleston (I-95 north and south and I-26 west and east of the GLT, with extremely limited use of US 301).
- I-26 between US 301 and I-95 south of the site would likely not be used by Jafza-generated truck traffic (see analysis above related to Jafza-generated traffic on US 301).
- Jafza-generated non-truck traffic is made up primarily of Jafza employees and is distributed on the entire network based on existing and proposed residential areas (I-95 primarily, with I-26 east of I-95 and US 301 the next heaviest used segments, with lesser use of SC 210 and SC 6 both directions).
- The Jafza Park is projected to generate approximately 2,132 daily external truck trips and 8,215 external non-truck trips for a total of 10,347 external daily trips by the buildout of Phase III (2030).



- The current projected 2030 volumes with Phase III buildout are significantly lower than the previously projected 53,430 daily external trips (2030) due to the extension of the complete project buildout from 2030 to 2050. SCDOT also encouraged Jafza to reconsider their original traffic evaluation to reflect more realistic assumptions, resulting in the June 25, 2009 analyses included in this EA.
- Project Phases 1A (2014), 1B (2016), and 1C (2020) will be accommodated satisfactorily by the existing roadway network. I-26 north of US 301 would be above capacity at full buildout of the Jafza Park.
- Phase III assumes completion of roadway improvements by SCDOT including the extension of US 301 to connect with SC 6 and interchange improvements at I-95/US 301. However, it is probable that the improvements will be completed before 2021.

3.2.5.5 Projected Traffic Generated by Matthews Industrial Park Tenants

Only one potential tenant has expressed interest in the MIP to date, the Green Energy Holding, LLC biofuels plant.

If Green Energy Holding LLC is successful in finding funding and electricity purchasers to the extent that the project is ever considered viable, a projected 30 employees for operation of the electricity generating plant would not cause substantial traffic on US 301 or US 176. Traffic generated by the plant would be primarily 80 trucks per day delivering wood chips 5 days per week, 10 hours per day. Ash from the plant would be stored on-site for approximately 7 days, and then removed to a qualified landfill. The company projects that most truck traffic would use US 301, with US 176 used secondarily, as the trucks would be accessing local timber activities and therefore would not need to use the interstate system. This could potentially add another 20,800 truck-trips annually to the traffic on US 301 and US 176. Although Jafza officials state in the *Technical Report* that Jafza-generated traffic would not use US 301 to a great degree based on Table 2, Table 1 indicates that the use may be greater (see analysis in Section 3.2.6.3). Until the extension of US 301 through the Jafza Park to SC 6 is completed, which would substantially decrease the Jafza-generated traffic volume on US 301 (Table 2), it is possible that traffic volumes on US 301 between I-95 and I-26 generated by both the Jafza Park and Green Energy could be as high as LOS D for a period of time. As Jafza Park truck traffic is not projected to use US 176, there would be no cumulative traffic volume with Jafza traffic on US 176.

As no other potential users of the MIP are known at this time, it is highly speculative to attempt to project traffic volumes contributed by MIP tenants on the local road system and will not be attempted for this analysis.



3.2.6 Conclusions: Potential for Induced Development and Traffic in the GLT Area

Water and wastewater infrastructure has been provided to the Lake Marion High School on SC 267 near its junction with US 15 for approximately 5 years, and no residential development has occurred in this area since then. Using this trend, it is clear that under past and current circumstances, increases in population and associated residential development in the area will be slow and gradual throughout the GLT, primarily occurring in the areas of current clustered residential development in and adjacent to municipalities. Any increase in the growth rate will primarily be in response to increased industrial and commercial development concentrated at the Matthews Industrial Park and the Jafza Park and a potential in-migration of retirees to the area near the southern shore of Lake Marion, all of which are highly dependent on the state of the national economy.

The LMRWA water treatment plant has sufficient capacity to support long-term residential development throughout the study area with existing, planned, or proposed projects, but the size and capacities of distribution pipelines, lack of developable land in areas with major wetlands, and Orangeburg County binding covenants associated with the USDA-RD loan agreement or the USACE PPA, guarantees will limit the extent of such development primarily to the areas adjacent to municipalities, including along the south shore of the lake. Areas outside of service areas will continue to use private wells for drinking water. Existing municipal wastewater systems in Santee, Elloree, and Bowman will continue to serve their existing customers, with little margin for growth without the supplemental capacity provided by the Goodby's Regional WWTP for Santee and Elloree and the proposed expansions of the Bowman system. It is reasonably foreseeable that the wastewater system may be expanded to include SC 6 in the area of Vance, but this is not proposed at this time. The City of Orangeburg DPU WWTP has sufficient capacity to serve current and future needs.

US 301 will most likely experience a mixture of commercial growth to serve the MIP and Jafza Park, with some intermingled residential areas, but is constrained by wetlands associated primarily with Providence Swamp, Four Hole Swamp, and Goodby's Creek. Residential development in the GLT would be most likely in localized areas near existing clusters of residences, the towns of Bowman, Santee, and Elloree, and other smaller towns. Some commuters may choose to access the area on the interstate system from outside Orangeburg County. As the proposed Goodby's Regional WWTP system is intended to primarily serve industrial and commercial growth at sites designated for such use by Orangeburg County (MIP, Jafza Park, supplemental capacity to Elloree and Santee WWTPs, and selected interchanges on I-95 and I-26), most potential residential areas in between the sites would continue to be dependent on on-site septic systems and a mixture of public and private drinking water.

Jafza has committed to hiring locally as much as possible, and is currently working with local colleges to ensure training opportunities critical to the Park and its tenants are available. Therefore, of the 8,000 to 10,000 jobs that may ultimately be available at the



Jafza Park, it is expected that a substantially lower number of employees will require associated housing in and adjacent to the area.

Traffic volumes on regional system roads will continue to increase with the increase in residents in the area. It is expected that tenants at the MIP and the Jafza Park would contribute to higher increases than what would occur naturally, especially in truck and employee non-truck traffic. Traffic increases originating from these two industrial sites would occur mainly along I-95 north between US 301 and SC 6, along US 301 until the US 301 extension to SC 6 is completed, and south of the GLT and I-26 west of US 301 and east of the I-26/I-95 intersection. SCDOT projects that these interstate highway segments (I-95 and I-26) would exceed road capacity in out-years, especially using SCDOT's more conservative traffic projections (Table 2). It is possible that, with Jafza- and Green Energy-generated traffic combined on US 301, that LOS level could be between LOS C and LOS D until the US 301 extension is completed, which would draw a substantial volume of Jafza-generated traffic off of US 301.

Commuter traffic would use all system roads, depending on residential development patterns, but this use is not anticipated to stress capacity of any of the roads within the GLT. Jafza Park officials estimated that current system roads had sufficient capacity to support the background and site-generated traffic through 2025 when an extension of US 301 east through the Jafza Park to SC 6 would increase the road capacity to support buildout of the Park. Upon final buildout of the Park in 2030 (Phase III), Jafza-generated traffic would be a small proportion of the total traffic on systems roads; therefore, the segments of I-26 and I-95 that would exceed capacity would exceed that capacity with background, non-Jafza-generated traffic (see Table 2). Background traffic will be the major contributors to predicted congestion (LOS of D or E) on the following segments:

- I-26 west of US 301, Jafza-generated traffic would make up 2.9% of the total traffic
- I-95 south of I-26, Jafza-generated traffic would make up 1.2% of total traffic
- I-26 east of I-95, Jafza-generated traffic would make up 7.5% of total predicted traffic
- I-95 between SC 6 and US 301 north of the Jafza site, Jafza-generated traffic would make up 3.6% of the total traffic

At this time, it is highly speculative to estimate traffic that would be generated by the MIP beyond that projected for the biofuels plant, as the MIP is relatively new and Orangeburg County is in the early stages of marketing its resources to potential tenants. The MIP also requires the wastewater infrastructure that would be provided by the Goodby's Regional WWTP to support potential industrial tenants.

Therefore, industrial and commercial development will most likely be concentrated within areas designated by Orangeburg County, and residential development will most likely be gradual, localized around existing municipalities directly in the vicinity of roads



where lots have legal access to existing roads (no new roads for small subdivisions per county ordinance), and mostly in response to development of the MIP and Jafza Park as these sites work toward build-out over the next 20 to 40 years. Residential growth will be constrained by:

- Tap-in size of both water and wastewater pipelines, based on binding covenants made by Orangeburg County to USDA-RD as part of its loan guarantees within the framework of its zoning and development ordinances and Comprehensive Land Use Plan,
- SCDHEC policy of disapproving development and on-site septic systems that would adversely affect wetlands or that would have unsuitable soils;
- Buffers required by Orangeburg County Subdivision ordinances, state regulations, and CWA Section 404 regulations regarding discharge of fill material into wetlands.

Traffic generated by industries at the MIP and Jafza Park would not contribute substantially to the background traffic projected for the roads within the GLT, including I-95 and I-26. The heaviest traffic (both background and industry-generated) would be on I-95 and I-26 outside of the GLT, and background traffic would be the primary reason for exceeding roadway capacities (Table 2). Based on analysis in Sections 3.2.6.3 and 3.2.6.4, it is possible that US 301 could reach LOS levels ranging from LOS C to LOS D, both acceptable levels, with combined background and Jafza and Green Energy average daily traffic volumes for a period of time until the US 301 extension through the Jafza Park is completed.

Therefore, with the existing binding covenants regarding water and wastewater tap sizes, the binding covenant proposed for the Goodby's Regional wastewater system, and existing buffer protections for wetlands, the existing and proposed water and wastewater systems would not substantially increase either the level of development or traffic within the GLT above that which is already foreseen within the GLT. It is unnecessary to incorporate potential impacts due to induced growth into the individual cumulative impact analyses in the remainder of this chapter, as this analysis indicates that both developmental and traffic growth induced by public water and wastewater systems in the GLT will be minimal.

3.3 Potential Impacts to Important Farmland

3.3.1 Context for Impacts

One of the most important elements of South Carolina's agricultural industry's success is the abundance of productive cropland and pastureland. As is the case through much of the Southeastern United States, conversion of productive cropland and pastureland to non-agricultural uses continues to rise as a result of industrial expansion, population growth and the associated need for housing, and other competing land uses. Orangeburg County recognizes the importance of agriculture to the region and has made a sincere effort to avoid encroachment into Important Farmlands and Formally Classified



Lands in the preliminary planning, design, and construction of water and wastewater systems development and expansion.

USDA Natural Resources Conservation Service (NRCS) is the jurisdictional authority for the Farmland Protection Policy Act (FPPA). The purpose of the FPPA is to minimize the extent to which Federal programs contribute to the unnecessary and irreversible conversion of farmland to nonagricultural uses, and to assure that Federal programs are administered in a manner that will be compatible with State, local government and private programs and policies protecting farmland. The Act instructs the Department of Agriculture, in cooperation with other departments, agencies, independent commissions and other units of the Federal government, to develop criteria for identifying the effects of Federal programs on the conversion of farmland to nonagricultural uses. The FPPA does not apply to non-Federal actions.

USDA Form No. AD-1006 uses criteria such as soil types, percentage of site being farmed, distance to urban support services and from urban buildup areas, portion of a farm unit that would be non-farmable, on-farm investments, effects of conversion on farm support services and compatibility with existing agriculture use. The analysis must consider the amount of farmland to be converted directly and indirectly compared to the total acres of prime and unique farmland. These factors are given rating points, which are added and compared to the total maximum points of 160 (total site assessment) plus the relative value of the farmland (100 points), for a total of 260 points. If the site receives 160 points or less, USDA considers and classifies the property within the "committed to urban development" category and requires no further consideration. If the site receives greater than 160 points, then the proposed site is considered to be important farmland and alternative sites having less valuable land for farming must be considered and evaluated or the applicant must supply sufficient well-documented rationale that there is "no practicable alternative" to the proposed site.

As stipulated in the implementing regulations for the *Farmland Protection Policy Act* (FPPA), farmland does not include land already in, or committed to, urban development (7 CFR 658.1). FPPA protects important farmland (which includes statewide important, prime farmland, locally important farmland and unique farmlands). Per section 523.11 Part C of the Farmland Protection Policy Act, "construction within right-of-way purchased on or before August 4, 1984 is not subject to FPPA provisions. Therefore, actions conducted within existing rights-of-way, such as the laying of water transmission and wastewater collection lines, is considered not to have impact on important farmland.

3.3.2 Analysis of Impacts to Important Farmlands on Site of Goodby's Regional WWTP and Pump Stations

The soils on the 10-acre site on which the WWTP would be constructed (of the 542 acres total) are not Prime, Statewide Locally Importance or Unique Farmland soil types. These soils cannot therefore be classified as "Important Farmland" and are not subject to FPPA. See Appendix C, Exhibit C.2.



All conveyance and collection lines associated with the Goodby's Regional WWTP system would be constructed within existing road rights-of-way and therefore are not subject to FPPA compliance.

There will be a minor conversion of Important Farmland in conjunction with four of the ten proposed pumping station sites. Moreover, general information pertaining to two of the ten proposed pumping station sites and a letter dated December 18, 2009 were sent to USDA NRCS in conjunction with USDA Form No. AD-1006 requesting their determination. After receiving the determination (See Appendix C, Exhibit C.2 and Exhibit C.3) and associated response email on May 6, 2010 (Refer Appendix C, Exhibit C.1) from USDA NRCS office for the two proposed wastewater pumping sites located adjacent to Interstate 95, only one of the sites (entitled US15/I-95 pump site) would be classified as a prior converted Important Farmlands site and therefore is not subject to FPPA.

NRCS analysis for the one-acre pump site located at the intersection of I-95/US 176 resulted in a combined score of 165 points, five points above the threshold for requiring evaluation of alternative sites per FPPA (See Appendix C, Exhibit C.3). This site was originally selected based on criteria such as conformance with the Orangeburg County Comprehensive Plan, proximity to a planned elevated water storage tank, and avoiding potential direct impacts to wetlands, floodplains, and important farmlands (See Maps in Appendix B, Exhibit B.14 thru Exhibit B.16).

A second determination package was sent to the NRCS October 6, 2010 to include the additional eight proposed wastewater pump sites located along Tee Vee Road, US 301, and Woolbright Road. The second determination package indicated that the Felderville Pumping Station and the Woolbright Road Pumping Station, as seen in Exhibit B.14 (3), both received Farmland Conversion Impact Rating exceeding 160. The other six pumping station sites (White Cane Branch, Providence Swamp, County Line, Ellore WWTP, Highway 6 and Jafza) received Farmland Conversion Impact Rating scores of 160 points or less; therefore, these sites are considered committed to urban development and no mitigation is required. Four of the eight proposed wastewater pump sites from the second determination along US 301 (Jafza Pumping Station, White Cane Branch Pumping Station, Providence Swamp Pumping Station, and the Felderville Pumping Station), are in areas that have been slated for growth per the Orangeburg County Comprehensive Future Land Use Map (See Appendix A, Exhibit A.9) and are planned as Residential / Mixed Use or Industrial / Mixed Use. These four proposed wastewater pump sites are located in areas that have been planned for growth. Additionally, the Ellore WWTP Pumping Station and the Highway 6 Pumping Station Sites are located in areas that have been slated for growth per the Orangeburg County Comprehensive Future Land Use Map (See Appendix A, Exhibit A.9) and are planned as Residential / Mixed Use or Industrial / Mixed Use. Both the County Line Pumping Station and the Woolbright Road Pumping Station are located in areas classified as forested or agricultural lands.

Based upon the Farmland Conversion Impact Rating, alternative sites were considered for the Felderville Pump Station and the Woolbright Road Pump Station, as



seen in Exhibit B.14 (3). These sites have been located based upon hydraulic limitations of the force main and pump station limitations of the phased lift stations. The Felderville Pumping Station has been planned in order to accept and convey wastewater from the White Cane Branch Pumping Station, the Providence Swamp Pumping Station, and the Jafza Pumping Station. Additionally, the site was selected based upon hydraulic limitations of the force main, pump station limitations of the phased lift stations, and to attempt to avoid the conversion of important farmland. Alternative sites in this location, within 500 feet are important farmland and some of the properties are not available to purchase. Thus, alternative sites would create a direct impact to important farmland or would involve using the Eminent Domain Act of South Carolina. Orangeburg County is not willing to use the Eminent Domain Act to condemn properties. As for the final wastewater pumping station site, to be located on Woolbright Road, was selected based upon hydraulic limitations of the force main, pump station limitations of the phased lift stations, and to attempt to avoid any wetland disturbance and/or construction in the 100-year flood plain. Thus, alternative sites would create a direct impact to floodplains, wetlands, or would involve using the Eminent Domain Act of South Carolina. Orangeburg County is not willing to use the Eminent Domain Act to remove existing condemn properties. As previously noted, wetlands are protected and floodplains typically do not provide adequate soil-bearing capacity for structures. The Woolbright Road Pumping Station will convey waste collected from all remaining pumping stations with the exception of the two sites to be located along Interstate 95.

This overall area in which potential sites were evaluated was selected based on factors such as existing engineering constraints, geographic, operational, regulatory requirements, constraints associated with the design and operations of the proposed wastewater pump site, and the shared use and proximity to the proposed elevated storage tank. The Site Selection Map associated with the U.S. Highway 15/I-95 pump site (See Appendix B, Exhibit B.17) depicts the area of potential sites, existing wetland/floodplains, existing SCDOT right-of-way, land currently in urban use, and Important Farmlands depicted within the NRCS Important Farmland Report obtained from NRCS web soils survey (Refer to Appendix E, Exhibit E.21 (1-8)).

As depicted within the Site Selection Map, Providence Swamp is located west of I-95 along US 176. This led Orangeburg County to rule out all potential sites located west of I-95 due to potential direct impacts to wetlands. East of I-95, sites located along and adjacent to US 176; Hutto Market Street, and Farm Field Road as depicted within the Site Selection Map were evaluated. Most of these sites are considered Important Farmlands due to their USDA-NRCS soil types (See Appendix B, Exhibit B.16 and Appendix E, Exhibit E.21 (1-8)). Other potential sites located east of Interstate 95 either are currently in urban use as residential structures or located within a wetlands or floodplains. Thus, alternative sites would create a direct impact to floodplains, wetlands, or would involve using the Eminent Domain Act of South Carolina. Orangeburg County is not willing to use the Eminent Domain Act to condemn properties. As previously noted, wetlands are protected and floodplains typically do not provide adequate soil-bearing capacity for structures.



Therefore, the remaining potential sites would also create direct impact and conversion of Important Farmlands, as the original site would do. It appears that all these Important Farmlands are actively farmed and use of any sites would result in impacts to active farming operations on larger tracts of Important Farmlands. Thus, there are no practical alternatives to a conversion of Important Farmlands. The original 1-acre selected site at US 176/I-95 intersection is located in close proximity to I-95 on a smaller tract of land and would not disrupt active farming operations and would result in only a minor conversion of Important Farmland.

Land use will not be changed from hay production on the 50-acre Sanders Pointe Farm effluent land application site across from the Goodby's Regional WWTP site and therefore is not subject to FPPA. Application of treated effluent should enhance the conditions for use for growing hay and pasturing livestock and therefore this action is not considered a conversion of "important farmland" subject to FPPA. See Appendix C, Exhibit C.2.

Therefore, the Goodby's Regional WWTP and conveyance and collection systems would have only minor adverse impacts to Important Farmlands with relation to four of the pumping station sites subject to compliance with FPPA.

3.3.3 Mitigation for the Goodby's Regional WWTP for Protection of Important Farmland

See Section 3.2.4 for wording for the binding covenant for the Goodby's Regional wastewater system to supplement the Orangeburg County Zoning and Development ordinances to control residential and commercial development outside of designated areas. Orangeburg County has the authority to control the location and type of commercial/industrial growth through its land use ordinances, policies, and decisions.

Any new development in the area outside of the Matthews Industrial Park, the County/City Industrial Park and the Jafza Logistics Park is expected to consist of residential or small commercial development. Outside of these development zones, the County would restrict the amount and type of development that is served by the proposed Goodby's Regional wastewater system through ordinances supplemented by the binding covenant, which would be instituted as part of the USDA RD loan agreement or the USACE PPA.

No additional mitigation is required.

3.3.4 Potential Cumulative Impacts to Important Farmlands

Previous environmental documents prepared per NEPA and preliminary engineering reports have identified the following potential impacts to Important Farmlands and Formally Classified Lands for the water and wastewater projects in the project area as described in Chapter 2 and summarized in Table 3.

All transmission lines in all projects are not subject to FPPA provisions because of placement in existing road rights-of-way. All wastewater and water pump stations, including for the Goodby's Creek WWTP, and elevated water storage tanks have been



evaluated and either found to not be subject to FPPA provisions or having no practicable alternative sites. Focusing industrial development into the Matthew's Industrial Park, the County/City Industrial Park, and the Jafza Logistics Park would minimize requests for use of green space in the area. Utility restrictions put into place by Orangeburg and Calhoun Counties through binding covenants tied to loan agreements with USDA-RD or the USACE PPA to control induced development in areas of prime and important farmlands would provide protection of limited acreage of Important Farmlands subject to the provisions of FPPA.

Based on the finding of no impact to Important Farmlands for the Goodby's Regional WWTP and the existing and proposed projects evaluated in Table 3, no cumulative impacts would occur to Important Farmland within the GLT.

Table 3: Potential Impacts to Important Farmland from Other Projects

| Project | Document | Summary of Impacts |
|----------------------------------|--|---|
| Town of Bowman Wastewater System | PER 5/14/10 USDA Approved 6/24/10 Final EA 8/10/10 USDA Approved 08/25/10 | <p>Little to no impacts to important farmlands installation of transmission lines within existing ROW in Phases 1 through 3, three small pump stations; Phase 3 would also install two large pump stations.</p> <p>USDA (May 27, 2010) determined that two pump station sites on I-26 were important farmland and alternative sites needed to be considered:</p> <ol style="list-style-type: none"> 1) ½ mille of the intersection of Homestead Road and I-26 selected based on proximity to large commercial customers, the I-26 growth corridor (Orangeburg County Comprehensive Land Use Plan Future Land Use Map), strategically located to limit potential taps along the gravity line section of the collection system, avoiding wetlands and floodplains, and attempt to avoid important farmlands, as well as technical and regulatory requirements and constraints. Potential sites north of I-26 along Homestead Road and Cascade Drive are either currently in urban use or classified as Important Farmlands. Potential sites south of I-26 are bound to the south by Mill Branch, classified as either wetlands or floodplains. Bowman evaluated remaining properties south of I-26 along Homestead Road and Falls Drive: Important Farmlands, actively farmed, in urban use as residences or commercial structures (requiring the use of eminent domain). To effectively minimize impacts to Important Farmlands, the site is located adjacent to existing urban use close to I-26 on a small tract of land that would not disrupt active farming operations. No practicable alternative exists. 2) ½ mile of the intersection of I-26/SC 210 selected based on proximity to large commercial customers, the I-26 growth corridor (Orangeburg County Comprehensive Land Use Plan Future Land Use Map), strategically located to limit potential taps along the gravity line section of the collection system, avoiding wetlands and floodplains, and attempt to avoid important farmlands, as well as technical and regulatory requirements and constraints. Four Hole Swamp and isolated wetlands are east of I-26 along SC 210. All potential sites east of I-26 are Important Farmlands or in urban use. Bowman evaluated remaining sites west of I-26 located along |



| Project | Document | Summary of Impacts |
|----------------------------------|--|--|
| Town of Bowman Wastewater System | PER 5/14/10 USDA Approved 6/24/10 Final EA 8/10/10 USDA Approved 08/25/10 | <p>and adjacent to SC 210, Wamer Road, Patrick Dairy Road, and Overlook Court are Important Farmlands, actively farmed, or urban use as residences or commercial structures requiring use of eminent domain and one site potentially has a leaking underground storage tank at the site of an abandoned gas station. To effectively minimize impacts to Important Farmlands, the site is located adjacent to existing urban use close to I-26 on a small tract of land that would not disrupt active farming operations. No practicable alternative exists.</p> <p>3) Canal Street site is located at a previously impacted site at Canal and Ann Streets to serve existing residents via gravity service, avoiding wetlands, floodplains, and property condemnation.</p> <p>For limiting unplanned development, Bowman is entering into a binding covenant as described in Section 3.2.4</p> <p>There will be no direct impacts to Important Farmlands and Formally Classified Lands for the proposed collection and conveyance lines; there will be direct impacts to important farmlands for two sites (near I-26/Homestead Road and near I-26/SC 210) of the 5 sites (Canal Street, Apple Street, and Vance Road wastewater pump stations) wastewater pumping stations sites, as no practical alternative site exists.</p> |
| Town of Bowman Water System | Draft EA draft 5/10/10 Final EA 06/23/10 USDA Approved 06/29/10 | <p>No conversion of farmlands within ROW</p> <p>USDA NRCS May 27, 2010: 2 acres total would be converted for two elevated storage tanks, both determined within Important Farmlands and needing evaluation of practicable alternatives:</p> <ol style="list-style-type: none"> 1) ½ mile of I-26/Homestead Road intersection, close to large commercial customers and land growth corridor, efficient hydraulic conveyance from City of Orangeburg water system, avoiding wetlands and floodplains, attempt to avoid important farmlands. North of I-26 along Homestead and Cascade Drives are in urban use or classified as Important Farmlands; S of I-26 bound by Mill Branch and classified as either wetlands or floodplains. Most sites south of I-26 actively farmed, Important Farmlands, or in residential or commercial development. Bowman not willing to use eminent domain for developed or farming areas, or impact wetlands or floodplains. Selected site would not disrupt active farming operations and no practicable alternatives exist. 2) ½ mile of I-26/SC 210 close to commercial customers and land growth corridor, efficient hydraulic conveyance from LMRWA system, avoiding wetlands and floodplains, and attempt to avoid important farmlands. East of I-26 along Homestead Rd. is Four Holes Swamp and isolated wetlands, Important farmlands or developed; sites along SC 210, Warner Rd., Patrick Dairy Rd., and Overlook Court designated Important Farmlands or actively farmed. West of I-26 developed, one site has a potentially leaking underground storage tank. Bowman is not willing to use eminent domain for developed or farming areas or impact wetlands or floodplains. Selected site would not disrupt active farming |



| Project | Document | Summary of Impacts |
|---|--|---|
| | | <p>operations, and no practicable alternatives exist.</p> <p>For limiting unplanned development, Bowman is entering into binding covenant as described in Section 3.2.4</p> |
| Town of Vance Water System Expansion | Environmental Report 4/10 | <p>Approximately 5 acres would be disturbed, but except for 870 LF of water main installed within an acquired permanent general utility easement, all disturbance would be within SCDOT or Orangeburg Co. rights-of-way that are considered "prior converted lands" and not subject to FPPA</p> <p>NRCS: no adverse effect on farmland.. 870 LF in 0.6A near intersection of Camden and Vance Roads in Vance received score of 147 out of possible 260, so this site is not subject to the FPPA</p> |
| Proposed Orangeburg County Water System Expansion | Final EA 6/16/10 USDA Approved 06/16/10 | <p>USDA NRCS USDA Form AD-1006 6/6/10 one of tank sites (US15/I95) was classified as "committed to urban development" and therefore not subject to provisions of FPPA</p> <p>The second tank at US 176/I-95 was selected based on proximity to LMRWA water transmission line, avoiding direct impacts to wetlands, avoiding direct impact to floodplains, and avoiding important farmlands, as well as technical issues such as hydraulic, geographic, engineering, operational, regulatory requirements and constraints associated with elevated tanks. Providence Swamp is located west of I-95 along US 176, so all sites west of I-95 ruled out to avoid this swamp. Soils that are also unsuitable for sufficient load bearing capacity to support foundations and construction loads were avoided. Sites east of I-95 are either already developed or in wetlands or floodplains, so no practicable alternative sites exist there because all remaining sites are important farmlands. The existing selected site is close to I-95 on a smaller tract of land that would create a smaller disruption to existing farming operations.</p> <p>Potential exists for indirect impacts to important farmland from development. Mitigation for the US 176/I-95 tank site is to limit the site size to the minimal extent practicable for the tank and by locating the selected site at the corner of active farms to limit disruptions to farm activities.</p> <p>In an effort to mitigate indirect impacts on important farmlands in accordance with FPPA, Orangeburg County Water and Sewer District is willing to enter into a binding covenant that will limit tap size of potential customers to a minimum of 1.5 inches per lot within areas designated as agricultural land use as zoned in the Orangeburg County Comprehensive Land Use Plan through a binding covenant. This binding covenant will become effective at the issuance of the USDA Letter of Condition. These commitments shall be included in all contract documents</p> |
| LMRWA Five-County Water System Phase II | Final USACE/EPA EA (undated), Final USACE/EPA FONSI 2/12/04, and Final Environmental Information | <p>The Proposed pipeline follows existing road ROWs and utility and railroad easements so no impact on Prime or Important Farmland subject to provisions of FPPA</p> |



| Project | Document | Summary of Impacts |
|--|--|---|
| | Document 10/03 | |
| Southern Calhoun County Phase I Water System Expansion | Draft EA 3/20/10 | <p>The largest concentrations of "Important Farmland" are east of the area proposed for service on the east side of Hwy 6. However, "Important Farmland" soils are scattered throughout the proposed service area. All pipelines installed within existing ROWs are not subject to FPPA provisions.</p> <p>Some potential exists for induced growth, so the County has agreed to restrictions on taps in areas of "Important Farmland" within areas that the County has identified for future industrial and large commercial development (Section 3.2.4) which will minimize potential for adverse impact. Any new development is expected to consist of residential or small commercial development. Outside of these development zones, the County restricts the amount and type of development that is served by expansion of the county water system; which would be reaffirmed by the County as part of the funding for this project.</p> |
| MIP | Draft EA for proposed Green Energy Electricity Generating Plant v. 2 [undated] | The Matthews Industrial Park is considered "committed to urban development" and therefore not subject to FPPA provisions. |
| Jafza Park | | Jafza Park is committed to urban development and therefore not subject to FPPA provisions. |

3.4 Potential Impacts to Floodplains

3.4.1 Context for Impacts

The Lake Marion Regional Water Authority project lies within the Black, Lower Santee, and Edisto River sub-basins. The Black River Sub-Basin is north of Lake Marion and is outside the scope of this EA. SCDHEC considers these waters to be viable surface water sources. The Santee River flows into Lake Marion, which is up to 75 feet deep and approximately 111,000 acres (44,759 hectare). Due to shallow depth and high nutrient levels in the lake, aquatic plants have proliferated throughout Lake Marion. Santee-Cooper Authority, using herbicides and grass carp to control aquatic plants, have ensured that recreational uses are fully supported in the lake.

The Santee River Basin is formed from the confluence of the Congaree and Wateree Rivers, flows through Lake Marion, is then either diverted at lower Lake Marion through the Santee Dam or is channeled along 7.5 mile diversion canal to fill Lake Moultrie. It then flows down the Cooper River to the Atlantic Ocean near Charleston. This river basin is comprised of eleven watersheds and 1,300 square miles. The Santee River Basin is 0.5% urban, 12% agricultural land, 12% scrub/shrub, 0.5% barren, 43% forested, 16% forested wetland, 5% nonforested wetland, and 12% water.

The Edisto River sub-basin has 30 subwatersheds and 2 million acres, and is made up of the North and South Forks of the Edisto River, which then join south of



Orangeburg. The Edisto River flows undammed for 206 miles into the Atlantic Ocean near Beaufort. It is the longest undammed/unleveed blackwater river in North America. It is characterized by 2% urban, 23% agricultural, 11% scrub/shrub, 0.5% barren, 49% forested, 11% forested wetland, 2% nonforested wetland, and 2% open water. In the project area, the Edisto watershed, which is listed on the Nationwide Rivers Inventory (see Section 3.7.2) is comprised of Four Hole Swamp, with its tributaries of Goodby's Swamp and Providence Swamp, and White Cane Branch Swamp, which is a tributary of Providence Swamp. Cow Castle Creek flows through Bowman, which flows into Four Hole Swamp south of SC 201. Ellore, Holly Hill, Santee, St. George and Lake Marion are located in the Upper Santee and Edisto Sub-Basins.

3.4.2 Analysis of Impacts to Floodplains from Goodby's Regional Wastewater System

Trenching and backfill will be used in dry upland areas of floodplains. Directional boring would be used under all wetland areas unless it is cost-prohibitive. It is possible that some wetlands may require disturbance during crossing and a Nationwide Permit (NWP) 12 (Section 3.5.1) may be issued by the USACE. If NWP 12 is used, all environmental agencies would be notified and construction would not proceed until all resource agency requirements and restrictions were satisfied. All elevated water storage tanks are located outside of 100-year floodplains and therefore would not impact floodplains. Orangeburg County abides by Orangeburg County's Flood Damage Prevention Ordinance pertaining to construction in floodplains. This ordinance adopts FEMA's restrictions for construction in floodplains. Therefore, public water and wastewater service will not be provided to new construction located within 100-year floodplains. This requirement will be included in construction documents that will be attached to USDA RD Loan Resolutions.

A FEMA map for the Proposed Goodbys Regional Wastewater System is included in Appendix B, Exhibit B.7. FEMA form 81-93 "Standard Flood Hazard Determination Form" (SFHDF) has been completed for the Goodby's Regional WWTP (Appendix E., Exhibit E.9), the Sander's Pointe Land Application Site (Appendix A, Exhibit A.14, and Appendix E, Exhibit E.10) and the ten (10) proposed pump station sites (Appendix E, Exhibits E.11 thru E.20).

3.4.3 Mitigation for the Goodby's Regional Wastewater System for Floodplains

As all drilling for pipeline installation through floodplains will be conducted when the portions of the floodplains outside of wetlands are dry within existing disturbed road rights-of-way, no additional mitigation is required for protection of floodplains other than using Best Management Practices and replacing the soil to original grade. All requirements will be included in the project contract documents. See Section 4.4 for detailed BMPs and mitigation for floodplains.

3.4.4 Potential Cumulative Impacts to Floodplains

Previous environmental documents prepared per NEPA and preliminary engineering reports have identified the following potential impacts to floodplains for the



existing and proposed water and wastewater projects in the project area as described in Chapter 2 and summarized in Table 4.

All existing and proposed water and wastewater projects and Jafza Park must comply with Orangeburg County Flood Damage Prevention Ordinance (2009-07-20-05), which complies with FEMA requirements regarding flood insurance and finished floor elevations above 100-year flood elevation. No concerns were anticipated with any of the projects, including the Goodby's Regional wastewater system.

Therefore, no cumulative impacts to floodplains are anticipated.

Table 4: Floodplain Impacts due to Wastewater Treatment Expansions

| Project | Document | Summary of Impacts |
|---|--|---|
| Town of Bowman Proposed Wastewater Expansion | Draft PER 5/14/10 USDA Approved 6/24/10 Final EA 8/10/10 USDA Approved 08/25/10 | <p>Federal assistance can be obtained for needed wastewater service within floodplains under the condition that any wastewater system improvements located in a floodplain or providing service to a floodplain area is planned, designed, and constructed and insured in accordance with FEMA requirements.</p> <p>Orangeburg County Flood Damage Prevention Ordinance (2009-07-20-05) complies with FEMA requirements regarding flood insurance, and finished floor elevations above 100-year flood elevation.</p> <p>Portions of floodplains that are wetlands will require directional boring for pipeline placement. Dry areas classified only as floodplain will use cut and trench and crossing restored to original grade after construction is completed. These requirements will be included in contracts and construction plans.</p> <p>USFWS 1/12/10: Where lines are placed in open trenches, natural pre-project elevations should be re-vegetated to native species. Compensatory mitigation should be provided for all adverse impacts. Construction and maintenance activities in forested communities should take place outside of the breeding season of migratory birds (March-August).</p> |



| Project | Document | Summary of Impacts |
|---|---|--|
| Town of Bowman Proposed Water Expansion | PER 5/10 /10 USDA Approved 06/30/10 Final EA 06/23/10 USDA Approved 06/29/10 | <p>The proposed action is mostly located within areas of minimal flooding, with small portions within 100-year floodplains. These wetland portions are limited to streams, creeks, and/or swamps crossing existing roads, where directional boring will be used. For dry areas using cut and trench, the crossing restored to original elevations and conditions. These requirements will be construction contract requirements.</p> <p>Federal assistance can be obtained for needed water service within 100-year floodplains under the condition that any water system improvements located in the floodplain or providing service to a floodplain area is planned, designed, and constructed to serve only the existing development. The Town of Bowman commits that there will be no excess capacity for future growth sited anywhere in the floodplain. Furthermore, investigation of potentially insurable structures needs to be determined in conjunction with FEMA requirements.</p> <p>Both elevated water storage tanks are located outside of the 100-year floodplain.</p> <p>Orangeburg County Planning Department is the managing agency for flood hazard reduction in Orangeburg County via the County Code of ordinances. The Town of Bowman does not supply water service to any new construction within a 100-year floodplain and will follow Orangeburg County Flood Damage Prevention Ordinance. Portions of the project area located within the 100-year floodplain.</p> |
| Town of Vance Water System | Environmental Report 4/10 | <p>No buildings or structures are proposed for construction in a floodplain, as all water mains are to be buried underground in road rights-of-way.</p> <p>The proposed project route crosses several tributaries that flow either northeast to Lake Marion or south to Four Hole Swamp.</p> <p>FEMA Flood Insurance Rate map shows areas along the route are completely enclosed by flood hazard zone C, which designates areas outside the 200-year floodplain; therefore, purchase of flood insurance is not required. No direct impacts would occur and no short-term mitigation is required. Long-term mitigation to protect against impacts potentially caused by induced growth includes a binding covenant that would prohibit Orangeburg County from granting drinking water services to any structures not existing at the time of funding approval and located below the 100-year base flood elevations identified by FEMA.</p> |
| Orangeburg County Water Expansion | Final EA 6/16/10 USDA Approved 06/16/10 | <p>Federal assistance can be obtained for needed water service within floodplains under the condition that any water system improvements located in the floodplain or providing service to a floodplain area is planned, designed, and constructed to serve only the existing development. Furthermore, investigation of potentially insurable structures needs to be determined in conjunction with FEMA requirements.</p> |



| Project | Document | Summary of Impacts |
|---|---|---|
| Orangeburg County Water Expansion | Final EA 6/16/10 USDA Approved 06/16/10 | <p>Elevated water storage tank sites are outside of 100-year floodplains.</p> <p>Orangeburg County Planning Department is the authority for flood hazard reduction and regulations within the Orangeburg County Code of Ordinances are intended to limit impacts to floodplains.</p> <p>Restrictions on building in floodplains must comply with FEMA requirements.</p> <p>Orangeburg County will not supply public water service to any new construction within the 100-year floodplain and will adhere to the Orangeburg County Flood Damage Prevention Ordinance.</p> <p>For all areas of the proposed water system that are located within a 100-year floodplain, such as streams, creeks, and/or swamp crossings along existing roads, directional boring would be used.</p> <p>Within the dry areas of floodplains, the water mains will be constructed within the rights-of-way and the area of crossing restored to its original grade after construction is completed.</p> <p>Orangeburg County will abide by Orangeburg County's Flood Damage Prevention Ordinance pertaining to construction in floodplains to limit future growth induced by the project. This ordinance adopts FEMA's restrictions for construction in flood plans. Therefore, public water service will not be provided to new construction located within the 100-year floodplains. This requirement will be included in construction documents which will be attached to the USDA RD Loan Resolution.</p> |
| LMRWA Five-County Water System Phase II | Final USACE/USEPA EA (undated) Final USACE/EPA FONSI 2/12/04 Final Environmental Information Document (EID) USACE 10/03 | <p>This project would have 16 stream crossings, all of which would be covered. BMPs, including silt fencing, directional boring under streams, and bridge suspension of waterlines where appropriate would be used.</p> <p>Trench and cover and directional drilling would temporarily change topography, but all construction areas would be restored to original elevation and topography.</p> <p>No development is planned within any 100-year floodplains.</p> <p>Phase II of the LMRWA project:</p> <ul style="list-style-type: none"> • Begins in Dorchester Co Zone X (areas determined to be outside 500-year floodplain), • Until it crosses Indian Field Swamp, which is Zone A (special flood hazard areas inundated by 100-year flood, with no base flood elevation (BFE) determined), • Continues across Zone X even as it crosses the Pee Dee Branch of Four Hole Swamp and unnamed tributary of Four Hole Swamp, which is Zone A no BFE determined. • Outside of Four Hole Swamp, it crosses the Orangeburg County line through Zone C, which is areas of minimal flooding |



| Project | Document | Summary of Impacts |
|---|---|--|
| LMRWA Five-County Water System Phase II | Final USACE/USEPA EA (undated) Final USACE/EPA FONSI 2/12/04 Final Environmental Information Document (EID) USACE 10/03 | <ul style="list-style-type: none"> • Until it crosses the floodplain of Kettle Branch, which is Zone A, with no BFE determined, then • Passes through Zone C, then through • Zone A line crossing US 15 and US 176 in Orangeburg County that crosses Kettle Branch, Horse Branch, and unnamed tributary of Horse Branch and Target Swamp |
| Southern Calhoun County Phase I Water System Expansion | Draft EA 3/2/10 | <p>All water lines would be constructed within right-of-way within 15 feet of the roadway and will not disrupt any areas of floodplains. The contractor must adhere to SCDHEC regulations regarding stormwater and erosion control, using BMPs such as silt fencing.</p> <p>No net fill of floodplains would occur, and pre-construction topography and elevation will be returned after water line installation, so no permits would be needed.</p> <p>Calhoun County commits to a binding covenant regarding development in floodplain to limit impacts.</p> |
| MIP and Proposed Green Energy Electrical Generating Plant | Green Energy LLC Draft EA, Version 2 [undated] MIP site Certification 01/10 | The site is mostly within in Zone C, located outside 100- and 500-year floodplains, with two isolated areas in the four Hole Swamp floodplain, which would not be infringed by tenants on the site. |
| Jafza Logistics and Distribution Park | Jafza 404 Permit Application 12/08 Jafza Phase I Environmental Analysis 6/2/08 | <p>The majority of site is in Flood Zone C, which has a low to moderate risk of flooding.</p> <p>A small part in extreme southwester part of the site is in Zone A, which is in the 100-year floodplain and has a high flood risk</p> |

3.5 Potential Impacts to Wetlands from the Proposed Goodby's Regional Wastewater Project

For the proposed Goodby's Regional WWTP project, the primary potential for impact to wetlands would result from the wastewater force main that would cross Goodby's Swamp at a narrow point via directional drilling to access the WWTP from Woolbright Road. No wetlands would be impacted on WWTP site because the plant has been carefully sited on only ten acres of the entire location to avoid all wetland areas. See Appendix A, Exhibit A.5, Appendix C, Exhibit C.14, and Appendix D, Exhibit D.5. No wetlands are impacted on the Sanders Point Farm Land Application site. See Appendix A, Exhibit A.14, and Appendix C, Exhibit C.14. No wetlands are impacted in



the proposed pumping station sites or crossing of White Cane Branch Swamp, Providence Swamp along US 301, or Big and Little Poplar Creeks along SC 267, or Providence Swamp along US 176. See Appendix B, Exhibit B.13, and Appendix C, Exhibit C.14.

Directional boring would be used under all wetland areas unless it is cost-prohibitive. The proposed directional drilling under Goodby's Swamp would not disturb the wetlands. However, it is possible that some wetlands may require disturbance during crossing and a Nationwide Permit (NWP) 12 (Section 3.5.1) may be issued by the USACE. All temporarily impacted wetlands along rights-of-way would be smaller than ½ acre and in pump station sites would be smaller than ¼ acre, making all wetland crossings eligible for NWP 12. If NWP 12 is used, all environmental agencies would be notified and construction would not proceed until all resource agency requirements and restrictions were satisfied.

3.5.1 US Army Corps of Engineers Nationwide Permit 12 for Limited Fill of Wetlands

Depending on costs and impacts to wetlands, it may not be appropriate for all stream and wetland crossings to be directionally drilled, especially if the crossing is done at the time of year when water levels are low. No impacts that result in net loss to wetland is proposed within the scope of this project. In that case, NWP 12 may be used for limited and temporary impacts to wetlands for utility crossings, as long as the terms and conditions of the NWP 12 are met, as stated below and the USACE agrees that a NWP 12 is appropriate for the circumstances.

Per the US Army Corps of Engineers Clean Water Act Section 404 regulations (*Federal Register* 72(47):11092-11198, March 12, 2007, expiring March 18, 2012), NWP 12 provides for (Note: This is only a partial duplication of NWP 12 from the Federal Register; non-applicable portions are not provide):

Activities required for the construction, maintenance, repair and removal of utility lines and associated facilities in waters of the United States, provided the activity does not result in the loss of greater than ½ acre of waters of the United States. This NWP authorizes the construction, maintenance, or repair of utility lines, including the outfall and intake structures, and the associated excavation, backfill, or bedding for the utility lines, in all waters of the United States, provided there is no change in pre-construction contours. A "utility line" is defined as any pipeline for the transportation of any gaseous, liquid, liquiscent, or slurry substance, for any purpose...The term "utility line" does not include activities that drain a water of the United States, such as drainage tile or french drains, but it does apply to pipe conveying drainage from another area. Material resulting from trench excavation may be temporarily sidecast into waters of the United States for no more than three months, provided the material is not placed in such a manner that it is dispersed by currents or other forces. The district engineer may extend the period of a temporary sidecasting for no more than a total of 180 days, where appropriate. In wetlands, the top 6 to 12 inches of the trench should normally be backfilled with topsoil from the trench. The trench cannot be constructed or backfilled in



such a manner as to drain waters of the United States (e.g., backfilling with extensive gravel layers, creating a french drain effect). Any exposed slopes and stream banks must be stabilized immediately upon completion of the utility line crossing of each waterbody.

The permittee must submit a pre-construction notification to the district engineer prior to commencing the activity if any of the following criteria are met: 1) the activity involves mechanized land clearing in a forested wetland for the utility line right-of-way; (2) a section 10 permit is required; 3) the utility line in waters of the United States, excluding overhead lines, exceeds 500 feet; 4) the utility line is placed within a jurisdictional areas (i.e. water of the United States) and it runs parallel to a stream bed that is within that jurisdictional area; 5) discharges that result in the loss of greater than 1/10th-acre of waters of the United States; (6) permanent access roads are constructed above grade in waters of the United States for a distance of more than 500 feet; or (7) permanent access roads are constructed in waters of the United States with impervious materials..

The following nationwide permit general conditions for NWP 12 apply as appropriate:

1. Navigation. Not applicable to the proposed Goodby's Creek project.
2. Aquatic life movements. No activity may substantially disrupt the necessary life cycle movements of those species of aquatic life indigenous to the waterbody, including those species that normally migrate through the area, unless the activity's primary purpose is to impound water.
3. Spawning areas. Activities in spawning areas during spawning seasons must be avoided to the maximum extent practicable. Activities that result in the physical destruction (e.g., through excavation, fill, or downstream smothering by substantial turbidity) of an important spawning area are not authorized.
4. Migratory bird breeding areas. Activities in waters of the United States that serve as breeding areas for migratory birds must be avoided to the maximum extent practicable.
5. Shellfish beds. No activity may occur in areas of concentrated shellfish populations, unless the activity is directly related to a shellfish harvesting activity authorized by NWPs 4 and 48.
6. Suitable material. No activity may use unsuitable material (e.g., trash, debris, car bodies, asphalt, etc.). Material used for construction or discharge must be free from toxic pollutants in toxic amounts (see Section 307 of the Clean Water Act).
7. Water supply intakes. No activity may occur in the proximity of a public water supply intake, except where the activity is for the repair or improvement of public water supply intake structures or adjacent bank stabilization.
8. Adverse effects from impoundments. Not applicable to the proposed Goodby's Creek project.



9. Management of water flows. To the maximum extent practicable, the pre-construction course, condition, capacity, and location of open waters must be maintained for each activity, including stream channelization and storm water management activities, except as provided below. The activity must be constructed to withstand expected high flows. The activity must not restrict or impede the passage of normal or high flows, unless the primary purpose of the activity is to impound water or manage high flows. The activity may alter the pre-construction course, condition, capacity or location of open waters if it benefits the aquatic environment (e.g., stream restoration or relocation activities).
10. Fills within 100-year floodplains. The activity must comply with applicable FEMA approved state or local floodplain management requirements.
11. Equipment. Heavy equipment workings in wetlands or mudflats must be placed on mats, or other measures must be taken to minimize soil disturbance.
12. Soil erosion and sediment controls. Appropriate soil erosion and sediment controls must be used and maintained in effective operating condition during construction, and all exposed soil and other fills, as well as any work below the ordinary high water mark or high tide line, must be permanently stabilized at the earliest practicable date. Permittees are encouraged to perform work within waters of the United States during periods of low-flow or no-flow.
13. Removal of temporary fills. Temporary fills must be removed in their entirety and the affected areas returned to pre-construction elevations. The affected areas must be re-vegetated, as appropriate.
14. Proper maintenance. Any authorized structure or fill shall be properly maintained, including maintenance to ensure public safety.
15. Wild and scenic rivers. No activity may occur in a component of the National Wild and Scenic River System, or in a river officially designated by Congress as a "study river" for possible inclusion in the system while the river is in official study status, unless the appropriate Federal agency with direct management responsibility for such river has determined in writing that the proposed activity will not adversely affect the Wild and Scenic River designation or study status.
16. Tribal rights. No activity or its operation may impair reserved tribal rights, including, but not limited to, reserved water rights and treaty fishing and hunting rights.
17. Endangered species. (a) No activity is authorized under any NWP which is likely to jeopardize the continued existence of a threatened or endangered species or a species proposed for such designation or which will destroy or adversely modify the critical habitat of such species. No activity is authorized under any NWP which "may affect" a listed species or critical habitat unless Section 7 consultation addressing the effects of the proposed activity has been completed.



18. Historic properties. (a) In cases where the district engineer determines that the activity may affect properties listed, or eligible for listing in the National Register of Historic Places, the activity is not authorized until the requirements of Section 106 of the National Historic Preservation Act (NHPA) have been satisfied.

19. Designated critical resources waters. Critical resources waters include National Oceanic and Atmospheric Administration (NOAA) -designated marine sanctuaries, National Estuarine Research Reserves, state natural heritage sites, and outstanding national resource waters or other waters officially designated by a state as having particular environmental or ecological significance and identified by the district engineer after notice and opportunity for public comment. (a) Discharge of dredged or fill material into waters of the United States are not authorized by NWP 12 and notification is required in accordance with general condition 27, for any activity proposed in the designated critical resource waters including wetlands adjacent to those waters.

20. Mitigation. The district engineer will consider the following factors when determining appropriate and practicable mitigation necessary to ensure that adverse effects on the aquatic environment are minimal:

(a) The activity must be designed and constructed to avoid and minimize adverse effects, both temporary and permanent, to waters of the United States to the maximum extent practicable at the project site.

(b) Mitigation in all its forms (avoiding, minimizing, rectifying, reducing, or compensating) will be required to the extent necessary to ensure that the adverse effects to the aquatic environment are minimal.

(c) Compensatory mitigation at a minimum of one-for-one ratio will be required for all wetland losses that exceed 1/10 acre and require pre-construction notification, unless the district engineer determines in writing that some other form of mitigation would be more environmentally appropriate and provides a project-specific waiver of this requirement. For wetland losses of 1/10 acre or less that require pre-construction notification, the district engineer may determine on a case-by-case basis that compensatory mitigation is required to ensure that the activity results in minimal adverse effects on the aquatic environment. Since the likelihood of success is greater and the impacts to potentially valuable uplands are reduced, wetland restoration should be the first compensatory mitigation option considered.

(d) For losses of streams or other open waters that require pre-construction notification, the district engineer may require compensatory mitigation, such as stream restoration, to ensure that the activity results in minimal effects on the aquatic environment.

(e) Compensatory mitigation will not be used to increase the acreage losses allowed by the acreage limits of the NWPs....However, compensatory



mitigation can and should be used, as necessary, to ensure that a project already meeting the established acreage limits also satisfies the minimal impact requirement associated with NWP.

(f) Compensatory mitigation plans for projects in or near streams or other open waters will normally include a requirement for the establishment, maintenance, and legal protection (i.e. conservation easements) of riparian areas next to open waters. In some cases, riparian areas may be the only compensatory mitigation required. Riparian areas should consist of native species. The width of the required riparian area will address documented water quality or aquatic habitat loss concerns. Normally the riparian area will be 25 to 50 feet wide on each side of the stream, but the district engineer may require slightly wider riparian areas to address documented water quality or habitat loss concerns. Where both wetlands and open water exist on the project site, the district engineer will determine the appropriate compensator mitigation (i.e., riparian areas and/or wetlands compensation) based on what is best for the aquatic environment on a watershed basis. In cases where riparian areas are determined to be the most appropriate form of compensatory mitigation, the district engineer may waive or reduce the requirement to provide wetland compensatory mitigation for wetland losses.

(g) Permittees may propose the use of mitigation banks, in-lieu fee arrangements or separate activity-specific compensatory mitigation. In all cases, the mitigation provisions will specify the party responsible for accomplishing and/or complying with the mitigation plan.

(h) Where certain functions and services of waters of the United States are permanently adversely affected, such as the conversion of a forested or scrub-shrub wetland to a herbaceous wetland in a permanently maintained utility right of way, mitigation may be required to reduce the adverse effects of the project to the minimal level.

21. Water quality. Where States or authorized Tribes or EPA where applicable have not previously certified compliance of a NWP with CWA Section 401, individual 401 Water Quality Certification must be obtained or waived. The district engineer or State or Tribe may require additional water quality management measures to ensure that the authorized activity does not result in more than minimal degradation of water quality.

22. Coastal zone management. Not applicable to the proposed Goodby's Creek project.

23. Regional and case-by-case conditions. The activity must comply with any regional conditions that may have been added by the Division Engineer (see 33 CFR 330.4(e)) and with any case specific conditions added by the Corps or by the state, Indian Tribe, or U.S. EPA in its section 401 Water Quality Certification, or by the state in its Coastal Zone Management Act consistency determination.



24. Use of multiple nationwide permits. The use of more than one NWP for a single and complete project is prohibited, except when the acreage loss of waters of the United States authorized by the NWPs does not exceed the acreage limit of the NWP with the highest specified acreage limit. For example, if a road crossing over tidal waters is constructed under NWP 14, with associated bank stabilization authorized by NWP 13, the maximum acreage loss of waters of the United States for the total project cannot exceed 1/3-acre.

25. Transfer of nationwide permit verifications. Not applicable to the proposed Goodby's Creek project.

26. Compliance certification. Each permittee who received an NWP verification from the Corps must submit a signed certification regarding the completed work and any required mitigation.

27. Pre-construction notification.

(a) Timing. Where required by the terms of the NWP, the prospective permittee must notify the district engineer by submitting a pre-construction notification (PCN) as early as possible. The district engineer must determine if the pre-construction notification is complete within 20 calendar days of the date of receipt and, as a general rule, will request additional information necessary to make the PCN complete only once. However, if the prospective permittee does not provide all the requested information, then the district engineer will notify the prospective permittee that the PCN is still incomplete and the PCN review process will not commence until all of the requested information has been received by the district engineer [NOTE: see general condition 27 for information on the content and form of the PCN].

(b) Agency coordination. The district engineer will consider any comments from Federal and state agencies concerning the proposed activity's compliance with the terms and conditions of the NWPs and the need for mitigation to reduce the project's adverse environmental effects to a minimal level.

(c) District engineer's decision. In reviewing the PCN for the proposed activity, the district engineer will determine whether the activity authorized by the NWP will result in more than minimal individual or cumulative adverse environmental effects or may be contrary to the public interest. If the proposed activity requires a PCN and will result in a loss of greater than 1/10 acre of wetlands, the prospective permittee should submit a mitigation proposal with the PCN. Applicants may also propose compensatory mitigation for projects with smaller impacts. The district engineer will consider any proposed compensatory mitigation the applicant has included in the proposal in determining whether the net adverse environmental effects to the aquatic environment or the proposed work are minimal....



28. Single and complete project. The activity must be a single and complete project. The same NWP cannot be used more than once for the same single and complete project.

3.5.2 Mitigation for the Goodby's Regional Wastewater System for Wetlands

Overall, the USFWS, USEPA, USACE, and SCDHEC have clearly identified mitigation for impacts to wetlands, with a focus on avoidance, directional boring under wetlands, and use of BMPs during construction. NWP 12 has general conditions that are similar to those mitigation measures, with an additional option of compensation for mitigating for minimal wetland losses. All agencies have agreed that, with the use of such mitigation, no adverse impacts would occur to wetlands. See Section 4.4 for details on mitigation. These mitigations would be incorporated into the proposed Goodby's Regional WWTP project through contractual requirements.

USFWS stated in three different letters (dated August 2, 2006 (See Appendix C, Exhibit C.23), July 29, 2008 (See Appendix C, Exhibit C.19), and April 23, 2009 (See Appendix C, Exhibit C.20)) that the Service applauds the use of directional drilling under wetlands and placement of pipelines in previously disturbed ROW.

The USFWS requested that any construction and maintenance activities in forested wetlands should take place outside of the breeding season for migratory birds (March through August). However, all construction involved in placing collection pipelines would occur in existing disturbed rights-of-way and therefore this condition would not apply. Construction of the WWTP would occur on an approximately 10-acre forested site and outside of the existing rights-of-way. The construction would possibly occur during the period of the migratory bird breeding season (March through August). This would be mitigated through a provision included in the contract documents requiring clearance from the USFWS prior to starting clearing operations. The Jafza Park is private property and any mitigations regarding protection of wetlands would occur through future on-site wetlands permits per Section 404 of the Clean Water Act and land disturbance permits through SCDHEC.

3.5.3 Potential Cumulative Impacts to Wetlands

Previous environmental documents prepared per NEPA and preliminary engineering reports have identified the following potential impacts to wetlands for the existing and proposed water and wastewater projects in the project area as described in Chapter 2 and summarized in Table 5.



Table 5: Potential Wetlands Impacts due to Proposed Water and Wastewater Projects

| Project | Document | Summary of Impacts |
|---|---|---|
| <p>Town of Bowman Proposed Wastewater Expansion</p> <p>Town of Bowman Proposed Wastewater Expansion</p> | <p>Draft PER 5/14/10</p> <p>USDA Approved 6/24/10</p> <p>Final EA 8/10/10</p> <p>USDA Approved 08/25/10</p> <p>Draft PER 5/14/10</p> <p>USDA Approved 6/24/10</p> <p>Final EA 8/10/10</p> <p>USDA Approved 08/25/10</p> | <p>Wastewater collection pipelines located only within existing road rights-of-way. Wastewater lines will use directional boring crossing wetlands. Location of five proposed pump station sites and the WWTP expansion will be constructed on sites that the USACE determines will not require a CWA Section 404 permit and therefore will not impact wetlands. The wetland approximation report and supporting documentation submitted to USACE indicated no permits required for the five sites and WWTP (3/30/10).</p> <p>Some buffers may be required near wetland areas. BMPS such as sediment and erosion control devices required by construction plans and contracts.</p> <p>Bowman will mitigate potential for unplanned growth by affirming a binding covenant that prohibits the extension of utility services to structures located in wetland areas and specifying that no new customer taps are to be installed in association with future development that may adversely affect a wetland, attached to USDA-RD Loan Resolution,</p> <p>USFWS 1/12/10: Avoid wetland areas, and unavoidable impacts including temporary ones must be mitigated under USACE SOP 02-01 (Section 404 of the Clean Water Act). Contact USACE to determine if wetlands are present and if a Section 404 permit is required. Provided these mitigations are incorporated into project design, it is Service's determination that this action is not likely to adversely affected federally protected species and/or designated critical habitat.</p> <p>USFWS concerned about residential and commercial development that will result from installation of centralized water services, impairing water through direct construction runoff, altered hydrology from increased impervious surface runoff, nutrient loading from wastewater discharge, and increased water temperatures from increased deforestation, among others .</p> |
| <p>Town of Bowman Proposed Water Expansion</p> | <p>PER 5/10 /10</p> <p>USDA Approved 06/30/10</p> <p>Final EA 06/23/10</p> <p>USDA Approved 06/29/10</p> | <p>Directional drilling will be performed under wetlands. Sediment and erosion devices (BMPs) required by the construction plans and contract documents.</p> <p>To avoid wetland areas, all water mains constructed within existing road ROWs except for two storage tanks, which would not be constructed in wetlands or in any area needing a USACE 404 permit.</p> <p>USACE 3/23/10: No permits would be required for elevated water storage tanks.</p> <p>Future impacts on wetlands would be mitigated by affirming a binding covenant that prohibits the extension of utility services to structures located in wetland areas. This covenant will be effective on the date that the Town of Bowman signs the Loan Resolution with USDA-RD. The covenant will specify that no new taps are to be installed in</p> |



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| | | association with future development that may result in an adverse impact to a wetland area. |
| Town of Vance Water System | Environmental Report 4/10 | <p>Two wetlands would be crossed by underground directional boring, therefore no adverse impacts to wetlands. The remainder of the project in upland areas would use open trenching, which would temporarily disturb approximately 0.1 acres of wetlands. SCDNR and USFWS indicate that if proper methods of construction are used to ensure the site is properly returned to pre-existing conditions or use construction techniques that avoid impacting wetlands, no adverse effects on identified wetland areas.</p> <p>USACE indicates that proposed action would result in minimal individual or cumulative adverse environmental effects and is not contrary to the public interest. As the proposed action would impact less than 0.5 acres, the proposed project meets the conditions of NWP 12. Induced growth is not anticipated as Orangeburg County would be the entity responsible for granting service taps along the proposed water main and could restrict water service to any structures, thereby inhibiting development in identified areas.</p> <p>Short-term impacts would be mitigated by these conditions: 1) prevent oil, tar, trash, other pollutants from entering adjacent waters or wetlands, 2) excavated material will be returned to the trench and remaining material to be placed on upland sites; 3) substrate containing roots, rhizomes, seeds etc. must be kept viable and replaced at the surface of the excavated site 4) impacted wetlands will be allowed to naturally re-vegetate from replaced substrate and/or replanted with native wetlands species; 5) each individual wetland crossing would be stabilized immediately following completion of construction at that crossing; 6) erosion control measures will be placed between disturbed area and affected wetland; 7) no fill material will be placed in wetlands or streams; 8) adjacent access roads and drainage ditches will not alter the natural flow regimes through wetland stream areas; 9) pipeline construction must be accomplished in existing disturbance corridors where applicable. Contract documents will include BMPs identified by SCDNR/USFWS: prior to construction initiation.</p> <p>SCDHEC stormwater permit must be obtained prior to the project to ensure regulatory compliance and use of BMPs.</p> <p>Long-term impacts caused by induced growth shall be avoided through implementation of a binding covenant such that no structures erected after funding approval and located within delineated wetlands are granted drinking water services from the funded project.</p> |
| Orangeburg County Water Expansion | Final EA 6/16/10 USDA Approved 06/16/10 | <p>Wetlands would not be impacted by the proposed water mains because of directional boring at wetland crossings, and USACE determined that no permits would be required for any tanks (3/23/10).</p> <p>Construction could have an indirect impact, including induced potential for future development. Using direction drilling, burying all water mains within SCDOT and Orangeburg County road rights of-way, and the use of sediment- and erosion-control BMPs, would minimize impacts to wetlands.</p> |



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| | | A binding covenant that that would be effective on the date that Orangeburg County signs the loan resolution with USDA RD specifies that no new customer taps are to be installed in association with any future development that may result in an adverse impact to wetlands would control potential indirect effects. |
| LMRWA Five-County Water System Phase II | Final USACE/USEPA EA (undated) Final USACE/EPA FONSI 2/12/04 Final Environmental Information Document (EID) USACE 10/03 | 107 jurisdictional wetlands and stream crossings would be crossed via either directional drilling or cut and cover, and would be covered by CWA Nationwide Permit 12. BMPs to impacts on wetlands and streams such as silt fencing, hay bales, directional drilling, and bridge suspension across streams and wetlands would be implemented where appropriate. |
| Southern Calhoun County Phase I Water System Expansion | Draft EA 3/2/10 | All wetlands will be avoided during construction by modifying the alignment of the water lines by using direction drilling; With this mitigation, USACE determined that a CWA Section 404 permit not needed because no direct impact or conversion of wetlands would occur. Indirect impacts to wetlands are not anticipated because of binding covenants prohibiting service to any new structures that would be located in jurisdictional wetlands. |
| Jafza Park | Section 404 Permit Application 12/08 | The project would impact 0.12 acres of federally jurisdictional wetlands, which are freshwater ditch wetlands connected to wetlands. As of 2008, the Jurisdictional Determination was pending. Conceptual project plans have almost completely avoided jurisdictional wetlands except for fill and culverts at four roadway crossings along the main ditch (0.12 acres). Jafza would coordinate with the USACE to use 0.8 mitigation credits from a USACE-approved mitigation bank, such as Beidler Forest. |
| MIP | Green Energy draft EA v.2 (undated) MIP Site Certification 01/10 | Thirteen wetlands and four streams; seven jurisdictional wetlands located along the western portion of the site hydraulically connected to Four Hole Swamp, and six non-jurisdictional wetlands scattered throughout site. USACE letter (3/6/03): 133 acres of defined jurisdictional freshwater wetlands and approximately 8 acres of defined non-jurisdictional wetlands. No wetlands associated with Four Hole Swamp would be adversely impacted by any tenants of the MIP. |



3.6 Potential Impacts to Water Quality from the Goodby's Regional Wastewater System

Both Goodby's and Four Hole Swamp are classified on the 303(d) list as "FW" - freshwater that is suitable for primary and secondary contact recreation and as a source of drinking water with a site-specific classification that requires a dissolved oxygen (DO) level not less than 4.0 mg/L and pH between 5.0 and 8.5. Both swamps are monitored as part of SCDHEC statewide water quality monitoring program. All other streams are FW: suitable for primary and secondary recreation and source of drinking water. Goodby's, Four Hole, and Providence Swamps, and Big Poplar Creek are monitored by DHEC for water quality upstream and downstream of WWTP site.

The 2008 South Carolina list of Impaired Waters (303(d) list), the most recent list, has the following designations and TMDL target dates and is illustrated in **Table 6**.

Table 6: Impaired Waters in the Orangeburg County Region

| Basin | HUC | Location | County | Use | Cause | TMDL Target Date |
|--------|--------------|---|------------|-------------------|--------------------------------------|------------------|
| Edisto | 030502050105 | Goodby's Swamp at US 176 6 mi SW of Elloree | Orangeburg | Aquatic Life | Macroinvertebrate community impaired | 2013 |
| Edisto | 030503050108 | Four Hole Swamp at US 301 | Orangeburg | Fish | Mercury | 2017 |
| Edisto | 030502050108 | Four Hole Swamp at SC 210 | Orangeburg | Recreation | Fecal coliform bacteria | 2009 |
| Edisto | 030502050108 | Unnamed Tributary to Four Hole Swamp at County Road S-38-93 5.5 miles northeast of Bowman | Orangeburg | Aquatic Life | Macroinvertebrate community impaired | 2017 |
| Edisto | 030502050302 | Providence Swamp at E frontage road to I-95 northwest of Holly Hill | Orangeburg | Aquatic Life | Copper, dissolved oxygen | 2014, 2014 |
| Edisto | 030502050305 | Four Hole Swamp at SC 453 | Dorchester | Aquatic Life/Fish | Dissolved oxygen/mercury | 2014/2017 |



The reasons for impairment of the various surface waters monitored by SCDHEC per Section 303(d) of the Clean Water Act (Table 6) are:

- Four Hole Swamp is designated as impaired due to either high coliform bacteria or high levels of mercury in fish. It is designated as FW*, which means that it is freshwater suitable for primary and secondary contact recreation and a source of drinking water, with standards set for dissolved oxygen and pH.
- Goodby's Swamp next to the WWTP site shows impairment due to high fecal coliform and impaired macroinvertebrate communities. It is designated as FW, meaning that it is suitable for primary and secondary contact recreation and a source of drinking water.
- Providence Swamp shows impairments due to high fecal coliform, low DO, and high copper levels. It is designated as FW, meaning that it is suitable for primary and secondary contact recreation and a source of drinking water.
- Big Poplar Creek downstream of the proposed lines showed impairments due to low DO levels. It is designated as FW, meaning that it is suitable for primary and secondary contact recreation and a source of drinking water.

A letter from SCDHEC (dated August 9, 2006; conclusions still valid) concurred that it does not appear that the proposed work for Goodby's Regional wastewater system would adversely affect water quality or contravene water quality standards. SCDHEC recommended the following issues be addressed when planning and constructing any non-point discharges into a stream or river from construction of areas of 1 acre or more:

- will require a Department-administered Stormwater Management and Sediment Control Permit;
- A Construction in Navigable Waters Permit will be required for all construction within navigable waters of SC;
- With new businesses and other commercial/industrial operations, wastewater pre-treatment permits and/or other local approvals may be required;
- The project would require SCDHEC to approve a preliminary engineering report and issue a land application permit and associated wastewater construction permits. DHEC's final review of the suitability of the project would be during these processes;
- Drinking water construction requires a permit from SCDHEC. Department review of acceptability will occur with review of the application for permit. The applicant should also check with local water utility on availability capacity;
- Sewer system construction requires a permit from DHEC. Department review of acceptability will occur with review of the application for permit. Check with local sewer utility on available capacity.



Treated effluent from the proposed WWTP would be applied via underground drip irrigation at Sanders Pointe Farm across US 176 from the WWTP site. This effluent would have potential nutrient loads (nitrogen and phosphorus); however, effluent would be treated to tertiary levels, including ultraviolet (UV) disinfection system, which reduces typical effluent characteristics by 90-100%. Nitrate nitrogen would be treated at the disposal site by filtering through the underground drip system will further reduce nutrient loading.

Therefore, the Goodby's Regional WWTP would have no direct adverse effects on surface water quality and could have positive effects on Four Hole Swamp by eliminating failing on-site septic systems at the residences at Bush Branch and Providence Swamp on US 176.

3.6.1.1 Protection of Water Quality Through Orangeburg County Ordinances

Section 2.4 of the Orangeburg County Zoning Ordinance, Section 2.4, Table 2 FN states that a *"riparian buffer setback not less than 40 feet [on each side] or one-third the depth of a lot or parcel, whichever is less, shall be provided along the banks of all lakes, streams or rivers. The buffer area shall remain undeveloped, except for piers, docks, and pervious access paths to the water's edge."*

The SCDHEC Stormwater Management and Sediment and Erosion Control Plan Review Checklist for Design Professionals requires: *"Delineation of all waters of the State, including wetlands, shown and labeled on plans (delineation not required if a 100-foot undisturbed buffer can be maintained between the waters of the State and all land-disturbing activities)."* Therefore, delineation of jurisdictional wetlands by the US Army Corps of Engineers per Section 404 of the Clean Water Act is not required if 100-foot undisturbed buffers are retained on either side of waters of the State (as shown on the National Wetlands Inventory Map, reviewed and approved by SCDHEC and verified through the Orangeburg County GIS mapping service and building permitting process), which includes Four Hole Swamp and its tributaries. This provides incentive to retain at least 100-foot buffers along Four Hole Swamp and its tributaries.

The land topography along Four Hole Swamp and its tributaries is generally flat and most swamps and creeks have a natural floodplain buffer that varies greatly. Using aerial photos and topographical maps, average buffer widths along tributaries to the Four Hole Swamp within the GLT are approximated to be 500 feet on each side, varying from zero feet to several miles in some areas (See Appendix B, Exhibits B.6, B.7, B.12, and B.13). Orangeburg County Flood Damage Prevention Ordinance (2009-07-20-05) controls new structural development in FEMA-designated floodplains, which includes the wetland sections of the floodplain. Again, it is approximated that the average distance between the edge of the wetland and the edge of the floodplain (which is typically dry except in times of actual flooding) is generally 500 feet. Therefore, as existing County, state, and federal ordinances and regulations control structural development in floodplains and wetlands sufficiently to protect water quality in Four Hole Swamp and its



tributaries, no additional buffer protections would be required along US 176, SC 210, and US 15.

In summary, wetlands in the GLT vicinity will be protected by existing Orangeburg County Regulations including Orangeburg County Land Use Ordinances and Orangeburg County Flood Prevention Ordinances. The Land Use Ordinances prevent indirect impacts such as increased runoff through restricting density adjacent to wetlands. Additionally, SCDHEC would serve as the state agency prohibiting development within the 100 foot buffer area. Although the boundaries of the existing wetlands have not been delineated, they have been identified and located through the use of National Wetlands Inventory Mapping (See Appendix B, Exhibit B.6). The wetlands in the vicinity are buffered by the 100-year floodplain, which is generally 500 feet beyond the boundary of the wetlands, as designated by FEMA and verified through the FEMA flood mapping (See Appendix B, Exhibit B.7) and National Wetlands Inventory Maps. Also, the existing Orangeburg County Flood Damage Prevention Ordinance (2009-07-20-05) deters growth and development in FEMA-designated floodplains which in general, averages a distance of 500 feet beyond the boundary of the wetlands. Where the floodplain boundary is less than 100 feet from the boundary of the wetlands as shown in the NWI Mapping verified by Orangeburg County GIS Mapping Services, state regulations set forth by SCDHEC will deter development within the required buffer by requiring a wetland delineation subject to SCDHEC and USACE regulations. These ordinances and regulations combined will effectively ensure that a 100-foot wetland buffer will be maintained and development will not encroach upon the existing wetlands in the Goodby's region including the Four Holes Swamp.

3.6.1.2 Mitigation for the Goodby's Regional Wastewater System for Water Quality

The following mitigation will be included in construction contracts for the Goodby's Regional WWTP and collection and conveyance systems:

- No herbicides would be applied for the Goodby's Regional wastewater systems and water system expansions within or adjacent to wetland areas;
- No fill would be placed in wetlands;
- Adjacent access roads and drainage ditches will not alter natural flow regimes through wetland areas;
- Prior to initiation of construction activities, appropriate erosion control measures, such as silt fences, silt barriers, or other suitable devices, will be placed between the construction site and affected waterways and maintained in a functioning capacity until the area is permanently stabilized upon project completion;
- All necessary steps would be taken to prevent, oil, tar, trash, debris, and other pollutants from entering adjacent waterways and/or wetlands;



- Construction activities would avoid, to the greatest extent practical, encroachment into any wetland areas. Where practicable, sidecast soil material from trench excavation would be placed on the side of the trench opposite streams and wetlands.
- Cut and cover operations use backhoes and track hoes for digging trench, and bulldozers for necessary backfill and for hauling debris. In areas that cannot support the equipment, trucks would be used to place fill on the ground to stabilize the work area. Fill material would be placed in unstable areas to allow construction, but the material would be removed and the area restored to natural elevations following construction.

A local land use disturbance/construction permit and an NPDES stormwater permit will also be required, and these should be referenced in the plans and in the specifications.

For the proposed Goodby's Regional WWTP system and associated collection system, Orangeburg County has agreed to a binding covenant consistent with Orangeburg County land use ordinances to control the number and size of wastewater connections along US 176, US 15, and SC 210 to control development (Section 3.2.4).

3.6.1.3 Potential Cumulative Impacts to Water Quality

Previous environmental documents prepared per NEPA and preliminary engineering reports have identified the following potential impacts to water quality for the existing and proposed water and wastewater projects in the project area as described in Chapter 2 and summarized in Table 7.

Per SCDHEC 303(d) water quality monitoring data, water quality in Four Hole Swamp, Goodby's Swamp, Providence Swamp, and other tributaries is impaired for fish, recreation, and/or macroinvertebrate aquatic life, depending on the monitoring station and wetland. A primary concern is coliform bacterial impairment, which can be caused by livestock and failing septic systems. This is also a potential problem with the shallow drinking water wells used throughout the area. The Town of Bowman proposed expansion of the municipal wastewater system is intended to minimize that problem to protect Cow Castle Creek. The Goodby's Regional WWTP would also provide for connections to the existing community near Bush Branch off US 176, and the community at Providence Swamp, both of which have known older failing septic systems (Section 3.5), removing a source of potential pollutants to Four Hole Swamp. No TMDLs have been established for this section of Four Hole Swamp, with earliest target dates beginning in 2013 according to SCDHEC 303(d) list for 2008. No additional TMDL monitoring is proposed or needed as effluent from the WWTP is being land-applied and will be monitored via groundwater monitoring wells regulated by SCDHEC.

Overall, the USFWS, USEPA, USACE, and SCDHEC have clearly identified mitigation for impacts to water quality, with a focus on avoidance, directional boring under wetlands, and use of BMPs during construction. NWP 12 has general conditions



that are similar to those mitigation measures, with an additional option of compensation for mitigating for minimal wetland losses. All agencies have agreed that, with the use of such mitigation, no adverse impacts would occur to water quality. These mitigations have been incorporated into the various projects, and would be incorporated into the proposed Goodby's Regional WWTP project through contractual requirements.

To control development potentially induced by the various water projects, the Towns of Bowman and Vance, and Calhoun and Orangeburg Counties have agreed to binding covenants consistent with Orangeburg County land use ordinances to control the number and size of taps and the conditions under which taps would be approved for connecting to existing and proposed water distribution systems associated with the LMRWA (Section 3.2.4).

To control development potentially induced by the Town of Bowman proposed wastewater project, Bowman has agreed to a binding covenant to control the number and size of taps and the conditions under which taps would be approved for connecting to the proposed wastewater collection system for the Town of Bowman. For the proposed Goodby's Regional WWTP system and associated collection system, Orangeburg County has agreed to a binding covenant consistent with Orangeburg County land use ordinances to control the number and size of wastewater connections along US 176, US 15, and SC 210 (Section 3.2.4).

The use of avoidance, directional boring, BMPs, and binding covenants controlling future development also controls the potential for pollutants to flow into the various wetlands in the area from the water and wastewater existing and proposed projects. For the Goodby's Regional WWTP project, the effluent would be applied into the Sanders Pointe Farm and regulated by SCDHEC. The effluent would be treated to tertiary rather than secondary standards, which results in killing pathogens, as well as further removing pollutants. The effluent would also be filtered by the soils. Monitoring would be conducted on site to ensure that operation is in compliance with SCDHEC permits for land disposal of effluents. It is possible that tenants to the Matthews Industrial Park would also use effluent for process and cooling operations, which would substantially reduce the amount of effluent necessary for land disposal. The potential biomass electrical generating plant proposed for the MIP has proposed using the treated effluent for non-contact cooling water.

For the Goodby's Regional WWTP and collection system, the primary concern with impacts to wetlands, floodplains, and water quality is the potential for inducing growth along the US 176 corridor for the collection system proposed for Exits 90 and 93 on I-95. As US 176 flows parallel to Four Hole Swamp, Audubon South Carolina has expressed concern with the potential for impairing the water quality of Four Hole Swamp, which is protected by the Beidler Forest, owned and managed by Audubon South Carolina, on the Nationwide Rivers Inventory, and is a Ramsar designated site (Section 3.7.3). Therefore, protecting Four Hole Swamp is a priority for Orangeburg County. The binding covenant consistent with Orangeburg County land use ordinance and Comprehensive Plan Future Land Use Plan would best control the potential for



development, especially residential development, along US 176 (See Section 3.2.4). Undisturbed buffer strips along wetlands required by federal, state, and county regulations and ordinances implemented along US 176, US 15, and SC 210 would sufficiently protect water quality in Four Hole Swamp and its tributaries.

With mitigation identified in Chapter 4, compliance with federal and state regulations and Orangeburg County ordinances, and the binding covenants (Section 3.2.4), no adverse direct, indirect or cumulative impacts are anticipated to water quality from the various existing and proposed water and wastewater projects.

Table 7: Potential Impacts to Water Quality due to Proposed Water and Wastewater Projects

| Project | Document | Summary of Impacts |
|--|--|---|
| Town of Bowman Proposed Wastewater Expansion | Draft PER 5/14/10 USDA Approved 6/24/10 Final EA 8/10/10 USDA Approved 08/25/10 | <p>SCDHEC determination is that Cow Castle Creek is impaired for aquatic life and recreation use due to high fecal coliform (SCDHEC 303(d) listing). Use BMPs regarding soil erosion during construction. Minimize soil disturbance and using silt fences to reduce sediment loads entering waterways. NPDES permit from SCDHEC meeting strict treatment limits for quantities and qualities of priority pollutants of concern that can be discharged in effluent. Bowman existing NPDES permit limits discharge to Cow Castle Creek to 236,000 gpd.</p> <p>Excess stormwater runoff would be controlled by BMPs.</p> <p>SCDHEC Stormwater Discharges from Large and Small Construction Activities Permit required.</p> <p>All lines crossing wetlands would use directional boring.</p> <p>USFWS is concerned about residential and commercial development that could result from installation of centralized water services, impairing water through direct construction runoff, altered hydrology from increased impervious surface runoff, nutrient loading from wastewater discharge, and water temperatures from increased deforestation, among others.</p> |
| Town of Bowman Proposed Water Expansion | Draft EA draft 5/10/10 Final EA 06/23/10 USDA Approved 06/29/10 | <p>Water systems of the Town of Bowman and LMRWA are monitored regularly for compliance with SCDHEC's State Primary Drinking Water Regulations. The project will need formal construction permits and Operating Permits from SCDHEC Bureau of Water. SCDHEC will also have to approve formal Notices of Intent for Stormwater Discharges from Large and Small Construction Activities.</p> <p>The system will have no impact on existing raw water quality or quantity. Areas surrounding the proposed construction sites, including ROWs and road ditches, will be leveled, excavated, and grassed or landscaped to prevent excess stormwater runoff. Each site will be restored for natural drainage and/or landscaped so that no major impacts would occur. The construction contractor will</p> |



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| | | be required to follow the most current BMPs for sediment and erosion control. |
| Town of Vance Water System | Environmental Report 4/10 | <p>This project would eliminate numerous wells with potentially contaminated water. Surface waters could temporarily be affected by nearby construction activities, but BMPs will be used throughout to control all surface stormwater runoff and sedimentation associated with land disturbing activities.</p> <p>Water quality monitoring station downstream associated with the Santee River Basin is located in Lake Marion; the Lake is impaired for total phosphorus, but total maximum daily Load (TMDL) is established and regulated for this area. The closest downstream station in the Edisto river basin is Four Hole Swamp near SC 453, which indicates that this reach is impaired for dissolved oxygen (DO) and mercury contamination, but no TMDL established for DO and mercury.</p> |
| Orangeburg County Water Expansion | Final EA 6/16/10 USDA Approved 06/16/10 | <p>Project will need Construction Permits and Operating Permits from SCDHEC's Bureau of Water.</p> <p>No impact on existing raw water quality or quantity; areas surrounding proposed construction sites including ROWs and ditches along roads will be leveled, excavated, and grassed or landscaped to prevent excess runoff of stormwater. SCDHEC will have to approve Notices of Intent for Stormwater Discharges from large and small construction Activities.</p> <p>Each site will be restored to mimic natural drainage patterns and/or landscaped so that no major impacts will occur. BMPs will be implemented for sediment and erosion control and directional boring will be used for crossing wetlands.</p> |
| LMRWA Five-County Water System Phase II | <p>Final USACE/USEPA EA (undated)</p> <p>Final USACE/EPA FONSI 2/12/04</p> <p>Final Environmental Information Document (EID) USACE 10/03</p> | <p>Using BMPs for erosion/siltation, and remediation procedures will prevent any long-term impacts and degradation of water quality;</p> <p>The water treatment plant is not expected to produce additional plant growth or impact clarity or water temperature during construction and operation.</p> <p>The water produced would be consistent with SC water quality regulations and meet antidegradation requirements for point and nonpoint sources.</p> <p>No water shortages within the LMRWA system are anticipated, nor would this project adversely affect the withdrawal capacities of present users of the raw water supply.</p> <p>USACE received 401 certification from SCDHEC for this proposal on 7/25/03.</p> <p>Along the northern transmission pipeline route within the TawCaw and Potato Creek watersheds:</p> <ul style="list-style-type: none"> • TawCaw Creek, aquatic life is not supported due to low DO levels and high total phosphorus concentrations; recreational uses not supported due to fecal coliform. • Potato Creek, aquatic life is present and recreational use |



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| <p>LMRWA Five-County Water System Phase II</p> | <p>Final USACE/USEPA EA (undated) Final USACE/EPA FONSI 2/12/04 Final Environmental Information Document (EID) USACE 10/03</p> | <p>is only partially supported due to fecal coliform bacteria. Along the southern transmission pipeline route in the Four Hole Swamp, Horse Range Swamp, Indian Field Swamp, Providence Swamp and Target Swamp watersheds in Orangeburg and Dorchester Counties:</p> <ul style="list-style-type: none"> • Horse Range and Target Swamp are blackwater systems, with naturally low pH and DO levels; recreational uses are partially supported due to fecal coliform bacteria. • Providence Swamp is stable for aquatic life communities, with decreasing trend of DO and high zinc; is a black water system naturally low in DO and pH; suitable for fishing and other recreational uses. • Four Hole Swamp: aquatic life and recreational uses fully supported. • Indian Field Swamp: macroinvertebrate life is present at upstream and downstream sites, but high chromium at downstream site in 1997. <p>Pinewood hazardous waste landfill near Pinewood SC is located approximately 1,200 feet from the shore of Lake Marion approximately 13 miles north northwest of the water treatment plant intake. No known releases of wastes from landfill's containment system and although the potential exists, safeguards are in place that significantly reduce risk to Lake Marion Regional System's water supply, including groundwater monitoring wells would detect releases before contaminants reached the lake. If contaminants did reach the lake, the release rate would be slow, and have significant diffusion in the lake waters, with a resulting significant reduction in contaminant concentration before contaminants reached the raw water intake. If contaminants did reach the intake, concentrations would be very low and activated carbon unit in the treatment plant would remove contaminants from water. The threat posed by the Pinewood Landfills to the system's water supply very low.</p> <p>DHEC 12/23/02: We feel that keeping the water lines within highway and existing utility line rights-of-way will minimize impacts. Additional opportunities to mitigate impacts include directional drilling at wetland crossings, not maintaining ROWs, actively re-vegetating crossings, limiting corridor widths, accessing project sites from uplands and NWP 401 conditions.</p> |
| <p>Southern Calhoun County Phase I Water System Expansion</p> | <p>Draft EA 3/2/10</p> | <p>This project will have no wastewater discharges. All water would be purchased wholesale from LMRWA treatment facility, which meets all current SCDHEC and USEPA regulations of SCDHEC and EPA for drinking water.</p> <p>Because of the extensive agricultural nature of Calhoun County and current irrigation practices by agricultural entities, installation of a potable water system service by a surface water source will relieve potential overuse and withdrawal from the aquifer.</p> |



3.7 Potentially Impacts to Formally Classified Lands

3.7.1 Context for Impacts

There would be no adverse impacts to formally classified lands except the potential for effects from runoff from potentially induced residential development near Bowman and along US 176 into Four Hole Swamp (Section 3.7.3), which is on the Nationwide Rivers Inventory (NRI). The rationale for this conclusion is found in Section 3.7.6. The Congaree and Wateree NRI are not located within or near the GLT.

No commercial, residential or industrial development would be approved within any of these Formally Classified Lands by the authorized managing entity and the GLT is not in close proximity to any of these lands. Therefore, none of the existing or proposed projects have direct or indirect impacts on Formally Classified Lands. Mapping associated with formally classified lands can be found in Appendix E, Exhibit E.1 thru E.8.

Therefore, the analysis in Section 3.7 will focus on potential impacts to Four Hole Swamp as a segment of the Edisto River, a designated river on the NRI.

3.7.2 Nationwide Rivers Inventory and Four Hole Swamp

3.7.2.1 Context for Impacts

The NRI is a listing of more than 3,400 free-flowing river segments in the United States that are believed to possess one or more "outstandingly remarkable" natural or cultural values judged to be of more than local or regional significance. Under a 1979 Presidential Directive and associated Council on Environmental Quality (CEQ) procedures, all federal agencies must seek to avoid or mitigate actions that would adversely affect one or more NRI segments. The North and South Forks of the Edisto River, including portions of Four Hole Swamp, are on the NRI. The protected reach of Four Holes Swamp spans from its intersection with US 301 to its confluence with the Edisto River. The confluence of the North and South Forks of the Edisto River is located approximately seventeen (17) miles southwest of the limits of the GLT, but the proposed project area is at the headwaters of Four Hole Swamp, with its major tributaries of Goodby's Swamp and Providence Swamp. There would be no direct impacts to these portions of the listed river. However, the Goodby's Regional WWTP and collection and conveyance pipelines along US 176 are located within the general vicinity of Four Holes Swamp.

Per the NRI requirements, in order to determine if an adverse impact would occur, the environmental reviewer shall consult the National Park Service if the project involves any of the following three (3) requirements:

- Involves withdrawing water from the protected river or discharging water from a point source such as a wastewater treatment plant or
- Would be located within one-quarter mile of the banks of the protected river, or



- Would be visible from the banks of the protected river.

Purchased by the Audubon Society (Audubon South Carolina) and The Nature Conservancy in 1969, the Francis Beidler Forest, which is within Four Hole Swamp, is the largest area of virgin bald cypress and tupelo gum braided blackwater swamp forest in the world, including 1,500 year old trees. Audubon South Carolina has been continuously purchasing tracts of land in Four Hole Swamp to protect unique habitat, and received a \$1 million grant from the US Fish and Wildlife Service to purchase more land in Dorchester County, announced June 21, 2010. Four Holes Swamp feeds one-third of the flow into the Edisto River, which then feeds two-thirds of the water into the ACE basin, the landmark public and private conservation effort that has preserved more than a quarter-million conservation acres along the rapidly-developing Low Country coast. In addition to its unique ecosystems, it is a critical component of the Atlantic flyway for migrating birds.

The Ramsar Convention on Wetlands (Ramsar) is a worldwide treaty which provides a non-regulatory structure for the conservation of wetlands within a nation's borders, in conjunction with international cooperation for the conservation and best practices for the use of wetlands and their resources. It was created in 1971 in the city of Ramsar, Iran and ratified in 1975. Although non-regulatory, the Ramsar designation has considerable strength and has been pivotal in providing education and protecting wetlands worldwide. The Ramsar designation focuses on conservation, not protection, and the Ramsar Convention recognizes that wetlands are an important part of a nation's economy and food web and, while they may need to be protected, they can also be used sustainably. The three basic tenets of the Ramsar Convention are: 1) Designate specific wetlands as Wetlands of International Importance; 2) apply a "wise use" philosophy to the designated wetland; and 3) engage in international cooperation. Wetlands submitted for consideration must meet at least one of nine ecological criteria and be selected by the Ramsar Secretariat. For submittal of a site in the US, the site must have local support from the state natural resources agency and from at least one member of Congress, and all landowners must consent to the designation. In the US, Ramsar designation tends to increase the potential for obtaining grants for land acquisition, support for the site and surrounding areas, and, to a lesser extent, scientific research and ecotourism. (Garner, R.C. and K.D. Connolly. 2007. *The Ramsar Convention on Wetlands: Assessment of International Designations in the United States*. 37 ELR 10089-10113). As of June 2010, the United States has 26 sites included on the Ramsar List of Wetlands of International Importance (of a total of 1890 sites worldwide), and others are in the application process. The Francis Beidler Forest was designated as a Ramsar site on May 30, 2008.

3.7.2.2 Analysis of Impacts to NRI Characteristics of Four Hole Swamp from Goodby's Regional Wastewater System

As the Goodby's Regional WWTP would be constructed on upland areas within the site, no fill of Four Hole Swamp or Goodby's Creek would occur. The pipeline from the WWTP to the Sanders Pointe effluent disposal site would be placed using directional



drilling under Goodby's Creek. No discharge from the WWTP would occur into surface waters. Therefore, no direct impacts to Four Hole Swamp or Goodby's Creek would occur.

The primary concern with Four Hole Swamp is the potential for Goodby's Regional wastewater service, proposed to be constructed along US 176 from its junction with US 301 to I-95, in combination with proposed public water service, to facilitate development, primarily residential, on smaller tributaries to Four Hole Swamp and Providence Swamp.

As US 176 parallels Four Hole Swamp, development along this road has the greatest potential to impact the Swamp. The water service proposed for construction along US 176 would serve the existing older residential development near Bush Branch, and a lift station for wastewater service is also proposed to service this community. However, it would be sized for the current service, not to encourage more residential housing in the area. A wastewater lift station to serve the collection system for exit 93 on I-95 via Vance Road (SC 210) and a localized older community (Providence Swamp) is proposed at the intersection of SC 210 and US 176, but again, it is not intended to encourage residential growth. The commitment to binding covenants regarding tap size for water and wastewater service that is consistent with Orangeburg County land use ordinances (Section 3.2), is intended to limit new development along US 176. Existing federal, state and county laws, regulations, and ordinances protect floodplains and wetlands along US 176, US 15, and SC 210 (Section 3.2). Proposed wastewater service to the community at Bush Branch and Providence Swamp would also eliminate old on-site septic systems that have been reported to be failing, further protecting Four Hole Swamp.

Therefore, the proposed Goodby's Regional wastewater system would not adversely impact, either directly or indirectly, the NRI characteristics of Four Hole Swamp.

3.7.2.3 Mitigation for the Goodby's Regional WWTP for Protection of NRI Characteristics of Four Hole Swamp

See Section 3.2.4 for wording for the binding covenant for the Goodby's Regional wastewater system to supplement the Orangeburg County Zoning and Development ordinances to control residential and commercial development outside of designated areas, especially along US 176. Orangeburg County has the authority to control the location and type of commercial/industrial growth through its land use ordinances, policies, and decisions.

Any new development in the area outside of the Matthews Industrial Park, the County/City Industrial Park and the Jafza Logistics Park is expected to consist of residential or small commercial development. Outside of these development zones, the County would restrict the amount and type of development that is served by the proposed Goodby's Regional wastewater system through ordinances supplemented by the binding covenant, which would be instituted as part of the USDA RD loan agreement or the USACE PPA.



No additional mitigation is required.

3.7.2.4 Potential Cumulative Impacts to NRI Characteristics of Four Hole Swamp

The Orangeburg County proposed water expansion will cross through Four Hole Swamp along SC 210 within the existing SCDOT road embankment and will cross existing bridged wetlands using directional boring to avoid impacts. The USDA-RD State Environmental Coordinator determined no impact on Four Hole Swamp for the proposed Orangeburg County Water System Expansion; the National Park Service concurred in letter dated March 3, 2010. See Appendix C, Exhibit C.25. The water main along US 301 has already crossed Four Hole Swamp using directional drilling, with no adverse impacts.

The analysis of the potential for induced growth (Section 3.2), indicates that US 301 is designated as a growth corridor for mixed development (industrial/commercial and residential). Water service is already present and wastewater service is planned as part of the Goodby's Regional wastewater system. Development along US 301 would not occur in wetland areas, including Goodby's Swamp, and therefore development along this route would not adversely impact Four Hole Swamp. No adverse impacts would be caused to Four Hole Swamp, either physically or through degradation of water quality through construction or operation of the Goodby's Regional WWTP and its collection and conveyance system. Elimination of failing septic systems in the existing communities near Bush Branch and at Providence Swamp would potentially improve the quality of the water flowing into Four Hole Swamp from these areas. None of the existing or proposed water or wastewater projects would adversely affect Four Hole Swamp or its ecological and other qualities that led to its designation on the NRI or as a Ramsar site. The potential for induced residential growth along US 176, US 15, and SC 210 would be controlled as described in Section 3.2.

3.7.3 Other Formally Classified Lands

- **Coastal Barriers and/or National Seashores:** Orangeburg County is not considered one of the eight coastal counties in South Carolina and therefore none of the projects has the potential for direct or indirect impact on either Coastal Barriers or National Seashores.
- **National Forests:** Portions of Orangeburg County are located in the Santee Cooper Lakes region of the State of South Carolina. There are no National Forests in the immediate project area that could be impacted directly or indirectly as depicted in the Francis Marion and Sumter National Forest map, which shows the location of all National Forests within South Carolina. See Appendix E, Exhibit E.1.
- **Natural Landmarks:** South Carolina currently has six areas included in the National Registry of Landmarks: The Francis Beidler Forest in Berkeley and Dorchester Counties, John de La Howe Forest and Stevens Creek Natural Area in McCormick County, Congaree River Swamp in Richland County, Flat Creek



Natural Area, Forty Acre Rock in Lancaster County, and St. Phillips Island in Beaufort County. This project area is geographically removed from any of these Natural Landmarks with the exception of the Francis Beidler Forest which is discussed in Section 3.7.3.

- **National Parks and Monuments:** The closest National Park or Monument is the Congaree National Park near Hopkins, SC, which is not in the vicinity of the project area. The closest National Battlefield and Historic Park Site is the Fort Sumter National Monument in Charleston Harbor, SC, which is not in the vicinity of the project area. See Appendix E, Exhibit E.2 (1-4)
- **National Seashores and Trails:** South Carolina is bisected by the Overmountain Trail; however, the proposed project area is not in this region of the state. There are no local trails in this region of Orangeburg County as illustrated in National Parks, Battlefields, Monuments, Sites, Trails, and Corridors Map and the Location Map of National Trails in Orangeburg County, South Carolina. There are no National Seashores or Lakeshores in South Carolina. See Appendix E, Exhibit E.3.
- **Wild and Scenic Rivers:** Based on a review of the National Wild and Scenic Rivers listed in South Carolina for South Carolina, none of the water and wastewater projects would affect a river or portion of a river included in the Wild and Scenic Rivers System, as the only Wild and Scenic River in South Carolina is the Chattooga River, which is not in the vicinity of the proposed project. See Appendix E, Exhibit E.4 (1-3).
- **State Parks:** The Santee State Park is located in Orangeburg County along the southern shores of Lake Marion adjacent to the proposed Lakewilde and Blackwater Plantation residential developments in southern Calhoun County. However, no residential, commercial, or industrial development would be approved within the boundaries of the state park. See Appendix E, Exhibit E.6 (1-2).
- **National Wildlife Refuges and National Wildernesses:** The closest wilderness area is the Congaree National Park near Hopkins, SC, which is not in the vicinity of the project area. Orangeburg County does have a National Fish Hatchery located along the banks of the North Fork of Edisto River near the City of Orangeburg. The National Fish Hatchery is located approximately sixteen miles west of the limits of the proposed project area. The closest national Wildlife Refuge is the Santee National Wildlife Refuge in Summerton, SC, which is approximately nine miles northeast of the project area. See Appendix E, Exhibit E.7 and Exhibit E.8.
- **Native American-Owned Lands:** The closest Reservation is the Catawba Indian Reservation near Rock Hill, SC, which is not in the vicinity of the project area.



3.8 Potential for Impacts to Threatened and Endangered Species

3.8.1 Context for Impacts

Data and field surveys have been conducted for the various water and wastewater projects described in this environmental assessment (See Appendix C, Exhibit C.13, Appendix D, Exhibit D.3, and D.4). Based on this information, informal Section 7 consultation per the Endangered Species Act (ESA) was conducted with the US Fish and Wildlife Service (USFWS) for the Goodby's Regional wastewater system, with the results disclosed below. Brief descriptions of the primary species potentially found in the study area follow:

3.8.1.1 Shortnose sturgeon (*Acipenser brevirostrum*)

Shortnose sturgeon, listed as Federally Endangered per the ESA are bottom feeders, inhabiting coastal marine and estuarine waters and Piedmont rivers. Sturgeon spend more of their time in rivers and estuaries, and less time in the marine environment than the related Atlantic sturgeon (*A. oxyrinchus*). Natural spawning areas include higher-gradient riverine reaches with extensive cobble, gravel, and rocky or limestone substrates, located mostly in main stem rivers or larger tributary reaches, or the "fall zone" between the Coastal Plain and Piedmont area of South Carolina.

Since 1900, most Atlantic Coast Piedmont rivers have been fragmented by hydroelectric dams, blocking sturgeon access to historical prime spawning areas. In addition to population declines caused by fishing, since the shortnose sturgeon spends most of its life cycle in the near coastal and riverine areas, the dams resulted in its listing as endangered. The National Marine Fisheries Service (NMFS) has identified the main riverways in South Carolina as anadromous fish habitat, including habitat for shortnose sturgeon. The species is also sensitive to unnatural noise and vibration, and may abandon spawning runs when subjected to construction disturbances such as barge-mounted heavy machinery, blasting, or dredging. Shortnose sturgeon are sensitive to sediment in rivers, and the low-topographical characteristics of the rivers in the study area create natural conditions for high water turbidity caused by sediment from agricultural activities, forest management, and development.

Essential Fish Habitat for sturgeon in South Carolina includes habitat in tidal-influenced palustrine emergent and forested freshwater wetlands. According to the Southeast Atlantic Habitat Management Plan prepared per the Magnuson-Stevens Act, primary threats include overfishing, introduction of alien species, and land-based activities such as agriculture, timber harvest, and development and associated habitat alteration, destruction, and sedimentation.

3.8.1.2 American chaffseed (*Schwalbea americana*)

American chaffseed, listed as endangered per the ESA, is primarily impacted by habitat loss from overgrowth of dense understory vegetation in forests from lack of disturbance, especially fire suppression. This perennial root-parasitic plant occurs in