Englewood Water District

Wastewater System Improvements

Facilities Plan

September 2023

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This document, assembled by Angie Brewer & Associates, LC, contains information provided the Englewood Water District, Kimley-Horn and Associates, Inc., and HDR Engineering, Inc. It also contains the information listed in Rule 62-503.700 F.A.C.

I certify that that this report has been prepared using sound engineering principles.

Keith R. Ledford, Jr. P.E.

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Date: 11-1-2023

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TABLE OF CONTENTS

LIST OF APPENDICES

LIST OF COMMON ACRONYMS

CWA	Critical Wildlife Area
EPA	United States Environmental Protection Agency
EWD	Englewood Water District
F	Fahrenheit
F.A.C.	Florida Administrative Code
FDEP	Florida Department of Environmental Protection
FDOT	Florida Department of Transportation
FWC	Florida Fish and Wildlife Conservation Commission
FWS	United States Fish and Wildlife Service
LS	Lift Station
MGD	Million Gallons per Day
MHI	Median Household Income
SRF	State Revolving Fund
SWFWMD	Southwest Florida Water Management District
US	United States
WRF	Water Reclamation Facility

LIST OF TABLES

LIST OF FIGURES

ACKNOWLEDGEMENTS

This document was compiled by Angie Brewer & Associates, LC for the Englewood Water District. The background and engineering information contained within this Facilities Plan is a summary of information provided by the Englewood Water District, Kimley-Horn and Associates, Inc., and HDR Engineering, Inc.

1

SECTION 1 – EXECUTIVE SUMMARY

1.1 INTRODUCTION

This Facilities Plan and Capital Financing Plan have been prepared to complete a step in the process of establishing the eligibility of the Englewood Water District (EWD) for low-cost State Revolving Fund (SRF) loans to finance wastewater system improvements. The SRF program provides low interest loans to local governments for the planning, design, and construction of utility systems.

The Florida Department of Environmental Protection (FDEP) administers the Florida SRF program. Under the SRF program, local governments are required to submit to FDEP Facilities Plans and Capital Financing Plans containing detailed planning, financial, and technical information for the purpose of obtaining environmental clearance for the proposed project.

This Facilities Plan was prepared to meet the requirements of the SRF loan program. The Planning Area is the EWD utility service area. A map of the Service Area has been included in Section 2 as Figure 2-1.

Review of this document, consideration of public input, and adoption of the Facilities Plan by the EWD Board of Supervisors is required by the SRF program. Adoption of the Plans by the EWD Board in no way commits the EWD to construct the projects, nor does it commit the EWD to use SRF funding or FDEP to offer SRF funding.

1.2 EXISTING WASTEWATER TREATMENT AND COLLECTION SYSTEM

The EWD owns and operates a wastewater treatment and collection system. The major components of the system include a water reclamation facility, approximately 110 miles of gravity sewer main and force mains, 126.2 miles of vacuum collection lines, 79 lift stations, 7 vacuum stations, 13 low-pressure stations, and a vacuum booster station.

1.3 NEED FOR THE PROJECT

To ensure the proper functioning of its wastewater system, the EWD must make necessary improvements and upgrades. The improvements outlined in the following sections are required in order to maintain standards required by regulatory agencies and to ensure the EWD's wastewater system is functioning at sufficient levels to ensure the health and safety of system users.

1.4 THE SELECTED PLAN

The proposed project primarily includes construction of a new Water Reclamation Facility (WRF) (North), improvements to the existing WRF (South), downsizing of the Holiday Ventures Lift Station, and installation of force mains. The new WRF will be designed for 4.0 MGD with the first phase being 2.0 MGD.

1.5 FINANCING THE IMPROVEMENTS PROJECTS

The EWD is seeking consideration for low-interest SRF Construction Loan funding from FDEP for approximately $122.5 million based upon preliminary planning estimates. This amount includes the estimated cost of construction, contingency, technical services, capitalized interest, and loan service fee. A detailed breakdown of the costs has been included in Section 8. The SRF interest rate may fluctuate by calendar quarters. A rate of 0.166% has been used to calculate the estimated annual payments of approximately $7,164,361 (including a coverage rate of 115 percent).

The planning process for this project has established that the gross revenues currently generated by the water and wastewater systems are sufficient to support the estimated annual SRF loan debt payments.

2

SECTION 2 – INTRODUCTION

2.1 BACKGROUND

Partially located in both Sarasota and Charlotte Counties, the Englewood Water District (EWD) was created in 1959 as a political subdivision of Florida. The EWD encompasses approximately 44.5 total square miles and is home to an estimated 40,032 residents, based on data from the *2017 Utility Master Plan* prepared by HDR Engineering, Inc.

The EWD is governed by a five-member Board of Supervisors elected by EWD customers. The EWD is responsible for the operation and maintenance of its water and wastewater systems to ensure adequate levels of service to residents, businesses, and visitors.

2.2 PLANNING AREA AND NEED

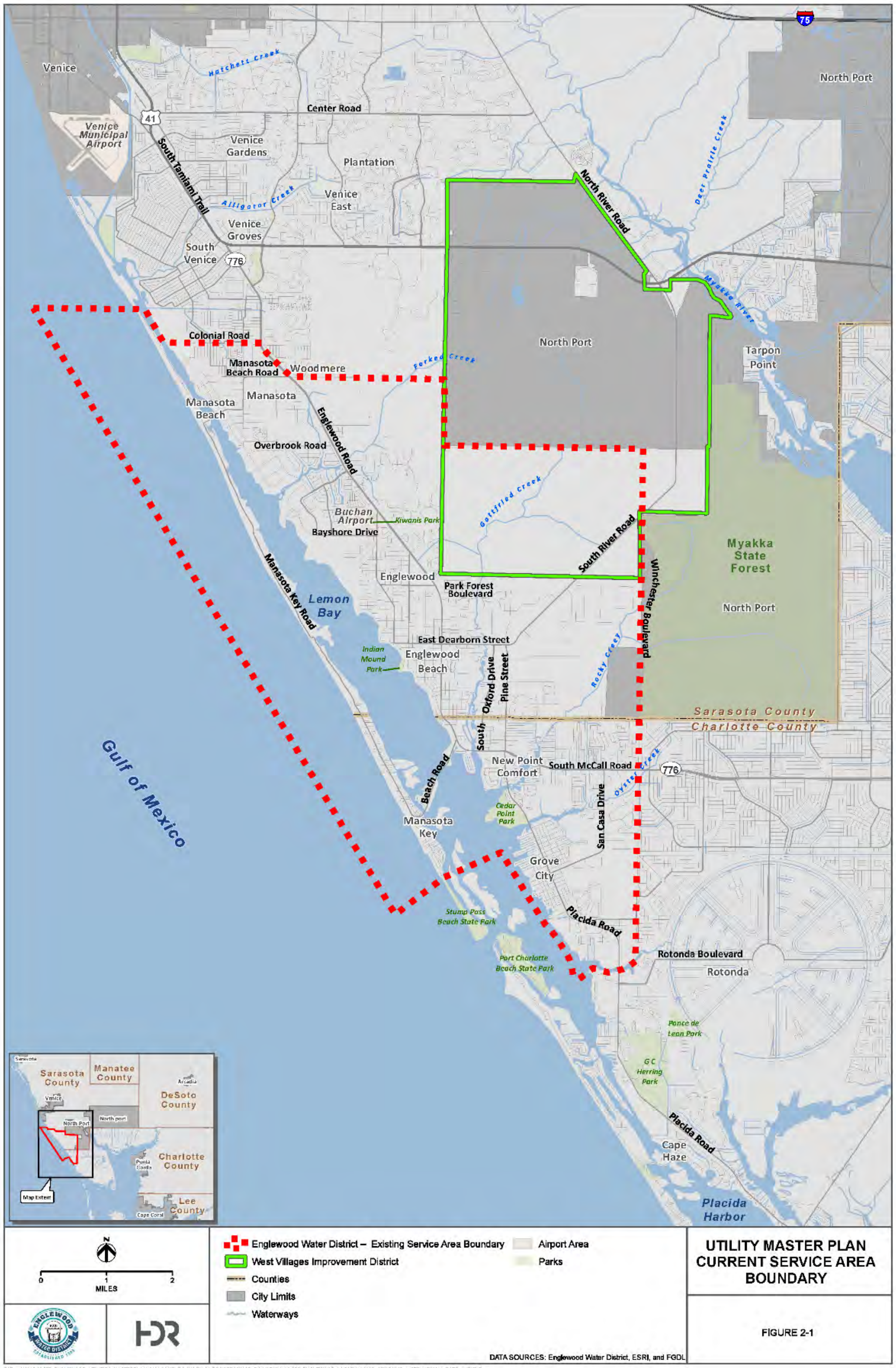
The Planning Area identified for this Facilities Plan is the EWD utility service area. In its role of protecting the health, welfare, and safety of its customers, the EWD continuously evaluates its utility systems to identify needed projects that are environmentally sound, technically feasible, cost-effective, permittable, and implementable. Using this set of criteria, this Facilities Plan has been prepared to present wastewater system improvements identified to meet the needs of its customers. A map of the Service Area is below as Figure 2-1.

2.3 PLANNING PERIOD

The wastewater system improvements identified in this Plan were proposed in the *2021 Holiday Ventures and Sewer Master Plan Update* as prepared by Kimley-Horn and Associates, Inc. and is based on a planning period of 20-Years.

The recommendations of this planning document are consistent with the Comprehensive Plans for Sarasota County and Charlotte County.

Figure 2-1
Englewood Water District Service Area Map



Source: 2017 Utility Master Plan, HDR Engineering, Inc.

3

SECTION 3 – ENVIRONMENTAL ASPECTS

3.1 INTRODUCTION

The environmental aspects of this project have been evaluated as described in this section. It is not anticipated that any site related environmental impacts will occur, however the project design will mitigate any potential impacts and the specifications will require appropriate mitigation measures.

Temporary adverse impacts anticipated during construction include increased noise levels and an increase in the number of airborne particulates. Control measures will be implemented to mitigate these temporary impacts.

It is expected that review by various crosscutting environmental agencies will establish that the proposed project will not have a significant adverse effect upon flora, fauna, threatened or endangered plant or animal species, prime agricultural lands, wetlands, undisturbed natural areas, or the socioeconomic character of the area.

3.2 DESCRIPTION OF PLANNING AREA

The Planning Area boundaries are the same as the Englewood Water District (EWD) utility service area. The portions of the Planning Area fall within Sarasota and Charlotte Counties.

The proposed projects will be constructed inside the boundaries of the Planning Area.

3.2.1 SURFACE AREA

The EWD is a political subdivision of the State of Florida. Located along the Gulf of Mexico, the EWD encompasses approximately 44.5 square miles and includes portions of southern Sarasota County and western Charlotte County.

3.2.2 CLIMATE

The climate of the Planning Area is humid and subtropical due to its proximity to the Gulf of Mexico. The month of January typically has the lowest temperatures during the year: an average high of 71° Fahrenheit (F) and an average low of 54° F. The average high temperature steadily increases during the year until reaching an average of 89° F for the month of August before beginning to cool again through December. The highest average rainfall months are typically June, July, August, and September where the average rainfall is nearly triple the amount compared to any other month. Table 3-1 shows the monthly average high temperature, average low temperature, average rainfall, and average water temperature for the Planning Area.

Table 3-1
Planning Area Monthly Weather Averages

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Average High	71ºF	72ºF	76ºF	80ºF	84ºF	88ºF	88ºF	89ºF	87ºF	84ºF	78ºF	74ºF
Average Low	54ºF	56ºF	59ºF	64ºF	77ºF	80ºF	81ºF	82ºF	80ºF	76ºF	69ºF	65ºF
Average Rain	2.0"	2.0"	2.2"	1.7"	2.0"	4.5"	4.8"	5.1"	4.9"	2.3"	1.5"	1.5"

Source: weatherspark.com, 2023

3.2.3 TOPOGRAPHY AND DRAINAGE

The topography of the Planning Area is characterized as flat, low-lying, and poorly draining. The elevation is 10 ft above sea level. Both natural and man-made drainage features currently accommodate stormwater drainage within the Planning Area. These systems provide on-site retention/ detention and a certain amount of percolation of run-off.

3.2.4 GEOLOGY AND SOILS

The EWD lies in an area with a range of soil types from poorly drained and sandy soils, to moderate to deep depth soils, to organic subsoils. Over seventy types of soil have been identified in the Planning Area. For a more detailed description of soils in the Planning Area, please see the *Custom Soil Resource Report for Charlotte County, Florida, and Sarasota County, Florida* prepared by the United States Department of Agriculture, Natural Resources Conservation Service included in Appendix F.

3.2.5 SURFACE AND GROUNDWATER HYDROLOGY

3.2.5.1 SURFACE WATER SYSTEMS

The Planning Area is situated along the Gulf of Mexico and includes portions of Lemon Bay. Lemon Bay has been established as an aquatic preserve, part of the larger Charlotte Harbor Aquatic Preserves. As such, Lemon Bay is a delicate ecosystem containing mangroves, seagrasses, and oysters. Other surface waters within the Planning Area consist of a number of freshwater creeks, streams, and marsh lands which include Forked Creek, Gottfried Creek, Ainger Creek, and Oyster Creek.

3.2.5.2 GROUNDWATER SYSTEMS

The EWD obtains water from 5 wellfields with a total of 80 production wells in depths from 40 feet to 430 feet. These are a combinate of freshwater and brackish water wells that draw from the Floridan and Upper Hawthorne Aquifers, as well as Surficial Aquifers depending on their depth. Two water treatment plants are used to treat the water drawn from the wells. A lime softening plant is used to treat the freshwater supply while a reverse osmosis plant is used to treat the brackish water supply.

3.2.6 ECOLOGY

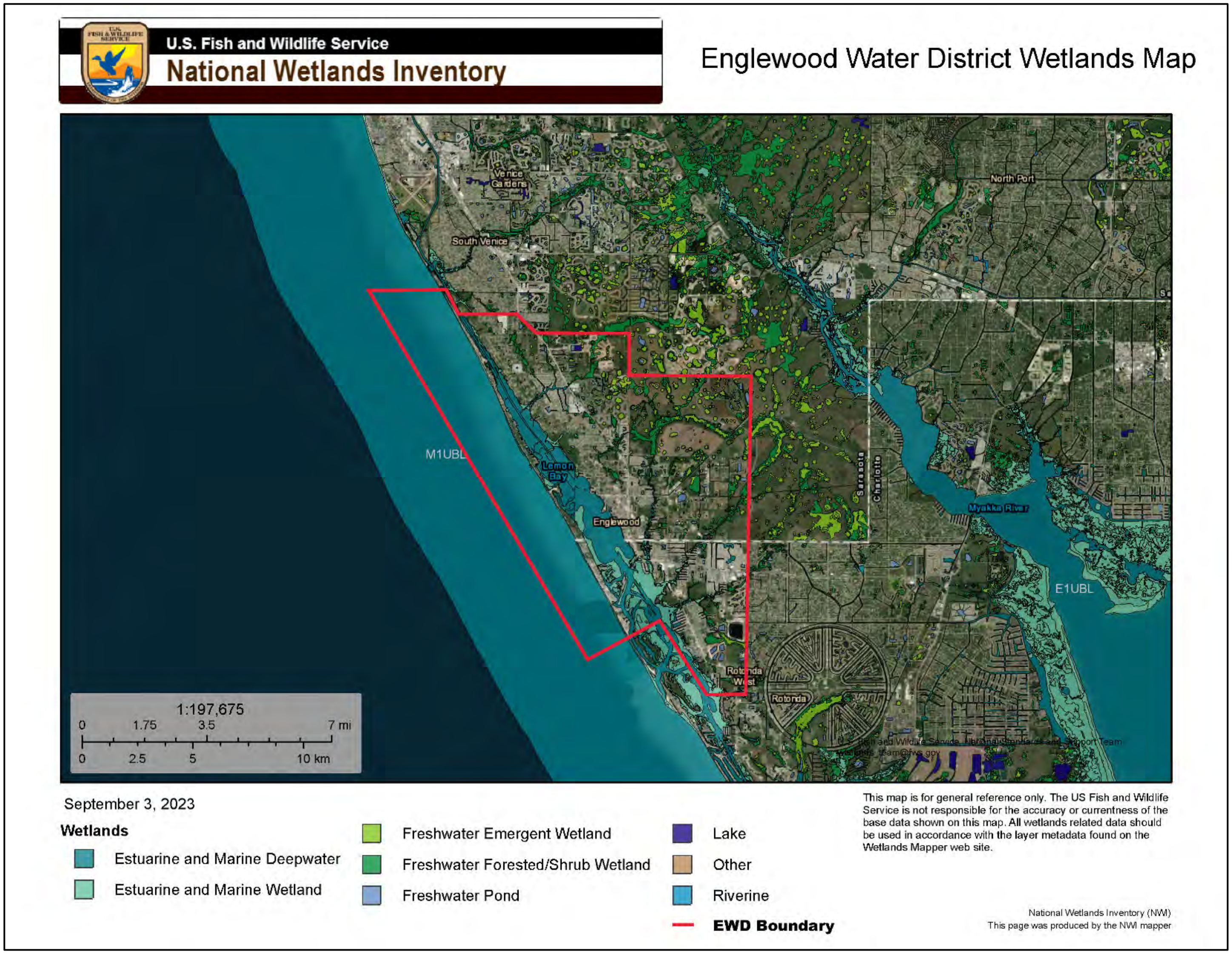
3.2.6.1 ENVIRONMENTALLY SENSITIVE LANDS

The Florida Critical Wildlife Area Program, which began in 1977, is a cooperative approach to protecting concentrations of one or more wildlife species that are in danger of extinction. Critical Wildlife Areas (CWA) ban human, domestic animal, and vehicular trespass during certain times of the year. They become mini sanctuaries for wildlife surrounded by inhospitable landscapes. This program is managed by the Florida Fish and Wildlife Conservation Commission (FWC). CWA protection is used only for sites where the potential for damage to these species caused by unregulated human activities is imminent. There are two CWAs within Sarasota County and none within Charlotte County. The focal species include spoonbills, pelicans, cormorants, herons, egrets, anhinga, and storks. There are no CWAs located within the Planning Area.

3.2.6.2 WETLANDS

The Planning Area has numerous wetlands and wetland systems disbursed throughout the area. Figure 3-1 is a wetlands map for the Planning Area.

Figure 3-1
Planning Area Wetlands Map



Source: US Fish and Wildlife Wetlands Mapper

3.2.6.3 PLANT AND ANIMAL COMMUNITIES

It is anticipated that the proposed projects will have no effect on the flora and fauna that may be found within the Planning Area.

Flora:

According to the United States Fish and Wildlife Service (FWS), there are two species of flora found in Sarasota County and two species of flora founds in Charlotte County that are classified as endangered. These are the Aboriginal Prickly-apple, Pigmy Fringe-Tree, and Beautiful Pawpaw. There are no species classified as threatened in the Planning Area.

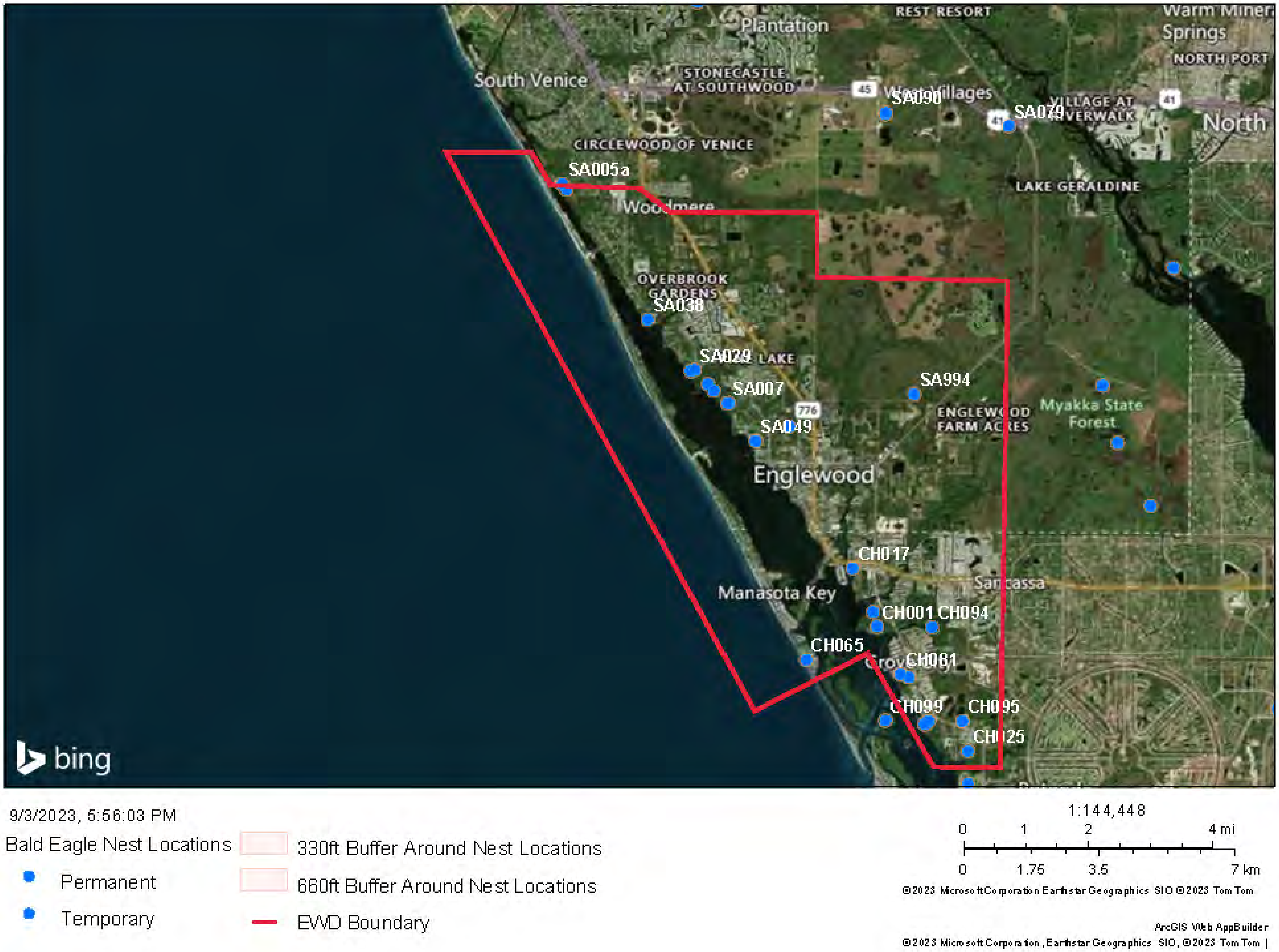
Fauna:

The FWS has identified twenty species of fauna in Sarasota County and twenty-one species of fauna in Charlotte County which have been classified as either endangered or threatened. The species considered endangered are the Eastern Black Rail, Red Knot, Everglade Snail Kite, Florida Scrub-Jay, Piping Plover, Audubon's Crested Caracara, Wood Stork, Red-Cockaded Woodpecker, Gulf Sturgeon, Florida Bonneted Bat, Puna, Florida Panther, Tricolored Bat, West Indian Manatee, Green Sea Turtle, Loggerhead Sea Turtle, American Alligator, American Crocodile, Eastern Indigo Snake, Leatherback Sea Turtle, Hawksbill Sea Turtle. The Gopher Tortoise and Monarch Butterfly are listed as candidates or resolved taxon.

Bald Eagles:

While no longer considered a threatened or endangered species, Bald Eagles are still protected by state and federal regulations. The Audubon Center for Birds of Prey, Audubon EagleWatch program maintains a mapping system with the most current locations of Bald Eagle nests. Based on this mapping system, there are over twenty Bald Eagle nests located within the EWD Planning Area. Figure 3-2 identifies these nest locations.

Figure 3-2
Bald Eagle Nest Locations



Source: National Audubon Society, Audubon Center for Birds of Prey

3.2.7 AIR QUALITY

Air quality within the Planning Area is considered to be good. According to the Environmental Protection Agency (EPA), the 2022 report for the geographic area of Sarasota County, FL show that there were 302 good days, 56 moderate days, and 0 unhealthy day for sensitive groups, and no unhealthy days, or very unhealthy days on record for 2022. At present, there are no major fixed identified sources of air pollution in the Planning Area.

3.2.8 ARCHEOLOGICAL AND HISTORIC SITES

According to the State Division of Historical Resources, there are no historical markers located within the Planning Area. The National Register of Historic Places lists three historical resources within the Planning Area. These resources are listed below in Table 3-2.

Table 3-2
National Register of Historic Places

Site Name	Location
Lemon Bay Woman's Club	51 N. Maple St., Englewood, FL
Hermitage--Whitney Historic District	6660 Manasota Key Rd., Englewood, FL
Manasota Beach Club Historic District	7660 Manasota Key Rd., Englewood FL

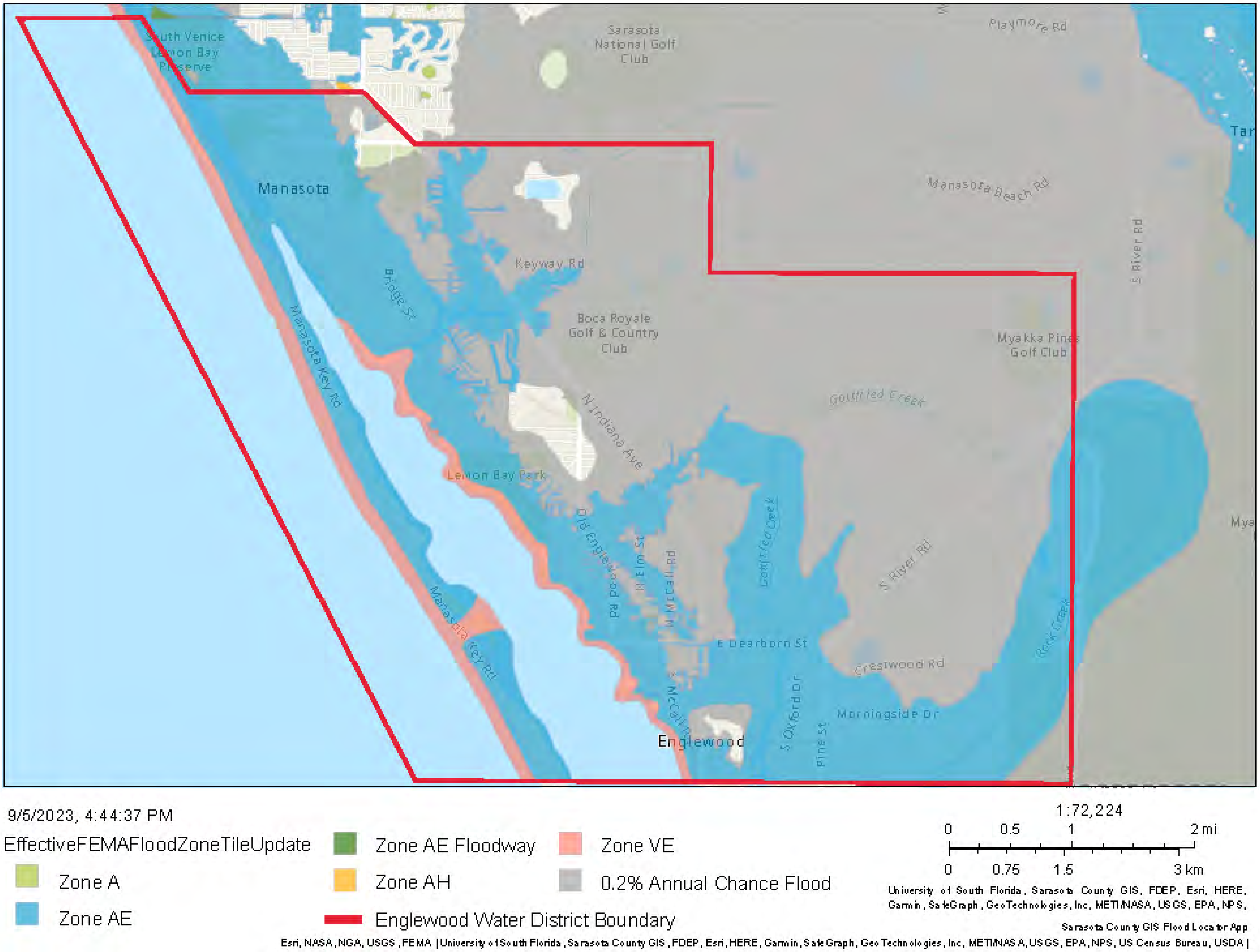
Source: National Register of Historic Places

It is anticipated that the proposed project will have no effect on the historical resources found within the Planning Area.

3.2.9 FLOOD PLAIN

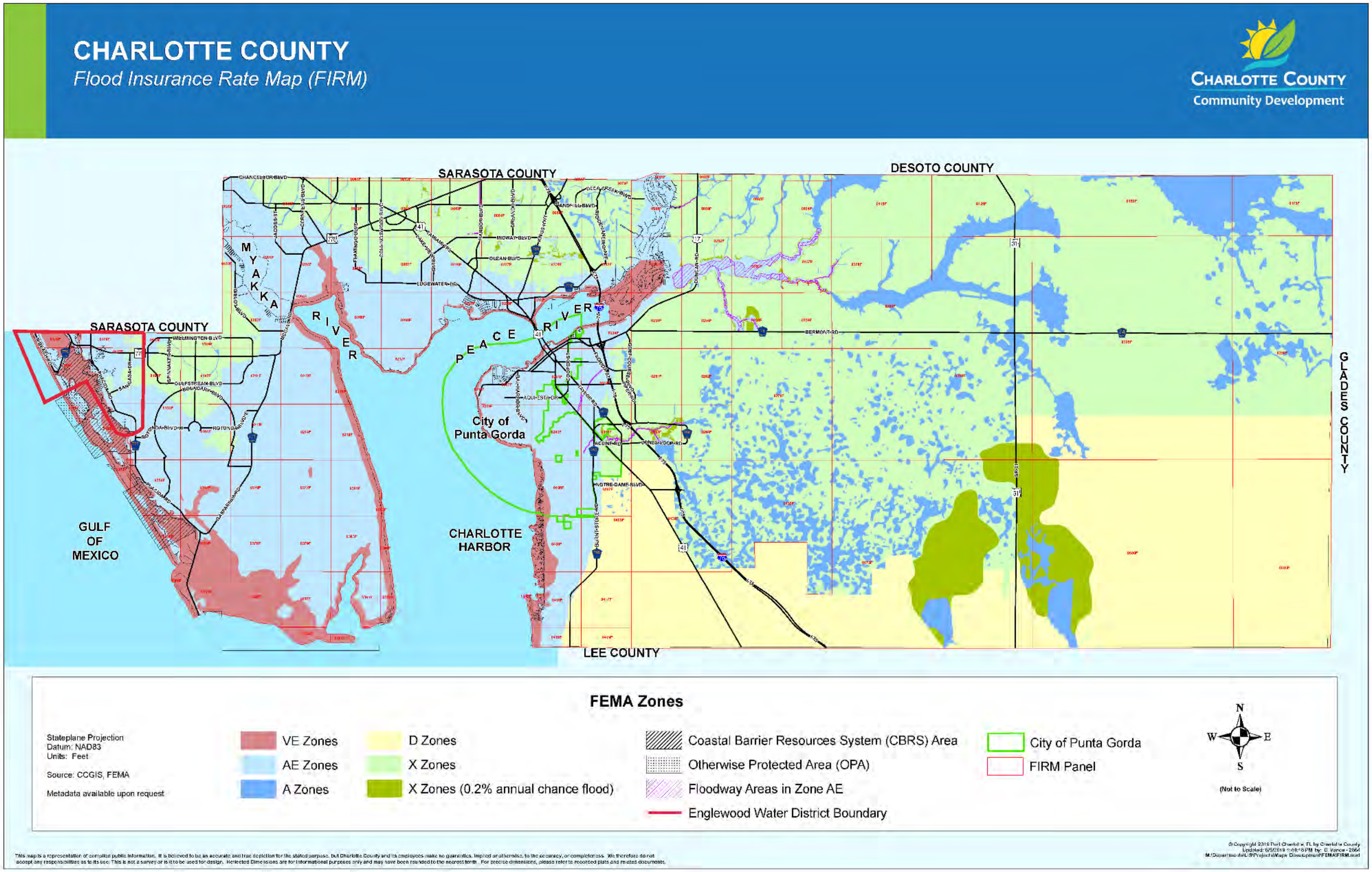
According to Sarasota and Charlotte County flood maps, the flood plains in the EWD are assigned to zones AE, VE, and X**.** Zone AE is characterized by 100-year flooding, for where the base flood elevations have been determined. Zone VE is defined by areas of 100-year coastal flooding with wave action. Zone X is defined by areas is 500-year flooding; areas with 100-year flood average depths of less than 1 foot; or areas determined to be outside 500-year floodplain. Project planning will include appropriate design details to adequately address flood zone issues. Figures 3-3 and 3-4 illustrate the flood plains within the EWD.

Figure 3-3
Flood Zone Map – Sarasota County



Source: Sarasota County Website: https://ags3.scgov.net/sarcoflood/

Figure 3-4
Flood Zone Map – Charlotte County

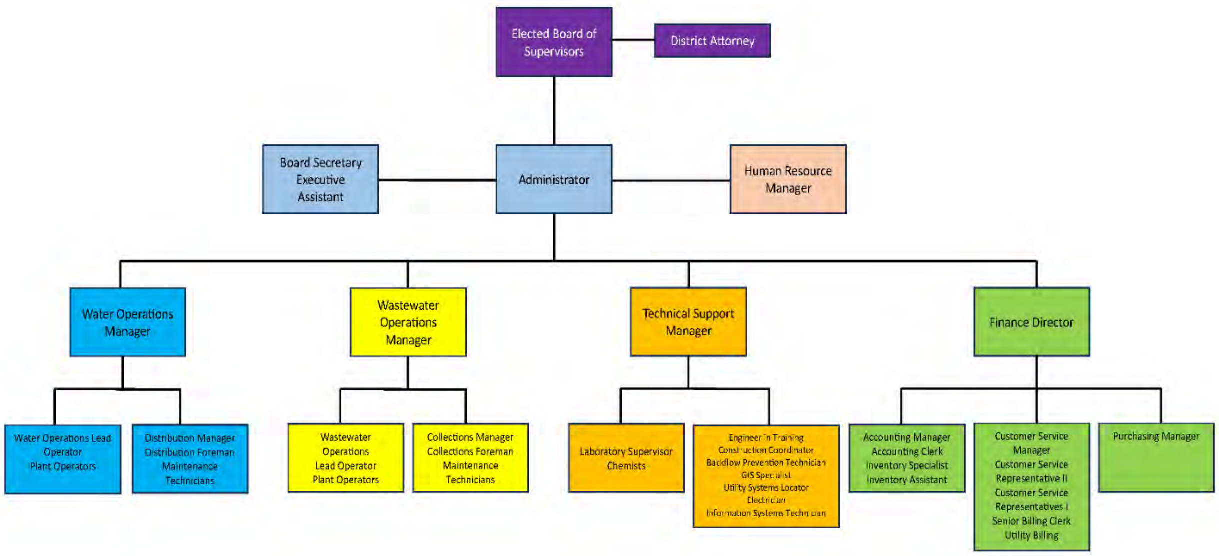


Source: Charlotte County Website: https://www.charlottecountyfl.gov/core/fileparse.php/480/urlt/flood-insurance-rate-map.pdf

3.3 ORGANIZATIONAL CONTEXT

The EWD is governed by a board of five Supervisors elected by district customers. The EWD is divided into five districts with approximately equal voting population. The voting district lines are evaluated every ten years to determine if adjustments are needed to ensure equal voting representation.

Figure 3-5
Englewood Water District Organizational Chart



Source: Englewood Water District Website

3.4 SOCIOECONOMIC CONDITIONS

3.4.1 POPULATION

Population projection detailed in the *2017 Utility Master Plan*, prepared by HDR Engineering, Inc., projects the District's for 2021 population as 40,032. Based on data from the United States Census Bureau, the median age of the residents in the EWD is 67.8 years old, and the population is 48.4% female and 51.6% male. The racial demographics of the EWD are: 96.4% White, 0.3% Black or African American, 0.7% Asian, 0.2% other race, 0.2% American Indian and Alaska Native, 0.0% Native Hawaiian or Pacific Islander, and 2.1% Two or More Races.

3.4.2 ECONOMY

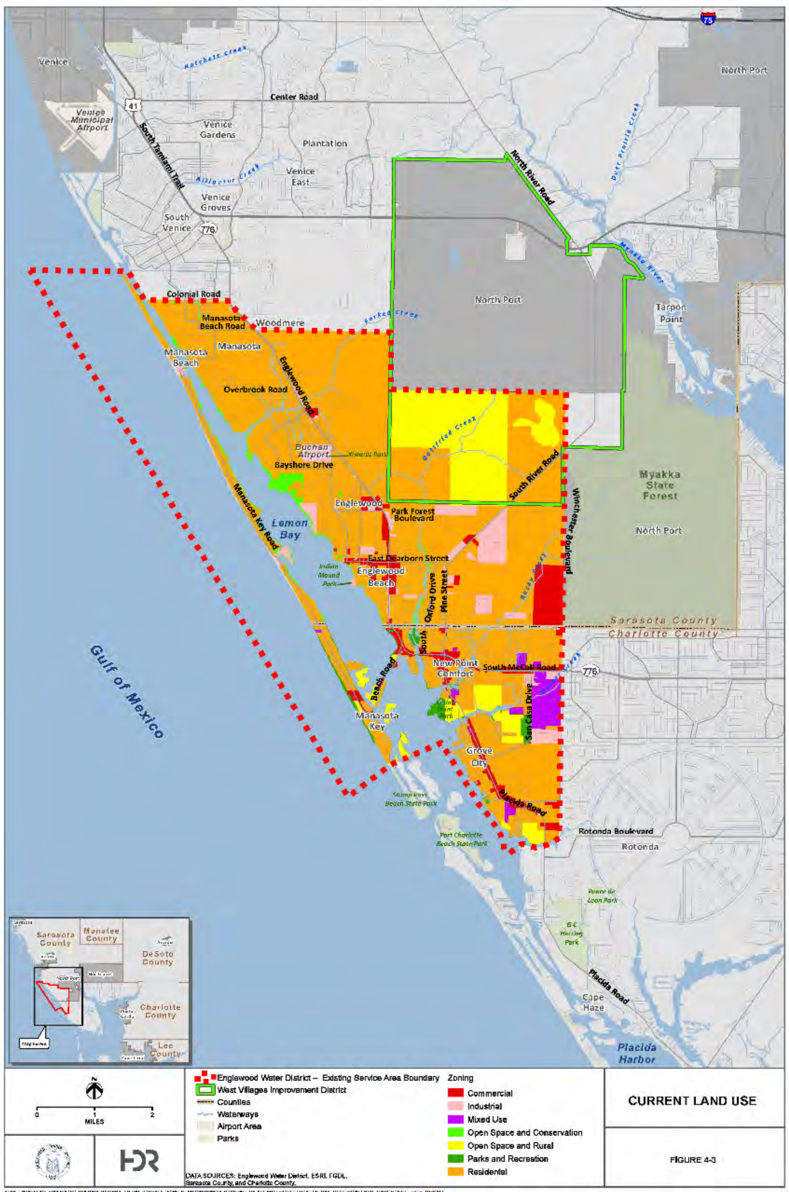
The United States Census Bureau estimates the unemployment rate for those aged 16 and over in the EWD at 26.54%. The median household income (MHI) in this area is approximately $70,980. The EWD MHI is greater than the MHI for the State of Florida which is approximately $63,062.

The highest percentage of employment comes from sales and office occupations for 9.0% and the second highest is management, business, science, and arts occupations at 7.3%.

3.4.3 LAND USE AND DEVELOPMENT

The EWD encompasses approximately 44.5 square miles of mixed land use. The current land uses include commercial, industrial, mixed use, open space and conservation, open space and rural, parks and recreation, and residential. A map of the current land uses is shown below in Figure 3-6.

Figure 3-6
Englewood Water District Current Land Use



Source: _2017 Utility Master Plan_, HDR Engineering, Inc.

3.5 ENVIRONMENTAL IMPACTS OF THE PROJECT

3.5.1 BENEFICIAL ENVIRONMENTAL EFFECTS

Implementation of the wastewater system improvements included in this plan will ensure that wastewater will be collected and treated to acceptable standards thereby protecting Englewood Water District customers and the environment.

3.5.2 ENVIRONMENTAL IMPACTS

No significant environmental impacts were identified during the planning phase. Minor environmental impacts will be addressed during design, and plans will be subject to environmental review and permitting by appropriate agencies.

Temporary adverse impacts during construction will include increased noise levels and an increase in the number of airborne particulates. The specifications will require control measures to minimize all temporary adverse impacts and will require construction in compliance with all permit conditions.

The proposed projects are not anticipated to adversely affect the flora, fauna, threatened or endangered plant or animal species, prime agricultural lands, wetlands, undisturbed natural areas, human health or the socioeconomic character of the area including minority or low-income families.

It is anticipated that these projects will have no adverse effects on historic, cultural, or archaeological sites within the project area.

The proposed projects are in conformance with the Comprehensive Plans of both Sarasota County, Florida and Charlotte County, Florida.

4

SECTION 4 – EXISTING SYSTEM

4.1 DESCRIPTION OF THE EXISTING WASTEWATER SYSTEM

The Englewood Water District (EWD) owns and operates a wastewater treatment and collection system. The system includes a 3.4 million gallons per day (MGD) water reclamation facility wastewater, approximately 56.2 miles of gravity sewer mains, approximately 53.8 miles of force mains, 126.2 miles of vacuum collection lines, 79 lift stations, 7 vacuum stations, 13 low-pressure stations, and a vacuum booster station.

4.1.1 WASTEWATER TREATMENT

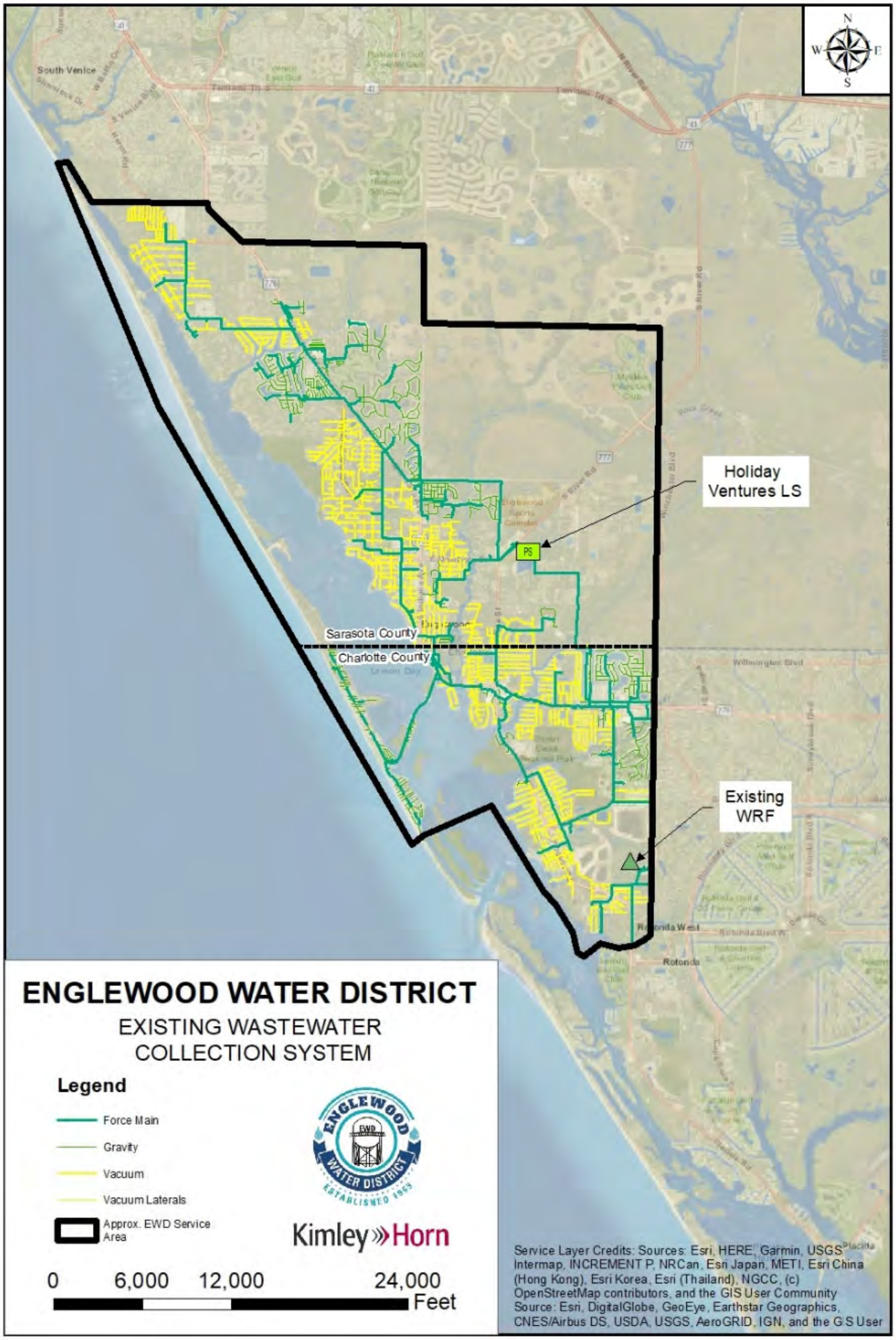
The EWD owns and operates the Paul J. Phillips Water Reclamation Facility (WRF) located at 140 Telman Rd, Rotonda West, FL 33947. The WRF is an extended aeration facility that includes headworks, screening tanks, odor control, four Davco package plants, three tertiary filters, disinfection, sludge processing, and reclaimed water transmission and storage. The current permitted capacity is 3.4 MGD. The administration/motor control building has been constructed to withstand a category 5 hurricane.

Figure 4-1 shows the location of the EWD wastewater reclamation facility.

4.1.2 WASTEWATER COLLECTION

The EWD wastewater collection system includes roughly 56.2 miles of gravity sewer mains, 53.8 miles of force main, and 126.2 miles of vacuum collection lines. The system also includes 79 lift stations, 7 vacuum stations, 13 low-pressure stations, and a vacuum booster station. The Holiday Ventures Lift Station (LS 121), noted on Figure 4-1, is a master lift station that conveys all pressurized wastewater from the north side of the district to the WRF.

Figure 4-1
Englewood Water District Wastewater System Map



Source: _2021 Holiday Ventures and Sewer Master Plan Update_. Kimley-Horn and Associates, Inc.

4.2 PRESENT AND FUTURE DEMAND PROJECTIONS

The estimated future wastewater flow projections have been provided by Kimley-Horn and Associates, Inc. and are included in Table 4-1 below.

Table 4-1
Wastewater Flow Projections

Year	Annual Average Daily Flow (MGD)
2025	1.98
2030	2.66
2035	3.68
2040	5.06
2045	5.35

Source: *2021 Holiday Ventures and Sewer Master Plan Update*. Kimley-Horn and Associates, Inc.

4.3 NEED FOR FACILITIES

The wastewater system improvements proposed in this Facilities Plan are needed to provide adequate wastewater treatment and collection services necessary to meet the current and future demands of system users.

5

SECTION 5 – PROGRAM ALTERNATIVES

5.1 INTRODUCTION

To provide better service and ensure current and future demands needs are met, the Englewood Water District (EWD) intends to make necessary improvements to its wastewater system.

5.2 ALTERNATIVES

The alternatives listed below have been prepared by Kimley-Horn and Associates, Inc. These alternatives have been evaluated and compared based on cost effectiveness, technical feasibility, permit requirements, implementability, and environmental soundness. For a more detailed evaluation of the alternatives for this project, please see the *2021 Holiday Ventures and Sewer Master Plan Update* prepared by Kimley-Horn and Associates, Inc. included in Appendix F.

5.2.1 ALTERNATIVE 1 – IMPROVE AND EXPAND THE EXISTING (SOUTH) WRF

With this alternative, wastewater will continue to be treated at the existing WRF. As a result, replacement of over 5 miles of force main and expansion of the existing WRF will be needed to increase capacity to treat projected flows.

5.2.2 ALTERNATIVE 2 – CONSTRUCT A NEW (NORTH) WRF

Alternative 2 includes the construction of a new WRF. All system flows will be conveyed and treated at the new facility. Interim improvements will also be needed at the existing WRF to treat projected flows while the new facility is being constructed.

5.2.3 ALTERNATIVE 3 – REHABILITATE THE EXISTING (SOUTH) WRF AND CONSTRUCT A NEW (NORTH) WRF

This alternative is a combination of Alternatives 1 and 2. Wastewater in the northern portion of the district would be conveyed to a newly constructed WRF for treatment. Wastewater in the southern portion of the district would be conveyed to the existing WRF for treatment. The new WRF will be designed for 4.0 MGD with the first phase being 2.0 MGD.

5.3 PRESENT WORTH ANALYSIS

A Present Worth Analysis has been prepared for each of the alternatives utilizing the following criteria:

Planning period of 20 years
Discount rate of 2.50%
Capital Costs

Operation, maintenance and replacement costs
Salvage values based on appropriate useful lives of various project components

Table 5-1
Present Worth Analysis – Alternative 1
Improve and Expand the Existing (South) WRF

PROJECT LIFE CYCLE (YEARS)		**20**		
DISCOUNT RATE (PERCENT)		**2.50%**		
Capital Costs		Years	Cost Estimate	Present Worth
	Holiday Ventures Lift Station Improvements	25	$ 10,930,000	$ 10,930,000
	Water Reclamation Facility Improvements	50	$ 139,406,000	$ 139,406,000
	Total Capital Cost		**$ 150,336,000**	**$ 150,336,000**
Replacement Costs/Salvage Values		Years	Salvage Value	Present Worth
	Holiday Ventures Lift Station Improvements	25	$ 2,186,000	$ 1,334,052
	Water Reclamation Facility Improvements	50	$ 83,643,600	$ 51,045,259
	Total Replacement Costs/Salvage Values		**$ 85,829,600**	**$ 52,379,311**
Operation & Maintenance Cost		Years	Cost Estimate	Present Worth
	Yearly Operating and Maintenance Cost	20	**$ 6,741,000**	**$ 105,086,543**
				$ -
Total Present Worth Costs			**$**	**203,043,232**

Table 5-2
Present Worth Analysis – Alternative 2
Construct a New (North) WRF

PROJECT LIFE CYCLE (YEARS)		**20**		
DISCOUNT RATE (PERCENT)		**2.50%**		
Capital Costs		Years	Cost Estimate	Present Worth
	Holiday Ventures Lift Station Improvements	25	$ 1,229,000	$ 1,229,000
	Water Reclamation Facility Improvements*	50	$ 118,342,000	$ 118,342,000
	Total Capital Cost		**$ 119,571,000**	**$ 119,571,000**
Replacement Costs/Salvage Values		Years	Salvage Value	Present Worth
	Holiday Ventures Lift Station Improvements	25	$ 245,800	$ 150,005
	Water Reclamation Facility Improvements	50	$ 71,005,200	$ 43,332,410
	Total Replacement Costs/Salvage Values		**$ 71,251,000**	**$ 43,482,415**
Operation & Maintenance Cost		Years	Cost Estimate	Present Worth
	Yearly Operating and Maintenance Cost	20	**$ 6,741,000**	**$ 105,086,543**
				$ -
Total Present Worth Costs			**$**	**181,175,128**

Table 5-3
Present Worth Analysis – Alternative 3
Rehabilitate the Existing (South) WRF and Construct a New (North) WRF

PROJECT LIFE CYCLE (YEARS)		**20**		
DISCOUNT RATE (PERCENT)		**2.50%**		
Capital Costs		Years	Cost Estimate	Present Worth
	Holiday Ventures Lift Station Improvements	25	$ 688,000	$ 688,000
	Water Reclamation Facility Improvements	50	$ 96,290,000	$ 96,290,000
	Total Capital Cost		**$ 96,978,000**	**$ 96,978,000**
Replacement Costs/Salvage Values		Years	Salvage Value	Present Worth
	Holiday Ventures Lift Station Improvements	25	$ 137,600	$ 83,973
	Water Reclamation Facility Improvements	50	$ 57,774,000	$ 35,257,793
	Total Replacement Costs/Salvage Values		**$ 57,911,600**	**$ 35,341,767**
Operation & Maintenance Cost		Years	Cost Estimate	Present Worth
	Yearly Operating and Maintenance Cost	20	**$ 6,741,000**	**$ 105,086,543**
				$ -
Total Present Worth Costs			**$**	**166,722,776**

5.4 COST COMPARISON OF THE ALTERNATIVES

The estimated costs associated with each alternative are listed below in Table 5-4. The costs were calculated based on a planning period of 20 years.

Table 5-4
Alternative Cost Comparison

Alternative	**Construction Cost**	**Average Annual O&M Cost**	**20 Year Present Worth**
ALTERNATIVE 1 - IMPROVE AND EXPAND THE EXISTING (SOUTH) WRF	$ 150,336,000	$ 6,741,000	$ 203,043,232
ALTERNATIVE 2 - CONSTRUCT A NEW (NORTH) WRF	$ 119,571,000	$ 6,741,000	$ 181,175,128
ALTERNATIVE 3 – REHABILITATE EXISTING (SOUTH) WRF AND CONSTRUCT A NEW (NORTH) WRF	$ 96,978,000	$ 6,741,000	$ 166,722,776

5.5 SUMMARY OF ALTERNATIVES

All of the alternatives have been compared based on complexity, compatibility, availability, implementability, feasibility, environmental, and financial aspects. Table 5-5 below summarizes these comparisons.

Table 5-5
Alternative Selection Comparison Matrix

Criteria	ALTERNATIVES		
	ALTERNATIVE 1 - IMPROVE AND EXPAND THE EXISTING (SOUTH) WRF	ALTERNATIVE 2 - CONSTRUCT A NEW (NORTH) WRF	ALTERNATIVE 3 – REHABILITATE THE EXISTING (SOUTH) WRF AND CONSTRUCT A NEW (NORTH) WRF
Complexity	1	2	3
Compatibility	2	2	3
Availability	1	2	2
Implementability	2	3	3
Feasibility	2	2	3
Environmental	2	3	3
Financial	1	2	3
Total	**11**	**16**	**20**

1 = Poor
2 = Acceptable
3 = Excellent

As shown in the table above, Alternative 3 had the highest rating based on the evaluation criteria. Alternative 2 scored lower in complexity, compatibility, availability, feasibility and financial categories due to the need to make significant modifications to the existing system along with the construction of a new facility to accommodate this alternative. Alternatives 2 and 3 scored the same in the environmental category because both alternatives must navigate to the same environmental concerns.

6

SECTION 6 – THE SELECTED PLAN

6.1 INTRODUCTION

The Englewood Water District (EWD) has established that the improvements to the wastewater system proposed in this plan are a necessary step to meet current and future wastewater demands, comply with regulatory requirements, and to protect its customers and the environment.

6.2 SELECTED IMPROVEMENTS

The selected improvements discussed below have been sourced from the *2021 Holiday Ventures and Sewer Master Plan Update* prepared by Kimley-Horn and Associates, Inc. included in Appendix F.

The selected project is Alternative 3. The primary components of this project will include construction of a new WRF (North), improvements to the existing WRF (South), downsizing of the Holiday Ventures Lift Station, and installation of force mains. The new WRF will be designed for 4.0 MGD with the first phase being 2.0 MGD.

6.3 SITE CONDITIONS

The project will be constructed within the rights-of-way, easements, and/or on land owned by the EWD. The EWD must purchase property to construct the new (North) WRF. The property being considered is adjacent to the Sarasota Scrub-Jay Reserve and contains wetlands. An environmental review of the project area was completed as part of the planning process. It is not anticipated that any site related environmental impacts will occur, however the project design will mitigate any potential impacts and the specifications will identify appropriate mitigation measures.

A map of the project is shown as Figure 6-1 at the end of this section.

6.4 SELECTED PLAN COSTS

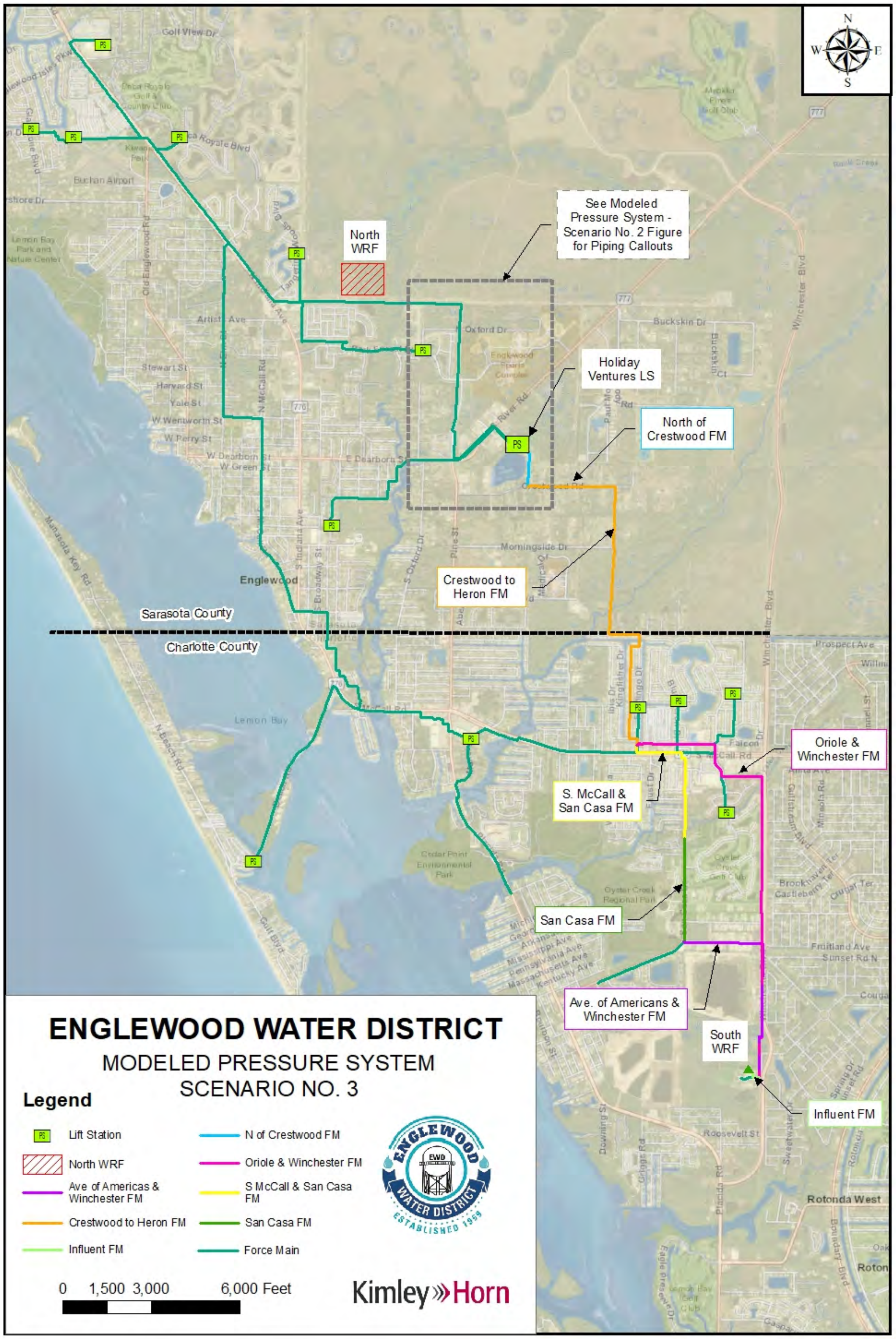
6.4.1 CONSTRUCTION COSTS

The preliminary estimate of probable construction costs for the proposed project is $95,823,000. This amount does not include the anticipated land acquisition costs of $4,100,000.

6.4.2 OPERATIONS AND MAINTENANCE COSTS

The estimate of operations and maintenance costs for the proposed project are approximately $6,741,000 based on information contained in the *2021 Holiday Ventures and Sewer Master Plan Update* as prepared by Kimley-Horn and Associates, Inc.

Figure 6-1
Project Location Map



Source: *2021 Holiday Ventures and Sewer Master Plan Update*. Kimley-Horn and Associates, Inc.

7

SECTION 7 – IMPLEMENTATION AND COMPLIANCE

7.1 PUBLIC HEARING

A Public Hearing was held to present this Facilities Plan to the public for review and comment prior to adoption of the Plan by the Englewood Water District Board of Supervisors. The selected alternatives were discussed and the environmental and cost impacts were presented. This allowed the public to participate in the evaluation of the alternatives as well as any potential financial impacts to affected parties. Appendix D contains a copy of the Notice of Public Hearing and a copy of the Resolution adopted by the Board.

7.2 REGULATORY AGENCY REVIEW

7.2.1 FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION

FDEP is the lead agency dealing with issues of environmental quality with regulatory authority encompassing large and small quantity hazardous waste generators, air pollution emissions, solid waste disposal, potable water usage, dredge and fill permitting, and development in environmentally sensitive areas. FDEP is the State agency with regulatory authority over the use of submerged lands and waters. FDEP is also charged with protecting and conserving Florida’s natural resources and managing State owned land and aquatic preserves. The EWD service area is within the South District of FDEP headquartered in Fort Myers.

7.2.2 FLORIDA DEPARTMENT OF HEALTH

The Florida Department of Health performs water tests for surface water quality and has the authority to issue health notices, advisories, and boil water orders when the potential for contamination exists in public water supply systems. It also issues health warnings and notices for surface water bodies and food sources that may place the public at a health risk.

7.2.3 SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT

The Southwest Florida Water Management District (SWFWMD) is one of five water management districts in Florida created by the Water Resources Act of 1972. SWFWMD is responsible for managing groundwater and surface water supplies in part or all of 16 counties on the west-central coast of Florida. The District contains 98 local governments spread over approximately 10,000 square miles, with a total population of nearly six million. SWFWMD provides a variety of regulatory programs including programs regulating the consumptive use of water, construction of wells, licensing water well contractors, surface water management facilities, stormwater management systems, and artificial recharge of ground water.

7.2.4 UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

The United States Environmental Protection Agency (EPA) reviews the actions of other governmental agencies and retains the authority to veto permits under the provisions of Section 404 of the Clean Water Act. It also manages the collection of water supply quality information under the Information Collection Rule. Many EPA responsibilities have been delegated to State agencies for implementation.

7.2.5 CLEAN AIR ACT

The Clean Air Act was amended in 1990. The Clean Air Act Amendments, Title I, address regional air quality for six criteria pollutants: carbon monoxide, lead, nitrogen dioxide, ozone, particulate matter and sulfur dioxide. If a particular area does not meet national ambient air quality standards it is established as a non-attainment area.

7.2.6 FEDERAL WATER POLLUTION CONTROL ACT

The Federal Water Pollution Control Act, commonly known as the Clean Water Act, was passed by Congress in 1972 to restore and maintain the chemical, physical, and biological integrity of the nation's waters by preventing point and nonpoint pollution sources, providing assistance to publicly owned treatment works for the improvement of wastewater treatment, and maintaining the integrity of wetlands.

7.2.7 UNITED STATES ARMY CORPS OF ENGINEERS

The United States (US) Army Corps of Engineer mission is to provide vital public engineering services in peace and war to strengthen our Nation's security, energize the economy, and reduce risks from disasters. The Jacksonville District of the Corps was established in 1884 and encompasses Florida, Puerto Rico, and the U.S. Virgin Islands. The Corps also has a Civil Works environmental mission that ensures all Corps projects, facilities and associated lands meet environmental standards. The program has four functions: compliance, restoration, prevention and conservation.

7.2.8 FLORIDA DEPARTMENT OF TRANSPORTATION

The Florida Department of Transportation (FDOT) mission is to provide a safe transportation system that ensures the mobility of people and goods, enhances economic prosperity, and preserves the quality of our environment and communities. District One includes twelve counties: Charlotte, Collier, DeSoto, Glades, Hardee, Hendry, Highlands, Lee, Manatee, Okeechobee, Polk, and Sarasota counties. The District serves 1.8 million residents, encompasses approximately 12,000 square miles, and is headquartered in Bartow, Florida.

7.3 IMPLEMENTATION RESPONSIBILITY

The EWD has the sole responsibility and authority to implement the recommended improvements.

7.4 IMPLEMENTATION SCHEDULE

Under the SRF program, entities who wish to receive funding must receive project and funding approval before construction may take place. This Facilities Plan, including the Capital Financing Plan, and biddable plans and specifications with all necessary permits to construct the selected plan must be approved by the FDEP in order for the entity to receive SRF funding for the proposed project.

Adoption of these Plans by the Englewood Water District Board of Supervisors is a necessary step to establish eligibility for the SRF program; however, adoption of the Plans in no way commits the EWD to construct the projects, nor does it commit the EWD to using SRF funding or FDEP to offering SRF funding.

The proposed schedule for this project is shown below in Table 7-1.

Table 7-1
Proposed Project Schedule

Activity	Target Completion Date
Permitting & Design	August 2024
Bid Project	October 2024
Begin Construction	December 2024
Substantial Completion	October 2026
Final Completion	December 2026

7.5 COMPLIANCE

The wastewater collected and treated will be in compliance with the FDEP clean water standards.

The wastewater system will meet the reliability requirements in Chapter 62-604, F.A.C.

The environmental aspects of the proposed facilities are satisfactory.

This plan is consistent with the Comprehensive Plans for Sarasota County, Florida and Charlotte County, Florida.

8

SECTION 8 – FINANCIAL PLANNING

8.1 GENERAL

The Englewood Water District (EWD) is seeking to finance wastewater system improvements from the SRF Loan program. The SRF program provides low interest loans and grants to eligible entities for the planning, design, and construction of wastewater systems.

Adoption of these Plans by the Englewood Water District Board of Supervisors is a necessary step to establish eligibility for the SRF program; however, adoption of the Plans in no way commits the EWD to construct the project, nor does it commit the EWD to use SRF funding or FDEP to offer SRF funding.

FDEP administers the Florida SRF program. Eligible entities are required to submit detailed project information to FDEP as part of the application process, consistent with the following SRF objectives:

To establish the financial capability of project sponsors to provide complete wastewater systems; and,

To ensure that project sponsor capital financing plans will not jeopardize the viability of the SRF program; and,

To ensure consistency between the capital financing plans, user system charges, and facilities plans; and,

To ensure the timeliness and consistency of reviews of capital financing plans and public hearing documentation; and,

To establish that adequate disclosure to the public of the project financing and public review and comment has been provided for; and,

To identify unusual or potentially controversial financing mechanisms that may be of concern in negotiating loan agreements.

8.2 PROJECTED COSTS

The EWD is seeking funding eligibility for the construction of the wastewater system improvements projects included in this plan. Table 8-1 summarizes the preliminary estimate of probable construction cost, loan service fees, and capitalized interest totaling approximately $122.5 million.

Table 8-1
Projected Costs

Item	Total
Estimated Construction	$95,823,000
Land Acquisition	$4,100,000
Contingency	$9,992,300
Technical Services After Bid Opening	$9,992,300
Capitalized Interest	$196,222
Loan Service Fee	$2,398,152
Total	**$122,501,974**

8.3 FINANCING CAPITAL IMPROVEMENTS

The EWD is responsible for financing its wastewater system improvements and plans to use SRF loan funding to minimize the financial impact of the project on the ratepayers. The pledged revenues supporting this debt issue will be the gross revenues derived yearly from the operation of the EWD Water and Wastewater Systems after payment of the operation and maintenance expenses and the satisfaction of all yearly senior debt payment obligations.

The EWD is seeking eligibility for low-interest SRF Construction Loan funding from FDEP in the amount of approximately $122.5 million based upon preliminary planning estimates.

SRF funding will be instrumental in allowing the EWD to proceed with the projects. This action supports the EWD's intent to secure maximum eligibility for all anticipated wastewater system improvements utilizing the lowest cost funding available. It is not anticipated that rate increases will be required as a direct result of these projects.

The preliminary estimate of probable construction cost of the projects is approximately $95.8 million. Adding other elements associated with the SRF program, the anticipated loan value is approximately $122.5 million including capitalized interest.

The SRF interest rate may fluctuate by calendar quarters. A rate of 0.166% has been used to calculate the estimated annual payments at $7,164,361 (including coverage of 115%). The actual interest rate is set based on the quarter in which the loan agreement is signed and is anticipated to be below 3.00%.

The planning process for this project has established that the gross revenues currently generated by the water and wastewater systems are sufficient support the estimated annual SRF loan debt payments.

8.4 OPERATION AND MAINTENANCE COSTS

The annual Operation and Maintenance costs are estimated at $6,741,000 per year. This cost includes all anticipated operations and personnel costs related to the projects included in the Facilities Plan. The estimated Operations and Maintenance costs were derived from information contained in the *2021 Holiday Ventures and Sewer Master Plan Update* as prepared by Kimley-Horn and Associates, Inc. The Kimley-Horn report estimates that the operations and maintenance costs as $1.26 per gallon with an anticipated annual flow of 5.35 MGD. This equates to an annual operations and maintenance cost of approximately $6,741,000.

8.5 USER CHARGE SYSTEM AND COSTS

A copy of the current rate structure is located in Appendix A.

A

Appendix A

Rate Schedule

CUSTOMER RULES
AND REGULATIONS

RESOLUTION NO: 23-09-14 A

October 1, 2023

Table of Contents

CUSTOMER RULES AND REGULATIONS

The Public Health Security and Bioterrorism Preparedness and Response Act, PL 107-188, June 2002, established new penalties for tampering with a water system:

- **Tampering is a felony punishable by up to 20 years in prison and a $1,000,000 fine.**
- **Attempted or threatened tampering is a felony punishable by up to 5 years in prison and $100,000 fine.**

Tampering per PL 107-188 is introducing a contaminant into, or otherwise interfering with the operation of a public water supply with the intention of harming persons. A similar federal law for wastewater is anticipated.

1.0 DEFINITIONS

1.1 "ADMINISTRATOR" - Englewood Water District Administrator.

1.2 "AADF" - Annual Average Daily Flow.

1.3 "ACTUAL COST" - Total personnel, material and equipment cost plus 25% mark-up for general overhead and administration.

1.4 "AGRF" - Accrued Guaranteed Revenue Fee. A charge representing the repayment of the carrying or financing costs of facilities: a) built or acquired in excess of those needed to serve current customers; ii) held for future use by future customers.

1.5 "APPLICANT" - is the owner of real property, a parcel, or parcels, who has applied for water/wastewater/reuse water service for said real property.

1.6 "ASSESSMENT" - a fee imposed against any parcel benefited by construction of water/wastewater/reuse water infrastructure.

1.7 "AVAILABILITY" – means that District water and/or wastewater systems(s), which has adequate permitted capacity to serve the parcel, is capable of being connected to any potable water or wastewater installations, to include but not limited to pipes, lines, valves, pumps, fixtures, appliances or apparatus of every kind, within the parcel and meets the following criteria:

1.7.1 For a residential or commercial parcel which has an estimated or actual water usage of less than 1,000 gallons/day, water and/or wastewater service is considered available if service exists in a public easement or right-of-way that abuts a property line of the parcel.

1.7.2 For a residential or commercial parcel which has an estimated or actual water usage of 1,000 gallons per day or more, or for a proposed residential subdivision with 50 lots or less, water and/or wastewater service is considered available if service is within 50 feet of a property line of the parcel or subdivision as accessed via existing right-of-way or utility easement.

1.7.3 For a proposed residential subdivision with more than 50 lots, for a proposed commercial subdivision, and for areas zoned or used for an industrial, or manufacturing purpose or its equivalent, water and/or wastewater service is considered available if service exists within one-fourth mile as measured and accessed via rights-of-way or utility easements.

1.7.4 For purposes of establishing availability, service shall mean the presence of a water main/line or wastewater gravity line, low pressure line, vacuum line, or force main as appropriate for service requested.

1.8 "AWWA" - AMERICAN WATER WORKS ASSOCIATION

1.9 "BASE FACILITY CHARGE" - a minimum monthly charge to a Customer for fixed costs.

1.10 "BOARD"- Board of Supervisors of the Englewood Water District.

1.11 "CAPITAL CAPACITY CHARGE" (CCC) - a charge for new service to pay for capacity in the following systems;

1.11.1 WATER: (1) Plant Capacity/Transmission Systems
(2) Distribution System

1.11.2 WASTEWATER: (1) Plant Capacity/Transmission System
(2) Collection System

1.12 "COLLECTION SYSTEM"- gravity lines, low pressure lines, or vacuum lines from the stub-out up to and including the Lift Station, and/or vacuum lines up to and including the Vacuum Station but excludes Master Lift Stations.

1.13 "CROSS-CONNECTION" - any physical arrangement whereby the District water supply is connected, directly or indirectly, with any other water supply system, wastewater system, drain, conduit, pool, storage reservoir, plumbing fixture, or other device which contains or may contain contaminated water, sewage or other waste or liquid of unknown or unsafe quality which may be capable of imparting contamination to the District water supply as the result of backflow. By-pass arrangements, jumper connections, removable sections, swivel, or changeable devices and other temporary or permanent devices through which or because of which backflow could occur are considered to be cross-connections.

1.14 "CUSTOMER" - parcel ownership.

1.14.1 "RESIDENTIAL CUSTOMER" - an Applicant or agent who has made application to the District for water, wastewater and/or reuse water service for a residential unit or units; who has paid the applicable charges or fees; and to whom the District has agreed to supply said water, wastewater and/or reuse water.

1.14.2 "COMMERCIAL CUSTOMER" - an Applicant or agent who has made application to the District for water/wastewater/reuse water service for a non-residential parcel(s) and has paid the applicable charges and fees, and to whom the District has agreed to supply said water/ wastewater/reuse water.

1.14.3 "BULK CUSTOMER" - any Applicant that owns, operates, and maintains a water, wastewater or reuse water system which provides service to more than two independent entities. Bulk Customers may include public utilities or franchised or certificated private utilities.

1.14.4 "TEMPORARY WATER CUSTOMER" - any Customer of the District that accepts water from a hydrant or similar source utilizing a temporary water meter and has not paid Capital Capacity Charges. A temporary water Customer is an exception to the definition which requires ownership of the property serviced.

1.14.5 "RENTAL CUSTOMER" - a tenant who is authorized by the landlord/parcel owner to receive a copy of the monthly utility bill.

1.15 "CUSTOMER INSTALLATION" - All pipes, shutoffs, valves, fixtures and appliances or apparatus of every kind and nature which are located on the Customer's side of the "Point of Delivery" and/or "Point of Collection" and used in connection with or forming a part of the installation necessary for rendering service to the Customer's premises, regardless of whether such installation is owned by the Customer or used by the Customer under lease or other agreement. For low pressure wastewater systems, this definition is exclusive of the grinder pump and control panel installed and owned by the District.

1.16 "DELINQUENT BILL" - any dollar amount owed the District which has not been paid within twenty (20) days after the billing date.

1.17 "DEVELOPMENT AGREEMENT" - an agreement entered into between EWD and an entity associated with the development of a parcel that will contain four (4) or more units and/or requires an extension of utility infrastructure.

1.18 "DISTRIBUTION SYSTEM" - water lines providing service directly to Customers.

1.19 "DISTRICT" - the Englewood Water District (EWD) to include its Board of Supervisors, employees, and agents.

1.20 "ENABLING ACT" - Chapter 2004-439 Laws of Florida re-codifies EWD as an Independent Special District of the State of Florida.

1.21 "ERC" - Equivalent Residential Capacity. The average metered consumption of water in gallons per day for a typical single family residential unit in the District. The average wastewater demand in gallons per day for a typical single family residential unit in the District. The wastewater demand is a calculated average percentage of a water ERC.

1.22 "EWD" - Englewood Water District

1.23 "FLAT RATE SERVICE" - a monthly base facility charge for Customers where service is available however, no connections are established.

1.24 "GOVERNMENTAL BULK RATE" - a water rate charged when water is provided to another Utility through an Interlocal Agreement.

1.25 "INACTIVE ACCOUNT" - an account for which the property has been liened for non-payment.

1.26 "I&I (Infiltration & Inflow) SURCHARGE" - applied when wastewater generated exceeds water consumed as determined by using industry standards for determining I&I contribution to flow.

1.27 "LIEN" - a legal claim against specific properties that can be enforced in Court to secure payment. District liens are 'government' liens in parity with County taxes.

1.28 "LOCK-OUT" - a process whereby a locking device is placed on a water meter to ensure termination of service as a result of non-payment on an account.

1.29 "LONG TAP" - the water main is located on the opposites side of the travel way. If the water main is located under the travel way or sidewalk, it will be considered a long tap.

1.30 "MASTER LIFT STATION" - a lift station that receives flow from downstream lift stations and is considered critical due to the consequence of failure.

1.31 "MAIN" - a pipe, conduit or facility used for conveying water, wastewater and/or reuse water.

1.32 "METER" - a device that registers flows of water, wastewater and/or reuse water.

1.33 "METER RE-INSTALLATION" - the installation of a water meter that was previously removed.

1.34 "PARCEL" - Any real property with a unique property identification number assigned by a county for purposes of taxation.

1.35 "PAYMENT EXTENSION" – an additional time period for payment to be made granted to a Customer at the sole discretion of the District.

1.36 "PAYMENT SCHEDULE" - an agreement between a Customer and the District to pay for fees or services over a period of time.

1.37 “PLANT CAPACITY” – treatment capacity as specified by the Department of Environmental Protection.

1.38 “POINT OF COLLECTION” - the point of physical connection between the Customer’s wastewater line and the District's line or inlet of wastewater meter.

1.39 “POINT OF DELIVERY” - the point of physical connection between the Customers’ water and/or reuse water line and the outlet of the District's water meter/meter box.

1.40 “RAW WATER” – untreated water from the wellfield to the water treatment plant.

1.41 “RE-ACTIVATION” – activation of account service once a delinquent account is paid in full and lien has been satisfied.

1.42 “RESIDENTIAL UNIT” – a structure, a room or rooms which provides for independent housekeeping to include sleeping, sanitation, and cooking functions. The Residential Unit may be connected to, separate from, within or without another structure.

1.43 “REUSE WATER” – reclaimed water which is the final product of the wastewater treatment process which meets all State standards and is suitable for irrigation of land generally accessible to the public.

1.44 “SERVICE” - water, domestic wastewater, and/or reuse water service provided by the District to the Customer.

1.45 “SERVICE AREA” - The geographical area described in the District’s Enabling Act.

1.46 "SERVICE FEES” - the rates or charges for a particular service.

1.47 “SHORT TAP” - the water main is located on the property side of the travel way.

1.48 "STUB-OUT" - same as "Point of Collection".

1.49 "SYSTEM” - everything necessary for the treatment, delivery, and or collection of water, wastewater and/or reuse water.

1.50 “TAMPERING” - Any act, direct or indirect, by the Customer, or by others, that will harm any EWD system. Harm would include, but not be limited to: contamination of a system, reduction in operational efficiency, damage to infrastructure, loss of revenues or additional cost to EWD. See PL 107-188 for Federal Definition of Tampering and federal penalties.

1.51 “TIERED RATE STRUCTURE” – a rate structure placed on water usage to encourage the conservation of water.

1.52 “TAMPERING CHARGE”- A charge imposed by the Administrator up to a maximum approved by the Board of Supervisors herein for tampering as defined above. The purpose of a Tampering Charge is to discourage acts which may harm any EWD system.

1.53 "TRANSMISSION SYSTEM" – Large water, wastewater, and/or reuse pipelines.

1.54 “TURN ON/TURN OFF” – Customer requested service by which EWD turns water on or off at the meter to avoid loss of water during extended periods of absence or under emergency conditions.

1.55 "USAGE" – the amount of flow registered through a meter.

1.56 "WASTEWATER" - an untreated domestic sewage and/or commercial water-based waste product.

1.57 "WATER" - a potable product of the water treatment plant.

2.0 GENERAL POLICIES AND INFORMATION

2.1 These rules and regulations are a part of the rate schedules, applications and contracts of the District, and in the absence of specific agreement to the contrary or action by the Board, apply without modification or change to each and every Customer to whom the District renders service.

2.1.1 In the event that a portion of these rules and regulations are declared null and void for any reason, by any court of competent jurisdiction, such decision shall in no way affect the validity of the remaining portions of the rules and regulations, unless such court order or decision shall so direct.

2.1.2 The District shall provide service to all Customers requiring such service within the territory described in its Enabling Act or acquisition documents upon such terms as are set forth in these rules and regulations. Service may be denied if it will create a financial hardship for the District to make service available.

2.1.3 The Enabling Act authorizes and empowers the District to require and enforce the use of its facilities whenever and wherever they are accessible in accordance with applicable general law and applicable local government comprehensive plans. All developed parcels must connect to the District's water and/or wastewater system when service is available within the shortest connection period as established by the following conditions:

a. Within 30 days upon the failure of the onsite potable water well or the onsite sewage treatment and disposal system;
b. As part of the construction of a modification to the Residential Unit or non-residential structure which would cause the onsite potable water well or the onsite sewage treatment and disposal system to be insufficient to provide the necessary capacity to provide service; connection must be made prior to the issuance of the Certificate of Occupancy by the local government responsible for the permitting of such modification; or
c. Within 365 days after the date of written Notification of Water and/or Wastewater Service Availability. The District will provide written notification by first class mail to each property for which service is available.

<u>NOTE: An existing, developed property with a water and/or wastewater "Customer Installation" will be considered connected to the District's system at the expiration of the connection period, **whether actual connection to the central system has been made or not**, with all fees, charges (except monthly usage charges until physically connected) and obligations being incurred per these Customer Rules and Regulations.</u>

2.1.4 The Board may waive connection to an available District system under the following conditions:

a. Applicant Hardship*:* If the requirement for connection of a primary residential unit which is classified as one (1) Equivalent Residential Capacity, creates an economic hardship on the part of the property owner, the property owner must contact the associated County with a State Housing Initiative Partnership (SHIP) programs in place. Economic hardship is defined based on the eligibility criteria established by the SHIP as it relates to homeowner rehabilitation assistance. See resolution number 07-02-01 C and contact the Englewood Water District office located at 201 Selma Avenue, Englewood, FL 34223 for more information.

b. Residential Acreage Exception*:* If a residential unit which is classified as one (1) Equivalent Residential Capacity, is located on a parcel of land of five (5) acres or more and has an onsite system(s) which is

c. functioning properly in accordance with State and local regulations, such property may be exempt from connection to the District's system(s). If the owner of such property has agreed in writing, to connect to the District's system(s) or subdivides the property, then the provisions for connection as provided herein shall apply. All other classes of Customers shall be subject to connection to available District system(s) regardless of parcel size.

d. District Hardship Case Exception*:* If the requirement for connection would create an economic hardship on behalf of the District.

2.1.5 For Residential and Commercial Customers, the District provides service to a parcel, not an individual. All District provided services including, but not limited to, capital improvements, assessments, purchased capacity, liens, legal notices, billings, fees, and charges "run with the parcel."

2.2 "EQUIVALENT RESIDENTIAL CAPACITY" (ERC)

The use of equivalent capacities ensures all Customers are similarly charged for equivalent levels of service. An ERC, as used within this document, is a historically defined gallons-per-day unit of measure specific to the District. ERC units are used to calculate CCCs, assessment fees, monthly base facility charges, and usage charges. The gallons per day (GPD) per one (1) ERC may change from time to time based on District production/treatment data. ERCs will be calculated as follows:

2.2.1 **A single-family residence by definition is one (1) ERC**. Any individual Residential Unit, to include those within a multi-residential complex (such as a condominium, apartment, townhouse, duplex, or other multiplex) will be considered to be single family residences and by definition will be one (1) ERC.

2.2.2 As an exception to 2.2.1, a single parcel with four (4) or more rental units with common ownership that are served by a master meter shall be considered to be a commercial account. ERCs shall be determined as in subparagraph 2.2.3.

2.2.3 Capacity requirements for a commercial account will be converted to equivalent residential capacities by dividing the account's metered or estimated (using accepted engineering practice) AADF by the GPD (as assigned herein) for one (1) ERC.

2.2.4 The minimum ERC assigned to any parcel, Point of Collection, or Point of Delivery shall be one (1) ERC. A single parcel with a Point of Collection and a Point of Delivery is 1 ERC for water and wastewater.

2.3 CAPITAL CAPACITY CHARGES (CCC) and AGRF

The District bills CCCs and the AGRF to recoup a portion of the cost of capital infrastructure as new Customers utilize available capacity within District systems. CCCs are grouped per section 1.9.

2.3.1 Once CCCs are paid, they shall become a part of the real property and shall remain with the real property when title is transferred to a new owner, as long as the base facility charge(s) continue to be paid.

2.3.2 For new development, the District will approve the expected AADF for the development in ERCs based on accepted engineering guidelines or historical flows from similar facilities and will calculate the CCCs. Since the initial Development Agreement or request for service is based on an estimate, the ERCs, CCCs and the AGRF are subject to upward adjustment should actual flows within the first five (5) years exceed the initial estimates. The initial estimate and upward adjustment, if needed, are considered to be a one-time billing event. The estimate and a one-time adjustment minimize the risk for both the Customer and the District. A downward adjustment will not be made unless there is a governmental rezoning or restriction subsequent to the service agreement that would reduce the potential AADF from what was initially envisioned.

2.3.3 CCCs and the AGRF are one-time charges for new demand placed upon available system capacity. Also see sections 1.11 and 2.3.

a. CCCs and the AGRF for new development or expansion/change-of-use of existing facilities are due as of the effective date of the service agreement.

b. CCCs and the AGRF for existing facilities, when the service is brought to the existing Residential or Commercial facility, may be financed with the District per terms as provided herein.

c. CCCs and the AGRF imposed by special assessment (typically for distribution or collection lines) shall be due per the terms of the special assessment resolutions which may supersede these Rules.

2.3.4 The terms of a negotiated Development Agreement may be unique to a specific development. However, CCCs under a Development Agreement are typically payable on or before the submittal of the Department of Environmental Protection (DEP) Certification of Completion of Construction. In cases where a DEP Certification is not required, the CCCs will be payable as of the effective date as defined within the Development Agreement.

2.3.5 Also see item 1.4 - AGRF

2.4 FREE SERVICE

The District will not provide any service without charge.

2.5 POLICY DISPUTE

Any dispute between the District Administrator and the Customer, prospective Customer, or former Customer, regarding the meaning or application of any provision of these rules and regulations shall, upon written request, be resolved by the Board of Supervisors.

3.0 APPLICATION TO ESTABLISH SERVICE

3.1 Service is furnished only after proper application, District approval of said application and payment of all applicable charges and fees. The conditions of such application or agreement are binding upon the Customer and the District. Applications are accepted by the District with the understanding that District approval is subject to service availability.

Application for initial service for a single-family residence may be made at the District office. Transfer of ownership may be initiated online or by contacting Customer Service. A Development Agreement will be required for new construction that will require service of four (4) or more ERCs. The applicant shall furnish to the District a documented legal description of the property to include all Parcel Information Numbers (PIN), the street addresses at which service is to be rendered, and the mailing address where the District bill will be sent.

3.2 When District water and wastewater service is available to a parcel, water service will not be provided without wastewater service. Florida law requires connection to central wastewater when available. Also see 2.1.3.

4.0 LIMITATION OF USE

4.1 The use of water, wastewater and/or reuse water service(s) is limited strictly to the parcel or development, for the intended purposes and in the amounts described in the application for service or Development Agreement. Resale of service or the supplying of service to any other parcel is prohibited, unless authorized in writing by the District.

4.2 In case of unauthorized extension, re-metering, sale, or disposition of service, the Customer's service will be subject to discontinuance until such unauthorized activity is discontinued and full payment of all outstanding amounts due are made.

5.0 CONTINUITY OF SERVICE

5.1 The District will use reasonable diligence to provide continuous service, and having used such reasonable diligence, shall not be liable to the Customer for failure or interruption. The District shall not be liable for any act or omission caused directly or indirectly by strikes, labor troubles, accidents, litigation, breakdowns, shutdowns for emergency repairs or adjustments, acts of sabotage, wars, other governmental interference, acts of God or other causes beyond District's control.

5.2 Customers requiring uniform pressure of water or reuse water shall install, at their expense, the equipment needed to insure uniform pressure.

5.3 Customers requiring a large amount of water in a short period of time shall install, at their expense, adequate interceptor or storage tanks of a type approved by the District.

5.4 Customers requiring continuous service shall have parallel installations. Testing of backflow prevention devices requires a water shutdown of about one (1) hour. For facilities that require an uninterrupted supply of water, and when it is not possible to provide water service from two separate meters, provisions shall also be made for a parallel installation of backflow prevention devices. The District will not accept an unprotected bypass around a backflow prevention device when the device is in need of testing, repair, or replacement.

6.0 CUSTOMER'S SYSTEM CONSTRUCTION AND MAINTENANCE

6.1 The Customer's system shall be installed, used, and maintained in accordance with standard plumbing practices and State and County building codes, District rules and regulations, and shall comply with all laws and governmental regulations.

6.2 The District shall not be responsible for the maintenance and operation of the Customers' installation. The Customer shall keep all privately-owned water, wastewater and/or reuse water pipes, including vacuum air inlets, low pressure lines, gravity lines, backflow assemblies, and all plumbing fixtures in repair and promptly stop all leaks on their premises. However, the District may inspect, test, and make repairs on private property to protect District systems, public health, or the environment as determined to be necessary in the sole judgment of the District. Actual cost of said inspections, tests or repairs shall be charged to the Customer.

6.3 The Customer expressly agrees not to utilize any appliance or device which is not properly constructed, controlled, and protected or which may adversely affect the service or the system. The District reserves the right to discontinue or withhold service to any Customer utilizing such apparatus or device.

6.4 Private gravity collection systems shall be maintained and repaired to minimize stormwater or groundwater I&I into the system. An I&I surcharge may be applied to the account if the account is determined to be a significant contributor of I&I, relative to their service, to the District's wastewater system.

7.0 NO CHANGE OF CUSTOMER'S INSTALLATION

No changes in the Customer's installation, which will materially affect the proper operation of a District system, shall be made without written consent of the District. The Customer will be liable for any costs resulting from a violation of this rule.

8.0 INSPECTION OF CUSTOMER'S INSTALLATION

All service connections and changes thereto shall be installed and maintained in accordance with all applicable rules including State and County plumbing/building codes and District rules and regulations. The District shall inspect the Customer's initial connection to any District line prior to rendering service. District reserves the right to inspect any

Customer Installation from time to time thereafter for proper maintenance and compliance with plumbing/building codes but assumes no responsibility whatsoever for any portion thereof.

9.0 PROTECTION OF DISTRICT PROPERTY

The Customer shall protect the District's property on the Customer's premises, and shall permit no one but the District's agents, or persons authorized by law, to have access to the District owned property. The Customer shall be liable for a tampering charge, any costs to the District arising out of the willful action, and possible loss of service; also refer to paragraph 23.1. Tampering with the intent to harm persons, under current federal law is subject to imprisonment up to 20 years and fines up to $1,000,000.

10.0 CROSS CONNECTION AND BACKFLOW PREVENTION PROGRAM

See Resolution Number 18-03-01 B

11.0 ACCESS TO PREMISES

The District shall have access to District property within private property at all reasonable hours for the purpose of meter reading, installing, maintaining, inspecting or removing the District's property, emergency mitigation as required by the sole judgment of the District to protect District systems, public health and/or the environment, and other purposes incident to the performance under or termination of the District's agreement with the Customer, and in such access shall not be liable for trespass. Access to the water meter or other District property shall not be obstructed by animals, bushes, fences, or any other condition that would prevent the District's personnel safe access.

12.0 RIGHTS-OF-WAY OR EASEMENTS REQUIRED FOR CUSTOMER'S SERVICE

The Customer shall grant to the District and without cost to the District, all rights, easements, permits and privileges which are necessary for the rendering of the requested service for the benefit of the Applicant.

13.0 BILLS FOR SERVICE

Bills for water and/or wastewater service and reuse service will be rendered monthly. Bills will be considered received by the Customer when mailed to the service address or other address as designated by the Customer. Non-receipt of bills by the Customer shall not release or diminish the obligation of the Customer with respect to payment thereof.

13.1 At a Customer's request the District will send bills to and receive payment from, an agent or tenant. This accommodation will in no way relieve the owner/principal of liability for charges.

13.2 MONTHLY CHARGES

13.2.1 Base Facility Charges will commence on the effective date of the service agreement. Base Facility Charges will be based on purchased capacity expressed in ERCs.

13.2.2 Usage Charges will typically not start until the date of installation of the meter; tap of the wastewater main; or connection to the wastewater stub-out, whichever occurs first. Once a water meter is provided, usage charges will begin for both water and wastewater services, if both are available for use. Rates will be depicted in thousands of gallons increments, and monthly charges will be calculated on a per gallon basis.

13.3 When the District determines that a Customer has been overcharged or undercharged, the amount in question shall be credited or billed to the Customer.

13.4 WATER/WASTEWATER ADJUSTMENT RULES
Based on circumstances, facts, and evidence available, the Administrator may authorize, at his or her sole discretion, a reduction to the Usage Charge portions of a Customer's bill. There will be no adjustment of water or wastewater Base Facility Charges.

13.4.1 The Water Usage charge portion of the bill may be reduced to the first (lowest) tiered rate and an adjustment may only be granted once every twenty-four (24) months. This adjustment must be requested by the Property Owner.

a. The usage must be at least three (3) times the annual average monthly usage, based on the last twelve (12) month consumption history. In cases where the account has been in existence for less than twelve (12) months, the existing monthly history for the parcel will be used.
b. A twelve (12) month payment schedule may be approved for a balance over $100.00.
c. Two (2) consecutive adjustments may be made at the Administrator's discretion when a continuous leak spans two billing cycles. Additional documentation of the leak may be required.

13.4.2 The Wastewater Usage charge portion of the bill may be reduced as follows, based on the Customer's annual average monthly usage, not including the bill in question.

a. When metered water usage is known to have not entered the wastewater collection system (for example, when a Customer reports filling a swimming pool), the measured or estimated amount of water usage may be adjusted from the total metered water gallons for that period. There is no limitation on the number of times this adjustment may be utilized based on factual conditions.
b. When all the conditions/limits within section 13.4.1 are met for a water usage adjustment as defined above, and it is determined or believed by the District that the excess water usage **did not enter** the wastewater collection system, the wastewater usage charge **may** be billed based on the Customer's annual average monthly usage.
c. When all the conditions/limits within section 13.4.1 are met for a water usage adjustment and it is determined or believed by the District, that the excess water usage **did enter** the wastewater collection system; the wastewater usage charges **may** be reduced by 50%.

13.4.3 New landscape required by the County to obtain a Certificate of Occupancy or required by code enforcement will be allowed for a 90-day period to establish root systems. During the 90-day period the maximum water usage rate attributable to landscape irrigation will be that cost per 1,000 gallons associated with the 8,000 to 12,000-gallon usage range. When requesting an adjustment, the Customer must provide proof of County requirement and proof of landscape installation.

13.5 When determined by the Administrator, miscellaneous costs incurred by the District in the day-to-day administration of an individual account may be "passed-on" to the Customer, without markup, as long as the Administrator's determination is applied consistently to all Customers within the same class. Typical miscellaneous costs may include, but are not limited to, the following:

a. The cost of obtaining a water-meter reading from another utility to allow wastewater billing by the District.
b. Credit card associated charges incurred by the District when the Customer elects to utilize a credit card to pay the District.
c. County document recording fees.

14.0 DISCONTINUATION OF SERVICE

The District may discontinue Service for any of the following reasons:

a. Non-payment of bill(s), or portions thereof, for service, fees and/or charges as provided for herein.

b. Willful waste of water and/or reuse water.
c. Tampering by the Customer or by others with the Customer's knowledge.
d. Addition of residential or commercial units without proper application.
e. Failure to maintain and/or test backflow devices as required.
f. Violation of any rule or regulation of the District.

14.1 In addition to discontinuing service, the District has the right to pursue any action of law or equity when any of the foregoing actions occur.

14.2 When service has been discontinued, it will be resumed only after the conditions, circumstances, or practices that caused the service to be discontinued are corrected to the satisfaction of the District, and after payment of all charges due.

14.3 When service has been discontinued due to violations of these rules, the water and/or reuse water meter may be removed at the sole discretion of the District.

14.4 Upon Customer request, a meter may be removed from an undeveloped parcel in order to discontinue paying base facility charge(s). Any CCC's AGRF, assessments or other charges/fess assessed at the time service was applied for will not be refunded. It will be credited to the parcel as described on the application for service. When subsequent application for service to the same parcel is received, the current CCC's for that service will be due, less the amount previously credited to the property.

14.5 When service is discontinued for any reason, the monthly base facility charge(s) will continue to apply.

15.0 DELINQUENT BILLS

The Customer is responsible for the payment of all service charges, fees, penalties, or other amounts owed pursuant to lawful billing by the District. There shall be no liability of any kind against the District for the discontinuance of service due to an Applicant's or Customer's failure to pay a bill or portions thereof as required herein. A delinquent bill is defined as any dollar amount owed the District which has not been paid within twenty (20) days of the billing date.

15.1 Payments may be made at the District office, by mail, bank draft, credit card or other methods that may be established by the District. If an account has not been paid in full within twenty (20) days after the bill date, the account will be considered delinquent and a penalty as established herein shall be added.

15.2 If after forty-five (45) days from the billing date, the delinquent bill remains unpaid, service may be terminated by placing a locking device on the meter. Upon termination, or District personnel arriving at the property for purposes of termination, payment of all charges due, including trip fees, shall be required to re-establish service.

15.3 After one hundred twenty (120) days of non-payment from the billing date, a Notice of Lien will be filed on the property. In addition to delinquent amounts, all associated fees must all be paid in full before service is restored.

16.0 RESTORING SERVICE

When service is discontinued in accordance with Sections 14 or 15, it will be restored within forty-eight (48) hours (exclusive of weekends and holidays) of payment in full of all amounts due as established herein and corrective action has been taken to eliminate any condition in violation of District rules.

17.0 CHANGE OF OWNERSHIP

The District is not a party to the sale of real property within the District. All District fees and charges run with the parcel. It is the responsibility of the Customer to notify the District of the change of ownership date.

17.1 When a Rental Account change of tenant is known, the tenant, landlord or owner shall inform the District

prior to the date of change. When the parcel/property is vacated by the tenant, the District must obtain full payment of all fees and charges incurred by the tenant before authorization of a new rental Customer can be established. Billing will remain with the property and ultimate responsibility for payment will be with the parcel/property owner.

17.2 When a property is sold, the District will provide a special meter reading which will serve as a final read for the seller and an initial read for the buyer, with a final bill being provided to the seller. A new service application fee, as provided herein, will be reflected in the new owner's first bill.

18.0 UNAUTHORIZED CONNECTIONS

Connections to the District's system(s), unless specifically authorized in writing, are to be made by or under the supervision of the District. Any unauthorized connections shall be subject to immediate discontinuance, without notice. Service shall not be restored until such unauthorized connections have been removed, and until settlement is

made in full for all water, and/or wastewater and/or reuse water service estimated by the District to have been used by reason of such unauthorized connection. Customers may also be subject to tampering charges; reimbursement of District costs and other fees and charges may be applied.

19.0 METERS

19.1 In general, a single meter will be required to provide service to a single parcel. Master meters may be allowed/required at the sole discretion of the District under the following two conditions:

a. When an owners' association, by recorded legal instrument, is singularly responsible for providing water and wastewater service for all parcels within the association, the association will indemnify and defend the District against any action involving breach, default or negligence by the association providing that the District may lien any or all parcels within the association during any period of association default or breach as provided by law or as provided by District Rules and Regulations in association with administration of the account.

b. When all parcels served by the master meter have, and continue to have, common ownership and any or all parcels are subject to District lien during any period of contractual default or breach as provided by law or as provided by District Rules and Regulations in association with administration of the account.

19.2 The District shall provide 5/8" to 2" meters at a fee established herein. The meter shall remain the property of the District and shall be accessible and subject to District control. The location of the meter will be designated by the District. The District will make reasonable efforts to accommodate the Customer when locating the meter.

19.3 Maintenance of District owned meters will be the responsibility of the District. Damage to a meter due to Customer's negligent or willful act will make the Customer liable for a tampering charge, all costs to repair or replace the meter and potential loss of service. The Customer shall promptly notify the District of any defects in, or damage to the meter or the service connection. **Please note: the valve on the water meter is only to be operated by the District. District personnel are on-call after hours should an emergency shut-off be required**.

19.4 The District shall test a meter for calibration of flow rates upon request of the Customer. If the meter is found within tolerance levels, a charge to the Customer as provided herein will be made for the test. If the meter is out of tolerance, as established herein, there will be no charge to the Customer for the test or replacement meter.

19.5 The portion of the Customer's installation for water or reuse water shall be so arranged to ensure that all water or reuse water shall pass through the associated meter. Temporary connections are only permitted when a Temporary Water Customer account with a temporary water meter is established with the District. Under no circumstances will any connection be allowed which may permit water or reuse water to by-pass the meter or metering equipment.

20.0 METER ACCURACY

All meters used for measuring quantity of water, reuse water, or wastewater delivered/received shall be in good mechanical condition and shall be adequate in design for the type of service that they measure. The District may remove a meter for test, repair and/or maintenance at any time.

20.1 METER ERROR - When meter tests are made by the District, the accuracy of the meter shall abide by AWWA standards. If a meter is found to be in error, in favor of the customer, usage charges for the latest two billing periods will be adjusted based on previous billing history.

20.2 ESTIMATED BILLS - If the meter should fail to register for any reason, or if the District personnel should be unable to read the meter for any reason, an estimated bill will be issued with previous billing history being used to calculate the estimated bill.

21.0 FILING OF CONTRACTS

Whenever a Contract for Service, Special Contract or Development Agreement is entered into by the District for the provision of service(s) in a manner not specifically covered by these Rules and Regulations or approved rate schedules, a copy of such contract(s) or agreement(s) shall be filed with the Clerk of the Circuit Court in the County where the service is provided.

22.0 WASTEWATER SERVICE

22.1 The Customer shall not discharge or cause to be discharged, waters, such as storm water, surface water, ground water, roof run-off, surface drainage, or cooling water, into the District's wastewater system. The Customer shall be subject to a tampering charge and possible discontinuation of all service in this event.

22.2 The Customer shall not discharge or cause to be discharged into the District wastewater system any waste harmful to the system to include but not limited to the following:

Gasoline, benzene, naphtha, fuel oil, or other flammable or explosive liquid(s), solid(s), or gas(es)

a. Pharmaceuticals, toxic or poisonous solids, liquid, or gases in any quantity, either singly or by interaction with other wastes, which would injure or interfere with any waste treatment process, constitute a hazard to humans or animals, create a public nuisance, or create any hazard in the wastewater treatment plant
b. Any waters or wastes having a pH lower than 5.5 or higher than 9.5 or having any other corrosive property capable of causing damage or hazard to structures, equipment, or personnel of the wastewater facilities
c. Any liquid having temperature greater than 150 degrees Fahrenheit
d. Solid or viscous substances in quantities or of such size capable of causing obstruction to the flow in sewers or otherwise interfering with the proper operation of the wastewater facilities such as, but not limited to, ashes, bones, cinders, sand, mud, straw shaving, metal, glass, rags, feathers, tar, plastics, wood, lint, un-ground garbage, whole blood, manure, hair, diapers, entrails, paper dishes, cups, containers either whole or ground by garbage grinding, excessive grease, paint thinners, floor and paint stripping compounds
e. Any chemical compounds producing toxic, flammable, or explosive gasses either upon acidification, alkalization, oxidation, or reduction
f. Any waste from industrial processes, hospital procedures or commercial processes containing viable pathogenic organisms

22.3 The maximum allowable values for certain material in, or characteristics of wastewater which, when entering the District’s wastewater system and measured at the point of discharge shall be governed by the standards of the U. S. Environmental Protection Agency, the Florida Department of Environmental Protection and the Water Pollution Control Federation. In defining and interpreting these values, references shall be made to Standard

Methods for the Examination of Water and Wastewater, American Water Works Association, latest edition. These aforementioned limitations apply to all users within the District's wastewater system. In the event that State and Federal regulatory agency regulations require a specific pretreatment concentration, the regulation more stringent shall apply.

22.4 If any waters or wastes are discharged or are proposed to be discharged into the District's wastewater system which contain or possess the restricted or prohibited characteristics enumerated in these rules, and which in the sole judgment of the District may have a deleterious effect upon the wastewater facilities, process, or receiving waters, or which otherwise create a hazard to life or constitute a public nuisance, the District may:

a. Reject the wastes
b. Require pretreatment to an acceptable condition for discharge to the District's wastewater system
c. Require control over the quantities and rates of discharge, and/or
d. Require payment to cover added cost of handling and treating the wastes not covered by wastewater rates and charges under the provisions of District rules
e. Discontinue service

If the District permits the pretreatment or equalization of waste flows, the design and installation of the facilities and equipment shall be subject to the District's review and approval.

22.5 Grease, oil and sand interceptors shall be provided by the Customer when in the opinion of the District, they are necessary for the proper handling of liquid wastes containing floatable grease in excessive amounts, they are necessary for the proper handling of liquid wastes containing floatable grease in excessive amounts, flammable wastes, sand or other harmful ingredients. All interceptors shall be approved by the District and shall be located as to be easily accessible for cleaning and inspection. The Customer shall be responsible for the proper inspection and maintenance of these interceptors and for the proper removal and disposal, by appropriate means, of the captured material and shall maintain records of the dates and means of disposal of the captured material. These records are subject to review by the District. Licensed waste disposal firms must perform any removal and hauling of the collected materials.

22.6 All facilities with outside grease interceptors shall provide proof of grease removal and quarterly inspections of grease interceptors to the District. Failure to do so may result in discontinuance of service.

22.7 Authorized agents and employees of the District, bearing proper credentials and identification, shall be permitted to enter all properties at regular hours for the purposes of inspection, observation, measurement, sampling, and testing pertinent to discharge to the District system in accordance with the provision of these rules. Authorized personnel may also enter all properties upon which the District holds an easement for the aforementioned purposes. All entry and subsequent work on said easement shall be done in full accordance with the terms of any easement pertaining to the property involved.

22.8 Grease interceptors shall be cleaned as often as necessary to maintain at least 50 percent of their grease retention capacity.

22.9 Where pretreatment or flow-equalizing facilities are provided or required for any water or wastes, they shall be maintained continuously in satisfactory and effective operation by the Customer, at their expense.

22.10 When the District determines that a Customer's discharge may be injurious to the District's systems or may violate these rules, at the District's request, the Customer will install a suitable structure, together with such necessary meters and other appurtenances to facilitate observation, sampling and measurement of the wastes. Such structure shall be constructed at Customer's expense, be accessible and safely located, and shall be constructed in accordance with plans approved by the District.

22.11 The District may require the Customer to provide information needed to determine compliance with this regulation. These requirements may include:

a. Wastewater discharge peak rate and volume over a specified time period
b. Chemical analyses of wastewater
c. Information on raw materials, processes and products affecting wastewater volume and quality
d. Quantity and disposition of specific liquid, sludge, oil, solvent, or other materials important to wastewater use control
e. A plot plan of wastewater collection and pretreatment facility location
f. Details of wastewater collection pretreatment facilities
g. Details of systems to prevent and control the losses of materials through spills to any District wastewater collection system

22.12 All measurements, tests, and analyses of the characteristics of waters and wastes to which reference is made in this Section shall be determined in accordance with the latest edition of Standard Methods for the Examination of Water and Waste Water published by the American Water Works Association. Sampling methods, locations, times, duration, and frequencies are to be determined on an individual basis subject to approval by the District.

22.13 No statement contained in these rules shall be construed to prevent any special agreement or arrangement between the District and any industrial concern whereby an industrial waste of unusual strength or character may be accepted by the District for treatment.

22.14 The District may require the Customer to supply information concerning processes that have a direct bearing on the kind and source of discharge to the wastewater system. The Customer may withhold information considered confidential, provided that the Customer must establish that disclosure to the District is not necessary and public disclosure of the information in question might result in direct and substantial economic advantage to competitors.

22.15 While performing necessary work on private property, any duly authorized representative(s) or employee(s) of the District shall observe all reasonable safety rules applicable to the premises as established by the user or owner.

22.16 The District reserves the right to refuse waste from any source, to include residential, commercial, or industrial building or activity which does not comply with District rules, utilize District provided water or an approved well connection, supply proper metering of its waste or is not within the District's service area.

22.17 All Residential Units and non-residential structures must connect to the District's wastewater collection system when service is available per section 2.1.3.

22.18 Upon connection to the District's wastewater system, the property owner must abandon its domestic onsite sewage treatment and disposal systems in accordance with local and state regulations. The District shall inspect the abandonment of the onsite domestic sewage system and no connection to the District's wastewater system will be allowed without approval from the District. Properly permitted, constructed, and operated "gray water systems" (wastewaters from only the bath, laundry, and non-kitchen sinks) need not be abandoned upon connection to the District wastewater system per FS 381.0065.

22.19 The Customer will be responsible for all costs to connect to the District's vacuum or gravity wastewater system's point of collection. Such costs shall include but are not limited to: a) the cost to construct the wastewater service lateral from the dwelling to the Point of Collection, and b) abandonment and removal from service of the onsite sewage treatment and disposal systems. The District shall be present to inspect the Customer's connection to the Point of Collection at the time of connection. The District will not be responsible for any costs associated with the maintenance or replacement of the service lines or laterals located on the Customer-side from the Point of Collection.

22.20 For new, low pressure wastewater service, when "available" the District shall provide a point of service at the edge of the property after payment of all applicable charges and fees. The Customer shall be responsible to provide and install the grinder pump station. This includes, but is not limited to the tank, pump, control panel, gravity line from the house to the pump's wet-well, discharge line from the pump to the point of service, and the electrical service required. The Customer shall also be responsible for disconnection and abandonment of existing septic tanks as applicable and will be responsible for all associated costs.

23.0 RESIDENTIAL REUSE

District personnel must be present at the time of any connection to a residential reuse line. District personnel is not required to be present for connection to a District provided reuse Point of Delivery within a "meter" box. Reuse irrigation systems will not be cross-connected to any potable water system. Standard "hose bib" connections are not allowed on any District supplied residential reuse system. Reuse shall not enter a Residential Unit or a building that contains a Residential Unit. Reuse water shall not be used to fill swimming pools, hot tubs, or wading pools. As a condition of Customer's application for reuse service either with EWD or with a homeowner's association, the Customer shall hold harmless and indemnify the District, its agents, representatives, servants, and employees, and the Customer will be solely responsible for compliance with health and safety requirements as required by the District, FAC 62-610 Part III and other State or Federal requirements that regulate the proper use of Public Access Reuse systems.

24.0 ASSESSMENT AREAS

For the purposes of calculating the amount of the assessment due, the following shall apply:

24.1 The total cost of a service provided to an assessment area may be paid for by those parcels that directly benefit from the service provided. The total cost will be allocated on a per ERC basis to affected parcels.

24.2 Each undeveloped parcel shall be charged at the estimated usage for a planned development or a minimum of 1.0 ERC if a development plan does not exist. A parcel which cannot be developed and is not provided service as part of an assessment area will not be included in the assessment.

24.3 ERCs for developed, non-residential parcels will be calculated per Section 2.2.3 with a minimum of 1.0 ERC per parcel.

24.4 ERCs for a residential unit will be based on the number if dwelling units on the parcel per County Records.

24.5 Any parcel capable of being provided service shall be assessed a minimum of 1.0 ERC. The minimum ERCs assigned to any Residential Unit shall be 1.0 ERC.

24.6 If the service provided under a special assessment has been constructed for a parcel, and the parcel is later combined with other parcels, there shall be no refund or credit for any prior payments of assessment charges for the eliminated parcel. The prior payments shall be compensation for construction of the "abandoned" service. If the service has NOT been constructed at the time the parcel is combined with other parcels, any prior payments of assessment or capital capacity charges will be credited to the consolidated parcel. There will be no cash refunds.

24.7 After project completion and after final assessment adjustments have been made (or there is a determination that no adjustments will be made) to the initial assessment estimates of affected parcels, which parcels are affected and cost per parcel, the assessment will be closed. All future new connections will be billed using Capital Capacity Charges and CCC rules in effect at the time of connections.

25.0 SUSTAINABLE WATER SUPPLY

Whereas the Surficial and Intermediate Aquifers are the raw water supply sources for the District's lime-softening water treatment plant and reverse osmosis water treatment plant, and whereas the Intermediate Aquifer has limited recharge capacity, it is appropriate that the District take reasonable precautions to ensure these shallow aquifers remain sustainable sources of raw water supply for the District.

25.1 The District in coordination with the Southwest Florida Water Management District and the Sarasota County Health Department will not allow any irrigation well to be drilled or the conversion of a potable water well to an irrigation well within one mile of an existing District water supply well head, unless the District determines through District accepted hydrologic models, that the irrigation well will have no detrimental impacts on the aquifer or any wetlands. A detrimental impact is defined as any impact that will limit the District's ability to obtain the maximum, sustainable wellfield production.

25.2 The District will utilize an "inverted" water usage rate schedule to encourage water conservation. As water usage increases, the rate schedule, cost per 1000 gallons, shall increase. In that irrigation is an elective use of water, the lowest water rates essential to health and sanitation shall not be applicable to potable water meters dedicated to irrigation usage.

25.3 During periods of sustained drought and increased demand for irrigation, the Board may further restrict by resolution, the hours available for irrigation beyond Water Management District restrictions.

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26.0 SERVICE FEES AND CHARGES

A. WATER RATES - Water Customers per ERC/month. Note: May increase a maximum of 5% annually effective October 1 of each fiscal year.

1. Base Facility Charge	$ 21.15 /ERC/month
2. Usage Charges	0-6,000 = $2.51/1,000 gallons 6,001-8,000 = $3.36/1,000 gallons 8,001-12,000 = $6.69/1,000 gallons 12,001-18,000 = $11.16/1,000 gallons Over 18,000= $17.43/1000 gallons
3. Dedicated Irrigation and Temporary Meters Usage Charges	 0-12,000 = $6.69/1000 gallons 12,001-18,000 = $11.16/1000 gallons Over 18,000 = $17.43/1000 gallons

B. WASTEWATER RATES – Wastewater Customers per ERC/month. Note: May increase a maximum of 5% annually effective October 1 of each fiscal year.

1. Base Facility Charge	$ 30.78/ERC/month
2. Usage Charge per ERC/month	All Usage = $3.92/1,000 gallons
a. Inflow & Infiltration (I&I) 50% Surcharge	1.5 times the total wastewater bill
3. Wastewater Only (no water meter)	$ 23.35 Use 196-gal X 365 days/12 = 5,962 gal/month/ ERC to calculate Usage, plus Base Charge.

C. WHOLESALE RATES – Note: May increase a maximum of 5% annually effective October 1 of each fiscal year.

1. Wholesale Water Rates	
a. Capital Capacity Charges Paid for Service	$ 5.01/1000 gallons
b. No Capital Capacity Charges Paid for Service	$ 6.65/1000 gallons
2. Governmental Bulk Rate	$ 5.01/1000 gallons

3. Wholesale Wastewater Rates – Master meters and non-District collection systems

Capital Capacity Charges Paid for Service – Treatment & Disposal Charge	
a. Billing off Water Meter	$ 6.59/1000 gallons
b. Billing off Wastewater Meter	$ 8.65/1000 gallons
No Capital Capacity Charges Paid for Services – Treatment & Disposal Charge	
a. Billing off Water Meter	$ 9.30/1000 gallons
b. Billing off Wastewater Meter	$12.22/1000 gallons

D. REUSE WATER (a wastewater treatment product) Note: May increase a maximum of 5% annually effective October 1 of each fiscal year.

a. Usage to Isolated Pond	$ 0.36/1000 gallons
b. Pressurized Usage	$ 0.48/1000 gallons

E. MISCELLANEOUS FEES (fees exceeding $1,000.00 must be paid by cash or check)

1. NEW SERVICE APPLICATION FEE $ 25.00

2. LATE PAYMENT (on past due balances exceeding $10.00)
   a. $5.00 or 1.5% of Cumulative Balance, whichever is greater

3. RETURN CHECK CHARGE
   a. Standard Check or Bank Draft returned, canceled, or stopped payment. Same as Florida Statue 68.065

$0 to $50.00	$ 25.00
$50.01 to $300.00	$ 30.00
Over $300.00	$ 40.00 or 5% whichever is greater

   b. Internet or Online Item Return. Same as Florida Statute 68.065

$0 to $50.00	$ 25.00
$50.01 to $300.00	$ 30.00
Over $300.00	$ 40.00 or 5% whichever is greater

4. ADDITIONAL METER OR REPLACEMENT METER – Actual Cost
   (after Capital Capacity Charge is paid)

5. TEMPORARY WATER CUSTOMER

a. Meter Deposit	$750.00
b. Rental (monthly)	$ 30.00
c. Usage	Irrigation and Temporary Meter Rates
d. Trip Charge (each)	$ 30.00
e. Tap (Administration Fee)	$500.00

6. FIRE LINE – Note: No Capital Capacity Charge
   a. Administration Fee $500.00
   b. Fire Line Adjusted Base Charge = 75% of Monthly Base Facility Charge per ERC
   c. Monthly Availability Charge Line Diameter of Service Line (1/12 * Fire Line Adjusted Base Charge* meter equivalent factor):

2” (meter equivalent factor of 8)	$ 10.57
3” (meter equivalent factor of 15)	$ 19.83
4” (meter equivalent factor of 25)	$ 33.04
6” (meter equivalent factor of 50)	$ 66.08
8” (meter equivalent factor of 80)	$105.74
10” (meter equivalent factor of 115)	$151.99
12” (meter equivalent factor of 215)	$284.16

7. TAMPERING with EWD Property

a. First Offense	$ 500.00 plus cost of replacing damaged property
b. Second Offense	$1000.00 plus cost of replacing damaged property
c. Third and Subsequent Offenses	$1500.00 plus cost of replacing damaged property

8. RESEARCH & COPIES

a. Recording Fee-First Page	Actual Cost
b. Recording Fee-Additional Pages	Actual Cost
c. One Side	All copies will be charged at the maximum allowable
d. Two Side	by Florida State Statue Chapter 119, Section 7
e. Minutes of Meeting (uncertified)	
f. Minutes of Meeting (certified)	
g. Research or Monitoring (1 hour)	$ 20.00/hour
h. Large Maps	$ 1.00/page

I. Blue Prints	$ 1.00/page
j. Auto Cad Disk	$ 5.00/each
k. FAX Request	$ 1.00/page
l. Mailing Labels & Computer Time	$30.00 + $15.00/hour
m. Bid Documents	As Advertised
9. PLAN REVIEW/INSPECTION	$300.00 includes first and second review $150.00 for each additional review
10. CONSTRUCTION REVIEW	1% of construction cost: Minimum $500.00
11. SERVICE TURN ON OR OFF AT OWNER'S REQUEST	
a. 48-hour notice (1 on/1 off annually)	No Charge (Monday-Friday 7 a.m. to 5 p.m.)
b. Additional with 48-hour notice	$ 30.00 (Monday-Friday 7 a.m. to 5 p.m.)
c. Less than 48-hour notice	$100.00
d. After working hours and weekends	$100.00 (Monday-Friday AFTER 5 p.m. and all day Saturday & Sunday)
e. Holidays	$145.00
12. ACCOUNT RE-ACTIVATION (7:00 a.m. to 5:00 p.m. Monday-Friday)	
a. Lock removal	
Disconnection/turn off non-payment	$ 30.00/trip
Re-connection/turn on non-payment	$ 30.00/trip
b. Meter re-installation plus cost of new meter if applicable	
During regular working hours	$ 90.00
13. PAYMENT DEADLINE EXTENSION	$ 10.00/each occurrence
14. SERVICE CALL OUTS	
a. During regular working hours	$ 30.00/trip (Monday-Friday 7:00 a.m. to 5 p.m.)
b. After working hours and weekends	$100.00/trip (Monday-Friday AFTER 5:00 p.m.)
c. Holidays	$145.00
d. Sewer Repair	Actual Cost
15. METER TEST WITHIN TOLERANCE	
a. 5/8", 1" or 1 ½" meters	$185.00
16. SEWER CAP/UNCAP CHARGE	$ 30.00/each occurrence
17. SPECIAL BILL/METER READ	$ 30.00/each
18. TESTING/INSPECTIONS	
a. Un-certified Fire Flow Test	$175.00/each
b. Service Tie-in (initial)	No Charge
c. Service Re-inspection	$ 30.00/each
d. Service Locate	No Charge
19. FINANCING TERMS FOR CAPITAL CAPACITY CHARGES (See Section 2.3.3)	
a. Interest	5%
b. Term	15 years
c. Down Payment	None

20. INITIAL METER INSTALLATION FEE

a. The standard District meter shall be a Neptune T-10 Radio Read. Meters 5/8" and 1" in size will typically, be placed in trafficable non-metal boxes. Meters larger than 1" will only be above ground. If required, there will be an additional Customer cost for an above-ground Reduced Pressure Backflow Assembly (RP) provided by a plumber.

b. District installed service & box.

District Installed with Short Tap

Size	
5/8" meter	$1,255.00
1" meter	$1,585.00
1 1/2" meter	$2,080.00
2" meter	$2,335.00

District Installed with Long Tap

Size	
5/8" meter	$1,970.00
1" meter	$2,015.00
1 1/2" meter	$2,910.00
2" meter	$3,160.00

c. Developer installed service & box (using District provided meter).

Size	
5/8" meter	$ 340.00
1" meter	$ 400.00
1 1/2" meter	$ 520.00
2" meter	$ 615.00

3.0" and larger meters (service, and backflow device provided and installed by customer.)

21. CLEARING METER BOX OBSTRUCTIONS - Will be billed at Actual Cost minimum $30.00

22. CAPITAL CAPACITY CHARGES per ERC

a. Water

1. Plant Capacity/Transmission System	$1,751.00
2. Distribution System	$1,200.00

b. Wastewater

1. Plant Capacity/Transmission System	$2,754.00
2. Collection System	$5,817.00

23. AGRF per ERC

a. Water	$ 329.00
b. Wastewater	$ 580.00

27.0 EFFECTIVE DATE

These Customer Rules and Regulations of the Englewood Water District shall become effective upon the date of passage hereof and shall supersede the revised October 1, 2022 Customer Rules and Regulations of the Englewood Water District and any other rules, resolutions, and regulations of the District over the same subject matter in conflict with the foregoing Customer rules and regulations from the effective date hereof.

B

Appendix B

Enabling Legislation

CHAPTER 2004-439

House Bill No. 1381

An act relating to the Englewood Water District, Charlotte and Sarasota Counties; codifying, amending, reenacting, and repealing the district's special acts; establishing boundaries; providing definitions; providing for election of a board of supervisors to govern said district; providing powers, authority, and duties of the board; granting to said governing board the authority in the territory defined to construct, acquire, extend, enlarge, reconstruct, improve, maintain, equip, repair, and operate a water system, wastewater system, or wastewater reuse system, or any combination thereof; authorizing the levy and collection of non-ad valorem assessments on property benefited by the construction of such water system, wastewater system, or wastewater reuse system, or combined systems; providing for optional methods of financing the cost of the water system, wastewater system, or wastewater reuse system or combined systems or extensions and additions thereto by the issuance of revenue bonds or assessment bonds or any combination thereof and the fixing and collection thereof and the fixing and collection of rates and charges on users of such systems; providing for the levy and collection of non-ad valorem assessments on benefited property and the pledge of such assessments for the payment of any revenue bonds, or assessment bonds; providing for the rights, remedies, and security of any of the holders of said bonds; providing penalties; repealing chapter 96-499, Laws of Florida, relating to the Englewood Water District; providing an effective date.

Be It Enacted by the Legislature of the State of Florida:

Section 1. In accordance with section 189.429, Florida Statutes, this act constitutes the codification of all special acts relating to the Englewood Water District. It is the intent of the Legislature in enacting this law to provide a single, comprehensive special act charter for the district, including all current legislative authority granted to the district by its several legislative enactments and any additional authority granted by this act.

Section 2. Chapter 96-499, Laws of Florida, relating to the Englewood Water District, is codified, reenacted, amended, and repealed as herein provided.

Section 3. The Englewood Water District is re-created and the charter is re-created and reenacted to read:

Section 1. (1) There is hereby created the Englewood Water District for the areas of Charlotte and Sarasota Counties, described as follows:

Sections 8, 9, 10, 11, 12, 13, 14, 15, 16, 21, 22, 23, 24, 25, 26, 27, 35, and 36, that part of sections 4 and 5, lying and being west of the west boundary of Lemon Bay, township 40 south; range 19 east; and sections 16, 17, 18, 19, 20, 21, 28, 29, 30, 31, 32 and 33, township 40 south, range 20 east, all being in Sarasota County, State of Florida.

Sections 1, 2, 12 and 13, Township 41 South, Range 19 East; Sections 4, 5, 6, 7, 8, 9, 16, 17, and 18, that part of Section 21 lying and being north of the north bank of Buck Creek, and that portion of Section 20 lying and being east of the east boundary of Lemon Bay, Township 41 South, Range 20 East, all lying and being in Charlotte County, State of Florida.

That portion of Section 3, Township 40 South, Range 19 East lying west of S.R. 776 (Englewood Road), and those portions of Sections 4 and 5, Township 40 South, Range 19 East, lying and being east of the west boundary of Lemon Bay, all being south of the east-west line prescribed by Colonial Road, all being in Sarasota County, Florida.

(2) The Englewood Water District, an independent special district, is hereby declared to be a body corporate and politic under the corporate name and style of "Englewood Water District" with power to contract, to sue and be sued in its corporate name, and with the other powers and duties hereinafter set forth, as well as all other powers and exemptions given by general law.

Section 2. As used in this act, unless the context otherwise requires:

(1) "District" means the Englewood Water District created by this act.

(2) "Water system" means and includes any plants, systems, facilities, or property and additions, extensions, and improvements thereto at any future time constructed or acquired as a part thereof, useful or necessary or having the present capacity for future use in connection with the development of sources, treatment for purification, and distribution of water for domestic, commercial, or industrial use and without limiting the generality of the foregoing shall include dams, reservoirs, storage tanks, mains, lines, valves, pumping stations, laterals, and pipes for the purpose of carrying water to the premises connected with such system and shall include all real and personal property and any interest therein, rights, easements, and franchises of any nature whatsoever relating to such system and necessary or convenient for the operation thereof.

(3) "Wastewater system" means and includes any plant, system, facility, or property and additions, extensions, and improvements thereto at any future time constructed or acquired as a part thereof, useful or necessary or having the present capacity for future use in connection with the collections, treatment, purification, or disposal of wastewater or sewerage of any nature or originating from any source, including industrial wastes resulting from any processes of any industry, manufacture, trade, or business or from the development of any natural resources, and without limiting the generality of the foregoing definition shall embrace treatment plants, pumping stations, lift stations, valves, force mains, intercepting sewers, laterals, pressure lines, mains, and all necessary appurtenances and equipment, and all wastewater mains and laterals for the reception and collection of wastewater or sewerage on premises connected therewith, and shall include all real and personal property and any interest therein, rights, easements, and franchises of any nature whatsoever relating to any such system and necessary or convenient for the operation thereof.

(4) "Wastewater reuse system" means and includes any plant, system, facility, or property and additions, extensions, and improvements thereto at any future time constructed or acquired as a part thereof, useful or necessary or having the present capacity for future use in connection with the collection, treatment, purification, disposal, or distribution of wastewater or stormwater originating from any source, for the purpose of reuse and without limiting the generality of the foregoing definition shall embrace treatment plants, dams, reservoirs, storage tanks, pumping stations, lift stations, valves, force mains, laterals, pressure lines, mains, and all necessary appurtenances and equipment, and shall include all real and personal property and any interest therein, rights, easements, and franchises of any nature whatsoever relating to any such system and necessary or convenient for the operation thereof. Water which has received at least secondary treatment and stormwater may be referred to as reclaimed wastewater and may be reused for such beneficial purposes, including, but not limited to, landscape or agricultural irrigation, aesthetic uses such as ponds or fountains, groundwater recharge, industrial uses, environmental enhancement, or fire protection.

(5) "System" or "systems" means the water, wastewater, or wastewater reuse systems authorized by this act, either individually, in any combination, or any part thereof.

(6) "Cost" means, as applied to the acquisition and construction of a water system, wastewater reuse system, or a wastewater system or extensions, additions, or improvements thereto, the cost of construction or reconstruction, acquisition, or purchase, the cost of all labor, materials, machinery, and equipment, the cost of all lands and interest therein, an office and administration building for the district, property, rights, easements, and franchises of any nature whatsoever, financing charges, interest prior to and during construction and for 1 year after completion of construction or acquisition of such water system, wastewater reuse system, or wastewater system or extensions, additions, or improvements thereto, bond discount, fees and expenses of financial advisors or fiscal agents, cost of plans and specifications, surveys and estimates of costs and revenues, cost of engineering and legal services, and all other expenses necessary or incidental in determining feasibility or practicality of such construction, reconstruction, or acquisition, administrative expenses, and such other expenses as may be necessary or incidental to the construction or acquisition or improvement of such water system, wastewater reuse system, or wastewater system authorized by this act and the financing thereof, and the reimbursement of any expenses incurred by the district in connection with any of the foregoing items of cost.

(7) "Revenue bonds" means bonds or other obligations secured by and payable as to principal and interest from the revenues derived from rates, fees, and charges collected by the district from the users of the facilities of the water system, wastewater reuse system, or wastewater system, or any combination thereof, and which may or may not be additionally secured by a pledge of the proceeds of non-ad valorem assessments levied against property benefiting from assessable improvements.

(8) "Board" means the board of supervisors of the district.

Section 3. The district shall be governed and its affairs administered by the board of supervisors consisting of five members.

(1)(a) By a majority vote, the Englewood Water District Board of Supervisors shall adopt a preliminary resolution dividing the district into five separate and distinct sections of approximately equal populations, drawn along Charlotte County and/or Sarasota County precinct lines, if feasible. These divisions shall be known as the “Englewood Water District Supervisor Election Districts” which shall be numbered 1 through 5.

(b) After the initial adoption by the board of the proposed Englewood Water District Supervisor Election Districts, the district shall hold a public hearing at which all residents of the district or other interested parties shall have an opportunity to be heard concerning the proposed Englewood Water District Supervisor Election Districts. Notice of such public hearing setting forth the five proposed Englewood Water District Supervisor Election Districts shall be given by one publication in a newspaper published in Charlotte County, and in one publication in a newspaper published in Sarasota County, and such notice shall also be posted in five public places in the district, at least 30 days prior to the date of such hearing, which may be adjourned from time to time.

(c) After such hearing, such preliminary resolution dividing the district into five separate and distinct sections, known as the Englewood Water District Supervisor Election Districts, either as initially adopted or as modified or amended, shall be finally adopted. A map of the Englewood Water District Supervisor Election Districts shall be kept on file in the office of the administrator of the district and shall be open to public inspection during normal business hours.

(d) The Englewood Water District Supervisor Election Districts shall be revised every 10 years in the same manner as they were originally established as hereinabove established. If the boundaries of the district are modified, the election districts shall be modified as necessary in the same manner established above in adequate time for the new election districts to be utilized during the next general election.

(2)(a) On the first Tuesday after the first Monday in November 2002, and every 4th year thereafter, two supervisors, one residing in Englewood Water District Board of Supervisors Election District 5 and one residing in Englewood Water District Board of Supervisors Election District 4, shall be elected by the qualified electors of the Englewood Water District for terms of 4 years each.

(b) On the first Tuesday after the first Monday in November 2004, and every 4th year thereafter, three supervisors, one residing in Englewood Water District Board of Supervisors Election District 3, one residing in Englewood Water District Board of Supervisors Election District 2, and one residing in Englewood Water District Board of Supervisors Election District 1, shall be elected by the qualified electors of the Englewood Water District for terms of 4 years each.

(c) The results of such election shall be declared by resolution adopted by the board. Each elected member of the Board shall assume office 10 days following the member's election. Each supervisor shall duly file his or her oath of office and a bond in such amount as the board shall determine for the faithful performance of his or her duties prior to taking office and the cost thereof shall be paid by the district.

(3) In the event no person has been elected at the general election to fill an office which was required to be filled at such election, the members of the board shall, within 60 days following the date of the election, by a majority vote of all members then in office, appoint a person from the appropriate Englewood Water District Supervisors Election District, to serve for each office not otherwise filled by said election, to serve until the next general election, at which election the qualified electors of the district shall elect a supervisor to serve the remaining unexpired term, if any, of such supervisors so appointed.

(a) In the event any supervisor shall resign, die, or be removed from the district, or the office of such supervisor shall for any reason become vacant, the remaining members of the board may, by a majority vote of all members then in office, appoint a successor to such supervisor, from the appropriate Englewood Water District Supervisors Election District, to serve until the next general election, at which election the qualified electors of the district shall elect a supervisor to serve for the remaining unexpired term, if any, of such supervisor whose office became vacant as aforesaid.

(b) A notice of the election shall be given at least once at least 14 days prior thereto by one publication in a newspaper published in Charlotte County, and in one publication in a newspaper published in Sarasota County, and such notice shall also be posted during the 14-day period in five public places in the district.

(4) All elections under this act shall be nonpartisan.

(5)(a) Elections for the purpose of electing supervisors to the board shall conform to the Florida Election code, chapters 97-106, Florida Statutes, as pertains to independent special districts as set forth in section 189.405, Florida Statutes.

1. The results of the election shall be jointly canvassed by the county canvassing boards of the Counties of Charlotte and Sarasota and the results of such joint canvass shall be reported in accordance with general law.

2. Supervisors shall be qualified electors with legal residence in the appropriate Englewood Water District Board of Supervisors Election District, who are freeholders. The office of any supervisor who ceases to be a qualified elector with legal residence in the appropriate election district and a freeholder in the district during his or her term of office shall become vacant.

(b) The board shall be vested with all administrative power and authority of the district and shall have and exercise all powers conferred upon such district by the terms of this act. Members of the board may each be paid a salary or honorarium to be determined by at least a majority plus one vote of the board, which salary or honorarium may not exceed $500 per month for each member. Special notice of any meeting at which the board will consider a salary change for a board member shall be published at least once, at least 14 days prior to the meeting, in a newspaper of general circulation in the county in which the district is located. Separate compensation for the board member serving as treasurer may be authorized by like vote so long as total compensation for the board member does not exceed $500 per month. Said board members shall also be reimbursed for moneys expended in the performance of their official duties consistent with the provisions of section 112.061, Florida Statutes.

(c) The organization and conduct of the board's affairs shall be as follows:

1. The chair and vice chair shall be elected at an annual meeting to be held in January of each year, and shall serve in said capacities until the next annual meeting; said officers may be removed at any time during their tenure, with or without cause, by a majority vote of all members of said board. Upon the expiration of the terms of office of any of said officers for any reason whatsoever, the board shall elect new officers to fill the positions thus vacated.

2. The board shall hold such meetings as the business affairs of the district may require, and all such meetings shall be noticed and open to the public as provided by law. Such meetings shall be held within the territorial limits of the district or may be held outside the district in conjunction with other boards, commissions, agencies, bodies, or persons for the purpose of holding discussions or for the exchange of information. However, no formal action may be taken by the passage of any resolution, rule, or order at meetings held outside the district other than that action which is required for the ordinary conduct of such meetings.

3. A majority of the board shall constitute a quorum at any meeting thereof and all actions of the board shall be upon an affirmative vote of the majority of board members present at any such meeting, provided that no action of the board may pass with less than three affirmative votes. However, any resolution authorizing the issuance of bonds or other obligations, or the levy on non-ad valorem assessments, or the fixing of rates and charges for the services and facilities of the systems of the district shall not be adopted except upon the affirmative vote of a majority of all the members of the board then in office. Actions of the board shall be evidenced by resolutions voted upon and adopted by the board, which may be finally adopted at the same meeting at which they are introduced and need not be published or posted, except resolutions authorizing the issuance of bonds or other obligations shall be advertised in accordance with the provisions of this section and a public hearing shall be held prior to the adoption of such resolutions. Resolutions providing solely for the refunding of any already existing bonds or other obligations need not be so advertised.

4. Written minutes of each board meeting shall be kept and there shall be recorded therein a report of all that transpired at any such meeting. The minutes shall be signed by the vice chair of the board and kept permanently in books provided for that purpose.

5. The board shall cause to be kept complete and accurate books of accounting in standard bookkeeping and accounting procedures. Annually, the board shall make a true and complete accounting of all moneys received and expended by said board and said accounting shall list the assets and liabilities of the district. Said accounting shall be based upon an audit prepared by a certified public accountant, and shall be in writing with sufficient copies thereof made to furnish to any inhabitants of the district requesting same.

6. All contracts of the district shall be signed by the chair of the board of supervisors, and the seal of the board shall be affixed thereto, attested by the secretary to the board who shall be official custodian of such seal. The board, by resolution, may delegate authority to sign contracts to the administrator of the district. Any bonds issued by the district under the provisions of this act shall be signed in the same manner as a contract. However, only one manual signature shall be required on any bonds and the seal of the district may be imprinted or reproduced thereon.

7. Every board member and every officer of the district shall be indemnified by the district against all expenses and liabilities, including counsel fees, reasonably incurred by or imposed upon the member or officer in connection with any proceeding or any settlement of any proceeding to which he or she may be a party or in which he or she may become involved by reason of his or her being or having been a board member or officer of the district, whether or not he or she is a board member or officer at the time such expenses are incurred. In the event of a settlement, the indemnification shall apply only when the board approves such settlement and reimbursement as being for the best interests of the district. The right of indemnification authorized by this subparagraph shall be in addition to and not exclusive of all other rights to which a board member or officer may be entitled. This subparagraph shall not apply to a board member or officer who is adjudged guilty of willful misfeasance or malfeasance in the performance of his or her duties.

8. The board may, by the vote of a majority of all members, elect a member to serve as chair or vice chair on an interim basis during the absence of such officer. The interim officer shall have all of the powers, duties, and authority of such officer during his or her absence.

Section 4. The district, by and through the board, is hereby authorized and empowered:

(1) To make rules and regulations for its own governance and proceedings and to adopt an official seal for the district.

(2) To employ such consulting and other engineers, technicians, construction and accounting experts, financial advisors or fiscal agents, attorneys, and such other agents and employees as the board may require or deem necessary to effectuate the purposes of this act and to take such steps as are necessary to be taken to provide coverage by the old age and survivors insurance system embodied in the federal Social Security Act to employees of the Englewood Water District on as broad a basis as permitted under the federal Social Security Act and the laws of Florida and may provide a pension or retirement plan for its employees. Notwithstanding the prohibition

against extra compensation set forth in section 215.425, Florida Statutes, the board may provide for an extra compensation program, including a lump-sum bonus payment program, to reward outstanding employees whose performance exceeds standards, if the program provides that a bonus payment may not be included in an employee's regular base rate of pay and may not be carried forward in subsequent years.

(3) To construct, install, erect, acquire and operate, maintain, improve, extend, or enlarge and reconstruct a water system, wastewater system, or wastewater reuse system or any combination thereof within or without said district for the furnishing of water service, wastewater service, or wastewater reuse service or any combination of such services to the inhabitants of the district, and to have the exclusive control and jurisdiction thereof, and to issue its revenue bonds, assessment bonds, or other obligations, or any combination thereof to pay all or part of the cost of such construction, reconstruction, erection, acquisition, or installation of such systems. The purchase or sale of a water, wastewater, or wastewater reuse system shall be accomplished in accordance with section 189.423, Florida Statutes.

(4) To regulate the disposal of wastewater, reuse of wastewater, and supply of water within the district and to prohibit the use and maintenance of outhouses, privies, septic tanks, or other unsanitary structures or appliances, in accordance with the general laws of the state.

(5) To fix and collect rates, fees, capital contributions, and other charges for the use of the facilities and services provided by any system, and to fix and collect charges for making connections and reconnections with any such system, and to provide for reasonable charges and penalties to any users of property for any such rates, fees, or charges that are delinquent.

(6) To acquire in the name of the district by purchase, gift, or the exercise of eminent domain pursuant to chapter 73 or chapter 74, Florida Statutes, such lands and rights and interest therein, both within and without the district, including land under water and riparian rights and to acquire such personal property as may be deemed necessary in connection with the construction, reconstruction, improvement, extensions, installation, erection, or operation and maintenance of any system, and to hold and dispose of all real and personal property under its control.

(7) To receive grants, either separately or in conjunction with any municipality, governmental agency, or governmental entity, either in the nature of public works or public improvement grants or loans from any governmental agency, department, bureau, or individual for the purpose of installing, constructing, erecting, acquiring, operating, or maintaining a system or other things necessary or incidental thereto.

(8) To exercise exclusive jurisdiction, control, and supervision over any system owned, operated, and maintained by the district and to make and enforce such rules and regulations for the maintenance and operation of any system as may be, in the judgment of the board, necessary or desirable for the efficient operation of any such systems or improvements in accomplishing the purposes of this act.

(9) To restrain, enjoin, or otherwise prevent the violation of this act or of any resolution, rule, or regulation adopted pursuant to the powers granted by this act.

(10) To join with any other district or districts, cities, towns, counties, or other political subdivisions, public agencies, or authorities in the exercise of common powers consistent with section 163.01, Florida Statutes.

(11) To contract with municipalities or other private or public corporations or persons to provide or receive a water supply or for wastewater disposal, collection, or treatment, or for wastewater reuse.

(12) To prescribe methods of pretreatment of industrial wastes not amenable to treatment with domestic wastewater before accepting those wastes for treatment and to refuse to accept such industrial wastes when not sufficiently pretreated as may be prescribed, and by proper resolution to prescribe penalties for the refusal of any person or corporation to so pretreat such industrial wastes.

(13) To require and enforce the use of its facilities whenever and wherever they are accessible in accordance with applicable general law and applicable local government comprehensive plans.

(14) To sell or otherwise dispose of the effluent, sludge, reclaimed wastewater, or other byproducts as a result of wastewater treatment and reclamation.

(15) To accomplish construction by holding hearings, advertising for construction bids, and letting contracts for all or any part or parts of the construction of any system in accordance with the provisions of section 15.

(16) To cause surveys, plans, specifications, and estimates to be made from time to time for any system.

(17) To enter on any lands, water, or premises, public or private, located within or without the district or either of the Counties of Charlotte or Sarasota to make surveys, borings, soundings, or examinations for the purposes of this act.

(18) To construct and operate connecting, intercepting, or outlet wastewater or reclaimed wastewater mains and pipes and water mains, conduits or pipelines in, along, or under any streets, alleys, highways, or other public places or ways within the state or any municipality or political subdivision.

(19) Subject to such provisions and restrictions as may be set forth in the resolution authorizing or securing any bonds or other obligations issued under the provisions of this act, to enter into contracts with the Government of the United States or any agency or instrumentality thereof, or with any other county, municipality, district, authority or political subdivision, private corporation, partnership, association, or individual providing for or relating to the treatment, collection, and disposal of wastewater or the treatment, supply, and distribution of water or reclaimed wastewater and any other matters relevant thereto or otherwise necessary to effect the

purposes of this act and to receive and accept from any federal agency grants for or in aid of the planning, construction, reconstruction, or financing of any system and to receive and accept aid or contributions from any other source of either money, property, labor, or other things of value to be held, used, and applied only for the purpose for which such grants and contributions may be made.

(20) To acquire, purchase, or buy real estate within or without the district to be used in the development, installation, construction, improvement, maintenance, operation, or servicing of any system of the district, by installment contract, agreement for deed, or note and mortgage, provided that said contract, agreement for deed, or mortgage does not constitute a lien or encumbrance upon any real property other than that being purchased thereby.

(21) To sell or otherwise dispose of effluent, sludge, or other byproducts produced by any system.

(22) To require the owner, tenant, or occupant of each lot or parcel of land within the district who is obligated to pay the rates, fees, or charges for the services furnished by any facility owned or operated by the district under the provisions of this act to make a reasonable deposit with the district in advance to ensure the payment of such rates, fees, or charges. If such rates, fees, or charges become delinquent, the district may apply the deposit to the payment or partial payment thereof, including accrued interest, shutoff charges, and penalties, if any.

(23) To invest and reinvest the surplus public funds of the district consistent with the requirements of section 218.415 Florida Statutes, and other applicable state or federal law.

Section 5. (1) The board for and on behalf of the district is authorized to provide from time to time for the issuance of revenue bonds to finance or refinance all or part of the costs of additions, extensions, and improvements to, or the acquisition of, any system. The principal of and interest on any such revenue bonds shall be payable from the rates, fees, charges, or other revenues derived from the operation of any such system or systems in the manner provided in this act and the resolution authorizing such bonds and pledging such revenues. The proceeds of non-ad valorem assessments levied as provided in this act may be pledged as additional security for said revenue bonds. It is the express intent of this act that the district shall be authorized to finance the purposes provided in this act by the issuance of revenue bonds or special assessment bonds separately for all or any part of the cost thereof, or to issue revenue bonds additionally secured by the non-ad valorem assessments for all or any part of such cost, so that the district shall have complete flexibility as to the types of bonds to be issued and the security for the holders of such bonds. The revenue bonds of the district shall be issued in such denominations and mature on such dates and in such amounts, and may be subject to optional and mandatory redemption, all as shall be determined by resolutions adopted by the board on behalf of the district. Bonds of said district may bear interest at a fixed or floating or adjustable rate and may be issued as interest-bearing, interest-accruing bonds or zero coupon bonds at such rate or rates not exceeding the maximum rate permitted by general law, all as shall be determined by resolutions of the board on behalf of the district. Principal and interest shall be payable in the manner determined by the board. The bonds shall be signed by the chair or vice chair of the board, attested with the seal of said district and by the signature of the chair of the board of supervisors. In case any officer whose signature or a facsimile of whose signature shall appear on the bonds shall cease to be such officer before the delivery of such bonds, such signature or facsimile shall nevertheless be valid and sufficient for all intents and purposes the same as if he or she had remained in office until such delivery. The board may sell such bonds in such manner not inconsistent with general law, either at public or private sale, and for such price, as it may determine to be for the best interests of the district.

(2) The proceeds of the sale of any such bonds shall be used to finance or refinance all or part of the costs of the construction or acquisition of additions, extensions, and improvements of any water system, wastewater reuse system, or wastewater system or any combination thereof, to fund reserves and renewal and replacement funds, and to pay the costs of issuing such bonds. The funds derived from the sale of the bonds shall be disbursed in such manner and under such restrictions as the board may provide in the authorizing resolution. Revenue bonds may be issued under the provisions of this act without any other proceeding or happening of any other condition or thing than those proceedings, conditions, or things which are specifically required by this act and by general law.

(3) A resolution providing for the issuance of revenue bonds may also contain such limitations upon the issuance of additional revenue bonds secured on a parity with the bonds theretofore issued, as the board may deem proper, and such additional bonds shall be issued under such restrictions and limitations as may be prescribed by such authorizing resolution.

(4) Revenue bonds may be issued under the provisions of this act without regard to any limitations or indebtedness prescribed by law.

(5) Revenue bonds issued under the provisions of this act shall not constitute a general obligation debt of the district within the meaning of any constitutional or statutory debt limitation, but such bonds shall be payable solely from the revenues and/or non-ad valorem assessments, if any, pledged therefor, and that the full faith and credit of the district is not pledged to the payment of the principal of or interest on such bonds.

(6) In connection with the sale and issuance of bonds, the district may enter into any contracts which the board determines to be necessary or appropriate to achieve a desirable effective interest rate in connection with the bonds by means of, but not limited to, contracts commonly known as investment contracts, funding agreements, interest rate swap agreements, currency swap agreements, forward payment conversion agreements, futures, or contracts providing for payments based on levels of or changes in interest rates, or contracts to exchange cash flows or a series of payments, or contracts, including, without limitation, options, puts, or calls to hedge payment, rate, spread, or similar exposure. Such contracts or arrangements

may also be entered into by the district in connection with, or incidental to, entering into any agreement which secures bonds or provides liquidity therefor. Such contracts and arrangements shall be made upon the terms and conditions established by the board, after giving due consideration for the credit worthiness of the counterparties, where applicable, including any rating by a nationally recognized rating service or any other criteria as may be appropriate.

(7) In connection with the sale and issuance of the bonds, or entering into any of the contracts or arrangements referred to in the paragraph above, the district may enter into such credit enhancement or liquidity agreements, with such payment, interest rate, security, default, remedy, and any other terms and conditions as the board shall determine.

(8) Notwithstanding any provisions of state law relating to the investment or reinvestment of surplus funds of any governmental unit, proceeds of the bonds and any money set aside or pledged to secure payment of the principal of, premium, if any, and interest on the bonds, or any of the contracts entered into pursuant to this section, may be invested in securities or obligations described in the resolution providing for the issuance of bonds.

Section 6. (1) The board shall, by resolution prior to the issuance of any revenue bonds, fix the initial schedule of rates, fees, or other charges for the use of and the services and facilities to be furnished by any such water system, wastewater reuse system, or wastewater system, or any combination thereof, to be paid by the owner, tenant, or occupant of each lot or parcel of land which may be connected with or used by any such system or systems of the district. After the system or systems shall have been in operation the district board may revise the schedule of rates, fees, and charges from time to time. However, such rates, fees, and charges shall be so fixed and revised so as to provide sums which, with other funds for such purposes, shall be sufficient at all times to pay:

(a) The principal of and interest on revenue bonds as the same shall become due and reserves therefor.

(b) The expenses of maintaining and repairing such systems, including reserves for such purposes and for capital replacements, depreciation, and necessary extensions or improvements and administrative expenses.

(c) Any other payments required by the resolution authorizing the issuance of such revenue bonds.

(2) Such rates, fees, and charges shall be just and equitable and uniform for users of the same class and where appropriate may be based or computed either upon the quantity of water or wastewater consumed or produced, or upon the number and size of wastewater connections or upon the number and kind of plumbing fixtures in use in the premises or upon the number or average number of persons residing or working in or otherwise using the facilities of such system or upon any other factor affecting the use of the facilities or services furnished or upon any combination of the foregoing factors as may be determined by the board on any other equitable basis. All rates, fees, and charges established pursuant to this act shall be set in

accordance with the total cost of service which is required to provide service to the customers. The water system, wastewater reuse system, and wastewater system shall be accounted for as separate and as distinct systems. However, the district shall set rates consistent with the guidelines adopted by the American Water Works Association for government-owned utilities. The district may, by resolution, consolidate any one or more systems, provided such consolidation shall not impair the rights of any existing bondholders of the district.

(3) No rates, fees, or charges shall be fixed under the foregoing provisions of this section until a public hearing at which all the users of the proposed system or owners, tenants, or occupants served or to be served thereby and all others interested shall have an opportunity to be heard concerning the proposed rates, fees, and charges. After the initial adoption by the board of the resolution setting forth the preliminary schedule or schedules fixing and classifying such rates, fees, and charges, notice of such public hearing setting forth the proposed schedule or schedules of rates, fees, and charges shall be given by one publication in a newspaper published in Charlotte County and in a newspaper published in Sarasota County and such notice shall also be posted in five public places in the district, at least 10 days prior to the date of such hearing, which may be adjourned from time to time. After such hearing, such preliminary schedule or schedules, either as initially adopted, or as modified or amended, may be finally adopted. A copy of the schedule or schedules of such rates, fees, or charges finally fixed in such resolution shall be kept on file in the office of the district and shall be open at all times to public inspection. The rates, fees, or charges so fixed for any class of users or property served shall be extended to cover any additional properties thereafter served which shall fall in the same class, without the necessity of any hearing or notice. Any change or revision of such rates, fees, or charges may be made in the same manner as such rates, fees, or charges were originally established as provided herein, provided that if such changes or revisions be made substantially pro rata as to all classes of service no hearing or notice shall be required.

Section 7. In addition to the other provisions and requirements of this act, any resolution authorizing the issuance of bonds may contain any other provisions deemed necessary or in the best interest of the district and the board is authorized to provide and may covenant and agree with the several holders of such bonds to include, but without limitation as to any other provisions, any of the following:

(1) As to a reasonable deposit with the district in advance, to ensure the payment of rates, fees, or charges for the facilities of the system or systems.

(2) May, in keeping with its rules and regulations, disconnect any premises from the water system, wastewater reuse system, or wastewater system if any such rates, fees, or charges are delinquent for a period of 30 days or more.

(3) The assumption of payment or discharge of any indebtedness, lien, or other claim relating to any part of any such system or any combination thereof, or any other obligations having or which may have a lien on any part of any such system or systems.

(4) Limitations on the powers of the district to construct, acquire, or operate, or permit the construction, acquisition, or operation of any plants, structures, facilities, or properties which may compete or tend to compete with any other system of the district.

(5) The manner and method of paying service charges and fees and the levying of penalties for delinquent payments.

(6) The manner and order of priority of the disposition of revenues or redemption of any bonds.

(7) Terms and conditions for modification or amendment of any provisions or covenants in any such bond resolution authorizing the issuance of such bonds.

(8) Provisions and limitations on the appointment of a trustee, paying agent, registrar, or escrow agent for bondholders.

(9) Provisions as to the appointment of a receiver of any system on default of principal of or interest on any such bonds or the breach of any covenant or condition of such authorizing resolution or the provisions and requirements of this act.

(10) Provisions as to the execution and entering into of trust agreements, if deemed necessary by the board, regarding the disposition of revenues or bond proceeds for the payment of the cost of the acquisition and construction of the system or any part thereof, or for any other purposes necessary to secure any such revenue bonds.

(11) Provisions as to the maintenance of any such system or systems and reasonable insurance thereof.

(12) Any other matters necessary to secure such bonds and the payment of the principal and interest thereof. All such provisions of the bond resolution and all such covenants and agreements in addition to the other provisions and requirements of this act shall constitute valid and legally binding contracts between the district and several holders of any such bonds regardless of the time of issuance of such bonds, and shall be enforceable by any such holder or holders by mandamus or other appropriate action, suit, or proceeding in law or in equity in any court of competent jurisdiction.

Section 8. (1) When the fees, rates, or charges for the services and facilities of any system are not paid when due and are in default for 10 days or more, following written notice to such delinquent customer, the district may discontinue and shut off the supply of the services and facilities of such systems, to the person, firm, corporation, or other body, public or private, so supplied with such services or facilities, until such fees, rates, or charges, including interest, penalties, and charges for the shutting off and discontinuance or the restoration of such services or facilities are fully paid. Such delinquent fees, rates, or charges, together with interest, penalties, and charges for the shutting off and discontinuance or the restoration of such services or facilities, and reasonable attorney's fees, costs and other expenses, may be recovered by the board in a court of competent jurisdiction.

(2) In the event that the fees, rates, or charges for the services and the facilities of any system shall not be paid as and when due, the unpaid balance thereof and all interest accruing thereon shall, to the extent permitted by law, be a lien on any parcel or property affected thereby. Such liens shall be superior and paramount to the interest on such parcel or property of any owner, lessee, tenant, mortgagee, or other person except the lien on county or district taxes and shall be on a parity with the lien on any such county or district taxes. In the event that any such service charge shall not be paid as and when due and shall be in default for 30 days or more, the unpaid balance thereof and all interest accrued or penalties thereon, together with attorney's fees and costs, may be recovered by the district in a civil action, and any such lien and accrued interest and penalties may be foreclosed or otherwise enforced by the district by action or suit in equity as for the foreclosure of a mortgage on real property in the manner provided by general law.

Section 9. (1) The district may provide for the levy of non-ad valorem assessments under this act on the lands and real estate benefited by the construction of any system, or extensions or improvements thereof, or any part thereof. Non-ad valorem assessments may be levied only on benefited real property at a rate of assessment based on the special benefit accruing to such property from such improvements. The district may use any assessment apportionment methodology that meets the "fair apportionment" standards.

(2) The board may determine to make any improvements authorized by this act and defray the whole or any part of the expense thereof by non-ad valorem assessments. The board shall so declare by resolution stating the nature of the proposed improvement, designating the location of wastewater facilities, the location of water mains, water laterals, and other water distribution facilities, or the location of the wastewater reuse facilities, and the part or portion of the expense thereof to be paid by non-ad valorem assessments, the manner in which said assessments shall be made, when said assessments are to be paid, and what part, if any, shall be apportioned to be paid from the general funds of the district. Said resolution shall also designate the lands upon which the non-ad valorem assessments shall be levied, and in describing said lands it shall be sufficient to describe them as "all lots and lands adjoining and contiguous or bounding and abutting upon such improvements or specially benefited thereby and further designated by the assessment plat hereinafter provided for." Such resolution shall also state the total estimated cost of the improvement. Such estimated cost may include the cost of construction or reconstruction, the cost of all labor and materials, the cost of all lands, property, rights, easements, and franchises acquired, financing charges, interest prior to and during construction and for 1 year after completion of construction, discount on the sale of assessment bonds, cost of plans and specifications, surveys of estimates of costs and of revenues, cost of engineering and legal services, and all other expenses necessary or incident to determining the feasibility or practicability of such construction or reconstruction, administrative expense, and such other expense as may be necessary or incident to the financing herein authorized.

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(3) At the time of the adoption of the resolution provided for in subsection (2), there shall be on file at the district's offices an assessment plat showing the area to be assessed, with plans and specifications, and an estimate of the cost of the proposed improvement, which assessment plat, plans, and specifications and estimate shall be open to the inspection of the public.

(4) Upon adoption of the resolution provided for in subsection (2), or completion of the preliminary assessment roll provided for in subsection (5), whichever is later, the vice chair of the board shall publish notice of the resolution once in a newspaper published in each of the Counties of Charlotte and Sarasota. The notice shall state in brief and general terms a description of the proposed improvements with the location thereof, and that the plans, specifications, and estimates are available to the public at the district's offices. The notice shall also state the date and time of the hearing to hear objections provided for in subsection (7), which hearing shall be no earlier than 15 days after publication of said notice. Such publication shall be verified by the affidavit of the publisher and filed with the secretary to the board.

(5) Upon the adoption of the resolution provided for in subsection (2), the board shall cause to be made a preliminary assessment roll in accordance with the method of assessment provided for in said resolution, said assessment roll shall show the lots and lands assessed and the amount of the benefit to and the assessment against each lot or parcel of land, and, if said assessment is to be paid in installments, the number of annual installments in which the assessment is divided shall also be entered and shown upon said assessment roll.

(6) Upon the completion of said preliminary assessment roll, the board shall by resolution fix a time and place at which the owners of the property to be assessed or any other persons interested therein may appear before said board and be heard as to the propriety and advisability of making such improvements, as to the cost thereof, as to the manner of payment therefor, and as to the amount thereof to be assessed against each property so improved. Ten days' notice in writing of such time and place shall be given to such property owners. The notice shall include the amount of the assessment and shall be served by mailing a copy by first class mail to each of such property owners at his or her last known address, the names and addresses of such property owners to be obtained from the records of the property appraiser, and proof of such mailing to be made by the affidavit of the secretary to the board, or by the engineer.

(7) At the time and place named in the notice provided for in subsection (4), the board shall meet and hear testimony from affected property owners as to the propriety and advisability of making the improvements and funding them with non-ad valorem assessments on property. Following the testimony, the board shall make a final decision on whether to levy the non-ad valorem assessments, adjusting assessments as may be warranted by information received at or prior to the hearing. If any property which may be chargeable under this section shall have been omitted from the preliminary roll or if the prima facie assessment shall not have been made against it, the board may place on such roll an apportionment to such property. The owners

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of any property so added to the assessment roll shall be mailed a copy of the notice provided for in subsection (6) by first class mail and granted 15 days from such date of mailing to file any objections with the board. When so approved by resolution of the board, a final assessment roll shall be filed with the vice chair of the board, and such assessments shall stand confirmed and remain legal, valid, and binding first liens upon the property against which such assessments are made until paid. The assessment so made shall be final and conclusive as to each lot or parcel assessed unless proper steps be taken within 30 days after the filing of the final assessment roll in a court of competent jurisdiction to secure relief. If the assessment against any property shall be sustained or reduced or abated by the court, the vice chair shall note that fact on the assessment roll opposite the description of the property affected thereby and notify the county property appraiser and the tax collector in writing. The amount of the non-ad valorem assessment against any lot or parcel which may be abated by the court, unless the assessment upon the entire district be abated, or the amount by which such assessment is so reduced, may by resolution of the board be made chargeable against the district at large, or, at the discretion of the board, a new assessment roll may be prepared and confirmed in the manner hereinabove provided for the preparation and confirmation of the original assessment roll. The board may by resolution grant a discount equal to all or a part of the payee's proportionate share of the cost of the project consisting of bond financing costs, such as capitalized interest, funded reserves, and bond discount included in the estimated cost of the project, upon payment in full of any assessment during such period prior to the time such financing costs are incurred as may be specified by the board.

(8) The non-ad valorem assessments shall be payable at the time and in the manner stipulated in the resolution providing for the improvement; shall remain liens, coequal with the lien of all state, county, district, and municipal taxes, superior in dignity to all other liens, titles, and claims, until paid; shall bear interest, at a rate not to exceed the percentage authorized by section 170.09, Florida Statutes, for municipal special assessments or, if bonds are issued pursuant to this chapter, at a rate not to exceed 1 percent above the rate of interest at which the bonds authorized pursuant to this act and used for the improvement are sold, from the date of the acceptance of the improvement; and may, by the resolution aforesaid and only for capital outlay projects, be made payable in equal installments over a period not to exceed 20 years, to which, if not paid when due, there shall be added a penalty at the rate of 1 percent per month, until paid. However, the assessments may be paid without interest at any time within 30 days after the improvement is completed and a resolution accepting the same has been adopted by the board.

(9) The non-ad valorem assessments approved by the board may be levied, assessed, and collected pursuant to section 197.3632, Florida Statutes. The collection and enforcement of the non-ad valorem assessment levied by the district shall be at the same time and in like manner as county taxes.

(10) All assessments shall constitute a lien upon the property so assessed from the date of confirmation of the resolution ordering the improvement of the same nature and to the same extent as the lien for general county,

municipal, or district taxes falling due in the same year or years in which such assessments or installments thereof fall due, and any assessment or installment not paid when due shall be collected with such interest and with reasonable attorney's fees and costs, but without penalties, by the district by proceedings in a court of equity to foreclose the lien of assessment as a lien for mortgages is or may be foreclosed under the laws of the state, provided that any such proceedings to foreclose shall embrace all installments of principal remaining unpaid with accrued interest thereon, which installments shall, by virtue of the institution of such proceedings immediately become due and payable. Nevertheless, if, prior to any sale of the property under decree of foreclosure in such proceedings, payment be made of the installment or installments which are shown to be due under the provisions of the resolution passed pursuant to this section, and all costs including attorney's fees, such payment shall have the effect of restoring the remaining installments to their original maturities and the proceedings shall be dismissed. It shall be the duty of the district to enforce the prompt collection of assessments by the means herein provided, and such duty may be enforced at the suit of any holder of bonds issued under this act in a court of competent jurisdiction by mandamus or other appropriate proceedings or action. Not later than 30 days after the annual installments are due and payable, it shall be the duty of the board to direct the attorney or attorneys whom the board shall then designate to institute actions within 3 months after such direction to enforce the collection of all non-ad valorem assessments for improvements made under this section and remaining due and unpaid at the time of such direction. Such action shall be prosecuted in the manner and under the conditions in and under which mortgages are foreclosed under the laws of the state. It shall be lawful to join in one action the collection of assessments against any or all property assessed by virtue of the same assessment roll unless the court shall deem such joiner prejudicial to the interest of any defendant. The court shall allow reasonable attorney's fees for the attorney or attorneys of the district, and the same shall be collectible as a part of or in addition to the costs of the action. At the sale pursuant to decree in any such action, the district may be a purchaser to the same extent as an individual person or corporation, except that the part of the purchase price represented by the assessments sued upon and the interest thereon need not be paid in cash. Property so acquired by the district may be sold or otherwise disposed of, the proceeds of such disposition to be placed in the fund provided by subsection (11). However, no sale or other disposition thereof shall be made unless the notice calling for bids therefor to be received at a stated time and place shall have been published in a newspaper of general circulation in the district once in each of 4 successive weeks prior to such disposition.

(11) All assessments and charges made under the provisions of this section for the payment of all or any part of the cost of any improvements for which assessment bonds shall have been issued under the provisions of this act are hereby pledged to the payment of the principal of and the interest on such assessment bonds and shall, when collected, be placed in a separate fund, properly designated, which fund shall be used for no other purpose than the payment of such principal and interest.

(12) The counties in which the district is located and each school district and other political subdivision wholly or partly within the district shall be subject to the same duties and liabilities in respect of assessment under this section affecting the real estate of such counties, school districts, or other political subdivisions which private owners of real estate are subject to hereunder, and such real estate of any such counties, school districts, and political subdivision shall be subject to liens for said assessments in all cases where the same property would be subject had it at the time the lien attached been owned by a private owner, except that no such lien may be foreclosed unless and until said real estate is conveyed to a person or entity which is not a political subdivision.

Section 10. The board shall cause to be made at least once each year a comprehensive report of its water system, wastewater reuse system, and wastewater system including all matters relating to rates, revenues, expenses of maintenance, repair, and operation and renewals and capital replacements, principal and interest requirements, and the status of all funds and accounts. Copies of such general report shall be filed with the vice chair and shall be open to public inspection.

Section 11. Any holder of bonds issued under the provisions of this act, or of any of the coupons appertaining thereto, except as to the extent that the rights herein granted may be restricted by the resolution authorizing the issuance of such bonds, may, either at law or in equity, by suit, mandamus, or other proceeding, protect and enforce any and all rights under the laws of the state or granted hereunder or under such resolutions, and may enforce and compel the performance of all duties required by this act and by such resolutions to be performed by the district or by the board or by any officer or officers or employees thereof, including the fixing and charging and collecting of rates, fees, and charges for the services and facilities furnished by the water system, wastewater reuse system, or wastewater system and the due and proper collection of any non-ad valorem assessments pledged therefor.

Section 12. (1) As the exercise of the powers conferred by this act constitutes the performance of essential public functions and as the systems constructed under the provisions of this act constitute public property used for public purposes, such district and the property thereof, including all revenues, moneys, or other assets of any type or character, shall not be subject to taxation by the state or any political subdivision, agency, instrumentality, or municipality thereof, and it is hereby expressly found determined and declared that all of the lands and real estate in said district will be benefited by the construction or acquisition of the systems, and additions, extensions, and improvements thereto, provided for in this act.

(2) All bonds or other obligations issued under this act shall be exempt from all taxation by the state or any county, municipality, or political subdivision thereof; however, the exemption does not apply to any tax imposed by chapter 220, Florida Statutes, on interest, income, or profits on debt obligations owned by corporations. Such bonds or other obligations shall be and constitute securities eligible for deposit as collateral to secure any state, county, municipal, or other public funds, and shall also be and constitute

legal investments for any banks, savings banks, trust funds, executors, administrators, state, county, municipal, or other public funds, or any other fiduciary funds.

Section 13. In any case in which the character or condition of the sewage from or originating in any manufacturing or industrial plant or building or premises is such that it imposes an unreasonable burden upon the wastewater system, an additional charge may be made therefor or the board may, if it deems it advisable, compel such manufacturing or industrial plant, building, or premises to treat such wastewater in such manner as shall be specified by the board before discharging such wastewater into any wastewater lines owned, maintained, or operated by the district.

Section 14. The district is authorized to enter into any agreement for the delivery of any revenue bonds, assessment bonds, or any combination thereof, at one time or from time to time as full or partial payment for any work done by any contractor who may have been awarded a contract for the construction of all or any part of any system. However, any such bonds so delivered for payment of services shall have been authorized and issued pursuant to the provisions of this act and shall otherwise conform to the provisions thereof.

Section 15. (1) All contracts for the purchase of commodities or contractual services in excess of $25,000 let, awarded, or entered into by the district for the construction, reconstruction, or addition to any system shall be publicly advertised and bid. The board shall adopt procedures for public advertisement and call for sealed bids, which procedures may vary the frequency and length of publication based on the amount of the procurement.

(2) Such advertisement for bids, in addition to the other necessary and pertinent matter, shall state in general terms the nature and description of the improvement or improvements to be undertaken and shall state that detailed plans and specifications for such work are on file in the office of the vice chair or will be mailed upon request to interested parties. The award shall be made to the responsible and competent bidder or bidders who shall offer to undertake the improvements at the lowest cost to the district and such bidder or bidders shall be required to file bond for the full and faithful performance of such work and the execution of any such contract in such amount as the board shall determine. No criteria may be used in determining the acceptability of the bid that was not set forth in the invitation to bid. The contract shall be awarded with reasonable promptness by written notice to the qualified and responsive bidder that submits the lowest responsive bid.

(3) When the board determines that the use of competitive sealed bidding is not practicable, commodities or contractual services shall be procured by competitive sealed proposals. A request for proposals which includes a statement of the commodities or contractual services sought and all contractual terms and conditions applicable to the procurement, including the criteria, which shall include, but not be limited to, price, to be used in determining acceptability of the proposal shall be issued. To ensure full understanding of and responsiveness to the solicitation requirement, discussions may be

conducted with qualified offerors. The offerors shall be accorded fair and equal treatment prior to the submittal dates specified in the request for proposals with respect to any opportunity for discussion and revision of proposals. The award shall be made to the responsible offeror whose proposal is determined in writing to be the most advantageous to the district, taking into consideration the price and the other criteria set forth in the request for proposals.

(4) If the chair of the board, or his or her designee, determines in writing that an immediate danger to the public health, safety, or welfare or other substantial loss to the district requires emergency action, the provisions of this section requiring competitive bidding or proposals shall be waived. After the chair or his or her designee makes such a written determination, the district may proceed with the procurement of commodities or contractual services necessitated by the immediate danger, without competition. However, such emergency procurement shall be made with such competition as is practicable under the circumstances. Commodities or contractual services available only from a single source may be excepted from the bid requirements if it is determined that such commodities or services are available only from a single source and such determination is documented and approved by the board. Nothing in this section shall be deemed to prevent the district from hiring or retaining such consulting engineers, or other professionals or other technicians as it shall determine, in its discretion, consistent with the requirements of section 287.055, Florida Statutes, or for undertaking any construction work with its own resources and without any such public advertisement.

Section 16. The same rates, fees, charges, and non-ad valorem assessments shall be fixed, levied, and collected on the property, officers, and employees of the counties, or any school district, or other political subdivision included within the district, as are fixed, levied, and collected on all other properties or persons in the district as provided in this act.

Section 17. Any county, municipality, or other political subdivision is authorized to sell, lease, grant, or convey any real or personal property to the district and any such sale, grant, lease, or conveyance may be made without formal consideration. The district is authorized to classify as surplus any of its property and dispose of such property consistent with the provisions of sections 274.05 and 274.06, Florida Statutes.

Section 18. No system or portion thereof shall be constructed within the district unless the board shall give its consent thereto and approve the plans and specifications therefor, subject, however, to the terms and provisions of any resolution authorizing any bonds and agreements with bondholders.

Section 19. The board shall have no power to mortgage, pledge, encumber, sell, or otherwise convey all or any part of its systems except as otherwise provided in this act, except that the board may dispose of any part of such system or systems as may be no longer necessary for the purposes of the district. The provisions of this section shall be deemed to constitute a contract with all bondholders. All district property shall be exempt from levy and sale by virtue of an execution and no execution or other judicial process shall issue against such property, nor shall any judgment against the district be a charge or lien on its property, provided that nothing herein contained shall apply to or limit the rights of bondholders to pursue any remedy for the enforcement of any lien or pledge given by the district on revenues derived from the operation of any system.

Section 20. The state does hereby pledge to and covenant and agree with the holders of any bonds issued pursuant to this act that the state will not limit or alter the rights hereby vested in the district to acquire, construct, maintain, reconstruct, and operate its systems and to fix, establish, charge, and collect its service charges therefor, and to fulfill the terms of any agreement made with the holders of such bonds or other obligations, and will not in any way impair the rights or remedies of such holders, until the bonds, together with interest thereon, with interest on any unpaid installments of interest, and all costs and expenses in connection with any action or proceeding by or on behalf of such holders, are fully met and discharged.

Section 21. The provisions of this act shall be deemed to constitute a contract with the holders of any bonds issued hereunder and shall be liberally construed to effect its purposes and shall be deemed cumulative and supplemental to all other laws.

Section 22. If any section or provision of this act is held to be invalid or inoperative, then the same shall be deemed severable from and shall not affect the validity of any of the other provisions hereof.

Section 23. The district may assume the operation of any system which substantially fails to meet its financial responsibilities or operating standards pursuant to this act or other laws and regulations of the state, if the board determines that such action is in the public interest and the system owner conveys ownership to the district.

Section 24. The board may lease or license the use of any real or personal property of the district upon such terms, conditions, and for such consideration as the board deems appropriate. However, no such lease or license shall be for a period exceeding 20 years in duration, unless renewed, and provided that the lease or license shall be restricted to permit the grantee to use such property during the term of the lease or license only for civic or public purposes or purposes not in conflict with this act or general law.

Section 25. The district may, in addition to other provisions of this act providing for the accrual of interest, assess an interest charge on contractual obligations owed the district. Such interest shall accrue at an annual percentage rate as provided in chapter 687, Florida Statutes, or as otherwise provided by contract. Such accrued interest charges, if payment thereof becomes delinquent, may be recovered in the same manner as provided in this act for other delinquent rates, fees, charges, or penalties.

Section 26. The members of the board of supervisors shall be subject to recall as provided by general law for elected officers of municipalities.

Section 27. Any person who shall steal or damage district property, or tamper with or alter district property or threaten or cause actual harm to public health commits a criminal offense and misdemeanor within the meaning of section 775.08, Florida Statutes, unless such offense is of a higher degree in general law, and shall be punishable as provided by law.

Section 28. All contracts, obligations, rules, regulations, or policies of any nature existing on the date of enactment of this act shall remain in full force and effect and this act shall in no way affect the validity of such contracts, obligations, rules, regulations, or policies.

Section 29. This act shall not affect the terms of office of the present district board, nor shall it affect the terms and conditions of employment of any employees of the district.

Section 4. Chapter 96-499, Laws of Florida, is repealed.

Section 5. It is declared to be the intent of the Legislature that if any section, subsection, sentence, clause, phrase, or portion of this act is, for any reason, held invalid or unconstitutional by a court of competent jurisdiction, such portion shall be deemed to be a separate, distinct, and independent provision and such holdings shall not affect the validity of the remaining portions of this act.

Section 6. This act shall be construed as a remedial act and the provisions of this act shall be liberally construed in order to effectively carry out the purpose of this act in the interest of the public health, welfare, and safety of the citizens served by the district.

Section 7. This act shall take effect upon becoming a law.

Approved by the Governor June 17, 2004.

Filed in Office Secretary of State June 17, 2004.

C

Appendix C

Capital Financing Plan

CAPITAL FINANCING PLAN

Englewood Water District
(Project Sponsor)

Raymond Burroughs, Administrator
(Authorized Representative and Title)

Englewood, FL 34223
(City, State, and Zip Code)

Lisa Hawkins, Finance Director
(Capital Financing Plan Contact, Title and Telephone Number)

201 Selma Ave.
(Mailing Address)

Englewood, FL 34223
(City, State, and Zip Code)

The Department needs to know about the financial capabilities of potential State Revolving Fund (SRF) loan applicants. Therefore, a financial capability demonstration (and certification) is required well before the evaluation of the actual loan application.

The sources of revenues being dedicated to repayment of the SRF loan are: The gross revenues derived yearly from the operation of the Water and Wastewater Systems after payment of the operation and maintenance expense and the satisfaction of all yearly payment obligations on account of the senior revenue obligations.

(Note: Projects pledging utility operating revenues should attach a copy of the existing/proposed rate ordinance)

Estimate of Proposed SRF Loan Debt Service

Capital Cost*	$	119,907,600
Loan Service Fee (2% of capital cost)	$	2,398,152
Subtotal	$	122,305,752
Capitalized Interest**	$	196,222
Total Cost to be Amortized	$	122,501,974
Interest Rate***		0.17%
Annual Debt Service	$	6,229,879
Annual Debt Service Including Coverage****	$	7,164,361

* Capital Cost = Construction Cost (including a 10% contingency) + Land Costs + Technical Services After Bid Opening.
** Estimated Capitalized Interest = Subtotal times Interest Rate times construction time in years divided by two.
*** 20 GO Bond Rate times Affordability Index divided by 200.
**** Coverage factor is generally 15%. However, it may be higher if other than utility operating revenues are pledged.

SCHEDULE OF PRIOR AND PARITY LIENS

List annual debt service beginning two years before the anticipated loan agreement date and continuing at least fifteen fiscal years. Use additional pages as necessary.

IDENTIFY EACH OBLIGATION

#1 **None.** *Coverage %* *Insured (Yes/No)*	#2 *Coverage %* *Insured (Yes/No)*	#3 *Coverage %* *Insured (Yes/No)*
#4 *Coverage %* *Insured (Yes/No)*	#5 *Coverage %* *Insured (Yes/No)*	#6 *Coverage %* *Insured (Yes/No)*
#7 *Coverage %* *Insured (Yes/No)*	#8 *Coverage %* *Insured (Yes/No)*	#9 *Coverage %* *Insured (Yes/No)*

FISCAL YEAR	ANNUAL DEBT SERVICE (PRINCIPAL + INTEREST)								TOTAL NON SRF DEBT SERVICE W/COVERAGE	TOTAL SRF DEBT SERVICE W/COVERAGE
	#1	**#2**	**#3**	**#4**	**#5**	**#6**	**#7**	**#8**		
2025	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
2026	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
2027	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
2028	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
2029	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
2030	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
2031	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
2032	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
2033	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
2034	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
2035	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
2036	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
2037	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
2038	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
2039	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
2040	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
2041	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
2042	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
2043	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
2044	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
2045	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
2046	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
2047	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
2048	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
2049	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
2050	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00

SCHEDULE OF ACTUAL REVENUES AND DEBT COVERAGE FOR PLEDGED REVENUE

(Provide information for the two fiscal years preceding the anticipated date of the SRF Loan Agreement)

		FY 2021	FY 2022
(a.)	Operating Revenues (Identify)		
	Charges for Service - Water Services	$ 8,066,514	$ 8,666,060
	Charges for Service - Waste Treatment	$ 9,375,019	$ 9,761,825
		$ -	$ -
(b.)	Capital Contributions	$ 2,391,962	$ 4,504,101
(c.)	Other Incomes or Revenues (Identify)		
	Misc Revenues	$ 261,404	$ 329,765
	Non-Operating Revenues	$ 127,082	$ (797,532)
(d.)	Total Revenues	$ 20,221,981	$ 22,464,219
(e.)	Operating Expenses (excluding interest on debt, depreciation, and other non-cash items)	$ 11,463,256	$ 14,019,966
(f.)	**Net Revenues (f = d - e)**	**$ 8,758,725**	**$ 8,444,253**
(g.)	Debt Service (including coverage) Excluding SRF Loans	$ 1,359,398	$ 1,399,370
(h.)	Debt Service (including coverage) for Outstanding SRF Loans	$ -	$ -
(i.)	**Net Revenues After Debt Service (i = f - g - h)**	**$ 7,399,327**	**$ 7,044,883**

Source:
Englewood Water District Annual Financial Report for the Fiscal Years Ended September 30, 2022 and 2021
Englewood Water District Annual Financial Report for the Fiscal Years Ended September 30, 2021 and 2020

Notes:
Depreciation has been deducted from the Operating Expenses for each year above.

SCHEDULE OF PROJECTED REVENUES AND DEBT COVERAGE FOR PLEDGED REVENUE

(Begin with the fiscal year preceding first anticipated semiannual loan payment)

		FY 2026	FY 2027	FY 2028	FY 2029	FY 2030
(a.)	Operating Revenues (Identify)					
	Charges for Service - Water Services	$ 9,829,705	$ 10,144,255	$ 10,468,872	$ 10,803,876	$ 11,149,600
	Charges for Service - Waste Treatment	$ 11,072,605	$ 11,426,928	$ 11,792,590	$ 12,169,953	$ 12,559,391
		$ -	$ -	$ -	$ -	$ -
(b.)	Capital Contributions	$ 5,108,894	$ 5,272,379	$ 5,441,095	$ 5,615,210	$ 5,794,897
(c.)	Other Incomes or Revenues (Identify)					
	Misc Revenues	$ 374,045	$ 386,014	$ 398,366	$ 411,114	$ 424,270
	Non-Operating Revenues	$ -	$ -	$ -	$ -	$ -
(d.)	Total Revenues	**$ 26,385,249**	**$ 27,229,577**	**$ 28,100,923**	**$ 29,000,153**	**$ 29,928,158**
(e.)	Operating Expenses[1]	$ 15,902,513	$ 16,411,393	$ 16,936,558	$ 17,478,527	$ 18,037,840
(f.)	**Net Revenues (f = d - e)**	**$ 10,482,736**	**$ 10,818,184**	**$ 11,164,365**	**$ 11,521,625**	**$ 11,890,317**
(g.)	Existing Debt Service on Non-SRF Projects (including coverage)	$ -	$ -	$ -	$ -	$ -
(h.)	Existing SRF Loan Debt Service (including coverage)	$ -	$ -	$ -	$ -	$ -
(i.)	**Total Existing Debt Service (i = g + h)**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**
(j.)	Projected Debt Service on Non-SRF Future Projects (including coverage)	$ -	$ -	$ -	$ -	$ -
(k.)	Projected SRF Loan Debt Service (including coverage)	$ -	$ 7,164,361	$ 7,164,361	$ 7,164,361	$ 7,164,361
(l.)	**Total Debt Service (Existing and Projected) (l = i + j + k)**	**$ -**	**$ 7,164,361**	**$ 7,164,361**	**$ 7,164,361**	**$ 7,164,361**
(m.)	**Net Revenues After Debt Service (m = f - l)**	**$ 10,482,736**	**$ 3,653,822**	**$ 4,000,004**	**$ 4,357,264**	**$ 4,725,956**

Source:

Notes: (I.e. rate increases, explanations, etc.)
FY 2026-2030 revenues and expenditures have been projected using current CPI of 3.2% from FY2022 audited figures.

CERTIFICATION

I, Lisa Hawkins ,certify that I have reviewed the information
Chief Financial Officer (please print)

included in the preceding capital financing plan worksheets, and to the best of my knowledge, this information accurately reflects the financial capability of Englewood Water District
Project Sponsor

I further certify that Englewood Water District has the financial capability to ensure
Project Sponsor

adequate construction, operation, and maintenance of the system, including this SRF project.

Lisa Hawkins
Signature

11-1-23
Date

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SRF PROJECT COST WORKSHEET / LOAN CALCULATION

Construction, Demolition and Related Procurement		**$**	**95,823,000**
Eligible Land		$	4,100,000
Contingency (10% or 5% of construction and land)		$	9,992,300
Technical Services After Bid Opening		$	9,992,300
Interim Financing (excluding SRF capitalized interest)		$	0
Start-up Services		$	0
Allowance		$	0
Subtotal		**$**	**119,907,600**
Years to Construct / Capitalized Interest	2	$	196,222
Total Cost for Priority List		**$**	**120,103,822**
Service Fee (2% of subtotal)		$	2,398,152
Total Cost for Amortization		**$**	**122,501,974**
Estimated Interest Rate	**0.17%**		
Semi-annual Payment Start Date / Annual Payment	**11/30/2027**	**$**	**6,229,879**
Annual Payment with 115% Coverage		**$**	**7,164,361**
Total Payments		**$**	**124,595,002**

Notes:

Angie Brewer & Associates, L.C.
Estimated SRF WW Amortization Schedule

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Enter Values	
Loan Amount	$ 122,501,973.55
Annual Interest Rate	0.166%
Loan Period in Years	20
Number of Payments Per Year	2
Start Date of Loan	5/30/2027
Coverage Factor	1.15

Loan Summary	
Scheduled Payment	$ 3,114,939.62
Scheduled Number of Payments	40
Actual Number of Payments	40
Total Early Payments	$ -
Total Interest	$ 2,095,611.39
Annual Payment	$ 6,229,879.25
Annual Payment with Coverage	$ 7,164,361.14
Total Payments	$ 124,595,001.68

Lender Name: FDEP

Pmt No.	Payment Date	Beginning Balance	Scheduled Payment	Extra Payment	Total Payment	Principal	Interest	Ending Balance
1	11/30/2027	$ 122,501,973.55	$ 3,114,939.62	-	$ 3,114,939.62	$ 3,013,262.99	$ 101,676.64	$ 119,488,710.56
2	5/30/2028	119,488,710.56	3,114,939.62	-	3,114,939.62	3,015,763.99	99,175.63	116,472,946.57
3	11/30/2028	116,472,946.57	3,114,939.62	-	3,114,939.62	3,018,267.08	96,672.55	113,454,679.49
4	5/30/2029	113,454,679.49	3,114,939.62	-	3,114,939.62	3,020,772.24	94,167.38	110,433,907.25
5	11/30/2029	110,433,907.25	3,114,939.62	-	3,114,939.62	3,023,279.48	91,660.14	107,410,627.77
6	5/30/2030	107,410,627.77	3,114,939.62	-	3,114,939.62	3,025,788.80	89,150.82	104,384,838.97
7	11/30/2030	104,384,838.97	3,114,939.62	-	3,114,939.62	3,028,300.21	86,639.42	101,356,538.76
8	5/30/2031	101,356,538.76	3,114,939.62	-	3,114,939.62	3,030,813.70	84,125.93	98,325,725.07
9	11/30/2031	98,325,725.07	3,114,939.62	-	3,114,939.62	3,033,329.27	81,610.35	95,292,395.79
10	5/30/2032	95,292,395.79	3,114,939.62	-	3,114,939.62	3,035,846.93	79,092.69	92,256,548.86
11	11/30/2032	92,256,548.86	3,114,939.62	-	3,114,939.62	3,038,366.69	76,572.94	89,218,182.17
12	5/30/2033	89,218,182.17	3,114,939.62	-	3,114,939.62	3,040,888.53	74,051.09	86,177,293.64
13	11/30/2033	86,177,293.64	3,114,939.62	-	3,114,939.62	3,043,412.47	71,527.15	83,133,881.17
14	5/30/2034	83,133,881.17	3,114,939.62	-	3,114,939.62	3,045,938.50	69,001.12	80,087,942.67
15	11/30/2034	80,087,942.67	3,114,939.62	-	3,114,939.62	3,048,466.63	66,472.99	77,039,476.04
16	5/30/2035	77,039,476.04	3,114,939.62	-	3,114,939.62	3,050,996.86	63,942.77	73,988,479.18
17	11/30/2035	73,988,479.18	3,114,939.62	-	3,114,939.62	3,053,529.19	61,410.44	70,934,949.99
18	5/30/2036	70,934,949.99	3,114,939.62	-	3,114,939.62	3,056,063.61	58,876.01	67,878,886.38
19	11/30/2036	67,878,886.38	3,114,939.62	-	3,114,939.62	3,058,600.15	56,339.48	64,820,286.23
20	5/30/2037	64,820,286.23	3,114,939.62	-	3,114,939.62	3,061,138.79	53,800.84	61,759,147.44
21	11/30/2037	61,759,147.44	3,114,939.62	-	3,114,939.62	3,063,679.53	51,260.09	58,695,467.91
22	5/30/2038	58,695,467.91	3,114,939.62	-	3,114,939.62	3,066,222.39	48,717.24	55,629,245.53
23	11/30/2038	55,629,245.53	3,114,939.62	-	3,114,939.62	3,068,767.35	46,172.27	52,560,478.18
24	5/30/2039	52,560,478.18	3,114,939.62	-	3,114,939.62	3,071,314.43	43,625.20	49,489,163.75
25	11/30/2039	49,489,163.75	3,114,939.62	-	3,114,939.62	3,073,863.62	41,076.01	46,415,300.13
26	5/30/2040	46,415,300.13	3,114,939.62	-	3,114,939.62	3,076,414.92	38,524.70	43,338,885.21
27	11/30/2040	43,338,885.21	3,114,939.62	-	3,114,939.62	3,078,968.35	35,971.27	40,259,916.86
28	5/30/2041	40,259,916.86	3,114,939.62	-	3,114,939.62	3,081,523.89	33,415.73	37,178,392.97
29	11/30/2041	37,178,392.97	3,114,939.62	-	3,114,939.62	3,084,081.56	30,858.07	34,094,311.41
30	5/30/2042	34,094,311.41	3,114,939.62	-	3,114,939.62	3,086,641.35	28,298.28	31,007,670.06
31	11/30/2042	31,007,670.06	3,114,939.62	-	3,114,939.62	3,089,203.26	25,736.37	27,918,466.81
32	5/30/2043	27,918,466.81	3,114,939.62	-	3,114,939.62	3,091,767.30	23,172.33	24,826,699.51
33	11/30/2043	24,826,699.51	3,114,939.62	-	3,114,939.62	3,094,333.46	20,606.16	21,732,366.05
34	5/30/2044	21,732,366.05	3,114,939.62	-	3,114,939.62	3,096,901.76	18,037.86	18,635,464.29
35	11/30/2044	18,635,464.29	3,114,939.62	-	3,114,939.62	3,099,472.19	15,467.44	15,535,992.10
36	5/30/2045	15,535,992.10	3,114,939.62	-	3,114,939.62	3,102,044.75	12,894.87	12,433,947.35
37	11/30/2045	12,433,947.35	3,114,939.62	-	3,114,939.62	3,104,619.45	10,320.18	9,329,327.90
38	5/30/2046	9,329,327.90	3,114,939.62	-	3,114,939.62	3,107,196.28	7,743.34	6,222,131.62
39	11/30/2046	6,222,131.62	3,114,939.62	-	3,114,939.62	3,109,775.25	5,164.37	3,112,356.37
40	5/30/2047	3,112,356.37	3,114,939.62	-	3,112,356.37	3,109,773.11	2,583.26	0.00

ENGLEWOOD WATER DISTRICT

ANNUAL FINANCIAL REPORT

FOR THE FISCAL YEARS ENDED SEPTEMBER 30, 2022 AND 2021

ENGLEWOOD WATER DISTRICT

STATEMENTS OF REVENUES, EXPENSES AND CHANGES IN NET POSITION FOR THE YEARS ENDED SEPTEMBER 30, 2022 AND 2021

	2022	2021
Operating revenues		
Water services	$ 8,666,060	$ 8,066,514
Waste treatment	9,761,825	9,375,019
Miscellaneous	329,765	261,404
Total operating revenues	18,757,650	17,702,937
Operating expenses		
Water treatment plants	3,590,914	2,772,293
Water distribution	2,263,204	2,148,022
Waste treatment	3,515,092	3,287,465
Waste collection	4,841,302	4,366,688
Laboratory	260,857	214,542
General and administrative	4,055,733	3,194,466
Total operating expenses	18,527,102	15,983,476
Operating income	230,548	1,719,461
Non-operating revenues (expenses)		
Investment income (loss)	(693,149)	43,913
Special assessment interest	75,150	102,615
Interest expense	(213,973)	(345,424)
Other revenues	-	41,472
Gain on disposal of capital assets	34,440	284,506
Total non-operating revenues (expenses), net	(797,532)	127,082
Income (loss) before contributions	(566,984)	1,846,543
Capital contributions		
Cash	1,642,581	2,391,962
Noncash	2,861,520	-
Total contributions	4,504,101	2,391,962
Change in net position	3,937,117	4,238,505
Total net position, beginning of year	103,078,314	98,839,809
Total net position, end of year	$ 107,015,431	$ 103,078,314

The accompanying notes are an integral part of these financial statements.

ENGLEWOOD WATER DISTRICT

STATEMENTS OF CASH FLOWS
FOR THE YEARS ENDED SEPTEMBER 30, 2022 AND 2021

		2022		2021
Reconciliation of Operating Income to Net Cash Provided by Operating Activities				
Operating income	**$**	**230,548**	$	1,719,461
Adjustments to reconcile operating income to net cash provided by operating activities				
Depreciation and amortization		**4,507,136**		4,520,220
Noncash OPEB and pension expense		**303,498**		(702,756)
Changes in assets and liabilities				
Net (increase) decrease in:				
Accounts receivable		**(263,744)**		13,731
Inventory		**(275,639)**		(31,473)
Other assets		**(6,997)**		141,463
Net increase (decrease) in:				
Accounts payable		**175,543**		107,418
Accrued liabilities and compensated absences		**(186,728)**		461,391
Net cash provided by operating activities	**$**	**4,483,617**	$	6,229,455
Noncash Investing, Capital, and Financing Activities				
Noncash capital contributions	**$**	**2,861,520**	$	-
Net unrealized gain (loss)		**(1,007,081)**		(246,661)
	$	**1,854,439**	$	(246,661)

The accompanying notes are an integral part of these financial statements.

NOTE 1. SUMMARY OF SIGNIFICANT ACCOUNTING POLICIES (CONTINUED)

Capital Contributions
Contributions are recognized in the Statement of Revenues, Expenses, and Changes in Net Position when earned. Capital contributions include connection fees and developer contributed utility systems.

Management Estimates
The preparation of financial statements in conformity with accounting principles generally accepted in the United States of America requires management to make estimates and assumptions that may affect the reported amounts of certain assets and liabilities and disclosures of contingencies at the date of the financial statements and the reported amounts of revenues and expenses during the reporting period. Actual results could differ from those estimates.

Reclassifications
Certain accounts in the prior year information have been reclassified for comparative purposes to conform with the presentation in the current-year financial statements.

NOTE 2. CASH, CASH EQUIVALENTS, AND INVESTMENTS

Deposits
Custodial credit risk is the risk that in the event of a bank failure, the District's deposits may not be returned to it. In accordance with its policy, all District depositories are banks designated by the Florida Chief Financial Officer as qualified public depositories. Chapter 280 of the Florida Statutes, Florida Security for Public Deposits Act, provides procedures for public depositories to ensure public monies in banks and saving and loans are collateralized with the Florida Chief Financial Officer as agent for the public entities. Chapter 280 defines deposits as demand deposit accounts, time deposit accounts, and nonnegotiable certificates of deposit.

Financial institutions qualifying as public depositories shall deposit with the Florida Chief Financial Officer eligible collateral at the pledging level required pursuant to Chapter 280. The Florida Security for Public Deposits Act has a procedure for the payment of losses in the event of a default or insolvency. When public deposits are made in accordance with Chapter 280, no public depositor shall be liable for any loss thereof, and therefore, the District is not exposed to custodial credit risk for its deposits.

At September 30, 2022, the District's deposits, except deposits held with the brokerage firm, were made in accordance with Chapter 280. Therefore, the District is not exposed to custodial credit risk at September 30, 2022 for these deposits.

Deposits with the brokerage firm totaling $77,278 and $215,659 at September 30, 2022 and 2021, respectively, were insured by the FDIC. Amounts in excess of FDIC limits are also included in Chapter 280 of the Florida Statutes.

NOTE 6. LONG-TERM DEBT

Bonds and notes payable consisted of the following at September 30, 2022 and 2021:

Description	2022	2021
Revenue Bonds		
Series 2008 Utility System Refunding Revenue Bonds for $9,996,440 (refinancing 1998 Utility System Refunding Revenue Bonds) with a pay-fixed interest rate at 3.73% (see Note 7), collateralized by a lien upon and pledge of the "Pledged Funds" as described in the Bond Resolution; matures in October 2023.	**$ 2,892,150**	$ 4,231,920
Utility System Revenue Bond, Series 2005 for $3,048,735 (refinancing 1994 Utility System Revenue Bonds) with a pay-fixed interest rate at 4.06% (see Note 7), collateralized by special assessments and non ad-valorem revenues as described in the bond resolution; matures in October 2021.	**-**	246,890
Promissory Notes		
Series 2003A Promissory Note for $8,350,000 (refinancing V-2 and V-3 Projects) with a pay-fixed interest rate at 4.27% (see Note 7), collateralized by special assessments and non ad-valorem revenues as described in the bond resolution; matures in December 2023.	**759,066**	1,337,480
Series 2004A Promissory Note for $5,550,000 (refinancing VA, VB, and 1996D Projects) with a pay-fixed interest rate at 4.30% (see Note 7), collateralized by special assessments and non ad-valorem revenues as described in the bond resolution; matures in January 2024.	**573,705**	955,145
Total bonds and notes payable	**$ 4,224,921**	$ 6,771,435

NOTE 6. LONG-TERM DEBT (CONTINUED)

Annual Maturities

The principal and interest requirements to maturity for all outstanding bonds and notes as of September 30, 2022 are as follows:

Year	Revenue Bonds and Notes			Promissory Notes		
Ending	Principal	Interest	Total	Principal	Interest	Total
2023	$ 1,421,232	$ 82,464	$ 1,503,696	$ 1,002,365	$ 39,550	$ 1,041,915
2024	1,470,918	27,852	1,498,770	330,406	3,429	333,835
	$ 2,892,150	$ 110,316	$ 3,002,466	$ 1,332,771	$ 42,979	$ 1,375,750

Year	Totals		
Ending	Principal	Interest	Total
2023	$ 2,423,597	$ 122,014	$ 2,545,611
2024	1,801,324	31,281	1,832,605
	$ 4,224,921	$ 153,295	$ 4,378,216

Debt service requirements for the variable rate debt with pay-fixed swap agreements are based on the pay-fixed amortization schedule.

Covenants

The bond and note agreements include various covenants, including rate and liquidity covenants. The District must maintain rate coverage of at least 110% of the annual debt service payable. The District must also maintain $7,500,000 in unencumbered and unrestricted cash, cash equivalents, and investments. Management believes it has complied with the covenants of the District's bond and note agreements.

NOTE 6. LONG-TERM DEBT (CONTINUED)

The following is a summary of changes in long-term debt for the years ended September 30, 2022 and 2021 (dollars in thousands):

September 30, 2022	Beginning Balance	Additions	Reductions	Ending Balance	Due Within One Year
Revenue bonds and notes	**$ 4,231,920**	**$ -**	**$ (1,339,770)**	**$ 2,892,150**	**$ 1,421,232**
Promissory notes	**2,292,625**	**-**	**(959,854)**	**1,332,771**	**1,002,365**
Net bonds and notes payable	**6,524,545**	**-**	**(2,299,624)**	**4,224,921**	**2,423,597**
Compensated absences	**714,843**	**418,111**	**(488,661)**	**644,293**	**-**
Derivative instruments	**282,127**	**-**	**(240,229)**	**41,898**	**-**
Total long-term debt	**$ 7,521,515**	**$ 418,111**	**$ (3,028,514)**	**$ 4,911,112**	**$ 2,423,597**

September 30, 2021	Beginning Balance	Additions	Reductions	Ending Balance	Due Within One Year
Revenue bonds and notes	$ 5,517,378	$ -	$ (1,285,458)	$ 4,231,920	$ 1,339,770
Special assessment bonds	551,937	-	(551,937)	-	-
Promissory notes	3,211,773	-	(919,148)	2,292,625	959,854
Net bonds and notes payable	9,281,088	-	(2,756,543)	6,524,545	2,299,624
Compensated absences	577,124	423,289	(285,570)	714,843	-
Derivative instruments	521,547	-	(239,420)	282,127	-
Total long-term debt	$ 10,379,759	$ 423,289	$ (3,281,533)	$ 7,521,515	$ 2,299,624

These worksheets are intended to assist in determining the affordability index and estimated loan financing rate. To use this form, input the CENSUS PLACE of the rate payers who will be paying for the project on tab Afford 1. Your affordability index will be calculated and shown on tab Afford 1 line 34. Complete the form below and your estimated loan financing rate will be shown on line 43 on Tab Afford 1. Note that a population must be entered for the financing rate to appear.

Project Sponsor -	Englewood
Project Number -	WW58032
Current Service Area Population (include population to be served)*	40,032
Does this project have Davis-Bacon provisions?*	Yes
Does this project qualify as a "Green Project"*	No
Does the sponsor have an approved Asset Mangement Plan?*	Yes
Does the project need to comply with American Iron and Steel (after 1/17/2014)?'	Yes

Financing Rate Reduction	1.10%

* Required fields for financing rate calculation

USER INTERFACE

Enter Census Place Number below
(a list of census place numbers and names is found on page 2)

Project Sponsor	Englewood
Project Number	WW58032

Number	Census Place Number	Census Place Name	Index Number	Population
1	20825	Englewood	96.51	14,366
2	0	0	0.00	0
3	0	0	0.00	0
4	0	0	0.00	0
5	0	0	0.00	0
6	0	0	0.00	0
7	0	0	0.00	0
8	0	0	0.00	0
9	0	0	0.00	0
10	0	0	0.00	0
11	0	0	0.00	0
12	0	0	0.00	0
13	0	0	0.00	0
14	0	0	0.00	0
15	0	0	0.00	0
16	0	0	0.00	0
17	0	0	0.00	0
18	0	0	0.00	0
19	0	0	0.00	0
20	0	0	0.00	0
21	0	0	0.00	0
22	0	0	0.00	0
23	0	0	0.00	0
24	0	0	0.00	0
25	0	0	0.00	0
Summary			**96.51**	**14,366**

Bond Buyer 20-Bond GO Index Rate =	3.59%
Financing Rate =	0.166%

NEWS RELEASE
BUREAU OF LABOR STATISTICS
U. S. DEPARTMENT OF LABOR

Transmission of material in this release is embargoed until 8:30 a.m. (ET) Thursday, August 10, 2023

USDL-23-1734

Technical information: (202) 691-7000 • cpi_info@bls.gov • www.bls.gov/cpi
Media contact: (202) 691-5902 • PressOffice@bls.gov

CONSUMER PRICE INDEX – JULY 2023

The Consumer Price Index for All Urban Consumers (CPI-U) rose 0.2 percent in July on a seasonally adjusted basis, the same increase as in June, the U.S. Bureau of Labor Statistics reported today. Over the last 12 months, the all items index increased 3.2 percent before seasonal adjustment.

The index for shelter was by far the largest contributor to the monthly all items increase, accounting for over 90 percent of the increase, with the index for motor vehicle insurance also contributing. The food index increased 0.2 percent in July after increasing 0.1 percent the previous month. The index for food at home increased 0.3 percent over the month while the index for food away from home rose 0.2 percent in July. The energy index rose 0.1 percent in July as the major energy component indexes were mixed.

The index for all items less food and energy rose 0.2 percent in July, as it did in June. Indexes which increased in June include shelter, motor vehicle insurance, education, and recreation. The indexes for airline fares, used cars and trucks, medical care, and communication were among those that decreased over the month.

The all items index increased 3.2 percent for the 12 months ending July, slightly more than the 3.0-percent increase for the 12 months ending in June. The all items less food and energy index rose 4.7 percent over the last 12 months. The energy index decreased 12.5 percent for the 12 months ending July, and the food index increased 4.9 percent over the last year.

Chart 1. One-month percent change in CPI for All Urban Consumers (CPI-U), seasonally adjusted, July 2022 - July 2023
Percent change

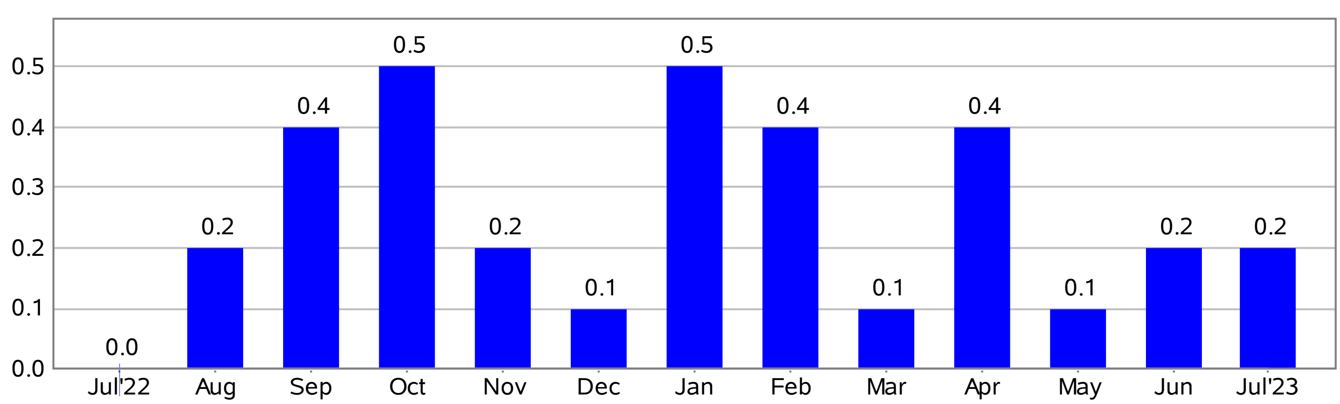

Chart 2. 12-month percent change in CPI for All Urban Consumers (CPI-U), not seasonally adjusted, July 2022 - July 2023

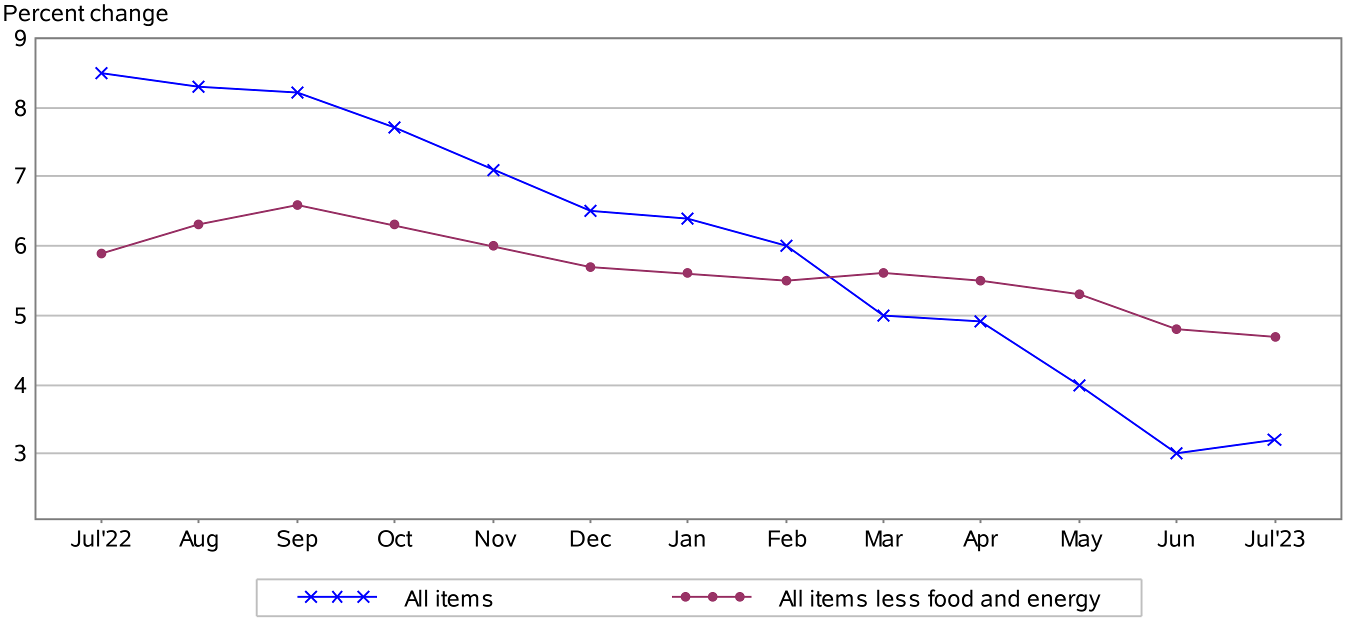

Table A. Percent changes in CPI for All Urban Consumers (CPI-U): U.S. city average

	Seasonally adjusted changes from preceding month							Un-adjusted 12-mos. ended Jul. 2023
	Jan. 2023	Feb. 2023	Mar. 2023	Apr. 2023	May 2023	Jun. 2023	Jul. 2023	
All items	0.5	0.4	0.1	0.4	0.1	0.2	0.2	3.2
Food	0.5	0.4	0.0	0.0	0.2	0.1	0.2	4.9
Food at home	0.4	0.3	-0.3	-0.2	0.1	0.0	0.3	3.6
Food away from home[1]	0.6	0.6	0.6	0.4	0.5	0.4	0.2	7.1
Energy	2.0	-0.6	-3.5	0.6	-3.6	0.6	0.1	-12.5
Energy commodities	1.9	0.5	-4.6	2.7	-5.6	0.8	0.3	-20.3
Gasoline (all types)	2.4	1.0	-4.6	3.0	-5.6	1.0	0.2	-19.9
Fuel oil[1]	-1.2	-7.9	-4.0	-4.5	-7.7	-0.4	3.0	-26.5
Energy services	2.1	-1.7	-2.3	-1.7	-1.4	0.4	-0.1	-1.1
Electricity	0.5	0.5	-0.7	-0.7	-1.0	0.9	-0.7	3.0
Utility (piped) gas service	6.7	-8.0	-7.1	-4.9	-2.6	-1.7	2.0	-13.7
All items less food and energy	0.4	0.5	0.4	0.4	0.4	0.2	0.2	4.7
Commodities less food and energy commodities	0.1	0.0	0.2	0.6	0.6	-0.1	-0.3	0.8
New vehicles	0.2	0.2	0.4	-0.2	-0.1	0.0	-0.1	3.5
Used cars and trucks	-1.9	-2.8	-0.9	4.4	4.4	-0.5	-1.3	-5.6
Apparel	0.8	0.8	0.3	0.3	0.3	0.3	0.0	3.2
Medical care commodities[1]	1.1	0.1	0.6	0.5	0.6	0.2	0.5	4.1
Services less energy services	0.5	0.6	0.4	0.4	0.4	0.3	0.4	6.1
Shelter	0.7	0.8	0.6	0.4	0.6	0.4	0.4	7.7
Transportation services	0.9	1.1	1.4	-0.2	0.8	0.1	0.3	9.0
Medical care services	-0.7	-0.7	-0.5	-0.1	-0.1	0.0	-0.4	-1.5

1 Not seasonally adjusted.

Food

The food index rose 0.2 percent in July. The food at home index increased 0.3 percent over the month, after being unchanged in June. Four of the six major grocery store food group indexes increased over the month. The index for meats, poultry, fish, and eggs rose 0.5 percent in July as the index for beef increased 2.4 percent. The fruits and vegetables index increased 0.4 percent over the month and the other food at home index rose 0.2 percent. The index for dairy and related products increased 0.5 percent in July after decreasing in each of the previous 4 months. The nonalcoholic beverages index and the cereals and bakery products index were both unchanged in July.

The food away from home index rose 0.2 percent in July. The index for full service meals and the index for limited service meals both increased 0.2 percent over the month.

The food at home index rose 3.6 percent over the last 12 months. The index for cereals and bakery products rose 7.0 percent over the 12 months ending in July. The meats, poultry, fish, and eggs index declined 0.2 percent over the year. The remaining major grocery store food groups posted increases ranging from 1.3 percent (dairy and related products) to 5.4 percent (both nonalcoholic beverages and other food at home).

The index for food away from home rose 7.1 percent over the last year. The index for full service meals rose 5.8 percent over the last 12 months, and the index for limited service meals rose 7.1 percent over the same period.

Energy

The energy index rose 0.1 percent in July after increasing 0.6 percent in June. The gasoline index increased 0.2 percent in July, following a 1.0-percent increase in the previous month. (Before seasonal adjustment, gasoline prices rose 0.6 percent in July.)

Other energy components were mixed in July. The natural gas index increased 2.0 percent over the month, following five consecutive monthly decreases. The index for fuel oil also rose in July, increasing 3.0 percent. The index for electricity fell 0.7 percent in July, after increasing 0.9 percent in June.

The energy index fell 12.5 percent over the past 12 months. The gasoline index decreased 19.9 percent over the last 12 months, while the natural gas index fell 13.7 percent, and the fuel oil index fell 26.5 percent over the span. In contrast, the index for electricity rose 3.0 percent over the last year.

All items less food and energy

The index for all items less food and energy rose 0.2 percent in July, as it did in June. The shelter index increased 0.4 percent over the month, the same increase as in June. The index for rent rose 0.4 percent in July, and the index for owners' equivalent rent increased 0.5 percent over the month. The index for lodging away from home decreased 0.3 percent in July after falling 2.0 percent in June.

The shelter index was the largest factor in the monthly increase in the index for all items less food and energy. Among the other indexes that rose in July was the index for motor vehicle insurance, which increased 2.0 percent after rising 1.7 percent the preceding month. The indexes for education and recreation also increased in July.

Several indexes declined in July, led by the airline fares index, which fell 8.1 percent over the month, its fourth consecutive monthly decline. The index for used cars and trucks fell 1.3 percent in July, after decreasing 0.5 percent in June. The communication index declined 0.1 percent over the month, as did the new vehicles index and the household furnishings and operations index.

The medical care index fell 0.2 percent in July, after being unchanged the previous month. The index for hospital services decreased 0.4 percent over the month, while the index for physicians' services rose 0.2 percent. The prescription drugs index was unchanged in July.

The index for all items less food and energy rose 4.7 percent over the past 12 months. The shelter index increased 7.7 percent over the last year, accounting for over two-thirds of the total increase in all items less food and energy. Other indexes with notable increases over the last year include motor vehicle insurance (+17.8 percent), recreation (+4.1 percent), new vehicles (+3.5 percent), and household furnishings and operations (+2.9 percent).

Not seasonally adjusted CPI measures

The Consumer Price Index for All Urban Consumers (CPI-U) increased 3.2 percent over the last 12 months to an index level of 305.691 (1982-84=100). For the month, the index increased 0.2 percent prior to seasonal adjustment.

The Consumer Price Index for Urban Wage Earners and Clerical Workers (CPI-W) increased 2.6 percent over the last 12 months to an index level of 299.899 (1982-84=100). For the month, the index increased 0.2 percent prior to seasonal adjustment.

The Chained Consumer Price Index for All Urban Consumers (C-CPI-U) increased 3.2 percent over the last 12 months. For the month, the index increased 0.2 percent on a not seasonally adjusted basis. Please note that the indexes for the past 10 to 12 months are subject to revision.

The Consumer Price Index for August 2023 is scheduled to be released on Wednesday, September 13, 2023, at 8:30 a.m. (ET).

D

Appendix D

Public Hearing Documentation

Appendix D

Public Hearing Documentation

Public Hearing Notice

The Daily SUN
Charlotte • DeSoto • Sarasota

38904756-1
FACILITIES PLAN
4 x 7
Submitted by: Teresa Herzog
Publish: 09/28/2023
251809 3904760

PUBLISHER'S AFFIDAVIT OF PUBLICATION STATE OF FLORIDA COUNTY OF CHARLOTTE:

Before the undersigned authority personally appeared Melinda Prescott, who on oath says that she is the Legal Advertising Representative of The Daily Sun, a newspaper published at Charlotte Harbor in Charlotte County, Florida; that the attached copy of advertisement, being a Legal Notice that was published in said newspaper in the issue(s)

09/28/23

as well as being posted online at www.yoursun.com and www.floridapublicnotices.com.
Affiant further says that the said newspaper is a newspaper published at Charlotte Harbor, in said Charlotte County, Florida, and that the said newspaper has heretofore been continuously published in said Charlotte County, Florida, Sarasota County, Florida and DeSoto County, Florida, each day and has been entered as periodicals matter at the post office in Punta Gorda, in said Charlotte County, Florida, for a period of 1 year next preceding the first publication of the attached copy of advertisement; and affiant further says that he or she has neither paid nor promised any person, firm or corporation any discount, rebate, commission or refund for the purpose of securing this advertisement for publication in the said newspaper.

Melinda Prescott

(Signature of Affiant)

Sworn and subscribed before me this 28th day of September, 2023

Laura M Robins

(Signature of Notary Public)

Notary Public State of Florida
Laura M Robins
My Commission HH 282830
Expires 9/26/2026

Personally known _X_ OR ___Produced Identification

LOCALiQ

The Gainesville Sun | The Ledger
Daily Commercial | Ocala StarBanner
News Chief | Herald-Tribune

PO Box 631244 Cincinnati, OH 45263-1244

PROOF OF PUBLICATION

Teresa Herzog
Englewood Water Dist./Legal
201 SELMA AVE
ENGLEWOOD FL 34223

STATE OF WISCONSIN, COUNTY OF BROWN

Before the undersigned authority personally appeared, who on oath says that he or she is the Legal Coordinator of the Herald-Tribune, published in Sarasota County, Florida; that the attached copy of advertisement, being a Main Legal CLEGL, was published on the publicly accessible website of Sarasota County, Florida, or in a newspaper by print in the issues of, on:

09/28/2023

Affiant further says that the website or newspaper complies with all legal requirements for publication in chapter 50, Florida Statutes.
Subscribed and sworn to before me, by the legal clerk, who is personally known to me, on 09/28/2023

Legal Clerk

Notary, State of WI, County of Brown

3/7/27

My commision expires

Publication Cost:	$495.94
Order No:	9323087
Customer No:	529022
PO #:	

# of Copies:
1

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Please do not use this form for payment remittance.

KAITLYN FELTY
Notary Public
State of Wisconsin

NOTICE OF PUBLIC HEARING

Notice is hereby given that the Englewood Water District Board of Supervisors will hold a public hearing on Thursday, October 12, 2023, at about 8:30 A.M. or as soon thereafter as can be heard in the 201 Selma Avenue Boardroom.

The Public Hearing will be held to discuss the Englewood Water District Wastewater System Improvements Facilities Plan which describes proposed improvements to the Englewood Water District wastewater system. Project alternatives, costs, and financial impacts on system customers will be discussed during the Public Hearing. The estimated construction costs are $95.8 million which the Englewood Water District intends to fund with a loan from the Florida Department of Environmental Protection State Revolving Fund program.

The following resolution, which includes adoption of the Facilities Plan, will be considered at the Public Hearing:

RESOLUTION NO ____

A RESOLUTION OF THE ENGLEWOOD WATER DISTRICT BOARD OF SUPERVISORS, RELATING TO THE FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION STATE REVOLVING FUND LOAN PROGRAM; ADOPTING THE ENGLWOOD WATER DISTRICT WASTEWATER SYSTEM IMPROVEMENTS FACILITIES PLAN DATED SEPTEMBER 2023; ADOPTING THE ENGLEWOOD WATER DISTRICT STATE REVOLVING FUND CAPITAL FINANCING PLAN; AUTHORIZING SUBMISSION OF THE PLANS TO THE FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION; DESIGNATING THE ENGLEWOOD WATER DISTRICT AUTHORIZED REPRESENTATIVE; AND PROVIDING FOR CONFLICTS, SEVERABILITY, AND AN EFFECTIVE DATE.

During consideration of the Resolution, the Board of Supervisors may approve, disapprove or take other such action deemed appropriate in the public interest. A draft of the Plans and Resolution can be obtained from the Secretary of the Board, 201 Selma Ave., Englewood, FL 34223, Tuesday – Friday, between the hours of 7:00 A.M. – 5:00 P.M. The public is encouraged to attend and participate in the Public Hearing.

Pursuant to Section 286.0107, Florida Statutes, as amended, the Board of Supervisors hereby advises that if any interested person decides to appeal any decision made by the Board with respect to any matter considered at the proceedings, they will need a record of the proceeding and that, for such purposes, may need to ensure that a verbatim record of the proceeding is made, which record includes the testimony and evidence upon which the appeal is to be based.

The Englewood Water District Board of Supervisors does not discriminate upon the basis of any individual's disability status. This non-discriminatory policy involves every aspect of the Board's functions, including one's access to, participation, employment, or treatment in its programs or activities. Anyone requiring reasonable accommodation as provided for in the Americans with Disabilities Act or Section 286.26, Florida Statutes, should contact the Secretary of the Board at (941) 474-3217.

FO-37411300

Appendix D

Public Hearing Documentation

Public Hearing Minutes

MINUTES
REGULAR MEETING
ENGLEWOOD WATER DISTRICT BOARD OF SUPERVISORS
201 SELMA AVENUE, ENGLEWOOD, FL 34223
OCTOBER 12, 2023 @ 8:30 A.M.

Board of Supervisors:
Taylor Meals, Chair (absent)
Robert C. Stern, Jr., Vice-Chair
Phyllis Wright
Sydney B. Crampton
Lani Gaver

Staff:
Ray Burroughs, Administrator (absent)
Robert H. Berntsson, District Counsel
Dewey Futch, Water Operations Manager
David Larson, Wastewater Operations Manager
Keith R. Ledford Jr., P.E., Technical Support Manager
Lisa Hawkins, Finance Director (absent)
Teresa Herzog, Executive Assistant

In Mr. Burrough's absence, Mr. Ledford, Acting Administrator, conducted the meeting and in Chair Meals' absence, Vice-Chair Stern chaired the meeting.

1. The meeting began with the Pledge of Allegiance and roll call to establish a quorum.

2. ANNOUNCEMENTS – Additions or Deletions – None

3. SERVICE AWARDS – With gratitude, Vice-Chair Stern presented Lead Meter Reader Beverly Perry with a 20-year service award.

4. PUBLIC INPUT – Damian Ochab, 5056 N Beach Rd – Mr. Ochab introduced himself as the President of the South Manasota Sandpiper Key Association. He voiced concern of future plans of expansion, increased density, the cost to develop and the lack of an EWD alert system during Hurricane Ian.

5. PUBLIC HEARING PRESENTATION – EWD Wastewater Facilities Plan, Presentation by Mr. Mark Brewer of Angie Brewer & Associates, LC. Attorney Berntsson called to open the public hearing on the resolution that is on the agenda under 5a then called for anyone in the public to speak. Mr. Brewer read the attached public hearing statement into the record.

Attorney Berntsson then called for a motion to close the public hearing.

Ms. Gaver moved, **"to close the public hearing,"** seconded by Ms. Crampton.

UNANIMOUS **23-10-12 A**

1) To adopt the Englewood Water District Wastewater Facilities Plan and Capital Financing Plan.

Ms. Wright moved, **"to approve as read,"** seconded by Ms. Crampton for discussion.

Ms. Crampton stated her concerns about adequate water supply to serve all this development, protection of our water resources and watershed, and our loss of forests caused by the development. Mr. Ledford assured Ms. Crampton that all these concerns will be addressed in the Water Master Plan due out at the end of the year, adding a rate study is planned for next year. Ms. Crampton also raised concern of the proximity of the new WRF to homes.

UNANIMOUS **23-10-12 B**

2) To approve submission of the Plans to FDEP.

Ms. Gaver moved, **"to make a motion as presented,"** seconded by Ms. Wright.

UNANIMOUS **23-10-12 C**

3) To allow the Englewood Water District Vice-Chair to sign and secretary to the Board attest, the resolution pertaining to Plans.

Ms. Gaver moved, **"to approve as read,"** seconded by Ms. Crampton.

UNANIMOUS **23-10-12 D**

6. CONSENT SECTION – Vice-Chair Stern called for a motion to approve the consent agenda in its entirety or pull anything for discussion. Ms. Crampton moved, **"to approve the consent agenda,"** seconded by Ms. Wright.

a. Minutes of the Regular Meeting dated September 14, 2023
Recommended Action: Approve the meeting minutes.
b. Big W Law Invoice dated September 30, 2023.
Recommended Action: Approve the attorney's invoice in the amount of $750.00.
c. Execution of the FDEP Agreement for South WRF Electrical Upgrade Project
Recommended Action: Authorize the Vice-Chair to execute the South WRF Electrical Upgrade Project No. LPA0515 FDEP Standard Grant Agreement.
d. Single Source Procurement/ WTP Hudson Pump Purchase
Recommended Action: Authorize the single source procurement of 2 pumps for the WTP from Hudson Pump & Equipment in the amount of $54,558.00.

UNANIMOUS **23-10-12 CS A**
23-10-12 CS B
23-10-12 CS C
23-10-12 CS D

7. ACTION ITEMS

a. V-1 Vacuum Station Improvement Project Determination for Award – Mr. Ledford introduced the item. This project was previously put out to bid and prices came in at over $4M. Since then, staff had identified PCL Construction as a contractor that could complete this work using a piggy back contract from the city of St. Pete. The proposal with a GMP of $2,959,580 was received which includes everything needed to complete the project. Previously ordered equipment should arrive soon.

Ms. Gaver moved, **"to approve as presented,"** seconded by Ms. Wright.

UNANIMOUS **23-10-12 E**

Full motion read: To award the V-1 Vacuum Station Improvement Project in the amount of $2,959,580.00 to PCL Construction, Inc.

b. Carry-over of Funds from FY23 to FY24 Hurricane Ian Related – Mr. Ledford introduced the item. Repairs were not completed during FY23 so staff requests the carry-over of funds from FY23 to FY24 and reissuance of new purchase orders.

Ms. Crampton moved, **"I make a motion,"** seconded by Ms. Gaver.

UNANIMOUS **23-10-12 F**

Full motion read: To approve the carry-over of funds in the amount of $290,178.16 to complete these repairs, currently under contract. Funds to come from water and wastewater revenues.

c. Carry-over of Funds from FY23 to FY24 WTP Motors and Repairs – Mr. Ledford introduced the item. Staff requests the carry-over of funds from FY23 to FY24 and reissuance of new purchase orders because these projects were not completed in FY23.

Ms. Gaver moved, **"to carry over the funds as stated,"** seconded by Ms. Wright.

UNANIMOUS **23-10-12 G**

Full motion read: To approve the carry-over of funds in the amount of $86,868.00 from FY23 to FY24 for Water Treatment Plant Motors & Repairs to complete these previously approved purchases/repairs. Funds to come from water revenues.

d. Thrive Operations LLC IT Service Agreement – Mr. Ledford introduced the item. EWD has used SouthTech since 2006, Thrive has acquired them so they are requesting a new agreement be signed.

Ms. Wright moved, **"to approve as read,"** seconded by Ms. Crampton for discussion. Discussion included the increase in monthly fees and GSA pricing.

UNANIMOUS **23-10-12 H**

Full motion read: To authorize the Administrator to sign the Thrive Operations LLC Service Order to include a one-time service fee of $3,445.80 and a recurring monthly service fee of $4,421.92. Funds to come from water & wastewater revenues.

8. DISCUSSION

a. Cathy Walter – Exception to the Water Adjustment Act – Mr. Ledford read the item summary adding that the amount of water used to refill her pool after the repairs were completed was not 3 times her normal average as required in the Customer Rules and Regulations. Following Board discussion, her request was denied.

9. ADMINISTRATOR'S REPORT – Ray Burroughs (absent) Mr. Burroughs was attending the FASD quarterly meeting.

a. WATER OPERATIONS MANAGER – Dewey Futch

<u>Production:</u>

1. Total send out for September 2023 was 83.20 MG/2022 was 74.44 MG.
2. Average send out was 2.77 MGD/2022 average send out was 2.48 MGD and the 2023 high was 3.13 MGD/2022 high was 3.42 MGD.

3. Rainfall for September 2023 was 5.29"/2022 was 24.73". (Hurricane Ian)
4. Roofing Brothers is still on-site working on the roofs, they are nearly finished.
5. Wells 1-4 are back in service in WF3. Rusty Plumbing has finished that project.
6. Operators at the Plant have been doing general maintenance and daily operations.

Distribution:

1. Distribution had 4 incidents to report: Three locations had precautionary boil water notices issued to customers resulting from broken watermains.
    a. 9/5 a 2" watermain on Bourbon Street
    b. 9/14 a 10" watermain on Beach Road was hit by a contractor for FPL
    c. 9/19 a 4" watermain on Forked Creek Drive
    d. 9/29 a 4" watermain on Wyoming Avenue
    e. 9/27 a fire truck ran over a valve at 12 street and Arkansas Avenue. Repairs were made under pressure and no boil water notice was issued.
2. 67 new single-family meters were set equaling 67 ERCs.
3. 90 radio heads were replaced.
4. 87 customer requested turn-ons were completed.
5. Lead inventory is at 65% completion.

b. WASTEWATER OPERATIONS MANAGER – David Larson

WRF:

1. The average daily flow for September 2023 was 1.53 MGD/100K more than last year with a peak flow of 2.04 MG for the month.
2. Normal operations and maintenance are ongoing.

Collections:

1. Crews replaced 1 vacuum pit bottom and continue to repair service lines damaged by the fiber optic installation.
2. Normal operations and maintenance are ongoing.

c. TECHNICAL SUPPORT MANAGER – Keith R. Ledford Jr., P.E. Mr. Ledford updated his written report.

CIP/In-house Projects:

1. LS 121 Rehab – Work is anticipated to begin October 30th and completed prior to Thanksgiving.

Developments/Projects Approved for Construction

1. Placida Storage and River Road Storage utility work has been completed and these projects will be removed from my report.

Developments/Projects in Plan Review:

1. Medical Twins – plan comments will be submitted shortly.

Upcoming Developments/Projects:

1. Charlotte County – Avenues of the Americas Sidewalk Project – this project was originally planned in 2019 but has kicked off again. There are minor conflicts with EWD water and sewer lines.
2. Englewood Apartments – Plans have been submitted for 252 apartments across from the post office, adjacent to the assisted living.

3. Englewood Self Storage – new storage units east of Denny's, formally a used car lot.
4. Fairway Vistas at Myakka Pines – this will be a 3-phase development project.
5. Prose Apartments – downsized to 260 apartments and an amenity center.
6. Quail's Run Inn – formally known as Mid-town Villa; the old concrete structures have been torn down,

d. FINANCE DIRECTOR – Lisa Hawkins (absent) In Ms. Hawkins' absence, Mr. Ledford stated the final numbers for FY23 will change slightly as invoices are still coming in. This will be reported next month.

1. September Financial Statements
2. September Investment Statements

Mr. Ledford concluded the Administrator's Report.

10. ATTORNEY'S REPORT – Robert H. Berntsson – None

11. OLD BUSINESS – None

12. NEW BUSINESS – None

13. PUBLIC COMMENT – ANY TOPIC – None

14. BOARD MEMBER COMMENTS

1. Ms. Gaver questioned if the current water and wastewater capacity permits will need to be increased in the next 20 years to cover the growth Englewood is experiencing and also commented on the Prose apartments being approved at 3 stories and density concerns.

2. Ms. Crampton questioned available water pressure to serve 3 stories, and concerns of pressure available for the fire department. She also requested that the Manasota Beach Club be added to the historical district portion of the Wastewater Facilities Plan. District Counsel Berntsson asked the board if there was any objection to this change being made since they had already approved the Draft Wastewater Facilities Plan and all 4 members had no objection. She also had concern with global warming and climate change and how EWD is dealing with that in our future planning.

3. Ms. Wright had concerns about the overabundance of storage buildings being built.

15. ADJOURNED @ 9:28 a.m.

____
Robert C. Stern, Jr., Vice-Chair

/tlh

APPROVED

Appendix D

Public Hearing Documentation

Authorizing Resolution

RESOLUTION NO: 23-10-12 B/C/D

A RESOLUTION OF THE ENGLEWOOD WATER DISTRICT BOARD OF SUPERVISORS, RELATING TO THE FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION STATE REVOLVING FUND LOAN PROGRAM; ADOPTING THE ENGLWOOD WATER DISTRICT WASTEWATER SYSTEM IMPROVEMENTS FACILITIES PLAN DATED SEPTEMBER 2023; ADOPTING THE ENGLEWOOD WATER DISTRICT STATE REVOLVING FUND CAPITAL FINANCING PLAN; AUTHORIZING SUBMISSION OF THE PLANS TO THE FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION; DESIGNATING THE ENGLEWOOD WATER DISTRICT AUTHORIZED REPRESENTATIVE; AND PROVIDING FOR CONFLICTS, SEVERABILITY, AND AN EFFECTIVE DATE.

WHEREAS, The Englewood Water District determined that the project recommended in the Englewood Water District Wastewater System Improvements Facilities Plan is in the best interest of its customers; and

WHEREAS, The Englewood Water District is seeking funding from the Florida Department of Environmental Protection under its State Revolving Fund Loan Program to fund the subject improvements to benefit the Englewood Water District wastewater system customers; and

WHEREAS, Englewood Water District Staff have requested that the Board of Supervisors approve the Englewood Water District Wastewater System Improvements Facilities Plan and the State Revolving Fund Capital Financing Plan in accordance with the State Revolving Fund's requirements; and

WHEREAS, on October 12, 2023, the Englewood Water District Board of Supervisors conducted a duly noticed public hearing prior to adoption of this resolution.

BE IT RESOLVED BY THE ENGLEWOOD WATER DISTRICT BOARD OF SUPERVISORS, that:

SECTION I. The foregoing findings are incorporated herein by reference and made a part hereof.

SECTION II. The Englewood Water District hereby adopts the Englewood Water District Wastewater System Improvements Facilities Plan dated September 2023.

SECTION III. That the Englewood Water District State Revolving Fund Capital Financing Plan has been reviewed, has been discussed at a public hearing of the Englewood Water District, and is hereby adopted.

SECTION IV. The Board of Supervisors hereby authorizes the submission of the Englewood Water District Wastewater System Improvements Facilities Plan and the Englewood

Water District State Revolving Fund Capital Financing Plan to the Florida Department of Environmental Protection.

SECTION V. The Administrator is authorized to represent the Englewood Water District in carrying out the responsibilities under the State Revolving Fund Loan Program and to delegate authority and responsibility to staff to carry out all activities to accomplish the goals of the State Revolving Fund Loan Program.

SECTION VI. All Resolutions or part of Resolutions in conflict with any of the provisions of this Resolution are hereby repealed.

SECTION VII. If any section or portion of a section of this Resolution proves to be invalid, unlawful, or unconstitutional, it shall not be held to invalidate or impair the validity, force, or effect of any other section or part of this Resolution.

SECTION VIII. This Resolution shall take effect immediately upon its adoption.

PASSED AND RESOLVED by a 4/4 **vote of the Englewood Water District Board of Supervisors on the** 12th **day of** October**, 2023.**

ENGLEWOOD WATER DISTRICT

By: ______________________

Name: Robert C. Stern, Jr.

Title: Vice-Chair, Board of Supervisors

ATTEST:

Teresa Herzog

Teresa Herzog, Secretary

E

Appendix E

Environmental Review Documentation

Appendix E

Environmental Review Documentation

U.S. Fish & Wildlife Threatened and Endangered Species County Reports

Sarasota County, FL
and
Charlotte County, FL

U.S. Fish & Wildlife Service
ECOS

ECOS / Species Reports / Species County Report

Listed species believed to or known to occur in Sarasota, Florida

This report includes species only if they have a **Spatial Current Range** in ECOS.

The following report contains species that are known to or are believed to occur in this county, based on the species current range, as defined by the USFWS. The definition of current range that the FWS uses is the general geographic area where we know or suspect that a species currently occurs.

This list of species by county cannot be used for consultation purposes. To obtain an official list of species that should be considered during consultation, please visit IPaC.

CSV

Show All entries Search:

36 Species Listings

Group	Name	Population	Status	Lead Region	Lead Office	Recovery Plan	Recovery Plan Action Status
Birds	Whooping crane (Grus americana)	U.S.A. (AL, AR, CO, FL, GA, ID, IL, IN, IA, KY, LA, MI, MN, MS, MO, NC, NM, OH, SC, TN, UT, VA, WI, WV, western half of WY)	Experimental Population, Non-Essential	2	Assistant Regional Director-Ecological Services		
Birds	Eastern Black rail (Laterallus jamaicensis ssp. jamaicensis)	Wherever found	Threatened	4	South Carolina Ecological Services	Eastern Black Rail Recovery Outline	Implementation Progress
Birds	Red knot (Calidris canutus rufa)	Wherever found	Threatened	5	New Jersey Ecological Services Field Office	U.S. Fish and Wildlife Service Recovery Plan for the Rufa Red Knot (Calidris canutus rufa)	Implementation Progress
Birds	Everglade snail kite (Rostrhamus sociabilis plumbeus)	Wherever found	Endangered	4	Florida Ecological Services Field Office	Everglade Snail Kite Recovery Plan Amendment 1	Implementation Progress
Birds	Everglade snail kite (Rostrhamus sociabilis plumbeus)	Wherever found	Endangered	4	Florida Ecological Services Field Office	South Florida Multi-Species Recovery Plan (68 spp.)	Implementation Progress
Birds	Florida scrub-jay (Aphelocoma coerulescens)	Wherever found	Threatened	4	Florida Ecological Services Field Office	Florida Scrub-Jay Revised Recovery Plan	Implementation Progress
Birds	Piping Plover (Charadrius melodus)	[Atlantic Coast and Northern Great Plains populations] - Wherever found, except those areas where listed as endangered.	Threatened	5	Office of the Regional Director	Piping Plover Atlantic Coast Population Revised Recovery Plan	Implementation Progress

Birds	Piping Plover (Charadrius melodus)	[Atlantic Coast and Northern Great Plains populations] - Wherever found, except those areas where listed as endangered.	Threatened	5	Office of the Regional Director	Volume I: Draft Revised Recovery Plan for the Northern Great Plains Piping Plover (Charadrius melodus)	Implementation Progress
Birds	Piping Plover (Charadrius melodus)	[Atlantic Coast and Northern Great Plains populations] - Wherever found, except those areas where listed as endangered.	Threatened	5	Office of the Regional Director	Volume II: Draft revised recovery plan for the wintering range of the Northern Great Plains piping plover (Charadrius melodus) and Comprehensive conservation strategy for the piping plover (Charadrius melodus) in its coastal migration and wintering range in the continental United States.	Implementation Progress
Birds	Audubon's crested caracara (Polyborus plancus audubonii)	U.S.A. (FL)	Threatened	4	Florida Ecological Services Field Office	South Florida Multi-Species Recovery Plan (68 spp.)	Implementation Progress
Birds	Wood stork (Mycteria americana)	U.S.A. (AL, FL, GA, MS, NC, SC)	Threatened	4	Florida Ecological Services Field Office	Revised Recovery Plan for the U.S. Breeding Population of the Wood Stork	Implementation Progress
Fishes	Gulf sturgeon (Acipenser oxyrinchus (=oxyrhynchus) desotoi)	Wherever found	Threatened	4	Florida Ecological Services Field Office	Gulf Sturgeon	Implementation Progress
Flowering Plants	Aboriginal Prickly-apple (Harrisia (=Cereus) aboriginum (=gracilis))		Endangered	4	Florida Ecological Services Field Office		
Flowering Plants	Blackbract pipewort (Eriocaulon nigrobracteatum)		Under Review	4	Florida Ecological Services Field Office		
Flowering Plants	Pygmy fringe-tree (Chionanthus pygmaeus)		Endangered	4	Florida Ecological Services Field Office	South Florida Multi-Species Recovery Plan (68 spp.)	Implementation Progress

Insects	Monarch butterfly (Danaus plexippus)	Wherever found	Candidate	3	Assistant Regional Director-Ecological Services		
Insects	Westfall's clubtail (Gomphus westfalli)	Wherever found	Under Review	4	Florida Ecological Services Field Office		
Mammals	Florida bonneted bat (Eumops floridanus)	Wherever found	Endangered	4	Florida Ecological Services Field Office	Recovery Outline for Florida Bonneted Bat (Eumops floridanus)	Implementation Progress
Mammals	Puma (=mountain lion) (Puma (=Felis) concolor (all subsp. except coryi))	U.S.A. (FL)	Similarity of Appearance (Threatened)	4	Florida Ecological Services Field Office		
Mammals	Florida panther (Puma (=Felis) concolor coryi)	Wherever found	Endangered	4	Florida Ecological Services Field Office	Third Revision of the Florida Panther Recovery Plan	Implementation Progress
Mammals	Tricolored bat (Perimyotis subflavus)	Wherever found	Proposed Endangered	5	Pennsylvania Ecological Services Field Office		
Mammals	West Indian Manatee (Trichechus manatus)	Wherever found	Threatened	4	Florida Ecological Services Field Office	Florida Manatee Recovery Plan, Third Revision	Implementation Progress
Mammals	West Indian Manatee (Trichechus manatus)	Wherever found	Threatened	4	Florida Ecological Services Field Office	Recovery Plan Puerto Rican Population of the West Indian (Antillean) Manatee	Implementation Progress
Reptiles	Green sea turtle (Chelonia mydas)	Green sea turtles originating from the North Atlantic Ocean, bounded by the following lines and coordinates: 48 degrees N. Lat. in the north, along the western coasts of Europe and Africa (west of 5.5 degrees W. Long.); north of 19 degrees N. Lat. in the east; bounded by 19 degrees N., 65.1 degrees W. to 14 degrees N., 65.1 degrees W. then 14 degrees N., 77 degrees W. in the south and west; and along the eastern coasts of the Americas (north of 7.5 degrees N., 77 degrees W.)	Threatened	4	Florida Ecological Services Field Office	Recovery Plan for U.S. Population of Atlantic Green Turtle	Implementation Progress

Reptiles	Loggerhead sea turtle (Caretta caretta)	Northwest Atlantic Ocean DPS - Loggerhead sea turtles originating from the Northwest Atlantic Ocean west of 40 degrees W. Long	Threatened	4	Florida Ecological Services Field Office	Recovery Plan for the Northwest Atlantic Population of the Loggerhead Sea Turtle (Caretta caretta); Second Revision	Implementation Progress
Reptiles	American alligator (Alligator mississippiensis)	Wherever found	Similarity of Appearance (Threatened)	4	Office of the Regional Director		
Reptiles	American crocodile (Crocodylus acutus)	U.S.A. (FL)	Threatened	4	Florida Ecological Services Field Office	American Crocodile Recovery Plan Amendment	Implementation Progress
Reptiles	American crocodile (Crocodylus acutus)	U.S.A. (FL)	Threatened	4	Florida Ecological Services Field Office	South Florida Multi-Species Recovery Plan (68 spp.)	Implementation Progress
Reptiles	Eastern diamondback rattlesnake (Crotalus adamanteus)	Wherever found	Under Review	4	Florida Ecological Services Field Office		
Reptiles	Gopher tortoise (Gopherus polyphemus)	Eastern DPS	Resolved Taxon	4	Florida Ecological Services Field Office		
Reptiles	Eastern indigo snake (Drymarchon couperi)	Wherever found	Threatened	4	Georgia Ecological Services Field Office	Eastern Indigo Snake Draft Recovery Implementation Strategy	Implementation Progress
Reptiles	Eastern indigo snake (Drymarchon couperi)	Wherever found	Threatened	4	Georgia Ecological Services Field Office	Eastern Indigo Snake Revised Recovery Plan	Implementation Progress
Reptiles	Leatherback sea turtle (Dermochelys coriacea)	Wherever found	Endangered	4	Florida Ecological Services Field Office	Recovery Plan for Leatherback Turtles in the U.S. Caribbean, Atlantic, and Gulf of Mexico	Implementation Progress
Reptiles	Leatherback sea turtle (Dermochelys coriacea)	Wherever found	Endangered	4	Florida Ecological Services Field Office	Recovery Plan for U.S. Pacific Populations of the Leatherback Turtle	Implementation Progress
Reptiles	Hawksbill sea turtle (Eretmochelys imbricata)	Wherever found	Endangered	4	Florida Ecological Services Field Office	Recovery Plan for the Hawksbill Turtle in the U.S. Caribbean, Atlantic and Gulf of Mexico	Implementation Progress

Reptiles	Hawksbill sea turtle (Eretmochelys imbricata)	Wherever found	Endangered	4	Florida Ecological Services Field Office	Recovery Plan for U.S. Pacific Populations of the Hawksbill Turtle	Implementation Progress

Showing 1 to 36 of 36 entries

Previous 1 Next

U.S. Fish & Wildlife Service
ECOS

ECOS / Species Reports / Species County Report

Listed species believed to or known to occur in Charlotte, Florida

This report includes species only if they have a **Spatial Current Range** in ECOS.

The following report contains species that are known to or are believed to occur in this county, based on the species current range, as defined by the USFWS. The definition of current range that the FWS uses is the general geographic area where we know or suspect that a species currently occurs.

This list of species by county cannot be used for consultation purposes. To obtain an official list of species that should be considered during consultation, please visit IPaC.

CSV

Show All entries Search:

38 Species Listings

Group	Name	Population	Status	Lead Region	Lead Office	Recovery Plan	Recovery Plan Action Status
Birds	Whooping crane (Grus americana)	U.S.A. (AL, AR, CO, FL, GA, ID, IL, IN, IA, KY, LA, MI, MN, MS, MO, NC, NM, OH, SC, TN, UT, VA, WI, WV, western half of WY)	Experimental Population, Non-Essential	2	Assistant Regional Director-Ecological Services		
Birds	Eastern Black rail (Laterallus jamaicensis ssp. jamaicensis)	Wherever found	Threatened	4	South Carolina Ecological Services	Eastern Black Rail Recovery Outline	Implementation Progress
Birds	Red knot (Calidris canutus rufa)	Wherever found	Threatened	5	New Jersey Ecological Services Field Office	U.S. Fish and Wildlife Service Recovery Plan for the Rufa Red Knot (Calidris canutus rufa)	Implementation Progress
Birds	Everglade snail kite (Rostrhamus sociabilis plumbeus)	Wherever found	Endangered	4	Florida Ecological Services Field Office	Everglade Snail Kite Recovery Plan Amendment 1	Implementation Progress
Birds	Everglade snail kite (Rostrhamus sociabilis plumbeus)	Wherever found	Endangered	4	Florida Ecological Services Field Office	South Florida Multi-Species Recovery Plan (68 spp.)	Implementation Progress
Birds	Florida scrub-jay (Aphelocoma coerulescens)	Wherever found	Threatened	4	Florida Ecological Services Field Office	Florida Scrub-Jay Revised Recovery Plan	Implementation Progress
Birds	Piping Plover (Charadrius melodus)	[Atlantic Coast and Northern Great Plains populations] - Wherever found, except those areas where listed as endangered.	Threatened	5	Office of the Regional Director	Piping Plover Atlantic Coast Population Revised Recovery Plan	Implementation Progress

Birds	Piping Plover (Charadrius melodus)	[Atlantic Coast and Northern Great Plains populations] - Wherever found, except those areas where listed as endangered.	Threatened	5	Office of the Regional Director	Volume I: Draft Revised Recovery Plan for the Northern Great Plains Piping Plover (Charadrius melodus)	Implementation Progress
Birds	Piping Plover (Charadrius melodus)	[Atlantic Coast and Northern Great Plains populations] - Wherever found, except those areas where listed as endangered.	Threatened	5	Office of the Regional Director	Volume II: Draft revised recovery plan for the wintering range of the Northern Great Plains piping plover (Charadrius melodus) and Comprehensive conservation strategy for the piping plover (Charadrius melodus) in its coastal migration and wintering range in the continental United States.	Implementation Progress
Birds	Audubon's crested caracara (Polyborus plancus audubonii)	U.S.A. (FL)	Threatened	4	Florida Ecological Services Field Office	South Florida Multi-Species Recovery Plan (68 spp.)	Implementation Progress
Birds	Wood stork (Mycteria americana)	U.S.A. (AL, FL, GA, MS, NC, SC)	Threatened	4	Florida Ecological Services Field Office	Revised Recovery Plan for the U.S. Breeding Population of the Wood Stork	Implementation Progress
Birds	Red-cockaded woodpecker (Picoides borealis)	Wherever found	Endangered	4	South Carolina Ecological Services	Red-cockaded Woodpecker Recovery Plan, Second Revision	Implementation Progress
Fishes	Gulf sturgeon (Acipenser oxyrinchus (=oxyrhynchus) desotoi)	Wherever found	Threatened	4	Florida Ecological Services Field Office	Gulf Sturgeon	Implementation Progress
Flowering Plants	Aboriginal Prickly-apple (Harrisia (=Cereus) aboriginum (=gracilis))		Endangered	4	Florida Ecological Services Field Office		
Flowering Plants	Blackbract pipewort (Eriocaulon nigrobracteatum)		Under Review	4	Florida Ecological Services Field Office		
Flowering Plants	Beautiful pawpaw (Deeringothamnus pulchellus)		Endangered	4	Florida Ecological Services Field Office	Beautiful Pawpaw_Recovery Plan Amendment	Implementation Progress
Flowering Plants	Beautiful pawpaw (Deeringothamnus pulchellus)		Endangered	4	Florida Ecological Services Field Office	South Florida Multi-Species Recovery Plan (68 spp.)	Implementation Progress

Insects	Monarch butterfly (Danaus plexippus)	Wherever found	Candidate	3	Assistant Regional Director-Ecological Services		
Insects	Westfall's clubtail (Gomphus westfalli)	Wherever found	Under Review	4	Florida Ecological Services Field Office		
Mammals	Florida bonneted bat (Eumops floridanus)	Wherever found	Endangered	4	Florida Ecological Services Field Office	Recovery Outline for Florida Bonneted Bat (Eumops floridanus)	Implementation Progress
Mammals	Puma (=mountain lion) (Puma (=Felis) concolor (all subsp. except coryi))	U.S.A. (FL)	Similarity of Appearance (Threatened)	4	Florida Ecological Services Field Office		
Mammals	Florida panther (Puma (=Felis) concolor coryi)	Wherever found	Endangered	4	Florida Ecological Services Field Office	Third Revision of the Florida Panther Recovery Plan	Implementation Progress
Mammals	Tricolored bat (Perimyotis subflavus)	Wherever found	Proposed Endangered	5	Pennsylvania Ecological Services Field Office		
Mammals	West Indian Manatee (Trichechus manatus)	Wherever found	Threatened	4	Florida Ecological Services Field Office	Florida Manatee Recovery Plan, Third Revision	Implementation Progress
Mammals	West Indian Manatee (Trichechus manatus)	Wherever found	Threatened	4	Florida Ecological Services Field Office	Recovery Plan Puerto Rican Population of the West Indian (Antillean) Manatee	Implementation Progress
Reptiles	Green sea turtle (Chelonia mydas)	Green sea turtles originating from the North Atlantic Ocean, bounded by the following lines and coordinates: 48 degrees N. Lat. in the north, along the western coasts of Europe and Africa (west of 5.5 degrees W. Long.); north of 19 degrees N. Lat. in the east; bounded by 19 degrees N., 65.1 degrees W. to 14 degrees N., 65.1 degrees W. then 14 degrees N., 77 degrees W. in the south and west; and along the eastern coasts of the Americas (north of 7.5 degrees N., 77 degrees W.)	Threatened	4	Florida Ecological Services Field Office	Recovery Plan for U.S. Population of Atlantic Green Turtle	Implementation Progress

Reptiles	Loggerhead sea turtle (Caretta caretta)	Northwest Atlantic Ocean DPS - Loggerhead sea turtles originating from the Northwest Atlantic Ocean west of 40 degrees W. Long	Threatened	4	Florida Ecological Services Field Office	Recovery Plan for the Northwest Atlantic Population of the Loggerhead Sea Turtle (Caretta caretta); Second Revision	Implementation Progress
Reptiles	American alligator (Alligator mississippiensis)	Wherever found	Similarity of Appearance (Threatened)	4	Office of the Regional Director		
Reptiles	American crocodile (Crocodylus acutus)	U.S.A. (FL)	Threatened	4	Florida Ecological Services Field Office	American Crocodile Recovery Plan Amendment	Implementation Progress
Reptiles	American crocodile (Crocodylus acutus)	U.S.A. (FL)	Threatened	4	Florida Ecological Services Field Office	South Florida Multi-Species Recovery Plan (68 spp.)	Implementation Progress
Reptiles	Eastern diamondback rattlesnake (Crotalus adamanteus)	Wherever found	Under Review	4	Florida Ecological Services Field Office		
Reptiles	Gopher tortoise (Gopherus polyphemus)	Eastern DPS	Resolved Taxon	4	Florida Ecological Services Field Office		
Reptiles	Eastern indigo snake (Drymarchon couperi)	Wherever found	Threatened	4	Georgia Ecological Services Field Office	Eastern Indigo Snake Draft Recovery Implementation Strategy	Implementation Progress
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Showing 1 to 38 of 38 entries

Previous 1 Next

Appendix E

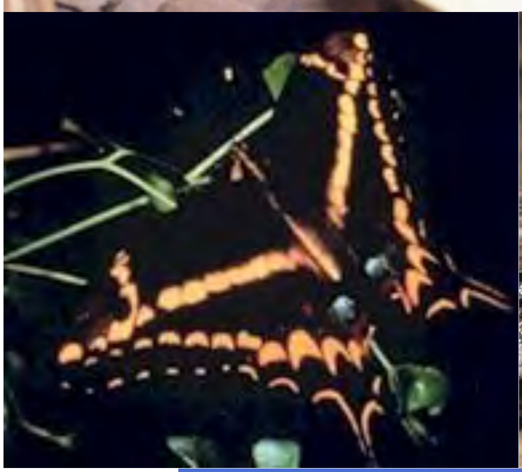
Environmental Review Documentation

Florida's Endangered and Threatened Species

Updated December 2022

FLORIDA'S ENDANGERED AND THREATENED SPECIES





Updated December 2022

FLORIDA FISH AND WILDLIFE CONSERVATION COMMISSION

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CONTENTS

PREFACE

This document provides a table and list of the State of Florida's imperiled species of wildlife. It includes species listed at the Federal level as Endangered, Threatened, Threatened Due to Similarity of Appearance, or Non-Essential Experimental by the U. S. Fish and Wildlife Service (USFWS) and National Marine Fisheries Service (NMFS). It also includes species listed at the State level as State-designated Threatened and Species of Special Concern by the Florida Fish and Wildlife Conservation Commission (FWC).

FWC is a constitutional agency, and its authority to regulate and manage most wildlife comes from the Florida constitution. FWC was created by a 1998 amendment to the State of Florida constitution merging the former Game and Fresh Water Fish Commission (GFC), a constitutional agency, the former Marine Fisheries Commission, and certain parts of the Florida Department of Environmental Protection (FDEP), both statutory agencies. At the time of the merger, there were several wildlife species, not under the constitutional authority of the GFC, for which the Florida Legislature had given some statutory authority to regulate and manage to FDEP. The authority for FWC to regulate and manage these species, listed in Rule 68A-27.0031, Florida Administrative Code (F.A.C.), comes from this statutory authority, not constitutional authority. These species are included in this document for the convenience of the user, but they are not included in rules codifying the Florida Endangered and Threatened Species List (Rule 68A-27.003, F.A.C.) or the Species of Special Concern list (Rule 68A-27.005, F.A.C.). The Federal listing status of these species shown in Rule 68A-27.0031 is that of the species in 1998 and does not reflect any status changes since that time. However, the status of these species in *this* document *does* reflect their status as of the date of this document.

In November 2010, FWC established an imperiled species management system and revised its imperiled species rules. All species listed by the USFWS and NMFS that occur in Florida are now included on Florida Endangered and Threatened Species List as Federally-designated Endangered, Federally-designated Threatened, Federally-designated Threatened Due to Similarity of Appearance, or Federally-designated Non-Essential Experimental Population species. Species listed by the FWC are included on the Florida Endangered and Threatened Species List as State-designated Threatened species.

The revised imperiled species management system abolishes the species of special concern (SSC) category once all species on that list are reclassified as State-designated Threatened, found to not meet any of the State's listing criteria, or become Federally listed. Until then, the FWC will continue to maintain a separate Species of Special Concern list. These species are included in this document.

The State lists of plants, which are designated Endangered, Threatened, and Commercially Exploited, are administered and maintained by the Florida Department of Agriculture and Consumer Services (DOACS) via Chapter 5B-40, F.A.C.

The Federal list of Endangered and Threatened animals and plants is administered by the USFWS and is published in 50 CFR 17 (animals) and 50 CFR 23 (plants). Additional information regarding Federal listings can be located at the NMFS and USFWS websites.

Common and scientific names listed first are as they appear in the Florida Administrative Code, Title 68A. Common and/or scientific names following this and located within parentheses ( ) are names as used by USFWS, or other commonly used names.

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Cover Photos by FWC Staff: Key Largo Woodrat, Burrowing Owls, Okaloosa Darter, Schaus' swallowtail butterfly, Short-tailed Snake.

NUMERICAL SUMMARY OF SPECIES

Listed by the State of Florida as Federally-designated Endangered **(FE)**, Federally-designated Threatened **(FT)**, Federally-designated Threatened due to Similarity of Appearance **[FT(S/A)]**, Federal Non-Essential Experimental Population **(FXN)**, State-designated Threatened **(ST)**, or State Species of Special Concern **(SSC)**.

STATUS DESIGNATION	FISH	AMPHIBIANS	REPTILES	BIRDS	MAMMALS	INVERTEBRATES	TOTAL
FE	3(1)[1]	1	3(3)	8	22(5)[2]	13	50(9)
FT	4(1)	1	7(2)	7	2(1)	18	39(4)
FT(S/A)	0	0	1	0	0	3	4
FXN	0	0	0	1	0	0	1
ST	6	2	9	16	4	2	39
SSC	0	0	0	0	0	0	0
TOTAL	**13(2)**	**4**	**20(5)**	**32**	**28 (6)**	**36**	**134(13)**

[1] Numbers in the parentheses are the number of species for which the FWC does not have constitutional authority. The status in Rule 68A-27.0031 is the Federal status these species had when the FWC was created by amendment to the Florida Constitution, adopted in 1998. The status of these species listed in here is their current Federal status as of December 2022 apart from the humpback whale.

[2] There is one additional species included in Rule 68A-27.0031 as a species for which the FWC does not have constitutional authority. This species, the Caribbean monk seal, is not included here because it has been determined to be extinct.

FLORIDA'S ENDANGERED AND THREATENED SPECIES LIST

VERTEBRATES

FISH

Common Name	Scientific Name	Status
Atlantic sturgeon	*Acipenser oxyrinchus oxyrinchus*	FE
Blackmouth shiner	*Notropis melanostomus*	ST
Bluenose shiner	*Pteronotropis welaka*	ST
Crystal darter	*Crystallaria asprella*	ST
Giant manta ray	*Manta birostris*	FT
Gulf sturgeon	*Acipenser oxyrinchus [=oxyrhynchus] desotoi*	FT[1]
Key silverside	*Menidia conchorum*	ST
Nassau grouper	*Epinephelus striatus*	FT
Okaloosa darter	*Etheostoma okalossae*	FT
Saltmarsh topminnow	*Fundulus jenkinsi*	ST
Shortnose sturgeon	*Acipenser brevirostrum*	FE[1]
Smalltooth sawfish	*Pristis pectinate*	FE
Southern tessellated darter	*Etheostoma olmstedi maculaticeps*	ST

AMPHIBIANS

Common Name	Scientific Name	Status
Florida bog frog	*Lithobates okaloosae*	ST
Frosted flatwoods salamander	*Ambystoma cingulatum*	FT
Georgia blind salamander	*Eurycea wallacei*	ST
Reticulated flatwoods salamander	*Ambystoma bishopi*	FE
Striped newt	*Notophthalmus perstriatus*	ST

REPTILES

Common Name	Scientific Name	Status
American alligator	*Alligator mississippiensis*	FT(S/A)
American crocodile	*Crocodylus acutus*	FT
Atlantic salt marsh snake	*Nerodia clarkii taeniata*	FT
Barbour's map turtle	*Graptemys barbouri*	ST
Bluetail mole skink	*Plestiodon egregius lividus*	FT
Eastern indigo snake	*Drymarchon couperi*	FT

Common Name	Scientific Name	Status
Florida brown snake	*Storeria victa*	ST[3]
Florida Keys mole skink	*Plestiodon egregius egregius*	ST
Florida pine snake	*Pituophis melanoleucus mugitus*	ST
Gopher tortoise	*Gopherus polyphemus*	ST
Green sea turtle	*Chelonia mydas*	FT[1]
Hawksbill sea turtle	*Eretmochelys imbricata*	FE[1]
Kemp's ridley sea turtle	*Lepidochelys kempii*	FE[1]
Key ringneck snake	*Diadophis punctatus acricus*	ST
Leatherback sea turtle	*Dermochelys coriacea*	FE[1]
Loggerhead sea turtle	*Caretta caretta*	FT[1]
Rim rock crowned snake	*Tantilla oolitica*	ST
Sand skink	*Plestiodon reynoldsi*	FT
Short-tailed snake	*Lampropeltis extenuata*	ST
Suwannee alligator snapping turtle	*Macrochelys suwanniensis*	ST

BIRDS

Common Name	Scientific Name	Status
American oystercatcher	*Haematopus palliatus*	ST
Audubon's crested caracara	*Polyborus plancus audubonii*	FT
Bachman's wood warbler	*Vermivora bachmanii*	FE
Black skimmer	*Rynchops niger*	ST
Cape Sable seaside sparrow	*Ammodramus maritimus mirabilis*	FE
Eastern black rail	*Laterallus jamaicensis jamaicensis*	FT
Eskimo curlew	*Numenius borealis*	FE
Everglade snail kite	*Rostrhamus sociabilis plumbeus*	FE
Florida burrowing owl	*Athene cunicularia floridana*	ST
Florida grasshopper sparrow	*Ammodramus savannarum floridanus*	FE
Florida sandhill crane	*Antigone canadensis pratensis*	ST
Florida scrub-jay	*Aphelocoma coerulescens*	FT
Ivory-billed woodpecker	*Campephilus principalis*	FE
Kirtland's warbler (Kirtland's wood warbler)	*Setophaga kirtlandii (Dendroica kirtlandii*)	FE
Least tern	*Sternula antillarum*	ST
Little blue heron	*Egretta caerulea*	ST
Marian's marsh wren	*Cistothorus palustris marianae*	ST

Common Name	Scientific Name	Status
Piping plover	*Charadrius melodus*	FT
Red-cockaded woodpecker	*Picoides borealis*	FE
Reddish egret	*Egretta rufescens*	ST
Roseate spoonbill	*Platalea ajaja*	ST
Roseate tern	*Sterna dougallii dougallii*	FT
Rufa red knot	*Calidris canutus rufa*	FT
Scott's seaside sparrow	*Ammodramus maritimus peninsulae*	ST
Snowy plover	*Charadrius nivosus*	ST
Southeastern American kestrel	*Falco sparverius paulus*	ST
Tricolored heron	*Egretta tricolor*	ST
Wakulla seaside sparrow	*Ammodramus maritimus juncicola*	ST
White-crowned pigeon	*Patagioenas leucocephala*	ST
Whooping crane	*Grus americana*	FXN
Worthington's marsh wren	*Cistothorus palustris griseus*	ST
Wood stork	*Mycteria americana*	FT

MAMMALS

Common Name	Scientific Name	Status
Anastasia Island beach mouse	*Peromyscus polionotus phasma*	FE
Big Cypress fox squirrel	*Sciurus niger avicennia*	ST
Choctawhatchee beach mouse	*Peromyscus polionotus allophrys*	FE
Everglades mink	*Neovison vison evergladensis*	ST
Finback whale	*Balaenoptera physalus*	FE[1]
Florida bonneted bat	*Eumops floridanus*	FE
Florida panther	*Puma [=Felis] concolor coryi*	FE
Florida salt marsh vole	*Microtus pennsylvanicus dukecampbelli*	FE
Gray bat	*Myotis grisescens*	FE
Gray wolf	*Canis lupus*	FE[2]
Bryde's Whale (Gulf of Mexico subspecies)	*Balaenoptera edeni [unnamed subspecies]*	FE
Humpback whale	*Megaptera novaeangliae*	FE[1]
Indiana bat	*Myotis sodalis*	FE
Key deer	*Odocoileus virginianus clavium*	FE
Key Largo cotton mouse	*Peromyscus gossypinus allapaticola*	FE
Key Largo woodrat	*Neotoma floridana smalli*	FE

Common Name	Scientific Name	Status
Lower Keys rabbit	*Sylvilagus palustris hefneri*	FE
North Atlantic right whale	*Eubalaena glacialis*	FE[1]
Perdido Key beach mouse	*Peromyscus polionotus trissyllepsis*	FE
Red wolf	*Canis rufus*	FE
Rice rat	*Oryzomys palustris natator*	FE[3]
Sanibel Island rice rat	*Oryzomys palustris sanibeli*	ST
Sei whale	*Balaenoptera borealis*	FE[1]
Sherman's short-tailed shrew	*Blarina shermani*	ST
Southeastern beach mouse	*Peromyscus polionotus niveiventris*	FT
Sperm whale	*Physeter macrocephalus*	FE[1]
St. Andrew beach mouse	*Peromyscus polionotus peninsularis*	FE
West Indian manatee (Florida manatee)	*Trichechus manatus* (*Trichechus manatus latirostris*)	FT[1]

INVERTEBRATES

<u>CORALS</u>

Common Name	Scientific Name	Status
Boulder star coral	*Orbicella franksi*	FT
Elkhorn coral	*Acropora palmata*	FT
Lobed star coral	*Orbicella annularis*	FT
Mountainous star coral	*Orbicella faveolata*	FT
Pillar coral	*Dendrogyra cylindricus*	FT
Rough cactus coral	*Mycetophyllia ferox*	FT
Staghorn coral	*Acropora cervicornis*	FT

<u>CRUSTACEANS</u>

Common Name	Scientific Name	Status
Black Creek crayfish	*Procambarus pictus*	ST
Panama City crayfish	*Procambarus econfinae*	FT
Santa Fe cave crayfish	*Procambarus erythrops*	ST
Squirrel Chimney Cave shrimp	*Palaemonetes cummingi*	FT

INSECTS

Common Name	Scientific Name	Status
American burying beetle	*Nicrophorus americanus*	FT
Bartram's scrub-hairstreak	*Strymon acis bartrami*	FE
Cassius blue butterfly	*Leptotes cassius theonus*	FT(S/A)
Ceraunus blue butterfly	*Hemiargus ceraunus antibubastus*	FT(S/A)
Florida leafwing	*Anaea troglodyta floridalis*	FE
Miami blue butterfly	*Cyclargus thomasi bethunebakeri*	FE
Miami tiger beetle	*Cicindelidia floridana*	FE
Nickerbean blue butterfly	*Cyclargus ammon*	FT(S/A)
Schaus swallowtail butterfly	*Heraclides aristodemus ponceanus*	FE

MOLLUSKS

Common Name	Scientific Name	Status
Chipola slabshell (mussel)	*Elliptio chiplolaensis*	FT
Choctaw bean	*Obovaria choctawensis*	FE
Fat threeridge (mussel)	*Amblema neislerii*	FE
Fuzzy pigtoe	*Pleurobema strodeanum*	FT
Gulf moccasinshell (mussel)	*Medionidus penicillatus*	FE
Narrow pigtoe	*Fusconaia escambia*	FT
Ochlockonee moccasinshell (mussel)	*Medionidus simpsonianus*	FE
Oval pigtoe (mussel)	*Pleurobema pyriforme*	FE
Purple bankclimber (mussel)	*Elliptoideus sloatianus*	FT
Round ebonyshell	*Reginaia rotulata*	FE
Shinyrayed pocketbook (mussel)	*Hamiota subangulata*	FE
Southern kidneyshell	*Ptychobranchus jonesi*	FE
Southern sandshell	*Hamiota australis*	FT
Stock Island tree snail	*Orthalicus reses [not incl. nesodryas]*	FT
Suwannee moccasinshell	*Medionidus walkeri*	FT
Tapered pigtoe	*Fusconaia burki*	FT

KEY TO ABBREVIATIONS AND NOTATIONS

List Abbreviations

FWC	Florida Fish and Wildlife Conservation Commission
FE	Federally-designated Endangered
FT	Federally-designated Threatened
FXN	Federally-designated Threatened Nonessential Experimental Population
FT(S/A)	Federally-designated Threatened species due to similarity of appearance
NMFS	National Marine Fisheries Service
ST	State-designated Threatened
SSC	State Species of Special Concern
USFWS	United States Fish and Wildlife Service

List Notations

[1] A species for which the FWC does not have constitutional authority.
[2] Not documented in Florida.
[3] Lower Keys population only.

LISTING CHANGES SINCE 2010

The Florida black bear was removed from Florida's Endangered and Threatened Species List on August 23, 2012 after approval by the Commission at the June 2012 Commission meeting. A new Florida Black Bear Management Plan was also approved at this meeting.

The Miami blue butterfly was emergency listed as Endangered by the USFWS on August 10, 2011. On April 6, 2012, the Miami blue was officially listed as Endangered by the USFWS. Effective September 19, 2012 the FWC listed the Miami blue butterfly as Federally-designated Endangered on Florida's Endangered and Threatened Species List.

The Cassius blue butterfly, ceraunus blue butterfly, and nickerbean blue butterfly were emergency listed as Threatened Due to Similarity of Appearance to the Miami blue by the USFWS on August 10, 2011. On April 6, 2012, these three species were officially listed as Threatened Due to Similarity of Appearance to the Miami blue by the USFWS. These three species were listed on Florida's Endangered and Threatened Species List as Federally Threatened by Similarity of Appearance to the Miami blue butterfly effective September 19, 2012, and as such only the following prohibitions apply to these three species:

a. Incidental take, that is, take that results from, but is not a purpose of, carrying out an otherwise lawful activity will not apply to cassius blue butterfly, ceraunus blue butterfly, and nickerbean blue butterfly.
b. Collection of the cassius blue butterfly, ceraunus blue butterfly, and nickerbean blue butterfly is prohibited in coastal counties south of Interstate 4 and extending to the boundaries of the State of Florida at the endpoints of Interstate 4 at Tampa and Daytona Beach. Specifically, such activities are prohibited in the following counties: Brevard, Broward, Charlotte, Collier, De Soto, Hillsborough, Indian River, Lee, Manatee, Pinellas, Sarasota, St. Lucie, Martin, Miami-Dade, Monroe, Palm Beach, and Volusia

The Okaloosa darter was reclassified by the USFWS effective May 2, 2011 from Endangered to Threatened. A special rule under Section 4d of the Endangered Species Act was also adopted that allows Eglin Air Force Base to continue activities with a reduced regulatory burden and will provide a net benefit to the Okaloosa darter. FWC reclassified the darter from Federally Endangered to Federally Threatened on September 19, 2012.

The Atlantic sturgeon was listed as Endangered by the NMFS on April 6, 2012. FWC reclassified the fish from Species of Special Concern to Federally Endangered on September 19, 2012.

On October 10, 2012, the USFWS listed the round ebonyshell, southern kidneyshell, and Choctaw bean as Endangered. All three muscles were listed as Federally Endangered by the FWC on June 10, 2015.

The USFWS listed the tapered pigtoe, narrow pigtoe, southern sandshell, and fuzzy pigtoe as Threatened on October 12, 2012. All four mussels were listed as Federally Threatened by the FWC on June 10, 2015.

The Florida bonneted bat was listed as Endangered by the USFWS on October 2, 2013 after receiving a petition for emergency listing in January 2010. FWC reclassified this bat species from State Threatened to Federally Endangered on June 10, 2015.

The wood stork was reclassified by the USFWS on June 30, 2014, from Endangered to Threatened. FWC reclassified the wood stork to Federally Threatened on June 10, 2015.

The Florida leafwing and Bartram's scrub-hairstreak butterfly were listed as Endangered by the USFWS on September 11, 2014. Both species were listed by the FWC as Federally Endangered on June 10, 2015.

The pillar coral was listed as Threatened by the USFWS on November 13, 2014. FWC reclassified the coral from State Threatened to Federally Threatened on June 10, 2015.

The rufa red knot was listed as Threatened by USFWS on January 12, 2015 and listed by FWC as Federally Threatened on June 10, 2015.

The species-level federal listing of the humpback whale was revised by NMFS on December 21, 2016, and the West Indies distinct population segment of the humpback whale was removed from the Endangered Species List due to recovery. The FWC does not have constitutional authority over this species.

The Miami tiger beetle was listed as Endangered by the USFWS on November 4, 2016 and listed by FWC as Federally Endangered on or about June 12, 2017.

The Suwannee moccasinshell was listed as Threatened by the USFWS on November 7, 2016 and listed by FWC as Federally Threatened on or about June 12, 2017.

On January 11, 2017, the State listing status changes that were proposed in 2011 as part of the newly implemented imperiled species management system became official after the approval of Florida's Imperiled Species Management Plan by FWC Commissioners.

- 15 species were removed from Florida's Endangered and Threatened Species List: Eastern chipmunk, Florida mouse, brown pelican, limpkin, snowy egret, white ibis, peninsula ribbon snake (Lower Keys population), red rat snake Lower Keys population), striped mud turtle (Lower Keys population), Suwannee cooter, gopher frog, Pine Barrens tree frog, Lake Eustis pupfish, mangrove rivulus, and Florida tree snail.
- 23 species changed from State-designated Species of Special Concern to State-designated Threatened species: Sherman's short-tailed shrew, Sanibel rice rat, little blue heron, tricolored heron, reddish egret, roseate spoonbill, American oystercatcher, black skimmer, Florida burrowing owl, Marian's marsh wren, Worthington's Marsh wren, Scott's seaside sparrow, Wakulla seaside sparrow, Barbour's map turtle, Florida Keys mole skink, Florida pine snake, Georgia blind salamander, Florida bog frog, bluenose shiner, saltmarsh top minnow, Southern tessellated darter, Santa Fe crayfish, and Black Creek crayfish.
- 14 species maintain their State-designated Threatened status: Everglades mink, Big Cypress fox squirrel, Florida sandhill crane, snowy plover, least tern, white-crowned

pigeon, Southeastern American kestrel, Florida brown snake (Lower Keys population), Key ringneck snake, short-tailed snake, rim rock crowned snake, Key silverside, blackmouth shiner, and crystal darter. Six species remain listed as State-designated Species of Special Concern: (list species): Homosassa shrew, Sherman's fox squirrel, osprey (Monroe County population), alligator snapping turtle, Panama City crayfish, and harlequin darter.

On December 23, 2018, the State listing status changes that were proposed in 2011 as part of the newly implemented imperiled species management system became official after the approval of Florida's Imperiled Species Management Plan by FWC Commissioners.

- Four species were removed from Florida's Endangered and Threatened Species List as State Species of Special Concern: Harlequin darter, Osprey (Monroe County population), Homosassa shrew, and Sherman's fox squirrel.
- The Alligator snapping turtle was taxonomically reclassified into three subspecies. The Suwannee alligator snapping turtle was listed as a State-designated Threatened species.
- Two species were listed as Federally-designated Threatened species: Giant manta ray and Nassau grouper.
- Four species had changes in their scientific names: Short tailed snake, Bluetail mole skink, Florida Keys mole skink, and Sand skink.

The Bryde's whale (Gulf of Mexico subspecies) was listed as Endangered by NMFS on May 15, 2019 and listed by FWC as Federally Endangered on February 9, 2021.

The Eastern black rail was listed as Threatened by the USFWS on November 9, 2020 with an additional rule under Section 4(d) of the Endangered Species Act. The Eastern black rail was listed by FWC as Federally Threatened on May 27, 2021.

The American burying beetle was reclassified from Endangered to Threatened by the USFWS on November 16, 2020 and listed by FWC as Federally Threatened on May 27, 2021.

Three mussels, Choctaw bean, round ebonyshell, and shinyrayed pocketbook, and the eastern indigo snake underwent changes to their scientific names on May 18, 2022. FWC adopted these federal standards on December 1, 2022.

The Panama City crayfish was listed as Threatened by the USFWS on February 4, 2022. The crayfish's status on Florida's Endangered and Threatened Species List was changed from SSC to FT after approval by the Commission on December 1, 2022.

The striped newt was determined to warrant state listing as Threatened and was added to Florida's Endangered and Threatened Species list after approval by the Commission on December 1, 2022. Species Conservation Measures and Permitting Guidelines, the Species Action Plan for the newt, and updates to the Imperiled Species Management Plan to incorporate the newt were also approved on December 1, 2022.

Appendix E

Environmental Review Documentation

Custom Soil Resource Report for Charlotte County, Florida, and Sarasota County, Florida

United States Department of Agriculture,
Natural Resources Conservation Service

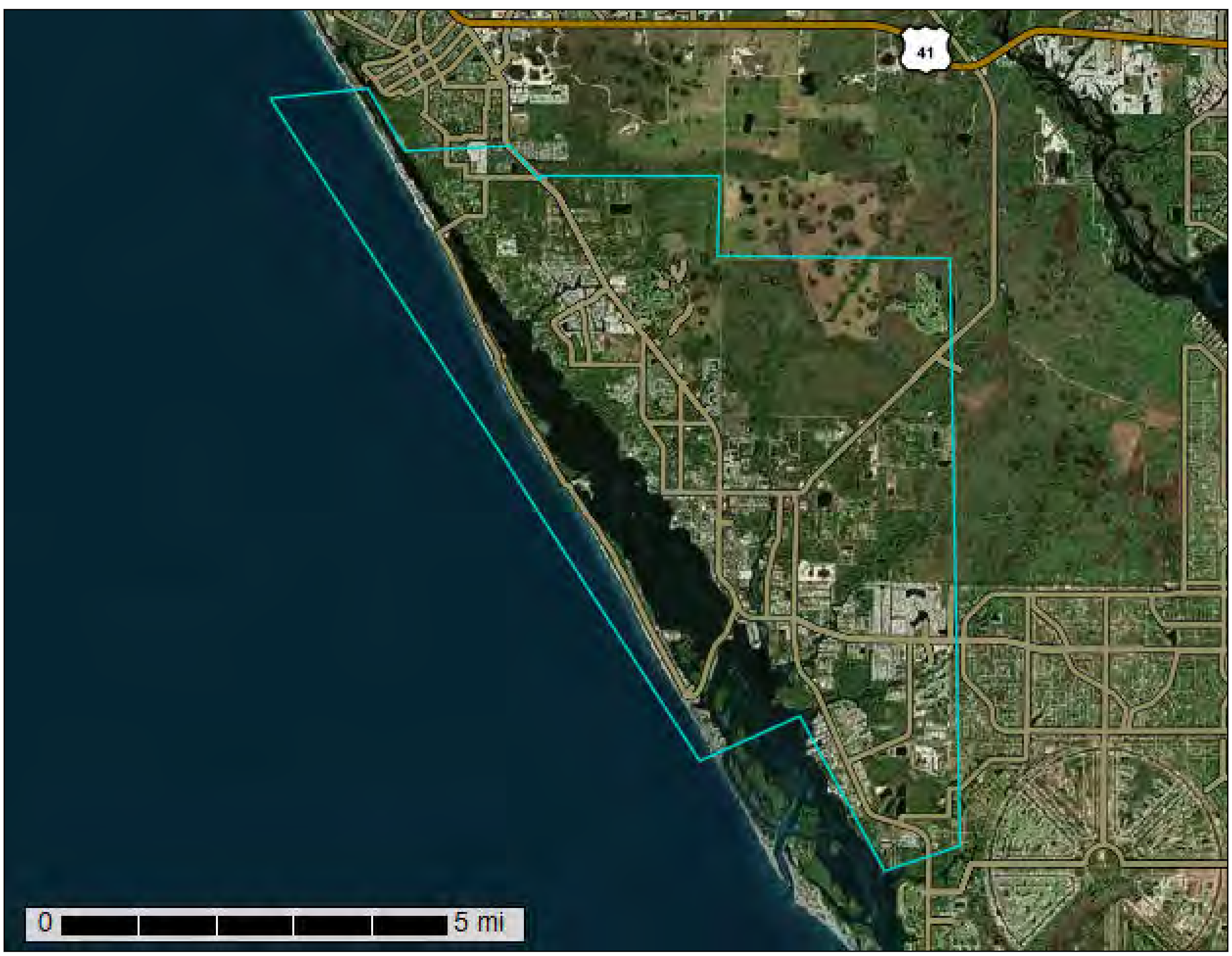
United States Department of Agriculture

NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for Charlotte County, Florida, and Sarasota County, Florida



September 3, 2023

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

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Contents

How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

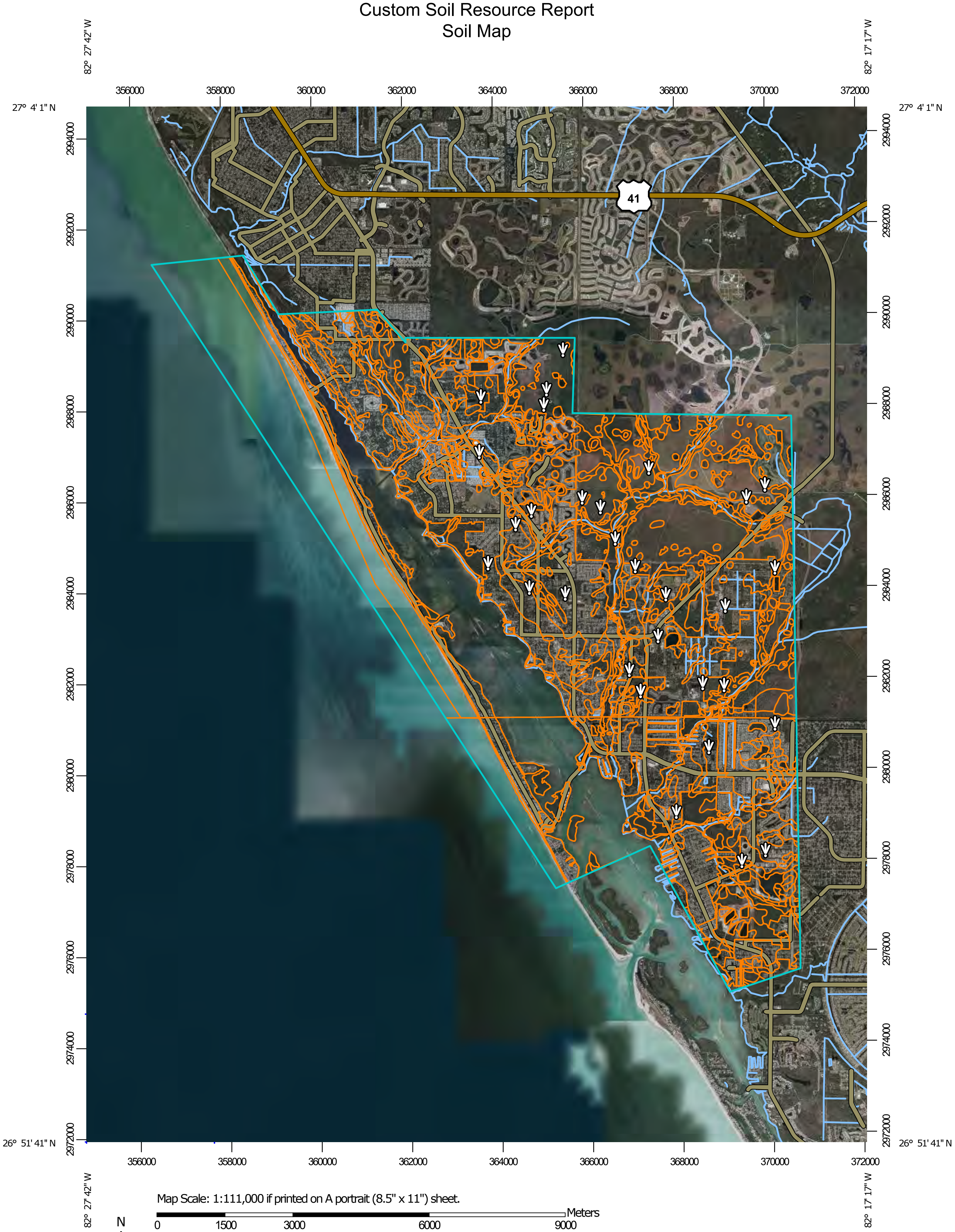
Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report
Soil Map



Map Scale: 1:111,000 if printed on A portrait (8.5" x 11") sheet.

N

Meters: 0, 1500, 3000, 6000, 9000

Feet: 0, 5000, 10000, 20000, 30000

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 17N WGS84

MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Map Unit Polygons

Soil Map Unit Lines

Soil Map Unit Points

Special Point Features

Blowout

Borrow Pit

Clay Spot

Closed Depression

Gravel Pit

Gravelly Spot

Landfill

Lava Flow

Marsh or swamp

Mine or Quarry

Miscellaneous Water

Perennial Water

Rock Outcrop

Saline Spot

Sandy Spot

Severely Eroded Spot

Sinkhole

Slide or Slip

Sodic Spot

Spoil Area

Stony Spot

Very Stony Spot

Wet Spot

Other

Special Line Features

Water Features

Streams and Canals

Transportation

Rails

Interstate Highways

US Routes

Major Roads

Local Roads

Background

Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at scales ranging from 1:20,000 to 1:24,000.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Charlotte County, Florida
Survey Area Data: Version 21, Sep 1, 2022

Soil Survey Area: Sarasota County, Florida
Survey Area Data: Version 20, Sep 2, 2022

Your area of interest (AOI) includes more than one soil survey area. These survey areas may have been mapped at different scales, with a different land use in mind, at different times, or at different levels of detail. This may result in map unit symbols, soil properties, and interpretations that do not completely agree across soil survey area boundaries.

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Dec 31, 2009—Nov 23, 2021

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background

MAP LEGEND	MAP INFORMATION
	imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
4	Canaveral fine sand-Urban land complex, 0 to 2 percent slopes	297.7	1.1%
6	Brynwood fine sand, wet, 0 to 2 percent slopes	9.9	0.0%
7	Matlacha gravelly fine sand-Urban land complex, 0 to 2 percent slopes	255.7	0.9%
11	Myakka fine sand, 0 to 2 percent slopes	265.9	1.0%
12	Felda fine sand, 0 to 2 percent slopes	5.6	0.0%
13	Cypress Lake fine sand, 0 to 2 percent slopes	14.9	0.1%
15	Estero muck, tidal, 0 to 1 percent slopes	32.6	0.1%
16	Peckish mucky fine sand, tidal, 0 to 1 percent slopes	9.3	0.0%
22	Beaches	36.9	0.1%
23	Wulfert muck, tidal, 0 to 1 percent slopes	87.7	0.3%
24	Kesson fine sand, tidal, 0 to 1 percent slopes	53.4	0.2%
27	Pompano fine sand, frequently ponded, 0 to 1 percent slopes	9.0	0.0%
28	Immokalee sand, 0 to 2 percent slopes	227.7	0.8%
29	Punta fine sand, 0 to 2 percent slopes	94.3	0.3%
35	Wabasso sand, 0 to 2 percent slopes	5.1	0.0%
36	Immokalee sand-Urban land complex, 0 to 2 percent slopes	854.6	3.1%
40	Anclote sand, frequently ponded, 0 to 1 percent slopes	40.1	0.1%
43	Smyrna fine sand, 0 to 2 percent slopes	113.2	0.4%
45	Copeland fine sandy loam, frequently ponded, 0 to 1 percent slopes	4.4	0.0%
48	St. Augustine sand, 0 to 2 percent slopes	8.2	0.0%
59	Urban land, 0 to 2 percent slopes	21.5	0.1%

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
64	Brynwood fine sand, wet-Urban land complex, 0 to 2 percent slopes	36.6	0.1%
67	Smyrna fine sand-Urban land complex, 0 to 2 percent slopes	634.9	2.3%
69	Matlacha gravelly fine sand, 0 to 2 percent slopes	3.9	0.0%
99	Water	89.3	0.3%
100	Waters of the Gulf of Mexico	2,010.8	7.3%
101	Anclote sand, ponded-Urban land complex, 0 to 1 percent slopes	13.1	0.0%
102	Cypress Lake fine sand-Urban land complex, 0 to 2 percent slopes	21.6	0.1%
105	Copeland fine sandy loam, ponded-Urban land complex, 0 to 1 percent slopes	14.5	0.1%
106	Daytona sand-Urban land complex, 0 to 5 percent slopes	16.0	0.1%
107	EauGallie sand-Urban land complex, 0 to 2 percent slopes	25.3	0.1%
110	Felda fine sand-Urban land complex, 0 to 2 percent slopes	21.0	0.1%
116	Isles fine sand, ponded-Urban land complex, 0 to 1 percent slopes	17.1	0.1%
118	Kesson fine sand, tidal-Urban land complex, 0 to 1 percent slopes	4.7	0.0%
123	Myakka fine sand-Urban land complex, 0 to 2 percent slopes	733.4	2.6%
124	Myakka fine sand, ponded-Urban land complex, 0 to 1 percent slopes	11.4	0.0%
125	Oldsmar sand-Urban land, 0 to 2 percent slopes	86.6	0.3%
127	Orsino fine sand-Urban land complex, 0 to 5 percent slopes	114.9	0.4%
131	Pompano fine sand-Urban land compex, 0 to 2 percent slopes	4.0	0.0%
133	Punta fine sand-Urban land complex, 0 to 2 percent slopes	333.3	1.2%

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
134	Satellite fine sand-Urban land complex, 0 to 2 percent slopes	30.0	0.1%
135	St. Augustine sand-Urban land complex, 0 to 2 percent slopes	50.5	0.2%
137	Wabasso sand-Urban land complex, 0 to 2 percent slopes	33.2	0.1%
138	Wabasso sand, limestone substratum-Urban land complex, 0 to 2 percent slopes	197.5	0.7%
Subtotals for Soil Survey Area		**6,951.2**	**25.1%**
Totals for Area of Interest		**27,705.8**	**100.0%**

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
2	Beaches	124.5	0.4%
3	Cypress Lake and Brynwood soils, 0 to 2 percent slopes	151.7	0.5%
4	Bradenton fine sand, 0 to 2 percent slopes	14.8	0.1%
6	Canaveral fine sand, 0 to 5 percent slopes	18.7	0.1%
7	Cassia fine sand, 0 to 2 percent slopes	75.4	0.3%
8	Delray fine sand, frequently ponded, 0 to 1 percent slopes	142.3	0.5%
10	EauGallie, Myakka fine sands and 0 to 2 percent slopes	3,777.3	13.6%
11	Felda, wet-Felda fine sand complex, 0 to 2 percent slopes	6.3	0.0%
12	Felda fine sand, frequently ponded, 0 to 1 percent slopes	8.5	0.0%
15	Floridana and Gator soils, frequently ponded, 0 to 1 percent slopes	13.4	0.0%
17	Gator-Gator, drained mucks, frequently ponded, 0 to 1 percent slopes	10.2	0.0%
21	Ft. Green fine sand, 0 to 2 percent slopes	2.5	0.0%
22	Holopaw fine sand, frequently ponded, 0 to 1 percent slopes	1,208.2	4.4%
24	Kesson, Wulfert mucks, Tidal and 0 to 1 percent slopes	60.4	0.2%
25	Malabar fine sand, 0 to 2 percent slopes	18.7	0.1%

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
26	Manatee loamy fine sand, frequently ponded, 0 to 1 percent slopes	114.9	0.4%
29	Orsino fine sand, 0 to 2 percent slopes	5.4	0.0%
30	Ona fine sand, 0 to 2 percent slopes	95.3	0.3%
31	Pineda-Pineda, wet, fine sand, 0 to 2 percent slopes	330.3	1.2%
32	Pits and Dumps	4.3	0.0%
33	Pomello fine sand, 0 to 2 percent slopes	4.6	0.0%
34	Pompano fine sand, ponded-Urban land complex, 0 to 1 percent slopes	4.6	0.0%
36	Pople fine sand, wet, 0 to 2 percent slopes	395.5	1.4%
38	Smyrna fine sand, 0 to 2 percent slopes	24.8	0.1%
39	St. Augustine fine sand-Urban land complex, 0 to 2 percent slopes	54.3	0.2%
50	Cypress Lake-Brynwood fine sands-Urban land complex, 0 to 2 percent slopes	147.7	0.5%
51	Bradenton fine sand-Urban land complex, 0 to 2 percent slopes	14.0	0.1%
52	Canaveral fine sand-Urban land complex, 0 to 5 percent slopes	363.6	1.3%
53	Cassia fine sand-Urban land complex, 0 to 2 percnet slopes	627.7	2.3%
54	Delray fine sand, ponded-Urban land complex, 0 to 1 percent slopes	30.0	0.1%
55	EauGallie-Myakka fine sands-Urban land complex, 0 to 2 percent slopes	5,054.6	18.2%
60	Floridana-Gator soils, ponded-Urban land complex, 0 to 1 percent slopes	17.1	0.1%
62	Gator-Gator, drained mucks, ponded-Urban land complex, 0 to 1 percent slopes	10.3	0.0%
63	Holopaw fine sand, ponded-Urban land complex, 0 to 1 percent slopes	902.8	3.3%
64	Kesson-Wulfert mucks, tidal-Urban land complex, 0 to 1 percent slopes	166.8	0.6%

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
65	Malabar fine sand-Urban land complex, 0 to 2 percent slopes	19.5	0.1%
66	Manatee loamy fine sand, ponded-Urban land complex, 0 to 1 percent slopes	49.7	0.2%
67	Ona fine sand-Urban land complex, 0 to 2 percent slopes	14.7	0.1%
68	Orsino fine sand-Urban land complex, 0 to 2 percent slopes	148.4	0.5%
69	Pineda fine sand-Urban land complex, 0 to 2 percent slopes	235.6	0.9%
70	Pomello fine sand-Urban land complex, 0 to 2 percent slopes	559.2	2.0%
71	Pople fine sand, wet-Urban land complex, 0 to 2 percent slopes	117.0	0.4%
72	Smyrna fine sand-Urban land complex, 0 to 2 percent slopes	75.9	0.3%
73	Tavares fine sand-Urban land complex, 0 to 5 percent slopes	70.4	0.3%
99	Water	2,419.0	8.7%
100	Waters of the Gulf of Mexico	873.0	3.2%
Subtotals for Soil Survey Area		**18,583.8**	**67.1%**
Totals for Area of Interest		**27,705.8**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Charlotte County, Florida

4—Canaveral fine sand-Urban land complex, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: 2x9d6
Elevation: 0 to 20 feet
Mean annual precipitation: 45 to 54 inches
Mean annual air temperature: 70 to 77 degrees F
Frost-free period: 360 to 365 days
Farmland classification: Not prime farmland

Map Unit Composition

Canaveral and similar soils: 50 percent
Urban land: 45 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Canaveral

Setting

Landform: Flats on marine terraces, ridges on marine terraces
Landform position (two-dimensional): Summit, backslope
Landform position (three-dimensional): Interfluve, tread, talf
Down-slope shape: Convex, concave
Across-slope shape: Linear
Parent material: Sandy marine deposits

Typical profile

A1 - 0 to 7 inches: fine sand
A2 - 7 to 15 inches: fine sand
C - 15 to 80 inches: paragravelly fine sand

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Very high (19.98 to 39.96 in/hr)
Depth to water table: About 18 to 42 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 4 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 5.0
Available water supply, 0 to 60 inches: Low (about 4.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: A
Forage suitability group: Forage suitability group not assigned (G155XB999FL)
Other vegetative classification: Forage suitability group not assigned (G155XB999FL)

Hydric soil rating: No

Minor Components

Captiva

Percent of map unit: 3 percent
Landform: Drainageways on marine terraces
Landform position (three-dimensional): Tread, dip
Down-slope shape: Linear
Across-slope shape: Concave
Other vegetative classification: Slough (R155XY011FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: Yes

Kesson, tidal

Percent of map unit: 2 percent
Landform: Tidal marshes on marine terraces
Landform position (three-dimensional): Tread, talf
Down-slope shape: Convex, linear
Across-slope shape: Linear
Other vegetative classification: Salt Marsh (R155XY009FL), Forage suitability group not assigned (G155XB999FL)
Hydric soil rating: Yes

6—Brynwood fine sand, wet, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: 2zlfc
Elevation: 0 to 70 feet
Mean annual precipitation: 46 to 56 inches
Mean annual air temperature: 70 to 77 degrees F
Frost-free period: 360 to 365 days
Farmland classification: Not prime farmland

Map Unit Composition

Brynwood and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Brynwood

Setting

Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Tread, talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Sandy marine deposits over limestone

Typical profile

A - 0 to 2 inches: fine sand
Eg - 2 to 7 inches: fine sand

Bw - 7 to 12 inches: fine sand
2R - 12 to 22 inches: bedrock

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: 2 to 20 inches to lithic bedrock
Drainage class: Poorly drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 5.95 in/hr)
Depth to water table: About 3 to 18 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water supply, 0 to 60 inches: Very low (about 0.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4w
Hydrologic Soil Group: B/D
Forage suitability group: Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Other vegetative classification: South Florida Flatwoods (R155XY003FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: Yes

Minor Components

Cypress lake

Percent of map unit: 6 percent
Landform: Drainageways on marine terraces, flats on marine terraces
Landform position (three-dimensional): Tread, dip, talf
Down-slope shape: Linear, convex
Across-slope shape: Concave, linear
Other vegetative classification: South Florida Flatwoods (R155XY003FL), Sandy over loamy soils on flats of hydric or mesic lowlands (G155XB241FL)
Hydric soil rating: Yes

Rock outcrop, misc

Percent of map unit: 5 percent
Hydric soil rating: No

Parkwood variant, mod. deep

Percent of map unit: 2 percent
Landform: Drainageways on marine terraces
Landform position (three-dimensional): Tread, dip
Down-slope shape: Linear
Across-slope shape: Concave
Other vegetative classification: Wetland Hardwood Hammock (R155XY012FL), Loamy and clayey soils on flats of hydric or mesic lowlands (G155XB341FL)
Hydric soil rating: No

Wabasso

Percent of map unit: 2 percent
Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Tread, talf

Down-slope shape: Linear, convex
Across-slope shape: Linear
Other vegetative classification: South Florida Flatwoods (R155XY003FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: No

7—Matlacha gravelly fine sand-Urban land complex, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: 2x9dc
Elevation: 0 to 30 feet
Mean annual precipitation: 45 to 54 inches
Mean annual air temperature: 70 to 77 degrees F
Frost-free period: 360 to 365 days
Farmland classification: Not prime farmland

Map Unit Composition

Matlacha and similar soils: 48 percent
Urban land: 42 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Matlacha

Setting

Landform: Flats on marine terraces
Landform position (three-dimensional): Tread, talf
Down-slope shape: Convex, linear
Across-slope shape: Linear
Parent material: Sandy mine spoil or earthy fill over sandy marine deposits

Typical profile

^C - 0 to 35 inches: gravelly fine sand
2Ab - 35 to 40 inches: fine sand
2Eb - 40 to 80 inches: fine sand

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat poorly drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)
Depth to water table: About 18 to 42 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 4 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0

Available water supply, 0 to 60 inches: Low (about 4.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: B
Forage suitability group: Forage suitability group not assigned (G155XB999FL)
Other vegetative classification: Forage suitability group not assigned (G155XB999FL)
Hydric soil rating: No

Description of Urban Land

Setting

Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Riser, talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: No parent material

Interpretive groups

Land capability classification (irrigated): None specified
Forage suitability group: Forage suitability group not assigned (G155XB999FL)
Other vegetative classification: Forage suitability group not assigned (G155XB999FL)
Hydric soil rating: Unranked

Minor Components

St. augustine

Percent of map unit: 5 percent
Landform: Marine terraces
Landform position (three-dimensional): Tread, rise
Down-slope shape: Linear
Across-slope shape: Convex
Other vegetative classification: Forage suitability group not assigned (G155XB999FL)
Hydric soil rating: No

Caloosa

Percent of map unit: 5 percent
Landform: Marine terraces
Landform position (three-dimensional): Tread, rise
Down-slope shape: Convex, linear
Across-slope shape: Convex, linear
Other vegetative classification: Forage suitability group not assigned (G155XB999FL)
Hydric soil rating: No

11—Myakka fine sand, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: 2s3lg
Elevation: 0 to 130 feet
Mean annual precipitation: 42 to 56 inches
Mean annual air temperature: 68 to 77 degrees F
Frost-free period: 350 to 365 days
Farmland classification: Farmland of unique importance

Map Unit Composition

Myakka and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Myakka

Setting

Landform: Drainageways on flatwoods on marine terraces
Landform position (three-dimensional): Tread, talf, dip
Down-slope shape: Linear
Across-slope shape: Linear, concave
Parent material: Sandy marine deposits

Typical profile

A - 0 to 6 inches: fine sand
E - 6 to 20 inches: fine sand
Bh - 20 to 36 inches: fine sand
C - 36 to 80 inches: fine sand

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 5.95 in/hr)
Depth to water table: About 6 to 18 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water supply, 0 to 60 inches: Low (about 5.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4w
Hydrologic Soil Group: A/D

Forage suitability group: Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Other vegetative classification: South Florida Flatwoods (R155XY003FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: No

Minor Components

Basinger

Percent of map unit: 5 percent
Landform: Depressions on marine terraces
Landform position (three-dimensional): Tread, dip
Down-slope shape: Linear, concave
Across-slope shape: Linear, concave
Other vegetative classification: Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: Yes

Wabasso

Percent of map unit: 4 percent
Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Tread, talf
Down-slope shape: Linear, convex
Across-slope shape: Linear
Other vegetative classification: South Florida Flatwoods (R155XY003FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: No

Cassia

Percent of map unit: 3 percent
Landform: Flatwoods on marine terraces, rises on marine terraces
Landform position (three-dimensional): Tread, talf
Down-slope shape: Convex
Across-slope shape: Linear
Other vegetative classification: Sand Pine Scrub (R155XY001FL), Sandy soils on rises and knolls of mesic uplands (G155XB131FL)
Hydric soil rating: No

Immokalee

Percent of map unit: 2 percent
Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Riser, talf
Down-slope shape: Linear
Across-slope shape: Linear
Other vegetative classification: South Florida Flatwoods (R155XY003FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: No

Satellite

Percent of map unit: 1 percent
Landform: Rises on marine terraces, flatwoods on marine terraces
Landform position (three-dimensional): Tread, rise, talf
Down-slope shape: Linear, convex
Across-slope shape: Linear
Other vegetative classification: Sand Pine Scrub (R155XY001FL), Sandy soils on rises and knolls of mesic uplands (G155XB131FL)
Hydric soil rating: No

12—Felda fine sand, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: 2tzvy
Elevation: 0 to 180 feet
Mean annual precipitation: 40 to 60 inches
Mean annual air temperature: 70 to 77 degrees F
Frost-free period: 350 to 365 days
Farmland classification: Not prime farmland

Map Unit Composition

Felda and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Felda

Setting

Landform: Flatwoods on marine terraces, drainageways on marine terraces
Landform position (three-dimensional): Tread, talf, dip
Down-slope shape: Linear
Across-slope shape: Linear, concave
Parent material: Sandy and loamy marine deposits

Typical profile

A - 0 to 4 inches: fine sand
Eg - 4 to 35 inches: fine sand
Btg - 35 to 43 inches: fine sandy loam
Cg - 43 to 80 inches: extremely paragravelly fine sand

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 6.00 in/hr)
Depth to water table: About 3 to 18 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 4 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water supply, 0 to 60 inches: Low (about 5.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: A/D

Forage suitability group: Sandy over loamy soils on flats of hydric or mesic lowlands (G155XB241FL)
Other vegetative classification: Slough (R155XY011FL), Sandy over loamy soils on flats of hydric or mesic lowlands (G155XB241FL)
Hydric soil rating: Yes

Minor Components

Wabasso

Percent of map unit: 6 percent
Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Tread, talf
Down-slope shape: Linear, convex
Across-slope shape: Linear
Other vegetative classification: South Florida Flatwoods (R155XY003FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: No

Oldsmar

Percent of map unit: 5 percent
Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Talf
Down-slope shape: Linear, convex
Across-slope shape: Linear
Other vegetative classification: South Florida Flatwoods (R155XY003FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: No

Valkaria

Percent of map unit: 4 percent
Landform: Drainageways on flatwoods on marine terraces
Landform position (three-dimensional): Tread, talf, dip
Down-slope shape: Linear
Across-slope shape: Linear, concave
Other vegetative classification: Slough (R155XY011FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: Yes

13—Cypress Lake fine sand, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: 2zlds
Elevation: 0 to 60 feet
Mean annual precipitation: 42 to 56 inches
Mean annual air temperature: 70 to 77 degrees F
Frost-free period: 350 to 365 days
Farmland classification: Not prime farmland

Map Unit Composition

Cypress lake and similar soils: 80 percent

Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Cypress Lake

Setting

Landform: Drainageways on marine terraces, flatwoods on marine terraces
Landform position (three-dimensional): Tread, dip, talf
Down-slope shape: Linear, convex
Across-slope shape: Linear, concave
Parent material: Sandy and loamy marine deposits over limestone

Typical profile

A - 0 to 3 inches: fine sand
E - 3 to 14 inches: fine sand
E/B - 14 to 25 inches: fine sand
Btg - 25 to 30 inches: fine sandy loam
2R - 30 to 40 inches: bedrock

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: 8 to 40 inches to lithic bedrock
Drainage class: Poorly drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: About 3 to 18 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 4 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water supply, 0 to 60 inches: Very low (about 2.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: A/D
Forage suitability group: Sandy over loamy soils on flats of hydric or mesic lowlands (G155XB241FL)
Other vegetative classification: South Florida Flatwoods (R155XY003FL), Sandy over loamy soils on flats of hydric or mesic lowlands (G155XB241FL)
Hydric soil rating: Yes

Minor Components

Brynwood

Percent of map unit: 8 percent
Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Tread, talf
Down-slope shape: Linear
Across-slope shape: Linear
Other vegetative classification: South Florida Flatwoods (R155XY003FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: Yes

Wabasso

Percent of map unit: 6 percent
Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Tread, talf
Down-slope shape: Linear, convex
Across-slope shape: Linear
Other vegetative classification: South Florida Flatwoods (R155XY003FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: No

Pineda

Percent of map unit: 4 percent
Landform: Drainageways on marine terraces, flats on marine terraces
Landform position (three-dimensional): Tread, dip, talf
Down-slope shape: Linear
Across-slope shape: Concave, linear
Other vegetative classification: Slough (R155XY011FL), Sandy over loamy soils on flats of hydric or mesic lowlands (G155XB241FL)
Hydric soil rating: Yes

Ft. drum

Percent of map unit: 2 percent
Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Tread, talf
Down-slope shape: Convex
Across-slope shape: Linear
Other vegetative classification: Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: No

15—Estero muck, tidal, 0 to 1 percent slopes

Map Unit Setting

National map unit symbol: 2x9ds
Elevation: 0 to 10 feet
Mean annual precipitation: 45 to 56 inches
Mean annual air temperature: 70 to 77 degrees F
Frost-free period: 355 to 365 days
Farmland classification: Not prime farmland

Map Unit Composition

Estero, tidal, and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Estero, Tidal

Setting

Landform: Tidal marshes on marine terraces
Landform position (three-dimensional): Tread, dip

Down-slope shape: Linear
Across-slope shape: Concave
Parent material: Thin herbaceous organic material over sandy marine deposits

Typical profile

Oan - 0 to 5 inches: muck
An - 5 to 13 inches: fine sand
En - 13 to 33 inches: fine sand
Bhn - 33 to 43 inches: fine sand
Bn - 43 to 55 inches: fine sand
Cn - 55 to 80 inches: fine sand

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Very poorly drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: Very frequent
Frequency of ponding: None
Maximum salinity: Moderately saline to strongly saline (8.0 to 24.0 mmhos/cm)
Sodium adsorption ratio, maximum: 50.0
Available water supply, 0 to 60 inches: Moderate (about 7.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8w
Hydrologic Soil Group: A/D
Forage suitability group: Forage suitability group not assigned (G155XB999FL)
Other vegetative classification: Salt Marsh (R155XY009FL), Forage suitability group not assigned (G155XB999FL)
Hydric soil rating: Yes

Minor Components

Brynwood, tidal

Percent of map unit: 4 percent
Landform: Tidal marshes on marine terraces
Landform position (three-dimensional): Tread, talf
Down-slope shape: Linear
Across-slope shape: Linear
Other vegetative classification: Salt Marsh (R155XY009FL), Forage suitability group not assigned (G155XB999FL)
Hydric soil rating: Yes

Canaveral

Percent of map unit: 2 percent
Landform: Flats on marine terraces, ridges on marine terraces
Landform position (two-dimensional): Summit, backslope
Landform position (three-dimensional): Interfluve, tread, talf
Down-slope shape: Concave, convex
Across-slope shape: Linear
Other vegetative classification: Forage suitability group not assigned (G155XB999FL)
Hydric soil rating: No

Wulfert, tidal

Percent of map unit: 2 percent
Landform: Tidal marshes on marine terraces
Landform position (three-dimensional): Tread, talf
Down-slope shape: Linear
Across-slope shape: Linear
Other vegetative classification: Salt Marsh (R155XY009FL), Forage suitability group not assigned (G155XB999FL)
Hydric soil rating: Yes

Kesson, tidal

Percent of map unit: 2 percent
Landform: Tidal marshes on marine terraces
Landform position (three-dimensional): Tread, talf
Down-slope shape: Convex, linear
Across-slope shape: Linear
Other vegetative classification: Salt Marsh (R155XY009FL), Forage suitability group not assigned (G155XB999FL)
Hydric soil rating: Yes

16—Peckish mucky fine sand, tidal, 0 to 1 percent slopes

Map Unit Setting

National map unit symbol: 2x9f5
Elevation: 0 to 10 feet
Mean annual precipitation: 45 to 55 inches
Mean annual air temperature: 70 to 77 degrees F
Frost-free period: 360 to 365 days
Farmland classification: Not prime farmland

Map Unit Composition

Peckish, tidal, and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Peckish, Tidal

Setting

Landform: Tidal flats on marine terraces
Landform position (three-dimensional): Tread, dip
Down-slope shape: Linear
Across-slope shape: Concave
Parent material: Sandy marine deposits

Typical profile

An - 0 to 9 inches: mucky fine sand
En - 9 to 36 inches: fine sand
Bhnz - 36 to 48 inches: fine sand
Cn - 48 to 80 inches: fine sand

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Very poorly drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 19.98 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: Very frequent
Frequency of ponding: None
Maximum salinity: Strongly saline (32.0 to 200.0 mmhos/cm)
Sodium adsorption ratio, maximum: 50.0
Available water supply, 0 to 60 inches: Low (about 5.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8w
Hydrologic Soil Group: A/D
Forage suitability group: Forage suitability group not assigned (G155XB999FL)
Other vegetative classification: Salt Marsh (R155XY009FL), Forage suitability group not assigned (G155XB999FL)
Hydric soil rating: Yes

Minor Components

Cypress lake, tidal

Percent of map unit: 5 percent
Landform: Tidal marshes on marine terraces
Landform position (three-dimensional): Tread, talf
Down-slope shape: Linear
Across-slope shape: Concave
Other vegetative classification: Salt Marsh (R155XY009FL), Forage suitability group not assigned (G155XB999FL)
Hydric soil rating: Yes

Brynwood, tidal

Percent of map unit: 5 percent
Landform: Tidal marshes on marine terraces
Landform position (three-dimensional): Tread, talf
Down-slope shape: Linear
Across-slope shape: Linear
Other vegetative classification: Salt Marsh (R155XY009FL), Forage suitability group not assigned (G155XB999FL)
Hydric soil rating: Yes

Estero, tidal

Percent of map unit: 5 percent
Landform: Tidal marshes on marine terraces
Landform position (three-dimensional): Tread, dip
Down-slope shape: Linear
Across-slope shape: Concave
Other vegetative classification: Salt Marsh (R155XY009FL), Forage suitability group not assigned (G155XB999FL)
Hydric soil rating: Yes

22—Beaches

Map Unit Setting

National map unit symbol: 1ksf6
Elevation: 0 to 20 feet
Mean annual precipitation: 42 to 54 inches
Mean annual air temperature: 52 to 77 degrees F
Frost-free period: 190 to 365 days
Farmland classification: Not prime farmland

Map Unit Composition

Beaches: 95 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Beaches

Setting

Landform: Beaches on marine terraces
Landform position (three-dimensional): Rise
Down-slope shape: Convex
Across-slope shape: Linear

Properties and qualities

Slope: 1 to 3 percent
Drainage class: Poorly drained
Runoff class: Very high
Depth to water table: About 0 to 72 inches
Frequency of flooding: Very frequent

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8
Forage suitability group: Forage suitability group not assigned (G155XB999FL)
Other vegetative classification: Forage suitability group not assigned (G155XB999FL)
Hydric soil rating: Unranked

Minor Components

Canaveral

Percent of map unit: 5 percent
Landform: Flats on marine terraces, ridges on marine terraces
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Linear
Other vegetative classification: Forage suitability group not assigned (G155XB999FL)
Hydric soil rating: No

23—Wulfert muck, tidal, 0 to 1 percent slopes

Map Unit Setting

National map unit symbol: 2x9d2
Elevation: 0 to 10 feet
Mean annual precipitation: 45 to 54 inches
Mean annual air temperature: 70 to 77 degrees F
Frost-free period: 360 to 365 days
Farmland classification: Not prime farmland

Map Unit Composition

Wulfert, tidal, and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Wulfert, Tidal

Setting

Landform: Tidal marshes on marine terraces
Landform position (three-dimensional): Tread, talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Herbaceous organic material over sandy marine deposits

Typical profile

Oan1 - 0 to 12 inches: muck
Oan2 - 12 to 36 inches: muck
Cn - 36 to 80 inches: fine sand

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Very poorly drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 19.98 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: Very frequent
Frequency of ponding: None
Maximum salinity: Slightly saline to strongly saline (4.0 to 24.0 mmhos/cm)
Sodium adsorption ratio, maximum: 50.0
Available water supply, 0 to 60 inches: Very high (about 15.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8w
Hydrologic Soil Group: A/D
Forage suitability group: Forage suitability group not assigned (G155XB999FL)
Other vegetative classification: Salt Marsh (R155XY009FL), Forage suitability group not assigned (G155XB999FL)

Hydric soil rating: Yes

Minor Components

Kesson, tidal

Percent of map unit: 10 percent
Landform: Tidal marshes on marine terraces
Landform position (three-dimensional): Tread, talf
Down-slope shape: Convex, linear
Across-slope shape: Linear
Other vegetative classification: Salt Marsh (R155XY009FL), Forage suitability group not assigned (G155XB999FL)
Hydric soil rating: Yes

24—Kesson fine sand, tidal, 0 to 1 percent slopes

Map Unit Setting

National map unit symbol: 2x9d0
Elevation: 0 to 10 feet
Mean annual precipitation: 45 to 54 inches
Mean annual air temperature: 70 to 77 degrees F
Frost-free period: 360 to 365 days
Farmland classification: Not prime farmland

Map Unit Composition

Kesson, tidal, and similar soils: 88 percent
Minor components: 12 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Kesson, Tidal

Setting

Landform: Tidal marshes on marine terraces
Landform position (three-dimensional): Tread, talf
Down-slope shape: Convex, linear
Across-slope shape: Linear
Parent material: Sandy marine deposits

Typical profile

Akn - 0 to 6 inches: fine sand
Ckn1 - 6 to 23 inches: fine sand
Ckn2 - 23 to 38 inches: fine sand
Ckn3 - 38 to 80 inches: fine sand

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Very poorly drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): High to very high (1.98 to 19.98 in/hr)

Depth to water table: About 0 inches
Frequency of flooding: Very frequent
Frequency of ponding: None
Calcium carbonate, maximum content: 4 percent
Maximum salinity: Moderately saline to strongly saline (8.0 to 24.0 mmhos/cm)
Sodium adsorption ratio, maximum: 50.0
Available water supply, 0 to 60 inches: Low (about 4.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8w
Hydrologic Soil Group: A/D
Forage suitability group: Forage suitability group not assigned (G155XB999FL)
Other vegetative classification: Salt Marsh (R155XY009FL), Forage suitability group not assigned (G155XB999FL)
Hydric soil rating: Yes

Minor Components

Wulfert, tidal

Percent of map unit: 6 percent
Landform: Tidal marshes on marine terraces
Landform position (three-dimensional): Tread, talf
Down-slope shape: Linear
Across-slope shape: Linear
Other vegetative classification: Salt Marsh (R155XY009FL), Forage suitability group not assigned (G155XB999FL)
Hydric soil rating: Yes

Captiva, tidal

Percent of map unit: 6 percent
Landform: Tidal marshes on marine terraces
Landform position (three-dimensional): Tread, talf
Down-slope shape: Linear
Across-slope shape: Concave
Other vegetative classification: Slough (R155XY011FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: Yes

27—Pompano fine sand, frequently ponded, 0 to 1 percent slopes

Map Unit Setting

National map unit symbol: 2sm5f
Elevation: 0 to 160 feet
Mean annual precipitation: 38 to 64 inches
Mean annual air temperature: 68 to 77 degrees F
Frost-free period: 340 to 365 days
Farmland classification: Not prime farmland

Map Unit Composition

Pompano and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Pompano

Setting

Landform: Depressions on marine terraces
Landform position (three-dimensional): Tread, dip
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Sandy marine deposits

Typical profile

A - 0 to 12 inches: fine sand
C - 12 to 80 inches: fine sand

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Very poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 19.98 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: None
Frequency of ponding: Frequent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water supply, 0 to 60 inches: Low (about 4.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7w
Hydrologic Soil Group: A/D
Forage suitability group: Sandy soils on stream terraces, flood plains, or in depressions (G155XB145FL)
Other vegetative classification: Freshwater Marshes and Ponds (R155XY010FL), Sandy soils on stream terraces, flood plains, or in depressions (G155XB145FL)
Hydric soil rating: Yes

Minor Components

Basinger

Percent of map unit: 3 percent
Landform: Depressions on marine terraces
Landform position (three-dimensional): Tread, dip
Down-slope shape: Concave, linear
Across-slope shape: Concave, linear
Other vegetative classification: Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: Yes

Malabar

Percent of map unit: 2 percent
Landform: Depressions on marine terraces
Landform position (three-dimensional): Tread, dip
Down-slope shape: Linear, concave
Across-slope shape: Linear, concave
Other vegetative classification: Freshwater Marshes and Ponds (R155XY010FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: Yes

Myakka

Percent of map unit: 2 percent
Landform: Depressions on marine terraces
Landform position (three-dimensional): Tread, dip
Down-slope shape: Linear, concave
Across-slope shape: Linear, concave
Other vegetative classification: Freshwater Marshes and Ponds (R155XY010FL), Sandy soils on stream terraces, flood plains, or in depressions (G155XB145FL)
Hydric soil rating: Yes

Placid

Percent of map unit: 1 percent
Landform: Drainageways on marine terraces, depressions on marine terraces
Landform position (three-dimensional): Tread, dip
Down-slope shape: Concave
Across-slope shape: Concave
Other vegetative classification: Freshwater Marshes and Ponds (R155XY010FL), Sandy soils on stream terraces, flood plains, or in depressions (G155XB145FL)
Hydric soil rating: Yes

Adamsville

Percent of map unit: 1 percent
Landform: Knolls on marine terraces, rises on marine terraces
Landform position (three-dimensional): Tread, rise
Down-slope shape: Convex
Across-slope shape: Linear
Other vegetative classification: Upland Hardwood Hammock (R155XY008FL), Sandy soils on rises and knolls of mesic uplands (G155XB131FL)
Hydric soil rating: No

Anclote

Percent of map unit: 1 percent
Landform: Depressions on marine terraces
Landform position (three-dimensional): Tread, dip
Down-slope shape: Convex, concave
Across-slope shape: Linear, concave
Other vegetative classification: Sandy soils on stream terraces, flood plains, or in depressions (G155XB145FL)
Hydric soil rating: Yes

28—Immokalee sand, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: 2s3ll
Elevation: 0 to 150 feet
Mean annual precipitation: 42 to 57 inches
Mean annual air temperature: 70 to 77 degrees F
Frost-free period: 350 to 365 days
Farmland classification: Farmland of unique importance

Map Unit Composition

Immokalee and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Immokalee

Setting

Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Talf
Down-slope shape: Linear, convex
Across-slope shape: Linear
Parent material: Sandy marine deposits

Typical profile

A - 0 to 9 inches: sand
E - 9 to 36 inches: sand
Bh - 36 to 55 inches: sand
C - 55 to 80 inches: sand

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: About 6 to 18 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water supply, 0 to 60 inches: Very low (about 3.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4w
Hydrologic Soil Group: B/D
Forage suitability group: Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)

Other vegetative classification: South Florida Flatwoods (R155XY003FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: No

Minor Components

Valkaria

Percent of map unit: 5 percent
Landform: Drainageways on flatwoods on marine terraces
Landform position (three-dimensional): Tread, talf, dip
Down-slope shape: Linear
Across-slope shape: Linear, concave
Other vegetative classification: Slough (R155XY011FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: Yes

Oldsmar

Percent of map unit: 4 percent
Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Talf
Down-slope shape: Linear, convex
Across-slope shape: Linear
Other vegetative classification: South Florida Flatwoods (R155XY003FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: No

Pomello

Percent of map unit: 3 percent
Landform: Knolls on marine terraces, ridges on marine terraces
Landform position (two-dimensional): Summit, backslope
Landform position (three-dimensional): Side slope, interfluve, riser
Down-slope shape: Linear, convex
Across-slope shape: Linear
Other vegetative classification: Sand Pine Scrub (R155XY001FL), Sandy soils on rises and knolls of mesic uplands (G155XB131FL)
Hydric soil rating: No

Satellite

Percent of map unit: 2 percent
Landform: Drainageways on flatwoods on marine terraces
Landform position (three-dimensional): Tread, talf, dip
Down-slope shape: Linear
Across-slope shape: Linear, concave
Other vegetative classification: Sand Pine Scrub (R155XY001FL), Sandy soils on rises and knolls of mesic uplands (G155XB131FL)
Hydric soil rating: No

Felda

Percent of map unit: 1 percent
Landform: Flatwoods on marine terraces, drainageways on marine terraces
Landform position (three-dimensional): Tread, talf, dip
Down-slope shape: Linear
Across-slope shape: Linear, concave
Other vegetative classification: Slough (R155XY011FL), Sandy over loamy soils on flats of hydric or mesic lowlands (G155XB241FL)
Hydric soil rating: Yes

29—Punta fine sand, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: 2x9f7
Elevation: 0 to 70 feet
Mean annual precipitation: 45 to 54 inches
Mean annual air temperature: 70 to 77 degrees F
Frost-free period: 360 to 365 days
Farmland classification: Not prime farmland

Map Unit Composition

Punta and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Punta

Setting

Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Tread, talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Sandy marine deposits

Typical profile

A - 0 to 4 inches: fine sand
E - 4 to 57 inches: fine sand
Bh - 57 to 80 inches: fine sand

Properties and qualities

Slope: 1 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: About 6 to 18 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water supply, 0 to 60 inches: Low (about 5.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4w
Hydrologic Soil Group: A/D
Forage suitability group: Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)

Other vegetative classification: South Florida Flatwoods (R155XY003FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: No

Minor Components

Immokalee

Percent of map unit: 5 percent
Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Riser, talf
Down-slope shape: Linear
Across-slope shape: Linear
Other vegetative classification: South Florida Flatwoods (R155XY003FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: No

Satellite

Percent of map unit: 3 percent
Landform: Rises on marine terraces, flatwoods on marine terraces
Landform position (three-dimensional): Tread, rise, talf
Down-slope shape: Linear, convex
Across-slope shape: Linear
Other vegetative classification: Sand Pine Scrub (R155XY001FL), Sandy soils on rises and knolls of mesic uplands (G155XB131FL)
Hydric soil rating: No

Myakka

Percent of map unit: 2 percent
Landform: Drainageways on flatwoods on marine terraces
Landform position (three-dimensional): Tread, talf, dip
Down-slope shape: Linear
Across-slope shape: Linear, concave
Other vegetative classification: South Florida Flatwoods (R155XY003FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: No

35—Wabasso sand, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: 2svyr
Elevation: 0 to 70 feet
Mean annual precipitation: 46 to 55 inches
Mean annual air temperature: 70 to 77 degrees F
Frost-free period: 355 to 365 days
Farmland classification: Farmland of unique importance

Map Unit Composition

Wabasso and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Wabasso

Setting

Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Tread, talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Sandy and loamy marine deposits

Typical profile

A - 0 to 6 inches: sand
E - 6 to 25 inches: sand
Bh - 25 to 30 inches: sand
Btg - 30 to 58 inches: sandy clay loam
Cg - 58 to 80 inches: loamy sand

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: 9 to 50 inches to strongly contrasting textural stratification
Drainage class: Poorly drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 6 to 18 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 5 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water supply, 0 to 60 inches: Very low (about 1.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: C/D
Forage suitability group: Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Other vegetative classification: South Florida Flatwoods (R155XY003FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: No

Minor Components

Brynwood

Percent of map unit: 6 percent
Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Tread, talf
Down-slope shape: Linear
Across-slope shape: Linear
Other vegetative classification: South Florida Flatwoods (R155XY003FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: Yes

Cypress lake

Percent of map unit: 5 percent

Landform: Drainageways on marine terraces, flats on marine terraces
Landform position (three-dimensional): Tread, dip, talf
Down-slope shape: Linear, convex
Across-slope shape: Concave, linear
Other vegetative classification: South Florida Flatwoods (R155XY003FL), Sandy over loamy soils on flats of hydric or mesic lowlands (G155XB241FL)
Hydric soil rating: Yes

Pineda

Percent of map unit: 4 percent
Landform: Flats on marine terraces, drainageways on marine terraces
Landform position (three-dimensional): Tread, talf, dip
Down-slope shape: Linear
Across-slope shape: Linear, concave
Other vegetative classification: Slough (R155XY011FL), Sandy over loamy soils on flats of hydric or mesic lowlands (G155XB241FL)
Hydric soil rating: Yes

36—Immokalee sand-Urban land complex, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: 2x9c1
Elevation: 0 to 150 feet
Mean annual precipitation: 42 to 68 inches
Mean annual air temperature: 70 to 77 degrees F
Frost-free period: 355 to 365 days
Farmland classification: Not prime farmland

Map Unit Composition

Immokalee and similar soils: 43 percent
Urban land: 35 percent
Minor components: 22 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Immokalee

Setting

Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Riser, talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Sandy marine deposits

Typical profile

A - 0 to 9 inches: sand
E - 9 to 36 inches: sand
Bh - 36 to 55 inches: sand
C - 55 to 80 inches: sand

Properties and qualities

Slope: 0 to 2 percent

Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: About 6 to 18 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water supply, 0 to 60 inches: Very low (about 3.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4w
Hydrologic Soil Group: B/D
Forage suitability group: Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Other vegetative classification: South Florida Flatwoods (R155XY003FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: No

Description of Urban Land

Setting

Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Riser, talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: No parent material

Interpretive groups

Land capability classification (irrigated): None specified
Forage suitability group: Forage suitability group not assigned (G155XB999FL)
Other vegetative classification: Forage suitability group not assigned (G155XB999FL)
Hydric soil rating: Unranked

Minor Components

Basinger

Percent of map unit: 5 percent
Landform: Depressions on marine terraces
Landform position (three-dimensional): Tread, dip
Down-slope shape: Concave, linear
Across-slope shape: Concave, linear
Other vegetative classification: Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: Yes

Pomello

Percent of map unit: 4 percent
Landform: Knolls on marine terraces, ridges on marine terraces
Landform position (two-dimensional): Summit, backslope
Landform position (three-dimensional): Side slope, interfluve, riser
Down-slope shape: Convex
Across-slope shape: Linear

Other vegetative classification: Sand Pine Scrub (R155XY001FL), Sandy soils on rises and knolls of mesic uplands (G155XB131FL)
Hydric soil rating: No

Oldsmar

Percent of map unit: 4 percent
Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Talf
Down-slope shape: Convex
Across-slope shape: Linear
Other vegetative classification: South Florida Flatwoods (R155XY003FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: No

Satellite

Percent of map unit: 2 percent
Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Tread, talf
Down-slope shape: Linear
Across-slope shape: Linear
Other vegetative classification: Sand Pine Scrub (R155XY001FL), Sandy soils on rises and knolls of mesic uplands (G155XB131FL)
Hydric soil rating: No

Felda

Percent of map unit: 2 percent
Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Tread, talf
Down-slope shape: Linear
Across-slope shape: Linear
Other vegetative classification: Slough (R155XY011FL), Sandy over loamy soils on flats of hydric or mesic lowlands (G155XB241FL)
Hydric soil rating: Yes

Immokalee

Percent of map unit: 2 percent
Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Riser, talf
Down-slope shape: Linear
Across-slope shape: Linear
Other vegetative classification: South Florida Flatwoods (R155XY003FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: No

Brynwood

Percent of map unit: 2 percent
Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Tread, talf
Down-slope shape: Linear
Across-slope shape: Linear
Other vegetative classification: South Florida Flatwoods (R155XY003FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: Yes

Jenada

Percent of map unit: 1 percent
Landform: Flats on marine terraces

Landform position (three-dimensional): Tread, dip
Down-slope shape: Linear
Across-slope shape: Concave, linear
Other vegetative classification: Slough (R155XY011FL), Sandy soils on stream terraces, flood plains, or in depressions (G155XB145FL)
Hydric soil rating: Yes

40—Anclote sand, frequently ponded, 0 to 1 percent slopes

Map Unit Setting

National map unit symbol: 2svzj
Elevation: 0 to 130 feet
Mean annual precipitation: 46 to 58 inches
Mean annual air temperature: 68 to 77 degrees F
Frost-free period: 350 to 365 days
Farmland classification: Not prime farmland

Map Unit Composition

Anclote and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Anclote

Setting

Landform: Depressions on marine terraces
Landform position (three-dimensional): Tread, dip
Down-slope shape: Convex, concave
Across-slope shape: Linear, concave
Parent material: Sandy marine deposits

Typical profile

A1 - 0 to 8 inches: sand
A2 - 8 to 22 inches: sand
Cg1 - 22 to 40 inches: sand
Cg2 - 40 to 80 inches: sand

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Very poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): High to very high (6.00 to 20.00 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: None
Frequency of ponding: Frequent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0

Available water supply, 0 to 60 inches: Very low (about 2.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7w
Hydrologic Soil Group: A/D
Forage suitability group: Sandy soils on stream terraces, flood plains, or in depressions (G155XB145FL)
Other vegetative classification: Freshwater Marshes and Ponds (R155XY010FL), Sandy soils on stream terraces, flood plains, or in depressions (G155XB145FL)
Hydric soil rating: Yes

Minor Components

Floridana

Percent of map unit: 5 percent
Landform: Depressions on marine terraces
Landform position (three-dimensional): Tread, dip
Down-slope shape: Linear, concave
Across-slope shape: Linear, concave
Other vegetative classification: Freshwater Marshes and Ponds (R155XY010FL), Sandy over loamy soils on stream terraces, flood plains, or in depressions (G155XB245FL)
Hydric soil rating: Yes

Terra ceia

Percent of map unit: 4 percent
Landform: Depressions on marine terraces
Landform position (three-dimensional): Tread, dip
Down-slope shape: Convex, concave
Across-slope shape: Linear, concave
Other vegetative classification: Freshwater Marshes and Ponds (R155XY010FL), Organic soils in depressions and on flood plains (G155XB645FL)
Hydric soil rating: Yes

Riviera

Percent of map unit: 3 percent
Landform: Flats on marine terraces, drainageways on marine terraces
Landform position (three-dimensional): Tread, talf, dip
Down-slope shape: Linear
Across-slope shape: Concave, linear
Other vegetative classification: Slough (R155XY011FL), Sandy over loamy soils on flats of hydric or mesic lowlands (G155XB241FL)
Hydric soil rating: Yes

Tomoka

Percent of map unit: 3 percent
Landform: Depressions on marine terraces
Landform position (three-dimensional): Talf, dip
Down-slope shape: Concave
Across-slope shape: Concave
Other vegetative classification: Freshwater Marshes and Ponds (R155XY010FL), Organic soils in depressions and on flood plains (G155XB645FL)
Hydric soil rating: Yes

43—Smyrna fine sand, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: 2svzh
Elevation: 0 to 130 feet
Mean annual precipitation: 38 to 63 inches
Mean annual air temperature: 68 to 77 degrees F
Frost-free period: 300 to 365 days
Farmland classification: Farmland of unique importance

Map Unit Composition

Smyrna and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Smyrna

Setting

Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Tread, talf
Down-slope shape: Linear, convex
Across-slope shape: Linear
Parent material: Sandy marine deposits

Typical profile

A - 0 to 4 inches: fine sand
E - 4 to 13 inches: fine sand
Bh - 13 to 18 inches: fine sand
C/Bw - 18 to 49 inches: fine sand
C - 49 to 80 inches: fine sand

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 6.00 in/hr)
Depth to water table: About 6 to 18 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water supply, 0 to 60 inches: Low (about 5.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4w
Hydrologic Soil Group: A/D

Forage suitability group: Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Other vegetative classification: South Florida Flatwoods (R155XY003FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: No

Minor Components

Eaugallie

Percent of map unit: 5 percent
Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Tread, talf
Down-slope shape: Convex
Across-slope shape: Linear
Other vegetative classification: South Florida Flatwoods (R155XY003FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: No

Basinger

Percent of map unit: 4 percent
Landform: Depressions on marine terraces
Landform position (three-dimensional): Tread, dip
Down-slope shape: Concave, linear
Across-slope shape: Concave, linear
Other vegetative classification: Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: Yes

Placid

Percent of map unit: 2 percent
Landform: Drainageways on marine terraces, depressions on marine terraces
Landform position (three-dimensional): Tread, dip
Down-slope shape: Concave
Across-slope shape: Concave
Other vegetative classification: Freshwater Marshes and Ponds (R155XY010FL), Sandy soils on stream terraces, flood plains, or in depressions (G155XB145FL)
Hydric soil rating: Yes

Immokalee

Percent of map unit: 2 percent
Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Riser, talf
Down-slope shape: Linear
Across-slope shape: Linear
Other vegetative classification: South Florida Flatwoods (R155XY003FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: No

Pomello

Percent of map unit: 2 percent
Landform: Knolls on marine terraces, ridges on marine terraces
Landform position (two-dimensional): Summit, backslope
Landform position (three-dimensional): Side slope, interfluve, riser
Down-slope shape: Convex, linear
Across-slope shape: Linear

Other vegetative classification: Sand Pine Scrub (R155XY001FL), Sandy soils on rises and knolls of mesic uplands (G155XB131FL)
Hydric soil rating: No

45—Copeland fine sandy loam, frequently ponded, 0 to 1 percent slopes

Map Unit Setting

National map unit symbol: 2x9dj
Elevation: 0 to 150 feet
Mean annual precipitation: 45 to 63 inches
Mean annual air temperature: 68 to 77 degrees F
Frost-free period: 350 to 365 days
Farmland classification: Not prime farmland

Map Unit Composition

Copeland and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Copeland

Setting

Landform: Depressions on marine terraces
Landform position (three-dimensional): Tread, dip
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Sandy and loamy marine deposits over limestone

Typical profile

A1 - 0 to 8 inches: fine sandy loam
A2 - 8 to 20 inches: fine sandy loam
Btkg - 20 to 28 inches: sandy clay loam
2R - 28 to 38 inches: bedrock

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Drainage class: Very poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: None
Frequency of ponding: Frequent
Calcium carbonate, maximum content: 40 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water supply, 0 to 60 inches: Low (about 3.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 7w
Hydrologic Soil Group: D
Forage suitability group: Loamy and clayey soils on stream terraces, flood plains, or in depressions (G155XB345FL)
Other vegetative classification: Freshwater Marshes and Ponds (R155XY010FL), Loamy and clayey soils on stream terraces, flood plains, or in depressions (G155XB345FL)
Hydric soil rating: Yes

Minor Components

Felda

Percent of map unit: 4 percent
Landform: Depressions on marine terraces, flats on marine terraces
Landform position (three-dimensional): Tread, dip, talf
Down-slope shape: Linear
Across-slope shape: Linear, concave
Other vegetative classification: Freshwater Marshes and Ponds (R155XY010FL), Sandy over loamy soils on stream terraces, flood plains, or in depressions (G155XB245FL)
Hydric soil rating: Yes

Anclote

Percent of map unit: 3 percent
Landform: Depressions on marine terraces
Landform position (three-dimensional): Tread, dip
Down-slope shape: Convex, concave
Across-slope shape: Linear, concave
Other vegetative classification: Sandy soils on stream terraces, flood plains, or in depressions (G155XB145FL)
Hydric soil rating: Yes

Pompano

Percent of map unit: 3 percent
Landform: Drainageways on marine terraces, flats on marine terraces
Landform position (three-dimensional): Tread, dip
Down-slope shape: Linear
Across-slope shape: Concave, linear
Other vegetative classification: Slough (R155XY011FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: Yes

48—St. Augustine sand, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: 2x9dd
Elevation: 0 to 30 feet
Mean annual precipitation: 45 to 70 inches
Mean annual air temperature: 70 to 77 degrees F
Frost-free period: 360 to 365 days

Farmland classification: Not prime farmland

Map Unit Composition

St. augustine and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of St. Augustine

Setting

Landform: Marine terraces
Landform position (three-dimensional): Tread, rise
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Sandy mine spoil or earthy fill over sandy marine deposits

Typical profile

^C - 0 to 30 inches: paragravelly sand
2Ab - 30 to 40 inches: paragravelly fine sand
2Cb - 40 to 80 inches: paragravelly fine sand

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat poorly drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 19.98 in/hr)
Depth to water table: About 18 to 42 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 4 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water supply, 0 to 60 inches: Low (about 3.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: A
Forage suitability group: Forage suitability group not assigned (G155XB999FL)
Other vegetative classification: Forage suitability group not assigned (G155XB999FL)
Hydric soil rating: No

Minor Components

Matlacha

Percent of map unit: 4 percent
Landform: Flats on marine terraces
Landform position (three-dimensional): Tread, talf
Down-slope shape: Convex, linear
Across-slope shape: Linear
Other vegetative classification: Forage suitability group not assigned (G155XB999FL)
Hydric soil rating: No

St. augustine, organic substratum

Percent of map unit: 2 percent
Landform: Marine terraces
Landform position (three-dimensional): Tread, dip
Down-slope shape: Convex
Across-slope shape: Linear
Other vegetative classification: Forage suitability group not assigned (G155XB999FL)
Hydric soil rating: No

Samsula

Percent of map unit: 2 percent
Landform: Depressions on marine terraces
Landform position (three-dimensional): Tread, dip
Down-slope shape: Concave
Across-slope shape: Concave
Other vegetative classification: Freshwater Marshes and Ponds (R155XY010FL), Organic soils in depressions and on flood plains (G155XB645FL)
Hydric soil rating: Yes

Basinger

Percent of map unit: 1 percent
Landform: Depressions on marine terraces
Landform position (three-dimensional): Tread, dip
Down-slope shape: Concave, linear
Across-slope shape: Concave, linear
Other vegetative classification: Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: Yes

Canaveral

Percent of map unit: 1 percent
Landform: Ridges on marine terraces, flats on marine terraces
Landform position (two-dimensional): Summit, backslope
Landform position (three-dimensional): Interfluve, tread, talf
Down-slope shape: Convex, concave
Across-slope shape: Linear
Other vegetative classification: Forage suitability group not assigned (G155XB999FL)
Hydric soil rating: No

59—Urban land, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: 2x9fc
Elevation: 0 to 200 feet
Mean annual precipitation: 40 to 68 inches
Mean annual air temperature: 68 to 79 degrees F
Frost-free period: 345 to 365 days
Farmland classification: Not prime farmland

Map Unit Composition

Urban land: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Urban Land

Setting

Landform: Flatwoods on marine terraces, rises on marine terraces, knolls on marine terraces, ridges on marine terraces, hills on marine terraces
Landform position (two-dimensional): Summit, backslope
Landform position (three-dimensional): Side slope, interfluve, riser, talf, rise
Down-slope shape: Linear, convex
Across-slope shape: Linear
Parent material: No parent material

Interpretive groups

Land capability classification (irrigated): None specified
Forage suitability group: Forage suitability group not assigned (G155XB999FL)
Other vegetative classification: Forage suitability group not assigned (G155XB999FL)
Hydric soil rating: Unranked

Minor Components

Matlacha

Percent of map unit: 3 percent
Landform: Flats on marine terraces
Landform position (three-dimensional): Tread, talf
Down-slope shape: Convex, linear
Across-slope shape: Linear
Other vegetative classification: Forage suitability group not assigned (G155XB999FL)
Hydric soil rating: No

St. augustine

Percent of map unit: 3 percent
Landform: Marine terraces
Landform position (three-dimensional): Tread, rise
Down-slope shape: Linear
Across-slope shape: Convex
Other vegetative classification: Forage suitability group not assigned (G155XB999FL)
Hydric soil rating: No

Apopka

Percent of map unit: 1 percent
Landform: Ridges on marine terraces, hills on marine terraces
Landform position (two-dimensional): Summit, backslope
Landform position (three-dimensional): Side slope, interfluve, riser
Down-slope shape: Convex
Across-slope shape: Linear
Other vegetative classification: Longleaf Pine-Turkey Oak Hills (R155XY002FL), Sandy soils on ridges and dunes of xeric uplands (G155XB111FL)
Hydric soil rating: No

Adamsville

Percent of map unit: 1 percent
Landform: Knolls on marine terraces, rises on marine terraces
Landform position (three-dimensional): Tread, rise
Down-slope shape: Convex
Across-slope shape: Linear
Other vegetative classification: Upland Hardwood Hammock (R155XY008FL), Sandy soils on rises and knolls of mesic uplands (G155XB131FL)
Hydric soil rating: No

Eaugallie

Percent of map unit: 1 percent
Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Tread, talf
Down-slope shape: Convex
Across-slope shape: Linear
Other vegetative classification: South Florida Flatwoods (R155XY003FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: No

Pomello

Percent of map unit: 1 percent
Landform: Knolls on marine terraces, ridges on marine terraces
Landform position (two-dimensional): Summit, backslope
Landform position (three-dimensional): Side slope, interfluve, riser
Down-slope shape: Convex, linear
Across-slope shape: Linear
Other vegetative classification: Sand Pine Scrub (R155XY001FL), Sandy soils on rises and knolls of mesic uplands (G155XB131FL)
Hydric soil rating: No

Paola

Percent of map unit: 1 percent
Landform: Knolls on marine terraces, ridges on marine terraces
Landform position (two-dimensional): Summit, backslope
Landform position (three-dimensional): Side slope, interfluve, riser
Down-slope shape: Convex, linear
Across-slope shape: Linear
Other vegetative classification: Sand Pine Scrub (R155XY001FL), Sandy soils on ridges and dunes of xeric uplands (G155XB111FL)
Hydric soil rating: No

Cypress lake

Percent of map unit: 1 percent
Landform: Drainageways on marine terraces, flats on marine terraces
Landform position (three-dimensional): Tread, dip, talf
Down-slope shape: Linear, convex
Across-slope shape: Concave, linear
Other vegetative classification: South Florida Flatwoods (R155XY003FL), Sandy over loamy soils on flats of hydric or mesic lowlands (G155XB241FL)
Hydric soil rating: Yes

Immokalee

Percent of map unit: 1 percent
Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Riser, talf

Down-slope shape: Linear
Across-slope shape: Linear
Other vegetative classification: South Florida Flatwoods (R155XY003FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: No

Brynwood

Percent of map unit: 1 percent
Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Tread, talf
Down-slope shape: Linear
Across-slope shape: Linear
Other vegetative classification: South Florida Flatwoods (R155XY003FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: Yes

Myakka

Percent of map unit: 1 percent
Landform: Drainageways on flatwoods on marine terraces
Landform position (three-dimensional): Tread, talf, dip
Down-slope shape: Linear
Across-slope shape: Linear, concave
Other vegetative classification: South Florida Flatwoods (R155XY003FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: No

64—Brynwood fine sand, wet-Urban land complex, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: 2zlfd
Elevation: 0 to 80 feet
Mean annual precipitation: 42 to 70 inches
Mean annual air temperature: 70 to 79 degrees F
Frost-free period: 360 to 365 days
Farmland classification: Not prime farmland

Map Unit Composition

Brynwood and similar soils: 45 percent
Urban land: 33 percent
Minor components: 22 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Brynwood

Setting

Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Tread, talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Sandy marine deposits over limestone

Typical profile

A - 0 to 2 inches: fine sand
Eg - 2 to 7 inches: fine sand
Bw - 7 to 12 inches: fine sand
2R - 12 to 22 inches: bedrock

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: 2 to 20 inches to lithic bedrock
Drainage class: Poorly drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 5.95 in/hr)
Depth to water table: About 3 to 18 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water supply, 0 to 60 inches: Very low (about 0.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4w
Hydrologic Soil Group: B/D
Forage suitability group: Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Other vegetative classification: South Florida Flatwoods (R155XY003FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: Yes

Description of Urban Land

Setting

Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Riser, talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: No parent material

Interpretive groups

Land capability classification (irrigated): None specified
Forage suitability group: Forage suitability group not assigned (G155XB999FL)
Other vegetative classification: Forage suitability group not assigned (G155XB999FL)
Hydric soil rating: Unranked

Minor Components

Cypress lake

Percent of map unit: 5 percent
Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Tread, talf
Down-slope shape: Linear
Across-slope shape: Linear
Other vegetative classification: South Florida Flatwoods (R155XY003FL), Sandy over loamy soils on flats of hydric or mesic lowlands (G155XB241FL)

Hydric soil rating: Yes

Basinger

Percent of map unit: 3 percent
Landform: Depressions on marine terraces
Landform position (three-dimensional): Tread, dip
Down-slope shape: Concave, linear
Across-slope shape: Concave, linear
Other vegetative classification: Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: Yes

Jenada

Percent of map unit: 3 percent
Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Tread, dip
Down-slope shape: Linear
Across-slope shape: Concave
Other vegetative classification: Forage suitability group not assigned (G156AC999FL)
Hydric soil rating: Yes

Dania

Percent of map unit: 3 percent
Landform: Marshes on marine terraces
Landform position (three-dimensional): Tread, dip
Down-slope shape: Concave
Across-slope shape: Concave
Other vegetative classification: Freshwater Marshes and Ponds (R156AY010FL), Organic soils in depressions and on flood plains (G156AC645FL)
Hydric soil rating: Yes

Clewiston

Percent of map unit: 2 percent
Landform: Depressions on marine terraces, flats on marine terraces
Landform position (three-dimensional): Tread, dip, talf
Down-slope shape: Concave, linear
Across-slope shape: Concave, linear
Other vegetative classification: Freshwater Marshes and Ponds (R155XY010FL), Organic soils in depressions and on flood plains (G155XB645FL)
Hydric soil rating: Yes

Wabasso

Percent of map unit: 2 percent
Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Tread, talf
Down-slope shape: Linear
Across-slope shape: Linear
Other vegetative classification: South Florida Flatwoods (R155XY003FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: No

Brynwood

Percent of map unit: 2 percent
Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Tread, talf
Down-slope shape: Linear

Across-slope shape: Linear
Other vegetative classification: South Florida Flatwoods (R155XY003FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: No

Pompano

Percent of map unit: 2 percent
Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Tread, dip
Down-slope shape: Linear
Across-slope shape: Linear, concave
Other vegetative classification: Slough (R155XY011FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: Yes

67—Smyrna fine sand-Urban land complex, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: 2x9cm
Elevation: 0 to 130 feet
Mean annual precipitation: 42 to 63 inches
Mean annual air temperature: 70 to 77 degrees F
Frost-free period: 355 to 365 days
Farmland classification: Not prime farmland

Map Unit Composition

Smyrna and similar soils: 45 percent
Urban land: 38 percent
Minor components: 17 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Smyrna

Setting

Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Tread, talf
Down-slope shape: Linear, convex
Across-slope shape: Linear
Parent material: Sandy marine deposits

Typical profile

A - 0 to 4 inches: fine sand
E - 4 to 13 inches: fine sand
Bh - 13 to 18 inches: fine sand
C/Bw - 18 to 49 inches: fine sand
C - 49 to 80 inches: fine sand

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches

Drainage class: Poorly drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 6.00 in/hr)
Depth to water table: About 6 to 18 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water supply, 0 to 60 inches: Low (about 5.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4w
Hydrologic Soil Group: A/D
Forage suitability group: Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Other vegetative classification: South Florida Flatwoods (R155XY003FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: No

Description of Urban Land

Setting

Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Riser, talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: No parent material

Interpretive groups

Land capability classification (irrigated): None specified
Forage suitability group: Forage suitability group not assigned (G155XB999FL)
Other vegetative classification: Forage suitability group not assigned (G155XB999FL)
Hydric soil rating: Unranked

Minor Components

Eaugallie

Percent of map unit: 5 percent
Landform: — error in exists on —
Landform position (three-dimensional): Tread, talf
Down-slope shape: Convex
Across-slope shape: Linear
Other vegetative classification: South Florida Flatwoods (R155XY003FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: No

Basinger

Percent of map unit: 4 percent
Landform: Depressions on marine terraces
Landform position (three-dimensional): Tread, dip
Down-slope shape: Concave, linear
Across-slope shape: Concave, linear
Other vegetative classification: Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)

Hydric soil rating: Yes

Immokalee

Percent of map unit: 4 percent
Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Riser, talf
Down-slope shape: Linear
Across-slope shape: Linear
Other vegetative classification: South Florida Flatwoods (R155XY003FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: No

Smyrna

Percent of map unit: 2 percent
Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Tread, talf
Down-slope shape: Linear, convex
Across-slope shape: Linear
Other vegetative classification: South Florida Flatwoods (R155XY003FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: No

Placid

Percent of map unit: 2 percent
Landform: Drainageways on marine terraces, depressions on marine terraces
Landform position (three-dimensional): Tread, dip
Down-slope shape: Concave
Across-slope shape: Concave
Other vegetative classification: Freshwater Marshes and Ponds (R155XY010FL), Sandy soils on stream terraces, flood plains, or in depressions (G155XB145FL)
Hydric soil rating: Yes

69—Matlacha gravelly fine sand, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: 2x9db
Elevation: 0 to 30 feet
Mean annual precipitation: 45 to 54 inches
Mean annual air temperature: 70 to 77 degrees F
Frost-free period: 360 to 365 days
Farmland classification: Not prime farmland

Map Unit Composition

Matlacha and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Matlacha

Setting

Landform: Flats on marine terraces
Landform position (three-dimensional): Tread, talf
Down-slope shape: Convex, linear
Across-slope shape: Linear
Parent material: Sandy mine spoil or earthy fill over sandy marine deposits

Typical profile

^C - 0 to 35 inches: gravelly fine sand
2Ab - 35 to 40 inches: fine sand
2Eb - 40 to 80 inches: fine sand

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat poorly drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)
Depth to water table: About 18 to 42 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 4 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water supply, 0 to 60 inches: Low (about 4.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: B
Forage suitability group: Forage suitability group not assigned (G155XB999FL)
Other vegetative classification: Forage suitability group not assigned (G155XB999FL)
Hydric soil rating: No

Minor Components

Caloosa

Percent of map unit: 5 percent
Landform: Marine terraces
Landform position (three-dimensional): Tread, rise
Down-slope shape: Convex, linear
Across-slope shape: Convex, linear
Other vegetative classification: Forage suitability group not assigned (G155XB999FL)
Hydric soil rating: No

St. augustine

Percent of map unit: 5 percent
Landform: Marine terraces
Landform position (three-dimensional): Tread, rise
Down-slope shape: Linear
Across-slope shape: Convex

Other vegetative classification: Forage suitability group not assigned (G155XB999FL)
Hydric soil rating: No

99—Water

Map Unit Composition

Water: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Water

Interpretive groups

Land capability classification (irrigated): None specified
Forage suitability group: Forage suitability group not assigned (G155XB999FL)
Other vegetative classification: Forage suitability group not assigned (G155XB999FL)
Hydric soil rating: Unranked

100—Waters of the Gulf of Mexico

Map Unit Composition

Water of the gulf of mexico: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Water Of The Gulf Of Mexico

Interpretive groups

Land capability classification (irrigated): None specified
Forage suitability group: Forage suitability group not assigned (G155XB999FL)
Other vegetative classification: Forage suitability group not assigned (G155XB999FL)
Hydric soil rating: Unranked

101—Anclote sand, ponded-Urban land complex, 0 to 1 percent slopes

Map Unit Setting

National map unit symbol: 2x9cn
Elevation: 0 to 130 feet
Mean annual precipitation: 46 to 58 inches
Mean annual air temperature: 68 to 77 degrees F
Frost-free period: 350 to 365 days
Farmland classification: Not prime farmland

Map Unit Composition

Anclote and similar soils: 44 percent
Urban land: 39 percent
Minor components: 17 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Anclote

Setting

Landform: Depressions on marine terraces
Landform position (three-dimensional): Tread, dip
Down-slope shape: Linear, concave
Across-slope shape: Linear, concave
Parent material: Sandy marine deposits

Typical profile

A1 - 0 to 8 inches: sand
A2 - 8 to 22 inches: sand
Cg1 - 22 to 40 inches: sand
Cg2 - 40 to 80 inches: sand

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Very poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): High to very high (6.00 to 20.00 in/hr)
Depth to water table: About 0 to 6 inches
Frequency of flooding: None
Frequency of ponding: Frequent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water supply, 0 to 60 inches: Very low (about 2.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7w
Hydrologic Soil Group: A/D
Forage suitability group: Sandy soils on stream terraces, flood plains, or in depressions (G155XB145FL)
Other vegetative classification: Freshwater Marshes and Ponds (R155XY010FL), Sandy soils on stream terraces, flood plains, or in depressions (G155XB145FL)
Hydric soil rating: Yes

Description of Urban Land

Setting

Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Riser, talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: No parent material

Interpretive groups

Land capability classification (irrigated): None specified
Forage suitability group: Forage suitability group not assigned (G155XB999FL)
Other vegetative classification: Forage suitability group not assigned (G155XB999FL)
Hydric soil rating: Unranked

Minor Components

Floridana

Percent of map unit: 5 percent
Landform: Depressions on marine terraces
Landform position (three-dimensional): Tread, dip
Down-slope shape: Linear, concave
Across-slope shape: Linear, concave
Other vegetative classification: Freshwater Marshes and Ponds (R155XY010FL), Sandy over loamy soils on stream terraces, flood plains, or in depressions (G155XB245FL)
Hydric soil rating: Yes

Terra ceia

Percent of map unit: 4 percent
Landform: Depressions on marine terraces
Landform position (three-dimensional): Tread, dip
Down-slope shape: Concave, convex
Across-slope shape: Concave, linear
Other vegetative classification: Freshwater Marshes and Ponds (R155XY010FL), Organic soils in depressions and on flood plains (G155XB645FL)
Hydric soil rating: Yes

Tomoka

Percent of map unit: 3 percent
Landform: Depressions on marine terraces
Landform position (three-dimensional): Talf, dip
Down-slope shape: Concave
Across-slope shape: Concave
Other vegetative classification: Freshwater Marshes and Ponds (R155XY010FL), Organic soils in depressions and on flood plains (G155XB645FL)
Hydric soil rating: Yes

Riviera

Percent of map unit: 3 percent
Landform: Flats on marine terraces, drainageways on marine terraces
Landform position (three-dimensional): Tread, talf, dip
Down-slope shape: Linear
Across-slope shape: Concave, linear
Other vegetative classification: Slough (R155XY011FL), Sandy over loamy soils on flats of hydric or mesic lowlands (G155XB241FL)
Hydric soil rating: Yes

Anclote

Percent of map unit: 2 percent
Landform: Depressions on marine terraces
Landform position (three-dimensional): Tread, talf, dip
Down-slope shape: Linear, concave
Across-slope shape: Linear, concave

Other vegetative classification: Freshwater Marshes and Ponds (R155XY010FL), Sandy soils on stream terraces, flood plains, or in depressions (G155XB145FL)
Hydric soil rating: No

102—Cypress Lake fine sand-Urban land complex, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: 2zldz
Elevation: 0 to 70 feet
Mean annual precipitation: 42 to 56 inches
Mean annual air temperature: 68 to 77 degrees F
Frost-free period: 350 to 365 days
Farmland classification: Not prime farmland

Map Unit Composition

Cypress lake and similar soils: 42 percent
Urban land: 36 percent
Minor components: 22 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Cypress Lake

Setting

Landform: Drainageways on marine terraces, flatwoods on marine terraces
Landform position (three-dimensional): Tread, dip, talf
Down-slope shape: Linear
Across-slope shape: Concave, linear
Parent material: Sandy and loamy marine deposits over limestone

Typical profile

A - 0 to 3 inches: fine sand
E - 3 to 14 inches: fine sand
E/B - 14 to 25 inches: fine sand
Btg - 25 to 30 inches: fine sandy loam
2R - 30 to 40 inches: bedrock

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: 8 to 40 inches to lithic bedrock
Drainage class: Poorly drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: About 3 to 18 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 4 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)

Sodium adsorption ratio, maximum: 4.0
Available water supply, 0 to 60 inches: Very low (about 2.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: A/D
Forage suitability group: Sandy over loamy soils on flats of hydric or mesic lowlands (G155XB241FL)
Other vegetative classification: South Florida Flatwoods (R155XY003FL), Sandy over loamy soils on flats of hydric or mesic lowlands (G155XB241FL)
Hydric soil rating: Yes

Description of Urban Land

Setting

Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Riser, talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: No parent material

Interpretive groups

Land capability classification (irrigated): None specified
Forage suitability group: Forage suitability group not assigned (G155XB999FL)
Other vegetative classification: Forage suitability group not assigned (G155XB999FL)
Hydric soil rating: Unranked

Minor Components

Brynwood

Percent of map unit: 8 percent
Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Tread, talf
Down-slope shape: Linear
Across-slope shape: Linear
Other vegetative classification: South Florida Flatwoods (R155XY003FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: Yes

Wabasso

Percent of map unit: 6 percent
Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Tread, talf
Down-slope shape: Linear
Across-slope shape: Linear
Other vegetative classification: South Florida Flatwoods (R155XY003FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: No

Pineda

Percent of map unit: 4 percent
Landform: Drainageways on marine terraces, flats on marine terraces
Landform position (three-dimensional): Tread, dip, talf
Down-slope shape: Linear
Across-slope shape: Linear, concave

Other vegetative classification: Slough (R155XY011FL), Sandy over loamy soils on flats of hydric or mesic lowlands (G155XB241FL)
Hydric soil rating: Yes

Ft. drum

Percent of map unit: 2 percent
Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Tread, talf
Down-slope shape: Convex
Across-slope shape: Linear
Other vegetative classification: Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: No

Cypress lake

Percent of map unit: 2 percent
Landform: Flatwoods on marine terraces, drainageways on marine terraces
Landform position (three-dimensional): Tread, talf, dip
Down-slope shape: Linear
Across-slope shape: Linear, concave
Other vegetative classification: South Florida Flatwoods (R155XY003FL), Sandy over loamy soils on flats of hydric or mesic lowlands (G155XB241FL)
Hydric soil rating: No

105—Copeland fine sandy loam, ponded-Urban land complex, 0 to 1 percent slopes

Map Unit Setting

National map unit symbol: 2x9dk
Elevation: 0 to 70 feet
Mean annual precipitation: 45 to 54 inches
Mean annual air temperature: 70 to 77 degrees F
Frost-free period: 360 to 365 days
Farmland classification: Not prime farmland

Map Unit Composition

Copeland and similar soils: 48 percent
Urban land: 40 percent
Minor components: 12 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Copeland

Setting

Landform: Depressions on marine terraces
Landform position (three-dimensional): Tread, dip
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Sandy and loamy marine deposits over limestone

Typical profile

A1 - 0 to 8 inches: fine sandy loam
A2 - 8 to 20 inches: fine sandy loam
Btkg - 20 to 28 inches: sandy clay loam
2R - 28 to 38 inches: bedrock

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Drainage class: Very poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: None
Frequency of ponding: Frequent
Calcium carbonate, maximum content: 40 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water supply, 0 to 60 inches: Low (about 3.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7w
Hydrologic Soil Group: D
Forage suitability group: Loamy and clayey soils on stream terraces, flood plains, or in depressions (G155XB345FL)
Other vegetative classification: Freshwater Marshes and Ponds (R155XY010FL), Loamy and clayey soils on stream terraces, flood plains, or in depressions (G155XB345FL)
Hydric soil rating: Yes

Description of Urban Land

Setting

Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Riser, talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: No parent material

Interpretive groups

Land capability classification (irrigated): None specified
Forage suitability group: Forage suitability group not assigned (G155XB999FL)
Other vegetative classification: Forage suitability group not assigned (G155XB999FL)
Hydric soil rating: Unranked

Minor Components

Felda

Percent of map unit: 4 percent
Landform: Flats on marine terraces, depressions on marine terraces
Landform position (three-dimensional): Tread, talf, dip
Down-slope shape: Linear
Across-slope shape: Linear, concave

Other vegetative classification: Freshwater Marshes and Ponds (R155XY010FL), Sandy over loamy soils on stream terraces, flood plains, or in depressions (G155XB245FL)
Hydric soil rating: Yes

Pompano

Percent of map unit: 3 percent
Landform: Drainageways on marine terraces
Landform position (three-dimensional): Tread, dip
Down-slope shape: Linear
Across-slope shape: Linear, concave
Other vegetative classification: Slough (R155XY011FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: Yes

Anclote

Percent of map unit: 3 percent
Landform: Depressions on marine terraces
Landform position (three-dimensional): Tread, dip
Down-slope shape: Convex, concave
Across-slope shape: Linear, concave
Other vegetative classification: Sandy soils on stream terraces, flood plains, or in depressions (G155XB145FL)
Hydric soil rating: Yes

Copeland

Percent of map unit: 2 percent
Landform: Depressions on marine terraces
Landform position (three-dimensional): Tread, talf, dip
Down-slope shape: Linear, concave
Across-slope shape: Linear, concave
Other vegetative classification: Freshwater Marshes and Ponds (R155XY010FL), Loamy and clayey soils on stream terraces, flood plains, or in depressions (G155XB345FL)
Hydric soil rating: No

106—Daytona sand-Urban land complex, 0 to 5 percent slopes

Map Unit Setting

National map unit symbol: 2x9dm
Elevation: 10 to 70 feet
Mean annual precipitation: 44 to 61 inches
Mean annual air temperature: 68 to 77 degrees F
Frost-free period: 350 to 365 days
Farmland classification: Not prime farmland

Map Unit Composition

Daytona and similar soils: 45 percent
Urban land: 40 percent

Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Daytona

Setting

Landform: Knolls on marine terraces, rises on marine terraces
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve, tread, rise
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Sandy marine deposits and/or eolian deposits

Typical profile

A - 0 to 5 inches: sand
E - 5 to 36 inches: sand
Bh - 36 to 47 inches: sand
C - 47 to 80 inches: sand

Properties and qualities

Slope: 0 to 5 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)
Depth to water table: About 42 to 60 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water supply, 0 to 60 inches: Very low (about 2.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: A
Forage suitability group: Sandy soils on rises, knolls, and ridges of mesic uplands (G155XB121FL)
Other vegetative classification: Sand Pine Scrub (R155XY001FL), Sandy soils on rises, knolls, and ridges of mesic uplands (G155XB121FL)
Hydric soil rating: No

Description of Urban Land

Setting

Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Riser, talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: No parent material

Interpretive groups

Land capability classification (irrigated): None specified
Forage suitability group: Forage suitability group not assigned (G155XB999FL)
Other vegetative classification: Forage suitability group not assigned (G155XB999FL)

Hydric soil rating: Unranked

Minor Components

Immokalee

Percent of map unit: 4 percent
Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Talf
Down-slope shape: Linear, convex
Across-slope shape: Linear
Other vegetative classification: South Florida Flatwoods (R155XY003FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: No

Cassia

Percent of map unit: 4 percent
Landform: Knolls on marine terraces, rises on marine terraces
Landform position (three-dimensional): Tread, talf
Down-slope shape: Convex
Across-slope shape: Linear
Other vegetative classification: Sand Pine Scrub (R155XY001FL), Sandy soils on rises and knolls of mesic uplands (G155XB131FL)
Hydric soil rating: No

Satellite

Percent of map unit: 2 percent
Landform: Drainageways on flatwoods on marine terraces
Landform position (three-dimensional): Tread, talf, dip
Down-slope shape: Linear
Across-slope shape: Linear, concave
Other vegetative classification: Sand Pine Scrub (R155XY001FL), Sandy soils on rises and knolls of mesic uplands (G155XB131FL)
Hydric soil rating: No

Orsino

Percent of map unit: 2 percent
Landform: Knolls on marine terraces, rises on marine terraces
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve, tread, rise
Down-slope shape: Convex
Across-slope shape: Linear
Other vegetative classification: Sand Pine Scrub (R155XY001FL), Sandy soils on rises, knolls, and ridges of mesic uplands (G156BC121FL)
Hydric soil rating: No

St. lucie

Percent of map unit: 2 percent
Landform: Knolls on marine terraces, ridges on marine terraces, dunes on marine terraces
Landform position (two-dimensional): Summit, backslope
Landform position (three-dimensional): Interfluve, side slope, riser
Down-slope shape: Convex, linear
Across-slope shape: Linear
Other vegetative classification: Sand Pine Scrub (R155XY001FL), Sandy soils on ridges and dunes of xeric uplands (G155XB111FL)
Hydric soil rating: No

Pompano

Percent of map unit: 1 percent
Landform: Drainageways on marine terraces
Landform position (three-dimensional): Tread, dip
Down-slope shape: Linear
Across-slope shape: Linear, concave
Other vegetative classification: Slough (R155XY011FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: Yes

107—EauGallie sand-Urban land complex, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: 2x9cb
Elevation: 10 to 60 feet
Mean annual precipitation: 46 to 54 inches
Mean annual air temperature: 70 to 77 degrees F
Frost-free period: 355 to 365 days
Farmland classification: Not prime farmland

Map Unit Composition

Eaugallie and similar soils: 45 percent
Urban land: 40 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Eaugallie

Setting

Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Tread, talf
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Sandy and loamy marine deposits

Typical profile

A - 0 to 4 inches: sand
E - 4 to 22 inches: sand
Bh - 22 to 27 inches: sand
Bw - 27 to 45 inches: sand
E' - 45 to 58 inches: sand
Btg - 58 to 80 inches: sandy loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Runoff class: Very high

Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)
Depth to water table: About 6 to 18 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water supply, 0 to 60 inches: Very low (about 2.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4w
Hydrologic Soil Group: A/D
Forage suitability group: Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Other vegetative classification: South Florida Flatwoods (R155XY003FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: No

Description of Urban Land

Setting

Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Riser, talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: No parent material

Interpretive groups

Land capability classification (irrigated): None specified
Forage suitability group: Forage suitability group not assigned (G155XB999FL)
Other vegetative classification: Forage suitability group not assigned (G155XB999FL)
Hydric soil rating: Unranked

Minor Components

Malabar

Percent of map unit: 4 percent
Landform: Drainageways on marine terraces
Landform position (three-dimensional): Tread, dip
Down-slope shape: Concave, linear
Across-slope shape: Concave, linear
Other vegetative classification: Slough (R155XY011FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: Yes

Oldsmar

Percent of map unit: 3 percent
Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Talf
Down-slope shape: Convex, linear
Across-slope shape: Linear
Other vegetative classification: South Florida Flatwoods (R155XY003FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: No

Myakka

Percent of map unit: 3 percent
Landform: Drainageways on flatwoods on marine terraces
Landform position (three-dimensional): Tread, talf, dip
Down-slope shape: Linear
Across-slope shape: Linear, concave
Other vegetative classification: South Florida Flatwoods (R155XY003FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: No

Wabasso

Percent of map unit: 3 percent
Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Tread, talf
Down-slope shape: Linear
Across-slope shape: Linear
Other vegetative classification: South Florida Flatwoods (R155XY003FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: No

Eaugallie

Percent of map unit: 2 percent
Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Tread, talf
Down-slope shape: Linear, convex
Across-slope shape: Linear
Other vegetative classification: South Florida Flatwoods (R155XY003FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: No

110—Felda fine sand-Urban land complex, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: 2x9cc
Elevation: 0 to 180 feet
Mean annual precipitation: 40 to 60 inches
Mean annual air temperature: 68 to 77 degrees F
Frost-free period: 350 to 365 days
Farmland classification: Not prime farmland

Map Unit Composition

Felda and similar soils: 45 percent
Urban land: 38 percent
Minor components: 17 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Felda

Setting

Landform: Flatwoods on marine terraces, drainageways on marine terraces
Landform position (three-dimensional): Tread, talf, dip
Down-slope shape: Linear
Across-slope shape: Linear, concave
Parent material: Sandy and loamy marine deposits

Typical profile

A - 0 to 4 inches: fine sand
Eg - 4 to 35 inches: fine sand
Btg - 35 to 43 inches: fine sandy loam
Cg - 43 to 80 inches: extremely paragravelly fine sand

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 6.00 in/hr)
Depth to water table: About 3 to 18 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 4 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water supply, 0 to 60 inches: Low (about 5.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: A/D
Forage suitability group: Sandy over loamy soils on flats of hydric or mesic lowlands (G155XB241FL)
Other vegetative classification: Slough (R155XY011FL), Sandy over loamy soils on flats of hydric or mesic lowlands (G155XB241FL)
Hydric soil rating: Yes

Description of Urban Land

Setting

Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Riser, talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: No parent material

Interpretive groups

Land capability classification (irrigated): None specified
Forage suitability group: Forage suitability group not assigned (G155XB999FL)
Other vegetative classification: Forage suitability group not assigned (G155XB999FL)
Hydric soil rating: Unranked

Minor Components

Wabasso

Percent of map unit: 6 percent
Landform: Marine terraces, flatwoods
Landform position (three-dimensional): Tread, talf
Down-slope shape: Convex
Across-slope shape: Linear
Other vegetative classification: South Florida Flatwoods (R155XY003FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: No

Oldsmar

Percent of map unit: 5 percent
Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Talf
Down-slope shape: Linear, convex
Across-slope shape: Linear
Other vegetative classification: South Florida Flatwoods (R155XY003FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: No

Valkaria

Percent of map unit: 3 percent
Landform: Drainageways on flatwoods on marine terraces
Landform position (three-dimensional): Tread, talf, dip
Down-slope shape: Linear
Across-slope shape: Linear, concave
Other vegetative classification: Slough (R155XY011FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: Yes

Felda

Percent of map unit: 2 percent
Landform: Flatwoods on marine terraces, drainageways on marine terraces
Landform position (three-dimensional): Tread, talf, dip
Down-slope shape: Linear
Across-slope shape: Linear, concave
Other vegetative classification: Slough (R155XY011FL), Sandy over loamy soils on flats of hydric or mesic lowlands (G155XB241FL)
Hydric soil rating: No

Placid

Percent of map unit: 1 percent
Landform: Drainageways on marine terraces, depressions on marine terraces
Landform position (three-dimensional): Tread, dip
Down-slope shape: Concave
Across-slope shape: Concave
Other vegetative classification: Freshwater Marshes and Ponds (R155XY010FL), Sandy soils on stream terraces, flood plains, or in depressions (G155XB145FL)
Hydric soil rating: Yes

116—Isles fine sand, ponded-Urban land complex, 0 to 1 percent slopes

Map Unit Setting

National map unit symbol: 2x9cw
Elevation: 0 to 10 feet
Mean annual precipitation: 45 to 55 inches
Mean annual air temperature: 70 to 77 degrees F
Frost-free period: 360 to 365 days
Farmland classification: Not prime farmland

Map Unit Composition

Isles and similar soils: 43 percent
Urban land: 35 percent
Minor components: 22 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Isles

Setting

Landform: Depressions on marine terraces
Landform position (three-dimensional): Tread, dip
Down-slope shape: Linear
Across-slope shape: Concave, linear
Parent material: Loamy marine deposits over limestone

Typical profile

A - 0 to 5 inches: fine sand
E - 5 to 21 inches: fine sand
Btg - 21 to 47 inches: fine sandy loam
2R - 47 to 57 inches: bedrock

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: 22 to 60 inches to lithic bedrock
Drainage class: Very poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: None
Frequency of ponding: Frequent
Maximum salinity: Nonsaline to slightly saline (0.0 to 4.0 mmhos/cm)
Sodium adsorption ratio, maximum: 12.0
Available water supply, 0 to 60 inches: Low (about 5.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8w
Hydrologic Soil Group: B/D

Forage suitability group: Forage suitability group not assigned (G155XB999FL)
Other vegetative classification: Salt Marsh (R155XY009FL), Forage suitability group not assigned (G155XB999FL)
Hydric soil rating: Yes

Description of Urban Land

Setting

Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Riser, talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: No parent material

Interpretive groups

Land capability classification (irrigated): None specified
Forage suitability group: Forage suitability group not assigned (G155XB999FL)
Other vegetative classification: Forage suitability group not assigned (G155XB999FL)
Hydric soil rating: Unranked

Minor Components

Felda

Percent of map unit: 5 percent
Landform: Depressions on marine terraces, flats on marine terraces
Landform position (three-dimensional): Tread, dip, talf
Down-slope shape: Linear
Across-slope shape: Linear, concave
Other vegetative classification: Freshwater Marshes and Ponds (R155XY010FL), Sandy over loamy soils on stream terraces, flood plains, or in depressions (G155XB245FL)
Hydric soil rating: Yes

Pineda

Percent of map unit: 5 percent
Landform: Flats on marine terraces, drainageways on marine terraces
Landform position (three-dimensional): Tread, talf, dip
Down-slope shape: Linear
Across-slope shape: Linear, concave
Other vegetative classification: Slough (R155XY011FL), Sandy over loamy soils on flats of hydric or mesic lowlands (G155XB241FL)
Hydric soil rating: Yes

Pompano

Percent of map unit: 5 percent
Landform: Drainageways on marine terraces
Landform position (three-dimensional): Tread, dip
Down-slope shape: Linear
Across-slope shape: Concave, linear
Other vegetative classification: Slough (R155XY011FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: Yes

Malabar

Percent of map unit: 5 percent
Landform: Depressions on marine terraces

Landform position (three-dimensional): Tread, dip
Down-slope shape: Concave, linear
Across-slope shape: Concave, linear
Other vegetative classification: Freshwater Marshes and Ponds (R155XY010FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: Yes

Isles

Percent of map unit: 2 percent
Landform: Depressions on marine terraces
Landform position (three-dimensional): Tread, talf, dip
Down-slope shape: Linear
Across-slope shape: Linear, concave
Other vegetative classification: Salt Marsh (R155XY009FL), Forage suitability group not assigned (G155XB999FL)
Hydric soil rating: No

118—Kesson fine sand, tidal-Urban land complex, 0 to 1 percent slopes

Map Unit Setting

National map unit symbol: 2x9d1
Elevation: 0 to 10 feet
Mean annual precipitation: 45 to 54 inches
Mean annual air temperature: 70 to 77 degrees F
Frost-free period: 360 to 365 days
Farmland classification: Not prime farmland

Map Unit Composition

Kesson, tidal, and similar soils: 48 percent
Urban land: 38 percent
Minor components: 14 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Kesson, Tidal

Setting

Landform: Tidal marshes on marine terraces
Landform position (three-dimensional): Tread, talf
Down-slope shape: Convex, linear
Across-slope shape: Linear
Parent material: Sandy marine deposits

Typical profile

Akn - 0 to 6 inches: fine sand
Ckn1 - 6 to 23 inches: fine sand
Ckn2 - 23 to 38 inches: fine sand
Ckn3 - 38 to 80 inches: fine sand

Properties and qualities

Slope: 0 to 1 percent

Depth to restrictive feature: More than 80 inches
Drainage class: Very poorly drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): High to very high (1.98 to 19.98 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: Very frequent
Frequency of ponding: None
Calcium carbonate, maximum content: 4 percent
Maximum salinity: Moderately saline to strongly saline (8.0 to 24.0 mmhos/cm)
Sodium adsorption ratio, maximum: 50.0
Available water supply, 0 to 60 inches: Low (about 4.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8w
Hydrologic Soil Group: A/D
Forage suitability group: Forage suitability group not assigned (G155XB999FL)
Other vegetative classification: Salt Marsh (R155XY009FL), Forage suitability group not assigned (G155XB999FL)
Hydric soil rating: Yes

Description of Urban Land

Setting

Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Riser, talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: No parent material

Interpretive groups

Land capability classification (irrigated): None specified
Forage suitability group: Forage suitability group not assigned (G155XB999FL)
Other vegetative classification: Forage suitability group not assigned (G155XB999FL)
Hydric soil rating: Unranked

Minor Components

Wulfert, tidal

Percent of map unit: 6 percent
Landform: Tidal marshes on marine terraces
Landform position (three-dimensional): Tread, talf
Down-slope shape: Linear
Across-slope shape: Linear
Other vegetative classification: Salt Marsh (R155XY009FL), Forage suitability group not assigned (G155XB999FL)
Hydric soil rating: Yes

Captiva, tidal

Percent of map unit: 6 percent
Landform: Tidal marshes on marine terraces
Landform position (three-dimensional): Tread, talf
Down-slope shape: Linear
Across-slope shape: Concave

Other vegetative classification: Slough (R155XY011FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: Yes

Kesson, tidal

Percent of map unit: 2 percent
Landform: Tidal marshes on marine terraces
Landform position (three-dimensional): Tread, talf
Down-slope shape: Linear, convex
Across-slope shape: Linear
Other vegetative classification: Salt Marsh (R155XY009FL), Forage suitability group not assigned (G155XB999FL)
Hydric soil rating: No

123—Myakka fine sand-Urban land complex, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: 2x9ch
Elevation: 0 to 130 feet
Mean annual precipitation: 42 to 61 inches
Mean annual air temperature: 68 to 77 degrees F
Frost-free period: 350 to 365 days
Farmland classification: Not prime farmland

Map Unit Composition

Myakka and similar soils: 45 percent
Urban land: 38 percent
Minor components: 17 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Myakka

Setting

Landform: Drainageways on flatwoods on marine terraces
Landform position (three-dimensional): Tread, talf, dip
Down-slope shape: Linear
Across-slope shape: Linear, concave
Parent material: Sandy marine deposits

Typical profile

A - 0 to 6 inches: fine sand
E - 6 to 20 inches: fine sand
Bh - 20 to 36 inches: fine sand
C - 36 to 80 inches: fine sand

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Runoff class: Very high

Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 5.95 in/hr)
Depth to water table: About 6 to 18 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water supply, 0 to 60 inches: Low (about 5.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4w
Hydrologic Soil Group: A/D
Forage suitability group: Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Other vegetative classification: South Florida Flatwoods (R155XY003FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: No

Description of Urban Land

Setting

Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Riser, talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: No parent material

Interpretive groups

Land capability classification (irrigated): None specified
Forage suitability group: Forage suitability group not assigned (G155XB999FL)
Other vegetative classification: Forage suitability group not assigned (G155XB999FL)
Hydric soil rating: Unranked

Minor Components

Basinger

Percent of map unit: 5 percent
Landform: Depressions on marine terraces
Landform position (three-dimensional): Tread, dip
Down-slope shape: Concave, linear
Across-slope shape: Concave, linear
Other vegetative classification: Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: Yes

Wabasso

Percent of map unit: 4 percent
Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Tread, talf
Down-slope shape: Linear, convex
Across-slope shape: Linear
Other vegetative classification: South Florida Flatwoods (R155XY003FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: No

Cassia

Percent of map unit: 3 percent
Landform: Flatwoods on marine terraces, rises on marine terraces
Landform position (three-dimensional): Tread, talf
Down-slope shape: Convex
Across-slope shape: Linear
Other vegetative classification: Sand Pine Scrub (R155XY001FL), Sandy soils on rises and knolls of mesic uplands (G155XB131FL)
Hydric soil rating: No

Immokalee

Percent of map unit: 2 percent
Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Riser, talf
Down-slope shape: Linear
Across-slope shape: Linear
Other vegetative classification: South Florida Flatwoods (R155XY003FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: No

Myakka

Percent of map unit: 2 percent
Landform: Drainageways on marine terraces, flatwoods on marine terraces
Landform position (three-dimensional): Tread, talf, dip
Down-slope shape: Linear
Across-slope shape: Linear, concave
Other vegetative classification: South Florida Flatwoods (R155XY003FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: No

Satellite

Percent of map unit: 1 percent
Landform: Rises on marine terraces, flatwoods on marine terraces
Landform position (three-dimensional): Tread, rise, talf
Down-slope shape: Convex, linear
Across-slope shape: Linear
Other vegetative classification: Sand Pine Scrub (R155XY001FL), Sandy soils on rises and knolls of mesic uplands (G155XB131FL)
Hydric soil rating: No

124—Myakka fine sand, ponded-Urban land complex, 0 to 1 percent slopes

Map Unit Setting

National map unit symbol: 2x9f1
Elevation: 0 to 140 feet
Mean annual precipitation: 42 to 61 inches
Mean annual air temperature: 70 to 77 degrees F

Frost-free period: 355 to 365 days
Farmland classification: Not prime farmland

Map Unit Composition

Myakka and similar soils: 45 percent
Urban land: 38 percent
Minor components: 17 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Myakka

Setting

Landform: Depressions on marine terraces
Landform position (three-dimensional): Tread, dip
Down-slope shape: Linear, concave
Across-slope shape: Linear, concave
Parent material: Sandy marine deposits

Typical profile

A - 0 to 5 inches: fine sand
E - 5 to 25 inches: fine sand
Bh - 25 to 39 inches: fine sand
C - 39 to 80 inches: fine sand

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Very poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 5.95 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: None
Frequency of ponding: Frequent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water supply, 0 to 60 inches: Low (about 5.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7w
Hydrologic Soil Group: A/D
Forage suitability group: Sandy soils on stream terraces, flood plains, or in depressions (G155XB145FL)
Other vegetative classification: Freshwater Marshes and Ponds (R155XY010FL), Sandy soils on stream terraces, flood plains, or in depressions (G155XB145FL)
Hydric soil rating: Yes

Description of Urban Land

Setting

Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Riser, talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: No parent material

Interpretive groups

Land capability classification (irrigated): None specified
Forage suitability group: Forage suitability group not assigned (G155XB999FL)
Other vegetative classification: Forage suitability group not assigned (G155XB999FL)
Hydric soil rating: Unranked

Minor Components

Pompano

Percent of map unit: 4 percent
Landform: Drainageways on marine terraces
Landform position (three-dimensional): Tread, dip
Down-slope shape: Linear
Across-slope shape: Linear, concave
Other vegetative classification: Slough (R155XY011FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: Yes

Placid

Percent of map unit: 3 percent
Landform: Drainageways on marine terraces, depressions on marine terraces
Landform position (three-dimensional): Tread, dip
Down-slope shape: Concave
Across-slope shape: Concave
Other vegetative classification: Freshwater Marshes and Ponds (R155XY010FL), Sandy soils on stream terraces, flood plains, or in depressions (G155XB145FL)
Hydric soil rating: Yes

Immokalee

Percent of map unit: 3 percent
Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Riser, talf
Down-slope shape: Linear
Across-slope shape: Linear
Other vegetative classification: South Florida Flatwoods (R155XY003FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: No

St. johns

Percent of map unit: 3 percent
Landform: Depressions on marine terraces, flats on marine terraces
Landform position (three-dimensional): Tread, dip, talf
Down-slope shape: Linear
Across-slope shape: Concave
Other vegetative classification: South Florida Flatwoods (R155XY003FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: Yes

Myakka

Percent of map unit: 2 percent
Landform: Depressions on marine terraces
Landform position (three-dimensional): Tread, talf, dip
Down-slope shape: Linear, concave
Across-slope shape: Linear, concave

Other vegetative classification: Freshwater Marshes and Ponds (R155XY010FL), Sandy soils on stream terraces, flood plains, or in depressions (G155XB145FL)
Hydric soil rating: No

Samsula

Percent of map unit: 1 percent
Landform: Depressions on marine terraces
Landform position (three-dimensional): Tread, dip
Down-slope shape: Concave
Across-slope shape: Concave
Other vegetative classification: Freshwater Marshes and Ponds (R155XY010FL), Organic soils in depressions and on flood plains (G155XB645FL)
Hydric soil rating: Yes

Floridana

Percent of map unit: 1 percent
Landform: Depressions on marine terraces
Landform position (three-dimensional): Tread, dip
Down-slope shape: Concave, linear
Across-slope shape: Concave, linear
Other vegetative classification: Freshwater Marshes and Ponds (R155XY010FL), Sandy over loamy soils on stream terraces, flood plains, or in depressions (G155XB245FL)
Hydric soil rating: Yes

125—Oldsmar sand-Urban land, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: 2x9c2
Elevation: 0 to 80 feet
Mean annual precipitation: 42 to 56 inches
Mean annual air temperature: 70 to 77 degrees F
Frost-free period: 355 to 365 days
Farmland classification: Not prime farmland

Map Unit Composition

Oldsmar and similar soils: 45 percent
Urban land: 38 percent
Minor components: 17 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Oldsmar

Setting

Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Talf
Down-slope shape: Linear, convex
Across-slope shape: Linear

Parent material: Sandy and loamy marine deposits

Typical profile

A - 0 to 6 inches: sand
E - 6 to 38 inches: sand
Bh - 38 to 50 inches: sand
Btg - 50 to 80 inches: sandy clay loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 6 to 18 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water supply, 0 to 60 inches: Low (about 4.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4w
Hydrologic Soil Group: A/D
Forage suitability group: Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Other vegetative classification: South Florida Flatwoods (R155XY003FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: No

Description of Urban Land

Setting

Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Riser, talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: No parent material

Interpretive groups

Land capability classification (irrigated): None specified
Forage suitability group: Forage suitability group not assigned (G155XB999FL)
Other vegetative classification: Forage suitability group not assigned (G155XB999FL)
Hydric soil rating: Unranked

Minor Components

Immokalee

Percent of map unit: 6 percent
Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Talf
Down-slope shape: Linear, convex
Across-slope shape: Linear

Other vegetative classification: South Florida Flatwoods (R155XY003FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: No

Holopaw

Percent of map unit: 3 percent
Landform: Drainageways on marine terraces, flatwoods on marine terraces
Landform position (three-dimensional): Tread, dip, talf
Down-slope shape: Linear, convex
Across-slope shape: Linear, concave
Other vegetative classification: Slough (R155XY011FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: Yes

Basinger

Percent of map unit: 3 percent
Landform: Depressions on marine terraces
Landform position (three-dimensional): Tread, dip
Down-slope shape: Concave, linear
Across-slope shape: Concave, linear
Other vegetative classification: Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: Yes

Cypress lake

Percent of map unit: 2 percent
Landform: Drainageways on marine terraces, flats on marine terraces
Landform position (three-dimensional): Tread, dip, talf
Down-slope shape: Linear, convex
Across-slope shape: Concave, linear
Other vegetative classification: South Florida Flatwoods (R155XY003FL), Sandy over loamy soils on flats of hydric or mesic lowlands (G155XB241FL)
Hydric soil rating: Yes

Oldsmar

Percent of map unit: 2 percent
Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Talf
Down-slope shape: Linear, convex
Across-slope shape: Linear
Other vegetative classification: South Florida Flatwoods (R155XY003FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: No

Tequesta

Percent of map unit: 1 percent
Landform: Depressions on marine terraces
Landform position (three-dimensional): Tread, dip
Down-slope shape: Concave
Across-slope shape: Concave
Other vegetative classification: Freshwater Marshes and Ponds (R156BY010FL), Organic soils in depressions and on flood plains (G156AC645FL)
Hydric soil rating: Yes

127—Orsino fine sand-Urban land complex, 0 to 5 percent slopes

Map Unit Setting

National map unit symbol: 2x9dp
Elevation: 0 to 130 feet
Mean annual precipitation: 44 to 63 inches
Mean annual air temperature: 66 to 77 degrees F
Frost-free period: 335 to 365 days
Farmland classification: Not prime farmland

Map Unit Composition

Orsino and similar soils: 45 percent
Urban land: 40 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Orsino

Setting

Landform: Ridges on marine terraces, knolls on marine terraces
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve, tread
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Sandy marine deposits and/or eolian deposits

Typical profile

A - 0 to 2 inches: fine sand
E - 2 to 23 inches: fine sand
Bw and Bh/E - 23 to 43 inches: fine sand
Bw - 43 to 62 inches: fine sand
C - 62 to 80 inches: fine sand

Properties and qualities

Slope: 0 to 5 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Very high (19.98 to 50.02 in/hr)
Depth to water table: About 42 to 60 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water supply, 0 to 60 inches: Low (about 4.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: A
Forage suitability group: Sandy soils on rises, knolls, and ridges of mesic uplands (G155XB121FL)
Other vegetative classification: Sand Pine Scrub (R155XY001FL), Sandy soils on rises, knolls, and ridges of mesic uplands (G155XB121FL)
Hydric soil rating: No

Description of Urban Land

Setting

Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Riser, talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: No parent material

Interpretive groups

Land capability classification (irrigated): None specified
Forage suitability group: Forage suitability group not assigned (G155XB999FL)
Other vegetative classification: Forage suitability group not assigned (G155XB999FL)
Hydric soil rating: Unranked

Minor Components

Cassia

Percent of map unit: 5 percent
Landform: Knolls on marine terraces, rises on marine terraces
Landform position (three-dimensional): Tread, talf
Down-slope shape: Convex
Across-slope shape: Linear
Other vegetative classification: Sand Pine Scrub (R155XY001FL), Sandy soils on rises and knolls of mesic uplands (G155XB131FL)
Hydric soil rating: No

Tavares

Percent of map unit: 5 percent
Landform: Flatwoods on marine terraces, hills on marine terraces, knolls on marine terraces, ridges on marine terraces
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve, side slope, tread, rise
Down-slope shape: Convex, linear
Across-slope shape: Linear, convex
Other vegetative classification: Sand Pine Scrub (R155XY001FL), Longleaf Pine-Turkey Oak Hills (R155XY002FL), Sandy soils on rises, knolls, and ridges of mesic uplands (G155XB121FL)
Hydric soil rating: No

Daytona

Percent of map unit: 3 percent
Landform: Knolls on marine terraces, rises on marine terraces
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve, tread, rise
Down-slope shape: Convex
Across-slope shape: Linear

Other vegetative classification: Sand Pine Scrub (R155XY001FL), Sandy soils on rises, knolls, and ridges of mesic uplands (G155XB121FL)
Hydric soil rating: No

Immokalee

Percent of map unit: 2 percent
Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Riser, talf
Down-slope shape: Linear
Across-slope shape: Linear
Other vegetative classification: South Florida Flatwoods (R155XY003FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: No

131—Pompano fine sand-Urban land compex, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: 2x9c9
Elevation: 0 to 100 feet
Mean annual precipitation: 44 to 65 inches
Mean annual air temperature: 70 to 77 degrees F
Frost-free period: 355 to 365 days
Farmland classification: Not prime farmland

Map Unit Composition

Pompano and similar soils: 42 percent
Urban land: 36 percent
Minor components: 22 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Pompano

Setting

Landform: Flats on marine terraces
Landform position (three-dimensional): Tread, dip
Down-slope shape: Linear
Across-slope shape: Concave, linear
Parent material: Sandy marine deposits

Typical profile

A - 0 to 4 inches: fine sand
C - 4 to 80 inches: fine sand

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): High to very high (6.00 to 20.00 in/hr)

Depth to water table: About 3 to 18 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 2 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water supply, 0 to 60 inches: Low (about 4.8 inches)

Interpretive groups
Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4w
Hydrologic Soil Group: A/D
Forage suitability group: Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Other vegetative classification: Slough (R155XY011FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: Yes

Description of Urban Land

Setting
Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Riser, talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: No parent material

Interpretive groups
Land capability classification (irrigated): None specified
Forage suitability group: Forage suitability group not assigned (G155XB999FL)
Other vegetative classification: Forage suitability group not assigned (G155XB999FL)
Hydric soil rating: Unranked

Minor Components

Malabar
Percent of map unit: 4 percent
Landform: Drainageways on flats on marine terraces
Landform position (three-dimensional): Tread, talf, dip
Down-slope shape: Linear
Across-slope shape: Linear, concave
Other vegetative classification: Slough (R155XY011FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: Yes

Anclote
Percent of map unit: 4 percent
Landform: Depressions on marine terraces
Landform position (three-dimensional): Tread, dip
Down-slope shape: Convex, concave
Across-slope shape: Linear, concave
Other vegetative classification: Freshwater Marshes and Ponds (R155XY010FL), Sandy soils on stream terraces, flood plains, or in depressions (G155XB145FL)
Hydric soil rating: Yes

Valkaria

Percent of map unit: 4 percent
Landform: Drainageways on flats on marine terraces
Landform position (three-dimensional): Tread, dip, talf
Down-slope shape: Linear
Across-slope shape: Concave, linear
Other vegetative classification: Slough (R155XY011FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: Yes

Immokalee

Percent of map unit: 3 percent
Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Riser, talf
Down-slope shape: Linear
Across-slope shape: Linear
Other vegetative classification: South Florida Flatwoods (R155XY003FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: No

Myakka

Percent of map unit: 3 percent
Landform: Drainageways on flatwoods on marine terraces
Landform position (three-dimensional): Tread, dip, talf
Down-slope shape: Linear
Across-slope shape: Concave, linear
Other vegetative classification: South Florida Flatwoods (R155XY003FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: No

Pompano

Percent of map unit: 2 percent
Landform: Flats on marine terraces
Landform position (three-dimensional): Tread, talf, dip
Down-slope shape: Linear
Across-slope shape: Linear, concave
Other vegetative classification: Slough (R155XY011FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: No

Riviera

Percent of map unit: 2 percent
Landform: Flats on marine terraces, drainageways on marine terraces
Landform position (three-dimensional): Tread, talf, dip
Down-slope shape: Linear
Across-slope shape: Concave, linear
Other vegetative classification: Slough (R155XY011FL), Sandy over loamy soils on flats of hydric or mesic lowlands (G155XB241FL)
Hydric soil rating: Yes

133—Punta fine sand-Urban land complex, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: 2x9f8
Elevation: 0 to 70 feet
Mean annual precipitation: 45 to 54 inches
Mean annual air temperature: 70 to 77 degrees F
Frost-free period: 360 to 365 days
Farmland classification: Not prime farmland

Map Unit Composition

Punta and similar soils: 48 percent
Urban land: 40 percent
Minor components: 12 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Punta

Setting

Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Tread, talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Sandy marine deposits

Typical profile

A - 0 to 4 inches: fine sand
E - 4 to 57 inches: fine sand
Bh - 57 to 80 inches: fine sand

Properties and qualities

Slope: 1 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: About 6 to 18 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water supply, 0 to 60 inches: Low (about 5.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4w
Hydrologic Soil Group: A/D

Forage suitability group: Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Other vegetative classification: South Florida Flatwoods (R155XY003FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: No

Description of Urban Land

Setting

Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Riser, talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: No parent material

Interpretive groups

Land capability classification (irrigated): None specified
Forage suitability group: Forage suitability group not assigned (G155XB999FL)
Other vegetative classification: Forage suitability group not assigned (G155XB999FL)
Hydric soil rating: Unranked

Minor Components

Immokalee

Percent of map unit: 5 percent
Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Riser, talf
Down-slope shape: Linear
Across-slope shape: Linear
Other vegetative classification: South Florida Flatwoods (R155XY003FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: No

Satellite

Percent of map unit: 3 percent
Landform: Rises on marine terraces, flatwoods on marine terraces
Landform position (three-dimensional): Tread, rise, talf
Down-slope shape: Linear, convex
Across-slope shape: Linear
Other vegetative classification: Sand Pine Scrub (R155XY001FL), Sandy soils on rises and knolls of mesic uplands (G155XB131FL)
Hydric soil rating: No

Punta

Percent of map unit: 2 percent
Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Tread, talf
Down-slope shape: Linear
Across-slope shape: Linear
Other vegetative classification: South Florida Flatwoods (R155XY003FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: No

Myakka

Percent of map unit: 2 percent
Landform: Drainageways on flatwoods on marine terraces

Landform position (three-dimensional): Tread, talf, dip
Down-slope shape: Linear
Across-slope shape: Linear, concave
Other vegetative classification: South Florida Flatwoods (R155XY003FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: No

134—Satellite fine sand-Urban land complex, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: 2x9cl
Elevation: 0 to 80 feet
Mean annual precipitation: 45 to 61 inches
Mean annual air temperature: 68 to 77 degrees F
Frost-free period: 350 to 365 days
Farmland classification: Not prime farmland

Map Unit Composition

Satellite and similar soils: 47 percent
Urban land: 40 percent
Minor components: 13 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Satellite

Setting

Landform: Rises on marine terraces, flatwoods on marine terraces
Landform position (three-dimensional): Tread, rise, talf
Down-slope shape: Convex, linear
Across-slope shape: Linear
Parent material: Sandy marine deposits

Typical profile

A - 0 to 3 inches: fine sand
C1 - 3 to 65 inches: fine sand
C2 - 65 to 80 inches: fine sand

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Very high (20.00 to 50.02 in/hr)
Depth to water table: About 18 to 42 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0

Available water supply, 0 to 60 inches: Low (about 4.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: A
Forage suitability group: Sandy soils on rises and knolls of mesic uplands (G155XB131FL)
Other vegetative classification: Sand Pine Scrub (R155XY001FL), Sandy soils on rises and knolls of mesic uplands (G155XB131FL)
Hydric soil rating: No

Description of Urban Land

Setting

Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Riser, talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: No parent material

Interpretive groups

Land capability classification (irrigated): None specified
Forage suitability group: Forage suitability group not assigned (G155XB999FL)
Other vegetative classification: Forage suitability group not assigned (G155XB999FL)
Hydric soil rating: Unranked

Minor Components

Archbold

Percent of map unit: 3 percent
Landform: Ridges on marine terraces, knolls on marine terraces
Landform position (two-dimensional): Summit, backslope
Landform position (three-dimensional): Side slope, interfluve, tread
Down-slope shape: Convex
Across-slope shape: Linear
Other vegetative classification: Sand Pine Scrub (R155XY001FL), Sandy soils on rises, knolls, and ridges of mesic uplands (G155XB121FL)
Hydric soil rating: No

Daytona

Percent of map unit: 3 percent
Landform: Knolls on marine terraces, rises on marine terraces
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve, tread, rise
Down-slope shape: Convex
Across-slope shape: Linear
Other vegetative classification: Sand Pine Scrub (R155XY001FL), Sandy soils on rises, knolls, and ridges of mesic uplands (G155XB121FL)
Hydric soil rating: No

Basinger

Percent of map unit: 3 percent
Landform: Depressions on marine terraces
Landform position (three-dimensional): Tread, dip
Down-slope shape: Concave, linear

Across-slope shape: Concave, linear
Other vegetative classification: Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: Yes

Myakka

Percent of map unit: 2 percent
Landform: Drainageways on flatwoods on marine terraces
Landform position (three-dimensional): Tread, talf, dip
Down-slope shape: Linear
Across-slope shape: Linear, concave
Other vegetative classification: South Florida Flatwoods (R155XY003FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: No

Oldsmar

Percent of map unit: 2 percent
Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Talf
Down-slope shape: Linear, convex
Across-slope shape: Linear
Other vegetative classification: South Florida Flatwoods (R155XY003FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: No

135—St. Augustine sand-Urban land complex, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: 2x9df
Elevation: 0 to 30 feet
Mean annual precipitation: 45 to 70 inches
Mean annual air temperature: 70 to 77 degrees F
Frost-free period: 360 to 365 days
Farmland classification: Not prime farmland

Map Unit Composition

St. augustine and similar soils: 48 percent
Urban land: 42 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of St. Augustine

Setting

Landform: Marine terraces
Landform position (three-dimensional): Tread, rise
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Sandy mine spoil or earthy fill over sandy marine deposits

Typical profile

^C - 0 to 30 inches: paragravelly sand
2Ab - 30 to 40 inches: paragravelly fine sand
2Cb - 40 to 80 inches: paragravelly fine sand

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat poorly drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 19.98 in/hr)
Depth to water table: About 18 to 42 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 4 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water supply, 0 to 60 inches: Low (about 3.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: A
Forage suitability group: Forage suitability group not assigned (G155XB999FL)
Other vegetative classification: Forage suitability group not assigned (G155XB999FL)
Hydric soil rating: No

Description of Urban Land

Setting

Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Riser, talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: No parent material

Interpretive groups

Land capability classification (irrigated): None specified
Forage suitability group: Forage suitability group not assigned (G155XB999FL)
Other vegetative classification: Forage suitability group not assigned (G155XB999FL)
Hydric soil rating: Unranked

Minor Components

Matlacha

Percent of map unit: 4 percent
Landform: Flats on marine terraces
Landform position (three-dimensional): Tread, talf
Down-slope shape: Convex, linear
Across-slope shape: Linear
Other vegetative classification: Forage suitability group not assigned (G155XB999FL)
Hydric soil rating: No

Samsula

Percent of map unit: 2 percent
Landform: Depressions on marine terraces
Landform position (three-dimensional): Tread, dip
Down-slope shape: Concave
Across-slope shape: Concave
Other vegetative classification: Freshwater Marshes and Ponds (R155XY010FL), Organic soils in depressions and on flood plains (G155XB645FL)
Hydric soil rating: Yes

St. augustine, organic substratum

Percent of map unit: 2 percent
Landform: Marine terraces
Landform position (three-dimensional): Tread, dip
Down-slope shape: Convex
Across-slope shape: Linear
Other vegetative classification: Forage suitability group not assigned (G155XB999FL)
Hydric soil rating: No

Basinger

Percent of map unit: 1 percent
Landform: Depressions on marine terraces
Landform position (three-dimensional): Tread, dip
Down-slope shape: Concave, linear
Across-slope shape: Concave, linear
Other vegetative classification: Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: Yes

Canaveral

Percent of map unit: 1 percent
Landform: Ridges on marine terraces, flats on marine terraces
Landform position (two-dimensional): Summit, backslope
Landform position (three-dimensional): Interfluve, tread, talf
Down-slope shape: Convex, concave
Across-slope shape: Linear
Other vegetative classification: Forage suitability group not assigned (G155XB999FL)
Hydric soil rating: No

137—Wabasso sand-Urban land complex, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: 2x9c6
Elevation: 0 to 60 feet
Mean annual precipitation: 40 to 64 inches
Mean annual air temperature: 70 to 77 degrees F
Frost-free period: 355 to 365 days

Farmland classification: Not prime farmland

Map Unit Composition

Wabasso and similar soils: 45 percent
Urban land: 38 percent
Minor components: 17 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Wabasso

Setting

Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Tread, talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Sandy and loamy marine deposits

Typical profile

A - 0 to 6 inches: sand
E - 6 to 25 inches: sand
Bh - 25 to 30 inches: sand
Btg - 30 to 58 inches: sandy clay loam
Cg - 58 to 80 inches: loamy sand

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 6 to 18 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 5 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water supply, 0 to 60 inches: Moderate (about 6.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: C/D
Forage suitability group: Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Other vegetative classification: South Florida Flatwoods (R155XY003FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: No

Description of Urban Land

Setting

Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Riser, talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: No parent material

Interpretive groups

Land capability classification (irrigated): None specified
Forage suitability group: Forage suitability group not assigned (G155XB999FL)
Other vegetative classification: Forage suitability group not assigned (G155XB999FL)
Hydric soil rating: Unranked

Minor Components

Brynwood

Percent of map unit: 6 percent
Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Tread, talf
Down-slope shape: Linear
Across-slope shape: Linear
Other vegetative classification: South Florida Flatwoods (R155XY003FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: Yes

Cypress lake

Percent of map unit: 5 percent
Landform: Drainageways on marine terraces, flats on marine terraces
Landform position (three-dimensional): Tread, dip, talf
Down-slope shape: Linear, convex
Across-slope shape: Concave, linear
Other vegetative classification: South Florida Flatwoods (R155XY003FL), Sandy over loamy soils on flats of hydric or mesic lowlands (G155XB241FL)
Hydric soil rating: Yes

Pineda

Percent of map unit: 4 percent
Landform: Drainageways on marine terraces, flats on marine terraces
Landform position (three-dimensional): Tread, dip, talf
Down-slope shape: Linear
Across-slope shape: Concave, linear
Other vegetative classification: Slough (R155XY011FL), Sandy over loamy soils on flats of hydric or mesic lowlands (G155XB241FL)
Hydric soil rating: Yes

Wabasso

Percent of map unit: 2 percent
Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Tread, talf
Down-slope shape: Linear
Across-slope shape: Linear
Other vegetative classification: South Florida Flatwoods (R155XY003FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: No

138—Wabasso sand, limestone substratum-Urban land complex, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: 2x9c5
Elevation: 0 to 50 feet
Mean annual precipitation: 46 to 54 inches
Mean annual air temperature: 70 to 77 degrees F
Frost-free period: 360 to 365 days
Farmland classification: Not prime farmland

Map Unit Composition

Wabasso, limestone substratum, and similar soils: 45 percent
Urban land: 38 percent
Minor components: 17 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Wabasso, Limestone Substratum

Setting

Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Tread, talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Sandy and loamy marine deposits over limestone

Typical profile

A - 0 to 6 inches: sand
E - 6 to 25 inches: sand
Bh - 25 to 35 inches: sand
Btg - 35 to 45 inches: sandy clay loam
2R - 45 to 55 inches: bedrock

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: 13 to 54 inches to lithic bedrock
Drainage class: Poorly drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 6 to 18 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water supply, 0 to 60 inches: Low (about 3.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: C/D
Forage suitability group: Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Other vegetative classification: South Florida Flatwoods (R155XY003FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: No

Description of Urban Land

Setting

Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Riser, talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: No parent material

Interpretive groups

Land capability classification (irrigated): None specified
Forage suitability group: Forage suitability group not assigned (G155XB999FL)
Other vegetative classification: Forage suitability group not assigned (G155XB999FL)
Hydric soil rating: Unranked

Minor Components

Cypress lake

Percent of map unit: 6 percent
Landform: Drainageways on marine terraces, flats on marine terraces
Landform position (three-dimensional): Tread, dip, talf
Down-slope shape: Linear, convex
Across-slope shape: Concave, linear
Other vegetative classification: South Florida Flatwoods (R155XY003FL), Sandy over loamy soils on flats of hydric or mesic lowlands (G155XB241FL)
Hydric soil rating: Yes

Gentry

Percent of map unit: 3 percent
Landform: Depressions on marine terraces
Landform position (three-dimensional): Tread, dip
Down-slope shape: Concave
Across-slope shape: Concave
Other vegetative classification: Freshwater Marshes and Ponds (R155XY010FL), Sandy over loamy soils on stream terraces, flood plains, or in depressions (G155XB245FL)
Hydric soil rating: Yes

Brynwood

Percent of map unit: 3 percent
Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Tread, talf
Down-slope shape: Linear
Across-slope shape: Linear

Other vegetative classification: South Florida Flatwoods (R155XY003FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: Yes

Gator

Percent of map unit: 3 percent
Landform: Depressions on marine terraces
Landform position (three-dimensional): Tread, dip
Down-slope shape: Concave
Across-slope shape: Concave
Other vegetative classification: Freshwater Marshes and Ponds (R155XY010FL), Organic soils in depressions and on flood plains (G155XB645FL)
Hydric soil rating: Yes

Wabasso, limestone substratum

Percent of map unit: 2 percent
Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Tread, talf
Down-slope shape: Linear
Across-slope shape: Linear
Other vegetative classification: South Florida Flatwoods (R155XY003FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: No

Sarasota County, Florida

2—Beaches

Map Unit Setting

National map unit symbol: 2y9hw
Elevation: 0 to 10 feet
Mean annual precipitation: 55 to 63 inches
Mean annual air temperature: 70 to 77 degrees F
Frost-free period: 360 to 365 days
Farmland classification: Not prime farmland

Map Unit Composition

Beaches: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Beaches

Setting

Landform: Beaches on marine terraces
Landform position (three-dimensional): Tread, rise
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Beach sand

Properties and qualities

Slope: 1 to 5 percent
Drainage class: Poorly drained
Runoff class: Very high
Depth to water table: About 0 to 50 inches
Frequency of flooding: Frequent

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8
Forage suitability group: Forage suitability group not assigned (G155XB999FL)
Other vegetative classification: Forage suitability group not assigned (G155XB999FL)
Hydric soil rating: Unranked

3—Cypress Lake and Brynwood soils, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: 2zldk
Elevation: 0 to 40 feet
Mean annual precipitation: 55 to 63 inches
Mean annual air temperature: 70 to 77 degrees F
Frost-free period: 355 to 365 days
Farmland classification: Not prime farmland

Map Unit Composition

Cypress lake and similar soils: 45 percent
Brynwood and similar soils: 35 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Cypress Lake

Setting

Landform: Flats on marine terraces
Landform position (three-dimensional): Tread, talf
Down-slope shape: Linear, convex
Across-slope shape: Linear
Parent material: Sandy and loamy marine deposits over limestone

Typical profile

A - 0 to 4 inches: fine sand
E - 4 to 18 inches: fine sand
E/B - 18 to 22 inches: fine sand
Btkg - 22 to 25 inches: fine sandy loam
Ckg - 25 to 32 inches: loamy fine sand
2R - 32 to 42 inches: bedrock

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: 8 to 53 inches to lithic bedrock
Drainage class: Poorly drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: About 1 to 18 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 4 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water supply, 0 to 60 inches: Low (about 3.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: C/D
Forage suitability group: Sandy over loamy soils on flats of hydric or mesic lowlands (G155XB241FL)
Other vegetative classification: South Florida Flatwoods (R155XY003FL), Sandy over loamy soils on flats of hydric or mesic lowlands (G155XB241FL)
Hydric soil rating: No

Description of Brynwood

Setting

Landform: Flats on marine terraces
Landform position (three-dimensional): Tread, talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Sandy marine deposits over limestone

Typical profile

A - 0 to 4 inches: fine sand
Bw - 4 to 10 inches: fine sand
Ckg - 10 to 14 inches: fine sand
2R - 14 to 24 inches: bedrock

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: 4 to 30 inches to lithic bedrock
Drainage class: Poorly drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 6.00 in/hr)
Depth to water table: About 6 to 30 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 4 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water supply, 0 to 60 inches: Very low (about 1.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4w
Hydrologic Soil Group: C/D
Forage suitability group: Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Other vegetative classification: South Florida Flatwoods (R155XY003FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: No

Minor Components

Rock outcrop

Percent of map unit: 5 percent
Hydric soil rating: No

Felda

Percent of map unit: 5 percent
Landform: Drainageways on marine terraces, flats on marine terraces
Landform position (three-dimensional): Tread, dip, talf
Down-slope shape: Linear
Across-slope shape: Concave, linear
Other vegetative classification: Slough (R155XY011FL), Sandy over loamy soils on flats of hydric or mesic lowlands (G155XB241FL)
Hydric soil rating: Yes

Pineda

Percent of map unit: 5 percent
Landform: Flats on marine terraces, drainageways on marine terraces
Landform position (three-dimensional): Tread, talf, dip
Down-slope shape: Linear
Across-slope shape: Linear, concave
Other vegetative classification: Slough (R155XY011FL), Sandy over loamy soils on flats of hydric or mesic lowlands (G155XB241FL)
Hydric soil rating: Yes

Pompano

Percent of map unit: 5 percent
Landform: Depressions on marine terraces
Landform position (three-dimensional): Tread, dip
Down-slope shape: Concave
Across-slope shape: Concave
Other vegetative classification: Freshwater Marshes and Ponds (R155XY010FL), Sandy soils on stream terraces, flood plains, or in depressions (G155XB145FL)
Hydric soil rating: Yes

4—Bradenton fine sand, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: 2svzf
Elevation: 0 to 130 feet
Mean annual precipitation: 45 to 63 inches
Mean annual air temperature: 70 to 77 degrees F
Frost-free period: 350 to 365 days
Farmland classification: Not prime farmland

Map Unit Composition

Bradenton and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Bradenton

Setting

Landform: Flats on marine terraces
Landform position (three-dimensional): Tread, talf
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Sandy and loamy marine deposits

Typical profile

A - 0 to 4 inches: fine sand
E - 4 to 10 inches: fine sand
Btg - 10 to 19 inches: fine sandy loam
Btkg - 19 to 26 inches: fine sandy loam
Ckg - 26 to 80 inches: fine sandy loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)

Depth to water table: About 3 to 18 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 4 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water supply, 0 to 60 inches: Moderate (about 7.3 inches)

Interpretive groups
Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: B/D
Forage suitability group: Loamy and clayey soils on flats of hydric or mesic lowlands (G155XB341FL)
Other vegetative classification: Wetland Hardwood Hammock (R155XY012FL), South Florida Flatwoods (R155XY003FL), Loamy and clayey soils on flats of hydric or mesic lowlands (G155XB341FL)
Hydric soil rating: Yes

Minor Components

Felda
Percent of map unit: 5 percent
Landform: Flats on marine terraces, drainageways on marine terraces
Landform position (three-dimensional): Tread, talf, dip
Down-slope shape: Linear
Across-slope shape: Linear, concave
Other vegetative classification: Slough (R155XY011FL), Sandy over loamy soils on flats of hydric or mesic lowlands (G155XB241FL)
Hydric soil rating: Yes

Malabar
Percent of map unit: 4 percent
Landform: — error in exists on —
Landform position (three-dimensional): Tread, talf, dip
Down-slope shape: Linear, concave
Across-slope shape: Linear, concave
Other vegetative classification: Slough (R155XY011FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: Yes

Floridana
Percent of map unit: 3 percent
Landform: Depressions on marine terraces
Landform position (three-dimensional): Tread, dip
Down-slope shape: Linear, concave
Across-slope shape: Linear, concave
Other vegetative classification: Freshwater Marshes and Ponds (R155XY010FL), Sandy over loamy soils on stream terraces, flood plains, or in depressions (G155XB245FL)
Hydric soil rating: Yes

Wabasso
Percent of map unit: 2 percent
Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Tread, talf
Down-slope shape: Linear, convex

Across-slope shape: Linear
Other vegetative classification: South Florida Flatwoods (R155XY003FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: No

Pineda

Percent of map unit: 1 percent
Landform: Flats on marine terraces, drainageways on marine terraces
Landform position (three-dimensional): Tread, talf, dip
Down-slope shape: Linear
Across-slope shape: Linear, concave
Other vegetative classification: Slough (R155XY011FL), Sandy over loamy soils on flats of hydric or mesic lowlands (G155XB241FL)
Hydric soil rating: Yes

6—Canaveral fine sand, 0 to 5 percent slopes

Map Unit Setting

National map unit symbol: 2x9fd
Elevation: 0 to 130 feet
Mean annual precipitation: 42 to 63 inches
Mean annual air temperature: 68 to 77 degrees F
Frost-free period: 350 to 365 days
Farmland classification: Not prime farmland

Map Unit Composition

Canaveral and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Canaveral

Setting

Landform: Flats on marine terraces, ridges on marine terraces
Landform position (two-dimensional): Summit, backslope
Landform position (three-dimensional): Interfluve, tread, talf
Down-slope shape: Convex, concave
Across-slope shape: Linear
Parent material: Sandy marine deposits

Typical profile

A - 0 to 5 inches: fine sand
C - 5 to 17 inches: fine sand
Ck1 - 17 to 49 inches: paragravelly fine sand
Ck2 - 49 to 80 inches: very paragravelly fine sand

Properties and qualities

Slope: 0 to 5 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat poorly drained
Runoff class: Negligible

Capacity of the most limiting layer to transmit water (Ksat): Very high (19.98 to 39.96 in/hr)
Depth to water table: About 18 to 42 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 4 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 5.0
Available water supply, 0 to 60 inches: Low (about 4.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: A
Forage suitability group: Forage suitability group not assigned (G155XB999FL)
Other vegetative classification: Forage suitability group not assigned (G155XB999FL)
Hydric soil rating: No

Minor Components

St. augustine

Percent of map unit: 6 percent
Landform: Marine terraces
Landform position (three-dimensional): Tread, rise
Down-slope shape: Linear
Across-slope shape: Convex
Other vegetative classification: Forage suitability group not assigned (G155XB999FL)
Hydric soil rating: No

Pompano

Percent of map unit: 3 percent
Landform: Depressions on marine terraces
Landform position (three-dimensional): Tread, dip
Down-slope shape: Concave
Across-slope shape: Concave
Other vegetative classification: Freshwater Marshes and Ponds (R155XY010FL), Sandy soils on stream terraces, flood plains, or in depressions (G155XB145FL)
Hydric soil rating: Yes

Myakka

Percent of map unit: 3 percent
Landform: Drainageways on flatwoods on marine terraces
Landform position (three-dimensional): Tread, talf, dip
Down-slope shape: Linear
Across-slope shape: Linear, concave
Other vegetative classification: South Florida Flatwoods (R155XY003FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: No

Palm beach

Percent of map unit: 2 percent
Landform: Ridges on marine terraces, dunes on marine terraces
Landform position (two-dimensional): Summit, backslope
Landform position (three-dimensional): Side slope, tread

Down-slope shape: Convex, linear
Across-slope shape: Linear, convex
Other vegetative classification: Sandy soils on ridges and dunes of xeric uplands (G156BC111FL)
Hydric soil rating: No

Captiva

Percent of map unit: 1 percent
Landform: Flats on marine terraces
Landform position (three-dimensional): Tread, talf
Down-slope shape: Linear
Across-slope shape: Concave
Other vegetative classification: Slough (R155XY011FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: Yes

7—Cassia fine sand, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: 2tzx6
Elevation: 0 to 110 feet
Mean annual precipitation: 42 to 63 inches
Mean annual air temperature: 68 to 77 degrees F
Frost-free period: 350 to 365 days
Farmland classification: Not prime farmland

Map Unit Composition

Cassia and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Cassia

Setting

Landform: Knolls on flatwoods on marine terraces, rises on flatwoods on marine terraces
Landform position (three-dimensional): Tread, talf, rise
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Sandy marine deposits

Typical profile

A - 0 to 5 inches: fine sand
E - 5 to 26 inches: fine sand
Bh - 26 to 42 inches: fine sand
C - 42 to 80 inches: fine sand

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat poorly drained

Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 5.95 in/hr)
Depth to water table: About 18 to 42 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water supply, 0 to 60 inches: Low (about 5.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: A
Forage suitability group: Sandy soils on rises and knolls of mesic uplands (G155XB131FL)
Other vegetative classification: Sand Pine Scrub (R155XY001FL), Sandy soils on rises and knolls of mesic uplands (G155XB131FL)
Hydric soil rating: No

Minor Components

Myakka

Percent of map unit: 7 percent
Landform: Drainageways on flatwoods on marine terraces
Landform position (three-dimensional): Tread, talf, dip
Down-slope shape: Linear
Across-slope shape: Linear, concave
Other vegetative classification: South Florida Flatwoods (R155XY003FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: No

Pomello

Percent of map unit: 6 percent
Landform: Knolls on marine terraces, ridges on marine terraces
Landform position (two-dimensional): Summit, backslope
Landform position (three-dimensional): Interfluve, side slope, riser
Down-slope shape: Convex, linear
Across-slope shape: Linear
Other vegetative classification: Sand Pine Scrub (R155XY001FL), Sandy soils on rises and knolls of mesic uplands (G155XB131FL)
Hydric soil rating: No

Satellite

Percent of map unit: 4 percent
Landform: Rises on marine terraces, flatwoods on marine terraces
Landform position (three-dimensional): Tread, rise, talf
Down-slope shape: Linear, convex
Across-slope shape: Linear
Other vegetative classification: Sand Pine Scrub (R155XY001FL), Sandy soils on rises and knolls of mesic uplands (G155XB131FL)
Hydric soil rating: No

Jonathan

Percent of map unit: 3 percent
Landform: Ridges on marine terraces, knolls on marine terraces
Landform position (two-dimensional): Summit

Landform position (three-dimensional): Interfluve, tread, rise
Down-slope shape: Convex
Across-slope shape: Linear
Other vegetative classification: Sandy soils on rises, knolls, and ridges of mesic uplands (G155XB121FL)
Hydric soil rating: No

8—Delray fine sand, frequently ponded, 0 to 1 percent slopes

Map Unit Setting

National map unit symbol: 2y9g4
Elevation: 10 to 100 feet
Mean annual precipitation: 45 to 63 inches
Mean annual air temperature: 68 to 77 degrees F
Frost-free period: 335 to 365 days
Farmland classification: Not prime farmland

Map Unit Composition

Delray and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Delray

Setting

Landform: Depressions on marine terraces
Landform position (three-dimensional): Tread, dip
Down-slope shape: Linear
Across-slope shape: Concave, linear
Parent material: Sandy and loamy marine deposits

Typical profile

A - 0 to 16 inches: fine sand
E - 16 to 60 inches: fine sand
Btg - 60 to 80 inches: sandy clay loam

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Very poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: None
Frequency of ponding: Frequent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water supply, 0 to 60 inches: Low (about 4.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7w
Hydrologic Soil Group: A/D
Forage suitability group: Sandy soils on stream terraces, flood plains, or in depressions (G155XB145FL)
Other vegetative classification: Freshwater Marshes and Ponds (R155XY010FL), Sandy soils on stream terraces, flood plains, or in depressions (G155XB145FL)
Hydric soil rating: Yes

Minor Components

Pompano

Percent of map unit: 7 percent
Landform: Depressions on marine terraces
Landform position (three-dimensional): Tread, dip
Down-slope shape: Concave
Across-slope shape: Concave
Other vegetative classification: Freshwater Marshes and Ponds (R155XY010FL), Sandy soils on stream terraces, flood plains, or in depressions (G155XB145FL)
Hydric soil rating: Yes

Placid

Percent of map unit: 5 percent
Landform: Drainageways on marine terraces, depressions on marine terraces
Landform position (three-dimensional): Tread, dip
Down-slope shape: Concave
Across-slope shape: Concave
Other vegetative classification: Freshwater Marshes and Ponds (R155XY010FL), Sandy soils on stream terraces, flood plains, or in depressions (G155XB145FL)
Hydric soil rating: Yes

Gator

Percent of map unit: 3 percent
Landform: Depressions on marine terraces
Landform position (three-dimensional): Tread, dip
Down-slope shape: Concave
Across-slope shape: Concave
Other vegetative classification: Freshwater Marshes and Ponds (R155XY010FL), Organic soils in depressions and on flood plains (G155XB645FL)
Hydric soil rating: Yes

10—EauGallie, Myakka fine sands and 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: 2y9g6
Elevation: 0 to 130 feet

Mean annual precipitation: 38 to 68 inches
Mean annual air temperature: 68 to 77 degrees F
Frost-free period: 350 to 365 days
Farmland classification: Farmland of unique importance

Map Unit Composition

Eaugallie and similar soils: 45 percent
Myakka and similar soils: 40 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Eaugallie

Setting

Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Talf
Down-slope shape: Linear, convex
Across-slope shape: Linear
Parent material: Sandy and loamy marine deposits

Typical profile

A - 0 to 6 inches: fine sand
E - 6 to 22 inches: fine sand
Bh - 22 to 44 inches: fine sand
E' - 44 to 48 inches: fine sand
Btg - 48 to 66 inches: sandy loam
Cg - 66 to 80 inches: loamy fine sand

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.60 in/hr)
Depth to water table: About 6 to 18 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water supply, 0 to 60 inches: Moderate (about 6.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4w
Hydrologic Soil Group: B/D
Forage suitability group: Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Other vegetative classification: South Florida Flatwoods (R155XY003FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: No

Description of Myakka

Setting

Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Talf

Down-slope shape: Linear, convex
Across-slope shape: Linear
Parent material: Sandy marine deposits

Typical profile

A - 0 to 6 inches: fine sand
E - 6 to 24 inches: fine sand
Bh - 24 to 42 inches: fine sand
Bw - 42 to 60 inches: fine sand
Cg - 60 to 80 inches: fine sand

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)
Depth to water table: About 6 to 18 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water supply, 0 to 60 inches: Low (about 5.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4w
Hydrologic Soil Group: A/D
Forage suitability group: Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Other vegetative classification: South Florida Flatwoods (R155XY003FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: No

Minor Components

Ona

Percent of map unit: 4 percent
Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Tread, talf
Down-slope shape: Linear
Across-slope shape: Linear
Other vegetative classification: Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: No

Basinger

Percent of map unit: 4 percent
Landform: Flats on marine terraces, drainageways on marine terraces
Landform position (three-dimensional): Tread, talf, dip
Down-slope shape: Convex, concave
Across-slope shape: Linear, concave
Other vegetative classification: Slough (R155XY011FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: Yes

Cassia

Percent of map unit: 4 percent
Landform: Knolls on marine terraces, rises on marine terraces
Landform position (three-dimensional): Tread, talf
Down-slope shape: Convex
Across-slope shape: Linear
Other vegetative classification: Sand Pine Scrub (R155XY001FL), Sandy soils on rises and knolls of mesic uplands (G155XB131FL)
Hydric soil rating: No

Wabasso

Percent of map unit: 3 percent
Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Tread, talf
Down-slope shape: Linear, convex
Across-slope shape: Linear
Other vegetative classification: South Florida Flatwoods (R155XY003FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: No

11—Felda, wet-Felda fine sand complex, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: 2y9g8
Elevation: 0 to 190 feet
Mean annual precipitation: 55 to 63 inches
Mean annual air temperature: 70 to 77 degrees F
Frost-free period: 350 to 365 days
Farmland classification: Not prime farmland

Map Unit Composition

Felda, wet, and similar soils: 65 percent
Felda and similar soils: 20 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Felda, Wet

Setting

Landform: Flats on marine terraces, drainageways on marine terraces
Landform position (three-dimensional): Tread, talf, dip
Down-slope shape: Linear
Across-slope shape: Linear, concave
Parent material: Sandy and loamy marine deposits

Typical profile

A - 0 to 4 inches: fine sand
Eg - 4 to 35 inches: fine sand
Btg - 35 to 43 inches: fine sandy loam

Cg - 43 to 80 inches: extremely paragravelly fine sand

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Very poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 6.00 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: None
Frequency of ponding: Frequent
Calcium carbonate, maximum content: 4 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water supply, 0 to 60 inches: Low (about 5.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: A/D
Forage suitability group: Sandy over loamy soils on flats of hydric or mesic lowlands (G155XB241FL)
Other vegetative classification: Slough (R155XY011FL), Sandy over loamy soils on flats of hydric or mesic lowlands (G155XB241FL)
Hydric soil rating: Yes

Description of Felda

Setting

Landform: Flats on marine terraces
Landform position (three-dimensional): Tread, talf
Down-slope shape: Linear, convex
Across-slope shape: Linear
Parent material: Sandy and loamy marine deposits

Typical profile

A - 0 to 4 inches: fine sand
Eg - 4 to 35 inches: fine sand
Btg - 35 to 43 inches: fine sandy loam
Cg - 43 to 80 inches: extremely paragravelly fine sand

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 6.00 in/hr)
Depth to water table: About 6 to 18 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 4 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water supply, 0 to 60 inches: Low (about 5.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: A/D
Forage suitability group: Sandy over loamy soils on flats of hydric or mesic lowlands (G155XB241FL)
Other vegetative classification: Slough (R155XY011FL), Sandy over loamy soils on flats of hydric or mesic lowlands (G155XB241FL)
Hydric soil rating: No

Minor Components

Holopaw

Percent of map unit: 5 percent
Landform: Depressions on marine terraces
Landform position (three-dimensional): Tread, dip
Down-slope shape: Concave, linear
Across-slope shape: Concave, linear
Other vegetative classification: Freshwater Marshes and Ponds (R155XY010FL), Sandy soils on stream terraces, flood plains, or in depressions (G155XB145FL)
Hydric soil rating: Yes

Myakka

Percent of map unit: 5 percent
Landform: Drainageways on flatwoods on marine terraces
Landform position (three-dimensional): Tread, talf, dip
Down-slope shape: Linear
Across-slope shape: Linear, concave
Other vegetative classification: South Florida Flatwoods (R155XY003FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: No

Bradenton

Percent of map unit: 5 percent
Landform: Flats on marine terraces, drainageways on marine terraces
Landform position (three-dimensional): Tread, talf, dip
Down-slope shape: Convex, linear
Across-slope shape: Linear, concave
Other vegetative classification: Wetland Hardwood Hammock (R155XY012FL), South Florida Flatwoods (R155XY003FL), Loamy and clayey soils on flats of hydric or mesic lowlands (G155XB341FL)
Hydric soil rating: Yes

12—Felda fine sand, frequently ponded, 0 to 1 percent slopes

Map Unit Setting

National map unit symbol: 2tzxb
Elevation: 0 to 150 feet

Mean annual precipitation: 46 to 63 inches
Mean annual air temperature: 68 to 77 degrees F
Frost-free period: 335 to 365 days
Farmland classification: Not prime farmland

Map Unit Composition

Felda and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Felda

Setting

Landform: Flats on marine terraces, depressions on marine terraces
Landform position (three-dimensional): Tread, talf, dip
Down-slope shape: Linear
Across-slope shape: Linear, concave
Parent material: Sandy and loamy marine deposits

Typical profile

A - 0 to 7 inches: fine sand
Eg - 7 to 24 inches: fine sand
Btg - 24 to 36 inches: fine sandy loam
Cg - 36 to 80 inches: fine sand

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Very poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 6.00 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: None
Frequency of ponding: Frequent
Calcium carbonate, maximum content: 2 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water supply, 0 to 60 inches: Low (about 5.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7w
Hydrologic Soil Group: A/D
Forage suitability group: Sandy over loamy soils on stream terraces, flood plains, or in depressions (G155XB245FL)
Other vegetative classification: Freshwater Marshes and Ponds (R155XY010FL), Sandy over loamy soils on stream terraces, flood plains, or in depressions (G155XB245FL)
Hydric soil rating: Yes

Minor Components

Floridana

Percent of map unit: 5 percent
Landform: Depressions on marine terraces
Landform position (three-dimensional): Tread, dip

Down-slope shape: Concave
Across-slope shape: Concave
Other vegetative classification: Freshwater Marshes and Ponds (R155XY010FL), Sandy over loamy soils on stream terraces, flood plains, or in depressions (G155XB245FL)
Hydric soil rating: Yes

Basinger

Percent of map unit: 3 percent
Landform: Depressions on marine terraces
Landform position (three-dimensional): Tread, dip
Down-slope shape: Linear, concave
Across-slope shape: Linear, concave
Other vegetative classification: Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: Yes

Winder

Percent of map unit: 2 percent
Landform: Depressions on marine terraces
Landform position (three-dimensional): Tread, dip
Down-slope shape: Linear, concave
Across-slope shape: Linear, concave
Other vegetative classification: Freshwater Marshes and Ponds (R155XY010FL), Loamy and clayey soils on stream terraces, flood plains, or in depressions (G155XB345FL)
Hydric soil rating: Yes

Eaton

Percent of map unit: 2 percent
Landform: Depressions on marine terraces
Landform position (three-dimensional): Talf, dip
Down-slope shape: Linear, concave
Across-slope shape: Linear, concave
Other vegetative classification: Freshwater Marshes and Ponds (R154XY010FL), Loamy and clayey soils on stream terraces, flood plains, or in depressions (G154XB345FL)
Hydric soil rating: Yes

Sanibel

Percent of map unit: 1 percent
Landform: Depressions on marine terraces
Landform position (three-dimensional): Tread, dip
Down-slope shape: Linear, concave
Across-slope shape: Concave
Other vegetative classification: Organic soils in depressions and on flood plains (G155XB645FL)
Hydric soil rating: Yes

Myakka

Percent of map unit: 1 percent
Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Tread, talf
Down-slope shape: Linear
Across-slope shape: Linear
Other vegetative classification: South Florida Flatwoods (R155XY003FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)

Hydric soil rating: No

Kaliga

Percent of map unit: 1 percent
Landform: Depressions on marine terraces
Landform position (three-dimensional): Tread, dip
Down-slope shape: Linear, concave
Across-slope shape: Linear, concave
Other vegetative classification: Freshwater Marshes and Ponds (R155XY010FL), Organic soils in depressions and on flood plains (G155XB645FL)
Hydric soil rating: Yes

15—Floridana and Gator soils, frequently ponded, 0 to 1 percent slopes

Map Unit Setting

National map unit symbol: 2y9gb
Elevation: 0 to 70 feet
Mean annual precipitation: 55 to 63 inches
Mean annual air temperature: 70 to 77 degrees F
Frost-free period: 350 to 365 days
Farmland classification: Not prime farmland

Map Unit Composition

Floridana and similar soils: 75 percent
Gator and similar soils: 25 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Floridana

Setting

Landform: Depressions on marine terraces
Landform position (three-dimensional): Tread, dip
Down-slope shape: Concave, linear
Across-slope shape: Concave, linear
Parent material: Sandy and loamy marine deposits

Typical profile

A1 - 0 to 5 inches: mucky fine sand
A2 - 5 to 14 inches: fine sand
Eg - 14 to 36 inches: fine sand
Btg - 36 to 52 inches: sandy clay loam
Cg - 52 to 80 inches: sandy loam

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Very poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 0 inches

Frequency of flooding: None
Frequency of ponding: Frequent
Calcium carbonate, maximum content: 4 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water supply, 0 to 60 inches: Moderate (about 7.0 inches)

Interpretive groups
Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7w
Hydrologic Soil Group: C/D
Forage suitability group: Sandy over loamy soils on stream terraces, flood plains, or in depressions (G155XB245FL)
Other vegetative classification: Freshwater Marshes and Ponds (R155XY010FL), Sandy over loamy soils on stream terraces, flood plains, or in depressions (G155XB245FL)
Hydric soil rating: Yes

Description of Gator

Setting
Landform: Depressions on marine terraces
Landform position (three-dimensional): Tread, dip
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Herbaceous organic material over sandy and loamy marine deposits

Typical profile
Oa - 0 to 22 inches: muck
Cg1 - 22 to 36 inches: loamy fine sand
Cg2 - 36 to 60 inches: sandy clay loam
Ckg3 - 60 to 80 inches: fine sand

Properties and qualities
Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Very poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: None
Frequency of ponding: Frequent
Calcium carbonate, maximum content: 4 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water supply, 0 to 60 inches: Very high (about 14.2 inches)

Interpretive groups
Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: C/D
Forage suitability group: Organic soils in depressions and on flood plains (G155XB645FL)
Other vegetative classification: Freshwater Marshes and Ponds (R155XY010FL), Organic soils in depressions and on flood plains (G155XB645FL)

Hydric soil rating: Yes

17—Gator-Gator, drained mucks, frequently ponded, 0 to 1 percent slopes

Map Unit Setting

National map unit symbol: 2y9gc
Elevation: 0 to 140 feet
Mean annual precipitation: 45 to 63 inches
Mean annual air temperature: 68 to 77 degrees F
Frost-free period: 335 to 365 days
Farmland classification: Not prime farmland

Map Unit Composition

Gator and similar soils: 45 percent
Gator, drained, and similar soils: 40 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Gator

Setting

Landform: Depressions on marine terraces
Landform position (three-dimensional): Tread, dip
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Herbaceous organic material over sandy and loamy marine deposits

Typical profile

Oa - 0 to 22 inches: muck
Cg1 - 22 to 36 inches: loamy fine sand
Cg2 - 36 to 60 inches: sandy clay loam
Cg3 - 60 to 80 inches: fine sand

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Very poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 0 to 6 inches
Frequency of flooding: None
Frequency of ponding: Frequent
Calcium carbonate, maximum content: 4 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water supply, 0 to 60 inches: Very high (about 14.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: C/D
Forage suitability group: Organic soils in depressions and on flood plains (G155XB645FL)
Other vegetative classification: Freshwater Marshes and Ponds (R155XY010FL), Organic soils in depressions and on flood plains (G155XB645FL)
Hydric soil rating: Yes

Description of Gator, Drained

Setting

Landform: Depressions on marine terraces
Landform position (three-dimensional): Tread, dip
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Herbaceous organic material over sandy and loamy marine deposits

Typical profile

Oa - 0 to 22 inches: muck
Cg1 - 22 to 36 inches: loamy fine sand
Cg2 - 36 to 60 inches: sandy clay loam
Cg3 - 60 to 80 inches: fine sand

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Very poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 12 to 36 inches
Frequency of flooding: None
Frequency of ponding: Frequent
Calcium carbonate, maximum content: 4 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water supply, 0 to 60 inches: Very high (about 14.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: A
Forage suitability group: Organic soils in depressions and on flood plains (G155XB645FL)
Other vegetative classification: Freshwater Marshes and Ponds (R155XY010FL), Organic soils in depressions and on flood plains (G155XB645FL)
Hydric soil rating: Yes

Minor Components

Floridana

Percent of map unit: 5 percent
Landform: Depressions on marine terraces

Landform position (three-dimensional): Tread, dip
Down-slope shape: Linear, concave
Across-slope shape: Linear, concave
Other vegetative classification: Freshwater Marshes and Ponds (R155XY010FL), Sandy over loamy soils on stream terraces, flood plains, or in depressions (G155XB245FL)
Hydric soil rating: Yes

Manatee, I

Percent of map unit: 5 percent
Landform: Drainageways on marine terraces, depressions on marine terraces
Landform position (three-dimensional): Tread, dip
Down-slope shape: Linear, convex, concave
Across-slope shape: Concave, linear
Other vegetative classification: Freshwater Marshes and Ponds (R155XY010FL), Loamy and clayey soils on stream terraces, flood plains, or in depressions (G155XB345FL)
Hydric soil rating: Yes

Delray

Percent of map unit: 5 percent
Landform: Depressions on marine terraces
Landform position (three-dimensional): Tread, dip
Down-slope shape: Linear, convex
Across-slope shape: Concave, linear
Other vegetative classification: Freshwater Marshes and Ponds (R155XY010FL), Sandy soils on stream terraces, flood plains, or in depressions (G155XB145FL)
Hydric soil rating: Yes

21—Ft. Green fine sand, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: 2y9gg
Elevation: 0 to 130 feet
Mean annual precipitation: 55 to 63 inches
Mean annual air temperature: 68 to 77 degrees F
Frost-free period: 350 to 365 days
Farmland classification: Not prime farmland

Map Unit Composition

Ft. green and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Ft. Green

Setting

Landform: Flatwoods on marine terraces

Landform position (three-dimensional): Tread, talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Sandy and loamy marine deposits

Typical profile

A - 0 to 6 inches: fine sand
E1 - 6 to 17 inches: fine sand
E2 - 17 to 31 inches: fine sand
Btg1 - 31 to 42 inches: cobbly sandy clay loam
Btg2 - 42 to 52 inches: sandy clay loam
Btg3 - 52 to 80 inches: fine sandy loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.60 in/hr)
Depth to water table: About 6 to 18 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water supply, 0 to 60 inches: Moderate (about 6.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: C/D
Forage suitability group: Sandy over loamy soils on flats of hydric or mesic lowlands (G155XB241FL)
Other vegetative classification: South Florida Flatwoods (R155XY003FL), Sandy over loamy soils on flats of hydric or mesic lowlands (G155XB241FL)
Hydric soil rating: No

Minor Components

Holopaw

Percent of map unit: 5 percent
Landform: Flatwoods on marine terraces, drainageways on marine terraces
Landform position (three-dimensional): Tread, talf, dip
Down-slope shape: Linear
Across-slope shape: Linear, concave
Other vegetative classification: Slough (R155XY011FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: No

Wabasso

Percent of map unit: 5 percent
Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Tread, talf
Down-slope shape: Linear, convex
Across-slope shape: Linear
Other vegetative classification: South Florida Flatwoods (R155XY003FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)

Hydric soil rating: No

Malabar

Percent of map unit: 5 percent
Landform: — error in exists on —
Landform position (three-dimensional): Tread, talf, dip
Down-slope shape: Linear, concave
Across-slope shape: Linear, concave
Other vegetative classification: Slough (R155XY011FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: Yes

Eaugallie

Percent of map unit: 5 percent
Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Tread, talf
Down-slope shape: Convex
Across-slope shape: Linear
Other vegetative classification: South Florida Flatwoods (R155XY003FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: No

22—Holopaw fine sand, frequently ponded, 0 to 1 percent slopes

Map Unit Setting

National map unit symbol: 2x9g8
Elevation: 0 to 190 feet
Mean annual precipitation: 46 to 63 inches
Mean annual air temperature: 68 to 77 degrees F
Frost-free period: 350 to 365 days
Farmland classification: Not prime farmland

Map Unit Composition

Holopaw and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Holopaw

Setting

Landform: Depressions on marine terraces
Landform position (three-dimensional): Tread, dip
Down-slope shape: Concave
Across-slope shape: Linear, concave
Parent material: Sandy and loamy marine deposits

Typical profile

A - 0 to 4 inches: fine sand
Eg - 4 to 50 inches: fine sand
Btg - 50 to 66 inches: fine sandy loam
Cg - 66 to 80 inches: loamy fine sand

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Very poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: None
Frequency of ponding: Frequent
Calcium carbonate, maximum content: 4 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water supply, 0 to 60 inches: Low (about 5.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7w
Hydrologic Soil Group: A/D
Forage suitability group: Sandy soils on stream terraces, flood plains, or in depressions (G155XB145FL)
Other vegetative classification: Freshwater Marshes and Ponds (R155XY010FL), Sandy soils on stream terraces, flood plains, or in depressions (G155XB145FL)
Hydric soil rating: Yes

Minor Components

Basinger

Percent of map unit: 6 percent
Landform: Drainageways on marine terraces, flats on marine terraces
Landform position (three-dimensional): Tread, dip, talf
Down-slope shape: Concave, convex
Across-slope shape: Linear, concave
Other vegetative classification: Slough (R155XY011FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: Yes

Riviera

Percent of map unit: 4 percent
Landform: Depressions on marine terraces
Landform position (three-dimensional): Tread, dip
Down-slope shape: Concave
Across-slope shape: Concave
Other vegetative classification: Freshwater Marshes and Ponds (R155XY010FL), Sandy over loamy soils on stream terraces, flood plains, or in depressions (G155XB245FL)
Hydric soil rating: Yes

Floridana

Percent of map unit: 3 percent
Landform: Depressions on marine terraces
Landform position (three-dimensional): Tread, dip
Down-slope shape: Concave
Across-slope shape: Linear, concave

Other vegetative classification: Freshwater Marshes and Ponds (R155XY010FL), Sandy over loamy soils on stream terraces, flood plains, or in depressions (G155XB245FL)
Hydric soil rating: Yes

Manatee

Percent of map unit: 2 percent
Landform: Depressions on marine terraces
Landform position (three-dimensional): Tread, dip
Down-slope shape: Concave
Across-slope shape: Linear, concave
Other vegetative classification: Freshwater Marshes and Ponds (R155XY010FL), Loamy and clayey soils on stream terraces, flood plains, or in depressions (G155XB345FL)
Hydric soil rating: Yes

24—Kesson, Wulfert mucks, Tidal and 0 to 1 percent slopes

Map Unit Setting

National map unit symbol: 2y9gk
Elevation: 0 to 10 feet
Mean annual precipitation: 55 to 63 inches
Mean annual air temperature: 70 to 77 degrees F
Frost-free period: 360 to 365 days
Farmland classification: Not prime farmland

Map Unit Composition

Kesson, tidal, and similar soils: 50 percent
Wulfert, tidal, and similar soils: 40 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Kesson, Tidal

Setting

Landform: Tidal marshes on marine terraces
Landform position (three-dimensional): Tread, talf
Down-slope shape: Linear, convex
Across-slope shape: Linear
Parent material: Thin herbaceous organic material over sandy marine deposits

Typical profile

Oan - 0 to 7 inches: muck
Ckn1 - 7 to 16 inches: fine sand
Ckn2 - 16 to 80 inches: fine sand

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Very poorly drained
Runoff class: High

Capacity of the most limiting layer to transmit water (Ksat): High to very high (1.98 to 19.98 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: Very frequent
Frequency of ponding: None
Calcium carbonate, maximum content: 4 percent
Maximum salinity: Moderately saline to strongly saline (8.0 to 24.0 mmhos/cm)
Sodium adsorption ratio, maximum: 50.0
Available water supply, 0 to 60 inches: Moderate (about 7.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8w
Hydrologic Soil Group: A/D
Forage suitability group: Forage suitability group not assigned (G155XB999FL)
Other vegetative classification: Salt Marsh (R155XY009FL), Forage suitability group not assigned (G155XB999FL)
Hydric soil rating: Yes

Description of Wulfert, Tidal

Setting

Landform: Tidal marshes on marine terraces
Landform position (three-dimensional): Tread, talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Herbaceous organic material over sandy marine deposits

Typical profile

Oan - 0 to 30 inches: muck
Cn1 - 30 to 38 inches: mucky fine sand
Cn2 - 38 to 80 inches: fine sand

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Very poorly drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 19.98 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: Very frequent
Frequency of ponding: None
Maximum salinity: Slightly saline to strongly saline (4.0 to 24.0 mmhos/cm)
Sodium adsorption ratio, maximum: 50.0
Available water supply, 0 to 60 inches: Very high (about 14.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8w
Hydrologic Soil Group: A/D
Forage suitability group: Forage suitability group not assigned (G155XB999FL)
Other vegetative classification: Salt Marsh (R155XY009FL), Forage suitability group not assigned (G155XB999FL)
Hydric soil rating: Yes

Minor Components

St. augustine

Percent of map unit: 5 percent
Landform: Marine terraces
Landform position (three-dimensional): Tread, rise
Down-slope shape: Linear
Across-slope shape: Convex
Other vegetative classification: Forage suitability group not assigned (G155XB999FL)
Hydric soil rating: No

Canaveral

Percent of map unit: 5 percent
Landform: Flats on marine terraces, ridges on marine terraces
Landform position (two-dimensional): Summit, backslope
Landform position (three-dimensional): Interfluve, tread, talf
Down-slope shape: Convex, concave
Across-slope shape: Linear
Other vegetative classification: Forage suitability group not assigned (G155XB999FL)
Hydric soil rating: No

25—Malabar fine sand, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: 2svz3
Elevation: 10 to 140 feet
Mean annual precipitation: 42 to 63 inches
Mean annual air temperature: 70 to 77 degrees F
Frost-free period: 350 to 365 days
Farmland classification: Not prime farmland

Map Unit Composition

Malabar and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Malabar

Setting

Landform: Flats on marine terraces, drainageways on marine terraces
Landform position (three-dimensional): Tread, talf, dip
Down-slope shape: Linear
Across-slope shape: Linear, concave
Parent material: Sandy and loamy marine deposits

Typical profile

A - 0 to 5 inches: fine sand

E - 5 to 17 inches: fine sand
Bw - 17 to 42 inches: fine sand
Btg - 42 to 59 inches: fine sandy loam
Cg - 59 to 80 inches: loamy fine sand

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)
Depth to water table: About 3 to 18 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 1 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water supply, 0 to 60 inches: Low (about 5.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4w
Hydrologic Soil Group: A/D
Forage suitability group: Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Other vegetative classification: Slough (R155XY011FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: Yes

Minor Components

Valkaria

Percent of map unit: 5 percent
Landform: Drainageways on marine terraces, flatwoods on marine terraces
Landform position (three-dimensional): Tread, dip, talf
Down-slope shape: Linear
Across-slope shape: Concave, linear
Other vegetative classification: Slough (R155XY011FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: Yes

Oldsmar

Percent of map unit: 4 percent
Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Talf
Down-slope shape: Linear, convex
Across-slope shape: Linear
Other vegetative classification: South Florida Flatwoods (R155XY003FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: No

Pineda

Percent of map unit: 4 percent
Landform: Flats on marine terraces, drainageways on marine terraces
Landform position (three-dimensional): Tread, talf, dip
Down-slope shape: Linear

Across-slope shape: Linear, concave
Other vegetative classification: Slough (R155XY011FL), Sandy over loamy soils on flats of hydric or mesic lowlands (G155XB241FL)
Hydric soil rating: Yes

Basinger

Percent of map unit: 2 percent
Landform: Depressions on marine terraces
Landform position (three-dimensional): Tread, dip
Down-slope shape: Concave, linear
Across-slope shape: Concave, linear
Other vegetative classification: Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: Yes

26—Manatee loamy fine sand, frequently ponded, 0 to 1 percent slopes

Map Unit Setting

National map unit symbol: 2sm59
Elevation: 0 to 140 feet
Mean annual precipitation: 46 to 63 inches
Mean annual air temperature: 68 to 77 degrees F
Frost-free period: 350 to 365 days
Farmland classification: Not prime farmland

Map Unit Composition

Manatee and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Manatee

Setting

Landform: Drainageways on marine terraces, depressions on marine terraces
Landform position (three-dimensional): Tread, dip
Down-slope shape: Convex, linear, concave
Across-slope shape: Linear, concave
Parent material: Sandy and loamy marine deposits

Typical profile

A - 0 to 18 inches: loamy fine sand
Btg - 18 to 36 inches: fine sandy loam
BCkg - 36 to 48 inches: fine sandy loam
Ckg - 48 to 80 inches: fine sandy loam

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Very poorly drained
Runoff class: Negligible

Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: None
Frequency of ponding: Frequent
Calcium carbonate, maximum content: 4 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water supply, 0 to 60 inches: Moderate (about 6.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7w
Hydrologic Soil Group: B/D
Forage suitability group: Loamy and clayey soils on stream terraces, flood plains, or in depressions (G155XB345FL)
Other vegetative classification: Freshwater Marshes and Ponds (R155XY010FL), Loamy and clayey soils on stream terraces, flood plains, or in depressions (G155XB345FL)
Hydric soil rating: Yes

Minor Components

Floridana

Percent of map unit: 5 percent
Landform: Depressions on marine terraces
Landform position (three-dimensional): Tread, dip
Down-slope shape: Concave, linear
Across-slope shape: Concave, linear
Other vegetative classification: Freshwater Marshes and Ponds (R155XY010FL), Sandy over loamy soils on stream terraces, flood plains, or in depressions (G155XB245FL)
Hydric soil rating: Yes

Parkwood, loamy fine sand

Percent of map unit: 4 percent
Landform: Flats on marine terraces
Landform position (three-dimensional): Tread, dip
Down-slope shape: Linear
Across-slope shape: Linear
Other vegetative classification: Wetland Hardwood Hammock (R155XY012FL), Loamy and clayey soils on flats of hydric or mesic lowlands (G155XB341FL)
Hydric soil rating: Yes

Winder

Percent of map unit: 3 percent
Landform: Drainageways on marine terraces, flats on marine terraces
Landform position (three-dimensional): Tread, dip, talf
Down-slope shape: Linear, convex
Across-slope shape: Linear, concave
Other vegetative classification: Wetland Hardwood Hammock (R155XY012FL), Slough (R155XY011FL), Cabbage Palm Flatwoods (R155XY005FL), Loamy and clayey soils on flats of hydric or mesic lowlands (G155XB341FL)
Hydric soil rating: Yes

Placid

Percent of map unit: 3 percent

Landform: Drainageways on marine terraces, depressions on marine terraces
Landform position (three-dimensional): Tread, dip
Down-slope shape: Concave
Across-slope shape: Concave
Other vegetative classification: Freshwater Marshes and Ponds (R155XY010FL), Sandy soils on stream terraces, flood plains, or in depressions (G155XB145FL)
Hydric soil rating: Yes

29—Orsino fine sand, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: 2y9f7
Elevation: 0 to 80 feet
Mean annual precipitation: 46 to 63 inches
Mean annual air temperature: 70 to 77 degrees F
Frost-free period: 350 to 365 days
Farmland classification: Not prime farmland

Map Unit Composition

Orsino and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Orsino

Setting

Landform: Ridges on marine terraces, knolls on marine terraces
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve, tread
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Sandy marine deposits and/or eolian deposits

Typical profile

A - 0 to 2 inches: fine sand
E - 2 to 23 inches: fine sand
Bw and Bh/E - 23 to 43 inches: fine sand
Bw - 43 to 62 inches: fine sand
C - 62 to 80 inches: fine sand

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Very high (19.98 to 50.02 in/hr)
Depth to water table: About 42 to 60 inches
Frequency of flooding: None

Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water supply, 0 to 60 inches: Low (about 4.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4s
Hydrologic Soil Group: A
Forage suitability group: Sandy soils on rises, knolls, and ridges of mesic uplands (G155XB121FL)
Other vegetative classification: Sand Pine Scrub (R155XY001FL), Sandy soils on rises, knolls, and ridges of mesic uplands (G155XB121FL)
Hydric soil rating: No

Minor Components

Myakka

Percent of map unit: 5 percent
Landform: Drainageways on flatwoods on marine terraces
Landform position (three-dimensional): Tread, talf, dip
Down-slope shape: Linear
Across-slope shape: Linear, concave
Other vegetative classification: South Florida Flatwoods (R155XY003FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: No

Pomello

Percent of map unit: 5 percent
Landform: Knolls on marine terraces, ridges on marine terraces
Landform position (two-dimensional): Summit, backslope
Landform position (three-dimensional): Interfluve, side slope, riser
Down-slope shape: Convex, linear
Across-slope shape: Linear
Other vegetative classification: Sand Pine Scrub (R155XY001FL), Sandy soils on rises and knolls of mesic uplands (G155XB131FL)
Hydric soil rating: No

Eaugallie

Percent of map unit: 4 percent
Landform: — error in exists on —
Landform position (three-dimensional): Tread, talf
Down-slope shape: Convex
Across-slope shape: Linear
Other vegetative classification: South Florida Flatwoods (R155XY003FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: No

Basinger

Percent of map unit: 1 percent
Landform: Flats on marine terraces, drainageways on marine terraces
Landform position (three-dimensional): Tread, talf, dip
Down-slope shape: Convex, concave
Across-slope shape: Linear, concave
Other vegetative classification: Slough (R155XY011FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: Yes

30—Ona fine sand, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: 2w4gy
Elevation: 10 to 130 feet
Mean annual precipitation: 44 to 63 inches
Mean annual air temperature: 68 to 77 degrees F
Frost-free period: 350 to 365 days
Farmland classification: Not prime farmland

Map Unit Composition

Ona and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Ona

Setting

Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Sandy marine deposits

Typical profile

A - 0 to 4 inches: fine sand
Bh - 4 to 22 inches: fine sand
C - 22 to 80 inches: fine sand

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: About 6 to 18 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water supply, 0 to 60 inches: Low (about 5.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: B/D
Forage suitability group: Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)

Other vegetative classification: South Florida Flatwoods (R155XY003FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: No

Minor Components

Basinger

Percent of map unit: 5 percent
Landform: Flats on marine terraces, drainageways on marine terraces
Landform position (three-dimensional): Tread, talf, dip
Down-slope shape: Convex, concave
Across-slope shape: Linear, concave
Other vegetative classification: Slough (R155XY011FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: Yes

Myakka

Percent of map unit: 3 percent
Landform: Drainageways on flatwoods on marine terraces
Landform position (three-dimensional): Tread, talf, dip
Down-slope shape: Linear
Across-slope shape: Linear, concave
Other vegetative classification: South Florida Flatwoods (R155XY003FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: No

Immokalee

Percent of map unit: 3 percent
Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Riser, talf
Down-slope shape: Linear
Across-slope shape: Linear
Other vegetative classification: South Florida Flatwoods (R155XY003FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: No

Pomello

Percent of map unit: 2 percent
Landform: Knolls on marine terraces, ridges on marine terraces
Landform position (two-dimensional): Summit, backslope
Landform position (three-dimensional): Interfluve, side slope, riser
Down-slope shape: Convex, linear
Across-slope shape: Linear
Other vegetative classification: Sand Pine Scrub (R155XY001FL), Sandy soils on rises and knolls of mesic uplands (G155XB131FL)
Hydric soil rating: No

Eaugallie

Percent of map unit: 2 percent
Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Tread, talf
Down-slope shape: Convex
Across-slope shape: Linear
Other vegetative classification: South Florida Flatwoods (R155XY003FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: No

31—Pineda-Pineda, wet, fine sand, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: 2svyp
Elevation: 0 to 100 feet
Mean annual precipitation: 42 to 63 inches
Mean annual air temperature: 68 to 77 degrees F
Frost-free period: 350 to 365 days
Farmland classification: Not prime farmland

Map Unit Composition

Pineda and similar soils: 45 percent
Pineda, wet, and similar soils: 40 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Pineda

Setting

Landform: Flatwoods on marine terraces, drainageways on marine terraces
Landform position (three-dimensional): Tread, talf, dip
Down-slope shape: Linear
Across-slope shape: Linear, concave
Parent material: Sandy and loamy marine deposits

Typical profile

A - 0 to 1 inches: fine sand
E - 1 to 5 inches: fine sand
Bw - 5 to 36 inches: fine sand
Btg/E - 36 to 54 inches: fine sandy loam
Cg - 54 to 80 inches: fine sand

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)
Depth to water table: About 6 to 18 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 15 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water supply, 0 to 60 inches: Low (about 5.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3w

Hydrologic Soil Group: A/D
Forage suitability group: Sandy over loamy soils on flats of hydric or mesic lowlands (G155XB241FL)
Other vegetative classification: South Florida Flatwoods (R155XY003FL), Sandy over loamy soils on flats of hydric or mesic lowlands (G155XB241FL)
Hydric soil rating: No

Description of Pineda, Wet

Setting

Landform: Flats on marine terraces, drainageways on marine terraces
Landform position (three-dimensional): Tread, talf, dip
Down-slope shape: Linear
Across-slope shape: Linear, concave
Parent material: Sandy and loamy marine deposits

Typical profile

A - 0 to 1 inches: fine sand
E - 1 to 5 inches: fine sand
Bw - 5 to 36 inches: fine sand
Btg/E - 36 to 54 inches: fine sandy loam
Cg - 54 to 80 inches: fine sand

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: None
Frequency of ponding: Frequent
Calcium carbonate, maximum content: 15 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water supply, 0 to 60 inches: Low (about 5.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: A/D
Forage suitability group: Sandy over loamy soils on flats of hydric or mesic lowlands (G155XB241FL)
Other vegetative classification: Slough (R155XY011FL), Sandy over loamy soils on flats of hydric or mesic lowlands (G155XB241FL)
Hydric soil rating: Yes

Minor Components

Felda

Percent of map unit: 6 percent
Landform: Flats on marine terraces, drainageways on marine terraces
Landform position (three-dimensional): Tread, talf, dip
Down-slope shape: Linear
Across-slope shape: Linear, concave

Other vegetative classification: Slough (R155XY011FL), Sandy over loamy soils on flats of hydric or mesic lowlands (G155XB241FL)
Hydric soil rating: Yes

Wabasso

Percent of map unit: 3 percent
Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Tread, talf
Down-slope shape: Linear, convex
Across-slope shape: Linear
Other vegetative classification: South Florida Flatwoods (R155XY003FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: No

Valkaria

Percent of map unit: 2 percent
Landform: Drainageways on flats on marine terraces
Landform position (three-dimensional): Tread, talf, dip
Down-slope shape: Linear
Across-slope shape: Linear, concave
Other vegetative classification: Slough (R155XY011FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: Yes

Brynwood

Percent of map unit: 2 percent
Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Tread, talf
Down-slope shape: Linear
Across-slope shape: Linear
Other vegetative classification: South Florida Flatwoods (R155XY003FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: Yes

Cypress lake

Percent of map unit: 2 percent
Landform: Drainageways on marine terraces, flats on marine terraces
Landform position (three-dimensional): Tread, dip, talf
Down-slope shape: Linear, convex
Across-slope shape: Concave, linear
Other vegetative classification: South Florida Flatwoods (R155XY003FL), Sandy over loamy soils on flats of hydric or mesic lowlands (G155XB241FL)
Hydric soil rating: Yes

32—Pits and Dumps

Map Unit Setting

National map unit symbol: 2y9hx
Elevation: 0 to 70 feet
Mean annual precipitation: 55 to 63 inches

Mean annual air temperature: 70 to 77 degrees F
Frost-free period: 350 to 365 days
Farmland classification: Not prime farmland

Map Unit Composition

Pits: 50 percent
Dumps: 50 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Pits

Setting

Landform: Marine terraces
Landform position (three-dimensional): Tread, dip
Down-slope shape: Concave
Across-slope shape: Concave

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Forage suitability group: Forage suitability group not assigned (G155XB999FL)
Other vegetative classification: Forage suitability group not assigned (G155XB999FL)
Hydric soil rating: Unranked

Description of Dumps

Setting

Landform: Marine terraces
Landform position (three-dimensional): Tread, rise
Down-slope shape: Convex
Across-slope shape: Convex

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8s
Forage suitability group: Forage suitability group not assigned (G155XB999FL)
Other vegetative classification: Forage suitability group not assigned (G155XB999FL)
Hydric soil rating: Unranked

33—Pomello fine sand, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: 2tzw1
Elevation: 0 to 110 feet
Mean annual precipitation: 42 to 60 inches
Mean annual air temperature: 68 to 77 degrees F
Frost-free period: 350 to 365 days
Farmland classification: Not prime farmland

Map Unit Composition

Pomello and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Pomello

Setting

Landform: Knolls on marine terraces, ridges on marine terraces
Landform position (two-dimensional): Summit, backslope
Landform position (three-dimensional): Interfluve, side slope, riser
Down-slope shape: Convex, linear
Across-slope shape: Linear
Parent material: Sandy marine deposits

Typical profile

A - 0 to 4 inches: fine sand
E - 4 to 42 inches: fine sand
Bh - 42 to 54 inches: fine sand
B/C - 54 to 80 inches: fine sand

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)
Depth to water table: About 18 to 42 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water supply, 0 to 60 inches: Low (about 5.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: A
Forage suitability group: Sandy soils on rises and knolls of mesic uplands (G155XB131FL)
Other vegetative classification: Sand Pine Scrub (R155XY001FL), Sandy soils on rises and knolls of mesic uplands (G155XB131FL)
Hydric soil rating: No

Minor Components

Duette

Percent of map unit: 5 percent
Landform: Knolls on marine terraces, ridges on marine terraces
Landform position (two-dimensional): Summit, backslope
Landform position (three-dimensional): Interfluve, side slope, riser
Down-slope shape: Convex, linear
Across-slope shape: Linear
Other vegetative classification: Sand Pine Scrub (R155XY001FL), Sandy soils on rises, knolls, and ridges of mesic uplands (G155XB121FL)

Hydric soil rating: No

Immokalee

Percent of map unit: 5 percent
Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Riser, talf
Down-slope shape: Linear
Across-slope shape: Linear
Other vegetative classification: South Florida Flatwoods (R155XY003FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: No

Jonathan

Percent of map unit: 3 percent
Landform: Ridges on marine terraces, knolls on marine terraces
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve, tread, rise
Down-slope shape: Convex
Across-slope shape: Linear
Other vegetative classification: Sandy soils on rises, knolls, and ridges of mesic uplands (G155XB121FL)
Hydric soil rating: No

Tavares

Percent of map unit: 2 percent
Landform: Flatwoods on marine terraces, hills on marine terraces, knolls on marine terraces, ridges on marine terraces
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve, side slope, tread, rise
Down-slope shape: Convex, linear
Across-slope shape: Linear, convex
Other vegetative classification: Longleaf Pine-Turkey Oak Hills (R155XY002FL), Sand Pine Scrub (R155XY001FL), Sandy soils on rises, knolls, and ridges of mesic uplands (G155XB121FL)
Hydric soil rating: No

34—Pompano fine sand, ponded-Urban land complex, 0 to 1 percent slopes

Map Unit Setting

National map unit symbol: 2x9f6
Elevation: 10 to 90 feet
Mean annual precipitation: 44 to 64 inches
Mean annual air temperature: 70 to 77 degrees F
Frost-free period: 355 to 365 days
Farmland classification: Not prime farmland

Map Unit Composition

Pompano and similar soils: 48 percent
Urban land: 40 percent

Minor components: 12 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Pompano

Setting

Landform: Depressions on marine terraces
Landform position (three-dimensional): Tread, dip
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Sandy marine deposits

Typical profile

A - 0 to 12 inches: fine sand
C - 12 to 80 inches: fine sand

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Very poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 19.98 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: None
Frequency of ponding: Frequent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water supply, 0 to 60 inches: Low (about 4.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7w
Hydrologic Soil Group: A/D
Forage suitability group: Sandy soils on stream terraces, flood plains, or in depressions (G155XB145FL)
Other vegetative classification: Freshwater Marshes and Ponds (R155XY010FL), Sandy soils on stream terraces, flood plains, or in depressions (G155XB145FL)
Hydric soil rating: Yes

Minor Components

Basinger

Percent of map unit: 3 percent
Landform: Depressions on marine terraces
Landform position (three-dimensional): Tread, dip
Down-slope shape: Concave, linear
Across-slope shape: Concave, linear
Other vegetative classification: Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: Yes

Malabar

Percent of map unit: 2 percent
Landform: Depressions on marine terraces
Landform position (three-dimensional): Tread, dip

Down-slope shape: Concave, linear
Across-slope shape: Concave, linear
Other vegetative classification: Freshwater Marshes and Ponds (R155XY010FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: Yes

Pompano

Percent of map unit: 2 percent
Landform: Depressions on marine terraces
Landform position (three-dimensional): Tread, talf, dip
Down-slope shape: Linear, concave
Across-slope shape: Linear, concave
Other vegetative classification: Freshwater Marshes and Ponds (R155XY010FL), Sandy soils on stream terraces, flood plains, or in depressions (G155XB145FL)
Hydric soil rating: No

Myakka

Percent of map unit: 2 percent
Landform: Depressions on marine terraces
Landform position (three-dimensional): Tread, dip
Down-slope shape: Linear, concave
Across-slope shape: Linear, concave
Other vegetative classification: Freshwater Marshes and Ponds (R155XY010FL), Sandy soils on stream terraces, flood plains, or in depressions (G155XB145FL)
Hydric soil rating: Yes

Anclote

Percent of map unit: 1 percent
Landform: Depressions on marine terraces
Landform position (three-dimensional): Tread, dip
Down-slope shape: Concave, convex
Across-slope shape: Concave, linear
Other vegetative classification: Sandy soils on stream terraces, flood plains, or in depressions (G155XB145FL)
Hydric soil rating: Yes

Placid

Percent of map unit: 1 percent
Landform: Depressions on marine terraces, drainageways on marine terraces
Landform position (three-dimensional): Tread, dip
Down-slope shape: Concave
Across-slope shape: Concave
Other vegetative classification: Freshwater Marshes and Ponds (R155XY010FL), Sandy soils on stream terraces, flood plains, or in depressions (G155XB145FL)
Hydric soil rating: Yes

Adamsville

Percent of map unit: 1 percent
Landform: Knolls on marine terraces, rises on marine terraces
Landform position (three-dimensional): Tread, rise
Down-slope shape: Convex
Across-slope shape: Linear
Other vegetative classification: Upland Hardwood Hammock (R155XY008FL), Sandy soils on rises and knolls of mesic uplands (G155XB131FL)

Hydric soil rating: No

36—Pople fine sand, wet, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: 2y9gq
Elevation: 0 to 70 feet
Mean annual precipitation: 55 to 63 inches
Mean annual air temperature: 70 to 77 degrees F
Frost-free period: 335 to 365 days
Farmland classification: Not prime farmland

Map Unit Composition

Pople and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Pople

Setting

Landform: Flats on marine terraces, drainageways on marine terraces
Landform position (three-dimensional): Tread, talf
Down-slope shape: Linear
Across-slope shape: Linear, concave
Parent material: Sandy and loamy marine deposits

Typical profile

A - 0 to 4 inches: fine sand
E - 4 to 17 inches: fine sand
Bk - 17 to 28 inches: fine sand
Btk - 28 to 56 inches: fine sandy loam
Ckg - 56 to 80 inches: fine sand

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.60 in/hr)
Depth to water table: About 3 to 18 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 4 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water supply, 0 to 60 inches: Moderate (about 6.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3w

Hydrologic Soil Group: C/D
Forage suitability group: Sandy over loamy soils on flats of hydric or mesic lowlands (G155XB241FL)
Other vegetative classification: Cabbage Palm Flatwoods (R155XY005FL), Sandy over loamy soils on flats of hydric or mesic lowlands (G155XB241FL)
Hydric soil rating: Yes

Minor Components

Wabasso

Percent of map unit: 5 percent
Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Tread, talf
Down-slope shape: Linear, convex
Across-slope shape: Linear
Other vegetative classification: South Florida Flatwoods (R155XY003FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: No

Bradenton

Percent of map unit: 5 percent
Landform: Flats on marine terraces
Landform position (three-dimensional): Tread, talf
Down-slope shape: Convex
Across-slope shape: Linear
Other vegetative classification: Wetland Hardwood Hammock (R155XY012FL), South Florida Flatwoods (R155XY003FL), Loamy and clayey soils on flats of hydric or mesic lowlands (G155XB341FL)
Hydric soil rating: Yes

Eaugallie

Percent of map unit: 5 percent
Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Tread, talf
Down-slope shape: Convex
Across-slope shape: Linear
Other vegetative classification: South Florida Flatwoods (R155XY003FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: No

38—Smyrna fine sand, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: 2svzh
Elevation: 0 to 130 feet
Mean annual precipitation: 38 to 63 inches
Mean annual air temperature: 68 to 77 degrees F
Frost-free period: 300 to 365 days
Farmland classification: Not prime farmland

Map Unit Composition

Smyrna and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Smyrna

Setting

Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Tread, talf
Down-slope shape: Linear, convex
Across-slope shape: Linear
Parent material: Sandy marine deposits

Typical profile

A - 0 to 4 inches: fine sand
E - 4 to 13 inches: fine sand
Bh - 13 to 18 inches: fine sand
C/Bw - 18 to 49 inches: fine sand
C - 49 to 80 inches: fine sand

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 6.00 in/hr)
Depth to water table: About 6 to 18 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water supply, 0 to 60 inches: Low (about 5.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4w
Hydrologic Soil Group: A/D
Forage suitability group: Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Other vegetative classification: South Florida Flatwoods (R155XY003FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: No

Minor Components

Eaugallie

Percent of map unit: 5 percent
Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Tread, talf
Down-slope shape: Convex
Across-slope shape: Linear
Other vegetative classification: South Florida Flatwoods (R155XY003FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: No

Basinger

Percent of map unit: 4 percent
Landform: Depressions on marine terraces
Landform position (three-dimensional): Tread, dip
Down-slope shape: Concave, linear
Across-slope shape: Concave, linear
Other vegetative classification: Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: Yes

Placid

Percent of map unit: 2 percent
Landform: Drainageways on marine terraces, depressions on marine terraces
Landform position (three-dimensional): Tread, dip
Down-slope shape: Concave
Across-slope shape: Concave
Other vegetative classification: Freshwater Marshes and Ponds (R155XY010FL), Sandy soils on stream terraces, flood plains, or in depressions (G155XB145FL)
Hydric soil rating: Yes

Immokalee

Percent of map unit: 2 percent
Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Riser, talf
Down-slope shape: Linear
Across-slope shape: Linear
Other vegetative classification: South Florida Flatwoods (R155XY003FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: No

Pomello

Percent of map unit: 2 percent
Landform: Knolls on marine terraces, ridges on marine terraces
Landform position (two-dimensional): Summit, backslope
Landform position (three-dimensional): Interfluve, side slope, riser
Down-slope shape: Convex, linear
Across-slope shape: Linear
Other vegetative classification: Sand Pine Scrub (R155XY001FL), Sandy soils on rises and knolls of mesic uplands (G155XB131FL)
Hydric soil rating: No

39—St. Augustine fine sand-Urban land complex, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: 2y9g2
Elevation: 0 to 150 feet
Mean annual precipitation: 42 to 68 inches
Mean annual air temperature: 68 to 77 degrees F
Frost-free period: 350 to 365 days

Farmland classification: Not prime farmland

Map Unit Composition

St. augustine and similar soils: 45 percent
Urban land: 40 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of St. Augustine

Setting

Landform: Marine terraces
Landform position (three-dimensional): Tread, rise
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Sandy human-transported material over sandy marine deposits

Typical profile

^C - 0 to 30 inches: fine sand
2Cb - 30 to 80 inches: fine sand

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat poorly drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): High to very high (6.00 to 20.00 in/hr)
Depth to water table: About 18 to 42 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 4 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water supply, 0 to 60 inches: Low (about 4.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: A
Forage suitability group: Forage suitability group not assigned (G155XB999FL)
Other vegetative classification: Forage suitability group not assigned (G155XB999FL)
Hydric soil rating: No

Description of Urban Land

Setting

Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Riser, talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: No parent material

Interpretive groups

Land capability classification (irrigated): None specified
Forage suitability group: Forage suitability group not assigned (G155XB999FL)

Other vegetative classification: Forage suitability group not assigned (G155XB999FL)
Hydric soil rating: Unranked

Minor Components

Matlacha

Percent of map unit: 5 percent
Landform: Flats on marine terraces
Landform position (three-dimensional): Tread, talf
Down-slope shape: Convex, linear
Across-slope shape: Linear
Other vegetative classification: Forage suitability group not assigned (G155XB999FL)
Hydric soil rating: No

Peckish, tidal

Percent of map unit: 5 percent
Landform: Tidal flats on marine terraces
Landform position (three-dimensional): Tread, dip
Down-slope shape: Linear
Across-slope shape: Concave
Other vegetative classification: Salt Marsh (R155XY009FL), Forage suitability group not assigned (G155XB999FL)
Hydric soil rating: Yes

Kesson, tidal

Percent of map unit: 5 percent
Landform: Tidal marshes on marine terraces
Landform position (three-dimensional): Tread, talf
Down-slope shape: Linear, convex
Across-slope shape: Linear
Other vegetative classification: Salt Marsh (R155XY009FL), Forage suitability group not assigned (G155XB999FL)
Hydric soil rating: Yes

50—Cypress Lake-Brynwood fine sands-Urban land complex, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: 2zldl
Elevation: 0 to 40 feet
Mean annual precipitation: 55 to 63 inches
Mean annual air temperature: 70 to 77 degrees F
Frost-free period: 355 to 365 days
Farmland classification: Not prime farmland

Map Unit Composition

Cypress lake and similar soils: 30 percent

Brynwood and similar soils: 25 percent
Urban land: 20 percent
Minor components: 25 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Cypress Lake

Setting

Landform: Flats on marine terraces
Landform position (three-dimensional): Tread, talf
Down-slope shape: Linear, convex
Across-slope shape: Linear
Parent material: Sandy and loamy marine deposits over limestone

Typical profile

A - 0 to 4 inches: fine sand
E - 4 to 18 inches: fine sand
E/B - 18 to 22 inches: fine sand
Btkg - 22 to 25 inches: fine sandy loam
Ckg - 25 to 32 inches: loamy fine sand
2R - 32 to 42 inches: bedrock

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: 8 to 53 inches to lithic bedrock
Drainage class: Poorly drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: About 1 to 18 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 4 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water supply, 0 to 60 inches: Low (about 3.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: C/D
Forage suitability group: Sandy over loamy soils on flats of hydric or mesic lowlands (G155XB241FL)
Other vegetative classification: South Florida Flatwoods (R155XY003FL), Sandy over loamy soils on flats of hydric or mesic lowlands (G155XB241FL)
Hydric soil rating: No

Description of Brynwood

Setting

Landform: Flats on marine terraces
Landform position (three-dimensional): Tread, talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Sandy marine deposits over limestone

Typical profile

A - 0 to 4 inches: fine sand
Bw - 4 to 10 inches: fine sand
Ckg - 10 to 14 inches: fine sand
2R - 14 to 24 inches: bedrock

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: 4 to 30 inches to lithic bedrock
Drainage class: Poorly drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 6.00 in/hr)
Depth to water table: About 6 to 30 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 4 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water supply, 0 to 60 inches: Very low (about 1.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4w
Hydrologic Soil Group: C/D
Forage suitability group: Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Other vegetative classification: South Florida Flatwoods (R155XY003FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: No

Description of Urban Land

Setting

Landform: Flats on marine terraces
Landform position (three-dimensional): Riser, talf
Down-slope shape: Linear
Across-slope shape: Linear

Minor Components

Pompano

Percent of map unit: 5 percent
Landform: Depressions on marine terraces
Landform position (three-dimensional): Tread, dip
Down-slope shape: Concave
Across-slope shape: Concave
Other vegetative classification: Freshwater Marshes and Ponds (R155XY010FL), Sandy soils on stream terraces, flood plains, or in depressions (G155XB145FL)
Hydric soil rating: Yes

Rock outcrop

Percent of map unit: 5 percent
Hydric soil rating: No

Felda

Percent of map unit: 5 percent
Landform: Drainageways on marine terraces, flats on marine terraces
Landform position (three-dimensional): Tread, dip, talf
Down-slope shape: Linear
Across-slope shape: Concave, linear
Other vegetative classification: Slough (R155XY011FL), Sandy over loamy soils on flats of hydric or mesic lowlands (G155XB241FL)
Hydric soil rating: Yes

Pineda

Percent of map unit: 5 percent
Landform: Flats on marine terraces, drainageways on marine terraces
Landform position (three-dimensional): Tread, talf, dip
Down-slope shape: Linear
Across-slope shape: Linear, concave
Other vegetative classification: Slough (R155XY011FL), Sandy over loamy soils on flats of hydric or mesic lowlands (G155XB241FL)
Hydric soil rating: Yes

Cypress lake

Percent of map unit: 5 percent
Landform: Flats on marine terraces
Landform position (three-dimensional): Tread, talf
Down-slope shape: Linear, convex
Across-slope shape: Linear
Other vegetative classification: South Florida Flatwoods (R155XY003FL), Sandy over loamy soils on flats of hydric or mesic lowlands (G155XB241FL)
Hydric soil rating: No

51—Bradenton fine sand-Urban land complex, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: 2y9f1
Elevation: 0 to 130 feet
Mean annual precipitation: 45 to 63 inches
Mean annual air temperature: 70 to 77 degrees F
Frost-free period: 350 to 365 days
Farmland classification: Not prime farmland

Map Unit Composition

Bradenton and similar soils: 44 percent
Urban land: 39 percent
Minor components: 17 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Bradenton

Setting

Landform: Flats on marine terraces
Landform position (three-dimensional): Tread, talf
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Sandy and loamy marine deposits

Typical profile

A - 0 to 4 inches: fine sand
E - 4 to 10 inches: fine sand
Btg - 10 to 19 inches: fine sandy loam
Btkg - 19 to 26 inches: fine sandy loam
Ckg - 26 to 80 inches: fine sandy loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: About 3 to 18 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 4 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water supply, 0 to 60 inches: Moderate (about 7.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: B/D
Forage suitability group: Loamy and clayey soils on flats of hydric or mesic lowlands (G155XB341FL)
Other vegetative classification: Wetland Hardwood Hammock (R155XY012FL), South Florida Flatwoods (R155XY003FL), Loamy and clayey soils on flats of hydric or mesic lowlands (G155XB341FL)
Hydric soil rating: Yes

Description of Urban Land

Setting

Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Riser, talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: No parent material

Interpretive groups

Land capability classification (irrigated): None specified
Forage suitability group: Forage suitability group not assigned (G155XB999FL)
Other vegetative classification: Forage suitability group not assigned (G155XB999FL)

Hydric soil rating: Unranked

Minor Components

Felda

Percent of map unit: 5 percent
Landform: Flats on marine terraces, drainageways on marine terraces
Landform position (three-dimensional): Tread, talf, dip
Down-slope shape: Linear
Across-slope shape: Linear, concave
Other vegetative classification: Slough (R155XY011FL), Sandy over loamy soils on flats of hydric or mesic lowlands (G155XB241FL)
Hydric soil rating: Yes

Malabar

Percent of map unit: 4 percent
Landform: — error in exists on —
Landform position (three-dimensional): Tread, dip, talf
Down-slope shape: Concave, linear
Across-slope shape: Concave, linear
Other vegetative classification: Slough (R155XY011FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: Yes

Floridana

Percent of map unit: 3 percent
Landform: Depressions on marine terraces
Landform position (three-dimensional): Tread, dip
Down-slope shape: Linear, concave
Across-slope shape: Linear, concave
Other vegetative classification: Freshwater Marshes and Ponds (R155XY010FL), Sandy over loamy soils on stream terraces, flood plains, or in depressions (G155XB245FL)
Hydric soil rating: Yes

Wabasso

Percent of map unit: 2 percent
Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Tread, talf
Down-slope shape: Linear, convex
Across-slope shape: Linear
Other vegetative classification: South Florida Flatwoods (R155XY003FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: No

Bradenton

Percent of map unit: 2 percent
Landform: Flats on marine terraces
Landform position (three-dimensional): Tread, talf
Down-slope shape: Convex
Across-slope shape: Linear
Other vegetative classification: Wetland Hardwood Hammock (R155XY012FL), South Florida Flatwoods (R155XY003FL), Loamy and clayey soils on flats of hydric or mesic lowlands (G155XB341FL)
Hydric soil rating: No

Pineda

Percent of map unit: 1 percent
Landform: Flats on marine terraces, drainageways on marine terraces
Landform position (three-dimensional): Tread, talf, dip
Down-slope shape: Linear
Across-slope shape: Linear, concave
Other vegetative classification: Slough (R155XY011FL), Sandy over loamy soils on flats of hydric or mesic lowlands (G155XB241FL)
Hydric soil rating: Yes

52—Canaveral fine sand-Urban land complex, 0 to 5 percent slopes

Map Unit Setting

National map unit symbol: 2y9f9
Elevation: 0 to 30 feet
Mean annual precipitation: 48 to 63 inches
Mean annual air temperature: 70 to 77 degrees F
Frost-free period: 360 to 365 days
Farmland classification: Not prime farmland

Map Unit Composition

Canaveral and similar soils: 44 percent
Urban land: 39 percent
Minor components: 17 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Canaveral

Setting

Landform: Flats on marine terraces, ridges on marine terraces
Landform position (two-dimensional): Summit, backslope
Landform position (three-dimensional): Interfluve, tread, talf
Down-slope shape: Convex, concave
Across-slope shape: Linear
Parent material: Sandy marine deposits

Typical profile

A - 0 to 5 inches: fine sand
C - 5 to 17 inches: fine sand
Ck1 - 17 to 49 inches: paragravelly fine sand
Ck2 - 49 to 80 inches: very paragravelly fine sand

Properties and qualities

Slope: 0 to 5 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Very high (19.98 to 39.96 in/hr)

Depth to water table: About 18 to 42 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 4 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 5.0
Available water supply, 0 to 60 inches: Low (about 4.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: A
Forage suitability group: Forage suitability group not assigned (G155XB999FL)
Other vegetative classification: Forage suitability group not assigned (G155XB999FL)
Hydric soil rating: No

Description of Urban Land

Setting

Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Riser, talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: No parent material

Interpretive groups

Land capability classification (irrigated): None specified
Forage suitability group: Forage suitability group not assigned (G155XB999FL)
Other vegetative classification: Forage suitability group not assigned (G155XB999FL)
Hydric soil rating: Unranked

Minor Components

St. augustine

Percent of map unit: 6 percent
Landform: Marine terraces
Landform position (three-dimensional): Tread, rise
Down-slope shape: Linear
Across-slope shape: Convex
Other vegetative classification: Forage suitability group not assigned (G155XB999FL)
Hydric soil rating: No

Pompano

Percent of map unit: 3 percent
Landform: Depressions on marine terraces
Landform position (three-dimensional): Tread, dip
Down-slope shape: Concave
Across-slope shape: Concave
Other vegetative classification: Freshwater Marshes and Ponds (R155XY010FL), Sandy soils on stream terraces, flood plains, or in depressions (G155XB145FL)
Hydric soil rating: Yes

Myakka

Percent of map unit: 3 percent
Landform: Drainageways on flatwoods on marine terraces
Landform position (three-dimensional): Tread, talf, dip
Down-slope shape: Linear
Across-slope shape: Linear, concave
Other vegetative classification: South Florida Flatwoods (R155XY003FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: No

Palm beach

Percent of map unit: 2 percent
Landform: Ridges on marine terraces, dunes on marine terraces
Landform position (two-dimensional): Summit, backslope
Landform position (three-dimensional): Side slope, tread
Down-slope shape: Convex, linear
Across-slope shape: Linear, convex
Other vegetative classification: Sandy soils on ridges and dunes of xeric uplands (G156BC111FL)
Hydric soil rating: No

Canaveral

Percent of map unit: 2 percent
Landform: Flats on marine terraces, ridges on marine terraces
Landform position (two-dimensional): Summit, backslope
Landform position (three-dimensional): Interfluve, tread, talf
Down-slope shape: Convex, concave
Across-slope shape: Linear
Other vegetative classification: Forage suitability group not assigned (G155XB999FL)
Hydric soil rating: No

Captiva

Percent of map unit: 1 percent
Landform: Flats on marine terraces
Landform position (three-dimensional): Tread, talf
Down-slope shape: Linear
Across-slope shape: Concave
Other vegetative classification: Slough (R155XY011FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: Yes

53—Cassia fine sand-Urban land complex, 0 to 2 percnet slopes

Map Unit Setting

National map unit symbol: 2y9fb
Elevation: 0 to 110 feet
Mean annual precipitation: 44 to 63 inches
Mean annual air temperature: 68 to 77 degrees F

Frost-free period: 350 to 365 days
Farmland classification: Not prime farmland

Map Unit Composition

Cassia and similar soils: 45 percent
Urban land: 35 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Cassia

Setting

Landform: Flatwoods on marine terraces, knolls on marine terraces, rises on marine terraces
Landform position (three-dimensional): Tread, rise, talf
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Sandy marine deposits

Typical profile

A - 0 to 5 inches: fine sand
E - 5 to 26 inches: fine sand
Bh - 26 to 42 inches: fine sand
C - 42 to 80 inches: fine sand

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 5.95 in/hr)
Depth to water table: About 18 to 42 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water supply, 0 to 60 inches: Low (about 5.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: A
Forage suitability group: Sandy soils on rises and knolls of mesic uplands (G155XB131FL)
Other vegetative classification: Sand Pine Scrub (R155XY001FL), Sandy soils on rises and knolls of mesic uplands (G155XB131FL)
Hydric soil rating: No

Description of Urban Land

Setting

Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Riser, talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: No parent material

Interpretive groups

Land capability classification (irrigated): None specified
Forage suitability group: Forage suitability group not assigned (G155XB999FL)
Other vegetative classification: Forage suitability group not assigned (G155XB999FL)
Hydric soil rating: Unranked

Minor Components

Myakka

Percent of map unit: 6 percent
Landform: Drainageways on flatwoods on marine terraces
Landform position (three-dimensional): Tread, talf, dip
Down-slope shape: Linear
Across-slope shape: Linear, concave
Other vegetative classification: South Florida Flatwoods (R155XY003FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: No

Pomello

Percent of map unit: 5 percent
Landform: Ridges on marine terraces, knolls on marine terraces
Landform position (two-dimensional): Summit, backslope
Landform position (three-dimensional): Interfluve, side slope, riser
Down-slope shape: Convex, linear
Across-slope shape: Linear
Other vegetative classification: Sand Pine Scrub (R155XY001FL), Sandy soils on rises and knolls of mesic uplands (G155XB131FL)
Hydric soil rating: No

Satellite

Percent of map unit: 4 percent
Landform: Rises on marine terraces, flatwoods on marine terraces
Landform position (three-dimensional): Tread, rise, talf
Down-slope shape: Linear, convex
Across-slope shape: Linear
Other vegetative classification: Sand Pine Scrub (R155XY001FL), Sandy soils on rises and knolls of mesic uplands (G155XB131FL)
Hydric soil rating: No

Jonathan

Percent of map unit: 3 percent
Landform: Ridges on marine terraces, knolls on marine terraces
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve, tread, rise
Down-slope shape: Convex
Across-slope shape: Linear
Other vegetative classification: Sandy soils on rises, knolls, and ridges of mesic uplands (G155XB121FL)
Hydric soil rating: No

Cassia

Percent of map unit: 2 percent
Landform: Flatwoods on marine terraces, knolls on marine terraces, rises on marine terraces
Landform position (three-dimensional): Tread, rise, talf

Down-slope shape: Convex
Across-slope shape: Linear
Other vegetative classification: Sand Pine Scrub (R155XY001FL), Sandy soils on rises and knolls of mesic uplands (G155XB131FL)
Hydric soil rating: No

54—Delray fine sand, ponded-Urban land complex, 0 to 1 percent slopes

Map Unit Setting

National map unit symbol: 2y9g5
Elevation: 0 to 150 feet
Mean annual precipitation: 42 to 68 inches
Mean annual air temperature: 68 to 77 degrees F
Frost-free period: 335 to 365 days
Farmland classification: Not prime farmland

Map Unit Composition

Delray and similar soils: 44 percent
Urban land: 39 percent
Minor components: 17 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Delray

Setting

Landform: Depressions on marine terraces
Landform position (three-dimensional): Tread, dip
Down-slope shape: Linear, convex
Across-slope shape: Concave, linear
Parent material: Sandy and loamy marine deposits

Typical profile

A - 0 to 16 inches: fine sand
E - 16 to 60 inches: fine sand
Btg - 60 to 80 inches: sandy clay loam

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Very poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: None
Frequency of ponding: Frequent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water supply, 0 to 60 inches: Low (about 4.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7w
Hydrologic Soil Group: A/D
Forage suitability group: Sandy soils on stream terraces, flood plains, or in depressions (G155XB145FL)
Other vegetative classification: Freshwater Marshes and Ponds (R155XY010FL), Sandy soils on stream terraces, flood plains, or in depressions (G155XB145FL)
Hydric soil rating: Yes

Description of Urban Land

Setting

Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Riser, talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: No parent material

Interpretive groups

Land capability classification (irrigated): None specified
Forage suitability group: Forage suitability group not assigned (G155XB999FL)
Other vegetative classification: Forage suitability group not assigned (G155XB999FL)
Hydric soil rating: Unranked

Minor Components

Pompano

Percent of map unit: 7 percent
Landform: Depressions on marine terraces
Landform position (three-dimensional): Tread, dip
Down-slope shape: Concave
Across-slope shape: Concave
Other vegetative classification: Freshwater Marshes and Ponds (R155XY010FL), Sandy soils on stream terraces, flood plains, or in depressions (G155XB145FL)
Hydric soil rating: Yes

Placid

Percent of map unit: 5 percent
Landform: Drainageways on marine terraces, depressions on marine terraces
Landform position (three-dimensional): Tread, dip
Down-slope shape: Concave
Across-slope shape: Concave
Other vegetative classification: Freshwater Marshes and Ponds (R155XY010FL), Sandy soils on stream terraces, flood plains, or in depressions (G155XB145FL)
Hydric soil rating: Yes

Gator

Percent of map unit: 3 percent
Landform: Depressions on marine terraces
Landform position (three-dimensional): Tread, dip
Down-slope shape: Concave

Across-slope shape: Concave
Other vegetative classification: Freshwater Marshes and Ponds (R155XY010FL), Organic soils in depressions and on flood plains (G155XB645FL)
Hydric soil rating: Yes

Delray

Percent of map unit: 2 percent
Landform: Depressions on marine terraces
Landform position (three-dimensional): Tread, dip
Down-slope shape: Convex, linear
Across-slope shape: Linear, concave
Other vegetative classification: Freshwater Marshes and Ponds (R155XY010FL), Sandy soils on stream terraces, flood plains, or in depressions (G155XB145FL)
Hydric soil rating: No

55—EauGallie-Myakka fine sands-Urban land complex, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: 2y9g7
Elevation: 0 to 70 feet
Mean annual precipitation: 55 to 63 inches
Mean annual air temperature: 70 to 77 degrees F
Frost-free period: 350 to 365 days
Farmland classification: Not prime farmland

Map Unit Composition

Eaugallie and similar soils: 31 percent
Myakka and similar soils: 28 percent
Urban land: 26 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Eaugallie

Setting

Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Talf
Down-slope shape: Linear, convex
Across-slope shape: Linear
Parent material: Sandy and loamy marine deposits

Typical profile

A - 0 to 6 inches: fine sand
E - 6 to 22 inches: fine sand
Bh - 22 to 44 inches: fine sand
E' - 44 to 48 inches: fine sand
Btg - 48 to 66 inches: sandy loam

Cg - 66 to 80 inches: loamy fine sand

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.60 in/hr)
Depth to water table: About 6 to 18 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water supply, 0 to 60 inches: Moderate (about 6.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4w
Hydrologic Soil Group: B/D
Forage suitability group: Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Other vegetative classification: South Florida Flatwoods (R155XY003FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: No

Description of Myakka

Setting

Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Talf
Down-slope shape: Linear, convex
Across-slope shape: Linear
Parent material: Sandy marine deposits

Typical profile

A - 0 to 6 inches: fine sand
E - 6 to 24 inches: fine sand
Bh - 24 to 42 inches: fine sand
Bw - 42 to 60 inches: fine sand
Cg - 60 to 80 inches: fine sand

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)
Depth to water table: About 6 to 18 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water supply, 0 to 60 inches: Low (about 5.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4w
Hydrologic Soil Group: A/D
Forage suitability group: Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Other vegetative classification: South Florida Flatwoods (R155XY003FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: No

Description of Urban Land

Setting

Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Riser, talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: No parent material

Interpretive groups

Land capability classification (irrigated): None specified
Forage suitability group: Forage suitability group not assigned (G155XB999FL)
Other vegetative classification: Forage suitability group not assigned (G155XB999FL)
Hydric soil rating: Unranked

Minor Components

Ona

Percent of map unit: 4 percent
Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Tread, talf
Down-slope shape: Linear
Across-slope shape: Linear
Other vegetative classification: Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: No

Basinger

Percent of map unit: 4 percent
Landform: Drainageways on marine terraces, flats on marine terraces
Landform position (three-dimensional): Tread, dip, talf
Down-slope shape: Concave, convex
Across-slope shape: Concave, linear
Other vegetative classification: Slough (R155XY011FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: Yes

Cassia

Percent of map unit: 4 percent
Landform: Knolls on marine terraces, rises on marine terraces
Landform position (three-dimensional): Tread, talf
Down-slope shape: Convex
Across-slope shape: Linear
Other vegetative classification: Sand Pine Scrub (R155XY001FL), Sandy soils on rises and knolls of mesic uplands (G155XB131FL)

Hydric soil rating: No

Eaugallie

Percent of map unit: 3 percent
Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Talf
Down-slope shape: Linear, convex
Across-slope shape: Linear
Other vegetative classification: South Florida Flatwoods (R155XY003FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: No

60—Floridana-Gator soils, ponded-Urban land complex, 0 to 1 percent slopes

Map Unit Setting

National map unit symbol: 2y9gd
Elevation: 0 to 70 feet
Mean annual precipitation: 55 to 63 inches
Mean annual air temperature: 70 to 77 degrees F
Frost-free period: 350 to 365 days
Farmland classification: Not prime farmland

Map Unit Composition

Floridana and similar soils: 34 percent
Gator and similar soils: 32 percent
Urban land: 29 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Floridana

Setting

Landform: Depressions on marine terraces
Landform position (three-dimensional): Tread, dip
Down-slope shape: Concave, linear
Across-slope shape: Concave, linear
Parent material: Sandy and loamy marine deposits

Typical profile

A1 - 0 to 5 inches: mucky fine sand
A2 - 5 to 14 inches: fine sand
Eg - 14 to 36 inches: fine sand
Btg - 36 to 52 inches: sandy clay loam
Cg - 52 to 80 inches: sandy loam

Properties and qualities

Slope: 0 to 1 percent

Depth to restrictive feature: More than 80 inches
Drainage class: Very poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: None
Frequency of ponding: Frequent
Calcium carbonate, maximum content: 4 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water supply, 0 to 60 inches: Moderate (about 7.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7w
Hydrologic Soil Group: C/D
Forage suitability group: Sandy over loamy soils on stream terraces, flood plains, or in depressions (G155XB245FL)
Other vegetative classification: Freshwater Marshes and Ponds (R155XY010FL), Sandy over loamy soils on stream terraces, flood plains, or in depressions (G155XB245FL)
Hydric soil rating: Yes

Description of Gator

Setting

Landform: Depressions on marine terraces
Landform position (three-dimensional): Tread, dip
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Herbaceous organic material over sandy and loamy marine deposits

Typical profile

Oa - 0 to 22 inches: muck
Cg1 - 22 to 36 inches: loamy fine sand
Cg2 - 36 to 60 inches: sandy clay loam
Ckg3 - 60 to 80 inches: fine sand

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Very poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: None
Frequency of ponding: Frequent
Calcium carbonate, maximum content: 4 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water supply, 0 to 60 inches: Very high (about 14.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: C/D
Forage suitability group: Organic soils in depressions and on flood plains (G155XB645FL)
Other vegetative classification: Freshwater Marshes and Ponds (R155XY010FL), Organic soils in depressions and on flood plains (G155XB645FL)
Hydric soil rating: Yes

Description of Urban Land

Setting

Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Riser, talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: No parent material

Interpretive groups

Land capability classification (irrigated): None specified
Forage suitability group: Forage suitability group not assigned (G155XB999FL)
Other vegetative classification: Forage suitability group not assigned (G155XB999FL)
Hydric soil rating: Unranked

Minor Components

Floridana

Percent of map unit: 5 percent
Landform: Depressions on marine terraces
Landform position (three-dimensional): Tread, dip
Down-slope shape: Concave, linear
Across-slope shape: Concave, linear
Other vegetative classification: Freshwater Marshes and Ponds (R155XY010FL), Sandy over loamy soils on stream terraces, flood plains, or in depressions (G155XB245FL)
Hydric soil rating: No

62—Gator-Gator, drained mucks, ponded-Urban land complex, 0 to 1 percent slopes

Map Unit Setting

National map unit symbol: 2y9ht
Elevation: 0 to 70 feet
Mean annual precipitation: 55 to 63 inches
Mean annual air temperature: 70 to 77 degrees F
Frost-free period: 350 to 365 days
Farmland classification: Not prime farmland

Map Unit Composition

Gator and similar soils: 32 percent
Gator, drained, and similar soils: 27 percent
Urban land: 21 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Gator

Setting

Landform: Depressions on marine terraces
Landform position (three-dimensional): Tread, dip
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Herbaceous organic material over sandy and loamy marine deposits

Typical profile

Oa - 0 to 22 inches: muck
Cg1 - 22 to 36 inches: loamy fine sand
Cg2 - 36 to 60 inches: sandy clay loam
Cg3 - 60 to 80 inches: fine sand

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Very poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 0 to 6 inches
Frequency of flooding: None
Frequency of ponding: Frequent
Calcium carbonate, maximum content: 4 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water supply, 0 to 60 inches: Very high (about 14.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: C/D
Forage suitability group: Organic soils in depressions and on flood plains (G155XB645FL)
Other vegetative classification: Freshwater Marshes and Ponds (R155XY010FL), Organic soils in depressions and on flood plains (G155XB645FL)
Hydric soil rating: Yes

Description of Gator, Drained

Setting

Landform: Depressions on marine terraces
Landform position (three-dimensional): Tread, dip
Down-slope shape: Concave
Across-slope shape: Concave

Parent material: Herbaceous organic material over sandy and loamy marine deposits

Typical profile

Oa - 0 to 22 inches: muck
Cg1 - 22 to 36 inches: loamy fine sand
Cg2 - 36 to 60 inches: sandy clay loam
Cg3 - 60 to 80 inches: fine sand

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Very poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 12 to 36 inches
Frequency of flooding: None
Frequency of ponding: Frequent
Calcium carbonate, maximum content: 4 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water supply, 0 to 60 inches: Very high (about 14.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: A
Forage suitability group: Organic soils in depressions and on flood plains (G155XB645FL)
Other vegetative classification: Freshwater Marshes and Ponds (R155XY010FL), Organic soils in depressions and on flood plains (G155XB645FL)
Hydric soil rating: Yes

Description of Urban Land

Setting

Landform: Flats on marine terraces
Landform position (three-dimensional): Riser, talf
Down-slope shape: Linear
Across-slope shape: Linear

Minor Components

Delray

Percent of map unit: 5 percent
Landform: Depressions on marine terraces
Landform position (three-dimensional): Tread, dip
Down-slope shape: Linear, convex
Across-slope shape: Concave, linear
Other vegetative classification: Freshwater Marshes and Ponds (R155XY010FL), Sandy soils on stream terraces, flood plains, or in depressions (G155XB145FL)
Hydric soil rating: Yes

Floridana

Percent of map unit: 5 percent

Landform: Depressions on marine terraces
Landform position (three-dimensional): Tread, dip
Down-slope shape: Linear, concave
Across-slope shape: Linear, concave
Other vegetative classification: Freshwater Marshes and Ponds (R155XY010FL), Sandy over loamy soils on stream terraces, flood plains, or in depressions (G155XB245FL)
Hydric soil rating: Yes

Manatee, I

Percent of map unit: 5 percent
Landform: Drainageways on marine terraces, depressions on marine terraces
Landform position (three-dimensional): Tread, dip
Down-slope shape: Linear, convex, concave
Across-slope shape: Concave, linear
Other vegetative classification: Freshwater Marshes and Ponds (R155XY010FL), Loamy and clayey soils on stream terraces, flood plains, or in depressions (G155XB345FL)
Hydric soil rating: Yes

St. augustine, organic substratum

Percent of map unit: 5 percent
Landform: Marine terraces
Landform position (three-dimensional): Tread, dip
Down-slope shape: Convex
Across-slope shape: Linear
Other vegetative classification: Forage suitability group not assigned (G155XB999FL)
Hydric soil rating: No

63—Holopaw fine sand, ponded-Urban land complex, 0 to 1 percent slopes

Map Unit Setting

National map unit symbol: 2y9gj
Elevation: 0 to 190 feet
Mean annual precipitation: 46 to 63 inches
Mean annual air temperature: 68 to 77 degrees F
Frost-free period: 350 to 365 days
Farmland classification: Not prime farmland

Map Unit Composition

Holopaw and similar soils: 43 percent
Urban land: 40 percent
Minor components: 17 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Holopaw

Setting

Landform: Depressions on marine terraces
Landform position (three-dimensional): Tread, dip
Down-slope shape: Concave
Across-slope shape: Concave, linear
Parent material: Sandy and loamy marine deposits

Typical profile

A - 0 to 4 inches: fine sand
Eg - 4 to 50 inches: fine sand
Btg - 50 to 66 inches: fine sandy loam
Cg - 66 to 80 inches: loamy fine sand

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Very poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: None
Frequency of ponding: Frequent
Calcium carbonate, maximum content: 4 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water supply, 0 to 60 inches: Low (about 5.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7w
Hydrologic Soil Group: A/D
Forage suitability group: Sandy soils on stream terraces, flood plains, or in depressions (G155XB145FL)
Other vegetative classification: Freshwater Marshes and Ponds (R155XY010FL), Sandy soils on stream terraces, flood plains, or in depressions (G155XB145FL)
Hydric soil rating: Yes

Description of Urban Land

Setting

Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Riser, talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: No parent material

Interpretive groups

Land capability classification (irrigated): None specified
Forage suitability group: Forage suitability group not assigned (G155XB999FL)
Other vegetative classification: Forage suitability group not assigned (G155XB999FL)
Hydric soil rating: Unranked

Minor Components

Basinger

Percent of map unit: 6 percent
Landform: Flats on marine terraces, drainageways on marine terraces
Landform position (three-dimensional): Tread, talf, dip
Down-slope shape: Convex, concave
Across-slope shape: Linear, concave
Other vegetative classification: Slough (R155XY011FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: Yes

Riviera

Percent of map unit: 4 percent
Landform: Depressions on marine terraces
Landform position (three-dimensional): Tread, dip
Down-slope shape: Concave
Across-slope shape: Concave
Other vegetative classification: Freshwater Marshes and Ponds (R155XY010FL), Sandy over loamy soils on stream terraces, flood plains, or in depressions (G155XB245FL)
Hydric soil rating: Yes

Floridana

Percent of map unit: 3 percent
Landform: Depressions on marine terraces
Landform position (three-dimensional): Tread, dip
Down-slope shape: Concave
Across-slope shape: Concave, linear
Other vegetative classification: Freshwater Marshes and Ponds (R155XY010FL), Sandy over loamy soils on stream terraces, flood plains, or in depressions (G155XB245FL)
Hydric soil rating: Yes

Manatee

Percent of map unit: 2 percent
Landform: Depressions on marine terraces
Landform position (three-dimensional): Tread, dip
Down-slope shape: Concave
Across-slope shape: Concave, linear
Other vegetative classification: Freshwater Marshes and Ponds (R155XY010FL), Loamy and clayey soils on stream terraces, flood plains, or in depressions (G155XB345FL)
Hydric soil rating: Yes

Holopaw

Percent of map unit: 2 percent
Landform: Depressions on marine terraces
Landform position (three-dimensional): Tread, dip
Down-slope shape: Concave
Across-slope shape: Concave, linear
Other vegetative classification: Freshwater Marshes and Ponds (R155XY010FL), Sandy soils on stream terraces, flood plains, or in depressions (G155XB145FL)
Hydric soil rating: No

64—Kesson-Wulfert mucks, tidal-Urban land complex, 0 to 1 percent slopes

Map Unit Setting

National map unit symbol: 2y9gl
Elevation: 0 to 10 feet
Mean annual precipitation: 55 to 63 inches
Mean annual air temperature: 70 to 77 degrees F
Frost-free period: 360 to 365 days
Farmland classification: Not prime farmland

Map Unit Composition

Kesson, tidal, and similar soils: 32 percent
Wulfert, tidal, and similar soils: 28 percent
Urban land: 25 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Kesson, Tidal

Setting

Landform: Tidal marshes on marine terraces
Landform position (three-dimensional): Tread, talf
Down-slope shape: Linear, convex
Across-slope shape: Linear
Parent material: Thin herbaceous organic material over sandy marine deposits

Typical profile

Oan - 0 to 7 inches: muck
Ckn1 - 7 to 16 inches: fine sand
Ckn2 - 16 to 80 inches: fine sand

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Very poorly drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): High to very high (1.98 to 19.98 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: Very frequent
Frequency of ponding: None
Calcium carbonate, maximum content: 4 percent
Maximum salinity: Moderately saline to strongly saline (8.0 to 24.0 mmhos/cm)
Sodium adsorption ratio, maximum: 50.0
Available water supply, 0 to 60 inches: Moderate (about 7.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8w
Hydrologic Soil Group: A/D
Forage suitability group: Forage suitability group not assigned (G155XB999FL)
Other vegetative classification: Salt Marsh (R155XY009FL), Forage suitability group not assigned (G155XB999FL)
Hydric soil rating: Yes

Description of Wulfert, Tidal

Setting

Landform: Tidal marshes on marine terraces
Landform position (three-dimensional): Tread, talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Herbaceous organic material over sandy marine deposits

Typical profile

Oan - 0 to 30 inches: muck
Cn1 - 30 to 38 inches: mucky fine sand
Cn2 - 38 to 80 inches: fine sand

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Very poorly drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 19.98 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: Very frequent
Frequency of ponding: None
Maximum salinity: Slightly saline to strongly saline (4.0 to 24.0 mmhos/cm)
Sodium adsorption ratio, maximum: 50.0
Available water supply, 0 to 60 inches: Very high (about 14.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8w
Hydrologic Soil Group: A/D
Forage suitability group: Forage suitability group not assigned (G155XB999FL)
Other vegetative classification: Salt Marsh (R155XY009FL), Forage suitability group not assigned (G155XB999FL)
Hydric soil rating: Yes

Description of Urban Land

Setting

Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Riser, talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: No parent material

Interpretive groups

Land capability classification (irrigated): None specified

Forage suitability group: Forage suitability group not assigned (G155XB999FL)
Other vegetative classification: Forage suitability group not assigned (G155XB999FL)
Hydric soil rating: Unranked

Minor Components

Canaveral

Percent of map unit: 5 percent
Landform: Flats on marine terraces, ridges on marine terraces
Landform position (two-dimensional): Summit, backslope
Landform position (three-dimensional): Interfluve, tread, talf
Down-slope shape: Convex, concave
Across-slope shape: Linear
Other vegetative classification: Forage suitability group not assigned (G155XB999FL)
Hydric soil rating: No

St. augustine

Percent of map unit: 5 percent
Landform: Marine terraces
Landform position (three-dimensional): Tread, rise
Down-slope shape: Linear
Across-slope shape: Convex
Other vegetative classification: Forage suitability group not assigned (G155XB999FL)
Hydric soil rating: No

Kesson, tidal

Percent of map unit: 5 percent
Landform: Tidal marshes on marine terraces
Landform position (three-dimensional): Tread, talf
Down-slope shape: Linear, convex
Across-slope shape: Linear
Other vegetative classification: Salt Marsh (R155XY009FL), Forage suitability group not assigned (G155XB999FL)
Hydric soil rating: No

65—Malabar fine sand-Urban land complex, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: 2x9cd
Elevation: 10 to 130 feet
Mean annual precipitation: 42 to 63 inches
Mean annual air temperature: 70 to 77 degrees F
Frost-free period: 355 to 365 days
Farmland classification: Not prime farmland

Map Unit Composition

Malabar and similar soils: 45 percent
Urban land: 38 percent
Minor components: 17 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Malabar

Setting

Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Tread, dip
Down-slope shape: Concave, linear
Across-slope shape: Concave, linear
Parent material: Sandy and loamy marine deposits

Typical profile

A - 0 to 5 inches: fine sand
E - 5 to 17 inches: fine sand
Bw - 17 to 42 inches: fine sand
Btg - 42 to 59 inches: fine sandy loam
Cg - 59 to 80 inches: loamy fine sand

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)
Depth to water table: About 3 to 18 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 1 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water supply, 0 to 60 inches: Low (about 5.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4w
Hydrologic Soil Group: A/D
Forage suitability group: Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Other vegetative classification: Slough (R155XY011FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: Yes

Description of Urban Land

Setting

Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Riser, talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: No parent material

Interpretive groups

Land capability classification (irrigated): None specified
Forage suitability group: Forage suitability group not assigned (G155XB999FL)
Other vegetative classification: Forage suitability group not assigned (G155XB999FL)
Hydric soil rating: Unranked

Minor Components

Valkaria

Percent of map unit: 5 percent
Landform: Drainageways on flatwoods on marine terraces
Landform position (three-dimensional): Tread, dip, talf
Down-slope shape: Linear
Across-slope shape: Concave, linear
Other vegetative classification: Slough (R155XY011FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: Yes

Oldsmar

Percent of map unit: 4 percent
Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Talf
Down-slope shape: Linear, convex
Across-slope shape: Linear
Other vegetative classification: South Florida Flatwoods (R155XY003FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: No

Pineda

Percent of map unit: 4 percent
Landform: Drainageways on marine terraces, flats on marine terraces
Landform position (three-dimensional): Tread, dip, talf
Down-slope shape: Linear
Across-slope shape: Concave, linear
Other vegetative classification: Slough (R155XY011FL), Sandy over loamy soils on flats of hydric or mesic lowlands (G155XB241FL)
Hydric soil rating: Yes

Malabar

Percent of map unit: 2 percent
Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Tread, talf, dip
Down-slope shape: Linear, concave
Across-slope shape: Linear, concave
Other vegetative classification: Slough (R155XY011FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: No

Basinger

Percent of map unit: 2 percent
Landform: Depressions on marine terraces
Landform position (three-dimensional): Tread, dip
Down-slope shape: Concave, linear
Across-slope shape: Concave, linear

Other vegetative classification: Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: Yes

66—Manatee loamy fine sand, ponded-Urban land complex, 0 to 1 percent slopes

Map Unit Setting

National map unit symbol: 2y9gm
Elevation: 0 to 140 feet
Mean annual precipitation: 46 to 63 inches
Mean annual air temperature: 68 to 77 degrees F
Frost-free period: 350 to 365 days
Farmland classification: Not prime farmland

Map Unit Composition

Manatee and similar soils: 44 percent
Urban land: 39 percent
Minor components: 17 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Manatee

Setting

Landform: Drainageways on marine terraces, depressions on marine terraces
Landform position (three-dimensional): Tread, dip
Down-slope shape: Linear, convex, concave
Across-slope shape: Concave, linear
Parent material: Sandy and loamy marine deposits

Typical profile

A - 0 to 18 inches: loamy fine sand
Btg - 18 to 36 inches: fine sandy loam
BCkg - 36 to 48 inches: fine sandy loam
Ckg - 48 to 80 inches: fine sandy loam

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Very poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: None
Frequency of ponding: Frequent
Calcium carbonate, maximum content: 4 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0

Available water supply, 0 to 60 inches: Moderate (about 6.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7w
Hydrologic Soil Group: B/D
Forage suitability group: Loamy and clayey soils on stream terraces, flood plains, or in depressions (G155XB345FL)
Other vegetative classification: Freshwater Marshes and Ponds (R155XY010FL), Loamy and clayey soils on stream terraces, flood plains, or in depressions (G155XB345FL)
Hydric soil rating: Yes

Description of Urban Land

Setting

Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Riser, talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: No parent material

Interpretive groups

Land capability classification (irrigated): None specified
Forage suitability group: Forage suitability group not assigned (G155XB999FL)
Other vegetative classification: Forage suitability group not assigned (G155XB999FL)
Hydric soil rating: Unranked

Minor Components

Floridana

Percent of map unit: 5 percent
Landform: Depressions on marine terraces
Landform position (three-dimensional): Tread, dip
Down-slope shape: Linear, concave
Across-slope shape: Linear, concave
Other vegetative classification: Freshwater Marshes and Ponds (R155XY010FL), Sandy over loamy soils on stream terraces, flood plains, or in depressions (G155XB245FL)
Hydric soil rating: Yes

Parkwood

Percent of map unit: 4 percent
Landform: Flats on marine terraces
Landform position (three-dimensional): Tread, dip
Down-slope shape: Linear
Across-slope shape: Linear
Other vegetative classification: Wetland Hardwood Hammock (R155XY012FL), Loamy and clayey soils on flats of hydric or mesic lowlands (G155XB341FL)
Hydric soil rating: Yes

Winder

Percent of map unit: 3 percent
Landform: Drainageways on marine terraces, flats on marine terraces
Landform position (three-dimensional): Tread, dip, talf
Down-slope shape: Convex, linear

Across-slope shape: Concave, linear
Other vegetative classification: Wetland Hardwood Hammock (R155XY012FL), Slough (R155XY011FL), Cabbage Palm Flatwoods (R155XY005FL), Loamy and clayey soils on flats of hydric or mesic lowlands (G155XB341FL)
Hydric soil rating: Yes

Placid

Percent of map unit: 3 percent
Landform: Drainageways on marine terraces, depressions on marine terraces
Landform position (three-dimensional): Tread, dip
Down-slope shape: Concave
Across-slope shape: Concave
Other vegetative classification: Freshwater Marshes and Ponds (R155XY010FL), Sandy soils on stream terraces, flood plains, or in depressions (G155XB145FL)
Hydric soil rating: Yes

Manatee

Percent of map unit: 2 percent
Landform: Drainageways on marine terraces, depressions on marine terraces
Landform position (three-dimensional): Tread, dip
Down-slope shape: Linear, convex, concave
Across-slope shape: Concave, linear
Other vegetative classification: Freshwater Marshes and Ponds (R155XY010FL), Loamy and clayey soils on stream terraces, flood plains, or in depressions (G155XB345FL)
Hydric soil rating: No

67—Ona fine sand-Urban land complex, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: 2y9gn
Elevation: 0 to 150 feet
Mean annual precipitation: 44 to 63 inches
Mean annual air temperature: 68 to 77 degrees F
Frost-free period: 350 to 365 days
Farmland classification: Not prime farmland

Map Unit Composition

Ona and similar soils: 44 percent
Urban land: 39 percent
Minor components: 17 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Ona

Setting

Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Talf

Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Sandy marine deposits

Typical profile

A - 0 to 4 inches: fine sand
Bh - 4 to 22 inches: fine sand
C - 22 to 80 inches: fine sand

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: About 6 to 18 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water supply, 0 to 60 inches: Low (about 5.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: B/D
Forage suitability group: Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Other vegetative classification: South Florida Flatwoods (R155XY003FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: No

Description of Urban Land

Setting

Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Riser, talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: No parent material

Interpretive groups

Land capability classification (irrigated): None specified
Forage suitability group: Forage suitability group not assigned (G155XB999FL)
Other vegetative classification: Forage suitability group not assigned (G155XB999FL)
Hydric soil rating: Unranked

Minor Components

Basinger

Percent of map unit: 5 percent
Landform: Flats on marine terraces, drainageways on marine terraces
Landform position (three-dimensional): Tread, talf, dip
Down-slope shape: Convex, concave
Across-slope shape: Linear, concave

Other vegetative classification: Slough (R155XY011FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: Yes

Myakka
Percent of map unit: 3 percent
Landform: Drainageways on flatwoods on marine terraces
Landform position (three-dimensional): Tread, talf, dip
Down-slope shape: Linear
Across-slope shape: Linear, concave
Other vegetative classification: South Florida Flatwoods (R155XY003FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: No

Immokalee
Percent of map unit: 3 percent
Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Riser, talf
Down-slope shape: Linear
Across-slope shape: Linear
Other vegetative classification: South Florida Flatwoods (R155XY003FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: No

Pomello
Percent of map unit: 2 percent
Landform: Knolls on marine terraces, ridges on marine terraces
Landform position (two-dimensional): Summit, backslope
Landform position (three-dimensional): Interfluve, side slope, riser
Down-slope shape: Convex, linear
Across-slope shape: Linear
Other vegetative classification: Sand Pine Scrub (R155XY001FL), Sandy soils on rises and knolls of mesic uplands (G155XB131FL)
Hydric soil rating: No

Eaugallie
Percent of map unit: 2 percent
Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Tread, talf
Down-slope shape: Convex
Across-slope shape: Linear
Other vegetative classification: South Florida Flatwoods (R155XY003FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: No

Ona
Percent of map unit: 2 percent
Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Other vegetative classification: South Florida Flatwoods (R155XY003FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: No

68—Orsino fine sand-Urban land complex, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: 2y9g3
Elevation: 0 to 150 feet
Mean annual precipitation: 42 to 68 inches
Mean annual air temperature: 68 to 77 degrees F
Frost-free period: 350 to 365 days
Farmland classification: Not prime farmland

Map Unit Composition

Orsino and similar soils: 45 percent
Urban land: 40 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Orsino

Setting

Landform: Ridges on marine terraces, knolls on marine terraces
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve, tread
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Sandy marine deposits and/or eolian deposits

Typical profile

A - 0 to 2 inches: fine sand
E - 2 to 23 inches: fine sand
Bw and Bh/E - 23 to 43 inches: fine sand
Bw - 43 to 62 inches: fine sand
C - 62 to 80 inches: fine sand

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Very high (19.98 to 50.02 in/hr)
Depth to water table: About 42 to 60 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water supply, 0 to 60 inches: Low (about 4.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 4s
Hydrologic Soil Group: A
Forage suitability group: Sandy soils on rises, knolls, and ridges of mesic uplands (G155XB121FL)
Other vegetative classification: Sand Pine Scrub (R155XY001FL), Sandy soils on rises, knolls, and ridges of mesic uplands (G155XB121FL)
Hydric soil rating: No

Description of Urban Land

Setting

Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Riser, talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: No parent material

Interpretive groups

Land capability classification (irrigated): None specified
Forage suitability group: Forage suitability group not assigned (G155XB999FL)
Other vegetative classification: Forage suitability group not assigned (G155XB999FL)
Hydric soil rating: Unranked

Minor Components

Myakka

Percent of map unit: 5 percent
Landform: Drainageways on flatwoods on marine terraces
Landform position (three-dimensional): Tread, talf, dip
Down-slope shape: Linear
Across-slope shape: Linear, concave
Other vegetative classification: South Florida Flatwoods (R155XY003FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: No

Pomello

Percent of map unit: 5 percent
Landform: Knolls on marine terraces, ridges on marine terraces
Landform position (two-dimensional): Summit, backslope
Landform position (three-dimensional): Interfluve, side slope, riser
Down-slope shape: Convex, linear
Across-slope shape: Linear
Other vegetative classification: Sand Pine Scrub (R155XY001FL), Sandy soils on rises and knolls of mesic uplands (G155XB131FL)
Hydric soil rating: No

Eaugallie

Percent of map unit: 4 percent
Landform: — error in exists on —
Landform position (three-dimensional): Tread, talf
Down-slope shape: Convex
Across-slope shape: Linear
Other vegetative classification: South Florida Flatwoods (R155XY003FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: No

Basinger

Percent of map unit: 1 percent
Landform: Flats on marine terraces, drainageways on marine terraces
Landform position (three-dimensional): Tread, talf, dip
Down-slope shape: Convex, concave
Across-slope shape: Linear, concave
Other vegetative classification: Slough (R155XY011FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: Yes

69—Pineda fine sand-Urban land complex, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: 2x9cj
Elevation: 0 to 130 feet
Mean annual precipitation: 38 to 63 inches
Mean annual air temperature: 68 to 77 degrees F
Frost-free period: 350 to 365 days
Farmland classification: Not prime farmland

Map Unit Composition

Pineda and similar soils: 40 percent
Urban land: 33 percent
Minor components: 27 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Pineda

Setting

Landform: Flats on marine terraces, drainageways on marine terraces
Landform position (three-dimensional): Tread, talf, dip
Down-slope shape: Linear
Across-slope shape: Linear, concave
Parent material: Sandy and loamy marine deposits

Typical profile

A - 0 to 1 inches: fine sand
E - 1 to 5 inches: fine sand
Bw - 5 to 36 inches: fine sand
Btg/E - 36 to 54 inches: fine sandy loam
Cg - 54 to 80 inches: fine sand

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)

Depth to water table: About 6 to 18 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 15 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water supply, 0 to 60 inches: Low (about 5.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: A/D
Forage suitability group: Sandy over loamy soils on flats of hydric or mesic lowlands (G155XB241FL)
Other vegetative classification: Slough (R155XY011FL), Sandy over loamy soils on flats of hydric or mesic lowlands (G155XB241FL)
Hydric soil rating: No

Description of Urban Land

Setting

Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Riser, talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: No parent material

Interpretive groups

Land capability classification (irrigated): None specified
Forage suitability group: Forage suitability group not assigned (G155XB999FL)
Other vegetative classification: Forage suitability group not assigned (G155XB999FL)
Hydric soil rating: Unranked

Minor Components

Pineda, wet

Percent of map unit: 10 percent
Landform: Flats on marine terraces, drainageways on marine terraces
Landform position (three-dimensional): Tread, talf, dip
Down-slope shape: Linear
Across-slope shape: Linear, concave
Other vegetative classification: Slough (R155XY011FL), Sandy over loamy soils on flats of hydric or mesic lowlands (G155XB241FL)
Hydric soil rating: Yes

Felda

Percent of map unit: 6 percent
Landform: Flats on marine terraces, drainageways on marine terraces
Landform position (three-dimensional): Tread, talf, dip
Down-slope shape: Linear
Across-slope shape: Linear, concave
Other vegetative classification: Slough (R155XY011FL), Sandy over loamy soils on flats of hydric or mesic lowlands (G155XB241FL)
Hydric soil rating: Yes

Wabasso

Percent of map unit: 3 percent
Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Tread, talf
Down-slope shape: Linear, convex
Across-slope shape: Linear
Other vegetative classification: South Florida Flatwoods (R155XY003FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: No

Cypress lake

Percent of map unit: 2 percent
Landform: Flats on marine terraces
Landform position (three-dimensional): Tread, talf
Down-slope shape: Convex, linear
Across-slope shape: Linear
Other vegetative classification: South Florida Flatwoods (R155XY003FL), Sandy over loamy soils on flats of hydric or mesic lowlands (G155XB241FL)
Hydric soil rating: Yes

Brynwood

Percent of map unit: 2 percent
Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Tread, talf
Down-slope shape: Linear
Across-slope shape: Linear
Other vegetative classification: South Florida Flatwoods (R155XY003FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: Yes

Valkaria

Percent of map unit: 2 percent
Landform: Drainageways on flats on marine terraces
Landform position (three-dimensional): Tread, talf, dip
Down-slope shape: Linear
Across-slope shape: Linear, concave
Other vegetative classification: Slough (R155XY011FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: Yes

Pineda

Percent of map unit: 2 percent
Landform: Drainageways on marine terraces, flats on marine terraces
Landform position (three-dimensional): Tread, talf, dip
Down-slope shape: Linear
Across-slope shape: Linear, concave
Other vegetative classification: Slough (R155XY011FL), Sandy over loamy soils on flats of hydric or mesic lowlands (G155XB241FL)
Hydric soil rating: No

70—Pomello fine sand-Urban land complex, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: 2x9g0
Elevation: 0 to 150 feet
Mean annual precipitation: 42 to 68 inches
Mean annual air temperature: 68 to 77 degrees F
Frost-free period: 350 to 365 days
Farmland classification: Not prime farmland

Map Unit Composition

Pomello and similar soils: 45 percent
Urban land: 40 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Pomello

Setting

Landform: Knolls on marine terraces, ridges on marine terraces
Landform position (two-dimensional): Summit, backslope
Landform position (three-dimensional): Interfluve, side slope, riser
Down-slope shape: Convex, linear
Across-slope shape: Linear
Parent material: Sandy marine deposits

Typical profile

A - 0 to 4 inches: fine sand
E - 4 to 42 inches: fine sand
Bh - 42 to 54 inches: fine sand
B/C - 54 to 80 inches: fine sand

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)
Depth to water table: About 18 to 42 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water supply, 0 to 60 inches: Low (about 5.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s

Hydrologic Soil Group: A
Forage suitability group: Sandy soils on rises and knolls of mesic uplands (G155XB131FL)
Other vegetative classification: Sand Pine Scrub (R155XY001FL), Sandy soils on rises and knolls of mesic uplands (G155XB131FL)
Hydric soil rating: No

Description of Urban Land

Setting

Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Riser, talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: No parent material

Interpretive groups

Land capability classification (irrigated): None specified
Forage suitability group: Forage suitability group not assigned (G155XB999FL)
Other vegetative classification: Forage suitability group not assigned (G155XB999FL)
Hydric soil rating: Unranked

Minor Components

Immokalee

Percent of map unit: 5 percent
Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Riser, talf
Down-slope shape: Linear
Across-slope shape: Linear
Other vegetative classification: South Florida Flatwoods (R155XY003FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: No

Duette

Percent of map unit: 5 percent
Landform: Knolls on marine terraces, ridges on marine terraces
Landform position (two-dimensional): Summit, backslope
Landform position (three-dimensional): Interfluve, side slope, riser
Down-slope shape: Convex, linear
Across-slope shape: Linear
Other vegetative classification: Sand Pine Scrub (R155XY001FL), Sandy soils on rises, knolls, and ridges of mesic uplands (G155XB121FL)
Hydric soil rating: No

Jonathan

Percent of map unit: 3 percent
Landform: Ridges on marine terraces, knolls on marine terraces
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve, tread, rise
Down-slope shape: Convex
Across-slope shape: Linear
Other vegetative classification: Sandy soils on rises, knolls, and ridges of mesic uplands (G155XB121FL)
Hydric soil rating: No

Tavares

Percent of map unit: 2 percent
Landform: Hills on marine terraces, flatwoods on marine terraces, knolls on marine terraces, ridges on marine terraces
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve, side slope, tread, rise
Down-slope shape: Linear, convex
Across-slope shape: Convex, linear
Other vegetative classification: Longleaf Pine-Turkey Oak Hills (R155XY002FL), Sand Pine Scrub (R155XY001FL), Sandy soils on rises, knolls, and ridges of mesic uplands (G155XB121FL)
Hydric soil rating: No

71—Pople fine sand, wet-Urban land complex, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: 2y9gp
Elevation: 0 to 150 feet
Mean annual precipitation: 42 to 68 inches
Mean annual air temperature: 68 to 77 degrees F
Frost-free period: 335 to 365 days
Farmland classification: Not prime farmland

Map Unit Composition

Pople and similar soils: 45 percent
Urban land: 40 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Pople

Setting

Landform: Flats on marine terraces, drainageways on marine terraces
Landform position (three-dimensional): Tread, talf
Down-slope shape: Linear
Across-slope shape: Linear, concave
Parent material: Sandy and loamy marine deposits

Typical profile

A - 0 to 4 inches: fine sand
E - 4 to 17 inches: fine sand
Bk - 17 to 28 inches: fine sand
Btk - 28 to 56 inches: fine sandy loam
Ckg - 56 to 80 inches: fine sand

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained

Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.60 in/hr)
Depth to water table: About 3 to 18 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 4 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water supply, 0 to 60 inches: Moderate (about 6.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: C/D
Forage suitability group: Sandy over loamy soils on flats of hydric or mesic lowlands (G155XB241FL)
Other vegetative classification: Cabbage Palm Flatwoods (R155XY005FL), Sandy over loamy soils on flats of hydric or mesic lowlands (G155XB241FL)
Hydric soil rating: Yes

Description of Urban Land

Setting

Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Riser, talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: No parent material

Interpretive groups

Land capability classification (irrigated): None specified
Forage suitability group: Forage suitability group not assigned (G155XB999FL)
Other vegetative classification: Forage suitability group not assigned (G155XB999FL)
Hydric soil rating: Unranked

Minor Components

Bradenton

Percent of map unit: 5 percent
Landform: Flats on marine terraces
Landform position (three-dimensional): Tread, talf
Down-slope shape: Convex
Across-slope shape: Linear
Other vegetative classification: Wetland Hardwood Hammock (R155XY012FL), South Florida Flatwoods (R155XY003FL), Loamy and clayey soils on flats of hydric or mesic lowlands (G155XB341FL)
Hydric soil rating: Yes

Wabasso

Percent of map unit: 4 percent
Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Tread, talf
Down-slope shape: Linear, convex
Across-slope shape: Linear

Other vegetative classification: South Florida Flatwoods (R155XY003FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: No

Eaugallie

Percent of map unit: 4 percent
Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Tread, talf
Down-slope shape: Convex
Across-slope shape: Linear
Other vegetative classification: South Florida Flatwoods (R155XY003FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: No

Pople

Percent of map unit: 2 percent
Landform: Flats on marine terraces, drainageways on marine terraces
Landform position (three-dimensional): Tread, talf
Down-slope shape: Linear
Across-slope shape: Linear, concave
Other vegetative classification: Cabbage Palm Flatwoods (R155XY005FL), Sandy over loamy soils on flats of hydric or mesic lowlands (G155XB241FL)
Hydric soil rating: No

72—Smyrna fine sand-Urban land complex, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: 2x9cm
Elevation: 0 to 130 feet
Mean annual precipitation: 42 to 63 inches
Mean annual air temperature: 70 to 77 degrees F
Frost-free period: 355 to 365 days
Farmland classification: Not prime farmland

Map Unit Composition

Smyrna and similar soils: 45 percent
Urban land: 38 percent
Minor components: 17 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Smyrna

Setting

Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Tread, talf
Down-slope shape: Linear, convex
Across-slope shape: Linear
Parent material: Sandy marine deposits

Typical profile

A - 0 to 4 inches: fine sand
E - 4 to 13 inches: fine sand
Bh - 13 to 18 inches: fine sand
C/Bw - 18 to 49 inches: fine sand
C - 49 to 80 inches: fine sand

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 6.00 in/hr)
Depth to water table: About 6 to 18 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water supply, 0 to 60 inches: Low (about 5.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4w
Hydrologic Soil Group: A/D
Forage suitability group: Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Other vegetative classification: South Florida Flatwoods (R155XY003FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: No

Description of Urban Land

Setting

Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Riser, talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: No parent material

Interpretive groups

Land capability classification (irrigated): None specified
Forage suitability group: Forage suitability group not assigned (G155XB999FL)
Other vegetative classification: Forage suitability group not assigned (G155XB999FL)
Hydric soil rating: Unranked

Minor Components

Eaugallie

Percent of map unit: 5 percent
Landform: — error in exists on —
Landform position (three-dimensional): Tread, talf
Down-slope shape: Convex
Across-slope shape: Linear

Other vegetative classification: South Florida Flatwoods (R155XY003FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: No

Basinger

Percent of map unit: 4 percent
Landform: Depressions on marine terraces
Landform position (three-dimensional): Tread, dip
Down-slope shape: Concave, linear
Across-slope shape: Concave, linear
Other vegetative classification: Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: Yes

Immokalee

Percent of map unit: 4 percent
Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Riser, talf
Down-slope shape: Linear
Across-slope shape: Linear
Other vegetative classification: South Florida Flatwoods (R155XY003FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: No

Smyrna

Percent of map unit: 2 percent
Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Tread, talf
Down-slope shape: Linear, convex
Across-slope shape: Linear
Other vegetative classification: South Florida Flatwoods (R155XY003FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: No

Placid

Percent of map unit: 2 percent
Landform: Drainageways on marine terraces, depressions on marine terraces
Landform position (three-dimensional): Tread, dip
Down-slope shape: Concave
Across-slope shape: Concave
Other vegetative classification: Freshwater Marshes and Ponds (R155XY010FL), Sandy soils on stream terraces, flood plains, or in depressions (G155XB145FL)
Hydric soil rating: Yes

73—Tavares fine sand-Urban land complex, 0 to 5 percent slopes

Map Unit Setting

National map unit symbol: 2y9gs
Elevation: 0 to 130 feet

Mean annual precipitation: 42 to 63 inches
Mean annual air temperature: 66 to 77 degrees F
Frost-free period: 340 to 365 days
Farmland classification: Not prime farmland

Map Unit Composition

Tavares and similar soils: 43 percent
Urban land: 37 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Tavares

Setting

Landform: Knolls on marine terraces, ridges on marine terraces, hills on marine terraces, flats on marine terraces
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve, side slope, tread, rise
Down-slope shape: Linear, convex
Across-slope shape: Convex, linear
Parent material: Eolian or sandy marine deposits

Typical profile

A - 0 to 6 inches: fine sand
C - 6 to 80 inches: fine sand

Properties and qualities

Slope: 0 to 5 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): High to very high (6.00 to 20.00 in/hr)
Depth to water table: About 18 to 42 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water supply, 0 to 60 inches: Low (about 4.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3s
Hydrologic Soil Group: A
Forage suitability group: Sandy soils on rises, knolls, and ridges of mesic uplands (G155XB121FL)
Other vegetative classification: Longleaf Pine-Turkey Oak Hills (R155XY002FL), Sand Pine Scrub (R155XY001FL), Sandy soils on rises, knolls, and ridges of mesic uplands (G155XB121FL)
Hydric soil rating: No

Description of Urban Land

Setting

Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Riser, talf
Down-slope shape: Linear

Across-slope shape: Linear
Parent material: No parent material

Interpretive groups

Land capability classification (irrigated): None specified
Forage suitability group: Forage suitability group not assigned (G155XB999FL)
Other vegetative classification: Forage suitability group not assigned (G155XB999FL)
Hydric soil rating: Unranked

Minor Components

Pomello

Percent of map unit: 6 percent
Landform: Knolls on marine terraces, ridges on marine terraces
Landform position (two-dimensional): Summit, backslope
Landform position (three-dimensional): Interfluve, side slope, riser
Down-slope shape: Convex, linear
Across-slope shape: Linear
Other vegetative classification: Sand Pine Scrub (R155XY001FL), Sandy soils on rises and knolls of mesic uplands (G155XB131FL)
Hydric soil rating: No

Cassia

Percent of map unit: 5 percent
Landform: Knolls on marine terraces, rises on marine terraces
Landform position (three-dimensional): Tread, talf
Down-slope shape: Convex
Across-slope shape: Linear
Other vegetative classification: Sand Pine Scrub (R155XY001FL), Sandy soils on rises and knolls of mesic uplands (G155XB131FL)
Hydric soil rating: No

Apopka

Percent of map unit: 4 percent
Landform: Ridges on marine terraces, hills on marine terraces
Landform position (two-dimensional): Summit, backslope
Landform position (three-dimensional): Interfluve, side slope, riser
Down-slope shape: Convex
Across-slope shape: Linear
Other vegetative classification: Longleaf Pine-Turkey Oak Hills (R155XY002FL), Sandy soils on ridges and dunes of xeric uplands (G155XB111FL)
Hydric soil rating: No

Astatula

Percent of map unit: 3 percent
Landform: Knolls on marine terraces, ridges on marine terraces, hills on marine terraces
Landform position (two-dimensional): Summit, backslope
Landform position (three-dimensional): Interfluve, side slope, riser, rise
Down-slope shape: Convex
Across-slope shape: Linear
Other vegetative classification: Sandy soils on ridges and dunes of xeric uplands (G155XB111FL)
Hydric soil rating: No

Adamsville

Percent of map unit: 2 percent
Landform: Knolls on marine terraces, rises on marine terraces
Landform position (three-dimensional): Tread, rise
Down-slope shape: Convex
Across-slope shape: Linear
Other vegetative classification: Upland Hardwood Hammock (R155XY008FL), Sandy soils on rises and knolls of mesic uplands (G155XB131FL)
Hydric soil rating: No

99—Water

Map Unit Composition

Water: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Water

Interpretive groups

Land capability classification (irrigated): None specified
Forage suitability group: Forage suitability group not assigned (G155XB999FL)
Other vegetative classification: Forage suitability group not assigned (G155XB999FL)
Hydric soil rating: Unranked

100—Waters of the Gulf of Mexico

Map Unit Composition

Waters of the gulf of mexico: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Waters Of The Gulf Of Mexico

Interpretive groups

Land capability classification (irrigated): None specified
Forage suitability group: Forage suitability group not assigned (G155XB999FL)
Other vegetative classification: Forage suitability group not assigned (G155XB999FL)
Hydric soil rating: Unranked

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Appendix E

Environmental Review Documentation

Winchester Parcel
Environmental Due Diligence Report

Prepared by:
Environmental Consulting & Technology, Inc.
December 2021

WINCHESTER PARCEL

ENVIRONMENTAL DUE DILIGENCE REPORT

Prepared for:

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ECT No. 210692

December 2021

DOCUMENT REVIEW

The dual signatory process is an integral part of Environmental Consulting & Technology, Inc.'s (ECT's) Document Review Policy No. 9.03. All ECT documents undergo technical/peer review prior to dispatching these documents to any outside entity.

This document has been authored and reviewed by the following employees:

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December 23, 2021	December 23, 2021
Date	Date

TABLE OF CONTENTS

APPENDICES

LIST OF TABLES

LIST OF FIGURES

1.0 INTRODUCTION

Environmental Consulting & Technology, Inc. (ECT) conducted an environmental due diligence assessment on the 86-acre (+/-) site that the Englewood Water District is considering for a future wastewater treatment facility. The site is located on the southwest corner of Winchester Ranch at Wellen Park (PID 0830001000) west of River Road and east of State Road 776 (aka N Indiana Avenue), in Section 19, Township 40 South, Range 20 East, Englewood, Sarasota County, Florida (Figure 1). The site is surrounded by residential development to the west and south and undeveloped lands to the north and east. An FPL transmission corridor also runs along the south side of the property. Gottfried Creek (Lateral Canal) runs through the north side of the site flowing east where it joins the main branch of Gottfried Creek that drains south under the FPL easement and ultimately discharges into Lemon Bay. Historic aerials dating back to 1948, 1974 and 1986 are enclosed that show the creek was channelized and maintained regularly dating back to the 1940's (Figure's 2-4). The site is located in the Forked Creek-Gottfried Creek Frontal Subbasin which is part of the Southern Coastal Watershed (Figure 5).

The site is located in Winchester Ranch which was recently approved as a Critical Area Plan (CAP) by Sarasota County under Ordinance No. 2021-014 formally adopted on April 21, 2021 (Appendix A). This overall site (Winchester Ranch) has been part of a large ranch operation for well over fifty (50) years and some areas are still being used for agricultural purposes, but this parcel hasn't been under any agricultural uses.

In order to identify potential development constraints and environmental permitting considerations associated with the site, ECT evaluated the property for habitats and listed wildlife species that are subject to protection under state, federal, and local government regulations. Field work to support this ecological assessment was conducted in October 2021. Specific tasks completed during the due diligence review include habitat assessment and mapping, wetland delineations, Grand Tree assessments and listed species surveys to identify potential threatened and endangered species occurring on or near the site.

In addition to the field assessment, ECT reviewed publicly available data such as: high resolution aerial photographs, National Wetlands Inventory (NWI), Southwest Florida

Water Management District (SWFWMD) Land Use data, Sarasota County GIS data, the Natural Resource Conservation Service (NRCS) Soil Survey, and a number of listed species databases published by the Florida Fish and Wildlife Conservation Commission (FWC) and the United States Fish and Wildlife Service (USFWS). ECT also reviewed records from regulatory agencies (e.g. SWFWMD) to evaluate permitting history associated with the site, but no records were found.

2.0 SOILS

The site contains five (5) different soil types according to the 1991 *Soil Survey of Sarasota County* (Figure 6), but is predominantly characterized by Eau Gallie and Myakka fine sand (010 and 055) and Boca and Hallandale soils (003) which are both non-hydric soils commonly associated with uplands. The site also contains Holopaw fine sand, depressional soils (022) and Bradenton fine sand (004) which are considered hydric soils commonly associated with wetlands.

Table 2-1. NRCS Soils Within the Winchester Parcel.

Soil Name	Mapping Unit	Hydric Status	General Description
Eau Gallie and Myakka Fine Sands	010	No	Nearly level, poorly drained soils on broad flatwoods. Commonly associated with slash pine, longleaf pine, scattered cabbage palm and oaks. Understory includes inkberry, saw palmetto, bluestem, pineland threeawn and other grasses.
Eau Gallie and Myakka Fine Sands-Urban Land Complex	055	No	These soils were historically associated with native communities similar to those found with Eau Gallie and Myakka Fine Sands but have been altered from development (i.e., FPL transmission corridor).
Boca and Hallandale Soils	003	No	Nearly level, poorly drained soils on broad flatwoods and low areas within the flatwoods. Commonly associated with slash pine, scattered cabbage palm and laurel oaks. Understory includes saw palmetto, wax myrtle, chalky bluestem, pineland threeawn, maidencane and other grasses.
Holopaw Fine Sand, Frequently Ponded, 0 to 1% Slopes	022	Yes	Nearly level, very poorly drained soil in depressions. Commonly associated with blue maidencane, broomsedge, St. Johnswort, wax myrtle, panicum, sand cordgrass, sedge, pipewort, paspalum, and various other water-tolerant plants and grasses.
Bradenton Fine Sand	004	Yes	Nearly level, poorly drained soils in low ridges and hammocks adjacent to floodplains, sloughs and depressions. Commonly associated with slash pine, longleaf pine, laurel oak, live oak, cabbage palm, and magnolia. Understory includes saw palmetto, wax myrtle, wild coffee, blue stem, longleaf uniola and panicum.

3.0 HABITATS AND LAND USES

ECT conducted wetland delineations and habitat assessments on the subject property to evaluate the extent of wetland jurisdiction and native habitats that may be subject to agency jurisdiction or development restrictions. Wetlands were delineated based on state methodology (Chapter 62-340, F.A.C. *Delineation of the Landward Extent of Wetlands and Surface Waters*). ECT also evaluated the site for native habitats and Grand Trees that might be subject to protection by Sarasota County under the County's Comprehensive Plan, Unified Development Code (UDC) and Tree Protection Code. Overall, the site contains approximately 13.58 acres of wetlands and surface waters as shown on the Wetland Map (Figure 7) and the remainder of the site is characterized as native upland habitats with the exception of the transmission corridor on the south side of the site. ECT conducted a site review on November 17, 2021 with Mr. Bryan Beard and Mr. Jim Dierolf (Sarasota County) to review habitats onsite, particularly those subject to County protection (i.e., scrubby flatwoods, mesic hammock). Wetland and upland habitat descriptions are discussed in more detail below.

3.1 HABITAT DESCRIPTIONS

ECT mapped all habitats and land uses onsite based on the *Florida Land Use Cover and Forms Classification System*[1] (FLUCFCS) as reflected on the enclosed Land Use Map (Figure 8). ECT also confirmed the site has wetlands and also identified some upland habitats that are subject to protection under the County Comprehensive Plan and UDC including scrubby flatwoods and mesic hammock. A summary of uplands and wetlands/surface waters is provided below with a brief description of each habitat type reflected on the Land Use Map (Figure 8). Representative photographs of each habitat are included in Appendix B.

[1] Florida Department of Transportation, January 1999

3.1.1 UPLANDS

The site contains approximately 73.3 (+/-) acres of uplands, most of which is native habitat (FLUCFCS 411, 4111, 434, 425) with the exception of the FPL transmission corridor (FLUCFCS 832) as depicted on the Land Use Map (Figure 8). Each upland land use is discussed in more detail below.

Pine Flatwoods (FLUCFCS 411; 22.47 acres)

Most of the uplands on this parcel are characterized as pine flatwoods. This community type is dominated by slash pine (*Pinus elliotti*) and saw palmetto (*Serenoa repens*) understory that is highly overgrown as a result of years of fire suppression and disturbed from hog rooting. The flatwoods also contain scattered cabbage palm (*Sabal palmetto*), laurel oaks (*Quercus laurifolia*), and live oaks (*Quercus virginiana*) intermixed with a variety of shrubs, herbaceous vegetation and vines including wax myrtle (*Morella cerifera*), saltbush (*Baccharis hamilifolia*), rusty lyonia (*Lyonia ferruginea*), gallberry (*Ilex glabra*), fetterbush (*Lyonia lucida*), winged sumac (*Rhus copallinum*), shiny blueberry (*Vaccinium myrsinites),* broomsedge (*Andropogon virginicus*), wire grass (*Aristida stricta*), flattop goldenrod (*Euthamia caroliniana*), blackroot (*Pterocaulon pycnostachyum*), blackberry (*Rubus* sp.), laurel greenbriar (*Smilax laurifolia*), and grapevine (*Vitis rotundifolia*). Pine flatwoods are considered native habitat, and therefore, subject to some open space preservation requirements based on Sarasota County's Comprehensive Plan and UDC. However, there are more restrictive habitats onsite (i.e., wetlands, scrubby flatwoods) that are subject to higher protection standards and will likely satisfy open space requirements.

Scrubby Flatwoods (FLUCFCS 4111; 9.78 acres)

Scrubby flatwoods are located in the southwest portion of the site, just north of the powerline easement and adjacent to the County preserve parcel. The area very sandy xeric soils and is characterized by scrubby vegetation, scrub oaks, scattered pines and patches of exposed xeric soils. Vegetation includes a diversity of scrub oaks (*Quercus inopina*, *Quercus geminate*, *Quercus myrtifolia,*), scattered slash pine, low-growing shrubs that include saw palmetto, fetterbush, wax myrtle, gallberry, winged sumac, and blackberry.

Herbaceous vegetation includes wiregrass, runner oak (*Quercus minima*), coontie (*Zamia integrifolia*), blazing star (*Liatris spicata*), tarflower (*Bejaria racemosa*), pawpaw (*Asimina* spp.), broomsedge, tickseed (*Coreopsis* spp.), pricklypear (*Opuntia humifusa*), lopsided indiangrass (*Sorghastrum secundum*), black root, shiny blueberry, and grapevine. *Scrubby Flatwoods* habitat as identified under the Sarasota County's Comprehensive Plan and UDC are considered a highly protected habitat and is required to be preserved based on County regulations.

Temperate Hardwood/Mesic Hammock (FLUCFCS 425; 0.28 acres)

There is one isolated pocket of temperate hardwoods abutting the south side of the creek (on the east side of the site) that meets the County's criteria for mesic hammock. The area is vegetated predominantly with a dense canopy of cabbage palms and scattered oaks and the understory contains wild coffee (*Pyschotria nervosa*), and American beautyberry (*Callicarpa americana*). *Mesic Hammock* habitat as identified under the County's Comprehensive Plan and UDC would also be considered a protected habitat and is required to be preserved based on County regulations. The County regulations allow for up to 25% of the overall area of the habitat to be impacted.

Upland Mixed Coniferous Hardwood (FLUCFCS 434; 31.06 acres)

This community has similar species as those found in the pine flatwoods although there is a higher density of cabbage palms and oak trees (live oaks and laurel oaks). The understory of these areas includes shrub vegetation that is similar to pine flatwoods such as saw palmetto, winged sumac, gallberry, shiny blueberry, saltbush, and fetterbush. Herbaceous vegetation includes tall goldenrod (*Solidago altissima*), flat-topped goldenrod, and oak-leaf fleabane (*Erigeron quercifolius*) as well as grasses such as switchgrass (*Panicum virgatum*), chalky bluestem (*Andropogon virginicus var. glaucus*), and wiregrass. Although these upland coniferous hardwood communities are considered native habitat, they don't meet the County's criteria for pine flatwoods or hammocks that are outlined in the County's Comprehensive Plan and UDC.

Disturbed Land /Brazilian Pepper (FLUCFCS 740/422; 0.84 acres)

A spoil berm occurs along the south side of Gottfried Creek channel. This berm is vegetated almost predominantly with Brazilian pepper and also contains scattered oaks, pines and cabbage palms.

Electrical Power Transmission Lines (FLUCFCS 832; 8.84 acres)

An FPL transmission corridor occurs on the south side of the site and is regularly maintained by FPL.

3.1.2 WETLANDS AND SURFACE WATERS

ECT delineated wetlands on the subject parcel as reflected on the Wetland Map (Figure 7). Overall, the site contains a total of 13.58 acres of wetlands and surface waters. Three isolated wetlands occur on the interior/south side of the site and the remainder of the wetlands are associated with the Gottfried Creek system that runs through the north side of the site. All wetlands are considered jurisdictional to SWFWMD, but only the Gottfried Creek wetlands are considered jurisdictional Waters of the U.S. (WOTUS) based on the Navigable Waters Protection Rule (NWPR) and are subject to Florida Department of Environmental Protection (FDEP) jurisdiction under the State 404 Program. The Gottfried Creek corridor is considered jurisdictional WOTUS since it is a tributary system that feeds into Lemon Bay downstream which is considered Traditional Navigable Waters (TNWs). However, the isolated wetlands are not WOTUS since they are surrounded by uplands and are not connected to any tributaries that feed into TNWs downstream.

GOTTFRIED CREEK

The Gottfried Creek corridor encompasses a total of 10.28 acres of wetlands and 0.63 acres of surface waters. The west branch of Gottfried Creek (lateral canal) runs through the north side of the site and is mapped as a stream (FLUCFCS 511; 0.63 acres) but has a spoil berm (FLUCFCS 740/422) on the south side which is sidecast material from when the creek was channelized historically and is now overgrown with thick Brazilian pepper as shown on the Land Use Map (Figure 8). The creek has a forested wetland system that runs along the south side of the creek and is mostly dominated by stream and lake swamp community

(FLUCFCS 615; 7.37 acres), but the south lobe is characterized as wetland forested mixed community (FLUCFCS 630; 2.91 acres). The system is dominated by laurel oaks, red maples (*Acer rubrum*), bays (*Persea borbonia*), cabbage palms, buttonbush (*Cephalanthus occidentalis*), Carolina willow (*Salix caroliniana*) and pop ash (*Fraxinus caroliniana*) and also has dense pockets of Brazilian pepper scattered throughout. The understory also has scattered ferns, wild coffee, caesarweed (*Urena lobata*) and beautyberry.

ISOLATED WETLANDS

There are three isolated wetland systems on the interior/south portion of the site that total 2.67 acres and are dominated by freshwater marsh communities and hydric pine flatwoods as shown on the Land Use Map (Figure 8). Each vegetation community associated with the isolated wetlands is described below.

Freshwater Marshes (FLUCFCS 641; 0.24 acres)

The marsh communities are vegetated with pickerelweed (*Pontedaria cordata*), arrowhead (*Sagitarria lancifolia*), yellow-eyed grass (*Xyris* sp.), sand cordgrass (*Spartina bakeri*), beakrush (*Rhyncospora* sp.), broomsedge, witchgrass (*Dicanthelium* sp.), hairgrass (*Eleocharis baldwinii*), maidencane (*Panicum hemitomon*), torpedo grass (*Panicum repens*), smartweed (*Polygonum hydropiperoides*), and water hyssops (*Bacopa monnieri*).

Freshwater Marsh with Shrubs, Brush and Vines (FLUCFCS 6417; 0.73 acres)

The central isolated wetland is dominated by a freshwater marsh community but has young red maples recruiting into the interior and cabbage palms, pines, laurel oaks, wax myrtle and gallberry encroaching in the periphery.

Primrose Willow Wetland/Freshwater Marsh (FLUCFCS 6419; 0.74 acres)

The southernmost isolated wetland that extends into the FPL transmission corridor is dominated by primrose willow (*Ludwigia peruviana*) with smartweed and vines.

Hydric Pine Flatwoods (FLUCFCS 625; 0.96 acres)

The isolated wetlands on the central and south side of the site have some hydric pine communities that are dominated by slash pine intermixed with scattered cabbage palms and laurel oaks and gallberry with sparse hairgrass and wiregrass as groundcover.

3.1.3 GRAND TREES

ECT evaluated the site for large native trees (live oaks and pines) that have potential to meet Sarasota County's Grand Tree criteria (Section 54 of UDC). Only one large pine was identified in the middle of two isolated wetlands as shown on the Land Use Map (Figure 8). ECT conducted a site review with Tom Mallet (Sarasota County Arborist) on December 23, 2021 and the tree did not meet Grand Tree criteria. The tree measures at 99.1 points and needs to be 100 points to be claimed as a Grand Tree. There is a chance that the tree could become Grand Tree size in the next few years and could be claimed during future permitting with the County so this should be taken into consideration with site plan design. If the tree is claimed in the future, Sarasota County requires Grand Trees be preserved and earthmoving activities are typically restricted under the dripline.

4.0 GENERAL WILDLIFE SURVEY

ECT conducted a general wildlife survey to evaluate the site for Threatened or Endangered species that are subject to state and federal protection by FWC under Chapter 68A-27, F.A.C. and the USFWS under 50 CFR 17 and 23. This survey was intended as a preliminary assessment to identify listed species that either occur or have potential to utilize the site based on available habitats and require consideration for future permitting and development.

ECT conducted wildlife surveys in October 2021 that focused on listed species that are known to occur in Sarasota County, but also took into consideration habitats found onsite and in the surrounding areas. Before initiating field surveys, ECT conducted a desktop analysis to review relevant regulatory databases for listed species that are known to occur in the area (i.e., scrub jays, eagle nests, wood stork colonies, etc.). ECT also verified which USFWS consultation areas overlap this site to evaluate specifically for those species (i.e., eastern indigo snakes, Florida scrub jays, wood storks, Florida bonneted bats). ECT then conducted field surveys and mapped locations of any listed species observed or evidence of their presence (e.g. burrows, nests, rookeries, etc.). As part of the field survey efforts, ECT also conducted a preliminary (15%) gopher tortoise (*Gopherus polyphemus*) survey in accordance with FWC's *Gopher Tortoise Permitting Guidelines* (Revised July 2020) and a formal Florida scrub jay (*Aphelocoma coerulescens*) survey in accordance with *USFWS Scrub Jay Survey Guidelines* (August 2007).

During the listed species survey, ECT observed gopher tortoise burrows, an American kestrel and a bald eagle (*Haliaeetus leucocephalus*) flying overhead as shown on the Land Use Map (Figure 8). No Florida scrub jays were observed or heard during the formal scrub jay survey nor were any other listed species observed during ECT's field efforts. Table 4-1 below summarizes the federal and state listed species that have potential to occur onsite and the likelihood of them occurring based on available habitats. Immediately following is a summary for key listed species that should be considered for permitting.

Table 4-1. Listed Species Observed or Having Potential to Occur on the Winchester Parcel.

Common Name	Scientific Name	Legal Status		Probability of Occurrence
		USFWS	FWC[1]	
Reptiles				
American Alligator	*Alligator mississippiensis*	T (S/A)	FT(S/A)	Low
Eastern Indigo Snake	*Drymarchon couperi*	T	FT	Moderate
Gopher Tortoise	*Gopherus polyphemus*	C	ST	Observed
Florida Pine Snake	*Pituophis melanoleucus mugitus*	-----	ST	Moderate
Mammals				
Florida Bonneted Bat	*Eumops floridanus*	E	FE	Low
Birds				
Wood Stork	*Mycteria americana*	T	FT	Moderate
Florida Sandhill Crane	*Antigone canadensis pratensis*	-----	ST	Low
Little Blue Heron	*Egretta caerulea*	-----	ST	Moderate
Tricolored Heron	*Egretta tricolor*	-----	ST	Moderate
Roseate spoonbill	*Platalea ajaja*	-----	ST	Low
Reddish Egret	*Egretta rufescens*	-----	ST	Low
Bald Eagle	*Haliaeetus leucocephalus*	*	-----	Observed
Southeastern American Kestrel	*Falco sparverius paulus*	-----	ST	Observed**
Florida Scrub-jay	*Aphelocoma coerulescens*	T	FT	Low
Burrowing Owl	*Athene cunicularia floridana*	-----	ST	Low

* Bald eagles are afforded federal protection under the Bald and Golden Eagle Protection Act.

** Unable to confirm if kestrel was the protected species (Southeastern American kestrel) that is native to Florida or non-listed, migratory species (American kestrel). Formal kestrel surveys required (April-August) to confirm for listed species.

USFWS Status: E: Endangered (subject to state and federal protection); T: Threatened (subject to state and federal protection); T(S/A): Threatened due to similarity of appearance; C=Candidate for Listing.

FWC Status: FE: Federal Endangered (subject to state and federal protection); FT: Federally Threatened (subject to state and federal protection); ST: State-Threatened only (not federally listed);

FT(S/A): Federally Threatened due to similarity of appearance

Gopher Tortoise

Gopher tortoises are listed as State-Threatened and prefer sandhills, xeric scrub habitat, palmetto prairie and pine flatwoods but can be found in other habitats and even developed areas. ECT observed a total of twelve (12) potentially occupied gopher tortoise burrows in the scrubby flatwoods, pine flatwoods and transmission corridor (Figure 8). For any areas that are being cleared and developed, a formal (100%) pre-construction survey will be required within 90-days of construction to identify all gopher tortoise burrows and a FWC permit will be required to relocate tortoises prior to construction in accordance with FWC's Gopher Tortoise Permitting Guidelines (Revised July 2020). Any burrows within preserved lands that are being avoided (i.e., scrubby flatwoods) will not need to be relocated unless they are located within 25 feet of proposed clearing/construction activities. A silt fence would also need to be installed prior to clearing/construction to exclude tortoises from entering the workspace during construction.

Eastern Indigo Snakes

This site occurs in the consultation area for the Eastern indigo snake (*Drymarchon couperi*) which is federally listed as Threatened and can be found in a wide range of habitats including pine flatwoods, scrubby flatwoods, high pine, dry prairie, and tropical hardwood hammocks. They are also commonly associated with gopher tortoises since they are a commensal species that can be found occupying the same burrows and other refugia (i.e. logs). ECT did not observe any indigo snakes or signs of species occurrence, but they are often too cryptic to detect or find during routine surveys.

The *Eastern Indigo Snake Effect Determination Key*[2] is used by agencies to evaluate potential impacts to this species based on habitat and gopher tortoise density. Based on the *Eastern Indigo Snake Effect Determination Key*[2], if the project will impact more than 25 acres of potential indigo snake habitat (i.e., pine flatwoods, scrubby flatwoods, hardwood-conifer mixed habitats), it is designated as "may affect" and may require formal consultation by USFWS. Habitat fragmentation from transmission corridor and development to the west and south may limit potential for indigo snakes to occur onsite, but there is still moderate potential since the lands to the north and east are undeveloped.

[2] South Florida Ecological Service Office Eastern Indigo Snake Effect Determination Key (USFWS, Revised August 2017).

Florida Pine Snake

Florida pine snakes (*Pituophis melanoleucus mugitus*) are listed as State-Threatened and inhabit sandhill, scrub, xeric hammock, scrubby flatwoods, mesic pine flatwoods, and dry prairie with dry soils. They are commonly associated with gopher tortoises and pocket gophers since they are a commensal species that can be found occupying the same burrows, but they are often too cryptic to detect or find. Suitable habitat occurs on the property, and there is a moderate potential for this species to occur onsite.

Florida Bonneted Bat

The Florida bonneted bat (*Eumops floridanus*; FBB) was listed as Endangered by the USFWS in 2013. The project is located within the recently updated FBB Consultation Area which includes all of Sarasota County based on the updated USFWS guidelines (October 2019). The FBB guidelines[3] requires formal acoustic surveys for any projects located in the consultation area if the project contains potential roosting habitat (i.e., forested habitats and other areas with tall, mature trees or other suitable roost structures) and is greater than 5 acres in size. The site is over 5 acres and contains potential roosting habitat (i.e., pine flatwoods) and foraging habitat (marsh wetlands and pasture) for bats. As a result, formal acoustic surveys may be required (by USFWS) to survey for FBB as discussed in more detail in Section 5.4 below. However, ECT has completed numerous FBB surveys on surrounding lands throughout Wellen Park and FBB have not been detected anywhere in Wellen Park thus far; therefore, FBB are very unlikely to occur on this site.

Bald Eagles

While no longer listed as Threatened by FWS or FWC, bald eagles (*Haliaeetus leucocephalus*) continue to be protected by state and federal laws under the Migratory Bird Treaty Act and Bald and Golden Eagle Protection Act. There are two eagle nests located within a mile of this site including one nest (SA036) located roughly 0.75 miles southwest of the site and another nest (SA994) located a little over a mile directly east of this site (Figure 9). ECT also observed an eagle flying over the site during wildlife surveys which can be expected given the nearby nests. The project site is well outside of the protection

[3] Consultation Key for the Florida Bonneted Bat (USFWS, October 2019)

zones (330-foot primary and 660-foot secondary) of these nearby nests, and therefore, does not create any development constraints for this site. Eagle sightings can be expected given the nearby nests, and although the site has a lot of pines, they are all generally too small to be used for nesting by eagles. Therefore, it's unlikely that eagles would establish a nest on this site.

Florida Scrub Jays

The site occurs in the USFWS consultation for Florida Scrub Jays which are federally listed as Threatened by USFWS. ECT completed a formal scrub jay survey in accordance with USFWS *Scrub Jay Survey Guidelines* (August 2007) since the site has suitable scrub habitat (i.e., scrubby flatwoods) and directly abuts a County-owned parcel to the west that also has scrub habitat and previously had scrub jays on the parcel. The scrub jay survey focused on the scrubby flatwoods area that offers the most suitable habitat and was conducted over a five (5) day period (October 18^{th}, 19^{th}, 20^{th}, 21^{st}, 22^{nd}) in accordance with *USFWS Scrub Jay Survey Guidelines* (August 2007). Surveys were done by broadcasting calls at pre-determined monitoring stations as shown on the Land Use Map (Figure 8). No scrub-jays were documented or heard during the survey, nor were any scrub jays detected during previous field work conducted for the Winchester CAP. Therefore, Florida scrub-jays do not appear to be using this site, but the survey only remains valid for one year and USFWS may require an updated survey during future permitting. ECT also reviewed Sarasota County's Scrub Jay Parcel List and this parcel (PID 0830001000) was not identified on their scrub jay parcel list (Appendix C).

Florida Sandhill Cranes

Florida sandhill cranes (*Antigone canadensis pratensis*) are state listed as Threatened and typically nest in shallow, freshwater marsh wetlands between February and April. They also utilize open grassy areas and pasture for foraging. The wetlands onsite are mostly characterized by forested and shrubby wetlands that do not offer suitable nesting habitat for sandhill cranes, nor does the site have any open grassy areas for foraging. Therefore, sandhill cranes are not expected to use this site for foraging or nesting. Although nesting is very unlikely, FWC may still require a pre-construction survey be conducted for wetlands to rule out concerns for sandhill crane should construction occur during the breeding season (December – August).

Wood Storks and State-Listed Wading Birds

ECT evaluated the site for state and federally listed wading birds including wood storks[4] (*Mycteria americana*), little blue herons[5] (*Egretta caerulescens*) and tricolored herons[5] (*Egretta tricolor*). No listed wading birds were observed during the recent surveys, but they are expected to periodically use wetlands onsite for foraging and loafing. Based on the USFWS Wood Stork database, the closest known wood stork colony is located approximately five (5) miles northeast of the project site in the Myakka River immediately adjacent to an active wading bird colony (Figure 9). Therefore, the site is located in the Core Foraging Area[6] (CFA) of this wood stork colony. Any impacts associated with onsite wetlands that result in a loss of wading bird habitat would need to be addressed as part of permitting, particularly with regard to USFWS consultation for wood stork foraging habitat. FWC may also require pre-construction wading bird surveys to evaluate for potential nesting (by listed wading birds) should construction occur during the active breeding season for any listed species[7].

Southern American Kestrels

Two kestrel species are found in Florida including American kestrels (*Falco sparverious*) which are the wintering migratory species and the Southeastern American kestrel (*Falco sparverious paulus*) which is the state listed (Threatened) species that resides in Florida year-round. Kestrels are generally found nesting in cavities in dead trees (snags) and wooden utility poles near open lands where prey can easily be detected including pine woodlands, prairies, and pastures. Both species are identical and can only be distinguished by conducting surveys in late spring-summer (April-August) when the non-listed migratory species vacates Florida. One kestrel was observed perched in a tree on the west side of the site (Figure 8), but since it was observed in October, it is most likely the non-listed

[4] Federally Threatened
[5] State Threatened
[6] 18.6-mile radius
[7] Feb-August for little blue heron and tricolored heron; Nov-Feb for roseate spoonbill; Oct-May for reddish egret

migratory species. Kestrels are often found using overhead utility lines as they often perch on them to seek out prey and also use utility poles for nesting. Therefore, formal kestrel surveys are recommended during the breeding season (April-August) to rule out concerns for the southeastern American kestrel prior to development. FWC also typically recommends a breeding season survey be conducted for kestrels if suitable habitat is present, particularly if kestrels have been observed and construction is to occur during nesting season. More details regarding the constraints and permitting considerations related to Southeastern American kestrels are provided in Section 5.4 below.

5.0 PERMITTING CONSIDERATIONS/RECOMMENDATIONS

Below is a summary of permitting considerations for the property based on ECT's findings and applicable state, federal, and local government regulations. Permitting considerations are outlined specific to each agency we anticipate engaging with including the SWFWMD, FDEP, Sarasota County and wildlife agencies (FWC and USFWS).

5.1 SWFWMD

As discussed in Section 3.0, the site contains approximately 13.58 acres of wetlands and surface waters that are jurisdictional to SWFWMD. The wetlands are shaded on the Environmental Constraints Map included as Figure 10. The wetland lines should be considered approximate until field verified and approved by SWFWMD as part of either a formal wetland determination process or environmental resource permitting. Most of the wetlands are associated with Gottfried Creek corridor which will is considered higher quality as opposed to the three isolated wetlands on the interior of the site which total 2.67 acres. The isolated wetlands may be more challenging to design around and may need to be impacted, but avoidance and minimization will need to be addressed during SWFWMD permitting consistent with criteria outlined in the ERP Applicant's Handbook (Volume 1). Any unavoidable impacts will also require mitigation consistent with ERP criteria and the extent of mitigation will be determined based on the *Uniform Mitigation Assessment Method* (UMAM) outlined in Chapter 62-345, F.A.C. However, isolated wetlands that are less than 0.5 acres do not require avoidance/minimization or mitigation for SWFWMD purposes under Section 10.2.2.1[8] of the ERP Applicant's Handbook. Therefore, Wetland 4 (0.19 acres) will not require mitigation for SWFWMD purposes.

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[8] *Subsection 10.2.2.1 of ERP Applicant's Handbook Volume 1, wetland mitigation is not required for impacts to isolated wetlands that are less than ½ acre in size and are not used by endangered or threatened species, not located in an area of critical state concern, not connected by standing or flowing surface water at season high water level to one or more wetlands, and not of more than minimum value to fish and wildlife.*

Mitigation for any impacts to non-isolated wetlands (>0.5 acres) can be accomplished through either the use of a mitigation bank (if a bank is available with appropriate credits) or through onsite mitigation in the form of wetland creation, enhancement, restoration or upland preservation (or combination thereof). This site is in the located in the Southern Coastal Watershed which does not currently have any mitigation banks available. Therefore, mitigation if needed, would need to be provided onsite. There is plenty of opportunity for onsite wetland mitigation associated with the Gottfried Creek corridor as well as upland preservation.

SWFWMD also requires buffers (15 foot minimum, 25-foot average) around wetlands to ensure no secondary wetland impacts occur. Therefore, secondary impacts will need to be addressed during permitting for any areas where buffers are not being maintained. Wetlands also need to be taken into consideration with the stormwater design. Stormwater needs to be pre-treated before being discharged into wetlands to ensure water quality is maintained and the stormwater management system needs to be carefully designed in consideration of the wetlands (SHW elevations) to avoid secondary impacts.

5.2 FDEP 404

On December 22, 2020, U.S. Environmental Protection Agency (EPA) delegated the Clean Water Act Section 404 (Dredge and Fill) permitting to the FDEP for assumed waters (e.g., not traditionally navigable waters or immediately adjacent WOTUS). As mentioned in Section 3.0, the Gottfried Creek system is considered WOTUS (subject to FDEP 404 jurisdiction) and the isolated wetlands are considered non-WOTUS. The FDEP will be engaged during SWFWMD permitting process and a WOTUS determination would need to be submitted to FDEP to rule out Section 404 jurisdiction for any isolated wetlands being impacted (since isolated wetlands are not WOTUS). However, any impacts associated with the Gottfried Creek system would require a State 404 Permit from FDEP.

Any impacts to WOTUS wetlands would either require a General Permit for Commercial or Institutional Developments (Chapter 62-331.236) which allows up to 0.5 acres of impacts to 404 WOTUS or an Individual Permit will be required if WOTUS impacts are greater than 0.5 acres. Similar to SWFWMD, the FDEP would also require mitigation as well as avoidance and minimization but may also require an alternative sites analysis (for an Individual Permit). The FDEP typically requires the use of a mitigation bank (under the State 404 Program) unless there are extenuating circumstances, but since no mitigation banks are available in this watershed, onsite mitigation is the only viable option. Therefore, mitigation would need to be provided through onsite mitigation (i.e., wetland enhancement, restoration or creation). As mentioned previously, Gottfried Creek offers plenty of opportunity for wetland enhancement/restoration since it is overgrown with Brazilian pepper and has spoil scattered as sidecast material from the creek channelization that could be removed to restore wetlands. The FDEP will also rely on the UMAM to evaluate functional loss for wetland impacts and mitigation requirements.

5.3 SARASOTA COUNTY

Sarasota County has provisions under both their Comprehensive Plan and UDC that provide for protection of native habitats (both upland and wetlands), Grand Trees and listed species. The site contains wetlands which are subject to protection (designated as "*shall be preserved*") under the County's Comprehensive Plan and UDC, but impacts can be permitted based on wetland habitat management guidelines[9] outlined in the Comprehensive Plan (*Principles for Evaluating Development Proposals in Native Habitats).* The project needs to demonstrate that *no reasonable alternative exists other than impacting wetlands* which can easily be demonstrated given the challenges the location and configuration of isolated wetlands creates for the site plan design. However, Gottfried Creek is considered higher quality and would be more challenging to get impacts approved by the County unless a roadway or utility crossing was needed. Mitigation for wetlands impacts would also need to be provided consistent with SWFWMD criteria, but unlike SWFWMD, the County also requires mitigation for isolated wetlands that are less than 0.5-acres.

Another consideration for wetlands are the buffer requirements. The County generally requires 30-foot buffers for freshwater wetlands which would apply for the isolated wetlands. However, the County will require a 50-foot watercourse buffer for wetlands

[9] Section VII(2)(f) Management Guidelines for Freshwater Wetlands

abutting Gottfried Creek based Section 124-251 of the UDC. The watercourse buffer criteria reads as follows: "*vegetative buffers shall be established between future development and watercourses, including bay waters. Buffer widths shall be measured landward from the top of bank or landward extent of wetland vegetation. Minimum buffer widths shall be 50 feet. To provide flood plain protection or water quality enhancement and habitat protection or enhancement, the Administrator may authorize variable watercourse buffers that provide equivalent benefit as those provided by a 50-foot wide watercourse buffer using the Administrator's best professional judgement. In no instance shall the Administrator authorize a watercourse buffer less than 30 feet wide*."

In addition to wetlands, the County also has specific management guidelines for native upland habitats and restrictions associated with certain habitats including scrubby flatwoods, mesic hammock and pine flatwoods. The scrubby flatwoods encompass 9.78 acres on the southwest corner of the property (Figure 10) is considered highly protected and designated as "*shall be preserved*" under the County's habitat management guidelines for scrubby flatwoods[10] outlined in the Comprehensive Plan. Therefore, this habitat should be avoided and would be very challenging to get County approval for impacts to this habitat.

ECT also evaluated the property for mesic hammock which is subject to protection under County criteria and only found one (1) small pocket of hammock (0.28 acres) that continues to the east buffering the south side of Gottfried Creek as shown on the Environmental Constraints Map (Figure 10). Mesic hammock is protected by the County and generally should be preserved based on the County's habitat management guidelines for mesic hammock[11] outlined in the Comprehensive Plan. The habitat management guidelines allow for some impacts to mesic hammock consistent with criteria outlined in Section VIII (2)(b) as follows: "*Mesic Hammock in required buffers and areas not approved for development shall be preserved. When mesic hammock habitat exists adjacent to wetlands or the top of bank of any watercourse, required buffers shall be a minimum of 50 feet wide. Impacts to*

[10] Section X(2)(a) Management Guidelines for Scrubby Flatwoods
[11] Section VIII(2)(b) Management Guidelines for Mesic Hammock

other mesic hammock areas, may be allowed only if no significant loss of function to the balance of the hammock would be incurred. In such cases, up to 25 percent of the mesic hammock habitat on site may be removed." Given the mesic hammock is so small and buffers the creek, it does not present a design constraint for the site and can easily be avoided.

The rest of the upland habitats onsite are characterized as pine flatwoods and hardwood-conifer mixed habitats which is still considered native habitat but not subject to the same level of protection as other habitats (i.e., wetlands, scrubby flatwoods, mesic hammock). Habitat management guidelines for pine flatwoods[12] indicate pine flatwoods should be conserved to fulfill open space criteria and Section 124-173 of the UDC also has criteria that requires the use of native habitats to fulfill open space criteria. However, wetlands, scrubby flatwoods and mesic hammock will likely satisfy the County's open space criteria, and therefore, the pine flatwoods will not need to be conserved to satisfy open space criteria. As part of the County permitting process, any areas designated as preserves (i.e., scrubby flatwoods) may also need to be addressed under a Resource Management Plan to eradicate nuisance and exotic vegetation and provide for long-term management of these habitats.

ECT also conducted a cursory review of the site for potential Grand Trees and only identified one (1) large pine (shown on Figure's 8 and 10) that could potentially meet Grand Tree criteria, in which case the tree and area under the canopy dripline would be subject to preservation based on the County's Tree Protection Code (Section 54-588(2)(a). The County arborist still needs to review the site to evaluate potential Grand Trees. All of the County environmental constraints are shown on the Constraints Map included as Figure 10 including wetlands, scrubby flatwoods, mesic hammock, the watercourse buffer and potential Grand Tree.

[12] Section IX (2)(a) Management Guidelines for Pine Flatwoods

Listed species will also need to be addressed as part of the Sarasota County permitting process, but will also be required to address FWC and USFWS concerns as outlined in Section 5.4 below.

5.4 LISTED SPECIES

The project will need to adhere to state and federal guidelines mandated by the FWC and USFWS. FWC typically receives copies of both the state and federal permit applications, but only regulates state listed species; whereas the USFWS only deals with federally listed species and typically is engaged by the FDEP as part of the Section 404 coordination. The following is a summary of permitting and/or agency consultation ECT reasonably expects that will need to be addressed for certain listed species based on our findings outlined in Section 4.0. It should be noted that although some species were not directly observed, there is still potential for some species to occur onsite which may require consideration for permitting or agency consultation.

Gopher Tortoises

ECT conducted a preliminary gopher tortoise survey and observed twelve (12) gopher tortoise burrows in the scrubby flatwoods, pine flatwoods, and along the powerline easement as shown on the Land Use Map (Figure 8). A formal (100%) gopher tortoise survey will be required for the development footprint and needs to be conducted within 90-days of anticipated construction/clearing timeframes in accordance with FWC's *Gopher Tortoise Permitting Guidelines* (Revised July 2020). Based on our preliminary finding, ECT expects to find more burrows particularly in the scrubby flatwoods areas. However, assuming this area is being preserved, only the burrows in the pine flatwoods (FLUCFCS 411) and hardwood conifer mixed (FLUCFCS 434) that are being developed would need to be addressed. A relocation permit from FWC will be required to relocate tortoises from the development footprint found during the formal survey. Tortoises can either be relocated offsite to an FWC-approved recipient site or could potentially be relocated onsite if suitable habitat is being preserved (i.e., scrubby flatwoods). Given the increased costs associated with recipient sites, onsite relocation would be far less expensive.

Eastern Indigo Snakes

Based on the USFWS *Eastern Indigo Snake Effect Determination Key* issued for South Florida (USFWS, August 2017), any projects that impact more than 25 acres of eastern indigo snake habitat (sandhill, scrub, pine flatwoods, pine rocklands, scrubby flatwoods, high pine, dry prairie, coastal prairie, mangrove swamps, tropical hardwood hammocks, hydric hammocks, edges of freshwater marshes, agricultural fields) are generally keyed out as “may affect” and may require USFWS consultation. Based on our recent permitting experience with the USACE/FDEP on nearby projects (within Wellen Park), the USFWS has made “no effect” determinations specific to Eastern indigo snakes since no indigo snakes have been recorded nearby and they are not likely to occur as a result of habitat fragmentation from the agricultural uses, roadway infrastructure and developments. However, this site may offer more potential for indigo snakes to occur given the native habitats that occur onsite (including scrubby flatwoods) and surrounding the property to the north/east.

Florida Scrub Jays

ECT conducted a formal scrub jay survey (in October 2021) since the site contains suitable scrub habitat and no scrub jays were observed or heard during the recent survey. Therefore, it appears Florida scrub jays do not occur onsite; however, another survey may be required during future permitting since the survey findings are typically valid for one year. If an updated survey is required by Sarasota County or USFWS, it must be conducted between March 1st and October 31 per the USFWS survey protocol.

Wading Birds

No listed wading birds were observed during the recent survey, but they are expected to periodically use the wetlands onsite for foraging. Since the project occurs in the Core Foraging Area of a nearby wood stork colony, any impacts to wetlands would need to be evaluated for potential loss of wood stork foraging habitat based on guidance in the USFWS *Wood Stork Effect Determination Key*[13]. The guidelines generally read such that if the project impacts less than 0.5 acre of suitable foraging habitat (wetlands, ditches, etc.),

[13] South Florida Programmatic Concurrence on Wood Stork Effect Determination Key in South Florida (USFWS, May 2010).

the project is not likely to adversely affect wood storks. Compensation for impacts to wood stork foraging habitat can be addressed either through onsite mitigation or floodplain compensation.

Southeastern American Kestrels

A kestrel was observed along the west side of the site (Figure 8) and although the site offers suitable nesting habitat (snags and utility poles), the site doesn't have much open foraging habitat other than the transmission corridor. The kestrel was observed in October when the non-listed migratory species occurs in Florida. Therefore, it could easily be the non-listed species that was observed. ECT has also conducted formal kestrel surveys for a number of projects throughout Wellen Park, and although migratory kestrels have been observed, the resident listed species has not been documented during any of the formal kestrel survey efforts.

A formal kestrel survey is still recommended during the kestrel breeding season (i.e., April – August) following guidelines outlined in FWC *Species Conservation Measures and Permitting Guidelines for the Southeastern American Kestrel (2020)* to confirm no Southeastern American kestrels are nesting onsite (or the adjacent transmission corridor). If Southeastern American kestrels nest on or near the property, a 150-meter (i.e., 492 foot) setback buffer would be required around the occupied nest to avoid disturbance and kestrel foraging habitat may also require further protection. Should Southeastern American kestrels be documented nesting onsite, coordination and permitting will be required with FWC for nest removal/disturbance or impacts to occupied foraging habitat.

Florida Bonneted Bat

The likelihood for FBB to occur onsite is low given no FBB have been documented during extensive survey efforts conducted on surrounding lands throughout Wellen Park. However, since the project is in the FBB consultation area, is greater than 5 acres and has potential roosting habitat, formal acoustic surveys are generally required by USFWS (per USFWS October 2019 FBB Guidelines) to rule out concerns for FBB.

APPENDIX A

WINCHESTER CAP ORDINANCE

FLORIDA DEPARTMENT *of* STATE

RON DESANTIS
Governor

LAUREL M. LEE
Secretary of State

April 22, 2021

BOARD RECORDS
FILED FOR THE RECORD
2021 APR 22 AM 11:08
KAREN E. RUSHING
CLERK OF THE CIRCUIT COURT
SARASOTA COUNTY.FL

Honorable Karen E. Rushing
Clerk of the Circuit Court
Board Records Department
Sarasota County
1660 Ringling Boulevard, Suite 210
Sarasota, Florida 34236

Attn: Blanca Montoya

Dear Ms. Rushing:

Pursuant to the provisions of Section 125.66, Florida Statutes, this will acknowledge receipt of your electronic copy of Sarasota County Ordinance No. 2021-014, which was filed in this office on April 21, 2021.

Sincerely,

Ernest L. Reddick
Program Administrator

ELR/lb

PASSED AND DULY ADOPTED BY THE BOARD OF COUNTY COMMISSIONERS OF SARASOTA COUNTY, FLORIDA, this 21st day of April, 2021.

SEAL
FLORIDA
SARASOTA COUNTY

BOARD OF COUNTY COMMISSIONERS
OF SARASOTA COUNTY, FLORIDA

Chairman

ATTEST:

KAREN E. RUSHING, Clerk of
the Circuit Court and Ex-
Officio Clerk of the Board of
County Commissioners of
Sarasota County, Florida.

By: Blanca Montoya
Deputy Clerk

O2021-014

ORDINANCE NO. 2021-014

AN ORDINANCE OF THE COUNTY OF SARASOTA, FLORIDA, RELATING TO THE REGULATION OF LAND USE AND IMPLEMENTATION OF THE SARASOTA COUNTY COMPREHENSIVE PLAN; PROVIDING FINDINGS; PROVIDING FOR THE ADOPTION OF THE WINCHESTER RANCH AT WELLEN PARK CRITICAL AREA PLAN (NO. 2018-01-SP); PROVIDING FOR THE RELATIONSHIP TO OTHER CRITICAL AREA PLANS, COUNTY REGULATIONS AND APPLICABILITY; PROVIDING FOR SEVERABILITY; AND PROVIDING AN EFFECTIVE DATE.

BOARD RECORDS
FILED FOR THE RECORD
2021 APR 21 PM 3:33
KAREN E. RUSHING
CLERK OF THE CIRCUIT COURT
SARASOTA COUNTY, FL

BE IT ORDAINED BY THE BOARD OF COUNTY COMMISSIONERS OF SARASOTA COUNTY, FLORIDA:

Section 1. Findings. The Board of County Commissioners, hereinafter referred to as the "Board," hereby makes the following findings:

1. The Applicant, John Luczynski, has filed an application for a Critical Area Plan for the area located south and west of the City of North Port along River Road, pursuant to the Sarasota County Comprehensive Plan, as adopted by Section 94-61 of the County Code, and the Critical Area Plan Regulations adopted by Ordinance 2016-062.

2. The Board on September 11, 2018, after due public notice, held a public hearing to consider the boundaries and scope of work for the Winchester Ranch at Wellen Park study area and all matters relating to said boundaries and scope of work for the Winchester Ranch at Wellen Park Critical Area Plan, including the testimony of the general public.

3. At the close of the September 11, 2018 public hearing, the Board adopted Resolution 2018-184, adopting the boundaries and scope of work for the Winchester Ranch at Wellen Park Critical Area Plan, pursuant to the Sarasota County Comprehensive Plan and the Critical Area Plan Regulations.

4. A Critical Area Plan for Winchester Ranch at Wellen Park has been prepared, herein referred to as the "Winchester Ranch at Wellen Park Critical Area Plan", pursuant to the Critical Area Plan Regulations adopted by Ordinance 2016-062.

5. The area of the Winchester Ranch at Wellen Park Critical Area Plan is described as follows:

Lands located in Township 40 South, Range 20 East, Sarasota County, Florida:

O2021-014

Exhibit A
Conditions for Development Approval

General

1. All future development within the Critical Area Plan (CAP) area (i.e., Rezone Petitions, Special Exceptions, Subdivision or Site Development Plans, and Final Subdivision Plats) shall comply with this Winchester Ranch at Wellen Park CAP ("Winchester Ranch CAP").

2. Each Winchester Ranch Community (which may also be referred to as a "Community") shall be rezoned to the appropriate implementing planned district in accordance with Section 124-101, Sarasota County Unified Development Code (UDC).

3. In order to ensure development of residential, commercial, office and industrial uses within the Winchester Ranch CAP is consistent with the Future Land Use Plan (Figure 2) and these Conditions for Development Approval, a Land Use Mix and Tracking Chart, in substantially the same form as attached hereto as Attachment 1, shall be included with each Rezone Petition, Special Exception, Subdivision or Site Development Plan, and Final Subdivision Plat application. As a rezone application may embrace all or a portion of a Community, each rezone application shall, additionally, include an analysis of its consistency with the Winchester Ranch CAP and a master plan depicting how the area that is the subject of the rezone application is consistent with and corresponds with the Future Land Use Plan (Figure 2).

4. To ensure continuity between development within the boundaries of the unincorporated Winchester Ranch CAP and that portion of Wellen Park within the corporate limits of the City of North Port (which unincorporated and incorporated lands, together, comprise all lands within the West Villages Improvement District), rezone applications for planned development districts under Article 7 of the Sarasota County UDC may contain the following modifications to the UDC, as applicable:

    a. A modification to Article 7, Section 124-101.(b)(1)a.1, UDC, to allow the minimum open space requirement to be 30 percent for planned developments within those portions of the Winchester Ranch CAP that are within the Future Urban Service Area identified on the Future Land Use Plan (Figure 2).

    b. A modification to Article 7, Section 124-101.(b)(2)b, UDC, to allow the maximum acreage/percentage of commercial for all Planned Unit Developments ("PUDs") within the adopted boundaries of the Winchester Ranch at to be aggregated based upon the total gross acreage of the combined PUDs within the boundary of the Winchester Ranch CAP.

    c. A modification to Article 7, Section 124-101.(b)(2)e, UDC, to allow commercial uses within Winchester Ranch Communities as designated on the Future Land Use Plan (Figure 2):

O2021-014

All of Section 15,
All of Section 17;
All of Section 18;
All of Section 19;
All of Section 20;
All of Section 21; less and except the following:

The SW 1/4 of the SE 1/4 lying East of County Road No. 777 (South River Road) conveyed to Florida Power & Light Company, recorded in Official Records Book 986, Page 904, of the Public Records of Sarasota County, Florida.

Said Tract contains 3,855.5846 Acres, more or less

6. On February 18, 2021, the Sarasota County Planning Commission held a duly noticed public hearing on said Winchester Ranch at Wellen Park Critical Area Plan, received all pertinent evidence and testimony, closed the public input portion of the public hearing and recommended approval of the Winchester Ranch at Wellen Park Critical Area Plan (No. 2018-01-SP).

7. On April 21, 2021, the Board held a duly noticed public hearing to consider the said Winchester Ranch at Wellen Park Critical Area Plan, including the Planning Commission recommendation, and all evidence relevant to said Critical Area Plan, including testimony of the general public.

8. The Board, sitting as the Sarasota County Land Development Regulations Commission (LDRC), has reviewed this Ordinance and found that it is consistent with the Sarasota County Comprehensive Plan, as adopted by Section 94-61 of the County Code.

Section 2. Adoption of the Winchester Ranch at Wellen Park Critical Area Plan.

1. Pursuant to the Sarasota County Comprehensive Plan and the provisions of the Critical Area Planning Regulations, and based on the evidence and testimony and the foregoing findings, the Board hereby adopts the Winchester Ranch at Wellen Park Critical Area Plan, consisting of conditions for development approval contained in Exhibit "A" and the following figures and maps contained in Exhibit "B" attached hereto and incorporated herein by reference:

Figure 1 – Critical Area Plan Boundary Map
Figure 2 – Future Land Use Plan (2 Sheets)
Figure 3 – Conceptual Transportation Infrastructure Map
Figure 4 – Environmental Features Map

O2021-014

2. Future development orders including Zoning Map Amendments, Special Exceptions, Subdivision or Site Development Plans, and Final Subdivision Plats within the boundaries of the Winchester Ranch at Wellen Park Critical Area Plan shall be consistent with the conditions for development approval contained in Exhibit "A" and the figures and maps contained in Exhibit B, attached hereto and incorporated by reference.

3. A true copy of the document entitled Winchester Ranch at Wellen Park Critical Area Plan shall be maintained by Sarasota County Planning Services. Those portions of this document not specifically adopted by Sections 2.1 above shall constitute supportive material. Supportive material may be used to explain the adopted portions of the Winchester Ranch at Wellen Park Critical Area Plan (No. 2018-01-SP) but shall not be used as sole grounds for a decision on a development permit.

Section 3. Relationship to Other Critical Area Plans, County Regulations and Applicability.

1. The Winchester Ranch at Wellen Park Critical Area Plan does not in itself grant development approval, nor does it modify the requirements of the Comprehensive Plan or exempt any person or development activity from the requirements thereof.

2. The Winchester Ranch at Wellen Park Critical Area Plan affects the unincorporated areas of Sarasota County within the Winchester Ranch at Wellen Park Critical Area Plan as defined in Section 1.5 above.

3. The Winchester Ranch at Wellen Park Critical Area Plan amends and supersedes overlapping portions of The Pine Street, Dearborn Street, and South River Road (Ordinance No. 93-059, As Amended) Critical Area Plan.

Section 4. Severability. If any provision of this Ordinance is for any reason finally held invalid or unconstitutional by any court of competent jurisdiction, such provisions shall be deemed a separate, distinct, and independent provision and such holding shall not affect the validity of the remaining provisions.

Section 5. Effective Date. This Ordinance shall take effect immediately upon receipt of official acknowledgment from the Office of the Secretary of State of Florida that this Ordinance has been filed with said office.

O2021-014

PASSED AND DULY ADOPTED BY THE BOARD OF COUNTY COMMISSIONERS OF SARASOTA COUNTY, FLORIDA, this 21st day of April, 2021.

BOARD OF COUNTY COMMISSIONERS
OF SARASOTA COUNTY, FLORIDA

Alan Maio

Chairman

ATTEST:

KAREN E. RUSHING, Clerk of the Circuit Court and Ex-Officio Clerk of the Board of County Commissioners of Sarasota County, Florida.

By: Blanca Montoya
Deputy Clerk

SEAL SARASOTA COUNTY FLORIDA

O2021-014

Exhibit A
Conditions for Development Approval

General

1. All future development within the Critical Area Plan (CAP) area (i.e., Rezone Petitions, Special Exceptions, Subdivision or Site Development Plans, and Final Subdivision Plats) shall comply with this Winchester Ranch at Wellen Park CAP ("Winchester Ranch CAP").

2. Each Winchester Ranch Community (which may also be referred to as a "Community") shall be rezoned to the appropriate implementing planned district in accordance with Section 124-101, Sarasota County Unified Development Code (UDC).

3. In order to ensure development of residential, commercial, office and industrial uses within the Winchester Ranch CAP is consistent with the Future Land Use Plan (Figure 2) and these Conditions for Development Approval, a Land Use Mix and Tracking Chart, in substantially the same form as attached hereto as Attachment 1, shall be included with each Rezone Petition, Special Exception, Subdivision or Site Development Plan, and Final Subdivision Plat application. As a rezone application may embrace all or a portion of a Community, each rezone application shall, additionally, include an analysis of its consistency with the Winchester Ranch CAP and a master plan depicting how the area that is the subject of the rezone application is consistent with and corresponds with the Future Land Use Plan (Figure 2).

4. To ensure continuity between development within the boundaries of the unincorporated Winchester Ranch CAP and that portion of Wellen Park within the corporate limits of the City of North Port (which unincorporated and incorporated lands, together, comprise all lands within the West Villages Improvement District), rezone applications for planned development districts under Article 7 of the Sarasota County UDC may contain the following modifications to the UDC, as applicable:

    a. A modification to Article 7, Section 124-101.(b)(1)a.1, UDC, to allow the minimum open space requirement to be 30 percent for planned developments within those portions of the Winchester Ranch CAP that are within the Future Urban Service Area identified on the Future Land Use Plan (Figure 2).

    b. A modification to Article 7, Section 124-101.(b)(2)b, UDC, to allow the maximum acreage/percentage of commercial for all Planned Unit Developments ("PUDs") within the adopted boundaries of the Winchester Ranch at to be aggregated based upon the total gross acreage of the combined PUDs within the boundary of the Winchester Ranch CAP.

    c. A modification to Article 7, Section 124-101.(b)(2)e, UDC, to allow commercial uses within Winchester Ranch Communities as designated on the Future Land Use Plan (Figure 2):

O2021-014

1) to permit internal commercial development within a PUD to be located adjacent to arterial roadways as shown on the Future Land Use Plan (Figure 2) and the Conceptual Transportation and Infrastructure Map (Figure 3); and
2) to permit internal commercial areas as designated on a binding development concept plan to exceed five acres in size, consistent with the Future Land Use Plan (Figure 2).

d. A modification to Article 8, Section 124-122.(i)(2), UDC, to ensure that any Winchester Ranch Community under unified control and containing both Major Employment Center (MEC) designated lands and lands within the Future Urban Service Area identified on the Future Land Use Plan (Figure 2) are developed in a cohesive mixed use manner, no landscape buffers shall be required between such lands zoned PCD (that is, the MEC lands) and PUD (that is, lands within the Future Urban Service Area identified on the Future Land Use Plan (Figure 2)), when embraced in a single rezone application made subject to a unified Development Concept Plan;

e. A modification to Article 8, Section 124-125(b)(2), UDC, to permit the construction of community/subdivision perimeter walls with a maximum height of up to ten (10) feet, exclusive of any berm; and

f. A modification to Article 11, Section 124-215 (a)(1)k, UDC, may be approved to permit community (gateway monument) signs to be constructed at locations designated on the Future Land Use Plan (Figure 2) with the following limitations:

1) The maximum height shall be twenty-five (25) feet
2) The maximum area shall be one hundred and twenty (120) square feet.

Historic Preservation

5. A preservation and/or mitigation plan shall be developed for archaeological site 8SO6585, located within Section 18, Township 40 South, Range 20 East, prior to development within 100 feet of the boundaries of such archaeological site. The preservation and/or mitigation plan should be developed by a professional archaeologist meeting the U.S. Secretary of the Interior's Standards and done in consultation with the Sarasota County Department of Historical Resources and the Florida Division of Historical Resources.

6. Future applications are subject to review under SC Code Chapter 66, Sec. 66-73 (a) and (b) and the standard Fortuitous Finds Statement under Sec. 66-81 is in effect during all activities.

Environmental Systems

7. Any future proposed impacts to preservation/conservation areas for this Winchester Ranch CAP shall be consistent with the Comprehensive Plan's Principles for Evaluating Development Proposals in Native Habitats and subject to the review and approval by the County through the development review process and shall not be deemed inconsistent with the Winchester Ranch CAP. All wetland and habitat

02021-014

delineations shown on the Environmental Features Map (Figure 4) shall be considered approximate and subject to formal delineation efforts conducted as part of future rezonings and permitting processes.

8. Additional listed species surveys will be conducted concurrent with future rezoning applications and coordinated directly with Florida Fish and Wildlife Conservation Commission (FWC) and U.S. Fish and Wildlife Service (USFWS), as appropriate. Sarasota County shall be provided copies of all relevant correspondence exchanged with FWC and USFWS as part of any rezoning application for lands included in such listed species surveys.

9. Owners of those portions of Winchester Ranch Communities located within two (2) miles of any County or state maintained natural area, shall cause to be recorded in the Public Records of Sarasota County, Florida, a Notice of Proximity to said County or state maintained natural area, which shall be in substantially the same form as attached hereto as Attachment 2. The Notice shall contain a legal description of the Owner's property, be recorded at the time of the recording of each final plat or condominium plat survey, and its recording information shall be set forth on such plat.

10. Winchester Ranch Communities shall designate minimum 50-foot wide wildlife corridors consistent with the Wildlife Corridor Alignments reflected on Environmental Features Map (Figure 4). Roadway and other infrastructure crossings of any wildlife corridor shall accommodate provisions for the movement of large aquatic vertebrates such as otters and alligators.

Stormwater

11. Future development within the Lemon Bay watershed shall demonstrate consistency with the Lemon Bay Watershed Management Plan.

12. Future development within the Lower Myakka River watershed shall demonstrate consistency with the Lower Myakka River Basin Master Plan.

Parks and Recreation

13. Each Winchester Ranch Community shall incorporate private recreational amenities for use by its residents (e.g., fitness center, court games and/or field sport facility, open play field, playground, dog park, community garden, passive recreation area, private recreational trails). A private recreational amenity must be constructed within each separate residential subdivision (for single family residential units) or residential site and development plan (for multifamily residential units) prior to or concurrent with the issuance of a certificate of occupancy for the 100th residential unit within such separate residential subdivision or site and development plan. Cumulatively, the private recreational amenities within each Community shall be equal to at least 1% of such Community's gross acreage. The majority of the residential units within a Community shall be within 1/3 mile of at least one such private recreational amenity or one access to the public recreational trail system, described in Condition 14, below.

14. In addition to the private recreational amenities described in Condition 13, a public recreational trail system shall be provided in substantial accordance with the alignment of the "Conceptual Trail Network"

O2021-014

shown on the Conceptual Transportation and Infrastructure Plan (Figure 3). The entire public recreational trail system shall be open to and available for use by the public and shall comply with the applicable provisions of the Americans with Disabilities Act. Each segment's width and surface material shall be determined as part of the applicable preliminary subdivision plan or site and development plan, giving consideration to the type of trail (e.g., natural surface trail or shared use path), context (conditions and nature of the area traversed), and allowed uses on the trail, in accordance with the Sarasota County Trails Master Plan. Natural surface trails provided in areas of native habitat shall be six feet in width but may widen to up to 12 feet for passing areas and boardwalk trails. The public recreational trail system segment(s) within each Community shall be included within the first preliminary subdivision plan or site and development plan filed for such Community and constructed concurrently with the other infrastructure shown on such plans. Private sidewalks and private recreational trails internal to neighborhoods comprising a Community shall provide at least one access point to the public recreational trail system. Such neighborhood access points to the public recreational trail system may be gated.

15. The first preliminary subdivision plan or site and development plan filed for development within Community B shown on the Future Land Use Plan (Figure 2) shall include an analysis of the feasibility of providing a public pedestrian trail to Community B's southern boundary to facilitate access to the Sarasota County Englewood Sports Complex. Such pedestrian trail connection may be provided as appurtenant to Preto Boulevard shown on the Conceptual Transportation and Infrastructure Plan (Figure 3).

16. Upon issuance of the certificate of occupancy for the 3,600th dwelling unit within the boundaries of the Winchester Ranch CAP, the property owner will make a parcel available to the County for a County-owned and operated park or recreational facility ("Park Site"). The Park Site shall be in a location mutually agreeable to the County and property owner. The Park Site may take the form of land within Community B immediately adjacent to the Englewood Sports Complex to serve as an addition to that Sarasota County facility, which has access from River Road and a future Preto Boulevard/Pine Street. If, however, the Park Site is located elsewhere within the Winchester Ranch CAP Area, it shall have an improved legal access to the public roadway network built to the Park Site. The property owner shall receive consideration in an amount equal to the average of two appraisals of the value of the Park Site at the time of conveyance. In no event shall the consideration be less than the per acre purchase price for the acreage containing the Park Site paid by the then-owner (if other than the "property owner" referenced in this Ordinance). After the size, location and value of the Park Site have been established, the County, can elect, at its absolute and sole discretion, whether to move forward with the acquisition of the Park Site. If the County elects to move forward with acquisition of the Park Site, the County and property owner shall enter into an agreement in a form acceptable to the County Attorney. Any consideration paid by the County for the Park Site shall be impact fee credit from the South County Park Impact Fee District, cash, or combination of impact fee credit and cash. If the Park Site contemplated by this condition is acquired by the County elsewhere (outside the boundaries of the Winchester Ranch at Wellen Park CAP) or if the County determines it does not need the Park Site, for any reason, then this condition shall be deemed met and the property owner shall have no obligation to provide the Park Site described herein.

02021-014

Transportation

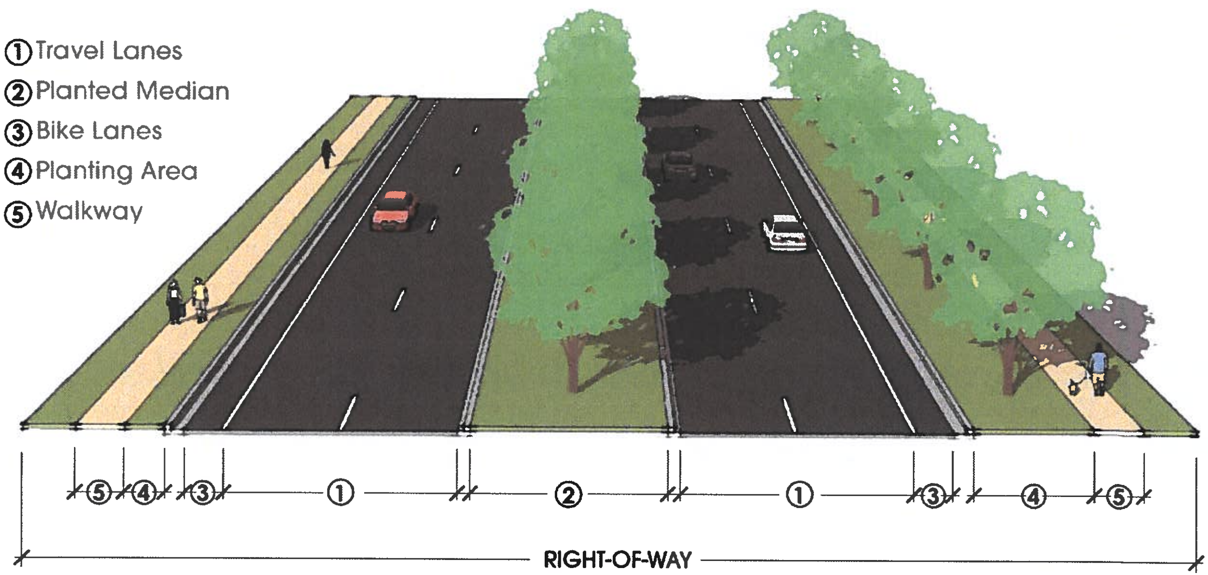
17. The alignment of County arterials on the Winchester Ranch Conceptual Transportation and Infrastructure Plan (Figure 3) are conceptual and may be modified through the rezone and/or development review process.

18. The construction or reconstruction of County Arterials within the Winchester Ranch CAP Study Area (Figure 1) should adhere to the following roadway design standards:

Arterial Roadways

a. **Option 1.** Arterials may be constructed as a 2 or 4 lane divided thoroughfare. The major arterials shown on the Winchester Ranch CAP Conceptual Transportation and Infrastructure Map (Figure 3) include Preto Boulevard, West Villages Parkway and Keyway Road.

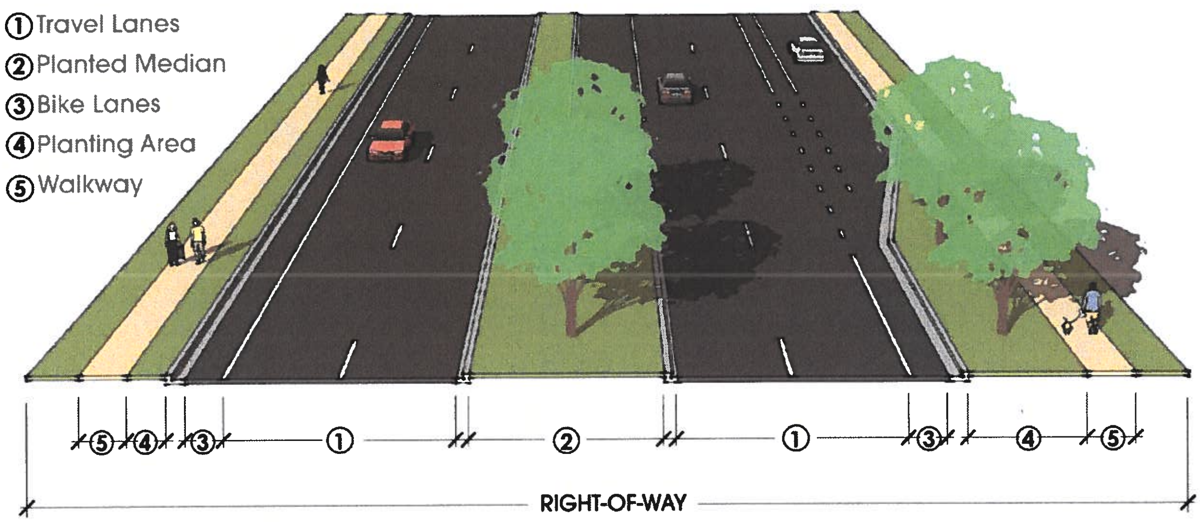
Target Speed:	35-45 miles per hour
Travel Lane Width:	11-12 feet
Turn Lane Width:	10-12 feet
Bike Lane Width:	7'
Median Width:	15'
Right of Way:	100' minimum, no maximum



O2021-014

b. **Option 2.** With turn lanes. Arterials may be constructed as a 2 or 4 lane divided thoroughfare. The major arterials shown on the Winchester Ranch CAP Conceptual Transportation and Infrastructure Map (Figure 3) include Preto Boulevard, West Villages Parkway and Keyway Road.

Target Speed:	35-45 miles per hour
Travel Lane Width:	11-12 feet
Turn Lane Width:	10-12 feet
Bike Lane Width:	7'
Median Width:	15'
Right of Way:	100' minimum, no maximum



Notwithstanding the standards contained in this condition, property owners shall construct only those roads, and with such configurations and lanes, as necessary to serve Communities within the Winchester Ranch CAP Area.

19. Any additions, deletions or changes to the alignment of future thoroughfare roadways on the Transportation and Infrastructure Map (Figure 3) shall not be deemed inconsistent with the Winchester Ranch CAP. Final ordinances adopting changes to the thoroughfare roadways within the boundaries of the Winchester Ranch CAP will be used to amend this Winchester Ranch CAP by reference.

20. Future rezoning applications shall be coordinated with Sarasota County Area Transit (SCAT) to establish the timing and location of transit service. If SCAT provides transit service within or adjacent to a Winchester Ranch Community prior to its development, the property owner/developer shall construct an ADA compliant bus stop pad and shelter and bicycle racks. The director of SCAT may approve a waiver of these provisions if it is clearly demonstrated that there is no reasonable means of providing transit services to the development.

O2021-014

Land Use

21. In accordance with FLU Policies 3.1.5 and 3.1.6, a maximum of 8,999 residential dwelling units may be developed within the adopted boundaries of the Winchester Ranch CAP as shown on Figure 2 of the Index Map Series. Consistent with FLU Policy 3.1.6, within the Winchester Ranch CAP Area, the residential densities of the lands within the Future Urban Service Area identified on the Future Land Use Plan (Figure 2) and the lands in the Urban Service Area may be blended.

    Notwithstanding the maximum number of residential dwelling units shown on Figure 2 of the Index Map Series, additional residential densities may be permitted within Winchester Ranch Communities where specifically provided for by policy in the Sarasota County Comprehensive Plan, including, but not limited to, High Density Residential development (13 units/gross acre) approved within Major Employment Center designated lands, pursuant to FLU Policy 1.2.14, provided that the residential use is part of a mixed-use development.

22. Commercial uses may be developed within the boundaries of the Winchester Ranch CAP consistent with the Future Land Use Plan (Figure 2) as follows:

    a. Neighborhood-scale commercial development within "Potential Commercial Area 1" shall be established as part of a planned district rezoning consistent with FLU Policy 2.5.5 of the Comprehensive Plan and in accordance with Section 124-101, UDC.

    b. Village-scale commercial development within "Potential Commercial Area 2" shall be established as an amendment to the Comprehensive Plan's Future Land Use Map designating such area as a Commercial Center with defined boundaries and a concurrent rezoning to a consistent, implementing commercial zone district consistent with FLU Policies 1.3.9 and 2.5.3.

23. As part of the rezoning of Winchester Ranch Communities, the Future Land Use Plan (Figure 2) shall be updated by reference to incorporate and identify the approved Winchester Ranch at Wellen Park Community.

School Board

24. A "Proposed School Site" is identified within Community B on the Future Land Use Plan (Figure 2) for the benefit of the School Board which shall consist of 60 net buildable acres for a K-8 school. If the School Board should determine the "Proposed School Site" is, instead, needed for an elementary school, then the site's acreage can be reduced to 30 net buildable acres.

25. If the School Board determines a need for either a K-8 school or elementary school, a survey and legal description for the "Proposed School Site" shall be provided to the School Board more particularly identifying its location that is agreeable to the School Board and property owner and consistent with the requirements of these School Board Conditions. The "Proposed School Site" shall not be located within the 100-year flood plain or within 600 feet of any FPL transmission right of way. Once developed with a

D2021-014

completed school, the "Proposed School Site" shall be directly accessible to a completed public road and served by adequate public utilities ready to serve the site.

26. The Land Use Mix and Tracking Chart filed with each rezone application for lands within the Winchester Ranch CAP as required by Condition 3, above, shall be provided to the School Board to assist it with the school capacity analysis and assessing the need for the "Proposed School Site." The Land Use Mix and Tracking Chart shall include the total number of single family units and multifamily units approved through rezoning and the total number constructed as evidenced by issuance of certificates of occupancy.

27. If the School Board determines a need for the "Proposed School Site" in connection with its review of a rezone application for lands within the Winchester Ranch CAP, the School Board and property owner will enter into an agreement for it to be conveyed to the School Board. Such agreement shall provide for the School Board to pay fair market value for the "Proposed School Site" established at the time of conveyance, which amount the School Board shall provide as cash, impact fee credit or combination of cash and impact fee credit. The process for establishing the fair market value shall be in accordance with the legal requirements applicable to the School Board.

28. If the need for the "Proposed School Site" has not been determined and, thus, it has not been conveyed at 50% of the buildout of the approved residential dwelling units within the Winchester Ranch CAP, the School Board and property owner shall reevaluate the need for a K-8 or elementary school. The reevaluation may result in the School Board determining its need for the "Proposed School Site;" the School Board and property owner agreeing to a different location within the Winchester Ranch CAP; or the School Board determining there is no need for a school within the Winchester Ranch CAP.

29. If the "Proposed School Site" identified within Community B on the Future Land Use Plan (Figure 2) is determined to not be needed by the School Board pursuant to these School Board Conditions, then it may be developed with any other use permitted under the terms of this CAP and Sarasota County Unified Development Code.

Air and Water Quality

30. The need for developer-sponsored ambient water quality monitoring shall be assessed in conjunction with each Rezone Petition. Any such monitoring shall be initiated prior to commencing development within the area embraced by the Rezone Petition.

Fire/EMS

31. The Winchester Ranch CAP Area (which represents the unincorporated, southernmost portion of the West Villages Improvement District) is provided fire protection by the Englewood Area Fire Control District (the "Fire District") and emergency medical services ("EMS") by the County. The City of North Port (the "City") provides fire protection and EMS to the entire northern portion of West Villages Improvement District which is within its corporate limits. The property owner has coordinated with the City the timing and method for providing City fire station sites within the incorporated portion of Wellen

02021-014

Park so that fire protection and EMS are in place to serve new development as it occurs. This is memorialized in the "West Villages Developer Agreement," recorded in Official Records Instrument # 2020042302, Public Records of Sarasota County, Florida, which, among other things, requires the preparation of a "Future Fire Study," as defined therein. The scope of the "Future Fire Study" will include the lands within the Winchester Ranch CAP Area and will be coordinated with the Fire District and County.

The Fire District and County have identified a potential future need for a fire station site within the Winchester Ranch CAP Area to collocate their respective services; specifically, a 2.5-acre parcel, directly accessible to a completed public road, and served by adequate public utilities ready to serve the site once developed with a completed fire station ("Fire Station Site").

32. If the Fire District and County determine a need for the Fire Station Site in connection with their review of a rezone application for lands within the Winchester Ranch CAP Area processed before completion of the "Future Fire Study," they and property owner will enter into an agreement for it to be conveyed. A survey and legal description for the Fire Station Site shall be provided to the Fire District and County more particularly identifying its location that is agreeable to the parties and consistent with these Fire/EMS Conditions. Such agreement shall provide for County and Fire District to pay fair market value for the Fire Station Site established at the time of conveyance, which amount shall provided to property owner as cash, impact fee credit or combination of cash and impact fee credit. The process for establishing the fair market value shall be in accordance with the legal requirements applicable to the Fire District and County.

33. If the need for the Fire Station Site has not been determined in connection with the processing of a rezone application for lands within the Winchester Ranch CAP Area and, thus, the Fire Station Site has not been conveyed, the Fire District, County and property owner shall evaluate its need in connection with the "Future Fire Study" to be conducted under the "West Villages Developer Agreement." If the Fire Station Site is determined to be needed as a result of such study, it shall be conveyed pursuant to the process described in Condition 32, above.

34. If the Fire Station Site contemplated by these Fire/EMS Conditions is acquired by Fire District and County elsewhere (outside the boundaries of the Winchester Ranch CAP) or if the Fire District and County determine they do not need the Fire Station Site, for any reason, then these Fire/EMS Conditions shall be deemed met and the property owner shall have no obligation to provide the Fire Station Site described herein.

O2021-014

ATTACHMENT 1 - LAND USE TRACKING CHART

Winchester Ranch at Wellen Park CAP Development Tracking Chart

				Approved Development					Constructed Development[1]				
				# Res. Units			SF Com/ Office	SF Industrial	# Res. Units			SF Com/ Office	SF Industrial
Community	Rezone # / Ordinance #	Parcel / Name	Acres	SF	MF	Total DUs			SF	MF	Total DUs		
Total						0	0	0					

Maximum Development permitted within CAP as of 2020-06-01 8,999

Remaining CAP Units available 8,999

Note: 1 Includes only that development for which a Certificate of Occupancy (CO) has been issued.

ATTACHMENT 2 - NOTICE OF PROXIMITY

NOTICE OF PROXIMITY TO ____

This Notice dated this ______ day of ____________, 20__, and entered into the public record by ______________________________, as owner of the property described as follows:

[Insert or attach metes and bounds description of subject property or provide reference to recording information for plat being concurrently recorded within Notice] (hereinafter the "Property")

WHEREAS, it is the intent of this Notice to make known that the Property is located in close proximity to the property known as the______________________________________.

WHEREAS, it is further the intent of this Notice to advise purchasers of all or a portion of the Property, that it is in close proximity to the ______________________________________.

NOW, THEREFORE, the general public and those parties specifically purchasing all or a portion of the Property are hereby notified that:

1. The Property is located in close proximity to the ______________________________________.
2. This Notice is to further advise such potential purchasers that its proximity to ________________________ may result in said purchasers being affected by: continuing current resource management practices to include, but not be limited to, ecological burning, pesticide usage, exotic plant and animal removal, usage of heavy equipment and machinery and other practices as may be deemed necessary for the proper management of ______________________.
3. The nature and extent of the effects of the operations of the ____________________________ which shall include all management practices as contained within the approved management plans for the ______________________________ which may be amended from time to time.
4. All property owners which take title to all or a portion of the Property shall be deemed to have constructive knowledge of this Notice due to its recordation in the Public Records of Sarasota County, Florida, and further shall be deemed to have consented to said resource practices, including ecological burning, pesticide usage, exotic plant and animal removal, usage of heavy equipment and machinery and other practices as may be deemed necessary for the proper management of the __________________________.

IN WITNESS WHEREOF, the owners have hereunto set their hands and seals this _______ day of ________________, 20___.

______________________________ ______________________________

______________________________ ______________________________

STATE OF FLORIDA
COUNTY OF SARASOTA

I HEREBY CERTIFY that on this day before me, an office duly qualified to take acknowledgments, personally appeared ____________________________ and ____________________________, to me known to be the persons described in and who executed the foregoing instrument and acknowledged before me that they executed same.

WITNESS my hand and official seal in the County and State last aforesaid this __________ day of __________________, 201__.

____

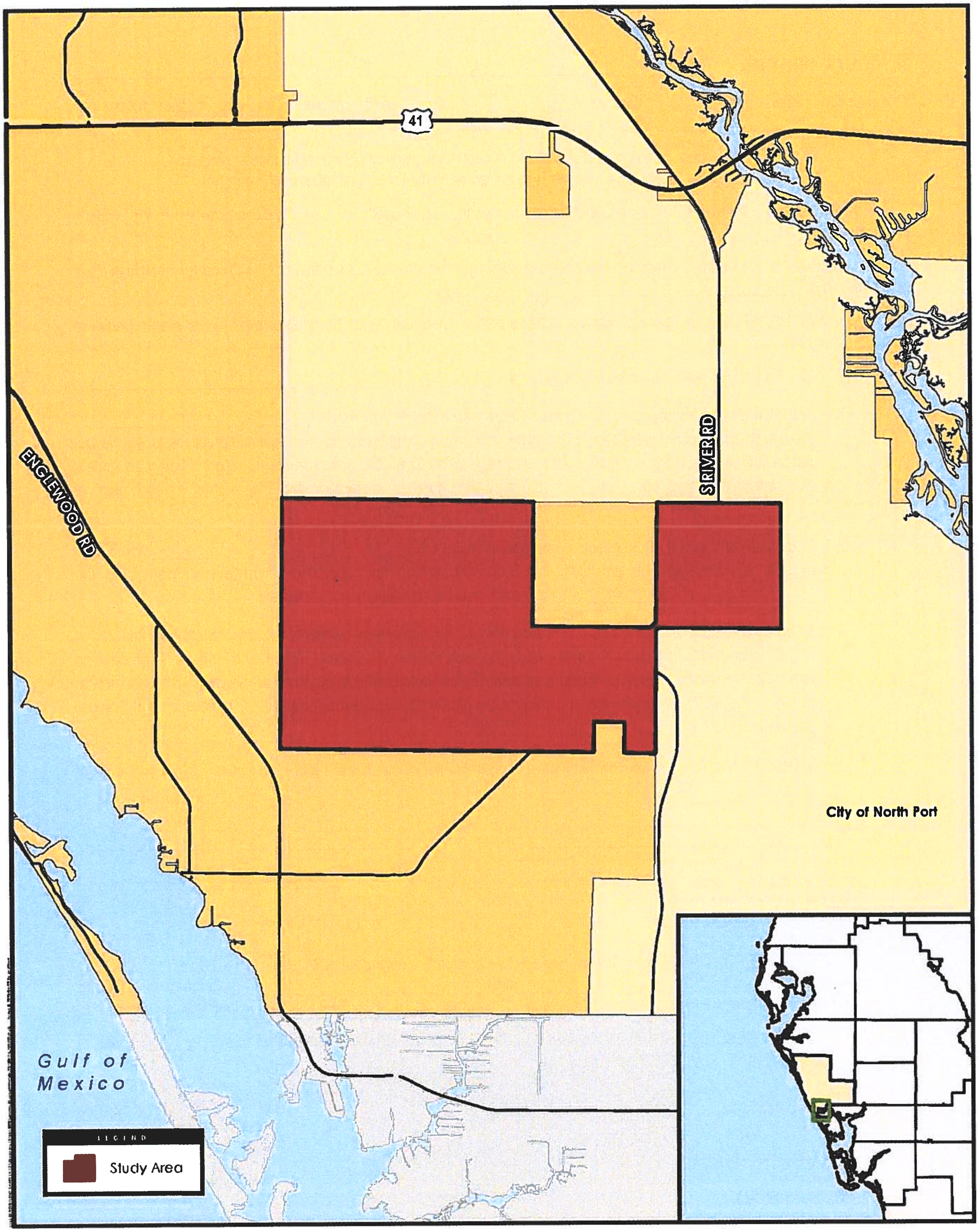
NOTARY PUBLIC

My Commission Expires:

(NOTARY SEAL)

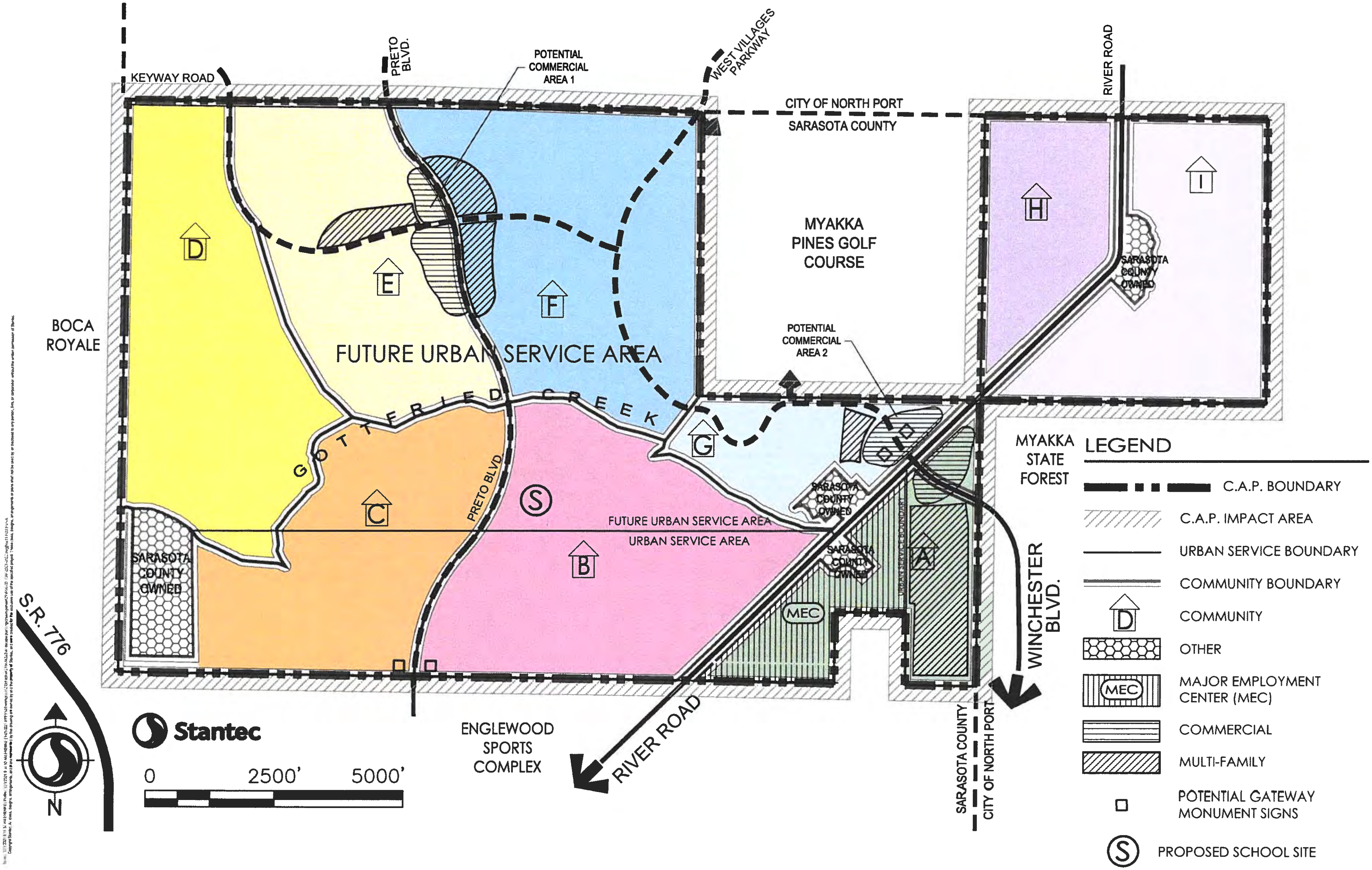
O2021-014

Exhibit B
Critical Area Plan Maps



INDEX MAP SERIES: FIGURE 1 BOUNDARY MAP
Winchester Ranch at Wellen Park Critical Area Plan, Sarasota County, Florida

O2021-014



INDEX MAP SERIES: FIGURE 2 FUTURE LAND USE PLAN (MAP) (PAGE 1 OF 2)

MARCH 23, 2021

Winchester Ranch at Wellen Park Critical Area Plan, Sarasota County, Florida

2 - B

02021-014

O2021-014

NOTES:
1. COMMUNITY BOUNDARIES AND ACREAGE DEPICTED ON THE FUTURE LAND USE PLAN MAP SERIES ARE CONCEPTUAL AND SUBJECT TO MODIFICATION DURING THE REZONING PROCESS.
2. THE AMOUNT OF RESIDENTIAL AND NON-RESIDENTIAL USES WITHIN EACH COMMUNITY ARE CONCEPTUAL AND SUBJECT TO MODIFICATION DURING THE REZONING PROCESS.
3. COMMUNITIES OUTSIDE OF THE URBAN SERVICE AREA THAT ARE PROXIMATE TO NON-RESIDENTIAL DEVELOPMENT MAY DESIGNATE INDIVIDUAL PARCELS WITH FRONTAGE ON AN ARTERIAL ROAD FOR UP TO NINE (9) DWELLING UNITS PER GROSS ACRE PER FLU POLICY 3.1.6 THROUGH THE REZONING PROCESS.
4. TOTAL RESIDENTIAL UNITS MAY INCREASE IF THE MAJOR EMPLOYMENT CENTER (MEC) IS REZONED AT A FUTURE DATE.
5. NON-RESIDENTIAL LAND USE TOTALS SHOWN ARE WITHIN POTENTIAL COMMERCIAL AREA 1 (COMMUNITY E) AND POTENTIAL COMMERCIAL AREA 2 (COMMUNITIES A AND G.
6. THE URBAN SERVICE BOUNDARY SHOWN ON THIS FUTURE LAND USE PLAN DEPICTS ITS LOCATION ON THE COMPREHENSIVE PLAN'S FUTURE LAND USE MAP ON THE DATE OF THE WINCHESTER RANCH CAP'S ADOPTION (ORDINANCE NO. 2021-014). IN THE EVENT THE URBAN SERVICE BOUNDARY IS SUBSEQUENTLY MOVED TO INCLUDE ALL OR A PORTION OF THE FUTURE URBAN SERVICE AREA DEPICTED HEREON WITHIN THE URBAN SERVICE AREA, ALL CONDITIONS FOR DEVELOPMENT APPROVAL (EXHIBIT "A") AND THE CRITICAL AREA PLAN MAPS (EXHIBIT "B") SHALL NOT BE AFFECTED AND SHALL BE APPLIED WITHIN THE CAP BOUNDARY UNLESS AMENDED.

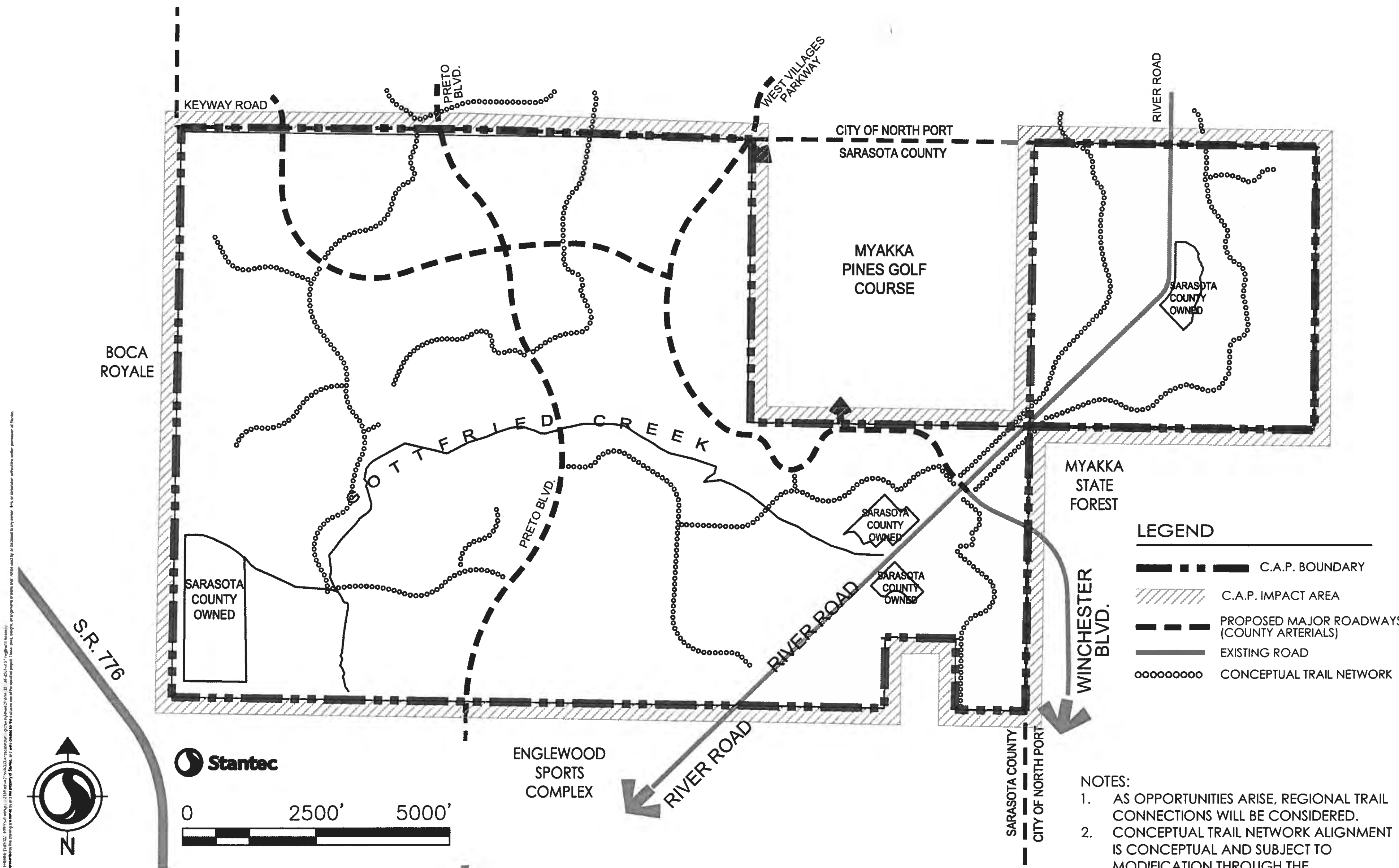
Winchester Ranch Critical Area Plan					
Future Land Use Table					
		Land Use			
		Residential Units		Non Residential	
Communities	Acres ±	Units	Density	Industrial/ Warehouse (SF)	Comm. (SF)
A	256	266	1.99	100,000	45,000
B	570	1,796	3.15		
C	464	1,415	3.05		
D	538	1,103	2.05		
E	462	1,432	3.1		25,000
F	596	1,848	3.1		
G	183	549	3		30,000
H	214	214	1		
I	377	377	1		
Total	3,660	8,999		100,000	100,000
R-O-W, Other	195				
Total CAP	3,855				

Stantec

INDEX MAP SERIES: FIGURE 2 FUTURE LAND USE PLAN (NOTES AND TABLE) (PAGE 2 OF 2)

Winchester Ranch at Wellen Park Critical Area Plan, Sarasota County, Florida

MARCH 23, 2021



Conceptual Roadways				
Roadway	**SC 2040 Future Thoroughfare Plan**	**Winchester Ranch CAP Designation**	**Existing**	**Planned**
River Road	Major Arterial	Boulevard	2 lane undivided	6 lane divided
Keyway Road	Major Arterial	Boulevard	N/A	4 lane divided
Preto Blvd	Major Arterial	Boulevard	N/A	4 lane divided
West Villages Parkway	Major Arterial	Boulevard	N/A	4 lane divided
Winchester Road	Major Arterial	Boulevard	2 lane undivided	4 lane divided

NOTES:

1. AS OPPORTUNITIES ARISE, REGIONAL TRAIL CONNECTIONS WILL BE CONSIDERED.
2. CONCEPTUAL TRAIL NETWORK ALIGNMENT IS CONCEPTUAL AND SUBJECT TO MODIFICATION THROUGH THE DEVELOPMENT REVIEW PROCESS.
3. DEVELOPERS OF LAND WITHIN THE BOUNDARIES OF THE CAP ARE REQUIRED TO CONTRIBUTE ONLY THEIR PROPORTIONATE-SHARE OF THE FACILITIES DETERMINED TO BE SIGNIFICANTLY IMPACTED BY THE DEVELOPMENT.

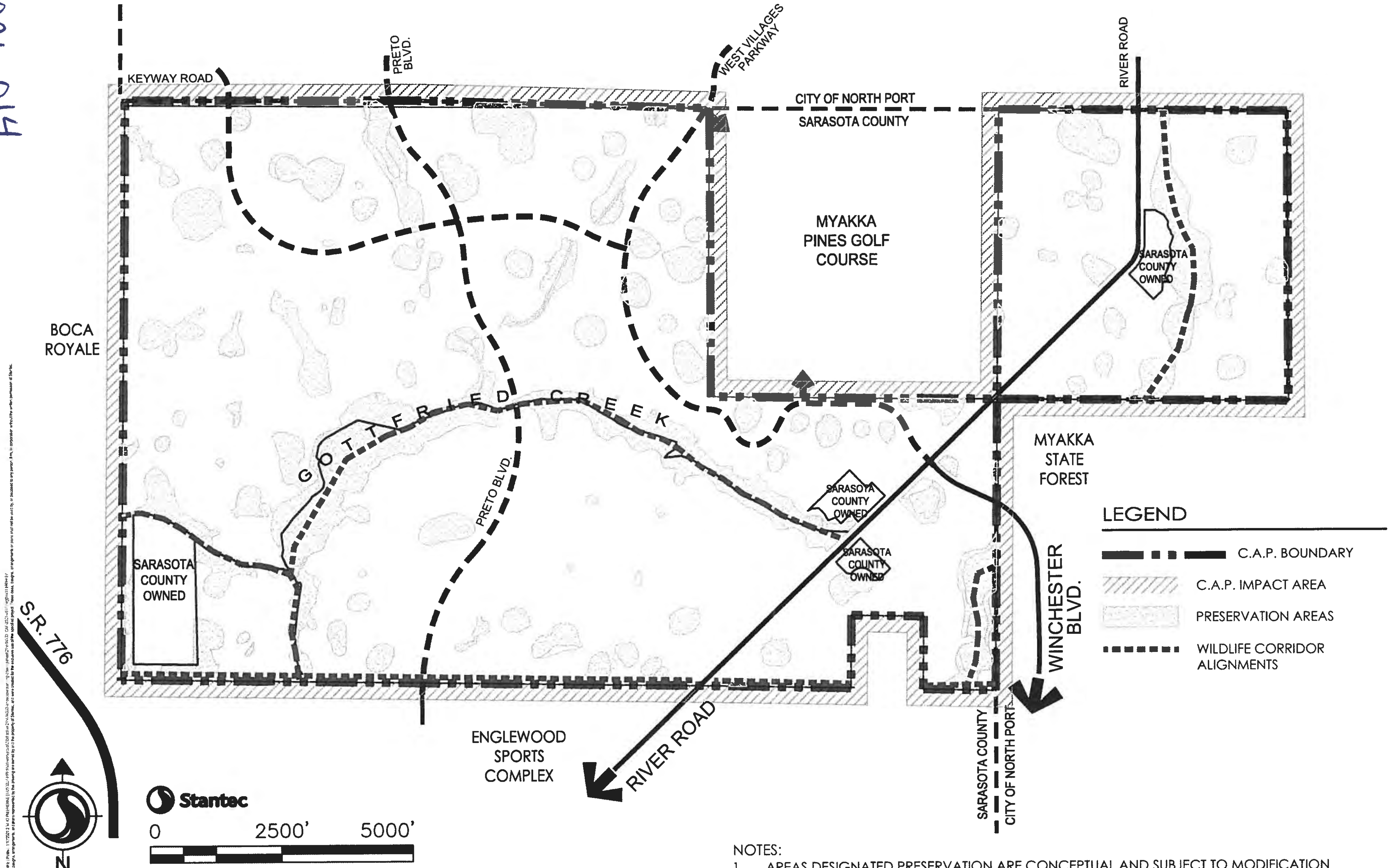
INDEX MAP SERIES: FIGURE 3 CONCEPTUAL TRANSPORTATION AND INFRASTRUCTURE PLAN

January 12, 2021

Winchester Ranch at Wellen Park Critical Area Plan, Sarasota County, Florida

O2021-014

O2021-014



NOTES:

1. AREAS DESIGNATED PRESERVATION ARE CONCEPTUAL AND SUBJECT TO MODIFICATION THROUGH THE DEVELOPMENT REVIEW PROCESS.
2. WILDLIFE CORRIDORS SHALL BE NO LESS THAN FIFTY (50) FEET IN WIDTH.

INDEX MAP SERIES: FIGURE 4 ENVIRONMENTAL FEATURES

January 12, 2021

Winchester Ranch at Wellen Park Critical Area Plan, Sarasota County, Florida

APPENDIX B

PHOTOLOG

Photo 1 Forested Wetlands Along Creek Corridor

Photo 2 Cabbage Palm Hammock

Photo 3 Cabbage Palm Hammock

Photo 4 Pine Flatwoods

Photo 5 Pine Flatwoods

Photo 6 Scrubby Flatwoods

Photo 7 Scrubby Flatwoods

Photo 8 Isolated Wetlands

Photo 9 Spoil Berm on Gottfried Creek System

Photo 10 Isolated Wetlands

APPENDIX C

SARASOTA SCRUB JAY PARCEL LIST

Sarasota County Sites Requiring USFWS Review for Development*		
No.	**PID**	**Acreage**
1	0223-00-3000	281.63
2	0225-00-3000	482.57
3	0459-13-0027	0.29
4	0459-13-0075	0.18
5	0459-13-0110	0.46
6	0459-13-0130	0.54
7	0459-14-0041	0.46
8	0472-03-0097	0.28
9	0472-03-0118	0.48
10	0472-03-0128	0.18
11	0472-03-0133	0.46
12	0472-04-0003	0.37
13	0472-04-0007	0.28
14	0472-04-0013	0.23
15	0472-04-0021	0.23
16	0472-05-0003	0.23
17	0472-05-0004	0.23
18	0472-05-0013	0.32
19	0472-05-0019	0.18
20	0472-05-0029	0.18
21	0472-06-0058	0.18
22	0472-06-0069	5.79
23	0472-11-0059	0.18
24	0472-12-0001	0.28
25	0472-12-0021	0.18
26	0472-12-0025	0.18
27	0472-12-0043	0.18
28	0472-12-0062	0.28
29	0473-04-0015	1.06
30	0473-05-0003	1.01
31	0473-05-0004	1.09
32	0473-06-0001	0.18
33	0473-06-0005	0.18
34	0473-06-0007	0.18
35	0473-06-0015	0.18
36	0473-06-0035	0.18
37	0473-06-0046	0.23
38	0473-06-0054	0.18
39	0473-06-0073	0.23
40	0473-06-0153	0.23
41	0473-06-0158	0.19
42	0473-06-0160	0.19
43	0473-06-0166	0.19
44	0473-06-0171	0.47
45	0473-12-0005	1.02
46	0473-12-0008	1.06
47	0475-03-0002	0.53
48	0475-10-0001	0.44
49	0475-10-0002	0.46
50	0475-15-0025	0.46
51	0475-15-0027	0.46

Sites Requiring USFWS Review for Development*		
No.	**PID**	**Acreage**
52	0475-15-0032	0.46
53	0475-15-0034	0.39
54	0478-07-0001	5.08
55	0478-15-0006	2.54
56	0487-02-0042	1.39
57	0492-09-0006	1.44
58	0492-09-0009	2.00
59	0492-09-0010	2.12
60	0494-04-0004	4.33
61	0528-00-4000	19.72
62	0528-00-4010	19.65
63	0528-01-0170	9.35
64	0528-01-0200	10.00
65	0528-01-0210	10.05
66	0528-01-0220	10.02
67	0528-01-0230	9.88
68	0528-01-0240	28.07
69	0529-00-1000	54.77
70	0529-01-0290	9.89
71	0529-01-0300	9.96
72	0565-00-1000	574.81
73	0566-00-4000	39.41
74	0799-00-1000	558.65
75	0809-00-1000	655.93
76	0827-00-1000	652.68
77	0840-00-1010	3.30

List Updated: August 2018

***NOTE: This list may be revised from time to time to reflect new data. Further, coordination with the U.S. Fish and Wildlife Service may still be required if verified survey information, or County, State or Federal personnel observations indicate scrub-jay use of a parcel not on the list above. Contact the Environmental Protection Division at 941-861-5000 for additional information.**

FIGURES

Legend

Project Boundary

N

0 0.5 1

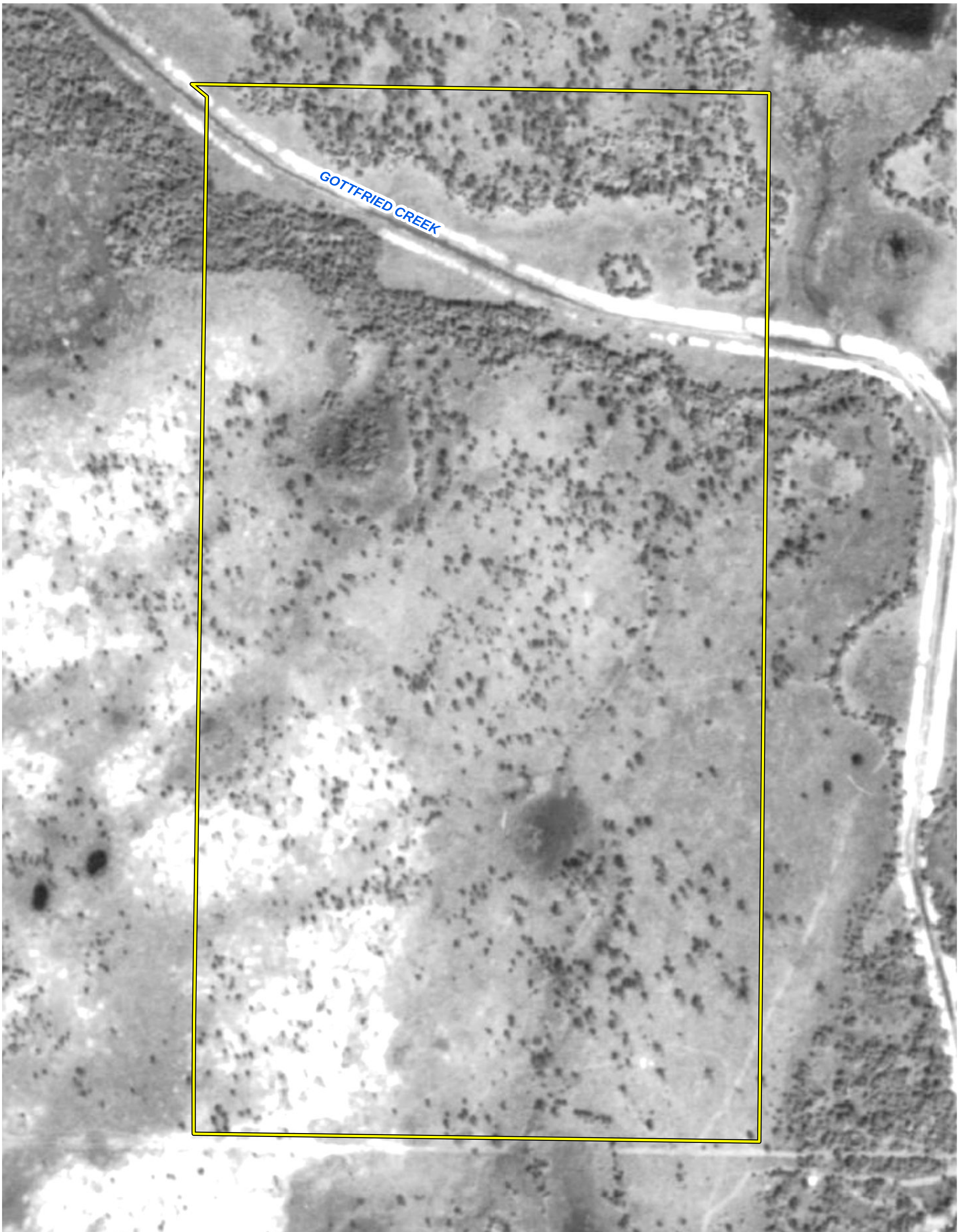
Miles

Sources: ESRI, 2020; ECT, 2021.

Figure 1
Site Location

Englewood Water District
Sarasota County, Florida

ECT



Legend

Project Boundary

N

0 125 250

Feet

Sources: USDA, 1948; ECT, 2021.

Figure 2
Historical Imagery
Fly Date: 1948

Englewood Water District
Sarasota County, Florida

ECT

Legend

Project Boundary

N

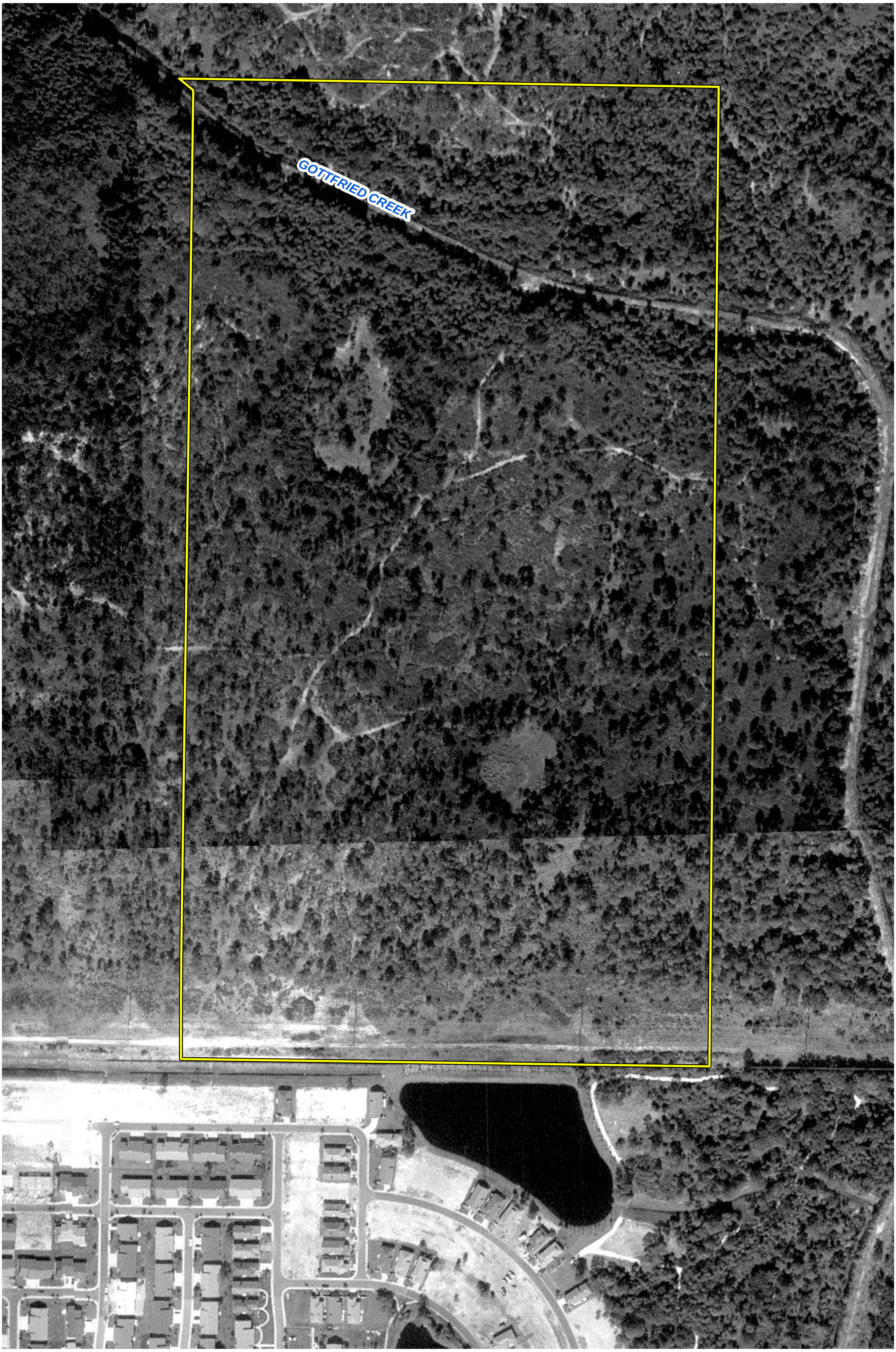
0 125 250

Feet

Sources: USDA, 1974; ECT, 2021.

Figure 3
Historical Imagery
Fly Date: 1974

Englewood Water District
Sarasota County, Florida



Legend

Project Boundary

N

0 125 250

Feet

Sources: USDA, 1986; ECT, 2021.

Figure 4
Historical Imagery
Fly Date: 1986

Englewood Water District
Sarasota County, Florida

ECT

Sources: USGS, 2021; Sarasota County Imagery, 2021; ECT, 2021.

Figure 5
Watersheds

Englewood Water District
Sarasota County, Florida

Symbol	Description	Hydric	Acres
3	Boca and Hallandale soils, 0 to 2 percent slopes	No	24.41
4	Bradenton fine sand, 0 to 2 percent slopes	Yes	4.99
10	EauGallie and Myakka fine sands, 0 to 2 percent slopes	No	40.09
22	Holopaw fine sand, frequently ponded, 0 to 1 percent slopes	Yes	14.42
55	EauGallie-Myakka fine sands-Urban land complex, 0 to 2 percent slopes	No	2.96
Total			86.86

Legend

- Project Boundary
- Soil
- Hydric Soil

N

0 125 250

Feet

Figure 6
Soils

Englewood Water District
Sarasota County, Florida

ECT

Sources: USDA, 2020; Sarasota County Imagery, 2021; ECT, 2021.

Type	ID	Acres
Stream	S-1	0.63
Wetland	W-1	1.37
Wetland	W-2	1.11
Wetland	W-3	9.82
Wetland	W-4	0.19
Wetland	W-9C	0.01
Wetland	W-10C	0.09
Wetland	W-11C	0.36
Total		13.58

Legend

Project Boundary

Stream

Wetland

N

0 125 250

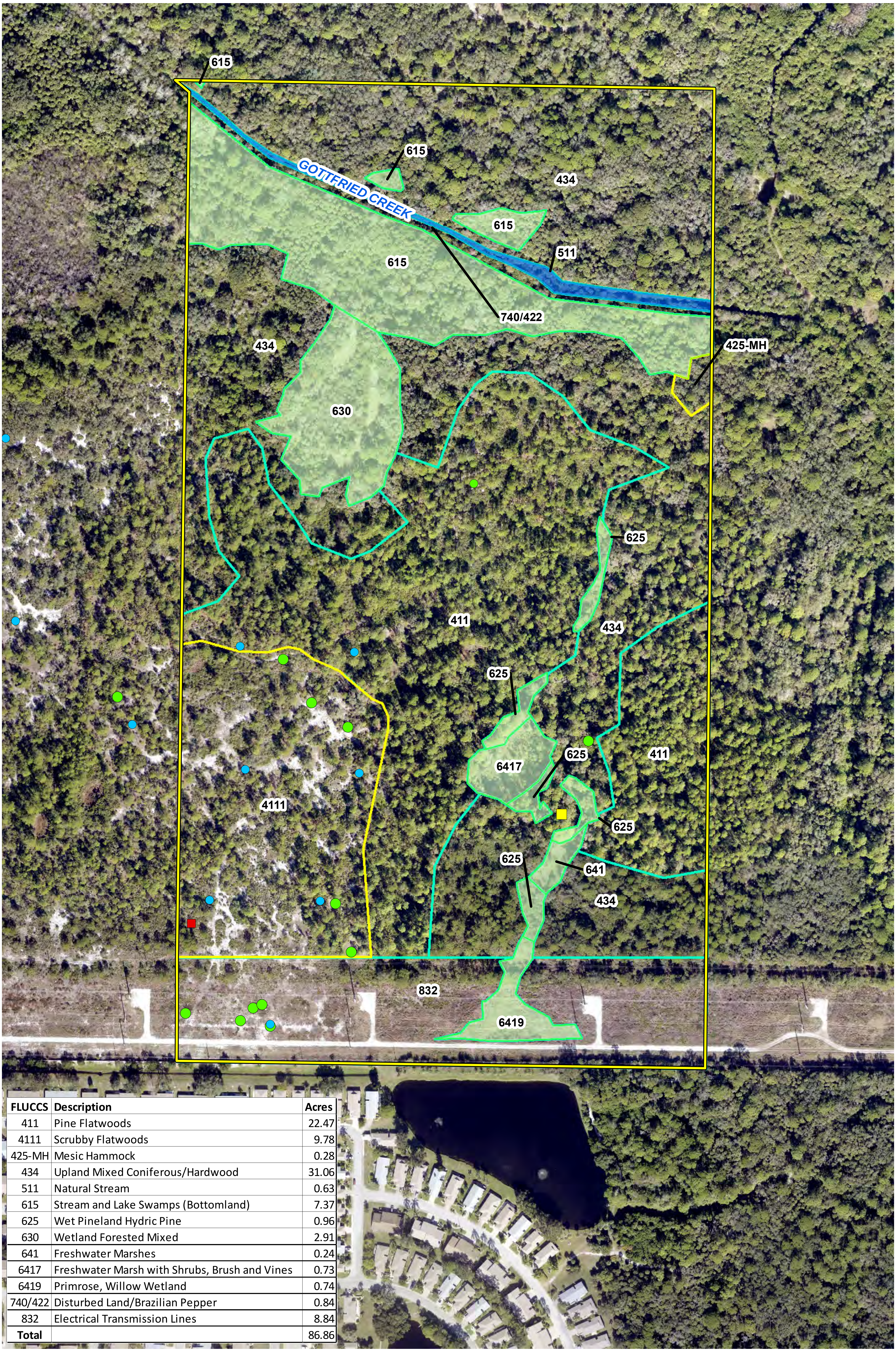
Feet

Sources: Sarasota County Imagery, 2021; ECT, 2021.

Figure 4
Wetlands and Habitat Photograph Locations

Englewood Water District
Sarasota County, Florida

ECT



FLUCCS	Description	Acres
411	Pine Flatwoods	22.47
4111	Scrubby Flatwoods	9.78
425-MH	Mesic Hammock	0.28
434	Upland Mixed Coniferous/Hardwood	31.06
511	Natural Stream	0.63
615	Stream and Lake Swamps (Bottomland)	7.37
625	Wet Pineland Hydric Pine	0.96
630	Wetland Forested Mixed	2.91
641	Freshwater Marshes	0.24
6417	Freshwater Marsh with Shrubs, Brush and Vines	0.73
6419	Primrose, Willow Wetland	0.74
740/422	Disturbed Land/Brazilian Pepper	0.84
832	Electrical Transmission Lines	8.84
Total		86.86

Legend

- Project Boundary
- Land Use/Land Cover
- County Preservation
- Stream
- Wetland
- Potentially Occupied Gopher Tortoise Burrow
- Potential Grand Tree
- Kestrel
- Scrub Jay Survey Station

N

0 125 250

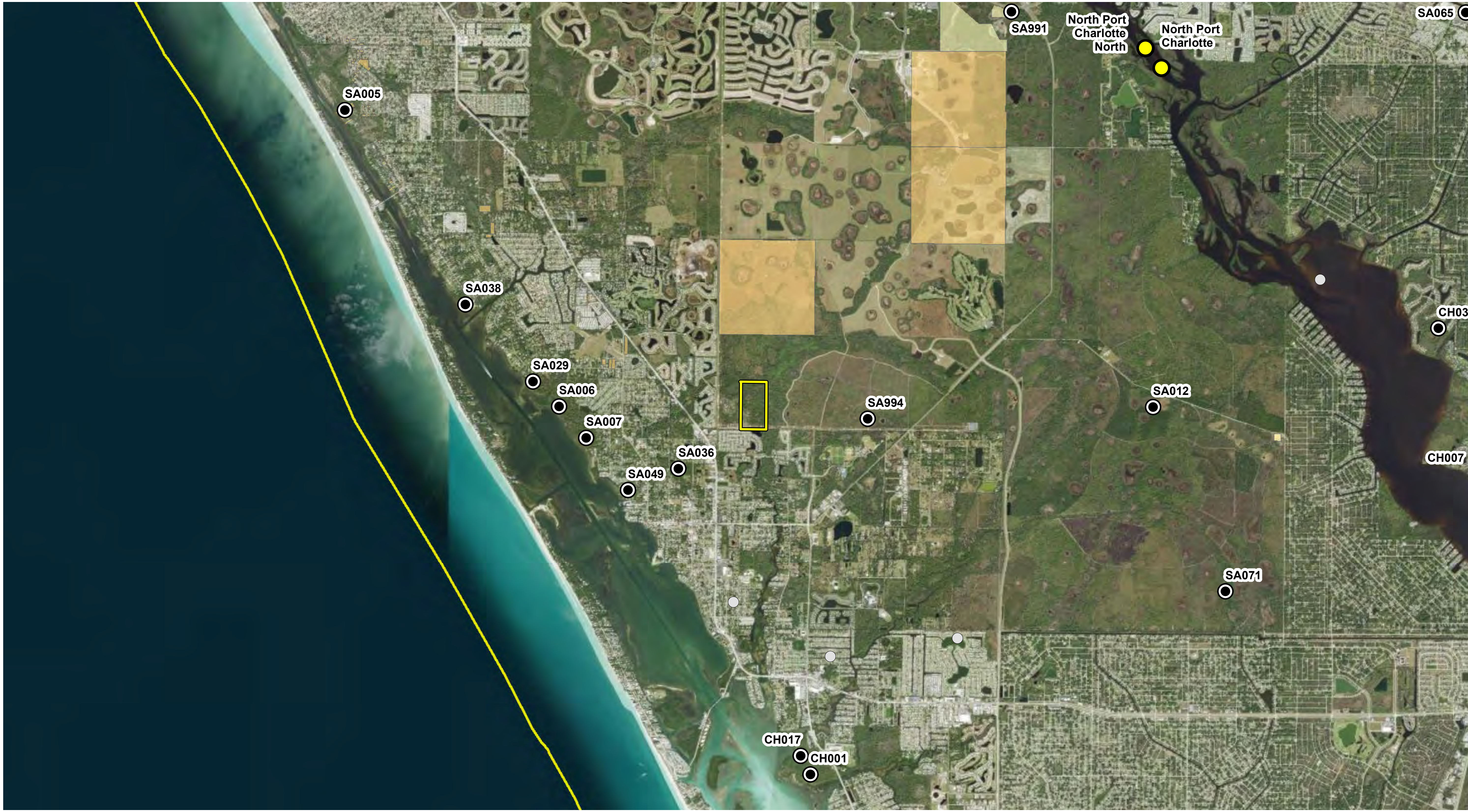
Feet

Sources: Sarasota County Imagery, 2021; ECT, 2021.

Figure 8
Land Use/ Land Cover

Englewood Water District
Sarasota County, Florida

ECT



Legend

Project Boundary

Wood Stork Colony

Bald Eagle Nest

Wading Bird Rookery

North Port Scrub Jay Parcel

Sarasota Scrub Jay Parcel

Wood Stork Foraging Area

Site Lies Within:
USFWS Wood Stork Foraging Area
USFWS Consultation Area:
Florida Scrub Jay
Bonneted Bat

N

0 0.5 1
Miles

Sources: FWC, 2021; USFWS, 2021; SWFWMD, Imagery. 2020; ECT, 2021.

Figure 9
Listed Species

Englewood Water District
Sarasota County, Florida

ECT

M:\acad\2021\210692\EWD_Listed.mxd

Coordinate System: NAD 1983 StatePlane Florida West FIPS 0902 Feet

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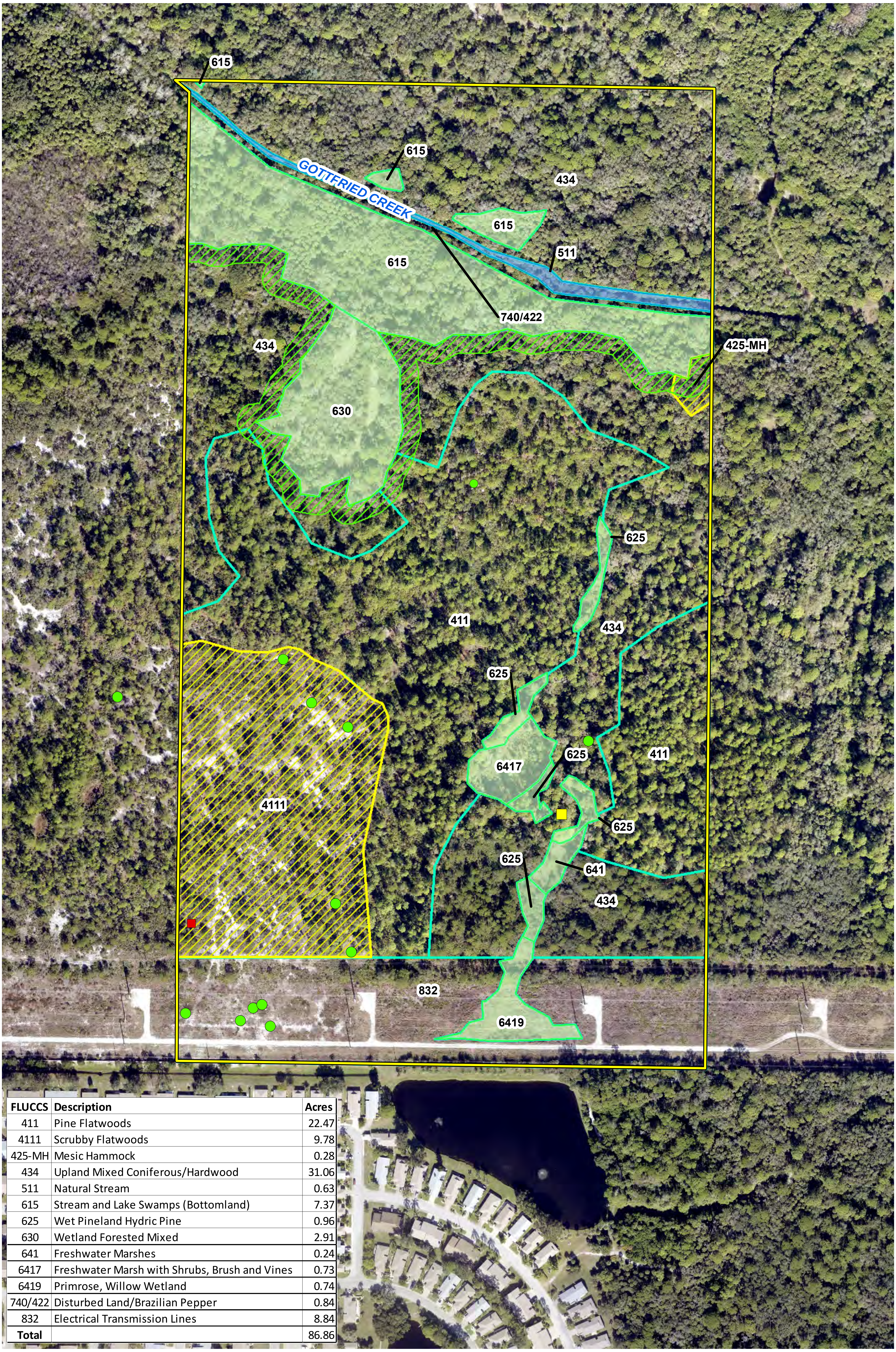

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630	Wetland Forested Mixed	2.91
641	Freshwater Marshes	0.24
6417	Freshwater Marsh with Shrubs, Brush and Vines	0.73
6419	Primrose, Willow Wetland	0.74
740/422	Disturbed Land/Brazilian Pepper	0.84
832	Electrical Transmission Lines	8.84
Total		86.86

Legend

Project Boundary
Land Use/Land Cover
County Preservation
Water Course Buffer (50 ft)
Stream
Wetland
Potentially Occupied Gopher Tortoise Burrow
Potential Grand Tree
Kestrel

N

0 125 250
Feet

Sources: Sarasota County Imagery, 2021; ECT, 2021.

Figure 10
Environmental Constraints

Englewood Water District
...da

ECT

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F

Appendix F

Engineering Reports

Appendix F

Engineering Reports

Englewood Water District Holiday Ventures and Sewer Master Plan Update

Prepared by
Kimley-Horn and Associates, Inc.

Englewood Water District

Holiday Ventures and Sewer Master Plan Update

Prepared for:

Englewood Water District

201 Selma Avenue
Englewood, Florida 34223

Registry No. 696
June 2021
Sarasota, Florida
148896001

Final Report

Englewood Water District
Holiday Ventures and Sewer Master Plan Update

Prepared for:

Englewood Water District
201 Selma Avenue
Englewood, Florida 34223

Prepared by:

Kimley-Horn and Associates, Inc.
1777 Main Street, Suite 200
Sarasota, FL 34236

HEATHER MARIE RIPLEY
LICENSE
No 88329
STATE OF
FLORIDA
PROFESSIONAL ENGINEER

6/17/2021

Heather M. Ripley, P.E.
FL #88329

Registry No. 696
June 2021
Sarasota, Florida
148896001

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

LIST OF APPENDICES

I. Introduction

The Englewood Water District (EWD) Utility Master Plan was completed in 2017 by HDR (2017 Utility Master Plan). The 2017 Utility Master Plan is a combined potable water, wastewater, and reclaimed water plan that evaluated pre-2015 populations, flows and EWD water, wastewater, and reclaimed systems. The 2017 Utility Master Plan assessed the facility needs for a 20-year planning period, from 2016 through 2036. Since the plan was completed, projected 2016 to 2020 populations and flows are now historical data and thus components of the 2017 Utility Master Plan will be incorporated and updated for better planning analysis. The focus of this Study is primarily on the wastewater system and, as deemed appropriate, a sewer master plan update to the 2017 Utility Master Plan.

The 2017 Utility Master Plan identified critical improvement projects and needs through 2036. As part of the critical improvements, multiple projects were identified for the Holiday Ventures Lift Station (Holiday Ventures LS) and surrounding area for force main redundancy, capacity upgrades, hydraulic analysis, operational reviews, and design and construction of recommended upgrades. In addition, there are multiple projects associated with the Water Reclamation Facility (WRF) including upgrades, replacements, rehabilitation, and expansion.

In accordance with Work Assignment No. 21-001 under Agreement No. 2017-001 dated February 8, 2017 (Study), Kimley-Horn and Associates, Inc. (Kimley-Horn) has been authorized by the EWD to evaluate the Holiday Ventures LS capacity to determine the extent of the station needed updates and replacement. In addition to the Holiday Ventures evaluation, a WRF and a new facility site evaluation has been completed to understand and compare the improvement needs for the existing WRF and a new sited facility.

The Study includes five (5) tasks:

1. Update Populations and Flows
2. Site Evaluations
3. System Evaluations and Improvement Needs
4. Cost Comparison and Recommended Improvements
5. Engineering Report

This Engineering Report has been created to document the work associated with the Project.

1.1 *Background*

In 1959, EWD was created as a political sub-division of the State of Florida under Chapter 2004-439. EWD owns and operates water, wastewater, and reclaimed water infrastructure and facilities and provides service with the unincorporated areas of Englewood, Grove City, and Manasota Key in Sarasota County and Charlotte County. In 1994, EWD acquired the West Charlotte Utilities Wastewater Treatment Plant. In addition to providing sewer service to customers within the EWD service area, EWD provides service to Charlotte County Utilities and Utilities Inc. of Sandalhaven through two (2) separate bulk agreements. **Figure 1** shows the existing EWD wastewater collection system and service area.

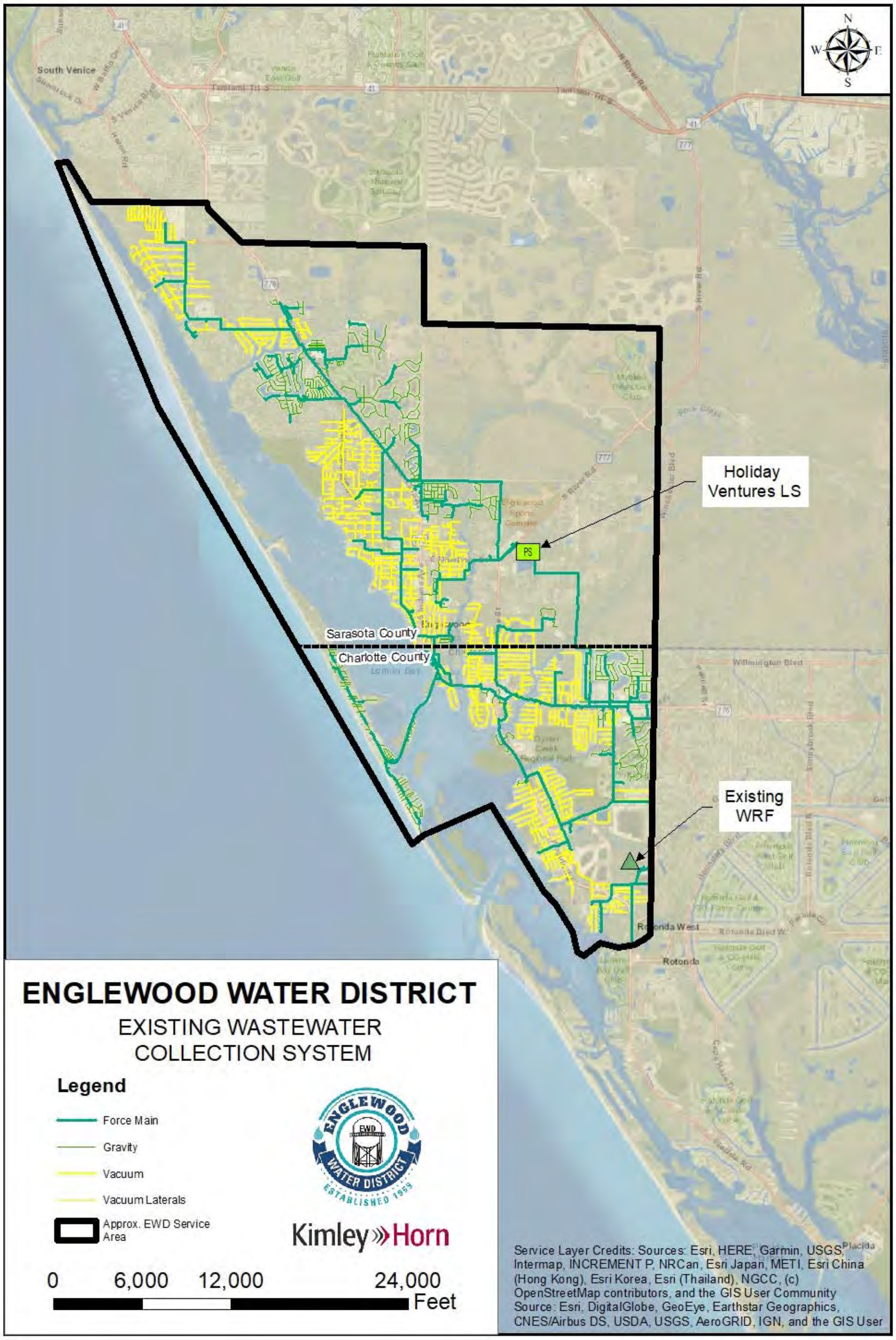


Figure 1: Existing Englewood Water District Wastewater Collection System

II. Existing Wastewater Facilities and Permit Conditions

2.1 *Wastewater Collection System*

The EWD wastewater collections system consists of gravity, low pressure, and vacuum systems that convey wastewater to approximately 92 submersible lift stations. The lift stations pump wastewater through an existing force main system to the existing WRF. This Study focuses on the Holiday Ventures LS, also identified as LS 121, as it is a critical master lift station that conveys all pressurized wastewater from the north EWD service area to the treatment facility.

2.2 *Wastewater Treatment Facility and Permitting*

The wastewater flows from the EWD service area are conveyed to and treated at the WRF, located on 160 acres at 140 Telman Road in Charlotte County. The WRF has a Florida Department of Environmental Protection (FDEP) operating permit (Permit No. FLA014126) for a permitted capacity of 3.0 million gallons per day (mgd) Annual Average Daily Flow (AADF). Per the FDEP WRF operating permit, the permitted capacity of the facility has the ability to increase to 3.4 mgd AADF, if written approval is received from FDEP after permitting conditions are completed.

The existing WRF is an extended aeration domestic wastewater facility, that contains a headworks facility, pre- and post-headworks screening tanks, odor control, four (4) Davco package plants, three (3) tertiary filters, disinfection, sludge processing and reclaimed water transmission and storage.

III. Populations and Wastewater Flows

To evaluate the Holiday Ventures LS and WRF capacity, Kimley-Horn collected data by generating a data request list and providing it to EWD. After receiving the data from EWD, Kimley-Horn reviewed the data and used it to develop existing flows, future populations, future flows, Holiday Ventures LS pump capacities and WRF capacity.

3.1 *Data Collection*

In addition to the requested and provided data from EWD, Kimley-Horn collected published data by FDEP, Sarasota County, Charlotte County, and Xylem. The data requested, and subsequently provided by EWD, is summarized below.

- Billing data
- Cost data
- Future development list and information
- Geographic Information System (GIS) collection system spatial data
- Selected lift station size, depth, and operating ranges

3.2 *Coordination with Local Government Partners – West Villages Improvement District*

As part of this Study, consideration was given to future developments, and changes in usage areas and flows. Projected for the next 20 years in the EWD service area, there will be infill in existing developed areas, and new development growth is anticipated mostly in the northeast. In the northeast, the West Villages Improvement District (WVID) owns the majority of the land as part of their existing master planned community of Winchester Ranch at Wellen Park.

The WVID is comprised of approximately 12,000 acres in the City of North Port and Sarasota County, including approximately 3,200 acres in the EWD service area. There is existing development in the City of North Port, and the City of North Port Utilities provides water and sanitary sewer service to the residents and commercial entities. The WVID provides reclaimed water service to all current and future developments.

Based on discussions with the WVID on December 15, 2020, residential, commercial, and industrial development is anticipated within the EWD service area as the Winchester Ranch at Wellen Park. **Figure 2** shows the Future Land Use Plan for Winchester Ranch at Wellen Park which consists of nine (9) planned villages. The WVID growth is currently expected to expand from the northern EWD service area boundary to the south. Additionally, Villages H and I are currently not within the EWD service area but, for planning purposes, are included in the future wastewater flows for this Study due to their proximity to other facilities in the area. If Villages H and I are to be served by EWD in the future, a Bulk Service Agreement will be needed.

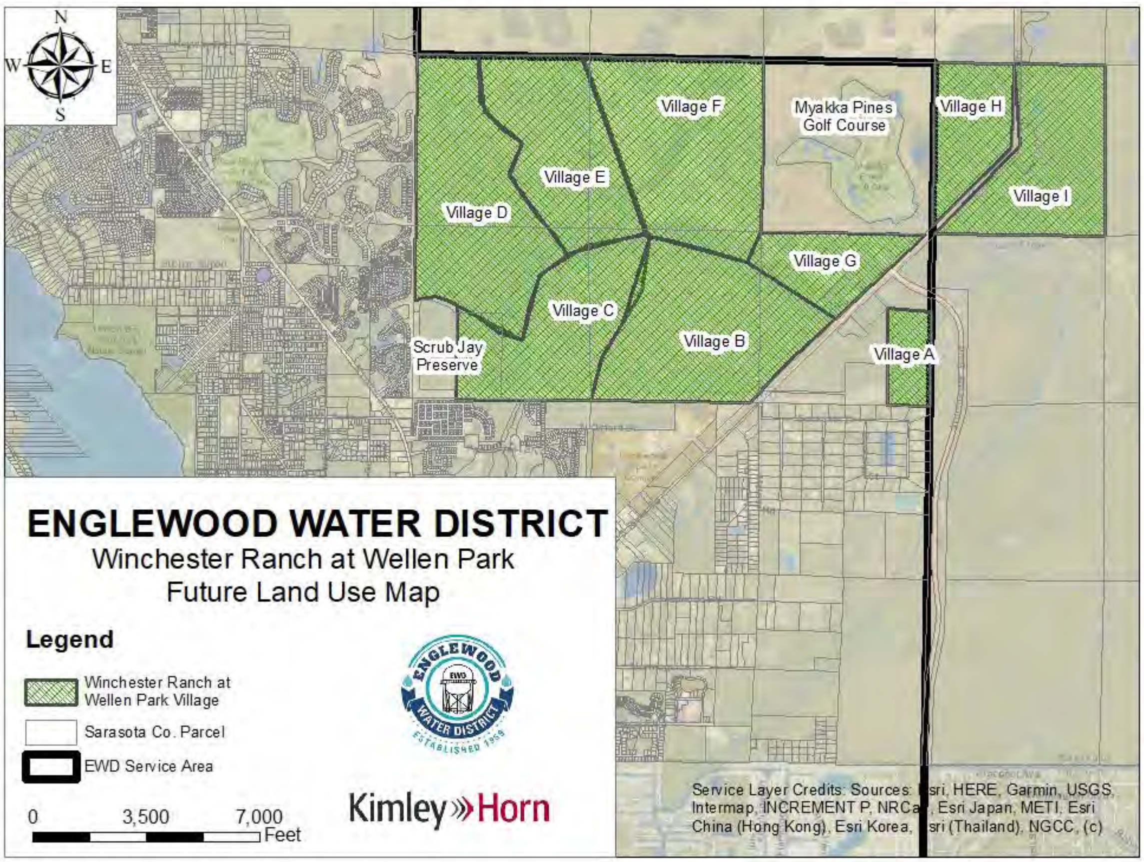


Figure 2: Winchester Ranch at Wellen Park Future Land Use Map

3.3 *Geolocating Customer Usage*

Kimley-Horn used the EWD provided fiscal year 2020 (FY2020) customer billing data to develop an existing customers GIS database. The billing addresses were spatially assigned in GIS, based on the customer information. This data provided account information such as customer name, associated parcel ID, location ID, land use, address, and account number, as well as, information on the type of sewer service.

There are three (3) types of customer accounts that are categorized by EWD dependent on their sewer service: customers with sewers connected; addresses that have sewer available but are not connected; and areas where sewer is not available. These three (3) types of sewer services are further defined below:

- **Sewer Connected** - An existing customer account that is connected to the EWD wastewater system in FY2020.
- **Sewer Available, Not Connected** - An EWD existing customer account that is not currently connected to the EWD wastewater system in FY2020; however, there is sewer service in the vicinity and the account has the ability to connect to the sewer at any time.
- **Sewer Not Available** - An account that does not receive sewer service in FY2020 and will require additional wastewater infrastructure to receive sewer service in the future.

Kimley-Horn compared and analyzed the three (3) types of sewer service and removed anomalies. An example of an anomaly is an account that has conflicting types of sewer service, such as an account identified as both connected to sewer and not connected to sewer. These accounts were discussed with EWD and the sewer service was finalized. Based on the analysis of the updated FY2020 EWD customer billing data, **Table 1** was developed to summarize the sewer service types.

Table 1: FY2020 Customer Billing Sewer Service Summary

Type of Sewer Service	Number of Metered Accounts
Sewer Connected	15,821
Sewer Available, Not Connected	570
Sewer Not Available	1,634

After the customer database was spatially mapped and overlaid with EWD sewer and water pipelines, customer areas with existing sewers or existing watermains were found, but the customers were not provided with a sewer service type. Therefore, an additional evaluation was completed so the majority of the customers were accounted for in this analysis. The evaluation process included: analyzing the spatial location and account information related to water meters within EWD; comparing the water meter shapefile to the spatial referenced FY2020 customer billing file; identifying residential parcels that were not included in the FY2020 customer billing data. Based on this analysis, most of the parcels did not have sewer available and thus, they were classified as Sewer Not Available as shown in **Figure 3**.

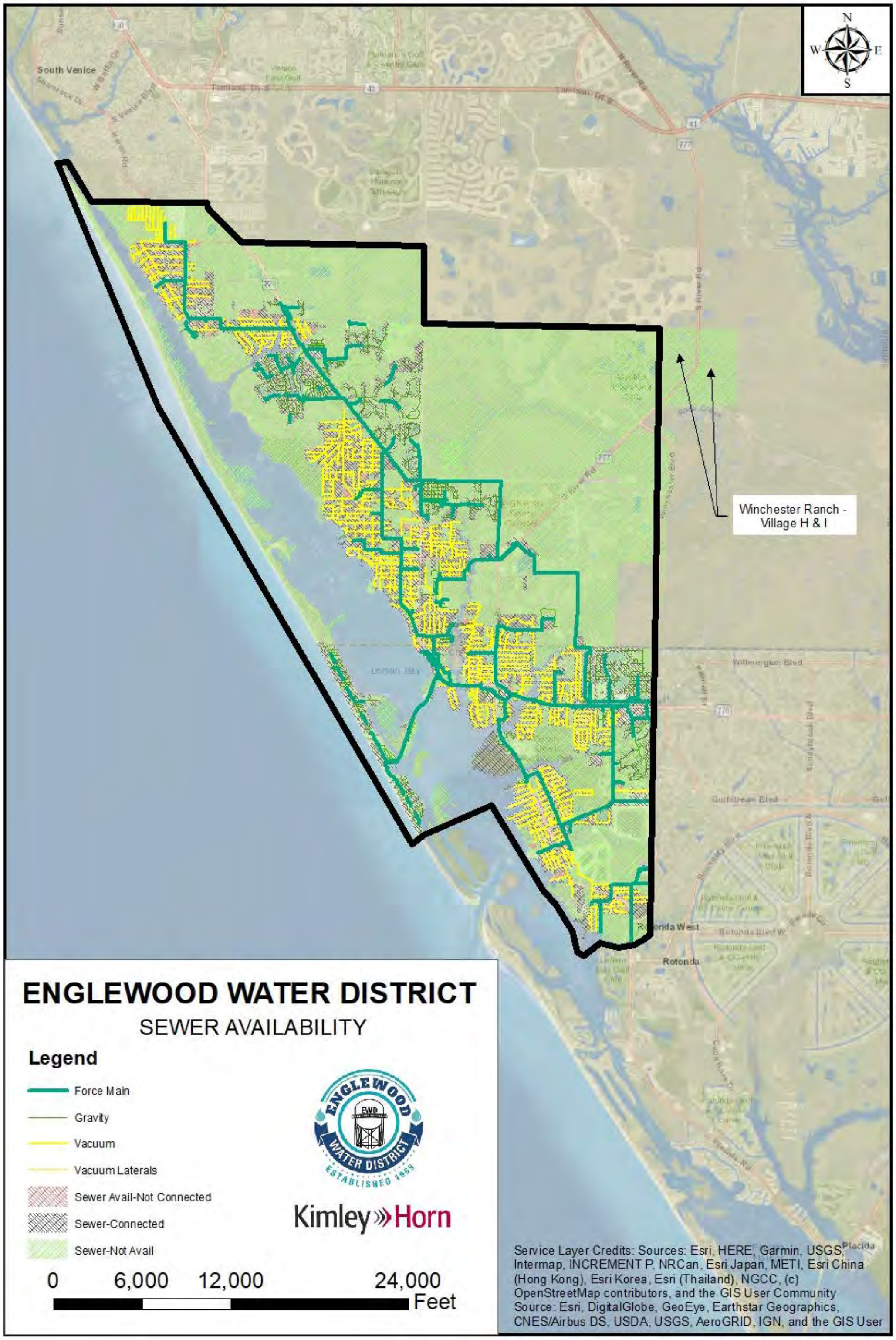


Figure 3: Englewood Water District Sewer Availability Map

3.4 *Existing Population and Flow Adjustments*

The existing 2017 Utility Master Plan included existing flows through 2015 and projected populations and flows through 2036. Since the 2017 Utility Master Plan, the projected 2016 through 2020 flows, are recorded historical flows. Therefore, this Study will update the 2017 Utility Master Plan with the actual flow data.

3.4.1 Wastewater Historical Flows

Kimley-Horn updated the 2017 Utility Master Plan past projected flows with the recorded flow data using the Discharge Monitoring Reports (DMRs) obtained from EWD and the FDEP website. The historical wastewater flows are shown in **Table 2**. This table provides a continuation of the data presented in the 2017 EWD Utility Master Plan, with the updated data from 2016 through 2020 wastewater data.

Table 2: Englewood Water District Wastewater Historical Flows

Year	Annual Average Daily Flow (mgd)	Max. 3-Month Average Daily Flow (mgd)	Max Month 3-Month Occurred
2007	1.998	2.265	May
2008	2.175	2.471	October
2009	1.793	2.047	January
2010	1.621	1.818	April
2011	1.745	2.009	June
2012	1.658	1.964	April
2013	1.669	1.729	December
2014	1.908	2.354	October
2015	1.587	1.870	April
2016	1.599	1.993	February
2017	1.405	1.596	March
2018	1.384	1.679	February
2019	1.345	1.703	January
2020	1.512	1.562	September

In comparison with the 2017 Utility Master Plan, the projected 2016 wastewater flows were anticipated to be greater than the historical flows in 2016 through 2020, as reported above and in the DMRs.

Based on the wastewater historical AADF, over the last 5-years of operation, the existing WRF is operating within 48% of its permitted capacity, and approximately 50.4% of its permitted capacity in 2020.

3.4.2 Existing Population and Service Level

The population of the EWD service area is not an inclusive indicator of the population that has sewer. There are bulk customers outside of the City that have sewer service from EWD, there are areas with septic within EWD, and other areas that have sewer available but are not connected to service. The 2017 Utility Master Plan developed base year populations using extensive research with various methodology and referenced populations from multiple data sources. In addition, they adjusted population counts and did not include bulk customer populations. The 2017 Utility Master Plan identified an estimated service level of 96 gallons per day (gpd) per equivalent residential capacity (ERC). For this Study, the existing flow per resident was updated by using the FY2020 EWD customer billing data, to estimate the existing EWD wastewater customers and to further assess the provided flows per resident. The existing population was established by filtering the FY2020 customer billing data for residential and mixed residential/commercial land uses. Resolution No. 20-11-05 A, 2020 EWD Customer Rules and Regulations (EWD Rules and Regulations) defines ERCs to assist in charging customers similarly for equivalent service. Based on this methodology, there is an estimated customer base accounting of 15,464 ERCs with wastewater service in EWD. To determine the FY2020 wastewater flows per person, only the confirmed Sewer-Connected accounts from the FY2020 customer billing data were used. The October 2019 through September 2020 DMRs were assessed to calculate the FY2020 AADF of 1.428 mgd. Based on this methodology, the FY2020 wastewater service for the EWD service area is estimated to be approximately 92 gpd/ERC. This coincides with the 2017 EWD Utility Master Plan's estimated wastewater flow per capita.

3.5 *Future Population and Flow Projections*

Based on discussions with WVID, and as described in **Section 3.2**, the future populations and development timing of the northeastern EWD service area were estimated along with EWD known incoming developments and infill areas, for the next twenty years.

EWD provided Kimley-Horn with an average district usage per ERC of 157 gpd/ERC. Kimley-Horn projected the EWD wastewater flows based on 5-year intervals to EWD's service area for the 20-year planning period. The most significant growth, anticipated within EWD's service area, will be new developments followed by minor infill development. Kimley-Horn and EWD reviewed and updated the new developments and wastewater flow table from the 2017 EWD Utility Master Plan. This exercise provided the anticipated ERCs and associated planning period for twenty (20) major developments within the current or future EWD wastewater service area to potentially include the Winchester Ranch H and I developments. Additionally, Kimley-Horn and EWD reviewed five (5) smaller developments that are actively seeking to establish wastewater service in the next ten years.

To categorize the wastewater flows into planning periods, Kimley-Horn and EWD reviewed the map of the sewer service types and applied base assumptions for their future growth. These assumptions are summarized below.

- **Sewer Connected**: Parcels are considered existing customers.
- **Sewer Available, Not Connected**: A split 40/60 percentage rate was applied to estimate when these parcels will connect to the available sewer, 40% of the parcels will have sewer service in the next five years, and 60% of the parcels will have service in ten years. These areas were generally estimated because the infill rate is based on individual property owner preference.
- **Sewer Not Available:** Parcels were spatially assigned to five (5) areas, where each area will receive sewer service based on their location and estimated infrastructure and growth. Since these areas do not currently have service, it was predicted these areas will be out

further on the planning horizon to design and construct. Four (4) of the five (5) areas are within Sarasota County and consist of: north Manasota Key (15 years), northeast EWD (15 years), central Manasota Key (20 years), and east EWD (20 years). It is projected that the fifth area, Charlotte County – EWD, will have sewer service in twenty years. These future Sewer Not Available growth areas are shown in **Figure 4.** All parcels designated as non-residential and over 10 acres were reviewed for potential future development. Based on the individual parcel's respective county zoning code, the maximum residential density per acre was applied to determine an estimated number of ERCs and wastewater flows for each parcel.

Figure 4 shows the existing sewer availability, the future Sewer Not Available growth areas, and the twenty (24) identified developments. **Table 3** summarizes the future ERCs, and projected wastewater flows categorized by future customer groups or developments for the planned twenty-year horizon and beyond.

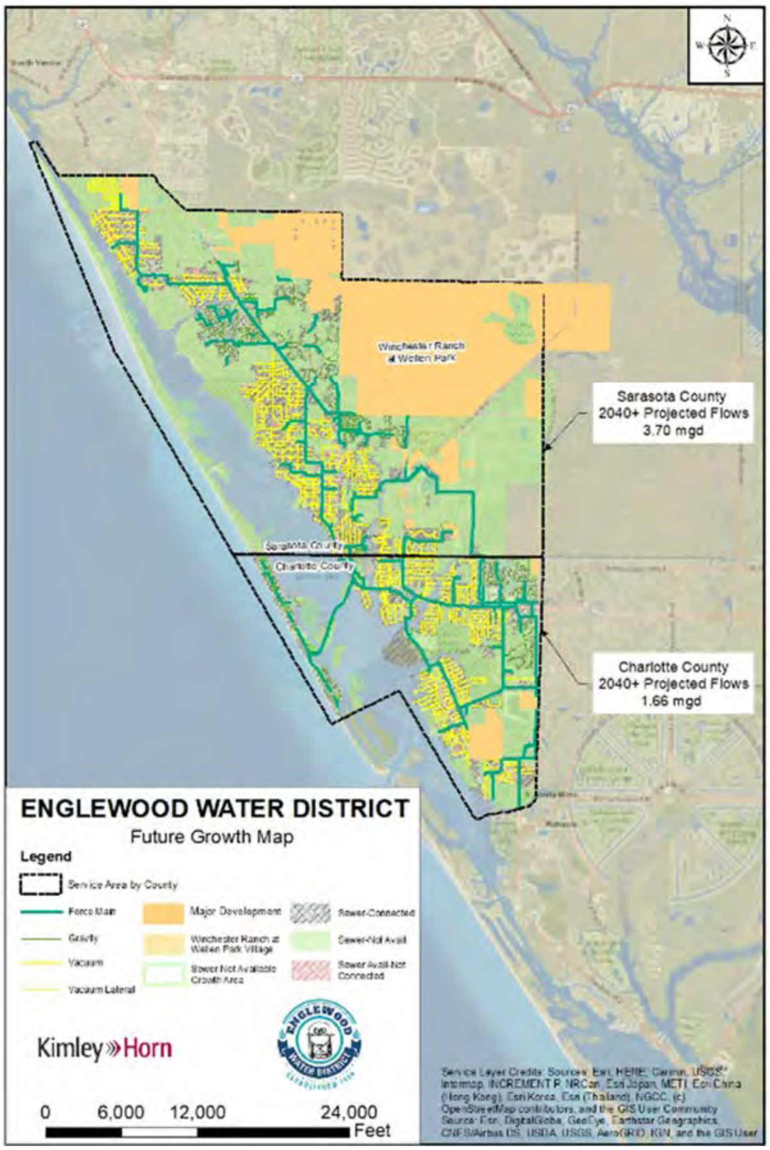


Figure 4: Englewood Water District Future Growth Map

Table 3: Future Customers and Flow Projections

Customer Group	0-5 Years		5-10 Years		10-15 Years		15-20 Years		20 + Years	
	ERCs	Flow (gpd)	ERCs	Flow (gpd)	ERCs	Flow (gpd)	ERCs	Flow (gpd)	ERCs	Flow (gpd)
Sewer Avail- Not Connected	164	25,748	244	38,308						
Sewer Not Avail	72	11,304	6	942	3,719	583,883	6,084	955,188		
Andress Property	273	42,861								
Beachwalk by Manasota Key	600	94,200	963	151,191						
Beachwalk Preserve	220	34,540								
Boca Royale 13	3	471								
Boca Royale 14	210	32,970								
Boca Royale 15	28	4,396								
Boca Royale 16	82	12,874								
Boca Royale 17	33	5,181								
Island Lake Estates	400	62,800								
Ivory Bill Dr & Winchester Blvd	94	14,758	94	14,758						
Japanese Gardens			414	64,998						
Medical Boulevard	173	27,161	173	27,161						
Morris Industrial Park			50	7,850	50	7,850				
Myakka Pines					400	62,800	477	74,889		
Paddock Pines	30	4,710								
Park Forest 6	5	785								
Park Forest 7	56	8,792								
Pine Street Development	48	7,536	48	7,536						
Tromble Bay			72	11,304						
Wellen Park A			266	41,762						
Wellen Park B			500	78,500	500	78,500	796	124,972		
Wellen Park C			500	78,500	500	78,500	415	65,155		
Wellen Park D	500	78,500	603	94,671						
Wellen Park E					500	78,500	500	78,500	432	67,824
Wellen Park F					500	78,500	500	78,500	848	133,136
Wellen Park G			250	39,250	299	46,943				
Wellen Park H									214	33,598
Wellen Park I									377	59,189
Winchester Lakes			169	26,533						
TOTAL	***2,991***	***469,587***	***4,352***	***683,264***	***6,468***	***1,015,476***	***8,772***	***1,377,204***	***1,871***	***293,747***
CUMULATIVE TOTAL		**469,587**		**1,152,851**		**2,168,327**		**3,545,531**		**3,839,278**

To estimate the future flows of the EWD wastewater collection system, the average of the past five years of historical DMR data was 1.45 mgd and the past year, 2020, AADF was recorded as 1.51 mgd. To be conservative and due to growth in the system, the recorded 2020 AADF was used along with the projected flows to estimate the future flows of the EWD wastewater collection system.

While the permitted capacity of the existing EWD WRF is 3.0 mgd AADF, the capacity is limited by the age and condition of the facility. Based on the site evaluation discussed later in this Study, it is not recommended that the existing EWD WRF operates beyond a 2.0 mgd AADF operating capacity without significant upgrades. Therefore, **Figure 5** shows the total projected wastewater flows graphed against the existing EWD WRF permitted capacity of 3.0 mgd AADF.

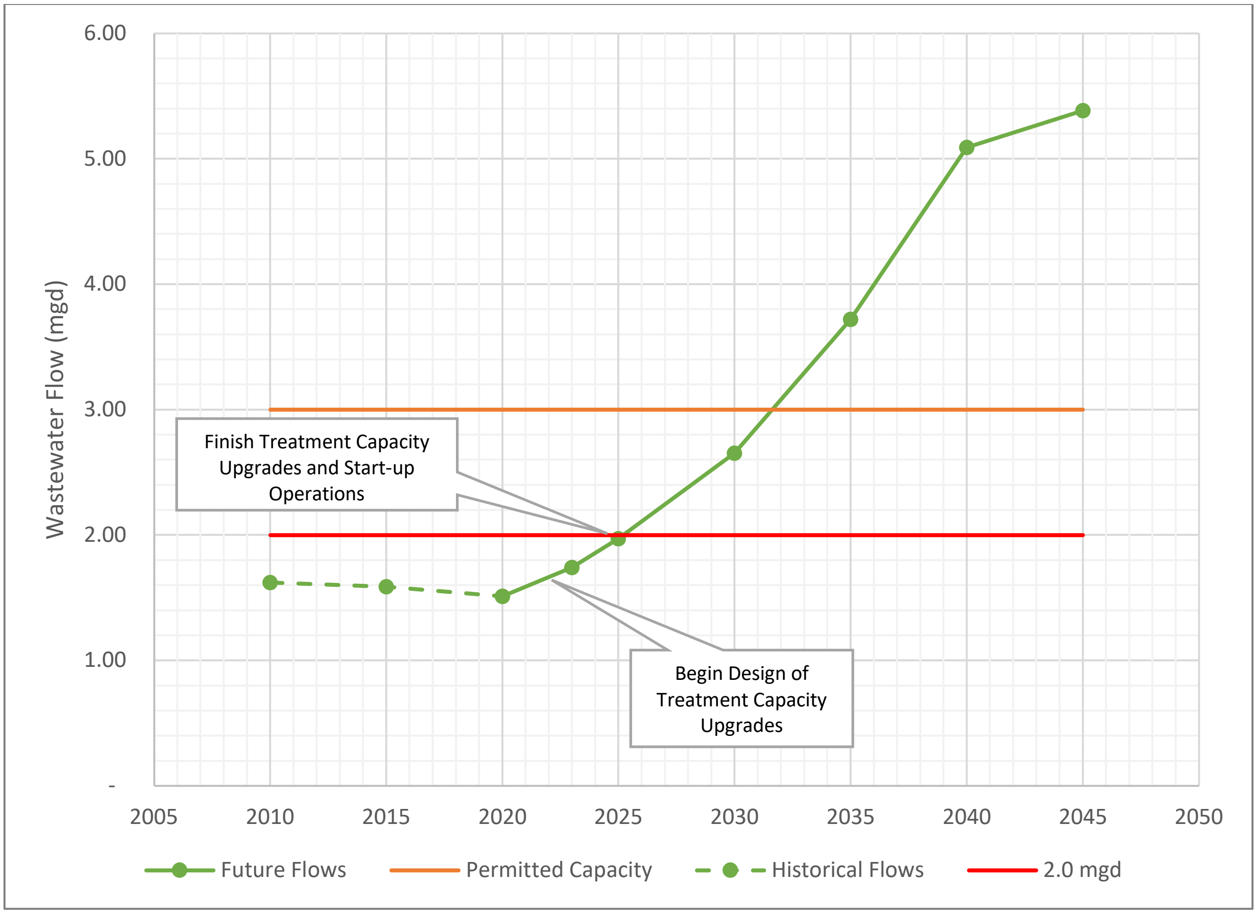


Figure 5: Wastewater Flows and Existing WRF Permitted Capacity

Per the Florida Administrative Code (FAC) Section 62-601.405, a capacity analysis report (CAR) shall be updated every five years or with the next permit renewal, whichever comes first. In addition, according to FAC 62-601.405, the following steps should be adhered to when the WRF is equaled to or exceeded:

- Within the next 10 years, an annual updated CAR should be submitted to FDEP.
- Within 5 years, planning and preliminary design of the expansion shall be initiated.
- Within 4 years, plans and specifications should be in process.
- Within 3 years, permit application for the expansion should be completed.

EWD submitted an updated CAR in 2017 and are required to submit an update in 2022 with the next operational permit renewal. It is anticipated the permitted capacity will be near exceedance in ten years from the 2022 updated CAR. If development continues as projected, EWD will exceed its permitted capacity in the next ten to fifteen years. In comparison to the 2017 Utility Master Plan, this analysis is consistent with the 2017 Utility Master Plan that determined the plant will exceed its capacity in 2031.

IV. Site Evaluations

As part of the Study, Kimley-Horn conducted site evaluations of the existing Holiday Ventures LS, the existing WRF, and completed a desktop analysis of a potential future wastewater reclamation facility site in Winchester Ranch. The site evaluations, for the Holiday Ventures LS and the WRF, included above ground visual condition inspections, data collection, and discussions with EWD operators and engineers familiar with the processes and facilities. For the existing WRF, the evaluations were to only update the 2017 Utility Master Plan based on visible changes or new issues not previously accounted for and thus, the evaluations provided the needed background in determining the recommended improvements discussed in this Study.

4.1 *Holiday Ventures Lift Station Evaluation*

The Holiday Ventures LS is an existing submersible triplex lift station located at 13400 Haligan Way in Sarasota County. The lift station was originally designed in 2003. The Holiday Ventures LS pumps convey the majority of the north service area sewer flows to the existing WRF. The 2017 Utility Master Plan identified the Holiday Ventures LS as a highly critical wastewater system with a high consequence of failure. The onsite wastewater components include: a Muffin Monster inline sewage grinder, three (3) Flygt submersible pumps, two (2) 45 horsepower (Hp) pumps (Pump Nos. 1 and 3) and one (1) 47 Hp pump (Pump No. 2) with a combined firm capacity of 1,692 gallons per minute (gpm). The three (3) submersible pumps are housed inside a 12-feet (ft) diameter wet well that is approximately 17-ft in depth. The Holiday Ventures site also has an electrical building, existing deep injection well (DIW), and reuse pump station. A picture of the Holiday Ventures LS, discharge pump headers and valving, is provided in **Figure 6.**

Figure 6: Existing Holiday Ventures Lift Station

The 2017 Utilities Master Plan did an overall condition rating and assessment on the Holiday Venture LS and scored the station with an overall rating of 3.6 out of 5.0. To further evaluate the Holiday Ventures LS, Kimley-Horn conducted a site evaluation of the wastewater components on December 1, 2020. **Table 4** provides a summary of the evaluation based on Kimley-Horn's visual assessment and discussions with EWD operations and engineering staff. Pictures illustrating any noted deficiencies are in **Appendix A**.

Table 4: Holiday Ventures Lift Station Evaluation Summary

Component	Condition
Site Access	• Haligan Way is a private road, partially paved • Ponding occurs on road and drive
Site and Civil	• EWD Fire Department currently leases portion of parcel • No visible issues
Muffin Monster	• Originally installed in 2009, replaced once in 2018 • No visible issues • No ongoing operational issues
Wet Well	• Thick layer of fats, oils, and grease (FOG) • Wet well requires more than weekly cleaning. Right after it is cleaned, the FOG builds up again (not typical to other stations). • Internal liner cracked and missing • Large spalls on walls with visible aggregate • Concrete where bolts are connected have spalls and rebar showing • Corrosion on metal rail plates, concrete missing behind plates and unable to fully bolt down rail plates • Metal plates bolted under each pump due to wet well bottom missing
Pumps	• All three (3) pumps originally installed 2002, since rebuilt/replaced • All pumps have seat functioning issues due to bolts loosening and shifting of metal plates under pumps • Pumps cannot maintain adequate pumping rates during storm events, all running at max flow • Pressures increase when fighting against bypass at WRF (surge basin have higher head and tanks than normal operation) • Lots of maintenance in last 2 years
Lift Station Piping	• No visible issues
Deep Injection Well	• No visible issues
Reuse Booster Station	• Doesn't operate properly

During the site evaluations, pump drawdown tests were completed to evaluate the performance of the three (3) submersible pumps. Additional drawdown tests were completed on April 29, and May 27, 2021 to evaluate two or three pumps operating in parallel. The December and April tests were completed for short intervals while inflow was entering the station. The results of the tests proved unreliable based on varying inflow rates, changing discharge pressures, and pump seats shifting during the testing. Therefore, the December and April test results were discarded. The May testing was completed without the incoming flow and for longer durations to allow the downstream system to equalize. During the May testing, the flows were also monitored from the lift station's electromagnetic meter. The calculated flows were consistent with the metered flows and the pump curves and as expected for newer pumps. This testing set-up proved more dependable and thus the results were used to further evaluate the pumps capacity and operation. **Table 5** summarizes the May 27, 2021 testing results and compares the calculated tested flows with the design head of each pump.

Table 5: Pump Design versus Drawdown Testing Parameters

Pump(s) Operating	Design		Drawdown Test (5/27/2021)			Δ Field vs Design (%)
	Flow (gpm	Head (ft)	Flow (gpm)	Flow per Pump (gpm)	Total Discharge Head (ft)	
Pump No. 1	846	115	1,005	1,005	93	- 9%
Pump No. 2	850	115	1,057	1,057	91	-9%
Pump No. 3	846	115	1,035	1,035	89	-1%
Pump Nos. 1 & 2	1,696	115	1,322	661	124	-3%
Pump Nos. 2 & 3	1,696	115	1,427	713	126	-1%
Pump Nos. 1 & 3	1,692	115	1,417	709	124	+ 1%
Pump Nos. 1, 2, & 3	2,542	115	1,503	501	133	- 5%

The drawdown flow and discharge heads were calculated and plotted on manufacturer curves. These plotted curves are provided in **Appendix B.**

Based on the results of the testing, the pumps are operating within 10% of their design capacity with the current system conditions. Therefore, the pumps will not be recommended for replacement in the near-term improvements.

4.2 *WRF Site Evaluation*

The EWD WRF is a permitted, extended aeration domestic wastewater facility (Permit No. FLA014126) located at 140 Telman Road in Charlotte County**. Figure 7** is an overview picture of the existing WRF.

Figure 7: Overview of EWD WRF

Kimley-Horn conducted a site evaluation accompanied by operations staff on December 1, 2020. **Table 6** details the results of this visual assessment and operational issues that were discussed. Some of the deficiencies identified in the table are shown in **Appendix C**.

Following the site evaluation, Kimley-Horn reviewed the 2017 Utility Master Plan's recommended WRF capital improvements. The results of the WRF site evaluation and 2017 Utility Master Plan comparison are incorporated in the Observation or Discussion within **Table 6**.

Table 6: Water Reclamation Facility Site Evaluation Observation

Process	Component	Observation or Discussion
Site	Telecommunications	• Telecom access to site is limited (dial-up only). There is phone and internet service onsite but when operated together at the plant the service is unreliable. This is a safety issue. • No SCADA. This is a safety issue during storms.
	Site and Civil	• Site Ponding Issues • Reject ponds frame site and limit future expansion • Existing light poles are scheduled to be replaced • Limited site lighting. Additional poles are needed for proper lighting.
Pre-Treatment	Pre-Screen Tank	• Rehabilitated and lined 5 years ago • Four (4) Gorman Rupp pumps • Pumps cannot keep up with heavy wet weather flows. • Rags, grit, and grease issues that impact overall capacity and operational levels • Need to clean the tanks 1-2 times per year • When bypassing or when offline, influent does not get screened
	Headworks and Screening	• Screens 1 and 2 were replaced in 2000 within their original housings • Screen 3 installed in 2004 • Significant corrosion of screens housings. Screen housings 1 and 2 are warped (1) • Screen hatches are rusty • Piping are severely deteriorated; have peeling paint and corrosion, repair sleeves and repair welds • Significant corrosion and rust of existing metal structure including frame, joints, and bolts (1) • Grease issues within screens causes influent discharge to dumpster • Operational issues with grease and grit (need to clean basins once to twice per year) • No Grit Removal • Discharge dumpster under screen no. 1 is not accessible to waste management. Operators must take dumpster out and move for pickup due to configuration under structure
	Post-Screen Tank	• Refurbished four-cell tank into one (1) cell for odor control • Liner and structural replacements are needed with new concrete and coating • Four (4) pumps: Two (2) Gorman Rupp pumps that are rebuilt every 2 years and need replacing, and 2 EMU (Wilo) pumps that are obsolete (can't self-prime and are not good for existing set-up) • When bypassing or when offline, influent does not get screened
	Odor Control	• BioAir Scrubbers (two-stage biological scrubber) and Biofiltration system; both systems have same media • Wood media is replaced every 5 years • Plastic grating has broken bars and is currently duct taped

Process	Component	Observation or Discussion
Evoqua/ Davco Plants	Plant No. 1	• Rehabbed plant 10 years ago • Liner and paint fading • Surface rust on tank walls • Common airline for Plant 1 and Plant 2 • Small airline holes on underside of tank catwalk, will need to take offline to service. May not be able to retrofit due to concerns of structural integrity. •
	Plant No. 2	• Rehabbed plant 10 years ago • Mixer handles are broken • Common airline for Plant 1 and Plant 2. • Audible air leaks in diffuser header • Cavitating mixers • Small airline holes on underside of tank catwalk, will need to take offline to service. May not be able to retrofit due to concerns of structural integrity.
	Plant No. 3	• Installed in 2000 • Rehabbed in 2016 • Weirs have significant algae build up and corrosion • No visible fading in liner • No digestion; wastes to Plant 1& 2
	Plant No. 4	• Installed in 2007 • Currently out of operation for rehabilitation (2) (first rehab); anticipated completion 2021 • Air pipes were replaced and recoated (December 2020) • No digestion; wastes to Plant 1 & 2
Blowers	Blower Nos. 1 through 7	• Blowers 1-4 are original, bought remanufactured • Blowers 1 and 2 were previously rehabbed • Blowers 5-7 were installed during expansions, bought remanufactured • Blower 1 and 3 stopped working in March and were sent to be rebuilt in April (could take up to 1-year to rebuild) • Starter for Blower 2 was recently replaced (2021) • Blower 4 has been rebuilt three (3) times • Blowers are inefficient (1) • Cannot use all blowers at once, operators adjust combinations to prevent tripping breakers (1)
Post Treatment	Filters	• Used when received (late 2000s), from the City of North Port • Three (3) disc filters, two (2) 322-sqft filters (5 microns) and one (1) 695-sqft filter (10 microns). • In process of changing all filters to 10 microns (2021) • Cloth maintenance needed for Filters 2 and 3 • Large unit PLC was replaced and other two (2) PLCs need replacing. • PLC are obsolete and difficult to find replacement parts for.

Process	Component	Observation or Discussion
Post Treatment	Chlorine Contact	• Meter and effluent pipe cannot be bypassed • Bottlenecks in system in and out of basin due to hydraulic configuration • Expansion is needed (2)
Reclaimed Storage and Pumping	Reclaimed Pump Station	• Operates at high pressure (120 -130 psi) to provide service to northern customers • High pressures are likely impacting system piping, onsite components, and have high energy consumption and costs • Controls were not designed for current operations; pump station operates as both transfer and high service pump station
	Reject Ponds	• Air bubbles have formed below pond liner • Both ponds need re-lined • Liner had rip formed (2021) in large pond; currently being patched
	Reclaimed Storage Tank	• No visible signs of issues • Reclaimed water supply is depleted by mid-week based on storage availability (in off-season and dry weather)
Sludge Treatment	Dewatering Centrifuges	• 3 units: 50 gpm, 125 gpm, and 150 gpm • 125 gpm centrifuge (installed in 2008) has been rebuilt five (5) times. Rotted on the inside of the casing. Difficulty finding spare parts. • Window frame and louver repair needed due to significant deterioration • Interior walls need painted and recoated • Floor hatch buckled and not rated – Safety hazard • Rusted mechanical pulley system (installed in 2004) • Overhead degas piping is corroded
Electrical (3)	Electrical Components	• Generator No. 1: Reliability has been steadily declining and keeping the unit in operation is more difficult and costly due to age and availability of system components • Electrical Service No. 1, 2, and 3: Commercial grade design using common gutter and cable splices to feed multiple fused switches on a single rack. This does not provide reliability in accordance with EPA guidelines. • Main Breaker Load Side Cables: incoming feeders show signs of deterioration due to heat • ATS-1 and ATS-2 are in good condition • MCC No. 3 Sections 1 and 2 are in good condition • Headworks Generator is providing reliable service to the headworks. • Blowers Starters: Reduced voltage motor starters service the plant blowers • Plant Nos. 1 - 4 and Centrifuge PLCs are KOYO PLC Direct processors. They are outdated and cannot be upgraded to provide remote PLC monitoring from a central HMI interface • Plant 4 PLCs are KOYO PLC Direct processors that are outdated and cannot be upgraded to provide remote PLC monitoring from a central HMI interface

Process	Component	Observation or Discussion
Chemical Treatment	Chemical Pumping and Storage	• Chlorine gas, delivered at same time as the water treatment plants • 4-tons allowed on site (3-4 cylinders per rep)

Notes:
(1) The deficiencies noted in the EWD 2017 Utility Master Plan has worsened.
(2) The deficiencies noted in the EWD 2017 Utility Master Plan persists and have not yet been remediated.
(3) The electrical components were evaluated by Bailey Engineering Consultants in a separate evaluation and is provided in **Appendix D.** A summary of the evaluation is provided in the above table.

There are two (2) additional recommended capital improvements listed in the 2017 Utility Master Plan that have not been addressed in **Table 6**. One of the improvements was to replace the existing chlorine gas chemical feed system. This was briefly discussed with the operators who indicated the gas was easy to maintain. EWD uses chlorine gas at other facilities and replacing the gas system should be considered for consistency at all the EWD facilities for costs and cross-training. The other improvement was to update the reuse pond pumping station to be code compliant. This improvement has not been completed and remains as a potential recommended improvement to be assessed during the reuse system evaluation.

4.2.1 Available Land and Accessibility

The WRF is situated on 77 acres with ample truck and road access. The WRF process equipment, buildings, ponds, and tankage occupy approximately 40 acres. The reject ponds surround the current utilized area, limiting the available space. Further, the ponds will likely need to be relocated for an expansion.

Wired communication is not currently available. Based on discussions with EWD, it was previously determined to be an expensive option to connect to the site. The 2021 Bailey Electrical Consultants Englewood Electrical Upgrades Report (Electrical Upgrades Report), included as **Appendix D,** details a wired and wireless alternative at the existing EWD WRF.

4.3 *New Plant Site Evaluation*

An agreement exists between EWD, Pulte Home Company, Manasota Beach Ranchlands, Winchester Ranch, WVID, and BMG Three that requires EWD to complete a Capital Improvement Study (CIS) to determine the feasibility of a new water reclamation facility (North WRF) located within the Winchester Ranch. Section 10, Item B of the agreement states the following:

> *EWD has included in the approved current year's fiscal budget a Capital Improvement Study (the "CIS") for sewer. If the CIS recommends a new North Wastewater Treatment Plant ("NWWTP"), West Villages Entities and EWD agree to negotiate in good faith regarding the possibility and feasibility of siting and developing the NWWTP within the portion of the EWD service area located in the boundary of the Winchester Property. The required land for said NWWTP will be sold to EWD in exchange for an equivalent amount of ERC credits. If necessary, a separate agreement for the land exchange shall be completed at such time.*

WVID, EWD, and Kimley-Horn confirmed the North WRF selected site within Winchester Ranch at Wellen Park at meeting held on December 15, 2020. The selected site which is referred to the Winchester Property for this Study, is defined as Parcel 0830001000, located east of the Sarasota Scrub Jay Reserve and north of an existing, unpaved access easement with Winchester Florida Ranch, LLLP, EWD, and Sarasota County. As part of this Study, Kimley-Horn was authorized to conduct a desktop analysis of this parcel as a potential location for the North WRF.

The new plant site evaluation was conducted using available data from the Sarasota County Property Appraiser, US Fish and Wildlife Service National Wetlands Inventory, and GIS files provided by EWD.

4.3.1 Available Land and Existing Conditions

The potential North WRF site will need sufficient space for an advanced wastewater treatment facility that is able to treat the influent wastewater to reclaimed water standards and will need to include onsite reject basins or tanks and setback buffers to aid in community acceptance, and to mitigate odor control.

The recently designed and completed Phase I of the Southwest Wastewater Reclamation Facility (SWWWRF) in WVID is located on site of 21.36 acres within the City of North Port. The full build-out of the SWWWRF is 6.0 mgd AADF. The SWWWRF has reject tanks rather than reject ponds for reject disposal. The preliminary design of the SWWWRF evaluated different disposal alternatives for wet weather flows. Part of that evaluation provided an estimate of 20 acres of land needed for a 2.0 mgd percolation basin. In addition, the existing EWD WRF, with a permitted capacity of 3.0 mgd, has approximately 40 acres of land currently being used for process equipment, storage, stormwater mitigation, and reject ponds. Due to the planning stage of this Study and based on the above discussion on basins and setbacks, it is anticipated the maximum site will be approximately 35 acres for the North WRF. Variables exist in finalizing the site size including physical site evaluations during design phase, groundwater tables, location of reject ponds, or if tanks are needed. The existing Winchester Property is approximately 77 acres of heavily forested undeveloped land. While the site provides sufficient area, selecting a heavily forested site for a potential WRF will increase surveying, clearing costs, scheduling, and possible permitting.

The Sarasota County Property Appraiser states the Winchester Property includes two (2) FEMA Flood Zones, AE and X. Zone X is defined as an area with 0.2-percent-annual-chance (or 500-year) flood. Zone AE indicates the site will be inundated by the 1 percent annual flood, even where the base flood elevations are shown. For this property the base flood elevation is 10-ft. Per FAC 62-600.400, essential components and structures, needed for wastewater treatment, are required to be designed to the 100-year flood elevation and a treatment plant needs to be fully operational and accessible based on the 25-year flood elevation. Therefore, it is recommended the site be centralized on the Zone X area, to decrease costs of potential fill and minimize stormwater storage area. Zone X is located on the west side of the Winchester Property, adjacent to the Sarasota Scrub Jay Reserve.

4.3.2 Proximity to Existing EWD Wastewater Collections System

The proximity to the existing EWD wastewater collections system will determine the cost to install new influent force main to the potential WRF and how the potential North WRF will interact with the existing system, including annual operational pumping costs.

The nearest point of connection to the EWD wastewater collections system is a 16-inch poly-vinyl chloride (PVC) force main that is located along the existing utility easement with Winchester Florida Ranch, LLLP, and EWD. This force main is directly south of the Winchester Property where a tee can be installed to serve as the influent force main for the North WRF, and/or the future Beachwalk force main could potentially be utilized and teed into the North WRF site. The Winchester Property is located near the middle of the EWD service area. If a wastewater treatment facility was in this general vicinity, the northern areas of the EWD sewer area will not have to pump to the far extent of the southern area where the existing WRF is located. This will provide positive benefits for energy savings and cost savings. A map showing the Winchester Property and the surrounding wastewater collection system is provided in **Figure 8.**

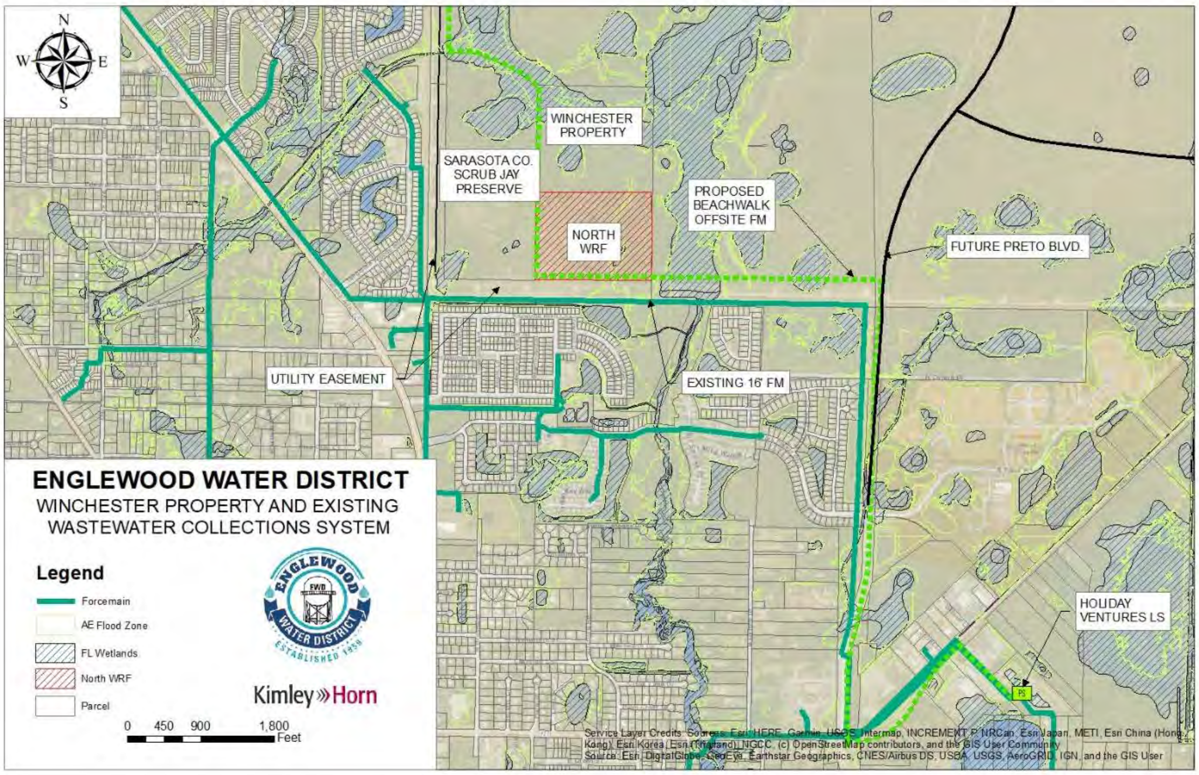


Figure 8: Winchester Property and Existing Wastewater Collections System

4.3.3 Proximity to Existing EWD Reclaimed Water System

The proximity to the existing EWD reclaimed water system and customers will determine the cost to install new reclaimed water main piping from the potential North WRF and how the North WRF will interact with existing reclaimed system**,** including annual operational pumping costs.

The existing WRF reuse leaves the plant at a very high pressure to serve the customers north of Holiday Ventures LS (and north of the Winchester Property). Operating at such high pressures is not ideal, it has potential for main breaks, and expends high energy and costs. Having a North WRF in the middle of the system, located at the Winchester Property that produces reclaimed water, will provide reuse to the northern service area and thus reduces pumping costs and existing reuse pump pressures in the southern system, and at the existing WRF.

For the reclaimed system, there is an existing 12-inch PVC reclaimed main that is installed within the existing Winchester Florida Ranch, LLLP, and EWD easement. This 12-inch reclaimed main can be used as the point of connection for the potential North WRF; however, as recommended in the 2017 Utility Master Plan, a hydraulic evaluation should be completed to evaluate the needed head conditions and capacities. A map is provided in **Figure 9.**

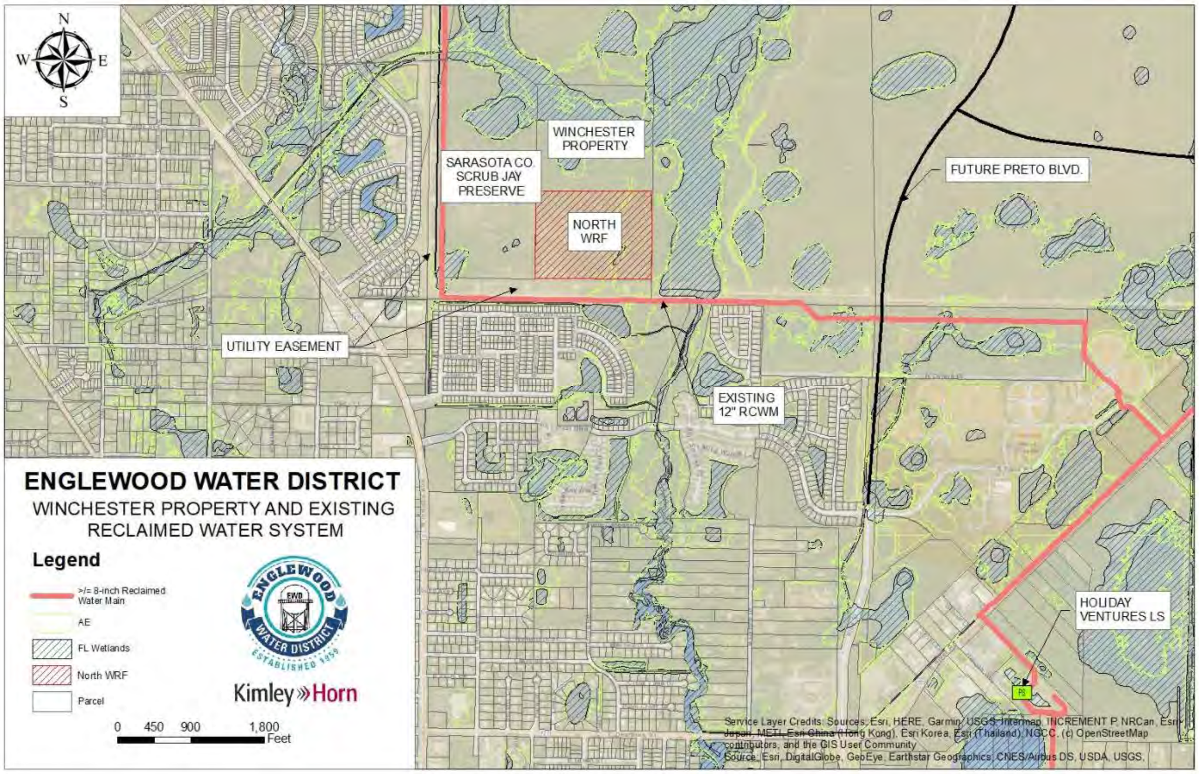


Figure 9: Winchester Property and Existing Reclaimed Water Main System

4.3.4 Potential Environmental Impacts

The parcel west of the Winchester Property is an existing Sarasota County Scrub Jay Preserve. Protected wildlife will be expected in this area and an environmental report and species survey is recommended during preliminary design. If protected species are identified, there will be an increase in mitigation costs and overall construction duration.

According to the National Wetlands Inventory, there are four (4) previously delineated wetlands within the Winchester Property. To avoid U.S. Army Corps of Engineers permitting and wetland mitigation, the North WRF site plan should minimize impacts to the wetlands.

4.3.5 Site Access

The site has existing access through an existing agricultural road, within an existing easement with Winchester Florida Ranch, LLLP, and EWD. The site is approximately 2,800 linear feet (LF) from the unpaved access road within the existing EWD well fields. While this may be the most direct path for EWD staff to access the site, access from the future Preto Boulevard or Pine Street will be needed. In addition, there is a Florida Power and Light (FP&L) easement that could be used.

4.3.6 Private Utility Access

At the time of this Study, there are no existing electric or communications utilities at the Winchester Property. It is recommended for the design of the North WRF to include coordination with FP&L and communications providers to determine service to the site, and for necessary easements.

V. System Evaluations and Improvement Needs

The existing and future flows defined in **Section III** were used to evaluate the existing system and to determine the sewer improvement needs at Holiday Ventures LS for future flows. The total design flow consists of the appropriated portion of existing flows, based on a LOS of 92 gpd/ERC, and future flows based on a LOS of 157 gpd/ERC. Three (3) scenarios were used in this Study. Each scenario is defined as follows:

- **Scenario No. 1 - EWD WRF**: All flow is conveyed and treated at the existing EWD WRF. The system will remain as is and transfer wastewater to the existing WRF in the southern portion of the EWD service area, through the 20-year planning period.
- **Scenario No. 2 - Future North WRF**: All flow is conveyed and treated at the North WRF. The North WRF will be constructed in a location central to the majority of future flows and convey the wastewater flow to the North WRF through the 20-year planning period.
- **Scenario No. 3 - Flow Split**: The flow is split based on the location of the existing and future sewer flow. All Sarasota County flow will be treated at the North WRF and all Charlotte County flow will be treated at the existing EWD. Scenario No. 3 is a hybrid of the first two (2) scenarios, using the existing South WRF and a new North WRF.

In addition to utilizing the existing and future flows, the findings of the site evaluation and testing were used to assess the hydraulics of the Holiday Ventures LS area and lift station capacity for the above defined scenarios during the planning period.

As discussed, the existing Holiday Ventures LS is a triplex station with three (3) submersible pumps, and a 12-ft diameter wet well. The system map provided in **Figure 10** shows the Holiday Venture LS downstream force main segments.

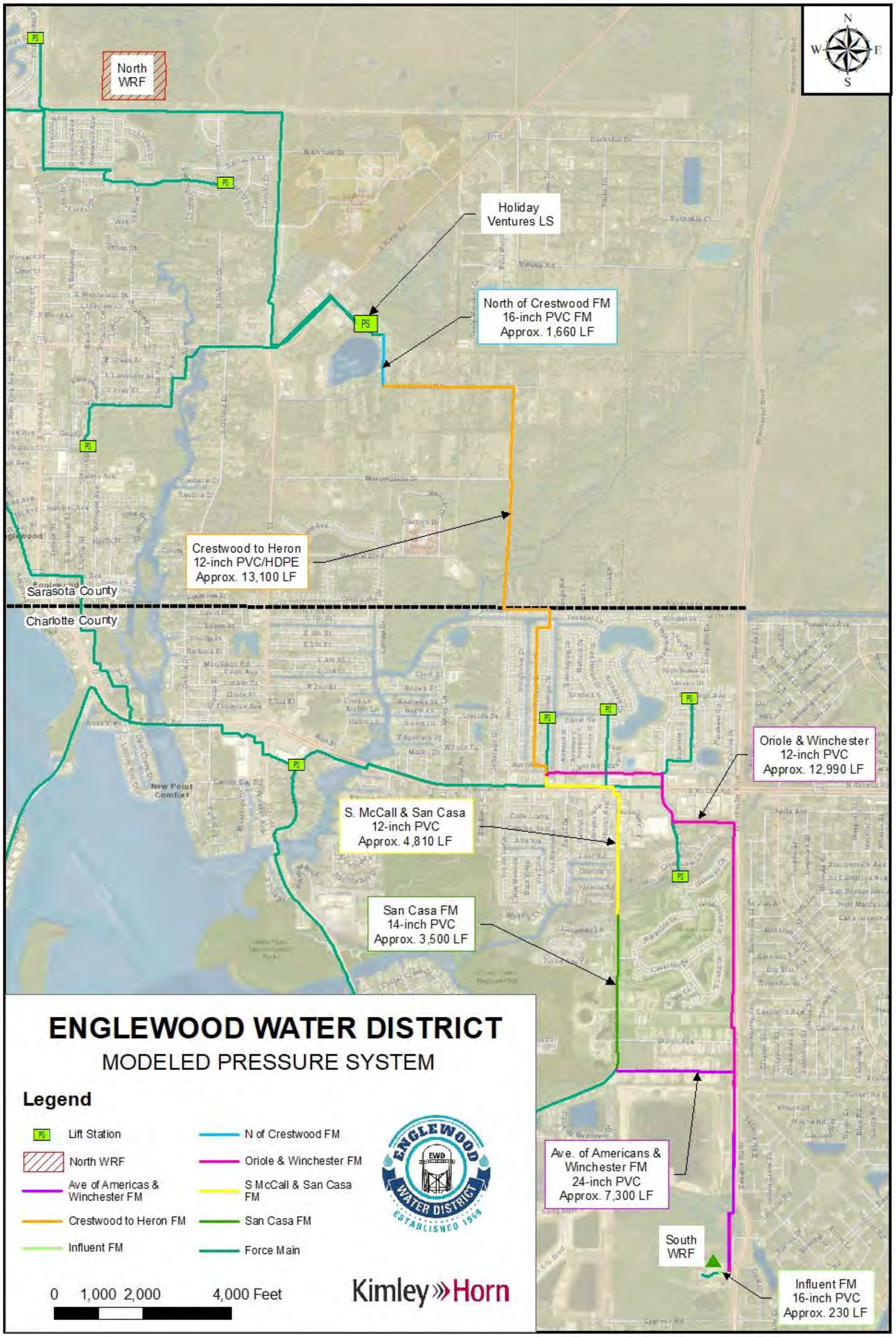


Figure 10: Holiday Ventures Lift Station to the South WRF, Existing Pressure System

A force main model (Model) was developed and used to evaluate the existing pipe sizing in the Holiday Ventures LS area for the three (3) scenarios. The Model was built using EWD provided GIS data for pipelines and lift station components and locations. Lift stations with pumps greater than 10 Hp were added to the Model. The pump design point and curves were assigned to the modeled pumps, along with the operational information provided by EWD. The estimated existing and projected future flows were allocated to the closest modeled tie-in point dependent on the originated parcel location. Typical wastewater diurnal patterns were applied to each sanitary loading point and the Model was set-up with a 72-hours Extended Period Simulation (EPS) time series. The EPS Model provides opportunity to analyze the changes in flows during the day and accounts for flow attenuation at multiple locations in the system. The modeled force mains were evaluated based on their hydraulic capacity and velocities.

Pipeline condition assessment or integrity testing were not included in this Study. Therefore, if force mains are not recommended for replacement, but are to be used in future scenarios, a condition assessment of the critical force mains are recommended.

To estimate the future Holiday Ventures LS and pump sizing, the pump design flows were based on peak hourly flows (PHFs) and calculated by assigning a peaking factor based on Ten States Standards – Recommended Standards for Wastewater Facilities (Ten States Standards). In addition to the system hydraulic evaluation, a capacity assessment was completed for each scenario to estimate the potential needs at the Holiday Ventures LS. The assessment was based on the existing and projected future flows.

Based on the results of the Holiday Ventures LS site evaluations, discussions with EWD staff and operations, and the results of the system hydraulic evaluation and capacity assessment, recommended improvements were created for the existing Holiday Ventures LS. Improvements include recommendations on the existing inline Muffin Monster, wet well improvements, and potential improvements to mitigate the large amount of FOG present at the lift station. These improvements were sized and categorized using the flow scenarios and planning periods defined in this Study.

The structural integrity of the existing wet well is in poor condition and the wet well will need to be repaired or replaced for continued operation of the lift station for all scenarios. The existing Muffin Monster, while noted in Holiday Ventures LS evaluation as having no visible issues, is currently operating at its maximum capacity of 1,200 gpm. Therefore, an additional Muffin Monster or another screening removal option will be required in all three (3) flow scenarios. Installing an additional Muffin Monster provides operational flexibility and options to repair a unit while maintaining most of the screening capabilities with the parallel unit staying in service.

To evaluate the improvements needed at the WRF, site evaluations were conducted on December 1, and 4, 2020, February 16, 2021, and April 6, 2021. The combined results of these multiple site visits and additional discussions with EWD staff provided information to develop the recommended improvements for the existing WRF. No hydraulic or biological modeling of the existing WRF was completed as part of this Study. Based on the site assessment at the existing WRF, the existing headworks and piping has major issues and has high potential of failure. Therefore, the headworks will need to be replaced in all three (3) flow scenarios.

The Electrical Upgrades Report includes the results of two (2) site evaluations, condition assessments of the existing MCCs, PLCs, electrical services, emergency power system, and recommended alternatives for electrical and control upgrades and associated cost estimates. Based on the evaluation, there are some improvements needed immediately to continue to function properly. Since these improvements are required regardless of the scenario, they are listed in **Table 7** below. The other electrical improvements recommended for the existing South WRF are listed for each scenario.

Table 7: WRF Electrical Improvements Needed Immediately

ID	Project	Phase	Estimated Project Cost	Project Description	Notes
WRF-E01	Replace Main Breakers and Load Feeders	0 Years	$84,000	Replace main breaker with solid state option and load side feeders	WRF Electrical Evaluation Improvement Nos. 1 and 2
WRF-E02	Replace Generator 1	0 Years	$470,000	Replace Generator 1 with a 1200 KW generator	WRF Electrical Evaluation Improvement No. 3
WRF-E03	Install Surge Protection	0 Years	$64,000	Install surge protection for each main breaker, remote MCC, incoming and lighting panels	WRF Electrical Evaluation Improvement No. 4
WRF-E04	Enhance Grounding	0 Years	$48,000	Enhance the grounding at Services 1, 2, and 3	WRF Electrical Evaluation Improvement No. 5
WRF-E05	Power Cable Testing	0 Years	$20,000	Test the 480 power cables, 100 amps and larger	WRF Electrical Evaluation Improvement No. 6
All Scenarios – Immediate Electrical Improvements Total Estimated Budget Cost			**$ 686,000**		

Some items that are considered regular maintenance projects have not been included in the needed improvements, due to necessary maintenance required for all scenarios. However, any maintenance projects recommended as part of the 2017 Master Plan that have not been completed, will remain, and will be carried over as recommended improvements.

Recommended improvements are categorized as near-term and long-term improvements for each scenario. Near-term improvements are determined necessary for the existing WRF to stay in compliance with the existing FDEP Permit (FLA 014126) and continue to serve the existing and future customers within the next five years. Therefore, near-term improvements are recommended to be designed, permitted, constructed, and placed into operation within the next five years.

Long-term improvements are recommended improvements from the next five to twenty years. These improvements will provide reliability and increased capacity to serve future customers, and to meet EWD's capacity and operational goals. Kimley-Horn evaluated the identified deficiencies in **Section IV** and utilized the results of the analysis from **Section III** to specify the needed improvements.

All planning level sizing and capacity design were completed based on the existing and anticipated projected flows discussed in **Section III.** All final sizing should be completed under a separate design phase. The existing and projected flows are summarized based on each scenario in **Table 8**.

Table 8: Existing and Projected Flows per Scenario

Flow Scenario	Facility in Service	Estimated Total Flow (mgd)						
		2020 Existing	0-5 Years	5-10 Years	10-15 Years	15-20 Years	20+ Years	Total
No. 1 - South WRF	South WRF	1.51	1.98	2.66	3.68	5.06	5.35	5.35
No. 2 - North WRF	Future WRF	-	1.98	2.66	3.68	5.06	5.35	5.35
No. 3 - Flow Split	South WRF (Charlotte Co.)	-	0.93	0.99	0.99	1.66	1.66	1.66
	North WRF (Sarasota Co.)	-	1.06	1.67	2.69	3.40	3.70	3.70

Budget opinions of costs were developed for the improvement projects specifically for a comparison between the scenarios. The costs are based on 2021 dollars. The costs should be re-evaluated after the identified scenario is chosen and refinement of costs should be completed during basis of design for the projects. Based on engineering experience of recent plant projects, the general cost for a new plant or an upgrade to an existing plant is approx. $17 per gallon. Therefore, for the South and North WRF expansion or upgrades, a cost per gallon of $17/gallon was used for the initial phase and following expansions. The budget breakdown for each project is included in **Appendix E.**

In addition to the recommended improvement costs, an analysis of the operations and maintenance (O&M) costs was completed for the existing WRF. Using the WRF (South WRF) budget summaries, provided by EWD, for FY2016 – FY2020, repair costs were deducted; the Study's South WRF recommended improvements are expected to minimize the repair costs, as well as the North WRF due to being a new facility, is expected to have low repair costs during the planning period. The annual O&M cost, without repair costs, were divided by the AADF for each year of the provided cost data. This exercise calculated the cost per gallon for operating and maintaining a WRF, which is summarized in **Table 9**.

Table 9: Operation and Maintenance Cost per Gallon

Budget Year	FY16	FY17	FY18	FY19	FY20
Annual O&M Cost [(1)]	$1,811,679	$2,036,300	$2,058,750	$1,504,323	$1,808,337
Average Annual Daily Flow (mgd)	1.644	1.415	1.407	1.357	1.430
O&M Cost/Gallon	$1.10	$1.44	$1.46	$1.11	$1.26

Note:
(1) Cost does not include annual costs for maintenance/repair items.

Comparison of the O&M costs over the five-year period, shows fluctuating costs which are not steadily increasing or decreasing. The current operating costs are on average $1.27 per gallon.

Scenario No. 3 will have two (2) plants and therefore, will have the largest annual O&M cost. However, it is difficult to quantify accurately; while there will be additional staffing and sampling requirements, the general treatment costs will largely be the same. Scenario Nos. 1 and 2 will have equivalent total buildout capacities which results in the same annual O&M cost. Yet, pumping costs will greatly be reduced with Scenario No. 3, since pumping wastewater to the plant and pumping reclaimed water from the plant to the customer will not be as extensive.

5.1 *Scenario No. 1 System Evaluation and Improvement Needs*

Scenario No. 1 incorporates all the flow going to the existing South WRF, and the Holiday Ventures LS existing flows along with the projected flows estimated in Sarasota County, will be conveyed through the Holiday Ventures LS and pumps. An overview map of the modeled Scenario 1 is provided in **Figure 11.**

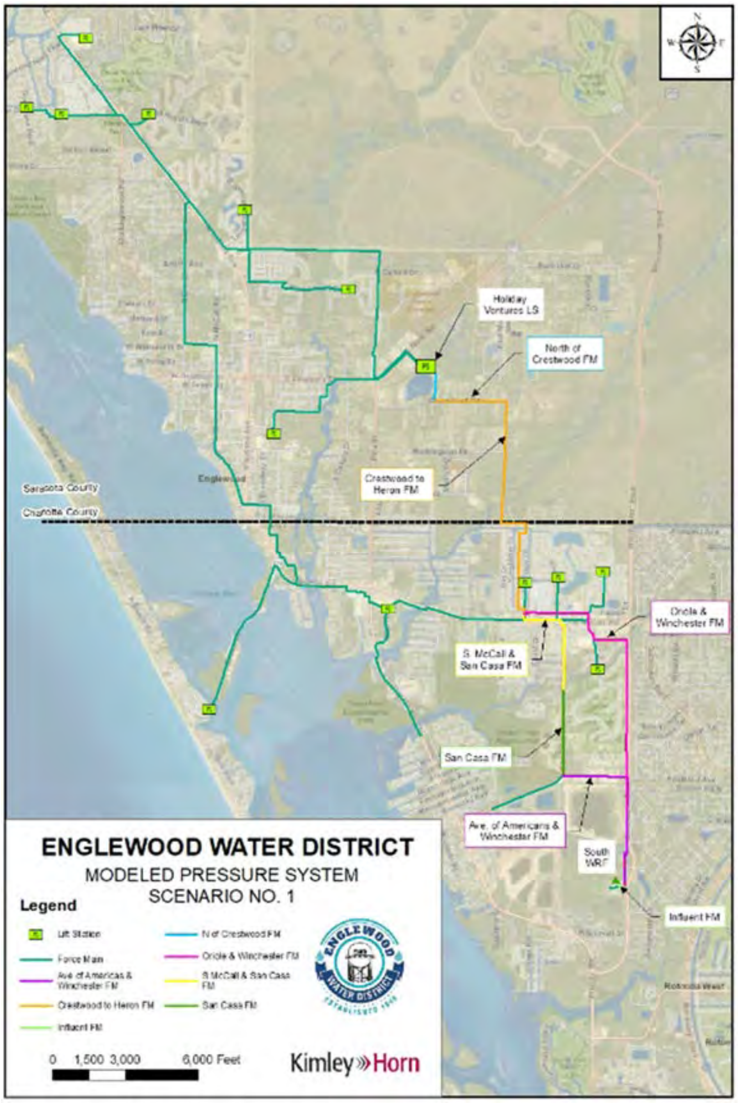


Figure 11: Scenario No. 1 Existing Wastewater Pressure System

5.1.1 Scenario No. 1 - Hydraulic Evaluation and Capacity Assessment

For Scenario No. 1, the Holiday Ventures LS will remain as a triplex station and the peak flows will be sent through two (2) pumps. Scenario No. 1 design flows are presented in **Table 10**.

Table 10: Scenario No. 1 - Projected Holiday Ventures Lift Station Design Flows

Scenario	Holiday Ventures Projected Design Flows (gpm)			
	2025 (0-5 Yrs)	2030 (5-10 Yrs)	2035 (10-15 Yrs)	2040 (15-20 Yrs)
No. 1 – All Flows to South WRF	1,940	2,930	4,400	5,360

The existing Holiday Ventures LS pumps' firm design capacity is 1,692 gpm with two (2) pumps running. Based on Scenario No. 1 estimated future flows, the Holiday Ventures LS will require larger pumps in the next 5 – 10 years, to accommodate the anticipated 2030 flows. These pumps with a firm combined capacity of 2,930 gpm will need to be replaced again in twenty years to accommodate the anticipated future 2040 flows of 5,360 gpm.

Based on the existing and projected flows for Scenario No. 1, the capacity of the Holiday Ventures LS wet well was evaluated for each planning period. The minimum operating volume for the wet well was sized using the recommended Ten States Standards of 5 pump starts per hour per pump, or 15 pump starts per hour total. The existing capacity was assessed with the existing pumps. The future planning capacities were assessed using properly sized pumps based on the above pump evaluation.

The calculated existing and future capacity needs of the wet well is provided in **Table 11.**

Table 11: Scenario No. 1 – Existing Wet Well Capacity and Future Needs

	Volume (gallons)				
	2020	2025	2030	2035	2040
Existing Wet Well Available Volume	3,130				
Wet Well Required Volume	970	1,450	2,200	3,300	4,020

Based on this evaluation, the Holiday Ventures LS wet well is estimated to be adequately sized until 2035, when the required capacity of the wet well exceeds the actual installed wet well volume. The new wet well should be sized for full capacity of the future 2040 volume. The additional wet well volume will provide operational capacity until the flows are received.

The Model was used to assess the existing flows at Holiday Ventures LS with different pump operations. The flows and pressures from the Model assessment were also compared with the Site Evaluation in **Section 4.1**. Based on the Model evaluation, one (1) pump will operate at or near its curve. With the opened force main configuration in the Model, as currently operating in the EWD system, the discharge pressure is estimated to be approx. 45 psi with 1,220 gpm of flow. With two (2) pumps operating, the Model is estimating a discharge pressure of approx. 58 psi and a combined flow of approx. 1,280 gpm.

The Model was used to analyze the velocities of the existing downstream force mains with the AADF and PHFs for the planning periods. For the existing and future planning periods, the Model predicted the majority of the existing downstream force main segments met the minimum velocity requirement of greater than 2 feet per second (fps), except for the 24-inch Avenue of Americas/ Winchester force main. The Model estimated the velocities are less than 2 fps for this existing force main through 2030 scenarios based on the information available and input. The maximum velocities predicted by the Model are summarized in **Table 12.**

Table 12: Scenario No. 1 - Downstream Holiday Ventures Force Main Velocities

Force Main Segment	Force Main Maximum Velocity (fps)			
	2025	2030	2035	2040
16” North of Crestwood	3.1	4.6	7.1	8.6
12” Crestwood to Heron	5.5	8.3	12.6	15.3
12” Oriole and Winchester (1)	5.5	8.3	12.6	15.3
16” Winchester to WRF Pre-Screen	4.2	6.4	9.8	10.4

Notes:
(1) The 12-inch Oriole to Winchester is assumed to take all of the Holiday Ventures LS flows for this scenario.

The 12-inch force main segments are estimated to be undersized in the next 5 – 10 years, the 16-inch North of Crestwood force main is anticipated to be undersized in the next 10 – 15 years, and the 16-inch Winchester to WRF Pre-Screen segment is estimated to be nearly undersized in the next 5 – 10 years. **Figure 12** is a map of the Scenario No. 1 proposed wastewater pressure system with the improvements text boxes highlighted yellow.

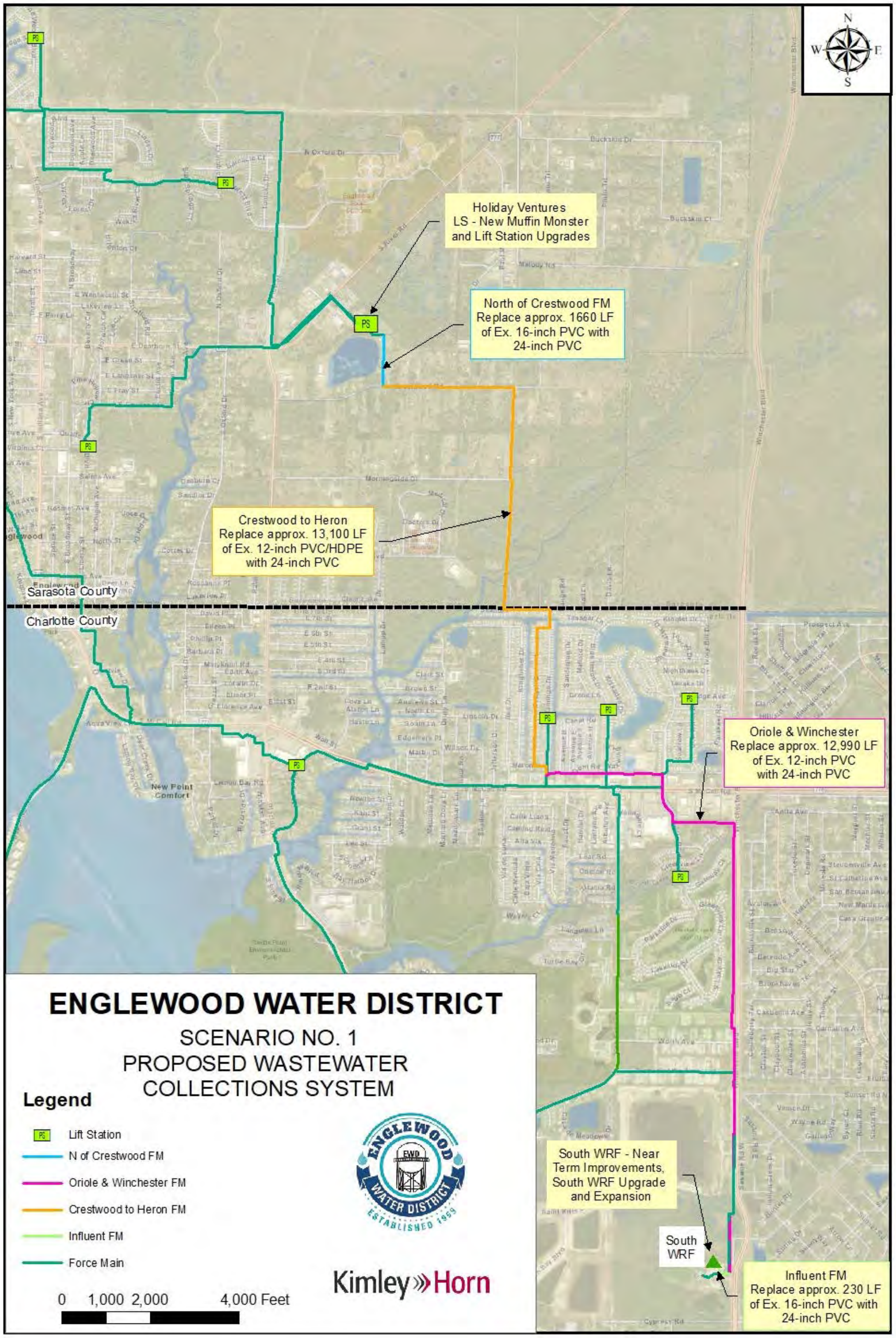


Figure 12: Scenario No. 1 Proposed Wastewater Pressure System

5.1.2 Scenario No. 1 – Holiday Ventures Lift Station Improvement Needs

For Scenario No. 1, all the northern service area, the Sarasota County portion of the service area, wastewater will be pumped through Holiday Venture LS to the existing South WRF.

For the Holiday Ventures LS, the recommended projects, estimated completion planning period, and opinion of budget costs for Scenario No. 1 is listed in **Table 13.** All listed opinions of costs are provided for budgetary purposes and are represented in 2021 dollars. Improvements recommended in the 2017 Utility Master Plan are updated based on the Consumer Price Index recorded inflation rate.

Table 13: Scenario No. 1 - Holiday Ventures Lift Station Needed Improvements

ID	Project	Phase	Estimated Project Cost	Project Description	Notes
HV-01	Holiday Ventures LS Muffin Monster and Wet Well Improvements	0 - 5 Years	$400,000	Install a parallel Muffin Monster with a 2,700 gpm capacity with parallel 16" pipe and bypass. Rehabilitate the existing wet well with a new liner, top, and hatch.	2017 Master Plan Project No. LS-03
FM-01	Install Parallel Holiday Ventures Force Main to South WRF	0 - 5 Years	$8,220,000	Install approx. 5.8 miles of parallel 18-inch PVC force main. Cost includes force main condition assessment evaluation. Upsize on-site WRF force main to 24-inch during Headworks project (WRF-02).	2017 Master Plan Project No. CL-02
Scenario No. 1 – Holiday Ventures LS Near-Term Estimated Budget Cost			**$ 8,620,000**		
HV-02	Holiday Ventures LS New Wet Well and Pumps	5 – 10 Years	$900,000	Install new wet well and piping. Replace existing pumps with larger pumps to accommodate design flows.	Three (3) new pumps designed for 1,500 gpm
HV-03	Holiday Ventures LS Muffin Monster and Pump Replacement	15 - 20 Years	$1,410,000	Replace existing pumps with larger pumps to accommodate design flows. Original 1,200 gpm muffin monster to be replaced with parallel 2,700 gpm muffin monster.	Three (3) new pumps designed for 2,680 gpm with VFDs.
Scenario No. 1 – Holiday Ventures LS Long-Term Estimated Budget Cost			**$ 2,310,000**		
Scenario No. 1 – Holiday Ventures LS Total Estimated Budget Cost					**$ 10,930,000**

5.1.3 Scenario No. 1 – Water Reclamation Facility Improvement Needs

Scenario No. 1 involves all EWD wastewater to be conveyed and treated at the existing South WRF. This flow scenario requires near-term improvements to maintain compliance and operations of the facility, WRF upgrade where major process improvements are recommended to maintain the existing 3.0 mgd permitted capacity, and a two-phase expansion plan to utilize the existing equipment as long as possible for existing and future flows. The near-term (0-5 years), and long-term (> 5 years) needed improvements are listed in **Table 14.**

Table 14: Scenario No. 1 – Water Reclamation Facility Needed Improvements

ID	Project	Phase	Estimated Project Cost	Project Description	Notes
WRF-01	Onsite SCADA	0 - 5 Years	$227,000	Install onsite SCADA system with wireless interface	WRF Electrical Evaluation Improvement No. 10
WRF-02	New Headworks	0 - 5 Years	$2,500,000	Install new headworks with mechanical screens, grit removal, transfer pumps, piping and bypass piping with a bar screen. Improvements include decommissioning pre- and post-tanks.	Two (2) post-screen pumps for on-site plant transfer from Headworks to flow splitter, combined capacity 2,360 gpm
WRF-03	Odor Control Rehab at Headworks	0 - 5 Years	$440,000	Rehabilitate and reconfigure odor control system.	2017 Master Plan Project No. WRF-02
WRF-04	Drying Bed	0 - 5 Years	$160,000	Install drying bed at the WRF.	-
WRF-05	Chlorine Contact Basin Expansion	0 - 5 Years	$130,000	Project is anticipated to replace existing chlorine contact tank inlet piping to remove existing hydraulic bottleneck.	2017 Master Plan Project No. WRF-11
WRF-06	Dewatering Unit Replacement	0 - 5 Years	$630,000	Replace existing 125 gpm centrifuge with a new dewatering unit.	Existing centrifuge needs to be replaced due to continued maintenance and reliability
WRF-07	Dewatering Building Replacement	0 - 5 Years	$600,000	Repair/recoat interior dewatering building to protect building from future corrosion. Replace overhead piping, replace existing floor hatch, and install mechanical pulley system.	-
WRF-08	Blowers 2, 3, and 4 Replacement	0 - 5 Years	$950,000	Replace Blower Nos. 2, 3, and 4	Part of the improvement includes WRF Electrical Evaluation Improvement No. 7

ID	Project	Phase	Estimated Project Cost	Project Description	Notes
WRF-09	Reclaimed Water Hydraulics, Storage Capacity and Operations Evaluation	0 - 5 Years	$150,000	Engineering evaluation of the reclaimed system, storage capacity.	2017 Master Plan Project No. RU-01
WRF-E06	PLC Upgrades	0 - 5 Years	$190,000	Replace and upgrade the WRF PLCs.	WRF Electrical Evaluation Improvement No. 9
Scenario No. 1 – South WRF Near-Term Total Estimated Budget Cost			**$ 5,977,000**		
WRF-10	Plant Upgrades	5 - 10 Years	$44,800,000	Upgrade includes demolishing the Plants 1 – 2, new construction of 2.0 mgd aeration, clarifiers, and digesters. Upgrade site lighting and install a duplicate chlorine contact basin. Relocate and increase storage capacity of west reject pond to accommodate space needed for South Plant Expansion.	Estimate based on cost per gallon of $17/gallon
WRF-11	Reclaimed Transfer Pump Station Upgrades	5 - 10 Years	$691,000	Construct a new reclaimed transfer pump station for onsite transfer of reclaimed. Rehabilitate existing reclaimed water station to serve solely as a high service pump station.	2017 Master Plan Project No. WRF-16
WRF-E07	Replace Generator 2	5 - 10 Years	$100,000	Replace the existing generator 2 (250KW)	WRF Electrical Evaluation Improvement No. 11
WRF-E08	ATS 1, 2, and 3	5 - 10 Years	$150,000	Replace ATS 1, 2, and 3	WRF Electrical Evaluation Improvement No. 12
WRF-E09	Services 1, 2, and 3 Main Electrical Equipment Improvements	5 - 10 Years	$1,140,000	Replace main electrical equipment for services 1, 2, and 3 per electrical sheets E-5 amd E-6	WRF Electrical Evaluation Improvement No. 13
WRF-12	South WRF Expansion (Phase I)	10 - 15 Years	$42,830,000	Expand plant to 4.0 mgd and upgrade chemical pumping and storage. Cost includes equalization basin.	Estimate based on cost per gallon of $17/gallon
WRF-13	Telecom Improvements	10 - 15 Years	$78,000	Install telecommunication fibers to bring to the WRF site.	-

ID	Project	Phase	Estimated Project Cost	Project Description	Notes
WRF-E10	MCC Replacement	10 - 15 Years	$540,000	Replace effluent, headworks, and process MCCs	WRF Electrical Evaluation Improvement No. 14
WRF-14	South WRF Expansion (Phase II)	15 - 20 Years	$43,100,000	Expand plant from 4.0 to 6.0 mgd and Decommission existing plants 3 and 4.	Expansion to include upgrading to meet advanced wastewater treatment requirements based on $17/gallon
Scenario No. 1 – South WRF Long-Term Estimated Budget Cost			**$ 133,429,000**		
Scenario No. 1 – South WRF Total Estimated Budget Cost					**$ 139,406,000**

5.2 *Scenario No. 2 System Evaluation and Improvement Needs*

For Scenario No. 2, all the southern service area, the Charlotte County portion of the service area, wastewater will be pumped north to the North WRF, effectively reversing the flow of the system. However, while the North WRF is being constructed the South WRF will require near term improvements until the North WRF is operational. An overview map of the modeled Scenario 2 is provided in **Figure 13.**

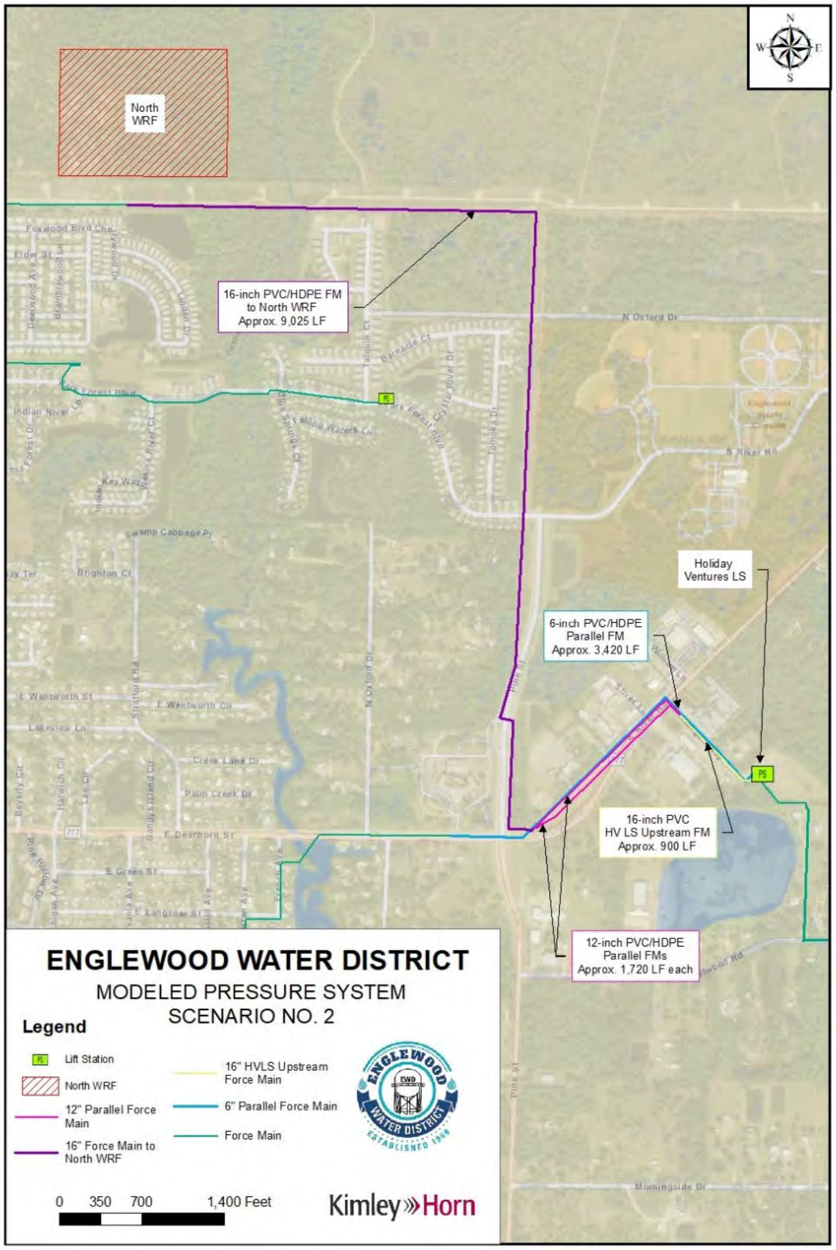


Figure 13: Scenario No. 2 Wastewater Pressure System

5.2.1 Scenario No. 2 - Hydraulic Evaluation and Capacity Assessment

For Scenario No. 2, the Model was utilized to determine the existing head conditions at Holiday Ventures LS if the southern system was to reverse flow towards the North WRF. The northern flows, or the Sarasota flows, will not be conveyed to the Holiday Ventures LS, and instead enter directly into the North WRF, only the southern flows will enter the Holiday Ventures LS.

The Model estimated the pressure head, from the southern area, will be less approx. 10 psi when it will reach the Holiday Ventures LS and the North WRF in 2025. Therefore, a lift station will be required to send the southern flows to the North WRF. Although the optimal location for this lift station may not be at Holiday Ventures existing site, to evaluate the needs of the force main and lift station, the analysis was performed at the Holiday Ventures LS site. To determine the optimal location and configuration of a master lift station, a system hydraulic analysis and siting evaluation is recommended if this Scenario is chosen. Scenario No. 2 design flows are presented in **Table 15.**

Table 15: Scenario No. 2 - Proposed Holiday Ventures Lift Station Design Flows

Scenario	Holiday Ventures LS Projected Design Flows (gpm)			
	2025 (0-5 Yrs)	2030 (5-10 Yrs)	2035 (10-15 Yrs)	2040 (15-20 Yrs)
No. 2 – All Flows to North WRF	1,730	1,820	1,820	2,870

The firm design capacity of the existing Holiday Ventures LS pumps is 1,692 gpm with two (2) pumps running. Based on Scenario No. 2 estimated future flows, the Holiday Ventures LS will require larger pumps in the next 0 – 5 years, to accommodate the anticipated 2040 flows.

Based on the existing and projected flows for Scenario No. 2, the capacity of the Holiday Ventures LS wet well was evaluated for each planning period. The minimum operating volume, for the wet well, was sized using the recommended Ten States Standards of 5 pump starts per hour per pump, or 15 pump starts per hour total. The existing capacity was assessed with the existing pumps. The future planning capacities were assessed using properly sized pumps based on the above pump evaluation. The existing capacity of the Holiday Ventures LS wet well is 3,130 gallons. The future 2040 required wet well volume is estimated to be 2,153 gallons. Therefore, the existing Holiday Ventures LS wet well is adequately sized to accommodate the projected future flows entering the station from the south.

The Model was used to analyze the velocities of the existing force mains north from Holiday Ventures LS to the North WRF with the AADF and PHFs for the planning periods. From Holiday Ventures LS to the North WRF, there is a approx. 900 LF of 16-inch PVC that ties into parallel 12-inch force mains (approx. 1,720 LF each). A 6-inch force main also parallels these pipes from Pine Street to Holiday Ventures LS on Haligan Way. These pipes tie into approx. 9,025 LF of 16-inch that will reach to the North WRF site. These upstream force mains are shown in **Figure 13**. The existing upstream force mains will be utilized for the southern flows from Holiday Ventures LS to the North WRF site. In 2040, the maximum velocity in the 16-inch force main with the flows from Holiday Ventures LS is estimated to be approx. 4.6 fps. Therefore, the force mains are large enough to convey the southern flows to the North WRF from the existing Holiday Ventures LS property. However, to tie some of the pipelines together, an estimated 500 LF of 16-inch force main will be required at East Dearborn Street and Pine Street, and a tee will be needed outside the North WRF to re-route the flows to the plant site.

Figure 14 is a map of the Scenario No. 2 proposed wastewater pressure system with the improvements text boxes highlighted yellow.

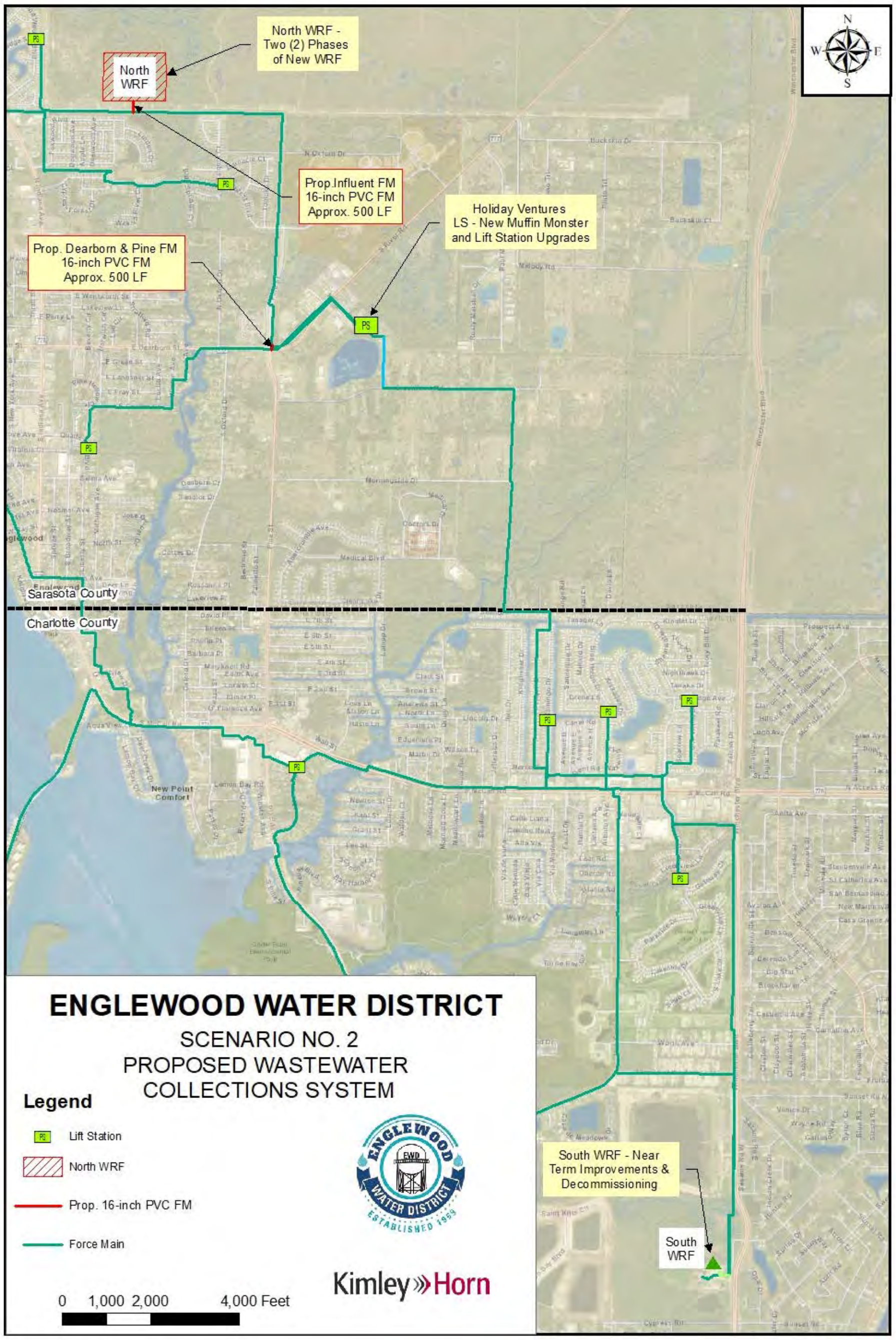


Figure 14: Scenario No. 2 Proposed Wastewater Pressure System

5.2.2 Scenario No. 2 – Holiday Ventures Lift Station Improvement Needs

For Scenario No. 2, all the southern service area, the Charlotte County portion of the service area, wastewater will be pumped through Holiday Venture LS to the North WRF.

For the Holiday Ventures LS, the recommended projects, estimated completion planning period, and opinion of budget costs for Scenario No. 2 is listed in **Table 16.**

Table 16: Scenario No. 2 - Holiday Ventures Recommended Improvements

ID	Project	Phase	Estimated Project Cost	Project Description	Notes
HV-01	Holiday Ventures LS Muffin Monster and Wet Well Improvements	0 - 5 Years	$554,000	Replace existing Muffin Monster and piping with new Muffin Monster with a 2,900 gpm capacity, 16" pipe and bypass. Rehabilitate the existing wet well with a new liner, top, and hatch and install mixers.	2017 Master Plan Project No. LS-03
FM-01	Install Dearborn and Pine Forcemain	0 – 5 Years	$150,000	Install approx. 500 LF of connecting 16-inch PVC force main and tees for conveyance into the North WRF.	Replaces 2017 Master Plan Project No. CL-02
FM-02	Condition Assessment of Major Force Mains	0 – 5 Years	$150,000	Conduct an assessment to determine the condition of the major existing force mains to remain in operation.	-
Scenario No. 2 – Holiday Ventures LS Near-Term Estimated Budget Cost			**$ 854,000**		
HV-01	Holiday Ventures LS Pump Replacement	0 - 5 Years	$375,000	Replace existing Muffin Monster and piping with new Muffin Monster with a 2,900 gpm capacity, 16" pipe and bypass. Rehabilitate the existing wet well with a new liner, top, and hatch and install mixers.	2017 Master Plan Project No. LS-03
Scenario No. 2 – Holiday Ventures LS Long-Term Estimated Budget Cost			**$ 375,000**		
Scenario No. 2 – Holiday Ventures LS Total Estimated Budget Cost					**$ 1,229,000**

5.2.3 Scenario No. 2 – Water Reclamation Facility Improvement Needs

Scenario No. 2 assumes all wastewater in the EWD service area will be conveyed and treated at the new North WRF. In this case, the South WRF will need near-term improvements completed to maintain reliability which in the long-term the South WRF will be decommissioned after the North WRF comes online. To accommodate the EWD system wastewater flows, the North WRF will require two (2) 3.0 mgd phases for a total of 6.0 mgd at buildout. The near- and long-term improvements at the South WRF and North WRF are listed in **Table 17.**

Table 17: Scenario No. 2 – Water Reclamation Facility Needed Improvements

ID	Project	Phase	Estimated Project Cost	Project Description	Notes
WRF-01	Phase 1 of the North WRF	0 - 5 Years	$61,200,000	Construct Phase One of a 3.0 MGD WRF. Site design based on a future buildout capacity of 6.0 MGD.	Based on a cost per gallon of $17/gallon
WRF-02	Onsite SCADA (S WRF)	0 - 5 Years	$227,000	Install onsite SCADA system with wireless interface	WRF Electrical Evaluation Improvement No. 10
WRF-03	New Headworks (S WRF)	0 - 5 Years	$1,600,000	Install new headworks with mechanical screens, grit removal, and bypass piping with a bar screen. Improvements maintain pre- and post-tanks.	-
WRF-04	Drying Bed (S WRF)	0 - 5 Years	$160,000	Install drying bed at the WRF.	-
WRF-05	Chlorine Contact Basin Expansion (S WRF)	0 - 5 Years	$130,000	Project is anticipated to replace existing chlorine contact tank inlet piping to remove existing hydraulic bottleneck.	2017 Master Plan Project No. WRF-11
WRF-06	Dewatering Unit Replacement (S WRF)	0 - 5 Years	$680,000	Replace existing 125 gpm centrifuge with a new dewatering unit.	Existing centrifuge needs to be replaced due to continued maintenance and reliability
WRF-07	Dewatering Building Replacement (S WRF)	0 - 5 Years	$600,000	Repair/recoat interior dewatering building to protect building from future corrosion. Replace overhead piping, replace existing floor hatch, and install mechanical pulley system.	-
WRF-08	Blowers 2, 3, and 4 Replacement	0 - 5 Years	$950,000	Replace Blowers 2, 3, and 4	Part of the improvement includes WRF Electrical Evaluation Improvement No. 7
WRF-09	Reclaimed Water Hydraulics, Storage Capacity and Operations Evaluation	0 - 5 Years	$150,000	Engineering evaluation of the reclaimed system, storage capacity.	2017 Master Plan Project No. RU-01

ID	Project	Phase	Estimated Project Cost	Project Description	Notes
WRF-E06	PLC Upgrades	0 - 5 Years	$190,000	Replace and upgrade the WRF PLCs	WRF Electrical Evaluation Improvement No. 9
Scenario No. 2 – North WRF Near-Term Total Estimated Budget Cost			**$ 65,887,000**		
WRF-08	Phase 2 of the North WRF and Decommission South WRF	10 - 15 Years	$51,300,000	Construct Phase Two, adding 3.0 MGD capacity for a total of 6.0 MGD. Phase Two to include treatment processes to meet advanced wastewater treatment. Decommission the existing South WRF tanks, process equipment and buildings	Based on a cost per gallon of $17/gallon
Scenario No. 2 - North WRF Long-Term Total Estimated Budget Cost			**$51,300,000**		
Scenario No. 2 – North WRF Total Estimated Budget Cost					**$ 117,187,000**

5.3 *Scenario No. 3 Hydraulic Evaluation and Capacity Assessment*

Scenario No. 3 has the flow splitting between the existing WRF and the North WRF. For the evaluation, the existing Holiday Ventures LS flows and the Sarasota County projected flow will go to the North WRF. The remaining existing flows and projected Charlotte County flows will go to the existing WRF. The flows that are currently conveyed through the existing Holiday Ventures LS will flow directly to the North WRF and bypass the Holiday Ventures LS. An overview map of modeled Scenario No. 3 is provided in **Figure 15.**

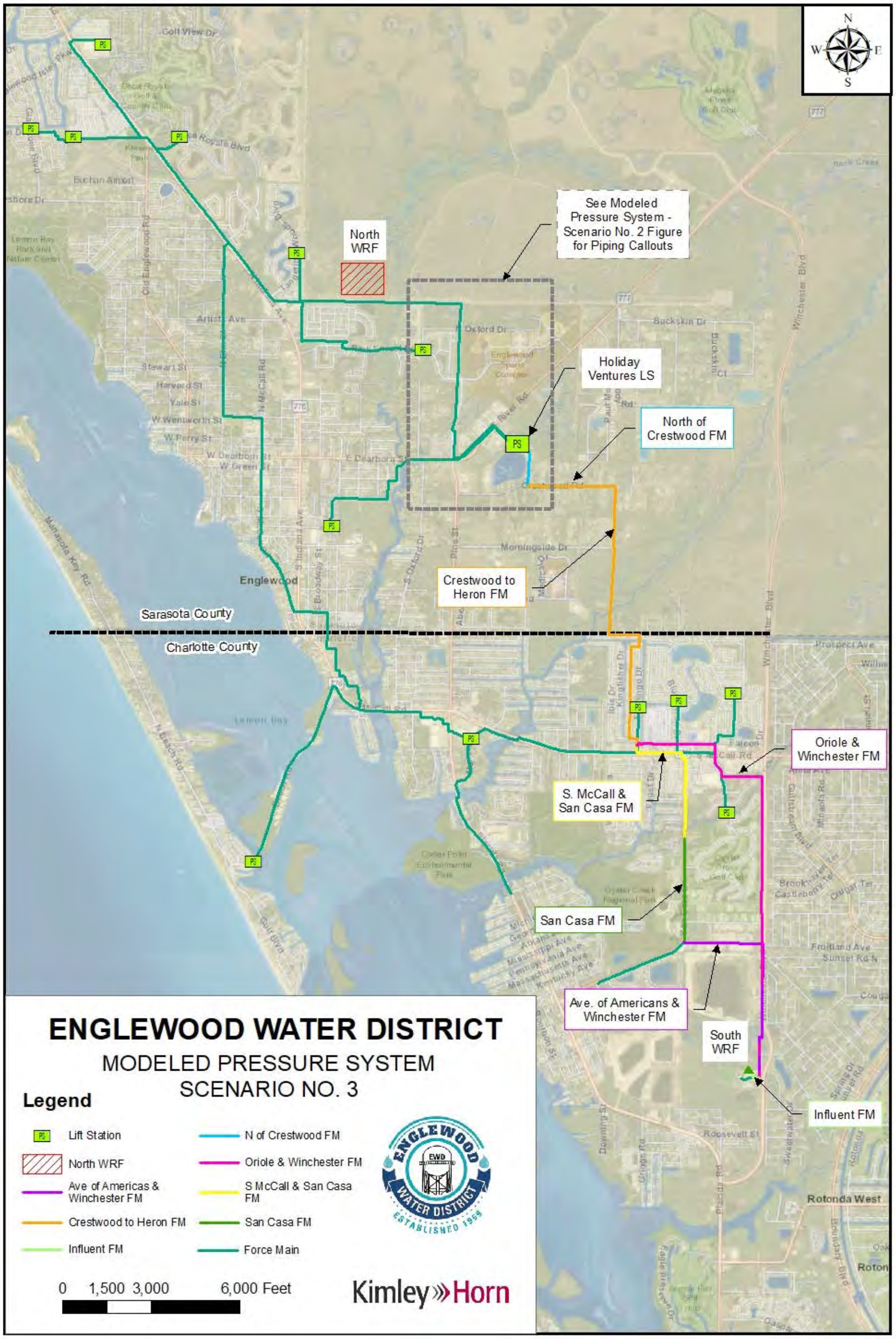


Figure 15: Scenario No. 3 Existing Wastewater Pressure System

5.3.1 Scenario No. 3 - Hydraulic Evaluation and Capacity Assessment

For Scenario No. 3, the Holiday Ventures LS will not be needed after the North WRF is operational since the northern flows will enter directly into the North WRF and the southern flows will be treated at the South WRF. However, the Holiday Ventures LS may be repurposed for future operational flexibility in the system. Scenario No. 3 design flows are presented in **Table 18.**

Table 18: Scenario No. 3 - Projected Holiday Ventures Lift Station Design Flows

Scenario	Holiday Ventures Projected Design Flows (gpm)			
	2025 (0-5 Yrs)	2030 (5-10 Yrs)	2035 (10-15 Yrs)	2040 (15-20 Yrs)
No. 3 – Flow Split	700	--	--	--

The firm design capacity of the existing Holiday Ventures LS pumps is 1,692 gpm with two (2) pumps running. After the North WRF is constructed, increased Holiday Ventures LS pump, and wet well capacity will not be required.

Estimated based on the Model results and the anticipated flows, the velocity in the 16-inch force main will be adequately sized with having less than 6.0 fps until 2040.

As with Scenario No. 2, an estimated 500 LF of 16-inch force main will be required at East Dearborn Street and Pine Street, and a tee will be needed outside the North WRF to re-route the flows to the plant site**. Figure 16** is a map of the Scenario No. 3 proposed wastewater pressure system with the improvements text boxes highlighted yellow.

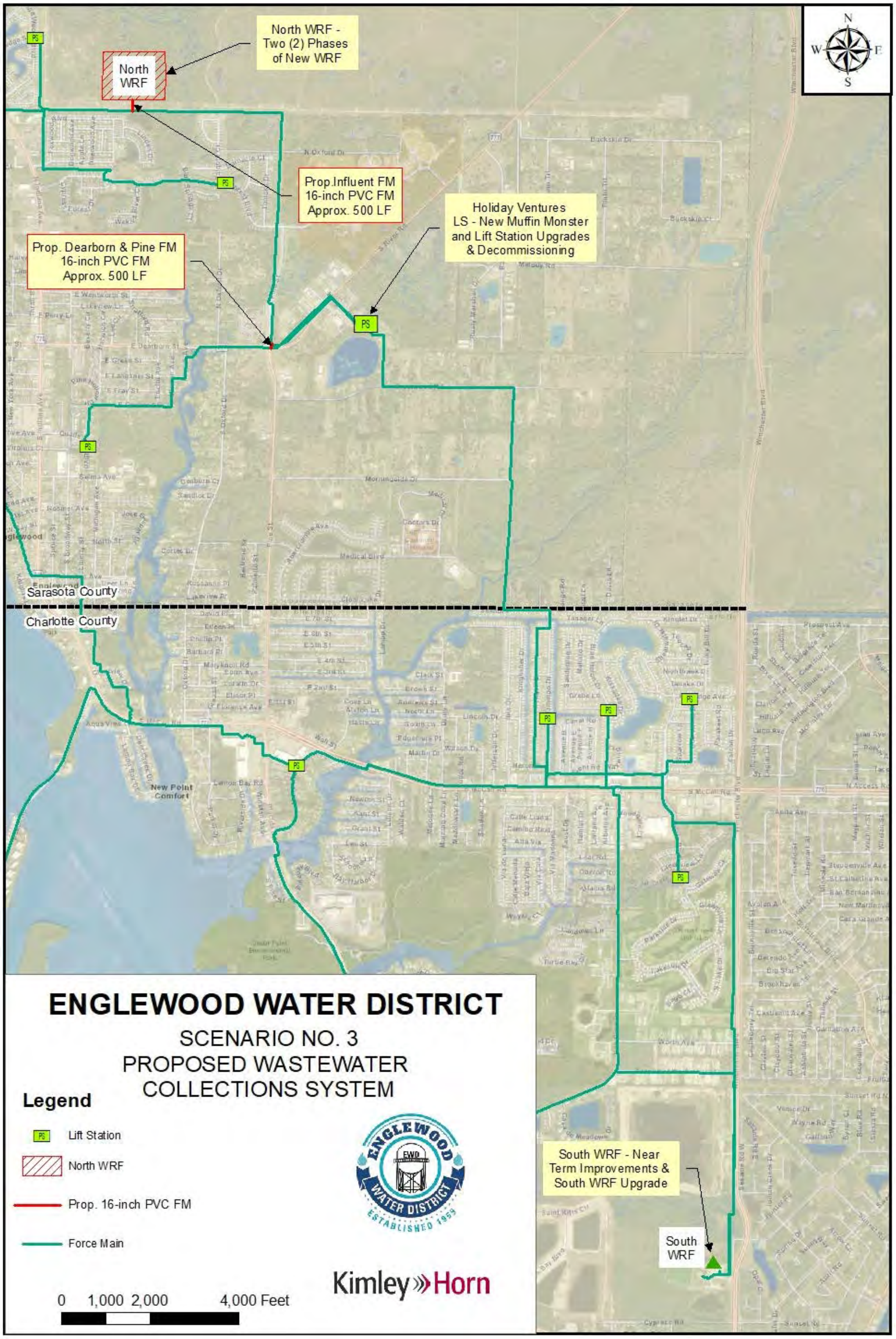


Figure 16: Scenario No. 3 Proposed Wastewater Pressure System

5.3.2 Scenario No. 3 – Holiday Ventures Lift Station Improvement Needs

The flow split scenario, Scenario No. 3, the Sarasota County flows pump directly to the North WRF and the Charlotte County flows pump to the South WRF. Some minor improvements are recommended for the near-term planning period. For this Study, areas and pumps outside of Holiday Ventures LS, were not evaluated and thus are recommended for hydraulic and capacity evaluation dependent on the chosen Scenario.

For the Holiday Ventures LS, the recommended projects, estimated completion planning period, and opinion of budget costs for Scenario No. 3 are listed in **Table 19.** All listed opinions of costs are provided for budgetary purposes and are represented in 2021 dollars. Improvements recommended in the 2017 Utility Master Plan are updated based on the Consumer Price Index recorded inflation rate.

Table 19: Scenario No. 3 - Holiday Ventures Lift Station Needed Improvements

ID	Project	Phase	Estimated Project Cost	Project Description	Notes
HV-01	Holiday Ventures LS - Lift Station Improvements	0 - 5 Years	$364,000	Rehabilitate the existing wet well with a new liner, top, and hatch and install mixers.	2017 Master Plan Project No. LS-03
FM-01	Install Dearborn and Pine Street Forcemain	0 – 5 Years	$150,000	Install approx. 500 LF of connecting 16-inch PVC force main and tees for conveyance into the North WRF.	Replaces 2017 Master Plan Project No. CL-02
FM-02	Condition Assessment of Major Force Mains and Smaller LSs	0 – 5 Years	$150,000	Conduct an assessment to determine the condition of the major existing force mains to remain in operation.	-
Scenario No. 3 – Holiday Ventures LS Near-Term Estimated Budget Cost			**$ 664,000**		
HV-03	Downsize Holiday Ventures LS	5 - 10 Years	$24,000	Downsize Holiday Ventures LS and take out of service the wet well, pumps, station piping and appurtenances	Smaller pumps will be required. Site to remain as reclaimed PS, DIW& potential site for storage. Wet well and pumps can remain for flexible operations between WRFs.
Scenario No. 3 – Holiday Ventures LS Long-Term Estimated Budget Cost			**$ 24,000**		
Scenario No. 3 – Holiday Ventures LS Total Estimated Budget Cost					**$ 688,000**

5.3.3 Scenario No. 3 – Water Reclamation Facility Improvement Needs

The flow split scenario, Scenario No. 3, the wastewater will be split along the existing county division. All Sarasota County wastewater, in the EWD system, will be conveyed to and treated at the new North WRF and all Charlotte County flows will be conveyed and treated at the existing South WRF. In addition to building the North WRF, the South WRF will require near-term improvements and a plant upgrade to maintain the existing 3.0 mgd permitted capacity. See **Table 20** for the improvement needs to this scenario.

Table 20: Scenario No. 3 – Flow Split Recommended Improvements

ID	Project	Phase	Estimated Project Cost	Project Description	Notes
WRF-01	Phase I North WRF	0 - 5 Years	$42,500,000	Construct phase one of a 2.0 mgd WRF. Site design based on a future buildout capacity of 4.0 mgd	Based on a cost per gallon of $17/gallon
WRF-02	Onsite SCADA (S WRF)	0 - 5 Years	$227,000	Install onsite SCADA system with wireless interface	WRF Electrical Evaluation Improvement No. 10
WRF-03	New Headworks (S WRF)	0 - 5 Years	$2,500,000	Install new headworks with mechanical screens, grit removal, transfer pumps, piping and bypass piping with a bar screen. Improvements include decommissioning pre- and post-tanks	Two (2) post-screen pumps for on-site plant transfer from Headworks to flow splitter, combined capacity 2,360 gpm
WRF-04	Odor Control Rehab at Headworks (S WRF)	0 - 5 Years	$440,000	Rehabilitate and reconfigure odor control system	2017 Master Plan Project No. WRF-02
WRF-05	Drying Bed (S WRF)	0 - 5 Years	$160,000	Install drying bed at the WRF	-
WRF-06	Chlorine Contact Basin Expansion	0 - 5 Years	$130,000	Project is anticipated to replace existing chlorine contact tank inlet piping to remove existing hydraulic bottleneck	2017 Master Plan Project No. WRF-11
WRF-07	Dewatering Unit Replacement (S WRF)	0 - 5 Years	$630,000	Replace existing 125 gpm centrifuge with a new dewatering unit	Existing centrifuge needs to be replaced due to continued maintenance and reliability

ID	Project	Phase	Estimated Project Cost	Project Description	Notes
WRF-08	Dewatering Building Replacement (S WRF)	0 - 5 Years	$600,000	Repair/recoat interior dewatering building to protect building from future corrosion. Replace overhead piping, replace existing floor hatch, and install mechanical pulley system.	-
WRF-09	Blowers 2, 3, and 4 Replacement	0 - 5 Years	$950,000	Replace Blower Nos. 2, 3, and 4	Part of the improvement includes WRF Electrical Evaluation Improvement No. 7
WRF-10	Reclaimed Water Hydraulics, Storage Capacity and Operations Evaluation	0 - 5 Years	$150,000	Engineering evaluation of the reclaimed system, storage capacity.	2017 Master Plan Project No. RU-01
WRF-E06	PLC Upgrades	0 - 5 Years	$190,000	Replace and upgrade the WRF PLCs.	WRF Electrical Evaluation Improvement No. 9
Scenario No. 3 – N & S WRF Near-Term Total Estimated Budget Cost			**$ 48,447,000**		
WRF-11	Reclaimed Transfer Pump Station Upgrades	5 - 10 Years	$700,000	Construct a new reclaimed transfer pump station for onsite transfer of reclaimed. Rehabilitate existing reclaimed water station to serve solely as a high service pump station.	-
WRF-E07	Replace Generator 2	5 - 10 Years	$100,000	Replace the existing generator 2 (250KW)	WRF Electrical Evaluation Improvement No. 11
WRF-E08	ATS 1, 2, and 3	5 - 10 Years	$150,000	Replace ATS 1, 2, and 3	WRF Electrical Evaluation Improvement No. 12
WRF-E09	Services 1, 2, and 3 Main Electrical Equipment Improvements	5 - 10 Years	$1,140,000	Replace main electrical equipment for services 1, 2, and 3 per electrical sheets E-5 amd E-6	WRF Electrical Evaluation Improvement No. 13

ID	Project	Phase	Estimated Project Cost	Project Description	Notes
WRF-12	Phase II North WRF	10 - 15 Years	$42,500,000	Construct Phase Two, adding 2.0 mgd capacity for a total of 4.0 mgd. Phase Two to include treatment processes to meet advanced wastewater treatment.	Based on a cost per gallon of $17/gallon
WRF-11	South WRF Upgrade	10 - 15 Years	$1,480,000	Decommission the existing South WRF Plant No. 1 & 2. Rehabilitate Plant No. 3 and 4	-
WRF-13	Telecom Improvements	10 - 15 Years	$78,000	Install telecommunication fibers to bring to the WRF site.	-
WRF-E10	MCC Replacement	10 - 15 Years	$540,000	Replace effluent, headworks, and process MCCs	WRF Electrical Evaluation Improvement No. 14
Scenario No. 3 - N & S WRF Long-Term Total Estimated Budget Cost			**$ 46,688,000**		
Scenario No. 3 – N & S WRF Total Estimated Budget Cost					**$ 95,135,000**

VI. Cost Comparison and Recommended Improvements

Based on the results of the Holiday Ventures LS and the existing WRF site evaluations, system hydraulic evaluation and Holiday Ventures LS capacity assessment, necessary improvements for each scenario were created and defined in **Section V**. In addition to identifying the needed improvements, a cost benefit analysis was completed to develop a cost comparison for a final recommended scenario based on the Study.

6.1 *Recommended Improvement Plan Comparison*

The three (3) flow scenarios lend themselves to the recommended improvements for the Holiday Ventures LS, South WRF, and North WRF. Each flow scenario has advantages and disadvantages in operations and overall wastewater system goals. These advantages and disadvantages are presented to compare the flow scenarios outside of the Cost Benefit Analysis included in this Study.

6.1.1 Flow Scenario No. 1 Recommended Improvements Review

Since Scenario No. 1 involves all flow conveyed to the South WRF, the improvements consist of significant upgrades and replacements at both the Holiday Ventures LS, the force main infrastructure, and the existing South WRF. This scenario will require a heavy emphasis on phased construction and intentional redundancy in design as no new facility site is proposed and the high criticality of Holiday Ventures LS and the South WRF will remain.

The advantages of this scenario include:

- Existing operations and maintenance of the Holiday Ventures LS and South WRF will continue as no new facilities are recommended.
- No additional staff is needed to maintain staffing requirements at new facilities.

The disadvantages of this scenario include:

- Constructing major upgrades and expansions at Holiday Ventures LS and the South WRF will be costly and time consuming to ensure there are no impacts to operations.
- There is limited space to expand treatment processes as the existing reject ponds frame the existing site plan. To reshape and move the reject ponds will be costly and require temporary reject storage at the South WRF.
- Extensive costs to pump northern wastewater to South WRF.
- Longer collection system adds a potential for wastewater septicity problems and odors.
- After treatment, the reclaimed water is pumped from the south to the northern system, which also has extensive costs.

6.1.2 Scenario No. 2 Recommended Improvements Review

In Scenario No. 2 the wastewater system will operate similar to Scenario No 1; however, the flows will be essentially reversed. All flows will be conveyed to the North WRF constructed at the Winchester Property. This scenario requires near-term improvements at Holiday Ventures LS and the South WRF while the North WRF is being constructed.

The advantages for this scenario include:

- Construction of new North WRF at a green field site can be completed with further expansion and improvements in treatment processes in mind rather than expanding an older facility.
- The North WRF will be more centrally located in Sarasota County. The majority of new flows that will be added to the system in the next 20-years are within Sarasota County.
- Once the North WRF is operational and the South WRF is decommissioned, no additional staff is needed to maintain staffing requirements at two (2) facilities.
- Holiday Ventures LS can be decommissioned. However, a new master lift station location will be needed.
- Major force main upsizing is not needed to convey wastewater flows to the North WRF as the existing force mains along the south boundary of the Winchester property is adequately sized for Charlotte County wastewater flows.
- Reclaimed water will be processed in Sarasota County which will meet the increased demands for reclaimed water service in the area. Small pumps may be needed to pump offsite for storage/disposal.

The disadvantages of this scenario include:

- During low demand, excess reclaimed water will need to be pumped offsite to the South WRF's existing ASR well for disposal.

6.1.3 Scenario No. 3 Recommended Improvements Review

In the flow split scenario, Scenario No. 3, the Sarasota County and the Charlotte County flows will be split and conveyed and treated at the North WRF and the South WRF, respectively. Scenario No. 3 includes a combination of improvements recommended for Scenario No. 1 and 2, with similar advantages and disadvantages. This scenario will add the most redundancy and operational flexibility to the wastewater system. However, it will require operating and maintaining two (2) facilities and require major simultaneous construction at both the North WRF and South WRF within the next 10-years.

The advantages of this scenario include:

- Construction of new North WRF at a green field site can be completed to aid with future expansions and improvements in treatment processes.
- The North WRF will be more centrally located in Sarasota County. The majority of new flows that will be added to the system in the next 20-years are within Sarasota County.
- Holiday Ventures LS can be decommissioned.
- No major force main piping is needed to convey wastewater flows to the North WRF as the existing 16-inch force main along the south boundary of the Winchester property is adequately sized for Charlotte County wastewater flows.
- Operating two independent WRFs will allow for greater flexibility during construction at either WRF or during peak flows.
- Operating two WRFs allows for operational flexibility and additional options in case of an emergency at one of the plants.
- Keeping wastewater treated locally, to where it was generated, greatly reduces annual pumping costs.
- Minimizing the distance traveled for sending reclaimed water, greatly reduces reclaimed pumping costs.
- Reclaimed water will be processed in Sarasota County which will meet the increased demands for reclaimed water service in the area. Small pumps may be needed to pump offsite for storage/disposal.

The disadvantages of the scenario include:

- Additional staff is needed to maintain staffing requirements at two (2) facilities (potential to utilize some offsite monitoring with proper SCADA).

Flow Scenario Nos. 2 and 3 allow for the most flexibility and reliability in operations as retrofitting the existing South WRF while operational, and with the existing site limitations will be difficult.

6.2 *Cost Benefit Analysis*

After comparing the operational advantages and disadvantages of the three (3) scenarios, a cost benefit analysis was completed to determine the most cost-effective scenario. All costs listed are present costs and based on budgetary estimates as well as engineering experience. Scenario Nos. 2 and 3 will require the purchase or trade of land from WVID. A high-level estimate was completed for inclusion of the cost comparison. Based on four (4) recent past parcels sold from WVID, an estimated cost per acre of land is approximately $33,000. This would equate to $1,155,000 for a 35-acre site. These costs were added to the total scenario costs as appropriate. The total costs for each scenario as listed in **Table 21**.

Table 21: Estimated Total Project Cost per Scenario

Scenario	Estimated Cost
No. 1 – All Flow to South WRF	$150,336,000
No. 2 – All Flow to North WRF	$119,571,000
No. 3 – Split Flow to North and South WRF	$96,978,000

6.3 *Recommended Improvements*

Based on the Study, Scenario No. 3 is recommended for design, construction, and implementation. The recommended improvements estimated total project cost and the added benefit of having the operational flexibility indicates Scenario No. 3 is the most preferable scenario. Due to the proposed location of the North WRF and the existing location of the South WRF, the existing system is laid out well and major improvements of the collection system are not anticipated to be needed. Having two plants will provide additional operational flexibility and assist if one of the plants go offline. Further, wastewater pumping will be minimized as well as reclaimed pumping will also be reduced. The recommended improvements associated with this scenario are summarized in **Table 22** through **Table 25** and shown on the map in **Figure 17.**

Table 22: Immediate (Year 0) Recommended Improvements

Updated ID	Report ID	2017 MP Project ID	Project	Phase	Estimated Project Cost	Project Description
WRF-E01	**WRF-E01**	-	Replace Main Breakers and Load Feeders	0 Years	$84,000	Replace main breaker with solid state option and load side feeders
WRF-E02	**WRF-E02**	**WRF-15**	Replace Generator 1	0 Years	$470,000	Replace Generator 1 with a 1200 KW generator
WRF-E03	**WRF-E03**	-	Install Surge Protection	0 Years	$64,000	Install surge protection for each main breaker, remote MCC, incoming and lighting panels
WRF-E04	**WRF-E04**	-	Enhance Grounding	0 Years	$48,000	Enhance the grounding at Services 1, 2, and 3
WRF-E05	**WRF-E05**	-	Power Cable Testing	0 Years	$20,000	Test the 480 power cables, 100 amps and larger
Immediate Improvements Total Estimated Budget Cost						**$ 686,000**

Table 23: Near-Term (0 – 5 Years) Recommended Improvements

Updated ID	ID	2017 MP Project ID	Project	Phase	Estimated Project Cost	Project Description
WRF-01	**WRF-01**	-	Phase I North WRF	0 - 5 Years	$42,500,000	Construct phase one of a 2.0 mgd WRF. Site design based on a future buildout capacity of 4.0 mgd.
WRF-02	**WRF-02**	-	Onsite SCADA (S WRF)	0 - 5 Years	$227,000	Install onsite SCADA system with wireless interface
WRF-03	**WRF-03**	-	New Headworks (S WRF)	0 - 5 Years	$2,500,000	Install new headworks with mechanical screens, grit removal, transfer pumps, piping and bypass piping with a bar screen. Improvements include decommissioning pre- and post-tanks.
WRF-04	**WRF-04**	**WRF-02**	Odor Control Rehab at Headworks (S WRF)	0 - 5 Years	$440,000	Rehabilitate and reconfigure odor control system
WRF-05	**WRF-05**	-	Drying Bed (S WRF)	0 - 5 Years	$160,000	Install drying bed at the WRF
WRF-06	**WRF-06**	**WRF-11**	Chlorine Contact Basin Expansion	0 - 5 Years	$130,000	Project is anticipated to replace existing chlorine contact tank inlet piping to remove existing hydraulic bottleneck
WRF-07	**WRF-07**	-	Dewatering Unit Replacement (S WRF)	0 - 5 Years	$630,000	Replace existing 125 gpm centrifuge with a new dewatering unit
WRF-08	**WRF-08**	-	Dewatering Building Replacement (S WRF)	0 - 5 Years	$600,000	Repair/recoat interior dewatering building to protect building from future corrosion. Replace overhead piping, replace existing floor hatch, and install mechanical pulley system.
WRF-09	**WRF-09**	**WRF-06 and WRF-07**	Blowers 2, 3, and 4 Replacement	0 - 5 Years	$950,000	Replace Blower Nos. 2, 3, and 4. Portion of project is currently funded
WRF-11	**-**	**WRF-01**	Replacement of Liquid Process Piping	0 - 10 Years	$223,000	WRF buried pipe replacement until plant is upgraded
WRF-E06	**WRF-E06**	-	PLC Upgrades	0 - 5 Years	$190,000	Replace and upgrade the WRF PLCs

Updated ID	ID	2017 MP Project ID	Project	Phase	Estimated Project Cost	Project Description
RU-01	**WRF-10**	**RU-01**	Reuse Hydraulic Analysis and Operational Evaluation	0 - 5 Years	$150,000	Engineering evaluation of the reclaimed system. Project will identify booster station operation with potential storage tank and forcemain improvements.
RU-02	**-**	**RU-02**	Install Reuse Storage Tank at Holiday Ventures	0 - 5 Years	$1,033,000	Dependent on outcome of RU-01
RU-03	**-**	**RU-03**	Holiday Ventures - Rehabilitate Reuse Booster Station	0 - 5 Years	$110,000	Station required rebuild of pumps, motors, piping, and valves
LS-01	**HV-01**	**LS-03**	Holiday Ventures LS - Lift Station Improvements	0 - 5 Years	$364,000	Rehabilitate the existing wet well with a new liner, top, and hatch and install mixers.
LS-02	**-**	**LS-04**	Holiday Ventures Standby Generator	0 - 5 Years	$217,500	Standby generator replacement and upsize for Re-Use Booster Station
CL-01	**FM-01**	**Replaces CL-02**	Install Dearborn and Pine Street Forcemain	0 - 5 Years	$150,000	Install approx. 500 LF of connecting 16-inch PVC force main and tees for conveyance into the North WRF.
CL-02	**FM-02**	-	Condition Assessment of Major Force Mains and Smaller LSs	0 - 5 Years	$150,000	Conduct an assessment to determine the condition of the major existing force mains to remain in operation.
CL-03	**-**	**CL-03**	Rehab/Replace Clay Pipes	0 - 15 Years	$5,000,000	Reline or replace clay sewer pipes
CL-04	**-**	**CL-04**	Manhole Rehabilitations	0 - 5 Years	$130,000	Rehabilitate manholes by relining brick manholes with GML
CL-05	**-**	**CL-05**	North Beach Sewer Study	0 - 5 Years	$71,000	Conduct a North Beach sewer service study and evaluation.
Near-Term Total Estimated Budget Cost				**$ 55,925,500**		

Table 24: Mid-Term (5 – 10 Years) Recommended Improvements

Updated ID	ID	2017 MP Project ID	Project	Phase	Estimated Project Cost	Project Description
WRF-12	**WRF-11**	**WRF-16 and WRF-17**	Reclaimed Transfer Pump Station Upgrades	5 - 10 Years	$700,000	Construct a new reclaimed transfer pump station for onsite transfer of reclaimed. Rehabilitate existing reclaimed water station to serve solely as a high service pump station.
WRF-E07	**WRF-E07**	**WRF-15**	Replace Generator 2	5 - 10 Years	$100,000	Replace the existing generator 2 (250KW)
WRF-E08	**WRF-E08**		ATS 1, 2, and 3	5 - 10 Years	$150,000	Replace ATS 1, 2, and 3
WRF-E09	**WRF-E09**		Services 1, 2, and 3 Main Electrical Equipment Improvements	5 - 10 Years	$1,140,000	Replace main electrical equipment for services 1, 2, and 3 per electrical sheets E-5 and E-6
WRF-13	**-**	**WRF-12**	Replace CL2 Gas System	5 - 15 Years	$136,000	Replace the chlorine gas system due to risk/liability decision
VS-08	**-**	**VS-08**	Rehabilitate Standby Generators	5 - 15 Years	$325,000	Rehabilitation vacuum generators (5 remain)
LS-03	**HV-03**	-	Downsize Holiday Ventures LS	5 - 10 Years	$24,000	Downsize Holiday Ventures LS and take out of service the wet well, pumps, station piping and appurtenances
LS-04	**-**	**LS-13**	Eliminate LS-113	5 - 15 Years	$136,000	Potential elimination of LS-113 Englewood Rd LS
CL-06	**-**	**CL-07**	Sewer Extension	5 - 10 Years	$TBD	Sewer extensions to alternate areas
Mid-Term Total Estimated Budget Cost						**$ 2,711,000**

Table 25: Long-Term (10 – 15 Years) Recommended Improvements

Updated ID	ID	2017 MP Project ID	Project	Phase	Estimated Project Cost	Project Description
WRF-13	**WRF-12**	-	Phase II North WRF	10 - 15 Years	$42,500,000	Construct Phase Two, adding 2.0 mgd capacity for a total of 4.0 mgd. Project includes treatment processes to meet advanced wastewater treatment.
WRF-14	**WRF-13**	**WRF-05**	South WRF Upgrade	10 - 15 Years	$1,480,000	Decommission the existing South WRF Plant No. 1 & 2. Rehabilitate Plant No. 3 and 4
WRF-15	**WRF-14**	-	Telecom Improvements	10 - 15 Years	$78,000	Install telecommunication fibers to bring to the WRF site
WRF-16	**WRF-E10**	-	MCC Replacement	10 - 15 Years	$540,000	Replace effluent, headworks, and process MCCs
WRF-17	**-**	**WRF-01**	Replacement of Process Piping	10 - 15 Years	$205,000	Replace buried liquid process piping
Long-Term Total Estimated Budget Cost						**$ 44,803,000**

Some projects will have the ability to be value engineered, or will have multiple options for reducing costs dependent on the conditions and needs at the time. In addition, incoming development capacity charges and accred guaranteed revenue fees will assist in offsetting the costs especially of capacity needs and upgrades. For the future customers anticipated in the next twenty years, the estimated capacity charges ($3,334 per ERC) for the 23,127 units is approximately $77,100,000. However, some of these projects will likely require additional funding due to the projects needing to be completed prior to the capacity charges being connected. There are grants and low-interest rate loans currently available for funding planning, engineering, and construction of these types of projects. It is recommended to evaluate funding options prior to starting the larger projects.

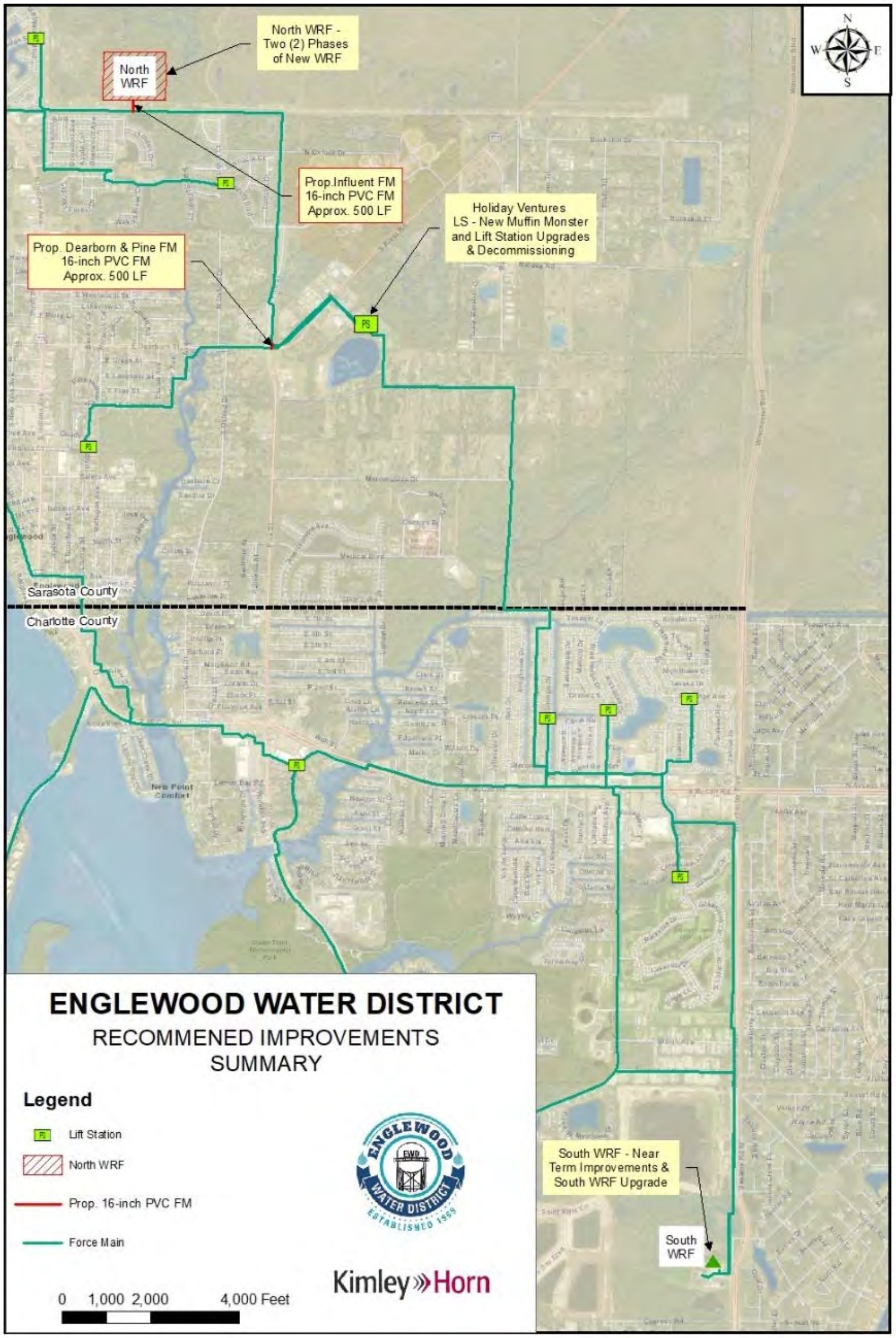


Figure 17: Scenario No. 3 Proposed Wastewater Pressure System

References

HDR (2017). *Utility Master Plan.* Prepared for Englewood Water District.

Executive Summary

I. Introduction

Englewood Water District's (EWD) most recent utility master plan was completed in 2017 by HDR (2017 Master Plan). The 2017 Master Plan outlines existing conditions and improvement plans for EWD's water, wastewater, and reclaimed water systems. The 2017 Master Plan was based on pre-2015 data and projected populations, demands, flows, and improvements for a 20-year planning period, from 2016 through 2036. Since projected flows from 2016 – 2020 are now historical flows, and new development is being completed earlier than expected, Kimley-Horn and Associates, Inc. (Kimley-Horn) updated the 2017 Master Plan by projecting wastewater flows for a 20-year planning period, from 2021 – 2040. These flows were used to complete Work Assignment No. 21-001 under Agreement No. 2017-001 dated February 8, 2017 to prepare the Holiday Ventures and Sewer Master Plan Update (Study).

Kimley-Horn evaluated the Holiday Ventures Lift Station (Holiday Ventures LS) and the existing Water Reclamation Facility (WRF) conditions and provided recommendations to meet the future needs of the EWD wastewater service area. Kimley-Horn compared the advantages and disadvantages of improvements needed at the Holiday Ventures LS and the existing (South) WRF, to the cost of constructing a new (North) WRF.

The existing EWD wastewater collection system is shown in **Figure 1**.

The following tasks were completed for this Study:

- Update population and flow projections.
- Evaluate Holiday Ventures LS and WRF sites.
- Identify needed improvements.
- Cost-Benefit comparison for three alternative scenarios.

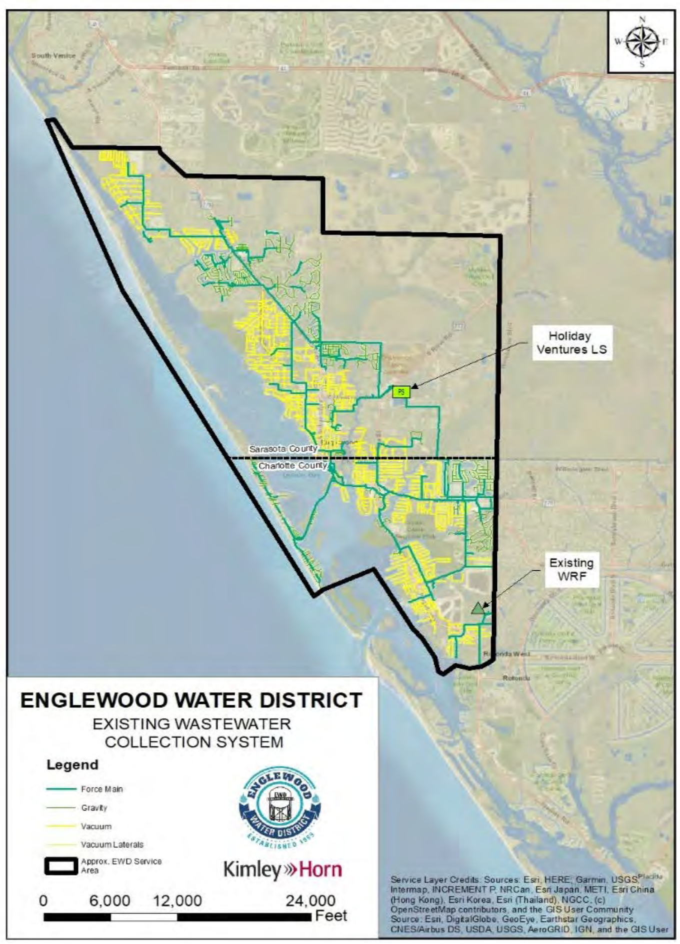


Figure 1: Existing Water District Wastewater Collection System

II. Projected Population and Flow

Kimley-Horn collected and reviewed data from EWD as well as external sources. Data provided by EWD included customer billing data for Fiscal Year (FY) 2020 which includes sewer service. This data was spatially assigned in GIS following data validation.

The types of sewer service identified are as follows:

- Sewer Connected
- Sewer Available, Not Connected
- Sewer Not Available (this includes undeveloped areas)

The customer type comparison and analysis show the majority of land within EWD's wastewater service area is currently categorized as Sewer Not Available. The results of this analysis are shown in **Figure 2**.

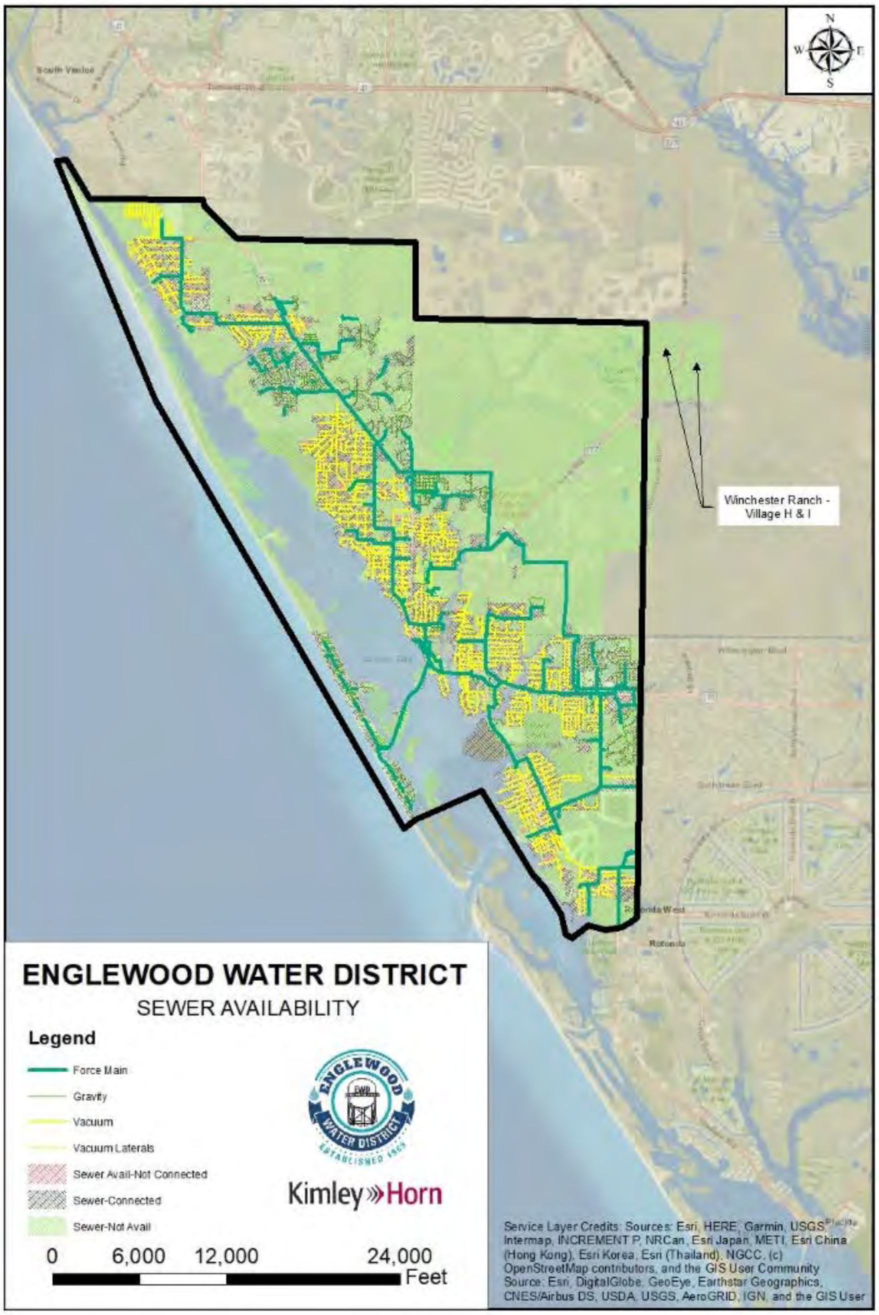


Figure 2: Englewood Water District Sewer Availability Map

Existing Populations and Wastewater Flows

The parcels designated as Sewer Connected in the FY2020 billing data represent the existing sewer population for EWD. Based on the wastewater historical AADF, the existing WRF is operating at approximately 50.4% of its permitted capacity in 2020.

Using the DMRs and the existing sewer population, an existing wastewater level of service (LOS) was established. For this Study, the sewer population was in units of equivalent residential capacities (ERCs). Based on this methodology, the FY2020 wastewater LOS is approximately 92 gallons per day (gpd) per ERC.

Future Populations and Flow Projections

Kimley-Horn projected the EWD wastewater flows based an average district usage per ERC of 157gpd/ERC and categorized the projections in 5-year intervals to EWD's service area for the 20-year planning period. This exercise provided the anticipated ERCs for twenty (20) major planned developments within the current or future EWD wastewater service area. This includes the Winchester Ranch H and I developments.

Comparing the historical wastewater flow, the projected wastewater flow, and the permitted capacity of the existing South WRF, it is anticipated that the existing South WRF will exceed its permitted capacity of 3.0 million gallons per day (mgd) AADF in the next 10 – 15 years. Although permitted by FDEP, the capacity is limited by the age and condition of the facility. Based on the site inspections and evaluation, it is Kimley-Horn's opinion that the existing South WRF should not operate beyond a 2.0 mgd AADF, and significant upgrades are needed to reliably achieve the 3.0 mgd AADF permitted capacity.

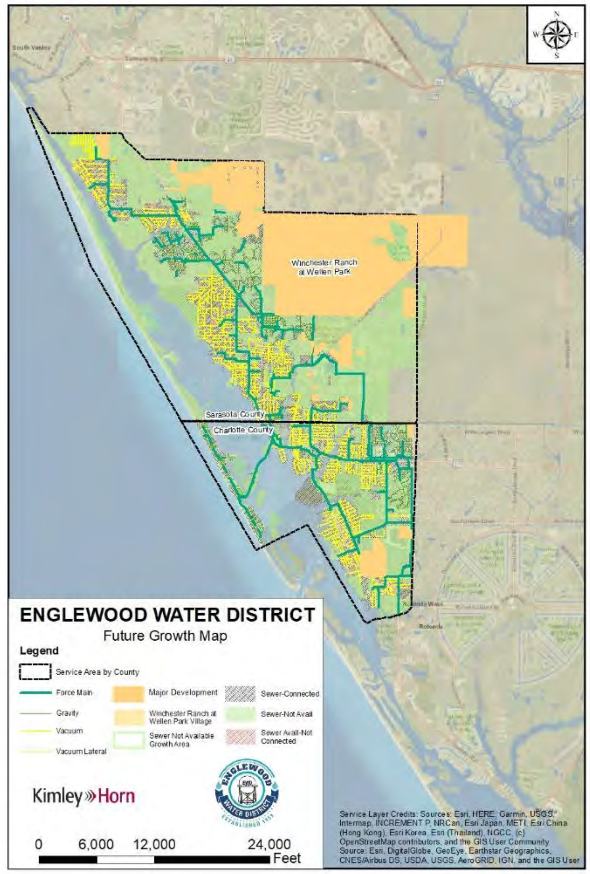


Figure 3: Wastewater Future Growth Map

III.Site Evaluations

Site evaluations were performed for the Holiday Ventures LS and the existing South WRF

Holiday Ventures Lift Station Site Evaluation

Holiday Ventures LS is an existing triplex submersible lift station built in 2003. This lift station conveys the majority of the wastewater collected in the northern service area to the existing South WRF, located in Charlotte County.

Figure 4: Holiday Ventures LS FOG

The existing wet well is structurally deteriorating with visible spalled and missing concrete, and exposed rebar. Photos taken during the Holiday Ventures LS site evaluation are shown in **Figures 4 and 5**. Pump testing was conducted on each individual pump as well as the pumps operating in parallel. The testing determined the existing pumps are operating within 10% of their design capacity.

Figure 5: Pump Rail Plates on Missing Concrete

WRF Site Evaluation

The existing South WRF is an advanced secondary wastewater treatment plant using the extended aeration process with effluent filtration. The facility consists of pretreatment screening, pre- and post-screening tanks, and odor control, four Evoqua steel tank package plants, post treatment with three filters, and a chlorine contact basin. Digested sludge is dewatered with three horizontal centrifuges and treated effluent is stored onsite in an aquifer storage recovery (ASR) well, a 1.0 million gallons (MG) reclaimed water storage tank, and a 3.6 MG reclaimed water storage pond.

Numerous deficiencies were observed during the site evaluation. The facility does not have SCADA installed. The existing headworks structure has significant corrosion and structural damage. The pre- and post-screening pumps have been rebuilt and staff noted the pumps do not operate adequately. The post-screening tank has concrete damage. Two of the four package plants, Plant No. 1 and Plant No. 2, have significant corrosion, air leaks, and numerous minor deficiencies.

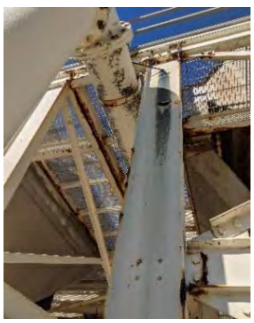


Figure 6: Headworks Structural Corrosion

The chlorine contact basin has hydraulic bottlenecks in the existing inlet and outlet piping which reduces the accuracy of the effluent flow meter. The centrifuge building has visible corrosion and structural cracking along the window frames and louvers. One centrifuge is severely rusted, and the access hatch has buckled. Pictures taken during the site evaluation are provided in **Figures 6** and **7**.

Figure 7: Plant 1 Corrosion

The reclaimed water pumping station has conflicting controls as it operates as a transfer pumping station and as a high service pumping station.

Kimley-Horn authorized an electrical subconsultant, Bailey Electrical Consultants (BEC), to conduct an inspection and prepare a separate Electrical Upgrades Report. BEC's EWD Electrical Upgrades Report notes that the existing generator performance is declining, and updates are needed for the electrical service. The existing controls are obsolete, making repairs difficult.

New Plant Site Evaluation

An alternative to a full upgrade and capacity expansion of the South WRF, is consideration for a second plant, the North WRF. The last component of the Site Evaluations task included a desktop analysis of a potential site for a new WRF, the North WRF. An agreement exists between EWD, Pulte Home Company, Manasota Beach Ranchlands, Winchester Ranch, WVID, and BMG Three that requires EWD to complete a Capital Improvement Study (CIS) to determine the feasibility of a new water reclamation facility (North WRF) located within the Winchester Ranch. The desktop analysis evaluated the site based on:

- Available land and existing conditions
- Proximity to existing EWD wastewater collection system
- Proximity to existing EWD reclaimed water system
- Potential environmental impacts
- Accessibility
- Electrical and communications service

The Winchester Property under consideration is approximately 77 acres of heavily forested undeveloped land. Portions of the property are in flood zones and overlap wetlands that would need to be protected. The Winchester Property is in proximity with wastewater and reclaimed water infrastructure to the south. Site access is possible from the future Preto Boulevard or Pine Street. Generally, the large property has sufficient acreage, is in proximity to existing utility infrastructure, and is or will be accessible in the future. It is concluded that a new wastewater treatment facility could be constructed on this property and about 35-acres would be needed.

IV. Alternative System Evaluation

In order to meet the wastewater flow projections for the next 20 years three wastewater treatment scenarios were evaluated, and a recommended improvement plan was developed for the centrally located Holiday Ventures LS. The three scenarios are summarized below:

- **Scenario No. 1 - EWD WRF:** All wastewater is conveyed and treated at an improved South WRF.
- **Scenario No. 2 - Future WRF**: All wastewater is conveyed and treated at a new North WRF.
- **Scenario No. 3 - Flow Split:** Wastewater flow is split with Sarasota County derived flow treated at a new North WRF and Charlotte County flow is treated at an improved South WRF.

The existing and future flows for each scenario are summarized in **Table 2**.

Table 2: Scenario based Projected Flows

Flow Scenario	Facility in Service	Estimated Total Flow (mgd)					
		2020 Existing	0-5 Years	5-10 Years	10-15 Years	15-20 Years	20+ Years
No. 1 - South WRF	South WRF	1.51	1.98	2.66	3.68	5.06	5.35
No. 2 - North WRF	Future WRF	-	1.98	2.66	3.68	5.06	5.35
No. 3 - Flow Split	South WRF (Charlotte Co.)	-	0.93	0.99	0.99	1.66	1.66
	North WRF (Sarasota Co.)	-	1.06	1.67	2.69	3.40	3.69

In addition to the flows, the results of the site evaluation and testing were used to assess the lift station capacity and improvement needs for each planning period. A wastewater force main model (Model) was developed and used to evaluate the hydraulics downstream of the Holiday Ventures LS. Estimated future Holiday Ventures LS and pump sizing, were determined and a capacity assessment was completed for each scenario to estimate the potential needs at the Holiday Ventures LS. A system map is provided in **Figure 8** showing the Holiday Ventures LS downstream force mains.

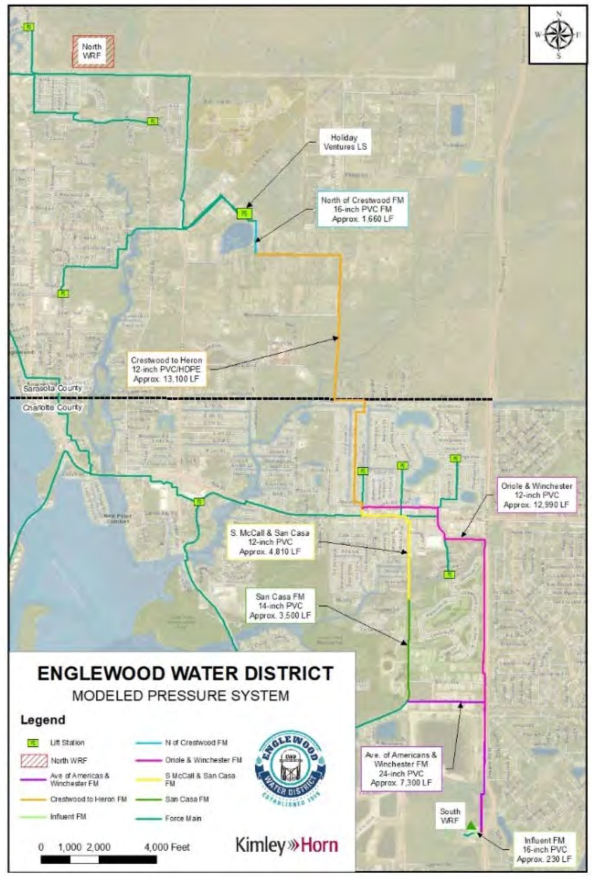


Figure 8: System Map of Holiday Ventures LS Downstream Force Mains

Recommendations for the Holiday Ventures LS improvements include an additional Muffin Monster, wet well rehab/replacement, and potential improvements to mitigate the large amount of FOG present at the lift station.

Improvements needed at the WRF are based on the site assessment.

Recommended improvements have been prioritized for each scenario. Near-term improvements are necessary for the existing South WRF to stay in compliance with the existing FDEP Permit (FLA 014126) and continue to serve the existing and future customers within the next five years. The near-term improvements are recommended to be designed, permitted, constructed, and placed into operation within five years. Long-term improvements will provide reliability and increased capacity to serve future customers.

For all scenarios, the existing headworks and piping have major issues and have a high potential of failure. In addition, the WRF electrical evaluation included recommendations required immediately to keep the plant functioning properly.

For the cost comparison between the scenarios, budget opinions were developed for improvement projects based on 2021 dollars.

Scenario Nos. 2 and 3 will require the purchase or trade of land from Wellen Park. A high-level estimate was completed for inclusion of the cost comparison. Based on four recent past parcels sold from West Villages, an estimated cost per acre of land is approximately $33,000. This would equate to $1,155,000 for a 35-acre site. These costs were added to the total scenario costs as appropriate.

Scenario No. 1 – Improve and Expand the Existing (South) WRF

In Scenario No. 1, all flows will continue to be treated at the existing facility and flows from Sarasota County will be conveyed to and pumped by the Holiday Venture LS. As the future developments come online and flows increase, the facility will need to be replaced with a lift station of increased capacity.

The force main piping from Holiday Venture LS to the South WRF was analyzed based on minimum and maximum velocities. The results are that the existing pipelines will need to be replaced with 5.4 miles of 12-inch force main and 1,800 feet of 16-inch force main.

To treat the projected flows, the South WRF will need major upgrades and phased capacity expansions throughout the 20-year planning period. The total cost of the recommended improvements for Scenario No. 1 is projected to be $150,336,000.

The advantage of this scenario is that it maintains the existing Holiday Ventures LS and WRF operations and no additional staff would be required to operate the facilities. Disadvantages are that this scenario is comparatively costly, limits opportunities for use of reclaimed water without added infrastructure, and limits operational flexibility compared to Scenario No. 3.

Scenario No. 2 – Construct a new (North) WRF

In Scenario No. 2, all the flow will be conveyed and treated at the new North WRF located at the Winchester Property. The wastewater in the southern service area will be pumped north to the North WRF, reversing the flow in the system. The results of the Model analysis determined a lift station will be needed to pump flow to the North WRF from the southern portion of the service area. It was determined that the Holiday Ventures LS can be modified to repump the southern flows and will require 500 lineal feet of 16-inch force main installed and connected at Pine Street and Dearborn to tie the some western lift stations into the North WRF wastewater system.

This scenario requires a new WRF to be constructed which is a large capital expense. In addition, there are necessary interim improvements needed at the South WRF while the North WRF is being designed, permitted, and constructed.

The total projected cost of the recommended improvements for Scenario No. 2, including land cost, is $119,571,000.

An advantage of Scenario No. 2 is that the North WRF would be strategically located where the majority of new wastewater flow is expected to be added during the 20-year planning period, and therefore no major force main infrastructure needs to be installed. However, the reclaimed effluent storage is at the south location and effluent from a new north facility would need to be pumped south to be utilized in the south service area.

Scenario No. 3 – Rehabilitate the Existing (South) WRF and Construct a new (North) WRF

Scenario No. 3 is a hybrid of Scenario No. 1 and Scenario No. 2. For Scenario No. 3 the Sarasota County wastewater flows would be conveyed and treated at a new North WRF, and the Charlotte County flows would be conveyed and treated at the South WRF. Scenario No. 3 does not require an additional lift station or additional capacity since the majority of the existing northern flows will enter directly into the North WRF site. However, interim upgrades to the Holiday Venture LS existing wet well and screening are needed while the North WRF is being designed, permitted, and constructed.

There is minimal additional system pipeline infrastructure needed for this scenario. Approximately 500 lineal feet of 16-inch force main will be needed to tie-in existing western stations to the force main south of the North WRF site at Pine and Dearborn.

The total projected cost of the recommended improvements for Scenario No. 3, including estimated land cost, is $96,958,000.

Scenario No. 3 advantages include operational flexibility, and improved opportunities for utilization of treated effluent as reclaimed water. The disadvantage of this scenario is the need to maintain two wastewater facilities.

V. Recommended System

The projected costs for each of the three scenarios are shown in **Table 4.**

Table 4: Projected Scenario Cost

Scenario	Estimated Cost
No. 1 – All Flow to South WRF	$150,336,000
No. 2 – All Flow to North WRF	$119,571,000
No. 3 – Split Flow to North and South WRF	$96,958,000

Some projects will have the ability to be value engineered, or will have multiple options for reducing costs dependent on the conditions and needs at the time. In addition, incoming development capacity charges and accrued guaranteed revenue fees will assist in offsetting the costs especially of capacity needs and upgrades. For the future customers anticipated in the next twenty years, the estimated capacity charges ($3,334 per ERC) for 23,127 units is approximately $77,100,000. However, some of these projects will likely require additional funding due to the projects needing to be completed prior to the capacity charges being connected. There are many grants and low-interest rate loans currently available for funding planning, engineering, and construction of these types of projects. It is recommended to evaluate funding options prior to starting the larger projects.

Based on the lowest projected cost and operational flexibility, the most seamless construction phasing, and the lowest impact to the collection/transmission system infrastructure, we recommend proceeding with Scenario No. 3: the construction of a North WRF while maintaining an improved South WRF. This system is illustrated in **Figure 9**.

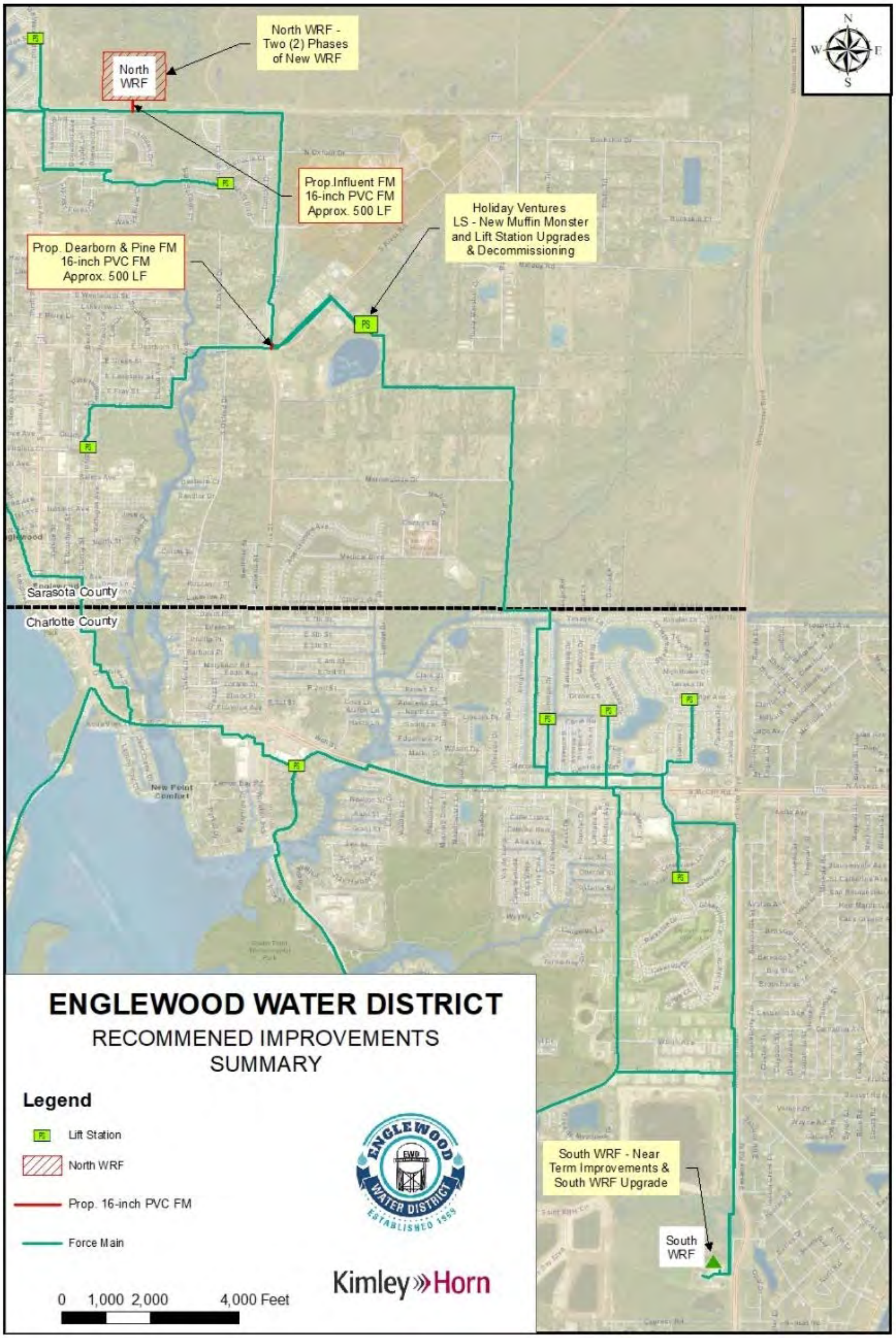


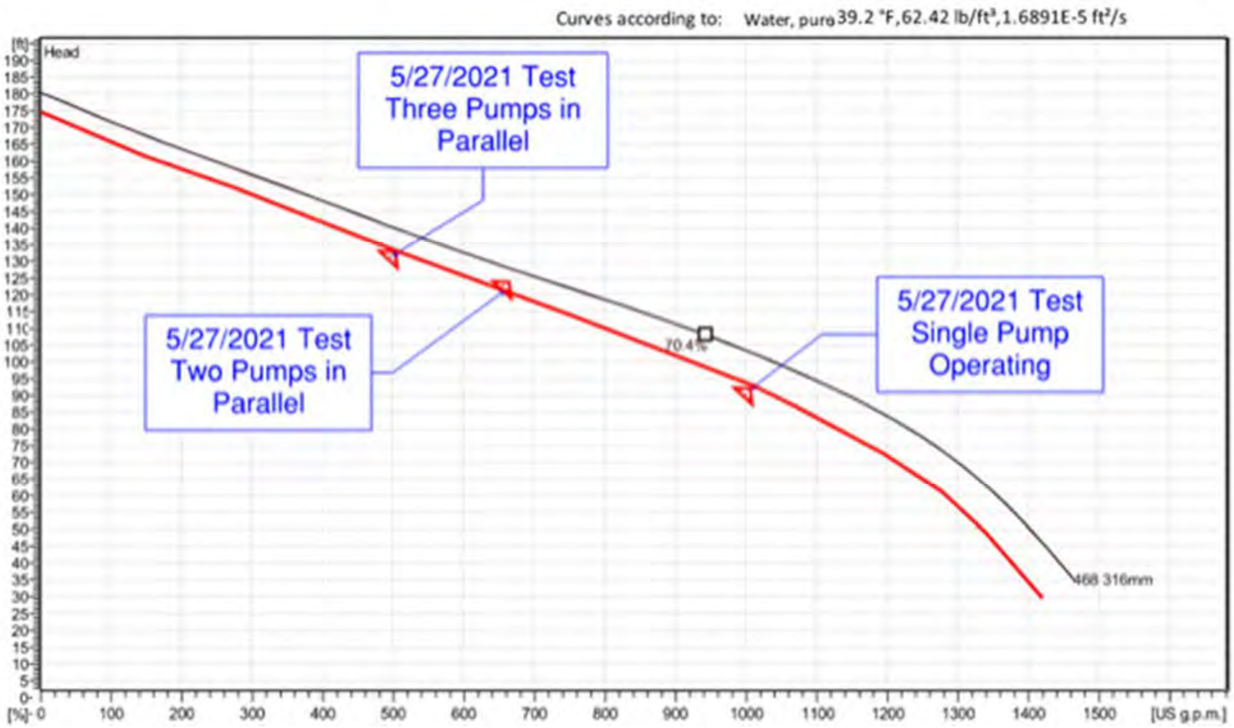
Figure 9: Recommended Wastewater System

APPENDIX A: HOLIDAY VENTURES PHOTOS OF NOTED DEFICIENCIES

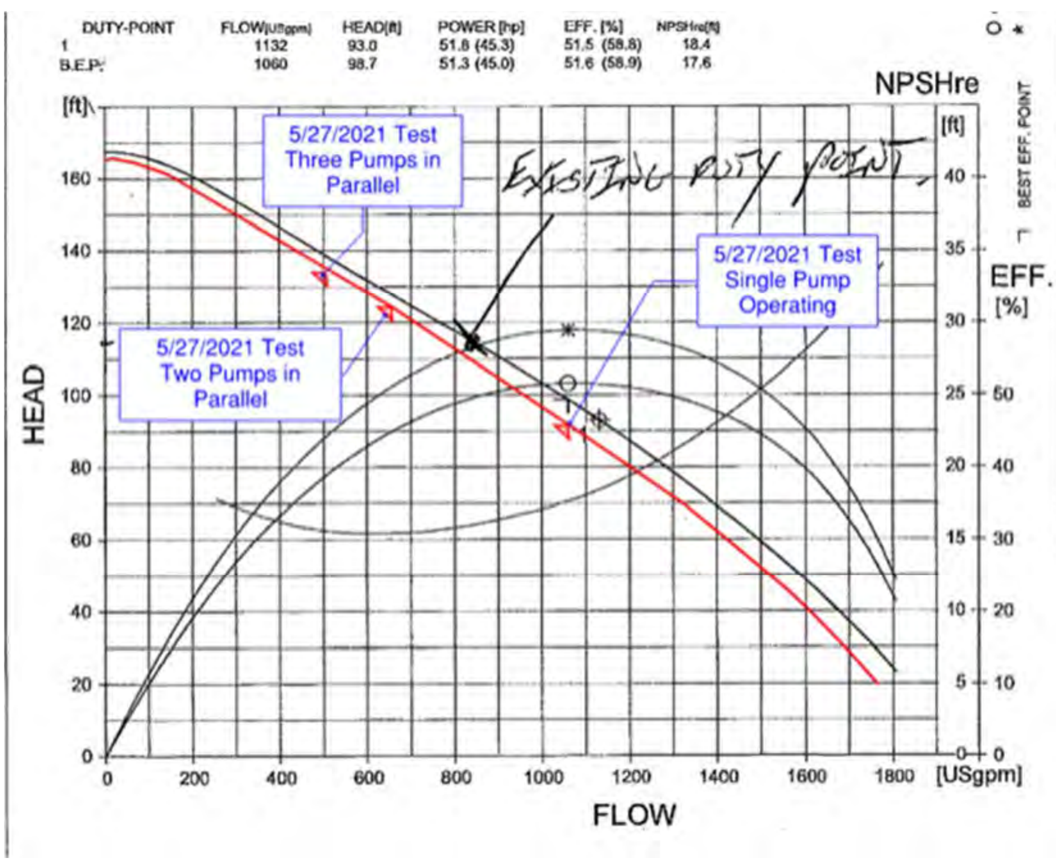
`

<table>
<tr><th colspan="3">Holiday Ventures LS (121) Visible Deficiencies</th></tr>
<tr><td rowspan="3">Wet Well</td><td>
1.</td><td>
2.</td></tr>
<tr><td>
3.</td><td>
4.</td></tr>
<tr><td colspan="2">1. Thick layer of fats, oil and grease.
2. Cracking in the wetwell liner with spalling on walls with visible aggregate
3. Spalling at joints between wetwell walls and top
4. Corrosion on exposed metal (guide rails and bolts) with concrete missing behind metal plate</td></tr>
</table>

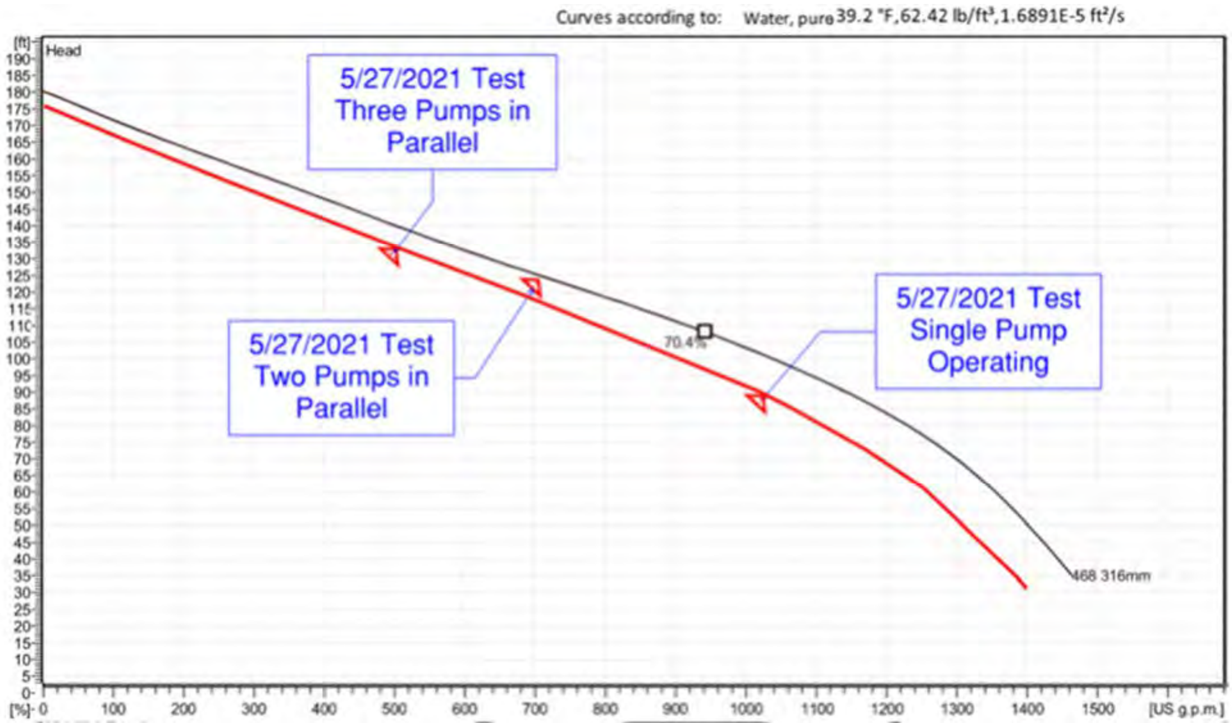
APPENDIX B: HOLIDAY VENTURES LIFT STATION CURVES DRAWDOWN TESTING MAY 27, 2021



Holiday Venture Lift Station May 27, 2021 Drawdown Test Results - Pump No. 1

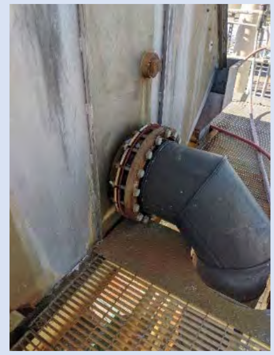
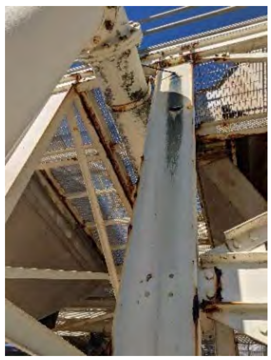
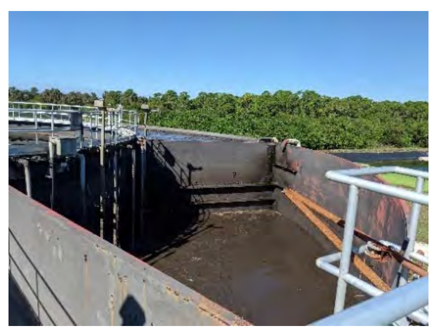


Holiday Venture Lift Station May 27, 2021 Drawdown Test Results - Pump No. 2



Holiday Venture Lift Station May 27, 2021 Drawdown Test Results - Pump No. 2

APPENDIX C: EWD WRF PHOTOS OF NOTED DEFICIENCIES

EWD WRF Visible Deficiencies		
Headworks	1. 	2. 
	3. 	4. 
	1. Screen 1 and associated piping with rust and corrosion 2. Significant rusting on headworks structure and at pipe connections 3. Rusting and corrosion at structural beams and support joints of headworks structure 4. Rusting and corrosion visible at base of screen	
Davco Plant No. 1	 1.	 2.
	1. and 2. Coating is fading and visible corrosion on steel walls	

Davco Plant No. 2	 1.	 2.
	1. Coating is fading and visible corrosion on steel walls 2. Air supply valve handles missing	
Reclaimed Pumping and Storage	 1.	
	1. Rust at base of vertical turbine reclaimed water pumps	
Dewatering	 1.	 2.
	1. & 2. Window frames have significant rust and corrosion	

APPENDIX D: ENGLEWOOD ELECTRICAL UPGRADES REPORT

WRF ELECTRICAL EVALUATION

ENGLEWOOD, FLORIDA

June 2021

IN PARTNERSHIP WITH

10620 GRIFFIN ROAD, SUITE 202 • COOPER CITY, FLORIDA 33328 • P. 954.448.7930 • F. 954.713.9959

Table of Contents

List of Figures

List of Tables

List of Abbreviations

Amp	Amperes
ATS	Automatic Transfer Switch
BEC	Bailey Engineering Consultants, Inc.
CIP	Capital Improvement Project
DC	Direct Current
EDB	Electrical Distribution Building
EOPCC	Engineer’s Opinion of Probable Construction Cost
FPL	Florida Power and Light
EV	Feasibility Study
G	Generator
GE	General Electric
HMI	Human Machine Interface
HP	Horsepower
KH	Kimley Horn
KVA	Kilovolt-Amperes

KW	Kilowatts
LE	Local Emergency
MB	Main breaker
MDP	Main Distribution Panel
MCC	Motor Control Center
MLO	Main Lugs Only
MTS	Manual Transfer Switch
PLC	Programmatic Logic Controllers
R&R	Renewal and/or Replacement
RTU	Remote Telemetry Units
SCADA	Supervisory Control and Data Acquisition
TM	Technical Memorandum
UPS	Uninterrupted Power Supply
V	Volts
W	Watts
WWTP	Wastewater Treatment Plant

Section 1: Executive Summary

The Englewood Water Reclamation Facility (WRF) was dedicated on November 17, 2005 and committed to recycling of Biosolids and reclaimed water. The WRF is rated for 3.0 MGD. The WRF consists of four (4) package treatment plants and is designed to produce effluent that meets or exceeds all State and Federal reclaimed water requirements. The WRF solids are pumped from the wastewater treatment plant to the centrifuge building and dewatered.

Kimley Horn (KH) and Bailey Engineering Consultants (BEC) were hired by the Englewood Water District (EWD) to assess the existing electrical and control systems operating the WRF. The electrical and control systems provide the basic requirement of powering and controlling the facility loads. However, there are issues with both systems that this report identifies. Basic recommendations are provided and estimated improvement costs are presented.

KH/BEC reviewed the following existing documents for the WRF:

- 2001 WRF Expansion Plans.
- 2006 Siemens WWTP no. 4 record drawings.
- 2009 WRF Expansion Plans.
- As built control panel drawings as available inside existing plant WRF control panels.
- WRF Electric Bills

KH/BEC's work included developing options to improve the existing electrical system reliability and to upgrade the existing PLC based controls to allow for networking and integration with an overall plant monitoring and control system. As part of this study, KH/BEC performed the following:

- Visited the site and observed the existing condition of the electrical and control systems.
- Reviewed existing record drawings.
- Reviewed existing electric bills to determine the WRF existing electrical demand.
- Provided conceptual design drawings for the proposed electrical single line diagram and PLC network improvements.
- Identified alternatives and recommendations relative to the work above.

The above work was the foundation for the assessments and recommendations contained in this report. Discussions were held with the EWD and basic ideas developed as a basis of the recommended improvements are outlined in this report. KH/BEC participated in Workshop 1, 2 and 3 on site where various ideas were developed and discussed. These discussions helped in shaping the recommendations contained in this report.

A set of evaluation criteria to determine the criticality for each identified improvement was developed. An equipment rating score ranging from one to four (1 is immediate replacement required and 4 is normal maintenance is required) was assigned to each improvement to reflect the overall equipment rating of the asset and the extent of the improvement needed. The approximate age of the infrastructure was determined from record drawings, field observations and staff input. The remaining useful life estimates were developed based on our visual observations and experience. Finally, a condition rating factor was assigned. The improvement time frames were adjusted after considering the actual age and criticality of equipment. Based on the evaluation criteria, KH/BEC categorized each recommended improvement as *Requiring Immediate Action, Requiring Action within the Next 5 Years* or *Requiring Action in the Next 5 to 10 Years*.

Requiring Immediate Action

The study results demonstrate that some electrical equipment and infrastructure require immediate replacement. KH/BEC has identified the projects that require this action for the facility to maintain adequate reliability. The total cost of these projects is estimated at $ 512,000.00

Requiring Action within the Next 5 Years

The study results demonstrate that some electrical equipment and infrastructure require replacement within the next five (5) years. KH/BEC has identified the projects that require this action for the facility to maintain adequate reliability. The total cost of these projects is estimated at $ 440,000.00.

Requiring Action in the Next 5 to 10 Years

The study results demonstrate that some electrical equipment and infrastructure require replacement within the next 5 to 10 years. KH/BEC has identified the projects that require this action for the facility to maintain adequate reliability. The total cost of these projects is estimated at $ 1,270,000.00.

Section 2: Introduction

2.1 Background

The main WRF electrical system is located outdoors centered in the middle of the WRF facility. Currently, the EWD is experiencing problems operating blowers due to main breaker issue with service 1. Also, electrical failures are common when lightning or electrical surge events occur. The WRF does not have a centralized monitoring and control system, as such, operators are required to manually monitor process performance and equipment run/fail status. Three (3) FPL transformers provide electrical service to the WRF. The picture in figure 2.1 shows the main WRF electrical system and the existing 1000 KW generator that serves the liquid and solids treatment processes of the WRF. The WRF Headworks is provided with emergency power from a separate generator (not pictured).

Figure 2.1. Overall Site Electrical System

2.2 Objective

The EWD has requested that KH/BEC perform an Electrical Evaluation (EV) that includes the investigation of the electrical system equipment reliability and overall condition of the existing equipment. This report will provide recommendations for various options for replacing the existing electrical and emergency power systems and improving overall operating deficiencies. The EV also provides cost estimates for the items recommended to be improved.

2.3 Project Scope

Specific scope elements included the following:

- Visiting the site and observing existing field conditions.
- Reviewing available existing record drawings and operation and maintenance (O&M) manuals.
- Performing conceptual layouts of proposed work.
- Identifying alternatives and recommendations relative to the work above.

Section 3: Existing Condition Assessment & Recommendations

KH/BEC visited the WRF on December 4th, 2020, February 16th, 2021 and May 27th, 2021 to observe the existing facility. The following assessments and observations were made:

- Observed the existing condition of the electrical and emergency power systems serving plants 1, 2, 3 and 4 and reclaimed water system.
- Observed the existing condition of the emergency power system serving the headworks facility.
- Observed the existing condition of the plant PLC control system.
- Reviewed available existing record drawings.
- Performed a conceptual layout of the proposed work, including new electrical equipment layouts and potential emergency power source connectivity.

3.1 Existing Electrical Distribution

The WRF is currently served from three (3) separate 480 volt, 3ϕ, 4W, FPL pad mounted transformers. Section 5 tables 1, 2 and 3 identify the loading on each of these transformers.

3.1.1 North Transformer (Transformer 1)

The loads connected to the north transformer are shown on drawing E-1. This transformer feeds electrical service no. 1, electrical service no. 2, MCC-3A/3B (solids building), effluent pump station and the headworks. The following issues were noted:

- The 800 amp service no. 1 main breaker is an 80% rated thermal magnetic breaker and is located in direct sunlight in a stainless steel enclosure. Excessive heat is causing this breaker to derate. This is impacting operations.
- The load side feeders fed from the 800 amp service are showing signs of overheating. This is caused by loading of the cable connection and requires attention.
- MCC-3B is not provided with emergency power. This MCC serves all the WRF centrifuges and Effluent Pumps 2 and 3.
- There is a manual transfer scheme between effluent pumps 1 and 2 that allows effluent pump 2 to be operated from the effluent pump no. 1 VFD. Operation of this feature was tested during our last visit. Plant staff participated in this test.
- There are no 480 volt surge protection devices located on any of the main breakers or sub feed fused switches serving plant loads.
- There are no 480 volt surge protection devices located on MCC-3A or MCC-3B.
- There are no surge protection devices for 120 volt lighting panels.
- The grounding system resistance for services 1 and 2 should be checked. The ground rods do not appear to be deep enough. There was play when movement of the ground rod was attempted by hand. These services are installed on manmade dirt elevations. Grounds should extend 10 feet minimum into the original site grade.
- There is a single ground connection to the Plant 1 thru 4 electrical building. This connection is corroded.

3.1.2 South Transformer (Transformer 2)

The loads connected to the south transformer are shown on drawing E-2. This transformer serves electrical service no. 3 which serves treatment plant no. 4. The following issues were noted:

- There are no 480 volt surge protection devices located on the fused switches serving the plant 4 loads.
- There are no surge protection devices for 120 volt lighting panels.
- The grounding system resistance for service 3 should be checked. The ground rods do not appear to be deep enough. There was play when movement of the ground rod was attempted by hand. These services are installed on manmade dirt elevations. Grounds should extend 10 feet minimum into the original site grade.

3.1.3 West Transformer (Transformer no. 3)

The loads connected to the West transformer are shown on drawing E-2. This transformer serves electrical service no. 4. The two reclaim pond pumps are fed from this service. The following issues were noted:

- There are no 480 volt surge protection devices located on the main fused switch or on the starter control panels.
- There are no surge protection devices for 120 volt lighting loads.
- The grounding system resistance for service 4 should be checked. The ground rods were not evident by visual observation.

3.1.4 Existing Emergency Power System

The existing standby power system consists of two (2) generators. Generator No.1 is rated at 1,000 KW and was manufactured in 2001. This generator feeds the majority of the WRF process treatment loads. Generator No. 2 is rated at 250 KW. This generator serves the headworks facility. Generator No. 1 is having issues providing reliable service.

Section 4: Facility Assessment

This section presents the WRF electrical infrastructure equipment assessment. The equipment assessment is a combination of the equipment condition assessment and the overall reliability assessment. The condition assessment takes into account age, projected remaining useful life and projected performance over a 10-year planning horizon. The reliability assessment compares the installed equipment's design to Class 1 electrical system design standard as required by EPA. The two (2) evaluation criteria provide a broad assessment of electrical equipment which can serve as a basis for the planning and development of improvement projects. This equipment rating was used to develop infrastructure renewal and/or replacement (R&R) recommendations and to allow the EWD to budget for future projects. These assessments were performed for the following treatment processes and components:

- Electrical Services 1, 2, 3 and 4.
- MCC-3A/3B (Effluent Pumps and Centrifuges).
- Headworks Electrical System.
- MCC-1, 2, 3 and 4 located in the north electrical building.
- Emergency Generator No. 1.
- Emergency Generator No. 2.

4.1 Condition Assessment

The condition assessment included visual inspections and qualitative field evaluations of the electrical and emergency power systems. KH/BEC visited the facilities, met with staff and discussed the electrical and emergency power systems' operation and maintenance history. EWD input regarding condition, operations, maintenance issues and recent improvements was considered when determining the overall condition rating.

The objective of the field evaluation was to collect sufficient information to:

- Document the general condition of the electrical and emergency power systems.
- Determine the type of improvement and whether the component/structure needed renewal, replacement or further investigation.
- Estimate the condition and remaining useful life of the equipment.
- Estimate the time frame required for the improvement.
- Develop a budgetary estimate of probable cost to implement the recommendation.

4.2 Reliability Assessment

The reliability assessment included identifying design criteria for the existing electrical system. This criteria was compared to EPA guidelines for the "Design Criteria for Mechanical, Electric, and Fluid System and Component Reliability" for Wastewater Treatment Facilities. Facilities providing Class 1 reuse are required to meet Class 1 reliability guidelines for the electrical system. The following outlines the electrical system requirements required to meet this criteria.

"The electrical distribution design criteria should include considerations for reliability, maintainability and safety. To provide for reliable distribution, the system should be designed with two independent sources of power and protection from common mode failure. These sources are generally two totally independent utility sources or a utility service and sufficient standby power, to allow complete operation of the plant in order to meet discharge permit requirements."

The key areas of interest are as follows:

- Power sources and transformers are to be distributed and arranged to avoid common mode failures.
- No single fault or loss of power will disrupt power to more than one MCC. Loads of the same type are to be divided among at least two (2) MCCs.

4.3 Equipment Assessment

The electrical equipment assessment took into account equipment condition and reliability. KH/BEC performed visual observations and reviewed design concepts in order to provide our equipment rating. The following areas of interest were our focus:

- Age or Wear-Related Deterioration - Identify the presence of general deterioration.
- Obsolescence - Based on current industry technology or the general ability for manufacturers to support the observed equipment.
- Operational Issues - Identify based on visual inspection and input from staff.
- Reliability Issues – Identify the subsequent effect on the treatment process when an electrical component fails.

4.4 Electrical Evaluation

General Guidelines in this section provide a condition rating for each component evaluated. The condition rating is a numerical value from 1 to 4 as noted in table 4-1 below that reflects the equipment rating and the extent of the improvement needed.

Table 4-1. Electrical Equipment Condition Rating

Condition Rating	Condition	Description of Condition
1	Very Poor	Component requires immediate replacement
2	Poor	Significant maintenance required
3	Fair	Minor maintenance required
4	Good	Normal maintenance required

4.4.1 Existing Generator No. 1

This existing generator serves electrical services 1, 2 and 3. 2 – 800 amp breakers are unit mounted on this generator. These 2 breakers serve the emergency side of the 2 - 800 amp automatic transfer switches (ATS'). The reliability of this generator has been steadily declining and the operations staff has reported that keeping this unit in operation is more difficult and costly due to the age and availability of system components. This equipment's failure will jeopardize the emergency power system for the entire treatment process.

Figure 4-1. Generator No. 1

Description	Component
Quantity	1
Manufacturer	Detroit Diesel
Size	1000 KW
Equipment Rating	1
Remaining Useful Life	0-1 year
Criticality	Immediate Replacement Recommended

4.4.2 Electrical Service No. 1

This electrical service is shown on drawing E-1. It is a commercial grade design utilizing a common gutter and cable splices to feed multiple fused switches on a single rack. A single cable fault in the gutter would take out all equipment that this service feeds. This service does not provide Class 1 reliability in accordance with EPA guidelines.

Figure 4-2. Service #1

Description	Component
Quantity	See drawing E-1 for equipment identification.
Manufacturer	Square D
Service Size	800 amps
Equipment Rating	3
Remaining Useful Life	5-10 years
Criticality	Moderate

4.4.3 Service No. 1 Main Breaker

The 800 amp main breaker is an 80% rated thermal magnetic breaker. This breaker will not carry more than 600 amps. 800 amps of continuous electrical service is required to allow EWD staff to operate the required blowers and effluent pumps simultaneously. It is recommended that this breaker be replaced with a solid state breaker. Solid state breakers do not derate with heat.

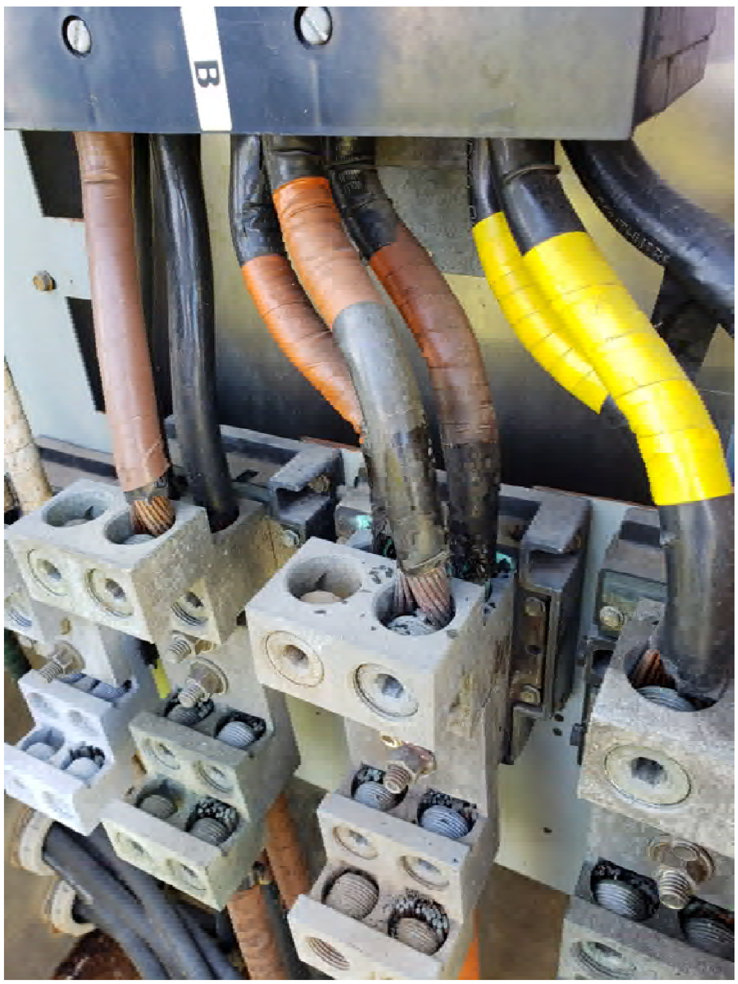
Figure 4-3. Service No. 1 Main Breaker

Description	Component
Quantity	1
Manufacturer	Square D
Size	800 amps
Equipment Rating	1
Remaining Useful Life	0-1 Year
Criticality	Immediate Replacement Recommended

4.4.4 Service No. 1 Main Breaker Load Side Cables

The incoming feeders to the service no. 1 main breaker show signs of deterioration due to heat. This is most likely caused by loose wire terminations. These cables should be replaced immediately.

Figure 4-4 Service No. 1 Load Side Cables	
Description	**Component**
Quantity	1
Manufacturer	Square D
Size	800 amps
Equipment Rating	1
Remaining Useful Life	0-1 year
Criticality	Immediate Repair Recommended

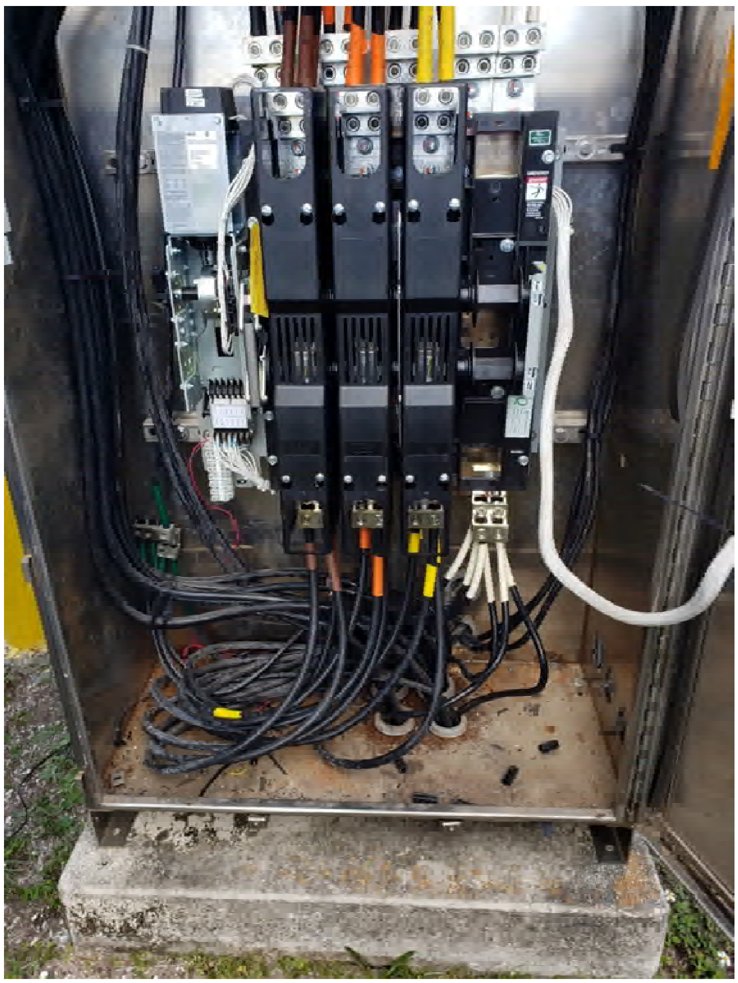


4.4.5 Service No. 1 ATS-1

Service No. 1 ATS-1 is in good condition. This ATS is served from an 800 amp, 3P breaker located in the generator 1 enclosure.

Figure 4-5 Service #1 ATS

Description	Component
Quantity	1
Manufacturer	ASCO
Bus Size	800 amps
Equipment Rating	3
Remaining Useful Life	5-10 Years
Criticality	Moderate



4.4.6 Service No. 2 ATS-2

Service No. 2 ATS is in good condition. This ATS is served from an 800 amp, 3P breaker located in the generator 1 enclosure.

Figure 4-6. Service #2 ATS

Description	Component
Quantity	1
Manufacturer	GE Zenith Controls
Bus Size	800 amps
Equipment Rating	3
Remaining Useful Life	5-10 Years
Criticality	Moderate

4.4.7 Electrical Service No. 2

This electrical service is shown on drawing E-1. It is a commercial grade design utilizing a common gutter and cable splices to feed multiple fused switches on a single rack. A single cable fault in the gutter would take out all equipment that this service feeds. This service does not provide Class 1 reliability in accordance with EPA guidelines. A 600 amp feeder breaker on the rack provides emergency power to Service No. 3.

Figure 4-7. Service # 2

Description	Component
Quantity	2
Manufacturer	Square D
Bus Size	800
Equipment Rating	3
Remaining Useful Life	5-10 Years
Criticality	Moderate

4.4.8 Electrical Service No. 3

This electrical service is shown on drawing E-2. It is a commercial grade design utilizing a common gutter and cable splices to feed multiple fused switches on a single rack. A single cable fault in the gutter would take out all equipment that this service feeds. This service does not provide Class 1 reliability in accordance with EPA guidelines.

Figure 4-8. Service # 3

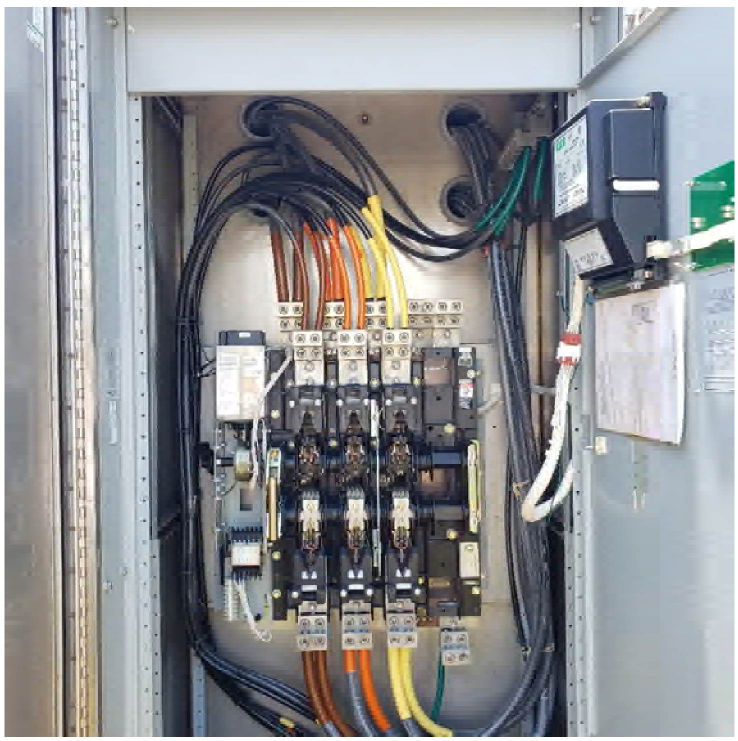
Description	Component
Quantity	2
Manufacturer	Square D
Bus Size	800
Equipment Rating	3
Remaining Useful Life	5-10 years
Criticality	Moderate

4.4.9 Service No. 3 ATS-3

Service No. 3 ATS-3 is in good condition. This ATS is served from a 600 amp, 3P fused switch located on the service no. 2 lineup.

Figure 4-9. Service #3 ATS

Description	Component
Quantity	1
Manufacturer	ASCO
Bus Size	800 amps
Equipment Rating	3
Remaining Useful Life	5-10 Years
Criticality	Moderate



4.4.10 Electrical Service No. 4

This electrical service is shown on drawing E-2. This service feeds 2 reuse pond pumps. The operation of these pumps is not critical to plant operations. This service does not need to provide Class 1 reliability.

Figure 4-10. Service # 4

Description	Component
Quantity	1
Manufacturer	Square D
Bus Size	200
Equipment Rating	4
Remaining Useful Life	10+ Years
Criticality	Minor

4.4.11 MCC-3A/3B

This MCC is located in the solids building in the second floor electrical room. The MCC is in good condition and is currently providing reliable service. VFDs are located inside the MCC. The VFDs can be easily replaced should a failure occur.

Figure 4-11. MCC-3

Description	Component
Quantity	1
Manufacturer	Square D
Bus Size	1200 amps
Equipment Rating	4
Remaining Useful Life	10+ Years
Criticality	Minor

4.4.12 Headworks Electrical

This service is fed from transformer #1. The main fuse switch and the gutter are old and unreliable. The gutter feeds MCC-2 located in the air conditioned Headworks electrical building. This original gutter installed electrical equipment should be removed and the associated equipment re fed from MCC-2. The service feeders should be reconfigured to serve the MCC-2 main breaker.

Figure 4-12. Headworks Electrical

Description	Component
Quantity	1
Manufacturer	Varies
Bus Size	800 amps
Equipment Rating	2
Remaining Useful Life	0-5 Years
Criticality	Significant

4.4.13 Headworks MCC-2

This MCC is in good condition and is fed from the existing Headworks wiring gutter. The gutter is old and unreliable. The service feeders should be re configured to serve the MCC-2 main breaker

Figure 4-13. Headworks MCC-2

Description	Component
Quantity	1
Manufacturer	ASCO
Bus Size	800 amps
Equipment Rating	3
Remaining Useful Life	5-10 Years
Criticality	Moderate

4.4.14 Headworks ATS

The headworks ATS is in good condition. This ATS is served from a 250 KW Generator.

Figure 4-14. Headworks ATS

Description	Component
Quantity	1
Manufacturer	ASCO
Bus Size	800 amps
Equipment Rating	3
Remaining Useful Life	5-10 Years
Criticality	Moderate

4.4.15 Headworks Generator

Generator is currently providing reliable service to the headworks area.

Figure 4-15. Headworks Generator	
Description	**Component**
Quantity	2
Manufacturer	Cummins / Detroit Diesel
Bus Size	250 KW
Equipment Rating	3
Remaining Useful Life	5-10 Years
Criticality	Moderate

4.4.16 Blowers 1, 2, 3 and 4 Motor Starters

These blowers are fed from across the line motor starters. It is recommended that any motor over 50 HP be served by a reduced voltage motor starter. These reduced voltage motor starters can be retrofitted into the existing enclosure until MCC replacement can be budgeted.

Figure 4-16. Blower Starters

Description	Component
Quantity	4
Manufacturer	Challenger
Bus Size	800
Equipment Rating	2
Remaining Useful Life	0-5 Years
Criticality	Significant

4.4.17 Reclaim Pump Station PLC

The reclaim pump station PLC is a Koyo Direct 205. This PLC does not have on board Ethernet and is no longer being supported by Koyo. Replacement in the near term should be budgeted.

Figure 4-17. Reclaim Pump- Station PLC

Description	Component
Quantity	1
Manufacturer	Unknown
PLC Type	Koyo 205
Equipment Rating	2
Remaining Useful Life	0-5 Years
Criticality	Significant

4.4.18 Sludge Pump Control Panel

The sludge pump PLC is a Koyo Direct 205. This PLC does not have on board Ethernet and is no longer being supported by Koyo. Replacement in the near term should be budgeted.

Figure 4-18. Sludge Pump CP

Description	Component
Quantity	1
Manufacturer	Unknown
PLC Type	Koyo 205
Equipment Rating	2
Remaining Useful Life	0-5 Years
Criticality	Significant

4.4.19 Centrifuge No. 1 PLC

The centrifuge PLC is controlled by an Allen Bradley CompactLogix L18ER PLC. This PLC does not have on board Ethernet and is no longer being supported by Koyo. Replacement in the near term should be budgeted.

Figure 4-19. Centrifuge No. 1 PLC

Description	Component
Quantity	1
Manufacturer	Allen Bradley
Bus Size	N/A
Condition Rating	2
Remaining Useful Life	0-5 Years
Criticality	Significant

4.4.20 Centrifuge 2 and 3

The centrifuge PLC is controlled by an Allen Bradley CompactLogix L32E PLC. This PLC will need to be upgraded to provide Ethernet communication.

Figure 4-20. Centrifuge No. 2 and 3 PLC

Description	Component
Quantity	2
Manufacturer	Allen Bradley
Bus Size	N/A
Equipment Rating	2
Remaining Useful Life	0-5 Years
Criticality	Significant

4.4.21 Disk Filter 1

The Disk Filter No. 1 Micrologix 1400 PLC. This PLC does not have on board Ethernet but it can be added.

Figure 4-21.   Disk Filter No. 1 PLC

Description	Component
Quantity	1
Manufacturer	Allen Bradley
Bus Size	N/A
Condition Rating	2
Remaining Useful Life	0-5 Years
Criticality	Significant

4.4.22 Disk Filter 2 and 3 PLC

The Disk Filters No. 2 and 3 are Allen Bradley SLC Series 5. These PLCs are obsolete and require replacement.

Figure 4-22. Disk Filter 2 and 3 PLC

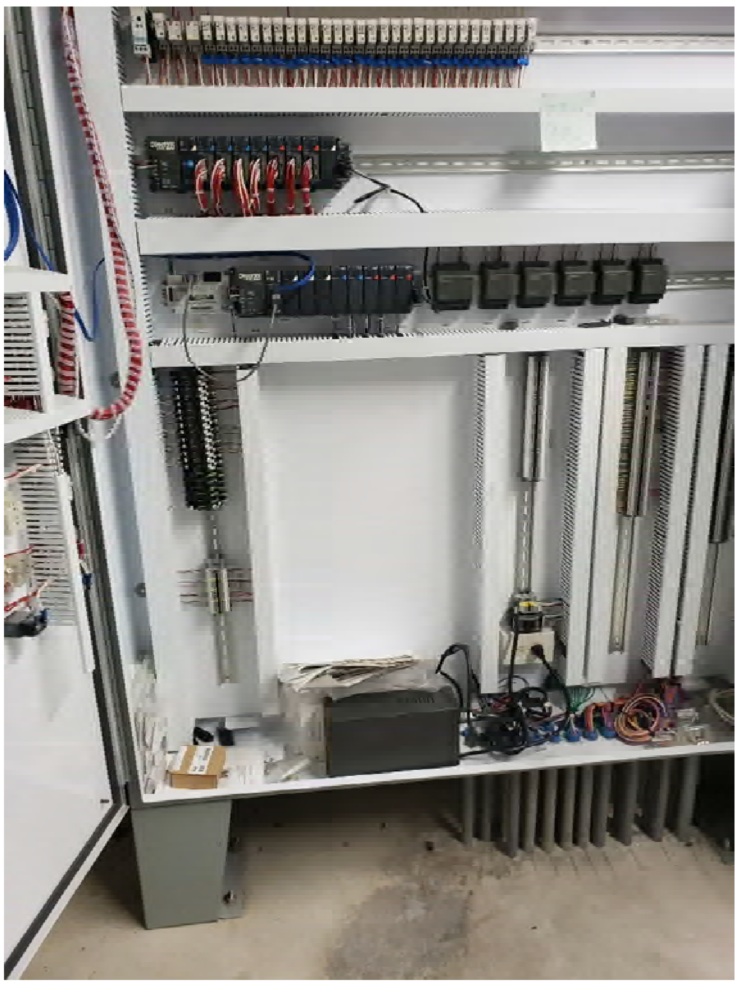
Description	Component
Quantity	1
Manufacturer	Allen Bradley
Bus Size	N/A
Equipment Rating	2
Remaining Useful Life	0-5 Years
Criticality	Significant

4.4.23 Plant 4 PLC

KOYO PLC Direct processors. These PLCs are outdated and cannot be upgraded to provide remote PLC monitoring from a central HMI interface

Figure 4-23. Plant 4 PLC

Description	Component
Quantity	1
Manufacturer	Koyo
Bus Size	N/A
Condition Rating	1
Remaining Useful Life	0-5 Years
Criticality	Significant



4.4.24 Process MCCs MCC-1 section 1 and MCC-1 section 2 and MCC-4 (Plant 4)

KOYO PLC Direct processors. These PLCs are outdated and cannot be upgraded to provide remote PLC monitoring from a central HMI interface

Figure 4-24. Plant 1, 2 and 3 MCCs

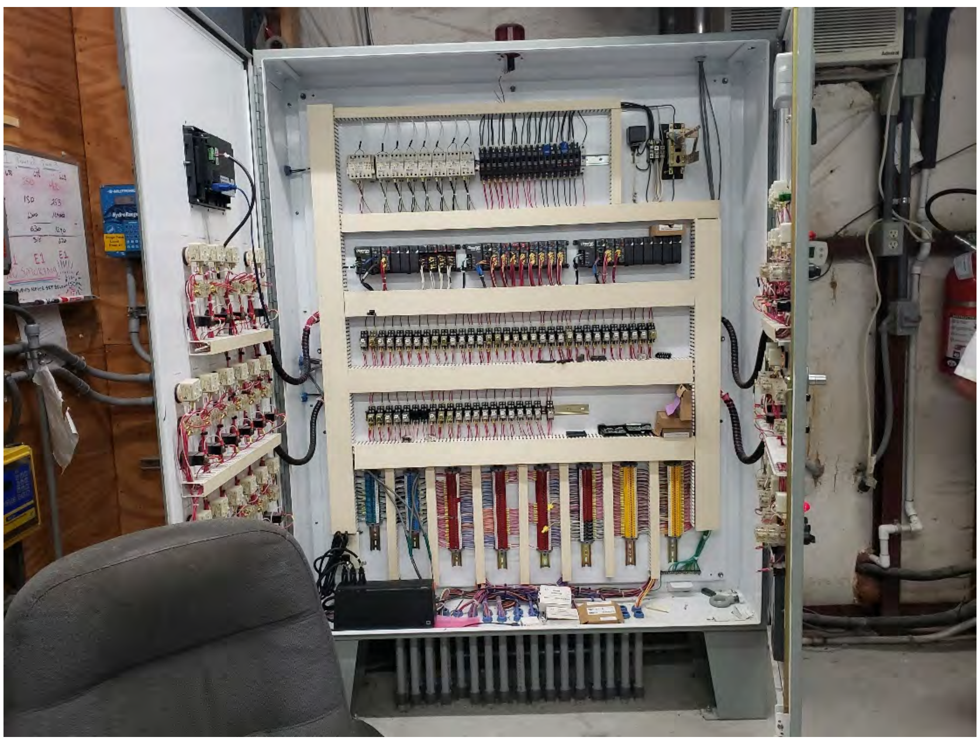
Description	Component
Quantity	1
Manufacturer	Square D
Bus Size	800
Equipment Rating	3
Remaining Useful Life	5-10 Years
Criticality	Moderate

4.4.25 Plant 1, 2 and 3 PLC

KOYO PLC Direct processors. These PLCs are outdated and cannot be upgraded to provide remote PLC monitoring from a central HMI interface.

Figure 4-25. Plant 1, 2 and 3 PLC

Description	Component
Quantity	1
Manufacturer	Koyo
Bus Size	N/A
Condition Rating	1
Remaining Useful Life	0-5 Years
Criticality	Significant



Section 5: Electrical Load Evaluation and Discussion

Table 5-1 identifies the loading for the North transformer #1. This transformer serves the majority of the WRF loads. 680 KW is the highest measure loading over the period noted.

Table 5-1. Account No. 06116-80190 Loading	
Month/Year	Max Demand (Kw)
February 2021	539
January 2021	526
December 2020	594
November 2020	575
October 2020	552
September 2020	582
August 2020	557
July 2020	569
June 2020	643
May 2020	590
April 2020	672
March 2020	680
February 2020	678
January 2020	637

Table 5-2 identifies the loading for the South transformer #2. This transformer serves plant 4. This plant was off line during the billing noted below. It is estimated that this plant will measure approximately 150KWs of demand when on line.

Table 5-2. Account No. 10989-61053 Loading	
Month/Year	Max Demand (Kw)
February 2021	Not Available*
January 2021	Not Available*
December 2020	Not Available*
November 2020	Not Available*
October 2020	Not Available*
September 2020	Not Available*
August 2020	Not Available*
July 2020	Not Available*
June 2020	Not Available*
May 2020	Not Available*
April 2020	0

Table 5-2. Account No. 10989-61053 Loading	
Month/Year	Max Demand (Kw)
March 2020	0
February 2020	2
January 2020	2

*General Service – Non-Demand. Demand KW not available on FPL bill.

Table 5-3 identifies the loading for the West transformer #3. This transformer serves the 2 reuse pond pumps. 101 KW is the highest measure loading over the period noted.

Table 5-3. Account No. 49751-96504 Loading	
Month/Year	Max Demand (Kw)
February 2021	78
January 2021	80
December 2020	83
November 2020	69
October 2020	84
September 2020	85
August 2020	61
July 2020	45
June 2020	49
May 2020	47
April 2020	47
March 2020	49
February 2020	49
January 2020	101

5.1 Summary

An estimated service size for any facility upgrade should allow for the highest KW demand for all 3 meters combined, plus any future loading, multiplied by a 125% safety margin. Utilizing this criteria the loading will be:

- Table 5-1 Highest Demand 680 KW (850 KVA)
- Table 5-2 Highest Demand 150 KW (estimated)
- Table 5-3 Highest Demand 101 KW (126 KVA)

Based on the above the replacement normal and emergency power system should be capable of operating approximately 1200 KVA continuously. The recommendations outlined in section 6 are based on this estimate of facility loading.

Section 6: Electrical System Improvements

6.1 Electrical System Criteria

The primary focus of these electrical system improvements is to achieve gains in overall electrical system reliability and improve the overall system's operational abilities. KH/BEC has identified that the existing electrical system does not provide EPA defined Class 1 Electrical Reliability. Based on EPA guidelines for facilities of this type producing Class 1 reuse, it is recommended that a dual main electrical service be implemented for this facility. In order to implement Class 1 reliability the existing electrical power system will need significant improvements in the near term. The following serves to identify options for achieving these improvements.

6.2 Normal Power System Recommendations

In order to serve 1200 KVA of estimated facility loading identified in section 5 above and to implement Class 1 electrical service to the extent economically feasible, we are recommending that two new electrical services be provided. Drawing E-5 shows the connections for these new services. Dual 1600 amp services are recommended. Each service will consist of a main breaker, ATS and MCC. The services will be interconnected after the ATS' to permit complete WRF operations in the event a single ATS or primary feeder is out of service. A single 1600 amp main breaker is capable of serving 1250 KVA (1250 HP) of loading continuously.

The new electrical service equipment is recommended to be installed in an air conditioned building. Drawing E-6 provides preliminary layout of the proposed electrical equipment and estimated building sizes. This building size can be accommodated by precast electrical buildings. E-5 shows the proposed refeed strategy of the existing facility loads.

6.3 Emergency Power System Recommendations

Two (2) existing generators serve the WRF facility. It is understood that the EWD will be replacing the existing 1000KW generator in the near future. We recommend that this generator size be increased due to the possibility of increased nonlinear VFD loading that may occur in the future. KH/BEC recommends that the 1000KW generator be upsized to a 1200 KW generator.

The second existing generator is a 250 KW generator serving the headworks electrical system. Our current recommended design serves the existing headworks electrical system from the new MCC-1. This allows the headworks electrical system to be served from generator no. 1 should generator 2 fail. In the future when the headworks generator is replaced, we would recommend upsizing this generator and connecting it to the new ATS-2 located in the new electrical building.

Section 7: Control System Improvements

7.1 Current state of Control System

The primary focus of the control system improvements is to achieve gains in overall control, monitoring and network system performance and reliability with minimal disruption to operations. These additions will improve the overall system's operations and availability. KH/BEC has identified that the existing control system is an aging system with the following critical items that need attention:

- Discontinued PLC parts and the risk of unplanned downtime and consequences (i.e. loosing PLC program).
- No interconnecting plant networks. Lacks an interconnected network across the PLC control panels that control and monitor the different facility processes. Operator does not have the ability to monitor and access all systems from a centralized location.
- No scalable architecture for future growth or upgrades.
- No SCADA system for monitoring and controlling effectively and efficiently.
- No historian, alarming or reporting capabilities.
- No inherent security or robustness in control system

7.2 Control System Improvement Criteria

The following serves to identify options for modernization:

- Available replace in place modern PLC modules for improved and low risk upgrade with minimal operation downtime.
- Secure wired or wireless options for interconnected network across all PLC panels in the plant.
- Suitable SCADA options available with modular flexible options.
- Visibility, historian, alarming and reporting from control room and mobile devices with the proper security clearance.
- Cybersecurity and scalable PLC, Network and SCADA architecture.

7.3 PLC modernization Recommendations

For the Automation Direct Logic PLC platform used in the majority of the plant, there are two options to proceed with that will minimize cost and time for upgrading:

- Automation Direct Do-more H2 PLC module replacement to the Direct Logic 260 PLC that is currently installed in the PLC control panels.
- Automation Direct “CLICK PLUS” series PLC complete chassis and modules replacement to the Direct Logic 260 PLC chassis and modules that are currently installed in the PLC control panels.

The Do-more H2 Series PLC is the newest technology available that uses proven DirectLOGIC PLC DL205 hardware for a flexible control platform, but with more powerful and faster performance. Do-more PLCs provide the following benefits:

- Do-more Designer – Programming software for Do-more PLCs.
- User-friendly programming instruction set.
- Minimal invasive changes to existing PLC chassis and operations.
- Built-in Data Logging.

- Easy PID setup.
- Serial/Ethernet Communication.
- Integrated Security.
- Free Online Training.
- Free PLC development Software.

The CLICK PLUS PLC Series combines the simplicity of the older platforms with advanced features including data logging, Wi-Fi connectivity, and increased security measures. This hardware platform allows for scalable architecture that will promote a more optimal and efficient operations allowing for savings on energy and chemical consumption while reducing operations and maintenance costs. The CLICK PLUS series offers the additional benefits over the Do more PLCs:

- High-speed inputs standard on discrete input internal I/O modules.
- Stackable I/O.
- MQTT communication and data logging.
- Enhanced security to minimize vulnerabilities.
- Free software with simple instruction set
- WiFi features for installation and programming.

Allen Bradley PLC modernization should continue in the Centrifuge and Disk Filter control panels.

7.4 Network modernization Recommendations

With the upgraded PLC in the control system being the first step towards an improved control and monitoring system, the next step is the Network modernization.

Below are two options presented along with the control system block diagrams attached:

Option A – Drawing I-1 shows the Control System Block Diagram as a WIRED Ethernet network connecting the PLC control panels throughout the plant together and to the proposed SCADA system.

PROS

- Fiber or Copper Ethernet connections make for a robust and reliable network.

CONS:

- Very costly to trench, run conduit and cables then terminate.
- Very time consuming.
- More vulnerable to physical damage.

Option B – Drawing I-2 shows the Control System Block Diagram as a WIRELESS Ethernet network connecting the PLC control panels throughout the plant together and to the proposed SCADA system through wireless secured industrial radios.

PROS:

- Wireless radio connections make for an easy and quick interconnected and reliable network once a radio study confirms lines of sight (No obstructions).
- More cost effective than wired.
- Less installation time.

CONS:

- Relies on line of sight and radio study first to prove viable.
- Less reliable.

7.5 Security modernization Recommendations

The PLC and Network architecture needs to be secured as the supervisory control and data acquisition control SCADA enables the operators to monitor and control the facility treatment processes. The recommended approach is to secure the systems both logically and physically.

- Hardwired intrusion switches to each PLC control panel. network interconnecting panel and SCADA network panel.
- Intrusion Monitoring and Alarming capability for local OIT and SCADA.
- Utilizing industry standard secure managed ethernet switch to interconnect PLC and SCADA systems.
- Configure and segment the network utilizing latest applicable Cybersecurity industry standards.

7.6 SCADA modernization Recommendations

With a secured interconnected modernized control system, a modern SCADA to augment the control system is a vital integration step. It provides visibility and controllability to a central location where the authorized operator has an up to date status on all equipment in the treatment process.

Our recommendation would be a PLC based SCADA solution. Our choice based on performance and functionality is VT SCADA. VTScada's hardware independence and open connectivity support all major PLCs provide an advancement over polling with Master PLCs.

VTScada integrates all core HMI SCADA software features into a single, easy-to-use package. It is also a cost-effective solution with scalable capabilities.

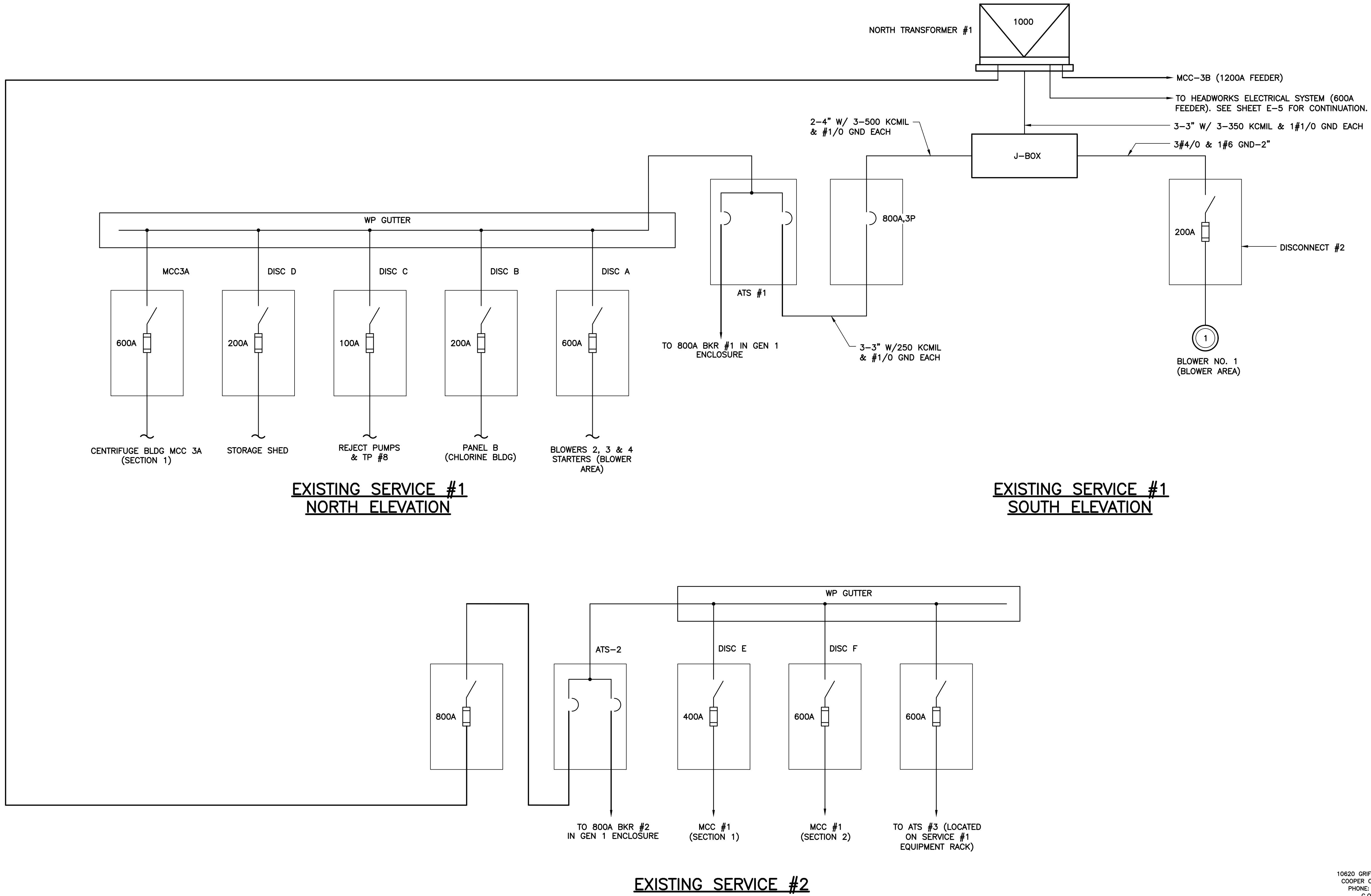
Section 8: Summary and Engineer's Opinion of Probable Construction Cost (EOPPC)

8.1 Engineer's Opinion of Probable Construction Cost (EOPCC)

The costs estimated in the table below are budget estimates. They were developed for use in budget or CIP planning.

Table 8-1. EOPCC			
Improve-ment	Description	Planning Time Frame (Years)	Cost
1	Replace Main Breaker with solid state option	Immediate	$38,000
2	Replace main breaker load side feeders	Immediate	$16,000
3	Replace Generator 1 – 1200 KW	Immediate	$375,000
4	Install surge protection (Each MB, remote MCC incoming and Lighting Panels)	Immediate	$40,000
5	Enhance grounding at service 1, 2 and 3	Immediate	$28,000
6	Test All 480 Power Cable 100 amp and larger	Immediate	$15,000
7	Upsize blower 2,3 and 4	0-5	$25,000
8	Headworks Electrical Improvements	0-5	$145,000
9	PLC Replacements (upgrades)	0-5	$125,000
10	HMI (SCADA) Addition (VT SCADA) plus wireless interface	0-5	$145,000
11	Replace Generator 2- 250KW	5-10	$75,000
12	Place ATS 1, 2 and 3	5-10	$95,000
13	Replace main electrical equipment for services 1, 2 and 3 per E-5 and E-6.	5-10	$750,000
14	Replace MCCs,(Eff, Headworks and Process)	10+	$350,000
		TOTAL	$2,222,000

Appendix A: Preliminary Drawings



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KHA PROJECT	148896002
DATE	JUNE 2021
SCALE	AS SHOWN
DESIGNED BY	SEB
DRAWN BY	DAC
CHECKED BY	SEB

ENGLEWOOD WATER RECLAMATION FACILITY

LICENSED PROFESSIONAL
STEPHEN E. BAILEY, P.E.
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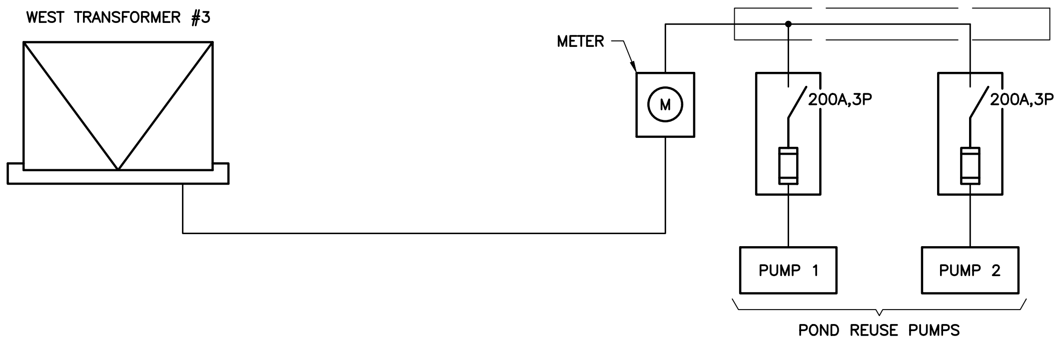
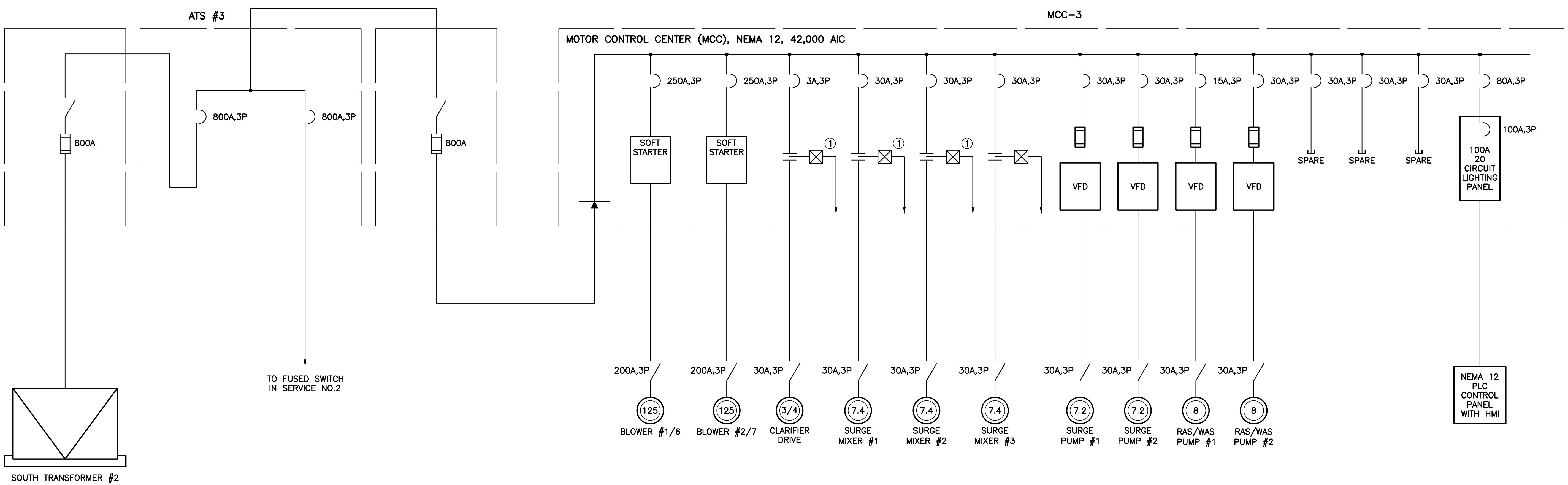
DATE:

EXISTING SERVICE NO. 1 & 2 SINGLE LINE DIAGRAM

SHEET NUMBER
E-1



EXISTING SERVICE NO. 4



EXISTING SERVICE NO. 3

EXISTING PLANT NO. 4
MCC-3 SINGLE LINE DIAGRAM (SECTION 3)

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DRAWN BY DAC
CHECKED BY SEB

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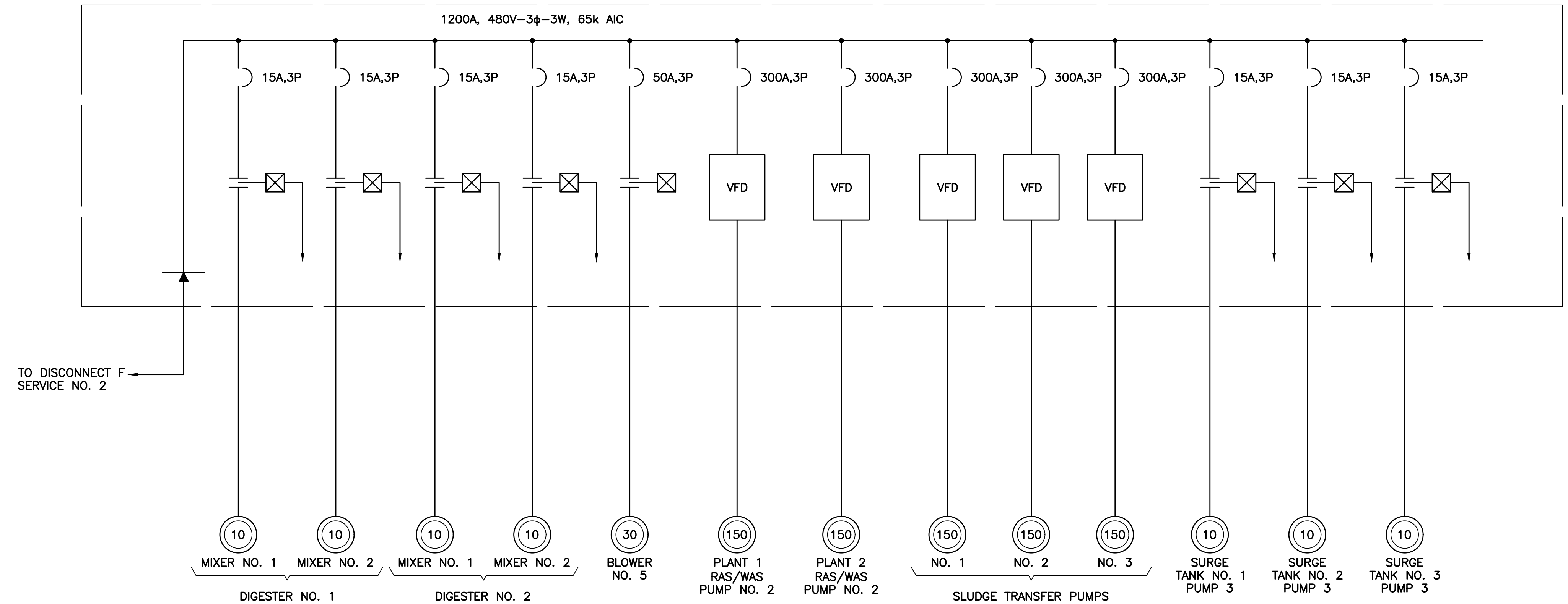
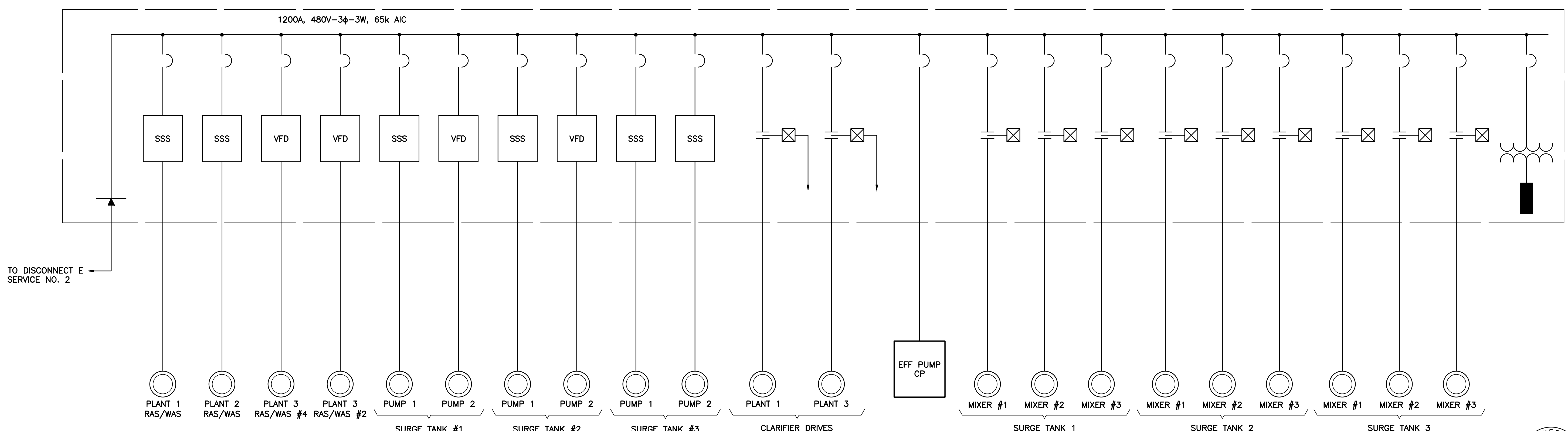
EXISTING SERVICE NO. 3/MCC-4 SINGLE LINE DIAGRAM

SHEET NUMBER
E-2



EXISTING MCC-1 SECTION 2 SINGLE LINE DIAGRAM



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EXISTING MCC-1 SECTION 1 SINGLE LINE DIAGRAM

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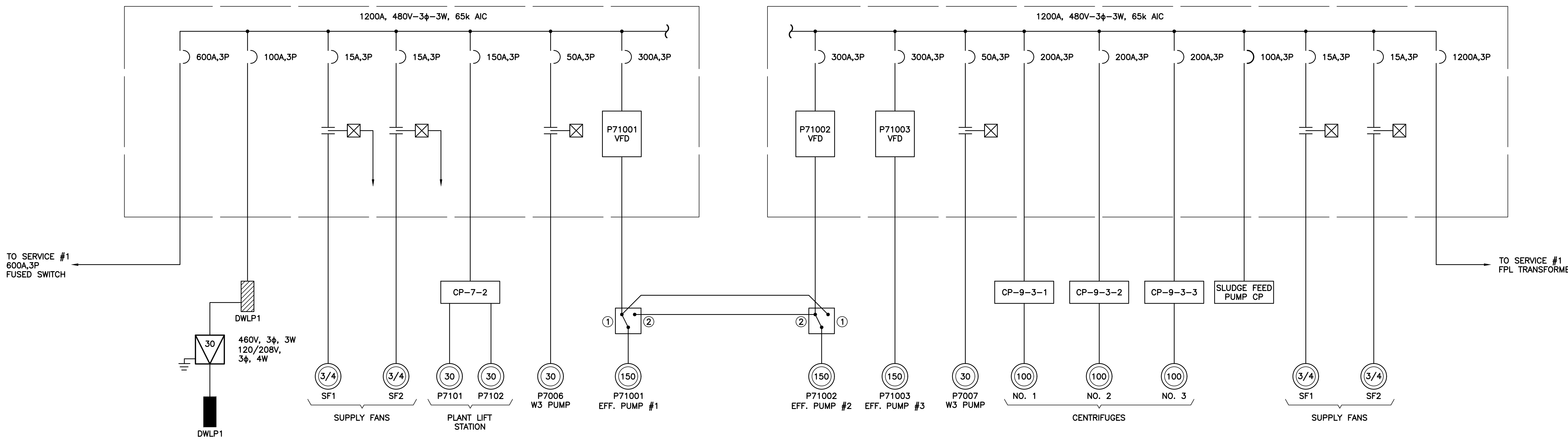
EXISTING MCC-1 & MCC-2 SINGLE LINE DIAGRAM

SHEET NUMBER
E-3



EXISTING MCC−3A SINGLE LINE
(SECTION 1)

EXISTING MCC−3B SINGLE LINE
(SECTION 2)

NOTES:
1. MCC−3B IS NOT POWERED BY PLANT GENERATOR.

EXISTING SOLIDS HANDLING BUILDING ELECTRICAL ROOM

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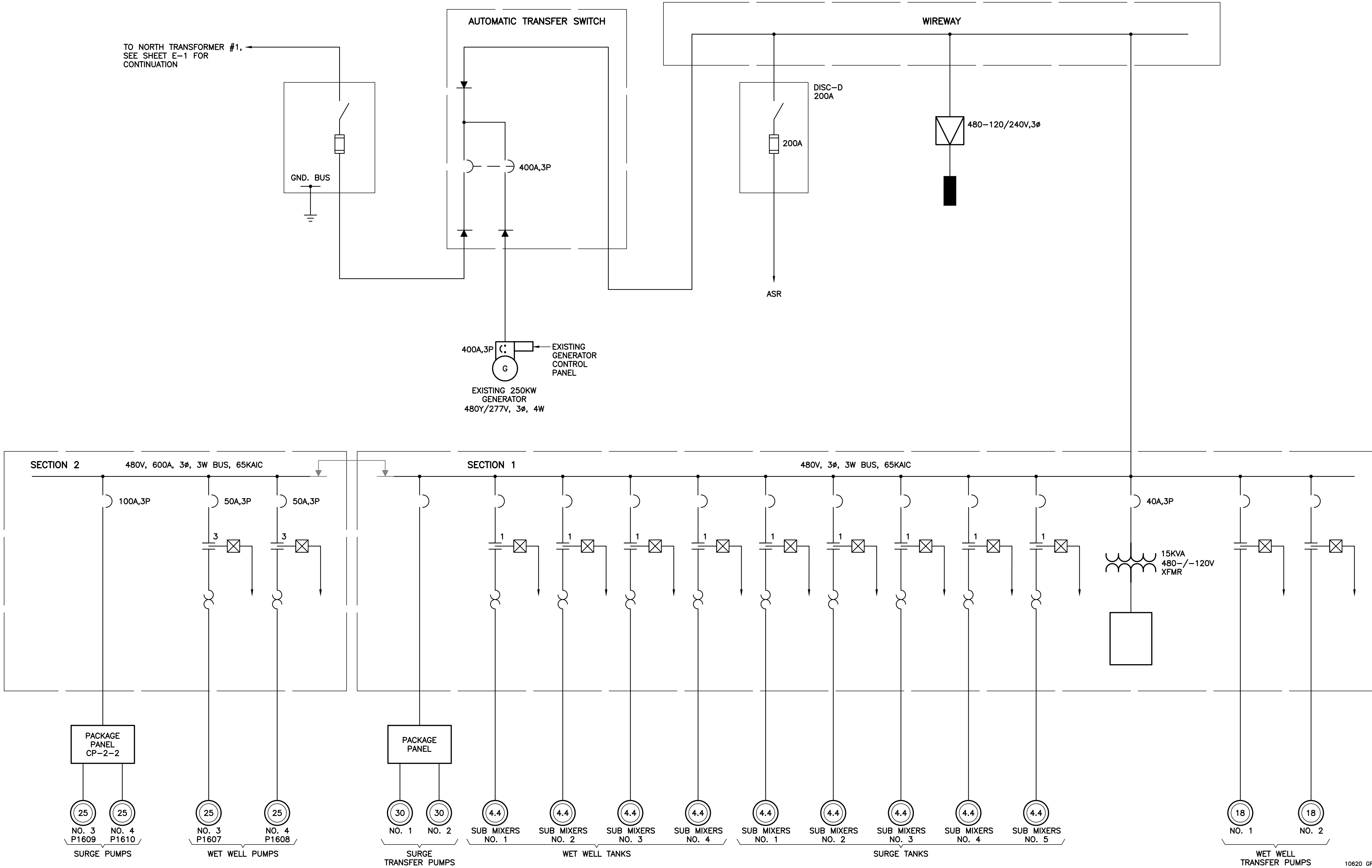
EXISTING MCC-3A & MCC-3B SINGLE LINE DIAGRAM

SHEET NUMBER
E-4



EXISTING MCC-2 HEADWORKS SINGLE LINE DIAGRAM

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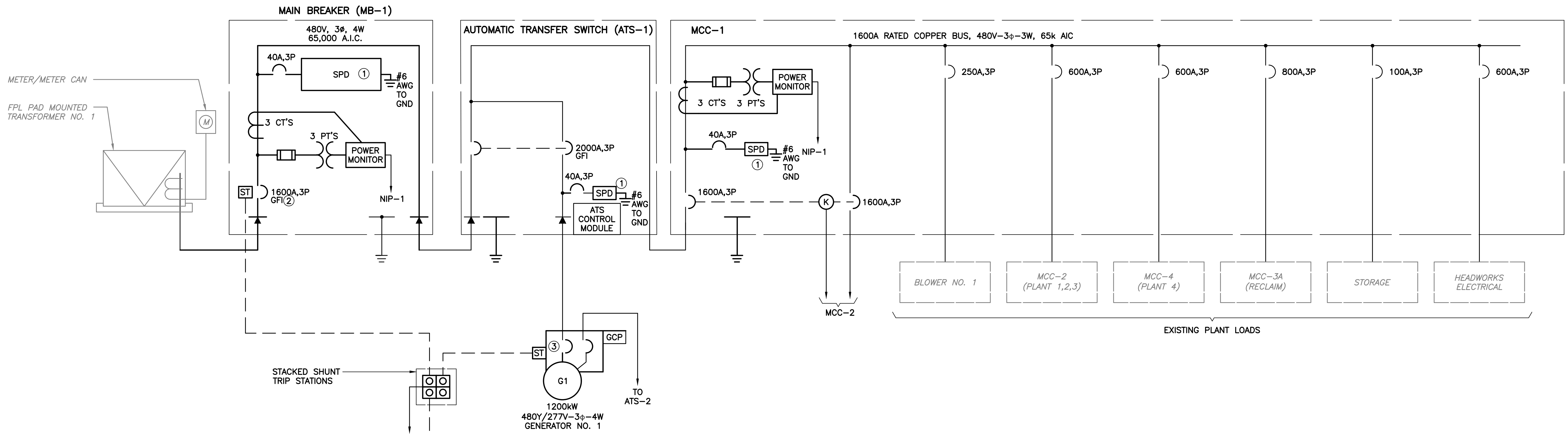
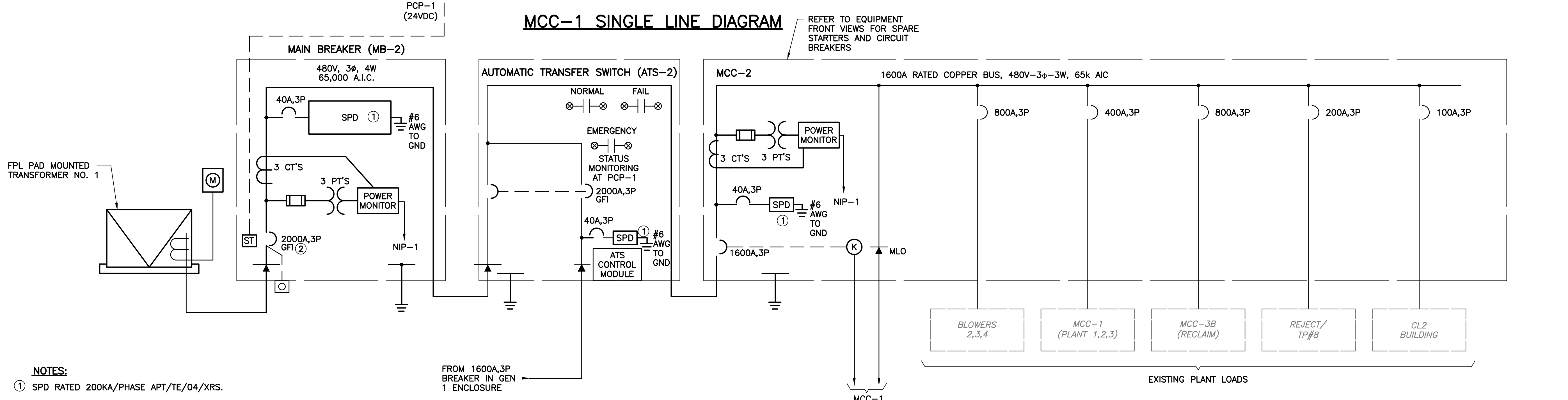
EXISTING HEADWORKS SINGLE LINE DIAGRAM

SHEET NUMBER
E-5



MCC-1 SINGLE LINE DIAGRAM



NOTES:

1. ① SPD RATED 200KA/PHASE APT/TE/04/XRS.
2. ② ARC ENERGY REDUCTION MAINTENANCE SETTING MOTOR OPERATED CIRCUIT BREAKER (REMOTE OPEN/CLOSE).
3. ③ 1600A,3P (TYP,2)

MCC-2 SINGLE LINE DIAGRAM

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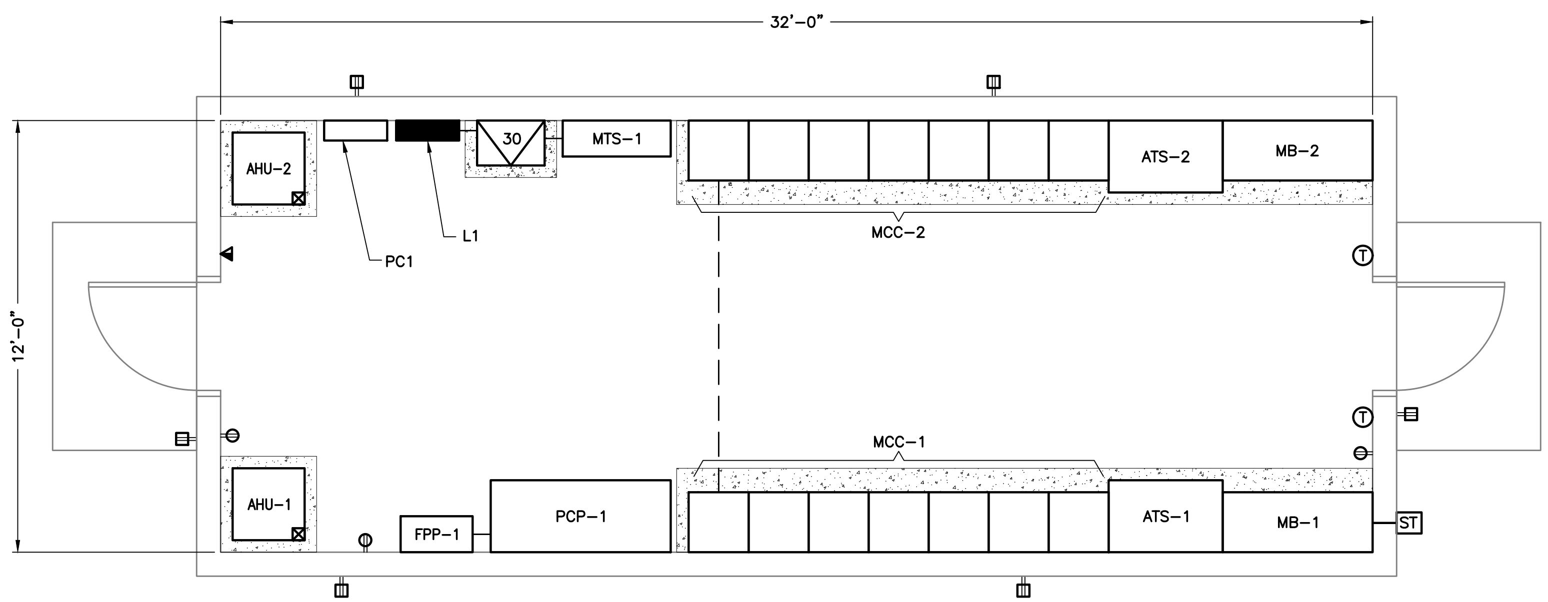
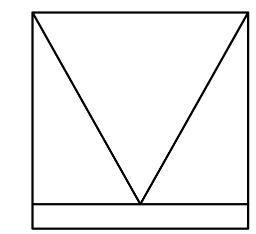
DATE:

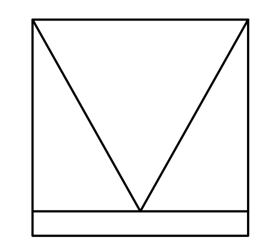
PROPOSED MCC-1 & MCC-2 SINGLE LINE DIAGRAMS

SHEET NUMBER
E-6





FPL TRANSFORMER NO. 2



FPL TRANSFORMER NO. 1

PRECAST ELECTRICAL BUILDING
POWER PLAN

SCALE: 3/8"=1'-0"

12" 0 1 2 4'

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CHECKED BY	SEB

ENGLEWOOD WATER RECLAMATION FACILITY

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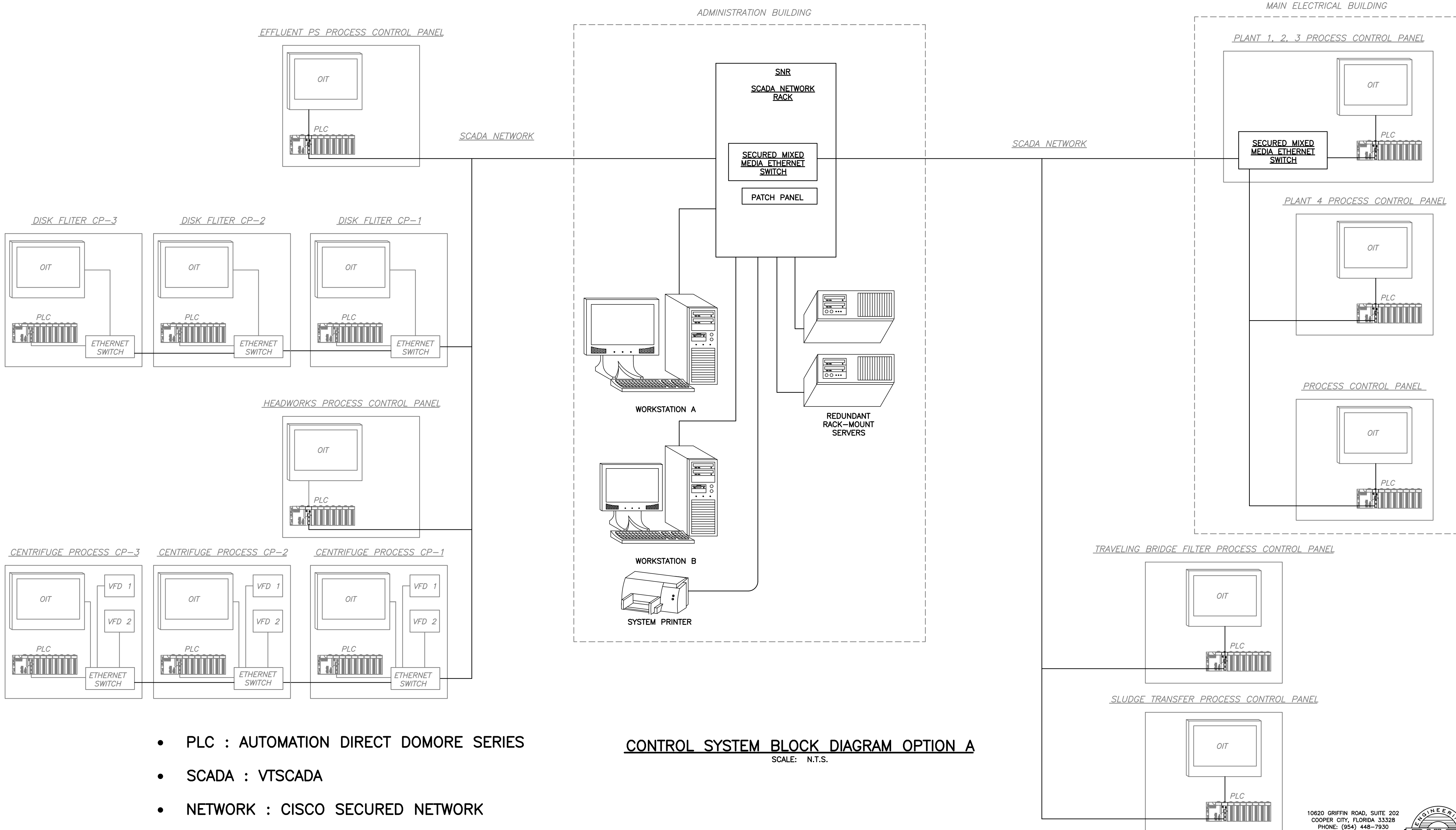
PROPOSED ELECTRICAL BUILDING POWER PLAN

SHEET NUMBER
E-7



- PLC : AUTOMATION DIRECT DOMORE SERIES
- SCADA : VTSCADA
- NETWORK : CISCO SECURED NETWORK

CONTROL SYSTEM BLOCK DIAGRAM OPTION A

SCALE: N.T.S.

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KHA PROJECT	148896002
DATE	JUNE 2021
SCALE	AS SHOWN
DESIGNED BY	SEB
DRAWN BY	DAC
CHECKED BY	SEB

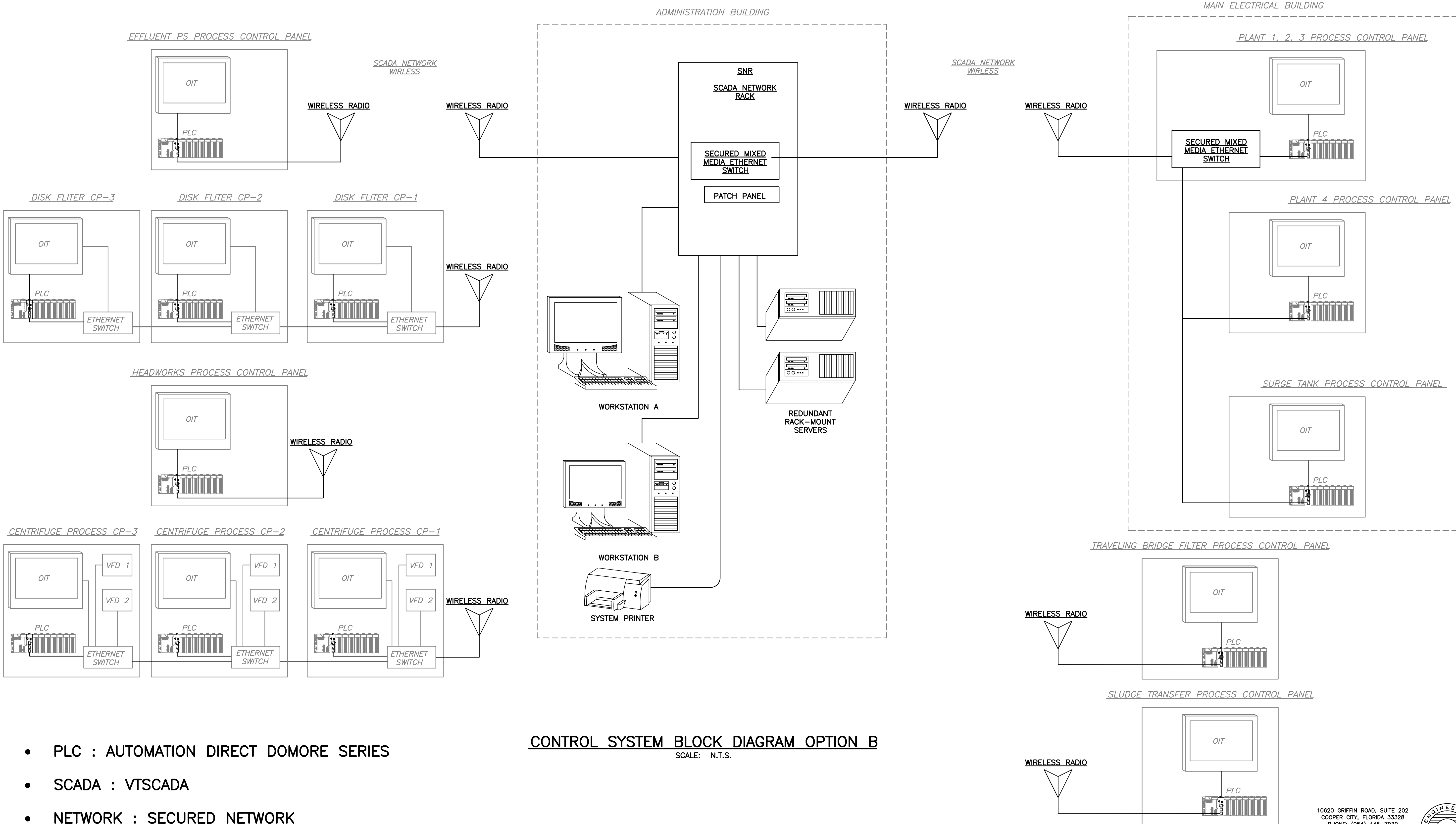
ENGLEWOOD WATER RECLAMATION FACILITY

LICENSED PROFESSIONAL
STEPHEN E. BAILEY, P.E.
FL LICENSE NUMBER
42461
DATE:

PROPOSED BLOCK DIAGRAM OPTION A

SHEET NUMBER
I-1

ENGLEWOOD WRF MODERNIZATION



CONTROL SYSTEM BLOCK DIAGRAM OPTION B

SCALE: N.T.S.

- PLC : AUTOMATION DIRECT DOMORE SERIES
- SCADA : VTSCADA
- NETWORK : SECURED NETWORK

10620 GRIFFIN ROAD, SUITE 202
COOPER CITY, FLORIDA 33328
PHONE: (954) 448-7930
C.O.A. NO. 6783
Stephen E. Bailey, P.E.
Florida P.E. No. 42461

BAILEY ENGINEERING CONSULTANTS

No.	REVISIONS	DATE	BY

Kimley»Horn
1777 MAIN STREET, SUITE 200, SARASOTA, FL 34236
PHONE: 941-379-7600
WWW.KIMLEY-HORN.COM CA 00000696

KHA PROJECT	148896002
DATE	JUNE 2021
SCALE	AS SHOWN
DESIGNED BY	SEB
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ENGLEWOOD WATER RECLAMATION FACILITY

LICENSED PROFESSIONAL
STEPHEN E. BAILEY, P.E.
FL LICENSE NUMBER
42461
DATE:

PROPOSED BLOCK DIAGRAM OPTION B

SHEET NUMBER
I-2

APPENDIX E: OPINION OF PROJECT COST ESTIMATE

ENGLEWOOD WATER DISTRICT
HOLIDAY VENTURES AND SEWER MASTER PLAN UPDATE

OPINION OF PROJECT COST

ALL SCENARIOS
WRF - ELECTRICAL: REPLACE MAIN BREAKERS AND LOAD FEEDERS
PROJECT NO. WRF-E01

ESTIMATED COSTS

ITEM	UNIT	QUANTITY	UNIT COST	TOTAL COST
Replace Main Breaker with Solid State Option	LS	1	$ 38,000	$ 38,000
Replace Main Breaker Load Side Feeders	LS	1	$ 16,000	$ 16,000
SUBTOTAL				$ 54,000
Engineering Design, and Permitting (15%)				$ 10,000
Construction Engineering, and Inspection (10%)				$ 6,000
Contingency (25%)				$ 13,500
TOTAL				**$ 84,000**

Notes:
(1) The Consultant has no control over the cost of labor, materials, equipment, or over the Contractor's methods of determining prices or over competitive bidding or market conditions. Opinions of probable costs provided herein are based on the information known to Consultant at this time and represent only the Consultant's judgment as a design professional familiar with the construction industry. The Consultant cannot and does not guarantee that proposals, bids, or actual construction costs will not vary from its opinions of probable costs.
(2) 2021 Bailey Engineering WRF Electrical Evaluation Recommended Improvement Nos. 1 and 2

ENGLEWOOD WATER DISTRICT
HOLIDAY VENTURES AND SEWER MASTER PLAN UPDATE

OPINION OF PROJECT COST

ALL SCENARIOS
WRF - ELECTRICAL: REPLACE GENERATOR 1
PROJECT NO. WRF-E02

ESTIMATED COSTS

ITEM	UNIT	QUANTITY	UNIT COST	TOTAL COST
Replace Generator 1 with 1200 KW Generator	LS	1	$ 375,000	$ 375,000
SUBTOTAL				$ 375,000
Engineering Design, and Permitting (15%)				
Construction Engineering, and Inspection (10%)				
Contingency (25%)				$ 93,800
TOTAL				**$ 470,000**

Notes:
(1) The Consultant has no control over the cost of labor, materials, equipment, or over the Contractor's methods of determining prices or over competitive bidding or market conditions. Opinions of probable costs provided herein are based on the information known to Consultant at this time and represent only the Consultant's judgment as a design professional familiar with the construction industry. The Consultant cannot and does not guarantee that proposals, bids, or actual construction costs will not vary from its opinions of probable costs.
(2) 2021 Bailey Engineering WRF Electrical Evaluation Recommended Improvement No. 3

ENGLEWOOD WATER DISTRICT
HOLIDAY VENTURES AND SEWER MASTER PLAN UPDATE

OPINION OF PROJECT COST

ALL SCENARIOS
WRF - ELECTRICAL: INSTALL SURGE PROTECTION
PROJECT NO. WRF-E03

ESTIMATED COSTS

ITEM	UNIT	QUANTITY	UNIT COST	TOTAL COST
Install Surge Protection (Each MB, Remote MCC, Incoming and Lighting Panels)	LS	1	$ 40,000	$ 40,000
SUBTOTAL				$ 40,000
Engineering Design, and Permitting (15%)				$ 10,000
Construction Engineering, and Inspection (10%)				$ 4,000
Contingency (25%)				$ 10,000
TOTAL				**$ 64,000**

Notes:
(1) The Consultant has no control over the cost of labor, materials, equipment, or over the Contractor's methods of determining prices or over competitive bidding or market conditions. Opinions of probable costs provided herein are based on the information known to Consultant at this time and represent only the Consultant's judgment as a design professional familiar with the construction industry. The Consultant cannot and does not guarantee that proposals, bids, or actual construction costs will not vary from its opinions of probable costs.
(2) 2021 Bailey Engineering WRF Electrical Evaluation Recommended Improvement No. 4

ENGLEWOOD WATER DISTRICT
HOLIDAY VENTURES AND SEWER MASTER PLAN UPDATE

OPINION OF PROJECT COST

ALL SCENARIOS
WRF - ELECTRICAL: ENHANCE GROUNDING
PROJECT NO. WRF-E04

ESTIMATED COSTS

ITEM	UNIT	QUANTITY	UNIT COST	TOTAL COST
Enhance Grounding at Services 1, 2, and 3	LS	1	$ 28,000	$ 28,000
SUBTOTAL				$ 28,000
Engineering Design, and Permitting (15%)				$ 10,000
Construction Engineering, and Inspection (10%)				$ 3,000
Contingency (25%)				$ 7,000
TOTAL				**$ 48,000**

Notes:
(1) The Consultant has no control over the cost of labor, materials, equipment, or over the Contractor's methods of determining prices or over competitive bidding or market conditions. Opinions of probable costs provided herein are based on the information known to Consultant at this time and represent only the Consultant's judgment as a design professional familiar with the construction industry. The Consultant cannot and does not guarantee that proposals, bids, or actual construction costs will not vary from its opinions of probable costs.
(2) 2021 Bailey Engineering WRF Electrical Evaluation Recommended Improvement No. 5

ENGLEWOOD WATER DISTRICT
HOLIDAY VENTURES AND SEWER MASTER PLAN UPDATE

OPINION OF PROJECT COST

ALL SCENARIOS
WRF - ELECTRICAL: POWER CABLE TESTING
PROJECT NO. WRF-E05

ESTIMATED COSTS

ITEM	UNIT	QUANTITY	UNIT COST	TOTAL COST
Test 480 Power Cables, 100 Amps and Larger	LS	1	$ 15,000	$ 15,000
SUBTOTAL				$ 15,000
Engineering Design, and Permitting (15%)				$ -
Construction Engineering, and Inspection (10%)				$ -
Contingency (25%)				$ 3,800
TOTAL				**$ 20,000**

Notes:
(1) The Consultant has no control over the cost of labor, materials, equipment, or over the Contractor's methods of determining prices or over competitive bidding or market conditions. Opinions of probable costs provided herein are based on the information known to Consultant at this time and represent only the Consultant's judgment as a design professional familiar with the construction industry. The Consultant cannot and does not guarantee that proposals, bids, or actual construction costs will not vary from its opinions of probable costs.
(2) Testing cables does not include Engineering, Construction, or Inspection
(3) 2021 Bailey Engineering WRF Electrical Evaluation Recommended Improvement No. 6

ENGLEWOOD WATER DISTRICT
HOLIDAY VENTURES AND SEWER MASTER PLAN UPDATE

OPINION OF PROJECT COST

SCENARIO NO. 1
HOLIDAY VENTURES LS - MUFFIN MONSTER AND WET WELL IMPROVEMENTS
PROJECT NO. HV-01
2017 MASTER PLAN PROJECT NO. LS-03

ESTIMATED COSTS

ITEM	UNIT	QUANTITY	UNIT COST	TOTAL COST
Install Parallel 2,700 gpm Muffin Monster	LS	1	$ 94,000	$ 94,000
Install 16" Parallel Pipe Channel with 16" bypass	LF	100	$ 125	$ 12,500
16" Gate Valves	EA	2	$ 9,400	$ 18,800
Rehab Ex. Wet Well with Liner	LS	1	$ 120,000	$ 120,000
Replace Existing Concrete Top and New Hatch	LS	1	$ 20,000	$ 20,000
SUBTOTAL				$ 265,300
Engineering Design, and Permitting (15%)				$ 40,000
Construction Engineering, and Inspection (10%)				$ 26,600
Contingency (25%)				$ 66,400
TOTAL				**$ 400,000**

Notes:
(1) 2017 Master Plan recommended improvement.
(2) The Consultant has no control over the cost of labor, materials, equipment, or over the Contractor's methods of determining prices or over competitive bidding or market conditions. Opinions of probable costs provided herein are based on the information known to Consultant at this time and represent only the Consultant's judgment as a design professional familiar with the construction industry. The Consultant cannot and does not guarantee that proposals, bids, or actual construction costs will not vary from its opinions of probable costs.

ENGLEWOOD WATER DISTRICT
HOLIDAY VENTURES AND SEWER MASTER PLAN UPDATE

OPINION OF PROJECT COST

SCENARIO NO. 1
INSTALL PARALLEL HOLIDAY VENTURES FORCEMAIN TO SOUTH WRF
PROJECT NO. FM-01
2017 MASTER PLAN PROJECT NO. CL-02

ESTIMATED COSTS

ITEM	UNIT	QUANTITY	UNIT COST	TOTAL COST
Install parallel 18-inch PVC Forcemain	LF	27980	$ 192	$ 5,372,160
Force Main Condition Assessment	LS	1	$ 100,000	$ 100,000
SUBTOTAL				$ 5,472,160
Engineering Design, and Permitting (15%)				$ 830,000
Construction Engineering, and Inspection (10%)				$ 548,000
Contingency (25%)				$ 1,368,100
TOTAL				**$ 8,220,000**

Notes:
(1) 2017 Master Plan recommended improvement.
(2) The Consultant has no control over the cost of labor, materials, equipment, or over the Contractor's methods of determining prices or over competitive bidding or market conditions. Opinions of probable costs provided herein are based on the information known to Consultant at this time and represent only the Consultant's judgment as a design professional familiar with the construction industry. The Consultant cannot and does not guarantee that proposals, bids, or actual construction costs will not vary from its opinions of probable costs.

ENGLEWOOD WATER DISTRICT
HOLIDAY VENTURES AND SEWER MASTER PLAN UPDATE

OPINION OF PROJECT COST

SCENARIO NO. 1
HOLIDAY VENTURES LS NEW WET WELL AND PUMPS
PROJECT NO. HV-02

ESTIMATED COSTS

ITEM	UNIT	QUANTITY	UNIT COST	TOTAL COST
4,400 gal Wet Well with Mixers and Piping	LS	1	$ 300,000	$ 300,000
1,500 gpm Pumps (x3)	LS	1	$ 300,000	$ 300,000
SUBTOTAL				$ 600,000
Engineering Design, and Permitting (15%)				$ 90,000
Construction Engineering, and Inspection (10%)				$ 60,000
Contingency (25%)				$ 150,000
TOTAL				**$ 900,000**

Note:
(1) The Consultant has no control over the cost of labor, materials, equipment, or over the Contractor's methods of determining prices or over competitive bidding or market conditions. Opinions of probable costs provided herein are based on the information known to Consultant at this time and represent only the Consultant's judgment as a design professional familiar with the construction industry. The Consultant cannot and does not guarantee that proposals, bids, or actual construction costs will not vary from its opinions of probable costs.

ENGLEWOOD WATER DISTRICT
HOLIDAY VENTURES AND SEWER MASTER PLAN UPDATE

OPINION OF PROJECT COST

SCENARIO NO. 1
HOLIDAY VENTURES LS PUMP REPLACEMENT
PROJECT NO. HV-03

ESTIMATED COSTS

ITEM	UNIT	QUANTITY	UNIT COST	TOTAL COST
2,680 gpm Pumps with VFDs (x3)	LS	1	$ 650,000	$ 650,000
2,700 gpm Muffin Monster	LS	1	$ 94,000	$ 94,000
Upsize Ex. 12" to 16" Parallel Pipe Channel	LF	100	$ 125	$ 12,500
16" Gate Valves	EA	2	$ 9,400	$ 18,800
SUBTOTAL				$ 775,300
Engineering Design, and Permitting (15%)				$ 193,900
Construction Engineering, and Inspection (10%)				$ 242,300
Contingency (25%)				$ 193,900
TOTAL				**$ 1,410,000**

Note:
(1) The Consultant has no control over the cost of labor, materials, equipment, or over the Contractor's methods of determining prices or over competitive bidding or market conditions. Opinions of probable costs provided herein are based on the information known to Consultant at this time and represent only the Consultant's judgment as a design professional familiar with the construction industry. The Consultant cannot and does not guarantee that proposals, bids, or actual construction costs will not vary from its opinions of probable costs.

ENGLEWOOD WATER DISTRICT
HOLIDAY VENTURES AND SEWER MASTER PLAN UPDATE

OPINION OF PROJECT COST

SCENARIO NO. 1
WRF - ONSITE SCADA
PROJECT NO. WRF-01

ESTIMATED COSTS

ITEM	UNIT	QUANTITY	UNIT COST	TOTAL COST
Onsite SCADA System with Wireless Interface	LS	1	$ 145,000	$ 145,000

SUBTOTAL	$ 145,000
Engineering Design, and Permitting (15%)	$ 30,000
Construction Engineering, and Inspection (10%)	$ 15,000
Contingency (25%)	$ 36,300
TOTAL	**$ 227,000**

Notes:
(1)The Consultant has no control over the cost of labor, materials, equipment, or over the Contractor's methods of determining prices or over competitive bidding or market conditions. Opinions of probable costs provided herein are based on the information known to Consultant at this time and represent only the Consultant's judgment as a design professional familiar with the construction industry. The Consultant cannot and does not guarantee that proposals, bids, or actual construction costs will not vary from its opinions of probable costs.
(2) 2021 Bailey Engineering WRF Electrical Evaluation Recommended Improvement No. 10

ENGLEWOOD WATER DISTRICT
HOLIDAY VENTURES AND SEWER MASTER PLAN UPDATE

OPINION OF PROJECT COST

SCENARIO NO. 1
WRF - NEW HEADWORKS
PROJECT NO. WRF-02

ESTIMATED COSTS

ITEM	UNIT	QUANTITY	UNIT COST	TOTAL COST
Headworks with Mechanical Screens and Grit Removal	LS	1	$ 840,000	$ 840,000
24-inch Steel Piping and Bypass piping	LF	500	$ 450	$ 225,000
Decommission Pre- and Post-screen Tanks	LS	1	$ 200,000	$ 200,000
2,360 gpm Transfer Pump Station	EA	2	$ 200,000	$ 400,000
SUBTOTAL				$ 1,665,000
Engineering Design, and Permitting (15%)				$ 250,000
Construction Engineering, and Inspection (10%)				$ 167,000
Contingency (25%)				$ 416,300
TOTAL				**$ 2,500,000**

Notes:
(1) The Consultant has no control over the cost of labor, materials, equipment, or over the Contractor's methods of determining prices or over competitive bidding or market conditions. Opinions of probable costs provided herein are based on the information known to Consultant at this time and represent only the Consultant's judgment as a design professional familiar with the construction industry. The Consultant cannot and does not guarantee that proposals, bids, or actual construction costs will not vary from its opinions of probable costs.
(2) 2021 Bailey Engineering WRF Electrical Evaluation Recommended Improvement No. 8

ENGLEWOOD WATER DISTRICT
HOLIDAY VENTURES AND SEWER MASTER PLAN UPDATE

OPINION OF PROJECT COST

SCENARIO NO. 1
WRF - ODOR CONTROL SYSTEM REHAB AT HEADWORKS
PROJECT NO. WRF-03
2017 MASTER PLAN PROJECT NO. WRF-02

ESTIMATED COSTS

ITEM	UNIT	QUANTITY	UNIT COST	TOTAL COST
Odor Control Reconfiguration	LS	1	$ 285,000	$ 285,000
SUBTOTAL				$ 285,000
Engineering Design, and Permitting (15%)				$ 50,000
Construction Engineering, and Inspection (10%)				$ 29,000
Contingency (25%)				$ 71,300
TOTAL				**$ 440,000**

Notes:
(1) 2017 Master Plan recommended improvement.
(2) The Consultant has no control over the cost of labor, materials, equipment, or over the Contractor's methods of determining prices or over competitive bidding or market conditions. Opinions of probable costs provided herein are based on the information known to Consultant at this time and represent only the Consultant's judgment as a design professional familiar with the construction industry. The Consultant cannot and does not guarantee that proposals, bids, or actual construction costs will not vary from its opinions of probable costs.

ENGLEWOOD WATER DISTRICT
HOLIDAY VENTURES AND SEWER MASTER PLAN UPDATE

OPINION OF PROJECT COST

SCENARIO NO. 1
WRF - DRYING BED
PROJECT NO. WRF-04

ESTIMATED COSTS

ITEM	UNIT	QUANTITY	UNIT COST	TOTAL COST
Drying Bed	LS	1	$ 100,000	$ 100,000
SUBTOTAL				$ 100,000
Engineering Design, and Permitting (15%)				$ 20,000
Construction Engineering, and Inspection (10%)				$ 10,000
Contingency (25%)				$ 25,000
TOTAL				**$ 160,000**

Note:
(1) The Consultant has no control over the cost of labor, materials, equipment, or over the Contractor's methods of determining prices or over competitive bidding or market conditions. Opinions of probable costs provided herein are based on the information known to Consultant at this time and represent only the Consultant's judgment as a design professional familiar with the construction industry. The Consultant cannot and does not guarantee that proposals, bids, or actual construction costs will not vary from its opinions of probable costs.

ENGLEWOOD WATER DISTRICT
HOLIDAY VENTURES AND SEWER MASTER PLAN UPDATE

OPINION OF PROJECT COST

SCENARIO NO. 1
WRF - CHLORINE CONTACT BASIN EXPANSION
PROJECT NO. WRF-05
2017 MASTER PLAN PROJECT NO. WRF-11

ESTIMATED COSTS

ITEM	UNIT	QUANTITY	UNIT COST	TOTAL COST
Additional Piping and Tee	LS	1	$ 100,000	$ 100,000
SUBTOTAL				$ 100,000
Engineering Design, and Permitting (15%)				
Construction Engineering, and Inspection (10%)				
Contingency (25%)				$ 25,000
TOTAL				**$ 130,000**

Notes:
(1) 2017 Master Plan recommended improvement.
(2) The Consultant has no control over the cost of labor, materials, equipment, or over the Contractor's methods of determining prices or over competitive bidding or market conditions. Opinions of probable costs provided herein are based on the information known to Consultant at this time and represent only the Consultant's judgment as a design professional familiar with the construction industry. The Consultant cannot and does not guarantee that proposals, bids, or actual construction costs will not vary from its opinions of probable costs.
(3) Costs are estimated based on in-house EWD design and inspection.

ENGLEWOOD WATER DISTRICT
HOLIDAY VENTURES AND SEWER MASTER PLAN UPDATE

OPINION OF PROJECT COST

SCENARIO NO. 1
WRF - DEWATERING UNIT REPLACEMENT
PROJECT NO. WRF-06

ESTIMATED COSTS

ITEM	UNIT	QUANTITY	UNIT COST	TOTAL COST
New Dewatering Unit (replace ex. 125 gpm w/ more capacity)	LS	1	$ 500,000	$ 500,000
SUBTOTAL				$ 500,000
Engineering Design, and Permitting (15%)				
Construction Engineering, and Inspection (10%)				
Contingency (25%)				$ 125,000
TOTAL				**$ 630,000**

Note:
(1) The Consultant has no control over the cost of labor, materials, equipment, or over the Contractor's methods of determining prices or over competitive bidding or market conditions. Opinions of probable costs provided herein are based on the information known to Consultant at this time and represent only the Consultant's judgment as a design professional familiar with the construction industry. The Consultant cannot and does not guarantee that proposals, bids, or actual construction costs will not vary from its opinions of probable costs.

ENGLEWOOD WATER DISTRICT
HOLIDAY VENTURES AND SEWER MASTER PLAN UPDATE

OPINION OF PROJECT COST

SCENARIO NO. 1
WRF - DEWATERING BUILDING IMPROVEMENTS
PROJECT NO. WRF-07

ESTIMATED COSTS

ITEM	UNIT	QUANTITY	UNIT COST	TOTAL COST
Building Repairs, Recoat Interior, Piping Replacement, Floor Hatch & Mechanical Pulley	LS	1	$ 400,000	$ 400,000

SUBTOTAL	$ 400,000
Engineering Design, and Permitting (15%)	$ 60,000
Construction Engineering, and Inspection (10%)	$ 40,000
Contingency (25%)	$ 100,000
TOTAL	**$ 600,000**

Notes:
(1) The Consultant has no control over the cost of labor, materials, equipment, or over the Contractor's methods of determining prices or over competitive bidding or market conditions. Opinions of probable costs provided herein are based on the information known to Consultant at this time and represent only the Consultant's judgment as a design professional familiar with the construction industry. The Consultant cannot and does not guarantee that proposals, bids, or actual construction costs will not vary from its opinions of probable costs.
(2) This project is partially funded ($140K)

ENGLEWOOD WATER DISTRICT
HOLIDAY VENTURES AND SEWER MASTER PLAN UPDATE

OPINION OF PROJECT COST

SCENARIO NO. 1
WRF - BLOWERS 2, 3, and 4 REPLACEMENT
PROJECT NO. WRF-08
2017 MASTER PLAN PROJECT NO. WRF-06

ESTIMATED COSTS

ITEM	UNIT	QUANTITY	UNIT COST	TOTAL COST
Blower Replacement (2, 3, & 4)	EA	3	$ 200,000	$ 600,000
Electrical Improvements to Upsize Blowers	LS	1	$ 25,000	$ 25,000
SUBTOTAL				$ 625,000
Engineering Design, and Permitting (15%)				$ 100,000
Construction Engineering, and Inspection (10%)				$ 63,000
Contingency (25%)				$ 156,300
TOTAL				**$ 950,000**

Notes:
(1) 2017 Master Plan recommended improvement.
(2) The Consultant has no control over the cost of labor, materials, equipment, or over the Contractor's methods of determining prices or over competitive bidding or market conditions. Opinions of probable costs provided herein are based on the information known to Consultant at this time and represent only the Consultant's judgment as a design professional familiar with the construction industry. The Consultant cannot and does not guarantee that proposals, bids, or actual construction costs will not vary from its opinions of probable costs.
(3) 2021 Bailey Engineering WRF Electrical Evaluation Recommended Improvement No. 7

ENGLEWOOD WATER DISTRICT
HOLIDAY VENTURES AND SEWER MASTER PLAN UPDATE

OPINION OF PROJECT COST

SCENARIO NO. 1
RECLAIMED WATER HYDRAULIC, STORAGE, CAPACITY AND OPERATIONS EVALUATION
PROJECT NO. WRF-09
2017 MASTER PLAN PROJECT NO. RU-01

ESTIMATED COSTS

ITEM	UNIT	QUANTITY	UNIT COST	TOTAL COST
Reclaimed Water Evaluation	LS	1	$ 150,000	$ 150,000
SUBTOTAL				$ 150,000
Engineering Design, and Permitting (15%)				
Construction Engineering, and Inspection (10%)				
Contingency (25%)				
TOTAL				**$ 150,000**

Note:
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ENGLEWOOD WATER DISTRICT
HOLIDAY VENTURES AND SEWER MASTER PLAN UPDATE

OPINION OF PROJECT COST

SCENARIO NO. 1
WRF - ELECTRICAL: PLC UPGRADES
PROJECT NO. WRF-E06

ESTIMATED COSTS

ITEM	UNIT	QUANTITY	UNIT COST	TOTAL COST
PLC Replacement (Upgrades)	LS	1	$ 125,000	$ 125,000
SUBTOTAL				$ 125,000
Engineering Design, and Permitting (15%)				$ 20,000
Construction Engineering, and Inspection (10%)				$ 13,000
Contingency (25%)				$ 31,300
TOTAL				**$ 190,000**

Notes:
(1) The Consultant has no control over the cost of labor, materials, equipment, or over the Contractor's methods of determining prices or over competitive bidding or market conditions. Opinions of probable costs provided herein are based on the information known to Consultant at this time and represent only the Consultant's judgment as a design professional familiar with the construction industry. The Consultant cannot and does not guarantee that proposals, bids, or actual construction costs will not vary from its opinions of probable costs.
(2) 2021 Bailey Engineering WRF Electrical Evaluation Recommended Improvement No. 9

ENGLEWOOD WATER DISTRICT
HOLIDAY VENTURES AND SEWER MASTER PLAN UPDATE

OPINION OF PROJECT COST

SCENARIO NO. 1
WRF - PLANT UPGRADES
PROJECT NO. WRF-10

ESTIMATED COSTS

ITEM	UNIT	QUANTITY	UNIT COST	TOTAL COST
WRF Plant Upgrades	LS	1	$ 34,000,000	$ 34,000,000
Decommission Existing Plants 1 and 2	LS	1	$ 400,000	$ 400,000
West Reject Pond Relocation	LS	1	$ 600,000	$ 600,000
Geotechnical Investigation	LS	1	$ 20,000	$ 20,000
SUBTOTAL				$ 35,020,000
Engineering Design, and Permitting (15%)				$ 5,253,000
Construction Engineering, and Inspection (10%)				$ 3,502,000
Contingency (25%)				$ 1,020,000
TOTAL				**$ 44,800,000**

Notes:
(1) Cost estimated based on new plant or expansion $17/gallon for capacity of 2.0 mgd .
(2) The Consultant has no control over the cost of labor, materials, equipment, or over the Contractor's methods of determining prices or over competitive bidding or market conditions. Opinions of probable costs provided herein are based on the information known to Consultant at this time and represent only the Consultant's judgment as a design professional familiar with the construction industry. The Consultant cannot and does not guarantee that proposals, bids, or actual construction costs will not vary from its opinions of probable costs.
(3) Site lighting is included in upgrade.
(4) Chlorine contact basin expansion is included in upgrade.

ENGLEWOOD WATER DISTRICT
HOLIDAY VENTURES AND SEWER MASTER PLAN UPDATE

OPINION OF PROJECT COST

SCENARIO NO. 1
WRF - RECLAIMED TRANSFER PUMP STATION UPGRADES
PROJECT NO. WRF-11
2017 MASTER PLAN PROJECT NO. WRF-16

ESTIMATED COSTS

ITEM	UNIT	QUANTITY	UNIT COST	TOTAL COST
Reclaimed Transfer Pumps	LS	1	$ 360,000	$ 360,000
Station and Piping	LS	1	$ 100,000	$ 100,000
SUBTOTAL				$ 460,000
Engineering Design, and Permitting (15%)				$ 70,000
Construction Engineering, and Inspection (10%)				$ 46,000
Contingency (25%)				$ 115,000
TOTAL				**$ 691,000**

Notes:
(1) The Consultant has no control over the cost of labor, materials, equipment, or over the Contractor's methods of determining prices or over competitive bidding or market conditions. Opinions of probable costs provided herein are based on the information known to Consultant at this time and represent only the Consultant's judgment as a design professional familiar with the construction industry. The Consultant cannot and does not guarantee that proposals, bids, or actual construction costs will not vary from its opinions of probable costs.
(2) Additional reclaimed storage may be required and will need to be determined in Reclaimed System Evaluation
(3) 2017 Master Plan recommended improvement.

ENGLEWOOD WATER DISTRICT
HOLIDAY VENTURES AND SEWER MASTER PLAN UPDATE

OPINION OF PROJECT COST

SCENARIO NO. 1
WRF - ELECTRICAL: REPLACE GENERATOR 2
PROJECT NO. WRF-E07

ESTIMATED COSTS

ITEM	UNIT	QUANTITY	UNIT COST	TOTAL COST
Replace Generator 2 - 250KW	LS	1	$ 75,000	$ 75,000
SUBTOTAL				$ 75,000
Engineering Design, and Permitting (15%)				$ -
Construction Engineering, and Inspection (10%)				
Contingency (25%)				$ 18,800
TOTAL				**$ 100,000**

Notes:
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(2) 2021 Bailey Engineering WRF Electrical Evaluation Recommended Improvement No. 11

ENGLEWOOD WATER DISTRICT
HOLIDAY VENTURES AND SEWER MASTER PLAN UPDATE

OPINION OF PROJECT COST

SCENARIO NO. 1
WRF - ELECTRICAL: ATS 1, 2, AND 3
PROJECT NO. WRF-E08

ESTIMATED COSTS

ITEM	UNIT	QUANTITY	UNIT COST	TOTAL COST
Replace ATS 1, 2, and 3	LS	1	$ 95,000	$ 95,000
SUBTOTAL				$ 95,000
Engineering Design, and Permitting (15%)				$ 20,000
Construction Engineering, and Inspection (10%)				$ 10,000
Contingency (25%)				$ 23,800
TOTAL				**$ 150,000**

Notes:
(1) The Consultant has no control over the cost of labor, materials, equipment, or over the Contractor's methods of determining prices or over competitive bidding or market conditions. Opinions of probable costs provided herein are based on the information known to Consultant at this time and represent only the Consultant's judgment as a design professional familiar with the construction industry. The Consultant cannot and does not guarantee that proposals, bids, or actual construction costs will not vary from its opinions of probable costs.
(2) 2021 Bailey Engineering WRF Electrical Evaluation Recommended Improvement No. 12

ENGLEWOOD WATER DISTRICT
HOLIDAY VENTURES AND SEWER MASTER PLAN UPDATE

OPINION OF PROJECT COST

SCENARIO NO. 1
WRF - ELECTRICAL: SERVICES 1, 2, AND 3 MAIN ELECTRICAL EQUIPMENT REPLACEMENT
PROJECT NO. WRF-E09

ESTIMATED COSTS

ITEM	UNIT	QUANTITY	UNIT COST	TOTAL COST
Replace Main Electrical Equipment for Services 1, 2, and 3 per Sheets E-5 and E-6	LS	1	$ 750,000	$ 750,000
SUBTOTAL				$ 750,000
Engineering Design, and Permitting (15%)				$ 120,000
Construction Engineering, and Inspection (10%)				$ 75,000
Contingency (25%)				$ 187,500
TOTAL				**$ 1,140,000**

Notes:
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(2) 2021 Bailey Engineering WRF Electrical Evaluation Recommended Improvement No. 13

ENGLEWOOD WATER DISTRICT
HOLIDAY VENTURES AND SEWER MASTER PLAN UPDATE

OPINION OF PROJECT COST

SCENARIO NO. 1
WRF - SOUTH WRF EXPANSION (PHASE I)
PROJECT NO. WRF-12

ESTIMATED COSTS

ITEM	UNIT	QUANTITY	UNIT COST	TOTAL COST
WRF Plant Expansion from 2.0 mgd to 4.0 mgd [1]	LS	1	$ 34,000,000	$ 34,000,000
Upgrade Chemical Pumping and Storage	LS	1	$ 220,000	$ 220,000
SUBTOTAL				$ 34,220,000
Engineering Design, and Permitting (15%)				$ 5,133,000
Construction Engineering, and Inspection (10%)				$ 3,422,000
Contingency (25%)				$ 55,000
TOTAL				**$ 42,830,000**

Notes:
(1) Cost estimated based on new plant or expansion $17/gallon.
(2) The Consultant has no control over the cost of labor, materials, equipment, or over the Contractor's methods of determining prices or over competitive bidding or market conditions. Opinions of probable costs provided herein are based on the information known to Consultant at this time and represent only the Consultant's judgment as a design professional familiar with the construction industry. The Consultant cannot and does not guarantee that proposals, bids, or actual construction costs will not vary from its opinions of probable costs.
(3) EQ basin included in Plant Expansion

ENGLEWOOD WATER DISTRICT
HOLIDAY VENTURES AND SEWER MASTER PLAN UPDATE

OPINION OF PROJECT COST

SCENARIO NO. 1
WRF - TELECOM IMPROVEMENTS
PROJECT NO. WRF-13

ESTIMATED COSTS

ITEM	UNIT	QUANTITY	UNIT COST	TOTAL COST
Telecommunication Fiber to Site	LS	1	$ 50,000	$ 50,000
SUBTOTAL				$ 50,000
Engineering Design, and Permitting (15%)				$ 10,000
Construction Engineering, and Inspection (10%)				$ 5,000
Contingency (25%)				$ 12,500
TOTAL				**$ 78,000**

Note:
(1)The Consultant has no control over the cost of labor, materials, equipment, or over the Contractor's methods of determining prices or over competitive bidding or market conditions. Opinions of probable costs provided herein are based on the information known to Consultant at this time and represent only the Consultant's judgment as a design professional familiar with the construction industry. The Consultant cannot and does not guarantee that proposals, bids, or actual construction costs will not vary from its opinions of probable costs.

ENGLEWOOD WATER DISTRICT
HOLIDAY VENTURES AND SEWER MASTER PLAN UPDATE

OPINION OF PROJECT COST

SCENARIO NO. 1
WRF - ELECTRICAL: MCC REPLACEMENT
PROJECT NO. WRF-E10

ESTIMATED COSTS

ITEM	UNIT	QUANTITY	UNIT COST	TOTAL COST
Replace MCCs (Effluent, Headworks, and Process)	LS	1	$ 350,000	$ 350,000

	SUBTOTAL	$ 350,000
Engineering Design, and Permitting (15%)		$ 60,000
Construction Engineering, and Inspection (10%)		$ 35,000
Contingency (25%)		$ 87,500
	TOTAL	**$ 540,000**

Notes:
(1) The Consultant has no control over the cost of labor, materials, equipment, or over the Contractor's methods of determining prices or over competitive bidding or market conditions. Opinions of probable costs provided herein are based on the information known to Consultant at this time and represent only the Consultant's judgment as a design professional familiar with the construction industry. The Consultant cannot and does not guarantee that proposals, bids, or actual construction costs will not vary from its opinions of probable costs.
(2) 2021 Bailey Engineering WRF Electrical Evaluation Recommended Improvement No. 14

ENGLEWOOD WATER DISTRICT
HOLIDAY VENTURES AND SEWER MASTER PLAN UPDATE

OPINION OF PROJECT COST

SCENARIO NO. 1
WRF - SOUTH WRF EXPANSION (PHASE II)
PROJECT NO. WRF-14

ESTIMATED COSTS

ITEM	UNIT	QUANTITY	UNIT COST	TOTAL COST
WRF Plant Expansion from 4.0 mgd to 6.0 mgd [1]	LS	1	$ 34,000,000	$ 34,000,000
Decommission Existing Plants 3 and 4	LS	1	$ 400,000	$ 400,000
				$ -
SUBTOTAL				$ 34,400,000
Engineering Design, and Permitting (15%)				$ 5,160,000
Construction Engineering, and Inspection (10%)				$ 3,440,000
Contingency (25%)				$ 100,000
TOTAL				**$ 43,100,000**

Notes:
(1) Cost estimated based on new plant or expansion $17/gallon.
(2) The Consultant has no control over the cost of labor, materials, equipment, or over the Contractor's methods of determining prices or over competitive bidding or market conditions. Opinions of probable costs provided herein are based on the information known to Consultant at this time and represent only the Consultant's judgment as a design professional familiar with the construction industry. The Consultant cannot and does not guarantee that proposals, bids, or actual construction costs will not vary from its opinions of probable costs.
(3) EQ basin included in Plant Expansion

ENGLEWOOD WATER DISTRICT
HOLIDAY VENTURES AND SEWER MASTER PLAN UPDATE

OPINION OF PROJECT COST

SCENARIO NO. 2
HOLIDAY VENTURES LS - MUFFIN MONSTER AND WET WELL IMPROVEMENTS
PROJECT NO. HV-01
2017 MASTER PLAN PROJECT NO. WRF-02

ESTIMATED COSTS

ITEM	UNIT	QUANTITY	UNIT COST	TOTAL COST
Replace Existing Muffin Monster with 2,900 gpm Muffin Monster	LS	1	$ 94,000	$ 94,000
Install 16" Pipe Channel with 16" bypass	LF	100	$ 125	$ 12,500
16" Gate Valves	EA	2	$ 9,400	$ 18,800
Rehab Ex. Wet Well with Liner	LS	1	$ 120,000	$ 120,000
Replace Existing Concrete Top and New Hatch	LS	1	$ 20,000	$ 20,000
Install Mixers in Wet Well	EA	1	$ 100,000	$ 100,000
SUBTOTAL				$ 365,300
Engineering Design, and Permitting (15%)				$ 60,000
Construction Engineering, and Inspection (10%)				$ 36,600
Contingency (25%)				$ 91,400
TOTAL				**$ 554,000**

Notes:
(1) 2017 Master Plan recommended improvement.
(2) The Consultant has no control over the cost of labor, materials, equipment, or over the Contractor's methods of determining prices or over competitive bidding or market conditions. Opinions of probable costs provided herein are based on the information known to Consultant at this time and represent only the Consultant's judgment as a design professional familiar with the construction industry. The Consultant cannot and does not guarantee that proposals, bids, or actual construction costs will not vary from its opinions of probable costs.

ENGLEWOOD WATER DISTRICT
HOLIDAY VENTURES AND SEWER MASTER PLAN UPDATE

OPINION OF PROJECT COST

SCENARIO NO. 2
INSTALL DEARBORN AND PINE FORCE MAIN
PROJECT NO. FM-01
2017 MASTER PLAN PROJECT NO. CL-02

ESTIMATED COSTS

ITEM	UNIT	QUANTITY	UNIT COST	TOTAL COST
Install 16-inch PVC Forcemain	LF	500	$ 192	$ 96,000
				$ -
				$ -
SUBTOTAL				$ 96,000
Engineering Design, and Permitting (15%)				$ 20,000
Construction Engineering, and Inspection (10%)				$ 9,600
Contingency (25%)				$ 24,000
TOTAL				**$ 150,000**

Notes:
(1) 2017 Master Plan recommended improvement.
(2) The Consultant has no control over the cost of labor, materials, equipment, or over the Contractor's methods of determining prices or over competitive bidding or market conditions. Opinions of probable costs provided herein are based on the information known to Consultant at this time and represent only the Consultant's judgment as a design professional familiar with the construction industry. The Consultant cannot and does not guarantee that proposals, bids, or actual construction costs will not vary from its opinions of probable costs.

ENGLEWOOD WATER DISTRICT
HOLIDAY VENTURES AND SEWER MASTER PLAN UPDATE

OPINION OF PROJECT COST

SCENARIO NO. 2
CONDITION ASSESSMENT OF MAJOR FORCE MAINS
PROJECT NO. FM-02

ESTIMATED COSTS

ITEM	UNIT	QUANTITY	UNIT COST	TOTAL COST
Force Main Condition Assessment and Optimization Plan	LS	1	$ 150,000	$ 150,000
SUBTOTAL				$ 150,000
Engineering Design, and Permitting (15%)				
Construction Engineering, and Inspection (10%)				
Contingency (25%)				
TOTAL				**$ 150,000**

Note:
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ENGLEWOOD WATER DISTRICT
HOLIDAY VENTURES AND SEWER MASTER PLAN UPDATE

OPINION OF PROJECT COST

SCENARIO NO. 2
HOLIDAY VENTURES LS - PUMP REPLACEMENT
PROJECT NO. HV-02

ESTIMATED COSTS

ITEM	UNIT	QUANTITY	UNIT COST	TOTAL COST
1,500 gpm Pumps with VFDs (x3)	LS	1	$ 300,000	$ 300,000
SUBTOTAL				$ 300,000
Engineering Design, and Permitting (15%)				
Construction Engineering, and Inspection (10%)				
Contingency (25%)				$ 75,000
TOTAL				**$ 375,000**

Note:
(1) The Consultant has no control over the cost of labor, materials, equipment, or over the Contractor's methods of determining prices or over competitive bidding or market conditions. Opinions of probable costs provided herein are based on the information known to Consultant at this time and represent only the Consultant's judgment as a design professional familiar with the construction industry. The Consultant cannot and does not guarantee that proposals, bids, or actual construction costs will not vary from its opinions of probable costs.

ENGLEWOOD WATER DISTRICT
HOLIDAY VENTURES AND SEWER MASTER PLAN UPDATE

OPINION OF PROJECT COST

SCENARIO NO. 2
WRF - NORTH WRF (PHASE I)
PROJECT NO. WRF-01

ESTIMATED COSTS

ITEM	UNIT	QUANTITY	UNIT COST	TOTAL COST
WRF Plant of 3.0 mgd [(1)]	LS	1	$ 51,000,000	$ 51,000,000
SUBTOTAL				$ 51,000,000
Engineering Design, and Permitting (10%)				$ 5,100,000
Construction Engineering, and Inspection (10%)				$ 5,100,000
Contingency (25%)				
TOTAL				**$ 61,200,000**

Notes:
(1) Cost estimated based on new plant or expansion $17/gallon.

(2) The Consultant has no control over the cost of labor, materials, equipment, or over the Contractor's methods of determining prices or over competitive bidding or market conditions. Opinions of probable costs provided herein are based on the information known to Consultant at this time and represent only the Consultant's judgment as a design professional familiar with the construction industry. The Consultant cannot and does not guarantee that proposals, bids, or actual construction costs will not vary from its opinions of probable costs.

ENGLEWOOD WATER DISTRICT
HOLIDAY VENTURES AND SEWER MASTER PLAN UPDATE

OPINION OF PROJECT COST

SCENARIO NO. 2
WRF - ONSITE SCADA
PROJECT NO. WRF-02

ESTIMATED COSTS

ITEM	UNIT	QUANTITY	UNIT COST	TOTAL COST
Onsite SCADA System with Wireless Interface	LS	1	$ 145,000	$ 145,000
				$ -
				$ -
SUBTOTAL				$ 145,000
Engineering Design, and Permitting (15%)				$ 30,000
Construction Engineering, and Inspection (10%)				$ 15,000
Contingency (25%)				$ 36,300
TOTAL				**$ 227,000**

Notes:
(1) The Consultant has no control over the cost of labor, materials, equipment, or over the Contractor's methods of determining prices or over competitive bidding or market conditions. Opinions of probable costs provided herein are based on the information known to Consultant at this time and represent only the Consultant's judgment as a design professional familiar with the construction industry. The Consultant cannot and does not guarantee that proposals, bids, or actual construction costs will not vary from its opinions of probable costs.
(2) 2021 Bailey Engineering WRF Electrical Evaluation Recommended Improvement No. 10

ENGLEWOOD WATER DISTRICT
HOLIDAY VENTURES AND SEWER MASTER PLAN UPDATE

OPINION OF PROJECT COST

SCENARIO NO. 2
WRF - NEW HEADWORKS
PROJECT NO. WRF-03

ESTIMATED COSTS

ITEM	UNIT	QUANTITY	UNIT COST	TOTAL COST
Headworks with Mechanical Screens, Grease & Grit Removal	LS	1	$ 840,000	$ 840,000
24-inch Steel Piping and Bypass piping	LF	500	$ 450	$ 225,000
SUBTOTAL				$ 1,065,000
Engineering Design, and Permitting (15%)				$ 160,000
Construction Engineering, and Inspection (10%)				$ 107,000
Contingency (25%)				$ 266,300
TOTAL				**$ 1,600,000**

Note:

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ENGLEWOOD WATER DISTRICT
HOLIDAY VENTURES AND SEWER MASTER PLAN UPDATE

OPINION OF PROJECT COST

SCENARIO NO. 2
WRF - DRYING BED
PROJECT NO. WRF-04

ESTIMATED COSTS

ITEM	UNIT	QUANTITY	UNIT COST	TOTAL COST
Drying Bed	LS	1	$ 100,000	$ 100,000
SUBTOTAL				$ 100,000
Engineering Design, and Permitting (15%)				$ 20,000
Construction Engineering, and Inspection (10%)				$ 10,000
Contingency (25%)				$ 25,000
TOTAL				**$ 160,000**

Note:
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ENGLEWOOD WATER DISTRICT
HOLIDAY VENTURES AND SEWER MASTER PLAN UPDATE

OPINION OF PROJECT COST

SCENARIO NO. 2
WRF - CHLORINE CONTACT BASIN EXPANSION
PROJECT NO. WRF-05
2017 MASTER PLAN PROJECT NO. WRF-11

ESTIMATED COSTS

ITEM	UNIT	QUANTITY	UNIT COST	TOTAL COST
Additional Piping and Tee	LS	1	$ 100,000	$ 100,000
SUBTOTAL				$ 100,000
Engineering Design, and Permitting (15%)				
Construction Engineering, and Inspection (10%)				
Contingency (25%)				$ 25,000
TOTAL				**$ 130,000**

Notes:
(1) 2017 Master Plan recommended improvement.
(2) The Consultant has no control over the cost of labor, materials, equipment, or over the Contractor's methods of determining prices or over competitive bidding or market conditions. Opinions of probable costs provided herein are based on the information known to Consultant at this time and represent only the Consultant's judgment as a design professional familiar with the construction industry. The Consultant cannot and does not guarantee that proposals, bids, or actual construction costs will not vary from its opinions of probable costs.
(3) Costs are estimated based on in-house EWD design and inspection.

ENGLEWOOD WATER DISTRICT
HOLIDAY VENTURES AND SEWER MASTER PLAN UPDATE

OPINION OF PROJECT COST

SCENARIO NO. 2
WRF - DEWATERING UNIT REPLACEMENT
PROJECT NO. WRF-06

ESTIMATED COSTS

ITEM	UNIT	QUANTITY	UNIT COST	TOTAL COST
New Dewatering Unit (replace ex. 125 gpm w/ more capacity)	LS	1	$ 500,000	$ 500,000
SUBTOTAL				$ 500,000
Engineering Design, and Permitting (15%)				
Construction Engineering, and Inspection (10%)				$ 50,000
Contingency (25%)				$ 125,000
TOTAL				**$ 680,000**

Note:
(1) The Consultant has no control over the cost of labor, materials, equipment, or over the Contractor's methods of determining prices or over competitive bidding or market conditions. Opinions of probable costs provided herein are based on the information known to Consultant at this time and represent only the Consultant's judgment as a design professional familiar with the construction industry. The Consultant cannot and does not guarantee that proposals, bids, or actual construction costs will not vary from its opinions of probable costs.

ENGLEWOOD WATER DISTRICT
HOLIDAY VENTURES AND SEWER MASTER PLAN UPDATE

OPINION OF PROJECT COST

SCENARIO NO. 2
WRF - DEWATERING BUILDING IMPROVEMENTS
PROJECT NO. WRF-07

ESTIMATED COSTS

ITEM	UNIT	QUANTITY	UNIT COST	TOTAL COST
Building Repairs, Recoat Interior, Piping Replacement, Floor Hatch & Mechanical Pulley	LS	1	$ 400,000	$ 400,000

SUBTOTAL	$ 400,000
Engineering Design, and Permitting (15%)	$ 60,000
Construction Engineering, and Inspection (10%)	$ 40,000
Contingency (25%)	$ 100,000
TOTAL	**$ 600,000**

Notes:
(1) The Consultant has no control over the cost of labor, materials, equipment, or over the Contractor's methods of determining prices or over competitive bidding or market conditions. Opinions of probable costs provided herein are based on the information known to Consultant at this time and represent only the Consultant's judgment as a design professional familiar with the construction industry. The Consultant cannot and does not guarantee that proposals, bids, or actual construction costs will not vary from its opinions of probable costs.
(2) This project is partially funded

ENGLEWOOD WATER DISTRICT
HOLIDAY VENTURES AND SEWER MASTER PLAN UPDATE

OPINION OF PROJECT COST

SCENARIO NO. 2
WRF - BLOWERS 2, 3, and 4 REPLACEMENT
PROJECT NO. WRF-08
2017 MASTER PLAN PROJECT NO. WRF-06

ESTIMATED COSTS

ITEM	UNIT	QUANTITY	UNIT COST	TOTAL COST
Blower Replacement (2, 3, & 4)	EA	3	$ 200,000	$ 600,000
Electrical Improvements to Upsize Blowers	LS	1	$ 25,000	$ 25,000
SUBTOTAL				$ 625,000
Engineering Design, and Permitting (15%)				$ 100,000
Construction Engineering, and Inspection (10%)				$ 63,000
Contingency (25%)				$ 156,300
TOTAL				**$ 950,000**

Notes:
(1) 2017 Master Plan recommended improvement.
(2) The Consultant has no control over the cost of labor, materials, equipment, or over the Contractor's methods of determining prices or over competitive bidding or market conditions. Opinions of probable costs provided herein are based on the information known to Consultant at this time and represent only the Consultant's judgment as a design professional familiar with the construction industry. The Consultant cannot and does not guarantee that proposals, bids, or actual construction costs will not vary from its opinions of probable costs.
(3) 2021 Bailey Engineering WRF Electrical Evaluation Recommended Improvement No. 7

ENGLEWOOD WATER DISTRICT
HOLIDAY VENTURES AND SEWER MASTER PLAN UPDATE

OPINION OF PROJECT COST

SCENARIO NO. 2
RECLAIMED WATER HYDRAULIC, STORAGE, CAPACITY AND OPERATIONS EVALUATION
PROJECT NO. WRF-09
2017 MASTER PLAN PROJECT NO. RU-01

ESTIMATED COSTS

ITEM	UNIT	QUANTITY	UNIT COST	TOTAL COST
Reclaimed Water Evaluation	LS	1	$ 150,000	$ 150,000
SUBTOTAL				$ 150,000
Engineering Design, and Permitting (15%)				
Construction Engineering, and Inspection (10%)				
Contingency (25%)				
TOTAL				**$ 150,000**

Note:
(1) The Consultant has no control over the cost of labor, materials, equipment, or over the Contractor's methods of determining prices or over competitive bidding or market conditions. Opinions of probable costs provided herein are based on the information known to Consultant at this time and represent only the Consultant's judgment as a design professional familiar with the construction industry. The Consultant cannot and does not guarantee that proposals, bids, or actual construction costs will not vary from its opinions of probable costs.

ENGLEWOOD WATER DISTRICT
HOLIDAY VENTURES AND SEWER MASTER PLAN UPDATE

OPINION OF PROJECT COST

SCENARIO NO. 2
WRF - ELECTRICAL: PLC UPGRADES
PROJECT NO. WRF-E06

ESTIMATED COSTS

ITEM	UNIT	QUANTITY	UNIT COST	TOTAL COST
PLC Replacement (Upgrades)	LS	1	$ 125,000	$ 125,000
SUBTOTAL				$ 125,000
Engineering Design, and Permitting (15%)				$ 20,000
Construction Engineering, and Inspection (10%)				$ 13,000
Contingency (25%)				$ 31,300
TOTAL				**$ 190,000**

Notes:
(1) The Consultant has no control over the cost of labor, materials, equipment, or over the Contractor's methods of determining prices or over competitive bidding or market conditions. Opinions of probable costs provided herein are based on the information known to Consultant at this time and represent only the Consultant's judgment as a design professional familiar with the construction industry. The Consultant cannot and does not guarantee that proposals, bids, or actual construction costs will not vary from its opinions of probable costs.
(2) 2021 Bailey Engineering WRF Electrical Evaluation Recommended Improvement No. 9

ENGLEWOOD WATER DISTRICT
HOLIDAY VENTURES AND SEWER MASTER PLAN UPDATE

OPINION OF PROJECT COST

SCENARIO NO. 2
WRF - NORTH WRF (PHASE II) and SOUTH WRF DECOMMISSION
PROJECT NO. WRF-10

ESTIMATED COSTS

ITEM	UNIT	QUANTITY	UNIT COST	TOTAL COST
WRF Plant from 3.0 mgd to 6.0 mgd [1]	LS	1	$ 51,000,000	$ 51,000,000
South WRF Decommission	LS	1	$ 200,000	$ 200,000
SUBTOTAL				$ 51,200,000
Engineering Design, and Permitting (15%)				$ 30,000
Construction Engineering, and Inspection (10%)				$ 20,000
Contingency (25%)				$ 50,000
TOTAL				**$ 51,300,000**

Notes:
(1) Cost estimated based on new plant or expansion $17/gallon.
(2) The Consultant has no control over the cost of labor, materials, equipment, or over the Contractor's methods of determining prices or over competitive bidding or market conditions. Opinions of probable costs provided herein are based on the information known to Consultant at this time and represent only the Consultant's judgment as a design professional familiar with the construction industry. The Consultant cannot and does not guarantee that proposals, bids, or actual construction costs will not vary from its opinions of probable costs.

ENGLEWOOD WATER DISTRICT
HOLIDAY VENTURES AND SEWER MASTER PLAN UPDATE

OPINION OF PROJECT COST

SCENARIO NO. 3
HOLIDAY VENTURES LS - WET WELL IMPROVEMENTS
PROJECT NO. HV-01
2017 MASTER PLAN PROJECT NO. WRF-02

ESTIMATED COSTS

ITEM	UNIT	QUANTITY	UNIT COST	TOTAL COST
Rehab Ex. Wet Well with Liner	LS	1	$ 120,000	$ 120,000
Replace Existing Concrete Top and New Hatch	LS	1	$ 20,000	$ 20,000
Install Mixers in Wet Well	EA	1	$ 100,000	$ 100,000
SUBTOTAL				$ 240,000
Engineering Design, and Permitting (15%)				$ 40,000
Construction Engineering, and Inspection (10%)				$ 24,000
Contingency (25%)				$ 60,000
TOTAL				**$ 364,000**

Notes:
(1) 2017 Master Plan recommended improvement.
(2) The Consultant has no control over the cost of labor, materials, equipment, or over the Contractor's methods of determining prices or over competitive bidding or market conditions. Opinions of probable costs provided herein are based on the information known to Consultant at this time and represent only the Consultant's judgment as a design professional familiar with the construction industry. The Consultant cannot and does not guarantee that proposals, bids, or actual construction costs will not vary from its opinions of probable costs.

ENGLEWOOD WATER DISTRICT
HOLIDAY VENTURES AND SEWER MASTER PLAN UPDATE

OPINION OF PROJECT COST

SCENARIO NO. 3
INSTALL DEARBORN AND PINE STREET FORCEMAIN
PROJECT NO. FM-01
2017 MASTER PLAN PROJECT NO. WRF-02

ESTIMATED COSTS

ITEM	UNIT	QUANTITY	UNIT COST	TOTAL COST
Install 16-inch PVC Forcemain	LF	500	$ 192	$ 96,000
SUBTOTAL				$ 96,000
Engineering Design, and Permitting (15%)				$ 20,000
Construction Engineering, and Inspection (10%)				$ 9,600
Contingency (25%)				$ 24,000
TOTAL				**$ 150,000**

Notes:
(1) 2017 Master Plan recommended improvement.
(2) The Consultant has no control over the cost of labor, materials, equipment, or over the Contractor's methods of determining prices or over competitive bidding or market conditions. Opinions of probable costs provided herein are based on the information known to Consultant at this time and represent only the Consultant's judgment as a design professional familiar with the construction industry. The Consultant cannot and does not guarantee that proposals, bids, or actual construction costs will not vary from its opinions of probable costs.

ENGLEWOOD WATER DISTRICT
HOLIDAY VENTURES AND SEWER MASTER PLAN UPDATE

OPINION OF PROJECT COST

SCENARIO NO. 3
CONDITION ASSESSMENT OF MAJOR FORCE MAINS
PROJECT NO. FM-02

ESTIMATED COSTS

ITEM	UNIT	QUANTITY	UNIT COST	TOTAL COST
Condition Assessment of Force Mains	LS	1	$ 150,000	$ 150,000
SUBTOTAL				$ 150,000
Engineering Design, and Permitting (15%)				
Construction Engineering, and Inspection (10%)				
Contingency (25%)				
TOTAL				**$ 150,000**

Note:
(1) The Consultant has no control over the cost of labor, materials, equipment, or over the Contractor's methods of determining prices or over competitive bidding or market conditions. Opinions of probable costs provided herein are based on the information known to Consultant at this time and represent only the Consultant's judgment as a design professional familiar with the construction industry. The Consultant cannot and does not guarantee that proposals, bids, or actual construction costs will not vary from its opinions of probable costs.

ENGLEWOOD WATER DISTRICT
HOLIDAY VENTURES AND SEWER MASTER PLAN UPDATE

OPINION OF PROJECT COST

SCENARIO NO. 3
HOLIDAY VENTURES LS - DOWNSIZE STATION
PROJECT NO. HV-02

ESTIMATED COSTS

ITEM	UNIT	QUANTITY	UNIT COST	TOTAL COST
Downsize Holiday Ventures Lift Station	LS	1	$ 10,000	$ 10,000
SUBTOTAL				$ 10,000
Engineering Design, and Permitting (15%)				$ 10,000
Construction Engineering, and Inspection (10%)				$ 1,000
Contingency (25%)				$ 2,500
TOTAL				**$ 24,000**

Note:
(1) The Consultant has no control over the cost of labor, materials, equipment, or over the Contractor's methods of determining prices or over competitive bidding or market conditions. Opinions of probable costs provided herein are based on the information known to Consultant at this time and represent only the Consultant's judgment as a design professional familiar with the construction industry. The Consultant cannot and does not guarantee that proposals, bids, or actual construction costs will not vary from its opinions of probable costs.

ENGLEWOOD WATER DISTRICT
HOLIDAY VENTURES AND SEWER MASTER PLAN UPDATE

OPINION OF PROJECT COST

SCENARIO NO. 3
WRF - NORTH WRF (PHASE I)
PROJECT NO. WRF-01

ESTIMATED COSTS

ITEM	UNIT	QUANTITY	UNIT COST	TOTAL COST
WRF Plant of 2.0 mgd [1]	LS	1	$ 34,000,000	$ 34,000,000
SUBTOTAL				$ 34,000,000
Engineering Design, and Permitting (15%)				$ 5,100,000
Construction Engineering, and Inspection (10%)				$ 3,400,000
Contingency (25%)				
TOTAL				**$ 42,500,000**

Notes:
(1) Cost estimated based on new plant or expansion $17/gallon.
(2) The Consultant has no control over the cost of labor, materials, equipment, or over the Contractor's methods of determining prices or over competitive bidding or market conditions. Opinions of probable costs provided herein are based on the information known to Consultant at this time and represent only the Consultant's judgment as a design professional familiar with the construction industry. The Consultant cannot and does not guarantee that proposals, bids, or actual construction costs will not vary from its opinions of probable costs.

ENGLEWOOD WATER DISTRICT
HOLIDAY VENTURES AND SEWER MASTER PLAN UPDATE

OPINION OF PROJECT COST

SCENARIO NO. 3
WRF - ONSITE SCADA (S WRF)
PROJECT NO. WRF-02

ESTIMATED COSTS

ITEM	UNIT	QUANTITY	UNIT COST	TOTAL COST
Onsite SCADA System with Wireless Interface	LS	1	$ 145,000	$ 145,000
SUBTOTAL				$ 145,000
Engineering Design, and Permitting (15%)				$ 30,000
Construction Engineering, and Inspection (10%)				$ 15,000
Contingency (25%)				$ 36,300
TOTAL				**$ 227,000**

Note:
(1) The Consultant has no control over the cost of labor, materials, equipment, or over the Contractor's methods of determining prices or over competitive bidding or market conditions. Opinions of probable costs provided herein are based on the information known to Consultant at this time and represent only the Consultant's judgment as a design professional familiar with the construction industry. The Consultant cannot and does not guarantee that proposals, bids, or actual construction costs will not vary from its opinions of probable costs.
(2) 2021 Bailey Engineering WRF Electrical Evaluation Recommended Improvement No. 9

ENGLEWOOD WATER DISTRICT
HOLIDAY VENTURES AND SEWER MASTER PLAN UPDATE

OPINION OF PROJECT COST

SCENARIO NO. 3
WRF - NEW HEADWORKS (S WRF)
PROJECT NO. WRF-03

ESTIMATED COSTS

ITEM	UNIT	QUANTITY	UNIT COST	TOTAL COST
Headworks with Mechanical Screens, Grease & Grit Removal	LS	1	$ 840,000	$ 840,000
24-inch Steel Piping and Bypass piping	LF	500	$ 450	$ 225,000
Decommission Pre- and Post-screen Tanks	LS	1	$ 200,000	$ 200,000
2,360 gpm Transfer Pumps	EA	2	$ 200,000	$ 400,000
SUBTOTAL				$ 1,665,000
Engineering Design, and Permitting (15%)				$ 250,000
Construction Engineering, and Inspection (10%)				$ 167,000
Contingency (25%)				$ 416,300
TOTAL				**$ 2,500,000**

Note:
(1) The Consultant has no control over the cost of labor, materials, equipment, or over the Contractor's methods of determining prices or over competitive bidding or market conditions. Opinions of probable costs provided herein are based on the information known to Consultant at this time and represent only the Consultant's judgment as a design professional familiar with the construction industry. The Consultant cannot and does not guarantee that proposals, bids, or actual construction costs will not vary from its opinions of probable costs.

ENGLEWOOD WATER DISTRICT
HOLIDAY VENTURES AND SEWER MASTER PLAN UPDATE

OPINION OF PROJECT COST

SCENARIO NO. 3
WRF - ODOR CONTROL SYSTEM REHAB AT HEADWORKS
PROJECT NO. WRF-04
2017 MASTER PLAN PROJECT NO. WRF-02

ESTIMATED COSTS

ITEM	UNIT	QUANTITY	UNIT COST	TOTAL COST
Odor Control Reconfiguration	LS	1	$ 285,000	$ 285,000
SUBTOTAL				$ 285,000
Engineering Design, and Permitting (15%)				$ 50,000
Construction Engineering, and Inspection (10%)				$ 29,000
Contingency (25%)				$ 71,300
TOTAL				**$ 440,000**

Notes:
(1) 2017 Master Plan recommended improvement.
(2) The Consultant has no control over the cost of labor, materials, equipment, or over the Contractor's methods of determining prices or over competitive bidding or market conditions. Opinions of probable costs provided herein are based on the information known to Consultant at this time and represent only the Consultant's judgment as a design professional familiar with the construction industry. The Consultant cannot and does not guarantee that proposals, bids, or actual construction costs will not vary from its opinions of probable costs.

ENGLEWOOD WATER DISTRICT
HOLIDAY VENTURES AND SEWER MASTER PLAN UPDATE

OPINION OF PROJECT COST

SCENARIO NO. 3
WRF - DRYING BED
PROJECT NO. WRF-05

ESTIMATED COSTS

ITEM	UNIT	QUANTITY	UNIT COST	TOTAL COST
Drying Bed	LS	1	$ 100,000	$ 100,000
SUBTOTAL				$ 100,000
Engineering Design, and Permitting (15%)				$ 20,000
Construction Engineering, and Inspection (10%)				$ 10,000
Contingency (25%)				$ 25,000
TOTAL				**$ 160,000**

Note:
(1) The Consultant has no control over the cost of labor, materials, equipment, or over the Contractor's methods of determining prices or over competitive bidding or market conditions. Opinions of probable costs provided herein are based on the information known to Consultant at this time and represent only the Consultant's judgment as a design professional familiar with the construction industry. The Consultant cannot and does not guarantee that proposals, bids, or actual construction costs will not vary from its opinions of probable costs.

ENGLEWOOD WATER DISTRICT
HOLIDAY VENTURES AND SEWER MASTER PLAN UPDATE

OPINION OF PROJECT COST

SCENARIO NO. 3
WRF - CHLORINE CONTACT BASIN EXPANSION
PROJECT NO. WRF-06
2017 MASTER PLAN PROJECT NO. WRF-11

ESTIMATED COSTS

ITEM	UNIT	QUANTITY	UNIT COST	TOTAL COST
Additional Piping and Tee	LS	1	$ 100,000	$ 100,000
SUBTOTAL				$ 100,000
Engineering Design, and Permitting (15%)				
Construction Engineering, and Inspection (10%)				
Contingency (25%)				$ 25,000
TOTAL				**$ 130,000**

Notes:
(1) 2017 Master Plan recommended improvement.
(2) The Consultant has no control over the cost of labor, materials, equipment, or over the Contractor's methods of determining prices or over competitive bidding or market conditions. Opinions of probable costs provided herein are based on the information known to Consultant at this time and represent only the Consultant's judgment as a design professional familiar with the construction industry. The Consultant cannot and does not guarantee that proposals, bids, or actual construction costs will not vary from its opinions of probable costs.
(3) Costs are estimated based on in-house EWD design and inspection.

ENGLEWOOD WATER DISTRICT
HOLIDAY VENTURES AND SEWER MASTER PLAN UPDATE

OPINION OF PROJECT COST

SCENARIO NO. 3
WRF - DEWATERING UNIT REPLACEMENT
PROJECT NO. WRF-07

ESTIMATED COSTS

ITEM	UNIT	QUANTITY	UNIT COST	TOTAL COST
New Dewatering Unit (replace ex. 125 gpm w/ more capacity)	LS	1	$ 500,000	$ 500,000
SUBTOTAL				$ 500,000
Engineering Design, and Permitting (15%)				
Construction Engineering, and Inspection (10%)				
Contingency (25%)				$ 125,000
TOTAL				**$ 630,000**

Note:
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ENGLEWOOD WATER DISTRICT
HOLIDAY VENTURES AND SEWER MASTER PLAN UPDATE

OPINION OF PROJECT COST

SCENARIO NO. 3
WRF - DEWATERING BUILDING IMPROVEMENTS
PROJECT NO. WRF-08

ESTIMATED COSTS

ITEM	UNIT	QUANTITY	UNIT COST	TOTAL COST
Building Repairs, Recoat Interior, Piping Replacement, Floor Hatch & Mechanical Pulley	LS	1	$ 400,000	$ 400,000

SUBTOTAL	$ 400,000
Engineering Design, and Permitting (15%)	$ 60,000
Construction Engineering, and Inspection (10%)	$ 40,000
Contingency (25%)	$ 100,000
TOTAL	**$ 600,000**

Notes:
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(2) This project is partially funded ($140K)

ENGLEWOOD WATER DISTRICT
HOLIDAY VENTURES AND SEWER MASTER PLAN UPDATE

OPINION OF PROJECT COST

SCENARIO NO. 3
WRF - BLOWERS 2, 3, and 4 REPLACEMENT
PROJECT NO. WRF-09
2017 MASTER PLAN PROJECT NO. WRF-06

ESTIMATED COSTS

ITEM	UNIT	QUANTITY	UNIT COST	TOTAL COST
Blower Replacement (2, 3, & 4)	EA	3	$ 200,000	$ 600,000
Electrical Improvements to Upsize Blowers	LS	1	$ 25,000	$ 25,000
SUBTOTAL				$ 625,000
Engineering Design, and Permitting (15%)				$ 100,000
Construction Engineering, and Inspection (10%)				$ 63,000
Contingency (25%)				$ 156,300
TOTAL				**$ 950,000**

Notes:
(1) 2017 Master Plan recommended improvement.
(2) The Consultant has no control over the cost of labor, materials, equipment, or over the Contractor's methods of determining prices or over competitive bidding or market conditions. Opinions of probable costs provided herein are based on the information known to Consultant at this time and represent only the Consultant's judgment as a design professional familiar with the construction industry. The Consultant cannot and does not guarantee that proposals, bids, or actual construction costs will not vary from its opinions of probable costs.
(3) 2021 Bailey Engineering WRF Electrical Evaluation Recommended Improvement No. 7

ENGLEWOOD WATER DISTRICT
HOLIDAY VENTURES AND SEWER MASTER PLAN UPDATE

OPINION OF PROJECT COST

SCENARIO NO. 3
RECLAIMED WATER HYDRAULIC, STORAGE, CAPACITY AND OPERATIONS EVALUATION
PROJECT NO. WRF-10
2017 MASTER PLAN PROJECT NO. RU-01

ESTIMATED COSTS

ITEM	UNIT	QUANTITY	UNIT COST	TOTAL COST
Reclaimed Water Evaluation	LS	1	$ 150,000	$ 150,000
SUBTOTAL				$ 150,000
Engineering Design, and Permitting (15%)				
Construction Engineering, and Inspection (10%)				
Contingency (25%)				
TOTAL				**$ 150,000**

Note:
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ENGLEWOOD WATER DISTRICT
HOLIDAY VENTURES AND SEWER MASTER PLAN UPDATE

OPINION OF PROJECT COST

SCENARIO NO. 3
WRF - ELECTRICAL: PLC UPGRADES
PROJECT NO. WRF-E06

ESTIMATED COSTS

ITEM	UNIT	QUANTITY	UNIT COST	TOTAL COST
PLC Replacement (Upgrades)	LS	1	$ 125,000	$ 125,000
SUBTOTAL				$ 125,000
Engineering Design, and Permitting (15%)				$ 20,000
Construction Engineering, and Inspection (10%)				$ 13,000
Contingency (25%)				$ 31,300
TOTAL				**$ 190,000**

Notes:
(1) The Consultant has no control over the cost of labor, materials, equipment, or over the Contractor's methods of determining prices or over competitive bidding or market conditions. Opinions of probable costs provided herein are based on the information known to Consultant at this time and represent only the Consultant's judgment as a design professional familiar with the construction industry. The Consultant cannot and does not guarantee that proposals, bids, or actual construction costs will not vary from its opinions of probable costs.
(2) 2021 Bailey Engineering WRF Electrical Evaluation Recommended Improvement No. 9

ENGLEWOOD WATER DISTRICT
HOLIDAY VENTURES AND SEWER MASTER PLAN UPDATE

OPINION OF PROJECT COST

SCENARIO NO. 3
WRF - RECLAIMED TRANSFER PUMP STATION UPGRADES
PROJECT NO. WRF-11
2017 MASTER PLAN PROJECT NO. WRF-16

ESTIMATED COSTS

ITEM	UNIT	QUANTITY	UNIT COST	TOTAL COST
Reclaimed Transfer Pumps	LS	1	$ 360,000	$ 360,000
Station and Piping	LS	1	$ 100,000	$ 100,000
SUBTOTAL				$ 460,000
Engineering Design, and Permitting (15%)				$ 70,000
Construction Engineering, and Inspection (10%)				$ 46,000
Contingency (25%)				$ 115,000
TOTAL				**$ 700,000**

Notes:
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(2) Additional reclaimed storage may be required and will need to be determined in Reclaimed System Evaluation
(3) 2017 Master Plan recommended improvement.

ENGLEWOOD WATER DISTRICT
HOLIDAY VENTURES AND SEWER MASTER PLAN UPDATE

OPINION OF PROJECT COST

SCENARIO NO. 3
WRF - ELECTRICAL: REPLACE GENERATOR 2
PROJECT NO. WRF-E07

ESTIMATED COSTS

ITEM	UNIT	QUANTITY	UNIT COST	TOTAL COST
Replace Generator 2 - 250KW	LS	1	$ 75,000	$ 75,000
SUBTOTAL				$ 75,000
Engineering Design, and Permitting (15%)				$ -
Construction Engineering, and Inspection (10%)				
Contingency (25%)				$ 18,800
TOTAL				**$ 100,000**

Notes:
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(2) 2021 Bailey Engineering WRF Electrical Evaluation Recommended Improvement No. 11

ENGLEWOOD WATER DISTRICT
HOLIDAY VENTURES AND SEWER MASTER PLAN UPDATE

OPINION OF PROJECT COST

SCENARIO NO. 3
WRF - ELECTRICAL: ATS 1, 2, AND 3
PROJECT NO. WRF-E08

ESTIMATED COSTS

ITEM	UNIT	QUANTITY	UNIT COST	TOTAL COST
Replace ATS 1, 2, and 3	LS	1	$ 95,000	$ 95,000
SUBTOTAL				$ 95,000
Engineering Design, and Permitting (15%)				$ 20,000
Construction Engineering, and Inspection (10%)				$ 10,000
Contingency (25%)				$ 23,800
TOTAL				**$ 150,000**

Notes:
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(2) 2021 Bailey Engineering WRF Electrical Evaluation Recommended Improvement No. 12

ENGLEWOOD WATER DISTRICT
HOLIDAY VENTURES AND SEWER MASTER PLAN UPDATE

OPINION OF PROJECT COST

SCENARIO NO. 3
WRF - ELECTRICAL: SERVICES 1, 2, AND 3 MAIN ELECTRICAL EQUIPMENT REPLACEMENT
PROJECT NO. WRF-E09

ESTIMATED COSTS

ITEM	UNIT	QUANTITY	UNIT COST	TOTAL COST
Replace Main Electrical Equipment for Services 1, 2, and 3 per Sheets E-5 and E-6	LS	1	$ 750,000	$ 750,000
SUBTOTAL				$ 750,000
Engineering Design, and Permitting (15%)				$ 120,000
Construction Engineering, and Inspection (10%)				$ 75,000
Contingency (25%)				$ 187,500
TOTAL				**$ 1,140,000**

Notes:
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(2) 2021 Bailey Engineering WRF Electrical Evaluation Recommended Improvement No. 13

ENGLEWOOD WATER DISTRICT
HOLIDAY VENTURES AND SEWER MASTER PLAN UPDATE

OPINION OF PROJECT COST

SCENARIO NO. 3
WRF - NORTH WRF (PHASE II)
PROJECT NO. WRF-12

ESTIMATED COSTS

ITEM	UNIT	QUANTITY	UNIT COST	TOTAL COST
WRF Plant from 2.0 mgd to 4.0 mgd [1]	LS	1	$ 34,000,000	$ 34,000,000
SUBTOTAL				$ 34,000,000
Engineering Design, and Permitting (15%)				$ 5,100,000
Construction Engineering, and Inspection (10%)				$ 3,400,000
Contingency (25%)				
TOTAL				**$ 42,500,000**

Notes:
(1) Cost estimated based on new plant or expansion $17/gallon.
(2) The Consultant has no control over the cost of labor, materials, equipment, or over the Contractor's methods of determining prices or over competitive bidding or market conditions. Opinions of probable costs provided herein are based on the information known to Consultant at this time and represent only the Consultant's judgment as a design professional familiar with the construction industry. The Consultant cannot and does not guarantee that proposals, bids, or actual construction costs will not vary from its opinions of probable costs.

ENGLEWOOD WATER DISTRICT
HOLIDAY VENTURES AND SEWER MASTER PLAN UPDATE

OPINION OF PROJECT COST

SCENARIO NO. 3
WRF - SOUTH WRF UPGRADE
PROJECT NO. WRF-13

ESTIMATED COSTS

ITEM	UNIT	QUANTITY	UNIT COST	TOTAL COST
Rehab Plant No. 3 & 4	LS	2	$ 390,000	$ 780,000
Decommission existing plants 1-2	LS	1	$ 200,000	$ 200,000
SUBTOTAL				$ 980,000
Engineering Design, and Permitting (15%)				$ 150,000
Construction Engineering, and Inspection (10%)				$ 98,000
Contingency (25%)				$ 245,000
TOTAL				**$ 1,480,000**

Note:
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ENGLEWOOD WATER DISTRICT
HOLIDAY VENTURES AND SEWER MASTER PLAN UPDATE

OPINION OF PROJECT COST

SCENARIO NO. 3
WRF - TELECOM IMPROVEMENTS
PROJECT NO. WRF-14

ESTIMATED COSTS

ITEM	UNIT	QUANTITY	UNIT COST	TOTAL COST
Telecommunication Fiber to Site	LS	1	$ 50,000	$ 50,000
SUBTOTAL				$ 50,000
Engineering Design, and Permitting (15%)				$ 10,000
Construction Engineering, and Inspection (10%)				$ 5,000
Contingency (25%)				$ 12,500
TOTAL				**$ 78,000**

Note:
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ENGLEWOOD WATER DISTRICT
HOLIDAY VENTURES AND SEWER MASTER PLAN UPDATE

OPINION OF PROJECT COST

SCENARIO NO. 3
WRF - ELECTRICAL: MCC REPLACEMENT
PROJECT NO. WRF-E10

ESTIMATED COSTS

ITEM	UNIT	QUANTITY	UNIT COST	TOTAL COST
Replace MCCs (Effluent, Headworks, and Process)	LS	1	$ 350,000	$ 350,000
SUBTOTAL				$ 350,000
Engineering Design, and Permitting (15%)				$ 60,000
Construction Engineering, and Inspection (10%)				$ 35,000
Contingency (25%)				$ 87,500
TOTAL				**$ 540,000**

Notes:
(1) The Consultant has no control over the cost of labor, materials, equipment, or over the Contractor's methods of determining prices or over competitive bidding or market conditions. Opinions of probable costs provided herein are based on the information known to Consultant at this time and represent only the Consultant's judgment as a design professional familiar with the construction industry. The Consultant cannot and does not guarantee that proposals, bids, or actual construction costs will not vary from its opinions of probable costs.
(2) 2021 Bailey Engineering WRF Electrical Evaluation Recommended Improvement No. 14

Appendix F

Engineering Reports

Utility Master Plan
Englewood Water District

Prepared by
HDR Engineering, Inc.

Utility Master Plan

Englewood Water District

Englewood, FL
February 2017

2-22-2017

(SIGNATURE AND DATE)
TERRI S. HOLCOMB, PE
FL. PE LICENSE NO. 55505

ENGLEWOOD WATER
DISTRICT
UTILITY MASTER PLAN

Contents

Tables

Figures

Appendices

1 Executive Summary

1.1 Introduction

Master planning is especially critical for utilities projects because expenditures of capital to develop major infrastructure needs, including new facilities, need to occur several years before the new facilities can be placed into service. This Utility Master Plan assesses the District's water, wastewater, and reclaimed water service and facility needs for the next 20-year planning period from 2016 through 2036.

Utility Master Plan

A Utility Master Plan lays out, in an orderly fashion, a utility system's future infrastructure improvement program

The Utility Master Plan includes the following components:

Section 1 – Executive Summary

Section 2 – Introduction

Section 3 – Existing Facilities & Permit Conditions

Section 4 – Future Water Demands, Wastewater Flows, Reuse and Reject Disposal, and Regulatory Compliance

Section 5 – Capital Improvement Program

Section 6 – Capacity, Management, Operations and Maintenance Framework

Section 7 – Summary and Recommendations

Section 8 – References

Section 9 – Appendices

Preparation of this Utility Master Plan was done in collaboration with members of the Englewood Water District (District) Staff as well as representatives of local government partners including:

- Sarasota County
- Charlotte County
- City of North Port
- West Villages Improvement District; and
- Peace River Manasota Regional Water Supply Authority.

1.2 Existing Facilities and Permit Conditions

1.2.1 General

The District was created in 1959 and is classified as a political sub-division of the State of Florida under Chapter 2004-439. The District owns and operates a public utility that provides water, wastewater, and reclaimed water services within the unincorporated areas of Sarasota and Charlotte Counties generally known as Englewood, Grove City, and Manasota Key. The existing systems are generally composed of the following facilities:

1.2.2 Potable Water System

The District's potable water supply is made up of diverse sources including shallow potable groundwater and deeper brackish supply wells. Different water treatment systems are required for the fresh groundwater supply and the brackish groundwater. Lime softening is used to treat the fresh groundwater and reverse osmosis (RO) treatment is used for the brackish groundwater. In addition to the groundwater supply and treatment facilities, the District also has water storage, brackish water concentrate disposal, and potable water distribution facilities. The District's overall water supply, treatment and distribution facilities include six (6) groundwater wellfields; two (2) Water Treatment Plants with a combined capacity of 6.0 MGD; four (4) finished water storage tanks with a combined capacity of 7.5 million gallons; one (1) Deep Injection Well for brackish concentrate disposal; and over 260 miles of water transmission and distribution pipelines and appurtenances, with emergency interconnections with Sarasota and Charlotte Counties.

1.2.3 Domestic Wastewater and Reuse System

The District's domestic wastewater system starts with an extensive sewer collection system comprised of over 170 miles of gravity, low pressure, vacuum, and pressurized pipelines. In addition, the District maintains approximately 900 manholes, 3,800 vacuum pits, thirteen (13) low pressure stations and six (6) vacuum stations as part of the collection system. Wastewater flows are treated at the District's 3.0 MGD extended aeration Water Reclamation Facility. The wastewater effluent is sent to the 3.5 MGD permitted capacity slow-rate public access reuse system.

1.3 Future Water Demands, Wastewater and Reuse Flows, and Regulatory Compliance

1.3.1 Population Projections

Population projections for the District were developed to establish future water demands and wastewater flows. These estimates were based on information gathered from various sources to compile a comprehensive view of the District's historical and future population estimates. The methodology used to determine the Base Year Population and subsequent 20 year population forecasts is presented in Appendix A.

A trend based population projection was applied to the Base Year Population (2015), with a 1.5%, 1.0% and 0.8% growth rate for the near-term (1-5 year), mid-term (6-10 year) and long-term (11-20 year) planning horizons respectively. The existing and future District populations through 2036 are summarized in the following Table 1-1.

Table 1-1. Population Projections

	Total Population 2015 (Base Year)	Total Population 2016	Total Population 2021	Total Population 2026	Total Population 2031	Total Population 2036
Annual Growth Rate		1.5% (2015-2016)	1.5% (2017-2021)	1.0% (2022-2026)	0.8% (2027-2031)	0.8% (2032-2036)
Population	**36,611**	**37,160**	**40,032**	**42,074**	**44,220**	**46,018**

1.3.2 Water Supply Demands and Treatment Capacity Analysis

The Per Capita Model for forecasting water supply demands was used to determine the District's future water supply demands through 2036. Utilizing historical records of water production data as well as the Historical Functional Population Served reported on the District's Public Supply Annual Reports (PSARs) and 2015 census data, a demand of 70 gallons per capita/day was used. Including the water service to the Bocilla Utilities, the following Table 1-2 summarizes the total projected annual average and maximum day water supply demands for the District.

Table 1-2. Total Projected Water Supply Demands

Year	Projected Population	2011-2015 Average GPCD	Projected Annual Average Water Demands (MGD)	Bocilla Utilities Projected Annual Average Water Demands (MGD)	Total Annual Average Day Water Demands (MGD)	Projected Maximum Day Water Demands (MGD)*
2015	36,611	70	2.563	0.143	2.706	3.518
2016	37,160	70	2.601	0.152	2.753	3.579
2021	40,032	70	2.802	0.162	2.964	3.854
2026	42,074	70	2.945	0.171	3.116	4.051
2031	44,220	70	3.095	0.181	3.276	4.259
2036	46,018	70	3.221	0.191	3.412	4.436

* Historical Annual Average Daily Production to Annual Maximum Day Ratio of 1.3 was used.

Determination of the quantity and timing of projected water supply resources was accomplished by comparing the projected water supply demands shown in Table 1-2 above to the District's existing finished water capacity on an annual basis. Table 1-3 below identifies the current available water supply resources and associated water treatment plant capacities.

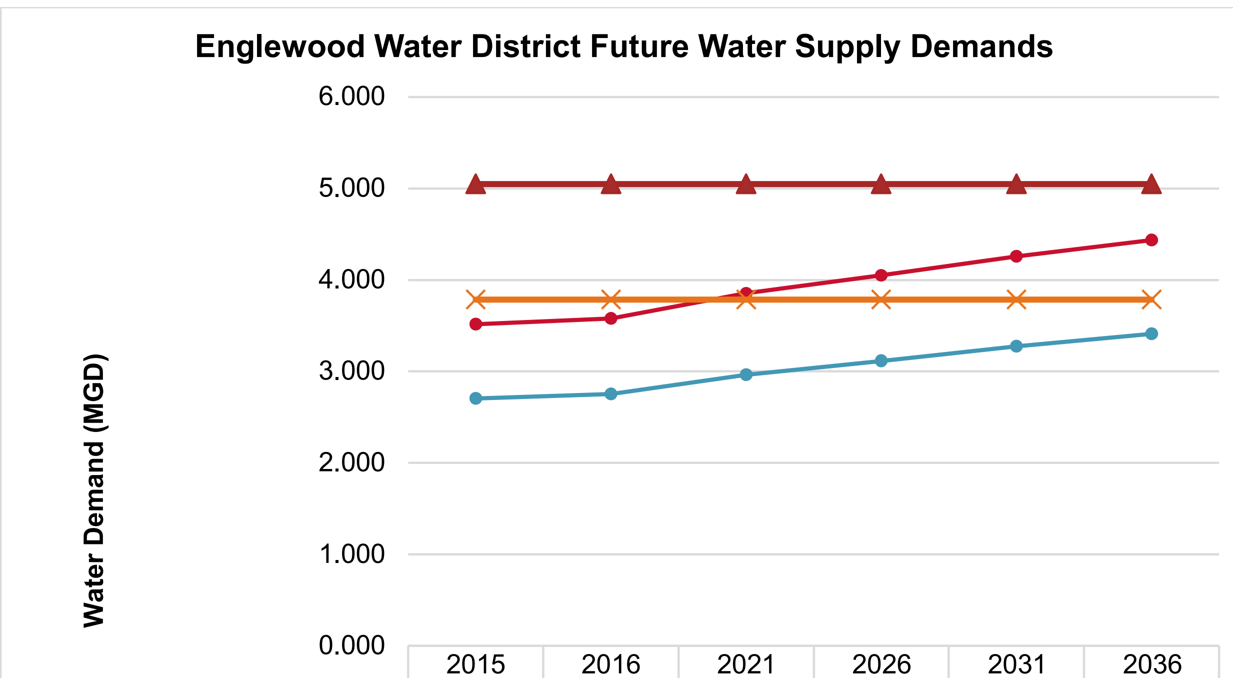
Table 1-3. Available Water Supply Resource Analysis

Supply	Permitted Source AAD (MGD)	Permitted Source Peak Day (MGD)	WTP Efficiency %	Finished Water AAD (MGD)	Finished Water Peak Day (MGD)
RO Wellfields 2,4	4.000	4.400	65	2.600	2.860
Wellfields 1,2,3,and 5	1.360	2.190	100*	1.360	2.190
Total Supply	**5.360**	**6.590**		**3.960**	**5.050**

* For the purpose of this Utility Master Plan, the efficiency of the Lime Softening Plant is considered to be 100%

A comparison of projected water supply demands to the District's current finished water capacity is shown in Figure 1-1.

Figure 1-1. Englewood Water District Future Water Supply Demands and Treatment Capacity



	2015	2016	2021	2026	2031	2036
Projected AADF	2.706	2.753	2.964	3.116	3.276	3.412
Projected Maximum Day	3.518	3.579	3.854	4.051	4.259	4.436
Peak Day Treatment Capacity	5.050	5.050	5.050	5.050	5.050	5.050
75% Peak Day Plant Capacity	3.788	3.788	3.788	3.788	3.788	3.788

In accordance with paragraph 62-555.348(3) (a), Florida Administrative Code (F.A.C.), an initial capacity analysis report must be submitted to the Department of Environmental Protection (DEP) within six months after the month in which the total maximum-day quantity of finished water produced by the District's water treatment plants exceeds seventy-five percent (75%) of the total permitted maximum-day operating capacity of the plants. Utilizing the combined permitted plant peak day capacity of 5.050 MGD from Table 1-3 above, when the District has a finished water peak day of 3.788 MGD, an initial capacity analysis report will need to be submitted to the DEP within six months. Based on the projected water supply demands, the District's Peak Month will near 75% of the current permitted peak day capacity in 2020.

When compared to the District's annual average treatment capacity, water demand projections for the next 20 years indicate that a new water source and treatment capacity will not be needed until after 2036. It is noted that new water supply sources and treatment capacities may take up to 10 years to permit, design and construct. It is recommended that the District include in its capital improvement plan the conceptual planning, permitting, design and construction of a new or expansion of a water supply source by 2026.

1.3.3 Wastewater Flow Projections and Treatment Analysis

To determine future wastewater flows, the population projections were converted to equivalent residential connections (ERCs) based on the average family household size of 2.4 as determined from 2015 Census data.

To estimate the flows associated with each ERC, a comparison was made between the previously published recommendation of 121 GPD/ERC in the District's 2005 Capacity Analysis Report (CH2MHill), and the District's 2015 Annual Average Daily Flows. The Annual Average Daily flow in 2015 was 1.471 MGD (Total 1.587 MGD – Sandalhaven and Charlotte County flows of 0.105 and 0.001 respectively). The estimated 2015 Base Population is 36,611. This equals approximately 40 gpcd. Using 2.4 people per household equates to an estimated flow of 96 GPD/ERC.

Table 1-4. Comparison of GPD/ERC

Source	Flow Rate (GPD/ERC)
2005 Capacity Analysis Report (CH2MHill)	121
2015 AADF/2015 Base Population	96

In developing a recommended flow per ERC for future flow calculations, consideration was given to the anticipated areas of growth within the District along with recognition that not all residences within the District's service area have sewer service, yet those residences were included in the determination of "Base Population" calculation above – skewing the flow rate down.

Several new developments have been identified that are zoned primarily single family residential, which would indicate that the reported household size of 2.4 may increase as more families move into the area.

It was determined to use a conservative approach and apply the previous estimate of 121GPD/ERC to calculate the District's projected wastewater flows.

In addition to the areas within the District's service boundary, additional wastewater flows will be collected from Charlotte County and Utilities, Inc. of Sandalhaven. The District's original bulk sewer agreement with Charlotte County (2005) was for 400,000 gpd, but with the new 2014 Interlocal Agreement, no capacity limit is enumerated. The Utilities, Inc. of Sandalhaven agreement with the District has an amended contract limit of 500,000 gpd, however at the time of this report, the utility has only paid for 300,000 gpd of the allocated capacity.

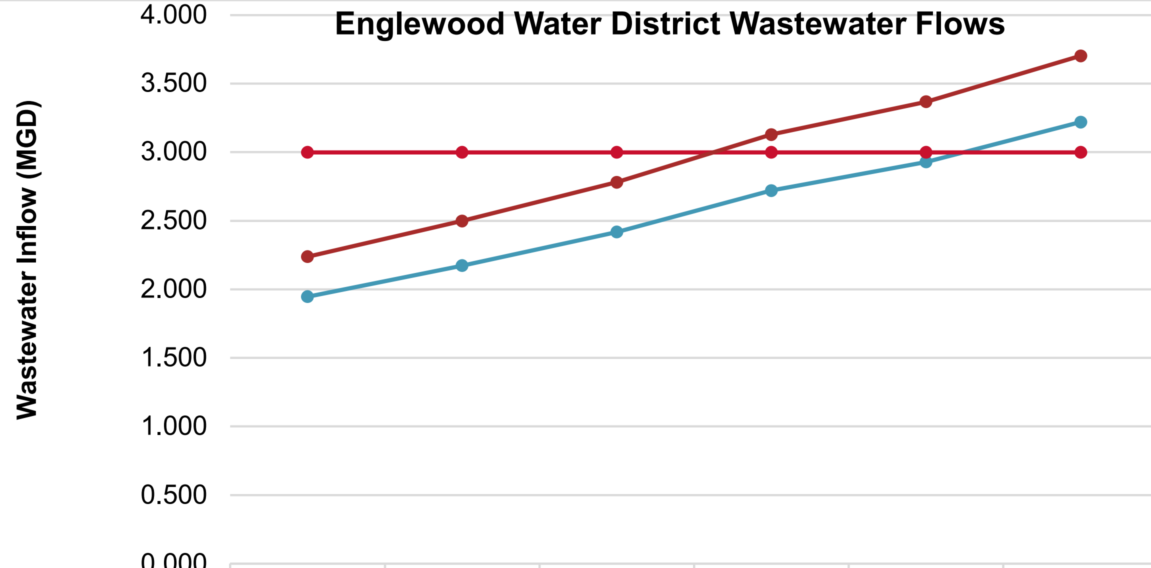
Utilizing the population projections presented in Section 4.0 of this Report, the assumption of 2.4 people per household and 121GPD/ERC, and the established 1.15 ratio of 3-MMADF to AADF, the following table identifies the projected wastewater flows within the District, as well as incremental flows from Charlotte County and Sandalhaven projected to a limit of the original or currently contracted flows.

Table 1-5. Projected Wastewater Flows

Year	Population (District Service Area)	ERC	Projected District Wastewater Flows (AADF) (MGD)	Charlotte County Allocation (MGD)	Sandalhaven Allocation (MGD)	Total Projected AADF (MGD)	Total Projected 3-MMADF (MGD)
2015	36,611	15255	1.846	0.001	0.1	1.947	2.239
2016	37,160	15483	1.873	0.1	0.2	2.173	2.500
2021	40,032	16680	2.018	0.1	0.3	2.418	2.781
2026	42,074	17531	2.121	0.2	0.4	2.721	3.129
2031	44,220	18425	2.229	0.3	0.4	2.929	3.369
2036	46,018	19174	2.320	0.4	0.5	3.220	3.703

As shown below, the District's AADF is projected to exceed the plants current permitted AADF capacity after 2031. It is recommended that the District perform an update to the 2006 Capacity Analysis Report, including the plant loading and biological performance analysis, to determine if the plant can be rerated at a higher flow. Such a rerating could defer the need for facility expansion beyond 2031.

Figure 1-2. Englewood Water District Wastewater Flows



	2015	2016	2021	2026	2031	2036
AADF	1.947	2.173	2.418	2.721	2.929	3.220
Permitted AADF	3	3	3	3	3	3
MMADF	2.239	2.500	2.781	3.129	3.369	3.703

1.4 Capital Improvement Program

The Capital Improvement Program (CIP) will ensure that the District plans for and maintains infrastructure assets in a sound, functioning condition. The CIP has been developed to include the projects necessary to implement the recommended water, wastewater and reclaimed water programs.

Rapid Assessments

To evaluate the District's existing assets, a Rapid Assessment was completed at each of the District's key facilities to determine critical repair and rehabilitation requirements. The scope of this task required visual condition inspections of each above ground facility utilizing professional personnel familiar with the design and operation of reverse osmosis and lime softening water treatment plants, wastewater treatment processes and operation, distribution, collection and pumping system components as well as water supply, aquifer storage and recovery and deep injection wells. Each facility inspected had a dedicated condition assessment team including a licensed utility operator to complete the assessment utilizing industry accepted condition assessment forms.

The intent of the Rapid Assessment is to provide an evaluation of the condition of the District's facilities by conducting field inspections, performing a desktop estimate of remaining life, developing a cost opinion range for equipment renewal, modifications and capital projects for each facility, and providing near-term (Year 1-4), mid-term (Year 5 to 10) and long-term (Year 11-20) capital improvement projects necessary to meet service demands. The facilities were grouped into the following six facility service types:

- Water Treatment Plants - Reverse Osmosis and Lime Softening
- Water Distribution System
- Wells and Well Fields
- Wastewater Reclamation Treatment Facility
- Wastewater Reclamation Transmission
- Wastewater Collection System – Sewer Lift and Vacuum Stations

A complete list of all resulting projects with cost estimates, brief project descriptions and dependencies is provided in Appendix C - TASK 3 Condition Assessment Report.

The following tables identify the comprehensive list of recommended Improvements by Planning Period.

1.4.1 Near-Term (Year 1 to 4) Improvements

Table 1-6. Year 1-4 Recommended Capital Improvements

Project ID	Improvement	Facility / Location	Cost Estimate
RO-04	Develop a facility one-line electrical diagram	RO Bldg.	$ 35,000
RO-05	Commission a Power Load Analysis and Arc-Flash Study	RO Plant	$ 75,000
RO-07	Upgrade older power distribution and motor control centers	RO Plant	$ 280,000
RO-11	Install new degasifier 2	RO Plant	$ 205,000
RO-18	SCADA and PLC upgrades	RO Plant	$ 120,000
LP-01	Replace raw storage diffuser tray and support structure	RWS Tank	$ 95,000
LP-02	Repair and replace internal coating raw water storage tank	RWS Tank	$ 35,000
LP-03	Plant 3 - ten year rehabilitation	LS Plant	$ 270,000
LP-04	Plant 2 - ten year rehabilitation	LS Plant	$ 295,000
LP-06	Plant 2 - Filter rehabilitation	LS Plant	$ 62,000
LP-08	Develop a facility one-line electrical diagram	LS Plant	$ 25,000
LP-09	Commission a Power Load Analysis and Arc-Flash Study	LS Plant	$ 60,000
LP-11	Upgrade older power distribution and motor control centers	Old HSP Room	$ 177,000
LP-14	Retrofit two (2) Newer High Service Pump motors with VFD' s	New HSP Room	$ 90,000
LP-17	Commission a LSP Facility plan to determine upgrades or decommissioning	LS Plant	$ 150,000

Project ID	Improvement	Facility / Location	Cost Estimate
LP-20	SCADA and PLC upgrades	LS Plant	$ 82,000
WL-01	Install telemetry communications to RO supply water wells	RO WF2	$ 45,000
WRF-06	Blower upgrades phase 1	WRF Plant	$ 385,000
WRF-13	Trace and label power and control wire terminations. Update electrical one-line diagram	WRF Plant	$ 35,000
WRF-16	Re-use Pond Pumping Rehabilitation	Re-Use Pond Pump Station	$ 128,000
LS-02	LS121 Holiday Ventures Capacity Upgrade Study and Facility Plan	LS121-Holiday Ventures	$ 100,000
LS-05	Purchase bypass pump and install on-site bypass pumping	LS121-Holiday Ventures	$ 65,000
CL-01	Replace Beach Road force main	Collection	$ 645,000
CL-04	Manhole rehabilitations - Reline brick manholes with GML	Collection	$ 120,000
CL-06	Install forcemain isolation valve near Elm St.	Collection	$ 67,000
RU-01	Reuse hydraulic analysis and operational review for service improvements	LS121-Holiday Ventures	$ 85,000
RU-03	Rehabilitate re-use booster station at Holiday Ventures	LS121-Holiday Ventures	$ 100,000
DS-06	System modifications to eliminate bottleneck at Roundabout	Water Dist	$ 315,000
DS-07	System modifications to provide redundancy at Forked Creek	Water Dist	$ 230,000
EWD-01	Select, purchase and execute an EAMS / CMMS	EWD (Water ½ Wastewater ½ Program)	$ 72,000
			$ 4,448,000

1.4.2 Mid-Term (Year 5 -10) Improvements

The following Table 1-6 includes those projects recommended to take place in the mid-term timeframe. The total estimated cost is $18,907,000. It is noted that recommended project LS-03, Design and build upgraded LS121 – Holiday Ventures does not have a cost estimate shown. This project (and its associated cost) will be determined as part of a "precursor" project identified in the Near-Term (1-4) Improvement list – LS02, Lift Station 121 – Capacity Upgrade Study and Facility Plan.

Table 1-7. Mid-term (Year 5-10) Recommended Capital Improvements

Project ID	Improvement	Facility / Location	Cost Estimate
RO-06	Upgrade Standby Generator and Power Distribution	RO Plant	$ 965,000
RO-10	Replace degasifier 1	RO Plant	$ 265,000

Project ID	Improvement	Facility / Location	Cost Estimate
LP-05	Plant 1 - ten year rehabilitation	LS Plant	$ 325,000
LP-10	Upgrade HSP standby generator and switchgear	Old HSP Room	$ 58,000
LP-12	Replace HSP buried piping under older HSP Bldg. to tanks	Old HSP Room	$ 142,000
LP-13	Older High Service Pump Replacements (3)	Old HSP Room	$ 172,000
WL-02	Install telemetry communications to LP supply water wells	WF1, WF3, WF5	$ 45,000
WL-04	Rehab, replacement, or abandonment of WF1 supply wells	WF1	$ 45,000
WL-08	Plug and Abandon IMW-1 and SMW-1	WRF Plant	$ 30,000
WRF-04	Plant 4 Rehabilitation - 15 year rehabilitation	Plant 4	$ 350,000
WRF-07	Blower upgrades phase 2	WRF Plant	$ 120,000
WRF-11	Chlorine contact basin expansion	CL2 Contact Basin	$ 220,000
WRF-15	Standby Power / Power Distribution Improvements	WRF	$ 90,000
WRF-17	Install two smaller horsepower variable frequency dive pumps	Effluent Pump Station	$ 195,000
LS-03	Design and build upgraded LS121 - Holiday Ventures	LS121-Holiday Ventures	$ TBD
LS-04	Standby generator replacement (up size for Re-use booster station)	LS121-Holiday Ventures	$ 200,000
LS-08	Instrumentation upgrades - install flow meters or pressure indication	Various	$ 125,000
CL-02	Install new force main from Holiday Ventures to point TBD	Collection	$ 8,500,000
CL-05	North Beach sewer service study and evaluation	Collection	$ 65,000
CL-08	Purchase new CCTV camera and trailer	Collection	$ 120,000
RU-02	Install new re-use storage tank at Holiday Ventures	LS121-Holiday Ventures	$ 950,000
RU-04	Install new re-use forcemain from WRF to new HV storage tank	LS121-Holiday Ventures	$ 1,000,000
DS-04	AC Pipe replacement on Beach - Charlotte County	Water Dist	$ 2,440,000
DS-05	AC Pipe replacement on Beach - Sarasota County	Water Dist	$ 2,330,000
DS-08	Service line extension to Manasota development (2000 homes)	Water Dist	$ 80,000
DS-12	Water Storage Study - needs analysis & conceptual design	Water Dist	$ 75,000
			$18,907,000

1.4.3 Long-Term (Year 11-20) Improvements

The following table includes those projects recommended to take place in the long-term timeframe. The total estimated cost is $4,336,000. It is noted that project RO-15; LP-18 and LP-19 are dependent upon the recommendations of Near-Team (1-4) improvement, LP-17 Facility Plan for the Lime Softening Plant.

Table 1-8. Long-Term (Year 11-20) Recommended Capital Improvements

Project ID	Improvement	Facility / Location	Cost Estimate
RO-13	RO Plant - Capacity Upgrade (new RO skids)	RO Plant	$ 1,630,000
RO-14	RO Plant - Pump modifications	RO Plant	$ 93,000
RO-15	New chemical feed process if lime plant decommissioned	RO Plant	$ TBD
RO-16	Replace Cl2 gas system due to risk / liability decision	RO Plant	$ 125,000
RO-17	Upsize plant raw water piping - eliminate bottleneck for Well F 2	RO Plant	$ 84,000
LP-07	Replace Shelter / Bldg. - Lime Process	Lime Bldg.	$ 59,000
LP-16	Instrument and analyzer upgrades - ten year renewal	LS Plant	$ 35,000
LP-18	Decommission Lime Softening Plant	LS Plant	$ TBD
LP-19	Upgrade Lime Softening Plant	LS Plant	$ TBD
WRF-02	Odor control system rehabilitation at headworks	Headworks	$ 260,000
WRF-05	Plant 1 and 2 Rehabilitation - 15 year rehabilitation	Plant 1 and 2	$ 600,000
WRF-12	Replace Cl2 gas system due to risk / liability decision	CL2 Contact Basin	$ 125,000
VS-08	Standby generator rehabilitation	Various	$ 200,000
LS-13	Potential elimination of LS-113 Englewood Rd	Englewood Road	$ 125,000
CL-07	Sewer extensions to alternate areas	Various Locations	$ TBD
DS-13	Design and build water storage tank(s)	Water Dist	$ 1,000,000
			$ 4,336,000

1.4.4 Project Spanning 20 Year Horizon (Year 1-20) Capital Improvements

The following Table 1-8 includes those projects recommended to take place throughout the 20- year time-frame, to be initiated based on availability of funding. The total estimated cost is $6,050,000.

Table 1-9. 20 Year Horizon (Year 1-20) Recommended Capital Improvements

Project ID	Improvement	Facility / Location	Cost Estimates
WRF-01	Replacement of buried liquid process piping	WRF Plant	$ 205,000
CL-03	Clay pipe re-line / replacement	Collection	$ 5,000,000
DS-02	Line extension program	Water Dist	$ 345,000
DS-09	Looping projects - south service area	Water Dist	$ 200,000
DS-10	Looping projects - north service area	Water Dist	$ 300,000
			$ 6,050,000

1.4.5 Recommended Capital Improvements by System Program

The following table summarizes the total costs between water and wastewater service programs.

Table 1-10. Recommended Capital Improvement Costs

	Near-Term Year 1-4	Mid-Term Year 5-10	Long-Term Year 11-20	Year 1-20	Total
Water Services	$ 2,682,000	$ 6,942,000	$ 3,026,000	$ 845,000	$ 13,495,000
Wastewater Services	$ 1,766,000	$ 11,965,000	$ 1,310,000	$ 5,205,000	$ 20,246,000
Total	**$ 4,448,000**	**$ 18,907,000**	**$ 4,336,000**	**$ 6,050,000**	**$ 33,741,000**

1.4.6 Renewal Funded Projects

The following table summarizes the projects not considered to be part of the capital funded program, but necessary to maintain asset service life. These include projects addressing annual operation and maintenance or replacement and renewal improvements in the near, mid and long-term planning horizons.

Table 1-11. Recommended O&M Renewal Improvement Costs

	Near-Term Year 1-4	Mid-Term Year 5-10	Long-Term Year 11-20	Year 1-20	Total
Water Services	$ 387,000	$ 258,000	$ 82,000	$ 4,190,000	$ 4,917,000
Wastewater Services	$ 304,000	$ 287,000	$ 175,000	$ 1,125,000	$ 1,891,000
Total	**$ 691,000**	**$ 545,000**	**$ 257,000**	**$ 5,315,000**	**$ 6,808,000**

1.5 Capacity, Management, Operations and Maintenance (CMOM) Framework

The District is in the process of developing and adapting a CMOM program to maintain compliance with all rules and regulations as set forth in Florida Administrative Code Chapter 62-604 and ensure that the District's service level objectives and capacity demands are met. It should be noted that a CMOM program is dynamic and staff will continue to update portions of this program.

In order to facilitate the development and on-going administration of the CMOM Program, an abbreviated outline is provided in Section 6 of the Utility Master Plan.

The full document is provided for reference in Appendix D and the working document will be under the control of the District's Wastewater Operations Manager.

1.6 Summary and Recommendations

The District's current potable water sources and treatment facilities have adequate capacity to provide the projected water demands through the 20 year planning horizon. Additional improvements to the water supply and treatment facilities will be required to maintain the systems at their rated capacities. Water transmission and distribution pipelines are adequate to provide acceptable operating conditions through the future demand projections. However, various improvements to the system will be necessary to maintain water quality, pressures and increase reliability of the system.

The District's projected wastewater annual average daily flows will exceed the WRF's current rated capacity by 2032, or in 16 years. In addition, improvements to the WRF's infrastructure will be required to maintain the facility at its existing rated capacity. Wastewater collection infrastructure improvements will be necessary to maintain the integrity and reliability of the system.

The District's existing reclaimed water pumping and storage facilities have adequate permitted capacities to accept effluent flows through the 20 year planning horizon. Reclaimed water transmission, distribution and pump station improvements will be necessary to maintain adequate pressure and increase reliability.

It is recommended that the District implement the capital improvement program, as well as the overall utility system recommendations outlined in Section 7 of this Utility Master Plan.

Table 1-12. Summary of Capital Costs and Project Timing

Facilities	Near-Term (1-4 years)	Mid-Term (5-10 years)	Long-Term (11-20 years)	Years 1-20	Total
Utility Wide	$72,000				$72,000
RO Plant	$715,000	$1,230,000	$1,932,000		$3,877,000
Lime Softening Plant	$1,341,000	$697,000	$94,000		$2,132,000
Water Distribution	$545,000	$4,925,000	$1,000,000	$845,000	$7,315,000
Wells	$45,000	$90,000			$135,000
Water Reclamation Facility & Reuse	$733,000	$2,955,000	$985,000	$205,000	$4,878,000
Lift & Vacuum Stations	$165,000	$325,000	$325,000		$815,000
Collection System	$832,000	$8,685,000		$5,000,000	$14,517,000
Total	**$4,448,000**	**$18,907,000**	**$4,336,000**	**$6,050,000**	**$33,741,000**

Table 1-13. Summary of Operation and Maintenance Costs by System and Timing

	Near-Term Year 1-4	Mid-Term Year 5-10	Long-Term Year 11-20	Year 1-20	Total
Water Services	$ 387,000	$ 258,000	$ 82,000	$ 4,190,000	$ 4,917,000
Wastewater Services	$ 304,000	$ 287,000	$ 175,000	$ 1,125,000	$ 1,891,000
Total	**$ 691,000**	**$ 545,000**	**$ 257,000**	**$ 5,315,000**	**$ 6,808,000**

2 Introduction

2.1 Authorization

The Englewood Water District (District) retained HDR Engineering, Inc. (HDR) to provide professional services to develop a Utility Master Plan. This Utility Master Plan assesses the District's water, wastewater, and reclaimed water service and facility needs for the next 20-year planning period from 2016 through 2036. The Utility Master Plan consists of nine sections as follows:

Utility Master Plan

A Utility Master Plan lays out, in an orderly fashion, a utility system's future infrastructure improvement program.

Section 1 – Executive Summary; provides an overview of the information and recommendations developed in the other sections.

Section 2 – Introduction; provides the background, goals, and scope of this Utility Master Plan.

Section 3 – Existing Facilities & Permit Conditions;

Section 4 – Future Water Demands, Wastewater Flows, Reuse and Reject Disposal, and Regulatory Compliance;

Section 5 – Capital Improvement Program;

Section 6 – Capacity, Management, Operations and Maintenance Framework;

Section 7 – Summary and Recommendations;

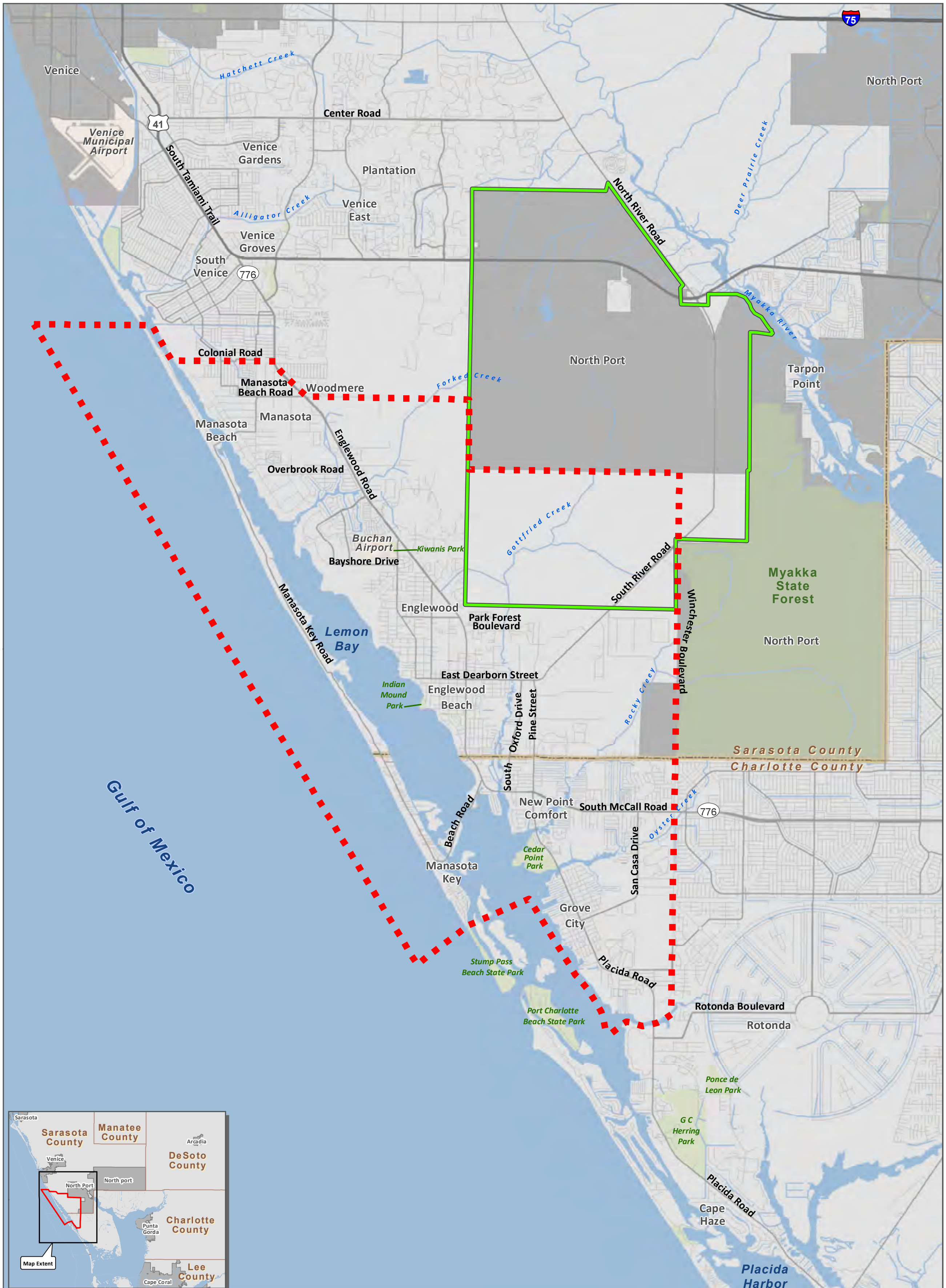
Section 8 – References

Section 9 – Appendices

The goal of this Utility Master Plan is to provide the District with a "road map" to guide their Board and staff on future planning of the utility's infrastructure. The Utility Master Plan documents the District's current facilities and the condition of those facilities, and assesses the need for and timing of improvements to provide adequate and reliable water, sewer and reclaimed water service to the District's customers.

2.2 Background

The District was created in 1959 and is classified as a political sub-division of the State of Florida under Chapter 2004-439. The District owns and operates a public utility that provides water, wastewater, and reclaimed water services within the unincorporated areas of Sarasota and Charlotte Counties generally known as Englewood, Grove City, and Manasota Key. The District's current service area boundary encompasses approximately 44.5 square miles and is illustrated in *Figure 2-1*. Initially the District only provided potable water service to its customers; however, with the acquisition of the West Charlotte Utilities Wastewater Treatment Plant (WCU WWTP) in 1994, the District now provides wastewater collection and treatment for portions of its water customers who are connected to the central sanitary sewer system, as well as reclaimed water thorough a public access irrigation system.



Englewood Water District – Existing Service Area Boundary

West Villages Improvement District

Counties

City Limits

Waterways

Airport Area

Parks

UTILITY MASTER PLAN CURRENT SERVICE AREA BOUNDARY

FIGURE 2-1

DATA SOURCES: Englewood Water District, ESRI, and FGDL.

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The District currently has four (4) interlocal agreements; two (2) for the delivery of potable water to the following bulk customers: Bocilla Utilities for the residents of Don Pedro and Knight/Palm Island in Charlotte County; and Japanese Gardens, a mobile home park in the northwest portion of the service area; and two (2) bulk agreements to provide sewer service to Charlotte County Utilities and Utilities, Inc. of Sandalhaven.

It is noted that the District does not currently have a Water Supply Master Plan; however, a Water Reclamation Facility Expansion Planning Report (CH2MHill) was completed in July 2006.

2.3 Coordination with Local Government Partners

As southwest Florida continues to grow in population, collaboration with local public water and wastewater utilities has become necessary to ensure that planning for adequate and sustainable water resources is being regionally coordinated. As part of the Utility Master Plan development process, District staff met with several public water and wastewater utilities within Sarasota and Charlotte Counties to discuss and coordinate future water resource planning efforts. The following paragraphs summarize those discussions.

Sarasota County

Sarasota County supplies potable water and sanitary sewer service to the unincorporated areas of the county, except for those areas served by the District and residents on private wells or septic systems. In October, 2016 the County adopted their most recent Comprehensive Plan Update. The Public Utilities Element of the Plan consists of chapters addressing the provision of potable water, sanitary sewer, and stormwater management. As part of the potable water sub-element, the County estimated that in 2015 approximately 27,446 people resided in the portion of the District within unincorporated Sarasota County.

The County's current water supply sources include three county brackish groundwater facilities (University Parkway Wellfield; Carlton Wellfield; and Venice Gardens Wellfield) and two additional sources through master agreement contracts with the Peace River Manasota Regional Water Supply Authority and Manatee County.

As part of the County's 10-Year Water Supply Facilities Work Plan (Carollo, December 2015), a summary of average annual water demands, treatment capacity, and permitted quantities was developed for the District. It was determined that the District's facility design and permitted capacities were sufficient to meet the potable water demands of the District through 2025.

There is currently a potable water interconnection between the District and Sarasota County's water system. However, due to pressure differentials between the two systems, additional infrastructure improvements would be required to allow water to be efficiently transferred between the County and the District.

Charlotte County

Charlotte County supplies potable water and sanitary sewer service to the unincorporated areas of the county, except for those areas served by the District and residents on private wells or septic systems. In June, 2011 the County adopted their Charlotte 2050 Comprehensive Plan. The Infrastructure Element addresses the provision of urban services such as potable water, sewer, stormwater, and solid waste disposal, as well as aquifer recharge protection. As part of the potable water sub-element, the County projected that in 2015, 14,234 people would reside in the portion of the District within unincorporated Charlotte County.

The County currently has two water supply sources, a county-owned brackish water wellfield located at their Burnt Store Facility which serves the area located in the southwestern portion of the county and is currently isolated from the remainder of the system; and a master agreement with the Peace River Manasota Regional Water Supply Authority to serve the area north and west of the Peace River.

There is currently a potable water interconnection between the District and Charlotte County's water system. However, due to pressure differentials between the two systems, additional infrastructure improvements would be required to allow water to be efficiently transferred between the County and the District.

In addition, Charlotte County has a 20-year Interlocal Agreement (June 2014) with the District for bulk sewer service for the area known as "Englewood East" through year 2034. The Agreement states that the District shall provide sanitary sewer service to the Englewood East area through a connection to the County's wastewater collection system. The District owns, operates and maintains a master flow meter at this connection and charges the County the applicable bulk service fees. At the end of the 20 year term, the parties have the ability to extend the Agreement on an annual basis. It is noted that there is no capacity limit listed in the Agreement.

City of North Port

The City of North Port supplies potable water and sanitary sewer service to areas within the incorporated City limits as well as annexed areas including the West Villages Improvement District and approximately 3,000 properties outside the City limits. Discussions with City staff indicate that they are in the process of updating the City's 2008 Comprehensive Plan, including the Potable Water and Sanitary Sewer Elements.

The City's current water supply sources include surface water from the Myakkahatchee Creek, groundwater from a brackish water wellfield and an additional source through a master agreement contract with the Peace River Manasota Regional Water Supply Authority. The City anticipates acquiring an additional water supply source, the brackish water wellfield and RO facility currently under design by the West Villages Improvement District, with ownership estimated by 2025.

The District does not currently have a potable water interconnect with the City. However, it was noted during discussions that, given the proximity and timing of the proposed West Villages Improvement District's water supply facilities, there may be opportunities in the future to coordinate pipeline routing and water transfer studies to identify system connection points.

West Villages Improvement District

The West Villages Improvement District (West Villages) encompasses approximately 11,000 acres in the City of North Port and southwest Sarasota County. They are a limited, single and specialized purpose Local Government entity whose purpose is to provide infrastructure, including community development systems, facilities, services, projects, and improvements to the residents of the West Villages. Currently the residents are provided potable water and sanitary sewer service through connections to the City of North Port's public system. As stated earlier, the West Villages is currently authorized to construct a proposed brackish ground water source and reverse osmosis water treatment facility to provide potable water for the additional projected demands and is anticipated to begin supplying potable water in 2024.

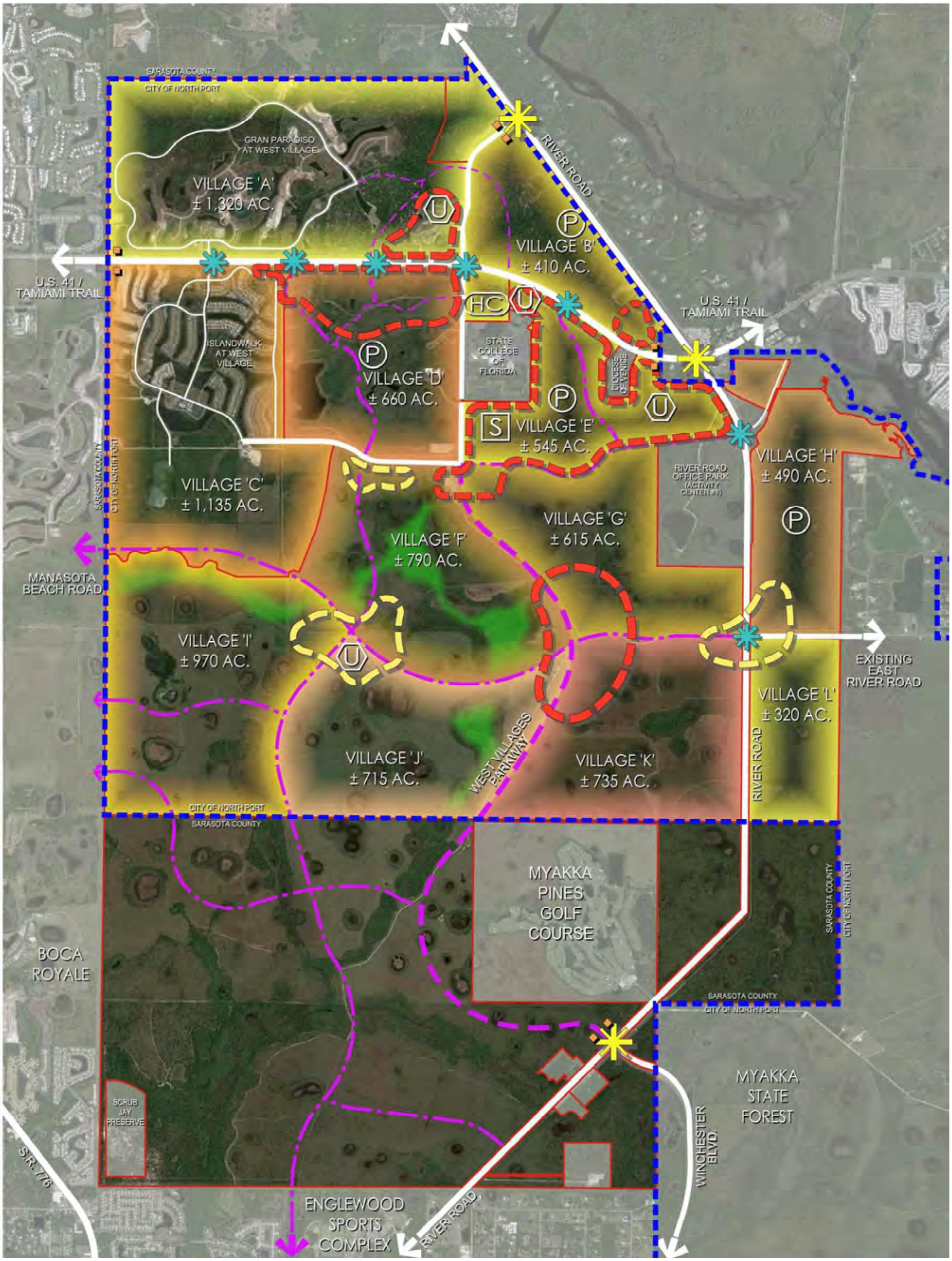
During discussions with representatives of the West Villages, an Index Map was provided that identified the proposed general layout of the ultimate build out of West Villages. Figure 2-2 depicts this Index Map. Although a portion of the development (south of the Myakka Pines Golf Course) is located within the District's current service area, it was stated that the development of this area most likely would occur outside of the District's 20 year planning horizon.

In addition, the District currently provides reclaimed water service to the Gran Paradiso area of the West Villages through a bulk use contract.

Peace River Manasota Regional Water Supply Authority

The Peace River Manasota Regional Water Supply Authority (Authority) is an independent special district, created and existing pursuant to Section 373.713 and 163.01, Florida Statutes, and by an inter-local agreement and operates water production storage and treatment, delivery and ancillary facilities to serve the four-county region of Charlotte, DeSoto, Manatee and Sarasota Counties. Currently the Authority provides potable water to Charlotte, DeSoto and Sarasota Counties, and the City of North Port. The Authority's current water supply source is the Peace River.

As noted in the Authority's 2015 Integrated Regional Water Supply Plan (Atkins 2015), the Authority's 2005 Master Water Supply Contract provides for excess water supplies to be temporarily made available to other Authority Customers through a redistribution pool. Beyond the sharing of Authority and Customer supplies, the sharing of other supplies distributed across the region through interconnections with Partner utilities including the City of Punta Gorda and the District have been implemented in part through the Southwest Water Management District's Water Use Permit (known as the "Operational Flexibility" Water Use Permit). This sharing of other supplies would be accomplished through the "wheeling" of water from one system to another through regional or utility system interconnects. As stated earlier, the District currently has two potable water interconnections, one with Sarasota County and one with Charlotte County. However, due to pressure differentials between the two potable water



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WEST VILLAGES INDEX MAP

DATA SOURCES: Information show on this map was provided to Englewood Water District and originally produced by Stantec.

WEST VILLAGES IMPROVEMENT DISTRICT

FIGURE 2-2

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As the District moves forward in the planning process, coordination with local government partners including consideration of potential future potable water supplies, interconnections, and other utility infrastructure is recommended.

3 Existing Facilities and Permit Conditions

3.1 Potable Water Supply

Water Supply Planning

An important component of water supply planning is the inventory of existing water supply sources and their permitted capacity's.

The District's potable water supply is made up of diverse sources including shallow potable groundwater and deeper brackish water supply wells. Different water treatment systems are required for the fresh groundwater supply and the brackish groundwater. Lime softening is used to treat the fresh groundwater and reverse osmosis (RO) treatment is used for the brackish groundwater. In addition to the groundwater supply and treatment facilities, the District also has water storage, brackish water concentrate disposal, and potable water distribution facilities. The District's overall water supply, treatment and distribution facilities include six (6) groundwater wellfields; two (2) Water Treatment Plants; four (4) finished water storage tanks with a combined capacity of 7.5 million gallons; one (1) Deep Injection Well for brackish concentrate disposal; and over 260 miles of water transmission and distribution pipelines and appurtenances, with emergency interconnections with Sarasota and Charlotte Counties.

3.1.1 Source Water

The District operates four individual wellfields and a combined freshwater and brackish water conjunctive use wellfield, which are permitted for a combined average annual withdrawal of 5.360 MGD and peak month withdrawal of 6.590 MGD under WUP No. 4866.010. Wellfields 1, 2, 3, and 5 provide raw fresh groundwater, which is treated at the District's Lime Softening Plant. Wellfield 4 and RO Wellfield 2, which is conjunctively located within the limits of freshwater Wellfield 2, provide raw brackish groundwater, which is treated at the District's RO Water Treatment Plant. Figure 3-1 is an excerpt from the District's 2016 Annual Wellfield Report (Figure 1-1) and identifies the general location of these water supply sources.

Freshwater Wellfield 1 consists of 25 6-inch diameter production wells that were constructed between 1962 and 1968. These wells are dispersed among a residential neighborhood located immediately west and north of the District's Lime Softening Plant. All 25 wells are cased to depths between 20 feet and 56 feet below land surface (bls), with total depths ranging from 40 feet to 82 feet bls. Generally, those production wells with depths of 40 feet utilize groundwater from the surficial aquifer (SA). Production wells with depths greater than 40 feet use groundwater from permeable zone 1(PZ1) of the intermediate aquifer system (IAS). Freshwater Wellfield 1 withdrawals are limited by the WUP to 400,000 gpd on an annual average day (AAD) basis. Withdrawals from Wellfield 1 between water year (WY) 2010 and

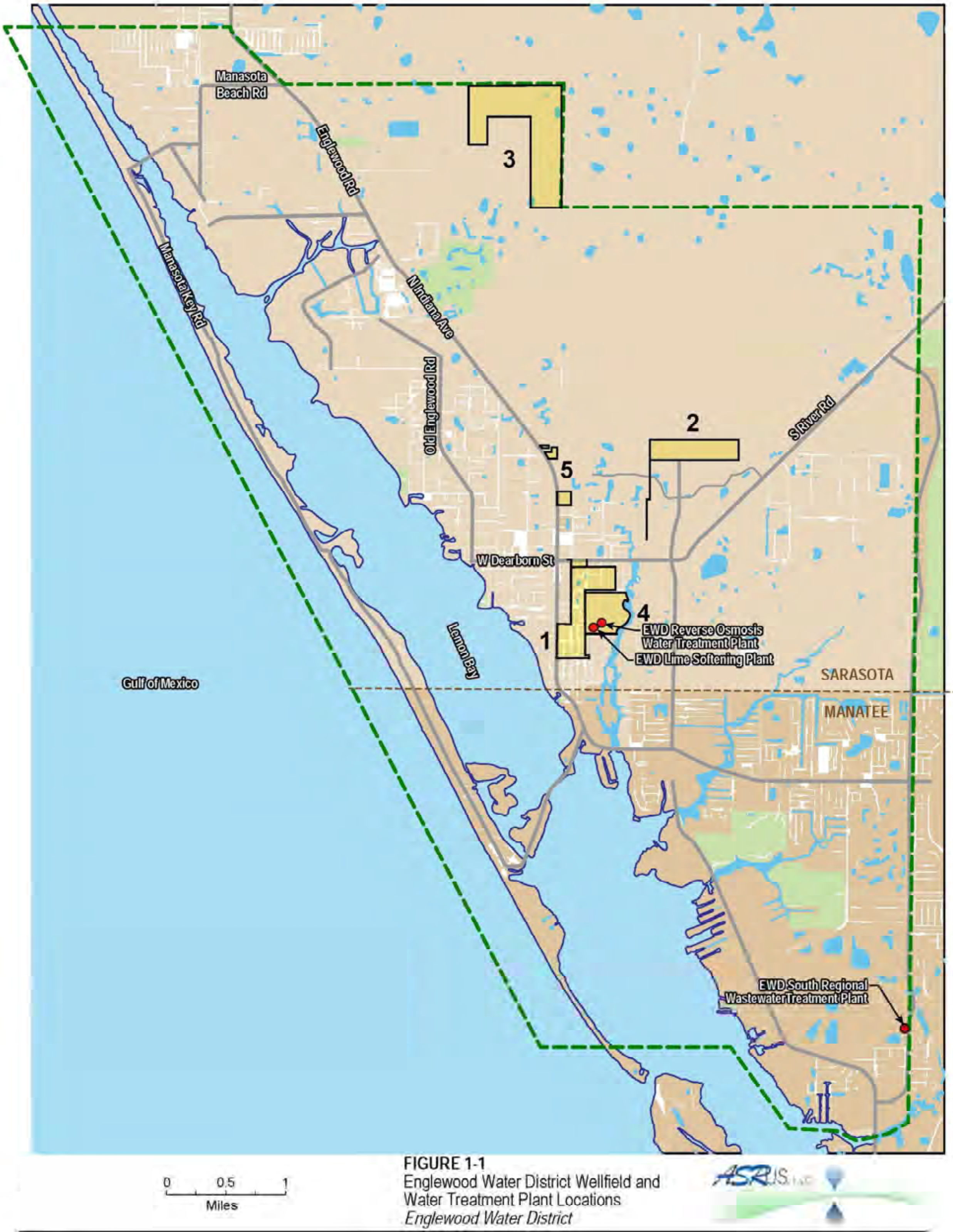

FIGURE 1-1
Englewood Water District Wellfield and Water Treatment Plant Locations
Englewood Water District

F1-1 EWD Wellfield and Plant Locations.ai 11/16/16

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LEGEND

- Englewood Water District Wellfield
- Englewood Water District Service Boundary
- EWD Treatment Facility Location

EWD Wellfield Locations

FIGURE 3-1

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WY 2016 have ranged from 75,220 gpd to 295,805 gpd on an AAD basis. A chloride concentration trigger level (CCTL) of 250 mg/L is established in the WUP for each production well; however, the CCTL has not limited withdrawals from the wellfield. In addition to providing groundwater for public supply use, the withdrawal of groundwater from the shallow aquifers over the past 5 decades has likely resulted in the lowering of the water table in the residential area that encompasses Wellfield 1. Should Wellfield 1 be taken out of service, a higher water table would likely be a result and consequentially there could be a greater potential for flooding in the area.

Freshwater Wellfield 2 and RO Wellfield 2 are located within a parcel of undeveloped land approximately 2 miles north of the EWD Lime Softening Plant. Freshwater Wellfield 2 consists of 18 6-inch diameter production wells that were constructed between 1969 and 1975. All 18 wells are cased to depths between 37 feet and 53 feet bls, with total depths ranging from 53 feet to 90 feet bls. The wellfield utilizes groundwater almost exclusively from PZ1 of the IAS. Withdrawals from freshwater Wellfield 2 are limited by the Wellfield Management Plan (WFMP) which was implemented in 2009 to protect onsite wetlands. Withdrawals at Wellfield 2 since the implementation of the WFMP have ranged from 87,554 gpd to 332,301 gpd on an AAD basis. A CCTL has also been established for this wellfield, which has limited withdrawals from some of the production wells. Future developments, or improvements to/extension of Pine Street may necessitate an evaluation of any impacts to the operation of Wellfield 2.

Freshwater Wellfield 3 consists of 12 8-inch diameter production wells that were constructed in 1980 and are located in the undeveloped north-central part of the District's service area. All 12 production wells are cased to depths between 37 feet and 64 feet bls, with total depths ranging from 61 feet to 125 feet bls. The wellfield utilizes groundwater almost exclusively from PZ1 of the IAS. Withdrawals from freshwater Wellfield 3, like Wellfield 2, are limited by the WFMP. Withdrawals at Wellfield 3 since the implementation of the WFMP have ranged from 41,791 gpd to 349,050 gpd on an AAD basis. A CCTL of 350 mg/L is established in the WUP for each production well; however, the CCTL has not limited withdrawals from the wellfield. Future developments, or infrastructure improvements may necessitate evaluation of any impacts to the operation of Wellfield 3.

Freshwater Wellfield 5 is the newest District wellfield, which was constructed in 2008 and consists of eight 6-inch diameter production wells that withdraw groundwater from PZ1 of the IAS. These wells are dispersed among a residential and commercial area along the east side of Indiana Avenue located north of Wellfield 1 and the Lime Softening Plant. The 8 production wells are cased to depths between 42 feet and 57 feet bls, with total depths ranging from 77 feet to 98 feet bls. Freshwater Wellfield 5 withdrawals are limited by the WUP to 820,000 gpd on AAD basis. A CCTL has also been established for this well field, which has limited withdrawals from some of the production wells. Withdrawals from Wellfield 5 between WY 2010 and WY 2016 have ranged from 145,539 gpd to 367,087 gpd on an AAD basis.

RO Wellfield 2 consists of eight 10-inch diameter production wells interspersed among the eighteen production wells of freshwater WF2. RO Wellfield 2 was designed to retard the vertical movement of brackish water into PZ1 through the withdrawal of groundwater from underlying PZ3, while at the same time providing an additional supply of feed water and rotational capacity for the RO WTP. The initial eight RO production wells were constructed in the early 1990s and brought online in 1994. The eight wells are cased to depths between 253 feet and 271 feet bls with total depths ranging from 420 feet to 430 feet bls. Since 1996, RO production Wells 2-1 and 2-2 (the two western-most wells) have been used sparingly because of high TDS concentrations. Due to poor water quality produced from these RO supply wells, EWD constructed two replacement wells, 2-9 and 2-10. These wells came online in December 2004 (2-10) and January 2005 (2-9). Wells 2-1 and 2-2 were taken offline and capped.

Combined withdrawals from RO Wellfields 2 and 4 are limited by the WUP to 4,000,000 gpd on an AAD basis. The long-term AAD production from WY 1995 through WY 2016 at RO Well Field 2 was 1,182,501 gpd. The average TDS, chloride, and sulfate concentrations for WY 2016 were 6,250 mg/L, 3,530 mg/L, and 578 mg/L, respectively.

RO Wellfield 4 is located near the RO WTP and immediately east of freshwater WF1. The RO wellfield consists of nine production wells each 12 inches in diameter (that were constructed and brought online between 1982 and 1984). All nine wells are cased to depths between 210 feet and 287 feet bls, with total depths ranging from 372 feet to 430 feet bls that withdraw groundwater from PZ3 of the IAS. The long-term AAD production from WY 1987 through WY 2016 at RO Wellfield 2 was 1,028,769 gpd. The average TDS, chloride and sulfate concentrations for WY 2016 were 9,850 mg/L, 5,237 mg/L, and 639 mg/L, respectively.

3.1.2 Water Treatment, Storage and Distribution Facilities

The District currently operates two water treatment plants to treat the fresh and brackish raw water from their groundwater supply wellfields. As stated above, Wellfields 1, 2, 3, and 5 provide raw fresh groundwater which is treated at the District's Lime Softening Plant while Wellfield 4 and RO Wellfield 2, provide raw brackish groundwater that is treated at the District's RO Water Treatment Plant. The finished water from each plant is then blended together prior to distribution. Both treatment plants are co-located at the District's main campus at 201 Selma Avenue, Englewood Florida. Figure 3-2 shows an aerial view of the water treatment facilities. Figure 3-3 illustrates a general schematic of the treatment process for both the lime softening process which is used to treat the fresh groundwater and the reverse osmosis process which is used to treat the brackish groundwater.

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Englewood Water District – Existing Service Area Boundary
West Villages Improvement District
Counties
City Limits
Waterways
Airport Area
Parks

WATER TREATMENT PLANT FACILITIES

FIGURE 3-2

DATA SOURCES: Englewood Water District, ESRI, and FGDL.

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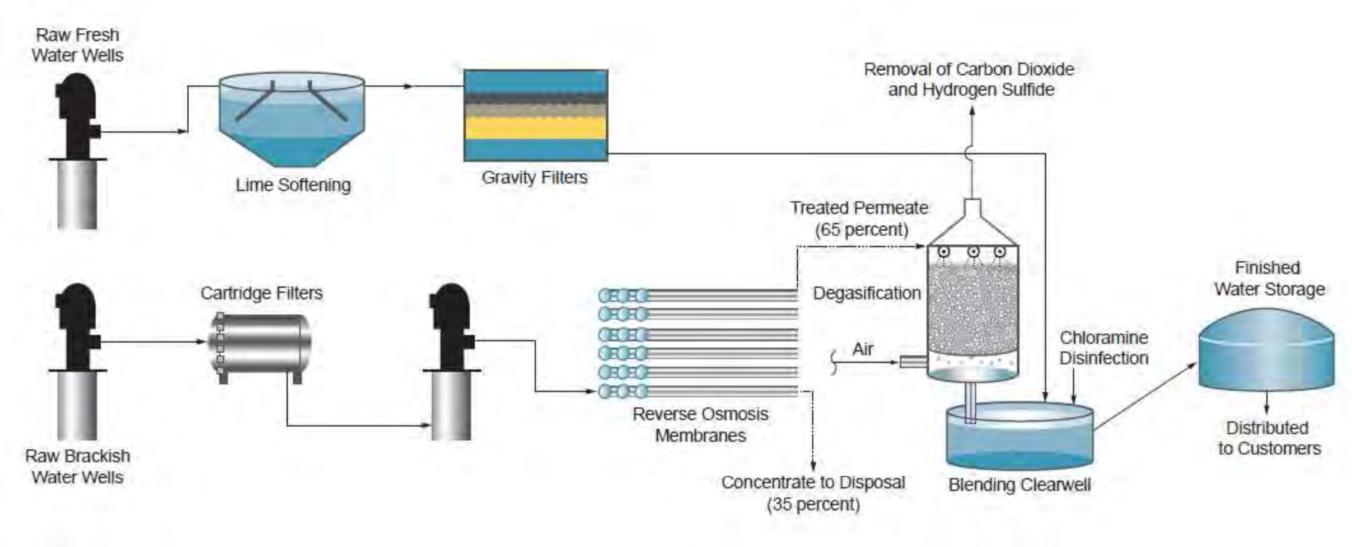
Figure 3-3. General Schematic of the District's Treatment Process



Lime Softening Plant

The Lime Softening Plant was built in 1961 and has a production capacity of 3.0 MGD (million gallons per day). Treatment of the raw water begins with the aeration process. Water from wellfields 1, 2, 3 and 5 is processed through a 5 MGD aerator installed above a 100,000 gallon raw water storage tank. The aeration process removes the hydrogen sulfide and carbon dioxide gases naturally found in ground water, and introduces oxygen into the water which aids in the oxidation of iron and manganese also found naturally in ground water. From there the water is pumped into a large circular tank where it is mixed with a lime solution to "soften" the water. The solution reacts with the calcium and magnesium compounds in the raw water to form insoluble carbonates (sand-like material), which settle to the bottom of the tank where they are mechanically removed. The lime sludge is then pumped to drying lagoons and stored for later disposal.

The softened water enters the top of the gravity filter tanks and flows down through a bed of anthracite coal media which provides removal of remaining particulate matter. From the bottom of the filter, water is collected and pumped to a finished water clearwell where it is blended with water that has been treated at the RO plant.

Reverse Osmosis Plant

Wellfield 4 and RO Wellfield 2, which is conjunctively located within the limits of freshwater Wellfield 2, provide raw brackish groundwater, which is treated at the District's RO Water Treatment Plant. The RO Water Treatment Plant was placed into service in 1982 and currently has a design flow total of 3.0 MGD. The RO process utilizes semi-permeable membranes which allow freshwater molecules to pass through while retaining dissolved inorganic and organic constituents. Feed water supplied by the wells is pumped into the plant where the water flows through a pre-filter to the suction inlet of a pressure pump at each of the plant's six membrane (Hydranautics) "trains", A-F. Each train has a rated capacity of 0.5 MGD and is composed of a bank of vessels containing the membranes. The water is forced through the membranes by the feed pumps and then, after adding acid for pH adjustment, passes through a degasifier where carbon dioxide and dissolved hydrogen sulfide gases are removed. The degasified water cascades into a clearwell where it is blended with the water from the Lime Softening plant.

State and Federal laws require that potable water be disinfected to kill pathogenic bacteria that may be present. The District adds chloramines, a chlorine/ammonia solution, at the end of the treatment process and prior to distribution to its customers to accomplish this required disinfection. The blended finished water is transferred to the District's finished water storage tanks before entering the distribution system.

Injection Well

Installed in 1985, a 1,800-foot-deep Class I injection well receives the concentrated brine (reject water) from the reverse osmosis plant and injects it into a saline aquifer. Reject water is pumped at a rate of 1,100 gpm (gallons per minute). A second deep injection well serves as a back-up, and is conjunctively used by the District's Water Reclamation Facility.

Finished Water Storage

Four storage tanks with a combined capacity of 7.5 million gallons, plus a 150' elevated tank with 100,000 gallon capacity are maintained. The elevated storage tank is utilized to control pumping and pressure fluctuations at the high service pumping system.

High Service Pumping System

The District's high service pumping system consists of four (4) pumps rated at 800 gpm (4.5 MGD) each and three (3) pumps rated at 3,000 gpm (12.9 MGD) each.

Computerized controls sense the pressure in the system to activate and control the pumps to maintain a constant pressure in the potable water distribution system.

Water Transmission and Distribution Facilities

The District's potable water transmission, distribution and service system is comprised of over 260 miles of pipelines ranging in size from 2" to 30" in diameter. These pipelines are primarily for the transmission and distribution of potable water within the service area, but also include private service laterals, fire lines and hydrant laterals. As identified in the District's GIS database, Table 3-1 below summarizes the pipeline material, length, and type of pipeline for the District's water transmission and distribution facilities.

Table 3-1. District's Water Transmission and Distribution Facilities

Pipeline Type	Pipeline Material							Total Length (Ft)
	AC	Copper	DIP	CI	HDPE	POLY	PVC	
Transmission Line	164,632		170,694	117	8,140	3,748	1,014,015	1,361,346
Service Line		23			9,173	680	5,858	15,734
Fire Line			62			189	4,640	4,891
Discharge Line							335	335
Hydrant Laterals	633						8,517	9,150
Grand Total (Ft)	**165,265**	**23**	**170,756**	**117**	**17,313**	**4,617**	**1,033,365**	**1,391,476**

3.2 Wastewater Collection, Treatment, and Reuse Facilities

3.2.1 Wastewater Collection Systems

The District's wastewater collection system is comprised of three types of sanitary sewer collection methods: gravity flow, low pressure collection, and vacuum collection. All of the wastewater flows are conveyed to the District's Water Reclamation Facility by pressurized forcemains. A brief description of each of the District's sewer collection systems follows:

Gravity Sewer Collection System

The District's gravity collection system is comprised of approximately 54 miles of pipelines including 16 miles of older vitrified clay pipe and approximately 900 manholes. The majority of the collection system, over 68%, is PVC. The following Table 3-2 identifies the material and length of the gravity lines currently identified in the District's GIS database.

Table 3-2. Gravity Sewer Collection

Collection Type	Pipe Material				Total (Ft)
	CIP (Ft)	DIP (Ft)	PVC (Ft)	VCP (Ft)	
Gravity	2,440	1,872	194,144	84,647	283,103

Low Pressure, Vacuum, and Forcemain Collection System

The District's low pressure and vacuum collection systems consist of approximately 3,800 vacuum pits and 13 low pressure stations that collect sewer discharges from residential and commercial service connections. While the low pressure stations pump directly to the forcemain system, a network of piping under vacuum evacuates the vacuum pits and transports the waste to a vacuum station in the service area. There are currently nine vacuum collection areas with over 116 miles of vacuum collection lines ranging in size from 3" to 10" in diameter and a vacuum booster station. Some vacuum collection stations are combined within one location / building at six vacuum station sites. The vacuum stations were placed into service from 1996 to 2004. The following Table 3-3 identifies the material and length of the forcemains currently identified in the District's GIS database. It is noted that the vacuum system improvements currently being installed in the V9-C area have not yet been included in the District's current GIS database.

Table 3-3. Low Pressure, Vacuum, and Forcemain Collection System

Pipeline Material	Pipeline Diameter (inches)										Total (Ft)
	2	3	4	6	8	10	12	14	16	24	
AC			1,162								1,162
DIP			308	4,933	271	316	2,683		435		8,946
HDPE	1,464	2,085	495	2,920	277		10,276		1,244		18,761
POLY	65										65
PVC	6,096	2,014	31,627	51,512	43,251	12,360	69,624	6,281	25,963	7,305	256,033
Grand Total (Ft)	**7,625**	**4,099**	**33,592**	**59,365**	**43,799**	**12,676**	**82,583**	**6,281**	**27,642**	**7,305**	**284,967**

Lift Stations

The District owns, operates and maintains eighty-two (82) submersible pump stations from fractional horsepower motor driven pumps to 70 horsepower motor driven pumps. Some lift stations receive flows from downstream lift stations and are considered critical or master stations due to their consequence of failure on the downstream infrastructure. Less critical (satellite) stations are generally of smaller size and lower flows and only affect their immediate service area if capacity is diminished.

3.2.2 Wastewater Treatment Facility

The District currently owns and operates a 3.00 MGD permitted capacity annual average daily flow (AADF) extended aeration domestic water reclamation facility. The Paul J. Phillips Water Reclamation Facility (WRF) was dedicated November 17, 2005, and named for a former, long-time Board of Supervisors member. Wastewater is collected and pumped to the 160 acre treatment facility property on Telman Road in Charlotte County. The WRF consists of the headworks, an odor control system, four steel circular package plants (U.S. Filter/Davco™), two filter systems, a disinfection system, a sludge dewatering system, and an onsite reclaimed water storage system. The plant is designed to produce effluent that meets drinking water standards, except for total dissolved solids (TDS), odor and color.

Wastewater is received at the headworks wet well and pumped to static screens to remove solids and then is discharged to a surge tank. The contents of the headworks surge tank is then pumped to the Davco™ surge tanks. Equalization pumps then pump to their respective Davco™ Plant 1 to 4 aeration basins. Effluent flow from the Davco™ Plants discharges to a series of three disk filters. After filtration, the filtrate gravity flows to the chlorine contact tank where gaseous chlorine is utilized for disinfection. Discharge from the chlorine contact tank flows to the effluent pump station where the discharge can be directed to the on-site storage system or the reclaimed water distribution system for public use irrigation. Figure 3-4 shows an aerial view of the District's wastewater treatment facilities.

Biosolids

The District manages the biosolids from the WRF in accordance with FDEP rules and regulations. The biosolids are pumped from the wastewater treatment plant to the centrifuge facility where they are de-watered. Two 50 gpm, one 100 gpm, and one 120 gpm centrifuge provide sludge dewatering prior to disposal. With the application of polymer, the centrifuges are capable of removing 98% of the liquid from the biosolids. The biosolids are trucked to the Charlotte County Bio-Recycling Center Complex in Punta Gorda for further advanced treatment. The liquid portion is pumped back to the plant for re-processing.

The WRF produces an average 18% solids sludge cake, which is then further treated via composting. The composting process naturally produces an FDEP Class AA product. The FDEP Class AA product is most commonly used on golf courses, farms, in parks and playgrounds, on street medians, and in mine reclamation horticulture.

3.2.3 Reclaimed Water System

The District's reclaimed water system consists of the WRF effluent pump station, a 1.0 MG reclaimed water storage tank, an on-site aquifer storage and recovery (ASR) injection well with a permitted storage capacity of 220 MG, a deep injection well (DIW) and one reclaimed water booster station.

The effluent pump station consists of three 1,740 gpm vertical turbine pumps with a firm capacity of 3,480 gpm or 5.01 mgd. The following Table 3-4 identifies the material and length of the reclaimed water forcemains currently identified in the District's GIS database.

Table 3-4. Reuse System Forcemains

Collection Type	Pipe Material			Total (Ft)
	DIP (Ft)	HDPE (Ft)	PVC (Ft)	
Reuse Main	351	8,025	92,772	101,148

Through an existing 3.5 MGD AADF permitted capacity slow-rate public access system, the District supplies reclaimed water for irrigation to customers in accordance with the Florida Department of Environmental Protection (FDEP) permit number FLA014126-032 Land Application R-001. The reuse system consists of users within southwest Sarasota and northwest Charlotte Counties. The District provides reclaimed water to golf courses, a sports complex/recreational area, and a spray field within its service area.

The following Table 3-5 identifies the reclaimed water customers and their associated capacity identified in the District FDEP Wastewater Permit.

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Englewood Water District – Existing Service Area Boundary
West Villages Improvement District
Counties
City Limits
Waterways
Airport Area
Parks

DATA SOURCES: Englewood Water District, ESRI, and FGDL

WATER RECLAIMATION FACILITY

FIGURE 3-4

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Table 3-5. Reclaimed Water Customers and Capacity

Reclaimed Water Customer Name	Capacity (MGD)
Lemon Bay Golf Club	0.41
Myakka Pines Golf Course	0.33
Oyster Creek Golf Course	0.40
Charlotte Co. Utilities Interlocal (Rotunda)*	0.38
Englewood Sports Complex	0.27
Spray Irrigation at the EWD WRF	0.36
Boca Royale Golf Club	0.40
Gran Paradiso	0.60
Oak Forest	0.07
Foxwood	0.065
Lemon Bay High School	0.019
Oyster Creek Regional Park	0.015
Park Forest Phase I	0.05
Park Forest Phase II	0.05
Park Forest Phase III	0.05
Park Forest Phase IV	0.05
Park Forest Phase V	0.03
Stillwater I and II	0.012
Stillwater III and IV	0.06
Handi Phil	0.001
SITC Inc. (TrustCo Bank Plaza)	0.01
Wal-mart	0.011
Total Reuse Commitments	**3.643**

*District indicates they no longer provide reclaimed service

3.2.4 Conservation Practices and Regulations

The District encourages water conservation both through goals of utilizing 100% of its reclaimed water and by promoting water use efficiency by reducing the overall demand for water in the system. The District accomplishes this by the following means:

- Adopting conservation-oriented water rates that include a usage/conservation surcharge;
- Adhering to the SWFWMD watering restrictions by adopting the Sarasota and Charlotte County ordinances for watering restrictions;
- Performing periodic water audits in association with the District's PSAR to the SWFWMD; and
- Participating in public education and outreach programs like the FSAWWA Drop Savers Water Conservation Poster Contest.

4 Future Water Demands, Wastewater Flows, Reuse and Reject Disposal, and Regulatory Compliance

4.1 Population Projections

Population projections were developed for the District to facilitate the development of anticipated water supply demands and wastewater flow projections through 2036. Various information sources were gathered to compile a comprehensive view of the District's historical and future population estimates. The following referenced materials were used in the development of the population projections:

Base Year Population

An important part of the population forecasting process is the estimation of the actual population at or near the time the study is undertaken. The District's Utility Master Plan used a base year of 2015.

- Bureau of Economic and Business Research – Florida Estimates of Population 2015 (April 1, 2015)
- Bureau of Economic and Business Research – Florida Estimates of Population 2015 (Vol. 49, Bulletin 174, January 2016)
- Department of Commerce – Census Bureau – Methodology, Assumptions, and Inputs for the 2014 National Projections. (August 2016)
- Englewood Water District – Monthly Operating Reports (January 2006 - May 2016)
- Englewood Water District – Consumption Report (March, 2016)
- Southwest Florida Water Management District – 2015 Regional Water Supply Plan (Southern Planning Region)
- Southwest Florida Water Management District – 2015 Regional Water Supply Plan: Public Water Supply Demand Projections
- Southwest Florida Regional Planning Council
- Sarasota County – GIS data set - zoning and land use, and
- Charlotte County – GIS data set - Zoning

In addition to these materials, additional information was compiled during the coordination meetings held with local utility partners. These meetings included:

- City of North Port
- Charlotte County
- Sarasota County
- Peace River Manasota Regional Water Supply Authority. and

- West Villages Improvement District.

The Methodology used to determine the Base Year Population (2015) and subsequent population forecasts is presented in more detail in the "Task 2 – Future Growth Projections, Water Supply Demands and Wastewater Flows" Technical Memorandum in Appendix A of this Utility Master Plan.

To determine the District's 2015 Base Year Population, the following four sources of information were compiled and reviewed.

1. *Published population estimates from the Southwest Florida Water Management District;*
2. *2015 Census Tract and Block Data;*
3. *Completion of the Southwest Florida Water Management District Worksheet B, Service Area Summary; and*
4. *District's published 2015 Public Supply Annual Report (PSAR).*

After comparing these sources, the Base Year Population (2015) for the District was estimated to be 36,611.

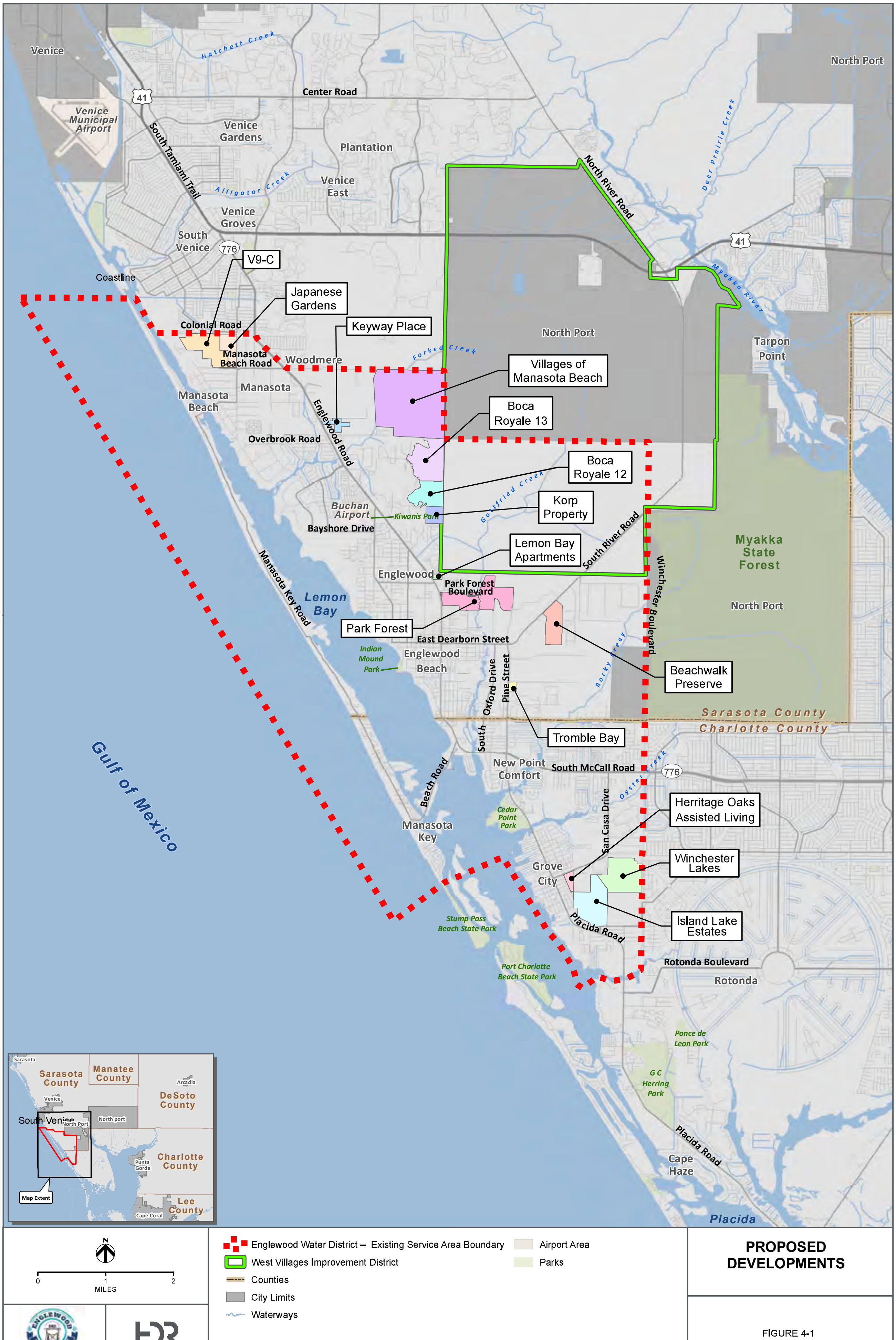
Following the determination of the Base Year Population (2015), evaluations and comparisons of three different data sets were completed to determine "percent growth" or "trend based" projections to be applied to the Base Year Population estimate. The following three sources of information were used in the development of the "percent growth" or "trend-based" population projections for the District:

1. *Projections developed by the University of Florida's Bureau of Economic and Business Research (BEBR) on a County-wide basis;*
2. *Historical water demand and wastewater flow within the District; and*
3. *Projections developed by the Southwest Florida Water Management District (SWFWMD) in the 2015 Regional Water Supply Plan.*

An examination of these data sources predicts that the population within the District's service area is most likely to experience annual increases between 0.12% and 2.4% over the 20 year planning horizon. This growth rate range covers the District's historical growth patterns as well as the BEBR and SWFWMD's projected population growth rates. It is noted that the BEBR and SWFWMD projections have near-term growth rates that are higher and then taper as the planning horizon increases.

Given that the District has identified several existing and/or planned developments within their service area, it is anticipated that they will experience a similar trend of higher growth rates in the near-term as new developments come on-line with a tapering or leveling off of growth as in-fill and build out of the developments occur.

Table 4-1 and Figure 4-1 list the developments, size and their respective locations within the District's service area boundary.



PROPOSED DEVELOPMENTS

FIGURE 4-1

DATA SOURCES: Englewood Water District, ESRI, and FGDL.

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Table 4-1. Developments within the District's Service Area

	Development	Water	Sewer	Proposed Units	Comments	Assumed Build-out %			
						0-5	5-10	10-15	15+
1	Beachwalk Preserve	X	X	325	Based on the latest Rezone in Feb of 2016	50%	50%		
2	Boca Royale 12	X	X	142	Utilities installed - will begin building houses soon	100%			
3	Boca Royale 13	X	X	120	Utilities being installed	100%			
4	Boca Royale 14	X	X		Nothing officially in works - Possibly Korp Property				
5	Heritage Oaks Assisted Living	X	X	70	70 ERC - currently under construction	100%			
6	Island Lake Estates	X	X	400	Plans submitted for Permitting, Construction to begin soon, Phase 1 to be broken down into sub phases, 60, 42, 42, and 34. Remaining homes may be phased as well. Builder hoping for 5 year buildout.	50%	50%		
7	Japanese Gardens		X	414	807 People- Website states owned by the 414 residents.	100%			
8	Keyway Place	X	X	35	Utilities installed - starting to build houses now	100%			
9	Korp Property (Boca Royale)	X	X	133	Currently in rezone - Boca Royale is pushing for it Possibly Boca 14 or 15	100%			
10	Lemon Bay Apartments	X	X	64	68 units - 64 ERC's Finalizing plans for permitting, Construction soon	100%			
11	Myakka Pines	X	X	877	Per Sarasota County 2050 plan. Villages may do land swap for homes. Will be 25+ years if they do				100%
12	Park Forest 6B	X	X	31	Homes currently being constructed	100%			
13	Park Forest 6C	X	X	39	Utilities being installed. Close to being completed	100%			
14	Park Forest 6D	X	X	11	Utilities being installed. Building will begin immediately after approval	100%			
15	Park Forrest	X	X	53	Agreements show Park Forest has 53 additional units available to build within their neighborhood	50%	50%		
16	Sandalhaven		X		See Bulk Agreements. Paid for 300K gpd.				

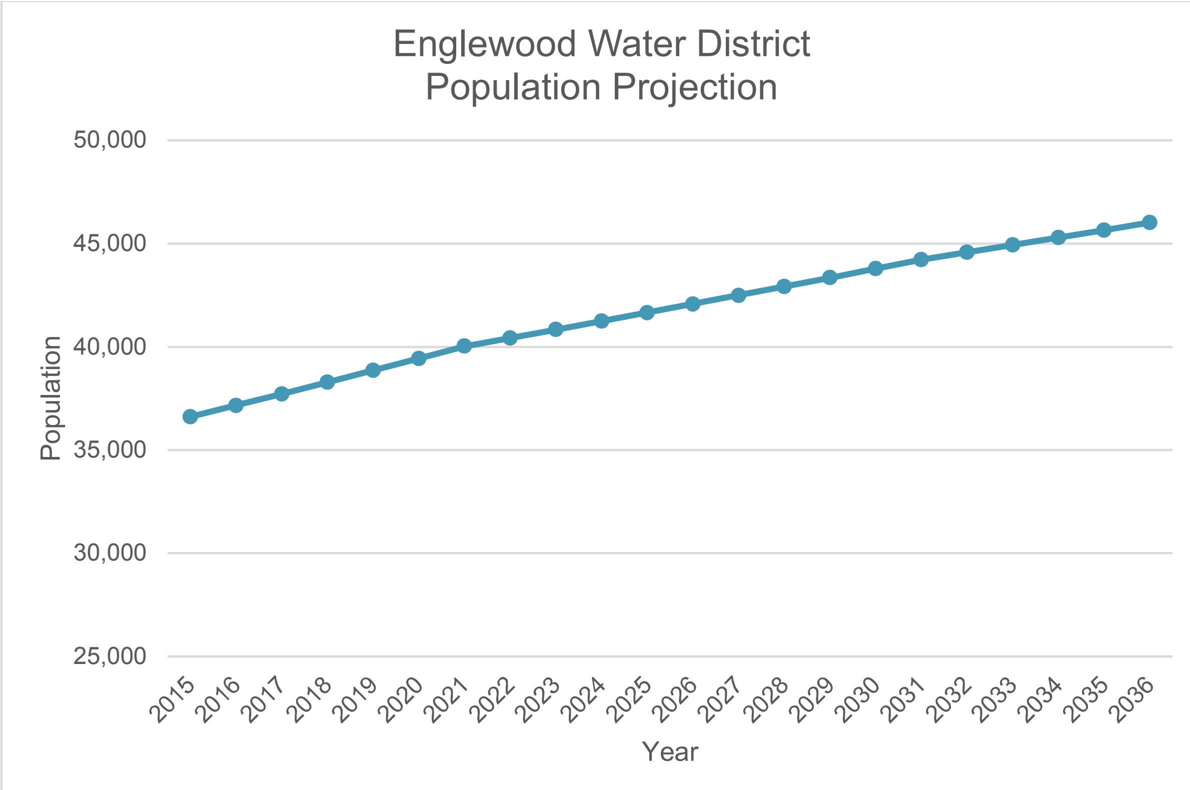
Development		Water	Sewer	Proposed Units	Comments	Assumed Build-out %			
						0-5	5-10	10-15	15+
17	Tromble Bay	X	X	72	Based on the latest rezone petition.	50%	50%		
18	V9-C		X	300	Roughly 300 homes currently. 361 lots in area. Construction done May 2017. Customers 1 year to hook up.	100%			
19	Villages of Manasota Beach	X	X	1563	Based on latest pubic announcement. Well Field 3. Developer is hoping within 10 years.	25%	25%	25%	25%
20	Winchester Lakes	X	X	169	Starting on Plans and Permitting now	25%	50%	25%	
	Total			**4,818**					

Based on this information, a trend based population projection was applied as shown in Table 4-2 and Figure 4-2, with a 1.5%, 1.0%, and 0.8% annual growth rate for the 5-year near-term (2016-2021) 10-year mid-term (2021-2031) and 5-year long term (2031-2036) planning horizons respectively. Utilizing an estimated 2.4 people per household, these growth rates equate to approximately 8,858 additional people living within the District's current service area boundary by 2036.

Table 4-2. Englewood Water District Population Projections

	Total Population 2015 (Base Year)	Total Population 2016	Total Population 2021	Total Population 2026	Total Population 2031	Total Population 2036
Annual Growth Rate		1.5% (2015-2016)	1.5% (2016-2021)	1.0% (2021-2031)	1.0% (2021-2031)	0.8% (2031-2036)
Population	**36,611**	**37,160**	**40,032**	**42,074**	**44,220**	**46,018**

Figure 4-2. Englewood Water District Population Projections

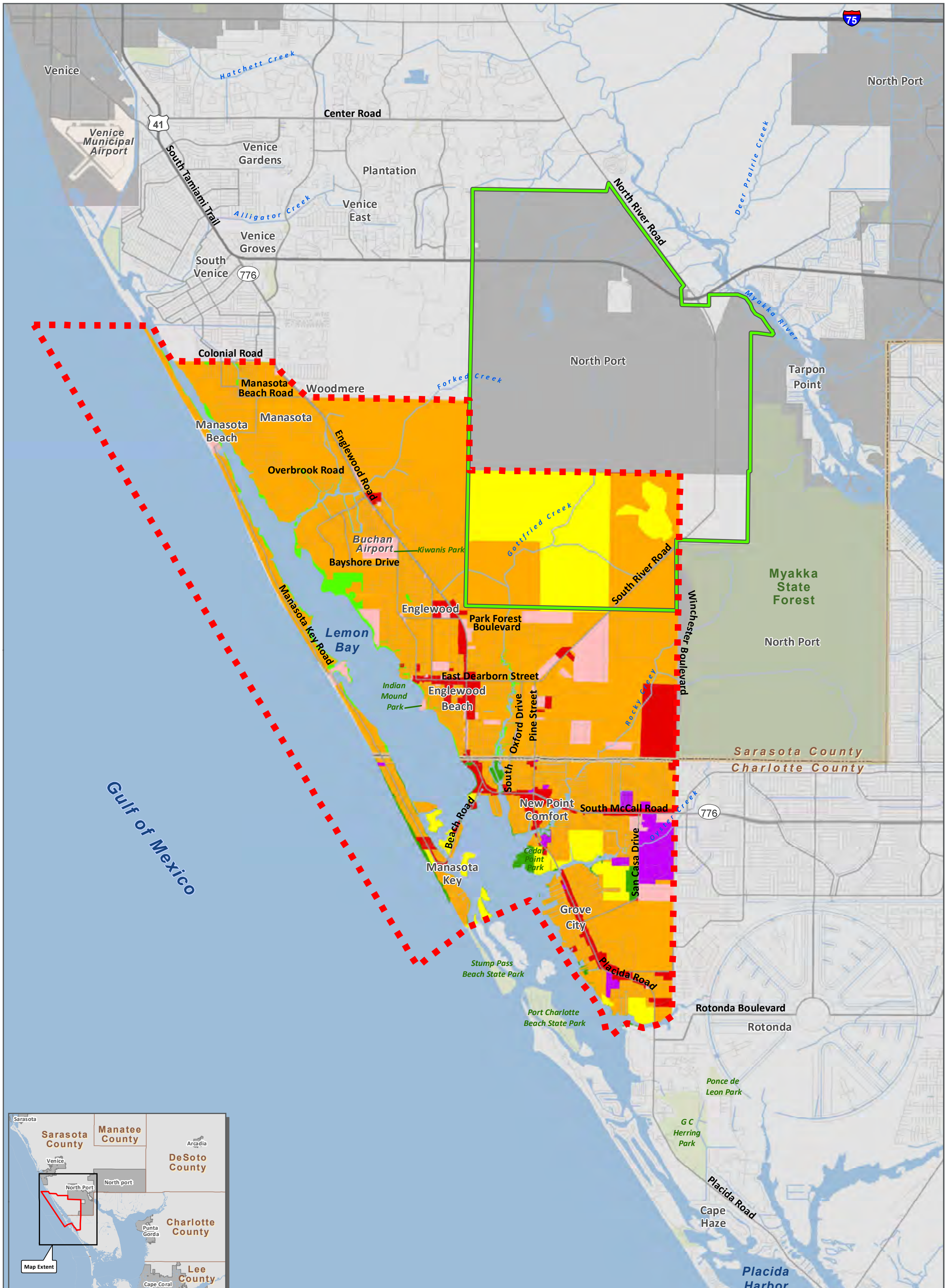


4.2 Water Supply Demands and Resource Analysis

4.2.1 Water Supply Demands

For the purpose of the District's Utility Master Plan, the Per Capita Model for forecasting water supply demands was used. The Per Capita Model calculates the total production or consumption per capita for a historical period and applies the current year per capita consumption to the population projections for future periods. This is the simplest forecasting method and requires only historical production or consumption data, historical population, and forecast of population through the demand forecasting horizon. This approach produces satisfactory results as long as the population forecast is reasonable, and the customer mix does not change substantially.

Review of the District's current zoning information (obtained from Sarasota & Charlotte County public GIS databases) indicates that the majority of the service area, approximately 91%, is zoned either residential (57%) or open space and conservation/rural/parks and recreation (34%). Table 4-3 lists the zoning categories, acreage and percentages within the District's service area and Figure 4-3 illustrates the location of the land use areas. Although there is anticipated population growth within the District over the next 20 years, the percent customer mix is not expected to change substantially. The identified growth is primarily residential.



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MILES

Englewood Water District – Existing Service Area Boundary
West Villages Improvement District
Counties
Waterways
Airport Area
Parks

Zoning
Commercial
Industrial
Mixed Use
Open Space and Conservation
Open Space and Rural
Parks and Recreation
Residential

DATA SOURCES: Englewood Water District, ESRI, FGDL, Sarasota County, and Charlotte County.

CURRENT LAND USE

FIGURE 4-3

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Table 4-3. Land Use/Zoning Categories

Land Use/Zoning	Sum of land (acres)	Percentage Within EWC*
Commercial	1,163.47	4.42
Industrial	936.22	3.56
Mixed Use	397.33	1.51
Open Space and Conservation	2,389.12	9.08
Open Space and Rural	2,691.97	10.24
Parks and Recreation	3,819.44	14.52
Residential	14,901.93	56.66
Grand Total	**26,299.48**	

Utilizing the District's historical (January 2006 to January 2016) records of production data as well as the Historical Population Served reported on the District's Public Supply Annual Reports (PSARs) to the SWFWMD, a determination of per capita usage was calculated and is shown in the following Table 4-4. It is noted that the District's PSARs for years 2006 and 2007 were not available.

Table 4-4. Historical Public Supply Annual Reports

Year	Annual Average Treated to System (MOR's)	Functional Population (PSAR)	Gallons per capita/day (GPCD)
2006	2.7046	N/A	-
2007	2.5444	N/A	-
2008	2.5280	51,863	48.75
2009	2.7125	44,223	61.34
2010	2.2449	41,229	54.44
2011	2.2855	34,413	66.42
2012	2.3299	31,899	73.00
2013	2.3594	37,585	62.77
2014	2.5272*	37,696	67.04
2015	2.4559*	38,071	64.51

*Includes Bocilla Utilities Exported Water

Since 2008, the reported per capita usage has varied from a low of 48.75 gpcd in 2008 to a high of 73 gpcd in 2014. In addition, the SWFWMD's 2015 Regional Water Supply

Plan identified a 5-year (2008-2012) average per capita use rate of 61 GPCD and utilized that gpcd to determine future demands.

The demographics of the District's service area, as evidenced by the 2015 Census Data, indicates that the median age of residents is 61.2 and the average household size is 1.9 people, with the average family size of 2.4 people per family. As stated earlier, the District has identified numerous single family and multi-family developments that are either currently under construction or are anticipated to be constructed within the 20-year planning horizon. As such, it is expected that the current median age will decrease as more families move into the area, and that the average household size will trend towards the Census' reported 2.4 people per family accordingly.

With the anticipated increase in the demographic percentage of family size, and the associated water usage patterns, an average per capita model number of 70 gallons per capita/day, was used to project future water demands. It is noted that Sarasota County utilized a per capita model number of 100 gpcd in their 2015 10-Year Water Supply Facilities Work Plan.

Table 4-5 illustrates the projected annual average water supply demands for the District within its current service boundary in 5-year increments from 2016 to 2036.

Table 4-5. Annual Average Water Demands within the District

Year	Projected Population	GPCD	Projected Annual Average Water Demands (MGD)*
2015	36,611	70	2.563
2016	37,160	70	2.601
2021	40,032	70	2.802
2026	42,074	70	2.945
2031	44,220	70	3.095
2036	46,018	70	3.221

* Not Including Bocilla Utilities

Additional Water Demands

The District currently provides potable water to Bocilla Utilities through a bulk service agreement for the residents of Don Pedro, Knight/Palm Island in Charlotte County. Currently, Bocilla Utilities services approximately 400 residences on the island including private homes, condominiums and a vacation resort. The District's billing records for 2015 indicate that the average daily usage was 143,140 gpd. Aerial photographs of the island suggest that it is approximately 75% built out. Assuming the

Island would be 100% built out with 533 residences at the end of the 20 year planning period, the ultimate water demand is estimated to be 190,734 annual average gallons per day. The additional annual average water demand was distributed evenly across the 20 year planning horizon.

Historical water production data from 2006 through 2015 was used to determine the average monthly peaking factors for peak month demand projections. The peak month demand is defined as the average daily demand during the highest demand month throughout a year. The average maximum month peaking factor from 2006 through 2015 was 1.23. A peaking factor of 1.3 was used for determining peak monthly water demands.

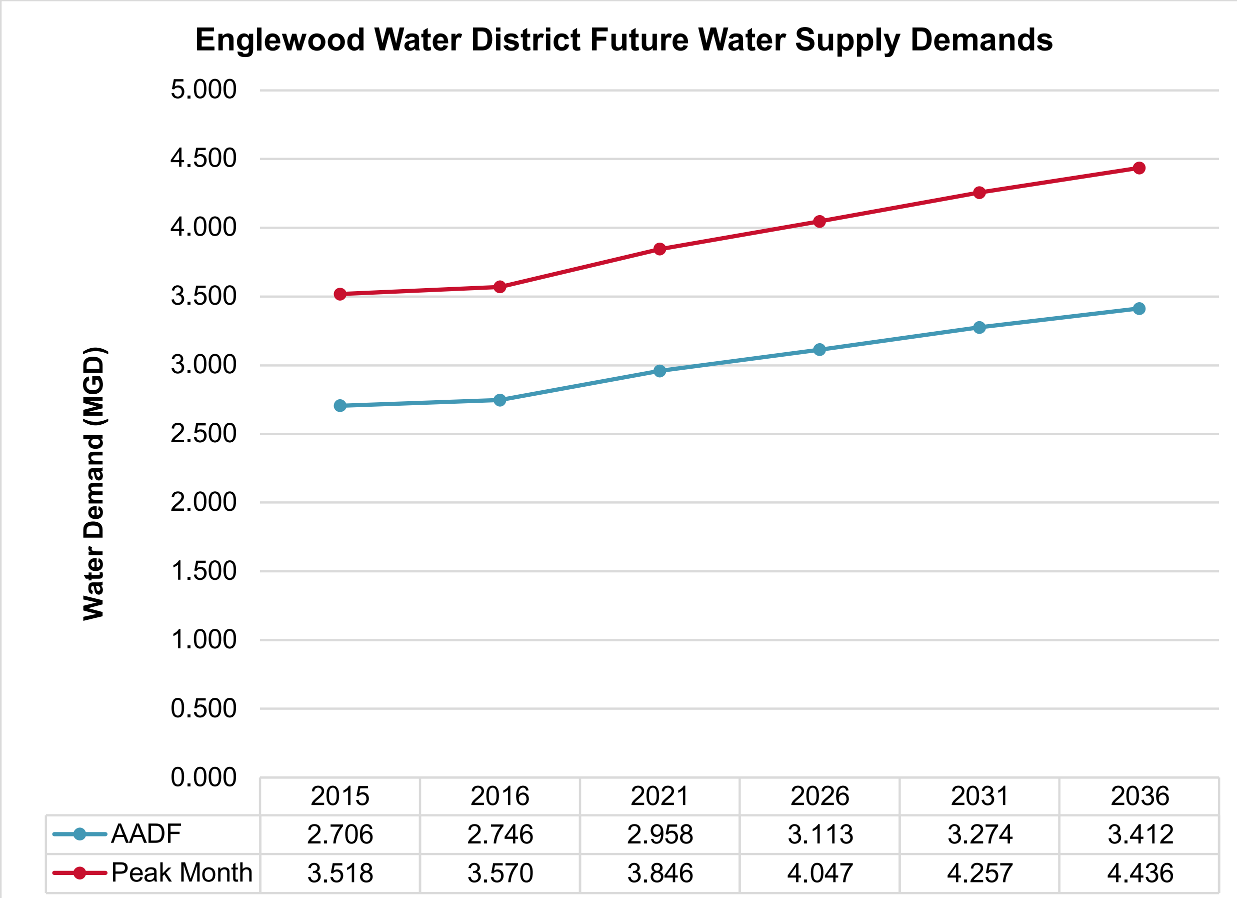
Table 4-6 and Figure 4-4 illustrates the total projected annual average and peak month water supply demands for the District over the 20 year planning period.

Table 4-6. Total Projected Water Supply Demands

Year	Projected Functional Population	2011-2015 Average GPCD	Projected Annual Average Water Demands (MGD)	Bocilla Utilities Projected Annual Average Water Demands (MGD)	Total Annual Average Water Demands (MGD)	Projected Peak Month Water Demands (MGD)*
2015	36,611	70	2.563	0.143	2.706	3.518
2016	37,160	70	2.601	0.145	2.746	3.570
2021	40,032	70	2.802	0.156	2.958	3.846
2026	42,074	70	2.945	0.168	3.113	4.047
2031	44,220	70	3.095	0.179	3.274	4.257
2036	46,018	70	3.221	0.191	3.412	4.436

* Historical Annual Average to Peak Month Ratio of 1.3

Figure 4-4. Englewood Water District Future Water Supply Demands



4.2.2 Water Resource and Treatment Analysis

Determination of the quantity and timing of projected water supply resources is accomplished by comparing the projected water supply demands to the utility system's existing finished water capacity on an annual basis. The raw water required to produce the estimated potable water demand is also related to the water treatment recovery efficiency. Water treatment recovery efficiency is a function of the treatment method used. Historical water treatment production data received from the District on the RO water treatment plant generally indicates a treatment efficiency of 65%. In addition, the combined withdrawals from RO Wellfields 2 and 4 are limited by the WUP to 4.000 MGD average annual and 4.400 MGD peak month and well fields 1, 2, 3 and 5 have a permitted average and peak day quantity of 1.360 MGD and 2.190 MGD, respectively. As stated earlier, the CCTL's established in the WUP for specific production wells may also limit withdrawals and raw water production in the future.

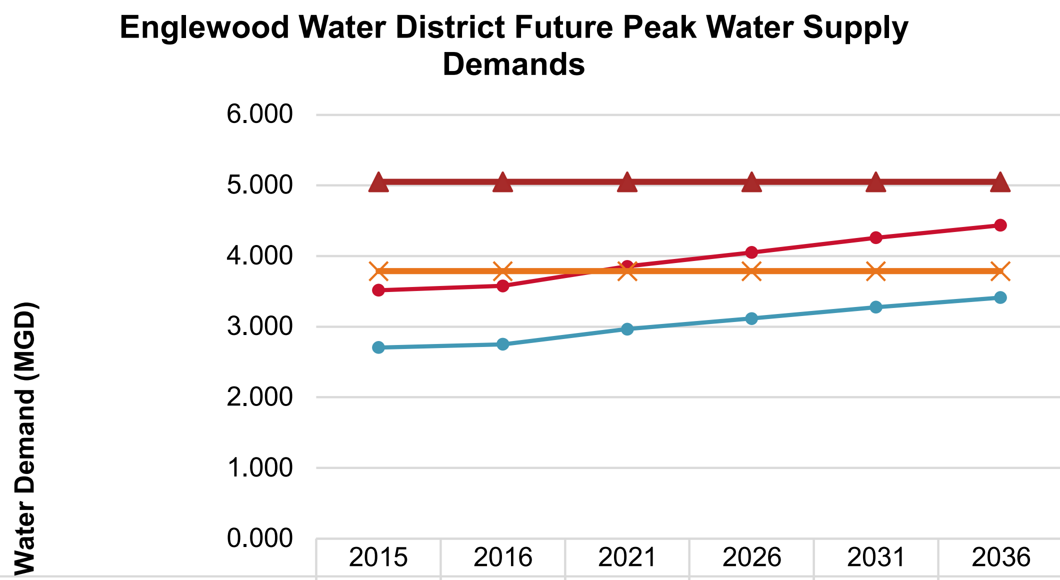
Table 4-7. Available Water Supply Resource Analysis

Supply	Permitted Source AAD (MGD)	Permitted Source Peak Day (MGD)	WTP Efficiency %	Finished Water AAD (MGD)	Finished Water Peak Day (MGD)
RO Wellfields 2,4	4.000	4.400	65	2.600	2.860
Wellfields 1,2,3,and 5	1.360	2.190	100*	1.360	2.190
Total Supply	**5.360**	**6.590**		**3.960**	**5.050**

* For the purpose of this Utility Master Plan, the efficiency of the Lime Softening Plant is considered to be 100%

In accordance with paragraph 62-555.348(3) (a), Florida Administrative Code (F.A.C.), an initial capacity analysis report must be submitted to the Department of Environmental Protection (DEP) within six months after the month in which the total maximum-day quantity of finished water produced by the District's water treatment plants exceeds seventy-five percent (75%) of the total permitted maximum-day operating capacity of the plants. Utilizing the combined permitted plant peak day capacity of 5.050 MGD from Table 4-7 above, when the District has a finished water peak day of 3.788 MGD, an initial capacity analysis report will need to be submitted to the DEP within six months. Based on the projected water supply demands, the District's Peak Month will exceed 75% of the current permitted peak day capacity in 2020.

Figure 4-5. Englewood Water District Future Water Supply Demands

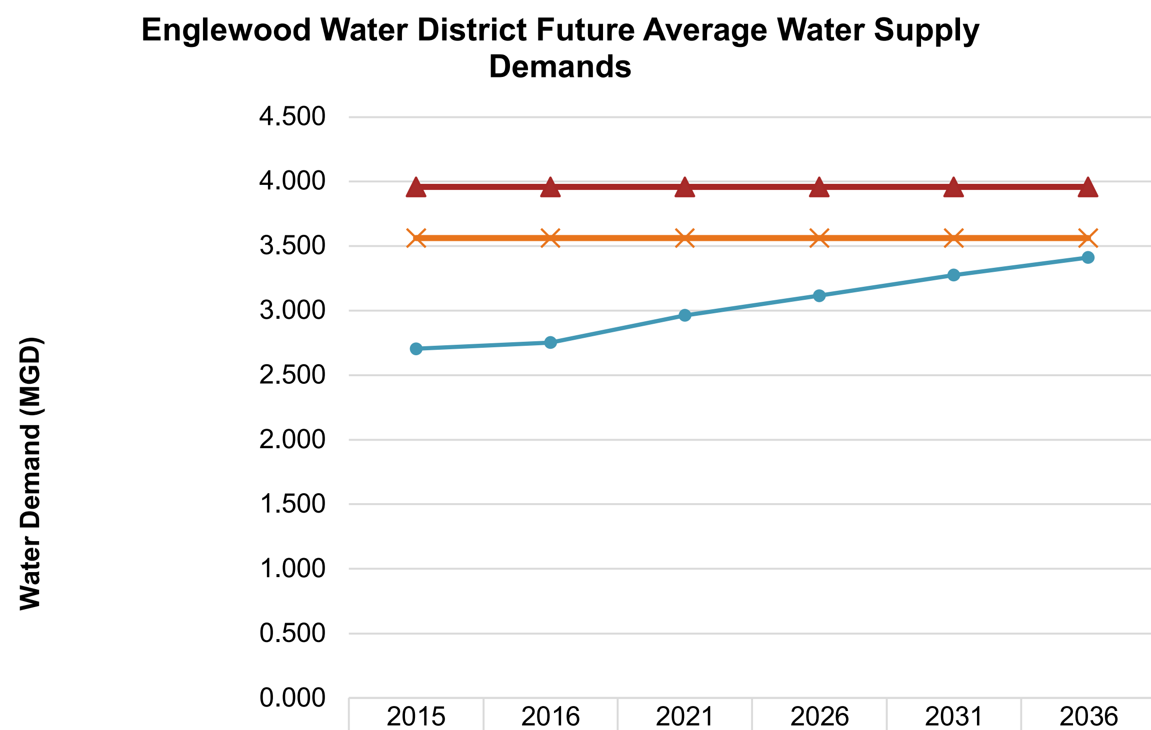


	2015	2016	2021	2026	2031	2036
Projected AADF	2.706	2.753	2.964	3.116	3.276	3.412
Projected Peak Month	3.518	3.579	3.854	4.051	4.259	4.436
Peak Day Treatment Capacity	5.050	5.050	5.050	5.050	5.050	5.050
75% Peak Day Plant Capacity	3.788	3.788	3.788	3.788	3.788	3.788

It is a general industry standard that when establishing the need for additional sources of water supply, new sources should be brought on-line when the projected finished water supply demand reaches 90% of the existing AAD treatment capacity.

As shown in Figure 4-6, water demand projections for the next 20 years indicate that a new water source and associated treatment capacity will need to be brought on-line after 2036. It is noted that new water supply sources and treatment capacities may take up to 10 years to permit, design and construct. It is recommended that the District include in its capital improvement plan the conceptual planning, permitting, design and construction of a new or expansion of the existing water supply source and treatment by 2026.

Figure 4-6. Englewood Water District Future Average Water Treatment Analysis



	2015	2016	2021	2026	2031	2036
AADF	2.706	2.753	2.964	3.116	3.276	3.412
Treatment Capacity AAD	3.96	3.96	3.96	3.96	3.96	3.96
90% AAD Treatment Capacity	3.564	3.564	3.564	3.564	3.564	3.564

Two additional permitting requirements are also applicable to the District's current water supply sources and treatment facilities. First, in accordance with Chapter 163.3177(6)(c), F.S., the District is required to submit a 10-Year Water Supply Facilities Work Plan to the SWFWMD within 18 months of the RWSP update, or by May 17, 2017. Second, the District's current WUP will expire on December 18, 2019.

The District must submit a permit application, no sooner than December 18, 2018, to renew the current WUP.

4.2.3 Water Transmission and Distribution Hydraulic Analysis

The ultimate goal of creating a water transmission and distribution hydraulic model is to provide a tool for the District to conduct ongoing evaluations of their existing and proposed water system infrastructure. A comprehensive hydraulic model can provide valuable information to assist utilities in planning for future service improvements by:

- Locating and sizing future transmission mains;
- Identifying current and future connection conditions for water distribution mains for new developments;
- Identifying opportunities that maximize the efficiency of existing and future facilities; i.e. – where looping of distribution lines may assist pressure; and
- Provide an additional layer of data to the District's existing GIS database.

The District did not have an existing hydraulic model, and thus the data collection and calibration efforts required to build a comprehensive model were beyond the scope of this Utility Master Plan. However, a rudimentary hydraulic model of the District's water distribution system was created in WaterGEMS.

The major components of the water network used to construct the hydraulic model include the following:

- Lime Softening and RO Water Treatment Plants;
- Finished Water Storage Facilities;
- High Service Pumps; and
- Over 100 miles of 6" – 30" diameter pipelines

The high service pumps at the treatment plants are operated to maintain a discharge pressure of approximately 62 psi. Therefore, operating conditions at the high service pump station were simulated by modeling them at a "one-point" design operating condition using the design flow and operating head of the pumps to develop a theoretical curve for each pump.

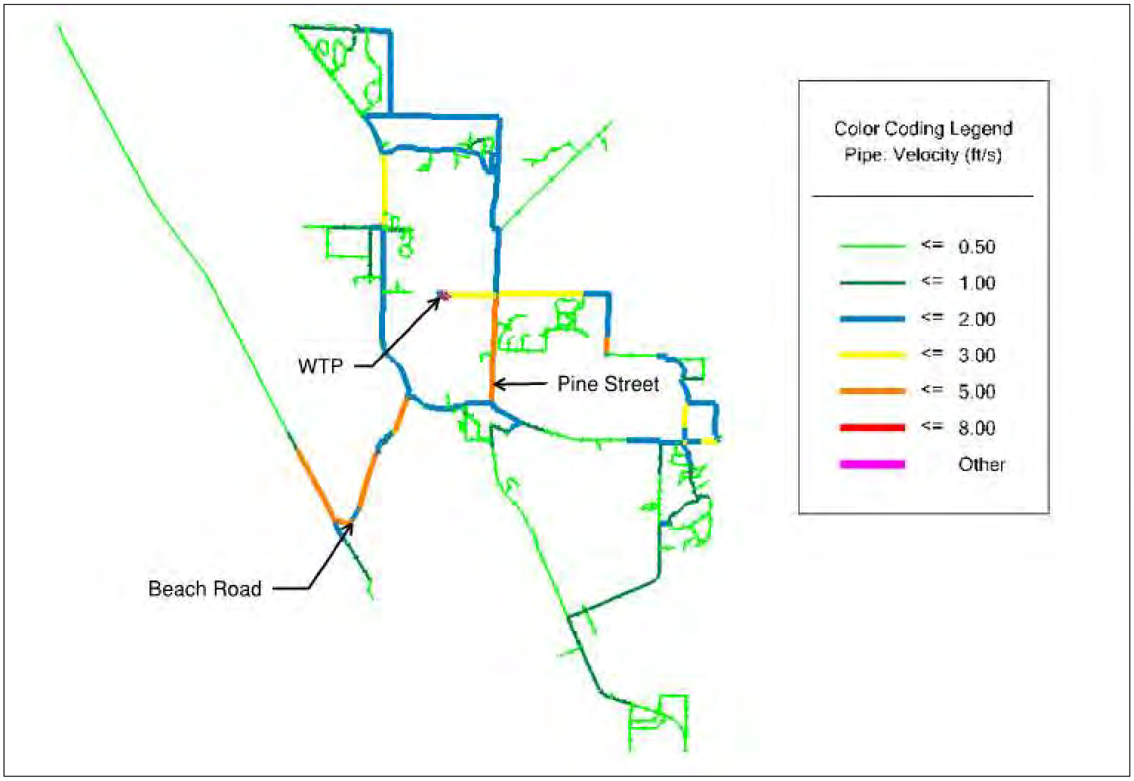
Information on the five water storage tanks at the water treatment facility, including one 500,000 gallon ground tank, one 1M (million) gallon ground tank, one 2M gallon ground tank, one 4M gallon ground tank, and one 100,000 gallon elevated storage tank was collected. Because the purpose of the model is to evaluate the existing water distribution system and determine any capacity improvements due to projected growth and service demands, the tanks were combined into one large tank with capacity equal to the aforementioned storage tanks and supplemented with a "reservoir" to deliver water to the high service pump station and distribution system. The modeled reservoir acts as a continuous water source at a constant surface elevation. This allows modeling of various peaking scenarios without concern for water availability.

Existing demand in the model was populated with customer meter data from March 2016 via GIS files which included the geo-referenced location of each meter and the maximum daily demand in gallons per day (gpd). In addition to meter data, daily logs noting treated water to the distribution system from January 2006 to May 2016 were reviewed to validate the March 2016 meter data. Once imported, meters and their associated demands were assigned to the system junction using Thiessen polygons to assign them to the nearest geographical junction.

The system model was simulated for steady state conditions at the average daily demand and two peaking factors of 1.5 and 2.5 for maximum day and peak hour demands respectively. Because, calibration of the model with physical operating conditions was not available at the time of modeling, the pump station was configured to provide between 70 and 100 pounds per square inch (psi) from the water treatment plant (WTP) to simulate standard operating conditions of typical water distribution systems. The underlying assumption used to develop this base existing model was that the system is currently operational with no major deficiencies other than the bottleneck of flow to Manasota Key noted by District personnel.

The Average Daily Demand (ADD) model simulation showed very little pressure reduction throughout the system, as expected, and confirmed the District's capacity issues on Manasota Key. On the main portion of the system, the pressure reduction from the WTP to the farthest north and south junctions is approximately 11 feet of head equivalent to a 5 psi reduction for both locations. Similarly, the capacity of the distribution piping system appeared adequate with few locations of major head loss gradients greater than 1 foot per 1,000 feet (ft/1,000 ft) and no single pipe velocity greater than 3 feet per second (fps).

Figure 4-7. Pressure and Velocity Results from Existing Model Simulation

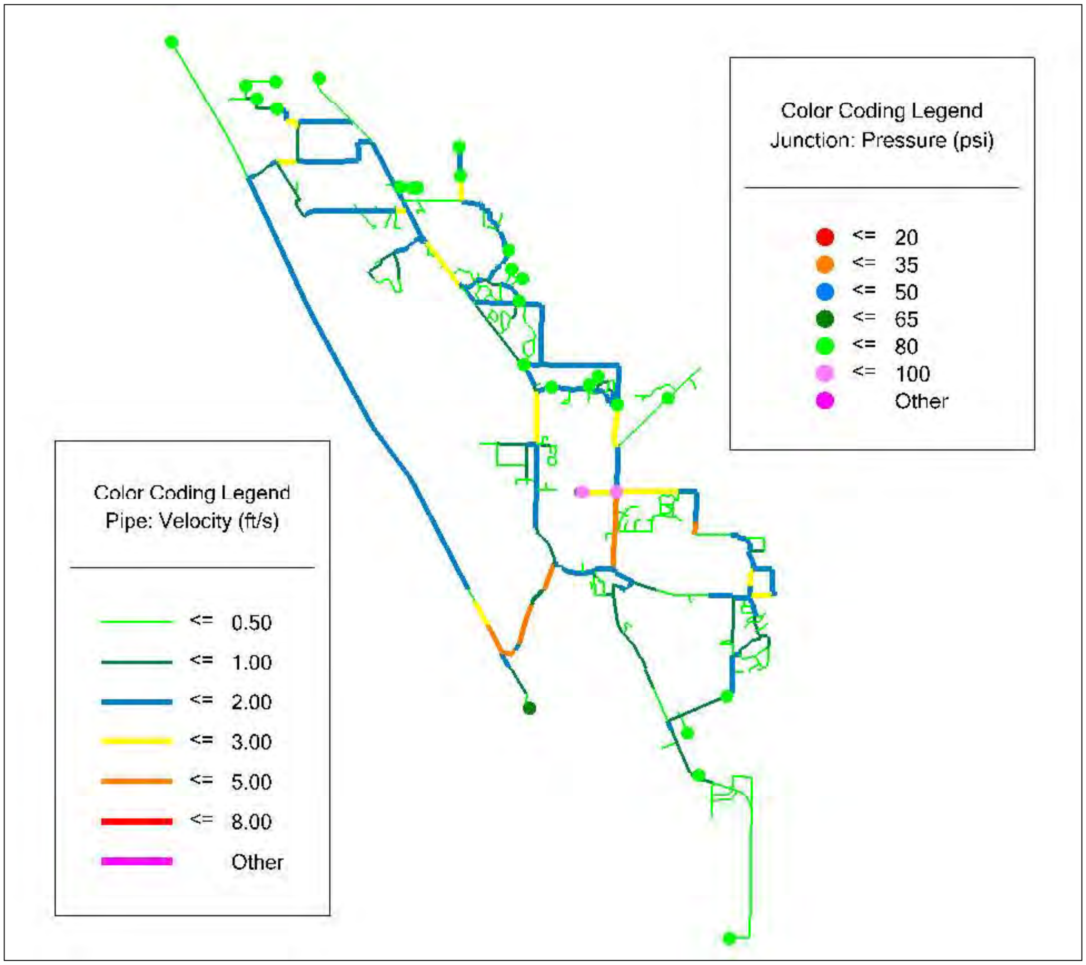


Future demand allocations were assigned in locations where developments have been planned as defined earlier in this report. These demand allocations were input into the model based on anticipated near-term, mid-term and long-term periods of zero to four years, five to ten years, and eleven to twenty years respectively. Future development areas were referenced into the model and the future demand was assigned to the junction nearest the transmission main assumed to deliver flow to the subject development.

For the future model simulations run with ADD, similar results to the existing model demand were experienced with respect to pressure reductions and pipe velocities. Only slight reductions in pressure were noted as compared to the existing model results. Accordingly, only minor velocity increases and hydraulic gradient losses were noted. Similar to the existing model at ADD conditions, no pipe velocities above 3 fps were shown in the results through the 20 year demand projections.

For the future demand model simulations with a maximum day peaking factor of 2.5, the pressure reductions for the three modeled future demand periods were not significant. Results show the average pressure reduction from the existing model to the 20 year future demand projection is approximately 15 psi (35 feet). Based on these results it appears that the existing system will be adequate to handle the future demands in the locations of the anticipated developments with respect to system head losses. The only area of concern is Manasota Key, which according to the results of the existing model, showed increased head losses in the system along Beach Road and moving north on the barrier island. Because the head losses on the existing system were already fairly significant, any further reductions due to increased demands elsewhere in the system may further compromise the ability to provide service to Manasota Key.

Figure 4-8. Pressure and Velocity Results from Future Demand with PF2.5



As noted, future demands indicated that there are portions of the existing water distribution system that may not have the ideal capacity to provide similar levels of services to what is currently being provided. These areas include Manasota Key and the 30-inch, 16-inch and 12-inch pipelines just downstream of the WTP.

For Manasota Key, the bottle neck along Beach Road may be resolved by increasing the diameter of the pipeline from 10-inches to 16-inches, which would reduce the head losses in that section of the system and improve the capacity to the farther reaches of the barrier island. Additionally, increasing the pipeline diameters of the first few sections north and south on Manasota Key from 8-inches to 10-inches and 6-inches to 8-inches, respectively would help to improve the existing capacity in these areas. These improvements should be considered within the first phase of future demand developments.

Near the WTP, pipe diameter increases to the 16-inch and 12-in water mains should be considered for the five to ten year demand projections. For the approximately 100 foot section of 16-inch water main running north of the connection to the 30-inch feeder line from the WTP, velocities appear to increase beyond acceptable ranges prior to splitting flow to a 12-inch water main to the east and continuing in a 16-inch water main to the north. This section of water main should be replaced with a 30-inch diameter pipeline to improve capacity. Similarly, the 12-inch water main splitting from the same 30-inch water main should be replaced with a 20-inch water main along Pine Street from the connection to the 30-inch line all the way to South McCall Road.

4.3 Wastewater Flow Projections and Treatment Analysis

4.3.1 Wastewater Flow Projections

To determine future wastewater flows, the population projections presented in Section 3.0 were converted to equivalent residential connections (ERCs) based on the average family household size of 2.4 as determined from the 2015 Census tract data.

To estimate the flows associated with each ERC, a comparison was made between the previously published recommendation of 121 GPD/ERC in the District's 2005 Capacity Analysis Report, (CH2MHill) and the District's 2015 Annual Average Daily Flows. The Annual Average Daily flow in 2015 was 1.471 MGD (Total 1.587 MGD – Sandalhaven and Charlotte County flows of 0.105 and 0.001 respectively). The estimated 2015 Base Population is 36,611. This equals approximately 40 gpcd. Using 2.4 people per household equates to an estimated flow of 96 GPD/ERC.

Table 4-8. Comparison of GPD/ERC

Source	Flow Rate (GPD/ERC)
2005 Capacity Analysis Report (CH2MHill)	121
2015 AADF/2015 Base Population	96

In developing a recommended flow per ERC, consideration was given to the anticipated areas of growth within the District along with recognition that not all residences within the District's service area have sewer service, yet those residences were included in the determination of "Base Population" calculation above – skewing the flow rate down.

Several new developments have been identified that are zoned primarily single family residential, which would indicate that the reported household size of 2.4 may increase as more families move into the area.

It was determined to use a conservative approach and apply the previous estimate of 121GPD/ERC to calculate the District's projected wastewater flows.

In addition to the areas within the District's service boundary, additional wastewater flows will be collected from Charlotte County and Utilities, Inc. of Sandalhaven. The District's original bulk sewer agreement with Charlotte County (2005) was for 400,000 gpd, but with the new 2014 Interlocal Agreement, no capacity limit is enumerated. The

Utilities, Inc. of Sandalhaven agreement with the District has an amended contract limit of 500,000 gpd; however at the time of this report, the utility has only funded 300,000 gpd of the allocated capacity.

Utilizing the population projections presented in Section 3.0 of this Report, the assumption of 2.4 people per household and 121GPD/ERC, and the established 1.15 ratio of 3-MMADF to AADF, Table 4-9 identifies the projected wastewater flows within the District, as well as incremental flows from Charlotte County and Sandalhaven projected to a limit of the original or contracted flows.

Table 4-9. Total Projected Wastewater Flows

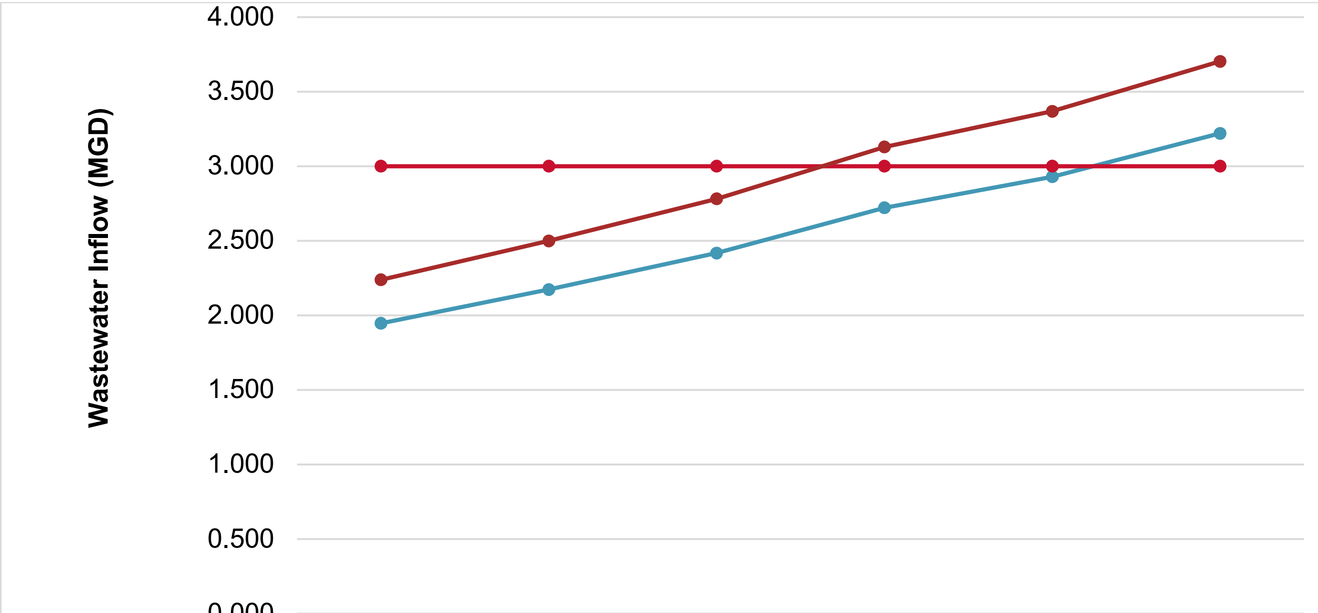
Year	Population (District Service Area)	ERC	Projected District Wastewater Flows (AADF) (MGD)	Charlotte County Allocation (MGD)	Sandalhaven Allocation (MGD)	Total Projected AADF (MGD)	Total Projected 3-MMADF (MGD)
2015	36,611	15255	1.846	0.001	0.1	1.947	2.239
2016	37,160	15483	1.873	0.1	0.2	2.173	2.500
2021	40,032	16680	2.018	0.1	0.3	2.418	2.781
2026	42,074	17531	2.121	0.2	0.4	2.721	3.129
2031	44,220	18425	2.229	0.3	0.4	2.929	3.369
2036	46,018	19174	2.320	0.4	0.5	3.220	3.703

4.3.2 Wastewater Treatment Analysis

The District's 2005 Capacity Analysis Report (CH2MHill) concluded that the District had adequate capacity to manage projected flows through 2016. In accordance with paragraph 62-600.405, Florida Administrative Code (F.A.C.), should a capacity analysis report document that the permitted capacity will not be equaled or exceeded for at least 10 years, an updated capacity analysis report shall be submitted to the DEP at five-year intervals or with the permittee's application for permit renewal.

As shown in Figure 4-9, the District's AADF is projected to exceed the plant's permitted capacity after 2031. It is recommended that the District perform an update to the 2006 Capacity Analysis Report (CAR), including the plant loading and biological performance analysis to determine if additional capacity is available for re-rating without construction of additional facilities. The CAR can be done in conjunction with the District's Domestic Wastewater Facility Permit renewal.

Figure 4-9. Englewood Water District Future Wastewater Treatment Analysis



	2015	2016	2021	2026	2031	2036
AADF	1.947	2.173	2.418	2.721	2.929	3.220
Permitted AADF	3	3	3	3	3	3
MMADF	2.239	2.500	2.781	3.129	3.369	3.703

In addition, the District's current FDEP Domestic Wastewater Facility Permit will expire on July 9, 2018. It is recommended that the District prepare and submit a Domestic Wastewater Facility Renewal Permit application to the FDEP no sooner than July 9, 2017. This permit renewal can be done in conjunction the recommended Capacity Analysis Report.

4.3.3 Forcemain Hydraulic Analysis

The data provided for the sewer model consisted of a GIS file containing the gravity, force main and vacuum sewer systems, including pipeline diameters and lengths. Per the scope of this study, models developed for this project included only the pipelines within the force main system sized 8-inches and larger. The District also provided limited lift station information including the coordinates of each station and the horse power of the pump(s) and general wet well dimensions for a select number of lift stations.

These data were imported into WaterGEMS where it was determined that an insufficient amount of data were available to provide a workable model for the sanitary sewer system. It is recommended that additional information be collected on the existing sanitary sewer system, including pipe invert elevations, identification of critical gravity trunk lines downstream of force mains, wet well dimensions for the entire system, detailed pump curves and operating data such as float switch elevations, known issues in the system, existing operating pressures, infiltration rates and data to develop peaking factors.

4.4 Reuse Flows

4.4.1 Reuse Demand

It is the District's goal to reclaim 100 percent of its wastewater treatment facility effluent for reuse. As previously listed in Table 3-5, there are existing reclaimed water commitments/permitted capacities totaling over 3.6 MGD. Based on the District's Total Projected Wastewater Flows identified in Section 4.3, and the current 3.5 MGD annual average daily flow permitted capacity of the reuse system, there are enough existing reclaimed water commitments to accept the anticipated permitted flows of 3.220 AADF through 2036.

Seasonal management of the District's reclaimed water flows during the wet season is assisted by the use of their 220 MG Class I ASR injection well which is used to manage excess reclaimed water during periods when reuse customers cannot efficiently use available effluent (during wet weather events).

4.4.2 Reuse System Hydraulic Analysis

The District did not have an existing hydraulic model, and thus the data collection and calibration efforts required to build a comprehensive model were beyond the scope of this Utility Master Plan. However, a rudimentary hydraulic model of the District's reclaimed water distribution system was created in WaterGEMS.

The major components of the reclaimed water network used to construct the hydraulic model include the following:

- Wastewater Treatment Plant;
- Effluent Pump Station; and
- Almost 20 miles 6" – 16" diameter pipelines

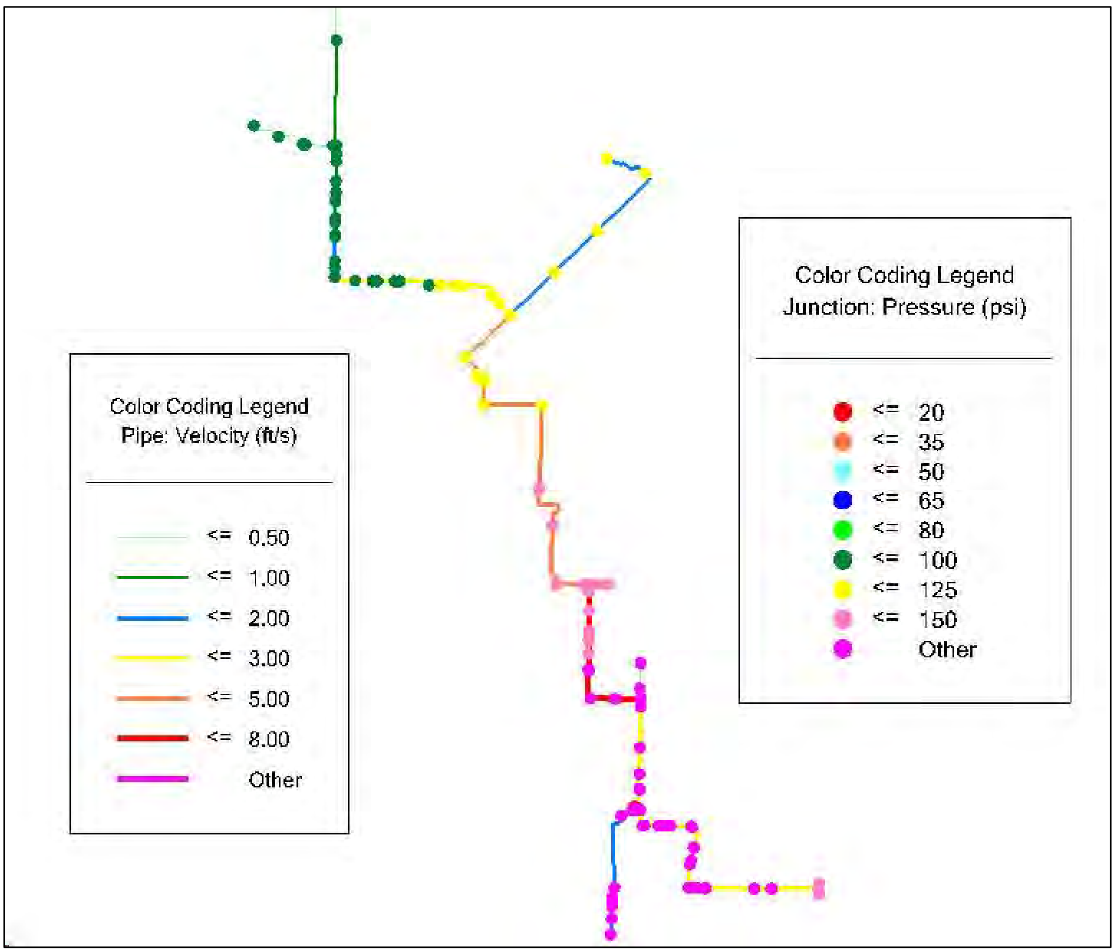
In addition to GIS data, limited information on the reclaimed pumping system was provided including the design flow (1,740 gpm) and horsepower (150 HP) of the three existing variable frequency drive (VFD) pumps. EWD also noted that the system typically runs at approximately 150 psi from the pump station. With this information, an operating point was input into the model using the design flow and operating head of the pumps to develop a theoretical operating curve for each of the pumps.

Reclaimed water demands were provided by the District utilizing their 2015 reclaimed water billing data. Average daily usage for each of the nine existing customers was calculated and modeled. This average daily usage was used as the average daily demand (ADD) and was input into the junctions nearest the users' geographic location for model simulations.

The ADD model results showed reduction in pressure from the pump station to the northernmost reaches of the model with the maximum reduction in head from the junction just downstream of the pumping station of approximately 85 feet (37 psi) and occurs at the northernmost node in the system. It is noted that approximately two-thirds of the demands flow to the northern end of the reclaimed system. Pressure reductions to the south are significantly less based on the results, with a maximum reduction in head of approximately 22 feet (10 psi). Model results also indicate that velocities in this simulation do not exceed 5 fps. The highest velocities were found to be in the 12-inch line along Worth Avenue and San Casa Drive.

Alternatively, when a peaking factor of 1.5 is applied, the model simulation results appear to be a more likely representation of the existing demands experienced by the reclaimed system. With a total steady state flow of 2,808 gpm, results from the model show a total head loss of approximately 164 feet, or a pressure drop of 78 psi. Velocity results from this model simulation show higher velocities in the system north of the pumping station. The highest velocities shown in this scenario are approximately 5 fps in the 12-inch pipeline along Worth Avenue and San Casa drive and approximately 3.5 fps in the 12-inch pipeline from South McCall Road and the Englewood Sports Complex.

Figure 4-10. Pressure and Velocity Results for Existing system with (PF1.5)



In order to address the issue of low pressures along the areas to the north of the pumping station, it is recommended that the District perform a feasibility study on the hydraulic operation of the existing, but non-functioning re-use booster station at Holiday Ventures.

In addition, it is important to note that this system was modeled under steady state conditions. Accordingly, information on the actual hourly demand data could provide insight into the times of highest demands, considering demands may not occur simultaneously. This hourly demand, along with recorded pressures at various locations in the system, could be used to calibrate the system in order to more accurately reflect the actual operating conditions. This information would also be beneficial for the District to implement a schedule of demand in order to spread the demand throughout the day evenly, therefore reducing the demand on the system at one given time.

4.5 Wastewater Collection Alternatives for Unsewered Areas

As noted earlier, not all parcels in the District's current service area are connected to the wastewater collection system. Sanitary systems are essential to protecting the public health and welfare of residents in areas of concentrated population, as well as critical to the environmental and economic health of the area. A brief summary of the various wastewater collection methods is described below.

4.5.1 Gravity Sewer System

A gravity sewer system is used to collect wastewater from multiple sources and convey the wastewater by gravity to a central location.

Collection sewers are typically eight-inch or larger diameter pipe. Pipe diameters increase with increasing volume of water being transported. Pipes are installed with sufficient slope to keep the suspended solids moving through the system.

Properly designed and constructed gravity sewers are a viable collection option for urban areas, but can be expensive for small communities. In its purest form (i.e., uniform slope from service connections to treatment components) gravity is an inexpensive means to convey water. However, the topography is rarely favorable to purely gravity flow, and lift stations must often be included. The cost of gravity sewers may be prohibitive unless there is sufficient population density to justify the installation.

4.5.2 Pressure Sewers

Pressure sewers are a means of collecting wastewater from multiple sources and delivering the wastewater to an existing collection sewer, and/or to a local or regional treatment facility. Pressurized sewers or Force Mains are not dependent on gravity to move wastewater and thus the local topography restrictions will represent no challenge. If gravity flow is not possible throughout the system, pump stations will be employed.

Low Pressure Small Diameter Sewer System (LPS)

A low pressure small diameter sewer system consists of small diameter (minimum 2 inches) forcemains that are typically installed within the road right-of-way (ROW). The system requires installing individual grinder pumps (GP) or septic tank effluent pumps (STEP) at each property to convey wastewater to the low pressure sewer system.

A grinder pump grinds the solids present in wastewater to a slurry in the manner of a kitchen sink garbage disposal. The septic tank of a STEP system captures the solids, grit, grease, and stringy material that could cause problems in pumping and conveys the liquid through the small diameter piping. In utility-scale STEP installations, it is typically the responsibility of the service provider (i.e. utility agency) to provide the maintenance and cleaning of the septic tank portions of the STEP system as well as the individual pump stations. The tanks and pumping systems are typically installed on the user/customer property with access agreements provided for maintenance and repair access by the service provider. Grinder pumps to serve individual users are usually 2-hp in size, but 1-hp units are also used. Some installations could use up 5-hp motors when serving industrial users. STEP pumps are usually fractional horsepower.

Serviceability of the pumping unit's components is important to both minimize the time lost due to a malfunction and keep the cost of inspection and maintenance to a minimum. A check valve on the service line prevents backflow, which is insured with a redundant check valve at the pumping unit.

The panel is usually installed on the side of the user/consumer and power paid by the user. Existing facilities may need to upgrade electrical mains and power boards. If a malfunction occurs, a high liquid level alarm is activated. This may be a light mounted outside of the user facility, or it may be an audible alarm which can be silenced by the user. The user then notifies the sewer service maintenance provider.

Due to potential power outages, both STEP and GP installations should have reserve holding capacity. Single service GP installations generally provide reserve storage capacity of about 50 gallons. Septic tanks usually have about 100 to 200 gallons. Additional storage capacity may be required based on local conditions. The loss of power in areas that are served by individual wells and cisterns essentially eliminates the possibility for wastewater generation because water supplies become unavailable. The minimum storage capacity required is 50 gallons unless local authorities require additional storage based on local conditions.

Vacuum Sewer System

A vacuum sewer system utilizes a partial vacuum to transport sewage through the collection system. As the name suggests, a vacuum (negative pressure) is drawn on the collection system, with a small diameter vacuum pipeline located typically in the road. Vacuum sewers do not require a septic tank at each wastewater source. All of the domestic wastewater and waste constituents are collected and transported by this collection method. Sewage from one or more homes or businesses could flow by gravity into a small valve pit. A service line connects the valve pit to the main vacuum line. Each valve pit is fitted with a pneumatic pressure-controlled vacuum valve. This valve automatically opens after a predetermined volume of sewage has entered the sump.

Service connections are made to each residence and a holding tank replaces the septic tank (much like the grinder pump system). A vacuum valve located in the holding tank allows rushing air from the service connection to transport the sewage to the central vacuum station. The central vacuum station operates 24-hours a day.

Because of the cost of a vacuum station, vacuum sewers are most appropriate for areas with 200 or more connections. A typical vacuum station can serve from a 15,000-foot radius or around 1,200 connections.

Because the movement of wastewater depends upon the differential pressure created when valves open, long pipe runs with few connections can result in poor performance. The same problem is seen when connections are installed but are not yet in use. As a solution for this, temporary valve pits installed at strategic locations can be fitted with timer-controlled valves that allow air to enter even though wastewater is not being generated by the source.

4.5.3 Evaluation of Sewer Collection Methods

The relative advantages and disadvantages of the effluent sewers discussed above are summarized in Table 4-10 below. This Table is an excerpt from the *Guidance Manual for the Evaluation of Effluent Sewer Systems*, EPRI, Palo Alto, CA, East Kentucky Power Cooperative, Inc., Winchester, KY, and Cooperative Research Network of NRECA, Arlington, VA: 2004. 1009130. To determine the most cost effective sewer collection method for a specific area, it is recommended that the District evaluate each area individually as cost effectiveness of the different collection methods vary with number of parcels served; topography of the area and regulatory drivers.

Table 4-10. Evaluation of Sewer Collection Methods

Collection Alternative	Advantages	Disadvantages
Conventional	• Well established technology. • Collectors contained within the public rights-of-way. • Entire waste stream conveyed from property. • No power required except at lift stations.	• Must maintain uniform grade at gradient sufficient for self cleansing. • Deep excavation and/or many lift stations required in areas of undulating or flat topography. • Self-cleansing velocities not maintained at low flows. • Manholes required at regular spacing • Infiltration/Inflow common through manholes and lift stations.

Collection Alternative	Advantages	Disadvantages
Septic Tank Effluent Gravity	• Variable, flat and inflective gradients allowed to reduce excavation costs • Can be combined with STEP units to avoid deep installation or lift stations • Performance not affected by low flows • Cleanouts in place of manholes • Infiltration/Inflow reduced by fewer manholes and lift stations • Collectors usually installed in public R/W off of road pavement • No power requirement except at lift station • Primary treatment requirements reduced or eliminated	• Interceptor tank located on private property with perpetual easement required • Settleable solids retained on property that require periodic removal • Septic, settled wastewater collected that requires odor control at manholes and lift stations
Septic Tank Effluent Pressure	• Cost of excavation may be reduced by installing collector mains at constant depth, conforming to topography • Performance not affected by low flows • Primary treatment requirements reduced or eliminated • Manholes eliminated • Infiltration/Inflow significantly reduced • Collectors usually installed in rights-of-way off of road pavement • Lift stations eliminated	• Interceptor tanks with pumping unit located on private property with perpetual easement required • Power required at each connection supplied by owner • Property owner's existing electrical panel may require replacement to accept the additional load or to comply with current codes. • Settleable solids retained on property that require periodic removal • Septic, settled wastewater requires odor control at air release valves and treatment plant • Individual service lost with power outage
Grinder Pump (Low Pressure)	• Collector mains may be laid at constant depth to conform to topography. • Conveys entire waste stream from property. • Performance not affected by low flows. • Infiltration/Inflow significantly reduced. • Manholes eliminated. • Collectors usually installed in public R/W off road pavement • Lift stations eliminated	• Vault with grinder pump located on private property with perpetual easement required • Power required at each connection supplied by owner • Property owner's existing electrical panel may require replacement to accept the additional load or to comply with current codes. • Septic wastewater requires odor control at air release valves and treatment plant • Individual service lost with power outage
Vacuum	• Entire waste stream conveyed from property • Wastewater maintained in aerobic state • Performance not affected by low flows • Exfiltration eliminated • Manholes eliminated • Lines and valves installed in R/W off road pavement • No power required at connection	• Collector mains must be installed with "saw-tooth" pattern • Standby power required at central vacuum station to prevent service loss during power outages • Limited number of equipment manufacturers

4.6 Regulatory Compliance

In the wake of the lead and copper crises in the news, utilities are faced with increased scrutiny from regulators, the press, environmental advocates, and the public they serve. It is essential for every utility to understand the current regulatory requirements, the impact of potential future regulations and their vulnerability to regulatory excursions that could impact both the cost of service and public confidence.

4.6.1 Safe Drinking Water Act

Current SDWA rules of particular relevance to the District include the Stage 2 Disinfectant/Disinfection By-Product (D/DBP) Rule, Total Coliform Rule, and the Lead and Copper Rule (LCR). The EPA is working on revisions to the LCR with potential roll-out in 2017. Important elements to the LCR revisions will focus on sampling protocols, copper sampling site criteria, lead service line replacement (potentially on private property), maintaining a proper lead service line inventory, and emphasis on maintaining optimum corrosion control requirements.

4.6.2 Clean Water Act

Overflows of raw sewage and inadequately controlled stormwater discharges from municipal sewer systems can end up in waterways or cause back ups into city streets or homes threatening water quality, human health and the environment. Reducing raw sewage overflows and stormwater discharges is one of EPA's National Enforcement Initiatives. EPA works with the Florida Department of Environmental Protection (FDEP) to protect human health and the environment by ensuring that the regulated community obeys environmental laws/regulations through on-site visits by qualified inspectors, and a review of the information the state requires to be submitted. The District complies with all monitoring and reporting regulations required by the FDEP.

4.6.3 Florida Department of Environmental Protection

The Florida Department of Environmental Protection (FDEP) is the state agency granted regulatory and enforcement powers in chapter 403, Florida Statutes, to control air and water pollution. Accordingly, FDEP is responsible for permitting and compliance activities for public water systems and domestic wastewater facilities in Florida. FDEP, through its South District Office and in conjunction with its delegated local program in Sarasota County, works with the District to regulate and enforce the State's Drinking Water and Domestic Wastewater Programs.

The Florida Administrative Code (FAC) Chapter 62 contains the requirements for public water systems and wastewater facilities. Specific to the District are requirements for Water and Wastewater Capacity Analysis Reports in accordance with Sections 62-555.348(3)(a) and 62-600.405 respectively as well as the renewal of the District's existing Domestic Wastewater Facility Permit.

4.6.4 Southwest Florida Water Management District

The District is located in the southwestern portion of the Southwest Florida Water Management District (SWFWMD). As defined in Chapter 373 of the Florida Statutes (F.S.), the SWFWMD's responsibilities include managing the water supply, protecting water quality and preserving natural systems. The SWFWMD 2015 Regional Water Supply Plan (RWSP) assessed projected water demands and potential sources of water to meet water supply demands for the period from 2015 through 2035. The District's projected potable water supply demands were included in the RWSP.

The SWFWMD requires that, within eighteen (18) months after an update to the RWSP is approved, the District shall submit a 10-Year Water Supply Facilities Work Plan. The 2015 RWSP Update was approved in September 2015 and the District will need to submit a 10-Year Water Supply Facilities Work Plan by May 17, 2017.

The District currently operates their potable water supply wells under an existing Water Use Permit (20 004866.010) which expires on December 18, 2019. An application to renew this permit will need to be submitted to the SWFWMD no sooner than December 18, 2018.

5 Capital Improvement Program

5.1 Introduction

The Capital Improvement Program (CIP) will ensure that the District plans for and maintains infrastructure assets in a sound, functioning condition. The CIP has been developed to include the projects necessary to implement the recommended water, wastewater and reclaimed water programs.

CIP Planning Horizons

Near-Term – years 1 through 4

Mid-Term – years 5 through 10

Long-Term – years 11 through 20

Rapid Assessments

To evaluate the District's existing assets, a Rapid Assessment was completed at each of the District's key facilities to determine critical repair and rehabilitation requirements. The scope of this task required visual condition inspections of each above ground facility utilizing professional personnel familiar with the design and operation of reverse osmosis and lime softening water treatment plants, wastewater treatment processes and operation, distribution, collection and pumping system components as well as water supply, aquifer storage and recovery and deep injection wells. Each facility inspected had a dedicated condition assessment team including a licensed utility operator to complete the assessment utilizing industry accepted condition assessment forms.

The intent of the Rapid Assessment was to provide an evaluation of the condition of the District's facilities by conducting field inspections, performing a desktop estimate of remaining service life, developing a cost opinion range for equipment renewal, modifications and capital projects for each facility, and providing near-term (Year 1-4), mid-term (Year 5 to 10) and long-term (Year 11-20) capital improvement projects necessary to meet service demands. The facilities were grouped into the following six facility service types:

- Water Treatment Plants - Reverse Osmosis and Lime Softening
- Water Distribution System
- Wells and Well Fields
- Wastewater Reclamation Treatment Facility
- Wastewater Reclamation Transmission and
- Wastewater Collection System – Sewer Lift and Vacuum Stations.\

A complete list of all projects with cost estimates, brief project descriptions and dependencies is provided in Appendix C - TASK 3 Condition Assessment Report.

The remainder of this Section is broken out into two divisions: Recommended Improvements by Planning Horizon and Recommended Improvements by Service Program (Water or Wastewater).

5.2 Recommended Capital Improvements by Planning Horizon

The following tables summarize the recommended capital improvements in the near, mid and long-term planning horizons.

5.2.1 Near-Term (Year 1 to 4) Improvements

Table 5-1 includes those capital projects recommended to take place in the short term (Year 1 to 4) timeframe. The total estimated cost is $4,448,000.

Table 5-1. Year 1-4 Recommended Capital Improvements

Project ID	Improvement	Facility / Location	Cost Estimate
RO-04	Develop a facility one-line electrical diagram	RO Bldg.	$ 35,000
RO-05	Commission a Power Load Analysis and Arc-Flash Study	RO Plant	$ 75,000
RO-07	Upgrade older power distribution and motor control centers	RO Plant	$ 280,000
RO-11	Install new degasifier 2	RO Plant	$ 205,000
RO-18	SCADA and PLC upgrades	RO Plant	$ 120,000
LP-01	Replace raw storage diffuser tray and support structure	RWS Tank	$ 95,000
LP-02	Repair and replace internal coating raw water storage tank	RWS Tank	$ 35,000
LP-03	Plant 3 - ten year rehabilitation	LS Plant	$ 270,000
LP-04	Plant 2 - ten year rehabilitation	LS Plant	$ 295,000
LP-06	Plant 2 - Filter rehabilitation	LS Plant	$ 62,000
LP-08	Develop a facility one-line electrical diagram	LS Plant	$ 25,000
LP-09	Commission a Power Load Analysis and Arc-Flash Study	LS Plant	$ 60,000
LP-11	Upgrade older power distribution and motor control centers	Old HSP Room	$ 177,000
LP-14	Retrofit two (2) Newer High Service Pump motors with VFD' s	New HSP Room	$ 90,000
LP-17	Commission a LSP Facility plan to determine upgrades or decommissioning	LS Plant	$ 150,000
LP-20	SCADA and PLC upgrades	LS Plant	$ 82,000
WL-01	Install telemetry communications to RO supply water wells	RO WF2	$ 45,000
WRF-06	Blower upgrades phase 1	WRF Plant	$ 385,000

Project ID	Improvement	Facility / Location	Cost Estimate
WRF-13	Trace and label power and control wire terminations. Update electrical one-line diagram	WRF Plant	$ 35,000
WRF-16	Re-use Pond Pumping Rehabilitation	Re-Use Pond Pump Station	$ 128,000
LS-02	LS121 Holiday Ventures Capacity Upgrade Study and Facility Plan	LS121-Holiday Ventures	$ 100,000
LS-05	Purchase bypass pump and install on-site bypass pumping	LS121-Holiday Ventures	$ 65,000
CL-01	Replace Beach Road force main	Collection	$ 645,000
CL-04	Manhole rehabilitations - Reline brick manholes with GML	Collection	$ 120,000
CL-06	Install forcemain isolation valve near Elm St.	Collection	$ 67,000
RU-01	Reuse hydraulic analysis and operational review for service improvements	LS121-Holiday Ventures	$ 85,000
RU-03	Rehabilitate re-use booster station at Holiday Ventures	LS121-Holiday Ventures	$ 100,000
DS-06	System modifications to eliminate bottleneck at Roundabout	Water Dist	$ 315,000
DS-07	System modifications to provide redundancy at Forked Creek	Water Dist	$ 230,000
EWD-01	Select, purchase and execute an EAMS / CMMS	EWD (Water ½ Wastewater ½ Program)	$ 72,000
			$ 4,448,000

5.2.2 Mid-Term (Year 5 -10) Improvements

Table 5-2 includes those projects recommended to take place in the mid- term timeframe. The total estimated cost is $18,907,000. It is noted that recommended project LS-03, Design and build upgraded LS121 – Holiday Ventures does not have a cost estimate shown. This project has a “precursor” project identified in the Near-Term (1-4) Improvement list – LS02, Lift Station 121 – Capacity Upgrade Study and Facility Plan.

Table 5-2. Mid-term (Year 5-10) Recommended Capital Improvements

Project ID	Improvement	Facility / Location	Cost Estimate
RO-06	Upgrade Standby Generator and Power Distribution	RO Plant	$ 965,000
RO-10	Replace degasifier 1	RO Plant	$ 265,000
LP-05	Plant 1 - ten year rehabilitation	LS Plant	$ 325,000
LP-10	Upgrade HSP standby generator and switchgear	Old HSP Room	$ 58,000

Project ID	Improvement	Facility / Location	Cost Estimate
LP-12	Replace HSP buried piping under older HSP Bldg. to tanks	Old HSP Room	$ 142,000
LP-13	Older High Service Pump Replacements (3)	Old HSP Room	$ 172,000
WL-02	Install telemetry communications to LP supply water wells	WF1, WF3, WF5	$ 45,000
WL-04	Rehab, replacement, or abandonment of WF1 supply wells	WF1	$ 45,000
WL-08	Plug and Abandon IMW-1 and SMW-1	WRF Plant	$ 30,000
WRF-04	Plant 4 Rehabilitation - 15 year rehabilitation	Plant 4	$ 350,000
WRF-07	Blower upgrades phase 2	WRF Plant	$ 120,000
WRF-11	Chlorine contact basin expansion	CL2 Contact Basin	$ 220,000
WRF-15	Standby Power / Power Distribution Improvements	WRF	$ 90,000
WRF-17	Install two smaller horsepower variable frequency dive pumps	Effluent Pump Station	$ 195,000
LS-03	Design and build upgraded LS121 - Holiday Ventures	LS121-Holiday Ventures	$ TBD
LS-04	Standby generator replacement (up size for Re-use booster station)	LS121-Holiday Ventures	$ 200,000
LS-08	Instrumentation upgrades - install flow meters or pressure indication	Various	$ 125,000
CL-02	Install new force main from Holiday Ventures to point TBD	Collection	$ 8,500,000
CL-05	North Beach sewer service study and evaluation	Collection	$ 65,000
CL-08	Purchase new CCTV camera and trailer	Collection	$ 120,000
RU-02	Install new re-use storage tank at Holiday Ventures	LS121-Holiday Ventures	$ 950,000
RU-04	Install new re-use forcemain from WRF to new HV storage tank	LS121-Holiday Ventures	$ 1,000,000
DS-04	AC Pipe replacement on Beach - Charlotte County	Water Dist	$ 2,440,000
DS-05	AC Pipe replacement on Beach - Sarasota County	Water Dist	$ 2,330,000
DS-08	Service line extension to Manasota development (2000 homes)	Water Dist	$ 80,000
DS-12	Water Storage Study - needs analysis & conceptual design	Water Dist	$ 75,000
			$18,907,000

5.2.3 Long-Term (Year 11-20) Improvements

Table 5-3 includes those projects recommended to take place in the long-term timeframe. The total estimated cost is $4,336,000. It is noted that project RO-15, LP-18 and LP-19 are dependent upon the recommendations of Near-Team (1-4) improvement, LP-17 Facility Plan for the Lime Softening Plant.

Table 5-3. Long-Term (Year 11-20) Recommended Capital Improvements

Project ID	Improvement	Facility / Location	Cost Estimate
RO-13	RO Plant - Capacity Upgrade (new RO skids)	RO Plant	$ 1,630,000
RO-14	RO Plant - Pump modifications	RO Plant	$ 93,000
RO-15	New chemical feed process if lime plant decommissioned	RO Plant	$ TBD
RO-16	Replace Cl2 gas system due to risk / liability decision	RO Plant	$ 125,000
RO-17	Upsize plant raw water piping - eliminate bottleneck for Well F 2	RO Plant	$ 84,000
LP-07	Replace Shelter / Bldg. - Lime Process	Lime Bldg.	$ 59,000
LP-16	Instrument and analyzer upgrades - ten year renewal	LS Plant	$ 35,000
LP-18	Decommission Lime Softening Plant	LS Plant	$ TBD
LP-19	Upgrade Lime Softening Plant	LS Plant	$ TBD
WRF-02	Odor control system rehabilitation at headworks	Headworks	$ 260,000
WRF-05	Plant 1 and 2 Rehabilitation - 15 year rehabilitation	Plant 1 and 2	$ 600,000
WRF-12	Replace Cl2 gas system due to risk / liability decision	CL2 Contact Basin	$ 125,000
VS-08	Standby generator rehabilitation	Various	$ 200,000
LS-13	Potential elimination of LS-113 Englewood Rd	Englewood Road	$ 125,000
CL-07	Sewer extensions to alternate areas	Various Locations	$ TBD
DS-13	Design and build water storage tank(s)	Water Dist	$ 1,000,000
			$ 4,336,000

5.2.4 Project Spanning 20 Year Horizon (Year 1-20) Capital Improvements

Table 5-4 includes those projects recommended to take place throughout the 20-year time-frame with the commencement of the project dependent on funding and opportunity. The total estimated cost is $6,050,000.

Table 5-4. 20 Year Horizon (Year 1-20) Recommended Capital Improvements

Project ID	Improvement	Facility / Location	Cost Estimates
WRF-01	Replacement of buried liquid process piping	WRF Plant	$ 205,000
CL-03	Clay pipe re-line / replacement	Collection	$ 5,000,000
DS-02	Line extension program	Water Dist	$ 345,000
DS-09	Looping projects - south service area	Water Dist	$ 200,000
DS-10	Looping projects - north service area	Water Dist	$ 300,000
			$ 6,050,000

5.2.5 Recommended Capital Improvements by System Program

Table 5-5 summarizes the breaks out the total capital costs between water and wastewater service programs.

Table 5-5. Recommended Capital Improvement Costs

	Near-Term Year 1-4	Mid-Term Year 5-10	Long-Term Year 11-20	Year 1-20	Total
Water Services	$ 2,682,000	$ 6,942,000	$ 3,026,000	$ 845,000	$ 13,495,000
Wastewater Services	$ 1,766,000	$ 11,965,000	$ 1,310,000	$ 5,205,000	$ 20,246,000
Total	**$ 4,448,000**	**$ 18,907,000**	**$ 4,336,000**	**$ 6,050,000**	**$ 34,741,000**

5.3 Recommended Capital Improvement by Facility Type

This section provides additional information on the facility projects including a short description of project dependencies, constraints and importance.

5.3.1 Reverse Osmosis Plant

The Reverse Osmosis (RO) Plant was first constructed in 1982 and has been upgraded in phases to the present. Some of the supporting equipment and structures including Trains A and B are at 34 years of service life and showing moderate to severe signs of deterioration and service failure. This is evident in the condition and performance of the plant's standby power and power distribution systems. Projects RO-04 to RO-07 are proposed to address these issues. In addition, the current condition of Degasifier 1 has been rated poor. Degasifier 1 is a single point of failure and losing its functionality will have a direct impact on water quality and present severe operational challenges. Projects RO-10 and RO-11 are proposed to address these issues.

The operation and performance of the RO Plant and the Lime Softening Plant are critical to delivering a drinking water that is safe and meets all water quality objectives including taste. A significant factor to determine future operations of the RO Plant is the age and condition of the Lime Softening Plant. Several of the RO Plant improvement projects scope and timing is dependent on project LP-17 LSP Facility Plan described in Table 5-7.

Table 5-6 includes those projects recommended for the RO Plant. The total estimated cost is $3,877,000.

Table 5-6. RO Plant Recommended Improvements

ID	Project	Phase	Total Project Estimate	Project Description	Dependencies and Constraints
RO-04	Develop a facility one-line electrical diagram	FY 1-4	$ 35,000	Project is necessary to prepare for future work and/or upgrades at the facility. Must be completed before power load analysis and arc-flash study	Cost estimates provided separate for each facility. Consider combining projects RO-04, LP-08 and WRF-13
RO-05	Commission a Power Load Analysis and Arc-Flash Study	FY 1-4	$ 75,000	Project is necessary to prepare for future work and comply with recent adoption of Arc-Flash safety regulations	Cost estimates provided separate for each facility. Consider combining projects RO-05, LP-09 and WRF-14
RO-06	Upgrade Standby Generator and Power Distribution	FY 5-10	$ 965,000	Current dual backup power gensets and switchgear are 30 years old and at or near the end of its useful life.	RO-05 must be performed to gain higher confidence in estimate
RO-07	Upgrade older power distribution and motor control centers	FY 1-4	$ 280,000	Several switchgear and motor control centers are beyond their useful life, obsolete and do not meet current code. Parts and components are not available from manufacturer. Approximately 50% of the equipment will not meet Arc-Flash requirements	Phasing in the removal of old equipment and replacing with new poses significant construction risk for an operating plant. May need to delay until RO-13 is performed. Could be combined with LP-10 and LP-11 if Lime Plant is rehabilitated.
RO-10	Replace degasifier 1	FY 5-10	$ 265,000	Existing degasifier shows severe signs of deterioration and delaminating of fiberglass structure. Equipment is a single point of failure.	Install degasifier 2 before starting work. Consider combining work with project RO-09
RO-11	Install new degasifier 2	FY 1-4	$ 205,000	Degasifier 1 is a single point of failure and is operating at or near capacity. Project provides redundancy and ability to perform required maintenance	Project requires completion before replacing degasifier #1
RO-13	RO Plant - Capacity Upgrade (new RO skids)	FY 11-20	$ 1,630,000	Install like kind RO skids (4) in new section of membrane building. Major pipe fittings and concrete platforms already in place.	Project timing may be influenced by the outcome of the Lime Softening Plant Facility Plan LP-17

ID	Project	Phase	Total Project Estimate	Project Description	Dependencies and Constraints
RO-14	RO Plant - Pump modifications	FY 11-20	$ 93,000	Standardize membrane feed pumping motors, pumps and controls. 6 motors, new motor starters, power leads, no VFD	Consider combining with project RO-13. Project RO-05 must be completed before starting.
RO-15	New chemical feed process if lime plant decommissioned	FY 11-20	$ -	Determine new chemical requirements and perform design and construction of new system	Project may need to be accelerated depending on outcome of the Lime Softening Plant facility plan LP-17.
RO-16	Replace Cl2 gas system due to risk / liability decision	FY 11-20	$ 125,000	Replace with sodium hypochlorite if required by regulatory statute or internal risk management decision	
RO-17	Upsize plant raw water piping - eliminate bottleneck for Well F 2	FY 11-20	$ 84,000	Replace FRP pipe. Some sections have experienced failure. Upsize pipe diameter to meet future plant capacity.	Complete before RO-13
RO-18	SCADA and PLC upgrades	FY 1-4	$ 120,000	Assumes like-kind replacement hardware and software	Minor system improvements and modifications
			$3,877,000		

5.3.2 Lime Softening Plant

The Lime Softening (LS) Plant was first constructed in 1958 and has been upgraded in phases to the present. Some of the supporting equipment and structures including the power distribution and portions of plant piping are 50 years old or older (beyond the end of their respective service life) and showing severe signs of deterioration and service failure. This is evident in the condition and performance of the plant's power distribution and electrical systems. Projects LP-08, LP-09 and LP-11 are proposed to address these issues. In addition, the current condition of the Raw Water Storage Diffuser is in an imminent failed state. The Diffuser is a single point of failure and losing its functionality will have a direct impact on water quality and present severe operational challenges. Projects LP-01 and LP-02 are proposed to prevent this failure.

A Lime Softening Facility Plan (LP-17) needs to be commissioned to consider the economic, water quality and regulatory factors to determine the future disposition of the Plant and the impacts to any planned upgrades to the Reverse Osmosis Plant. It is noted that the recommendations from the Lime Softening Facility Plan (LP-17) will determine the viability and cost estimates for project LP-18 and LP-19 – the decommissioning of or upgrades to the Lime Softening Plant.

Table 5-7 includes those projects recommended for the Lime Softening Plant. The total estimated cost is $ 2,131,200.

Table 5-7. Lime Softening Plant Recommended Improvements

ID	Project	Phase	Total Project Estimate	Project Description	Dependencies and Constraints
LP-01	Replace raw storage diffuser tray and support structure	FY 1-4	$ 95,000	Structure is in an imminent failure state. Unit is a single point of failure. Project requires replacement of whole assembly	Materials estimate includes design and fabrication of new diffuser tray. Diffuser tray is custom to facility and not available for purchase.
LP-02	Repair and replace internal coating raw water storage tank	FY 1-4	$ 35,000	There are no records available to determine the last time the coating has been replaced. Best estimate is the coating is at a minimum 25 years old and beyond the typical 20 years useful life estimate	Recommend combining with LP-01.
LP-03	Plant 3 - ten year rehabilitation	FY 1-4	$ 270,000	Scheduled renewal of plant equipment	Budgeted for 2017
LP-04	Plant 2 - ten year rehabilitation	FY 1-4	$ 295,000	Scheduled renewal of plant equipment	Budgeted for 2020
LP-05	Plant 1 - ten year rehabilitation	FY 5-10	$ 325,000	Scheduled renewal of plant equipment	Dependent of project LP-17
LP-06	Plant 2 - Filter rehabilitation	FY 1-4	$ 62,000	Filter shows signs of underdrain failure. Some indications of filter media disturbance	Budgeted for 2017 - Include cost for replacing underdrain system
LP-07	Replace Shelter / Bldg. - Lime Process	FY 11-20	$ 59,000	Replace sheet metal building including structural support	Dependent on project LP-17.
LP-08	Develop a facility one-line electrical diagram	FY 1-4	$ 25,000	Must be completed before power load analysis and arc-flash study	Cost estimates provided separate for each facility. Consider combining projects RO-04, LP-08 and WRF-13
LP-09	Commission a Power Load Analysis and Arc-Flash Study	FY 1-4	$ 60,000	Project is necessary to prepare for future work and comply with recent adoption of Arc-Flash safety regulations	Cost estimates provided separate for each facility. Consider combining projects RO-05, LP-09 and WRF-14

ID	Project	Phase	Total Project Estimate	Project Description	Dependencies and Constraints
LP-10	Upgrade HSP standby generator and switchgear	FY 5-10	$ 58,000	Propane generator and electrical switchgear are beyond useful life. Replacement may or may not be necessary. Final cost estimate is dependent on LP-09 LS Power Load Analysis	Project dependent on LP-17 LSP Facility Plan and LP-09 Power Load Analysis
LP-11	Upgrade older power distribution and motor control centers	FY 1-4	$ 177,000	Several switchgear and motor control centers are beyond their useful life, obsolete and do not meet current code. Parts and components are not available from manufacturer. Major failures have occurred recently	Could be combined with RO-06 if Lime Plant is rehabilitated.
LP-12	Replace HSP buried piping under older HSP Bldg. to tanks	FY 5-10	$ 142,000	Piping is from original in-service date circa 1950's. Not considered a high consequence if failed.	Project dependent on outcome of LP-17 LSP Facility Plan
LP-13	Older High Service Pump Replacements (3)	FY 5-10	$ 172,000	Replace with variable frequency driven pumps. Additional surge protection equipment required for operation under generator power. Replace with three 50 HP motors / 800 gpm split case horizontal pump	Project dependent on LP-17 LSP Facility Plan and LP-09 Power Load Analysis
LP-14	Retrofit two (2) Newer High Service Pump motors with VFD' s	FY 1-4	$ 90,000	Allows for operation of the New HSP and avoids capacity limitation	Consider coordinating work with project LP-13
LP-16	Instrument and analyzer upgrades - ten year renewal	FY 11-20	$ 35,000	Budget placeholder for renewal of instrumentation over 10 year period.	Project dependent on outcome of LP-17 LSP Facility Plan
LP-17	Commission a LSP Facility plan to determine upgrades or decommissioning	FY 1-4	$ 150,000	Evaluate water production requirements of the LP and RO plants to determine if LP to be upgraded or decommissioned. Include necessary modifications to RO plant if LP decommissioned	Priority project due to this being an early decision point
LP-18	Decommission Lime Softening Plant	FY 11-20	$ -	Project placeholder only	Project dependent on outcome of LP-17 LSP Facility Plan
LP-19	Upgrade Lime Softening Plant	FY 11-20	$ -	Project placeholder only	Project dependent on outcome of LP-17 LSP Facility Plan

ID	Project	Phase	Total Project Estimate	Project Description	Dependencies and Constraints
LP-20	SCADA and PLC upgrades	FY 1-4	$ 82,000	New installation. Monitoring equipment status, display analyzer readings and alarming only	Project dependent on outcome of LP-17 LSP Facility Plan
			$ 2,132,000		

5.3.3 Water Distribution System

One of the most significant operation and service challenges of the water distribution system is maintaining sufficient chlorine residual at the far ends of the north and south service areas. Project DS-12 and DS-13 are proposed to address these issues. Maintaining water quality and chlorine residual at segments of the system that are dead-ended also pose the same challenges. Opportunity projects DS-09 and DS-10 have been proposed to address these issues. In addition, a large portion of the District's service area could be compromised if a redundant distribution pipe is not installed at across Forked Creek as described in project DS-07.

Table 5-7 includes those projects recommended for the Water Distribution System. The total estimated cost is $ 7,315,000

Table 5-8. Water Distribution System Recommended Improvements

ID	Project	Phase	Total Project Estimate	Project Description	Dependencies and Constraints
DS-02	Line extension program	FY 1-20	$ 345,000	Budget placeholder over 20-year planning horizon	Opportunity projects
DS-04	AC Pipe replacement on Beach - Charlotte County	FY 5-10	$ 2,440,000		Opportunity projects
DS-05	AC Pipe replacement on Beach - Sarasota County	FY 5-10	$ 2,330,000		Opportunity projects
DS-06	System modifications to eliminate bottleneck at Roundabout	FY 1-4	$ 315,000	Capacity bottleneck. Field observation and hydraulic modeling confirms	Coordinate with DS-04
DS-07	System modifications to provide redundancy at Forked Creek	FY 1-4	$ 230,000	Project relieves a single point of failure	Must be completed before DS-06
DS-08	Service line extension to Manasota development (2000 homes)	FY 5-10	$ 80,000	Potentially contractor funded	Budget placeholder
DS-09	Looping projects - south service area	FY 1-20	$ 200,000	Relieves dead-end distribution and potential water quality issues	Budget placeholder. Opportunity projects
DS-10	Looping projects - north service area	FY 1-20	$ 300,000	Relieves dead-end distribution and potential water quality issues	Budget placeholder. Opportunity projects

ID	Project	Phase	Total Project Estimate	Project Description	Dependencies and Constraints
DS-12	Water Storage Study - needs analysis & conceptual design	FY 5-10	$ 75,000	Determine need and options for installation of tank(s) at treatment plants or north and south service areas	
DS-13	Design and build water storage tank(s)	FY 11-20	$ 1,000,000	Budget placeholder for storage system improvements	Dependent on outcome of DS-12 Water Tank Study
			$ 7,315,000		

5.3.4 Wellfields and Wells

The District operates and maintains their water supply wellfields and infrastructure in accordance with their approved Wellfield Management Plan. The most recent 2016 Annual Wellfield Report (ASRUs, Inc.) indicated that there were no events during 2016 that affected the approved Wellfield Management Plan. As discussed earlier, Project LP-17, the Lime Softening Plant Facility Plan should incorporate the viability and cost analysis of upgrading the existing plant or decommissioning / retrofitting to treat fresh groundwater and the implications to the hydroperiods in the service area.

Table 5-9 includes those projects recommended for the Wellfields and Wells at this time. The total estimated cost is $135,000.

Table 5-9. Wellfields and Wells Recommended Improvements

ID	Project	Phase	Total Project Estimate	Project Description	Dependencies and Constraints
WL-01	Install telemetry communications to RO supply water wells	FY 1-4	$ 45,000	Equipment monitoring status only	
WL-02	Install telemetry communications to LP supply water wells	FY 5-10	$ 45,000	Equipment monitoring status only	Project dependent on outcome of LP-17 LSP Facility Plan
WL-04	Rehab, replacement, or abandonment of WF1 supply wells	FY 5-10	$ 45,000	Current Inspection indicated WF1 supply wells 6, 7, 8, 9, 10, 16, 17 18, 19, 21, 23, 25, 28, 29, 30 need rehab, replacement or abandonment.	Project dependent on outcome of LP-17 LSP Facility Plan
			$135,000		

5.3.5 Wastewater Reclamation Facility

The Wastewater Reclamation Facility (WRF) was placed into service in 1994. Most assets are within their useful life and the projects listed are to maintain or replace infrastructure over the 20-year planning horizon. One significant issue is the final disposal of the reclaimed water from the WRF to the re-use system. Since the WRF is dependent on the condition and performance of this system, the re-use projects are included in this section. The main issue is that the re-use system operates at abnormally high pressure resulting in shortened useful life for many of the system components.

Another significant issue at the WRF is a hydraulic bottleneck and capacity limitation at the existing chlorine contact basin. During high rain events, the peak flows through the plant are restricted at the inlet to the basin and the detention time decreases to compliance lower warning limits.

Table 5-10 includes those projects recommended for the Wastewater Reclamation Facility and Re-use System. The total estimated cost is $4,878,000.

Table 5-10. Wastewater Reclamation Facility Recommended Improvements

ID	Project	Phase	Total Project Estimate	Project Description	Dependencies and Constraints
WL-08	Plug and Abandon IMW-1 and SMW-1	FY 5-10	$ 30,000	Plan to plug and abandon monitoring wells following next permitting effort.	
WRF-01	Replacement of buried liquid process piping	FY 1-20	$ 205,000	Plant has experienced buried pipe failures over the last 5 years. Budget is for unplanned pipe failures. Cost estimate based on 1,000 linear feet of 24 inch diameter pipe.	See WRF-11 for related project
WRF-02	Odor control system rehabilitation at headworks	FY 11-20	$ 260,000	Budget placeholder due to short original useful life	
WRF-04	Plant 4 Rehabilitation - 15 year rehabilitation	FY 5-10	$ 350,000	Replace launders, diffusers, gear drives and recoat steel tanks	Estimates based on past rehabilitation costs
WRF-05	Plant 1 and 2 Rehabilitation - 15 year rehabilitation	FY 11-20	$ 600,000	Replace launders, diffusers, gear drives and recoat steel tanks	Estimates based on past rehabilitation costs
WRF-06	Blower upgrades phase 1	FY 1-4	$ 385,000	Replace with high speed energy efficient blower skid with enclosure	Replace with only 3 blowers at $80,000 each
WRF-07	Blower upgrades phase 2	FY 5-10	$ 120,000	Replace with high speed energy efficient blower skid with enclosure	Replace one blower
WRF-11	Chlorine contact basin expansion	FY 5-10	$ 220,000	Construction of "like-kind" contact basin of same size and capacity. Project includes replacement of inlet pipeline bottleneck	

ID	Project	Phase	Total Project Estimate	Project Description	Dependencies and Constraints
WRF-12	Replace Cl2 gas system due to risk / liability decision	FY 11-20	$ 125,000	Replace with sodium hypochlorite if required by regulatory statute or internal risk management decision	Coordinate with water plants due to risk and bulk purchase requirements
WRF-13	Trace and label power and control wire terminations. Update electrical one-line diagram	FY 1-4	$ 35,000	Project to trace and label power and control wire terminations and update electrical one-line diagram	Must be completed before standby power and power distribution improvement project
WRF-15	Standby Power / Power Distribution Improvements	FY 5-10	$ 90,000	Budget placeholder to rehabilitate standby generators and automatic transfer switches as they near end of useful life estimates. Also for determining required connections to effluent pumping to provide redundancy	Project may be delayed into the FY 11-20 time period depending on maintenance history and future condition assessments
WRF-16	Re-use Pond Pumping Rehabilitation	FY 1-4	$ 128,000	Existing pumps and electrical equipment is in an imminent failure state. Work will provide for replacements to meet code and service requirements. Replace two pumps, piping, and power	$50,000 already budgeted for 2017
WRF-17	Install two smaller horsepower variable frequency dive pumps	FY 5-10	$ 195,000	Pumps and piping modifications to pump effluent to Reclaim Water Tank on site	
RU-01	Reuse hydraulic analysis and operational review for service improvements	FY 1-4	$ 85,000	System is operated at high pressures to maintain service to customers. High operating pressures pose operational challenges and increase wear and tear on equipment. Project to determine booster station operation with potential storage tank and forcemain improvements	Consider combining with LS-02 Holiday Ventures Capacity Upgrade Study.
RU-02	Install new re-use storage tank at Holiday Ventures	FY 5-10	$ 950,000	Cost estimate based on 2008 WRF 1 million gallon reuse tank total project cost	Dependent on outcome of RU-01.
RU-03	Rehabilitate re-use booster station at Holiday Ventures	FY 1-4	$ 100,000	Stations has not been operated for extended period and requires rebuild of pumps motors, piping and valves	Dependent on outcome of RU-01.

ID	Project	Phase	Total Project Estimate	Project Description	Dependencies and Constraints
RU-04	Install new re-use forcemain from WRF to new HV storage tank	FY 5-10	$ 1,000,000		Dependent on outcome of RU-01. Consider performing concurrently with CL-02 Install New Forcemain from HV to WRF
			$4,878,000		

5.3.6 Lift Stations and Vacuum Stations

A significant portion of renewal projects for the lift stations and vacuum stations are funded through the O&M Renewal Fund described in Section 5.0 of this chapter.

Failure at the Holiday Ventures Lift Station LS-121 would compromise sewage conveyance to most of the north service area. Due to the criticality or high consequence of failure, several projects are proposed to provide redundancy and increase the reliability of this station. A more detailed evaluation is proposed in project LS-02 Holiday Ventures Capacity Upgrade Study and Facility Plan to determine if reconditioning of the station is sufficient or a full upgrade is required to diminish the potential of failure. LS-03 Design and Build Upgraded LS-121 cost estimate could range from $300,000 for reconditioning to $2,000,000 for a new Master Station.

In the short term, project LS-05 proposes the purchase of a permanent skid mounted bypass pump to provide additional reliability for failure causes other than power loss. This bypass pump can be used for the Beach Road Lift Station in the future if LS-121 is upgraded.

Table 5-11 includes those projects recommended for the Lift Station and Vacuum Stations. The total estimated cost is $815,000 without a cost for LS-03 LS-121 Holiday Ventures Design and Build Upgrade**.**

Table 5-11. Lift and Vacuum Station Recommended Improvements

ID	Project	Phase	Total Project Estimate	Project Description	Dependencies and Constraints
VS-08	Standby generator rehabilitation	FY 11-20	$ 200,000	Budget placeholder for required rehabilitation by contractor over 20 year planning horizon	

ID	Project	Phase	Total Project Estimate	Project Description	Dependencies and Constraints
LS-02	LS121 Holiday Ventures Capacity Upgrade Study and Facility Plan	FY 1-4	$ 100,000	Determine necessary capacity upgrades: upgrade existing, add new station, duplicate existing station with forcemain? Note: this facility is considered highly critical with a high consequence of failure that compromises service to most of the North service area	Consider capacity upgrade for on-site standby power generator (LS-04)
LS-03	Design and build upgraded LS121 - Holiday Ventures	FY 5-10	$ TBD	Cost Estimate could range from approximately $300,000 for addition of VFD's and piping modifications to rehabilitate the pump station up to $2,000,000 for a new Master Lift Station.	Based on determination of LS121 Capacity Upgrade Study
LS-04	Standby generator replacement (up size for Re-use booster station)	FY 5-10	$ 200,000	Upgrade capacity of generator to provide service for upgraded station. Sizing to be determined in LS121 Upgrade Study LS-02	Size of replacement generator may be dependent on LS-02 and RO-03 Booster Station Rehabilitation.
LS-05	Purchase bypass pump and install on-site bypass pumping	FY 1-4	$ 65,000	Due to criticality of this lift station any structural or piping/valve failure cannot be mitigated. Purchasing an engine driven bypass pump is recommended for rapid return of service.	Will purchase for Holiday Ventures but may use for Beach Rd after upgrade to Holiday Ventures
LS-08	Instrumentation upgrades - install flow meters or pressure indication	FY 5-10	$ 125,000	Project is for SSO indication and conveyance system analysis. Flow meters for master stations. Pressure meters for single stations	Budget placeholder
LS-13	Potential elimination of LS-113 Englewood Rd	FY 11-20	$ 125,000	Lift station wet well is on private property in a pool patio area	Potential opportunity project
			$815,000		

5.3.7 Collections System

Sewage collection piping systems are typically the most capital intensive asset type wastewater utilities own. The District's most critical forcemain is the segment between LS-121 Holiday Ventures and the Water Reclamation Facility. Upon failure, all conveyance of sewage from the north service area will be severely compromised. Project CL-02 is proposed to provide a redundant forcemain to mitigate this risk.

The District owns 16 miles of vitrified clay pipe that could require replacement and/or relining over the 20-year planning horizon. Project CL-03 is proposed to address this issue as related projects and other opportunities arise.

The recent failure of the Beach Rd forcemain is addressed with a near-term project CL-01 to prevent future failures and avoid regulator oversight.

Table 5-12 includes those projects recommended for the Lift Station and Vacuum Stations. The total estimated cost is $14,517,000.

Table 5-12. Collection System Recommended Improvements

ID	Project	Phase	Total Project Estimate	Project Description	Dependencies and Constraints
CL-01	Replace Beach Road force main	FY 1-4	$ 645,000	Major forcemain with significant peak and daily flows. FM has history of failure at fittings. Pipe is under tidal influence	Per contractor raw estimate provided to EWD
CL-02	Install new force main from Holiday Ventures to point TBD	FY 5-10	$ 8,500,000	Likely paired with RU-04 reuse line from WRF to Holiday Ventures	Assumes approximately 6 miles of 16" PVC Forcemain installed from HV MLS to WRF as a dedicated line.
CL-03	Clay pipe re-line / replacement	FY 1-20	$ 5,000,000	On-going replacements	Opportunity projects over course of 20 year planning horizon.
CL-04	Manhole rehabilitations - Reline brick manholes with GML	FY 1-4	$ 120,000	Project to extend useful life and avoid constructed replacement. Estimates based on 15 manholes	
CL-05	North Beach sewer service study and evaluation	FY 5-10	$ 65,000	Commission study to determine strategy and appropriate infrastructure to extend sewer service to the North Beach area	
CL-06	Install forcemain isolation valve near Elm St.	FY 1-4	$ 67,000	Provides redundant route upon failure of collection system south of Elm St	
CL-07	Sewer extensions to alternate areas	FY 11-20	$ TBD	Service to alternate areas will require evaluation of each area for most cost effective method of sewer collection.	
CL-08	Purchase new CCTV camera and trailer	FY 5-10	$ 120,000	Purchase new replacement CCTV equipment to meet CMOM performance measurement of inspecting 5% of gravity sewers per year.	Current equipment is nearing end of useful life. Purchase may need to be executed in FY 1-4
			$ 14,517,000		

5.4 Summary of Costs and Project Timing

To summarize, recommended capital projects based upon the results of our condition assessment resulted in the following overall costs as summarized in Table 5-13.

Table 5-13. Summary of Costs and Project Timing

Facilities	Near-Term (1-4 years)	Mid-Term (5-10 years)	Long-Term (11-20 years)	Years 1-20	Total
Utility Wide	$72,000				$72,000
RO Plant	$715,000	$1,230,000	$1,932,000		$3,877,000
Lime Softening Plant	$1,341,000	$697,000	$94,000		$2,132,000
Water Distribution	$545,000	$4,925,000	$1,000,000	$845,000	$7,315,000
Wells	$45,000	$90,000			$135,000
Water Reclamation Facility & Reuse	$733,000	$2,955,000	$985,000	$205,000	$4,878,000
Lift & Vacuum Stations	$165,000	$325,000	$325,000		$815,000
Collection System	$832,000	$8,685,000		$5,000,000	$14,517,000
Total	**$4,448,000**	**$18,907,000**	**$4,336,000**	**$6,050,000**	**$33,741,000**

5.5 Operation and Maintenance Replacement and Renewal Funded Projects

The following tables summarize the projects not considered to be a capital funded, but necessary to maintain asset service life. These include projects considered annual operation and maintenance or replacement and renewal improvements in the near, mid and long-term planning horizons. Table 5-14 summarizes and breaks out the total costs between water and wastewater services.

Table 5-14. Recommended O&M Renewal Improvement Costs

	Near-Term Year 1-4	Mid-Term Year 5-10	Long-Term Year 11-20	Year 1-20	Total
Water Services	$ 387,000	$ 258,000	$ 82,000	$ 4,190,000	$ 4,917,000
Wastewater Services	$ 304,000	$ 287,000	$ 175,000	$ 1,125,000	$ 1,891,000
Total	$ 691,000	$ 545,000	$ 257,000	$ 5,315,000	$ 6,808,000

5.5.1 Water Services

Near-Term (Year 1 to 4) Improvements

Table 5-15 includes those O&M funded projects recommended to take place in the near term (Year 1 to 4) timeframe. The total estimated cost is $387,000.

Table 5-15. Year 1-4 Recommended Water O&M Funded Improvements

ID	Project	Total Project Estimate	Project Description	Dependencies and Constraints
RO-01	Rehabilitate RO cartridge rack frame structures	$ 200,000	Support structures show moderate to severe signs of corrosion. Failure will result in loss of service of supported train. Replace mounts, supports, framework and concrete bases as needed	Project timing may be adjusted based on Lime Plant facility plan outcome recommends decommisioning that accelerates RO-13
RO-03	Rehabilitate piping, supports, and valves in utility trench	$ 127,000	Replace pipe and pipe supports as needed with appropriate material (galvanized or stainless)	Consider combining with RO-01 project
RO-08	Re-land and power all PLC and control circuits through UPS	$ 45,000	Upon transfer of electrical power source or power quality issues the PLC and associated instrumentation fault. Powering through a UPS will decrease PLC fault events	Could be combined with RO-18 SCADA upgrade
WL-06	Repairs at WF 3	$ 10,000	Standpipe at well 51. Pump at well 52. Wires pulled at well 54. Meter at well 60.	Project dependent on outcome of LP-17 LSP Facility Plan
WL-07	Submersible pump replacements at WF 5	$ 5,000	6 of 8 wells are equipped with 5 HP pumps. Reducing HP. and pumping rates to reduce potential upconing of poorer quality water as pumps fail	
		$ 387,000		

Mid-Term (Year 5 to 10) Improvements

Table 5-16 includes those O&M funded projects recommended to take place in the mid-term (Year 5 to 10) timeframe. The total estimated cost is $258,000.

Table 5-16. Year 5-10 Recommended Water O&M Funded Improvements

ID	Project	Total Project Estimate	Project Description	Dependencies and Constraints
RO-02	Repair compromised block wall by chemical systems	$ 62,000	Evaluate structural defects if any and repair wall	
RO-09	Repairs to clearwell 1	$ 25,000	Make repairs per LEC inspection report and re-coat internal	Consider combining with RO-10 project
LP-15	Replace above ground filter piping and valves	$ 59,000	Significant portions of piping installed in 1950's and early 1960's nearing the end of its useful life. Replace approximately 300 feet of DI pipe. 8" and 12" diameter. Approx. fifteen 12" gate valves	Project dependent on outcome of LP-17 LSP Facility Plan
WL-05	Submersible pump replacements at WF 1	$ 12,000	Meter replacement at supply wells 13 and 14. Pump replacement at supply wells 26 and 27.	
DS-11	Water tank external painting	$ 100,000	Required to maintain service life	Budget placeholder - ten year cycle
		$ 258,000		

Long Term (Year 11 to 20) Improvements

Table 5-17 includes those O&M funded projects recommended to take place in the long term (Year 11 to 20) timeframe. The total estimated cost is $82,000.

Table 5-17. Year 11-20 Recommended Water O&M Funded Improvements

ID	Project	Total Project Estimate	Project Description	Dependencies and Constraints
RO-12	Instrument and analyzer upgrades - ten year renewal	$ 82,000	Budget placeholder for renewal of instrumentation over 10 year period.	Consider providing funds from CIP when performing project RO-13 to maintain standardization of equipment
		$ 82,000		

20 Year Horizon (Year 1-20) Capital Improvements

Table 5-18 includes those projects recommended to take place throughout the 20-year time-frame with the time of the project dependent on opportunity. The total estimated cost is $4,190,000.

Table 5-18. Year 1-20 Recommended Water O&M Funded Improvements

ID	Project	Total Project Estimate	Project Description	Dependencies and Constraints
RO-19	RO Membrane replacement	$ 350,000	Schedule replacement of RO membranes on 5 to 7 year cycle for 20 year planning horizon	
WL-03	Acidization of RO WF2 production wells. 1 per year ongoing	$ 240,000	Cost is per year with 1 well acidized per year on a rotating basis.	
DS-01	AC Pipe replacement program	$ 1,600,000	Replace as needed over 20 year planning horizon	Opportunity projects
DS-03	Distribution system repairs	$ 2,000,000	Budget placeholder over 20-year planning horizon	Opportunity projects
		$ 4,190,000		

5.5.2 Wastewater Services

Near Term (Year 1 to 4) Improvements

Table 5-19 includes those O&M funded projects recommended to take place in the near term (Year 1 to 4) timeframe. The total estimated cost is $304,000.

Table 5-19. Year 1-4 Recommended Wastewater O&M Funded Improvements

ID	Project	Total Project Estimate	Project Description	Dependencies and Constraints
WRF-08	SCADA upgrade - monitoring, control, alarming at ops building	$ 39,000	Provide communications from plant PLC's to PC based HMI located in the operations room. This will provide better response to alarms and abnormal conditions	
WRF-09	Disk Filter 1 - 10 year rehabilitation	$ 12,000	Budget placeholder to maintain equipment	
VS-01	Inspect and recoat vacuum tanks	$ 70,000	Steel vacuum tanks corrode and develop pin hole leaks. Repair and recoat 4 vacuum tanks	
VS-04	Sewage pump replacements - Phase 1	$ 30,000	Planned replacement with improved non-cavitation pumps	4 pumps @ 4500 ea.
VS-06	Vacuum pump replacements - Phase 1	$ 38,000	Budget placeholder	4 pumps @ 6500 ea.

ID	Project	Total Project Estimate	Project Description	Dependencies and Constraints
LS-01	Standby generator rehabilitation (fuel tank repair)	$ 40,000	Fuel tank shows signs of severe corrosion. Cannot determine condition of inner tank. $10,000 budgeted for inspection by contracted technical expert.	Determine if one of a kind Caterpillar generator meets required capacity for the next ten years. See LS-04 and RU-01 before proceeding with major repairs.
LS-06	Various wet well re-linings - Phase 1	$ 50,000	Prioritized repair cracks and deterioration. Replace existing tar coatings.	Budget placeholder
LS-10	Submersible pump replacements - Phase 1	$ 25,000	Budget placeholder	Replace 10 pumps assorted sizes 20 HP and under
		$304,000		

Mid Term (Year 5 to 10) Improvements

Table 5-20 includes those O&M funded projects recommended to take place in the mid-term (Year 5 to 10) timeframe. The total estimated cost is $287,000.

Table 5-20. Year 5-10 Recommended Wastewater O&M Funded Improvements

ID	Project	Total Project Estimate	Project Description	Dependencies and Constraints
WRF-10	Disk Filter 2 - 10 year rehabilitation	$ 22,000	Budget placeholder to maintain equipment	
VS-05	Sewage pump replacements - Phase 2	$ 45,000	Planned replacement with improved non-cavitation pumps	6 pumps
VS-07	Vacuum pump replacements - Phase 2	$ 95,000	Budget placeholder	10 pumps
LS-07	Various wet well re-linings - Phase 2	$ 75,000	Prioritized repair of cracks and deterioration. Replace existing tar coatings.	Budget placeholder
LS-11	Submersible pump replacements - Phase 2	$ 50,000	Replace 20 pumps assorted sizes 20 HP and under Budget placeholder	Budget placeholder
		$287,000		

Long Term (Year 11 to 20) Improvements

Table 5-21 includes those O&M funded projects recommended to take place in the long term (Year 11 to 20) timeframe. The total estimated cost is $175,000.

Table 5-21. Year 11-20 Recommended Wastewater O&M Funded Improvements

ID	Project	Total Project Estimate	Project Description	Dependencies and Constraints
WRF-03	Screenings platform repair and repaint	$ 50,000	Project to evaluate structural integrity of headworks screenings platform and perform necessary repairs to extend usable life	
LS-12	Submersible pump replacements - Phase 3	$ 125,000	Replace 50 pumps assorted sizes 20 HP and under	Budget placeholder
		$ 175,000		

20 Year Horizon (Year 1-20) Capital Improvements

Table 5-22 includes those projects recommended to take place throughout the 20-year time-frame with the time of the project dependent on opportunity. The total estimated cost is $1,125,000.

Table 5-22. Year 1-20 Recommended Wastewater O&M Funded Improvements

ID	Project	Total Project Estimate	Project Description	Dependencies and Constraints
VS-02	Building renovations - Repair doors, roof, soffits, external paint	$ 157,000	Various building components in poor to failing condition.	Budget placeholder to contract necessary repairs and replacement of doors, roofs, windows.
VS-03	Biofilter rehabilitation	$ 68,000		Budget placeholder for renewal due to biofilter ten year maximum expected life.
LS-09	Electrical cabinet renewal	$ 900,000	Upgrade of lift station electrical panels to include new telemetry and backup power quick connects	Budget placeholder
		$ 1,125,000		

6 Capacity, Management, Operations and Maintenance (CMOM) Framework

6.1 Introduction

The District is in the process of developing and adopting a CMOM program to maintain compliance with all rules and regulations as set forth in Florida Administrative Code Chapter 62-604 and ensure that the District's service level objectives and capacity demands are met. It should be noted that a CMOM program is dynamic and staff will continue to update portions of this program.

What is CMOM?

CMOM is a comprehensive program that establishes goals and objectives for the "proper operation and maintenance" of the wastewater system as required under the Clean Water Act, with a particular focus on the collection system.

In order to facilitate the development and on-going administration of the CMOM Program, an abbreviated outline is provided in this section of the Utility Master Plan.

The full document is provided for reference in Appendix D and the working document will be under the control of the Wastewater Operations Manager.

6.1.1 CMOM Objective

The District will implement and continuously improve a cost-effective CMOM Program based upon best practices for wastewater conveyance and wastewater treatment, maximizing the capacity of the existing and planned facilities to convey and treat wastewater.

6.1.2 Service Area Description and Characteristics

A system description is provided in the full document of the CMOM program and can be referenced in Appendix D.

6.2 Program Goals

The overall program goals of the District's CMOM Program will include:

- Properly manage, operate and maintain, at all times, the parts of the collection system that the permittee owns or over which it has operational control.
- Provide adequate capacity to convey base flows and peak flows.
- Take all feasible steps prevent, and mitigate the impact of, sanitary sewer overflows.
- Provide notification to parties with a reasonable potential for exposure to pollutants associated with an overflow event.

6.2.1 Overall Program Goals

To achieve the overall program goal, the District will pursue the following objectives:

- Continue to comply with regulatory requirements.
- Continue to maintain a safe work environment and facilities and also sustain a competent workforce.

6.2.2 Conveyance Goals

The goal for the conveyance service area, as developed by the District, in accordance with its mission, is to implement and continuously improve a CMOM Program with the intent of eliminating all SSOs except those caused by circumstances as defined by Title 40 of the Code of Federal Regulations (CFR) §122.41(m)(4).

- Where possible, establish additional practices to prevent SSOs, maintain or improve system performance, and avoid preventable failures.
- Continue to establish and document level of protection, design, and performance standards for new conveyance assets constructed in the District service area, and consider documented and predicted changes in climate.
- Minimize the cost of conveyance asset ownership while maintaining necessary stewardship of assets and achieving defined protection levels.

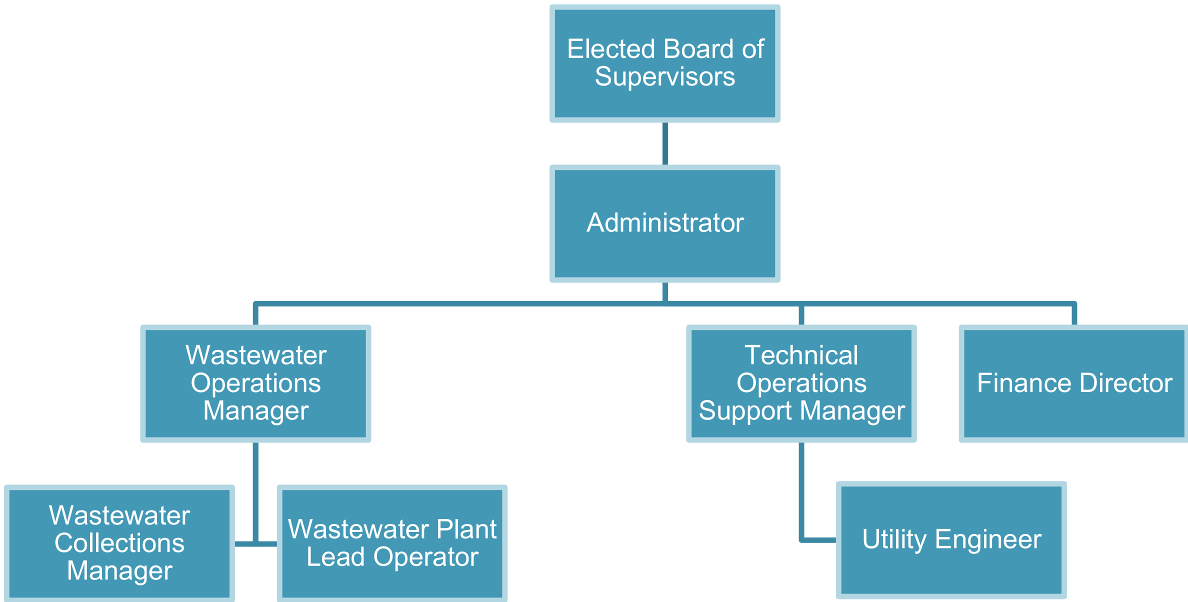
6.2.3 Treatment Goals

- Continue to provide effluent quality that meets or exceeds FDEP re-use requirements and effluent quality goals.

6.3 CMOM Management Programs

6.3.1 Organization

The following chart illustrates the organizational responsibilities and supporting roles to develop, execute and administer the District's CMOM Program. Specific duties and tasks are further defined in individual plans and procedures.



- The District's Administrator is responsible for overall operations and management of District programs and reports to the Elected Board of Supervisors.
- The Wastewater Operations Manager is responsible for the development, execution and administration of the CMOM Program and reports to the District Administrator.
- The Wastewater Operations Manager is supported by the Wastewater Collections Manager and the Wastewater Plant Lead Operator who are responsible for carrying out work directives to comply with CMOM policies and procedures in their respective work crews.
- The Technical Operations Support Manager with the assistance of the Utility Engineer supports the Wastewater Operations Manager in developing demand projections and executing upgrades to maintain system capacity.

6.3.2 Legal Authority

The Englewood Water District is a political subdivision of the State of Florida, codified by Chapter 2004-439 Laws of Florida House Bill No. 1381 providing "for election of a board of supervisors to govern said district; providing powers, authority, and duties of the board; granting to said governing board the authority in the territory defined to construct, acquire, extend, enlarge, reconstruct, improve, maintain, equip, repair, and operate a water system, wastewater system, or wastewater reuse system"

The District has adopted Customer Rules and Regulations (Resolution NO: 15-12-03 B December 3, 2015) in which section 23 describes the conditions customers must meet to connect and make use of the wastewater system.

6.3.3 Training

All job-specific training is primarily carried out in an On-the-Job scenario. Safety training is conducted by the Wastewater Collections Manager and Wastewater Lead Treatment Operator under the supervision of the Wastewater Operations Manager.

Upon development of specific CMOM plans and procedures, the Wastewater Operations Manager will provide formalized training with classroom materials and on-site demonstrations on an annual or biennial basis. Training will be scheduled to ensure all staff can attend and attendance records will be maintained and updated upon successful completion.

Training will be based on District specific plans and standard operating procedures (SOP) such as:

- Sanitary Sewer Overflow Response Plan - yearly
- Overflow Tracking and Reporting - yearly
- Lift Station Power Failure Response - yearly
- Vacuum Station Bypass Pumping - yearly
- Routine Lift Station Inspection SOP – every 2 years
- Routine Vacuum Station Inspection SOP – every 2 years
- Portable Generator Connection SOP - yearly
- Gravity Line Cleaning SOP – every 2 years
- Gravity Line Inspection SOP – every 2 years

Performance Measures

Performance measures will be established and monitored to help meet the following goals:

- Continue to maintain a safe work environment and facilities and also sustain a competent workforce.
- Where possible, establish additional practices to prevent SSOs, maintain or improve system performance, and avoid preventable failures.

Performance Measures to help meet the following goals include:

- Obtain 90% documented attendance on all one-year cycle training.
- Obtain 90% documented attendance on all two-year cycle training.
- New staff will complete all training listed in the CMOM training program within 6-months of hire.

6.3.4 Safety

Current staff practice and follow industry safety practices such as: confined space entry, traffic control, control of hazardous energy lockout/tagout (LOTO), blood borne pathogen protection, chemical handling, and trench safety.

Upon development of specific CMOM plans and procedures the Wastewater Operations Manager will review and revise the work crew safety training practices as needed and will develop a safety training program that schedules and records attendance

Performance Measures

Performance measures will be established and monitored to help meet the following goals:

- Continue to maintain a safe work environment and facilities and also sustain a competent workforce.

Performance Measures to help meet the following goals include:

- Obtain 90% documented attendance on all schedule safety training.
- New staff will complete all training listed in the CMOM training program within 6-months of hire.

6.3.5 Information Management Systems

The Utility Engineer is responsible for overseeing development and maintenance of a Geographical Informational Software (GIS) system to maintain an inventory of the conveyance system that includes location and physical attributes of the assets. In addition, the District currently documents all facility level assets in Excel™ spreadsheets. The current CIP contains a project (project ID# EWD-01) to upgrade the asset inventory Excel spreadsheets and migrate this information into a CMMS/EAM system in the near term.

Strategy

Develop an Information Management System with the capability to accurately document all assets including location, physical attributes, installation dates, repair history and condition data (estimated remaining useful life). This will provide the District improved capabilities to perform System Evaluation and Capacity Assurance Evaluations and develop Renewal and Rehabilitation Plans

Performance Measures

To be determined and updated by the District's Utility Engineer as part of an on-going CMOM program.

6.3.6 Engineering

Design Standards

The District currently has design standards and publishes these for the general public on the District's website. Information contained on the site includes details for gravity pipelines, vacuum pipelines, forcemains, lifts and vacuum stations including most components, valve boxes, electrical control panels and other design standards. The Utility Engineer is responsible for reviewing and revising all design standards and is in process of updating.

As-built Record Plans

The District has most as-built records dating back to the mid-1950's and requires submittal of completed as-built records in their construction project specifications. The District is currently migrating older paper copy as-built records plans into electronic or digital format.

Capacity Assurance Program

The District currently has conducted system capacity and performance evaluations on a case-by-case basis between the previous capacity analysis reports and Wastewater Master Plans. It is the intent of the District to improve their Information Management System and flow monitoring capabilities at the lift stations to support internal evaluations of capacity and performance management.

New Construction and Rehabilitation Inspection Program

The Utility Engineer reviews and approves (or requires re-submittal) of all construction and upgrade projects. Currently on-site construction progress inspections and final project inspections are being completed by the collections and distribution system managers. It is the District's intent to transfer these responsibilities to the Construction Coordinator position in the future.

Strategy for Engineering

The District is in process of updating many of their programs including design standards, as-built records and capacity assurance programs. The goal should be to

- Continue to establish and document level of protection, design, and performance standards for new conveyance assets constructed in the District service area, and consider documented and predicted changes in climate.
- Minimize the cost of conveyance asset ownership while maintaining necessary stewardship of assets and achieving defined protection levels.

Performance Measures

To be determined and updated by the District's Utility Engineer as part of an on-going CMOM program.

6.3.7 Overflow Prevention and Mitigation Programs

These programs are specifically developed to address the general program goals of the District's CMOM Program will include:

- Properly manage, operate and maintain, at all times, the parts of the collection system that the permittee owns or over which it has operational control.
- Provide adequate capacity to convey base flows and peak flows.
- Take all feasible steps prevent, and mitigate the impact of, sanitary sewer overflows.
- Provide notification to parties with a reasonable potential for exposure to pollutants associated with the overflow event.

Lift Station Power Failure Response Plan

The District has installed on-site back-up power generators at all "master" lift stations to diminish the potential of SSO at the site. Back-up power generators are maintained under contract with a local service provider and are maintained per the manufacturer's requirements. Additional maintenance information is contained in the District's wastewater response plan.

The District has reviewed all "satellite" lift stations and has estimated the average and peak flow collection storage time. Identification of all Lift Stations with portable generator power quick connections has been completed. Portable generator transit and connection times have been estimated and any satellite station that has the potential where the transit and connection time equals or exceeds the storage time then that station is a candidate for a site specific Lift Station Overflow Response Plan. The District is also in process of installing portable generator quick connection and has budgeted for the completion of this work in project ID LS-09 Electrical Cabinet Renewal.

In addition, the District has evaluated the Consequence of Failure (CoF) at most of their lift stations and has determined that LS-121 Holiday Ventures is highly critical and requires increased protection from failures other than loss of power. This Utility Master Plan recommends the purchase of one on-site bypass pump sufficient to meet peak flows and is described in project ID LS-05 Purchase Bypass Pump and Install On-site Bypass Pumping.

Vacuum Station Bypass Pumping Plan

The District has the capability to use one its vactor trucks to maintain system operation in the event of a station vacuum tank system failure.

The District includes in their design standards the connection required to perform bypass pumping of the station in the event of sewage pump failures.

An SOP template has been developed for these procedures and can be found in the full document contained in Appendix D.

Sanitary Sewer Overflow Response Plan

The District has adopted the Florida Rural Water Association's "Sanitary Sewer Overflow Response Pan" as of March 2016. This response plan includes action items, procedures and responsibilities specific to the District. The template is in the custody of the Wastewater Operations Manager who has the responsibility to follow the procedures contained within.

A copy of the Sanitary Sewer Overflow Response Plan can be found in the full document contained in Appendix D.

Overflow Tracking and Reporting

Sanitary sewer overflows are tracked formally by the customer service work request system when reported by residents and by the Utility Engineer when discovered by District personnel.

Methods to estimate spill volumes are dependent where the spill occurred within the system; when available flow meters are used to provide a more accurate estimation of the volume. If flow metering is not available then a combination of spill duration, amount recovered, and historical flow rates at the site and other observations are used. The method of estimating an SSO event is described in the Sanitary Sewer Overflow Report Form Appendix B of the Sanitary Sewer Overflow Response Plan.

Reporting of SSO's to the public and regulatory agencies follows the procedures found in the Florida Rural Water Association's "Sanitary Sewer Overflow Response Plan"

In the case of an overflow at the reclamation facility or non-compliance event, the Wastewater Operations Manager completes and submits the WWTP Malfunction / Abnormal Event Report to the appropriate FDEP Abnormal Events email.

Performance Measure for Overflow Prevention and Mitigation Programs

Performance measures will be established and monitored to help meet the following goals:

- Continue to comply with regulatory requirements.
- Where possible, establish additional practices to prevent SSOs, maintain or improve system performance, and avoid preventable failures.
- Minimize the cost of conveyance asset ownership while maintaining necessary stewardship of assets and achieving defined protection levels.
- Continue to provide effluent quality that meets or exceeds FDEP re-use requirements and effluent quality goals.

Performance Measures to help meet the following goals include:

- Limit SSO's over 1,000 gallons to one per year.
- Eliminate all SSO's due to Lift Station or Vacuum Station failure.

- Meet all SSO reporting requirements notifying the public and regulatory agencies as described in the Sanitary Sewer Overflow Response Plan.

6.4 Operations and Maintenance Programs

The District operates 82 lift stations. Larger (master) lift stations receive discharges from smaller (satellite) lift stations.

- There are nine vacuum collection system service areas, with nine vacuum stations located on six different parcels within the District's service area. Each vacuum station is designed with standardized equipment manufactured by Air-Vac. The District also maintains over 3,800 vacuum pits as part of the vacuum collection system.

The Operations and Maintenance Programs are specifically developed to address the general program goals of the District's CMOM Program and will include:

- Properly manage, operate and maintain, at all times, the parts of the collection system that the permittee owns or over which it has operational control.
- Provide adequate capacity to convey base flows and peak flows.

6.4.1 Lift Station Operations

Routine Operations – Master Lift Stations are physically inspected on a once-a-day frequency, with satellite lift stations being inspected on a once-a-week frequency. A field operations staff member performing routine inspections follows a Routine Inspection Checklist Form and once completed, records the information and date/time in the stations log. A copy of the Routine Inspection Checklist Form can be found in the full document contained in Appendix D.

Abnormal Operations - Lift station pump and power failure alarms are monitored by the DFS system and alarm at the Human Machine Interface terminal at the District's headquarters during normal business hours. An alarm dial-out system relays alarms to the on-call collection system operator during non-business hours.

Response procedures for Lift Station failures are outline in the Lift Station Failure Response SOP found in the full document contained in Appendix D.

Performance Measures

- Perform routine inspections at all master lift stations once per week 100% of the time.
- Perform routine inspections at all satellite lift stations once per week 90% of the time.
- Respond to all alarms during non-business hours within 60 minutes 100% of the time.

6.4.2 Vacuum Station Operation

Routine Operations – Vacuum Stations are physically inspected once per day seven days per week. A field operations staff member performing routine inspections follows a Routine Inspection Checklist Form and once completed, records the information and date/time in the stations log. A copy of the Routine Inspection Checklist Form can be found in the full document contained in Appendix D.

Abnormal Operations – Vacuum Station alarms are monitored by the DFS system and alarm at the Human Machine Interface terminal at the District's headquarters during normal business hours. An alarm dial-out system relays alarms to the on-call collection system operator during non-business hours.

Response procedures for Vacuum Station failures are outline in the Vacuum Station Failure Response SOP found in the full document contained in Appendix D.

Performance Measures

- Perform routine inspections at all vacuum stations once per week 100% of the time.
- Perform at least 80 vacuum pit inspections per week to obtain a once per year inspection frequency.
- Respond to all alarms during non-business hours within 60 minutes 100% of the time.

6.4.3 Forcemain Operations

The District currently monitors the right of way of their force mains and has an active "Call Before You Dig" program. All forcemains above waterways are visually inspected once per week. Force main pressures are monitored at most of the master lift stations. This Utility Master Plan recommends installing more flow meters at master lift stations and pressure indication devices at satellite stations (project ID # LS-8) to better identify abnormal events and assist with better conveyance system performance analysis.

Performance Measures

To be determined and updated by the District's Wastewater Operations Manager as part of an on-going CMOM program.

6.4.4 Gravity Line Cleaning and Inspections

The gravity collection system is comprised of approximately 54 miles of pipelines including 16 miles of vitrified clay pipe and approximately 900 manholes. This Utility Master Plan identifies several projects to continue relining or replacement of vitrified clay pipe (project ID CL-03) and reline manholes (project ID CL-04).

The District is in process of developing a program of scheduled gravity line cleaning and inspections. Equipment to accomplish this work is on-site and is already being used for responding to blockages and minor backups. A crew of three collection system operators under the direction of the Wastewater Collections Manager will target cleaning and inspection of 2.7 miles per year to obtain a complete cleaning and inspection of the system on a 20 year cycle.

Performance Measures

Performance measures will be established and monitored to help meet the following goals.

- Where possible, establish additional practices to prevent SSOs, maintain or improve system performance, and avoid preventable failures.
- Performance Measures to help meet the following goals include;
    - Complete 5% or 14,256 feet of gravity line cleaning and inspection per year.

6.4.5 Vacuum System Inspections

The District can measure system vacuum at each vacuum station. An indication of low vacuum typically means a vacuum pit valve is stuck in the open position. If the cause is determined not to be a stuck open vacuum valve, then the collection crew begins to visually inspect the vacuum system pipe line.

Routine inspections and scheduled cleaning will be determined and documented in this section of the full document at a later date.

7 Summary and Recommendations

7.1 Summary

District Utility Services

The District has provided potable water services since 1961 and sanitary sewer service since 1994 to residents within the unincorporated areas of Sarasota and Charlotte Counties generally known as Englewood, Grove City and Manasota Key.

The District has provided consistent high-quality and economical water and wastewater services to it's customers through times of high growth and fluctuating seasonal demands. Water supply production and wastewater treatment flows have seen a general increase since the end of the great recession in 2009 to levels that are near the 2005 annual averages.

Population projections for the District's service area over the 20 year planning horizon indicate that a near-term (1-5 years) growth rate of approximately 1.5% annually will be experienced as a result of recent increases in proposed developments within the unincorporated areas of southwestern Sarasota and northwestern Charlotte Counties. As build out of these areas occur, mid-term (6-10 years) and long-term (11-20 years) growth rates of 1.0% and 0.8% are anticipated. These projections equate to an estimated population growth of 8,857 additional people by 2036.

The District's current potable water sources and treatment facilities have adequate capacity to provide the projected water demands through the 20 year planning horizon. Additional improvements to the water supply and treatment facilities will be required to maintain the systems at their rated capacities. Water transmission and distribution pipeline improvements will be necessary to maintain water quality, pressures and increase the reliability of the system.

The District's projected wastewater annual average daily flows will exceed the WRF's current rated capacity by 2032, or in 16 years. In addition, improvements to the WRF's infrastructure will be required to maintain the facility at its existing rated capacity. Wastewater collection infrastructure improvements will be necessary to maintain the integrity and reliability of the system.

The District's existing reclaimed water pumping and storage facilities have adequate permitted capacities to accept effluent flows through the 20 year planning horizon. Reclaimed water transmission, distribution and pump station improvements will be necessary to maintain adequate pressures and flows in the system as well as increase reliability.

7.2 Recommendations

The planning period for this Utility Master Plan is 20 years. The following recommendations have been developed to allow the District to meet its potable water, wastewater and reclaimed water service needs through 2036. The major elements of the Utility Master Plan's Capital Improvement Program recommendations are broken out by system and planning period (near-term, mid-term and long-term) in which they are recommended. In addition, overall utility-wide system recommendations are provided.

7.2.1 Water System Recommendations

Recommended improvements to the District's water system are summarized as follows and have been divided into three categories:

- Water Treatment Plants - Reverse Osmosis and Lime Softening;
- Water Transmission and Distribution System; and
- Wells and Wellfields.

Water Treatment Plants

Near-term (1-4 Years)

- Commission a Lime Softening Plant Facility – Long Term Feasibility Study;
- Complete electrical recommendations at RO and Lime Softening Plants;
- Complete rehabilitation projects at Lime Softening Plant; and
- Complete Infrastructure and SCADA/PLC Upgrades at the RO and Lime Softening Plants.

Mid-term (5-10 Years)

- Complete upgrades to standby generator and power distribution system at RO Plant;
- Complete infrastructure improvements at RO Plant;
- Complete rehabilitation projects at Lime Softening Plant;
- Complete Improvements to high service pump station.

Long-term (11-20 Years)

- Complete upgrade to capacity at RO Plant;
- Complete pump modifications at RO Plant;
- Replace Chlorine gas system at RO Plant;
- Complete Infrastructure improvements at RO Plant;
- Complete instrumentation and analyzer upgrades at Lime Softening Plant;
- Replace lime slaker building at Lime Softening Plant.

Water Transmission and Distribution

Near-term (1-4 Years)

- Complete System modifications to eliminate bottleneck onto Manasota Key;
- Complete system improvements to provide redundancy at Forked Creek.

Mid-term (5-10 Years)

- Complete a water storage/system interconnection needs analysis;
- Complete asbestos cement pipeline replacement on Manasota Key Beach – Sarasota and Charlotte County;
- Complete transmission line improvements in north service area.

Long-term (11-20 Years)

- Complete design and construction of water storage tank.

Wells and Wellfields

Near-term (1-4 Years)

- Install telemetry communications to RO supply wells.

Mid-term (5-10 Years)

- Install telemetry communications to Lime Softening Plant wells;
- Complete rehabilitation; replacement or abandonment of WF1 Supply wells;
- Complete abandonment of 1MW-1 and SMW-1.

Long-term (11-20 Years)

- Complete upgrade to capacity at RO Plant;
- Complete pump modifications at RO Plant;
- Replace Chlorine gas system at RO Plant.

Additional recommendations for the water system include on-going projects scheduled to be implemented throughout the 20-year planning horizon with the commencement of the projects dependent on available funding and opportunity. These projects include distribution system looping and line extensions to improve water quality and pressures in the system.

In addition, regulatory requirements will necessitate the submittal of a 10-Year Facility Work Plan to be submitted to the SWFWMD by May17, 2017 and an application to renew the existing WUP by December 18, 2019.

7.2.2 Wastewater System Recommendations

Recommended improvements to the District's wastewater system are summarized as follows and have been divided into three categories:

- Wastewater Reclamation Treatment Plant;
- Reclaimed Water Transmission and Distribution;
- Wastewater Collection System – Sewer Lift and Vacuum Stations.

Wastewater Reclamation Treatment Plant

Near-term (1-4 Years)

- Complete Phase 1 Blower upgrades;
- Complete electrical recommendations at WRF;
- Complete rehabilitation of re-use pond pumping.

Mid-term (5-10 Years)

- Complete Plant 4 rehabilitation;
- Complete Phase 2 Blower upgrades;
- Complete the expansion of the chlorine contact basin;
- Complete Electrical and mechanical improvements at WRF.

Long-term (11-20 Years)

- Complete rehabilitation to odor control system at headworks;
- Complete Plant 1 & 2 Rehabilitation;
- Replace Chlorine gas system at WRF.

Reclaimed Water Transmission and Distribution

Near-term (1-4 Years)

- Complete hydraulic analysis and rehabilitation improvements to Holiday Ventures Booster Station.

Mid-term (5-10 Years)

- Complete planning, design and construction of new re-use storage and forcemain to Holiday Ventures Booster Station.

Long-term (11-20 Years)

- Complete design and construction of water storage tank.

Wastewater Collection System – Sewer Lift and Vacuum Stations

Near-term (1-4 Years)

- Complete LS121 Holiday Ventures Capacity Upgrade and Facility Plan;
- Purchase and install bypass pumping system;
- Complete forcemain infrastructure improvements;
- Complete manhole rehabilitation program.

Mid-term (5-10 Years)

- Complete planning, design and construction of LS121 – Holiday Ventures based on recommendation of Capacity Upgrade Study;
- Complete replacement of standby generator;
- Complete instrumentation upgrades at lift stations;
- Planning, design and construction of new forcemain from Holiday Ventures to WRF;
- Complete a sanitary sewer service evaluation for north Manasota Beach;
- Complete the purchase of a new CCTV camera and trailer.

Long-term (11-20 Years)

- Decommission LS-113;
- Complete collection system extensions to unserved areas.

Additional recommendations for the wastewater system include on-going projects recommended to take place throughout the 20-year planning horizon with the commencement of the projects dependent on available funding and opportunity. These projects include the re-lining or replacement of existing clay sewer pipes and replacement of the buried liquid process piping at the WRF.

It is also recommended that the District submit an updated Capacity Analysis Report in accordance with FDEP as well as a permit renewal application for the Domestic

7.2.3 Overall Utility System Recommendations

The following recommendations generally relate to the District's overall utility system planning, operation and maintenance practices and are based on discussions with District staff and general industry professional experience.

- With respect to the existing bulk sewer service agreements with Charlotte County and Utilities Inc. of Sandalhaven, it is recommended that the District work with each utility to amend the existing agreements to include a more detailed capacity commitment and sanitary sewer service schedule.

- It is recommended that the District implement and continuously update and improve a cost-effective CMOM Program based upon best practices for wastewater conveyance and treatment and as outlined in Appendix D.
- As the District moves forward in the planning process, collaboration and coordination with local government partners including consideration of potential future potable water supplies, interconnections, and other utility infrastructure is recommended.
- It is recommended that the District evaluate the benefits of purchasing an electronic asset management system (EAMS) or computerized maintenance and management software (CMMS) program.
- The District must submit a 10-Year Water Facility Work Plan to the Southwest Florida Water Management District by May 17, 2017.
- The District must submit an updated Wastewater Capacity Analysis Report to the FDEP.
- A renewal application for the existing WUP must be submitted to the Southwest Florida Water Management District by December 19, 2018.

8 References

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G

Appendix G

Comprehensive Planning Documents

Appendix G

Comprehensive Planning Documents

Sarasota County Comprehensive Plan

Public Utilities Element

ELEMENT 6
PUBLIC UTILITIES

CHAPTER 12 – WATERSHED MANAGEMENT
DATA AND ANALYSIS

CHAPTER 13 – SOLID WASTE AND RECYCLING
DATA AND ANALYSIS

ACCEPTED 10/25/2016

TABLE OF CONTENTS

LIST OF FIGURES AND MAPS

CHAPTER 12
WATERSHED MANAGEMENT

DATA AND ANALYSIS

SURFACE WATER AND FLOOD PROTECTION

DATA AND ANALYSIS

Stormwater and Surface Water policies focus on efforts to provide control of water quantity, enhance water quality, and effectively manage flooding.

SURFACE WATER AND FLOOD PROTECTION

Level of service standards are an important tool for evaluating the performance of storm and surface water management systems and for prioritizing capital improvement needs. Stormwater level of service standards are the primary method for ensuring that new development will provide adequate stormwater facility capacity to meet demands and to prevent adverse impacts to public health and safety, natural resources and private property. Regulatory programs are tied to level of service requirements to ensure maintenance of the level of service through mitigation of development impacts.

The level of service standards has two major components: quality of discharge and quantity of discharge. Both of these components must be considered to develop a well-rounded storm and surface water management program.

QUALITY OF DISCHARGE:

The county's level of service for quality of discharge is consistent with the recommendations developed by the Sarasota Bay and Charlotte Harbor National Estuary Programs and the requirements of State Water Policy. The State of Florida Department of Environmental Protection (FDEP) adopted revisions to the State Water Policy in December 1995, following a planning effort coordinated between the FDEP and the five water management districts.

Level of service criteria for stormwater quality should at a minimum maintain water quality consistent with the final pollutant load reduction goals established by the local, state and federal water quality programs. Pollutant load reduction goals are implemented according to a schedule provided in the Southwest Florida Water Management District's Water Management Plan. The following requirements should be included in the level of service:

1. The county shall implement a stormwater quality management plan consistent with the National Pollutant Discharge Elimination System (NPDES) requirements and are documented in the county's NPDES permit.
2. New and existing industrial activities, as defined in the National Pollutant Discharge Elimination System (NPDES) Regulations for stormwater require the development and implementation of a Stormwater Pollution Prevention Plan.

3. No discharge from any stormwater facility should cause or contribute to a violation of water quality standards in waters of the State as provided for in County Ordinances, Federal Laws and State Statutes. To meet this requirement:
    a) All stormwater systems for new development and re-development should include features to minimize pollution from oil, suspended solids, and other objectionable materials. Such features should be designed to treat the runoff resulting from the first one inch of rainfall. Stormwater systems should include additional measures designed to reduce floating and suspended solids to a minimum. Higher design criteria for water treatment should apply if such criteria are necessary to meet and maintain level of service or to protect water bodies (such as potable surface waters or Florida Outstanding Waters) that require higher levels of protection. The higher design criteria should be based on a treatment system that treats 1.5 times the volume required for the selected treatment system or equivalent.
    b) New development and redevelopment should provide mitigation measures and use best management practices to control pollutants specific to pollutant characteristics of the proposed land use consisting of the practices shown to be effective in controlling the specific pollutants characteristic of the type of new development.
    c) All development should meet and be consistent with requirements in the Basin Master Plans.
    d) Mitigation measures and best management practices relating to drainage should be taken during construction activities to ensure that water quality is not degraded during the land clearing and construction of development. No cutting, clearing, grading or filling should be accomplished on any site under development unless appropriate devices have been installed to minimize pollution from objectionable materials, to control erosion, and to remove sediment from surface water runoff. Appropriate techniques should also be utilized to stabilize and re-vegetate disturbed areas as soon as possible.

4. Best management practices should be encouraged for intensive agricultural land use practices that negatively impact water quality.
5. The County's Basin Master Plans should include evaluation of pollutant loading.

QUANTITY OF DISCHARGE:

Establishment of level of service standards for quantity of discharge must account for various magnitudes of storm events and acceptable levels of flooding. In the past, several concepts have been advanced which could serve as the basis for level of service standards. The 1987 County Stormwater Master Plan discussed levels of street, structure, and open space flooding that might be acceptable during a 25-year storm event.

By 2013, Basin Master Plans for most of the county's watersheds had been completed or were under contract. The Stormwater Quantity or Flood Protection Level of Service and Design Criteria used throughout the Basin Master Plan program is provided below:

TABLE 12-1: STORMWATER QUANTITY LEVEL OF SERVICE AND DESIGN CRITERIA

Flooding Reference (buildings, roads and sites)	**Level of Service (flood intervals in years)**
I. Buildings:	
A. Emergency shelters and essential services	>100
B. Habitable	100
C. Employment/Service centers	100
II. Road Access: roads shall be passable during flooding. Roadway flooding <6" depth at the outside edge of pavement is considered passable.	
A. Evacuation	>100
B. Arterials	100
C. Collectors	25
D. Neighborhood	10
III. Sites: flooding refers to standing water in agricultural land, developed open or green space (yards and parking lots etc.) and undeveloped lands designated for future development. This does not include areas incorporated into the stormwater or Basin Master Plan as flow ways, floodplain, or flood storage areas.	
A. Urban (>1 unit/acre)	5
B. Rural	2

It has already been shown in some of the completed Basin Master Plans, that it may not be feasible to meet all of the desired level of service criteria. In those cases, a reduced level of service might be adopted for the given drainage basin or specific area.

Based upon the aforementioned federal, state, and county policies, and studies, Sarasota County adopted the 100-year, 24-hour design storm criteria in July 1994. This design standard is outlined in Appendix C-14, "Stormwater Quantity Level-of-Service and Design Criteria," of the current Land Development Regulations, Sarasota County Ordinance No. 2000-074 as amended.

Another approach to controlling new development impacts is to consider volumes of discharge instead of peak rate. The impact assessment report notes that consideration of runoff volume in lieu of runoff rates may be an alternative method for addressing the stormwater impacts of new development. Regional stormwater facilities, however, maybe the preferred means of addressing new development impacts.

The assessment report further recommended that the county actively pursue providing regional stormwater management facilities that would take the place of individual onsite attenuation facilities. These regional facilities would provide better flood control and management. They could be established by the county and funded by new development. The county has identified regional stormwater facilities in its master planning effort. The Celery Fields project, while intended primarily to correct existing deficiencies, is being expanded to provide for new development attenuation. The Barton Farms Regional Stormwater Facility has been identified as a regional facility to accommodate further development. Regional facilities were recommended for Gottfried Creek and South Creek in 1996. Detailed design and development participation in these regional facilities is needed.

STORMWATER AND SURFACE WATER

INTRODUCTION

Historical drainage activities consisted primarily of attempts to open wetlands to human occupation and activity. These activities usually consisted of removal or control of surface waters. Early Sarasota settlers established drainage districts and constructed drainage canal networks to reclaim the land for the production of agricultural goods or for the construction of homes. Over the years, drainage of the land affected the hydrology of the area resulting in changes in the peak flow characteristics of runoff, changes in runoff volume, changes in water quality, and changes in the appearance of water bodies and adjacent lands. The hydrologic changes resulting from drainage of the land ultimately created the need for modern storm and surface water management practices.

Modernization of stormwater and surface water practices began in the 1960s within Sarasota County. Numerous studies were conducted; eventually stormwater management regulations were adopted at county, state and federal levels. In November 1989, Sarasota County created the Stormwater Environmental Utility (SEU). Today, the SEU is responsible for the funding, planning, development, and maintenance of the county's storm and surface water management facilities, as well as the permitting of stormwater facilities within private developments.

This section covers the following subjects which are related to: storm and surface water management, flood protection, water quality, legislation, planning studies, stormwater maintenance, erosion, sediment control, level of service standards and stormwater regulation.

LEGISLATION

The United States Congress created the National Flood Insurance Program (NFIP) in 1968. The intent was twofold: to reduce future flood damage through community floodplain management ordinances and to provide protection for property owners with insurance. This would result in a reduction in risk and federal expenditures related to flood damage.
In 1972, the United States passed the Federal Clean Water Act, to achieve fishable and swimmable waters. Sections 303, 319 and 320 of the Clean Water Act address this goal. Section 303 provides for dividing and sharing pollutant loads among sources, where loadings must be reduced to achieve established water quality standards. This is administered by the

United States Environmental Protection Agency (EPA) as the Total Maximum Daily Load (TMDL) program in coordination with the Florida Department of Environmental Protection (FDEP). Comprehensive Conservation and Management Plans have been completed for the Sarasota Bay and Charlotte Harbor estuaries under the NEP.

U.S. Public Law 92-500, the "Federal Water Pollution Control Act" was amended in 1987 to cover stormwater runoff into the Waters of the United States. In 1990 the Federal Environmental Protection Agency issued regulations for implementation of the amendment. The county was required to obtain a National Pollution Discharge Elimination System (NPDES) permit to discharge stormwater into Waters of the United States. The stormwater element of the federal NPDES program is mandated by Section 402(p) and implemented through federal regulations including 40 Code of Federal Regulations (CFR) 122.26.

Chapter 403, Florida Statutes, "Florida Air and Water Pollution Control Act," provides the Department of Environmental Protection with the authority to establish water quality guidelines and recognizes stormwater runoff as an important resource.
Chapter 62-25, Florida Administrative Code (FAC), "Regulation of Stormwater Discharge," implements this statute by providing minimum criteria for discharge into surface waters and groundwater of the State.

Chapter 62-25, Florida Administrative Code, emphasizes that "no discharge from a stormwater discharge facility shall cause or contribute to a violation of water quality standards in waters of the state" and continues by stating that erosion and sediment control "best management practices" shall be used as necessary during construction to retain sediment onsite.
Chapter 62-40, Florida Administrative Code, "Water Resource Implementation Rule," provides general guidelines related to water use, water reuse, water transfer, water quality, surface water management, flood protection, and water body minimum flows and levels. Specific goals related to stormwater management are outline in Section 62-40.431 (FAC), titled "Stormwater Management Program."

Chapter 62-624, Florida Administrative Code, "Municipal Separate Storm Sewer Systems" (MS4), provides general requirements and procedures for the issuance, denial, revision, suspension, and revocation of MS4 permits.

Chapter 62-302, Florida Administrative Code, "Surface Water Quality Standards," provides the classification of surface water according to their designated use, and provides criteria used in the protection of surface water and groundwater.

Chapter 62-303, Florida Administrative Code, "Identification of Impaired Surface Waters," establishes a methodology to identify impaired surface waters not meeting standards for which Total Maximum Daily Loads will be calculated, in accordance with the U.S. Clean Water Act (Section 303(d), 33 U.S.C., ss. 1251, et seq.) and the Florida Watershed Restoration Act (Section 403.067, Florida Statutes).

Chapter 62-305, Florida Administrative Code, "Total Maximum Daily Load (TMDL) Water Quality Restoration Grants," establishes TMDLs adopted by Florida, which are different from the United States Environmental Protection Agency (EPA) adopted TMDL's for Florida. State and federal agencies are currently working to resolve those differences.

The five Water Management Districts, including the Southwest Florida Water Management District (SWFWMD) were initially created by the State of Florida to control flooding.
The Governing Board of the Southwest Florida Water Management District is authorized in Chapter 373 and other chapters of the Florida Statutes to direct a wide range of programs, initiatives, and actions.

Chapter 62-43, Florida Administrative Code, "Surface Water Improvement and Management Act" (SWIM), directs the water management districts to protect, restore and maintain Florida's highly threatened surface water bodies and focuses on water quality and habitat restoration projects to accomplish these initiatives. SWIM water bodies include Sarasota Bay, Charlotte Harbor, and their tributaries.

Chapter 40D-2, Florida Administrative Code includes stormwater system design criteria. Chapter 40D-4 and Chapter 40D-40 FAC, state that the SWFWMD governs surface water permitting and stormwater runoff and Chapter 40D-4 limits peak discharge rates for new development. Rules also stipulate that activities affecting floodplains and floodways will not cause adverse impacts, such as increase flooding.

Sarasota County Ordinance No. 81-12, as amended, “Land Development Regulations” (LDR), provides regulations that guide development as it pertains to the force of flowing water and drainage of runoff. These LDR regulations require that post-development conditions do not exceed those under pre-development conditions for the 100-year storm. Additionally, Ordinance No. 81-12, as amended, requires that new development provide for the treatment of the first one-inch of runoff.

Sarasota County established a Stormwater Environmental Utility (SEU) in 1989 (Ordinance No. 89-117, as amended). The SEU is responsible for the funding, planning, construction and maintenance of the county’s storm and surface water management facilities.

The Stormwater Environmental Utility Ordinance provides funding for the operation of the Utility by enacting a “user fee.” Each parcel of land is charged an annual fee based upon the characteristics of the parcel and its relative contribution to stormwater runoff. An associated “credit” program was enacted, which enables “credits” to be granted against the “user fee” for properties that maintain their drainage facilities in full functioning condition. The SEU is also responsible for the permitting of proposed changes in the watershed.

New developments are required to consider the impacts of a 100-year storm event, to protect existing structures by demonstrating no increase in off-site flood stages, and by constructing any new structures so that the first habitable floor elevation is at or just above the estimated 100-year flood elevation, as required by the Federal Emergency Management Agency (FEMA) and Sarasota County Ordinance No. 92-055 as amended.

The Water Pollution Control Code, Ordinance No. 96-020 as amended, provides regulations to prohibit discharges that cause pollution to surface water, groundwater, or a stormwater conveyance system.

Sarasota County adopted a floodplain management ordinance (Ordinance No. 2003-085, as amended). This ordinance adopts both the current Federal Emergency Management Agency (FEMA) Flood Insurance Study and the Sarasota County Flood Studies. The minimum (lowest) finished floor elevations for new construction or any substantial improvement are required to be either at or above the base elevation as determined by FEMA or one foot above the 100-year flood stage established by Sarasota County.

Sarasota County Ordinance No. 2009-060 provides building construction requirements to maintain eligibility for flood insurance coverage in flood- prone areas in the unincorporated area of the county. This Ordinance amends Ordinance No. 92-055 as it relates to definition, adoption of flood hazard map, lowest flood elevation, and the placement of machinery or equipment, and provides an effective date. This Ordinance provides policy guidelines for all new residential and non-residential structures' lowest flood elevation in reference to the base flood elevation for a 100-year flood event.

PLANNING STUDIES AND EFFORTS

The drainage plans and programs from the early 1920's through the 1960's emphasized the removal of surface waters from the land, primarily for mosquito control and agricultural uses. Water quality did not begin emerging as a major concern until the late 1960's, as can be seen in the following review of planning studies for the Phillippi Creek basin.

In 1963, the Survey Report on Phillippi Creek Basin, Florida[1] was completed by the Army Corps of Engineers and identified several alternative degrees of protection for the area. It stated that "Improvement of Phillippi Creek to about 60 percent of standard project flood capacity..." would eliminate all flooding in the area from floods up to the 1 in 30 year magnitude. These are floods that have a statistical chance of occurring once in 30 years.

In 1967, the Survey of Phillippi Creek Basin[2] was a step in attempting to improve the water quality of Phillippi Creek basin. Although no recommendations were made concerning stormwater runoff, the study did recommend that sewer service be developed in the urban and suburban portions of Phillippi Creek basin in order to improve water quality.

In 1972, U.S. Public Law 92-500, the "Federal Water Pollution Control Act," was enacted which focused upon non-point pollution. The program, managed by the Southwest Florida Regional Planning Council, studied the Phillippi basin and made recommendations for improving the surface water quality of the county.

A further examination of Phillippi Creek, as an extension of the U.S. Public Law 92-500 Section 208 program, was prepared in 1980 by the Mote Marine Laboratory with county staff assistance.[3] This study included a spatial analysis of the existing and proposed future land uses, physical characteristics, and projected population growth.

In 1984, the Board of County Commissioners recognized major inadequacies in the existing stormwater management system and authorized the preparation of a stormwater master plan. The purpose of the Stormwater Master Plan[4] was to assess the need for improvement of major drainage systems in the developed portions of the county.

The report, released in February 1987, provided an analysis of selected portions of Alligator and Phillippi Creeks. The analysis of these two basins included identification of problem areas, alternative solutions, and recommended actions. This information was extrapolated to the 14 remaining basins within the study area to provide cost estimates for stormwater improvements that could be expected in these watersheds.

The Basin Master Planning Program was initiated by the county in 1991, when the Board of County Commissioners authorized the preparation of detailed basin master plans for Phillippi Creek and Hudson Bayou. Basin Master Plans identify problematic flooding and improvements needed to the county drainage systems to meet the adopted level-of-service standards within the basin.

As of July 2015, the following studies have been completed as shown in Map 12-1:

1. Whitaker Bayou – dated December 2003
2. Hudson Bayou – dated September 1994
3. Hudson Bayou Business District – dated April 2002
4. Phillippi Creek – dated December 1994
5. Matheny Creek – dated September 1994
6. Elligraw Bayou – dated August 1994
7. Holliday Bayou – dated August 1997
8. Clower Creek – dated March 1994
9. Catfish Creek – dated July 2001
10. North Creek – dated April 1999
11. South Creek – dated June 2001
12. Island of Venice – dated June 2002
13. Cow Pen Slough – dated October 2001
14. Curry Creek – dated July 2001
15. Hatchett Creek – dated July 2001

16. Upper Cow Pen Slough- Future
17. Alligator Creek – dated March 1987
18. Woodmere Creek – dated January 1999
19. Forked Creek – dated March 1996
20. Gottfried Creek – dated March 1996
21. Ainger Creek – dated July 1999
22. Upper Myakka River/Howard Creek – dated March 2008
23. Upper Myakka River/Flatford Swamp – Future
24. Upper Myakka River East – Future
25. Lower Myakka River – dated February 2004
26. Lower Myakka River/Little Salt Creek – dated February 2004
27. Lower Myakka River/Deer Prairie Slough – dated February 2004
28. Big Slough – dated October 2014
29. Braden River/Cooper Creek – dated September 2013
30. Sarasota Bay Coastal (Phase 3) – dated January 2015
31. Roberts Bay (North) Coastal (Phase 1) – dated August 2013
32. Little Sarasota Bay Coastal (Phase 3) – dated January 2015
33. Dona/Roberts Bay Coastal (Phase 3) – dated January 2015
34. Lemon Bay Coastal (Phase 2) – dated September 2014

The drainage basins within Sarasota County are shown on Map 12-1. Areas of Special Flood Hazard are shown in Map 12-2. Map 12-2 presents an important product of the basin master plan effort: the horizontal limits of the riverine, 100-year floodplain. Although much of the riverine floodplain map has been completed, it and the detailed flood prediction models must be kept up to date to reflect changes occurring in the watershed such as land development and stormwater projects. The models must be updated regularly or they will become obsolete.

Implementation of a plan to manage the quality of stormwater within Sarasota County's Municipal Separate Storm Sewer System (MS4) is the principle focus of the conditions of a National Pollutant Discharge Elimination System (NPDES) permit. The county along with several co-permittees (Cities of Sarasota, Venice, and North Port, Town of Longboat Key, and Florida Department of Transportation District One) are covered under a FDEP MS4 Permit No. FLS000004.

INVENTORY

NATURAL SYSTEM

Protection and restoration of natural systems is the foundation of Sarasota County's watershed management program. Natural systems protection and restoration programs include:

- The Lands Management Program that oversees the protection of environmentally sensitive lands through acquisition. This program provides for restoration of these lands as well as long-term management.
- The Regional Permitting, Mitigation, and Restoration program acquires and restores lands to mitigate for the watershed impacts associated with county roadway and other infrastructure projects.
- The county is responsible for administering Land Development Regulations for private development proposals.

Sarasota County established a Comprehensive Plan amendment for the future. Known as the 2050 Plan, it contains several Resource Management Areas or RMAs. The Village and Greenway RMA is intended to preserve and protect large contiguous greenways primarily centered on streams, rivers and watercourses. These greenway areas would consist of creeks and wetlands that provide an ecological benefit.

The natural features of Southwest Florida include scrub flatwoods; pine and palmetto flatwoods; isolated wet prairies; large wetland slough systems; mesic hammocks; tidal creeks; and the Myakka River. The United States General Land Office Township Plats from the Mid to Late 1800's, shown in Map 12-3, entitled Historic Survey provides some insight into the extent of the natural system and watercourses within Sarasota County during that time period. These maps indicate that our coastal creeks and streams did not extend significantly inland from the estuaries and bays.

The Natural Resource Conservation Service (NRCS) formerly known as the Soil Conservation Service (SCS) published the first Soil Survey for Sarasota County in 1948. This Soil Survey was updated in 1991. It identifies, describes and maps historic soil classifications. The soils descriptions include habitat types associated with each soil classification. The broad watershed habitat categories typical of Sarasota County include pine flatwoods, freshwater wetlands, mesic hammock, and scrub flatwoods.

In 2012, the Board of County Commissioners received four watershed plans, Sarasota Bay, Roberts Bay North, Little Sarasota Bay, and Lemon Bay. The objective of these plans are to identify projects or programs that lead to improvements in water quality, natural aquatic regimes, or water body hydrologic systems.

WATER BUDGET APPROACH

Sarasota County's natural system restoration efforts are ultimately intended to restore a more natural freshwater flow regime from the watershed to their receiving estuaries and bays. The intended basis of measurement for success of these hydrologic restoration efforts, consistent with recent objectives defined by the Charlotte Harbor National Estuary Program (CHNEP) are as follows:

1. Quantify the existing water budget – existing monthly inflows and outflows to the estuary.
2. Estimate the "pre-development" or natural systems' water budget monthly inflows and outflows to the estuary.
3. Determine how to best enable the existing water budget to resemble the natural system's water budget.

CONSTRUCTED SYSTEM

Included within the stormwater conveyance system are natural and man-made networks. The Sarasota County Board of County Commissioners has operational responsibility for the county's system within the unincorporated area and, as the result of an interlocal agreement, the City of Sarasota's system.

A comparison of the conveyance network depicted on Map 12-4 with Sarasota County's current Existing Land Use Map indicates that the county's system serves a combination of residential, commercial, industrial, extractive, institutional, and agricultural land uses as well as public facilities, conservation/ preservation areas, and vacant lands. Information on the geographic service area, predominant types of land use and surface water quality within each basin is presented in Element 1, Environmental Systems. More detailed existing land use studies are being prepared in conjunction with the Basin Master Planning Program, and the preparation of the Sarasota County's Comprehensive Watershed Management Plan.

ANALYSIS
FLOOD PROTECTION AND FLOODPLAIN MANAGEMENT

Flooding can come from two sources: storm surge and riverine events (excess rainfall). Storm surge flooding is caused by high tides, particularly those tides influenced by hurricanes or other tropical weather events. Riverine flooding results from heavy rainfall. The Sarasota County Watershed Management Program endeavors to address riverine flooding, not storm surge. The current Federal Emergency Management Agency Flood Insurance Rate Maps (FIRM) are reasonably complete in terms of identifying the storm surge floodplain, but have significant gaps with respect to the riverine floodplains. Sarasota County is updating the watershed models to provide a higher level of accuracy for flood risk. The final product will be submitted to FEMA with the intent of incorporating the data into the FEMA FIRM product.

Sarasota County adopted a flood protection level of service (FPLOS) that includes no flooding in homes and businesses up to 100-year, 24-hour design storm. A tiered depth of acceptable flooding as a function of storm frequency and roadway category is adopted for streets. Discussions with the community indicate that the street FPLOS may need to be considered for an acceptable duration of flooding as well as water depth.

Since Fiscal Year 1993, the Capital Improvement Program (CIP) contained funding for projects located throughout the county. The program to address flood protection level of service (FPLOS) deficiencies with cost effective projects is complete. Additional CIP projects to address Level of Service deficiencies will need to be evaluated for cost effectiveness. Not all FPLOS deficiencies will have a cost effective solution and secondary benefits may be considered when determining the value of the CIP project. FPLOS deficiencies include flooded homes and businesses as well as flooded streets.

Sarasota County has flood-protection-related policies and programs in place to minimize flood risk to protect human safety and property in existing developed areas while protecting natural and beneficial functions within a watershed. In addition, the county LDR provides standards for new development as it pertains to the force of flowing water and drainage runoff.

WATER QUALITY

Rainfall runoff often carries large volumes of litter, automobile wastes, animal wastes, fertilizers, and pesticides. As a result, water quality problems are often found in receiving waters. Stormwater runoff from urban and commercial areas typically contains significant quantities of the same general types of pollutants that are found in wastewater and industrial discharges. These pollutants contain heavy metals (e.g., chromium, cadmium, copper, lead, mercury, nickel, zinc), pesticides, herbicides and synthetic organic compounds such as fuels, waste oils, solvents, lubricants and grease. Surface waters that receive runoff from agricultural areas often are subject to pollution associated with concentrations of fertilizers, pesticides, and animal wastes. These pollutants cause problems to both human health and the aquatic ecosystems of receiving water bodies.

A proper balance of salinity, the mixture of salt and freshwater, in the tidal creeks and estuaries is vital to the development of fish, crabs and other sea life. Restored wetlands hold water on the land, attract wildlife and create scenic views. Sedimentation has been identified by the Sarasota bay Estuary Program (SBEP) as a common problem throughout the Sarasota Bay region. These concerns were partially addressed in 1981, with the adoption of Ordinance No. 81-12, the Land Development Regulations (LDR). The Ordinance requires all new subdivisions to incorporate stormwater treatment and attenuation techniques that mitigate downstream water quantity and quality impacts. However, subdivisions platted prior to the adoption of Ordinance No. 81-12 were not bound to incorporate such mitigation techniques into their development.

In 1991, Sarasota County began the preparation of a Storm Water Quality Management Program to meet the requirements for a National Pollutant Discharge Elimination System (NPDES) Municipal Separate Stormwater Sewer System (MS4) permit (#FLS000004) for stormwater discharge into the waters of the United States. The basic objective of the permitting program requirements is to reduce the impact of urban development on water quality to the “maximum extent practical.” The program requirements are extensive, it’s major components include: 1) obtaining adequate legal authority to control the discharge of pollutants to the county’s storm sewer system; 2) identification and water quality inventory of all major municipal stormwater outfalls within the county, cities and FDOT; and, 3) development of a comprehensive stormwater quality management program to reduce the discharge of pollutants to the maximum extent practicable. In The objective of this permit is to outline a Stormwater Management Program that will improve the quality of surface water within Sarasota County through the implementation of the elements outlined in the plan. The program elements include:

1. Maintenance of Structural Controls
2. Development Planning
3. Roadway Maintenance
4. Municipal Facilities
5. Pesticides, Herbicides, and Fertilizers
6. Illicit Discharges and Improper Disposal
7. Industrial and High Risk Runoff
8. Construction Site Planning and Inspection and Enforcement

In 1995, the Sarasota Bay Estuary Program (SBEP) published and the Governor approved the Comprehensive Conservation and Management Plan (CCMP). The CCMP was developed with input from local government staffs, area-wide experts and citizen volunteers. In Sarasota County, the priority watersheds included Hudson Bayou, Whitaker Bayou and Phillippi Creek. The CCMP for the Charlotte Harbor National Estuary Program (CHNEP) was published and approved by the Governor in 2000.

As required by Chapters 187, 373, and 403, Florida Statutes and 62-40 FAC, the Florida Water Plan is an integrated, coordinated plan prepared jointly by the FDEP and the five water management districts, which was adopted by the FDEP in December 1995. The plan addresses water supply, flood protection and floodplain management, water quality, natural systems, and coordination and evaluation issues, and is intended to be a guidance tool for statewide water management.

DRAINAGE SYSTEM OPERATION AND MAINTENANCE

The continuing operation of the county's existing drainage system requires periodic maintenance to remove silt, debris, and vegetation, including aquatic vegetation. Such maintenance requires access to and along man-made canals, ponds, and lakes. In many cases, access is not available, principally because the drainage system was constructed prior to the establishment of regulations requiring the provision of adequate easements. Some drainage ditches and canals have easements for the structure, but not for maintenance access. It is estimated that there are over 800 miles of man-made drainage ditches within Sarasota County. Approximately half of these ditches are located on private property, presenting a further challenge relative to access for periodic maintenance. First, the entire primary drainage system is being mapped, independent of ownership. Second, the ownership of this primary drainage system will be determined and mapped. Next, the portion of the primary drainage system that is located within public rights-of-way or easements will continue to be prioritized and scheduled for routine maintenance. At the same time, segments of the drainage system located upon private property will be prioritized for the acquisition of real property needs. This long-term maintenance plan will incorporate both the on-going needs of the public system and combine the incremental increases in the public system inventory as the needed real property rights are secured for the privately owned segments.

In addition to the primary drainage systems that act as the main arteries and collectors of stormwater runoff, there are countless networks of secondary drainage systems located within land developments. The secondary drainage systems targeted for maintenance are those serving public roadways and parking lots.

A long-term sustainable plan for the operation, maintenance, repair and replacement of the secondary drainage system serving public facilities will continue to be developed. The scope and cost of this effort should not be underestimated as numerous subdivisions with public streets constructed in the 1970's and 1980's may have used corrugated metal pipes that may be at the later stages of their life. The county has developed a prioritization for evaluating pipe systems to determine rehabilitation and replacement requirements to maintain and extend the functional life of the system assets.

Throughout the county there are individual private stormwater management systems with man-made lakes and drainage ways that serve only the onsite drainage requirements of specific developments and are not considered part of the county-wide drainage system. Maintenance responsibility for these onsite private facilities lies with private entities. Monitoring to confirm that these private systems are adequately maintained is done by the Southwest Florida Water Management District (SWFWMD) through an operating permit. New developments, when there is no entity responsible to maintain the capacity of the outfall, are required to either design their stormwater management system considering non-maintained conditions or provide for maintenance of the drainage way by providing a private or public maintenance easement.

LEVEL OF SERVICE

Level of service standards are an important tool for evaluating the performance of storm and surface water management systems and for prioritizing capital improvement needs. Stormwater level of service standards are the primary method for ensuring that new development will provide adequate stormwater facility capacity to meet demands and to prevent adverse impacts to public health and safety, natural resources and private property. Regulatory programs are tied to level of service requirements to ensure maintenance of the level of service through mitigation of development impacts. The level of service standards has two major components: quality of discharge and quantity of discharge. Both of these components must be considered to develop a well-rounded storm and surface water management program.

QUALITY OF DISCHARGE

The county's level of service for quality of discharge is consistent with the recommendations developed by the Sarasota Bay and Charlotte Harbor National Estuary Programs and the requirements of State Water Policy. The State of Florida Department of Environmental Protection (FDEP) adopted revisions to the State Water Policy in December 1995, following a coordinated planning effort between the FDEP and the five water management districts.

Level of service criteria for stormwater quality should at a minimum maintain water quality consistent with the final pollutant load reduction goals established by the local, state and federal water quality programs. Pollutant load reduction goals are implemented according to a schedule provided in the Southwest Florida Water Management District's Water Management Plan.
Quantity of Discharge: Establishment of level of service standards for quantity of discharge must account for various magnitudes of storm events and acceptable levels of flooding.
By 2015, Basin Master Plans for most of the county's watersheds had been completed or were under contract. The Stormwater Quantity or Flood Protection Level of Service and Design Criteria used throughout the Basin Master Plan program is provided below:

STORMWATER QUANTITY LEVEL OF SERVICE AND DESIGN CRITERIA

Stormwater Quantity Level of Service and Design Criteria are provided in Water Policy1.3.2. It has been shown in some of the completed Basin Master Plans that it may not be feasible to meet all of the desired level of service criteria. In those cases, a reduced level of service might be adopted for the given drainage basin or specific area.

Based upon the aforementioned federal, state, and county policies, and studies, Sarasota County adopted the 100-year, 24-hour design storm criteria in July 1994. This design standard is outlined in Appendix C-14, "Stormwater Quantity Level-of-Service and Design Criteria," of the current Land Development Regulations, Sarasota County Ordinance No. 2000-074 as amended.

SUMMARY SURFACE WATER AND FLOOD PROTECTION

In 1989 the county determined that the present system of stormwater management practices was not adequate to meet all of the problems associated with stormwater. In an effort to provide control of water quantity, enhance water quality, and effectively manage flooding, a Stormwater Environmental Utility was established.

Developed parcels of property are assessed a user fee based upon that property's contribution to stormwater runoff. This user fee is used by the utility for the preparation of basin master plans, to correct existing deficiencies, maintain the existing system, and provide for future facilities in the county's stormwater management system. A "credit" system was also established to encourage adequate maintenance of privately owned drainage facilities.

A Basin Master Planning Program was initiated in 1991. Each Basin Master Plan is based on a detailed study of existing and projected land uses, existing drainage facilities, and projected stormwater drainage management needs. Each plan identifies facility improvements that will be needed within the county owned system to provide an acceptable level of service as well as recommending any changes that should be made to accommodate the present and projected drainage needs within each basin. This effort is an on-going program directed at addressing flood protection level of service (FPLOS) deficiencies. FPLOS deficiencies consist of flooded homes and businesses as well as flooded streets. To date, the primary focus of the stormwater improvement program has been to address flooded homes and businesses, with a secondary focus on severe street flooding. As this program reaches a point of diminishing returns in terms of addressing flooded buildings, it is likely to focus more on remaining street FPLOS deficiencies.
The stormwater quality management program outlined within the county's National Pollutant Discharge Elimination System (NPDES) permit for stormwater discharge has been implemented

beginning in fiscal year 1995. The plan, which focuses primarily on water pollution prevention, will be updated as basin master plans are completed. The joint NPDES permit must be renewed every five years and permit conditions may change based upon the effectiveness of the plan.

The Basin Master Plans and the Storm Water Quality Management Program provide extensive information on the stormwater and surface water characteristics in the county. The plans also provide recommendations as to county facilities that should be constructed, as well as, recommending management standards that need to be met by the private sector in conjunction with new construction and the expansion of existing activities.

Provisions within the Environment and Future Land Use Chapters address the problems of development in the floodplain and protection of natural drainage features. Policies in the Environmental Systems Chapter recognize the necessity to address stormwater management with consideration for natural drainage features. Policies in the Future Land Use Chapter require new development to be consistent with master plans for drainage basins, as they are adopted, and prohibit development in floodplains that would adversely affect the functions of the floodplain or degrade the water quality of associated water bodies. The Future Land Use Map Series includes maps that delineate areas of special flood hazard and floodplain associated soils.

Sarasota County established a Comprehensive Plan amendment known as the 2050 Plan. The village and greenway concepts are intended to preserve and protect large contiguous greenways primarily centered on streams, rivers and watercourses and direct development into compact areas outside of these areas. An important strategy is to prevent the encroachment of floodwaters into homes and businesses by keeping them out of the floodplain.

Sarasota County's floodplain and watershed management program has also benefited from the Environmentally Sensitive Lands Protection Program (ESLPP). The ESLPP has protected thousands of acres, a significant portion consisting of natural floodplain areas thereby preventing future homes from being placed within the floodplain.

ENDNOTES SURFACE WATER AND FLOOD PROTECTION

1. Survey Report on Phillippi Creek Basin, Florida, U.S. Army Corps of Engineers, Jacksonville, Florida, 1963.
2. Survey of Phillippi Creek Basin, Florida State Board of Health, 1967.
3. 208 Water Quality Management Plan for Sarasota County, Mote Marine Laboratory, 1980.
4. Stormwater Master Plan, Camp, Dresser, and McKee, 1984.

SANITARY SEWER AND REUSE WATER

DATA AND ANALYSIS

Sanitary Sewer and Reuse Water policies focus on centralized regional wastewater collection and treatment systems that are safe, clean, efficient, economical, and operate in an environmentally sound, sustainable manner.

SANITARY SEWER AND REUSE WATER

INTRODUCTION

This sanitary sewer and reuse water section describes the status of both centralized wastewater treatment plants and onsite sewage treatment and disposal systems. In this section centralized wastewater treatment facilities are described first, immediately followed by onsite sewage treatment and disposal systems. Brief summaries are provided of the legislation that affects each type of treatment method along with the planning studies and adopted plans that provide the direction regarding county activities. Data is provided on the location and design capacity of wastewater treatment plants, and the location of onsite sewage treatment and disposal systems within the urbanized area. The analyses describe both the problems and the progress that has been made in dealing with various concerns related to the handling and disposal of sewage. The concluding section sets forth the recommended level of service.

WASTEWATER TREATMENT FACILITIES

LEGISLATION

In Sarasota County, any entity processing more than 2,000 gallons of sewage per day must treat wastewater through a centralized wastewater treatment system. The following are the relevant laws which govern wastewater treatment including a brief description of each.
U.S. Public Law 92-500, "Federal Water Pollution Control Act," relates to the provision of sanitary sewer service with the goal of restoring or maintaining the chemical, physical, and biological integrity of the nation's waters. In the first years after the 1972 passage of this act, area wide wastewater treatment and management plans were developed to ensure adequate control of source polluters.

Section 201 grants were available to local governments for the construction of facilities that would treat "point sources" of pollution including sewage treatment facilities.
Sections 403.085 and 403.086, Florida Statutes, "Sewage Disposal Facilities: Advanced and Secondary Waste Treatment," as amended, in part, and Chapters 62-4, "Permitting," and 62-600 "Wastewater Facilities," Florida Administrative Code, implement Public Law 92-500 at the State level. Chapters 62-4, 62-600, 62-601, 62-604, 62-610, 62-620 and 62-640, Florida Administrative Code, as amended, provide for rules regarding the permitting, construction and operation of wastewater treatment facilities, including regulations establishing minimum water quality standards for the discharge of treated effluent and residuals from domestic wastewater

facilities. Chapter 62-660, Florida Administrative Code, regulates industrial wastewater facilities and establishes minimum water quality standards for the discharge of the treated wastewater into the environment or into a domestic wastewater collection system.

Sections 403.085 and 403.086, Florida Statutes, establish requirements for the treatment and reuse or disposal of domestic wastewater. Prior to October 1, 1990, Section 403.086, Florida Statutes, required wastewater effluent to be treated to a minimum of secondary treatment, and to the extent necessary, required disinfection and pH control, as defined respectively in Sections 62-600.440 and 62-600.445, Florida Administrative Code, prior to discharge into holding ponds, disposal systems or surface waters. A 1987 amendment to Section 403.086, Florida Statutes, the Grizzle Figg bill, mandated advanced waste treatment (AWT) by October 1, 1990, for wastewater treatment plants, which employ surface water discharge. Surface waters included Sarasota Bay, Little Sarasota Bay, Roberts Bay, Lemon Bay, Charlotte Harbor Bay, and any river, stream, channel, canal, bay, bayou, or sound, or other water tributary thereto. Sarasota County Ordinance Nos. 82-90 and 87-139 as amended define AWT and require wastewater treatment plants, proposed expansions to existing plants and plants currently operating with advanced wastewater treatment standards which discharge to offsite surface waters to meet AWT standards.

In 1994, the Florida Legislature enacted the "Florida APRICOT (A Prototype Realistically Innovative Community of Today) Act," which amended Sections 403.086 and 403.859, Florida Statutes, regarding the reuse of wastewater effluent. The legislation allows for backup discharges to surface waters not exceeding 30 percent of the permitted capacity during periods of reduced demand for reclaimed water when certain conditions are met.

Chapters 62-4 and 62-620, Florida Administrative Code, set forth procedures on how to obtain a permit from the State of Florida Department of Environmental Protection (FDEP) and provide requirements and procedures for the issuance, denial, renewal, extension, transfer, modification, suspension and revocation of any permit required by the FDEP. Chapters 62-600 and 62-610 provide minimum standards for the design of domestic wastewater facilities and establish minimum treatment and disinfection requirements for the operation of domestic wastewater facilities. Chapter 62-601 ensures that owners and operators of domestic wastewater treatment facilities maintain accurate records and submit reports in a timely, accurate and uniform manner. Chapters 62-602, and 62-699 establish the guidelines for water, domestic wastewater treatment, and system operations to assure that qualified and certified personnel operate these facilities.

Chapter 62-604, Florida Administrative Code, provides minimum design, operation and maintenance standards for domestic wastewater collection/transmission systems. The FDEP requires a permit for the construction of wastewater collection and transmission facilities. Sarasota County conducts the FDEP plan reviews for collection and transmission facilities and reviews and issues wastewater treatment plant permits in accordance with the Specific Operating Agreement between the Florida Department of Environmental Protection and Sarasota County.

Sarasota County requires construction permits for construction of new, and expansion or modification, of existing wastewater treatment plants and transmission and collection systems. The Sarasota County "Uniform Water, Wastewater and Reclaimed Water System Code," adopted by Ordinance Nos. 99-058, 99-063 and 2011-044 as amended regulates new construction and modifications to existing water, wastewater and reuse systems in the unincorporated area of Sarasota County. The code establishes minimum guidelines, standards and technical specifications for the construction of new and the extension of existing water, wastewater, and reuse collection and transmission systems and requires inspection during construction by a certifying engineer. The ordinance also provides for spot checks by County Utilities staff and requires that a Certificate of Completion be issued by the County prior to use.

Although the FDEP requires a minimum setback for the construction of wastewater treatment plants, the Sarasota County Zoning Ordinance establishes more stringent setback requirements for the construction of wastewater treatment facilities. New wastewater treatment plants, and extensions and expansions of existing facilities must be setback a minimum of 150- 500 feet from the franchise or service area boundary and/or any residential structure. Proposed construction of new wastewater treatment plants is reviewed by the Sarasota County Development Services as part of Site and Development Plan review.

The FDEP entered into a Domestic Wastewater Specific Operating Agreement with the Sarasota County Board of County Commissioners on November 5, 1997 (Contract No. 98-003). This agreement was subsequently amended in 1999 and outlines delegation authority for wastewater compliance, permitting, and enforcement to Sarasota County. State regulations require that operation permits for wastewater treatment facilities are renewed every five years and when expansions or improvements occur. As part of permit renewal, Sarasota County conducts a complete inspection. In addition, State legislation requires the Engineer of Record to certify that the wastewater treatment facility complies with the permit requirements.

Chapter 62-610, Florida Administrative Code, provides for the regulation of both the disposal and reuse of reclaimed water (treated effluent). Disposal can include deep well injection and off-site discharge to surface waters. The rule also contains specific system and land application requirements. The County reclaimed water system generally includes the use of percolation ponds, storage ponds and irrigation to achieve the goal of beneficial reuse. Reclaimed water from Siesta Key Wastewater Treatment Plant discharges to surface water while the remainder of the reclaimed water supply uses a combination of storage ponds, deep injection wells or aquifer storage and recovery during wet weather conditions. Reclaimed water regulations require the operators of wastewater treatment plants to submit monthly discharge monitoring reports. The reports include information concerning effluent quality (for example, total suspended solids, bio-chemical oxygen demand, fecal coliform and nitrates) and daily operating data (such as flow, chlorine residual, pH, and staffing time).

The FDEP also has regulations regarding sanitary sewer facilities that are near capacity. Section 62-600.405 of the Florida Administrative Code, "Planning for Wastewater Facilities Expansion," requires permittees of facilities to monitor and compare actual flows with the permitted capacities, to submit capacity analysis reports on a scheduled basis and to provide for timely planning, design and construction of wastewater facilities, as necessary, in accordance with the stated schedule in the rule. This rule was adopted in January 1991, and it is significant in that it greatly increased the accountability required of permittees of facilities with respect to monitoring the facilities' capacity status.

To ensure the enforcement of regulations concerning wastewater treatment facility construction and operation, including effluent water quality standards and disposal, Sarasota County adopted Ordinance No. 96-020 in April 1996. This ordinance, which is known as the "Water Pollution Control Code," adopts all provisions of Chapter 403, Florida Statutes that relate to the regulation of domestic wastewater facilities, ground and surface water quality standards, and the general and specific conditions of FDEP permits.

PLANNING STUDIES AND EFFORTS

Numerous wastewater treatment studies have been conducted since the late 1960's. In 1967 the Report on the Engineering and Economic Feasibility of Water and Sanitary Sewerage Systems for the County of Sarasota[1] analyzed the consolidation of existing County wastewater treatment franchises and contained a general discussion of the advantages and disadvantages of private versus public ownership of wastewater treatment systems.

The 1970 Engineering and Cost Analysis of Water and Wastewater Systems[2] expanded upon the 1967 report. It recommended the development of centralized wastewater treatment facilities for the fast growing unincorporated areas in North Sarasota County surrounding the City of Sarasota. With regard to short-range disposal, it proposed two County owned service areas utilizing deep well injection, and recommended the investigation of land spreading as a long range effluent disposal technique.

The June 1971 Water and Wastewater Systems Master Plan for Sarasota County[3] expanded the recommended service areas of the 1970 study to include sewer service for all of the urbanized areas of Sarasota County, including developed areas near the City of Venice. It also divided the County into five pollution control zones and assessed the water and wastewater needs of each zone through the year 2000.

The 1975 Central County Pollution Control Zone Engineering and Cost Analysis of Water and Wastewater Systems[4] focused on water and wastewater problems in the central County area (in and around Venice), and presented cost estimates associated with its recommended treatment program.

Two years later, the Sarasota County 201 Facilities Plan[5] responded to the federally mandated Section 201 of Public Law 92-500, the "Federal Water Pollution Control Act." It used the five pollution control zones developed in the Master Plan to subdivide the Sarasota County study area and presented detailed proposals for centralized wastewater treatment in the three most highly urbanized pollution control zones.

The Sarasota County Wastewater Treatment Advisory Committee was created in 1984. The community and industry representatives and County staff members who comprised the committee were instructed to evaluate the status of wastewater treatment systems in the

southern portion of the County. In response to the Committee's report, the Board of County Commissioners adopted Resolution No. 84-122 which encourages the regionalization of central sewer systems, mandates connection to existing systems when available pursuant to State statutes, and encourages the reuse or recycling of treated sewage effluent.
A 1986 report, the Wastewater Sludge Disposal Study[6] detailed the problems with biosolids disposal from the County's numerous separate wastewater treatment plants. Based upon an evaluation of alternatives, the following recommendations were made:

- that the County adopt an interim plan whereby co disposal of wastewater treatment plant biosolids are conducted at the County's Septage Treatment Facility and approved land spreading facilities;
- that the County adopt a long term plan recommending specific management techniques for biosolids disposal; and
- that the County designate a single site for a biosolids handling facility.

The study further recommended that prior to implementation the County should consider developing regionalized wastewater treatment and disposal master plans.

In December 1986, the County sponsored the Sarasota County Assembly for Wastewater Management, which was coordinated by the Florida Atlantic University Institute of Government, based on the recommendations of the Utilities Department. The Assembly was composed of over thirty experts representing city, county, and regional governments; public and private utilities; engineering firms; media editors and publishers; and civic and environmental organizations. This key assembly process marked a turning point in the public's acceptance of this program when members concluded that the existing fragmented system of wastewater treatment was inadequate and that the county government should take the lead role in addressing the county's wastewater treatment problems. Several community organizations, including the Argus Foundation, the Taxpayers Association of Sarasota County, the League of Women Voters and others in attendance at the conference expressed support for the assembly's conclusions.

This action prompted the Board of County Commissioners to publicly endorse plans regarding central water and sewer systems. Resolution No. 87-157 set forth the Board of County Commissioners' policy to develop a Sarasota County centralized utility system. The resolution recognized that development of such a system would require the regionalization of wastewater treatment plants, the acquisition of privately owned systems, and the development of methods to recycle and reuse treated wastewater as an alternative supply in order to conserve potable water resources. Passage of the resolution represented a major step toward consolidation of the wastewater treatment plants in the unincorporated area of the county, and provided the direction for developing the county's Vision 20/20: Wastewater Resources Recovery Project study, 1989.

The Vision 20/20: Wastewater Resources Recovery Project[7] addressed the development of a comprehensive and regional wastewater and reuse utility in Sarasota County. The plan was adopted by the Board of County Commissioners in June 1990 as a "conceptual planning tool" and provided the basis for much of the county's most recent master planning efforts.[7]
In April 1991, the Board of County Commissioners adopted Resolution No. 91-101 which directed and authorized the formation of a Utilities Acquisition Negotiating Team (ANT) and the preparation of the necessary requests for proposals for the use of the accounting, engineering and legal consultant services needed to implement certain objectives of the Vision 20/20 Master Plan. As part of Resolution No. 91-101, the Board adopted the Procedures Manual for Public Acquisition of Water and Utility Systems in Sarasota County, Florida as the procedural guide for the Utilities Acquisition Negotiating Team.

In July 1993, the Board adopted the Franchise Acquisition, Consolidation, Implementation Plan- Wastewater Collection and Treatment Master Plan[8] prepared by the county Utilities Department. The document divides the unincorporated area of the county into four regions and contained an engineered master plan and implementation plan for providing wastewater service to these areas. The plan also includes a priority listing for the acquisition of franchise utilities in the county.

The Master Plan was amended by the Board in November 1994 to include a component establishing reuse as a third utility within the Sarasota County Utilities Department. Adopted by Resolution No. 94-277, the Reuse Master Plan[9] contains regulatory, engineering, public education and marketing, and financial strategies for the development of a regional distribution and storage system for reuse.

The Franchise Acquisition, Consolidation, Implementation Plan- Wastewater Collection and Treatment Master Plan[8] presented one possible scenario of how to connect all franchised and private plants to the regional plants. Multiple options were possible depending on the timing of acquisitions and the availability of capital improvement funds. By 2000 the majority of the acquisitions were either completed or scheduled. Changes in the rules for disposal of biosolids were discussed, and the county's disposal by land application would not be a long-range solution. Finally, the backbone of the reuse transmission system was built out and a plan for the continued expansion of the reclaimed water system was needed. These issues necessitated a complete review of wastewater and reclaimed water programs within the county and were addressed in the Wastewater Management Plan of November 2001.[12]

There are four major policies contained in the plan, each of which was adopted by vote by the Board of County Commissioners:

1. The county should continue to consolidate wastewater systems into a regional system consisting of five owned county plants, supplemented by county owned capacity in the plants of the City of Sarasota and the City of Venice. This modified the previous county plan by recommending that the Siesta Key Wastewater Plant remain in operation due to the prohibitive cost of connecting that plant to a regional plant (By agreement, the Siesta Key Utility would transfer to County ownership in 2006.)
2. The level of treatment by county owned plants would be the minimum needed for the selected method of effluent disposal. This means that the county plants must be able to treat to the standards required to dispose of effluent as reclaimed water.
3. Providing reclaimed water for irrigation will be the primary means of effluent disposal. The county will continue with its reuse program, even though that may not be the most economical means of effluent disposal.
4. The county should take the lead in developing a long term, regional solution for the disposal of biosolids in a manner that will beneficially use the product. With the issues surrounding land spreading of biosolids, the search of a new solution must begin immediately.

The Wastewater Management Plan identifies the most economical and efficient alternative for regionalization and details capital improvements program to accomplish that consolidation. While the plan incorporates all known changes due to growth, the Phillippi Creek Septic System Replacement Program, and the County's 2050 Plan, the management plan will be periodically reviewed and updated for changes in growth patterns.

In 2009, the Board of County Commissioners accepted an update to the Wastewater Management Plan, 13 which generally reaffirmed the four major policies, set forth in the prior plan and included new information on how to expand the system to address future growth. The 2009 plan included the policy decision to decommission the Siesta Key Wastewater Plant due to the facilities age, changes in regulations, and vulnerability associated with being on a barrier island. The 2009 plan identified the need for having a longer-term solution for the management of wastewater residuals (biosolids), created a series of wastewater collection system models, and identified the future need for additional wastewater treatment capacity in the Knights Trail Road area.

In 2013, the commission accepted an update to the Sarasota County Reclaimed Water Master Plan.[14] This update focused on the northern portion of the reclaimed water system, estimated the projected 20 year supply, identified potential reclaimed areas, update the hydraulic model, and developed capital improvement projects for system improvement. The plan also identified several projects that support interconnection between existing reclaimed water suppliers that could lead to the regional approach envisioned by earlier plans.
At the end of 2013, the county acquired the Sarasota County holdings of Aqua Utilities. This included its potable water, wastewater and reuse water systems. This was the last major wastewater franchise holder left in the county. The acquisition of Aqua Utilities has essentially completed the wastewater and reuse water objectives outlined in the 1993 Franchise Acquisition, Consolidation, Implementation Plan.

INVENTORY

The county owns and operates the Sarasota County Utilities Water and Wastewater System that provides water, wastewater and reuse water service to various retail and wholesale utility customers within Sarasota County. The county utility mainly serves areas within the unincorporated portions of Sarasota County. In general, this excludes the county's four municipalities, areas served by the Englewood Water District, a limited number of small-scale private utilities, areas served by franchised private utilities and private homes utilizing wells or septic tank systems.

In 1991, there were 116 (WWTP) wastewater treatment plants operating in Sarasota County, as of November 2004, there were 55, by 2013 the number was 36. The locations of the wastewater treatment plants are shown on Map 12-5: Wastewater Treatment Facilities in

Sarasota County. The facilities are grouped by the following categories: Sarasota County Owned, Franchised/Private Utilities, Municipality Owned, Other Wastewater Treatment Facilities and Abandoned Facilities. The service areas of the public and franchised wastewater treatment plants in the unincorporated area are shown in Map 12-6. The small, independently permitted facilities do not have service areas, as they provide service to specific properties. For general planning purposes, the unincorporated county is divided into three (3) wastewater service areas as described below.

NORTH COUNTY SERVICE AREA

The City of Sarasota and Sarasota County provide most of the wastewater treatment service for the north portion of Sarasota County. The Town of Longboat Key purchases wastewater treatment services from Manatee County. The Bee Ridge Water Reclamation Facility (BRWRF) is the county's regional plant serving the northern portion of the county. The Bee Ridge Water Reclamation Facility has an existing design capacity of 9.0 MGD-MMADF (Million Gallons per Day-Maximum Month Daily Flow). The plant is located on 143 acres, which includes a portion of the county's reclaimed water storage capacity in the form of onsite storage ponds. The plant site when fully built out will have a design capacity of 19.5 MGD- MMADF.

The Siesta Key AWWTP (Advanced Wastewater Treatment Plant) has a permitted capacity of 2.9 MGD-MMADF. All reclaimed water produced at this facility goes to surface water discharge. Up until 2006, this plant and the collection system were owned and operated by the Siesta Key Utility Authority (SKUA). The Siesta Key Plant has had a number of operating deficiencies and the county has been working to correct some of those deficiencies. In 2010, the county received a proposed consent order from the FDEP alleging the Siesta Key Plant was in violation of their permit for discharging effluent on occasion that contained certain constituents that exceeded the limits in the FDEP permit. The final consent order contains revised effluent limits, which gave the county the time to either rebuild the current plant or take it off line. The county is currently building the needed infrastructure to decommission the facility.

The Fruitville Wastewater Reclamation Facility (WRF), which was acquired from Aqua Utilities, is a 2.4 MGD-3MRADF (Million Gallons per Day-3 Month Rolling Average Daily Flow) activated sludge modified Ludzac- Ettinger Process Type 1 treatment plant. Reclaimed water produced at this facility goes to several off-site storage ponds that supply Schroeder Manatee Ranch, Tatum Ridge Golf Course, and agricultural sites located east of the plant. The plant is scheduled to be taken out of service and flows from this facility will be redirected to the Bee Ridge Water Reclamation Facility.

Progress continues on the Phillippi Creek Septic System Replacement Program (PCSSRP). Since 1997 when the Board of County Commissioners determined that septic systems and small package wastewater treatment plants were factors contributing to documented pollution problems in Phillippi Creek. The majority of the wastewater treatment plants in the watershed have been taken off line and approximately 8,000 connections have been constructed. With more than 50% of the identified areas complete, the county is beginning to look at the prioritization of the remaining areas and to make decisions about how to finish the PCSSRP program. Additional detail about the Phillippi Creek Septic System Replacement Program is located in the onsite sewage treatment and disposal systems section below.

CENTRAL SERVICE AREA

Central County Water Reclamation Facility (CCWRF) has a permitted capacity of 4.8 MGD-MMADF. The facility is located on 66 acres and is expandable to 8.0 MGD-MMADF. This facility has a reclaimed water Aquifer Storage and Recovery well (ASR) and the site contains a deep injection well for wet weather disposal of reclaimed water.

REUSE WATER IN NORTH AND CENTRAL SERVICE AREAS

The county has a solid base of reuse water customers served from two separate systems one in north county and one in south county. Overall, the reuse water distribution system consists of approximately 148 miles of reuse water main pipe ranging in size from 1 inch to 24 inches in diameter. The North Master Reuse System is located in northern Sarasota County bounded by the Manatee County line and extends south to Osprey near Green Street. Both the Central County WRF and the Bee Ridge WRF supply the reclaimed water used in the North Master Reuse system. There is also a system interconnect to the City of Sarasota's reuse system near 17th street and Country Meadows Blvd. The North Master Reuse System ties together all of the storage ponds, deep injection wells, and the Aquifer Storage and Recovery well that is used to manage the supply in North Sarasota County.

The Siesta Key AWWTP disposes treated effluent by permitted discharge to surface waters, and the county will continue to use that means of disposal for the facility. Several studies have demonstrated that it is neither practical nor economical to develop a reuse system on Siesta

Key. Once the Siesta Key plant is decommissioned, the effluent from Siesta Key will be treated at either the Central County WRF or the Bee Ridge WRF and the resulting reclaimed water will then become available to the North Master Reuse System.

The Fruitville WRF has its own separate reclaimed water system. Reclaimed water produced at this facility goes to several off-site storage ponds that supply Schroeder Manatee Ranch, Tatum Ridge Golf Course, and agricultural sites located east of the plant. Future planning studies will address how this system is incorporated into the main north county system.

SOUTH SERVICE AREA

The south service area is that portion of the county from the intersection of State Road 681 and US 41 south and east to the boundaries of the Englewood Water District and the City of North Port. Two interconnected plants treat wastewater: the county owned Venice Gardens WRF and the 3.15 MGD-MMADF of county owned capacity in the City of Venice WRF.

The county's Venice Gardens WRF has a permitted capacity of 2.0 MGD- MMADF. The facility is located on 71 acres, and the site contains storage ponds and a deep injection well for the disposal of reclaimed water. This facility is in the process of a plant expansion from 2.0 to 3.0 MGD- MMADF and the facility will eventually be expanded to 5.0 MGD- MMADF.

Englewood Water District WRF has a permitted capacity of 3.0 MGD- AADF (Million Gallons per Day-Annual Average Daily Flow) and 4.5MGD-MMADF. The plant is located in Charlotte County on 160 acres. The reclaimed system includes reclaimed water storage ponds, an aquifer storage and recovery well and a deep injection well for the disposal of reclaimed water.

Sarasota County currently owns 3.0 MGD-3MRADF of the plant treatment capacity at the City of Venice Eastside Plant AWWTP (Advanced Wastewater Treatment Plant) located within the South County Service area. A portion of the County's wastewater flows are collected and conveyed directly to the Eastside AWWTP. The county also has the ability to shift flows to the City of Venice Eastside AWWTP from the Venice Gardens WRF transfer pump station and from wastewater flows collected in the central area of the county. An interlocal agreement between the City of Venice and Sarasota County establishes the rate that the county pays to the City for the plants operation and maintenance. A major portion of the county's service area has annexed into the City of Venice and the Joint Planning Area (JPA) Agreement set forth the coordination of infrastructure and service provided by each party.

REUSE WATER IN THE SOUTH SERVICE AREA

The South Master Reuse System is primarily located between Venice Avenue and Manasota Beach Road and is located outside of the City of North Port and the City of Venice. Currently there is a reuse system interconnect between the City of Venice and the county's South Master Reuse System located near the intersection of Venice Avenue and Auburn Road. The majority of the reclaimed water in the area is used to irrigate golf courses and historically the service area has achieved a very high percentage of beneficial reuse.

The surplus in reclaimed water supply in the north service area and the strong demand in the south service area lead to a recommendation in the 2009 Wastewater Management Plan to connect the two service areas. The county is continuing to explore options for expanding the reuse system with that goal in mind. Wet weather disposal capacity in the South Master Reuse System consists of a series of storage ponds, ground storage tank and deep injection wells for those times when demand for reclaimed water is minimal and storage facilities are full.

In Sarasota County, reclaimed water is primarily used in outdoor irrigation, to irrigate golf courses, residential lots, common areas, commercial sites, roadway medians, and for agricultural uses. Map 12-3: Major Reuse Sites in Sarasota County Utilities System portrays the location of the county supplied reclaimed water sites. Municipal and privately owned irrigation sites and sites used by privately owned wastewater treatment plants are not depicted on the map. Most privately owned sites served by Sarasota County are golf courses or housing developments.

ANALYSIS

The status of implementation of each policy of the Wastewater Management Plan is as follows:

CONSOLIDATION

Since the county acquired ownership of Aqua Utilities in December of 2013 there are no more wastewater franchises of any significant size within unincorporated Sarasota County. The Gulf Gate facility was acquired in 2002, South Gate in 2002, Meadowood in 1996; and the Atlantic facility was acquired in 2003. From 2008-2009, the county decommissioned the Gulf Gate, South Gate, Meadowood, and Atlantic wastewater facilities and transferred wastewater flows to the Bee Ridge and Central County Water Reclamation Facilities in an effort to consolidate operations and eliminate the surface water discharges. The Gulf Gate and South Gate facilities were permitted with the ability to discharge to surface water. In 2009, the county took over the Oakford WWTP, which is a small 25,000 gpd (gallon per day) package plant and decommissioned that facility in 2014. The decommission of Fruitville WRF is scheduled for 2016, and the Siesta Key AWWTP by 2019.

LEVEL OF TREATMENT AND BENEFICIAL REUSE

Sarasota County's Water Reclamation Facilities (WRF) treat to advanced secondary treatment standards and provide high-level disinfection as described in Chapter 62-610, Florida Administrative Code. This process produces reclaimed water that protects public health and adheres to strict environmental quality standards. This treatment process includes chlorine disinfection, continuous monitoring of key parameters and regularly scheduled water quality testing to ensure public safety. The Siesta Key Plant operates as an advanced wastewater treatment facility because its reclaimed water discharges to surface water.

Sarasota County's reclaimed water can be used for non-potable water activities such as outdoor or crop irrigation, cooling tower water and certain commercial gray water systems (e.g., toilet flushing). Reclaimed water is an alternative water resource and allows for the conservation of either groundwater or freshwater supplies. The county's reuse system is designed, operated and regulated under Part III Public Access, Residential Irrigation and Edible Crops reuse standards under Chapter 62-610, of the Florida Administrative Code. The county is continuing to evaluate other alternative sources to improve its reuse system reliability. Utilization of reclaimed water, stormwater reuse, and Low Impact Development along with adopting other Green Building principles is needed in an effort to balance our community's freshwater needs with our surroundings.

The county's primary goal for its reclaimed water supply is to maximize the beneficial reuse of this resource for irrigation purposes and to limit the amount discharged to deep well. Wet weather disposal capacity consists of storage tanks and ponds, deep injection wells and an Aquifer Storage and Recovery well. Conservation measures and alternative water supplies are a crucial part of Sarasota County's long-term overall water supply strategy.

New reuse demand will come from new development, not existing developed areas. It has been demonstrated that it is neither practical nor economically feasible to retrofit existing areas with reuse distribution lines. Most new development will be required to connect to the reuse system if available. The developer is responsible for construction of the lines needed to connect to the central system as well as any storage or delivery systems that are needed within the development.

BIOSOLIDS

In accordance with the Board's direction to develop a long term, regional solution, staff issued a Request for Qualifications (RFQ) in February 2002, from firms that were interested in designing, constructing, funding, and maintaining a facility to legally dispose of biosolids. A Request for Proposals (RFP) was then issued in January 2003, to the eight firms deemed qualified. The only modification to the scope identified in the RFQ was that the biosolids product must be beneficially used. In July 2004, the Board approved a contract with the selected firm for a period of 20 years, with options for extension in 5-year increments. While the contract is by necessity between the County and the provider, the contract as approved by the Board specifically states that others may utilize the contact to negotiate terms for their own use.

Subsequent to the 2004 award, the firm went out of business before being able to provide the contracted services to the county. Since 2004, the county has continued to use vendor supplied mobile dewatering and transportation services to dispose of dewatered biosolids in a sanitary landfill. In 2013, the county issued a new RFP for a firm to provide the mobile biosolids dewatering and transportation services. In September 2013, the county entered into a new contract with a single firm to provide these services.

FUNDING

The funding and discussion of water, wastewater and reuse capital improvement projects can be found in Chapter 14, Capital Improvements.

COMPLIANCE

Sarasota County conducts routine inspections of wastewater treatment plants that are in private ownership and that have a treatment capacity of less than 100,000 GPD. They also conduct quarterly inspections of the larger plants within the county including municipally owned facilities. This monitoring program has been in place for many years. Field inspectors review the plants for compliance with state and county regulations and the specific permit conditions for the individual facility. The inspector's review may range from a visual inspection of the facility to a comprehensive record and facility review including sampling. These inspections are conducted with little or no advanced notice in order to get a true snapshot of facility operations. The county responds to citizen complaints and collection system issues throughout the county. The Florida Department of Environmental Protection, South District office regulates all of the county's facilities and its reuse system.

ONSITE SEWAGE TREATMENT AND DISPOSAL SYSTEMS (SEPTIC SYSTEMS) LEGISLATION

Section 381.272, Florida Statutes, and Chapter 64E-6, Florida Administrative Code, establish regulations governing the design, construction and regulation of onsite sewage treatment and disposal systems. In 1992, the State of Florida amended Chapter 10D-6 to provide for more stringent regulation of these systems. Some of the areas that were strengthened included increased system sizing in moderately or severely limited soils, specific elevation requirements for systems needing repairs, and provisions that limit the maximum size of any drain field absorption bed to 1500 square feet. Previous amendments to Section 381.272, Florida Statutes, as they relate to the operation of onsite sewage treatment and disposal systems in areas used or zoned for industrial or manufacturing purposes, had significantly increased the permitting and monitoring criteria for those potentially hazardous systems.

Chapter 381.00655, Florida Statutes, provides requirements for mandatory connection to publicly- and privately-owned central sewer systems within 365 days of those systems becoming available. The Statute also requires that establishments, using onsite sewage treatment and disposal systems that are in need of repair, or modification be connected to available central systems within ninety days. The county ordinance which provides for mandatory connection is 2000-079 as amended.

Sarasota County legislation regulating onsite sewage treatment and disposal systems includes Ordinance No. 83-83, as amended, which regulates the design, construction, installation, utilization, operation, maintenance and repair of individual onsite sewage treatment and disposal systems and includes permit requirements. The installation of new systems requires an "Individual Onsite Sewage Treatment and Disposal System Installation Permit" and, after a final inspection by the Florida Department of Health in Sarasota County, a "Final Installation Approval." Ordinance No. 83-83 also requires a permit for the reconstruction or repair of existing onsite sewage treatment and disposal systems.

Ordinance No. 83-83 requires a site evaluation and soil studies, including a soils analysis, to be performed in order to obtain an "Individual Onsite Sewage Treatment and Disposal System Installation Permit." A minimum of two soil profiles, both within the proposed absorption field, are required. The information obtained from the soil profiles is required to show the elevation of the water table at the time of the test and the height of the seasonally high water table. The construction plan for the proposed system must provide, among other requirements, a minimum separation of 36 inches, or 24 inches, if the lot was platted prior to the passage of Ordinance No. 83-83, between the bottom infiltrative surface of the drain field and the elevation of the water table at the wettest season of the year. If necessary, the elevation can be obtained by the use of mound soil absorption systems.

The County Land Development Regulations, Ordinance No. 81-12, as amended, require a minimum one acre lot size for installation of a private well and onsite sewage treatment and disposal system. The minimum lot size requirement for onsite sewage treatment and disposal system installations may be reduced to one half acre, if the lot is developed with a connection to a central water system. Ordinance No. 81-12, as amended, also stipulates that no onsite sewage treatment and disposal system shall be located within one hundred feet (100') of the ordinary high water mark of non-tidal lakes, streams, canals, bays, rivers and ponds or within one hundred feet (100') of the mean high water line of tidal bodies of water, including bays and tidal portions of rivers, streams and canals.

Commercial uses may still obtain permits for individual onsite sewage treatment and disposal systems where the amount and quality of wastewater produced meets certain restrictive standards. Discharge of industrial waste into onsite sewage treatment and disposal systems is prohibited by Chapter 64E-6, Florida Administrative Code.

In unincorporated Sarasota County, the Florida Department of Health enforces both State and Sarasota County onsite sewage treatment and disposal regulations. The Health Department office was established through cooperation between the State of Florida and Sarasota County. This local effort provides Sarasota County with superior enforcement of the increasingly stringent regulations governing installation, reconstruction and repair of onsite sewage treatment and disposal systems.

PLANNING STUDIES AND EFFORTS

In 1979, the 208 Water Quality Management Plan for Southwest Florida was prepared by the Southwest Florida Regional Planning Council. Developed under guidelines found in Section 208 of Public Law 92-500, it evaluated the impact of onsite sewage treatment and disposal systems upon the county's surface water quality. The plan recommended the development of local onsite sewage treatment and disposal system siting and installation guidelines and the dissemination of information on maintenance to owners.

Both the 1986 and the updated 1994 edition of the Florida Water Quality Assessment 305(b) Technical Report by the Bureau of Water Quality Management indicated that not all surface water pollution was caused by urban and agricultural runoff. Discharges from onsite sewage treatment and disposal systems are included among the potential causes of degradation of natural water bodies. Sufficient data did not exist in that report to quantify the proportional contribution of runoff sources producing water quality problems.

More recent studies include a study of onsite sewage treatment and disposal system construction, reconstruction and repair permits by the Health Department to identify areas of frequent and recurring onsite sewage treatment and disposal system failure.

In 1989, the Sarasota Bay Estuary Program (SBEP), administered by the U.S. Environmental Protection Agency, began work studying the quality of the waters in Sarasota Bay and its surrounding environs and developing plans of action for improving water quality in the region.

In regard to wastewater treatment, the NEP studies found that: (1) the principal pollutants of concern to Sarasota Bay are nutrients (primarily nitrogen) and toxic substances such as heavy metals and pesticides; (2) the amount of nitrogen that may be introduced into the bay from wastewater treatment plants is regulated, but the nitrogen pollution from onsite sewage treatment and disposal systems is not; (3) residual nitrogen from onsite sewage treatment and disposal systems is transported to the bay by groundwater; (4) small, inefficient wastewater treatment plants can load nutrients to bay waters; and (5) onsite sewage treatment and disposal systems in Sarasota County contributed approximately four times more nitrogen to Sarasota Bay through groundwater than the City of Sarasota's effluent discharge into Whitaker Bayou.[10]

The original nitrogen loading model used in the SBEP studies was developed using all available water quality data from the STORET data base, the repository of data used by the Florida Department of Environmental Protection, among others, to assess the status and trends of water quality in the State of Florida. After the SBEP Comprehensive Conservation and Management Plan was completed, it was learned that the data set within the STORET system did not contain the most recent data from Phillippi Creek testing. This led to an incorrect characterization of the present-day nitrogen concentrations in Phillippi Creek. As a result, the pollutant loading model used by the SBEP overestimated nitrogen loads from septic tanks by underestimating loads from wastewater treatment plants.

The Preliminary Engineering Report- Central Water and Sewer Service[11] adopted by the Board of County Commissioners in November 1994, presented a preliminary report for providing central utility service to the urban unincorporated areas. The study identified those areas, county wide, served by onsite sewage treatment and disposal systems and prioritized them for receiving central sewer service. A citizen task force was appointed by the Board to study the issues involved in the provision of central sewer to those areas. The task force's recommendations to proceed with the final design and construction of central sewer systems in the highest priority areas identified in the report were presented to the Board in August 1995.

In 1997 the Board of County Commissioners determined that septic systems were one of the factors contributing to pollution in Phillippi Creek. The Board directed staff to hire a consulting engineer to develop a plan to provide central sewer county wide, with the first phase being the Phillippi Creek drainage basin.

The Phillippi Creek Septic System Replacement Program (PCSSRP) Final Report was completed and Board of County Commissioners were briefed in September 2000. That report was separated into the following:

1. Document Review
2. Water Quality Problem Identification and Prioritization
3. Development of Geographical Information System Database
4. Preliminary Delineation of Service Areas
5. Population and delineation
6. Assessment of Wastewater Land Application Systems in the Study Area
7. Evaluation of onsite Wastewater Treatment and Wastewater Collection Systems Alternatives
8. Preliminary Design
9. Capital Improvement Plan
10. Preliminary Financial Plan
11. Alternative Institutional Framework Analysis
12. Funding Alternatives Screening Report

This report provided the framework for the replacement program and design that began in 2000, on the first area to be sewered. Property owners began connecting to the system in 2002, and all work on the first phase was completed in 2003. Since 2003, the majority of the wastewater treatment plants in the watershed have been taken off line and approximately 8,000 connections have been constructed. With more than 50% of the identified areas complete, the county is beginning to look at the prioritization of the remaining areas and to make decisions about how to finish the PCSSRP program.

An analysis of the remainder of the county using the same process as above has been completed. A program to provide central sewer to other parts of the county based on the report and the lessons learned from PCSSRP will be developed on an area basis.

In 2007, the Board of County Commissioners adopted the Neighborhood Initiated Petition Process to Create Central Water and/or Sewer Line Extension Projects (Ordinance No. 2007-085 and Resolution No. 2009-066). This program allows for the creation of an assessment district over a minimum of 15 improved taxable properties for the purposes of extending central water or wastewater service to a specific geographic area. The resolution outlines the specific procedures used to create a district and implement a project.

INVENTORY

The Health Department estimates that approximately 40,000 onsite sewage treatment and disposal systems are in place with varying degrees of satisfactory operation throughout the county. Since installation of these systems began before accurate record keeping, the locations of some systems are not known. Since 1972, however; the Health Department has maintained permit application data for construction, reconstruction, and repair of onsite sewage treatment and disposal systems. The permit data may be located with the use of half section maps and the Health Department database.

The 1994 Preliminary Engineering Report- Central Water and Sewer Service estimated that there were a total of about 38,000 platted residential lots with 30,188 existing homes in the unincorporated urbanized area where central water and sewer service was not available.

ANALYSIS

The principal limiting factor for use of onsite sewage treatment and disposal systems in Sarasota County is seasonally high water tables and lot sizes. Of the forty-one soil types identified in the Soil Survey of Sarasota County dated September 1991, only two types are not rated as “severe” or inappropriate for onsite sewage treatment and disposal systems. These two types make up less than one percent of the total acreage in the county. Although the soils themselves are generally capable of providing adequate percolation and filtration of wastewater effluent, their association with elevated seasonally high water tables requires virtually all new systems to be constructed in mound configurations elevated above natural grade. Table 1-2 in the Environment Chapter lists the county’s five generalized soil associations, while Map 1-2 of that Chapter presents a map showing the location of these soil associations. Soils maps are available at the Sarasota County Planning Department or the Sarasota County Soil Conservation Service at a scale of 1:24,000, the same scale used on United States Geologic Survey quadrangle map sheets.

Soil studies prior to the installation of onsite sewage disposal systems are addressed in Sarasota County Ordinance No.83-83 as amended, which requires a site evaluation, including a soils analysis, to be performed in order to obtain an "Individual Onsite Sewage Disposal System Installation Permit." A minimum of two soil profiles, both within the proposed absorption field, are required. The information obtained from the soil profiles is required to show the elevation of the water table at the time of the test and the estimated height of the seasonally high water table. The construction plan for the proposed system must provide, among other requirements, a minimum separation of 36 inches, or 24 inches if the lot was platted prior to the passage of Ordinance No. 83-83, between the bottom infiltrative surface of the drain field and the elevation of the water table at the wettest season of the year. If necessary the elevation can be obtained by the use of mound soil absorption systems.

Onsite sewage treatment and disposal systems can be installed on a lot platted after the June 30, 1981, passage of the Sarasota County Land Development Regulations, Ordinance No. 81-12, only if the lot is a minimum of one acre without central water, or one-half acre, if water is available from a central source. Larger lots are less visually impacted by the use of mitigation techniques such as elevation of a drain field. Larger lots also provide flexibility in the location of wastewater disposal systems, so that set-backs can be provided from surface water and other such features. Requiring large lots also reduces the density of onsite sewage treatment and disposal systems in any given area, and accordingly, reduces the amount of filtered effluent that reaches surface or groundwater, thereby increasing the dilution factor. Such spacing of septic drain fields is particularly valuable in soils where filtration may be inadequate. Although Sarasota County Land Development Regulations, Ordinance No. 81-12, require a minimum lot size of one acre without central water, or one-half acre if there is a connection to a central water system, most onsite sewage treatment and disposal systems are installed on lots below these minimum sizes, that were platted prior to the passage of Ordinance No. 81-12 and are not proximate to a sewer line.

These installations, however, must comply with all the applicable requirements of Chapter 64E-6, Florida Administrative Code, and Sarasota County Ordinance No. 83-83 as amended. Frequently, adjoining platted lots are combined under one ownership in these older subdivisions, so that the ownership lot sizes are larger, but even these combined lots are generally below the minimum lot size that would be required, if they had been platted after passage of Ordinance No. 81-12. As a result, installation of new onsite sewage treatment and disposal systems within these older subdivisions, which usually requires mounding, may lead to stormwater runoff problems for neighboring properties.

Many of the older, small lot subdivisions served by onsite sewage treatment and disposal systems have a history of system failures that indicates not only the consequences of aging, but may also indicate the presence of installations that were inappropriate for the environmental conditions on the site. Subdivisions that have had a high percentage (36%) of past failures of onsite sewage treatment and disposal systems, coupled with a continuing pattern of current failures, are considered to be "chronic septic tank failure areas." Difficulties are experienced in the repair of most of these systems due to the small lot areas and the high water tables. These failing systems have the potential to contaminate surface and groundwater, as well as creating significant repair costs for the owners of the systems. In 1990, the Health Department began a comprehensive analysis of onsite sewage treatment and disposal system failures was made possible by the development of a computerized database system for permits. This data has enabled an identification to be made of chronic failure areas. This information has been used as one of the factors considered in establishing priorities for the extension of collection systems and connection to wastewater treatment plants.

Many of the repairs are required because onsite sewage treatment and disposal system regulations prior to 1983, were less stringent than the existing state and Sarasota County regulations. Factors contributing to the inclusion of areas in this listing were lot size and overall size of subdivisions (septic system density), percentage of failures, seasonal high water table levels, age and size of systems, soil conditions and elevation of systems with respect to water tables.

DOMESTIC WASTEWATER TREATMENT RESIDUAL PRODUCTS

Sludge or biosolids are the residual by-product of sewage treatment plants. This residual is primarily water and digested wastewater solids. The State of Florida regulates the disposal of biosolids according to the degree of stabilization, and the nitrogen and metals content. The standards of Chapter 62-640, Florida Administrative Code, regulate this residual product, and require all wastewater treatment plant residuals destined for disposal by land spreading meet Class B stabilization as defined in that chapter. Biosolids stabilization may be accomplished on the wastewater treatment site or at a permitted residuals management facility. Chapter 62-640, Florida Administrative Code, stipulates that wastewater treatment plants may land spread biosolids, only if they have an approved land spreading plan and a current operating permit from the FDEP.

To be eligible for land application, routine biosolids analyses must be performed. The biosolids are required to meet minimum standards for pathogen and vector attraction reduction, and cannot exceed a certain level of heavy metal content as specified in Chapter 62-640, Florida Administrative Code. The regulations also include requirements for land spreading, which stipulate certain minimum setback distances from inhabited structures, surface-water bodies, and wells, and prohibit land application when the water table is less than two (2) feet from the surface. There are also annual and lifetime caps on the amount of heavy metals that may accumulate on any parcel as a result of land application of biosolids.

Sarasota County Air and Water Quality oversees the biosolids program within the County. Ordinance No. 96-020, as amended addresses the transportation and land spreading of biosolids within the entire county. There are no active land spreading sites with the county at this time.

SANITARY SEWER LEVEL OF SERVICE

Present legislation, at both the state and county level, helps in establishing level of service standards (LOS) for wastewater treatment. Two components comprise wastewater treatment level of service: 1) the minimum quantity of wastewater to be treated in gallons per day per equivalent dwelling unit, and 2) the minimum quality of treated effluent produced by the treatment facility.

An analysis of existing flow rates within the Sarasota County indicates that the existing use averages approximately 195 gallons per dwelling unit per day. Based on existing use, an appropriate level of service would be 200 gallons per day per equivalent dwelling unit to more closely reflect the actual usage by county residents.

Minimum water effluent and quality standards for wastewater treatment facilities are provided for in Section 403.086, Florida Statutes, “Sewage Disposal Facilities; Advanced and Secondary Waste Treatment” and its implementing tool, Chapter 62-600, Florida Administrative Code, “Wastewater Facilities,” as amended. These standards were adopted by reference in Sarasota County Ordinance No. 96-020, as amended and 98-066, as amended.

Based upon the previous page, the following criteria shall be used to establish a sanitary sewer level of service, as follows:

1. Minimum average daily flow to be treated from domestic units shall be 200 gallons per equivalent dwelling unit per day; and
2. Wastewater effluent shall meet standards defined by state law, permit requirements of the Florida Department of Environmental Protection, and county Ordinance when discharged to groundwater or surface water in the county.

To assure minimum average daily flow, the county reviews wastewater treatment facility capacity during the evaluation of development orders, in accordance with Ordinance No. 89-103 as amended, Sarasota County Concurrency Management Regulations. These regulations require that development orders be analyzed to determine the availability of adequate capacity based on an inventory of all central sanitary sewerage systems serving unincorporated Sarasota County. The inventory helps determine the provider's ability to serve a proposed project and includes data relating to system capacity, historical average daily flow of treated sewage, historical peak flow, number of hook-ups, and number of contractual commitments. Furthermore, the Sarasota County Utilities Department reviews development petitions pursuant to county requirements, including the Land Development Regulations and the Uniform Water, Wastewater and Reclaimed Water System Code, to ensure the availability of treatment capacity.

SUMMARY SANITARY SEWER AND REUSE WATER

Sarasota County has taken a series of steps to provide solutions to the problems associated with numerous independent wastewater treatment plants and onsite sewage treatment and disposal systems. These steps include the design and construction of projects outlined in the various Wastewater Management Plans, reuse and reclaimed water plans, and the Phillippi Creek Septic System Replacement Program (PCSSRP). Sarasota County has enacted a series of policy directives, ordinances, resolutions, and programs designed to improve the community's quality of life, provide for enforcement, safeguard the environment, and protect the health, safety and welfare of the public.

These projects and policies have created a framework for:

- Meeting the water needs of our natural systems while meeting the water needs of our community;
- Incorporating methods to reduce the county's ecological footprint;

- Creating opportunities to diversity the county's economic base;
- Advance the goals of an integrated, sustainable water resources management program.

ENDNOTES- SANITARY SEWER AND REUSE WATER

1. Report on the Engineering and Economic Feasibility of Water and Sanitary Sewer for the County of Sarasota, Smally, Wellford, & Nalven, 1967.
2. Engineering and Cost Analysis of Water and Wastewater Systems, Smally, Wellford, & Nalven and Russell & Axon, Inc. 1970.
3. Water and Wastewater Systems Master Plan for Sarasota County, Smally, Wellford, & Nalven and Russell & Axon, 1971.
4. Central County Pollution Control Zone Engineering and Cost Analysis of Water and Wastewater Systems, Smally, Wellford, & Nalven and Russell & Axon, 1975.
5. Sarasota County 201 Facilities Plan, Smally, Wellford, & Nalven and Russell & Axon, 1977.
6. Wastewater Sludge Disposal Study, Camp, Dresser, and McKee, 1986
7. Vision 20/20: Wastewater Resources Recovery Project, 1989.
8. Franchise Acquisition, Consolidation and Implementation Master Plan- Wastewater Collection and Treatment Master Plan, Sarasota County Utilities Department, 1993.
9. Reuse Master Plan, Sarasota County Utilities Department, 1994.
10. Sarasota Bay: Reclaiming Paradise, Sarasota Bay National Estuary Program, 1993.
11. Preliminary Engineering Report- Central Water and Sewer Service, Post, Buckley, Schuh and Jernigan, Inc., 1994.
12. Sarasota County Wastewater Management Plan, Greeley and Hansen, 2001.
13. Sarasota County Wastewater Management Plan Report, Greeley and Hansen 2009.
14. Sarasota County Reclaimed Water Master Plan, McKim & Creed Inc. May 2013.

POTABLE WATER

DATA AND ANALYSIS

Potable Water policies focus on maintaining sustainable water supplies, addressing deficiencies, protecting wellheads and natural recharge areas, defining levels of service, and acknowledging the importance of potable water as an economic driver for the community.

POTABLE WATER *(Prev. page 4-54)*

INTRODUCTION

Sarasota County's potable water demands are met by a variety of public and private potable water systems. The water supply demands of the unincorporated portion of Sarasota County are met by the Sarasota County Utilities System, the Englewood Water District, independent water treatment and supply systems, and individual wells. Municipal systems serve the cities of Sarasota, Venice and North Port, and the Town of Longboat Key. Through efforts to regionalize systems and diversify sources, many of these systems are interconnected, or have interconnection plans, to further strengthen the ability of water purveyors within Sarasota County to maintain a high level of service to residents in the event of droughts or other potential interruptions to water service.

The county began to play a role in the regulation and planning of water facilities in 1956 and 1957, when the Board of County Commissioners established amendments to subdivision regulations which, in part, required all new development to include provisions for central public water and sewer service. In the absence of a central water supply system, developers had the alternative to seek issuance of a water franchise from the county.

During the late 1960's and early 1970's, several factors heightened the county's awareness of the disadvantages of decentralized water systems. A growth rate of about 5,000 new residents per year, growing public concerns about the availability of future water supplies, and a severe drought during the winter of 1970-71 provided the impetus for the county to develop its first public water system under the general administrative auspices of the Sarasota County Utilities System. The critical demand for water carried the county through the planning stages in 1972-73, leading to construction in 1974-75 of the system which served the northwestern portion of unincorporated Sarasota County. The original and primary water supply source for the Sarasota County Utility District (SUD) system was from Manatee County. This was augmented with surplus treated water from the City of Sarasota and the development of the University Parkway wellfield.

The 1981 adoption of the Sarasota County Comprehensive Plan provided further policy direction for the county to develop a centralized, county-owned water supply. One of the prime areas identified as a potential water source was the 33,000 acre Ringling-MacArthur Reserve. This reserve was later renamed the T. Mabry Carlton, Jr. Memorial Reserve in honor of Sarasota County Commissioner, T. Mabry Carlton, Jr., a staunch supporter of an independent Sarasota County potable water supply source. In November 1982, Sarasota County voters approved a $30 million bond issue referendum to fund the public acquisition of the property. Bonds were issued in December 1982. Construction of the water treatment plant and wellfield began in 1993. The system became operational in early 1995.

Beginning in 1988, the county started to develop centralized water and sewer utility systems by placing certain franchise systems into public ownership. Through an active acquisition program, all of the large independent water treatment plants have been brought into public ownership, resulting in a unified distribution system for central water. All of the current franchise water systems are able to purchase water from the Sarasota County Utilities System under bulk water agreements. As of 2013, only one franchise utility with a bulk water agreement remains.

LEGISLATION

Under Public Law 93-523, the “Safe Drinking Water Act,” the federal government established water quality standards for the protection of water for public use, including operating standards and quality controls for public water supply systems. This law directed the Environmental Protection Agency (EPA) to establish minimum drinking water standards which are divided into “primary” standards, or those required for public health, and “secondary” standards, those recommended for aesthetic qualities.

In accordance with federal requirements, the Florida Legislature adopted Chapter 403.850, Florida Statutes, the “Florida Safe Drinking Water Act.” The Florida Department of Environmental Protection (FDEP) is the state agency responsible for implementing this act and has established rules classifying and regulating public water systems under Chapter 62-550, Florida Administrative Code. The primary and secondary standards of the “Safe Drinking Water Act” are mandatory in the State of Florida.

Drinking water quality standards in compliance with federal and state legislation are enforced and records are maintained by the Florida Department of Health in Sarasota County. The county is responsible for enforcement of FDEP rules and county ordinance concerning the pollution of groundwater or drinking water supplies, resulting from improper operation of wastewater treatment facilities or problems resulting from commercial or residential uses.

The Southwest Florida Water Management District (SWFWMD) has adopted rules under Chapter 40D, Florida Administrative Code, and is responsible for the management of water resources within a sixteen-county region to protect the supply necessary to meet existing and future demands. Additional regulations relating to the operation of community and non- community public water supply systems are set forth within Chapter 64 E-8, Florida Administrative Code.

Chapter 62-521, Florida Administrative Code, provides criteria for delineating wellhead protection areas; restrictions, including prohibition and regulation of certain substances, activities and facilities in wellhead protection areas; and, establishes permitting requirements, compliance review inspections and enforcement procedures.

The 2002 Legislature expanded the local government comprehensive plan requirements to strengthen coordination of water supply planning and local land use planning. The most significant new requirement is a 10-year Water Supply Facilities Work Plan, coordinated with the SWFWMD Regional Water Supply Plan (RWSP), which addresses the water supply facilities necessary to serve existing development and new growth for which the county is responsible. A key component of this legislation is the requirement that a local government must incorporate by reference this 10-year Water Supply Facilities Work Plan into its comprehensive plan, and update this work plan at a minimum every 5 years or within 18 months after the governing board of a water management district approves an updated regional water supply plan. In accordance with FS 163, comprehensive plan policy ICE Policy 1.3.7 provides an acknowledgment of the districts regional water supply plan and its policies.

PLANNING STUDIES AND INTERGOVERNMENTAL COORDINATION EFFORTS

During the late 1960's and early 1970's, concerns arose about the long term, potentially adverse economic and environmental effects of private water and sanitary sewer franchises. These concerns prompted the Board of County Commissioners to initiate preparation of one of its first planning efforts. The 1971 study, Water and Wastewater System Master Plan,[1] identified water pollution as the principal rationale for proposing the creation of a county-wide, county owned and operated water and wastewater treatment system. Public support for the implementation of a portion of the plan was strengthened by a drought during the winter of 1970-71, which led to widespread well failures and to the enactment of emergency watering restrictions by the Board of County Commissioners.

A 1975 engineering study entitled, Central County Pollution Control Zone Engineering and Cost Analysis of Water and Wastewater Systems[2] focused on particular problems associated with development of water and wastewater systems within the mid county area.

In 1978, a citizen's ad hoc committee was appointed. Its findings concurred with earlier recommendations to create a county-wide potable water system. The committee urged the Board of County Commissioners to continue creating special utility districts capable of becoming bulk water customers to a county-wide treatment and supply system. The recommendations proposed a phased development of existing water resources within the county, including the establishment of a wellfield in eastern Sarasota County as the initial supply source, followed by development of surface water supplies, such as the Myakka River and Cow Pen Slough. It was this report which helped stimulate interest and support for the county to examine the T. Mabry Carlton, Jr. Memorial Reserve for use as a long term potable water supply source. Additional recommendations called for negotiations among Sarasota, DeSoto, and Charlotte Counties in an effort to create a tri-county water authority capable of utilizing the Peace River as a long-range supply source.

The Peace River/Manasota Regional Water Supply Authority was created in 1982, by interlocal agreement among Charlotte, DeSoto, Hardee, Manatee, and Sarasota Counties. Hardee County withdrew in 1983, and a new interlocal agreement among the current members, Charlotte, DeSoto, Manatee and Sarasota Counties, was approved in 1984. The Authority is an Independent Special District of the State created pursuant to Chapter 373, Florida Statutes, in recognition by its member governments that provisions for water supply needs and protection of water resources is best accomplished by maintaining a regional water supply authority. By Florida Statute, the primary function of the authority is to ensure that future water supplies and the development, recovery, storing, and supplying of water resources for county or municipal purposes are completed in a manner that gives priority to encouraging conservation and reducing adverse environmental effects of excessive or improper withdrawals from concentrated areas.

SWFWMD urged the county to concentrate upon the development of an in county water supply. This suggestion, in conjunction with the ad hoc citizens committee report identifying the T. Mabry Carlton, Jr. Memorial Reserve as a potential water supply source, prompted the Board to seek additional information regarding the tract. Sarasota County also requested the

United States Geological Survey (USGS) to perform extensive exploratory hydrological studies on the surficial aquifer of the tract. These studies, which were completed in 1980, provided the basic foundation for developing the T. Mabry Carlton, Jr. Memorial Reserve as a potable water supply. In 1982, the Board proceeded with statements of financial commitment to acquire and develop the T. Mabry Carlton, Jr. Memorial Reserve; voters approved a referendum to purchase the tract.

Resolution No. 82-200 was also adopted to establish an ecological monitoring program for the Reserve, as well as determine the overall needs for acquiring and conserving additional portions of the reserve. The ecological monitoring requirements have been incorporated in the water use permit for the Carlton plant.

The Sarasota County Water System- Study Phase Report[3] was submitted to the Board in November 1985. This report focused on the design of a water treatment plant and a water transmission network sufficient to serve the county's projected needs. The recommendation of this report was for the county to proceed with the adoption of a "staged approach" to developing a water treatment plant capable of being expanded on a modular basis. Additionally, the Board agreed to consider efforts to secure water for potential customers, and to study the rate making requirements of combining the existing system with a county-wide water supply system.

The Water System Master Plan Update Report[4] completed in 1985, detailed the expansion of the county's potable water network. This study concentrated on projecting water usage within the existing SUD 1 service area. The study included revised population projections within the service area, refined historical usage data, and recommended improvements in the various facilities of the system. This report, with its refined usage data, was the basis for determining the level of service standard for potable water.

The November 1994 document, Preliminary Engineering Report- Central Water and Wastewater Service,[5] was prepared to update previous efforts for the phasing and design of a centralized utility system. Although the report primarily addressed the provision of central sewer service in areas of the urbanized, unincorporated area utilizing septic tanks, the report also identified those areas relying on private wells for water supply. The study established 226 project areas where central water and sewer service were not available. The project areas encompassed a total of 37,341 platted lots of record with 30,188 existing homes, 13,910 of which were served by private water wells.

In 1996, a master plan was prepared specifically addressing water storage, distribution and treatment needs for the southern portions of the county's service area. The master plan reviewed existing system information and facilities, utilized the CYBERNET computer model to evaluate demand scenarios and various system alternatives, and presented a series of recommendations for future operation and maintenance functions and capital improvements. In 1997, the Florida Legislature amended Chapter 373, Florida Statutes, to require the water management districts to prepare district-wide Water Supply Assessments (WSA). Based on the results of the WSA, Regional Water Supply Plans (RWSP) were required for areas where existing and reasonably anticipated sources of water were determined to be inadequate to meet future demand. The WSA addresses the needs of all classes of water users, not just public suppliers.

The SWFWMD WSA was completed and accepted by the SWFWMD Governing Board in June 1998. Four water supply planning regions were identified for purposes of preparing the WSA, with Sarasota, Manatee, DeSoto and Charlotte Counties comprising the southern region. Work then began on the development of the RWSP, which was adopted by the Governing Board in August 2001.

The RWSP identified county-wide demands through the year 2020 for agriculture, public supply, industrial, and recreational users. The RWSP also identified potential new sources of water to meet these demands. The RWSP does not dictate specific projects but rather provides a list of projects for users to choose from.

Concurrent with the development of the RWSP, Sarasota County retained the services of consultants CH2MHill to complete a Sarasota County Water Supply Master Plan (WSMP).[6] Whereas the SWFWMD RWSP identified needs of all classes of users to the year 2020, the county's WSMP looked at only potable water demands through the year 2030. The WSMP identified 25 supply alternatives and ranked those alternatives in a decision matrix based on factors to maximize reliability, ability to permit, resource management benefits, customer satisfaction, and management flexibility, and to minimize costs. The WSMP did not recommend specific projects. Because of the close timing to the creation of the Water Planning Alliance, the WSMP was forwarded to the Alliance for their use in evaluating water supply demand projections and potential projects on a regional basis. In conjunction with the county's 2050 Comprehensive Plan amendment, Planning staff developed population projections to the year 2050. The demand projections in the WSMP were updated in April 2002 to reflect the new population estimates.

In November of 2001, Sarasota County Utilities completed the Wastewater Management Plan[7] that evaluated the north, central and southern service areas for wastewater treatment. This plan outlined strategies for optimizing flows to regional wastewater treatment facilities, effluent disposal or reclaimed water supply and demand projections and biosolids disposal issues, all of which are discussed in the sanitary sewer section of this document.

In May of 2002, Sarasota County, along with representatives from every county and municipality in Charlotte, DeSoto, Manatee and Sarasota Counties, and the Englewood Water District met as the Water Planning Alliance (Alliance). The Alliance is a voluntary planning body which addresses water supply needs for the four-county region over a 20-year time frame. The goal of such a cooperative effort is to prevent any "water wars" in the future as the region grows. The Peace River/Manasota Regional Water Supply Authority acts as the administrative agency for the Alliance. The Alliance conducted a multi-phase Regional System Planning and Engineering Study to evaluate supply and demand needs for potable and reclaimed water within the region. Phase I focused on an assessment of the existing water supplies, treatment facilities and delivery methods. Phase II was completed in August of 2005, and focused on future water supply assessments and project prioritization. This feasibility study looked at a 20 year period (2003-2023) to address the region's future water supply needs The role of the Alliance is to evaluate projected demands and potential water supply projects on a regional basis. By planning cooperatively, the region can prevent potential adverse environmental impacts from concentrated water withdrawals in any particular water system and meet the water supply needs of the region.

In October 2005, the water authority member governments and water customers adopted the second amended interlocal agreement to the Master Water Supply Contract, (MWSC). The MWSC established the terms and conditions for providing potable water from the Authority to its member governments and customers. The Master Water Supply Contract is valid for a term of 35 years. Each water customer has an option to extend the contract for an additional term of 35 years. An important MWSC provision requires that on an annual basis each entity shall provide the Authority with its potable water demand projections for a 20-year period. These projections are used by the Authority for planning purposes. The MWSC further stipulates that the projections provided for the first 7 years of the 20-year planning period represent a contractual obligation on the part of the Authority to develop supplies and on the part of the members and customer(s) to purchase those supply quantities.

The information developed by the Water Planning Alliance was used by the Peace River/ Manasota Regional Water Supply Authority to develop an Integrated Regional Water Supply Master Plan which was completed in March 2006. This 2006 Master Supply Plan included a Capital Improvement Program, which identified projects through the 7-year MWSC planning period from 2006 through 2013. The master plan also includes an evaluation of water supply opportunities for the Authority to consider that go beyond the 7-year MWSC planning period, for the years from 2014 through 2025.

In 2006 Sarasota County updated its 2001 Water Supply Master Plan (WSMP). The purpose of this update was to address the County's water supply needs through the year 2050. During this same period of time (concurrently) the Southwest Florida Water Management District adopted its 2006 Regional Water Supply Plan (RWSP). The County has been working to coordinate its water supply needs with the Southwest Florida Water Management District (SWFWMD), the Peace River/Manasota Regional Water Supply Authority (PRMRWSA), the Water Planning Alliance (WPA), and its associate members to develop adequate water supply strategies in concert with these regional initiatives.

The Peace River/Manasota Regional Water Supply Authority's Master Plan was released in final draft form in December 2006, and finalized in September 2008. The Master Plan includes a preliminary evaluation of new regional supply opportunities, with an emphasis on providing a high degree of reliability. This Master Plan projected water demands through the year 2025. Pursuant to a change in Florida Statutes (Sec. 163.3177(6)(c)); Sarasota County amended its comprehensive plan to include reference to its adopted 10-year Water Supply Facilities Work Plan entitled Sarasota County Comprehensive Plan Water Facilities Supplement, dated September, 2009. Shortly thereafter in July of 2011 the Southwest Florida Water Management District adopted its 2010 Regional Water Supply Plan (RWSP), and Sarasota County updated its 10-year Water Supply Facilities Work Plan, in 2012[9] along with amending its comprehensive plan in accordance with state statute.

In June of 2013, the Board of County Commissioners accepted the 2012 Water Supply Master Plan,[10] which included the previously accepted 10-year Water Supply Facilities Work Plan along with additional data and analysis out to the 2050 planning horizon. In April of 2015, the Peace River/Manasota Regional Water Supply Authority updated its Integrated Regional Water Supply Plan. This was done in coordination with the Southwest Florida Water Management District 2015 Regional Water Supply Plan (RWSP) which was adopted by the District in November of 2015. In response to these plan updates Sarasota County updated its 10-year Water Supply Facilities Work Plan dated December, 2015.

WATER CONSERVATION

Sarasota County, in cooperation with SWFWMD and the FDEP, has long been an advocate of water conservation. In 1993, the county dedicated a full time person to outreach and resident education about the need to conserve precious water resources. The campaign has been very successful reducing per capita water use from approximately 150 gallons per person per day. In 1995, the county's Utility System customers used approximately 90 gallons of drinking water per person per day, by 2005 the number was 86, and in 2014 it was 78 gallons per person per day (gpcd). Starting in 2013 the County adopted the Southwest Florida Water Management District uniform methodology for calculating per capita consumption, which lowered the county's overall rate. Sarasota County Utilities have utilized a number of methods to promote conservation including:

- Inverted Rate Structure- Sarasota County Utilities and Englewood Water District use a tiered structure of increasing rates with increasing volume of water used. Initially implemented in November 1991, the county rate system has evolved over time to one of the most aggressive tiered rate systems in the state. Both EWD and the county will continue to utilize this effective conservation tool.
- Use of Low-Flow Plumbing Fixtures – Ordinance No. 94-001 requires low-flow plumbing fixtures (toilets, showerheads, faucets) in all new development. Public education and outreach programs since 1995 have promoted the installation of low-flow toilets, showerheads and faucet aerators for homeowners in existing homes through the use of financial incentives, showerhead exchanges, and giveaways.
- Use of Automatic Shut-Off Devices for Irrigation Systems- Ordinance 94-001 required automatic shutoff devices in all newly constructed irrigation systems. Ordinance No. 96-021 requires them in all systems and requires that the devices must be operational at all times.

- Ordinance related to Water-Efficient Landscaping Regulations Ordinance No. 2001-081, as amended discourages the connection of an automatic irrigation system to the potable water supply in new development and limits areas of turf and annual flowers to 50% or less of the irrigated area within new construction. Low volume micro-irrigation is required for plant beds and no grass can be planted in strips narrower than four feet.
- Golf Course Ordinance – Ordinance No. 2003-069 ensures the development, operation and maintenance of new golf courses protects and conserves natural resources and the environment. The ordinance requires that they protect water resources, employ best management practices to control stormwater pollution, and implement an integrated pest management plan. Included in the ordinance is a golf course technical manual.
- Promotion of Reclaimed Water – As discussed in the sanitary sewer section of this chapter, reclaiming treated wastewater for irrigation is the primary means of wastewater disposal for Sarasota County Utilities and Englewood Water District. This practice also offsets the amount of potable and groundwater that would be used for irrigation water.
- Watering Restrictions – Sarasota County initially implemented once a week watering restrictions on May 1, 2000. Even through severe rainy seasons, the county has remained committed to the once a week watering restrictions to help residents develop drought tolerant landscapes. Watering less frequently, but more deeply, creates a deep root system that will be able to survive the severe droughts that come naturally to this area.
- Outreach and Education – Sarasota County remains dedicated to outreach and education of residents of the need to conserve precious water resources. Most of the county's hands-on water conservation takes place through the UF/IFAS Extension and Sustainability Service, e.g. Horticulture – Commercial and Residential Conservation Programs.

Conservation programs, watering restrictions and building codes apply to the entire unincorporated area of the county including franchise and EWD service areas. Several education and outreach programs such as television and radio advertising, brochures, and outreach events, are cooperative efforts, between the county, the cities and SWFWMD. All potable water supply projects must be permitted through SWFWMD so constant coordination is vital to the success of the projects. In addition, SWFWMD is a supporter of several county and regional water supply projects, such as the Peace River Plant through their Cooperative Funding Program.

INVENTORY

The Sarasota County Utilities System's service area covers most of the urbanized area of unincorporated Sarasota County. The southernmost portion of the urbanized area lies within the service area of the Englewood Water District. The franchise water systems and their geographical service areas are shown on Map 12-8. The City of Sarasota, the City of North Port, the City of Venice, and the Englewood Water District own and operate independent water systems that provide service within their jurisdictional boundaries. The Town of Longboat Key purchases its water from Manatee County.

Due to the regional nature of water supplies, such as Manatee County and the Peace River Authority, and the benefits of having a diversity of sources, a number of interconnections among the public supply systems have been constructed. The county is interconnected with the Cities of Venice, North Port and Sarasota, and Englewood Water District. The county has Emergency Bulk Water Supply Agreements with the Cities of Venice and Sarasota in the event anything should happen to their water supplies. The county is connected to the City of North Port, Charlotte and DeSoto Counties through the Peace River pipeline. The pipeline typically conveys flows from the Peace River Plant to the Carlton Plant, but is designed to reverse flow direction if needed. The county is also connected to Manatee County through three water supply connections. This level of interconnection to systems throughout the county and region significantly strengthens the ability of public water suppliers to respond to emergencies or other interruptions in supplies such as extreme droughts or hurricanes.

SARASOTA COUNTY UTILITY POTABLE WATER SOURCES

MANATEE COUNTY CONTRACT

Sarasota County first contracted with Manatee County to purchase up to 10 mgd of potable water in 1973. In 1991, a second contract was negotiated for up to 5 mgd of additional water at premium rates. On October 21, 2003, the two counties entered into a new agreement with for potable water supply. This contract consolidated the two previous contracts and slowly decreases Sarasota County's purchase of water from Manatee as the Peace River Plant increases capacity. The allocation of water capacity is 10 mgd through spring 2008; 8

mgd through spring 2015; 6 mgd through spring 2020, and 5 mgd through spring 2025. The decrease in water purchased from Manatee County has been factored into Sarasota County's long-range water supply strategy.

UNIVERSITY WELLFIELD

The University Wellfield lies near the northern boundary of Sarasota County and supplies groundwater for blending with potable water received from Manatee County. The University Wellfield consists of seven permitted production wells that vary in depth from 580 feet to 640 feet below land service (bls). The current Water Use Permit (WUP) allows an average withdrawal of 2.0 mgd and a peak monthly quantity of 2.4 mgd. This wellfield is permitted under a county-wide consolidated water use permit, which lists all of the county's production wells: SWFWMD Permit No. 20008836.013, which expires on August 28, 2027. Key permit stipulations include the county's obligation to comply with chloride trigger levels, implement any necessary wellfield management measures to attain compliance, maintain a per capita water use rate of less than 150 gpd and achieve a minimum of 50% beneficial reuse.

CARLTON WELLFIELD AND TREATMENT PLANT

The Carlton Wellfield is located centrally in Sarasota County east of the Myakka River and Interstate 75. The Carlton Wellfield consists of 16 permitted production wells. The well depths vary from 400 feet to 715 feet below land surface. The current WUP allows an average daily groundwater withdrawal of 7.303 mgd and a peak monthly daily average of 9.625 mgd. The Carlton Wellfield is permitted under a consolidated water use permit, which lists all of the county's production wells, SWFWMD Permit No. 20008836.013, which expires on August 28, 2027.

The Carlton plant utilizes a desalination process called electrodialysis reversal, or EDR, to treat the brackish well water, and is one of the largest of its kind in the world. The process is highly efficient, recovering approximately 85 gallons of drinking water for every 100 gallons processed. The plant has a design capacity of 12 mgd. Key permit stipulations include the county's obligations to: follow specific construction specifications for new wells, manage chloride concentration trigger levels, submit water audits, and implement hydrologic, hydrogeologic and wetland monitoring plans.

JACARANDA WELLFIELD AND TREATMENT PLANT

The county also owns the Jacaranda water treatment plant and wellfield system (AKA Venice Gardens Wellfield), which it obtained in 1994 as part of the purchase of the Southern States Utilities, Inc. franchise. The plant uses reverse osmosis membranes to treat the brackish groundwater. The water use permit allows a daily withdrawal of 4.43 mgd but the plant is currently configured to produce 2.75 mgd. The water use permit for the Jacaranda Wellfield is permitted under the county's consolidated water use permit. The locations of these facilities are shown on Map 12-9.

PEACE RIVER MANASOTA REGIONAL WATER AUTHORITY

In May 1991, the Peace River/Manasota Regional Water Authority (Authority) purchased the General Development Corporation water treatment plant on the Peace River in DeSoto County. The plant capacity of 12 mgd was contracted to Charlotte County, DeSoto County and the City of North Port.

The Authority began planning for a 6 million gallon a day expansion and the plan was completed in June 1993. The Authority submitted a request for a twenty-year water use permit to SWFWMD in October 1994. Sarasota County's allocation in that application was 13.5 mgd.

By July 1996 the water use permit had been issued, SWFWMD funding was obtained, and water supply contracts for the expanded plant capacity had been signed. The Authority awarded the engineering contracts for the plant expansion, the additional aquifer storage and recovery (ASR) wells and the pipeline from the plant to the county's Carlton water treatment plant. The forty-two inch pipeline is designed to carry up to 20 mgd.

Sarasota County's allocation in the first expansion was 3.875 mgd. By a separate agreement, Sarasota County transferred 0.375 mgd of its allocation to DeSoto County. Also by separate agreement, Sarasota County purchased Charlotte County's allocation of 2.0 mgd for a period of ten years. The first expansion was completed in 2002. The agreements with Charlotte County and Desoto County are no longer active.

The Peace River Facility has a finished water capacity of 32.9 mgd with a rated peak capacity of 51 mgd. The facility has 21 ASR wells where treated water is stored for use in the dry season, a 625 million gallon reservoir for raw water storage from the Peace River, and a 6 billion gallon off-stream reservoir that was completed in 2009. Sarasota County's annual average allocation in the Peace River Facility was 10 mgd for 2010, 13.23 mgd for 2011, and increased to 15.06 mgd in 2015, thru the end of the Master Water Supply Contract.

In 2009, Sarasota County and the Peace River/Manasota Regional Water Supply Authority (Authority) entered into an Interlocal Agreement, for the Carlton/State Road 681 Regional Interconnect project (Regional Integrated Loop System, Phase 3A Interconnect). The project includes 8.3 miles of 48- inch pipe, 10 million gallons of storage, a high service pump station, and system appurtenances. This agreement includes provisions for hydraulic capacity entitlement, requires an operating protocol agreement, sets forth the method of funding the construction, establishes water delivery characteristics, and provides cost estimates as well as other related items required for the project. The addition of the 10 million gallons of storage from this project plus the 5 million gallons of storage owned by the county that currently resides at the Carlton water treatment plant allows for the water produced by both the Authority and the county to be blended together prior to leaving the Carlton site.

SARASOTA COUNTY INFRASTRUCTURE
SYSTEM INTERCONNECTIONS

The Sarasota County system is interconnected with six other public water supply systems. The county system is interconnected at three points with the Manatee system, at five points with the City of Sarasota's system, at two points with the City of Venice's system, two points with the Peace River/Manasota Regional Water Supply Authority, one point with Englewood Water District and at one point with the City of North Port. In addition to providing for the county's water purchase from Manatee, these interconnects allow the utilities to provide each other with water in cases of emergency, depending on the availability of supplies. Through the Peace River Pipeline, the county system is interconnected with North Port, Charlotte County and DeSoto County.

In addition to connections to other public suppliers, the Sarasota County Utility Water System is connected to one franchise water supplier within the county's jurisdiction. The county provides bulk water sales to the South Gate Utilities Franchise, owned by Pluris-South Gate Utilities Inc.

TRANSMISSION MAINS

The county has a large water transmission system, consisting of mains from 14 to 42 inches in diameter. Larger transmission mains (18-inch and greater) are usually ductile iron pipe, although a few large PVC pipes have been installed. The 10-year Water Supply Facilities Work Plan identifies the major transmission mains that will need to be constructed. The supply from Manatee County will reduce in the coming years, after which the University WTF will be the sole water supply source in the northern portion of the county. It will be necessary to continue the evaluation and construction of new transmission mains to address this change in supply and to meet customer demands.

PUMPING STATIONS

Six primary pumping stations drive the county utilities system. Pump Station No. 1 is located on University Parkway, and utilizes a three million gallon storage tank, which can store a blend of water from the Manatee County System and the University Parkway wellfield. It can also be used for storage of either supply source without mixing. Pump Station No. 2 is located on Beneva Road near its intersection with Bahia Vista Street and has a one million gallon storage tank. Pump Station No. 3, with 4.5 million gallons of storage, is located northeast of the intersection of Clark and Swift Roads. Pump Station No. 4, which has no associated storage capacity, is located on Lakewood Ranch Boulevard south of University Parkway.

Pump Station No. 5 is located at the intersection of Cattlemen and Proctor Roads and has 2.5 million gallons of storage. Pump Station No. 6 located at U.S. 41 and Vamo Way has a three million gallon storage tank onsite. Elevated Storage Tank No. 1 is north of Fruitville Road, east of I-75 and has 2.0 million gallons of storage. The Gulf Gate elevated storage tank provides 0.25 million gallons of storage.

FRANCHISES

The one franchised water supplier remaining in Sarasota County is South Gate Utilities. The county provides all of the water used by the South Gate Utilities franchise, which is owned by Pluris-South Gate Utilities Inc. Siesta Key Utilities, became part of the County system in 2006. In 2013, Sarasota County acquired the holdings of Aqua Utilities Florida Inc., which included the Dolomite Utilities and Kensington Park Utilities water systems.

DOMESTIC WELLS

Early development within Sarasota County typically utilized domestic wells for potable water supply. Areas such as South Venice, Osprey and Nokomis have a high density of residents that utilize domestic wells. In the late 2000's the county's Water Line Extension Program extended water lines into the Osprey and Nokomis areas. Wells constructed prior to new construction techniques established in the mid-1980s are susceptible to drought conditions simply due to outdated construction methods. To prevent the proliferation of domestic wells within the county, the Land Development Regulations require that new development within the existing urban service boundary connect to central water service based upon size of development and distance to the central water systems.

OTHER COMMUNITY WATER SUPPLY SYSTEMS

In addition to the water systems operated by the public authorities and franchises, there were[8] other Community Water Systems operating in Sarasota County in 2015. A Community Water System serves at least 25 persons on an annual basis or provides at least 15 service connections. These Community Water Systems are listed in the 10-year Water Supply Facilities Work Plan. In this listing the named Community Water System is the operator of responsibility. Most of these systems serve small residential communities, such as mobile home parks, and have limited and constrained geographic service areas. For example, the Community Water systems, which serve mobile home parks, serve only those parks. The geographic service area for the remaining systems is the physical location of the named plant. As Sarasota County Utilities extends infrastructure within the urban service boundary, pumps and transmission mains are sized to serve these systems wherever possible. The county cannot force these systems to connect to the central water system, but designs infrastructure so that service is available should the community want to connect.

NON COMMUNITY WATER SUPPLY SYSTEMS

A Non-Community Water System is a public water system that is not a Community Water System. This type of water system can be further classified as a transient Non-Community Water System which serves at least 25 individuals on a daily basis, for at least 60 days out of the year or a non-transient non-community water system which regularly serves at least 25 of the same persons at least 6 months of the year. There were 86 Non-Community Water Supply Systems in operation in 2015. The Non-Community Water Systems are listed in the 10-year Water Supply Facilities Work Plan. In this listing, the named Non-Community Water System is the operator of responsibility. Almost all of these systems serve proprietary uses and served only the location of the named plant. For example, the geographic service area for Seven Eleven No. 22859 is only that parcel which contains the Seven Eleven building. Other examples include restaurants, churches, bars, and small commercial buildings. As Sarasota County Utilities extends infrastructure within the urban service boundary, pumps and transmission mains are sized to serve these systems wherever possible. The county cannot force these systems to connect to the central water system, but designs infrastructure so that service is available should the customer want to connect.

MISCELLANEOUS WATER SYSTEMS

Apart from the individual wells used for water supply, the Florida Department of Health in Sarasota County also regulates water supply systems which are considered limited use community or limited use commercial water supply systems. In 2015, there were 516 Health Department regulated water supply systems owned and operated for commercial or residential rental units (2 or more rental units, but less than 15 service connections). As Sarasota County Utilities extends infrastructure within the urban service boundary, pumps and transmission mains are sized to serve these systems wherever possible. The county cannot force these systems to connect to the central water system, but designs infrastructure so that service is available should the customer want to connect.

ENGLEWOOD WATER DISTRICT POTABLE WATER SOURCES

The Englewood Water District (EWD) was created by special act of the Florida Legislature and is governed by the Englewood Water District Board of Supervisors. The five-member Board of Supervisors are elected through popular vote, and serve in four-year terms. Englewood Water District service area includes the southwestern portion of Sarasota County and northwestern portion of Charlotte County including Englewood, Manasota Key and significant rural lands in the Forked Creek, Gottfried Creek and Ainger Creek Drainage Basins within the Lemon Bay Watershed. The EWD provides potable water, sanitary sewer, and reclaimed water services within its service area. The county and EWD have one potable water system interconnect. EWD uses four fresh water wellfields providing raw water to a lime softening plant. In 1984 EWD implemented Reverse Osmosis (RO) treatment and has two brackish water or RO wellfields as an additional source of supply. Wellfield 1 consists of twenty-five 6-inch diameter fresh water production wells dispersed in a residential neighborhood, immediately west and north of EWD's lime softening water treatment plant. All twenty-five wells are cased to depths between 20 feet and 56 feet below land surface. Wellfield 2 is co-located with RO Wellfield 2

and consists of eighteen 6-inch diameter fresh water production wells located within a parcel of undeveloped land approximately two miles north of the lime softening water treatment plant. All eighteen wells are cased to depths between 37 and 55 feet below land surface with total depths ranging from 50 to 100 feet below land surface. Fresh water Wellfield 3 consists of twelve 8-inch diameter production wells located in the undeveloped north-central section of the service area. The twelve wells are located off Keyway Road with total depths ranging from 61 to 125 feet below land surface. Fresh water Wellfield 5 consists of eight 6-inch diameter wells cased to depths of 42 to 57 feet below land surface. Wellfield 5 is located on SR 776 between the Elks Lodge and Artist Avenue.
EWD uses two brackish water or RO wellfields. RO Wellfield 2 consists of eight 10-inch diameter wells interspersed among the fresh water production wells at Fresh water Wellfield 2. The eight production wells are cased to depths between 252 feet and 271 feet below land surface with total depths ranging from 420 feet to 430 feet deep. RO Wellfield 4 is located near the RO water treatment plant and immediately east of Fresh water Wellfield 1. The RO Wellfield consists of nine 12-inch diameter production wells which are cased to depths between 210 and 287 feet below land surface with total depths ranging from 372 feet and 430 feet below land surface.

These sixty three (63) fresh water wells and seventeen (17) brackish water wells are capable of producing 8.7 million gallons per day. However the water use permit issued by the Southwest Florida Water Management District restricts withdrawal to a peak month daily quantity of 6.59 million gallons, or an annual average daily quantity of 5.36 million gallons.

Englewood Water District's water use permit WUP No. 204866.010 expires December 18, 2019. Demand used in the permit uses a gross per capita rate of 94.5 gallons per capita day (gpcd) and an adjusted gross per capita rate of 65.5 gpcd.

The RO plant capacity can produce 3.0 MGD of finished water and realizes 65% efficiency based on historical data. It takes roughly 4.6 MGD of brackish raw water from its wellfields to produce 3.0 MGD of finished water, with the balance of the projected demand (0.76 MGD) coming from its freshwater wellfields to meet its current and future demands.

POTABLE WATER DEMANDS

The county updates population projections annually, and evaluates demands as part of the 10-year Water Supply Facilities Work Plan. Table 12-1 shows the dates, population, and

water use assumptions for Sarasota County Utilities. Table 12-2 shows similar information for the Englewood Water District (EWD) service area. To remain consistent with the Regional Water Supply Plan tables, the supply values listed for Englewood Water District in Table 11-2 encompass the entire supply for EWD that would serve both Charlotte County and Sarasota County. An analysis of the independent and Other Potable Water Supply population is included in the 10-year Water Supply Facilities Work Plan and represents the smaller water providers or individual wells based on Heath Department and Regional Water Supply Plan data.
The county considers two populations in its planning activities: resident and functional population. Resident population reflects the average year-round population. Functional population includes year-round population plus temporary winter season residents. The functional population represents an equivalent dwelling unit (EDU) with a greater level of occupancy. Thus, for planning proposes the county uses residential population when comparing the Average Daily Demand for the population served, to the Potable Water Supply/ Treatment Capacity available, expressed as an Annual Average Daily Demand. The resident population projection is used when comparing the county's demand projections to SWFWMD's Regional Water Supply Plan (RWSP). To address the functional population during peak months the County uses a peak month factor of 1.2 when evaluating available supplies and peak monthly treatment capacity. The peak month factor is based on historical operating data and is reviewed by the County on an annual basis. Formal changes to this factor are captured as part of the county's Water Supply Master Plan updates. Commercial use of water is included in the county's demand projections.

Independent water treatment and supply systems that have significant design capacities within unincorporated Sarasota County include Camelot Lakes, which is a mobile home community, and the Sun N Fun Resort owned by Royalty Resorts. These supply systems have capacities of 200,000 and 195,000 gallons per day (gpd), respectively. There are no large industrial customers on the county's utility system and the total amount of other potable water supplies in the unincorporated Sarasota County is estimated to be less than 2% of the total demand presently served by the county.

The Englewood Water District serves the southwestern portion of Sarasota County and northwestern portion of Charlotte County. Approximately 55% of EWD's demand is in Sarasota County and 45% in Charlotte County. The Sarasota County portion of EWD's service area represents approximately 7% of the relevant population within the Sarasota County, based on historical information, including 2010 Census data. The population and demands shown includes both Charlotte County and Sarasota County so that the figures are consistent with the Regional Water Supply Plan tables.

PROJECTED POTABLE WATER DEMANDS

The county uses a water projection model to update water demand projections on a regular basis to reflect changes in population growth, per capita water consumption, and county demographics such as housing occupancy. The model provides a consistent method to calculate average annual day and peak month average day water demand projections, as well as water service area population projections. Each year the Board of County Commissioners approves a water demand projection that is submitted to the Peace River/Manasota Regional Water Supply Authority as the annual projection of water demands for the next twenty years, in accordance with the Master Water Supply Contract.

The model's input data can be adjusted so that the most current information is used when calculating new water demand projections. Data such as housing occupancy ratio, average persons per household, per capita water consumption, and ratio of county population in the incorporated and unincorporated areas are among some of factors used in the model. The methodologies included in the model are utilized in the 10-year Water Supply Facilities Work Plan.

The methodologies utilized include a comparison of population projections based on the University of Florida, Bureau of Economic and Business Research (BEBR), housing growth trends, historical water production and the retrofitting of existing neighborhoods with potable water service through the Capital Improvement Program. The model also includes several charts to illustrate the population and demand projections. Comparisons of the various demand projections are made so that the county can identify the differences between the methodologies and how various data inputs affect the calculations.
The base input includes factors that can be adjusted or corrected from the previous year's population and demand projections. The factors included are outlined below.

1. Average housing occupancy ratio (from Planning & Development Services Department).
2. Average persons per household (from most recent Census).
3. Percent of county residents residing in the unincorporated area (from Planning &

Development Services Department).

4. Percent of county residents residing in the Englewood Water District (EWD).
5. Estimated households on private wells.
6. Estimated households on private wells that connect to the county water system each year (not attributed to septic tank retrofit programs).
7. Average persons per equivalent dwelling unit (EDU) for utility septic tank retrofit program planning purposes.
8. Peak (maximum) month peaking factor (ratio of peak month to average annual water demands).
9. Average per capita water consumption in gallons per capita per day (gpcd).
10. Average per capita water consumption in gpcd for planning purposes.
11. The estimated dwelling units added per year.

Only areas within the unincorporated portion of Sarasota County are served by the county water utility. The cities of Sarasota, Venice, and North Port have their own supplies and are not provided water by the county. In addition, some residents in the unincorporated area of the county utilize individual well systems. To develop population projections for the county water utility service area, a formula to account for incorporated and self-served areas was developed. The Unincorporated Sarasota County Service Area demands represent the unincorporated portion of the county including consecutive providers like South Gate Utilities. The unincorporated figures do not include the demands that are met by Englewood Water District, areas served by standalone private water suppliers Camelot Lakes, Sun N Fun, or by individual parcels served by wells. The projections take into account any water savings or potential offsets that maybe gained through conservation strategies.

TABLE 12-1: SUMMARY OF WATER DEMANDS, SUPPLY/TREATMENT CAPACITY, AND PERMITTED WATER AMOUNTS FOR SARASOTA COUNTY UTILITIES*

Sarasota County Population & Annual Average Projection

Year	2015	2020	2025
Population Served(1)	190,000	229,800	251,000
Demand per Capita (gpcd)	100	100	100
Avg. Daily Demand (mgd)	19.00	22.98	25.10
Available Supply/Treatment Capacity (mgd)			
Carlton WTF	5.850	5.850	5.850
Authority	15.060	15.060	15.060

Manatee County(2)	6.000	5.000	0.000
University WTF(3)	2.000	0.800	0.000
Venice Gardens WTF	2.750	2.750	2.750
Future Supply/Treatment(4)	0.000	0.000	4.190
Total Supply/Treatment Capacity (mgd)	31.660	29.460	27.850
Facility Treatment Capacity Surplus(5)	12.660	6.480	2.750
Permitted/Contracted Water Amount (mgd)			
Carlton/University/ Venice Gardens permitted water use quantity(6)	13.737	13.737	13.737
Authority	15.060	15.060	15.060
Manatee County	6.000	5.000	0.000
Future Permitted/Contracted Water Amount (mgd)	0.000	0.000	0.000
Total Permitted/Contracted Amount (mgd)	34.797	33.797	28.797
Permitted/Contracted Surplus(7)	15.797	10.817	3.697

* Facilities planning needs may be adjusted from these numbers using current trends.

Notes:

1. Based on Sarasota County demand projections.
2. The Manatee County contract provides 5 mgd until March 31, 2025, at which point the reserve capacity is reduced to zero.
3. Less than 2 mgd may be available based on University Wellfield water quality (TDS) and the amount (volume) from Manatee County available for blending. The capacity at University is reduced to zero when the Manatee County supply is no longer available for blending.
4. Future Supply/Treatment capacity expressed as 4.19 mgd (AADF) and 5 mdg (MMADF).
5. Calculated by subtracting Avg. Daily Demand from Total Supply/Treatment Capacity.
6. Use of the full 13.74 mgd water use permit allocation requires the transfer of wellfield allocation to the Carlton and 12 mgd of Carlton treatment capacity.
7. Calculated by subtracting the Avg. Daily Demand from the Total Permitted/ Contracted Amount.

The county requires readiness to serve letters from Englewood Water District, and South Gate Utilities, as part of its rezone, comprehensive plan amendments and development review process.

TABLE 12-2: SUMMARY OF EWD WATER DEMANDS, SUPPLY/TREATMENT CAPACITY, AND PERMITTED WATER AMOUNTS

EWD Population & Annual Average Projection

Year	2015	2020	2025
Population Served(1)	35,419	36,179	36,928
Demand per Capita (gpcd)	61	61	61
Avg. Daily Demand (mgd)	2.177	2.223	2.269
Available Supply/Treatment Capacity (mgd)			
Treatment Plant Capacity	5.460	5.460	5.460
Future Supply/Treatment	0.000	0.000	0.000
Total Supply/Treatment Capacity (mgd)	5.460	5.460	5.460
Facility Treatment Capacity Surplus(2)	3.283	3.237	3.191
Permitted/Contracted Water Amount (mgd)			
Wellfields	5.360	5.360	5.360
Future Permitted/Contracted Water Amount (mgd)	0.000	0.000	0.000
Total Permitted/Contracted Amount (mgd)	5.360	5.360	5.360
Permitted/Contracted Surplus(3)	3.183	3.137	3.091

Notes:

1. Based on SWFWMD's 2015 RWSP. Population includes both Charlotte and Sarasota Counties.
2. Calculated by subtracting demand from the available facility capacity.
3. Calculated by subtracting the demand from the total permitted/contracted quantity.

CAPITAL IMPROVEMENT PROGRAM

The county's Water Line Extension Program is part of the Capital Improvement Program (CIP), but supplemental funding mechanisms such as non-ad valorem assessments to assist with funding of this program are being considered on an area by area basis. The Nokomis community, including the Bay Pointe and Shore Lane areas, has voiced support of assessment districts to assist funding of central water extensions to their areas. The county has adopted a resolution for the Neighborhood Initiated Water and/or Sewer Line Extension Program that will allow residents to petition the county for service. To qualify, at least eighty percent (80%)

of the taxable improved property owners located within a proposed district are required to sign and notarize a Project Approval Petition in order for the project to proceed for Board consideration. This program is designed to increase the availability of central water and/or sewer within the unincorporated county, provide safe and reliable potable water and/or sewer service, minimize environmental impacts, improve groundwater quality, decrease pollution to county bays and watershed, eliminate septic systems, and offer fire protection.

The Philippi Creek and South Venice communities were originally developed with individual wells. Because of the population density, the county is continuing to look for ways to fund CIP projects in those areas. The CIP also includes funds to upsize water mains that are being constructed for new development as a way to improve the county's distribution infrastructure and plan for future needs. Other types of projects funded in the CIP include distribution and transmission main rehabilitation work, storage and treatment plant upgrades, water meter replacement, and strategic water system interconnects.

NON-POTABLE WATER STRATEGIES

One of the keys to sustainable water resource management is using the right water for the right use. Using highly treated drinking water to flush toilets, wash cars, and irrigate landscapes is not a wise use of the resource. Sarasota County has already taken a number of steps to reduce the per capita consumption of drinking water by over 40% since the early 1990s. In 1995, the county's utility system customers used approximately 90 gallons of drinking water per person per day, by 2005, the number was 86, and in 2014 it was 78 gallons per person per day (gpcd). Starting in 2013, the county adopted the Southwest Florida Water Management District uniform methodology for calculating per capita consumption, which lowered the county's overall rate. In particular, irrigation water offers significant opportunities for wise and more sustainable water use. Natural landscapes in Florida are capable of withstanding the annual wet-dry cycle as well as the natural extremes of flood and droughts by requiring less artificial irrigation. However, as our natural landscapes are replaced with non-native landscapes, more water intensive irrigation is the outcome. Ironically, over-irrigation can lead to shallower root zones and greater drought susceptibility. Water irrigation guidelines, or restrictions, are intended to prepare landscapes for droughts by creating a deeper root system as well as not to waste water. Making a distinction between potable water and reuse water is an essential prerequisite for developing more sustainable water supply resource strategies.

IRRIGATION STRATEGIES

Currently the county has several strategies to effectively deal with the irrigation of our community including reclaimed water, groundwater wells, surface water, a tiered utility rate structure, requirements for the use of drip or micospray irrigation, and demand management or conservation by limiting watering days and times and restricting system operation.

RECLAIMED WATER

Utilization of reclaimed water for irrigation is Sarasota County's primary means of effluent disposal as outlined in the sanitary sewer section of this document. Utilizing reclaimed water for irrigation reduces the amount of potable water and groundwater that would otherwise be used for irrigation purposes. Historically Sarasota County has utilized approximately 80% of treated wastewater as irrigation water. From 2008-2009, the county decommissioned the Gulf Gate, South Gate, Meadowood, and Atlantic wastewater facilities and transferred wastewater flows to the Bee Ridge and Central County Water Reclamation Facilities in an effort to consolidate operations and eliminate the surface water discharges. This consolidation effort increased the volume of available reclaimed water. Currently Sarasota County utilizes approximately 50 percent of treated wastewater annually for irrigation. The other 50 percent of treated wastewater is disposed of by alternative means such as deep well injection, surface water discharge, or percolation ponds. Major users include golf courses, subdivisions and highway medians. A list of customers can be found in the county's North and South County Master Reuse Permits. This information is updated in letter format annually. The county's reclaimed water system is interconnected with the City of Sarasota and the City of Venice. Englewood Water District utilizes 100% of their treated water for irrigation purposes. Their reclaimed water system is interconnected with Charlotte County.

SURFACE WATERS

Surface waters are currently an underutilized resource within the county's water resource management strategies, as the county developed, significant ditching and dredging of inlands was required for mosquito management and agriculture needs. This dramatically changed the volume and timing of flow to the county's bays and estuaries. The volume of flow has further increased with the urbanization of the county. Rebalancing the natural water volume, or water budget, to the bays and estuaries will help restore the natural productivity of a very viable and rich juvenile fish habitat.

As opposed to other areas of the state where too much freshwater is being removed from large river systems, the county's tidal creeks are believed to have too much freshwater being flushed to the bays. The county and SWFWMD are cooperatively funding monitoring projects of the tidal creek systems to manage the current and projected natural water budgets.

GROUNDWATER

The county's unique geologic system, including the Surficial Aquifer, Venice Clay Layer and the distinct production zones of the Intermediate Aquifer, play a significant role in the county's water resource management strategies. Many domestic and irrigation wells utilize Production Zones 1 and 2 (PZ1 and PZ2) of the Intermediate Aquifer. Public supply systems will typically not utilize these zones within the Intermediate Aquifer due to the limited yield capacity of those production zones. A clay layer, (confining unit) separates the surficial aquifer from the upper Intermediate Aquifer, which prevents or limits the downward migration of irrigation, stormwater, and groundwater, and restricts recharge to the Intermediate Aquifer. A second clay layer the Venice Clay layer underlies the uppermost part of the Intermediate Aquifer known as PZ1, further limiting recharge to the lower permeable zones of the Intermediate Aquifer (PZ2 and PZ3) and thus provides a sufficient degree of confinement for production zones PZ2 and PZ3. Historically across much of Sarasota County, PZ2, PZ3, and the underlying Floridan Aquifer were artesian in nature due to the presence of these clay layers and the influence of groundwater levels from the inland ridge areas of the state.

As a response to concerns raised when wells in the Osprey area were going dry during the multi-year drought in the late 1990s, SWFWMD conducted a study in 2000, including modeling, of the Intermediate Aquifer. The study concluded that the Intermediate Aquifer is a sustainable aquifer system for its current uses as long as the resource is used judiciously. The study did recommend a more dense system of monitoring wells in the Intermediate Aquifer System to better characterize local effects. SWFWMD and the county have cooperatively funded the installation of some of these monitoring wells.

DEMAND MANAGEMENT

Improper irrigation of landscapes can be a large consumer of precious water resources. The county, therefore, has developed a number of methods of reducing demand including:

- Watering Restrictions- The county enforces once a week water restrictions regardless of the water source. These restrictions are in place year round. The reason for once a week watering restrictions, even during the wet season, is that landscapes watered less frequently develop a deeper root zone than those watered more frequently. This deeper root zone will assist landscapes in surviving, and even thriving, during times of drought.

- Water-Efficient Landscape Ordinance – The county's Land Development Regulations limit the amount of turf in new developments to 50 percent or less of the landscaped areas, and requires mulching and use of drip or microspray irrigation in planted areas. The Water-Efficient Landscape Ordinance (Ordinance No. 2001-081 as amended) also discourages the use of potable water as a source to new irrigation systems.
- Promotion of Florida-Friendly Landscaping™ Program – The county has long been a sponsor and promoter of the Florida-Friendly Landscaping™ Program (FFL) principles. The county supports two outreach positions for developers and builders and large homeowner associations as well as residents to actively promote FFL concepts.

LEVEL OF SERVICE

Level of service standards are influenced by a variety of factors, including contractual obligations with suppliers and franchise holders, supply and physical plant conditions, and water quantity and quality regulatory requirements as established by state and county legislation. Sarasota County's Potable Water Level of Service essentially has two components, water quantity and water quality.

POTABLE WATER QUANTITY

Potable water quantity within the Sarasota County Utilities System can be expressed in terms of average daily demand and peak demand. A potable water system must have an adequate capacity to meet the average daily demand, while being able to accommodate periods of peak demand. This is especially true in Sarasota County, where the influx of seasonal residents coincides with the dry season. A review of historical data indicates that a production capacity of 250 gallons per day per equivalent dwelling unit is needed to meet peak demands and fire flows.

Franchise systems and other community water systems exhibit existing levels of service which may be markedly different than the one found in the county's service area. These providers are presently responsible for determining that their systems have adequate capacity to meet the demands of present users as well as future commitments based on approved development orders and building permits. Deviations from the county-wide average level of service may occur because of different population characteristics in these local areas, and different patterns of water use. Consequently, many of these systems may have a level of service relating to quantity which differs from that adopted for the Sarasota County Utilities System.

POTABLE WATER QUALITY

Potable water quality can be expressed in terms of water quality standards as defined by the U.S. Environmental Protection Agency, and Chapter 62-550, Florida Administrative Code." This legislation provides detailed criteria for primary and secondary drinking water standards. This legislation was promulgated in order to assure that public drinking water systems meet minimum drinking water requirements. Chapter 62-550, Florida Administrative Code, applies to virtually all public drinking water systems with a few limited exceptions that meet the following criteria:

- consists of distribution and storage facilities only and does not have any collection or treatment facilities;
- obtains all of its water from, but is not owned or operated by, a public water system to which such regulations apply;
- does not sell water to any person; and
- is not a carrier which conveys passengers in interstate commerce.

Based upon the above, the following criteria shall be used to establish a potable water level of service. Potable Water Quantity (Minimum Average Daily Flow):

1. System capacity shall be based on 250 gallons per equivalent dwelling unit per day based on peak flow plus the maintenance of minimum fire flow standards.
2. Minimum potable water quality shall be as defined by the U.S. Environmental Protection Agency, except where the county may impose stricter standards.

CONCURRENCY ANALYSIS

Sarasota County's review of proposed development to address level of service, or concurrency analysis, was established by Ordinance No. 89-103. The Sarasota County Concurrency Management System Regulations are codified in Chapter 94, Article VII of the Sarasota County Code of Ordinances. For potable water, all development orders are analyzed to determine if adequate capacity of potable water and distribution capacity exists to meet level of service standards. As a result, proposed development plans are reviewed at every stage of the development process, including Comprehensive Plan Amendments, Rezone Applications, Site and Development Plans and finally the Building Permit for concurrency with the county's established level of service for potable water.

SUMMARY POTABLE WATER

It is the goal of Sarasota County, through a centralized county water supply system, to augment existing Sarasota County water supplies and to make central water available to the remainder of its service area through a progressive, controlled program of expansion.

Since the adoption of the Sarasota County Comprehensive Plan in 1981 and its revision in 1989, the county has made significant strides toward ensuring that an adequate supply of potable water is available to meet existing and future needs. The completion of the water transmission network, wellfield, and water treatment plant on the T. Mabry Carlton, Jr. Memorial Reserve in early 1995 provided the county with its own major independent water supply source for the first time. In addition to reducing the county's reliance on other suppliers, this new water source also enabled the county to abandon several smaller wellfields and plants, reducing the stress on groundwater aquifers. The construction of the pipeline between the Carlton water plant and the Peace River plant not only provides for additional quantities of surface water from the Peace River/Manasota Regional Water Authority, but also serves as a two way regional interconnect that can facilitate sharing of resources among all of the regional water purveyors. Since the county began the acquisition of private utilities in 1988, 28 franchises have been acquired by the county. Fourteen of these included water supply and distribution facilities, providing the county with additional infrastructure and customer base for water service.

Although much has been achieved, continual attention to long-range planning for future water supplies is critical. Sarasota County will continue to work with purveyors currently supplying water to the county and with the Water Planning Alliance to secure water sources to meet future demands.

ENDNOTES POTABLE WATER

1. Water and Wastewater System Master Plan, 1971. Smally, Wellford, & Nalven and Russell & Axon.
2. Central County Pollution Control Zone Engineering and Cost Analysis of Water and

Wastewater Systems, 1975. Smally, Wellford, & Nalven and Russell & Axon.

3. Sarasota County Water System Study Phase Report, 1985. Smally, Wellford, & Nalven and Russell & Axon.
4. Sarasota County Special Utility District No. 1, Water System Master Plan Update Report, 1985. Smally, Wellford, & Nalven and Russel & Axon.
5. Preliminary Engineering Report- Central Water and Sewer Service, Post, Buckley, Schuh and Jernigan, Inc., 1994
6. Sarasota County Water Supply Master Plan (WSMP), CH2MHill, 2001
7. Sarasota County Wastewater Management Plan, Greeley and Hansen, 2001
8. Sarasota County Comprehensive Plan Water Facilities Supplement, dated September 2009, prepared by Carollo Engineers, P.C.
9. 10-year Water Supply Facilities Work Plan, June 2012 prepared by Carollo Engineers, P.C.
10. 2012 Water Supply Master Plan prepared by Carollo Engineers, P.C.
11. 10-year Water Supply Facilities Work Plan, December 2015 prepared by Carollo Engineers, P.C.

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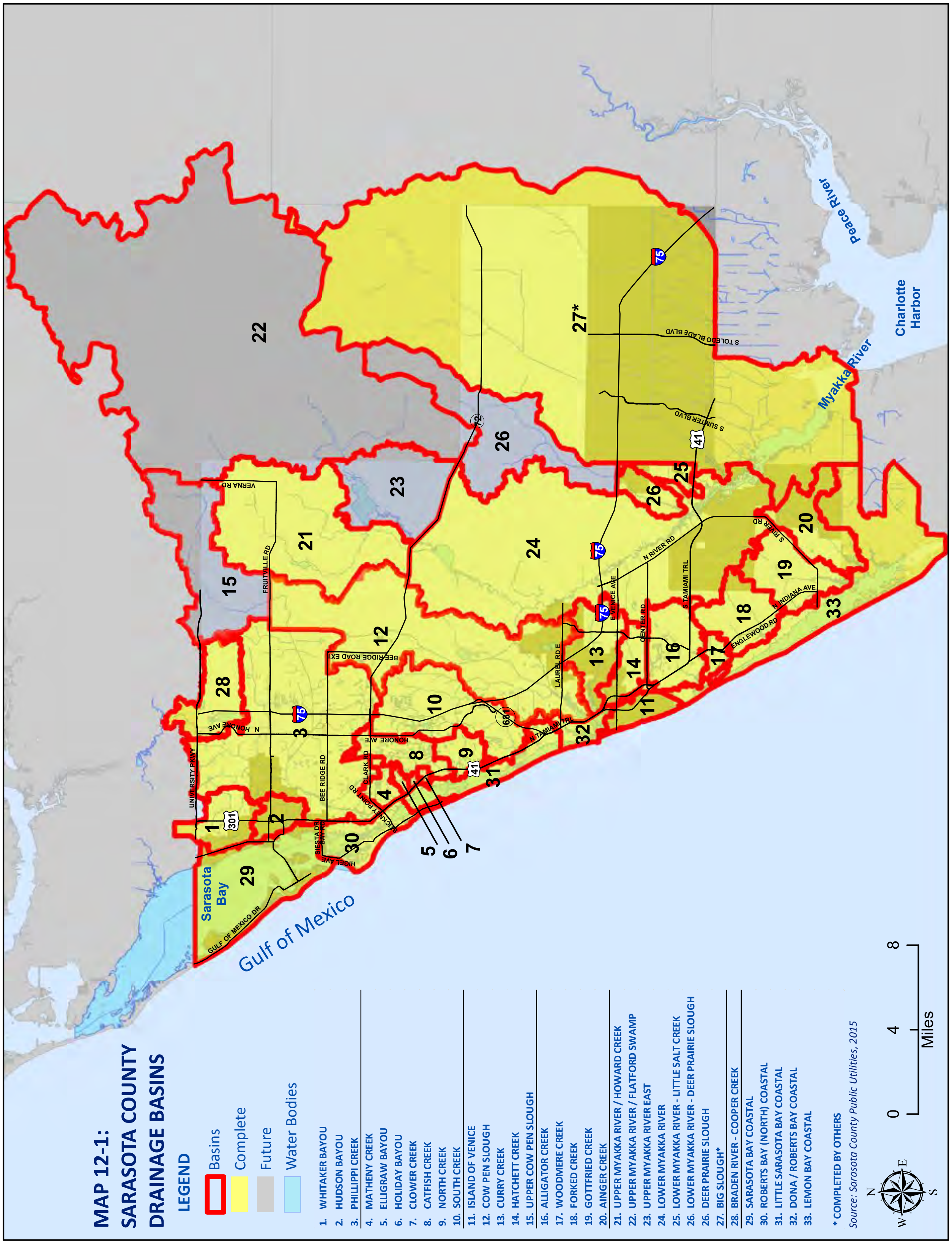
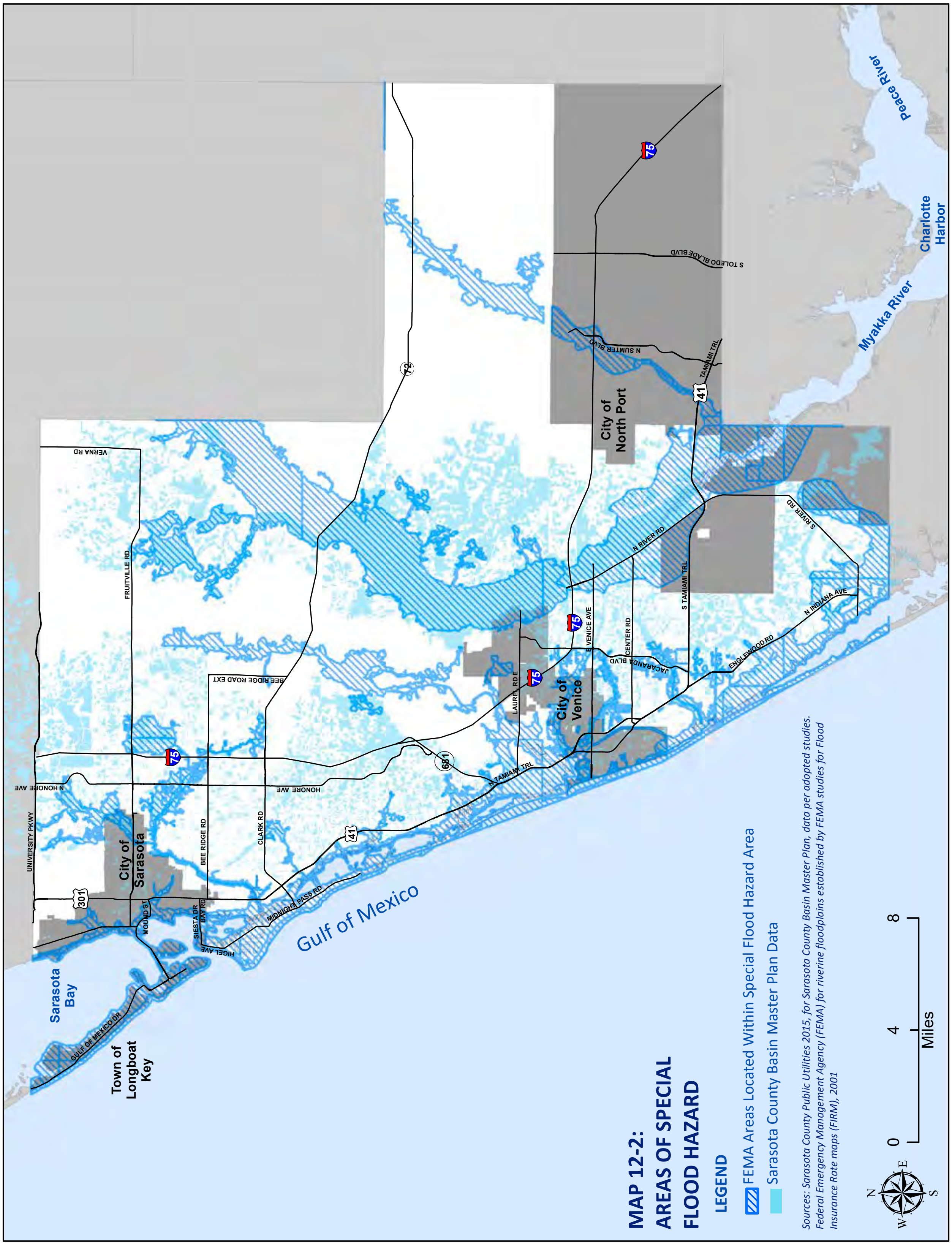
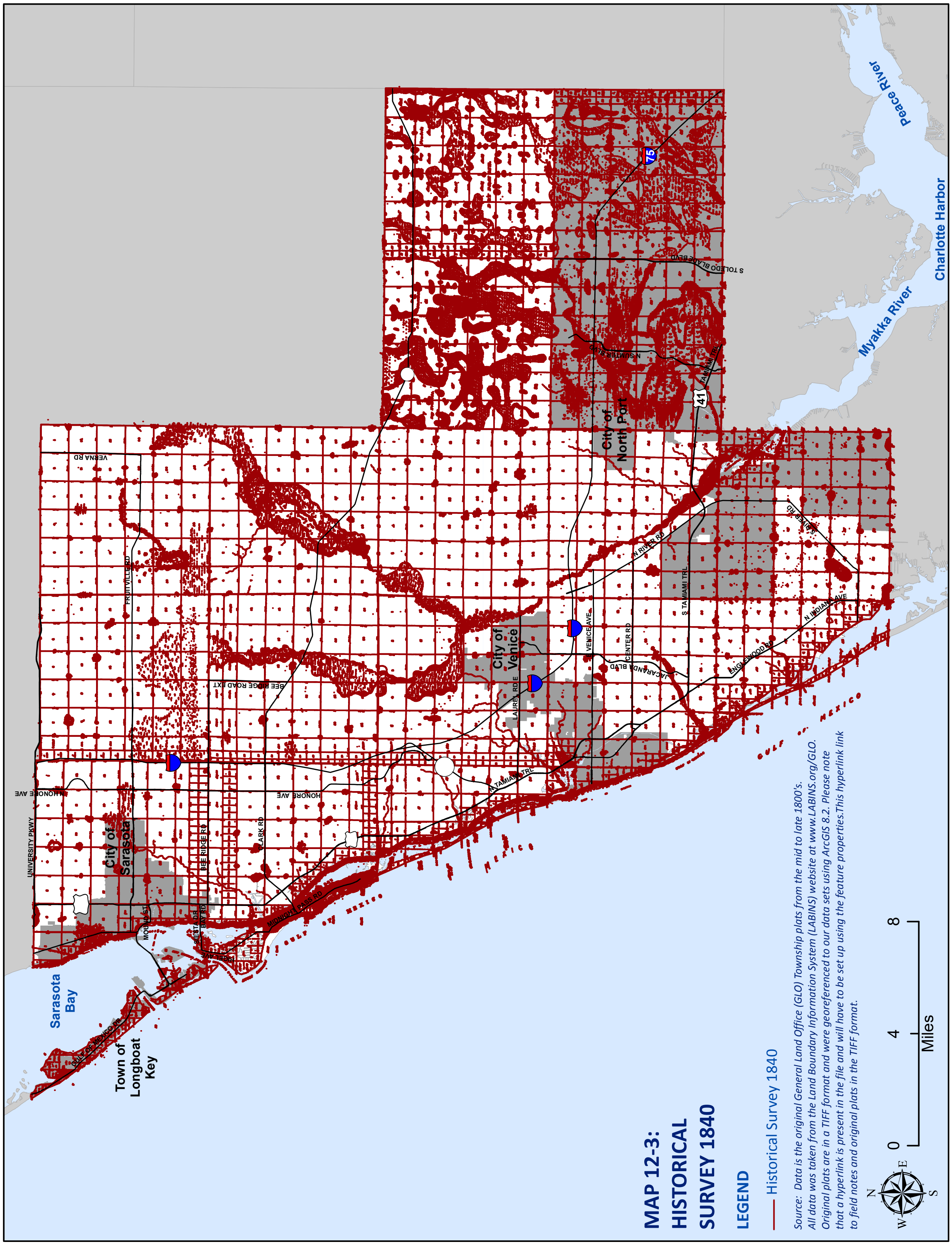
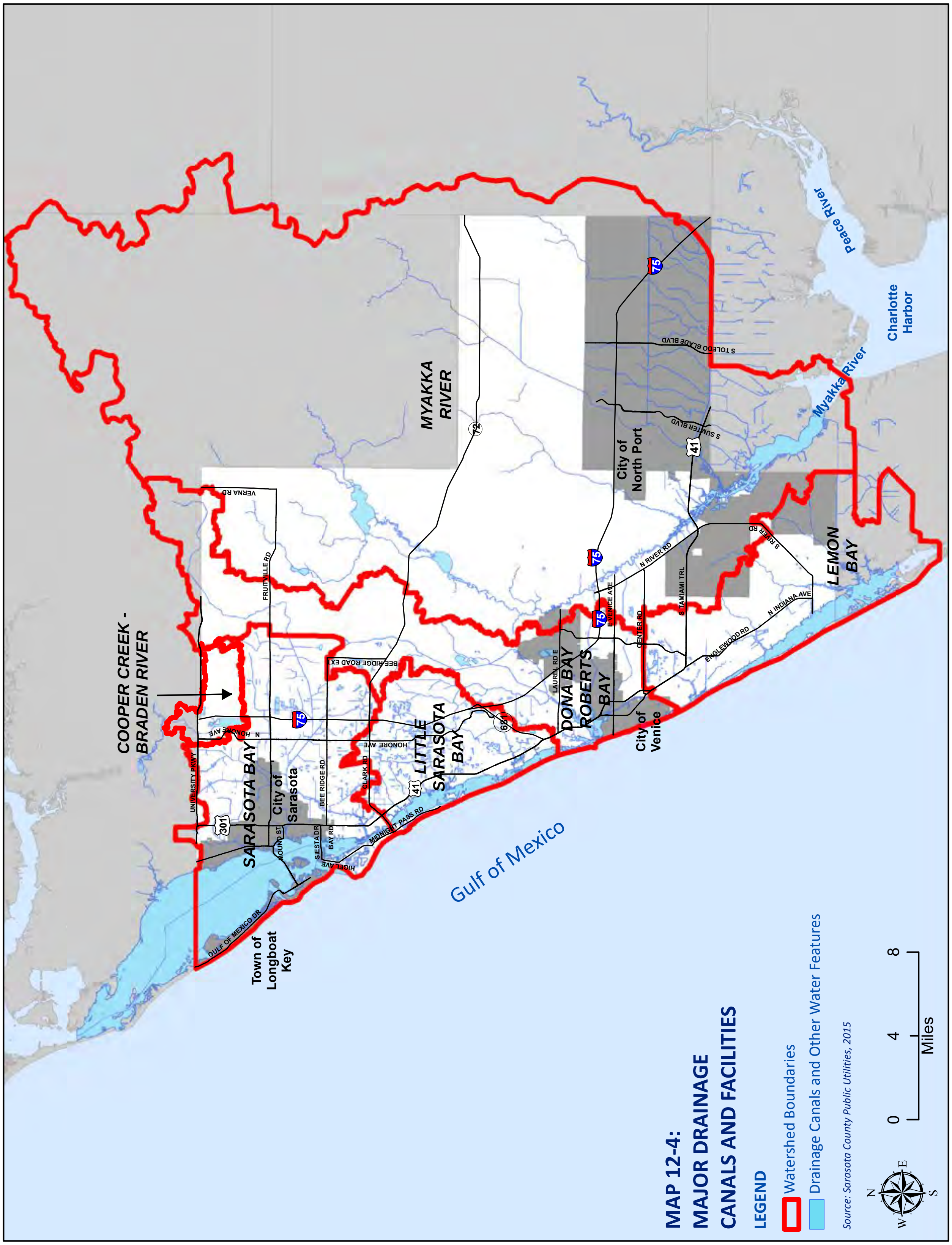
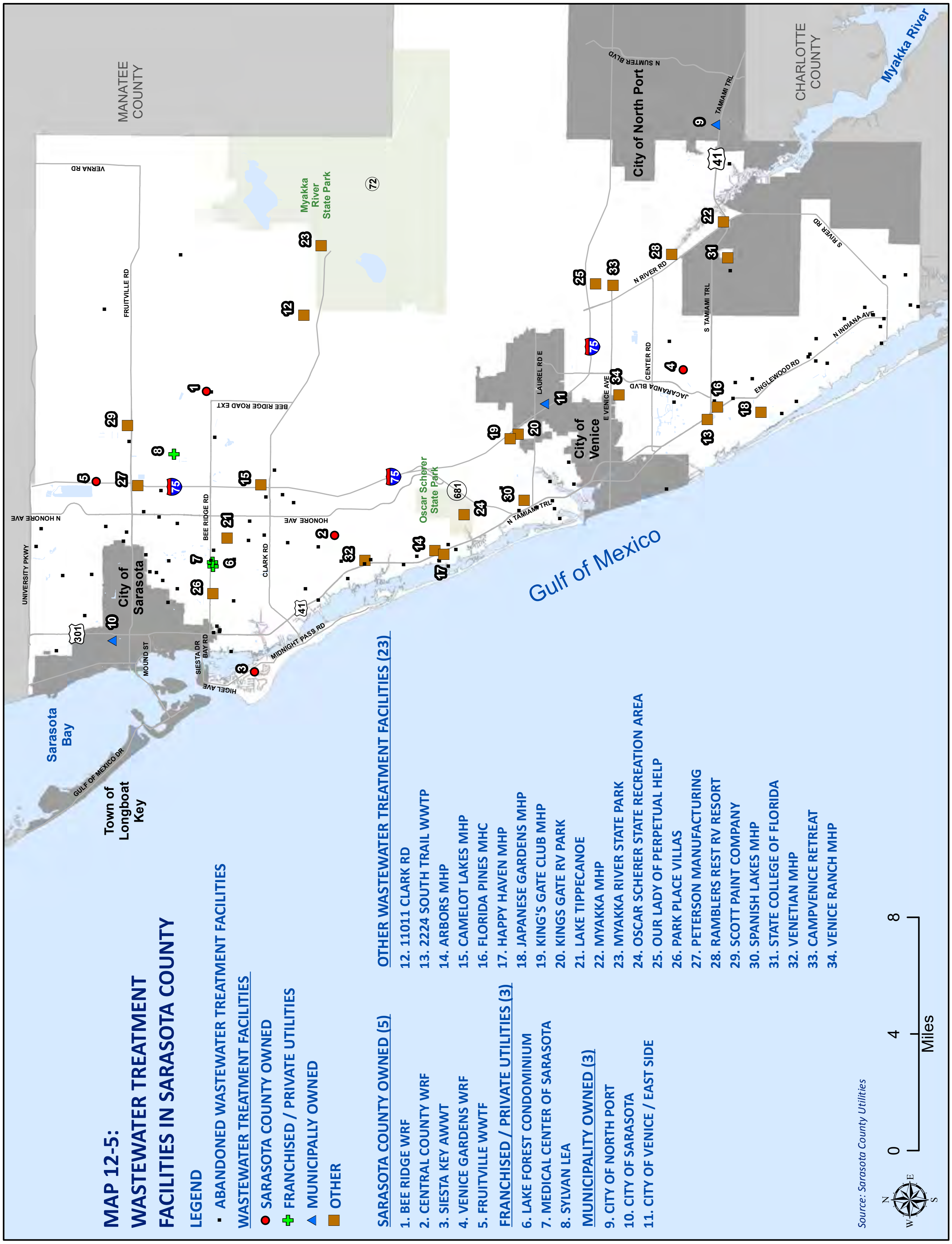
WATERSHED MANAGEMENT
MAPS

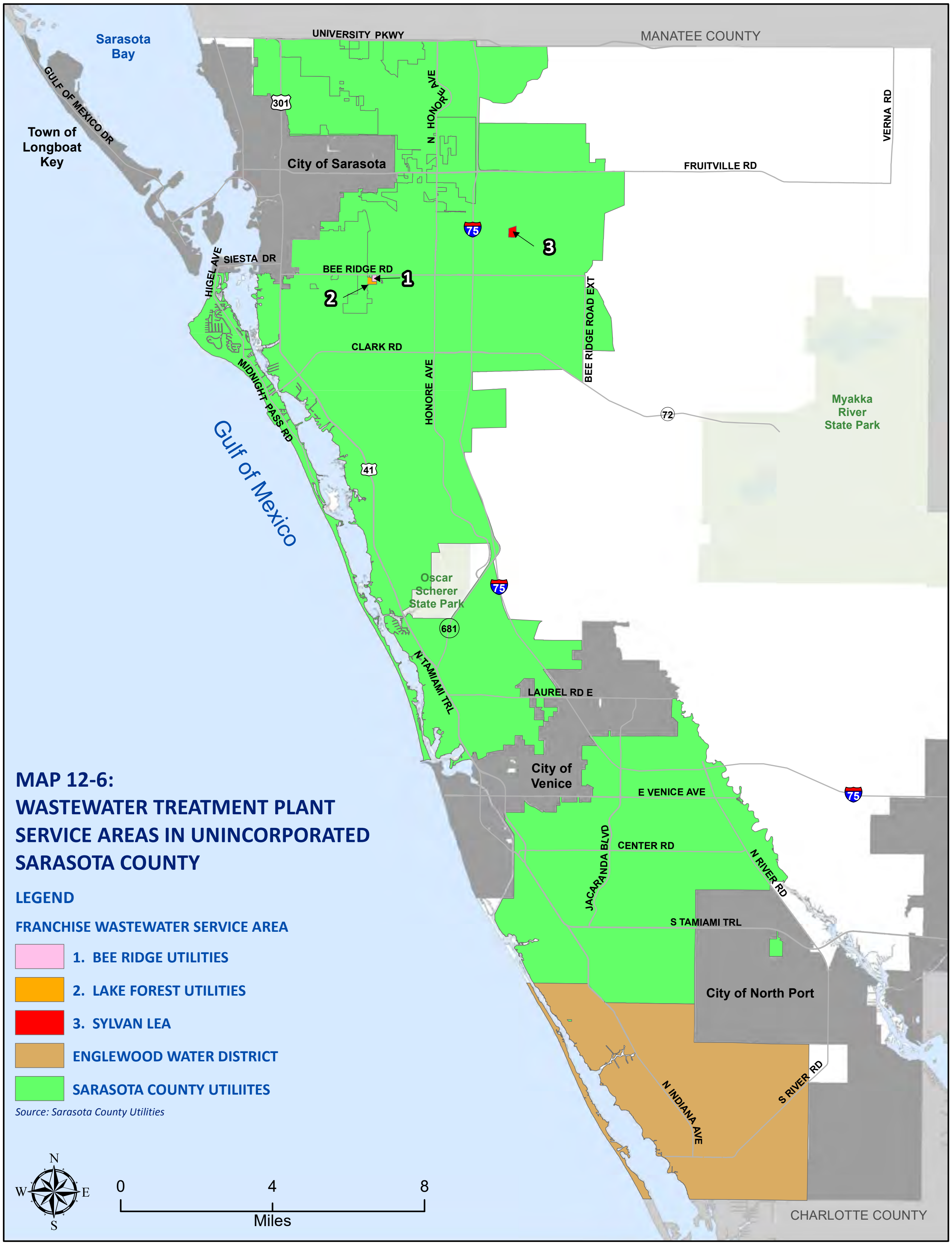

MAP 12-1:
SARASOTA COUNTY
DRAINAGE BASINS
LEGEND
Basins
Complete
Future
Water Bodies
1. WHITAKER BAYOU
2. HUDSON BAYOU
3. PHILLIPPI CREEK
4. MATHENY CREEK
5. ELLIGRAW BAYOU
6. HOLIDAY BAYOU
7. CLOWER CREEK
8. CATFISH CREEK
9. NORTH CREEK
10. SOUTH CREEK
11. ISLAND OF VENICE
12. COW PEN SLOUGH
13. CURRY CREEK
14. HATCHETT CREEK
15. UPPER COW PEN SLOUGH
16. ALLIGATOR CREEK
17. WOODMERE CREEK
18. FORKED CREEK
19. GOTTFRIED CREEK
20. AINGER CREEK
21. UPPER MYAKKA RIVER / HOWARD CREEK
22. UPPER MYAKKA RIVER / FLATFORD SWAMP
23. UPPER MYAKKA RIVER EAST
24. LOWER MYAKKA RIVER
25. LOWER MYAKKA RIVER - LITTLE SALT CREEK
26. LOWER MYAKKA RIVER - DEER PRAIRIE SLOUGH
26. DEER PRAIRIE SLOUGH
27. BIG SLOUGH*
28. BRADEN RIVER - COOPER CREEK
29. SARASOTA BAY COASTAL
30. ROBERTS BAY (NORTH) COASTAL
31. LITTLE SARASOTA BAY COASTAL
32. DONA / ROBERTS BAY COASTAL
33. LEMON BAY COASTAL
* COMPLETED BY OTHERS
Source: Sarasota County Public Utilities, 2015
0 4 8
Miles
N E S W
Gulf of Mexico
Sarasota Bay
Charlotte Harbor
Peace River
Myakka River

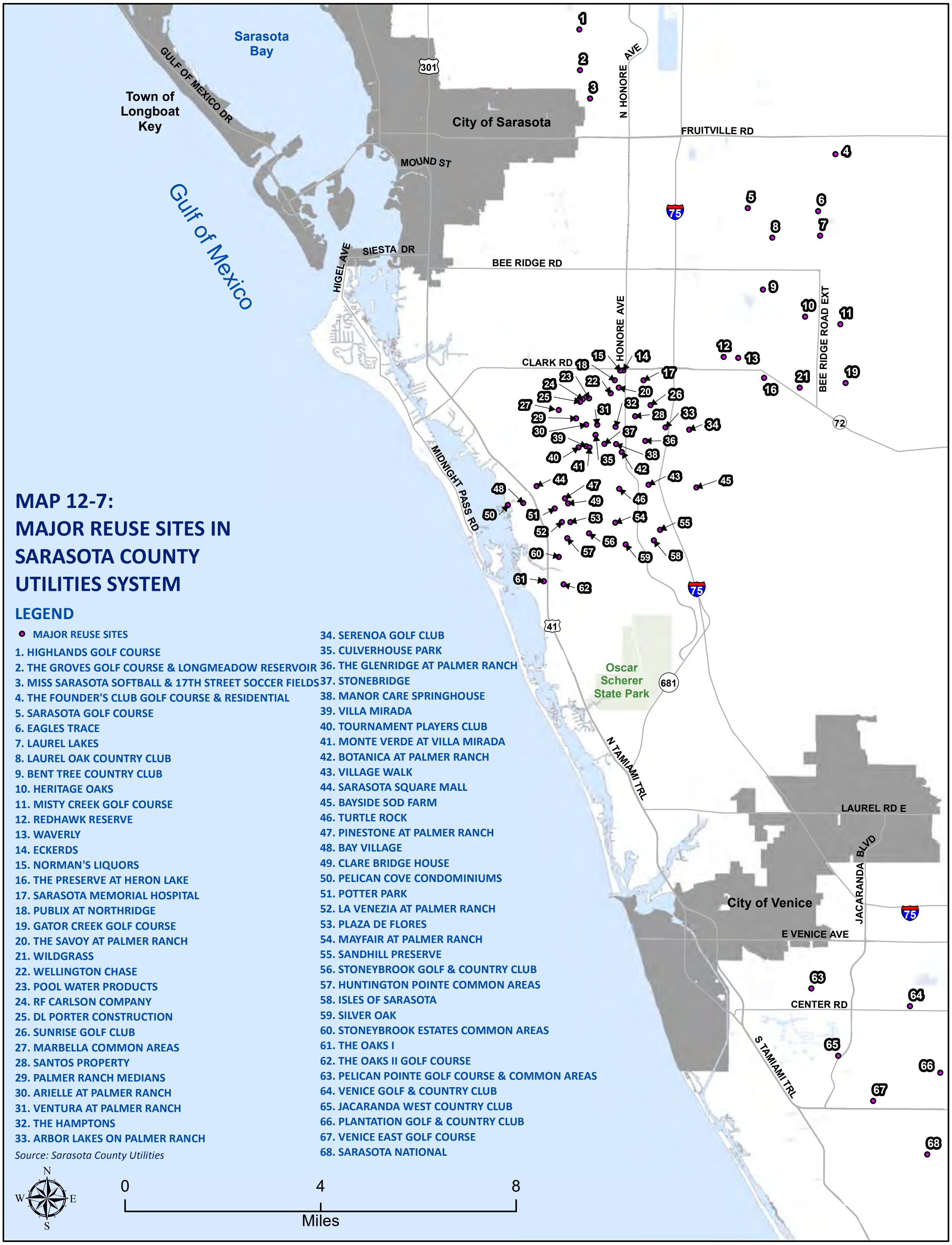

MAP 12-2:
AREAS OF SPECIAL
FLOOD HAZARD
LEGEND
FEMA Areas Located Within Special Flood Hazard Area
Sarasota County Basin Master Plan Data
Sources: Sarasota County Public Utilities 2015, for Sarasota County Basin Master Plan, data per adopted studies.
Federal Emergency Management Agency (FEMA) for riverine floodplains established by FEMA studies for Flood
Insurance Rate maps (FIRM), 2001
0
4
8
Miles
N
E
S
W
Gulf of Mexico
Sarasota Bay
Town of Longboat Key
City of Sarasota
City of Venice
City of North Port
Peace River
Charlotte Harbor
Myakka River
UNIVERSITY PKWY
N HONORE AVE
VERNA RD
FRUITVILLE RD
BEE RIDGE RD
BEE RIDGE ROAD EXT
CLARK RD
HONORE AVE
MOUND ST
SIESTA DR
BAY RD
HIGEL AVE
MIDNIGHT PASS RD
GULF OF MEXICO DR
N TAMIAMI TRL
LAUREL RD E
E VENICE AVE
CENTER RD
JACARANDA BLVD
S TAMIAMI TRL
N RIVER RD
S RIVER RD
ENGLEWOOD RD
N INDIANA AVE
N SUMTER BLVD
S TOLEDO BLADE BLVD
TAMIAMI TRL
75
72
681
41
301

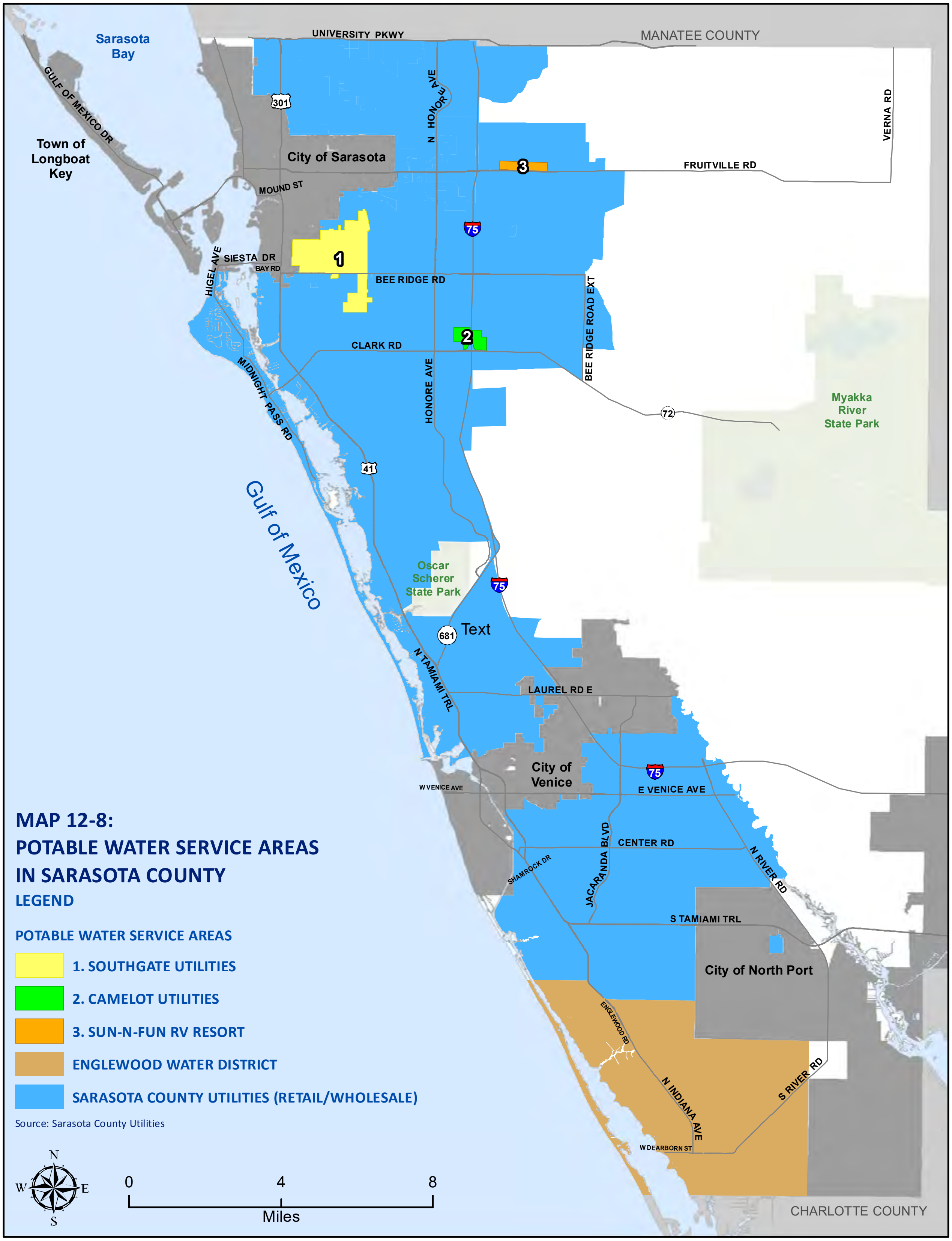

MAP 12-3:
HISTORICAL
SURVEY 1840
LEGEND
Historical Survey 1840
Source: Data is the original General Land Office (GLO) Township plats from the mid to late 1800's.
All data was taken from the Land Boundary Information System (LABINS) website at www.LABINS.org/GLO.
Original plats are in a TIFF format and were georeferenced to our data sets using ArcGIS 8.2. Please note
that a hyperlink is present in the file and will have to be set up using the feature properties.This hyperlink link
to field notes and original plats in the TIFF format.
0
4
8
Miles
Peace River
Charlotte Harbor
Myakka River
City of North Port
City of Venice
City of Sarasota
Sarasota Bay
Town of Longboat Key
75
41
S TOLEDO BLADE BLVD
VERNA RD
FRUITVILLE RD
HONORE AVE
UNIVERSITY PKWY
BEE RIDGE ROAD EXT
BEE RIDGE RD
LAUREL RD E
VENICE AVE
CENTER RD
JACARANDA BLVD
S TAMIAMI TRL
N RIVER RD
N INDIANA AVE
ENGLEWOOD RD
MIDNIGHT PASS RD

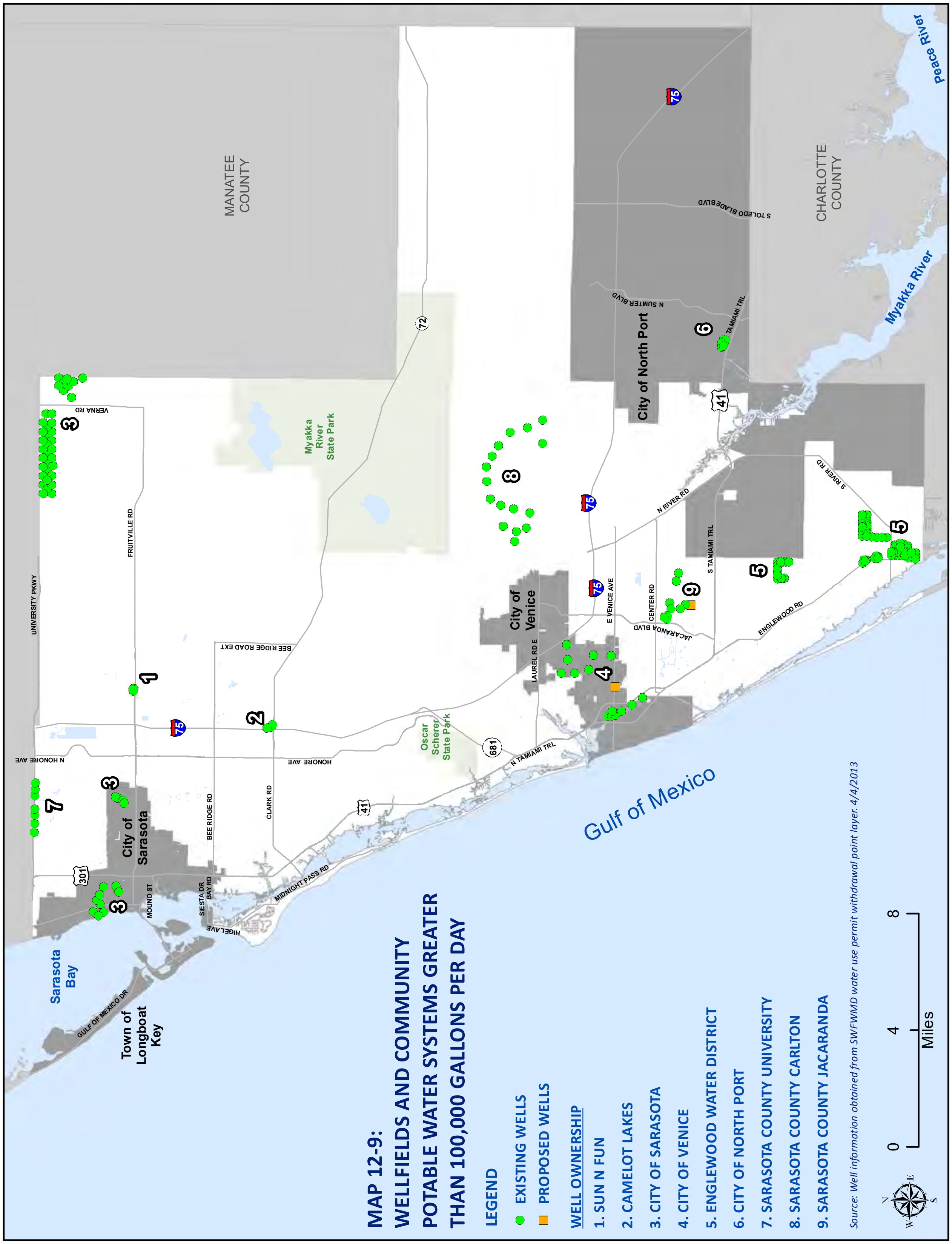

MAP 12-4:
MAJOR DRAINAGE
CANALS AND FACILITIES
LEGEND
Watershed Boundaries
Drainage Canals and Other Water Features
Source: Sarasota County Public Utilities, 2015
0
4
8
Miles
COOPER CREEK - BRADEN RIVER
SARASOTA BAY
LITTLE SARASOTA BAY
DONA BAY ROBERTS BAY
LEMON BAY
MYAKKA RIVER
Gulf of Mexico
Town of Longboat Key
City of Sarasota
City of Venice
City of North Port
Peace River
Myakka River
Charlotte Harbor


MAP 12-5:
WASTEWATER TREATMENT
FACILITIES IN SARASOTA COUNTY
LEGEND
ABANDONED WASTEWATER TREATMENT FACILITIES
WASTEWATER TREATMENT FACILITIES
SARASOTA COUNTY OWNED
FRANCHISED / PRIVATE UTILITIES
MUNICIPALLY OWNED
OTHER
SARASOTA COUNTY OWNED (5)
1. BEE RIDGE WRF
2. CENTRAL COUNTY WRF
3. SIESTA KEY AWWT
4. VENICE GARDENS WRF
5. FRUITVILLE WWTF
FRANCHISED / PRIVATE UTILITIES (3)
6. LAKE FOREST CONDOMINIUM
7. MEDICAL CENTER OF SARASOTA
8. SYLVAN LEA
MUNICIPALITY OWNED (3)
9. CITY OF NORTH PORT
10. CITY OF SARASOTA
11. CITY OF VENICE / EAST SIDE
OTHER WASTEWATER TREATMENT FACILITIES (23)
12. 11011 CLARK RD
13. 2224 SOUTH TRAIL WWTP
14. ARBORS MHP
15. CAMELOT LAKES MHP
16. FLORIDA PINES MHC
17. HAPPY HAVEN MHP
18. JAPANESE GARDENS MHP
19. KING'S GATE CLUB MHP
20. KINGS GATE RV PARK
21. LAKE TIPPECANOE
22. MYAKKA MHP
23. MYAKKA RIVER STATE PARK
24. OSCAR SCHERER STATE RECREATION AREA
25. OUR LADY OF PERPETUAL HELP
26. PARK PLACE VILLAS
27. PETERSON MANUFACTURING
28. RAMBLERS REST RV RESORT
29. SCOTT PAINT COMPANY
30. SPANISH LAKES MHP
31. STATE COLLEGE OF FLORIDA
32. VENETIAN MHP
33. CAMPVENICE RETREAT
34. VENICE RANCH MHP
0
4
8
Miles
Source: Sarasota County Utilities
MANATEE COUNTY
CHARLOTTE COUNTY
Myakka River State Park
Oscar Scherer State Park
City of Sarasota
City of Venice
City of North Port
Town of Longboat Key
Sarasota Bay
Gulf of Mexico
Myakka River


Sarasota Bay
UNIVERSITY PKWY
MANATEE COUNTY
GULF OF MEXICO DR
Town of Longboat Key
301
N. HONORE AVE
City of Sarasota
VERNA RD
FRUITVILLE RD
75
3
SIESTA DR
HIGEL AVE
BEE RIDGE RD
1
2
BEE RIDGE ROAD EXT
CLARK RD
MIDNIGHT PASS RD
HONORE AVE
72
Myakka River State Park
Gulf of Mexico
41
Oscar Scherer State Park
75
681
N TAMIAMI TRL
LAUREL RD E
City of Venice
E VENICE AVE
75
CENTER RD
JACARANDA BLVD
N RIVER RD
S TAMIAMI TRL
City of North Port
S RIVER RD
N INDIANA AVE
CHARLOTTE COUNTY
MAP 12-6:
WASTEWATER TREATMENT PLANT SERVICE AREAS IN UNINCORPORATED SARASOTA COUNTY
LEGEND
FRANCHISE WASTEWATER SERVICE AREA
1. BEE RIDGE UTILITIES
2. LAKE FOREST UTILITIES
3. SYLVAN LEA
ENGLEWOOD WATER DISTRICT
SARASOTA COUNTY UTILIITES
Source: Sarasota County Utilities
N
W
E
S
0
4
8
Miles


MAP 12-7:
MAJOR REUSE SITES IN SARASOTA COUNTY UTILITIES SYSTEM
LEGEND
MAJOR REUSE SITES
1. HIGHLANDS GOLF COURSE
2. THE GROVES GOLF COURSE & LONGMEADOW RESERVOIR
3. MISS SARASOTA SOFTBALL & 17TH STREET SOCCER FIELDS
4. THE FOUNDER'S CLUB GOLF COURSE & RESIDENTIAL
5. SARASOTA GOLF COURSE
6. EAGLES TRACE
7. LAUREL LAKES
8. LAUREL OAK COUNTRY CLUB
9. BENT TREE COUNTRY CLUB
10. HERITAGE OAKS
11. MISTY CREEK GOLF COURSE
12. REDHAWK RESERVE
13. WAVERLY
14. ECKERDS
15. NORMAN'S LIQUORS
16. THE PRESERVE AT HERON LAKE
17. SARASOTA MEMORIAL HOSPITAL
18. PUBLIX AT NORTHRIDGE
19. GATOR CREEK GOLF COURSE
20. THE SAVOY AT PALMER RANCH
21. WILDGRASS
22. WELLINGTON CHASE
23. POOL WATER PRODUCTS
24. RF CARLSON COMPANY
25. DL PORTER CONSTRUCTION
26. SUNRISE GOLF CLUB
27. MARBELLA COMMON AREAS
28. SANTOS PROPERTY
29. PALMER RANCH MEDIANS
30. ARIELLE AT PALMER RANCH
31. VENTURA AT PALMER RANCH
32. THE HAMPTONS
33. ARBOR LAKES ON PALMER RANCH
34. SERENOA GOLF CLUB
35. CULVERHOUSE PARK
36. THE GLENRIDGE AT PALMER RANCH
37. STONEBRIDGE
38. MANOR CARE SPRINGHOUSE
39. VILLA MIRADA
40. TOURNAMENT PLAYERS CLUB
41. MONTE VERDE AT VILLA MIRADA
42. BOTANICA AT PALMER RANCH
43. VILLAGE WALK
44. SARASOTA SQUARE MALL
45. BAYSIDE SOD FARM
46. TURTLE ROCK
47. PINESTONE AT PALMER RANCH
48. BAY VILLAGE
49. CLARE BRIDGE HOUSE
50. PELICAN COVE CONDOMINIUMS
51. POTTER PARK
52. LA VENEZIA AT PALMER RANCH
53. PLAZA DE FLORES
54. MAYFAIR AT PALMER RANCH
55. SANDHILL PRESERVE
56. STONEYBROOK GOLF & COUNTRY CLUB
57. HUNTINGTON POINTE COMMON AREAS
58. ISLES OF SARASOTA
59. SILVER OAK
60. STONEYBROOK ESTATES COMMON AREAS
61. THE OAKS I
62. THE OAKS II GOLF COURSE
63. PELICAN POINTE GOLF COURSE & COMMON AREAS
64. VENICE GOLF & COUNTRY CLUB
65. JACARANDA WEST COUNTRY CLUB
66. PLANTATION GOLF & COUNTRY CLUB
67. VENICE EAST GOLF COURSE
68. SARASOTA NATIONAL
Source: Sarasota County Utilities
0
4
8
Miles
N
S
E
W
Sarasota Bay
Town of Longboat Key
GULF OF MEXICO DR
Gulf of Mexico
City of Sarasota
MOUND ST
FRUITVILLE RD
N HONORE AVE
SIESTA DR
HIGEL AVE
BEE RIDGE RD
HONORE AVE
BEE RIDGE ROAD EXT
CLARK RD
MIDNIGHT PASS RD
Oscar Scherer State Park
N TAMIAMI TRL
LAUREL RD E
JACARANDA BLVD
City of Venice
E VENICE AVE
CENTER RD
S TAMIAMI TRL


Sarasota Bay
UNIVERSITY PKWY
MANATEE COUNTY
GULF OF MEXICO DR
Town of Longboat Key
301
N HONORE AVE
City of Sarasota
VERNA RD
FRUITVILLE RD
MOUND ST
3
75
SIESTA DR
BAY RD
1
HIGEL AVE
BEE RIDGE RD
BEE RIDGE ROAD EXT
2
CLARK RD
MIDNIGHT PASS RD
HONORE AVE
72
Myakka River State Park
41
Gulf of Mexico
Oscar Scherer State Park
75
681
Text
N TAMIAMI TRL
LAUREL RD E
City of Venice
W VENICE AVE
E VENICE AVE
CENTER RD
N RIVER RD
SHAMROCK DR
JACARANDA BLVD
S TAMIAMI TRL
City of North Port
ENGLEWOOD RD
N INDIANA AVE
S RIVER RD
W DEARBORN ST
CHARLOTTE COUNTY
MAP 12-8:
POTABLE WATER SERVICE AREAS
IN SARASOTA COUNTY
LEGEND
POTABLE WATER SERVICE AREAS
1. SOUTHGATE UTILITIES
2. CAMELOT UTILITIES
3. SUN-N-FUN RV RESORT
ENGLEWOOD WATER DISTRICT
SARASOTA COUNTY UTILITIES (RETAIL/WHOLESALE)
Source: Sarasota County Utilities
N
W
E
S
0
4
8
Miles


MAP 12-9:
WELLFIELDS AND COMMUNITY POTABLE WATER SYSTEMS GREATER THAN 100,000 GALLONS PER DAY
LEGEND
EXISTING WELLS
PROPOSED WELLS
WELL OWNERSHIP
1. SUN N FUN
2. CAMELOT LAKES
3. CITY OF SARASOTA
4. CITY OF VENICE
5. ENGLEWOOD WATER DISTRICT
6. CITY OF NORTH PORT
7. SARASOTA COUNTY UNIVERSITY
8. SARASOTA COUNTY CARLTON
9. SARASOTA COUNTY JACARANDA
Source: Well information obtained from SWFWMD water use permit withdrawal point layer. 4/4/2013
0
4
8
Miles
MANATEE COUNTY
CHARLOTTE COUNTY
Sarasota Bay
Gulf of Mexico
Myakka River
Peace River
Town of Longboat Key
City of Sarasota
City of Venice
City of North Port
Myakka River State Park
Oscar Scherer State Park
UNIVERSITY PKWY
VERNA RD
FRUITVILLE RD
BEE RIDGE ROAD EXT
N HONORE AVE
HONORE AVE
BEE RIDGE RD
CLARK RD
MOUND ST
SIESTA DR
BAY RD
HIGEL AVE
MIDNIGHT PASS RD
GULF OF MEXICO DR
N TAMIAMI TRL
LAUREL RD E
E VENICE AVE
CENTER RD
JACARANDA BLVD
S TAMIAMI TRL
ENGLEWOOD RD
N RIVER RD
S RIVER RD
N SUMTER BLVD
S TOLEDO BLADE BLVD
TAMIAMI TRL

CHAPTER 13
SOLID WASTE

DATA AND ANALYSIS

SOLID WASTE

INTRODUCTION

Historically, disposal of solid waste was accomplished by burying refuse at numerous sanitary landfill sites around the county. In 1970, Sarasota County opened the Bee Ridge Landfill and over the next several years older landfill sites in the county closed down. The county eventually purchased and assumed operation of the Venice Landfill from a private owner. The Venice Landfill was officially closed in 1985 and later converted into the Jackson Road Transfer Station so that refuse collected from the Venice, North Port and Englewood areas could be transferred to the Bee Ridge Landfill. Between 1985 and 1998 the Bee Ridge Landfill was the only permitted sanitary landfill in the county. It closed in 1998 with the opening of the new Central County Solid Waste Disposal Complex at 4000 Knights Trail in Nokomis. This landfill was designed to have a projected lifespan of 40 years. Sarasota County's mandatory recycling and diversion program has assisted in conserving airspace to extend the life of the landfill. With the current diversion and recycling rate, Phase II has approximately 10.6 years to reach maximum airspace capacity. Additional space is available in yet to be developed cells in Phases III and IV. Today the Sarasota County Solid Waste division operates the Central County Solid Waste Disposal Complex, the closed Bee Ridge Landfill which is now a park, and the Jackson Road Recycling Transfer Station.

SOLID WASTE LEGISLATION

Legislation designed to regulate the collection and disposal of solid waste was initiated at the federal, state and local level beginning in the early 1970's. Presented below are relevant laws which govern solid waste collection and disposal and a brief description of each.

U.S. Public Law 94-580, "Resource Conservation and Recovery Act," was passed in 1976. The main purpose of this legislation was to promote better utilization and management of increased volumes of solid waste by establishing resource recovery as a national priority.

In 1974, Florida enacted Section 403.706, Florida Statutes, "Florida Resource Recovery and Management Act"; this law required each county in the State to prepare a solid waste management plan. The law also established the Resource Recovery Council within the Florida Department of Environmental Regulation and designated 19 counties, including Sarasota, required to participate in a resource recovery feasibility study.

The details, guidelines and responsibilities for the participating counties were contained in Chapter 17-700 of the Florida Administrative Code. These covered solid waste resource recovery and management permits; criteria for operation and closure of sanitary landfills; long term care of landfills; special waste handling; criteria for resource recovery equipment and certification of resource recovery equipment; and domestic sludge classification, utilization, and disposal criteria. The rule also stipulated that yard waste could not be placed in lined landfills after 1992. Sarasota County Ordinance No. 86-35, which went into effect October 1, 1988, established five Municipal Service Taxing Units in the unincorporated area, known as Solid Waste Service Districts. Later, Ordinance No. 93-102 reduced the number of Municipal Service Taxing Units from five to two. The municipalities are not included in these service districts.

Ordinance No. 93-102 also specifies that within each service district, residential and commercial solid waste collection and disposal is mandatory, with collection and disposal to be conducted only by authorized franchise collectors.

Ordinance No. 97-131 amending Ordinance No. 93-102 went into effect December 2, 1997. This Ordinance calls for the continuation of a mandatory Solid Waste and Yard Trash collection and disposal system in those populated areas within the Municipal Service Benefit Units. It further determines that there are two distinct types of residential units called Class 1 and Class 2. Other components of this ordinance address Supplemental Collection Services, Schedules and Fees, the Governing Body, responsibilities of Authorized Haulers, responsibilities of the Franchise, Residential, Commercial and Industrial Customers, and the responsibilities of the county pertaining to Rate Regulation and Enforcement procedures.

Florida's Solid Waste Management Act of 1988 (codified as Part IV of Chapter 403, Florida Statutes) brought about major changes in the way counties manage waste and resources by requiring all counties to reduce the amount of solid waste land filled by at least 30% by December 31, 1994. No more than half the reduction could come in the form of special waste (e.g., yard trash, white goods, and construction and demolition debris). In addition, counties were required to recycle a minimum of 50% of the following four materials: newspaper, aluminum cans, glass, and plastic bottles. These statutes also addressed disposal of hazardous wastes and special wastes, such as tires, used oil, discarded refrigerators, and lead-acid batteries. Various funding and technical assistance programs were also included in the legislation. The Florida Legislature amended the law in 1993 and added steel cans to the list of materials that must be recycled.

In November 1990, voters approved an amendment to the Sarasota County Charter calling for comprehensive, mandatory recycling. The charter amendment set out an initial five-year program. The goal for this initial period was to reduce by at least 50% the volume of waste delivered to the landfill. Specified recyclable materials could not be placed in the landfill. Residential and commercial customers in the unincorporated county were required to separate recyclables, including yard waste, from other garbage. The Circuit Court, by order entered November 13, 1990, in City of Sarasota et al. v. Sarasota County et al., Case No. 90-5405-CA-01, enjoined the application of Article IV of the Charter to the municipalities within the county. Article IV of the Charter was implemented by Ordinance No. 91-24. County voters subsequently approved the establishment and maintenance of the mandatory recycling program by ordinance rather than Charter provision. Ordinance No. 91-24 outlined the specific items recycled under the county's mandatory program. Provisions were also included for enforcement of the ordinance and for the establishment of a citizen's advisory committee. Ordinance No. 97-130, which supersedes Ordinance No. 91-24, was implemented on March 10, 1998. The ordinance amends and further enhances the recycling program in Sarasota County by addressing the proper storage, transportation and disposal methods required for biological, biomedical, hazardous and radiological wastes. Inspection and enforcement procedures are included along with provisions for adjusting (adding or deleting) items from the existing recycling program.

Ordinance No. 2003-092 went into effect October 1, 2004 and combines language from Ordinance No. 97-130 and Ordinance No. 97-131. This comprehensive ordinance brings together all elements of the Sarasota County solid waste program. The ordinance sets up two new solid waste collection districts A and B which replaced current collection districts 1-4 and 5.

Ordinance No. 2006-001 went into effect January 10, 2006, amending Ordinance No. 2003-092 consolidating two solid waste service districts into one referred to as the Municipal Service Benefits Unit.

Additionally, Ordinance No. 2007-084, went into effect October 2, 2007, changed the funding source for the collection of residential waste and recyclable materials from Special Assessments to Annual Assessments as well as amending advisory committee requirements and establishing provisions for the collection of Disaster Debris Materials.

In 2008, the Florida Legislature enacted House Bill 7135, which created Section 403.7032, Florida Statutes that established a new statewide recycling goal of 75% to be achieved by the year 2020.

PLANNING STUDIES AND EFFORTS

This section describes studies related to the management of solid waste. These studies cover land filling, resource recovery, regional solid waste issues, and recycling.

The Solid Waste Management and Resource Recovery Plan[1] was prepared in 1981 pursuant to Ch. 403.706, Florida Statutes, "Florida Resource Recovery and Management Act." Each county in the state was required to prepare a solid waste management plan. Sarasota County was also chosen to participate in a detailed Solid Waste Management Plan (SWMP) designed to investigate the feasibility of resource recovery, whereby solid waste would be processed to produce a by-product, such as energy (electric or steam). The detailed guidelines and responsibilities guiding the study were set forth in Chapter 17-7, Part II, Florida Administrative Code.

The Resource Recovery Feasibility Report for Charlotte County, DeSoto County, and South Sarasota County[2] was prepared in August, 1985. Charlotte, DeSoto, and Sarasota Counties entered into an Interlocal Agreement whereby they appointed a committee to study the feasibility of establishing a joint resource recovery facility. The study area in Sarasota County was south of a line which extends to DeSoto County from the Osprey/Oscar Scherer State Recreation Area.

The study recommended that if the counties decided to proceed with developing a resource recovery alternative, they should consider passing a resolution whereby they:

- joined in creating an Authority to implement the program;
- delegated sufficient powers to allow for the project's efficient construction and operation.

The Resource Recovery Feasibility Study for Manatee and Sarasota Counties[3] was conducted at the same time. The consultants performed a resource recovery analysis along with a comparably detailed analysis for a sanitary landfill disposal alternative. The study was based on a 25-year planning period, 1985-2010, with study areas varying according to analytical scenario. These included Sarasota County; Manatee County; Sarasota and Manatee Counties; North Sarasota and Manatee Counties in individual and regional scenarios for resource recovery. Sanitary landfill alternatives included new landfills and vertical expansion of existing County landfills.

The economic analyses, which included transport costs and costs associated with by-pass wastes and ash or residual combustion wastes, indicated that:

- in the near term, the lowest cost disposal alternative was a vertically expanding, existing landfill facility. Total landfill disposal costs were projected to be $27.38/ton in 1990 and $57.53/ton in 2010;
- resource recovery costs for a mass-burn facility financed with revenue bonds were projected at $48.98/ton in 1990 and falling to $45.23/ton in 2010; and
- it is the revenue from the generation and sale of electricity from the mass-burn resource recovery plant which accounts for the decrease in costs associated with that technology.

In July 1986, the Landfill Site Feasibility Report: Walton Tract[4] was completed. The purpose of this study was to examine the feasibility of using an area of land known as the Walton tract for a County landfill. Many topics were examined including Florida statutory landfill requirements, physical characteristics of the site, hydrogeology and soils, landfill block configurations, environmental considerations, and regulatory agency comments.

The Central County Solid Waste Disposal Complex Preliminary Cost Estimate[5] prepared in May, 1987, presented a preliminary cost scenario by summarizing the design and construction costs from previous preliminary cost estimates. The cost estimate included the following: design fees; hydraulic modeling, fencing and security; preparation of a Master Drainage Plan, cultural and biological investigations, an environmental impact study, and a 20-year site plan; construction of access roads, a household hazardous waste collection facility, landfill cells and leachate collection system, administrative offices, site utilities, and an Air Curtain Destructor (yard waste incinerator); restoration of Cow Pen Slough; and, costs for permitting.

The Sarasota County Solid Waste Master Plan[6] was completed in November of 1989. The purpose of the plan was to provide a recommended course of action to manage and dispose of solid waste for both short and long-term purposes. The report included a conceptual facility plan for the Central County Solid Waste Disposal Complex. Also included was an implementation program for scheduling future county solid waste facilities and programs. In the summer of 1990, the Board of County Commissioners directed the consulting firm of Camp, Dresser and McKee (CDM) to prepare a landfill siting study, in part, to meet the requirements of regulatory agencies and to assist the Board of County Commissioners in arriving at a final determination as to the most appropriate location of a landfill site within the unincorporated area. The landfill siting study identified alternative sites based on the information obtained by and available to CDM.

The county had a groundwater monitoring plan completed[7] for the Central County Solid Waste Disposal Complex in March of 1992.The plan includes well location and sampling protocol for the site. A land management plan for the Central County Solid Waste Disposal Complex was developed in November 1992. The plan covered guidelines for protection of threatened and endangered species as well as management techniques for maintenance and improvement of the upland and wetland habitats on site. The plan also included a description of the monitoring and assessment program to be used in measuring the success of goals set under the plan. The Central County Solid Waste Disposal Complex opened in 1998 as planned. A Solid Waste Master Plan Update[8] was completed in September 2005. A new Solid Waste Master Plan is currently being developed and is scheduled to be presented to the Board of County Commissioners during calendar year 2016.

INVENTORY AND ANALYSIS

SOLID WASTE COLLECTION

Franchise areas were established by passage of Ordinance No. 86-35. In 1993, the county passed Ordinance No. 93-102, which combined Service Districts 1, 2, 3 and 4 into Service District 1-4 and Service District 5. On October 1, 2004, Ordinance No. 2003-092 became effective and created one Franchise Collection District with two new Service Districts, District A and District B. Ordinance No. 2006-001 went into effect on January 10, 2006, and consolidated both districts into one service district. The geographic service area for the service district is shown in Map 12-1. Note: The municipalities are not included in the county's Solid Waste Service District and provide their own solid waste collection services.

The service district is currently serviced by Waste Management of Sarasota County (WM). Collection of residential garbage, yard waste, and recyclables are made on the same day once per week. WM also provides collection service for white goods (such as refrigerators and stoves), used motor oil and filters, electronics, tires, and bulk items (furniture, bedding, etc). WM is also required to offer recyclables collection service at least once per week in the unincorporated county to businesses within the service district. Recyclable materials collected from county residences are delivered to a materials recycling facility under contract to the county which is responsible for sorting and marketing the recyclable materials.

Annual assessments for solid waste collection are determined by the Board of County Commissioners sitting as the governing body of the Solid Waste Service District Area. This body governs collection and disposal of residential solid waste for all improved residential real property and for commercial customers located within the Solid Waste Service District Area. The annual residential assessments cover the costs for providing the curbside recycling collection and processing services, along with solid waste and yard waste collection and disposal costs.

SOLID WASTE GENERATION

The amount of solid waste collected from the municipalities as well as the unincorporated area is shown on Table 13-1. The changes in collection practices that accompanied the beginning of the recycling program, and the addition of a county requirement for residents to separate yard waste from solid waste in 1991, made it possible to determine how much of the waste stream was comprised of each component beginning in 1992.

Sarasota County is required to report the amount of the solid waste stream that has been diverted from the landfill to the Florida Department of Environmental Protection (FDEP) annually. The State uses this data to monitor compliance with Florida's Solid Waste Management Act of 1988. One of the provisions of this legislation was a requirement that all counties reduce the amount of solid waste landfilled by 30% by December 31, 1994. Sarasota County has exceeded the state requirement for diversion of a minimum of 30% of the solid waste stream from the landfill.

In 2008, the Florida Legislature enacted House Bill 7135, which created Section 403.7032, Florida Statutes. This established a new statewide recycling goal of 75% to be achieved by the year 2020. In addition, the statute directed FDEP to develop a program designed to achieve this goal and submit it to the Legislature for approval. FDEP submitted its 75% Recycling Goal Report in January 2010. Sarasota County's recycling rate for 2014 was 53%.

TABLE 13-1 : SARASOTA COUNTY SOLID WASTE COLLECTION

		Solid Waste	Recyclables	Yard Waste	Total	Avg. Lbs./
Year	Population	Lbs./Day	Lbs./Day	Lbs./Day	Lbs./Day	Person/Day
1996	301,941	1,287,775	329,851	411,430	2,029,056	6.70
1997	307,086	1,263,266	403,514	328,663	1,995,443	6.50
1998	311,949	1,547,633	593,669	356,836	2,498,138	8.00
1999	316,996	1,380,415	545,331	275,671	2,201,417	6.90
2000	320,945	1,447,134	430,593	272,196	2,149,923	6.70
2001	328,981	1,463,808	414,434	315,467	2,193,709	6.70
2002	334,616	1,555,940	405,211	264,691	2,225,841	6.70
2003	348,761	1,629,706	464,193	282,060	2,375,959	6.80
2004	350,729	1,345,847	1,193,918	305,518	2,845,282	8.11
2005	360,354	1,492,471	1,117,655	321,090	2,931,216	8.13
2006	372,049	1,391,918	838,219	346,049	2,576,186	6.92
2007	380,183	2,014,499	1,650,652	323,156	3,988,307	10.49
2008	386,338	1,970,663	1,291,370	317,490	3,579,523	9.27
2009	382,057	1,803,836	1,431,847	290,89	3,526,575	9.23
2010	372,551	1,645,929	1,469,644	301,863	3,417,436	9.17
2011	374,393	1,735,737	1,442,860	284,537	3,463,134	9.25
2012	376,662	1,795,200	1,866,975	281,074	3,943,249	10.47
2013	378,204	1,513,671	2,469,666	290,340	4,273,677	11.30
2014	379,997	1,808,296	2,405,693	290,636	4,504,625	11.85

Population based on Growth Management Web Site, Annual Population Estimates, 1930-2014
The Town of Longboat Key disposes of its waste in Manatee County's Lena Road Landfill.
Therefore, the Town of Longboat Key's population has not been included in the total county population.
Source: Sarasota County Public Utilities 2015

SOLID WASTE DISPOSAL

Sarasota County is responsible for providing solid waste disposal capacity for all residences and commercial customers in the county including the municipalities, and maintains the only permitted Class 1 sanitary landfill. Sarasota County contracts out the operation of the Central County Landfill in Nokomis and the Jackson Road Transfer Station in Venice. The county monitors both the closed Bee Ridge Landfill and Venice Landfill under a long-term care permit. The location of these facilities is shown in Map 13-2.

The Bee Ridge Landfill sits atop a layer of clay, which restricts the downward movement of landfill leachate. To further ensure that the surrounding environment is protected, a clay slurry trench three feet wide and approximately 30 feet deep was constructed in order to act as an aquiclude and restrict lateral movement of landfill leachate. The county's long-term care permit requires that the collected leachate be processed by a conventional wastewater treatment system.

The Central County Solid Waste Disposal Complex, which opened in 1998, is located within the 6151 acres previously called the Walton Tract. This land has a zoning designation of Government Use (GU) and Open Use Conservation (OUC) which consist of 3,179+ and 2972+ acres respectively.

The Board approved a special exception for a 550 acre parcel within the GU area for a Solid Waste Disposal Complex, which includes a sanitary landfill and other uses associated with landfill operations. The sizing of the landfill took into consideration the reduction in landfill capacity needs resulting from implementation of the mandatory recycling program required by Article IV of the County Charter. Conditions placed on the portion of the property zoned GU stipulate that any structure not depicted on the development concept plan would only be permitted on the subject parcel after public notice and hearings by the Planning Commission and Board of County Commissioners. The location of the landfill is also shown on Map 13-2. In order to minimize potential environmental impacts to the greatest extent possible, stipulations in the special exception approval included requirements for submission of studies including a background Water Quality Monitoring Plan and a resource based Land Management Program, prior to development of the landfill or other associated operations. WASTE Policy 1.3.1, relating to the Central County Solid Waste Disposal Complex, incorporates by reference the specific criteria of the "Principles for Evaluation Development Proposals in

Native Habitats" in the Environment Chapter, as well as the specific environmental protection stipulations of Rezone Ordinance No. 90-54 and Special Exception Resolution No. 91-149, as well as Ordinance No. 2011-023, which amended Ordinance No. 90-54. In 2004, the county purchased an additional 1000 acres of adjoining property from a former citrus grove for borrow soil.

Sarasota County issued $49,770,000 of Solid Waste System Revenue Bonds in the spring of 1996, to finance construction of the Central County Solid Waste Disposal Complex. Included in the project were the following items:

- 294 acre Class 1 Landfill,
- 30 acre area for yard waste composting,
- waste tire collection area,
- white goods handling area,
- operations and maintenance facilities,
- storm water ponds,
- borrow pit areas,
- wetland mitigation areas, and
- access road.

The Solid Waste Division is an Enterprise Fund and pays for its own capital improvements and operating expenses. The county established the mechanism to fund division costs (including landfill costs) with the adoption of Ordinance No. 86-35. User fees were established for collection and disposal of solid waste in the Solid Waste Service District. The fees were based, in part, upon the necessary revenues required to retire the revenue bonds created to fund the construction of the Central County Solid Waste Disposal Complex.

LANDFILL GAS TO ENERGY

Sarasota County's Landfill Gas to Energy Facility, which opened in February 2015, is located at the Central County Solid Waste Disposal Complex, 4000 Knights Trail Road, Nokomis. The facility is the result of a unique public-private partnership between Sarasota County and Landfill Energy Systems Florida (Aria Energy) to utilize the methane gas produced by our landfill as a fuel and convert it to electricity that enters the power grid.

The facility was built with no capital spending by the county. It is fully financed, owned and operated by Aria Energy. As part of the 15 year agreement, Sarasota County receives a steady revenue stream based on a percentage of the power purchase revenues collected by Aria Energy. Additionally, the county receives credit towards the state's 75% recycling goal for the energy created from the landfill's methane gas.

RECYCLING PROGRAM

The county administers recycling, waste reduction, and litter and beautification programs. Major focus is placed on implementation and maintenance of the mandatory residential and commercial recycling programs. Each municipality operates its own recycling program. The county began providing curbside residential recycling collection service to all residences in 1991. Residents are required to separate recyclable items into one of two streams: paper (i.e., corrugated cardboard, mixed paper, magazines, catalogs, newspaper, etc.) or commingled items (i.e., glass bottles, cans, plastic containers #1-5 and #7, aluminum, etc.). The recyclable materials are collected by the county collection service contractor who is required to deliver the recyclables to the county's recyclable materials processing contractor. The county has an agreement with a recycling processor to receive, process, and market recyclables.

Public education programs inform residents, businesses, students and tourists of collection practices and other significant program highlights. Educational information is disseminated through a variety of means including "How-to Guides" and social media. Businesses are also required to recycle the same recyclable items collected in the residential curbside recycling program. Businesses must contract directly with a recycling hauler. The county provides onsite assessments, offers workshops, and provides customized presentations, along with other training and educational information for businesses. County government offices also participate in a commercial recycling collection program. A contract is procured to collect materials generated at county facilities.

The county also encourages construction and demolition debris to be recycled when generated and processed in the unincorporated portion of the county. There are several companies that accept, process, and market recyclable construction and demolition debris materials (concrete, brick, asphalt, drywall, etc.). The county has contracted out the operation of a construction and demolition debris recycling facility at the landfill to receive, process and market mixed construction and demolition debris since 1995. The current contract is scheduled to expire in 2016, with an option to renew for two additional one-year terms. The county's landfill operations contractor chips yard waste into a fines material for public use.

Keep Sarasota County Beautiful was launched in 1992 by Sarasota County to develop and implement a variety of litter reduction and beautification programs. These programs are assisted by an advisory board of county citizens who make recommendations to the Board of County Commissioners on subjects related to litter and beautification. Programs that utilize volunteers have been created, such as Community Clean-ups and the Adoption Programs (Adopt-a-Road, and Adopt-a-Shore). Other programs include: The Great American Cleanup, The International Coastal Cleanup, the Annual Awards Recognition Program, and Chapter Programs in partnership with the incorporated municipalities.

HAZARDOUS WASTE

Producers of hazardous waste fall into five distinct groups: Large Quantity Generators (LQGs), Small Quantity Generators (SQGs), Conditionally Exempt Small Quantity Generators (CESQGs) Non-Generators and households. LQGs produce over 2,200 pounds of hazardous waste per month and are strictly regulated by state and federal agencies. SQGs and CESQGs produce less than 2,200 pounds of hazardous waste per month and are regulated by both the state and county. LQGs and SQGs must contract with a licensed hazardous waste transporter to have their waste taken to an approved disposal site. CESQGs can transport their own waste to an approved disposal site or have a licensed hazardous waste transporter take it. State law requires counties to identify and monitor smaller hazardous waste generators – SQGs, CESQGs and Non-Generators. The county has identified thousands of businesses within the County that have the potential to generate hazardous waste. Through the SQG Program Sarasota County works with business, schools and other public facilities regarding the proper handling of hazardous wastes. Household waste that includes hazardous components is generally exempt from hazardous waste laws.

Recognizing that household hazardous waste can be easily incorporated into the normal waste stream through household trash, Sarasota County operates a variety of collection programs to divert household hazardous waste from landfill disposal. These programs consist of the following:

- Permanent Collection Centers- The County operates three permanent household chemical collection centers that are open at designated times during each week to accept household hazardous waste.

- Mobile Collection Events- The county provides community based collection services for household hazardous waste to residents living in remote areas of the county (greater than 10 miles from a permanent collection center).
- Curbside Used Oil and Oil Filter Collection- The contracted hauler for residential collection picks up used oil and oil filters from residents. Collections are limited to five gallons of oil and five oil filters per week.
- Curbside Electronics Collection- The contracted hauler for residential collection picks up electronics such as computers from residents and brings them to a central collection point to be processed by the county.
- Project Green Sweep- A program started by the county to assist Conditionally Exempt Generators and Non-Generators in disposing of small amounts of hazardous or regulated waste. Project Green Sweep is a fee-based program.
- ReUzIt Shop- Where useable items that are received through county chemical collection programs are made available to residents without a fee.

NON-OPERATIVE LANDFILLS

Prior to new landfill design and operating standards being promulgated by the United States Environmental Protection Agency and the Florida Department of Environmental Protection, there were several small unlined landfills throughout the county. The county has been able to identify several of these sites which are listed in Table 13-2 and shown in Figure 13-3. All of these sites identified are now closed. Some of these sites were known public landfills while others located on private property came to the attention of the county through word of mouth, newspaper articles, or other means.

TABLE 13-2: NON-OPERATIVE LANDFILLS

Sarasota	
1	12th Street and Tuttle Avenue
2	City of Venice Landfill
Englewood	
3	Buchan Airport, north at S.R. 775
4	South River Road
5	S.R. 775, northeast of Keyway Rd.

North Port	
6	City of North Port Landfill
Sarasota County	
7	Curry Creek, north shore at railroad tracks
8	Center Road and Jacaranda Blvd.
9	Jackson Road Landfill
10	S.R. 72, south of Foxfire
11	East Road, south of Fruitville Road
12	Gocio Road and Mink Road
13	Richardson Road and Richardson Way
14	17th Street, south of the Meadows
15	Siesta Key, east of Shadow Lawn Avenue
16	Ashton Road, south and east of McIntosh Road
17	Ashton Road, south and west of McIntosh Road
18	Bee Ridge and Bee Ridge Ext

Note: Numbers refer to those on Map 13-3.
Source: Sarasota County Public Utilities 2015

LEVEL OF SERVICE

One commonly used Level of Service (LOS) for solid waste is the number of pounds per person per day. A better measure is to define level of service as the volume and frequency with which the county will pick-up and dispose of residential solid waste. Consequently, the proposed solid waste LOS has two components, 1) the ability of the county to provide the collection and disposal capacity for solid waste, and 2) the ability of the county to facilitate collection and disposal in a timely manner.

Under the provisions of Ordinance No. 2003-092, the county, through a franchise hauler operating in Solid Waste Service District, collects all residential garbage, yard waste, recyclables, white goods, tires, used oil and oil filters, electronics and bulk items at least one time per week. As a result of the mandatory recycling program, per capita disposal of solid waste has gone down, as can be seen on Table 13-1.

SUMMARY SOLID WASTE & RECYCLING

Solid waste, recyclables, and yard waste are collected from residences in the unincorporated area, and taken to the landfill or a materials recycling processor, as appropriate. The collection of materials is handled by a private collection company operating within the Solid Waste District established by the Board of County Commissioners. Solid waste is taken to the Central County Landfill. Recyclables are handled at a private facility that operates under contract with the county.

The separation of the waste stream into the solid waste, recyclables, and yard waste components occurred in 1991 in response to several legislative initiatives: Chapter 17-700 of the Florida Administrative Code, which required that yard waste not be deposited into lined landfills after 1992; the Florida Solid Waste Management Act of 1988, which required all counties to reduce the amount of solid waste that was landfilled by 30% by December 31, 1994; and, the 1991 amendments to the County Charter, which called for the mandatory recycling of eighteen specified items.

Practices affecting the disposal of hazardous waste vary according to the type of generator. Large scale generators are regulated by State and Federal law. Small quantity generators are monitored by Sarasota County. The disposal of household hazardous waste is addressed through public education and programs including the operation of Permanent Collection Centers.

ENDNOTES SOLID WASTE & RECYCLING

1. Solid Waste Management and Resource Recovery Plan, Ollrey, Jan, 1981.
2. Resource Recovery Feasibility Report for Charlotte County, DeSoto County, and South Sarasota County, HDR Techserv, Inc., 1984.
3. Resource Recovery Feasibility Study for Manatee and Sarasota Counties, Hazen and Sawyer, P.C., 1985.
4. Landfill Feasibility Report: Walton Tract, Smally, Wellford, and Nalven, Inc., with Henningson, Durham and Richardson, Inc., 1986.
5. Central County Solid Waste Disposal Complex Preliminary Cost Estimate, HDR Techserv, Inc., 1987.
6. Sarasota County Solid Waste Master Plan, Camp, Dresser, and McKee, 1989.
7. Sarasota County Solid Waste Ground Water Monitoring Plan, Ardaman and Associates, Inc., 1992.
8. Sarasota County Solid Waste Master Plan Update, R. W. Beck, Solid Resources , Inc., 2005.

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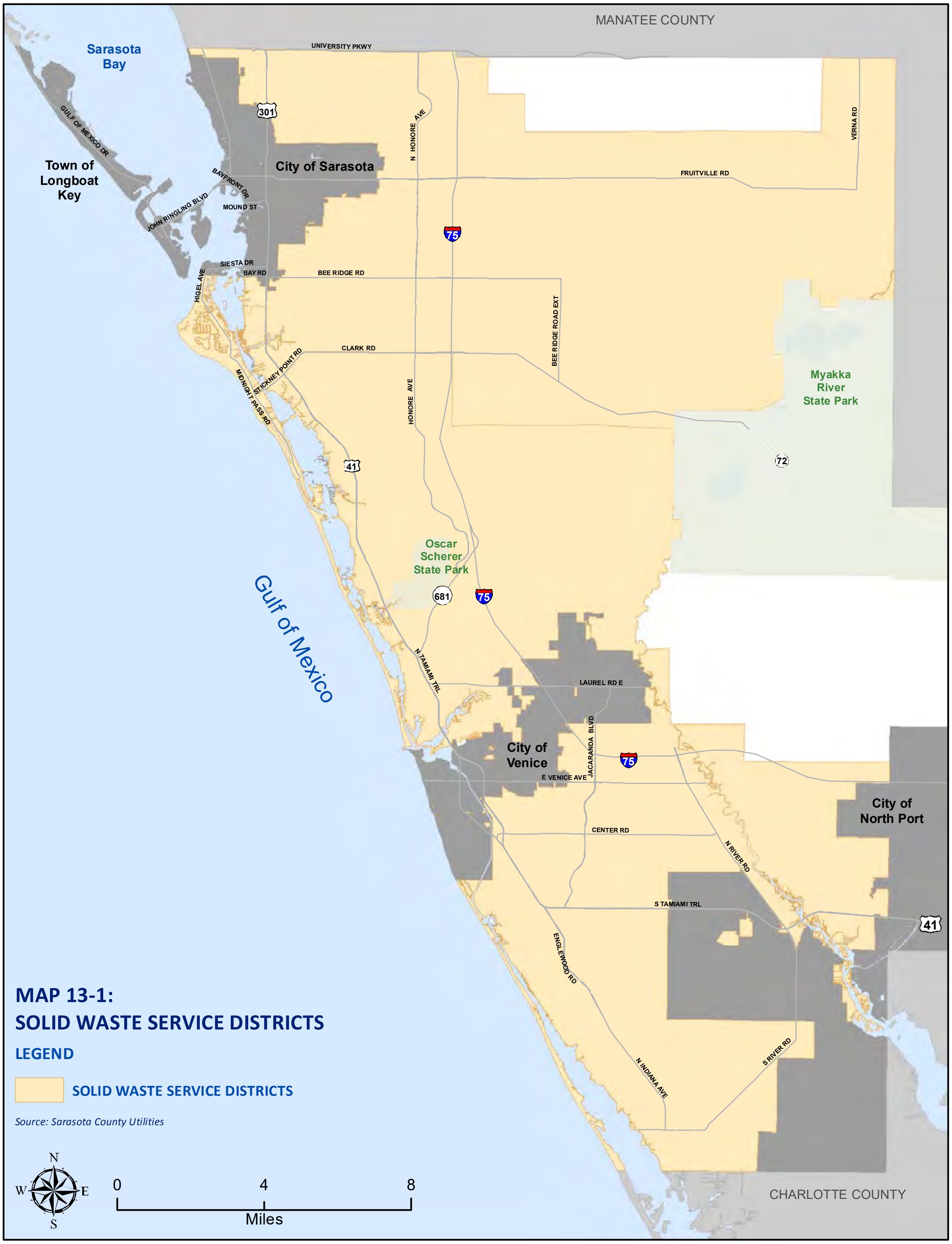
SOLID WASTE
MAPS


MANATEE COUNTY
Sarasota Bay
UNIVERSITY PKWY
301
Town of Longboat Key
GULF OF MEXICO DR
City of Sarasota
BAYFRONT DR
JOHN RINGLING BLVD
MOUND ST
N HONORE AVE
VERNA RD
FRUITVILLE RD
75
SIESTA DR
BAY RD
BEE RIDGE RD
HIGEL AVE
BEE RIDGE ROAD EXT
CLARK RD
STICKNEY POINT RD
MIDNIGHT PASS RD
HONORE AVE
Myakka River State Park
72
41
Oscar Scherer State Park
681
Gulf of Mexico
N TAMIAMI TRL
LAUREL RD E
JACARANDA BLVD
City of Venice
E VENICE AVE
CENTER RD
N RIVER RD
City of North Port
S TAMIAMI TRL
ENGLEWOOD RD
N INDIANA AVE
S RIVER RD
CHARLOTTE COUNTY
MAP 13-1:
SOLID WASTE SERVICE DISTRICTS
LEGEND
SOLID WASTE SERVICE DISTRICTS
Source: Sarasota County Utilities
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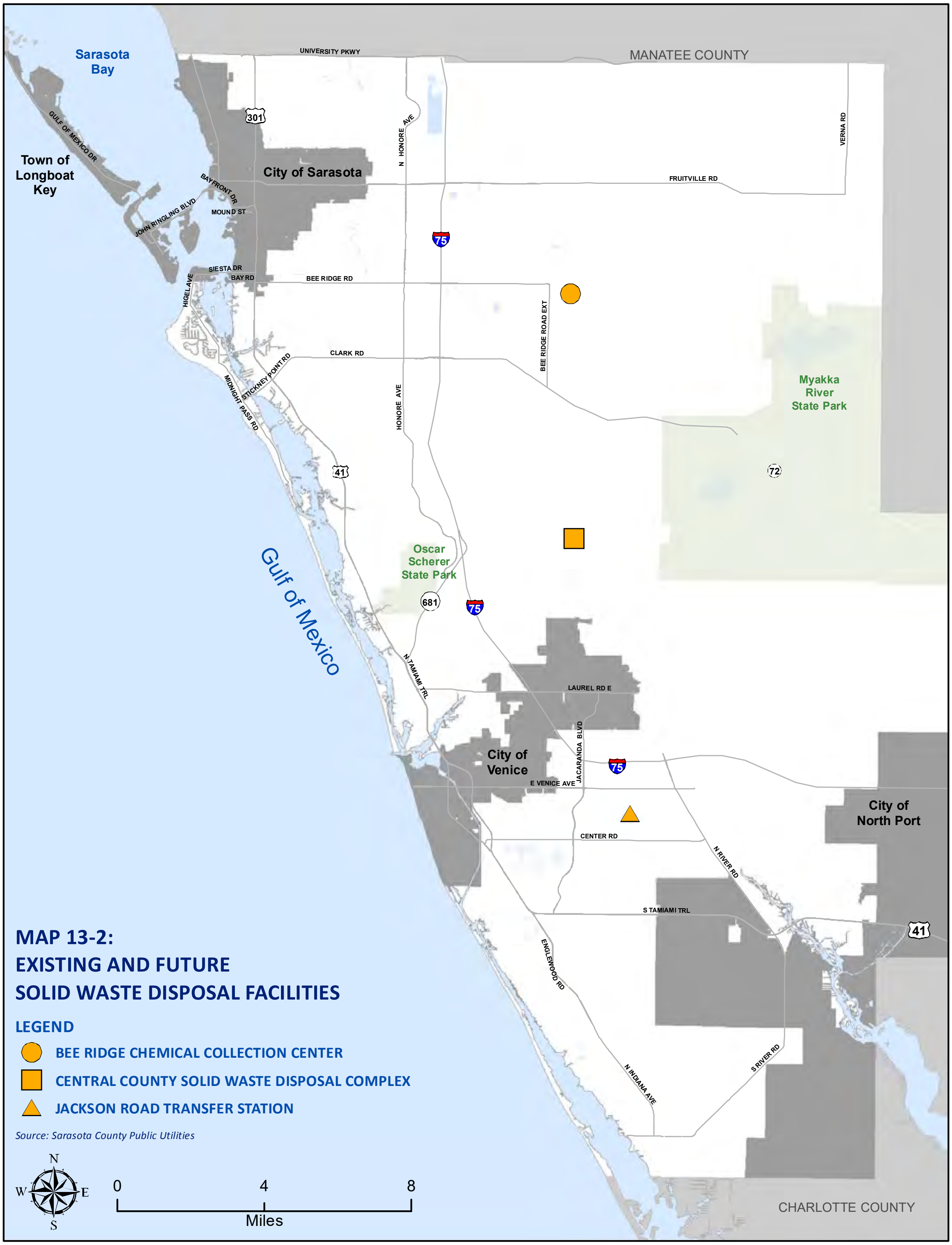
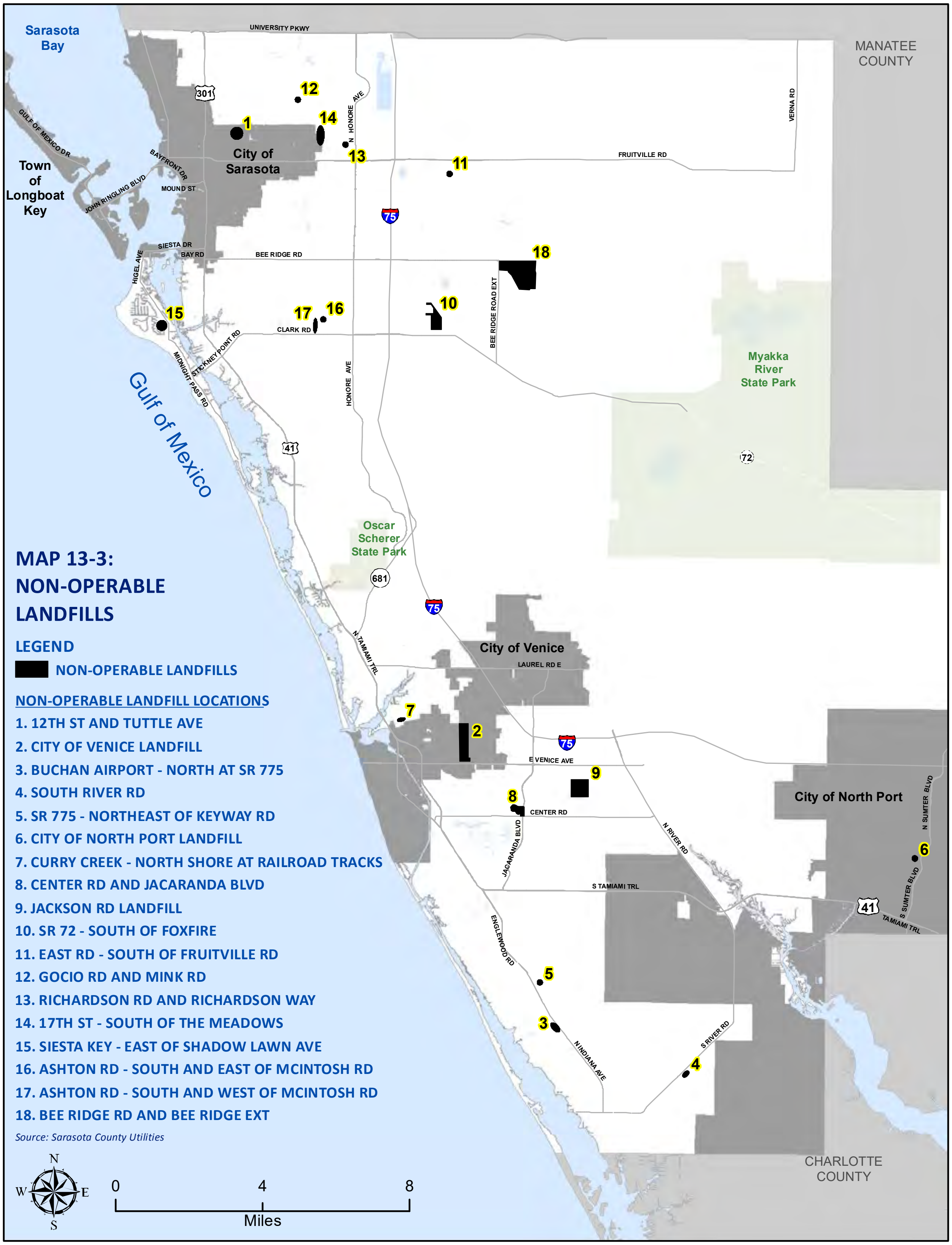
8
Miles



MAP 13-2:
EXISTING AND FUTURE SOLID WASTE DISPOSAL FACILITIES

LEGEND
- BEE RIDGE CHEMICAL COLLECTION CENTER
- CENTRAL COUNTY SOLID WASTE DISPOSAL COMPLEX
- JACKSON ROAD TRANSFER STATION

Source: Sarasota County Public Utilities


MAP 13-3:
NON-OPERABLE LANDFILLS
LEGEND
NON-OPERABLE LANDFILLS
NON-OPERABLE LANDFILL LOCATIONS
1. 12TH ST AND TUTTLE AVE
2. CITY OF VENICE LANDFILL
3. BUCHAN AIRPORT - NORTH AT SR 775
4. SOUTH RIVER RD
5. SR 775 - NORTHEAST OF KEYWAY RD
6. CITY OF NORTH PORT LANDFILL
7. CURRY CREEK - NORTH SHORE AT RAILROAD TRACKS
8. CENTER RD AND JACARANDA BLVD
9. JACKSON RD LANDFILL
10. SR 72 - SOUTH OF FOXFIRE
11. EAST RD - SOUTH OF FRUITVILLE RD
12. GOCIO RD AND MINK RD
13. RICHARDSON RD AND RICHARDSON WAY
14. 17TH ST - SOUTH OF THE MEADOWS
15. SIESTA KEY - EAST OF SHADOW LAWN AVE
16. ASHTON RD - SOUTH AND EAST OF MCINTOSH RD
17. ASHTON RD - SOUTH AND WEST OF MCINTOSH RD
18. BEE RIDGE RD AND BEE RIDGE EXT
Source: Sarasota County Utilities
Sarasota Bay
MANATEE COUNTY
Town of Longboat Key
City of Sarasota
Gulf of Mexico
Myakka River State Park
Oscar Scherer State Park
City of Venice
City of North Port
CHARLOTTE COUNTY
UNIVERSITY PKWY
FRUITVILLE RD
BEE RIDGE RD
CLARK RD
BEE RIDGE ROAD EXT
HONORE AVE
N HONORE AVE
VERNA RD
GULF OF MEXICO DR
JOHN RINGLING BLVD
BAYFRONT DR
MOUND ST
SIESTA DR
BAY RD
HIGEL AVE
MIDNIGHT PASS RD
STICKNEY POINT RD
N TAMIAMI TRL
LAUREL RD E
E VENICE AVE
CENTER RD
JACARANDA BLVD
N RIVER RD
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ENGLEWOOD RD
N INDIANA AVE
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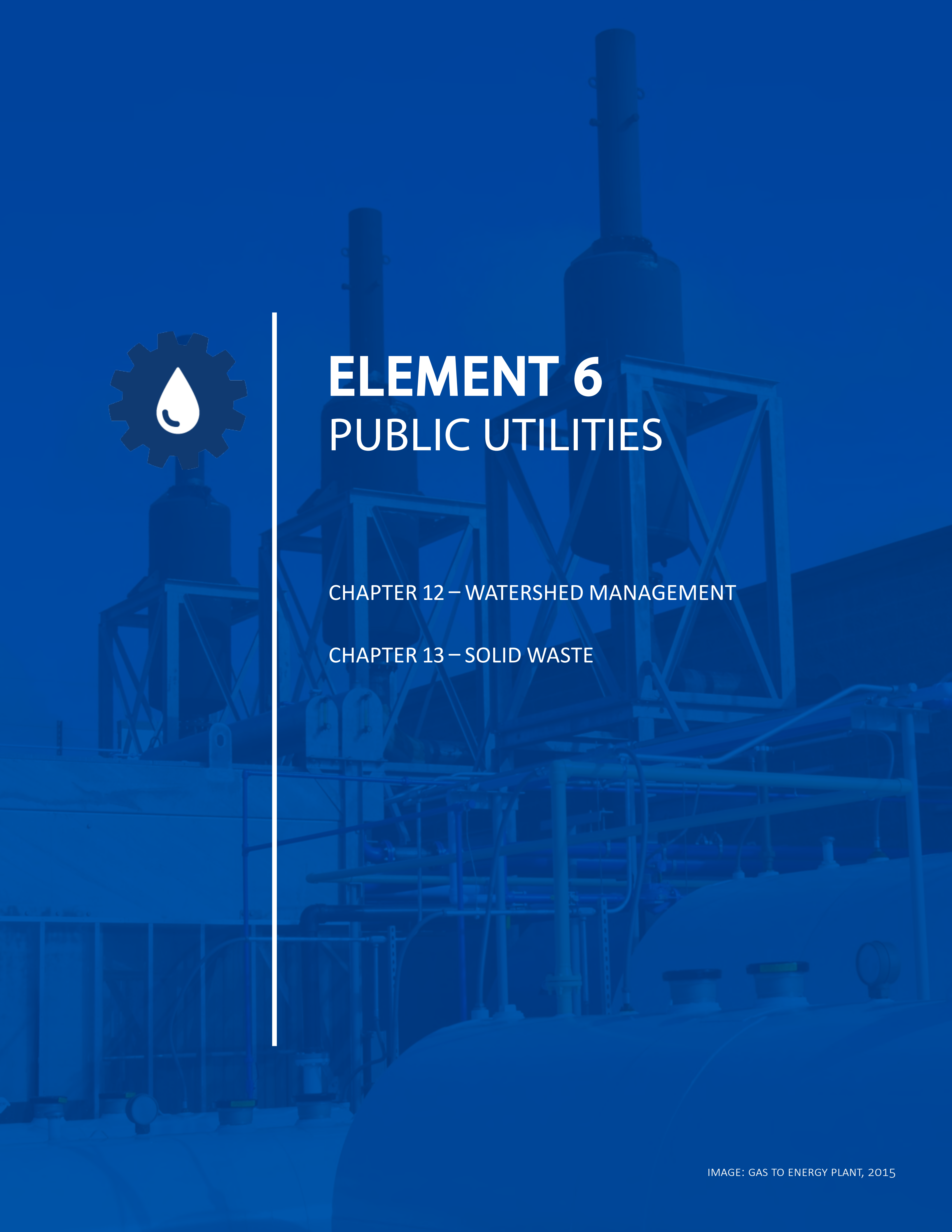

ELEMENT 6
PUBLIC UTILITIES

CHAPTER 12 – WATERSHED MANAGEMENT

CHAPTER 13 – SOLID WASTE

IMAGE: GAS TO ENERGY PLANT, 2015

TABLE OF CONTENTS

THE PUBLIC UTILITIES ELEMENT

Utilities can be considered as the basic building blocks of urban living. They are essential to quality of life, livability, and to cost-effective growth. The purpose of the Public Utilities Element is to serve as a guide to Sarasota County in providing the necessary facilities and services to meet the demands generated by growth, and to ensure that the services provided by Sarasota County are convenient, reliable, cost-effective, safe, and environmentally sustainable.

The Public Utilities Element consists of chapters addressing the subjects of stormwater and surface water management, potable water, natural groundwater and aquifer recharge, sanitary sewer, and solid waste and recycling services. The chapters provide goals, objectives, and policies designed to provide for the identification and correction of deficiencies, the management and protection of existing facilities and resources, planning for the expansion of existing systems or the design of new systems to satisfy future demand. Some of the topics addressed in the Element's goals, objectives, and policies include; wastewater collection, treatment, and reuse; utility consolidation, protection of natural groundwater recharge areas, natural drainage features, and surface water bodies; Basin Master Plans/floodplain management; water quality/pollution control and solid waste collection.

As an essential community building block, this element works in concert with many elements of the Comprehensive Plan, to ensure that the county will have adequate utilities to serve both existing development and future growth. The provision of utilities is closely tied to the urban form of growth. The type of utilities, where we provide the utilities, and the timing of the provision of utilities is impacted by and impacts by the majority of development in the county, with the exception of more rural areas.

Stormwater and surface water management not only protect the environment, but also aid in shaping where, and the type of, growth seen in particular areas of the county. The conservation and identification of water resources will impact how county growth will affect the natural environment. County capital improvement projects such as roadways usually require close coordination with both private and public utilities and, therefore, coordination among parties must be part of the planning process. The sanitary sewer and reuse water section addresses centralized wastewater treatment plants, onsite sewage treatment and disposal systems; and addresses issues related to the proper treatment and disposal, and the use of alternative supplies to reduce our impact on potable water resources. To ensure that potable water supplies are available to serve existing and future development, the county adopted policies related to potable water supply, the development and operation of sustainable potable water facilities, continued development of a centralized regional potable water supply system, and policies that encourage water conservation and groundwater conservation. To protect human health and the environment, it is essential that the county responsibly manages the solid waste generated by residents and visitors to the area, educates the public, focuses on recycling, reclaims materials, and increases awareness about litter prevention. The provision of adequate public facilities has a huge impact on the economy, as many companies look for locations that have adequate public facilities and compare the cost of those services when making investment decisions.

SYNERGY
of PUBLIC UTILITIES

The topics within the Public Utilities Element are closely connected to goals, objectives, and policies in other areas of the Comprehensive Plan. By understanding that these relationships exist, the county can maximize resources, understand potential results and leverage funding opportunities to benefit the county. The following Synergy table indicates how this Element connects to, and is interrelated with, the other Elements of the Comprehensive Plan.

MOBILITY
Stormwater conveyance systems and utility lines are often constructed in road rights-of-way, following linear and networked distribution paths. Roads are designed with stormwater considerations of removing water from roadways and managing vehicle related pollutants.

ENVIRONMENTAL SYSTEMS
Management of stormwater, surface water and water pumped from wells can impact water and habitat quality in local waterbodies. Proper solid waste management affects resource use and reuse, as well as litter and waste in natural areas.

IMPLEMENTATION
Infrastructure to serve the community is better coordinated and more cost effective when planned and designed together because of the distribution network of services and limited access in right-of-ways through which most properties are served.

LAND USE
Pace and location of future growth of residential and commercial properties will significantly affect the extent of utilities infrastructure and services that will need to be developed. Similarly, capacity limits of water systems and landfill capacity will influence the amount and pace of growth that can be accommodated locally.

QUALITY OF LIFE
Public amenities require services from utilities. Stormwater and water quality projects can be designed as an attractive feature at various public amenities. Like transportation corridors, public property at places such as parks are often the location of coordinated public improvements, creating opportunity for partnerships and need for agreements.

HEALTH
Public health is a primary concern and reason for quality, well-planned utility infrastructure, including reduction of standing water to limit mosquito breeding, clean water and effective removal of waste.

SUSTAINABILITY
Conservation of water resources and reduction of waste generation are key to the sustainability of utilities services into the future. Through more efficient building techniques, education efforts and behavior change, as well as development of local green jobs related to water and waste management, the costs associated with utilities can be reduced and the impact on the local and regional environment and social vulnerabilities can be reduced, while supporting the local economy.

CHAPTER

12

CORE PRINCIPLES
WATERSHED MANAGEMENT

The Core Principles for the Watershed Management Chapter of the Comprehensive Plan focus on conserving resources for future generations, and improving the overall quality of life in Sarasota County.

Build, maintain, operate, and improve facilities and systems in a financially responsible manner.

Plan for future growth, coordinate with regional and municipal partners to improve system reliability, reduce flooding, provide continuous service.

Integrate watershed restoration principles, operate waste management programs and manage the consumption of resources in a manner that safeguards the environment and mitigates for our ecological footprint to the greatest extent practicable.

Conduct public outreach, and education efforts on programs that increase public awareness, promote conservation, and adhere to the core principles needed to enhance community character, and operate efficiently.

INTRODUCTION

PURPOSE AND INTENT OF THE WATERSHED MANAGEMENT CHAPTER

The Watershed Management Chapter was created in response to the Sarasota Board of County Commissioners' Strategic Initiative to create integrated and sustainable water and resource based management programs; and is divided into the following sections to address the state statutes governing the preparation of Comprehensive Plans:

Surface Water and Flood Protection Sub-Chapter – objectives and policies that provide direction for the development, operation, and maintenance of the stormwater management facilities including the following:

1. Implement Watershed Management Plans, to address existing deficiencies and prioritize future needs.
2. Maintain existing stormwater management systems.
3. Meet the requirements of the National Pollutant Discharge Elimination System (NPDES) permit to reduce the discharge of pollutants while protecting the natural and beneficial functions of the watershed.
4. Establish level of service standards to ensure that facility capacity will be available prior to the issuance of development permits.

Sanitary Sewer and Reuse Water Sub-Chapter – objectives and policies describe the various aspects of the development and operation of sanitary sewer facilities including the following:

1. Continuing the development of a centralized regional wastewater collection system.
2. Maximizing the use of existing facilities and discouraging inefficient and costly urban sprawl.
3. Safeguarding the environment through the enforcement of regulations relating to the operation of wastewater treatment plants, biosolids spreading activities, and the installation and repair of onsite wastewater treatment and disposal systems.
4. Establishing level of service requirements that ensure the coordination of new development with the provision of sanitary sewer facilities.

Potable Water Sub-Chapter – objectives and policies describe the various aspects of the development and operation of potable water facilities including the following activities:

1. Continuing to develop a centralized regional potable water supply, treatment, and distribution system.
2. Developing programs that encourage water conservation.
3. Protecting the potable water supply through implementation of the Wellhead Protection Ordinance.
4. Establishing level of service standards to ensure the adequacy of potable water supplies to serve existing and future development.

The Public Utilities Element within Volume 2: Data and Analysis, contains the data and analysis that support the goals, objectives and policies of this Element.

SURFACE WATER MANAGEMENT AND FLOOD PROTECTION

SUB-CHAPTER

Stormwater and Surface Water policies focus on efforts to provide control of water quantity, enhance water quality, and effectively manage flooding.

SURFACE WATER MANAGEMENT and FLOOD PROTECTION

SUB-CHAPTER INTRODUCTION

Past drainage activities consisted primarily of attempts to open wetlands to human occupation and activity. These activities usually consisted of removal or control of surface waters. Early Sarasota settlers established drainage districts and constructed drainage canal networks to reclaim the land for the production of agricultural goods or for the construction of homes. Over the years, drainage of the land affected the hydrology of the area resulting in changes in the peak flow characteristics of runoff, changes in runoff volume, changes in water quality, and changes in the appearance of water bodies and adjacent lands. The hydrologic changes resulting from drainage of the land ultimately created the need for modern storm and surface water management practices.

Modernization of stormwater and surface water practices began in the 1960s within Sarasota County. Numerous studies were conducted; eventually stormwater management regulations were adopted at County, State and Federal levels; then, in November 1989, Sarasota County created the Stormwater Environmental Utility (SEU). Today, the SEU is responsible for the funding, planning, development, and maintenance of the County's storm and surface water management facilities, as well as the permitting of stormwater facilities within private developments.

This section covers the following subjects related to; storm and surface water management, flood protection, water quality, legislation, planning studies, stormwater maintenance, erosion, sediment control, level of service standards and stormwater regulation.

INVENTORY

Protection and restoration of natural systems is the foundation of Sarasota County's watershed management program. Natural systems protection and restoration programs include:

- The Lands Management Program that oversees the protection of environmentally sensitive lands through acquisition. This program provides for restoration of these lands as well as long-term management.

- The Regional Permitting, Mitigation, and Restoration program acquires and restores lands to mitigate for the watershed impacts associated with County roadway and other infrastructure projects.
- The County is responsible for administering Land Development Regulations for private development proposals.

SUMMARY

Sarasota County Surface Water Management & Flood Protection vision is a collection of adopted principles and policies used to protect, conserve, and enhance the health of our watersheds and natural systems, address flooding concerns, manage risk, minimize flood loss, and protect the natural and beneficial functions of the county's floodplain. Core stormwater objectives are to operate, repair and maintain drainage facilities, regulate the construction of new improvements or buildings to safeguard people and property from the impact of flooding, and to develop ways to reduce pollutants, sediment, and nutrient levels in stormwater runoff prior to discharge to our creeks, bays, estuaries, or the Gulf of Mexico. Through its watershed management plans, Sarasota County is developing ways to beneficially reuse stormwater runoff for irrigation, potable supply, and aquifer recharge, in an effort to restore our natural waterways by reducing fresh water volumes.

Sarasota County implements watershed and groundwater monitoring programs that affect the community's flood insurance rating, builds new and retrofits old stormwater control and flood protection systems, responds to citizen inquiries, and operates a Basin Master Planning program to make certain adopted level of service standards are achieved before issuing permits for new development. The county collects and administers public information about the hazards of flooding, promotes education and outreach programs about pollution prevention and the utilization of best management practices, and applies adaptive strategies to sea level rise when reviewing designs. The county's watershed management plans and basin studies contain additional information and program details.

EXAMPLES

FEMA flood map program, drainage ditch and conveyance system maintenance and repair, hydraulic modeling and the regulation of stormwater systems.

BACKGROUND

In 1989 the county determined that the present system of stormwater management practices was not adequate to meet all of the problems associated with stormwater. To this end, in an effort to provide control of water quantity, enhance water quality, and effectively manage flooding, a Stormwater Environmental Utility was established. Developed parcels of property are assessed a user fee based upon that property's contribution to stormwater runoff. The Basin Master Planning Program was initiated by the county in 1991 when the Board of County Commissioners authorized the preparation of detailed basin master plans for Phillippi Creek and Hudson Bayou. Basin Master Plans identify problematic flooding and improvements needed to the county drainage systems to meet the adopted level-of-service standards within the basin.

In 1991, Sarasota County began the preparation of a Storm Water Quality Management Program to meet the requirements for a National Pollutant Discharge Elimination System (NPDES) Municipal Separate Stormwater Sewer System (MS4) permit for stormwater discharge into the waters of the United States. The basic objective of the permitting program requirements is to reduce the impact of urban development on water quality to the "maximum extent practical". The county along with several co-permittees (Cities of Sarasota, Venice, and North Port, Town of Longboat Key, and Florida Department of Transportation District One) are covered under the MS4 Permit.

Sarasota County's floodplain and watershed management program has also benefited from the Environmentally Sensitive Lands Protection Program (ESLPP). The ESLPP has protected thousands of acres, a significant portion consisting of natural floodplain areas thereby preventing future homes from being placed within the floodplain. The Basin Master Plans and the Storm Water Quality Management Program provide extensive information on the stormwater and surface water characteristics in the county. The plans also provide recommendations as to county facilities that should be constructed, as well as, recommending management standards that need to be met by the private sector in conjunction with new construction and the expansion of existing activities.

WATER GOAL 1

Sarasota County shall provide programs which prevent and mitigate the losses, cost, and human suffering caused by flooding; protect natural and beneficial functions of the floodplain; protect water quality by preventing further degradation of the water resources; enhance water quality where appropriate; enhance, protect and conserve the hydrologic and ecological functions of natural systems including estuaries, the Gulf of Mexico, freshwater and groundwater systems; and ensure safe, efficient, economical, and sustainable water supplies that provides customers the appropriate water quality for the intended use.

WATER OBJ 1.1

Address the maintenance of existing facility capacity, and ensure the adequacy of facilities to meet future needs.

WATER POLICY 1.1.1

The county shall continue to operate a Stormwater Environmental Utility (SEU) to provide for monitoring, maintenance, and improvement of the county's stormwater management system. The Utility shall manage the county's stormwater system to minimize pollutants, flooding, and sedimentation wherever possible. The Utility shall continue cooperation with the municipalities, other appropriate governmental agencies, and public and/or private utilities, which will implement Watershed Management Plans. Replacement and correction of existing facility deficiencies as well as providing for future facility requirements shall be identified and prioritized for inclusion in the County's Capital Improvement Program (CIP).

WATER POLICY 1.1.2

The county and private developments shall monitor and maintain stormwater management and conveyance facilities to ensure that the stormwater management systems are adequately maintained and functioning in compliance with design and permit requirements.

WATER POLICY 1.1.3

The county shall continue to fund the continuous maintenance of watershed maps and models for each drainage basin in the County through the Basin Master Planning Program to provide a basis of review for new development and other watershed alteration proposals as well as assure that stormwater management systems are developed to attain the adopted level of service. Each detailed master plan shall be developed, in accordance with the Basin Master Plan Schedule, as a Sarasota County inter-department effort to ensure consideration of natural drainage functions. Basin master plans shall be developed in cooperation with the municipalities and adjacent Counties to address stormwater quality and quantity problems in basins crossing more than one political boundary. Each plan shall be designed to protect downstream and estuarine water from degradation by stormwater runoff. Each basin plan shall define the level of service and a cost- effective capital improvements program shall be developed. As each basin plan is completed, the comprehensive plan, including the Capital Improvements Plan, shall be amended to incorporate and reflect the stormwater management system improvements identified in the basin plan.

WATER POLICY 1.1.4

As part of the basin master planning program, the county shall identify: 1) the extent of the existing 100-year floodplain; 2) all drainage facilities which fall below adopted level of service standards; 3) costs associated with improving such facilities to meet minimum drainage level of service standards; and 3) funding sources for those improvements. Where the improvements of drainage facilities are not feasible or desirable, alternative methods may be employed including, but not limited to, off-line reservoirs, parks designed for flooding, and floodways. If the completion of improvements to provide the adopted minimum level of service standards for existing development or existing roadways would result in unacceptable adverse economic or social impacts to specific areas, a level of service less than the adopted minimum may be accepted for the specific area.

WATER POLICY 1.1.5

The county shall pursue providing regional stormwater management systems, including those that could take the place of site specific attenuation facilities. These regional systems should be developed by the county and, when appropriate, funded by development in lieu of construction of onsite, private attenuation facilities. Privately owned water quality treatment facilities should be located and maintained onsite to promote source control of pollutants before they enter the County stormwater system.

WATER POLICY 1.1.6

As the county develops stormwater management facilities, all system improvements shall be developed with consideration for aesthetics and the possibility of incorporation into the county park system.

WATER POLICY 1.1.7

The County shall support creation, implementation, and update of Watershed Management Plans, that includes holistic management practices, quantitative water quality readings, and protect the health of surface waters.

WATER OBJ 1.2

Protect the functions of natural groundwater recharge areas and natural drainage features by providing for the maintenance of existing, and where feasible the restoration of the pre-development, water budgets to historical watercourses (as identified by the original United States General Land Office Township Plats from the Mid to Late 1800's).

WATER POLICY 1.2.1

The county shall implement its Watershed Management Plan consistent with the National Pollutant Discharge Elimination System (NPDES) permit issued to the county by FDEP. The county's Stormwater Program shall provide for management and control of stormwater runoff to reduce pollution at the source and discharge of pollutants into receiving waters from the County's stormwater system to the maximum extent possible.

WATER POLICY 1.2.2

The county shall require that the treatment of stormwater discharge meet standards which will ensure that there will not be adverse impacts on the quality of natural surface waters.

WATER OBJ 1.3

Ensure that development and redevelopment provides for adequate stormwater management.

WATER POLICY 1.3.1

No permit shall be issued for new development which will result in an increase in demand upon deficient stormwater facilities prior to the completion of improvements needed to bring the facility up to adopted level of service standards.

WATER POLICY 1.3.2

Stormwater Level of Service:

1. Stormwater Quality: no discharge from any stormwater facility shall cause or contribute to a violation of water quality standards in waters of the State as provided for in County Ordinances, Federal Laws and State Statutes. Water quality levels of service shall be set consistent with the protection of public health, safety and welfare and natural resources functions and values.

   To protect water quality and maintain stormwater quality level of service standards:

   a. The county shall implement Watershed Management Plans consistent with the federal NPDES requirements.

   b. New and existing industrial activities (as defined in the National Pollutant Discharge Elimination System regulations for stormwater) shall develop and implement a Storm Water Pollution Prevention Plan (SW3P) for such activity.

   c. No discharge from any stormwater facility shall cause or contribute to a violation of water quality standards in waters of the State as provided for in County Ordinances, Federal Laws and State Statutes. To meet this requirement:

      i) All stormwater management systems for new development and re-development shall include features to minimize pollution from oil, suspended solids, and other objectionable materials. Such features shall be designed to treat the runoff resulting from the first one (1”) inch of rainfall. Stormwater systems shall include additional measures designed to reduce floating and suspended solids to a minimum. Higher design criteria for water treatment shall apply if such criteria are necessary to meet and maintain the level of service or to protect water bodies (such as potable surface waters or Outstanding Florida Waters) which require higher levels of protection. The higher design criteria shall be based on a treatment system that treats 1.5 times the volume required for the selected treatment system or equivalent.

ii) New development and re-development shall provide mitigation measures and best management practices to control pollutants specific to the pollutant characteristics of the proposed land use consisting of Best Management Practices shown to be effective in controlling the specific pollutants characteristic of the type of new development.

iii) All development shall meet and be consistent with requirements in the Basin Master Plans.

iv) Mitigation measures and best management practices relating to drainage shall be used during construction activities to ensure that water quality is not degraded during the land clearing and construction of development. No cutting, clearing, grading or filling shall be accomplished on any site under development unless appropriate devices have been installed to minimize pollution from objectionable materials, to control erosion, and to remove sediment from surface water runoff. Appropriate techniques shall also be utilized to stabilize and revegetate disturbed areas as soon as possible.

d. Best management practices shall be encouraged for intensive agricultural land use practices that negatively impact water quality.

e. The county's Basin Master Plans shall include an evaluation of pollutant loading.

2. Stormwater Quantity: Stormwater management systems shall provide for adequate control of stormwater runoff. The Stormwater Quantity Level of Service shall be:

STORMWATER QUANTITY LEVEL OF SERVICE AND DESIGN CRITERIA

Florida Reference (buildings, roads and sites)	Level of Service (flood intervals in years)
I. BUILDINGS	
A. Emergency shelters and essential services	>100
B. Habitable	100
C. Employment/Service Centers	100
II. ROAD ACCESS: roads shall be passable during flooding. Roadway flooding <6” depth at the outside edge of pavement is considered passable.	
A. Evacuation	>100
B. Arterials	100
C. Collectors	25
D. Neighborhood	10
III. SITES: flooding refers to standing water in agricultural land, developed open or green space (yards and parking lots etc.) and undeveloped lands designated for future development. This does not include areas incorporated into the stormwater or Basin Master Plan as flow ways, floodplain, or flood storage areas.	
A. Urban (>1 unit/acre)	5
B. Rural	2

IV. The water quantity level of service can be adjusted to allow for greater amounts of flooding of roads and sites if the flooding is provided for in a Basin Master Plan or as part of a stormwater management system design and does not adversely impact public health and safety, natural resources or property. The level of service for existing development and for improvements to existing roadways may be adjusted based on existing conditions such as adjacent topography, and economic and social impacts.

2. The requirements to maintain stormwater quantity level of service standards are stated below:
   a. New developments shall be designed to maintain the water quantity level of service standard and to minimize adverse stormwater impacts. Stormwater runoff shall not be diverted or discharged in such a way as to cause an adverse increase in off-site flood stages or have an adverse impact upon natural system values and functions. Stormwater management plan designs shall provide for the attenuation/retention of stormwater from the site. Water released from the site shall be in such a manner as to ensure that no adverse increases in off-site flood stages will result for up to and including a 100-year, 24-hour storm. The County shall pursue opportunities for off-site public or private regional stormwater attenuation/retention facilities to be used to accomplish stormwater attenuation requirements.
   b. Until drainage improvements are made to upgrade the level of service, developments in basins identified through Basin Master Plans as not meeting the Level of Service shall limit the rate of runoff after development to the drainage system capacity by limiting the 100-Year, 24-Hour post-development runoff rates to the apportioned downstream flow capacities which do not cause flooding of residential structures.
   c. Best management practices shall be encouraged for intensive agricultural land use practices which substantially increase runoff rates.
   d. All new development and stormwater management systems shall meet and be consistent with the requirements in the Basin Master Plans, and Watershed Management Plans.
   e. Sarasota County shall provide design standards for Low impact development (LID) measures to mitigate the effect of impervious surfaces and stormwater pollutants on increased runoff volumes. LID design measures may include, but are not limited to, bio-retention, detention with biofiltration, pervious pavement systems, green roofs, rainwater/stormwater harvesting, etc.

WATER POLICY 1.3.3

Consistent with the National Pollutant Discharge Elimination System (NPDES) permit, the county's Watershed Management Plan shall establish water quality design criteria for each drainage basin. In establishing these criteria, the county shall consider recommendations from the Sarasota Bay and Charlotte Harbor National Estuary Programs and the drainage basin pollutant load reduction goals to be established by the Southwest Florida Water Management District, and the State of Florida.

WATER POLICY 1.3.4

The county shall work with the Southwest Florida Water Management District (SWFWMD) in an effort to coordinate approaches to planning and permitting of stormwater management systems and shall specifically request SWFWMD comment on a volume based approach to regulating stormwater management in addition to the common peak discharge rate approach.

WATER POLICY 1.3.5

Development shall provide for easy maintenance of outfalls for discharge of drainage.

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SANITARY SEWER AND REUSE WATER

SUB-CHAPTER

Sanitary Sewer and Reuse Water policies focus on centralized regional wastewater collection and treatment systems that are safe, clean, efficient, economical, and operate in an environmentally sound, sustainable manner.

SANITARY SEWER and REUSE WATER

SUB-CHAPTER INTRODUCTION

SUMMARY

Sarasota County Sanitary Sewer and Reuse Water policies focus on centralized regional wastewater collection and treatment systems that are safe, clean, efficient, economical, and operate in an environmentally sound, sustainable manner. Core service objectives include maintaining and operating adequate collection and treatment facilities, addressing deficiencies, managing the reuse supply as a resource, expanding the wastewater and reuse systems concurrent with urban development, protecting natural systems, defining levels of service, and using conservation strategies to manage resources. Policies acknowledge the importance of maintaining adequate infrastructure as an economic driver for the community and ensuring that adequate resources are available before issuing permits for new development.

EXAMPLES

Maintaining continuous wastewater services, meet regulatory standards, build, maintain, operate, and improve wastewater and reuse water infrastructure. Produce, store, and deliver reuse water to residential, commercial, recreational, and agricultural customers throughout Sarasota County.

BACKGROUND

Planning studies from the late 1960’s and into the 1980’s outlined the fragmented nature of wastewater treatment within unincorporated Sarasota County, which was a mixture of small private treatment plants, onsite sewage treatment and disposal systems (septic systems), and several different franchised utilities. By 1991 there were 116 (WWTP) wastewater treatment plants operating within Sarasota County. In 1987 with the support from several community organizations, city, county and other government agency’s the Board of County Commissioners’ passed Resolution No. 87-157 which set forth new policy’s for a centralized wastewater utility system. The resolution recognized that development of such a system would require the regionalization of wastewater treatment plants, the acquisition of privately owned systems, and the development of methods to recycle and reuse treated wastewater as an alternative supply to conserve potable water resources.

The Public Utilities Element Volume 2 Data and Analysis provides additional details on the series of steps Sarasota County took to consolidate the numerous independent wastewater treatment plants and onsite sewage treatment and disposal systems.

There are four major themes, which the Board of County Commissioners adopted into policy over the years:

1. The county should continue to consolidate wastewater systems into a regional system consisting of county owned plants, and contracted capacity with the City of Sarasota and the City of Venice. The latest major consolidation decision was to decommission the Siesta Key Wastewater Plant instead of rebuilding the facility.
2. The level of treatment by county owned plants would be the minimum treatment level required for producing reclaimed water to offset potable water and groundwater use.
3. Providing reclaimed water for irrigation will be the primary means of effluent disposal. The county will continue with its reuse program, even though that may not be the most economical means of effluent disposal.
4. The county would take the lead in developing long term, regional solutions for the disposal of biosolids in a manner that will beneficially use the product. To combat the issues surrounding land spreading of biosolids~~;~~.

The Wastewater Management Plan identifies the most economical and efficient alternative for regionalization and details capital improvements program to accomplish that consolidation. While the plan incorporates all known changes due to growth, the Phillippi Creek Septic System Replacement Program, and the county’s 2050 Resource Management Area Plan, the Management Plan will be periodically reviewed and updated for changes in growth patterns.

WATER GOAL 2

Sanitary sewer service shall be provided to Sarasota County residents through the continual evolution of a centralized regional wastewater collection and treatment system, and shall be provided in a safe, clean, efficient, economical, and environmentally sound manner, concurrent with urban development.

WATER OBJ 2.1

Continue to correct existing wastewater facility deficiencies, and coordinate the acquisition, extension, and construction of, or increase in the capacity of, facilities to meet future needs.

WATER POLICY 2.1.1

Maintain an inventory of all wastewater treatment plants, both public and private, to include the following: entity having operational responsibility; current rated plant capacity; and existing treatment status (number and type of hookups).

WATER POLICY 2.1.2

The Utilities Department shall continue to identify existing Sarasota County Utilities System facility deficiencies, as well as address implementation activities for establishing priorities for replacement and correction of existing facility deficiencies. This shall be an ongoing effort for the continual setting of capital improvement priorities. Efforts to correct these deficiencies shall be made on the basis of maximizing the use of existing facilities as well as economic feasibility under the Utilities Department's preventive maintenance practices.

WATER POLICY 2.1.3

Consistent with the requirements in the Capital Improvements Plan, projects needed to correct existing deficiencies within the Sarasota County Utilities System shall be given priority in the formulation and implementation of the annual work schedules or programs of the Sarasota County Utilities Department.

WATER POLICY 2.1.4

The county shall continue implementation of the Franchise Acquisition, Consolidation, Implementation Plan – Wastewater Collection, Treatment, and Reuse Master Plan Wastewater Management Plan, which provides an engineered master plan for providing wastewater service to the unincorporated areas of Sarasota County concurrent with urban development and land use planning.

WATER POLICY 2.1.5

The Wastewater Management Plan shall be updated as acquisition and consolidation efforts warrant and continuing engineering activities progress.

WATER POLICY 2.1.6

The County shall continue its on-going planning and engineering activities for providing central wastewater systems or alternative on-site systems to critical areas in the Urban Service Area currently served by on-site wastewater treatment and disposal systems.

WATER POLICY 2.1.7

The County shall prohibit the installation of on-site wastewater treatment and disposal systems in the areas designated Urban Service Area and Barrier Island on the Future Land Use Map Series, unless the installation and use shall not adversely affect the quality of groundwater or surface water or adversely affect the natural function of floodplains as required by the provisions of the County Land Development Regulations and the Florida Administrative Code, regulating design, construction, installation, utilization, operation, maintenance and repair of individual on-site wastewater treatment and disposal systems, as amended; and any more stringent regulations applicable. Further, the County shall require that all buildings served by on-site wastewater treatment and disposal systems, except approved on-site greywater systems, connect to a publicly-owned or investor-owned sewerage system within one year of notification by the county that such a system is available as defined in Florida Statutes. The County shall establish procedures for the notification of sewer availability.

WATER POLICY 2.1.8

As the county consolidates wastewater treatment plants, all facilities shall be developed with consideration for aesthetics and the possibility of incorporation into the County park system.

WATER OBJ 2.2

Maximize the use of existing and available central wastewater facilities and new facilities when they are constructed, and discourage urban sprawl.

WATER POLICY 2.2.1

The county shall continue to require new development to connect to central wastewater systems consistent with the requirements contained in the Land Development Regulations based on the size of the development and distance to the existing system, the available capacity in the system, and the utility's rules allowing connection to the system.

WATER OBJ 2.3

Continue to explore and use alternative and supplemental water resources to conserve and replace the use of traditional potable water supplies.

WATER POLICY 2.3.1

The county shall continue implementation of the reuse policies in the Wastewater Management Plan in order to reduce the demand on potable water supplies and withdrawals from ground water aquifers.

WATER POLICY 2.3.2

The county shall reclaim treated wastewater for irrigation purposes as its primary method of disposal for treated wastewater. The use of deep well injection or surface water discharge shall be used only when opportunities to use reclaimed water for irrigation is not available.

WATER OBJ 2.4

Protect the functions of natural ground water recharge areas, natural drainage features, and surface water bodies.

WATER POLICY 2.4.1

The wastewater treatment plant inspection and compliance monitoring program shall continue. All wastewater treatment plants shall be monitored as outlined in the DEP Specific Operating Agreement. All costs for monitoring shall be equal to the appropriate inspection charge.

WATER POLICY 2.4.2

The county shall continue to provide a program to ensure that septage and biosolids are received and disposed of in an environmentally sound manner.

WATER POLICY 2.4.3

All biosolids disposal sites and facilities shall be authorized, specifically identified, monitored, and routinely inspected for compliance with State and County regulations.

WATER POLICY 2.4.4

Sarasota County regulations for the disposal and use of septage and biosolids shall provide for their efficient and beneficial use and prevent adverse environmental impacts. Land spreading and disposal of biosolids shall be allowed only in areas that will not adversely impact groundwater resources and watersheds that drain into surface water supplies (which are used to meet potable water supply needs), recharge areas of a public water system and/or Outstanding Florida Waters. The land spreading of septage shall be prohibited within the County.

WATER OBJ 2.5

Ensure that the issuance of development permits shall be conditioned upon adequate sanitary sewer service capacity.

WATER POLICY 2.5.1

No construction permit shall be issued for new development which will result in an increase in demand upon deficient wastewater treatment facilities prior to the completion of improvements needed to bring the facility up to adopted level of service standards, unless provided for by existing State and County laws.

WATER POLICY 2.5.2

Issuance of development orders for any site proposing to utilize an onsite wastewater treatment and disposal system shall be contingent upon demonstration of compliance with applicable federal, State and local permit requirements. Soil surveys shall be required for onsite wastewater treatment and disposal system permits. No individual onsite systems shall be permitted where soil conditions indicate that the system would not function without degrading water quality or where land alterations necessary to accommodate the system would interfere with drainage or floodplain functions.

WATER POLICY 2.5.3

Sanitary Sewer Level of Service:

1. Minimum average daily flow to be treated from domestic units shall be 200 gallons per Equivalent Dwelling Unit per day; and
2. Wastewater effluent shall meet standards defined by state law, permit requirements of the Florida Department of Environmental Protection, and County Ordinance when discharged to groundwater or surface water in the County.

POTABLE WATER

SUB-CHAPTER

Potable Water policies focus on maintaining sustainable water supplies, addressing deficiencies, protecting wellheads and natural recharge areas, defining levels of service, and acknowledging the importance of potable water as an economic driver for the community.

POTABLE WATER

SUB-CHAPTER INTRODUCTION

SUMMARY

Sarasota County Potable Water Resource policies encourage planning for future water supplies, conservation strategies, resource protection, and cost effective, safe, and reliable potable water service, built upon regional partnerships. Core potable water service objectives include maintaining sustainable water supplies, addressing deficiencies, protecting wellheads and natural recharge areas, defining levels of service, acknowledging the importance of potable water as an economic driver for the community while ensuring that adequate supplies and infrastructure are available before issuing permits for new development.

EXAMPLES

Maintaining continuous water service, meet regulatory water quality standards, build, maintain, operate, and improve water infrastructure, maintain water pressure and fire flow capabilities, control loss, repair leaks, enforce the backflow prevention program, and provide continuous system monitoring.

BACKGROUND

The Sarasota County Utilities System's service area covers most of the urbanized area of unincorporated Sarasota County. The southernmost portion of the urbanized area lies within the service area of the Englewood Water District. The City of Sarasota, the City of North Port, the City of Venice, and the Englewood Water District own and operate independent water systems that provide service within their jurisdictional boundaries. The Town of Longboat Key purchases its water from Manatee County.

Due to the regional nature of water supplies, such as Manatee County and the Peace River Authority, and the benefits of having a diversity of sources, a number of interconnections among the public supply systems have been constructed. The county is interconnected with the Cities of Venice, North Port and Sarasota, and Englewood Water District. The county has Emergency Bulk Water Supply Agreements with the Cities of Venice and Sarasota in the event anything should happen to their water supplies. The county is connected to the City of North Port, Charlotte and DeSoto Counties through the Peace River pipeline. The pipeline typically conveys flows from the Peace River Plant to the Carlton Plant, but is designed to reverse flow direction if needed. The county is also connected to Manatee County through three water supply connections. This level of interconnection to systems throughout the county and region significantly strengthens the ability of public water suppliers to respond to emergencies or other interruptions in supplies such as extreme droughts or hurricanes.

WATER CONSERVATION

Sarasota County, in cooperation with SWFWMD and the FDEP, has long been an advocate of water conservation. In 1993, the County dedicated a full time person to Outreach and Resident Education about the need to conserve precious water resources. The campaign has been very successful reducing per capita water use from approximately 150 gallons per person per day. In 1995, the county's utility system customers used approximately 90 gallons of drinking water per person per day, by 2005 the number was 86, and in 2014 it was 78 gallons per person per day (gpcd). Starting in 2013 the county adopted the Southwest Florida Water Management District uniform methodology for calculating per capita consumption, which lowered the county's overall rate. Sarasota County Utilities have utilized a number of methods to promote conservation including:

- Inverted Rate Structure – Sarasota County Utilities and Englewood Water District use a tiered structure of increasing rates with increasing volume of water used. Initially implemented in November 1991, the county rate system has evolved over time to one of the most aggressive tiered rate systems in the state. Both EWD and the County will continue to utilize this effective conservation tool.
- Use of Low-Flow Plumbing Fixtures – Ordinance No. 94-001 requires low-flow plumbing fixtures (toilets, showerheads, faucets) in all new development. Public Education and Outreach programs since 1995 have promoted the installation of low- flow toilets, showerheads and faucet aerators for homeowners in existing homes through the use of financial incentives, showerhead exchanges, and giveaways.
- Use of Automatic Shut-Off Devices for Irrigation Systems – Ordinance 94-001 required automatic shutoff devices in all newly constructed irrigation systems. Ordinance No. 96-021 requires them in all systems and requires that the devices must be operational at all times.

- Water-Efficient Landscaping Regulations – Ordinance No. 2001- 081, as amended discourages the connection of an automatic irrigation system to the potable water supply in new development and limits areas of turf and annual flowers to 50% or less of the irrigated area within new construction. Low volume micro-irrigation is required for plant beds and no grass can be planted in strips narrower than four feet.
- Golf Course Ordinance – Ordinance No. 2003-069 ensures the development, operation and maintenance of new golf courses protects and conserves natural resources and the environment. The ordinance requires that they protect water resources, employ best management practices to control stormwater pollution, and implement an integrated pest management plan. Included in the ordinance is a golf course technical manual.
- Promotion of Reclaimed Water – As discussed in the sanitary sewer section of this chapter, reclaiming treated wastewater for irrigation is the primary means of wastewater disposal for Sarasota County Utilities and Englewood Water District. This practice also offsets the amount of potable and groundwater that would be used for irrigation water.
- Watering Restrictions – Sarasota County initially implemented once a week watering restrictions on May 1, 2000. Even through severe rainy seasons, the county has remained committed to the once a week watering restrictions to help residents develop drought tolerant landscapes. Watering less frequently, but more deeply, creates a deep root system that will be able to survive the severe droughts that come naturally to this area.
- Outreach and Education – Sarasota County remains dedicated to outreach and education of residents of the need to conserve precious water resources. Most of the county's hands-on water conservation takes place through the UF/IFAS Extension and Sustainability Service, e.g. Horticulture – Commercial and Residential Conservation Programs.

Conservation programs, watering restrictions and building codes apply to the entire unincorporated area of the county including franchise and EWD service areas. Several education and outreach programs are cooperative efforts, between the county, the Cities and SWFWMD. Other intergovernmental coordination is outlined in Chapter 15 of the Sarasota County Comprehensive Plan. All potable water supply projects must be permitted through SWFWMD so constant coordination is vital to the success of the projects. In addition, SWFWMD is a supporter of several county and regional water supply projects, such as the Peace River Plant through their Cooperative Funding Program.

WATER GOAL 3

Potable water service shall be provided to Sarasota County residents through the continual evolution of a centralized regional supply, treatment, and distribution system, and shall be provided in a safe, reliable, economical, sustainable and environmentally sound manner, concurrent with urban development.

WATER OBJ 3.1

Continue to correct existing potable water facility deficiencies, and coordinate the acquisition, expansion, and construction of facilities to meet future needs.

WATER POLICY 3.1.1

Sarasota County Utilities shall maintain up to date inventories indicating the available capacity and present demand for potable water facilities in the Sarasota County Utilities System service area.

WATER POLICY 3.1.2

Sarasota County Utilities shall continue to identify existing Sarasota County Utilities System facility deficiencies, as well as address implementation activities for establishing priorities for replacement and correction of existing facility deficiencies. This shall be an ongoing effort for the continual setting of capital improvement priorities. Efforts to correct these deficiencies shall be made on the basis of maximizing the use of existing facilities as well as economic feasibility under the Sarasota County Utilities preventive maintenance practices.

WATER POLICY 3.1.3

Consistent with the requirements in the Capital Improvements Plan, projects needed to correct existing deficiencies within the Sarasota County Utilities System shall be given priority in the formulation and implementation of the annual work schedules or programs of Sarasota County Utilities.

WATER POLICY 3.1.4
Potable water master plans and modeling of the Sarasota County Utilities System shall be updated as continued engineering and construction activities progress.

WATER POLICY 3.1.5
Continue to extend water lines to those portions of unincorporated Sarasota County developed with private wells utilizing the County's Line Extension Policy through the Sarasota County Utilities Capital Improvement Program and utilizing other mechanisms such as Municipal Service Benefit Unit non-ad valorem assessments.

WATER POLICY 3.1.6
Sarasota County will continue to explore sustainable alternative water supply resources in cooperation with State, regional and local agencies and other local governments. County water supply planning will be coordinated with the Southwest Florida Water Management District's Regional Water Supply Plan. Additional water supply sources will need to be identified and developed to supplement existing sources. The Sarasota County 10-year Water Supply Facilities Work Plan, dated December 2015, prepared by Carollo Engineers, P.C. is hereby adopted into the Comprehensive Plan by reference as the 10-Year Water Supply Facilities Work Plan.

WATER POLICY 3.1.7
As the County consolidates and develops potable water facilities, all facilities shall be developed with consideration for aesthetics and the possibility of incorporation into the County park system.

WATER OBJ 3.2

Maximize the use of existing and available central potable water facilities and new facilities when they are constructed, and discourage urban sprawl.

WATER POLICY 3.2.1
Until such time as the Sarasota County Utilities System can expand its distribution system to provide centralized potable water service, individually owned platted lots of record located within the designated Urban Service Area may be provided potable water with a private well provided all other legislative and regulatory requirements are met.

WATER POLICY 3.2.2
The county shall mandate hookup to a centralized potable water system, where available, in accordance with State and County laws.

WATER POLICY 3.2.3
The county shall continue to require new development to connect to central water systems consistent with the requirements contained in the Land Development Regulations, based on the size of the development and distance to the existing system, if the capacity is available in the system and the Utility's rules allow connection to the system.

WATER OBJ 3.3
Continue to implement programs to conserve potable water resources.

WATER POLICY 3.3.1
Sarasota County shall continue its efforts to implement water conservation programs, including such initiatives as the existing inverted water rate structure, low flow toilet rebates and shower-head exchange and outreach educational programs. Water conservation programs shall operate in cooperation with the Southwest Florida Water Management District, and other appropriate entities, both public and private.

WATER POLICY 3.3.2
The county will continue to abide by the Southwest Florida Water Management District's (SWFWMD) emergency water shortage plan, and when necessary, the county may implement more restrictive water conservation measures, as may be required to protect and maintain the utility system.

WATER POLICY 3.3.3.
The county will continue, in partnership with the Southwest Florida Water Management District (SWFWMD) to ensure through a variety of educational and enforcement activities, the proper abandonment of unused water wells. SWFWMD Quality of Water Improvement Program (QWIP) incentive funding will be utilized to the greatest extent possible to realize the goal of measurable aquifer water quality improvement.

WATER POLICY 3.3.4

New development shall prioritize meeting irrigation needs through (1) demand management strategies, (2) reclaimed water, if available, (3) rain water or stormwater, and finally, (4) community ground water wells.

WATER OBJ 3.4

Protect the functions of natural groundwater recharge areas and natural drainage features.

WATER POLICY 3.4.1

Sarasota County will protect its potable water supply system, contributing recharge areas, and related open space benefits through implementation of its Wellhead Protection Ordinance which shall identify inappropriate land uses and facilities including, but not limited to, underground fuel storage tanks, landfills, hazardous materials storage, and certain commercial and industrial uses. The County's Wellhead Protection Ordinance will be amended, as needed, for consistency with the Florida Department of Environmental Protection's rule governing wellhead protection adopted in May 1995. The protection effort may include requests to the Southwest Florida Water Management District for cooperative funding or technical assistance to further identify zones of protection and cones of influence around individual wellheads or wellfields.

WATER POLICY 3.4.2

Usage and maintenance of potable water resources on the T. Mabry Carlton, Jr. Memorial Reserve shall be in accordance with County policy and the monitoring requirements contained in the Southwest Florida Water Management District Water Use Permit for the wellfield.

WATER OBJ 3.5

Ensure that the issuance of development permits shall be conditioned upon adequate potable water capacity.

WATER POLICY 3.5.1

No permit shall be issued for new development which will result in an increase in demand upon deficient central potable water facilities prior to the completion of improvements needed to bring the facility up to adopted level of service standards, unless provided for by existing State and County laws.

WATER POLICY 3.5.2

The Florida Department of Health in Sarasota County shall enforce potable water quality standards in accordance with the Federal Safe Drinking Water Act, Florida Statutes, "Florida Safe Drinking Water Act", and the Florida Administrative Code, and as prescribed by the U.S. Environmental Protection Agency. However, the County may adopt more stringent standards if it deems necessary.

WATER POLICY 3.5.3

Issuance of development orders will be contingent upon demonstration of compliance with applicable federal, State, and local permit requirements for on-site potable water systems.

WATER POLICY 3.5.4

Potable Water Level of Service:

1. System capacity shall be based on 250 gallons per Equivalent Dwelling Unit per day based on peak flow plus the maintenance of minimum fire flow standards.
2. Minimum potable water quality shall be as defined by the U.S. Environmental Protection Agency, except where the State, or County may impose stricter standards.

WATER OBJ 3.6

Continue to explore regional water supply initiatives through the implementation of the Joint Planning Agreement with the City of Venice.

WATER POLICY 3.6.1

The county will evaluate regional water supply sources, interconnections and joint storage facility locations.

Appendix G

Comprehensive Planning Documents

Charlotte 2050 Plan

Infrastructure Element

INFRASTRUCTURE DATA AND ANALYSIS

POTABLE WATER AND SANITARY SEWER

WATER SUPPLY FACILITIES WORK PLAN

INTRODUCTION

This is the Data and Analysis necessary to support the adopted Charlotte 2050 Plan goals, objectives, and policies. It also constitutes the County's Water Supply Facilities Work Plan.

The purpose of the Potable Water and Sanitary Sewer subelement is to ensure that potable water supplies and sanitary sewer disposal service are available to support development through the planning horizons established within the Comprehensive Plan. The provision of potable water and sanitary sewer is mandated by Florida growth management legislation under Chapter 163 of Florida Statutes (F.S.), which requires that sewer and water services be provided in accordance with future land use projections and which also identifies a basic framework for developing a series of goals, objectives, and policies formulated to accomplish the desired purpose based on an analysis of available data.

Adequate potable water and sufficient sanitary sewage disposal is a necessity for any development. Without such facilities, whether provided through the public sector or through private means, people cannot adequately live and operate, regardless of the availability of developable land. The availability of potable water supply and sanitary sewage disposal will influence the timing, location, and intensity of development. Planning for these facilities and the expansion of any public provision of them should therefore be considered an integral part of the County's development strategy as identified in the Future Land Use element.

Potable water in the County is supplied by 14 individual utilities. The three largest providers, Charlotte County, the City of Punta Gorda, and the Englewood Water District, are publicly owned while the remaining providers are privately owned. Public providers have established service areas, while private providers have certificated areas of operation which grant the authorized right to be the sole provider of a stipulated service within a described area, in order to ensure that service areas do not overlap. Any area not included in another utility's service area falls under the service of the County.

Sanitary sewer service in the County is provided by ten individual utilities. As with potable water service, the largest providers are Charlotte County, the City of Punta Gorda, and the Englewood Water District. The public providers have established service areas, while the remaining seven private providers have certificated service areas, with any land not specifically included in another utility's service area included within the County's.

Several community systems, for both potable water and sanitary sewer, have been approved by the Florida Department of Environmental Protection (FDEP). These systems are usually established in manufactured home parks, recreational vehicle parks, and similar small developments, where centralized public utility systems are not available. These systems generally do not serve more than a few hundred people each, and are usually required to be abandoned when public utilities become available. According to FDEP, there are six community water systems in the County and 13 community sewer systems.

Many areas of the County do not have access to centralized potable water or sanitary sewer systems. Residents of these areas are served by private wells, private on-site sewage disposal systems, or both. There are an estimated 5,300 private wells and over 10,600 known private on-site sewage disposal systems in the County.

In order to ensure that there is adequate potable water supply and sanitary sewage disposal for all residents, the County has adopted level of service (LOS) standards for these facilities: 225 gallons of potable water supply per day per Equivalent Residential Connection (ERC) and 190 gallons of sanitary sewage disposal per day per ERC. These standards apply to the unincorporated portions of the County. The City of Punta Gorda has established its own LOS standards for its incorporated area. Currently, all but one of the County's potable water utilities are projected to meet current demand using the adopted LOS standard. The one utility that is not projected to meet current demand has a certificated area much larger than its actual service area, and therefore likely meets the adopted standards for its current customers.

Two sanitary sewer utilities, including Charlotte County in its Burnt Store and Mid-County service areas, do not meet current demand using the adopted LOS standards. The other utility is the same as the deficient potable water utility. In all of these cases, the boundaries of the service areas contain many residences that are not connected to the existing systems, making it likely that the systems meet the adopted standards for their current customers.

This comprehensive plan incorporates certain principles that identify ocations towards which the County will seek to direct the majority of capital improvement funding for infrastructure and services. As a component of that infrastructure, potable water and sanitary sewerage services are already provided, or will need to be provided, to certain of those areas. The County is currently exploring ways to reduce the cost of the expansion to those affected property owners.

RELATIONSHIP TO THE 2050 PLAN

The provision of potable water supply and sanitary sewer disposal services is a major component of the comprehensive planning process. In order to ensure that public facilities are provided in an efficient and cost-effective manner, the County uses the availability of centralized infrastructure as one of the tools for determining when and where growth will occur. The goals, objectives, and policies of this subelement must therefore be consistent with those established for other elements to promote a well-coordinated growth management strategy for the County.

The Future Land Use element must overcome the problems created by the large number of lots that have already been platted. The ability to extend centralized sewer and water over a period of time is severely limited, and appropriate methods must be used when deciding which areas will receive infrastructure funding, and the timing of the installation of centralized facilities. As the largest provider of both centralized water and sewer services, the County has developed these methods and methodologies for its service area. Other public and private utilities in the County must also address these issues.

Infrastructure expansion by all utilities is identified in the Capital Improvements element (CIE). This schedule of capital projects establishes and prioritizes future expenditures of public funds on infrastructure projects including roads, parks, public facilities, and centralized water and sewer systems. The CIE also includes the Charlotte County Public Schools 5-Year District Facilities Work Program and the Charlotte County-Punta Gorda Metropolitan Planning Organization Transportation Improvement Program, but not any capital projects by the City of Punta Gorda. Due to requirements for concurrency and for potable water supply planning, however, all centralized water and sewer system projects are included, regardless of whether the County will complete them or whether the utility completing the project is publicly or privately owned.

Other key factors relating to the County's ability to provide water and sewer service are contingent upon interlocal agreements with various governmental entities. The majority of the potable water for the County's Mid- and West-County service areas is currently supplied by the Peace River/Manasota Regional Water Supply Authority (PR/MRWSA). This regional water supply authority includes DeSoto, Manatee, and Sarasota counties, and that portion of Charlotte County located within the boundaries of the Southwest Florida Water Management District (SWFWMD). Currently, three utility providers in Charlotte County also serve portions of Lee County, one utility provider serves customers in both Charlotte and Sarasota counties, one utility provider in Lee County has a certificated area that extends into Charlotte County, one utility provider in DeSoto County serves customers in Charlotte County, and one utility provider in Charlotte County has a certificated area that extends into DeSoto County. Many of these utilities have interconnection agreements with each other to provide backup service in emergencies. Interlocal utility agreements between the County and other utilities or neighboring jurisdictions are reflected in the Intergovernmental Coordination element.

The Intergovernmental Coordination element also identifies the various relationships between the County and agencies that affect potable water and sanitary sewer. At the State level, these agencies include FDEP and the Department of Health (DOH). Regional agencies include the Southwest Florida Regional Planning Council (SWFRPC), SWFWMD, and the South Florida Water Management District (SFWMD). The two Water Management Districts regulate water usage and evaluate water resource management issues. These issues are an important part of the Natural Resources and Coastal Planning elements.

LEGISLATION

FEDERAL

All utility providers in the County must construct and operate potable water and sanitary sewer facilities in accordance with all applicable Federal, State, and local regulations. Most of the existing regulations pertaining to water quality and sewage treatment are based on Federal guidelines mandated by the United States Environmental Protection Agency (EPA). Minimum drinking water standards are defined under Public Law 104-182, the “Safe Drinking Water Act Amendments of 1996.” This law establishes Federal water-quality standards for the protection of water for public uses, including operational standards and quality controls for public water systems.

Federal regulations governing wastewater treatment are set forth under Public Law 92-500, the “Water Pollution Control Act Amendments of 1972.” This law requires that wastewater treatment programs be established to regulate water-quality limits for effluent disposal and to control “point source” pollution.

STATE

In order to comply with the Federal regulations for water quality, the State of Florida has adopted legislation pursuant to Chapter 403.850, F.S., the “Florida Safe Drinking Water Act.” This law sets forth the same primary and secondary water quality standards required for public health and recommended for aesthetic quality as the Federal legislation. The State of Florida has also implemented specific laws for classifying and regulating public drinking water systems under Chapters 62-550, 62-555, 62-699, and 64E-8 of the Florida Administrative Code (F.A.C.).

In a similar fashion, the State has implemented Federal wastewater regulations through Chapter 403.086, F.S., and Chapter 62-600, F.A.C. Separate standards for on-site sewage treatment and disposal systems are established in Chapter 64E-6, F.A.C.

State requirements pertaining to the management of water resources and the regulation of consumptive water use have been adopted by regional Water Management Districts pursuant to Chapter 40D-2, F.A.C. The purpose of Chapter 40D-2 is to implement the provisions of Part II of Chapter 373, F.S., and the State of Florida Water Policy set forth in Chapter 62-40 F.A.C. Additional rules relating to water use are found in Chapter 40D-3, “Regulation of Wells”, Chapter 40D-8, “Water Levels and Rates of Flow”, and, Chapter 40D-21, “Water Shortage”. The State Public Service Commission (PSC) is responsible for regulation of the private, for-profit utilities within the County.

LOCAL

The only utility that the County has jurisdictional authority over is its own Utilities Department, known as Charlotte County Utilities (CCU). Other municipal or non-profit utilities are regulated by their own governing bodies. Private, for-profit utilities are regulated by the PSC. The County's established Level of Service standards apply to all utilities operating within the unincorporated area of the County.

EXISTING CONDITIONS

BASIS OF DEMAND – POTABLE WATER AND SANITARY SEWER

In order to properly plan for the expansion of centralized potable water supply and sanitary sewer collection systems, demand for these services must be projected. By projecting the timing and location of future population growth, utilities may better position themselves to provide service where and when it may be required and prevent the unnecessary expansion of such systems into areas where they will not be needed. The County has prepared population projections through the year 2040 for use in this subelement.

For purposes of potable water and sanitary sewer service demand projections, the total peak seasonal population was converted to a functional population using a methodology developed for that purpose by SWFWMD. This methodology reduces the peak seasonal population to a lower percentage, accounting for the fact that seasonal residents, by definition, do not place demands upon the potable water and sanitary sewer infrastructure throughout the entire year. The use of functional population in demand projection guards against overestimating future demand through the use of peak seasonal totals, and against over-expanding infrastructure systems based on demand that will not occur. Table WSW-1 shows the projected total functional population through the 2040.

Table WSW-1: Functional Population Projections, 2020-2040

Year	Permanent Population	Seasonal Population	Functional Seasonal Population	Hotel/Motel Population	Total Functional Population
2020	178,696	36,486	23,235	1,304	203,235
2025	189,365	38,580	24,682	1,548	215,595
2030	204,194	41,471	26,756	1,793	232,743
2035	233,478	45,285	29,139	2,037	264,654
2040	247,931	50,236	32,221	2,281	282,433

Source: Charlotte County Community Development Department, 2019

The County's population projections also project the location of future permanent population growth. This has been accomplished by using the existing Future Land Use Map designations of the land, the available vacant land, and the Urban Service Area. The projections were then collected by U.S. Census block. These geographical projections are integral in estimating population growth and demand in the service areas of the various utilities. Seasonal population percentages were determined at the Census tract level and applied to every block within that tract.

Population projections have also been completed for those areas served by community systems, small centralized systems that serve only a limited number of customers, usually located in a manufactured home park or recreational vehicle park. These projections are based upon the total number of units within the development and the County's annual growth rate of 1.46 percent, as established by the general projections. This growth rate was applied to the existing population of the development and assigned to the unoccupied units. When the maximum population is reached, population growth stops for that development. Table WSW-2 shows the projected population growth for all community systems.

Table WSW-2: Community System Population Projections, 2020-2040							
System	**Total Units**	**Max Pop**	**2020**	**2025**	**2030**	**2035**	**2040**
Bay Palms MHP	48	102	102	102	102	102	102
Charlotte Correctional Institute			1,278	1,371	1,471	1,578	1,693
Gasparilla Mobile Estates	174	372	372	372	372	372	372
Harbor View Trailer Park	149	318	270	289	310	318	318
Hideaway Bay Beach Club Condominium	202	432	360	386	414	432	432
Lazy Lagoon MHP	164	350	349	350	350	350	350
Palm & Pines	120	256	256	256	256	256	256
Paradise Park Condominium Association	314	671	671	671	671	671	671
Pelican Harbor MHP	159	340	323	340	340	340	340
Pelican Perch RV Park	30	64	41	43	46	49	52
River Forest Village	206	440	435	440	440	440	440
Shell Creek Park MHP	214	457	457	457	457	457	457
Sun N Shade Campground	196	419	378	405	419	419	419
Tropical Palms MHP	300	642	609	642	642	642	642
Villas Del Sol	92	196	162	173	185	196	196

Source: Charlotte County Community Development, 2019

The County's projections have also been compared to the Regional Water Supply Plans prepared by SWFWMD and SFWMD. This comparison is shown in Table WSW-3, included in WSW Appendix A, and graphically in Chart WSW-1 and Chart WSW-2.

Chart WSW-1: Population Projection Comparison, 2010-2040

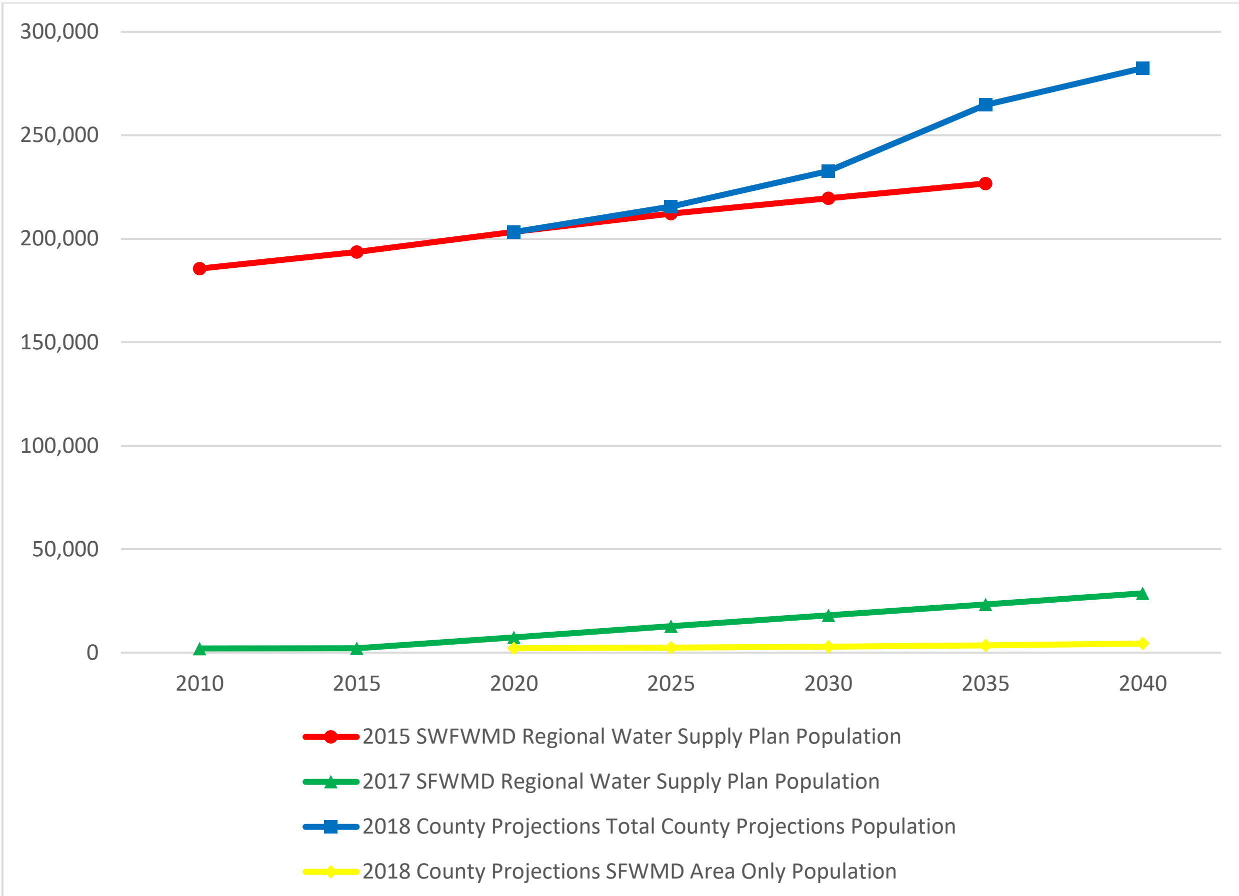
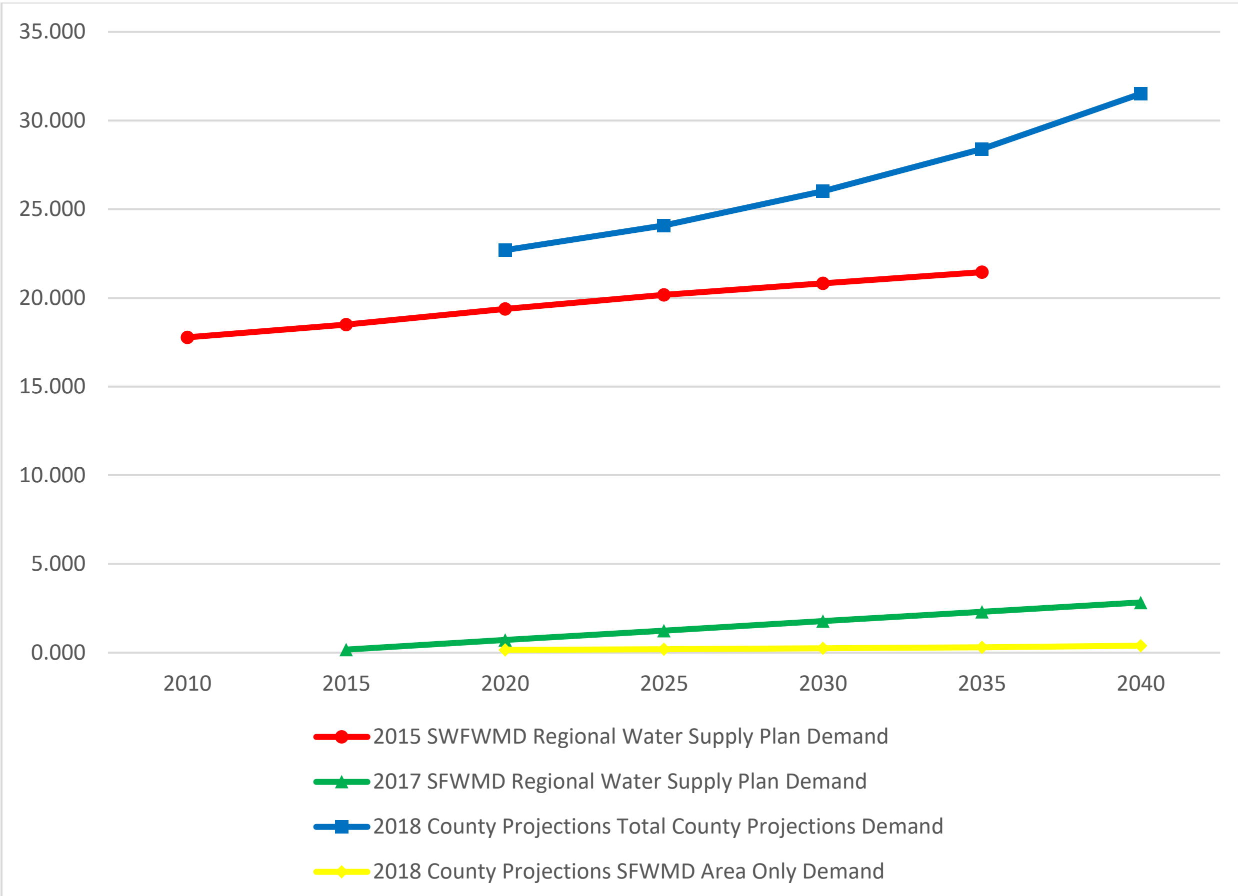


Chart WSW-2: Demand Projection Comparison, 2010-2040



This comparison shows that between 2020 and 2035 the County's population projections range between 0.05 percent less than and 15.4 percent greater than SWFWMD's projections. Between 2020 and 2040 for the area of the County within SFWMD's jurisdiction, the County's projections range between 28.5 percent and 15.2 percent of the SFWMD projections.

When demand projections are compared, the County's projections result in potable water demand that is between 12.5 percent and 27.4 percent greater than the SWFWMD projections. They are between 21.1 percent and 13.7 of the SFWMD projections.

LEVEL OF SERVICE – POTABLE WATER

The establishment of appropriate LOS standards for potable water supplies is necessary to plan for and meet projected demand. A potable water system must have adequate capacity to meet the average daily demand while also being able to accommodate periods of peak demand. A review of historical data indicates that a capacity of 225 gallons per day (gpd) per ERC is needed to meet peak demands and fire flows in the County's unincorporated areas, although actual average day demands may be significantly lower. As reported in its 2014 SWFWMD Public Supply Annual Report, the CCU per capita usage was 81 gpd. Using the 2010 U.S. Census calculation of 2.14 persons per household, actual average daily demand was 173.34 gpd/ERC. Planning to meet LOS demands is necessary to ensure adequate infrastructure capacity is available to satisfy short-term and instantaneous water supply demands without negatively impacting system performance (e.g., reduction in system pressure). Effectively planning for LOS demands also results in more efficient operation of the systems, and customers use a more consistent amount of water because they understand potable water will be available to them when needed.

This LOS standard is established for the unincorporated areas of the County, and all potable water providers are required to meet it. The City of Punta Gorda has established its own LOS standards for the incorporated area of the City, but for the unincorporated areas that receive service from the City, the County's LOS standards apply.

INVENTORY – POTABLE WATER SERVICE PROVIDERS

Potable water in Charlotte County is supplied by 14 public or certificated utilities. The three largest suppliers are all public: Charlotte County, the City of Punta Gorda, and the Englewood Water District. The remaining providers are privately owned. All of these potable water service providers have a customer base and an established area of operation throughout which they provide service. Public utilities have an established service area, while private utilities have a certificated area granted by the Florida Public Service Commission. These service areas grant the authorized right to be the sole provider of a stipulated service within a described area to ensure that service areas do not overlap. Any area not depicted as a certificated area falls within the County's service area. The 14 potable water utility service areas are depicted on SPAM Series Map #83. This map also shows the location of community water systems for small developments such as mobile home parks and recreational vehicle parks. SPAM Series Map #84 shows the location of all major water supply facilities such as water tanks, water treatment plants, wellfields, and reservoirs.

A detailed analysis of all public and private facilities was conducted pursuant to the criteria established by Statute. The potable water providers were inventoried by geographic location to identify plant design capacities, current demand, and existing levels of service for each certificated area. The existing and future water needs for the County were then identified based on the data obtained from the inventory. Future water demands were generated by applying population projections to the 225 gpd/ERC LOS standard and equated to per capita water usage by dividing the 225 gpd/ERC standard by 2.14 persons per household. For the City of Punta Gorda incorporated area, the adopted LOS for potable water is 287 gpd/ERC and the City has 2.035 persons per household. The Lee County portion of Gasparilla Island, served by the Gasparilla Island Water Association, has an adopted LOS of 250 gpd/ERC and 2.54 persons per household. After the future water demands were identified, the performance of existing facilities and adequacy of present levels of service was evaluated over time and the need for facility replacement and expansion was determined.

Existing Potable Water Providers

Peace River/Manasota Regional Water Supply Authority: The Peace River/Manasota Water Supply Authority is an independent special district of the State of Florida that supplies potable water to local government customers. These include Charlotte, DeSoto, Manatee, and Sarasota counties and the City of North Port, and have a total population of over 950,000. PR/MWSA provides treated water to its customers through a system of large-diameter regional transmission pipelines, who then actually distribute that water to their own customers. PR/MRWSA also maintains agreements with Sarasota County, the City of Punta Gorda, and Englewood Water District for emergency situations, allowing PR/MRWSA to draw from these resources to supplement available water supplies if needed.

The Peace River Water Treatment Facility (PRF) is a 51 million gallon per day (MGD) surface water treatment plant (WTP) located along the Peace River in southwest DeSoto County, approximately 19 miles above the river's mouth at Charlotte Harbor. The PRF includes a 120 MGD intake on the river, a diversion structure, a 6.5 billion gallon (BG) off-stream raw water reservoir, and 21 aquifer storage and recovery (ASR) wells with a 6.3 BG capacity. In 2017 the PR/MRWSA supplied an average of 28 MGD to its customers and is contracted to provide an annual average up to 34.7 MGD. Charlotte County receives an annual average daily allocation of 16.1 MGD, about 46 percent of the total allocated regional quantity.

In accordance with the 2005 Master Water Supply Contract, PR/MRWSA customers, including Charlotte County, may request the PR/MRWSA develop and supply additional quantities to meet future needs. Such a request must be made seven years prior to the delivery of new water in order to support the time frame for designing, permitting, and construction of new water supplies.

Charlotte County: Charlotte County's Utilities Department is the largest utility in the County. Its service area includes all areas of the County not included in any other utility's service area, and totals approximately 617.79 square miles. Its actual service area is much smaller, being limited to portions of the Port Charlotte area in the Mid-County region, portions of West County including Gulf Cove, Englewood East, Rotonda West, and South Gulf Cove, and the Burnt Store area of South County, south of Punta Gorda. In total, the County supplies potable water to approximately 60,126 service connections, which in 2018 created an average daily demand of 11.304 MGD. Of this total, 10.478 MGD was supplied by the PR/MRWSA and 0.0.826 MGD was supplied by the

Burnt Store reverse osmosis (RO) WTP. The County has an annual daily average allocation from PR/MRWSA of 16.102 MGD, which amounts to 46 percent of all the water produced by the PRF.

The County currently operates one WTP. The Burnt Store RO facility has a current capacity of 3.172 MGD and currently provides service to 2,514 service connections within its service area, including two areas in Lee County.

The County has a secondary public water supply permit that allows the annual withdrawal of 372 MG of raw water from the Upper Floridan aquifer, from wells located within the Babcock Ranch Preserve.

The County is a provider of bulk water to four private utilities. The Riverwood Community Development District, El Jobean Water Association, NHC Utilities (Encore Super Park), and Little Gasparilla Water Utility, Inc. all purchase bulk treated water from the County and resell it to their customers. Since three of these private utilities are located in the Mid-County region and the fourth is located in the West County region, the water they purchase was originally purchased by the County from PR/MRWSA. In 2017, the County entered into an agreement with the City of Cape Coral, in Lee County, for an interconnect to directly provide bulk potable water, wastewater, and reclaimed water services along the Burnt Store Corridor within the City's incorporated area.

The County maintains emergency interconnections with the Englewood Water District, the City of North Port, Gasparilla Island Water Association, and Charlotte Harbor Water Association. These interconnections are intended to be used only for the provision of additional water in the case of emergencies, not under the same terms as the bulk sale agreements that the County maintains with its bulk purchase customers. Use of the Englewood and North Port interconnections is conditioned upon prior approval by PR/MRWSA.

The County will begin development of a Master Potable Water Plan to address its entire service area, including future expansion of the potable water system. This plan is anticipated to be completed by the end of Fiscal Year 2020.

City of Punta Gorda: The City of Punta Gorda's service area covers approximately 37.32 square miles and is located south of the Peace River, including most of the incorporated area of the City itself and nearby areas of unincorporated Charlotte County, including the communities of Cleveland and Solana and the Charlotte County Airport. The service area includes approximately 17.28 square miles outside the City limits. The City operates a water treatment plant that draws surface water from Shell Creek, a tributary of the Peace River, located east of Interstate 75 on Washington Loop Road. The plant has a rated treatment capacity of 10 MGD and supplies water to 22,522 ERCs. The City's Water Use Permit allows annual average day withdrawals of 8.01 MGD and peak monthly withdrawals of 11.73 MGD. The utility is also responsible for the operation and maintenance of the Burnt Store Isles Elevated Tank and the Punta Gorda Isles Ground Storage Tank and Booster Pump Station.

In 2015, the City prepared a Water Supply Study that identified two projects to improve water quality and reliability. The first is the construction of a 4 MGD RO WTP at the Shell Creek Facility. The second is the construction of an interconnect pipeline between the Shell Creek Facility and the PR/MRWSA system. Both projects are currently under construction, the first by the City and the second by the PR/MRWSA, and are expected to be completed by May 2020. Upon completion, the RO facility will be used in combination with the existing 10 MGD surface water WTP.

Englewood Water District: The Englewood Water District encompasses approximately 45 square miles in southern Sarasota County and western Charlotte County, with approximately 12.12 square miles of the District in Charlotte County. The District's service area includes the Englewood area of Charlotte County as defined in the Englewood Water District's Enabling Act, generally that portion of the County west of Winchester Boulevard and north of Buck Creek, including Manasota Key, but not the bridgeless barrier island Knight Island.

The District uses four fresh water and two brackish water wellfields to provide source water. The four freshwater wellfields are capable of producing 3 MGD, but the Water Use Permit issued by SWFWMD restricts withdrawals to a maximum of 1.25 MGD. The two brackish wellfields are capable of producing over 4.25 MGD to the RO plant. All six wellfields are located in Sarasota County.

Raw water from these sources is treated at the RO WTP and a lime softening WTP which have a combined permitted capacity of 5.36 MGD. Finished waters from both plants are blended and sent into the distribution system. The District serves approximately 22,000 ERCs in both Sarasota and Charlotte Counties, approximately 38 percent of which are located in Charlotte County.

The District is a bulk provider to Bocilla Utilities and Knight Island Utilities, both located on bridgeless barrier islands.

The District maintains emergency interconnects with both Charlotte County and Sarasota County utility systems, with use of the Charlotte County interconnect conditioned upon prior approval by PR/MRWSA.

Charlotte Harbor Water Association: The Charlotte Harbor Water Association certificated area covers approximately 6.20 square miles located along the north shore of the Peace River, from Charlotte Harbor to Harbour Heights. The Association operates a RO WTP located east of Interstate 75 that treats brackish water drawn from the Floridan and Hawthorn aquifers via four active wells, with one standby well, and provides service to over 1,800 ERCs. Most of the service connections represent residential users. The facility has a permitted capacity of 0.750 MGD.

The Association maintains an emergency interconnect with Charlotte County, use of which is conditioned upon prior approval by PR/MRWSA.

Riverwood Community Development District: The Riverwood Community Development District certificated area covers approximately 2.19 square miles located east of the Myakka River and southwest of Port Charlotte, along S.R. 776. The CDD supplies potable water to approximately 1,400 ERCs in the Riverwood development. The CDD does not own or operate either a water supply or WTP of its own, purchasing bulk treated water from the County, instead.

Gasparilla Island Water Association: The Gasparilla Island Water Association certificated area covers approximately 3.05 square miles in Charlotte and Lee Counties, mostly on Gasparilla Island, a barrier island in southwestern Charlotte County. Approximately 1.22 square miles of the certificated area is located in Charlotte County. The Association operates a RO WTP, wellfield, and color removal plant, located southeast of Rotonda in Charlotte County, with a combined permitted capacity of 1.843 MGD providing service to nearly 2,200 ERCs in both Lee and Charlotte Counties, approximately 33 percent of which are located in Charlotte County. The utility maintains an interconnect with Charlotte County and purchased 0.501 million gallons in the twelve months representing the last half of 2017 and the first half of 2018.

El Jobean Water Association: The El Jobean Water Association certificated area covers approximately 0.64 square miles located east of the Myakka River along S.R. 776, southwest of Port Charlotte. The Association supplies potable water to approximately 775 ERCs. The Association does not own or operate either a water supply or WTP of its own, purchasing bulk treated water from the County.

NHC Utilities: The NHC Utilities certificated area covers approximately 0.13 square miles located west of S.R. 776, southwest of Port Charlotte. NHC presently serves nearly 600 ERCs within the Encore Super Park manufactured home park with a permitted capacity of 0.09 MGD. The utility does not own or operate either a water supply or WTP of its own, purchasing bulk treated water from the County.

North Charlotte Waterworks: The North Charlotte Waterworks certificated area covers approximately 17.96 square miles located along US 17, consisting of the Rivers Edge mobile home development and adjoining properties in Charlotte and DeSoto Counties. NCWW serves approximately 80 ERCs. Raw water is treated at a RO WTP with a plant capacity of 0.04 MGD.

The utility has entered into an interlocal agreement with DeSoto County Utilities to purchase bulk water following the construction of a connection with DCU.

Knight Island Utilities: The Knight Island Utilities certificated area covers approximately 0.92 square miles located on the bridgeless barrier islands of Knight Island and Thornton Key, serving over 260 ERCs. The utility does not own or operate either a water supply or WTP of its own, purchasing bulk treated water from Englewood Water District, which is delivered through an interconnect with Bocilla Utilities.

Little Gasparilla Island Utilities: The Little Gasparilla Island Utilities certificated area covers approximately 1.06 square miles located on Little Gasparilla Island, a bridgeless barrier island. The utility does not own or operate either a water supply or WTP of its own, purchasing bulk treated water from the County.

Bocilla Utilities: The Bocilla Utilities certificated area covers approximately 0.91 square miles located on Don Pedro Island, a bridgeless barrier island, serving over 375 ERCs. The utility does not own or operate either a water supply or WTP of its own, purchasing bulk treated water from the Englewood Water District. It has an interconnect with Knight Island Utilities through which it delivers water purchased from Englewood Water District.

Florida Governmental Utility Authority: The Florida Governmental Utility Authority certificated area covers approximately 2.47 square miles located immediately north of the Lee County line, between US 41 and I-75, an extension of its certificated area in Lee County to the south. FGUA does not currently have any residential or commercial service connections in Charlotte County, but serves nearly 1,900 residential customers in Lee County.

FGUA purchases bulk water from Lee County Utilities to service a portion of its Lee County customer base and the remainder is served by a WTP fed by two raw water supply wells.

Town & Country Utilities: The Town & Country Utilities certificated area covers approximately 27.79 square miles located north of Lee County Road 78, east of S.R. 31, and south of Charlotte County Road 74 in Charlotte and Lee Counties, with approximately 21.30 square miles located in Charlotte County. The utility operates a nano-filtration WTP and wellfield in southeastern Charlotte County, with a current permitted capacity of 0.250 MGD that provides service to over 1,500 ERCs.

The utility has been certified to serve the Babcock Ranch development, and its potable water capacity will expand as the community develops. The utility has received a Water Use Permit for an annual allocation of 282.84 MG, and expects to expand its WTP to a capacity of 6.00 MGD by 2031.

DeSoto County Utilities: DeSoto County Utilities does not have a certificated area in Charlotte County, but serves an area of approximately 0.04 square miles located in north-central Charlotte County, west of Kings Highway, along the DeSoto County line. The bulk of this utility's service area is located in DeSoto County. The utility serves approximately 42 residential service connections in Charlotte County and does not own or operate either a water supply or WTP of its own, purchasing bulk treated water from PR/MRWSA.

Community Systems: Several community systems serve areas of Charlotte County where centralized potable water systems do not exist but population densities do not allow potable water to be supplied by individual on-site wells. FDEP records indicate that there are six such community systems in Charlotte County that serve residential or residential-type development. These include manufactured home parks, recreational vehicle parks, and the Charlotte Correctional Institution. These facilities have capacities ranging from 0.004 MGD (4,000 gallons per day) to 0.3 MGD (300,000 gallons per day), and serve a total of approximately 3,800 people. The locations of these community systems are shown on SPAM Series Map #83.

On-site Wells: For those structures not connected to a centralized utility or a community system, their potable water is most likely obtained through on-site wells. Technically, a site without connection to a centralized or community water system could provide potable water through bottled water or similar sources, but the number of these sites compared to the total number of on-site systems should be negligible. There are an estimated 5,351 sites in Charlotte County that rely on on-site wells to provide potable water, and these are shown on SPAM Series Map #85.

Potable Water Quality

The principal law governing drinking water safety in the United States is the Safe Drinking Water Act. Primary drinking water standards are health-related criteria enforced by FDEP, which require water utilities to meet specified water quality standards. Secondary drinking water standards include criteria intended to control aesthetic factors and are established as guidelines that are strongly recommended, but not enforceable.

As required by Federal and State regulation of all utilities, an annual water quality report is distributed to all water customers. The report tabulates the results of water quality testing to identify the level of pollutants that may be in drinking water. The results as reported in the latest reports indicate that the levels of water contaminants for all water utilities within Charlotte County are safely below the maximum contaminant levels allowed.

Significant Non-Potable Water Users

The local Water Management Districts authorize significant water use as Individual Water Use Permits (WUPs). Less significant withdrawals, those less than 100,000 gpd are authorized under General WUPs. All Individual WUPs within Charlotte County are inventoried and are summarized in Table WSW-4, and allocate water for landscape irrigation, recreational or aesthetic use, industrial use, mining/dewatering, and agricultural irrigation. On an annual average daily basis, SWFWMD permits 31.652 MGD of withdrawals in Charlotte County, and SFWMD permits 113.774 MGD.

Table WSW-4: Significant Non-Potable Water Users				
WMD	Permit ID	Permittee	Water Use	Average Daily Usage (MGD)
SWFWMD	00608	SO Sweet Groves	Agricultural	0.135
	01019	Ryals Citrus and Cattle LLC	Agricultural	0.385
	01117	Neal Road Groves	Agricultural	2.316
	01759	Three Suns Ranch	Agricultural	2.461
	02588	Kelly Farms	Agricultural, Landscaping	1.043
	02593	Charlotte 650 LLC	Agricultural	0.524
	02689	East Charlotte Drainage District	Agricultural	2.763
	03243	Bermont Groves, LLC	Agricultural	0.367
	03275	AR Chapman 31 Ranch	Agricultural	1.101
	03523	Twin Isles Country Club, Inc.	Landscaping	0.256
	03656	Maple Leaf Estates	Landscaping	0.368
	04217	Wright Cattle Co.	Agricultural	0.198
	04589	Hudson Land & Cattle LLC	Agricultural	0.648
	04606	Emerald Island	Agricultural	3.402
	05936	Schwartz Charlotte Grove	Agricultural	1.001
	06426	Lemon Bay Golf Club	Landscaping	0.204
	06569	Farabee Grade Property	Agricultural	0.135
	07602	St. Andrews South Golf Club, Inc.	Landscaping	0.143
	07783	County Line Grove	Agricultural	0.456
	07815	Deep Creek Golf Course	Landscaping	0.194
	08224	Prairie Creek Ranch	Agricultural	2.533
	08388	Silkworth Grove	Agricultural	0.169
	09052	Ben Hill Griffin, Inc., C&S Grove	Agricultural	1.522
	09223	Kings Gate Homes and Victoria Estates	Landscaping	0.145
	09335	Rotonda Palms Golf & Country Club	Landscaping	0.189
	09372	Garrett Ranch	Agricultural	0.147
	09398	Charlotte Grove	Agricultural	1.257
	09417	Kyle & Deborah Bishop	Agricultural	0.171
	09476	Citrus Creek Grove	Agricultural	0.679
	09648	Lady Moon Farms, Inc.	Agricultural, Industrial	1.491
	09687	Williams Farm Partnership	Agricultural, Dewatering	1.858
	09727	Shell Creek Groves	Agricultural	0.491
	09926	R and D Cattle Ranch	Agricultural, Dewatering	0.664
	10006	Seminole Lakes Inc.	Landscaping	0.141
	10169	Riverwood Golf Course	Landscaping	0.247
	10726	JDI Farm	Agricultural	0.402

Table WSW-4: Significant Non-Potable Water Users				
WMD	**Permit ID**	**Permittee**	**Water Use**	**Average Daily Usage (MGD)**
	10874	Seminole Citrus Grove	Agricultural	0.221
	10932	Rotonda Hills Golf Course	Landscaping	0.236
	10959	Hall Ranch Watermelon Fields	Agricultural, Landscaping	0.203
	11688	White Marsh Golf Course	Landscaping	0.209
	11715	Coral Creek, LLC	Agricultural	0.240
	11982	Bethel Farms	Agricultural	0.715
	11997	Coral Creek Club	Landscaping	0.184
	12335	Pinemoor West Golf Course	Landscaping	0.228
	12541	Battista Farms	Agricultural	0.432
	12586	Tern Bay	Landscaping	0.444
	12907	River Club of Port Charlotte HOA	Landscaping	0.114
	12969	Pine Valley Golf Course	Landscaping	0.118
	13027	Williams Family Fun Park	Landscaping	0.110
	13096	TJ and Mary Chastain	Agricultural	0.493
	13349	Ryals Citrus and Cattle LLC	Agricultural	0.499
	20053	Hudson Hammocks	Agricultural	0.363
	20204	Bronco Farm	Agricultural	0.260
	20791	Tucker's Point	Landscaping	0.260
SFWMD	08-00001-W	Packers Gulf Citrus – Chiquita Pride Groves	Agricultural	3.838
	08-00002-W	Babcock Ranch Preserve	Agricultural, Livestock	31.556
	08-00005-W	Regina Grove	Agricultural	0.630
	08-00006-W	James Bickett	Agricultural	2.561
	08-00008-W	Coral Rock	Industrial, Public	9.358
	08-00011-W	Jay Rock Mine	Industrial	3.241
	08-00014-W	Earthsource	Dewatering	19.008
	08-00040-W	Bryant Farms	Livestock	1.150
	08-00047-W	Charlotte Correctional Institute	Agricultural, Public	0.124
	08-00069-W	Emerald Isles	Agricultural	6.468
	08-00074-W	Williams Farms	Agricultural	4.684
	08-00076-W	Edenbelle Grove	Agricultural	3.553
	08-00078-W	Evans Properties – Payson Tract	Agricultural	7.715
	08-00079-W	TJ and Mary Chastain	Agricultural	0.246
	08-00108-W	McNew Ranch	Agricultural	0.671
	08-00125-W	Williams Farms	Agricultural	2.786
	08-00163-W	Babcock Ranch Community	Landscaping	0.776
	28-00218-W	Amelia Groves	Agricultural	15.409

Table WSW-4: Significant Non-Potable Water Users				
WMD	Permit ID	Permittee	Water Use	Average Daily Usage (MGD)

Source: South Florida Water Management District & Southwest Florida Water Management District, 2019

Existing and Projected Water Facility Needs

The existing potable water suppliers in Charlotte County are permitted to provide 43.455 MGD gallons of water, as shown in Table WSW-5.

Table WSW-5: Existing Potable Water Service Providers							
DEP ID	Supplier	Population	Permitted Capacity (GPD)	Service Connections	Population per Service Connection	WTPs	Water Sources
6084079	Bocilla Utilities	410	120,000	204	2.01	1	2
5084082	Charlotte Correctional Institute	1,594	300,000	30	53.13	1	1
5084100	Charlotte County Utilities	128,967	16,102,000	57,833	2.23	5	N/A
6080318	Charlotte County Utilities – Burnt Store	6,300	3,172,000	2,210	2.76	1	1
6080044	Charlotte Harbor Water Association	4,500	750,000	1,675	2.69	1	4
6080054	City of Punta Gorda	29,561	10,000,000	11,722	2.52	1	2
6080081	El Jobean Water Association	1,338	N/A	600	2.23	1	1
6580531	Englewood Water District	48,970	6,000,000	16,478	2.97	2	5
6080104	Gasparilla Island Water Association	4,735	1,846,000	1,673	2.83	2	2
6084075	Knight Island Utilities	570	90,000	201	2.84	1	1
6144856	Lake Suzy Utilities	1,500	N/A	569	2.64	1	N/A
5364048	Lee County Utilities	229,788	4,740,000	82,067	2.80	6	2
5084110	NHC Utilities	401	90,000	200	2.01	1	1
6084007	Paradise Park Condominium Association	785	60,000	314	2.50	1	1
5084111	Riverwood Community Development District	2,133	N/A	853	2.50	1	1
6080256	Shell Creek Park	465	50,000	290	1.60	1	1

Table WSW-5: Existing Potable Water Service Providers							
DEP ID	**Supplier**	**Population**	**Permitted Capacity (GPD)**	**Service Connections**	**Population per Service Connection**	**WTPs**	**Water Sources**
6080272	Sun N Shade Campground	200	15,000	80	2.50	1	1
6084074	North Charlotte Waterworks	90	40,000	40	2.25	1	1
6080324	Tropical Palms MHP	350	80,000	360	0.97	1	1

Source: Florida Department of Environmental Protection, 2014

This plan incorporates the established potable water LOS standard of 225 gallons per day per Equivalent Residential Connection (ERC). The ERC data can be converted to gallons per capita per day (gpcd) by using the following formula:

1 ERC = 225 gpd/2.14 persons per household = 105.140 gpcd

This standard was used in conjunction with the County's population projections to determine the future water needs for Charlotte County. Estimates of future population were developed based on U.S. Census blocks, which were the basic unit of the geographical distribution of the projections. These blocks were then each assigned to one of the 14 service areas, and population estimates for each service area were developed from 2020 to 2040.

Since the boundaries of the certificated service areas do not always follow the boundaries of the Census blocks, in some cases the area used for population projection may be larger or smaller than the actual boundaries of the service area, increasing or decreasing the estimated population. Every effort was made to minimize these effects, and usually involved large, sparsely-settled Census blocks. In general, these effects are expected to balance out County-wide in the long run.

Table WSW-6, included in WSW Appendix A, depicts the projected potable water demands from 2020 to 2040 based on estimated functional population. Projected demands are calculated by multiplying the projected population by the per capita equivalent minimum LOS standard of 105.140 gallons per day, and are indicated in millions of gallons per day (MGD). The incorporated area of the City of Punta Gorda is calculated using the City's adopted LOS. The Lee County portion of the Gasparilla Island Water Association's service area is calculated using Lee County's adopted LOS. The functional population totals in this table are greater than those shown in Table WSW-1 because they include four additional users of potable water. Two are located in Lee County and serviced by the CCU Burnt Store facility. Because they are not physically located in Charlotte County, these two areas are not included in the general County totals shown in Table WSW-1. A third is also located in Lee County, the southern portion of Gasparilla Island, served by the Gasparilla Island Water Association. Just as with the two Lee County developments served by CCU, this area was not included in the general County population total. The fourth user is the

Charlotte Correctional Institution, a prison operated by the Florida Department of Corrections and served by its own potable water facility. The inmate population of this facility was also not included in the general County totals shown in Table WSW-1.

Table WSW-6 also compares the supply capacity for each of the potable water suppliers within Charlotte County presented as permitted capacities based on any approved Water Use Permits and peak capacities of the treatment facilities . Permitted capacities are presented in terms of Annual Average Daily Flow (AADF), or the average flow per day when the entire year is considered. Peak capacities are based upon the design capacity of each facility. Where a potable water supplier serves Charlotte County residents with a source located outside the boundaries of the County, only the Charlotte County population is shown. Peak capacities are included because the LOS standards are based on a peak usage, but permitted capacities are based on AADF. Since demand is presented as a peak, supply should also be presented as a peak in order to make an appropriate comparison.

Capacities are based on Water Use Permits (WUPs) issued by the appropriate Water Management District, and reflect the amount of water the utility is permitted to withdraw from groundwater sources such as wells, or surface water sources such as rivers or lakes.

Table WSW-6 also separates projected demand into areas within the Urban Service Area and within the Rural Service Area. Since it is the intent of Charlotte 2050 to limit expansion of potable water and sanitary sewer utility service into the Rural Service Area, those areas are assumed to have no supply capacity and rely completely upon on-site wells and septic systems for potable water and sanitary sewer service. Exceptions to this are the certificated utilities located on the bridgeless barrier islands, which are wholly located within the Rural Service Area, and any community systems serving small developments within the Rural Service Area. However, since all three utilities located on the bridgeless barrier islands (Little Gasparilla Utilities, Bocilla Utilities, and Knight Island Utilities) are now bulk customers of utilities within the Urban Service Area, those utilities are also included in the Urban Service Area totals.

The analysis presented in Table WSW-6 shows that, based on peak demand and supply, among centralized public utilities only North Charlotte Waterworks shows an immediate supply deficit, and this deficit continues through the projection horizon. Permit and usage data for NCWW indicate that the actual usage rate is much lower than the projected level. Table WSW-7 shows the reported AADF through the NCWW WTP for the first six months of 2019, which were submitted to the County. The table shows that the highest flow was 0.006 MGD and generally is recorded in the 0.003-0.005 MGD range. NCWW reported 40 single-family connections in June of 2019, which equates to 85 people using the 2010 U.S. Census estimate of 2.14 persons per household, compared to a functional population of 3,516 as estimated by the County's projections. In 2009, NCWW, as Sun River Utilities, received approval from the Florida Public Service Commission (PSC) to extend its potable water and wastewater service area in Charlotte County. The PSC concluded that Sun River Utilities had both the financial and technical ability to provide service to their expanded service area. Further, the PSC concluded that Sun River Utilities had sufficient capacity to serve the expanded service area or the ability to increase capacity when needed. This expansion increased the certificated service area of North Charlotte Waterworks tremendously, but the supply facilities have not yet been increased to serve the entire area. This adds to the projected shortage in potable water supply. NCWW and DeSoto County Utilities have entered into an interlocal agreement in which NCWW would purchase bulk treated water from DCU. Although the final amounts of water to be purchased have not been established, this agreement would eliminate the projected water shortage within NCWW's service area.

Table WSW-7: Reported Monthly Potable Water Flow for North Charlotte Waterworks, 2019

Month	AADF
January	0.004
February	0.006
March	0.005
April	0.005
May	0.003
June	0.002

Source: Charlotte County Community Development Department, 2019

Two centralized utilities show projected deficits by the projection horizon of 2040, including Charlotte County Utilities Mid- and West County service area and the Charlotte Harbor Water Association. Similar to North Charlotte Waterworks, both of these utilities have large areas that are not served by the transmission and distribution systems, and residents in those areas are dependent upon on-site wells for potable water. Compare these service areas shown on SPAM Series Map #83 with the locations of potable water wells shown on SPAM Series Map #85

Charlotte County is developing a secondary water source, and the Peace River/Manasota Regional Water Supply Authority is developing a regional loop connection that should work to alleviate the projected shortfall. Both of these projects are discussed under Future Water Supply Projects, below. Charlotte Harbor Water Association's projected shortfall is low, compared to their existing capacity, and should be able to be addressed without trouble before it occurs.

Two community systems also show immediate shortages and an additional community system shows a projected shortfall by 2025. These community systems serve RV parks in rural areas of the County and a small manufactured home park. Unlike certificated utility areas, Charlotte County does not require community systems to report their monthly usage, so a comparison cannot be made between these systems' projected demand and their actual demand. Traditionally, however, these developments have a much higher percentage of seasonal residents than standard residential development, and therefore have a lower demand than may be projected by equating a manufactured home or RV pad occupied only part of the year with a permanently-occupied site-built residence. An examination of DEP permit applications revealed some reported data, which showed that Paradise Park Condominium Association reported usage of 0.043 MGD, or 72 percent of the permitted capacity of 0.060 MGD. An operational analysis of this community system shows that, given current reported usage rates and projected growth rates, it will remain within capacity through the projection horizon. If all of the community systems have usage patterns similar to Paradise Park Condominiums then the deficits for them projected in Table WSW-6 do not exist.

SUMMARY OF FUTURE WATER SUPPLIES

Charlotte County's approach to meeting future unmet water demands will follow guidance from SWFWMD and SFWMD and provide potable water supplies that are reasonable and beneficial, will not interfere with any existing legal uses of water, and are consistent with the public interest pursuant to Chapter 373.223 of Florida Statutes.

Demand projections provided for all utility providers are based on the County's population projections and established levels of service. Table WSW-6 provides the projected demand estimates for each of the utility service areas.

Table WSW-8 presents a closer comparison of demand for the Water Use Permits issued by the Water Management Districts, and population and demand estimates used in the Water Use Permit applications to the Water Management Districts were likely prepared using a methodology different from that used to prepare the County's population projections. As shown through comparison with Table WSW-6, these alternative methods can result in demand projections that differ from the County's. It is important to note these differences may conflict with the County's desire to provide conservative estimates for potable water demands. However, the County has accepted the incorporation of alternative demand estimation methods in regional water supply planning documents. Demand projections based on alternative methodologies indicate the need for water supply expansion.

Table WSW-8: Demand Estimates and Water Use Permit Allocations

Potable Water Supplier	Permit ID	Year Expires	WUP Average Daily Use (MGD)	2035 Population Projections	2035 Demand Projection (MGD)
SWFWMD					
Charlotte County Utilities – PR/MRWSA	007104	2037	16.102(1)	144,243	10.929
Charlotte County Utilities – Burnt Store	003522	2033	3.172	9,520	0.597
City of Punta Gorda(2)	000871	2027	8.008	38,611	4.461
Englewood Water	004866	2019	5.360	38,358	2.357

Table WSW-8: Demand Estimates and Water Use Permit Allocations					
Potable Water Supplier	**Permit ID**	**Year Expires**	**WUP Average Daily Use (MGD)**	**2035 Population Projections**	**2035 Demand Projection (MGD)**
District(3)					
Charlotte Harbor Water Association	001512	2031	0.712	6,260	0.480
Gasparilla Island Water Association(4)	000718	2021	1.537	6,617	1.198
Island Harbor Beach Club /Knight Island Utilities(5)	007768	2022	0.103	883	0.097
El Jobean Water Association(6)	99913	N/A	N/A	1,481	0.154
Riverwood CDD(7)	99916	N/A	N/A	2,731	0.284
SFWMD					
Town and Country Utilities	08-00122-W	2020	0.433(8)	21,214	2.550

Source: Southwest Florida Water Management District, South Florida Water Management District, 2019

(1) This is an allocation from the PR/MRWSA
(2) The City of Punta Gorda serves both County and municipal customers. Approximately 37% of the service population lies in unincorporated Charlotte County.
(3) Englewood Water District serves customers in both Charlotte and Sarasota Counties. Approximately 38% of the service population lies in unincorporated Charlotte County.
(4) Gasparilla Island Water Association serves customers in both Charlotte and Lee Counties. Approximately 33% of the service population lies in unincorporated Charlotte County.
(5) As of 2014, Knight Island Utilities is a bulk purchaser of potable water from Englewood Water District.
(6) El Jobean Water Association is a bulk purchaser of potable water from Charlotte County Utilities. No active WMD permits exist for this utility, but the population and demand projections are calculated for the service area for future planning purposes.
(7) Riverwood CDD is a bulk purchaser of potable water from Charlotte County Utilities. No active WMD permits exist for this utility, but the population and demand projections are calculated for the service area for future planning purposes.
(8) This is an interim permit.

The potential future water supplies for Charlotte County are summarized below. Currently, 95 percent of the County utility's water supply is provided by PR/MRWSA. The County is the largest customer of PR/MRWSA and purchases more water than any other of its customers. Stabilized population growth in the County and the other customers supplied by PR/MRWSA have resulted in water supplies sufficient to handle projected demands over the next 20 years. Charlotte County currently accounts for 49 percent of PR/MRWSA's total contractual water demand and is thus liable for a large portion of its budgeted operational and capital improvement expenditures. At this time, the County is progressing toward a self-reliant two-pronged approach for meeting future water supply demands beyond the 20-year horizon.

PR/MRWSA is working to improve the integration, diversification, and interconnection of water resources for optimal use within its four-county service area in order to meet current and future demands. Through cooperation and collaboration of the owners working collectively, they have a facility that can treat up to 51 MGD and store nearly 13 BG of raw water. With average daily demands of 26.49 MGD being supplied to members and customers in 2014, there is considerable remaining capacity for the near future.

PR/MRWSA is preparing a preliminary investigation of brackish groundwater development opportunities in the event that an alternative water treatment process becomes necessary to adequately maintain secondary water standards for Total Dissolved Solids (TDS) due to the encroachment of salt water into the Peace River. This is a long-term investigation that may take years to complete and develop.

While the County will participate in water supply development programs initiated by PR/MRWSA, the long-term interests of the County are best served pursuing the development of water supply sources separate from those of the PR/MRWSA.

Diversity of supply through the use of groundwater to provide improved reliability and sustainability of the potable water supplies within the County is a priority and a key objective to meeting future demands. As provided in the schedule of Capital Improvements contained within the CIE Data and Analysis Appendix A, the County has devoted funds towards developing future water supply alternatives, including a Preliminary Engineering Report for siting a RO WTP and brackish groundwater well field in the eastern portion of the County. This treatment plant will receive water from an on-site well field at Babcock Ranch.

Since the County purchases more than 95 percent of its water supply from PR/MRWSA it is particularly vulnerable to fluctuations in the level of the Peace River, the source for the purchased water. To attempt to alleviate potential shortages due to low river levels, and to decrease the amount of total dissolved solids within the finished water sold to Charlotte County and others, PR/MRWSA has constructed two reservoirs and ASR storage at their Peace River Facility. Preliminary analysis of historical Peace River flows and available diversion volumes has indicated, however, that there would still be periods where these storage facilities would be completely depleted, and there would be periods prior to the depletion of the reservoir supply where the water quality would be significantly degraded.

Impact of Future Land Use

Planning for adequate potable water supplies should also take into account pending future land use map and rezoning amendments that might have a significant impact on the demand for potable water services. Such pending amendments represent a real short-term change to established demand, and may have a more immediate effect upon potable water supplies than general projected growth. Currently, there are no pending future land use map or rezoning amendments that would have such an effect upon existing potable water supplies. When such amendments are proposed, the County shall ensure that adequate potable water supplies are available to service them.

There are, however, a number of approved developments that remain unbuilt, and which may have a significant effect upon demand. These are all located within the County's Burnt Store service area, and are shown in Table WSW-9. There are 19 approved developments, with a total of 8,746 planned dwelling units.

Table WSW-9: Approved Developments Within the CCU Burnt Store Service Area

Owner	Total Planned Units	Confirmed Build-out	Final Build-out Year
Tern Bay – 8810 Development LLC	1,810	1,810	2033
Bryan Paul, Inc.	663	not given	not given
Bonita Bay Group, et. al.	2,052	2,052	2033
Burnt Store Road LLC	999	999	2023
Charlotte Orange Grove LLC	498	498	2023
Coral Creek Burnt Store LLC	440	not given	not given
Eagle Gregory Trust – Pinnacle Oaks	296	not given	not given
Hawks Landing of Punta Gorda LLC	506	not given	not given
Mark L. Lindner, Trustee	180	not given	not given
NYHUS Peter Trust LLC	unknown	not given	not given
Newfoundland Six	600	600	2033
Prince Ranch LLC	175	not given	not given
Punta Gorda Reserve LLC	395	not given	not given
Realmark Tuckers Grade LLC	unknown	not given	not given
SLD Landfill, Inc.	unknown	not given	not given
Southwest Land Developers	unknown	not given	not given
Sun and Shade LLC	unknown	not given	not given
Tuckers Grade & US 41 LLC	unknown	not given	not given
TOTAL	8,746	6,091	

Source: Charlotte County Community Development, 2014

Of the 8,746 planned dwelling units within the approved petitions, 6,091 are projected to be constructed by 2033, or roughly within the 2030 planning horizon and, using the 2.14 persons per household estimated by the 2010 U.S. Census, would result in 13,034 additional residents within the Burnt Store service area. If all of the planned dwellings were constructed within the projection horizon, that would result in 18,716 additional residents. When combined with the projected population for the Burnt Store service area included in Table WSW-6, which does not explicitly account for these approved petitions, the 2040 population of the Burnt Store service area could range between 34,104 and 39,786 residents, including the two developments served by the Burnt Store system in Lee County.

These larger population totals obviously place a greater demand upon the potable water supply. Using the adopted LOS of 105.140 gpcd, demand in the Burnt Store service area in 2030 could range between 3.585 MGD and 4.183 MGD. Both of these totals would exceed the current permitted capacity of the Burnt Store system, and the plant would need to be expanded, or additional water sources developed, to meet this additional demand.

Performance of Existing Facilities

The existing potable water facilities providing service in the County are generally well maintained and in good condition. Treatment plants and storage systems are regularly inspected, and each utility system has established maintenance programs for pipe, meter replacement, valve inspection and operation, and flow testing of fire hydrants. Most of the older systems are continually being upgraded to improve reliability and increase the expected life of the facilities. These facilities are regulated by numerous agencies, including FDEP and the Water Management Districts.

The current permitted capacity of the combined water treatment plants is adequate to meet current demands, and all of the regulated potable water suppliers provide levels of service that are consistent with those adopted in this element. The analysis indicates that demand currently exceeds capacity in the North Charlotte Waterworks certificated area but, as shown by Table WSW-7, reported usage is well below projected usage and there is no reason to expect that an actual service deficit exists.

FUTURE CONDITIONS – POTABLE WATER

PROBLEMS AND OPPORTUNITIES FOR FACILITY REPLACEMENT, EXPANSION, AND NEW FACILITY SITING

The performance of existing potable water facilities must be constantly monitored to determine the adequacy of the committed treatment capacity and evaluate the ability of the distribution system to meet the future demands of a growing population. Each utility provider must, therefore, plan ahead to ensure that sufficient capacity will always remain available to accommodate anticipated growth within their respective service areas. Any new or expanded facilities that are needed must comply with applicable Federal, State, and local regulations. These regulations require that all potable water facilities be constructed, operated, and maintained in accordance with the guidelines established by the FDEP.

In addition to these requirements, all potable water providers must obtain water use permits from the appropriate Water Management District before any new treatment facilities can be constructed or existing treatment facilities can be expanded. The Southern Water Use Caution Area (SWUCA) rules in place within Charlotte County, established by SWFWMD, limit groundwater pumping in order to stop saltwater intrusion into subsurface aquifers and to prevent depletion of groundwater levels. The Caution Area designation limits possibilities for expansion of potable water supply sources and requires potable water providers to consider alternatives to groundwater when making water supply planning decisions.

The opportunities for facility expansion are also limited by funding constraints. In order to alleviate this problem, potable water providers must work to maximize the use of existing infrastructure. This can be accomplished by directing growth to areas already served by existing facilities which will reduce the cost required for new facility construction.

When the construction of new potable water facilities is warranted, all necessary improvements will be built in an environmentally sound manner, while being economically feasible. New facilities will be located within previously developed or developing urban areas to discourage urban sprawl, and construction costs will, in general, be allocated to those members of the general public receiving the benefits. Funding sources for new facilities should be derived from a number of sources including, but not limited to, impact and user fees.

Utilities should evaluate and, where feasible, install interconnects for potable water lines. Interconnects would provide an emergency supply among utility providers and may result in more efficient usage of existing treatment facilities.

The Water Planning Alliance includes representatives of 13 local governments within the Peace River Basin and surrounding area charged with working together toward meeting future water needs for the area. This organization has adopted a “Regional Integrated Loop System” to facilitate resource capacity, improved reliability, and the matching of area supply with demand.

FUTURE WATER SUPPLY PROJECTS

Demand projection for potable water use in the County indicates that the existing supplies will be adequate to meet the future population at least through 2035, and likely through the projection horizon of 2040. But to ensure that projected deficits do not occur, certain projects are being pursued to expand and diversify the County's potable water supplies. These projects expand existing primary water sources, establish new primary and secondary water sources, and establish emergency interconnections between existing systems. Taken together, they expand available sources, reduce demand on any individual water supply, and extend the length of service for all of them. Significant projects are briefly outlined below.

SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT

The SWFWMD 2015 Regional Water Supply Plan (RSWP) for the Southern Planning Region includes the western two-thirds of Charlotte County. The RSWP is an assessment of projected water demands and potential sources to meet those demands through 2035. Several of the potential projects identified by the RSWP would increase water supplies in and for Charlotte County. These projects are detailed below.

System Interconnect/Improvement Project #4, Regional Loop System Phase 1 Design Update
This project will provide approximately six miles of 24-inch transmission pipeline from the Project Prairie booster station in southern DeSoto County to the City of Punta Gorda's Shell Creek WTP. This pipeline will extend from the booster station southward along US 17, cross under Shell Creek, and connect to the Shell Creek WTP. The original design of the project, developed in 2007, was to send treated surface water from the Shell Creek WTP to DeSoto County. The updated design will improve capacity of regional imports to Punta Gorda by establishing a true loop system and may provide regional supply to the City during seasonal periods of poor source water quality in Shell Creek. Future expansion and brackish groundwater development at the Shell Creek WTP will be regionally available through this project and may also provide regional supply for future development in the North Charlotte Waterworks service area.

Cost estimates for this project are $0.5 million for ongoing design and permitting, with SWFWMD contributing 50 percent, and between $11 million and $14 million for construction, depending upon final design choices.

Reclaimed Water Projects
The RSWP also includes several options for reclaimed water projects that would aid in supplementing, or the conservation of water supplies in Charlotte County. These are detailed in Table WSW-10, contained in WSW Appendix A.

PEACE RIVER/MANASOTA REGIONAL WATER SUPPLY AUTHORITY

The PR/MRWSA Integrated Regional Water Supply Plan 2015 identified two projects in Charlotte County to increase potable water supplies for the region. These include development of additional surface water resources on Shell and Prairie Creeks and partnering with the City of Punta Gorda on their development of a brackish groundwater RO supply. The 2015 plan also identified three regional pipeline projects and a new regional pumping station in Charlotte County that will expand the regional system to support local and regional reliability and the sharing of drinking water resources. These projects are summarized below.

Surface Water Option – Shell/Prairie Creek Public Supply

This option, also included in SWFWMD's adopted 2015 Southern Planning Region Regional Water Supply Plan, involves the construction of a new intake structure, a new raw water pumping station, and a 6.5 BG reservoir for the storage of raw water in the lower portion of the Shell/Prairie Creek watershed. It also involves construction of five miles of 36-inch pipeline to deliver water from the reservoir to a 20 MGD RO facility located near the Shell Creek WTP.

Table WSW-11: Shell/Prairie Creek Cost Estimate Summary

Quantity Available (MGD)	Capital Cost	Cost per 1,000,000 Gallons	Capital Debt Service Cost per 1,000 Gallons	Annual O&M per 1,000 Gallons	Total Cost per 1,000 Gallons
20.0	$399M	$19.97M	$3.53	$1.37	$4.90

Source: PR/MRWSA, 2018

Brackish Groundwater Option – PR/MRWSA Purchase of Excess Capacity from Punta Gorda Brackish RO

This option involves a partnership between the PR/MRWSA and the City of Punta Gorda enabling the region to purchase excess quantities that may be available in the City of Punta Gorda Brackish RO facilities at the Shell Creek WTP currently under design. A future scenario envisions that the PR/MRWSA and the City could form a partnership for expansion of these facilities. Costs shown in Table WSW-12 are based on 2014 estimates from the City's consultant for the initial 4.0 MGD brackish RO supply.

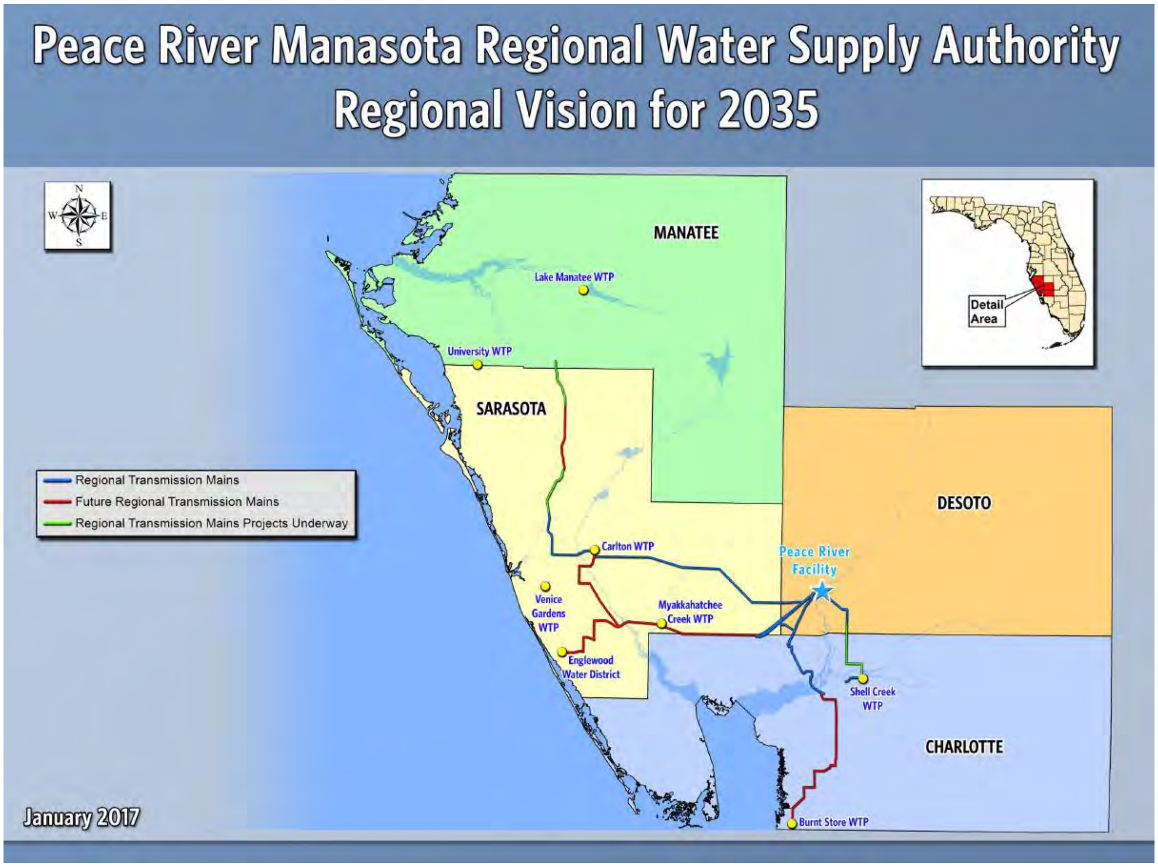
Table WSW-12: Punta Gorda Brackish RO Cost Estimate Summary

Quantity Available (MGD)	Capital Cost	Cost per 1,000,000 Gallons	Capital Debt Service Cost per 1,000 Gallons	Annual O&M per 1,000 Gallons	Total Cost per 1,000 Gallons
4.0	$34.3M	$8.10M	$1.43	$1.12	$2.55

Source: PR/MRWSA, 2018

System Interconnect/Improvement Options

System interconnections involve the construction of pipelines and booster pumping stations to interconnect sources with demand areas, increasing system reliability and providing for sharing of resources throughout the region. The PR/MRWSA Board of Directors has adopted a 20-Year Vison for the regional interconnection of supplies and demand areas, providing a resilient water system to meet current and future needs. This regional vision is shown in Figure WSW-1.



Source: PR/MRWSA, 2018

Three Regional pipeline projects and a Regional pumping and storage facility are planned for construction in Charlotte County. The locations of these facilities is shown in Figure WSW-1 and the projects are detailed in Table WSW-13.

Table WSW-13: Regional Interconnections and Pumping Facility Cost Estimate Summary

Project	Description	Estimated Capital Cost
Phase 1 Regional Interconnect	Six miles of 24-inch regional pipeline connecting the regional transmission system in DeSoto County to the City of Punta Gorda Shell Creek WTP	$12.0M
Phase 2b Regional Interconnect	9.3 miles of 36- and 42-inch regional pipeline extending the regional transmission system west along Hillsborough Avenue to the City of North Port Myakkahatchee Creek WTP	$30.4M
Phase 4 Regional Interconnect	15 miles of 24-inch regional pipeline connecting the transmission system on US 17 with the Charlotte County Burnt Store WTP	$27.5M
Bachman Regional Pumping and Storage Facility	10 MGD booster pumping and finished water storage facility installed on the Bachman Tract near the intersection of Harbor Boulevard and Veterans Boulevard	$12.0M

Source: PR/MRWSA, 2018

CHARLOTTE COUNTY

A separate source owned and operated by the County, even if only as a secondary source, would add to the diversity of the County's overall water supply. This secondary supply could be used as a backup for not only the County's system, but also other suppliers within the County such as the City of Punta Gorda or the Charlotte Harbor Water Association. Furthermore, this secondary supply could reduce the County's future reliance upon the regional water supply system, thus increasing available supply for other members and customers. As water demands increase, the County would look to convert the secondary source to an additional primary source.

Pursuant to the 2005 Interlocal Planning Agreement between MSKP III, Inc, the Florida Department of Community Affairs, Lee County, and Charlotte County, the Development Agreement Between Board of County Commissioners of Charlotte County, Florida and MSKP III, Inc., and Paragraph 33 entitled "Water Resources of the State Contract," Charlotte County was authorized to apply for a Water Use Permit from the State Lands of Babcock Ranch provided that the withdrawal of water by Charlotte County is solely for public water supply purposes and not for wholesale or retail sale outside Charlotte County. Under these authorizations, the County applied for a 20-year secondary public water supply permit, which was granted in 2011. This permit allows the annual withdrawal of 372MG of raw water until 2031.

Because the water supply from Babcock Ranch is a groundwater supply, it provides the desired water supply diversity, consistent with State of Florida Conjunctive Use objectives. As a secondary supply for the County this source would eliminate the need to purchase water from other PR/MRWSA members at higher rates and would relieve stress placed upon the natural systems during the minimum flow levels in the Peace River. Additionally, there are no anticipated environmental impacts associated with this use as the water is proposed to be withdrawn from the highly-confined Floridan aquifer. Order-of-magnitude cost estimates for development of the Babcock supply are provided in Table WSW-14. Capital costs include construction of the Floridan wells, treatment and storage facilities, delivery system, and concentrate disposal. Annual operations and maintenance (O&M) costs include labor, chemicals, power, membrane replacement, maintenance materials and spare parts, and sampling and monitoring.

Table WSW-14: Babcock Ranch Supply Cost Estimate Summary

Raw Yield (MGD)	Finished Yield (MGD)	Capital Cost	Cost/Finished 1,000 Gallons	Annual O&M in 2009 Dollars/1,000 Gallons	Capital & O&M Cost/1,000 Gallons(1)
12.5	10.0	$193M	$4.51	$1.31	$5.82
5.0	4.0	$85M	$4.99	$1.31	$6.30
3.0	2.4	$69M	$6.71	$1.31	$8.02

Source: Charlotte County Utilities, 2018

Table WSW-14: Babcock Ranch Supply Cost Estimate Summary					
Raw Yield (MGD)	Finished Yield (MGD)	Capital Cost	Cost/Finished 1,000 Gallons	Annual O&M in 2009 Dollars/1,000 Gallons	Capital & O&M Cost/1,000 Gallons(1)

(1) Includes annualized capital costs at 5.7% interest and 20 years plus annual O&M divided by an assumed average daily flow of 10 MGD, 4 MGD, or 2.4 MGD respectively.

CITY OF PUNTA GORDA

The City of Punta Gorda currently operates the Shell Creek WTP, a conventional surface water treatment plant with 10 MGD capacity, an in-stream reservoir on Shell Creek, and an Aquifer Storage and Recovery (ASR) storage system. The City is actively pursuing the development of a brackish wellfield and a 4 MGD RO system to be co-located at the Shell Creek WTP. The RO system would provide a blending source to improve the facility's finished water quality and would allow reduced surface water withdrawals from Shell Creek, if limited by a future recovery strategy. An injection well would be used for concentrate disposal. The option may also provide a backup regional supply to DeSoto County with the development of the PR/MRWSA Regional Loop System Phase 1 project. The conceptual costs shown in Table WSW-15 were prepared by the City's consultant in 2010 and are adjusted to 2014 dollars. The City initiated a brackish wellfield investigation in 2015 to determine the feasibility of the groundwater source. The capital costs shown in Table WSW-15 include elements of the wellfield investigation.

Table WSW-15: Shell Creek WTP Brackish Wellfield Cost Estimate Summary				
Quantity Produced (MGD)	Capital Cost	Cost/MGD	Cost 1,000 Gallons	O&M Cost/1,000 Gallons
4.0	$32.4M	$8.1M	$2.55	$1.12

Source: Southwest Florida Regional Water Management District, 2018

SOUTH FLORIDA WATER MANAGEMENT DISTRICT

The SFWMD 2017 Lower West Coast Water Supply Plan Update includes the eastern third of Charlotte County. The Water Supply Plan Update works to identify sufficient water supply sources and future projects to meet existing and future uses while sustaining water resources and related natural systems. Several of the potential projects identified in the Water Supply Plan Update would increase the water supplies in and for Charlotte County. These projects are detailed below.

TOWN AND COUNTRY UTILITIES

Town and Country Utilities, established to serve the Babcock Ranch development, is located in the rural eastern portion of the County. To serve the projected population of the development – projected to reach a maximum of more than 35,000 people –Town and Country has developed a five-phase plan for construction of the system, which is scheduled to be implemented between 2016 and 2031. This plan is shown in Table WSW-16.

Table WSW-16: Town and Country Cost Estimate Summary				
Project	Description	Capacity	Total	Estimated

		(MGD)	Capital	Completion
1.00 MGD WTP Expansion	Expansion of IAS wells and WTP from 0.25 MGD to 1.25 MGD	1.00	$7.00M	2018
1.25 MGD WTP Expansion	Expansion of IAS wells and WTP from 1.25 MGD to 2.50 MGD	1.25	$1.25M	2021
1.50 MGD WTP Expansion	Expansion of IAS wells and WTP from 2.50 MGD to 4.00 MGD	1.50	$1.10M	2026
0.08 MGD WWTF Expansion	Expansion of WWTF from 0.20 MGD to 1.00 MGD	1.50	$12.00M	2021
1.00 MGD WWTF Expansion	Expansion of WWTF from 1.00 MGD to 2.00 MGD	0.80	$6.00M	2026
1.50 MGD WWTF Expansion	Expansion of WWTF from 2.00 MGD to 3.50 MGD	1.00	$8.00	2029

Source: South Florida Water Management District, 2019

CAPITAL IMPROVEMENTS

Many of the County's potable water providers have plans to improve and expand existing facilities to ensure adequate levels of service will continue to be maintained in the future. These plans fall into three broad categories: supply increase, demand reduction, and system improvement.

The most obvious solution to ensuring adequate potable water supplies is to increase the amount of water available for distribution. Based on the water supply inventory and data analysis, the County, the City of Punta Gorda, PR/MRWSA, and other regional utilities have identified the need to explore potable water supply development, regional pipeline interconnects, and best management practices for use of supplies. By connecting utility systems that previously were unconnected, or perhaps had only a single connection point, emergency water supplies may become available if and when needed, and regional supply may be better balanced with regional demand.

While increasing the overall volume of potable water will produce more water for distribution, reducing demand will relieve strain upon the existing potable water sources, ensuring that their life-spans are extended. Through the use of reclaimed water for non-potable uses such as irrigation and certain industrial uses, and the conservation of potable water through more efficient fixtures, overall demand for potable water may be reduced. This reduction in demand would have the effect of increasing the available supply. Capital projects involving the reduction of demand for potable water in the County include expanding reclaimed water systems and the replacement of outdated home fixtures with more modern, water-efficient ones.

General system upgrades may also have an effect on potable water supplies by replacing transmission lines to create a more efficient distribution system or to prevent loss due to leakage from older lines, by replacing pumping stations with more efficient machinery and equipment, or by expanding existing service areas to reduce the direct impact on groundwater supplies which may decrease the number of subsurface potable water wells. Capital projects of this nature have been scheduled by many local utilities, involving projects such as water main replacement and relocation, water pumping station improvements, major transmission line extensions, and general service area extensions.

Capital projects scheduled by Charlotte County local utilities, including project costs allocated by fiscal year and sources of funding are detailed in Appendix II of the Capital Improvements element.

WATER CONSERVATION

In 2013, SWFWMD reinstated year-round water conservation measures superseding the Phase I Water Shortage Restrictions for the Charlotte County portion of the WMD, originally implemented in 2010. Lawn and landscape irrigation is limited to twice per week. New lawns or plantings may be watered daily for the first 30 days with restrictions.

Several utility providers in Charlotte County have implemented water conservation programs in order to reduce the dependence upon potable water supplies. The County previously prepared written water conservation plans for its service areas. These plans will be revised and updated by the end of 2020. The per capita consumption rate by customers of the County's utility was 74 gpcd for the Mid- and West County service area and 61 gpcd for the Burnt Store service area, as published in the 2018 SWFWMD Public Supply Annual Report, exceeding the goals outlined by SWFWMD to reduce per capita water consumption. In comparison, the District has established a standard of 81 gpcd.

Conservation measures that were analyzed in the written plans include general conservation measures such as alternative source programs and public education, and indoor conservation measures such as showerhead retrofits and toilet rebates. These plans emphasize maintaining that low consumption rate by continuing to implement existing conservation practices, continued distribution of plumbing retrofit kits, and expanding the distribution of reclaimed water.

Tentatively, the County anticipates continuing to implement existing conservation elements including reclaimed projects and a low-flow showerhead exchange. The toilet rebate program was discontinued in 2010. Charlotte County was one of the first utilities within the 16-county boundary of SWFWMD to implement year-round conservation rates in order to promote responsible water usage. In times of severe water shortages, the County adopts even stricter emergency rate structures to emphasize to its customers the value of water, including the adoption of water consumption rate structures that are designed to discourage the consumption of more than 5,999 gallons. The County has awarded an RFQ for a new Water Master Plan, including updating the conservation plans. This update is expected to be completed by the end of 2020.

Other water service providers within the County also participate in water conservation programs. The WUP issued to PR/MRWSA to supplement current water requires that a regional water conservation plan be approved and implemented with subsequent annual reports to demonstrate progress. As part of its Water Use Permit conditions the Charlotte Harbor Water Association must implement general water conservation practices and the governing board reserves the right to institute more specific conservation requirements during the duration of the permit.

EXISTING CONDITIONS – RECLAIMED WATER

The Englewood Water District and the County have implemented water reclamation programs. Many of these programs involve the delivery of treated wastewater effluent to surrounding golf course facilities for use in irrigation. The location of reclaimed water facilities in the County is shown on SPAM Series Map #90.

The County's utility makes reclaimed water available for irrigation purposes and other authorized non-potable uses in those areas of the County included within its service areas, and where the Board of County Commissioners determines that the construction of a reclaimed water distribution system is desired or requested by customers, and is practical and economical. The reclaimed water distribution system is being constructed in phases to provide service to designated areas as determined by the Board of County Commissioners. The County aims to maximize the reuse of treated wastewater and minimize new project impacts on potable water resources. Therefore, it is the responsibility of the project developer to provide for the use of reclaimed water as a condition precedent to wastewater treatment capacity availability if that service is available.

INVENTORY – RECLAIMED WATER PROVIDERS

Charlotte County: The County is committed to reusing 100 percent of all wastewater effluent produced through the treatment of sanitary sewage. Capital improvement projects that have been completed as of 2018 to further this goal include transmission lines interconnecting the Eastport Water Reclamation Facility (WRF) with its Westport and Rotonda WRFs, a Water Reclamation Pump Station, Westport pond expansion, two 0.500 MG storage tanks, and an expansion of the distribution system along Placida Road in West County. The tanks and ponds provide an additional supply of reclaimed water that allows the system to maintain a constant pressure for several hours during the day and improve reclaimed service to its customers. The County currently produces 5.9 MGD of reclaimed water and delivers approximately 3.0 MGD to its 49 reclaimed water customers. The County anticipates connecting nine new contracted customers in 2019 as new distribution lines become active, which will also allow other new customers to connect.

While the County now has a fully integrated reclaimed water transmission and distribution system in the Mid- and West County regions, it compiles statistics on the reclaimed system at each water reclamation facility, including those related to reclaimed water use. Table WSW-17 presents a summary of the most recent collection of data.

Table WSW-17: Charlotte County Utilities Annual Reclaimed Water Data, 2018				
Wastewater Facility	**Permitted Capacity (MGD)**	**Total Water Available for Reuse or Disposal (MGD)**	**Connections**	**Effluent Disposal Methods**
East Port WRF	6.000	4.1	30 connections, with 2 pending	Deep well disposal On-site irrigation
Rotonda WRF	2.000	0.9	9 connections, with 5 pending	Reject Pond; transmissions to Westport WRF for disposal
West Port WRF	1.200	0.6	6 connections	Deep well disposal On-site irrigation
Burnt Store WRF	0.500	0.3	4 connections, with 2 pending	Deep well disposal; rapid infiltration basins, including perc ponds
Total	**8.325**	**5.9**		

Source: Charlotte County Utilities Department, 2018

Englewood Water District: The Englewood Water District is committed to reusing 100 percent of its wastewater effluent water. The reuse pumping facility includes a 1 MG storage tank and ASR well, both located at the District's WRF in Charlotte County. The reuse storage tank and well provide a constant supply of reclaimed water to the service pumps, which allows the system to maintain a constant pressure for several hours during the day and improve reclaimed water service to customers. The District offers reclaimed water to residential customers and Wal-Mart. Additionally, Eagle Preserve, Myakka Pines Golf Club, Boca Royale Golf Club, Oyster Creek Golf Course, Lemon Bay High School athletic fields, Oyster Creek Regional Park, the Englewood Sports Complex, Taylor Ranch, the Lake Emily development, and the Villages of Manasota Beach either are or will be using reclaimed water for irrigation.

RECLAIMED WATER EXPANSION

The County's current reclaimed water program consists of a regional system that provides reclaimed water to local golf courses and approximately 1,875 private residential customers. the County encourages connections to this system to offset the use of potable water for activities that do not require it, and is actively pursuing new customers as the system expands.

As part of its phased reclaimed water expansion initiative, the County has expanded the transmission and distribution capacity of its reclaimed water transmission and collection system. As of 2014, transmission mains were extended to provide reclaimed water from its East port, Westport, and Rotonda WRFs to the Mid- and West County service areas and to interconnect all three facilities.

Future phases of the County's expansion initiative include projects to extend reclaimed water transmission and distribution facilities further into the West County service area in order to service additional golf courses and residential developments in the Rotonda and Placida areas. The County is currently in the funding and planning/design stages of Phase III of this portion of the reclaimed water expansion program. Other reclaimed water expansion projects are currently under way in the Burnt Store service area.

The County is developing a long-term comprehensive reclaimed water plan with the intent of eventually connecting all large-scale users of non-potable water within its service area to its system. This plan will include time frames, estimated costs, funding proposals, operational guidelines, reclaimed water use priorities, and rate analysis for expansion, and will not require the connection of individual single-family, duplex, or triplex buildings.

EXISTING CONDITIONS – SANITARY SEWER

LEVEL OF SERVICE – SANITARY SEWAGE DISPOSAL

The establishment of appropriate LOS standards for sanitary sewage disposal is necessary to plan for and meet projected demand. A sanitary sewer system must have an adequate capacity to meet the average daily demand, while being able to accommodate periods of peak demand. A review of historical data indicates that a capacity of 190 gallons per day per ERC is needed to meet peak demands in the unincorporated areas of Charlotte County. Actual average day demands may be significantly lower (approximately 85% of the average daily water use). Planning to meet LOS demands is necessary to ensure that adequate infrastructure capacity is available to satisfy short-term and instantaneous sanitary sewage disposal demands without negatively impacting system performance (e.g., reduction in system pressure). Effectively planning for LOS demands also results in more efficient operation of the systems in Charlotte County.

INVENTORY – SANITARY SEWER PROVIDERS

Sanitary sewage disposal in the County is provided by nine centralized utilities. The three largest suppliers are all public: Charlotte County, the City of Punta Gorda, and the Englewood Water District. The remaining providers are privately owned. All of these sanitary sewage disposal service providers have a customer base and an established area of operation throughout which they provide service. Public utilities have an established service area, while private utilities have a certificated area granted by the Florida Public Service Commission. These service areas grant the authorized right to be the sole provider of a stipulated service within a described area to ensure that service areas do not overlap. Further, any area not depicted as a service area of another utility falls under the service of Charlotte County. The nine centralized sanitary sewage disposal service areas are depicted on SPAM Series Map #86. This map also shows the location of community sewer systems for small developments such as manufactured home parks and recreational vehicle parks. SPAM Series Map #87 shows the location of all wastewater treatment plants.

A detailed analysis of all public and private facilities was conducted pursuant to the criteria established by Statute. The sanitary sewer providers were inventoried by geographic location to identify plant design capacities, current demand, and existing levels of service for each service area. The existing and future sewer needs for the County were then identified based on the data obtained from the inventory. Future sanitary sewer demands were generated by applying seasonal population projections to the 190 gallons per day per ERC LOS standard established in this element. Demands were equated to per capita sewer usage by dividing the 190 gpd ERC standard by 2.14 persons per household, the 2010 U.S. Census estimate for the County. After the future sewer demands were identified, the performance of existing facilities and adequacy of present levels of service was evaluated over time and the need for facility replacement and expansion was determined.

Existing Sanitary Sewer Providers

Charlotte County Utilities: Charlotte County's Utilities Department is the largest utility in the County. It's service area includes all areas of the County not included in any other certificated service area, and totals approximately 622.39 square miles. Its actual service area is much smaller, being limited to portions of the Port Charlotte area in the Mid-County region and portions of West County including Gulf Cove, Englewood East, South Gulf Cove, Rotonda, and the Burnt Store area of South County, south of Punta Gorda. The County currently provides service to 38,709 connections.

The County currently operates four wastewater treatment facilities. The Eastport WRF is located in eastern Port Charlotte and has a permitted capacity of 6.000 MGD, serving the Mid-County service aera. This facility uses spray irrigation, deep injection wells, and reclaimed water distribution for effluent disposal. Sale of reclaimed water to customers for irrigation purposes is the first choice of disposal. Expansion of this plant to 9.000 MGD is planned to be completed by 2023. However, the construction of this plant expansion will proceed on a schedule determined by actual flow increases to the plant in accordance with FDEP regulations.

The Westport WRF is located just west of the Myakka River, and has a permitted capacity of 1.200 MGD, serving the West County service area. This facility uses spray irrigation, deep well injection, and reclaimed water distribution for effluent disposal.

The Rotonda WRF is located west of the Rotonda area, and has a permitted capacity of 2.000 MGD, serving the West County service area. This facility uses reclaimed water distribution and on-site storage tanks for effluent disposal, transferring effluent to the West Port WRF for final disposal. The Rotonda and Westport WRFs have a reclaimed water interconnect to better serve their reclaimed water customers.

The Burnt Store WRF is located in the Burnt Store area of southern Charlotte County, and has a permitted capacity of 0.500 MGD, serving the Burnt Store service area in Charlotte and Lee counties. This facility uses on-site percolation ponds, deep well injection, and reclaimed water distribution for effluent disposal. Expansion of this plant to 2.500 MGD is planned to be completed by 2024. However, the construction of this plant expansion will proceed on a schedule determined by actual flow increases to the plant in accordance with FDEP regulations.

City of Punta Gorda: The City of Punta Gorda's service area covers approximately 37.32 square miles and is located south of the Peace River, including most of the incorporated area of the City itself as well as nearby areas of unincorporated Charlotte County, including the communities of Cleveland and Solana and the Charlotte County Airport. The service area includes approximately

17.28 square miles outside the City limits. The City operates a WRF with a permitted capacity of 4.000 MGD. This facility uses deep well injection for effluent disposal.

Englewood Water District: The Englewood Water District encompasses approximately 45 square miles in southern Sarasota County and western Charlotte County, with approximately 12.12 square miles of the District in Charlotte County. The certificated service area includes the Englewood area of Charlotte County as defined in the Englewood Water District's Enabling Act. The District operates a wastewater treatment plant (WWTP) located in the Englewood area of Charlotte County, and has a permitted capacity of 3.000 MGD which will be expanded to 3.400 MGD at the completion of an upgrade to the ASR well. The WWTP primarily uses deep well injection and reclaimed water distribution for effluent disposal.

The District recently completed a Utility Master Plan and permit renewal, including a capacity analysis report. This report showed that, based upon population projections and U.S. Census data, the WWTP will need to be expanded by 2026.

The District accepts all sanitary sewer flows from the Utilities of Sandalhaven certificated area and from a portion of Charlotte County's West County service area.

Riverwood Community Development District: The Riverwood Community Development District certificated area covers approximately 2.19 square miles located east of the Myakka River and southwest of Port Charlotte, along S.R. 776. The CDD operates a WWTP with a permitted capacity of 0.499 MGD. This facility uses spray irrigation and reclaimed water distribution for effluent disposal. The CDD supplies sanitary sewer disposal service to more than 850 single family and multi-family service connections in the Riverwood development.

Gasparilla Island Water Association: The Gasparilla Island Water Association certificated area covers approximately 3.05 square miles in Charlotte and Lee Counties, mostly on Gasparilla Island, a barrier island located in southwestern Charlotte County. Approximately 1.22 square miles of the certificated area is located in Charlotte County. The Association operates a WWTP on the island, with a permitted capacity of 0.705 MGD.

North Charlotte Waterworks: The North Charlotte Waterworks certificated area covers approximately 17.96 square miles located along US 17, near the DeSoto County line, consisting of the Rivers Edge mobile home development and adjoining properties in Charlotte and DeSoto Counties. The utility operates a WWTP with a permitted capacity of 0.015 MGD.

Knight Island Utilities: The Knight Island Utilities certificated area covers approximately 0.92 square miles located on the bridgeless barrier islands of Knight Island and Thornton Key. The utility maintains a WWTP on the island, with a permitted capacity of 0.055 MGD.

Florida Governmental Utility Authority: The Florida Governmental Utility Authority certificated area covers approximately 2.47 square miles located immediately north of the Lee County line, between US 41 and I-75, an extension of its certificated area in Lee County to the south. FGUA currently serves the Tropical Palms manufactured home park just north of the Lee County line on US 41. FGUA operates two WWTPs in Lee County with a permitted capacity of 4.550 MGD.

Town & Country Utilities: The Town & Country Utilities certificated area covers approximately 27.79 square miles located north of Lee County Road 78, east of SR 31, and south of Charlotte County Road 74 in Charlotte and Lee counties, with approximately 20.96 square miles located in Charlotte County. This utility operates a WWTP in southeastern Charlotte County with a current permitted capacity of 0.200 MGD that provides service to over 1,500 ERCs.

This utility has been certificated to serve the new Babcock Ranch development, and its sanitary sewer disposal capacity will expand as the community develops. The utility expects to expand is WWTP to 6.000 MGD by 2031.

Utilities, Inc. of Sandalhaven: The Sandalhaven certificated area covers approximately 2.12 square miles located in western Charlotte County, west of Rotonda and south of the Englewood area. The utility does not own or operate a WWTP, purchasing treatment capacity from the Englewood Water District.

Community Systems: Several community systems serve areas of Charlotte County where centralized sanitary sewer systems do not exist but population densities do not allow sewage disposal to be provided by individual on-site sewage disposal systems. FDEP records indicate that there are 13 such community systems in Charlotte County that serve residential or residential-type development. These include mobile home parks, recreational vehicle parks, and the Charlotte Correctional Institute. These facilities have capacities ranging from 0.010 MGD (10,000 gallons per day) to 0.180 MGD (180,000 gallons per day), and serve a total of approximately 7,795 people. The locations of these community systems are shown on SPAM Series Map #86.

On-site Sewage Disposal Systems: For those structures not connected to a centralized utility or a community system, their sanitary sewage disposal is most likely handled through on-site sewage disposal systems. According to the DOH, there are 10,639 properties known to be served by on-site sewage disposal systems, and these are shown on SPAM Series Map #89.

FUTURE CONDITIONS – SANITARY SEWER

EXISTING AND PROJECTED SANITARY SEWER FACILITY NEEDS

This plan incorporates the established wastewater LOS standard of 190 gallons per day per ERC. The majority of potable water used by customers is disposed through a sewage system in the form of wastewater, but a portion of water used, up to 25 percent, may be lost to consumption. This plan acknowledges that approximately 15 percent of the water demand will not be returned to the wastewater system. For that reason, the minimum LOS standard is approximately 85 percent of that for potable water. The ERC can be converted to gallons per capita per day (gpcd) by using the following formula:

1 ERC = 190 gpd / 2.14 persons per household = 88.785 gpcd

Table WSW-18: Existing Permitted Sanitary Sewage Disposal Service Providers			
DEP ID	**Supplier**	**Population**	**Permitted Capacity (GPD)**
FLA014067	Bay Palms MHP	50	10,000
FLA014130	Charlotte Correctional Institute	1,594	180,000
FLA014291	Charlotte County Utilities – East Port	79,807	6,000,000
FLA014048	Charlotte County Utilities – West Port		1,200,000
FLA014098	Charlotte County Utilities – Rotonda		2,000,000
FLA014083	Charlotte County Utilities – Burnt Store	6,300	500,000
FLA118371	City of Punta Gorda	29,561	4,000,000
FLA014126	Englewood Water District	48,970	4,200,000
FLA014641	Gasparilla Island Water Assn.	4,735	705,000
FLA014548	FGUA – Del Prado	42,000	4,250,000
FLA014463	FGUA – Lake Fairways		300,000
FLA014089	Gasparilla Mobile Estates	182	25,000
FLA014116	Harbor View Trailer Park	151	24,000
FLA014078	Hideaway Bay Condominiums	102	21,000
FLA014095	Knight Island Utilities	570	55,000
FLA014070	Lazy Lagoon MHP	157	70,000
FLA014088	Palm & Pines	126	15,000
FLA014072	Paradise Park Condominium Association	785	24,000
FLA014105	Pelican Harbor MHP	159	20,000
FLA014060	Riverwood Community Development District	2,133	499,000
FLA014122	River Forest Village	204	35,000
FLA014113	Shell Creek Park	465	20,000
FLA014120	Sun N Shade Campground	200	20,000

Table WSW-18: Existing Permitted Sanitary Sewage Disposal Service Providers			
DEP ID	Supplier	Population	Permitted Capacity (GPD)
FLA014062	Sun River Utilities	90	15,000
FLA665495	Town and Country Utilities	0	N/A
FLA014053	Utilities, Inc. of Sandalhaven	1,966	150,000
FLA014092	Villas Del Sol	88	29,000

Source: Florida Department of Environmental Protection, 2014

This standard was used in conjunction with the County's population projections, presented in Table WSW-1, to determine the future sanitary sewer needs for Charlotte County. Estimates of future population were developed based on U.S. Census blocks, as with the potable water projection demands. These blocks were assigned to one of the nine centralized sanitary sewer service areas, and seasonal population estimates for each certificated area were developed from 2020 to 2040. Since the boundaries of the service areas do not always follow the boundaries of the Census blocks, in some cases the area used for population projection may be larger or smaller than the actual boundaries of the certificated area, increasing or decreasing the estimated population. Every effort was made to minimize these effects, and usually involved large, sparsely-settled Census blocks. In general, these effects are expected to balance out County-wide in the long run.

Table WSW-19, included in WSW Appendix A, depicts the projected sanitary sewer service demands from 2020 to 2040 based on estimated functional population. Projected demands are calculated by multiplying the projected population by the per capita equivalent minimum LOS standard of 88.785 gallons per day and are indicated in millions of gallons per day (MGD). The incorporated area of the City of Punta Gorda is calculated using the City's adopted LOS. The functional populations in this table are greater than those shown in Table WSW-1 because they include the Charlotte Correctional Institution, a prison run by the Florida Department of Corrections and serviced by its own sanitary sewer facility. The inmate population of this facility was not included in the general County totals contained in Table WSW-1.

Table WSW-19 also compares the treatment capacity for each of the sanitary sewer service providers. This capacity is presented both as a permitted capacity, or the Average Annual Daily Flow through the wastewater treatment facility approved by DEP, and the peak capacity, or the maximum amount of flow the facility was designed to handle without failing. Since the LOS standard of 190 gpd/ERC represents a peak usage rate it can only be appropriately compared to the peak capacities of the facilities treating the wastewater. Unfortunately, an examination of the DEP permit applications showed that not every facility established its peak capacity using the same methodology. Some facilities used Peak Daily Flow (PDF), or the absolute maximum flow the facility could process on any single day. Some facilities used Maximum Monthly Average Daily Flow (MMADF), or the average daily flow for the month with the highest flow. Some facilities used Three Month Average Daily Flow (TMADF), or the average daily flow for the three-month period with the highest flow. Finally, some facilities used Average Annual Daily Flow (AADF), or the average daily flow for the entire year. In general, the smaller the permitted capacity of the facility the more likely the facility used AADF to determine peak capacity.

The analysis presented in that table indicates that two utilities show an immediate deficit in sanitary sewage disposal capacity, including Charlotte County in its Mid-County and Burnt Store service areas and North Charlotte Waterworks. It also shows that two additional utilities are projected to show deficits within the projection horizon. The City of Punta Gorda is projected to show a deficit beginning in 2035, and the Riverwood CDD is projected to show a deficit beginning in 2040. Table WSW-20 shows planned facility expansions, including expansions of both the County's Eastport facility that serves the Mid-County service area and the Burnt Store facility that serves the Burnt Store service area. The proposed Burnt Store facility expansion, from 0.500 MGD to 2.500 MGD, would address the projected treatment capacity deficit through the projection horizon, but it is not scheduled until 2024. The proposed Eastport facility expansion, from 6.000 MGD to 9.000 MGD, would address the immediate deficit, but it is not scheduled until 2023. There are no planned expansions for the NCWW, Punta Gorda, or Riverwood treatment facilities to address projected deficits.

Table WSW-20: Planned Wastewater Treatment Facility Expansions

Year of Improvement	Facility to be Improved	Existing Capacity (MGD)	Final Capacity (MGD)
2023	CCU – East Port WRF	6.000	9.000
2024	CCU – Burnt Store WRF	0.500	2.500
2025	Town & Country WRF	1.500	3.600

Source: Charlotte County Utilities & Town & Country Utilities, 2018

Usage data for the Charlotte County and NCWW service areas indicates that the actual usage for these utilities is much lower than the projected level. Table WSW-21 shows the reported flows through the wastewater treatment facilities for the first six months of 2019 for the service areas showing immediate deficits. This table indicates usage patterns well below the peak capacities for each service area. All of thses service areas have large areas that are not served by their collection systems, and residents in those unserved areas are dependent upon on-site sewage disposal systems. Compare the service areas shown on SPAM Series Map #86 with the location of on-site sewage disposal systems shown on SPAM Series Map #89. Charlotte County reports 37,094 residential connections in its Mid-County service area and 2,690 in its Burnt Store service area, while NCWW reported 40. Using the 2010 U.S. Census estimate of 2.14 persons per household, this equates to 78,391 people served by the Eastport facility, 5,756 by the Burnt Store facility, and 85 by NCWW. Compare this to the projected populations for those areas presented in Table WSW-19, of 97,839 for the Eastport facility, 6,560 for the Burnt Store facility, and 3,516 for NCWW. An operational analysis of these utilities shows that, given the most recent reported usage rates, projected growth, and planned facility expansions, all will remain within capacity through the projection horizon of 2040.

Table WSW-21: Reported Monthly Wastewater Flow, 2019			
Month	**Sun River AADF**	**Eastport AADF**	**Burnt Store AADF**
January	0.006	4.489	0.353
February	0.010	4.844	0.407
March	0.006	4.519	0.384
April	0.001	4.114	0.310
May	0.004	3.902	0.204
June	0.005	4.290	0.295

Source: Charlotte County Community Development Department, 2019

In 2009, North Charlotte Waterworks, as Sun River Utilities, received approval from the Florida Public Service Commission to extend its potable water and wastewater service area in Charlotte County. The PSC concluded that Sun River Utilities had both the financial and technical ability to provide service to their expanded service area. Further, the PSC concluded that Sun River Utilities had sufficient plant capacity to serve the expanded service area or the ability to construct a new plant when needed. This expansion increased the certificated service area of Sun River Utilities tremendously, but the supply facilities have not yet been expanded to serve the entire area. This adds to the projected shortage in wastewater disposal capacity. While Sun River Utilities currently does not have plans to expand their system to address this projected shortfall, the approval of the certificated area by the PSC indicates that the utility has demonstrated the capability, both technically and financially, to expand their supply when the time comes.

Table WSW-19 also projects that nine out of 13 community systems show an immediate service deficit. One facility, servicing the Harbor View manufactured home park, projects a service deficit by 2025, and another, servicing the Charlotte Correctional Institution, projects a service deficit by 2035. Unlike certificated utility areas, Charlotte County does not require community systems to report their monthly usage, so a comparison cannot be made between the system's projected demand and its actual demand. Traditionally, however, these developments have a much higher percentage of seasonal residents than standard residential development, and therefore have a lower demand than may be projected by equating a manufactured home occupied only part of the year with a permanently-occupied site-built residence.

An examination of FDEP permit applications revealed some reported data, which showed that Paradise Park Condominium Association reported an Annual Average Daily Flow of 0.009 MGD, or 38 percent of the permitted capacity of 0.024 MGD. An operational analysis of this community system shows that, given current reported usage rates and projected growth, it will remain within capacity through the projection horizon of 2040. If all of the community systems have usage patterns similar to Paradise Park Condominiums then the deficits projected in Table WSW-19 do not exist.

Not all of a utility's service area may actually be served by that utility. As discussed above, the County's Mid-County service area within the Urban Service Area, served by the Eastport WRF, has a 2020 estimated functional population of 97,839, but reports only 37,094 residential connections for an estimated actual population served of 78,391. This disparity between the number of potential and actual connections is not unique to the County's utility. Any structure not connected to a centralized sanitary sewer system must be connected either to a community system or to an on-site sewage disposal system. Table WSW-22 shows the number of on-site systems permitted since 1971, and projects future permits through 2040.

Table WSW-22: Sewage Treated by On-Site Systems, 2008-2040

Year	Existing Systems[1]	Systems Added[2]	Total Systems	Sewage Treated (MGD)
2013	26,723		26,723	5.077
2015		458	27,181	5.164
2020		1,145	28,326	5.382
2025		1,145	29,471	5.599
2030		1,145	30,616	5.817
2035		1,145	31,761	6.035
2040		1,145	32,906	6.252

Source: Charlotte County Health Department, Environmental Health Division, 2014
(1) Calculated number of permitted septic systems.
(2) Assumes 229 new systems are permitted annually based on the average of new systems installed annually, 2009-2013.

Table WSW-23 shows the total projected demand and total permitted capacity for sanitary sewage disposal for Charlotte County from 2020 to 2040, including centralized sewer systems, community systems, and on-site sewage disposal systems.

Table WSW-23: Current Sewerage Capacity vs Projected Demand, 2020-2040

Year	Functional Population	Projected Demand (MGD)	Projected Permitted Capacity (MGD)				Available Capacity (MGD)
			Centralized Sewer[1]	Community Systems	On-Site Systems	Total	
2020	204,868	18.057	16.524	0.438	5.382	22.344	4.287
2025	217,348	19.154	24.924	0.438	5.599	30.961	11.807
2030	234,623	20.673	24.924	0.438	5.817	31.179	10.506
2035	256,667	22.614	24.924	0.438	6.035	31.397	8.783
2040	284,589	25.078	24.924	0.438	6.252	31.614	6.536

Source: Charlotte County Community Development Department, 2019
(1) Includes facility expansions shown in Table WSW-16.

Table WSW-23 shows that, County-wide, there will be adequate sanitary sewage disposal capacity through the projection horizon of 2040, especially when on-site systems are included in the analysis, but as Table WSW-19 shows, not all service areas within the County will maintain this excess capacity. This table takes into account the planned facility expansions shown in Table WSW-20, but does not address any reduced demand based on water conservation methods, or any other facility expansions certain to occur within the horizons of this plan that are not yet planned or even considered. Even so, there is a projected surplus in sanitary sewer service by over 6.5 MGD, and since it is true that large portions of many existing centralized service areas are actually served by on-site sewage disposal systems rather than by centralized systems, it is likely that this situation will continue in the future despite the expansion of centralized systems, and that projected service deficits will not actually result in areas that are underserved by any form of sewage disposal. Plans for the expansion of centralized sewer systems will be discussed in further detail below.

PERFORMANCE OF EXISTING FACILITIES

The existing sanitary sewer facilities providing service to County residents are generally adequately maintained and in fair condition. Based upon FDEP permitting information, all of the major certificated areas had surplus capacity and exceed the established level of service standards. Table WSW-23 indicates that total existing capacity of septic systems, community systems, and sewage treatment plants should be adequate to meet the needs of the projected population through the projection horizon of 2040 although, as indicated earlier, this County-wide total hides regional imbalances between demand and permitted capacity.

PROBLEMS AND OPPORTUNITIES FOR WASTEWATER FACILITY AND INFRASTRUCTURE EXPANSION

Charlotte County is focused on the long-term expansion of centralized sanitary sewage collection and treatment systems and the reduced reliance on on-site and community sewage disposal systems that may have a negative impact on the natural environment and groundwater, especially in the urbanized area. The inclusion of Charlotte Harbor and Lemon Bay to the FDEP and EPA verified list of impaired waterways clearly indicate that a transition from on-site systems to centralized facilities should be prioritized in certain areas of the County.

Many of the smaller utilities fund the expansion of their collection and treatment systems through bonding, or even through bank loans. The County, however, has established Municipal Service Benefit Units (MSBUs) as the current method to fund sewer expansion initiatives. MSBUs are created by County ordinance or resolution as a funding mechanism to provide specific services to defined areas. The associated project costs are equitably assessed on each property within the benefit unit as non-ad valorem assessments that appear on their standard property tax bills. Unlike other MSBUs that may handle continuing maintenance, the sewer benefit units have been established for the purpose of constructing system expansions, and are designed to be removed once the project costs have been paid off. The County is in the process of exploring other methods of obtaining revenue to offset a portion of the cost to individual property owners to be used in conjunction with the MSBU method.

Currently there are 12 active utility expansion MSBUs, as shown on SPAM Series Map #88. In total, these MSBUs provide sewer availability to approximately 15,900 properties. Future success in expanding CCU's centralized sanitary sewer service to areas that need it will require direction from the Board of County Commissioners regarding the prioritization of future expansion areas.

In 2017 the County's Utility Department completed a Sewer Master Plan, a conceptual long-term strategic plan to bring centralized sanitary sewer service to the entire County service area, which could make centralized sanitary sewer available to approximately 72,000 additional properties within the Urban Service Area. The classification of Charlotte Harbor and Lemon Bay as impaired waters, a newly developed sewer model, and the Future Land Use element's adopted Goals, Objectives, and Policies pertaining to the targeting of centralized utility services provided key criteria in establishing the Master Plan. Areas where capacity upgrades are needed to support future growth, as well as areas for future system expansion based on the age of existing on-site systems, proximity to surface water bodies, and other factors were used for this conceptual long-term strategic plan.

The East and West Spring Lake Wastewater MSBU is in the final stages of construction to connect approximately 1,900 occupied properties. The proposed El Jobean vacuum system, scheduled for construction beginning in late 2019, will connect approximately 300 occupied properties.

Other opportunities exist for the County to improve system efficiencies and performance. The current sewer infrastructure is a complex network of treatment facilities, transmission mains, force mains, lift-stations, and collection systems. As the system expands, modifications and additions to the existing network will be required to accommodate the additional capacity, adding to capital expenditures. Any expansion to the existing system also increases the long-term O&M costs due to additional electrical costs, chemical costs, additional piping, replacement parts, additional staffing and equipment costs.

To eliminate a portion of the existing pressurized transmission system, a 48-inch gravity interceptor is now under construction through portions of the Mid-County service area to intercept flows from localized transmission and collection systems and transport sanitary sewage to the Eastport WRF. This will reduce reliance on a more extensive lift station/force main transmission strategy. The increased capital costs for this system would be offset by the long-term O&M savings.

In addition, increasing costs for construction of low-pressure sewer (LPS) systems and the associated long-term LPS O&M costs make it advisable to implement the use of gravity, modified gravity, and vacuum systems as alternatives to LPS systems.

Despite the fact that the County appears to have ample sewerage treatment capacity for the future, it is important that the public and certificated providers continue to upgrade and expand their treatment facilities and comply with FDEP regulations. To that point, the County has initiated the process to expand its Eastport and Burnt Store WRFs. As shown in Table WSW-23, 26.0 percent of the County's sanitary sewage treatment capacity is handled by on-site septic systems and community systems. While this is down from nearly half of all capacity as recently as the mid-1980s, Table WSW-23 also shows that given existing and projected treatment capacities and expansion this proportion will only fall to 21.1 percent by 2040. If the County wishes to significantly decrease the reliance upon non-centralized systems, then the provision of additional centralized sewer service is necessary concurrent with new residential, commercial, and industrial development. Alternatively, growth management policies may be adopted that direct future development into areas that are already served by centralized infrastructure, decreasing the costs of expansion and the per-unit O&M costs in a served area. Such regulation is in place at both the State and local level, discouraging the use of individual on-site sewage disposal systems on lots of less than one-half acre in area. There will likely always be areas of the County that are served by on-site systems; rural areas will not remain rural if public utility lines are extended to them, and there are areas within the County where urban densities are inappropriate or unwanted. The density of on-site systems shown on SPAM Series Map #89, however, is also inappropriate. Centralized sewer expansion into these areas will benefit the customer, the environment, and the County as a whole.

Additionally, existing sewage treatment facilities are being monitored for capacity and efficiency to ensure that future demands and regulations are met. A study of the feasibility of interconnections between existing sanitary sewerage collection and treatment systems could provide information on the creation of regional sewage treatment plants. In addition, sanitary sewer providers should improve existing infrastructure to maintain the current level of service and to decrease infiltration and inflow of water into sewer systems.

ON-SITE SEWAGE DISPOSAL SYSTEM MANAGEMENT PROGRAM

The Environmental Health Division of the Charlotte County office of DOH estimates that more than 48,000 on-site sewage disposal systems have been permitted over the years in the County (see Table WSW-24). An estimated 85 percent of these are likely or somewhat likely still in operation. SPAM Series Map #89 show the 10,639 locations that the Health Department has designated as "known septic." There are 26,786 sites that they have designated as "likely septic" and another 3,522 sites designated as "somewhat likely septic." These on-site systems require routine periodic maintenance to ensure proper function, and a large number of systems fail because this maintenance is not performed properly. Malfunctioning on-site systems may introduce fecal bacteria and viruses into the surface and groundwater supply. Enhanced programs by DOH have increased the functionality of septic systems by requiring larger areas for installation, maintaining strict separation between drainfields and seasonal high water tables, and requiring inspections on alternative aerobic systems required on projects with more intensive wastewater handling needs.

While the County has a large number of vacant lots with centralized sewer service available, there are even greater numbers without. A goal of this Comprehensive Plan is to encourage the development of those vacant lots already served by centralized potable water and sanitary sewer systems, and reduce the reliance on on-site systems. Encouragement to develop within areas already served, or targeted to be served in the near future, will be accomplished through a combination of incentives and regulatory restrictions. This Plan also considers financial costs of providing infrastructure, and it recognizes that property owners using on-site systems have made a financial investment in those systems. Laws have been adopted by the County requiring less intensive use of land for on-site systems before requiring that alternative systems be employed. This has effectively required more connections to centralized sanitary sewer systems as a more cost-effective solution, and has upgraded the standards for the average on-site system.

Table WSW-24: On-Site Sewage Disposal System Permits Issued

Year	New Permits	Repair Permits
Pre-1993	38,649	
1993	571	41
1994	497	185
1995	382	147
1996	402	212
1997	400	160
1998	336	160
1999	289	68
2000	325	75
2001	315	129
2002	365	135
2003	405	144
2004	406	70
2005	858	55
2006	1,171	212
2007	463	337
2008	166	462
2009	240	494
2010	158	369
2011	110	365
2012	125	414
2013	167	525
2014	181	549
2015	257	713
2016	354	713

Table WSW-24: On-Site Sewage Disposal System Permits Issued		
Year	**New Permits**	**Repair Permits**
2017	446	611
2018	701	617
Total	**48,739**	**7,962**

Source: Charlotte County Health Department, Environmental Health Division, 2019

On-site sewage disposal systems installed prior to 1983 are a concern in the County because they were built prior to the stricter regulations that are in effect today. In general, on-site systems present challenges when compared to a centralized sewer system due to the land area required per lot to install them, the costs associated with installing and maintaining them, and the high seasonal water table through much of the County, which requires many drainfields to be mound systems.

According to DOH records, 7,962 septic repair permits were granted between 1993 and 2018. This averages to 306 repairs or documented deficiencies per year, although 6,169 of those repair permits, or 77.5 percent of the total, were issued since 2007, as part of the County's inspection and maintenance program, which requires property owners to upgrade deficient systems to current standards where and when possible. Many, if not most of Mid-County's on-site systems were installed prior to 1983. In portions of West County, the Englewood Water District has successfully eliminated many of the older on-site systems and replaced them with vacuum sewer systems through the implementation of its regional central sewer program. As detailed above, the County has established several MSBUs to finance sewer expansion projects. The typical design life of an on-site sewage disposal system has been estimated at 15 to 20 years (Proposed Surface and Groundwater Quality Monitoring Program for Charlotte County, Florida, Mote Marine Laboratory, Technical Report #433, July 28, 1995).

On-site sewage disposal systems constitute a major component of existing wastewater treatment. While most of the County's platted lots are not fully served by centralized utility service, there are a number of vacant lots that are ready for development and served by central potable water and sewer service.

The three urbanized areas of West County, Mid-County, and South County contain nearly 40,000 lots and parcels that have central sewer service available to them yet are vacant and ready to serve new development. Much of the County's new development should be channeled into those areas in order to maximize the infrastructure investment that has been made.

IMPLEMENTATION

POTABLE WATER SUPPLIES, SANITARY SEWAGE DISPOSAL, AND GROWTH

The provision of centralized water or sewer lines, whether by a public agency or a private company, can be one of the strongest indicators of development potential. The extension of such infrastructure into a rural area is one of the most effective ways to ensure that such an area does not remain rural in the long run. The new utility lines allow for a much higher density of development than before and the utility provider must encourage higher-density development to realize an acceptable return on the infrastructure investment. Given the opportunities provided by the construction of infrastructure lines, such extensions should be considered a tool to direct development into areas that are deemed appropriate, and away from areas that are deemed inappropriate.

This comprehensive plan incorporates growth principles that identify locations where the County intends to direct development and capital investments in infrastructure. These areas are targeted due to their existing population densities and land uses, and their proximity to existing public infrastructure. By directing development to these areas, the County can reduce infrastructure costs by increasing the use of existing systems, reducing urban sprawl, saving money by not requiring the construction of new transmission or collection mains into undeveloped areas, and reducing the per-unit costs of operations and maintenance on the existing infrastructure systems.

Centralized potable water and sanitary sewer utilities may establish prioritization systems for expanding their service areas, but all such prioritization shall be consistent with the planning principles established and more fully described in the Future Land Use element.

POTABLE WATER AND SANITARY SEWER SYSTEM EXTENSIONS

Besides roads, centralized potable water lines have had the greatest infrastructure influence on the development pattern of Charlotte County. Much of the urbanized area has been subdivided into small lots where the predominant land use is low-density residential. In addition, many of the commercial and industrial sites have also been subdivided into smaller lots. This development pattern enabled many developers to install only potable water lines and rely upon on-site sewage disposal systems for sanitary sewage disposal. On-site systems are more appropriate in rural areas, where large lots allow for wide separation distances between on-site systems and on-site potable water wells. These separation distances are necessary to prevent the on-site drainfields from contaminating the groundwater drawn by the wells. If potable water lines are installed in an area without sanitary sewer service, however, this allows the land to be subdivided into small lots and on-site systems may be installed at a much higher density than would otherwise be permitted.

While in this situation on-site potable water wells are not in danger of being contaminated by malfunctioning on-site systems, such a high concentration of on-site sewage disposal still has the potential to produce adverse environmental effects, particularly in an area such as Charlotte County, where the soils are poorly equipped to deal with the percolation of effluent. The impairment of Charlotte Harbor and Lemon Bay, as determined by FDEP and EPA, was caused in part by a high concentration of on-site systems that have begun to malfunction due to age and lack of adequate maintenance.

One of the County's objectives continues to be the reduction of dependence on on-site systems, especially within the Urban Service Area, by reducing the number of new construction projects using them. New development should be directed into areas where centralized sewer service is available. Additionally, new areas for infrastructure expansion are being identified.

The County currently requires simultaneous extension and certification of potable water and sanitary sewer utility lines. However, this condition may not be achievable when the water and sewer providers are not the same due to the overlap of service areas (one example would be the Charlotte Harbor Water Association certificated area and Charlotte County's Mid-County service area). In these cases, extension of lines simultaneously should be evaluated on a case-by-case basis. The County presently has mandatory connection requirements if centralized water or sewer service is made available.

Currently, there are two utility providers in South County. These providers are the City of Punta Gorda and Charlotte County through its Burnt Store service area. While most of the City of Punta Gorda is served by central water and sewer service, much of the unincorporated areas surrounding the City are not. In order to ensure service provision to unincorporated areas, Charlotte County and the City continue to work towards solutions for providing the necessary infrastructure, including interlocal agreements for service provision and the sharing of expansion plans for meeting growing demands.

As development of the County continues, infrastructure expansion should continue in a manner consistent with the planning principles outlined in the Future Land Use element. The cost of infrastructure installation should be borne by those benefiting from its provision. Concurrency requires that adequate capacity for public services, including potable water and sanitary sewer, shall be in place to meet the projected demand upon those services from proposed development. If such capacity is not available at the time of proposal, it is generally the responsibility of the developer to provide it.

CONCURRENCY MANAGEMENT

Concurrency, or the policy of ensuring that public facilities are in place to serve projected demand produced by proposed development, is required by local ordinance. This concurrency is monitored by the County's Concurrency Management System, and potable water and sanitary sewage disposal service are both included. Most of the public facilities in the concurrency system are provided by the County, including transportation facilities, public schools, and parks. Potable water and sanitary sewer, however, are provided by many utilities, both public and private. All of these utilities are responsible for ensuring that concurrency is met for development within their service areas.

While the individual utilities are responsible for maintaining concurrency, the County, as the central agent for reviewing and approving development, makes any decision determining whether proposed development does or does not exceed the stated existing capacity of the utility. Every potable water and sanitary sewer utility in the County is required to report to the County the details of monthly usage, permitted capacity, and the number of customers. When development is proposed, County staff reviews these reports to compare the projected demand from the proposed development with the remaining permitted capacity of the utility serving the development, as reported. If the projected demand would exceed the available capacity, then the County will not issue an approval for the proposed project.

If a proposed development does not meet concurrency, there are several options to correct this situation. The developer may enter into an enforceable development agreement or development order with the utility to guarantee that the required facilities will be installed, or the developer may construct the facilities necessary to bring the utility into concurrency, or the developer may pay the utility to construct the necessary facilities. Other options may also be available. While the County may make the determination as to whether a proposed development meets concurrency for any utility within the County, it is the responsibility of that utility to ensure that concurrency is maintained or deficiencies are corrected.

FUTURE DIRECTION

As shown in Table WSW-1, Charlotte County's population will continue to grow, although it is projected to increase at a slower pace than in the past. Potable water and sanitary sewer service will need to be available to provide for the health, safety, and welfare of the future population. Table WSW-6 indicates that, overall, utility providers will be looking for additional sources of potable water to support the projected population increase through 2040. Several utilities will need additional permitted capacity before this time to meet projected demand. Table WSW-19 also shows that, overall, utility providers will be looking to expand sanitary sewage treatment capacity to support the projected population increase by 2040.

INFRASTRUCTURE - POTABLE WATER AND SANITARY SEWER (WSW) GOALS, OBJECTIVES AND POLICIES

PURPOSE

The purpose of the Potable Water and Sanitary Sewer section of the Infrastructure element is to ensure that potable water supplies and sanitary sewer disposal service are available to support development through the planning horizons established within the Comprehensive Plan. The provision of potable water and sanitary sewer and the specific parameters for this particular element are based on Florida Statute, which requires that sewer and water services be provided in accordance with future land use projections and also identifies a basic framework for developing a series of goals, objectives, and policies which are formulated to accomplish the desired purpose based on an analysis of available data.

The availability of sewer and water will influence the timing, location, and intensity of development. Planning for the extension of these services should therefore be considered an integral part of Charlotte County's development strategy. In order for the County to effectively utilize infrastructure expansion as a legitimate growth-management tool, this section incorporates a prioritization for providing facilities to areas targeted for new growth based upon Smart Growth principles established in the Future Land Use element. This will ensure that centralized potable water and sanitary sewer facilities are provided concurrently with future development, that utility infrastructure is directed towards those areas of the County where it is most appropriate, and that adequate facility capacity will be available to maintain adopted level of service standards.

All references to any ordinances, statutes or regulations contained herein shall, unless otherwise noted, be deemed to be those in effect as of the date of adoption of this element and thereafter as amended, renumbered or otherwise revised.

GOALS, OBJECTIVES AND POLICIES

WSW GOAL 1: LEVELS OF SERVICE
Maintain adequate Levels of Service (LOS) for potable water and sanitary sewer service to serve current and future needs and ensure that LOS standards are met.

WSW Objective 1.1: LOS Standards
To maintain potable water distribution and sanitary sewage collection systems to meet or exceed adopted LOS standards.

WSW Policy 1.1.1: LOS Applicability
The County shall require all utilities serving the unincorporated areas of Charlotte County, public or private, to meet the adopted LOS standards.

WSW Policy 1.1.2: Potable Water LOS
The County shall require all potable water utilities to provide for the treatment and distribution of 225 gallons of potable water per day per Equivalent Residential Connection (ERC).

WSW Policy 1.1.3: Sanitary Sewer LOS
The County shall require all sanitary sewer utilities to provide for the collection and treatment of 190 gallons of sanitary sewage per day per ERC.

WSW Policy 1.1.4: Effect of System Improvements on LOS
The County shall require all improvements for replacement, expansion, or increase in capacity of facilities to meet the adopted LOS standards.

WSW Policy 1.1.5: LOS Evaluation
The County shall periodically review water usage data from all public and certificated potable water supply utilities, and shall make any appropriate changes to the LOS standards.

WSW Objective 1.2: Concurrency
To maintain, operate, and monitor capacity sufficient to satisfy adopted Levels of Service through the long-range planning horizon of 2030 and to project possible capacity needs through the vision horizon of 2050.

WSW Policy 1.2.1: Reporting
The County shall require all utility providers to provide the Charlotte County Community Development Department, or its successor agency, with monthly Florida Department of Environmental Protection (FDEP) reports of total capacity and facility demand to ensure that the adopted LOS standards are maintained and the Concurrency Management System is up to date.

WSW Policy 1.2.2: Development Approval
The County shall not issue any development orders or permits unless the necessary facilities and services are in place and available to serve the new development or the necessary facilities and services are guaranteed to be in place and available to serve new development under an enforceable development agreement or development order.

WSW Policy 1.2.3: Consultation with Service Providers
The County shall require all municipalities within the County to consult with the appropriate potable water and sanitary sewer utilities to determine whether there is adequate capacity to serve any proposed development before issuing any development order or permit.

WSW GOAL 2: SMART GROWTH FRAMEWORK

Provide potable water and sanitary sewer services to new and existing development through the use of Smart Growth Principles as outlined in FLU Goal 1.

WSW Objective 2.1: Direction of Infrastructure Investment

To direct investment in potable water and sanitary sewer utility systems to those areas of the County where those investments will achieve the greatest benefit to the largest number of residents and businesses.

WSW Policy 2.1.1: Appropriate Future Land Use Policies

The County shall require all utility facility plans and programs to be designed and coordinated in a manner consistent with the following Future Land Use element policies:

1. FLU Policy 1.2.3: Service Area Delineation
2. FLU Policy 1.2.4: Urban Service Area
3. FLU Policy 3.2.4: Limitation on the Extension of Urban Infrastructure
4. FLU Policy 4.1.8: Priority for the Provision of Urban Services

WSW Policy 2.1.2: Growth Management Techniques

The County shall employ various growth management techniques as identified in the Future Land Use element to direct new development into areas served by central potable water and sanitary sewer service.

WSW Policy 2.1.3: Neighborhood Framework

The County shall encourage the extension of central potable water and sanitary sewer services in a manner consistent with **FLU Goal 4: Planning Concept Plan Implementation – Neighborhood Protection and Enhancement**.

WSW Policy 2.1.4: Utility Extensions through the Rural Service Area

The County shall only allow transmission lines for potable water or sanitary sewer service to be extended through the Rural Service Area if it is to provide service to lands located within the Urban Service Area. The County shall not allow water distribution or wastewater collection lines to expand from a transmission line located in the Rural Service Area except to address situations where the public health, safety, and welfare are in danger. This policy shall not be applicable to utilities that are regulated by the Florida Public Service Commission.

WSW Objective 2.2: Land Use Decisions

To use the location and availability of central potable water and sanitary sewer service when making land use decisions.

WSW Policy 2.2.1: Use of Utility Availability in Land Use Decisions
The County shall not permit the availability of centralized potable water and sanitary sewer service to be used as the primary justification for development approval.

WSW GOAL 3: PROVISION OF UTILITY SERVICES
Encourage utilities to provide well-designed and economically efficient systems of potable water and sanitary sewer service that maximizes the use of existing facilities to meet the needs of a growing population, while protecting the natural environment.

WSW Objective 3.1: Connection to Utility Services
To connect developed properties to central potable water and sanitary sewer service when such centralized utility services are made available.

WSW Policy 3.1.1: Concurrent Utility Line Extensions
The County shall require all utilities that provide both centralized potable water and sanitary sewer service to extend potable water and sanitary sewer lines concurrently. Lines may be extended separately only if the service area is primarily composed of one type of service line and it is determined by the utility that concurrent extensions are not feasible. This policy shall not be applicable to utilities that are regulated by the Florida Public Service Commission.

WSW Policy 3.1.2: Connection of Developed Property
In the Urban Service Area, whenever centralized potable water or sanitary sewer service is made available to any developed property, the constructing utility shall require the landowner to connect to the utility upon written notification by the utility provider that service is available for the property. "Available" means that the utility has adequate permitted capacity to serve the development and that a utility line is within the distance from the property as specified by County ordinance or State Statute.

WSW Policy 3.1.3: Connection of Property under Development
The County shall require that whenever central potable water or sanitary sewer service is made available, as established in WSW Policy 3.1.2, to any property with a new structure under construction, the landowner shall connect the structure to the utility system prior to receiving a certificate of occupancy or its functional equivalent.

WSW Policy 3.1.4: Connection and Decommissioning of Community Systems
The County shall require that whenever a centralized sanitary sewer system is made available, as established in WSW Policy 3.1.2, package treatment plants shall be decommissioned and connected to the centralized

system. Decommissioning shall be completed at the expense of the owners of the community system.

WSW Policy 3.1.5: Use of On-Site Wells upon Connection to Centralized Systems
Upon connection to a centralized potable water system, the County shall allow any on-site potable water sources to be converted to irrigation or other non-potable uses consistent with State law and the rules of the appropriate Water Management District.

WSW Policy 3.1.6: Abandonment of On-Site Septic Systems upon Connection to Centralized Systems
Upon connection to a centralized sanitary sewer system, the County shall require any on-site septic system, or necessary parts thereof, be made inoperable consistent with State law. Such work shall be done at the system owner's expense.

WSW Policy 3.1.7: Joint Sanitary Sewer Systems
The County shall encourage:

1. Sanitary sewer disposal agreements whereby package treatment plants may be interconnected and replaced by treatment facilities with better economies of scale in order to achieve greater operating efficiencies.
2. The installation of on-site treatment and disposal systems that treat effluent to advanced sanitary sewer treatment standards.

WSW Objective 3.2: Certificated Utility Service Areas
To manage the certificated utility areas within the boundaries of Charlotte County.

WSW Policy 3.2.1: County Review of and Action on Certificated Areas
The County shall review all proposed new certificated utility areas, or the proposed expansion of an existing certificated utility area, to ensure that any such new or expanded certificated area is consistent with and advances the Goals, Objectives, and Policies of this Plan.

WSW Policy 3.2.2: Responsibilities of Certification
The County shall require all utilities with an approved certification to provide service to their approved areas in accordance with that certification.

WSW Policy 3.2.3: Concurrent Expansion of Certificated Areas
The County shall require that all certificated utilities that provide both central potable water and sanitary sewer service shall not expand the Certificated Service Area for one service without concurrently expanding the Certificated Service Area for the other service.

WSW Policy 3.2.4: Certificated Utility Companies and the Urban Service Area
The County shall discourage expansion of the service areas of utility companies regulated by the Florida Public Service Commission (PSC) to any areas outside of the Urban Service Area, in accordance with **FLU Policy 3.2.5: Support Economic Viability of Agricultural Lands** and Special Provision 1(b) of the Rural Settlement Overlay District contained in FLU Appendix I.

WSW Objective 3.3: Non-Centralized Utility Systems
To provide for non-centralized potable water supply and sanitary sewage disposal in those areas not served by a certificated utility.

WSW Policy 3.3.1: New Platted Lots and On-Site Septic Systems
The County shall require that new lots platted and intended to be served by an on-site septic system shall have a minimum lot area consistent with the requirements of Chapter 64E-6, Florida Administrative Code (F.A.C.) or local ordinance, whichever standard is more restrictive.

WSW Policy 3.3.2: Community Utility Systems
The County may permit pre-manufactured treatment facilities designed and used to treat potable water and sanitary sewage at flows of 0.002 million gallons per day to 0.500 million gallons per day in small communities (package treatment plants) provided they are built to the standards specified by FDEP or the County, whichever standard is more restrictive.

WSW Policy 3.3.3: Community Utility System Reporting
The County shall coordinate with local community utility system operators to begin monitoring and data collection to be used in evaluating community system potable water supply and sanitary sewer collection needs. This data will be incorporated into the analysis of the next the Water Supply Facilities Work Plan.

WSW GOAL 4: POTABLE WATER
Provide adequate potable water supplies, treatment, and distribution throughout the County.

WSW Objective 4.1: Potable Water Supplies
To protect existing and future potable water supplies, including the Peace River, its tributaries, and wellhead and wellfield locations.

WSW Policy 4.1.1: Wellhead and Wellfield Protection
The County shall protect wellheads and wellfields as established in **FLU Policy 2.3.5: Public Water System Wellhead Protection**.

WSW Policy 4.1.2: Hazardous Materials and Potable Water Supplies
The County shall not permit land uses in which hazardous materials including, but not limited to, petroleum products or chemical or biological wastes are produced or stored, or land uses which may have an adverse impact on central potable water supplies for public consumption, in areas where their presence would adversely impact groundwater resources, recharge areas, or watersheds that drain into surface water supplies.

WSW Policy 4.1.3: Sewage Sludge Disposal
The County shall not permit the disposal of sludge in areas where it would adversely impact groundwater resources, recharge areas, or watersheds that drain into surface water supplies, unless such disposal is consistent with regulations established by FDEP.

WSW Objective 4.2: Potable Water Usage
To maintain residential per capita water use rates consistent with water use methodologies established by the Water Management Districts (WMDs).

WSW Policy 4.2.1: Wastewater Recycling and Reuse
The County shall encourage utilities to develop facilities and programs for recycling treated wastewater and to promote water reuse through methods such as irrigation.

WSW Policy 4.2.2: Water Restriction Programs
The County shall participate in water restriction programs established by the appropriate WMD. This participation shall include, but not be limited to, public notice and educational programs.

WSW Policy 4.2.3: Assistance to WMDs
The County shall assist the WMDs in such acts as notices to citizens and public awareness education programs, particularly during times of emergency water shortages and droughts, pursuant to 40D-21.231, Declaring a Water Shortage, and 373.609, F.S.

WSW Policy 4.2.4: Florida-friendly Landscaping
The County shall encourage Florida-friendly landscaping techniques through its public education program in order to reduce water usage for irrigation.

WSW Policy 4.2.5: Public Building Landscaping
The County shall utilize Florida-friendly landscaping techniques and recycled water, if available, for the landscaping of publicly-owned facilities.

WSW Policy 4.2.6: Public Education
The County shall support public education programs encouraging water conservation.

WSW Policy 4.2.7: Water-Conserving Plumbing Fixtures
The County shall require water-conserving plumbing fixtures and devices to be used for all new development and shall encourage the use of these fixtures and devices for renovations and remodeling.

WSW Policy 4.2.8: Tiered Conservation Rates
The County shall require all potable water providers to adopt a tiered conservation rate structure for users.

WSW Policy 4.2.9: Reclaimed Water Systems
The County shall require all new large developments to connect to reclaimed water supply systems for non-potable uses, when such systems are made available. "Made available" means that the reclaimed water utility has adequate capacity to serve the development and a functioning reclaimed water distribution main is located within 500 feet of the property or that it is cost effective for the utility to extend a reclaimed water distribution main to within 500 feet of the property. Individual single-family, duplex, or triplex buildings shall not be required to connect.

WSW Policy 4.2.10: Appropriate Water Quality for Use
The County shall require that non-potable water uses shall be met by reclaimed water supplies whenever possible. If reclaimed water sources are not available, non-potable water uses shall be met by groundwater sources.

WSW Objective 4.3: Water Supply Facilities Work Plan
To maintain the Water Supply Facilities Work Plan.

WSW Policy 4.3.1: Adoption of Water Supply Facilities Work Plan
The County hereby adopts the Water Supply Facilities Work Plan, comprised of the specific Goals, Objectives, and Policies listed below and dated December 10, 2019, for a period of not less than ten years. The data and analysis that constitutes the Water Facilities Supply Work Plan is the Infrastructure Data and Analysis, Potable Water and Sanitary Sewer Water Supply Facilities Work Plan document. The Water Supply Facilities Work Plan addresses issues that pertain to water supply facilities and requirements needed to serve current and future development within the County's water service areas.

<u>Infrastructure element</u>

- WSW Goal 1: Levels of Service
  - WSW Objective 1.1: LOS Standards

WSW Policy 1.1.1: LOS Applicability
WSW Policy 1.1.2: Potable Water LOS
WSW Policy 1.1.4: Effect of System Improvements on LOS
WSW Objective 1.2: Concurrency
WSW Policy 1.2.1: Reporting
WSW Policy 1.2.2: Development Approval
WSW Policy 1.2.3: Consultation with Service Providers
WSW Goal 4: Potable Water
WSW Objective 4.1: Potable Water Supplies
WSW Policy 4.1.1: Wellhead and Wellfield Protection
WSW Policy 4.1.2: Hazardous Materials and Potable Water Supplies
WSW Policy 4.1.3: Sewage Sludge Disposal
WSW Objective 4.3: Water Supply Facilities Work Plan
WSW Policy 4.3.1: Adoption of Water Supply Facilities Work Plan
WSW Policy 4.3.2: Plan Update Schedule
WSW Policy 4.3.3: Plan Coordination
WSW Policy 4.3.4: Inclusion of Capital Improvements

Capital Improvements element
CIE Goal 1: Timely Development of Infrastructure
CIE Objective 1.1: Making Necessary Improvements
CIE Policy 1.1.6: Concurrency Management System
CIE Policy 1.1.7: Capital Improvements Program
CIE Policy 1.1.8: Financially Feasible CIE Schedule
CIE Policy 1.1.9: Agency and Plan Coordination

Intergovernmental Coordination element
ICE Goal 1: Intergovernmental Coordination
ICE Objective 1.1: Implementation Coordination
ICE Policy 1.1.10: Utility Coordination
ICE Policy 1.1.12: Coordination with Water Management Districts
ICE Objective 1.2: Level of Service (LOS)
ICE Policy 1.2.3: Water Management

WSW Policy 4.3.2: Plan Update Schedule
The County shall update the Water Supply Facilities Work Plan at least once every five years and within eighteen months of the latest updated local WMD Regional Supply Plan.

WSW Policy 4.3.3: Plan Coordination
The County shall coordinate revisions to the Water Supply Facilities Work Plan with the South Florida Water Management District, the Southwest Florida Water Management District, the Florida Department of Economic Opportunity, and the potable water suppliers serving residents of the County.

WSW Policy 4.3.4: Inclusion of Capital Improvements
The County shall incorporate capital improvements identified by any potable water supply utility into the Water Supply Facilities Work Plan and the Capital Improvements element.

WSW GOAL 5: SANITARY SEWER
Provide adequate sanitary sewage collection and treatment throughout the County.

WSW Objective 5.1: On-Site Septic Systems
To implement a septic system management program serving the entire County.

WSW Policy 5.1.1: Septic System Maintenance Schedule
The County shall assist the Charlotte County Health Department (CCHD) Environmental Health Unit (EHU) in developing a schedule of septic system maintenance. The EHU will ensure that septic systems throughout the County receive periodic operational inspections and maintenance according to the Onsite Treatment and Disposal Systems (OSTDS) Ordinance.

WSW Policy 5.1.2: Program Participation
The County shall require all permitted on-site septic disposal systems to be part of the managed program in order to safeguard the public health, safety, and welfare.

WSW Policy 5.1.3: On-Site Septic System Standards
The County shall require that all on-site septic systems, whether new or replacement, will meet or exceed the treatment standard for onsite disposal systems within Chapter 64E-6, Florida Administrative Code, or local ordinance, whichever standard is higher.

WSW Policy 5.1.4: New Development and On-Site Septic Systems
The County shall attempt to reduce the percentage of septic systems serving new development.

WSW Objective 5.2: Environmental Quality
To establish and operate an ambient water quality monitoring program to determine the impacts of pollution resulting from the use of sanitary sewer treatment systems (e.g., septic systems, package treatment plants, and central sanitary sewer systems).

WSW Policy 5.2.1: Sampling
The County shall assist CCHD in collecting water and soil samples from various locations within the County to be analyzed for pollutant loadings.

WSW Policy 5.2.2: Funding
The County may seek funding, in cooperation with CCHD, from various sources in order to implement an ambient water quality monitoring program. Sources may include the State of Florida, local governments, regional and Federal agencies, and the Charlotte Harbor National Estuary Program.

WSW Policy 5.2.3: Adverse Environmental Impacts and System Repairs
The County shall, when analysis indicates that a sanitary sewer treatment system is adversely impacting the environment according to State water quality standards (Chapter 62-302, F.A.C., for surface water, Chapter 62-520, F.A.C., for ground water, and Chapter 64E-9, F.A.C., for bathing places) and that public health standards are endangered, cause those sanitary sewer treatment systems to be repaired or replaced.

WSW GOAL 6: CHARLOTTE COUNTY UTILITIES
Operate CCU in an efficient and business-like manner to the benefit of the public.

WSW Objective 6.1: Public Benefits
To ensure that CCU operations fulfill public health standards and meet the adopted LOS.

WSW Policy 6.1.1: Project Prioritization
The County shall give high priority to CCU capital projects that are needed to rectify existing deficiencies in the utility systems.

WSW Policy 6.1.2: Sewer Expansion Program
CCU shall develop a cost-effective sewer expansion program consistent with the Goals, Objectives, and Policies of this Plan with the intent of reducing the impact of pollutants on the natural environment and preserving groundwater quality.

WSW Policy 6.1.3: System Extension MSBUs
CCU may continue to finance the extension of its centralized potable water and sanitary sewer facilities through MSBUs or other funding mechanisms.

WSW Policy 6.1.4: Burnt Store Area Plan
The County shall encourage construction of potable water and sanitary sewer mains along Burnt Store Road, Zemel Road, and the proposed East-West Connector to U.S. 41 (Tuckers Grade Extension). All such mains shall be owned by CCU, but the cost of construction shall be borne by those who benefit from the

improvements. Rebate agreements may be used to facilitate the construction of potable water or sanitary sewer facilities that would serve area-wide needs rather than the needs of a single development.

WSW Objective 6.2: System Efficiencies
To ensure that CCU operations are efficient in the expenditure of public funds.

WSW Policy 6.2.1: Facility Rehabilitation and Reuse
CCU shall evaluate the rehabilitation and reuse of existing facilities and structures as an alternative to new construction.

WSW Policy 6.2.2: Funding Options
CCU shall actively seek Federal and State assistance for the funding of its central potable water and sanitary sewer infrastructure.

Appendix G

Comprehensive Planning Documents

Charlotte 2050 Plan

Intergovernmental Coordination Element

INTERGOVERNMENTAL COORDINATION DATA AND ANALYSIS

INTRODUCTION

The following is the Data and Analysis necessary to support the adopted Charlotte 2050 Plan goals, objectives and policies.

A major objective of the local comprehensive planning process is the *"coordination of the local comprehensive plan with the comprehensive plans of adjacent municipalities, the County, adjacent counties, or the region...and with the State Comprehensive Plan",* (Section 163.3177(4)(a), Florida Statutes). In accordance with Section 9J-5.015 of the Florida Administrative Code, the purpose of this Intergovernmental Coordination element (ICE) is as follows:

> *To identify and resolve incompatible goals, objectives and policies and development proposed in local government comprehensive plans and to determine and respond to the needs for coordination process and procedures with adjacent local governments, and regional and State agencies.*

This element addresses these requirements by identifying units of government and other agencies that have, or should have, mechanisms of coordination to implement the elements of this plan. It then provides an analysis of the adequacy of the coordination mechanisms, and identifies problem areas requiring improvements. The element concludes by providing a formal set of goals, objectives and policies (GOP), which are adopted as a separate document, to maintain and foster intergovernmental coordination.

The goals of this element are to increase the effectiveness, efficiency, and responsiveness of government; provide for consistency in decisions and actions between various departments and agencies; and to improve citizen awareness and participation.

The following recommendations are contained within this element:

1. Emphasizing coordination in the implementation of the Comprehensive Plan through the following:

    - Development of shared recreational facility agreements between Charlotte County, the City of Punta Gorda and the School Board of Charlotte County.
    - Establishment or expansion of agreements with independent districts for common issues of interest.

- Establishment and strengthening of mutual agreements with adjoining jurisdictions for assessment of land use proposals having inter-jurisdictional impacts, such as issues pertaining to rezoning, drainage, roads, and recreation.
- Coordination with private utility providers within the County.
- Coordination of activities with the Southwest Florida Water Management District (SWFWMD) and the South Florida Water Management District (SFWMD).

2. Coordination of Level of Service (LOS) standards with local, State, and Federal entities (e.g., Water Management District, Florida Department of Transportation). For example, there is local and regional planning council review in the Development of Regional Impact (DRI) process. Roadway funding from developers may be allocated between communities impacted by particular developments. More arrangements of this kind would be beneficial.

3. Coordination with adjacent local governments to ensure that impacts of development are addressed through the following:

   - Reciprocal communication with adjacent local governments regarding proposed amendments to the Comprehensive Plan, including the Future Land Use Map and the Zoning Atlas when the proposal is located within one-half mile of the jurisdictional boundary.
   - Consideration of the existing comprehensive plans of affected local governments during inter-jurisdictional review of development proposals and amendments.

Utilization of Southwest Florida Regional Planning Council's (SWFRPC) intergovernmental coordination process to determine whether development proposals would have significant impacts on Charlotte County and other local governments' resources and to develop remedies to mitigate the impacts.

RELATIONSHIP TO 2050 PLAN

The ICE necessarily relates to every other element of the Comprehensive Plan. There are two potential reasons for this being the case: (1) the substance of other elements has the potential to at least indirectly affect the resources of localities other than the unit of government responsible for that resource; and (2) the facility or resource is directly of concern to agencies at more than just the local level.

Examples of the first category of intergovernmental issues are: roads crossing governmental boundaries (Transportation element), rivers and estuaries that are downstream from sources either in, or flowing through, other counties or municipalities (Natural Resources element and Coastal Planning element).

Examples of the second category of intergovernmental issues are water management district control of usage of water resources for potable water to supply local land uses (Infrastructure element), Department of Environmental Protection (DEP) funding, regulation of beach re-nourishment, and land acquisition projects (Recreation and Open Space element, Natural Resources element, and Coastal Planning element). Coordination on land use planning is also required with the Charlotte County School District (Public School Facilities element).

LEGISLATION

Chapter 163, Florida Statutes contains the State's Local Government Comprehensive Plan and Land Development Regulation Act. The Act provides Charlotte County with the authority to plan for future development and growth and to adopt and amend a comprehensive plan. 163.3177(h) describes the ICE of the local comprehensive plan.

Chapter 9J-5 of the Florida Administrative Codes provides the standards and criteria for local government comprehensive plans. As noted in Part I of this element, Chapter 9J-5.015 of the Code requires that the ICE must provide for coordination with *"plans of school boards and other units of local government providing services but not having regulatory authority over the use of the land,"* provided such plans exist; may contain a voluntary dispute resolution process for settlement of intergovernmental disputes; and must describe joint processes for collaborative planning and decision making on a number of issues. Furthermore, the Code requires that, within one year of adoption of the ICE, each County, the district school board, and any unit of local government service providers in that County, establish by interlocal or other formal agreement, the joint processes described above.

There are many policies throughout the State Comprehensive Plan, Ch. 187, Florida Statutes, that impact on intergovernmental coordination, including land use, public facilities, transportation, government efficiency, and plan implementation. This element is designed to be compatible and support these policies.

INVENTORY AND ANALYSIS

This element provides an inventory and analysis of the linkages between various levels and sections of government. It also discusses intergovernmental coordination mechanisms and needs in reference to major planning bodies and activities, as well as in reference to each of the elements in the comprehensive plan.

There is a large volume of interlocal agreements, grant agreements, mutual aid agreements, maintenance agreements, etc., that Charlotte County has with other local governments and various governmental agencies. There are also a great number of agreements with private parties, development agreements, and contracts for construction and services. Agreements also exist with State and Federal agencies for such things as road maintenance, aid to libraries, dredging, and various services to the elderly. In 2004, Charlotte County completed an Interlocal Service Delivery Agreement Report (ISDAR) that summarizes the community's interlocal agreements. The ISDAR documents the cooperation and coordination that the County continues to undertake.

The interface points of intergovernmental coordination are important. Formal coordination mechanisms continue to exist through the water management districts established pursuant to Ch. 373 Florida Statutes, and related boards as well as the SWFRPC. In 1992, the Charlotte County-Punta Gorda Metropolitan Planning Organization (MPO) was formed for transportation planning. City and County public works staff meet together to coordinate on roads, water, and sewer. The County also coordinates with City and School District staff regarding school facility planning and school concurrency issues in accordance with the Updated Interlocal Agreement for Coordinated Planning and School Concurrency. To advance coordination of transportation plans between Charlotte and Sarasota Counties, in 2003, the MPO signed an interlocal agreement with the Sarasota-Manatee MPO in accordance with Section 339.175 Florida Statutes. Formalized coordination continues with State and Federal agencies through planning, permitting, and review processes. However, an informal working relationship between officials and staff in different jurisdictions and agencies continues to drive coordination.

Charlotte County's policy is to withhold approval of development proposals until the applicant has received all other required permits from the appropriate agencies. This practice benefits the County and other agencies by reducing redundancy, and prevents inter-agency conflict over a given project. Charlotte County also provides copies of its proposed Future Land Use Map amendments and rezoning petitions to the SWFRPC, the City of Punta Gorda, the City of North Port, DEP, Lee, Sarasota, and DeSoto counties, SFWMD, SWFWMD, the Florida Division of Historical Resources, and the Florida Fish and Wildlife Commission (FWC). Charlotte County takes the agencies' comments seriously and addresses their concerns through its review and approval processes. Likewise, Charlotte County receives, reviews, and, where necessary, provides comments on proposed land use changes, pending legislation, and other similar materials from these agencies as appropriate.

RESOURCES SIGNIFICANTLY IMPACTED BY OTHER JURISDICTIONS

Local resources identified by Charlotte County that are subject to impact and require intergovernmental coordination are: the roads classified on the traffic circulation map; the landfill, hurricane evacuation routes and shelters, parks and recreational facilities; potable water and sanitary sewer facilities impacted by inter-jurisdictional service agreements; public schools where attendance zones cross jurisdictional boundaries; Charlotte County government offices and facilities located south of Charlotte Harbor, existing and future land uses (including consideration of density, intensity, and compatibility) within one-half mile of jurisdictional boundaries; Charlotte Harbor; the Shell and Prairie Creek area; and drainage basins crossing jurisdictional boundaries.

SWFRPC

The SWFRPC, which is referred to in several different contexts in this element, is a regional planning agency established pursuant to Ch. 186, Florida Statues. Because SWFRPC is the major existing regional intergovernmental coordination agency it is of great utility in the comprehensive planning process. Charlotte County enjoys an excellent working relationship with them.

The SWFRPC is composed of representatives of Charlotte, Collier, Glades, Hendry, Lee, and Sarasota Counties, and various municipalities within those counties, including Punta Gorda. Supporting Policy and Analysis Map (SPAM) Series Map #94 shows the member counties of the SWFRPC. The SWFRPC has a full-time professional planning staff, and is responsible for the Strategic Regional Policy Plan (SRPP), which contains the following mechanisms for intergovernmental coordination involving local governments: regional clearinghouse review for State and Federal environmental agencies, the local planner's technical advisory committee, mediation of planning conflicts between local governments, and other specialized processes. The SWFRPC has near equal representation between large and small counties, which makes it a useful agency for mediating disagreements with large neighbors. They also conduct special studies and provide an outstanding library that is frequently used by local government planners throughout the region.

Both the City of Punta Gorda and the County are members of the council, and elected officials from both local governments participate actively on the SWFRPC board. Also, planning staff from both local governments participate actively in the SWFRPC-Technical Advisory Committee (TAC), and work with council staff in various planning and permitting processes.

SWFRPC is a review agency for all amendments to comprehensive plans. Under the formal review process, SWFRPC reviews local plan amendments for consistency with the SRPP and forwards its comments to the Department of Community Affairs (DCA). Findings of inconsistency with the SRPP may initiate administrative proceedings against a local government that can keep those plan amendments from taking effect. As such, Charlotte County considers the SRPP to ensure consistency with the spirit of its goals.

SWFRPC also reviews the County Evaluation and Appraisal Report (EAR). The SWFRPC plays a significant role in the intergovernmental coordination process through implementation of a formal dispute resolution process. Chapter 186.509, F.S. mandates the following:

> "*Dispute resolution process.--Each regional planning council shall establish by rule a dispute resolution process to reconcile differences on planning and growth*

management issues between local governments, regional agencies, and private interests. The dispute resolution process shall, within a reasonable set of timeframes, provide for: voluntary meetings among the disputing parties; if those meetings fail to resolve the dispute, initiation of voluntary mediation or a similar process; if that process fails, initiation of arbitration or administrative or judicial action, where appropriate. The council shall not utilize the dispute resolution process to address disputes involving environmental permits or other regulatory matters unless requested to do so by the parties. The resolution of any issue through the dispute resolution process shall not alter any person's right to a judicial determination of any issue if that person is entitled to such a determination under statutory or common law."

GENERAL INTER-COUNTY COORDINATION

Charlotte County shares borders with four counties, as well as touching two additional counties at section corners. SPAM Series Map #94 shows the arrangement of Charlotte County amidst these other counties, as well as the local jurisdictions that impact the County.

There are a few formal agreements with Lee County, Sarasota County and the City of North Port. An agreement with Lee County allows residents of the Lee County portion of Boca Grande to use Charlotte County's franchise to collect their garbage and also use Charlotte County's landfill for disposal. There is an agreement with Sarasota County's Solid Waste Department permitting residents in the south portion of Sarasota County to dispose of household waste on a limited basis at West Charlotte Mini-Transfer & Recycling. Charlotte County and Sarasota County are also parties to the interlocal agreement that established the Peace River/Manasota Regional Water Supply Authority (RWSA). An agreement exists with North Port for maintenance and traffic enforcement of Hillsborough and Chancellor Boulevards. There are also mutual aid agreements between Charlotte County Fire/EMS and the North Port Fire District.

Individual agreements also exist with other area counties. DeSoto County and Charlotte County have agreements for mutual aid. DeSoto County is a party to the Peace River agreement. Glades County is a party to the multi-County agreement with SWFRPC. Agreements with Hendry County are limited to the multi-County agreements on mutual aid and SWFRPC creation.

SWFRPC serves as a coordination forum among four of Charlotte County's surrounding counties. However, it does not have any coordinating functions with DeSoto County with which Charlotte County shares a lengthy border and the Peace River. Coordination between Charlotte County, the surrounding counties, and the SWFRPC has been fairly good, though informal, and it is certainly necessary to the comprehensive planning process.

Despite the limited number of agreements between Charlotte County and the adjoining counties, as further highlighted in this section, each are represented on various joint authorities, boards, and commissions that serve southwest Florida. This interaction aids with cooperation and the development of compatible goals by the Counties.

INTRA-COUNTY COUNTY COORDINATION

The Charlotte County Board of County Commissioners (BCC) holds an annual joint workshop with the School Board of Charlotte County and the City of Punta Gorda, quarterly meetings with the City and the Charlotte County Development Authority, as well as meetings with other agencies as needed. The BCC will continue to use agreements in support of coordination and cooperation.

Charlotte County and the City of Punta Gorda have various agreements addressing potable water and sewer service, mutual aid, the landfill, and the Shell Creek-Prairie Creek water supply area for Punta Gorda.

There are informal communication efforts between the staffs of Charlotte County and Punta Gorda. When a planning or zoning initiative is proposed that is located in proximity of the Charlotte County-Punta Gorda boundary, the staff of that jurisdiction contacts the other staff and solicits input. The County and City should jointly establish a formal process whereby the respective Growth Management Departments notify each other of plan amendments, actions affecting the municipal boundary, specified zoning, subdivision, and site plan reviews, and then provide the neighboring jurisdiction an opportunity to comment on the given item. All of this could be better addressed through the creation of a joint planning area.

The agreements between Charlotte County and local agencies are mostly with the School Board and the various fire control districts. Direct relationships between local governments and other entities, through contracts and agreements, have continued to expand in recent years. A substantial number of agreements were generated with the various utilities in the County and the Municipal Services Benefit Units (MSBU) or the Municipal Services Taxing Units (MSTU) formed to pay for improvements. Agreements with Punta Gorda continue for recycling, education, the justice center, fire academy training, traffic light maintenance, and formation of the MPO.

The Charlotte County Development Authority is a five-member elected body that is not responsible to the BCC, and has some jurisdiction over facilities such as the Charlotte County Airport. The Development Authority is represented on the MPO Technical Advisory Committee, supporting intergovernmental coordination. The coordination relationship between the Development Authority and the BCC are helpful in carrying out the comprehensive planning process.

THE COMPREHENSIVE PLAN

DCA is the State Land Planning Agency designated by the legislature, and as such, directs the formulation and implementation of all County comprehensive plans. The coordination relationship between DCA and counties is governed by Chapter 163, Florida Statutes. DCA's administrative responsibility is to ensure consistency of proposed plans and plan amendments with the law. It coordinates review of plans and plan amendments with other agencies; receives petitions from affected parties objecting to a plan or plan amendment; and works to resolve disputes in most cases before they are taken to an administrative hearing.

Future Land Use

The way in which land is used can have profound impacts on nearby jurisdictions, making it necessary to communicate with the other jurisdictions regarding future land use. Below is a discussion of some of the coordination efforts as they pertain to land use. However, as land use is such a wide topic that touches all of the other elements, further analysis is included in the respective element analyses.

County staff present and discuss development proposals such as rezonings, plan amendments, and DRIs to the BCC. When there are issues of significance, the appropriate staff is requested to gather information, perform analysis, and present information.

Transportation

Intergovernmental coordination of transportation-related elements of the Comprehensive Plan is organized through the MPO. The MPO provides a forum for transportation planning services, coordinates intergovernmental needs and goals, and facilitates public involvement. The MPO Board consists of elected officials from Charlotte County and the City of Punta Gorda along with an Airport Authority Commissioner. The Florida Department of Transportation (FDOT) Secretary, District One, has a non-elected official on the Board. The MPO Board's policies are implemented by its staff.

Federal funds for transportation improvements available through the Safe Accountable Flexible Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU) provides the MPO with regional planning influence. The Federal funds include the responsibility for cooperation and coordination among its members by requiring that the MPO adopt a Long Range Transportation Plan (LRTP). The regional plan must accomplish the objectives of the planning process to improve mobility, foster economic growth and development, minimize fuel consumption, and minimize air pollution. SAFETEA-LU allows the MPO some discretion in determining how the objectives are achieved and requires that it consider a range of options to achieve the objectives of the planning process. The LRTP is based on community priorities, Federal and State regulations, the Florida Transportation Plan, system plans (e.g, the Transit Development Plan and bicycle/pedestrian plans), area plans, and local comprehensive transportation and land use elements. The MPO uses the LRTP to develop MPO Transportation Improvement Program priorities, area plans, and other transportation plans.

State transportation dollars also fund significant portions of area transportation improvements. FDOT has a primary role in the planning and implementation of the transportation components of the comprehensive plan and, less directly, in the Future Land Use element since it must reflect an adequate ability to move people and goods. Significant changes in the relationship between local governments and FDOT resulted from the formation of the MPO, and the transportation funding process required by SAFETEA-LU. FDOT is represented on the MPO board as well as on the staff level Technical Advisory Committee. The utility of this relationship to the comprehensive planning process is great and its quality has been improved throughout the MPO structure and process.

In 2003, the MPO signed an interlocal agreement with the Sarasota-Manatee MPO. The agreement, formulated in accordance with Section 339.175 Florida Statutes, supports coordination of policies through development of a joint regional LRTP and joint regional project priorities. The agreement advances coordination of transportation plans between Charlotte and Sarasota Counties.

Natural Resources and Coastal Planning

The Natural Resources and Coastal Planning elements provide the foundation for the County's involvement in the permitting programs administered by a variety of regional, State, and Federal agencies. The County has standing as an affected party, and may provide comments to the various agencies including SWFWMD, SFWMD, DEP, the Florida Fish and Wildlife Conservation Commission (FFWCC), and the U.S. Army Corps of Engineers (USACoE), as provided through these agencies' specific permitting programs. While the Natural Resources and Coastal Planning elements acknowledge the lead authority of these and other agencies in the enforcement of their regulatory and permitting mandates, the County makes available local information and knowledge of which the lead agency may not be aware. This not only allows a more thorough review of permit applications, it also ensures that local issues are addressed to the greatest extent allowed through the specific permitting process.

The County's role of providing comments during permit review windows is often reciprocated by these agencies. For example, DCA routes plan amendments to DEP in order to receive that agency's comments regarding environmental impacts that may result from a proposed change in land use. Similarly, FFWCC participates in the DRI review process and provides written comments and recommendations to the County and SWFRPC.

The USACoE has jurisdictional responsibility over the navigable waters of the United States and over wetlands. Clearing and filling activities in wetlands require permits from them. Also, dredging, filling, and construction activities in Charlotte Harbor all require permits from USACoE. Area wide drainage improvements contemplated in the Drainage Section of the Infrastructure element should be planned in consultation with the USACoE because of the potential impact on wetlands. Coordination is generally at the development plan review stage and is useful in carrying out the Comprehensive Plan policies.

Charlotte Harbor is one of the most important natural resources of Charlotte County. In 1995, the Harbor was selected for inclusion in the National Estuary Program (NEP) administered by the Environmental Protection Agency (EPA). The Charlotte Harbor National Estuary Program (CHNEP) is locally administered by the SWFRPC with technical assistance from the Mote Marine Laboratory in Sarasota. In 2000, a Comprehensive Conservation and Management Plan was completed for Charlotte Harbor. The management plan has goals, quantifiable objectives, and priority actions. The priority actions are the specific strategies for achieving the goals and quantifiable objectives for the three priority problems: hydrologic alterations, water quality degradation, and fish and wildlife habitat loss. BCC endorsed the Comprehensive Conservation and Management Plan by being a signatory. BCC is also represented on the Policy Committee that establishes general policy for CHNEP and has ultimate authority in program administration. The management plan supports coordination between the many agencies. The Comprehensive Conservation and Management Plan was updated in 2008.

Charlotte Harbor can be potentially impacted by upstream development. The Peace River is the major tributary and is subject to impacts from mining and agriculture upstream in DeSoto County and Hardee County. The Peace River Basin Board and the Peace River/Manasota Regional Water Supply Authority are regional forums for coordination. The Peace River is a principal intergovernmental concern with jurisdictions outside Charlotte County. Existing forums established through the water management district may be adequate for discussion of broader policy issues but this element needs to include policies, agreed upon through "cross acceptance," for review of upstream development proposals and mitigation of impacts.

The Peace River Basin Board is a basin board within SWFWMD that covers parts of Polk, Hardee, DeSoto, Highlands, and Charlotte Counties. The Peace River Basin Board has taxing authority for funding projects through ad valorem taxes. Its board is appointed by the Governor. The projects of the Basin Board are largely driven by local government requests. Charlotte County could benefit from Basin Board funding for which it is eligible.

The Peace River/Manasota Regional Water Supply Authority is composed of elected officials from Manatee, Sarasota, Charlotte, and DeSoto Counties. There are three such authorities within SWFWMD boundaries. The Authority is a water supplier as a result of the acquisition of the General Development Utilities Plant on the Peace River, and also reviews utilization of water resources.

SWFWMD is the governing board for the Peace River Basin Board. SWFWMD is the permitting agency that approves water withdrawals for consumptive use, and approves stormwater management plans for development. While the basin boards manage individual projects within their jurisdictions, SWFWMD manages larger regional projects with which local projects must be coordinated.

SFWMD serves the same purpose as SWFWMD. The City of Punta Gorda is within SWFWMD but a portion of South Charlotte County lies within the SFWMD boundary. The Telegraph Swamp area south of the Babcock-Webb Wildlife Management Area drains southward to Lee County and is in SFWMD's jurisdiction.

SWFWMD and SFWMD complete District Water Management Plans consistent with the requirements of Section 373.036, Florida Statutes and Section 62-40.520, Florida Administrative Code. District Water Management Plans provide comprehensive long-range guidance for the actions of the two water management districts in implementing their responsibilities under State and Federal laws. To facilitate comparison and coordination of the plans of the water management districts, the District Water Management Plans are organized to reflect the four areas of responsibility of the water management districts: water supply, flood protection and floodplain management, water quality and natural systems. This common format is also used for the District Water Management Plan annual reports to help track the progress each district has made in implementing its district water management plans. To further assist with coordinating the policies between SWFWMD and SFWMD, especially for jurisdictions like Charlotte County that must develop coherent water policies that conform to the rules of both water management districts. The County reviews and comments on both District Water Management Plans. Also, SWFWMD and SFWMD executives meet and representatives of both sit as ex-officio members on the SWFRPC, which encourages formulation of a joint policy on Charlotte County.

The Myakka River Management Coordinating Council oversees the Myakka River Wild and Scenic River Plan. The segment of the Myakka that lies within Sarasota County was designated by the Florida Legislature under the Federal Wild and Scenic Rivers Act. The Wild and Scenic River Plan controls development and other activities on the river along a 200 foot corridor extending along either side of the river. Charlotte County is represented on the Council, which meets three times a years to discuss issues of concern. Charlotte County developments near the protected corridor are matters appropriate for intergovernmental coordination. This coordination relationship is useful in protecting a regionally significant resource and the quality of the relationship is good in terms of communication.

Regarding Charlotte Harbor, Charlotte County and Punta Gorda have a relationship with the United States Coast Guard. The agency provides important educational, law enforcement, and emergency resource functions. A Regional Harbor Board promotes a non-regulatory, educational approach to boating practices within Charlotte, Collier, Manatee, Sarasota, and Lee Counties by adopting common guidelines. The Board was formed in July of 1995 by a memorandum of agreement between DEP, the Florida Sea Grant College Program, WCIND, SWFRPC, and the Boater's Action and Information League (BAIL).

The Marine Advisory Committee is an advisory committee formed by BCC. It includes members from marine-oriented organizations throughout the County and four members-at-large. This body provides input on recreational, coastal management and conservation issues. Because of the mutual interest of the City and the County in Charlotte Harbor, the activities of this committee do provide some coordination benefit. The Committee advises the County on the expenditure of Boating Improvement Program funds and WCIND funds.

WCIND has representation from Charlotte County. Coordination with WCIND supports the comprehensive planning process by funding dredging and navigational improvement projects. The Environmental Lands Management Study III (ELMS III) law requires indemnification of dredge spoil disposal sites to be coordinated with WCIND and located on the Future Land Use Map if appropriate. Coordination with WCIND is useful to the comprehensive planning process.

FFWCC’s relationship centers on aspects of habitat and preservation. Coordination with the agency has resulted in acquisition of lands in the Charlotte Flatwoods through the Preservation 2000 and Florida Forever programs. The relationship has utility for the comprehensive planning process and the quality of the relationship is good.

The United States Fish and Wildlife Service (FWS) has responsibility for the Endangered Species Act, which plays a part in conservation policies of the Comprehensive Plan. The primary coordination relationship is in the review of individual development proposals. The coordination takes place through FFWCC.

In terms of soils and agriculture, there are several relationships. The Soil and Water Conservation District (SWCD) is an elected body that works closely with the Federal Natural Resources Conservation Service (NRCS). Assistance with soil analysis, water conservation, and agricultural site planning (crop selection and location, drainage, farm pond excavation) is available to Charlotte County through NRCS’s office in Fort Myers. The County has an agreement with SWCD to help improve the environment and safeguard natural resources by assisting with the inventory of soil, water and plant resources, helping with land use planning for the future, providing soil maps and interpretations, and by providing other technical assistance. The County cooperates with SWCD in such things as the development and implementation of land and water use programs using resources, data, and technical information provided by SWCD, counsel with SWCD concerning present and future plans for development, and considers and comments on SWCD’s long range plan and projects for watershed protection as they apply to the County’s plans and activities. This coordination relationship works well and it is useful in carrying out the comprehensive planning process insofar as it helps to sustain the viability of local agriculture.

The Florida Department of Agriculture’s main connection with the local comprehensive plan is through the Future Land Use element. Cattle, citrus groves, and other crops are important in Charlotte County. These activities require substantial land and water resources and they contribute to seasonal demands for housing and services. An interest of the agency is land planning policies that sustain valuable agricultural production areas in Charlotte County. Coordination should be achieved in concert with other agricultural and soil conservation agencies. An appropriate forum is the County's Agriculture and Natural Resources Advisory Committee

(ANRAC). Though coordination with the agency is limited, the potential utility and quality of the relationship are good.

The intergovernmental relationship with the United States Department of Agriculture (USDA) is primarily through the Soil Conservation Service, which is discussed above in the context of the SWCD. An indirect link with the USDA through the Cooperative Extension Service could be helpful in formulating and implementing landscaping programs and regulations.

Infrastructure

Coordination in public facilities has occurred as a matter of necessity. The Peace River agreement is an example of coordination between adjacent counties. Charlotte County has been regulating stormwater for years, and has been assuming a greater role in stormwater management as it has developed. Charlotte County reviews subdivision plats and development proposals to ensure that development is approved and constructed in accordance with the standards established by the Comprehensive Plan. The County's review also considers the standards of both Water Management Districts ensuring coordination with their District Water Management Plans. Coordination between City and County public works staff, the respective advisory boards, and the governing bodies on stormwater management increased due to implementation of the federally mandated National Pollutant Discharge Elimination System (NPDES) Act. An annual report is submitted to DEP documenting that the County is meeting the permit requirements of the NPDES Act. Solid waste issues are coordinated between the City and the County. Charlotte County and the City of Punta Gorda have an interlocal agreement to promote public awareness, support, and cooperation in solid waste management and recycling programs for the protection of the County's natural environment.

The EPA is responsible for implementing Federal environmental legislation (e.g. the Clean Water Act) that prescribes quality standards for potable water and sanitary sewer operations, as well as stormwater quality. Permitting and monitoring processes provide the opportunity for coordination on a regular basis. The EPA's enforcement of its regulations can potentially be very expensive to local governments. Coordination with EPA is useful to the comprehensive planning process and the quality of the relationship as a means of communication is adequate.

The SWCD addresses issues associated with the Infrastructure element. Charlotte County's unincorporated areas continue to be served by various private water and sewer utilities. Charlotte County owns and operates Charlotte County Utilities (CCU). In recent years, CCU has purchased a number of the private utilities, notably in the West County area. For purposes of this element, it should be noted that these utility relationships are not by and large intergovernmental relationships, except for the relationship between Charlotte County and Punta Gorda Utilities and the Englewood Water District. CCU and Punta Gorda Utilities are negotiating an interlocal agreement allowing the opportunity for the County to purchase water from Punta Gorda or for the County to sell water to the City at some future date, or for either to help each other during an emergency. Respective utilities staff and elected officials are holding joint meetings in an effort to arrive at an agreement. Another agreement is being negotiated among Charlotte County, Punta Gorda, and the RWSA to allow an interconnection with the City. The RWSA must get BCC's approval prior to running the line through Charlotte County.

CCU has an agreement with City of North Port to allow water interconnects. The agreement also provides for interconnects that allow either entity to provide water to the other in case of emergency such as drought or a hurricane.

The Englewood Water District is a governmental entity providing services but does not have regulatory authority over the use of the land. The water district's service plans must comply with the Future Land Use element, the accompanying Future Land Use Map, as well as the Urban Service Area. The Englewood Water District and the County must coordinate future activities to ensure that they complement the County's growth management efforts. CCU has an interlocal agreement with Englewood Water District for sanitary sewer service. Under the agreement, Englewood accepts and treats excess flows of up to 0.4 mgd from CCU's Rotonda service area.

The Public Works and Engineering Departments of the City and County work together to resolve road maintenance difficulties along the shared border. The County has agreements with Punta Gorda to maintain traffic signals and to provide street striping services on request. In the past, the County and the City have developed agreements to complete road and drainage improvements along roads that straddle the border. The relationship between the respective staffs needs improvement regarding right-of-way annexation issues. SPAM Series Map #95 shows the anticipated annexation plan of the City.

Environmental Health is a large State agency that is focused mainly on human services. However, septic system permitting is also an important responsibility. Environmental Health is providing technical assistance that will assist the County with a septic system management program. As the County develops and implements this program, coordination with Environmental Health will be a major component for success. The quality of the existing relationship is good.

The coordination that exists with Florida Power & Light (FPL) for land use and traffic circulation is informal. The same applies to telecommunication service providers. Coordination is generally at a development review level to avoid conflicts with utility easements and infrastructure.

Recreation and Open Space

Charlotte County's Comprehensive Plan has a Recreation and Open Space element that establishes LOS standards for recreational facilities. The County and the City coordinate with DEP in the acquisition of property for preservation. Additional public access to barrier island beaches is an issue that requires continued cooperation with State agencies.

The Charlotte County Historical Advisory Committee is a nine member body that is appointed by the Board of County Commissioners. It provides input on the management of the County's historic resources.

The Charlotte Harbor Environmental Center (CHEC), active with the County's archaeological heritage, provides coordination between various levels of government. CHEC is a not-for-profit organization composed of four corporate members: Charlotte County, the City of Punta Gorda, the Charlotte County School Board, and the Peace River Audubon Society. Each member supports CHEC through policy directives, financial assistance and donations of in-kind services.

In order that continuity of historic preservation efforts be maintained across jurisdictional boundaries, it is necessary to communicate and coordinate preservation efforts that affect these areas. In areas immediately outside Punta Gorda, it is necessary to coordinate efforts to maintain the atmosphere that the City has created within its limits.

Limited intergovernmental coordination with the Department of State occurs through the Division of Historical Resources. Since historic resources are fairly limited, the scope of this coordination relationship is also limited. The quality of the relationship is good.

SAFETEA-LU calls for coordination between the US Department of Transportation, FDOT, the MPO, and the Department of State's Division of Historical Resources when a transportation project has impact on a historical site or project. All of the above agencies work together to ensure that historic resources are preserved.

The United States Department of the Interior has an indirect intergovernmental relationship with local governments through which it coordinates enforcement of the Historic Preservation Act through State's Division of Historical Resources. The agency is responsible for the National Register of Historic Places. Charlotte County faces the task of identifying and managing scattered historic and archaeological resources. However, the coordination relationship between the agency and the County government is limited since so much of the building stock is less than fifty years old.

<u>Cultural Facilities and Services</u> - The main coordinating cultural body in the County is the Charlotte County Arts and Humanities Council, which is partially funded by the County. It promotes more than sixty associated organizations, and sometimes funnels government grant money to arts organizations. The department responsible for parks and recreation assists in coordinating and facilitating cultural resource activities throughout Charlotte County.

The Division of Cultural Affairs within the Department of State provides grant programs, guidance, and assistance to the Arts and Humanities Council regarding cultural facilities and services. The relationship among all of the arts agencies is good.

Housing

Charlotte County's non-profit housing development corporation is the Housing Corporation of Charlotte County, Inc. The Corporation contracts with Charlotte County to administer the City's and County's State Housing Initiatives Partnership Program (SHIP). The executive director of the Housing Corporation works with Charlotte County's Affordable Housing Advisory Committee (AHAC), an appointed body, to identify needs and solutions to County housing problems. The AHAC also works closely with local non-profit housing organizations to identify possible projects. Additionally, the City of Punta Gorda is a Community Development Block Grant (CDBG) entitlement community. CDBG funds may be used in support of affordable housing projects.

The Florida Housing Finance Corporation (FHFC), which deals with affordable housing projects, has an intergovernmental coordination relationship with the City and the County through SHIP. In addition to providing funding for housing, the SHIP program requires a plan to address affordable housing needs. The SHIP plan must be coordinated with the Comprehensive Plan's Housing element. The relationship has utility in planning and implementation for housing needs.

Charlotte County's AHAC provides advice to BCC regarding affordable housing matters, including SHIP funding. AHAC offers a forum for local agencies and housing service providers that facilitates coordination on SHIP and CDBG planning processes. Charlotte County does not have a public housing authority but the Charlotte County Housing Finance Authority issues bonds for affordable housing projects. The Punta Gorda Housing Authority (PGHA) manages a Section 8 Voucher program serving Punta Gorda and Charlotte County. PGHA is working on redevelopment of public housing units in the City that were destroyed by Hurricane Charley. Coordination with the FHFC concerning SHIP and the United States Department of Housing and Urban Development (HUD) for CDBG (City only) is facilitated through the planning processes for these programs. Coordination through Charlotte County's Housing Finance Authority and AHAC is good in terms of its utility and quality, but the intergovernmental aspect of this coordination is really between City and County staff and between local governments and FHFC and HUD.

One area of a potentially enhanced relationship with the State Department of Health and Rehabilitative Services (HRS) is in the Housing element. The County could potentially have a stronger relationship with HRS with respect to housing, as there could be more coordination regarding housing and services for special needs populations, low income persons, the elderly, and the homeless.

HUD has an intergovernmental coordination relationship with the City of Punta Gorda through the CDBG program. HUD relationships also exist with the PGHA for public housing and the Section 8 Voucher Program. These coordination relationships have utility in carrying out affordable housing objectives and the relationships generally work well in terms of communication.

Capital Improvements

Capital improvements utilizing local, State or Federal funding requires coordination through a financially feasible capital improvement plan. There are many reasons that this coordination is necessary: some capital facilities serve multiple jurisdictions, their construction impacts may cross jurisdictional boundaries, efficiencies might be gained through shared facilities, and various permitting agencies may be involved. Local governments and other agencies have to address impacts and mitigation across jurisdictional boundaries.

There are no permanent bodies in existence whose sole purpose is to coordinate intergovernmental relations in regard to capital improvements. When a capital project is proposed, the affected parties coordinate among themselves. For every capital improvement, all relevant bodies work together, and the local government looks for possible efficiencies through shared facilities and services.

Public Schools

Coordination between Charlotte County and the School Board on school siting is very important. In May 2003, the Charlotte County Board of Commissioners, the City of Punta Gorda, and the Charlotte County School Board adopted an Interlocal Agreement for School Facility Planning in agreement with Section 163.3177(6)(h)1 and 2, Florida Statutes. The Agreement provides a formal process for maintaining the coordination among all parties regarding comprehensive land use and school facilities planning issues. In 2008, this Interlocal Agreement was updated to reflect changes in growth management legislation, including provisions for school concurrency. It is now called, the Updated Interlocal Agreement for Coordinated Planning and School Concurrency. Minor revisions were made to it in May of 2009 and again in May 2010.

In support of the agreement, BCC conducts an annual meeting with the Punta Gorda City Council and the School Board to facilitate communication and encourage coordination. At the meeting, issues such as changes in land use, school siting, and population changes are discussed in hopes of establishing more meaningful cooperation regarding the range of issues related to school siting. In addition to the issues identified above, the Staff Working Group, which is made up of County, City, and School District staff, also meets regularly to discuss traffic implications, utility provision, impacts of development (school concurrency) and LOS for schools. These are all issues that require coordination between the County, the City, and the School Board on a regular basis. As required by the interlocal agreement, the School Board has appointed a non-voting representative on the Planning and Zoning Board to review staff reports dealing with residential projects that might impact school capacity.

In terms of public school facilities, the School Board has a joint use agreement with the department responsible for parks and recreation. The County has a facility development and use agreement with the School Board. The School Board also coordinates with the County's Emergency Management Office concerning the use of schools for hurricane shelters.

In 2005, the Florida Legislature added public schools as a mandatory concurrency item similar to other facets of public infrastructure. To satisfy these requirements, a new Public School Facilities element (PSFE) was added to the Comprehensive Plan. It was adopted by the Board of County Commissioners in September of 2008. School concurrency was implemented in Charlotte County in March of 2009.

COORDINATION OF COUNTY FACILITIES

Fire and Emergency Medical Services (EMS)

There are numerous interlocal agreements regarding fire and emergency medical services. The Englewood Area Fire District, the City of Punta Gorda Fire Department, and the North Port Fire District Authorities share automatic mutual aid with the Charlotte County Fire/EMS Department. If one fire department needs help dealing with an emergency, the neighboring fire departments assist. The Englewood Fire Control Department will go one mile into Charlotte County to aid in dealing with an emergency. North Port will respond to calls in the northern half of Charlotte County, and the Charlotte County Fire/EMS responds within the eastern portion of the City of North Port. There are also agreements with Sarasota County, the Bayshore Fire and Protection District, the Boca Grande Volunteer Fire Department, and the Cities of Cape Coral and North Fort Myers Fire Departments. The Bayshore interlocal agreement stipulates that Charlotte County Fire/EMS pays for three fire fighters and a portion of the administration costs, and supplies the facilities and equipment for Station 9 in Punta Gorda. The Bayshore Fire Department supplies the rest of the fire fighting personnel, and assumes responsibility for fire protection in the southeastern section of the County. The Punta Gorda agreement is one of mutual aid; each fire department will automatically go one mile within the jurisdiction of the other department. Charlotte County Fire/EMS has also agreed to respond to calls for help from the Boca Grande Volunteer Fire Department. These mutual aid agreements all function well in practice. Charlotte County Fire/EMS is also covered under the State-wide mutual aid plan.

Hurricane Shelters

Hurricane evacuation and shelter efforts are coordinated by the County Emergency Management Office, the Red Cross, the State Emergency Operations Center in Tallahassee, and all other Florida counties. The decision to open shelters is done together with the County and the School Board. Under Chapter 252, Florida Statutes, all suitable school facilities must be made available to the Emergency Operations Center; this includes schools, buses and cafeterias. The Charlotte County Emergency Management Office has direct communication with the local Red Cross headquarters at all times. In the event of activation of the County Emergency Operations Center, the Red Cross would send a liaison to help with the coordination of registration at the shelters. Charlotte County and Punta Gorda are parties to a State-wide mutual aid agreement. The County Emergency Management Office is in constant communication with the DCA Division of Emergency Management, and the County has the capability to link via satellite with any other County. All of these agreements and coordination efforts are vitally important to the safety of people in Charlotte County. Further coordination to try to establish hurricane shelters outside of the Category 3 Hurricane Vulnerability Zone is necessary to ensure that safety. The County could also pursue agreements with public and private agencies that own land in such places to cooperatively develop evacuation shelters or to ensure that any development on such properties would include shelter capacity.

Justice Facilities and Services

There is a mutual aid agreement in place ensuring that operational assistance is available from other Sheriff's Offices in the State during times of crisis, catastrophic disasters, civil unrest, or jail escape. In addition, the Charlotte County Sheriff's Office (CCSO) has a cooperative agreement with the Lee County Sheriff's Office to accommodate law enforcement on Gasparilla Island/Boca Grande, which lies within Lee's jurisdiction but is physically accessible through Charlotte County. CCSO also has a working relationship with Lee and other counties that aim to combat auto theft. There is also a working agreement between the Punta Gorda City Police and CCSO to provide concurrent services with the Punta Gorda City Police being the initial primary responder within the city limits. When funding allows, CCSO coordinates with the School Board in having School Resource Officers at several schools and various programs for Charlotte County students. As part of community oriented policing, CCSO coordinates safety efforts with various citizens' groups. The Florida Highway Patrol (FHP) has County-wide jurisdiction to provide law enforcement when called upon. Its main responsibility, however, is handling traffic related problems.

The Florida Department of Law Enforcement (FDLE) maintains officer records, controls officer training curriculum, certification exams, and officer discipline. FDLE regulates CCSO in many ways, and offers funding for various programs.

Health and Social Service Facilities and Services

Given the multiplicity inherent in the nature of social services, coordination is very important. At a minimum, agencies need to be aware of what other agencies are doing and how they do it. This helps to avoid duplication of services and possible conflicts. Charlotte County's social service agencies have strong coordination between them. Sometimes different State agencies have different rules and regulations that do conflict, and the County agencies try to resolve the differences. Prior to the 2004 hurricane season, the County and local community recognized the need and value in working closely together to prioritize needs and coordinate service delivery. Coalition networks including the Emergency Assistance Clearing House (EACH), Our Charlotte Elder Affairs Network (OCEAN), the Charlotte County Collective (C3), the Alliance for a Safe and Drug Free Community, and the Indigent Health Care Advisory Board promote coordination and cooperation among the County's social service providers. After hurricane season 2004, the human services community developed an even stronger desire to work together in the recovery efforts by pooling funding, identifying unmet needs, and coordinating service delivery. An out growth of the recovery efforts is the establishment of the non-profit Inter-Faith, Inter-Agency Network of Charlotte County (IINCC). IINCC assists in the collaboration of human services agencies, available resources, and volunteers.

In July 2005, the County implemented the 2-1-1 telephone line that provides information and referrals on health and human services. The service directs residents to over 400 health and human services agencies and 650 programs. The 2-1-1 telephone call center also serves as an excellent resource for the human services agencies in providing accurate information on available resources, identifying unmet needs, and coordinating the local service delivery system.

Government agencies such as the County Department of Human Services, the Department of Health, the County Public Health Unit, and Charlotte Community Mental Health Services all try to coordinate efforts to avoid duplication of services and in the hope of providing effective health and social services. Overall, these efforts have been successful, and the coordinating relationships are good.

DCA also regulates some of the activities of the County's Department of Human Services, and offers funding for a small amount of their activities.

The Department of Elder Affairs (DEA) provides a large amount of funding for the Department of Social/Senior Services, and provides an advisory and approval function of the various plans that Human Services offers. An advisory, funding and plan approval function also exists with the Charlotte County Council on Aging.

INTERGOVERNMENTAL COORDINATION – GOALS, OBJECTIVES AND POLICIES

PURPOSE

The Intergovernmental Coordination element identifies units of government and other agencies that have, or should have, mechanisms of coordination to implement the elements of the Comprehensive Plan. This element provides a formal set of goals, objectives and policies (GOP), which are adopted to maintain and foster intergovernmental coordination.

All references to any ordinances, statutes or regulations contained herein shall, unless otherwise noted, be deemed to be those in effect as of the date of adoption of this element and thereafter as amended, renumbered or otherwise revised.

GOALS, OBJECTIVES AND POLICIES

ICE GOAL 1: INTERGOVERNMENTAL COORDINATION

Maintain or enhance the level of coordination and cooperation among the various governments, authorities and agencies making decisions affecting natural resources, housing, historic and archaeological resources, public facilities, and public services within and around the County.

ICE Objective 1.1: Implementation Coordination

To coordinate the implementation of this Plan as it relates to the County with the City of Punta Gorda, Charlotte County Public Schools, the Charlotte County-Punta Gorda MPO, and other units of local government, such as independent districts, the comprehensive plans of adjacent municipalities and counties, and privately owned utilities serving Charlotte County.

ICE Policy 1.1.1: Dispute Resolution

The County shall be an active participant in the Southwest Florida Regional Planning Council (SWFRPC) Technical Advisory Committee, and participate in the Regional Dispute Resolution Program should it become appropriate as an institutional mechanism for addressing issues affecting local governments and those having regional significance. This process shall conform to the mandates of Chapter 186.509, Florida Statutes (F.S.).

ICE Policy 1.1.2: Consistency with Other Elements

The County shall adhere to the Updated Interlocal Agreement for Coordinated Planning and School Concurrency in effect with the City of Punta Gorda and the School Board of Charlotte County to, at a minimum:

1. Ensure consistency between school facility construction plans and the planning of related public facilities and infrastructure through the Capital Improvements element and the Future Land Use element;
2. Coordinate local land use plans, school facility capacity, population projections, development trends and locational planning necessary to support the needs of current and future student populations. The County, City and School District staff (Staff Working Group) will meet as needed, but no less than annually, to discuss these issues and formulate recommendations prior to any party making a decision that could impact on the areas of concern of the other parties;
3. Ensure consistency between the Natural Resources element and Coastal Planning element of this plan, particularly the disaster mitigation component, and school location and design. The use of new school facilities as hurricane evacuation shelters shall be pursued in a manner that is consistent with the provisions of the County and regional shelter location and design policies; and
4. Maximize the potential for the collocation and joint uses of public facilities, including the use of public school facilities for recreational, cultural and civic purposes in accordance with the Recreation and Open Space element.

ICE Policy 1.1.3: Coordination with Punta Gorda

The County shall notify the City of Punta Gorda at the time of application for initial staff review of plan amendments, rezonings, subdivisions, site plan approvals , and conditional use permits affecting shared boundaries and shall notify the City of development proposals within the Prairie and Shell Creek Watershed Study Area, as depicted on FLUM Series Map #4: Watershed Overlay District, to provide the City with an opportunity to offer meaningful input. The City of Punta Gorda is requested to reciprocate by extending the same courtesy to the County.

ICE Policy 1.1.4: Mutual Aid Agreements

The County shall maintain, and expand as appropriate, procedures and agreements for coordination with independent districts. These include arrangements such as mutual aid agreements between the Charlotte County Fire/EMS Department, independent fire districts and the Punta Gorda Fire Department. These arrangements shall be expanded to include ongoing communications between independent fire districts, utility districts and the County concerning the impact of land use planning on the need for services and facilities in those districts.

ICE Policy 1.1.5: Conservation

The County shall develop and maintain a land acquisition process in conjunction with adjacent counties and municipalities and in cooperation with property owners as well as resource management agencies such as the Florida Fish and Wildlife

Conservation Commission, the Florida Department of Environmental Protection, and Water Management Districts. Methods may include the development of multi-jurisdictional mitigation banks or parks; the creation of greenways and preserves that cross jurisdictional boundaries; and the establishment of resource conservation plans and management agreements with private landowners to ensure the long term presence of viable populations of wildlife and habitats.

ICE Policy 1.1.6: Consistency with State and Regional Plans
The County shall evaluate amendments to the local Comprehensive Plan for consistency with the Strategic Regional Policy Plan and the State Growth Management Plan.

ICE Policy 1.1.7: Conflict Mediation
The County shall continue to fully utilize regular Southwest Florida Regional Planning Council Technical Advisory Committee meetings and the Intergovernmental Clearing House Review process for intergovernmental communication and conflict mediation.

ICE Policy 1.1.8: Annexation
The County shall facilitate annexation of areas by municipalities consistent with the provisions of Chapter 171, F.S. County staff shall review the annexation reports prepared by City of Punta Gorda staff, participate in the joint quarterly meetings, exchange technical information, and attend appropriate public meetings concerning potential annexations.

ICE Policy 1.1.9: Loop Municipal Services Area Joint Planning Agreement
The County shall ensure, in coordination with the City of Punta Gorda, that all elements identified within the Interlocal Service Boundary Agreement and Joint Planning Agreement Establishing the “Loop Municipal Services Area” (Agreement), adopted by the County on September 10, 2013 and the City of Punta Gorda on October 16, 2013, shall be fulfilled and completed. The Agreement is effective until October 2033, unless extended, and shall be reviewed by the County and the City every five years.

ICE Policy 1.1.10: Utility Coordination
The County shall establish ongoing procedures and regular communication mechanisms with privately owned utilities supplying centralized potable water and sanitary sewer services in Charlotte County to coordinate facility expansion and extension with local land development as detailed in the Infrastructure element and the Future Land Use element of this Plan. Ongoing procedures and communications mechanisms to enhance coordination with telephone service providers in extension and location of lines, and with Florida Power and Light in

the location, extension and expansion of electrical generation transmission facilities in the County and the City shall be pursued.

ICE Policy 1.1.11: Coordination of Social Services

Charlotte County Department of Human Services shall foster cooperation and coordination between health and social service providers within the County in order to establish a clear direction that minimizes duplication of effort and maximizes all community resources.

ICE Policy 1.1.12: Coordination with Water Management Districts

The County shall coordinate with the Southwest Florida Water Management District through its adopted 2015 Regional Water Supply Plan for the Southern Planning Region and the South Florida Water Management District through its adopted 2017 Lower West Coast Water Supply Play Update in the development of the County's 10-year Water Supply Facilities Work Plan.

ICE Objective 1.2: Level of Service (LOS)

To coordinate LOS standards for public facilities with the State, regional or adjacent counties and municipalities or local entities with operational and maintenance responsibility for such facilities.

ICE Policy 1.2.1: LOS for Roads

The County shall coordinate with the Florida Department of Transportation (FDOT) and the Charlotte County-Punta Gorda MPO to maintain LOS standards for State roads consistent with the FDOT Five Year Improvement Program, in accordance with the Transportation element.

ICE Policy 1.2.2: Recreational Use of State Lands

The County shall seek the cooperation of the Florida Department of Environmental Protection and similar authorities to maximize opportunities for appropriate recreational use of State lands consistent with environmental considerations.

ICE Policy 1.2.3: Water Management

The County shall fully cooperate with Southwest Florida Water Management District in the development and implementation of the Surface Water Improvement and Management (SWIM) program and the Save Our Rivers (SOR) Program in Charlotte County. Charlotte County will coordinate with the District’s Regional Water Supply Authority (RWSA), the Southern Water Use Cautionary Area Recovery Strategy, and the Districts’ Water Management Plans.

ICE Policy 1.2.4: Dredge Disposal Sites

The County shall coordinate with the West Coast Inland Navigation District (WCIND) and other State and Federal agencies as appropriate in the identification and designation of new dredge spoil disposal sites. If siting conflicts arise, the

County will enlist the help of the Coastal Management Program of the Florida Coastal Zone Section.

ICE Policy 1.2.5: Conflict Resolution
The County shall address any conflicts that cannot be resolved locally between Charlotte County or Punta Gorda and any public agency seeking a dredge spoil disposal site through the dispute resolution process of the Southwest Florida Regional Planning Council (SWFRPC).

ICE Policy 1.2.6: Permanent Dredge Spoil Disposal
The County shall coordinate with the West Coast Inland Navigation District in determining an appropriate site should the need for a new permanent dredge spoil disposal site be identified. If siting conflicts arise, then the County will enlist the help of the Coastal Management Program of the Florida Coastal Zone Section.

ICE Objective 1.3: Impacts of Development
To coordinate with adjacent local governments and regional planning agencies to ensure that impacts of development are addressed.

ICE Policy 1.3.1: Bordering Jurisdictions
The County shall inform adjacent local governments of proposed amendments to this Plan, including the Future Land Use Map and the Zoning Atlas, when the proposals are located within one-half mile of the jurisdictional boundaries of neighboring municipalities. County staff shall inform adjacent local governments of proposed changes beyond the one-half mile distance of jurisdictional boundaries when those proposed changes are deemed to have potential impacts on them.

ICE Policy 1.3.2: Reciprocation
The County shall request that adjacent local governments inform County staff of proposed amendments to their comprehensive plans, including the Future Land Use Map and the zoning atlas when such proposals are located within one-half mile of the jurisdictional boundary of the County.

ICE Policy 1.3.3: Developments of Regional Impact (DRI)
The County shall utilize the intergovernmental coordination process of the SWFRPC as outlined and updated in the Strategic Regional Policy Plan to:

1. Determine whether development proposals would have significant impacts on other local governments or State or regional resources or facilities and to develop remedies to mitigate the impacts; and
2. Determine whether development proposals in other jurisdictions would have significant impacts on Charlotte County's resources or facilities and to develop remedies to mitigate the impacts.

ICE Policy 1.3.4: Shared Costs
Future development in Charlotte County and other affected jurisdictions will pay the proportionate cost of joint infrastructure and services resulting from the impact of that development.

ICE Policy 1.3.5: DRI Mixed Use
The Future Land Use Map officially sets aside a DRI Mixed Use category for Development of Regional Impact (DRI) projects. Each project within the DRI Mixed Use area shall develop in accordance with a DRI development order, which is a written resolution adopted by the County Commissioners for the purpose of allowing and promoting growth and development to occur in a responsible manner compatible with the County's 5-Year Capital Improvement Program and the Capital Improvements element. The mix of land uses and allowed densities and intensities within a DRI that is approved shall be adopted into FLU Appendix VI: Developments of Regional Impact.

ICE Policy 1.3.6: Other Comprehensive Plans
The County shall consider the existing comprehensive plans of affected local governments during inter-jurisdictional review of development proposals and amendments.

ICE Policy 1.3.7: Aquatic Preserves
The County shall coordinate with other local governments, and regional, State, and Federal governments in the management of the Charlotte Harbor and Lemon Bay aquatic preserves consistent with the Natural Resources and the Coastal Planning elements.

ICE Policy 1.3.8: Point-Source Pollution
The County shall consider entering into agreements with surrounding counties as well as with regulatory agencies to ensure that local concerns are addressed during the permitting stages of potential point-source pollutant generators.

ICE Policy 1.3.9: Joint Participation
The County encourages adjacent local governments to participate in various planning decisions that will have direct effects upon their citizens. The County shall participate in planning decisions of other local governments. Planning decisions that may impact surrounding jurisdictions include, but are not limited to, roadway and stormwater management improvements, land use and zoning amendments, public facility sitings, and recreational facility development.

H

Appendix H

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