2016 Annual Report

Stantec

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March 30, 2017

Sign-off Sheet

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ABBREVIATIONS

AMR	Automated Meter Reading
AADF	Annual Average Daily Flow
AWWA	American Water Works Association
BCC	Board of County Commissioners
BFC	Base Facility Charge
BFV	Butterfly Valve
BODR	Basis of Design Report
BSRO	Burnt Store Reverse Osmosis
CAR	Capacity Analysis Report
CBOD	Carbonaceous Biochemical Oxygen Demand (5 day)
CMMS	Computerized Maintenance Management System
CMOM	Capacity, Management, Operation and Maintenance
CCR	Consumer Confidence Report
CCT	Chlorine Contact Tank
CR	County Road
CRA	Community Redevelopment Area
Cu	Copper
DMR	Discharge Monitoring Report
DO	Dissolved oxygen
EAMS	Enterprise Asset Management System
EPA	U.S. Environmental Protection Agency
EPLAB	East Port Laboratory
EPWRF	East Port Water Reclamation Facility
EQ	Equalization
ERU	Equivalent Residential Unit
EWD	Englewood Water District
FDEP	Florida Department of Environmental Protection
FDOH	Florida Department of Health
FOG	Fats, Oils, and Grease
FPL	Florida Power and Light
FY	Fiscal Year
gal	Gallon
GDU	General Development Utilities
GIS	Geographical Information System
gpd	Gallons Per Day
gpm	Gallons Per Minute
GPS	Global Positioning System

GST	Ground Storage Tank
HDPE	High Density Polyethylene
HP	Horsepower
HSP	High Service Pump
I & C	Instrumentation and Control
I/I	Inflow/Infiltration
IW	Injection Well
kW	Kilowatt
L	Liter
LPS	Low Pressure Sewer
MBR	Membrane Bioreactor
MCC	Motor Control Center
MG	Million Gallons
mg	Milligram
mgd	Million Gallons Per Day
MLE	Modified Ludzack-Ettinger
MLSS	Mixed Liquor Suspended Solids
MLVSS	Mixed Liquor Volatile Suspended Solids
MSBU	Municipal Service Benefit Unit
NaOH	Sodium Hydroxide
NPW	Non-potable Water
NTU	Nephelometric Turbidity Unit
O&M	Operations and Maintenance
PACT	Powdered Activated Carbon Treatment
Pb	Lead
PLC	Programmable Logic Controller
ppm	Parts Per Million
PRMG	Public Resource Management Group
PRMRWSA	Peace River/Manasota Regional Water Supply Authority
psi	Pounds Per Square Inch
PVC	Polyvinyl Chloride
QA	Quality Assurance
QC	Quality Control
RAS	Return Activated Sludge
RCWM	Reclaimed Water Main
RO	Reverse Osmosis
RTS	Regional Transmission System
SCADA	Supervisory Control and Data Acquisition
SO	Service Order
SOP	Standard Operating Procedure

SR	State Road
SRT	Solids Retention Time
STEP	Septic Tank Effluent Pumping
SWFWMD	Southwest Florida Water Management District
TDS	Total Dissolved Solids
TMADF	Three-Month Average Daily Flow
TNI	The National Environmental Laboratory Accreditation Conference Institute
TSS	Total Suspended Solids
UF/IFAS	University of Florida/Institute for Food and Agricultural Sciences
UV	Ultraviolet
VFD	Variable Frequency Drive
WAP	Wetlands Assessment Procedure
WARN	Water/Wastewater Agency Response Network
WAS	Waste Activated Sludge
WRF	Water Reclamation Facility
WUP	Water Use Permit
WTP	Water Treatment Plant
WW	Wastewater
Zn	Zinc

GLOSSARY

Activated sludge	A process for treating wastewater using air and a biological floc to reduce the organic content of the wastewater.
Annual average daily flow (AADF)	The total volume of wastewater flowing into a wastewater facility, or water flowing from a water facility, during any consecutive 365 days, divided by 365.
Backflow prevention	A physical means to keep water from flowing back into a water system once it is discharged from the system. Examples are air gaps, double check valve assemblies, and reduced pressure zone devices.
Consumer Confidence Report (CCR)	An annual water quality report, required by the U.S. Environmental Protection Agency and Florida Department of Environmental Protection, distributed to the customers of a water utility.
Cross-connection	Any physical arrangement whereby a public water supply is connected, directly or indirectly, with any other water supply system, sewer, 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 public water supply as the result of backflow.
Deep injection well	A well, drilled into a confined, non-potable aquifer for disposal of wastewater.
Diurnal flow	The cumulative flow plotted against the time of day for a consecutive 24-hour period.
Force main	A pressure pipe joining the pump discharge at a wastewater pumping station with a point of gravity flow.
Gravity sewer	Piping installed at a gradual incline (slope) that allows wastewater to flow exclusively by the energy of gravity.
Headworks	The “front end” of a wastewater treatment plant that removes items from the wastewater that can’t be removed by the treatment process.
Lift station (pumping station)	A structure equipped with pumps to impart energy to convey wastewater through a force main.
Low pressure sewer	An alternative to gravity sewers that requires a small pump at each property. Piping is small, shallow, and can be constructed to follow the contours of the land, as opposed to deeper and larger pipes necessary to accommodate the slopes required for gravity sewers.
Peak day flow	The largest volume of wastewater flowing into a wastewater facility, or water flowing from a water facility, during any consecutive 24-hour period.
Peak hour flow	The largest volume of wastewater flowing into a wastewater facility, or water flowing from a water facility, during any consecutive one-hour period.
Public access reclaimed water	Treated wastewater meeting the requirements of Chapter 62-610, Part III of the Florida Administrative Code for application on areas accessible to the general public.
Restricted access reclaimed water	Treated wastewater meeting the requirements of Chapter 62-610, Part II of the Florida Administrative Code for application on areas where access by the general public is controlled and infrequent.
Reverse osmosis	A water treatment method that uses pressure and a semi-permeable membrane to purify water.

Three-month average daily flow	The total volume of wastewater flowing into a wastewater facility or water flowing from a water facility during a period of three consecutive months, divided by the number of days in this three-month period.
Vacuum sewer	A mechanized system of wastewater transport that relies on differential air pressure to move wastewater. Vacuum pumps maintain a negative pressure on the collection system. The differential pressure between atmosphere and vacuum is the driving force that conveys wastewater through the system.

EXECUTIVE SUMMARY

1. Introduction

The Charlotte County Utilities Department 2016 Annual Report serves two purposes. First, it is used to inform the public and bond holders of the status of the Utility. Second, the Annual Report is a reference for Utility staff in planning for future capital expenditures and operations of the Utility. This report includes a summary of Charlotte County Utilities Department's administration organization and financial information, major events during the fiscal year, the status of capital improvement program projects, and a review of the conditions and recommendations for the water treatment and distribution facilities, wastewater collection systems, wastewater treatment facilities, and reclaimed water distribution systems.

2. Administration

The current rate plan was approved in 2006 (a 5 tier rate structure) and is deemed sufficient by the County Commissioners to provide services to current customers. On June 24, 2014 the Board approved a rate increase (water 0.75%, wastewater 6%) for fiscal years 2015, 2016, and 2017.

Since 2010, the County has been transitioning to a new fixed base water meter system, which allows Charlotte County Utilities Department staff to have access to real-time data via central data collectors. Advantages of this technology includes enhanced leak detection, the ability to resolve disputes without having to go to the meter, and soft/hard disconnects to turn meters off/on remotely. The new meters and transponders have a 20-year warranty, increasing the expected life of the meters by 10 years. Many conveniences are also offered to the customer, such as electronic payment and electronic billing. Approximately 67% of customers paid their bills electronically and 25% of Charlotte County Utilities Department customers received their bills electronically since the system was implemented in July 2014.

The total Operations and Maintenance (O&M) revenue for FY 2016 was:

- $63,170,383 (water and wastewater services)
- $2,152,774 (connection charges)
- $2,892,402 (connection fees)

The number of active water services increased by 1.53% (from 57,281 to 58,158 services) and the number of active wastewater services increased by 0.8% (from 34,949 to 35,231 services). Total water sold to all customers during FY 2016 was 3,225,778,000 gallons.

3. Water Treatment and Distribution

The Charlotte County Utilities Department water system consists of two (2) distribution systems, the Central/West System and the Burnt Store (South) System. Charlotte County Utilities Department is a member of the Peace River/Manasota Regional Water Supply Authority (PRMRWSA). The water supply for the central and western part of the County is purchased from the PRMRWSA. The PRMRWSA

operates a surface water (Peace River) treatment plant under its own water use permit. Water produced at the Charlotte County Utilities Department-owned Burnt Store Reverse Osmosis (BSRO) Water Treatment Plant (WTP) is distributed to the extreme southern area of the County. Charlotte County Utilities Department purchased/produced an average of 11.0 million gallons per day (mgd) of water in FY 2016. For fiscal year 2016, the total unaccounted for water loss for the PRMRWSA supplied system was 7.90% and for the Burnt Store system was 11.22%. Because the loss is over 10% for the Burnt Store system, a water audit must be conducted, including a plan to mitigate the high loss. Charlotte County Utilities Department, in concert with the Southwest Florida Water Management District (SWFWMD), has been conducting a leak detection survey in the Burnt Store distribution system for three years. No significant leaks have been found.

The 2016 Water Quality Reports confirm that the water delivered by both Charlotte County Utilities Department water distribution systems meets or exceeds regulatory quality requirements.

PRMRWSA Supplied Water Service Area

At the end of the FY 2016, the Central/West County distribution system consisted of 1,288 miles of water main, approximately 4,060 fire hydrants, four (4) booster pumping stations with ground storage tanks, two (2) major interconnects and three (3) emergency interconnects with neighboring water utilities. The current total ground storage tank capacity for this system is 10 million gallons (MG). The PRMRWSA also has an additional 12 MG of storage capacity available to all Authority members for emergency fire flow or for general distribution during temporary loss of treatment at the PRMRWSA treatment plant.

For the PRMRWSA-supplied system during FY 2016, 28,452 meters were replaced, nine (9) hydrants were added, no hydrants were replaced, 360 hydrants had maintenance performed (including exercising, flow testing, and painting), 61 line breaks were repaired, 3 valves over 3-inches were replaced, and 817 valves were exercised. Charlotte County Utilities Department also maintains one (1) remote chlorine injector and chlorine injection points at each of the four (4) booster pumping stations. Recommendations for the PRMRWSA supplied system include continuing to replace water meters (the fixed base meter project) and continuing to maintain and/or upgrade the booster pumping stations and ground storage tanks as necessary.

Burnt Store RO Water Treatment Plant Supply

For the Burnt Store service area, the most recent Water Use Permit (WUP) (Permit No. 3522) was issued by Southwest Florida Water Management District (SWFWMD) on September 25, 2013 and expires in 2033. The total permitted withdrawal rate is 3.172 mgd Annual Average Daily Flow (AADF). Currently, there are six (6) production wells in service and one well currently not in service (seven (7) total wells). The current permitted capacity for the BSRO Water Treatment Plant is 3.61 mgd. The disposal of the concentrated treatment waste (brine) is by pumping into either of two deep injection wells that are located on the facility site. The combined capacity of the two injection wells is 3.44 mgd.

At the end of FY 2016, the Burnt Store distribution system consisted of 64 miles of water main and approximately 400 fire hydrants. There is a total ground storage tank capacity of 1.5 MG at the BSRO Water Treatment Plant. The water meters in the Burnt Store Service Area had been upgraded to fixed

base, remote reading meters previously. Recommendations for the Burnt Store system include replacing old "class" PVC pipe with new C-900 PVC pipe and continuing to identify sources of unaccounted water loss throughout the system.

4. Wastewater Collection

The Charlotte County Utilities Department wastewater service area is served by four (4) collection systems and treatment plants. The total collection systems consist of 378 miles of gravity sewer, 290 miles of low pressure sewers (LPS), 261 miles of force main, 304 lift stations and 9,514 manholes. Charlotte County Utilities Department also owns two (2) 6,000-gallon and three (3) 4,000-gallon tank trucks which are available to haul wastewater from lift stations during emergency situations. During FY 2016, all lift stations were maintained in working order.

Recommendations for the Charlotte County Utilities Department wastewater collection system include continuing to rehabilitate lift stations, continuing to use the system computer models to assess the need for upgrades, continuing to televise and repair gravity sewers and manholes, and installing odor control systems at lift stations that are significantly impacted by sewer gases.

5. Backflow Prevention and Laboratory Water Analyses Services

The East Port Laboratory conducts most of the water quality testing for each of the County's facilities. During FY 2016, the laboratory received a total of 8,084 samples and performed 26,952 analyses.

Under the Backflow and Cross Connection Prevention Program, the County tested 14 hydrant meters, conducted 3,144 cross-connection inspections, performed 223 backflow tests, and corrected 3 potential cross-connections.

6. Wastewater Treatment Facilities

Each of the County's four (4) water reclamation facilities (WRF) and one (1) landfill leachate treatment facility operated by Charlotte County Utilities Department met the required permit effluent limits. The following is a brief update on each of the wastewater treatment facilities:

- East Port WRF – The annual average daily flow (AADF) in FY 2016 was 4.825 mgd. Based on the highest three-month average daily flow (TMADF), the East Port WRF was operating at 98% of the 6.0 mgd permitted capacity. A phased construction to replace and/or upgrade equipment and expand from 6 mgd to 9 mgd was started in 2013. The current total wet weather effluent storage capacity is 141 MG, including two (2) storage ponds (45 MG and 95 MG) and two (2) 0.5 MG reclaimed water storage tanks. As part of the plant upgrade and expansion, the 95 MG pond will be converted to a reclaimed water reservoir. The East Port WRF contains two deep injection wells that are permitted to receive 9.6 mgd of treated wastewater. East Port WRF accepted 8,841,895 gallons of septic waste from 44 permitted haulers during FY 2016. The restaurant grease interceptor inspection program conducted 1,083 inspections and issued five (5) Notice of Violations for noncompliance. Grease trap waste is recycled by Affordable Biofeedstock, Inc., which is located on the East Port WRF property. Recommendations for the East Port WRF include upgrade and capacity improvements. These

recommendations should be accomplished when all of the phased plant upgrade and expansion is completed.

- West Port WRF – The AADF in FY 2016 was 0.657 mgd. Based on the highest TMADF, the West Port WRF was operating at 64% of the 1.2 mgd permitted capacity. The current total wet weather effluent storage capacity is 20 MG via two (2) on-site storage ponds. The West Port WRF includes one (1) deep injection well that is permitted for 4.75 mgd. It is used for disposal of excess treated water produced by the West Port WRF and the Rotonda WRF. An inline reclaimed booster station was installed in FY 2015 on the Rotonda/West Port inter-connected reclaimed transmission mains to improve pumping efficiencies and transfer of excess treated water at the Rotonda WRF to the deep injection well at the West Port WRF. Recommendations for the West Port WRF include rehabilitation of sedimentation equipment, replacing filter fabric on one effluent filter, and installation of new chlorination feed equipment.

- Rotonda WRF – The AADF in FY 2016 was 1.071 mgd. Based on the highest TMADF, the Rotonda WRF was operating at 66% of its 2 mgd permitted capacity. The current total wet weather effluent storage capacity is 13.08 MG via an on-site 2.64 MG reuse pond, an on-site 3 MG ground storage tank, and an offsite 7.44 MG reuse pond at the Palms golf course. An inline reclaimed water booster station benefits Rotonda WRF as well as the West Port WRF. Alternate effluent disposal is offsite by deep well injection at the West Port WRF. Recommendations for the Rotonda WRF include various painting/re-coating recommendations throughout the plant, installation of additional membrane filter cassettes when flows warrant, and replace a reclaimed water transmission pipe to a golf course.

- Burnt Store WRF – The AADF in FY 2016 was 0.339 mgd. Based on the highest TMADF, the Burnt Store WRF was operating at 86% of the 0.5 mgd permitted capacity. There is no significant wet weather storage capacity at this facility. The on-site percolation ponds have a total capacity of 0.25 mgd. Two deep injection wells with a combined capacity of 3.44 mgd, that are located on the site, are available for disposal of treated wastewater. Recommendations for the Burnt Store WRF include the installation of a mechanical screen and grit removal system in the headworks, removing the grit from the equalization tank, installation of two filter disks in the effluent filter, increase flow capacity from the chlorine contact chamber to the deepwell pumping station, and installation of a flow meter on the discharge line from the reclaimed water pumps. Plant replacement and site location alternatives are being pursued as well as upgrades to serve an increase in population within the service area. The required increase in capacity will result in a significant capital investment.

- Zemel Road Landfill Leachate Treatment Facility (Owned by Charlotte County Public Works and operated by Charlotte County Utilities Department) – The AADF in FY 2016 was 0.069 mgd. Based on the highest TMADF, the Leachate Treatment Facility is operating at 58% of the 0.15 mgd permitted capacity. An influent storage tank provides a buffer during peak flows. Disposal of the treated wastewater is in a deep injection well located at the facility site with a permitted capacity of o.461 mgd. Recommendations for this facility include refurbishing the sand filter utilizing a polyurea (rubberized) paint that has an excellent record of protection of the aeration tanks at the Leachate Treatment Facility. A portable generator connection should be installed to operate the facility in case

of a prolonged public power outage.

7. Reclaimed Water Distribution System

Charlotte County Utilities Department has adopted a posture to encourage more beneficial use of reclaimed water that is produced, in abundance, by all four (4) water reclamation facilities. Effective May 1, 2016, reclaimed water use rates were reduced to a base charge of $2.50 per month and volume changes of $0.10 to $0.36 per thousand gallons based on the monthly volume consumed.

Phase 2 of the reclaimed expansion project, completed in 2014, connected the Central and West County reclaimed water systems. This project included two (2) miles of 16-inch pipe, additional storage capacity, and a booster pumping station along the interconnect between the Rotonda and West Port WRFs.

Phase 3 of the reclaimed expansion project was begun in FY2016 with the construction of a transmission main from the West Port WRF to the Rotonda East Reclaimed Booster Pumping Station. The Phase 5 expansion project, currently in progress, includes conversion of a 95 million gallon reject storage pond at the East Port WRF to reclaimed water storage and increased pumping capacity at the East Port WRF.

Recommendations to the Central/West County system include adding reclaimed water customers and completion of the storage pond at the East Port WRF. FDEP granted a Master Reclaimed Water Permit for the Central/Western County reclaimed system. A comprehensive operating protocol, for the combined system, was developed by Department staff.

Preparation of a Master Reclaimed Water Permit for the South County reclaimed water system was begun at the end of FY 2016. A Burnt Store WRF permit modification is anticipated in March 2017 that acknowledges a General Reuse Service Area with a limited capacity of 0.5 mgd.

Recommendations to the Burnt Store (South County) system include preparing a hydraulic model to predict the impact of future demand and determining the feasibility of creating reclaimed water storage at the Burnt Store WRF.

8. Capital Improvements

The total amended FY 2016 capital improvement budget for the water system was $8,208,000 and the total amount spent was $7,591,053. For the wastewater system, the total amended FY 2016 capital improvement budget was $ 15,325,000 and the total amount spent was $23,558,685. For the reclaimed water system, the total amended FY 2016 capital improvement budget was $3,950,000 and the total amount spent was $184,597. Details of the capital budget and expenditures are contained in Section 7 of this report.

Charlotte County Utilities Department's new line extension program began in FY 2016. It is designed to serve new customers with water and sewer services. Line extension constructed by CCUD are available to properties within 500 feet of an existing utility main. Longer extensions may be considered if the requesting person is willing to pay the cost of the additional length of the water or sewer main.

9. Consolidated Recommendations

Detailed recommendations for each of Charlotte County Utilities Department's water, wastewater, and reclaimed water distribution systems are consolidated in Section 8 of this report.

1.0 INTRODUCTION

1.1 PURPOSE AND SCOPE

Charlotte County Utilities Department's interest in preparing an Annual Report is derived from the need to inform the public as to the status of its utility and to fulfill the requirements of Revenue Bonds issued to Charlotte County. The bonds require the County to retain the services of a registered engineer to ensure the quality of the Utility's operation. The bond covenant states:

"The Issuer shall at all times employ Consulting Engineers, whose duties shall be to make any certificates and perform any other acts required or permitted of the Consulting Engineer under this Resolution, and also to review the construction and operation of the System at least once a year, and, not more than 120 days prior to the end of each Fiscal Year, to submit to the Issuer a report with recommendations as to the proper maintenance, repair and operation of the System during the ensuing Fiscal Year, including recommendations for expansion and additions to the System to meet anticipated service demands, and an estimate of the amount of money necessary for such purposes. Copies of such reports, recommendations and estimates made as here in above provided shall be filed with the issuer for the inspection by bondholders, if such inspection is required."

Principal balance for bonds issued to Charlotte County (Utilities) is as follows:

Current Bond Issues	Original Issuance	Current Debt	Comments
2006 Bond	Original Acquisition - 1991	$ 2,530,000	Add. Acquisition from GDU
2008 Bond	Wastewater Expan. - 1998	$ 21,835,000	WW expansion program
2011 Bond	Refinance - 2011	$ 42,320,000	Refinanced debt
2013 Bond	Refinance - 2003A	$ 28,740,000	Refinanced debt
2016 Bond	Refinance - 2006 & part of 2011	$ 23,955,000	Refinanced debt
	Total Current Bond Debt	$119,380,000	
	State Revolving Fund Debt	$ 9,814,084	
	Total Long Term Debt	$ 129,194,084	

The Report is divided into the following sections:

1 Introduction: General information concerning the report's preparation

2 Administration: Charlotte County government structure, Charlotte County Utilities Department's organization, administration programs, and financial information

3 Water Treatment and Distribution: Description and records concerning the purchase and production of potable water, description of distribution system, and general condition of the equipment

4 Wastewater Collection: Description and records concerning the collection of wastewater

5 Wastewater Treatment Facilities: Description and records concerning the facilities used to treat water and wastewater

6 Reclaimed Water Distribution System: Description of distribution system and customer service

7 Engineering: The status of the water and wastewater capital improvement program and a summary of the major engineering reports completed for the County

8 Consolidated Recommendations: Summary of recommended capital improvements and operations & maintenance comments

1.2 AUTHORITY

The preparation by Stantec of the Fiscal Year (FY) 2016 Annual Report is authorized by Charlotte County Purchase Order NO. 2017000632 for File No. 17-017, Work Order No. 5.

1.3 DEMOGRAPHICS

Charlotte County is located on the southwest coast of Florida about 96 miles south of Tampa. It covers 694 square miles, and contains about 126 miles of waterways. With an elevation ranging from 5 to 25 feet above sea level, Charlotte County enjoys a sub-tropic climate where the extreme temperatures of both summer and winter are subdued by the prevailing gulf breezes. There are also numerous upland and aquatic preservation areas. Covering an area of 270 square miles and 219 linear miles of protected shoreline, Charlotte County has one of the largest protected marine estuaries.

The 2016 population of Charlotte County has been estimated to be 170,450 by the Office of Economic & Demographic Research. In 2009, Port Charlotte was named "Best Place to Retire" by *Money* magazine and the community has received similar recognition from other sources during this past decade.

A large portion of this coastal community's urban development is located in the western third of the County, including the barrier islands abutting the Gulf of Mexico. The Port Charlotte planned residential development occupies most of the Central County land with some house lots having canal access to Charlotte Harbor. A large development known as Rotonda is also located in the west central area of the County. Every lot within Rotonda is within one-half mile of a golf course.

The City of Punta Gorda, located near both the picturesque Peace River and Charlotte Harbor, is the only incorporated city in Charlotte County. Punta Gorda contains miles of canals, most of which connect directly to the harbor and provide a waterfront setting for much of this urban area. A growing area located in the extreme south area of the County, near the Lee County border, is known as the Burnt Store Corridor because of its location on and near Burnt Store Road. This area encompasses 8 square miles and is currently only at 15 percent build-out.

Commercial growth located along many of the main corridors constitutes over 1,500 acres. Most of the commercial epicenters are located along U.S. 41 and in the Murdock area of Port Charlotte. Commercial zones have also developed along Kings Highway, Rampart Boulevard and SR-776. Less than 0.1 percent of

the County area consists of industrial development. The industrial development is primarily located within the Community Redevelopment Area (CRA) in Charlotte Harbor.

1.4 MAJOR EVENTS IN FY 2016

Charlotte County Utilities Department is an active Charlotte County Department with projects and administrative activities underway. The following is a list of significant events in fiscal year 2016.

1.4.1 GENERAL OPERATIONS

- October 1, 2016 marked the final rate increase of a three (3) year plan approved by the Board of County commissioners in 2014. There were consumption rate increases of 0.75% for water and 6% for sewer in FY 2016.

- September 2014, Board approved proceeding with an operational audit of the Charlotte County Utilities Department Operations. The audit's purpose was to improve operations, fiscal sustainability, and increase customer satisfaction. In March 2015, KPMG presented their audit findings which resulted in 45 recommendations for the County to consider for implementation to maintain and enhance Utilities operational efficiency. The recommendations resulted in more than 600 action steps and 34 monitoring assessments that continued through FY 2016. Recommendation topics included financial, engineering, capital improvement program, knowledge base, customer relations, staff training, information technology, policies, and regulations. Approximately 525 action steps were completed by the end of FY 2016. Many audit recommendations were implemented in FY 2016 with an emphasis and focus on capital project governance, customer service and billing, human capital management, information technology, and internal reporting & accountability. On February 25, 2016 the BCC approved an updated strategic plan that was in response to KPMG's audit.

- July 2015, Board approved an amendment to the fixed based automatic water meter reading system contract with Mueller System to facilitate an accelerated deployment schedule of the field installation of the new water meters. Installation of new meters continued in FY 2016.

- Line extension program began in FY 2016. It is designed to serve new customers with water and sewer services. Line extension constructed by CCUD are available to properties within 500 feet of an existing utility main. Longer extensions may be considered if the requesting person is willing to pay the cost of the additional length of the water or sewer main.

1.4.2 ENGINEERING

- Evaluated alternatives for the East Port WRF upgrade and expansion - Stage 5 and decided upon the improvements to be built.
- Awarded a contract for the design of the East & West Spring Lake – Phase 2 vacuum sewer system.

- Secured additional Grant funding for Spring Lake Wastewater project, including Total Maximum Daily Load (TMDL), State Revolving Fund (SRF), and Legislative Appropriation. No additional TMDL funding was secured in FY 2016.
- Construction crew and equipment approved by Board of County Commissioners to perform onsite wastewater connections, line extensions, and renewal and replacement work.
- Applied for CDBG grant funds (award notification received October 1, 2015) for Gertrude Aaron Parkside CRA Utility Improvement Project.
- Completed design of two projects included in Reclaimed Water Expansion Phase 3:
    - A 16 inch reclaimed water main on Gasparilla Road and Placida Road and 12 inch reclaimed water main on Rotonda Boulevard West, and
    - The East Port WRF Stage 5 Improvements, which include a new high service pumping station and conversion of the 95 million gallon reject pond to a reclaimed water storage pond.
- The Burnt Store Brackish Groundwater Wellfield Study continued through FY 2016.
- Major Construction activity for FY 2016:
    - Burnt Store Phase 3 Road Widening resulting in new water, sewer, and reclaimed water transmission mains
    - Gasparilla Road Widening resulting in new water, sewer, and reclaimed water transmission mains
    - Elkcam Blvd. new water, sewer, and reclaimed water transmission mains
    - East Port WRF Expansion, Phase 1 completion
    - Edgewater Drive Phase 2, new water, wastewater and reclaimed water, transmission mains and lift stations
    - US 41 Widening resulting in new water, wastewater, reclaimed water transmission mains
    - Stormwater Control Structure – Sunrise Wastewater and Potable Water Replacement
    - East and West Spring Lake Wastewater Collection System Expansion Contracts B and C
    - Midway Widening Phase 3 resulting in new wastewater transmission mains
    - Parkside Utility Improvements – Ambrose Street water, sewer, RCWM transmission mains, and L.S. replacements
    - Cape Horn 12-inch water main
    - Harbor Heights 6-inch Force Main
    - Miscellaneous Line Extensions
- Major Design Activities for FY 2016:
    - Loveland Grand Master Station, 48-inch Interceptor, East Port WRF Equalization Basin

- Myakka River Water Main Crossing
- Gulf Cove/Myakka River Water Main Crossing
- Spring Lake Wastewater Expansion - Contract D
- Phase 2 Charlotte Harbor Water Quality Initiative (Ackerman Countryman)
- Chamberlain Master Lift Station
- Chancellor Blvd/Hillsborough Blvd water main
- Cape Haze Drive water main replacement, wastewater force main, and RCWM
- Parkside CRA Utility Improvements Gertrude – Aaron
- Placida Road reclaimed water main
- Gertrude Pumping Station and Tank Conversion to reclaimed water use
- East Port WRF Stage 5 Reclaimed Water Improvements
- Deep Creek Force Main Replacement with larger size to accommodate residential growth
- Ingrahm 24-inch Water Transmission Main (part of transmission main from Walenda Pumping Station to Rotonda Storage Tank)
- Force Main and Water Main – Spring Lake Boulevard, Ellicott Circle and Morningstar Waterway
- Miscellaneous Line Extensions

1.4.3 WATER SYSTEM OPERATION

- Provided 3.2 billion gallons of water to 58,158 customers.
- Received 140 million gallons (MG) of Punta Gorda produced water through the new Charlotte County Utilities Department/Punta Gorda 24-inch interconnect pipe. Distributed 124 million gallons (MG) back to Punta Gorda during their peak demand period.

1.4.4 WASTEWATER SYSTEM OPERATIONS

- Treated 2.5 billion gallons of wastewater from 35,231 customers.
- Continued the successful program of sewer rehabilitation lining to reduce infiltration of groundwater into the collection system. Work included internal T.V. inspection of 390 feet of gravity sewer, smoke testing, manhole repairs, and repairs of 58 service laterals. No additional lining was completed in FY 2016.

1.4.5 RECLAIMED WATER SYSTEM OPERATIONS

- Provided irrigation water to eight (8) golf courses, a professional sports park, and numerous residential and commercial customers.

- Installed 12-inch and 16-inch reclaimed water transmission main on County Road 771 from State Road 776 to the Rotonda East Reclaimed Water Booster Pumping Station.

1.4.6 INSTRUMENTATION AND CONTROL GROUP

- PLC Programming
- Cross training between divisions
- Control installation and calibration

1.4.7 OPERATIONS DATA MANAGEMENT

- The upgrade of the operation data management (Wonderware) for all major facilities began in FY 2016. The installation of this software on water and wastewater facility computers continued in FY 2017.

1.4.8 REPORTS AND STUDIES

- Utilities Department outlined Charlotte Harbor Water Quality Initiative to BCC to show how the sewer expansion program will help improve water quality.
- Organizational and Operational Audit of Utilities, KPMG, February 16, 2015. Charlotte County Board of County Commissioners continued KPMG's engagement in FY 2016 to assist the Utilities Department with the development and implementation of Action Plans for the 42 recommendations in the KPMG organizational and operational audit.
- Charlotte County Utilities 2015 Audit Report Update, Stantec, April 2016.
- Charlotte County Utilities (Operations) Quarterly Reports, Stantec, October 2015 – February 2016 – April 2016 – July 2016.
- 2015 Water Quality Report (PRMRWSA and Burnt Store water production), Charlotte County Utilities Department, 2016.
- 2016 Charlotte County Utilities Annual Report, Stantec, March 2016.
- Water Year 2015 Burnt Store Wellfield Report, RMA Geologic Consultants, Inc., March 2016.
- Gertrude Avenue Storage Tank and Pumping Station
    - Tech Memo #1 –
        - Condition Evaluation, draft report, August 2016.
    - Tech Memo #2 –
        - Irrigation Service Area Reclaimed Water Demand, August 2016.
- Ingrahm 24-inch Water Main Route Analysis, CCUD, March 2016.
- Ingrahm 24-inch Water Main Basis of Design, CCUD, April 2016, updated July 2016.
- SR 776/Myakka River Crossing Alternative Analysis, Stantec, March 2016, updated July 2016.

- Technical Report Myakka River 24 inch Watermain Method and Materials Analysis, DMK, March 2016
- Myakka River 24-inch Water Main Replacement Basis of Design, DMK, May 2016, updated July 2016.
- Gulf Cove Myakka River Crossing 24 - inch Water Main Preliminary Environmental Assessment Report, Charlotte County Environmental Group, October 2015.
- Cape Haze Force Main sizing and Rotonda Hydraulic Transmission Model, CCUD, updated March 2016.
- Reclaimed Water (RCW) Hydraulic Model Update and Calibration, CCUD, June 2016.
- Burnt Store Brackish Wellfield Study – Task 1 Evaluation of Existing Data, RMA, October 2015.
- Burnt Store Brackish Wellfield Study – Task 2 Burnt Store Hydrogeologic Testing Program, RMA, December 2015.
- Burnt Store Wellfield Geophysical Logging and Interference Pumping tests, Task 3A Interim Report, RMA Geologic, April 2016, updated August 2016.
- Burnt Store Wellfield Task 4 – Computer Modeling, Draft Report, RMA Geologic, July 2016.
- Burnt Store Wellfield Study Task 6 – Operations and Maintenance Manual, RMA Geologic, July 2016.
- Loveland Grand Master Lift Station and Interceptor Report, Johnson Engineering, May 2016.
- East and West Spring Lake Task 2 Report, TetraTech and Johnson Engineering, December 2015.
- Deep Creek Force Main Size and Route Report, John Edmunds, November 2016.
- Area 1 Preliminary Sewer Report, Giffels-Webster Engineers, April 2016.

1.5 ACKNOWLEDGEMENTS

Stantec acknowledges the following Charlotte County staff for providing guidance, information, and review in preparing this report: Gary Hubbard, Bruce Bullert, David Watson, Joan Brown, Keley Miller, Stephen Bozman, Stephen Kipfinger, Tom Hill, Bruce Schellinger, Richard Arthur, John McGinnis, Ben Jacobson, John Thompson, Tom Cimino, Kirk Kettler, Larry Burns, Henri Lafenetre, Gerard Steimle, Sandra Lavoie, Thomas Dunn, Ruta Vardys, and Delmis Castillo.

2.0 ADMINISTRATION

2.1 COUNTY GOVERNMENT

Charlotte County operates under an elected County Commission and an appointed County Administrator form of government. The Charlotte County Board of County Commissioners (BCC) is the governing body of the County and is composed of one representative from each of the five County Commission Districts. Each member serves a staggered term of four years. The BCC is responsible for the legislative duties of the County government.

The executive branch of the County government falls under the jurisdiction of the County Administrator. The County Administrator is appointed by, and is responsible to the BCC. The County Administrator is responsible for appointing County Department Directors, with final approval by the Board of County Commissioners.

Charlotte County Utilities Department, a department of the Charlotte County Government, provides potable water, wastewater treatment, and reclaimed water for irrigation within its assigned service area. Charlotte County Utilities Department serves more than 58,000 homes and businesses in the Greater Port Charlotte area, El Jobean, Gulf Cove, East Englewood, Rotonda and Burnt Store, as well as bulk customers, including El Jobean Water Association, Riverwood Development, Inc., Encore Super Park, Little Gasparilla Island and the City of Punta Gorda. Additionally, Charlotte Harbor Water Association, Gasparilla Island Water Association, City of North Port Utilities and Englewood Water District can purchase bulk water from Charlotte County Utilities Department in an emergency.

Charlotte County Utilities Department's Mission, Vision, and Values are as follows:

Mission: To provide essential safe, reliable water and sewer service for the community.

Vision: To exceed expectations in the delivery of water and sewer services.

Values:

- Integrity – Serve honestly.
- Customer service – Provide excellent service and achieve real results that earn the public's trust.
- Partnership –Work cooperatively with our coworkers and others for the overall good of the community.
- Innovation – Be committed to innovation and continual learning.
- Stewardship – Be committed to being good stewards of our resources.

Figure 2-1 shows the certificated water service areas of Charlotte County Utilities Department in red.

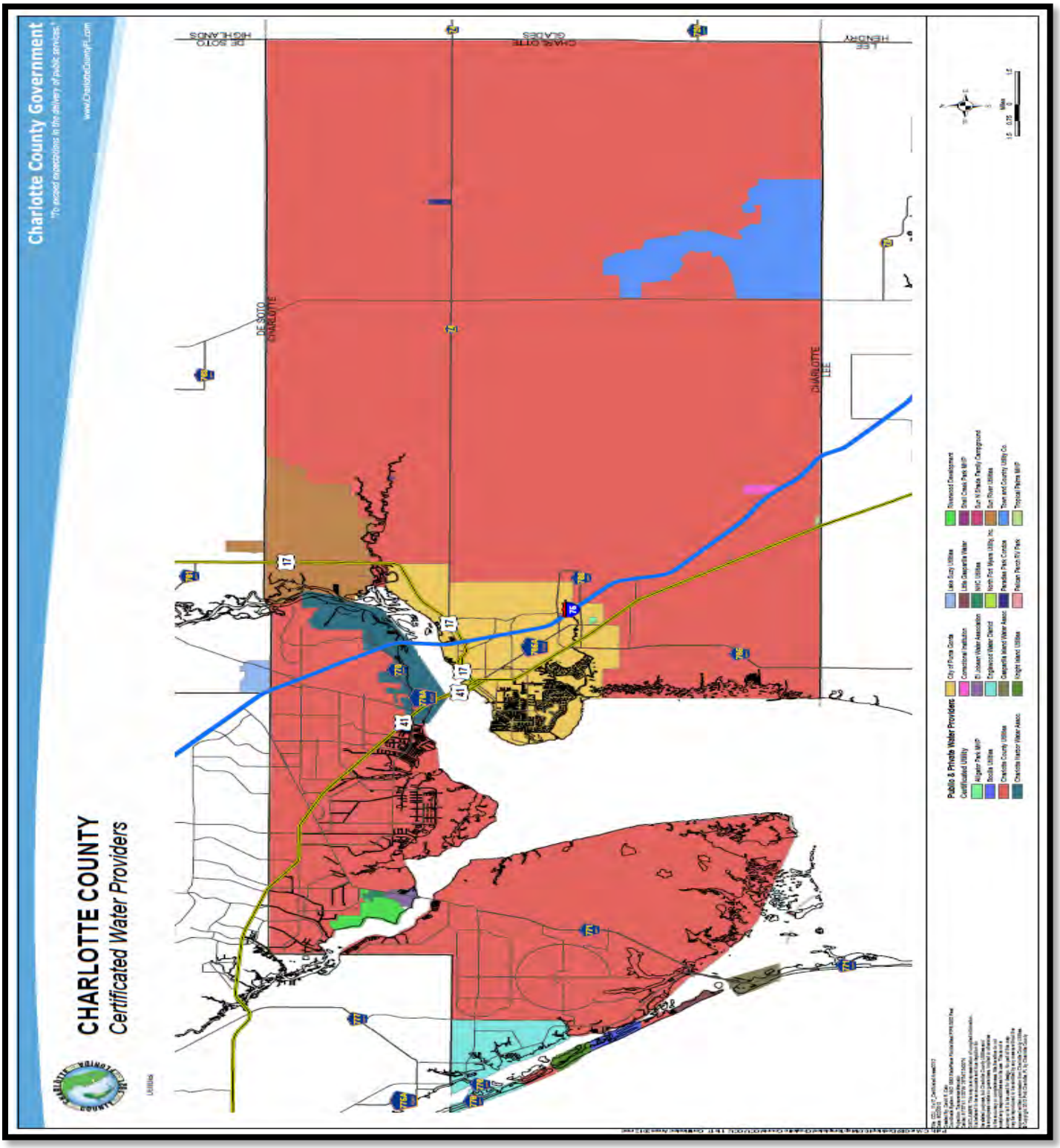


FIGURE 2-1 CERTIFICATED WATER SERVICE AREA

2.2 UTILITY DIVISIONS

The Utilities Department consists of four divisions: Administration, Business Services, Engineering Services, and Operations.

The Charlotte County Utilities Department is led by a Utilities Director, who works under the direction of the County Administrator. Charlotte County Utilities Department Administration Division includes the Utilities Director, Utilities Services Manager, and support staff. The Utilities Services Manager serves as the Assistant Director. The Administration Division manages the overall utility and supervises all other utility divisions. The Director's responsibilities include:

- Planning for water and wastewater needs;
- Development of potable water distribution systems;
- Development of wastewater treatment/collection systems;
- Development of reclaimed water distribution systems;
- Operation of the County's water and wastewater systems;
- Expansion of the County's existing utility service area;
- Water conservation efforts and education programs; and
- Communication – internally and externally

The Business Services Division is managed by the Business Services Manager that includes:

- Customer Service,
- Billing and Collections, and
- Meter Services.

The Engineering Services Division provides engineering and construction observation services to residential and commercial utility customers. The division is managed by the Engineering Service Manager that includes the:

- Preliminary Engineering group,
- Design group, and
- Construction Services group.

The Operations Division, overseen by the Utility Services Manager, is responsible for the operation and maintenance of all County-owned and operated water, wastewater, and reclaimed water facilities, including:

- Water and Wastewater Treatment facilities,

- Water distribution systems including booster pumping stations, storage tanks, fire hydrants, valves, and the entire water distribution piping,
- Wastewater collections including lift stations and wastewater collection systems,
- Reclaimed water distribution including cross-connection control and water quality monitoring
- A new Instrumentation and Controls Group, under a supervisor, was formed from existing I & C technicians in each division, and
- Parts and equipment warehouse.

Financial Services are supplied by the Fiscal Services Division of the Charlotte County Budget & Administrative Services Department and paid through an allocation. The Utilities pays an allocation for five (5) staff, led by a Financial Manager.

The Utilities Department also funds two positions in the County IT Department to assist with upgrading and maintaining hardware and software systems.

In FY 2016, the total number of positions budgeted for Charlotte County Utilities Department was 237. Charlotte County Utilities Department had 224 full-time employees at the end of September 2016. Figures 2-2 and 2-3 show the Charlotte County Utilities Department organizational structure as of September 30, 2016.

2.3 ADMINISTRATION FACILITIES

The Charlotte County Environmental Campus is located on an out-parcel of the East Port WRF. The campus is home to the Utilities Department Administration Building and Operations Service Center/Warehouse, and is shared by Charlotte County Public Works Solid Waste Division, Community Services, University of Florida IFAS Extension Services Division, the Charlotte County/Punta Gorda Municipal Planning Organization and Public Works Mosquito and Aquatic Weed Control.

2.4 CHARLOTTE COUNTY UTILITIES DEPARTMENT WATER CONSERVATION EFFORTS

Charlotte County Utilities Department continues with its outreach efforts, including oversight of the Water Conservation Programs and community education efforts.

2.4.1 WATERING RESTRICTIONS

Charlotte County began once-per-week watering restrictions for potable water in 2001. In early 2008, the County adopted the same once-per-week watering schedule recommended by SWFWMD to be consistent with other utilities in the area and aid in the ease of enforcement. Once a week restrictions expired on June 30, 2010. Charlotte County adopted the SWFWMD's year-round water restrictions, by ordinance, on March 30, 2010. This ensured that Charlotte County will be consistent with SWFWMD's recommendations for year-round restrictions. The District's year-round water conservation measures went into effect July 1, 2010. The District's Phase I Water Shortage Restrictions (Moderate Water Shortage) went into effect on Dec. 1, 2010, except where more strict measures have been imposed by local

governments. In Phase I, Charlotte County Utilities Department continued to follow the year-round water restriction in place in Charlotte County. On August 1, 2013 the Phase I Water Shortage Restrictions were lifted by SWFWMD. Charlotte County has continued year-round water restrictions, which limit irrigation watering to two days per week.

2.4.2 IN-HOUSE ENFORCEMENT OF WATERING RESTRICITONS

Enforcement of watering restrictions was approved by the Board of County Commissioners in early 2008. The enforcement allows Charlotte County Utilities Department staff to progressively enforce water restrictions for Charlotte County Utilities Department customers, including written warnings with educational materials and escalating unauthorized water usage charges for repeat offenses. These charges appear on the customer's water bills. The Sheriff's Office continues to provide enforcement services for non-Charlotte County Utilities Department customers.

FIGURE 2-2 CCUD ORGANIZATIONAL CHART - OVERALL

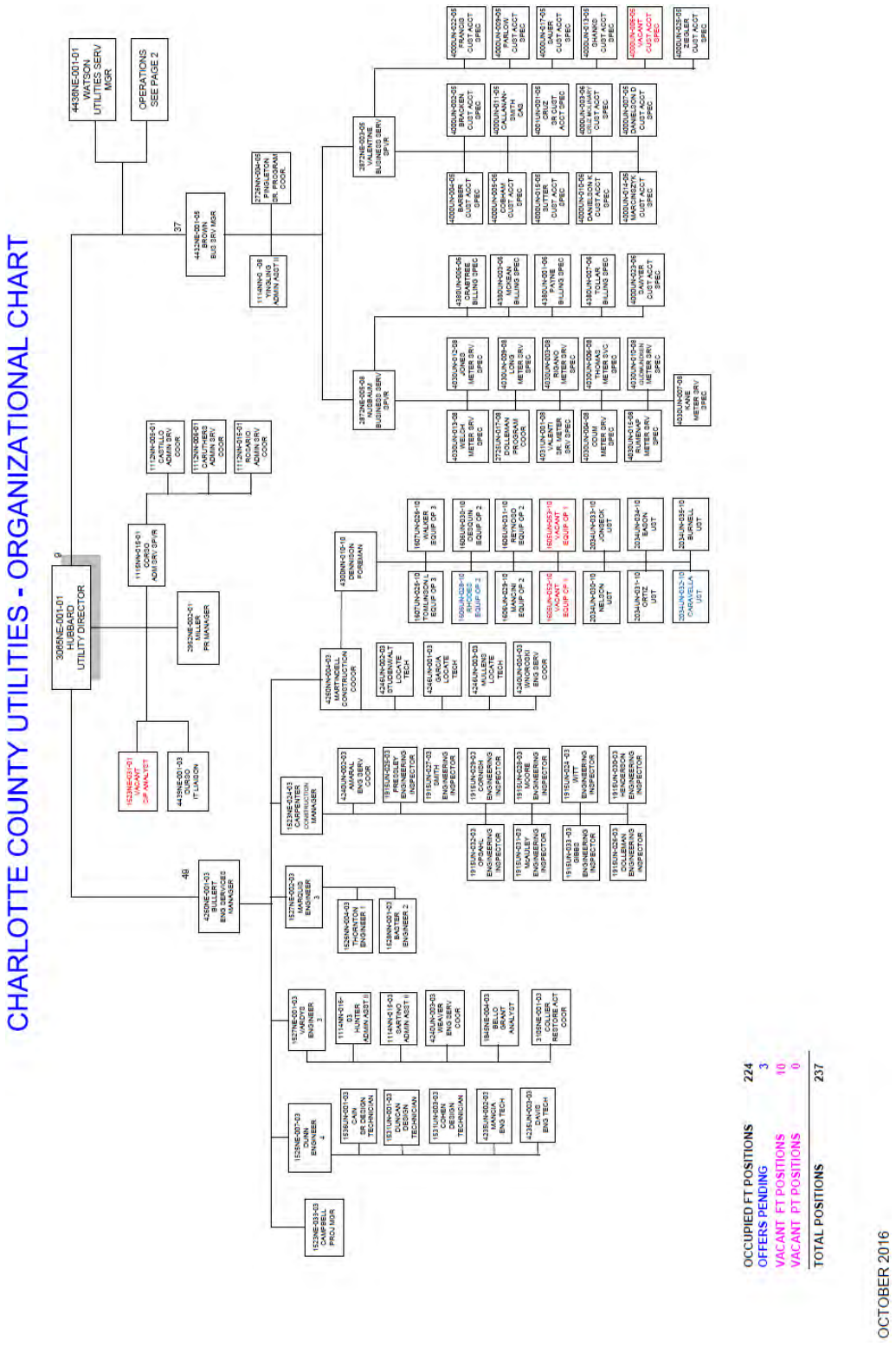
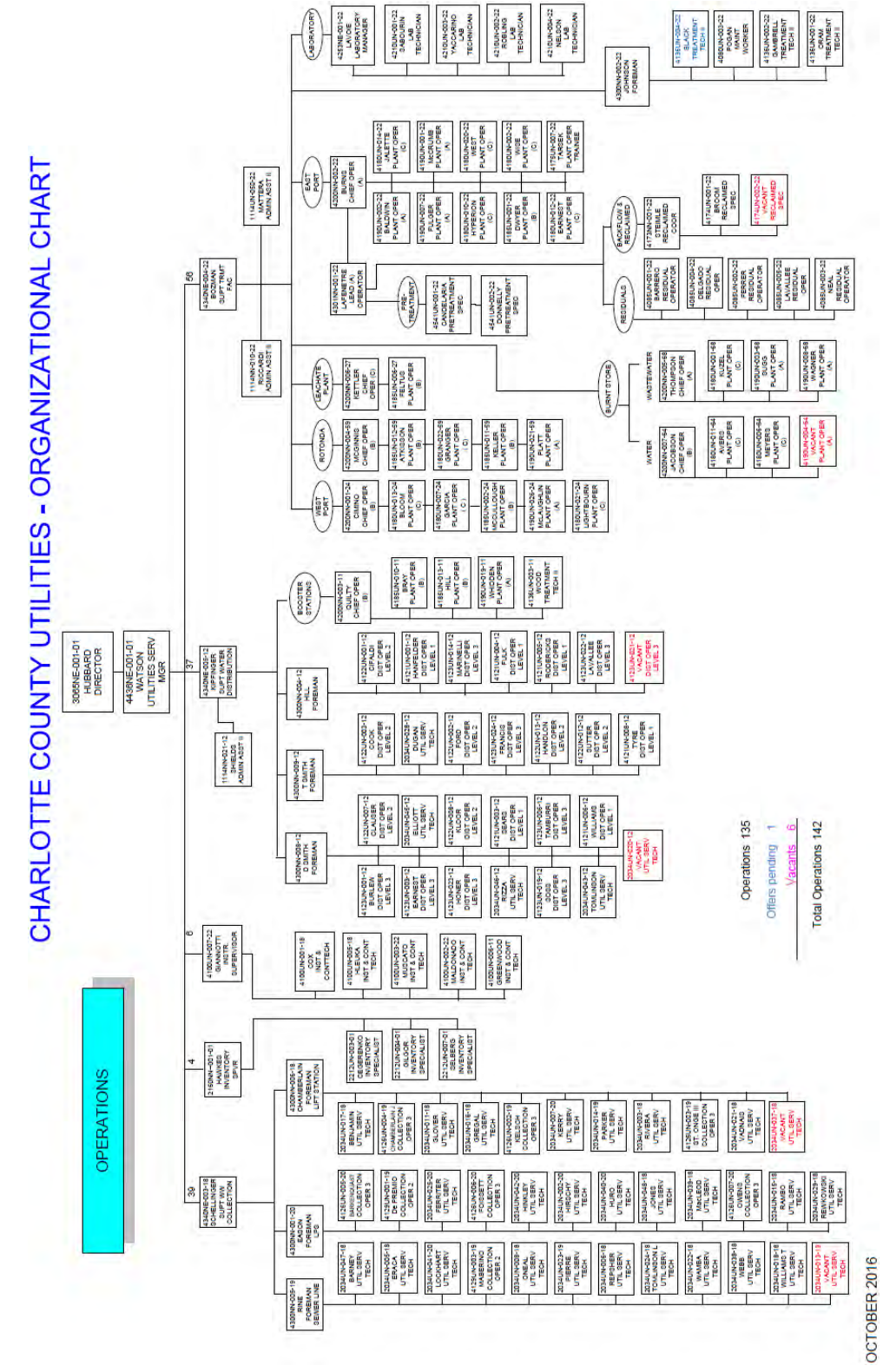


FIGURE 2-3 CCUD ORGANIZATIONAL CHART - OPERATIONS



2.4.3 WATER RESTRICTIONS ORDINANCE

Charlotte County Ordinance 2010-016 adopted the SWFWMD's year-round water conservation measures. The details of the watering restrictions are contained on *www.charlottecountyfl.gov/dept/utilities/pages/conservation-outreach.aspx.*

2.4.4 CONSERVATION-BASED RATE TIERS

As part of a year-long rate study by consultant Public Resource Management Group (PRMG) and as recommended by the Water Management District, Charlotte County Utilities Department's three tier rate structure was replaced with a five-tier system in October 2006. The first tier is 0-5,999 gallons; the highest tier is 25,000 gallons and above.

2.4.5 EMERGENCY WATER CONSERVATION RATES

Emergency water conservation rates were lifted in June 2010 and replaced with Charlotte County Utilities Department Conservation based rates. These rates are still in effect.

2.4.6 REGIONAL RECLAIMED WATER EXPANSION

Plentiful reclaimed water at the East Port WRF and customer demands for irrigation water throughout the central and western parts of the County was the driving force behind Charlotte County Utilities Department's desire to expand its reclaimed water distribution system. The use of reclaimed water for non-potable water use reduces the demand for potable water, surface water, and groundwater for irrigation. A reuse master plan was prepared in 2005 to expand the reclaimed water system. Phase 1 of the expansion project, located in Central County area of the Charlotte County Utilities Department service area was completed in 2009. The Phase I project included two (2) strategically placed 0.5 MG storage tanks and pumping stations along 14 miles of 16-inch diameter reclaimed water transmission main.

Phase 2 of the project was completed in 2014. It included approximately 2 miles of 16-inch transmission pipe, additional storage at the West Port WRF in western Charlotte County, and a booster pumping station along the interconnect between the reclaimed systems for the Rotonda and West Port WRFs.

2.4.7 INDOOR WATER CONSERVATION KITS

Charlotte County Utilities Department has continued to provide customers with Indoor Water Conservation Kits. These are provided during local area community outreach events. The kit includes a low-flow showerhead, bathroom aerators, a kitchen aerator, toilet flapper, leak detection tablets, water conservation literature, and more water-related information.

2.4.8 COMMUNITY OUTREACH

Charlotte County Utilities Department regularly participated in water conservation-related outreach, including bill inserts, customer newsletter, news articles and speaking engagements within the community. Charlotte County Utilities Department has funded for the past several years a portion of the

salary for Florida Yards and Neighborhoods Charlotte County UF/IFAS Extension Program Assistant. Charlotte County Utilities Department and Extension Services work jointly promoting Florida Friendly Landscaping. A demonstration garden donated for their use is located on Charlotte County Utilities Department's Environmental Campus property. The garden is accessible by all Charlotte County residents and is maintained by the Master Gardner's who are given free space at the Campus to better educate the residents.

Charlotte County Utilities Department conducted eleven (11) citizen educational tours during FY 2016 at the Eastport WRF, West Port WRF, Rotonda WRF, Burnt Store WRF, and the BSRO Water Treatment Plant. The tours included the promotion of alternative water sources, conservation, and good stewardship of water resources. The plant tours included:

Wastewater/Water Treatment Process

- Regulatory requirements
- State of the art Membrane Bioreactor (MBR) technology and Reverse Osmosis (RO) technology
- Process for producing reclaimed water
- Treatment and disposal of effluent
- Bio-solids and their disposal
- Environmental impacts of water reclamation
- Alternative water sources

Charlotte County Utilities Department promotes an understanding of its operations through outreach programs such as:

- Water conservation booth at the Charlotte Harbor Nature Festival
- Presentation at the Utility for County Ambassador Program
- Handouts and conservation display at the Environmental Campus and Administration building
- Engineering availability & Business Services presentations to Charlotte County Realtors
- Participation of Safety and Emergency Planning Fair at Heritage Oak Park Association
- Organization of several public educational meetings on US41 Utilities Expansion and East & West Spring Lake Project
- Creation of hydration public announcement video by Utility employees
- Hydration presentations to community groups: Parkside Neighborhood Watch Group, Volunteers of America Veterans Village, Summer day campers at Cedar Point Park, etc.
- Participation at the Southwest FL Water Management District Conservation Expo

- Participation of Government Academy Day
- Conservation Booth on Earth Day at Unitarian Universal Fellowship Center
- Creation of website for East and West Spring Lake Project

Charlotte County Utilities Department added to their community outreach efforts through the addition of a new initiative. The importance of staying properly hydrated "H20 and Your Health" was developed toward the end of Fiscal Year 13/14. The program focuses on the need to stay properly hydrated and Charlotte County Utilities Department TAP water is the most economical way to do so.

2.4.9 CONSERVATION SIGNS

All Utility vehicles have *CONSERVE WATER* stickers on bumpers.

2.4.10 WATER CONSERVATION MONTH

Charlotte County Utilities Department's annual Water Conservation Month program includes a Board of County Commissioners (BCC) proclamation with community outreach/educational displays at Murdock County Administration office and the Charlotte County Utilities Department office year-round.

2.4.11 CHARLOTTE COUNTY UTILITIES DEPARTMENT WEBSITE / SOCIAL MEDIA

Customers can receive the latest water restrictions, conservation tips, and general Charlotte County Utilities Department current events at the Charlotte County web site, *http://www.charlottecountyfl.gov* and at the administration office. Utilities Department launched its Utilities' Facebook page to the public on November 11, 2014.

The public can also receive updated information on projects, services, conservation tips, hydration information and general current events with pictures on Facebook. Facebook also allows the capability to announce public outreach events, educational tours, and even reservations can be accepted online.

2.5 FINANCIAL

Charlotte County Utilities Department is a government-owned enterprise fully funded by customer rates, not by tax dollars. Savings opportunities (or profits) are passed through to the benefit of the utility customers. The Department's policies, rates, and security deposits are established by the BCC. The County Clerk of Circuit Court serves as the accountant and auditor for the BCC and is responsible for the collection and disbursement of County funds.

2.5.1 REVENUES

The rate plan, approved by the BCC in 2006, incorporated projected water and wastewater demands through 2011, based on growth estimates. In September 2010, the rate increase that would have taken effect October 2010 was repealed. The BCC determined that the revenues based upon the 2009 rates will be adequate for Charlotte County Utilities Department to meet the needs of current and future customers

through fiscal year 2014. On June 24, 2014 the Board approved a rate increase (water 0.75%, wastewater 6%) for fiscal year 2015, 2016, and 2017.

In 2010, Charlotte County Utilities Department embarked upon a new fixed based water meter project. This project is designed to replace existing meters with fixed-base meters in a phased approach. The new meter system also extends the life of the meters from 10 to 20 years. At the end of FY 2016, 30,574 or 53% of the accounts were served by the fixed-base meter system. The fixed base meter system goes beyond basic remote reading capabilities to encompass real-time management and operations, event notification, consumer engagement features and a value-driven cost of ownership. Information is securely transferred, by every system end-point, up through the central data collectors. It is then made available to Charlotte County Utilities Department via a graphical and simple to use web interface, integrated with Charlotte County Utilities Department's Computerized Maintenance Management System (CMMS) and Geographic Information System (GIS) software packages. Account-specific consumption data is also presented to Charlotte County Utilities Department customers via a separate, easy-to-use web interface.

The Utility offers multiple methods of electronic payment and electronic billing which has resulted in 25% of the County's customers receiving their bills electronically and 67% of the customers paying their bill electronically.

The HeartShip Program is available to help customers who are faced with a period of personal or family crisis and do not have sufficient money to pay their utility bill. This program is funded by contributions from caring members of the community. The County's Human Services Department, in cooperation with Charlotte County Utilities Department's Business Services division, administers the HeartShip funds.

The total Operations and Maintenance (O&M) revenue for FY 2016 water and wastewater services was $63,170,383. The total O&M connection charge revenue was $2,152,774 and total connection fee revenue was $2,892,402.

2.5.2 CHARLOTTE COUNTY UTILITIES DEPARTMENT CUSTOMER BASE

During FY 2016, the number of active water services increased from 57,281 to 58,158 and the number of active sewer services increased from 34,949 to 35,231.

For planning purposes, the level of water and wastewater service established by Charlotte County Utilities Department is 225 gallons per day (gpd) of water consumption per equivalent residential unit (ERU) and 190 gpd of wastewater flow per ERU. These levels represent peak day usage, including fire flow. However, records over the past year show that annual average day usage patterns are closer to 165 gpd of water consumption and 140 gpd of wastewater flow, per Equivalent Residential Unit.

2.5.3 INSURANCE

Charlotte County Utilities Department is self-insured. The self-insurance is provided by the County and is administered by the Gehring Group, with Mr. Kurt Gehring acting as the agent of record. In addition, Charlotte County Utilities Department is also covered by general property and liability insurance, excess property insurance, boiler and machinery insurance and pollution liability insurance. Utility buildings and contents are covered for up to 100 percent of the replacement cost without depreciation. In Mr. Gehring's opinion, there is adequate insurance on Charlotte County Utilities Department and its facilities. Therefore, the County complies with the bond covenant property insurance requirements as set forth below.

"Insurance - The Issuer will carry such insurance as is ordinarily carried by private or public corporations owning and operating utilities similar to the System with a reputable insurance carrier or carriers, including public and product liability insurance in such amounts as the Issuer shall determine to be sufficient and such other insurance against loss or damage by fire, explosion (including underground explosion), hurricane, tornado or other hazards and risks, and said property loss or damage insurance shall at all times be in an amount or amounts equal to the fair appraisal value of the buildings, properties, furniture, fixtures and equipment of the System, or such other amount or amounts as the Consulting Engineers shall approve as sufficient."

"The Issuer may establish certain minimum levels of insurance for which the Issuer may self-insure. Such minimum levels of insurance shall be in amounts as recommended in writing by an insurance consultant who has a favorable reputation and experience and is qualified to survey risks and to recommend insurance coverage for persons engaged in operations similar to the System."

"The Issuer shall, immediately upon receipt, deposit the proceeds from property loss and casualty insurance to the credit of the Revenue Fund. The proceeds from property loss and casualty insurance shall be applied as follows: (A) if such proceeds, together with other available funds of the Issuer, are sufficient to repair or replace the damaged portion of the System, such proceeds and other available funds shall be deposited to the credit of the Renewal and Replacement Funds and, together with any other available funds of the Issuer, applied to such repair or replacement; or (B) if such proceeds, together with other available funds of the Issuer, are not sufficient to repair or replace the damaged portion of the System or if the Issuer makes a determination in accordance with Section 5.07 hereof that such portion of the System is no longer necessary or useful in the operation of the System, such proceeds shall (1) if such proceeds equal or exceed $50,000, (a) be applied to the redemption or purchase of Bonds or (b) be deposited in irrevocable trust for the payment of Bonds in the manner set forth in Section 9.01, provided the Issuer has received an opinion of Bond Counsel to the effect that such deposit shall not adversely affect the exclusion, if any, from gross income of interest on the Bonds for purposes of federal income taxation, or (2) if such proceeds are less than $50,000, be deposited in the Revenue Fund."

2.6 RATE COMPARISON

The County investigated the rates and rate structure for various neighboring utility systems that provide residential service. The results of this comparison as of October 2016, assumes that water service consists

of delivery of 4,000 gallons of water per month through a standard (⅝ inch by ¾-inch) meter and that sewer service corresponds with flows of 4,000 gallons of water per month. The results of the rate comparisons are set forth in Table 2-1.

Table 2-1 Rate Comparison

Utility Systems	Water Charge ($) (1)	Wastewater Charge ($) (1)	Combined Charges ($) (1)
Charlotte County Utilities Department	-	-	-
Current rates as of October 1, 2016	41.30	51.39	92.69
Other Neighboring Utilities	-	-	-
City of Cape Coral	32.92	57.23	90.15
City of Clearwater	28.33	35.68	64.01
DeSoto County	46.63	57.22	103.85
City of Fort Myers	28.58	71.29	99.87
City of Marco Island	52.71	51.30	104.01
City of Naples	13.40	35.18	48.58
City of North Port	34.14	53.06	87.20
City of Punta Gorda	26.95	32.37	59.32
Collier County	32.83	50.61	83.44
Englewood Water District	23.96	35.63	59.59
FGUA – Golden Gate (Collier County)	52.32	64.49	116.81
Hillsborough County	27.04	31.35	58.39
Lee County	25.67	43.85	69.52
Manatee County	17.17	39.44	56.61
Okeechobee Utility Authority	37.90	48.75	86.65
Sarasota County	25.83	45.05	70.88
St. Lucie County	36.45	51.97	88.42

(1) The reflected residential rates are in effect October 2016 and are exclusive of taxes or franchise fees, if any, and reflect rates charged for inside the city service, unless otherwise noted.

2.7 LARGE WATER USERS

Table 2-2 shows a list of the system's ten largest water consumers and the corresponding percentage of total water consumption for each.

Table 2-2 Large Water Users (FY 2015/2016)

Water Customer	Total Water purchased (in thousands of gals.)	Percentage of Total Water Sales
Riverwood (1)	49,702	1.54%
Peace River Regional Medical Center	28,347	0.88%
El Jobean Water Association (1)	25,481	0.79%
Charlotte County School Board	21,642	0.67%
Fawcett Memorial Hospital	20,508	0.64%
South Port Square	19,481	0.60%
Hampton Point Limited Partnership	15,606	0.48%
Colonial Construction Co, Inc.	14,830	0.46%
Murdock Circle Apartments	14,233	0.44%
Little Gasparilla Water Utility (1)	13,267	0.41%
Total Ten Largest Users	223,097	6.92%
All Other System Users	3,002,681	93.08%
Total FY 2015/2016 System Water Sales-All Customers	3,225,778	100.00%

(1) Denotes water customers only, all others listed are both water and sewer customers of the system.

2.8 PLANNING RECOMMENDATIONS

2.8.1 ADMINISTRATION

Recommendation: Continue Charlotte County Utilities Department's vision to ensure safe, reliable utility service at fair and reasonable rates.

Recommendation: Continue developing and updating standards for water and sewer construction to ensure the most effective use of capital improvement funds.

Recommendation: Continue the development of options for water, sewer, and reclaimed water service in the County to meet a growing demand for municipal utility services.

Recommendation: Continue with the development of the Utilities' Information System functions to update/replace software and computer equipment to increase operating efficiencies and cost savings.

Recommendation: Continue to explore regional solutions to water and wastewater service problems for mutual benefit to Charlotte County and adjoining counties and cities.

2.8.2 WATER SYSTEM

Recommendation: Continue to update the water system computer model and use it as a planning tool for future water system improvements.

Recommendation: Continue the fixed base Water Meter Replacement Program.

Recommendation: Continue the extension of the new 24-inch transmission main from the Myakka River Bridge to the Rotonda storage tank to serve the growing demand for water in western Charlotte County.

Recommendation: Continue to integrate acquired utilities into the overall Charlotte County Utilities Department water system to maximize reliability and reduce costs to the Charlotte County Utilities Department customers.

Recommendation: Explore ways to augment the demands on the PRMRWSA treatment facility through economically feasible means including new water sources.

Recommendation: Continue to make improvements at the Water Storage Tank/Booster Pumping Station Facilities to increase control of the pumps and reliability.

Recommendation: Plan for future water demands in the South County Service Area by analyzing the water distribution system using the computer water model completed in 2004, and most recently updated in 2014.

Recommendation: Complete the Burnt Store Brackish Wellfield Report.

2.8.3 WASTEWATER SYSTEM

Recommendation: Implement improvements and capacity upgrades for the BS WRF as outlined in the latest Capacity Analysis Report (CAR) and Operating Permit.

Recommendation: Continue the scheduled repair of sanitary lift stations that have deteriorated due to use and hydrogen sulfide presence.

Recommendation: Use the wastewater lift station and force main computer model to assess the need for upgrades to the system based on anticipated demand for services.

Recommendation: Continue to televise gravity sewers and smoke test to locate inflow/infiltration (I/I). Repair gravity sewers and manholes as required.

Recommendation: Continue to provide for the disposal of septage at the East Port WRF.

Recommendation: Seek ways to increase the use of public access reuse water currently produced by Charlotte County Utilities Department water reclamation facilities.

Recommendation: Install odor control systems at lift stations where hydrogen sulfide concentrations cause odors and deterioration of structures.

Recommendation: Continue to upgrade the East Port WRF to meet flow.

Recommendation: Expand public access reuse for the Burnt Store WRF reclaimed water.

Recommendation: Continue construction and plan for the next phases of sewer expansion in the Port Charlotte area.

2.8.4 RECLAIMED WATER DISTRIBUTION SYSTEM

Recommendation: Continue construction of Phase 3 of the reclaimed expansion project that was begun in FY2016 with the construction of a transmission main from the West Port WRF to the Rotonda East Reclaimed Booster Pumping Station.

Recommendation: Complete the design and construction of a future Phase 3 expansion project that includes conversion of a 95-million gallon reject storage pond at the East Port WRF to reclaimed storage and increased pumping capacity at the East Port WRF.

Recommendation: Complete preparation of a Master Reclaimed Water Permit for the South County reclaimed water system.

Recommendation: Prepare a hydraulic model to predict the impact of future demand on the South County reclaimed water transmission system.

Recommendation: Determining the feasibility of creating reclaimed water storage at the Burnt Store WRF.

3.0 WATER TREATMENT AND DISTRIBUTION

The Charlotte County Utilities Department water distribution system consists of two independent systems. The larger system that serves the central and western part of Charlotte County is supplied with water from the Peace River/Manasota Regional Water Supply Authority (PRMRWSA). The smaller system, that serves the extreme southern area of Charlotte County, is supplied by water from the Charlotte County Utilities Department-owned Burnt Store Reverse Osmosis (BSRO) Water Treatment Plant. Charlotte County Utilities Department purchased or produced an average of 11.0 million gallons per day (mgd) of water in FY 2016.

The Charlotte County Utilities Department water distribution system is comprised of the following major components:

- Regional transmission mains to transport water from the PRMRWSA Facility to the Charlotte County Utilities Department distribution system with flow meters at connections to the Charlotte County system,
- Charlotte County Utilities Department transmission mains that supply water to the distribution mains from the regional transmission mains,
- Transmission mains in southern Charlotte County that transport water from the BSRO Water Treatment Plant to distribution mains in southern Charlotte County and extreme north Lee County,
- Distribution mains that supply water from the transmission mains to customers,
- Fire protection assemblies and fire hydrants that may also be used for flushing the distribution system for maintenance purposes,
- Isolation valves that allow the operators to shut off the flow in pipe section for maintenance purposes,
- Ground storage tanks that provide storage for peak customer demand, firefighting, and periods when treatment plants are not producing water,
- Disinfection facilities to maintain appropriate disinfection levels in the distribution system for delivery to the consumer,
- Booster pumping stations that are located adjacent to storage tanks and system disinfection facilities.
- 24 inch check valve on main supply line from PRMRWSA to maintain system pressures and reserve water supply in the event the PRMRWSA is unable to supply water and pressure during emergencies.

3.1 WATER DISTRIBUTION SYSTEM SERVED BY PRMRWSA

The PRMRWSA owns and operates the Peace River/Manasota Regional Water Supply Facility (PRMRWSA). The PRMRWSA was created by agreement on February 26, 1982, by Charlotte, DeSoto,

Manatee, Hardee and Sarasota Counties. Hardee County ceased to be a member the following year. The initial term of the agreement was 35 years, renewable for an equal consecutive term; however, a new Master Water Supply Contract was executed in 2006 by the four members and one customer, Charlotte County, DeSoto County, Manatee County, Sarasota County and the City of North Port.

Members are not allowed to sell water supplied by the PRMRWSA outside of the member's service area. Each member does have an equal right to reasonably increase its allocation of water if the member can demonstrate the need for the increase because of future water demands, or to meet current demands that cannot be met by the current supply. The PRMRWSA must be able to obtain all environmental permits for the expansion to meet demands.

Water is supplied to Charlotte County Utilities Department through four PRMRWSA-owned regional transmission mains. The original pipeline is 36 inches in diameter and is supplemented by a 12-inch line. In September 2007, a 24-inch main became operational. In August 2012, a 42-inch main became operational.

At the end of FY 2016, Charlotte County Utilities Department's had 55,727 customer accounts in Central/Western County distribution system and 2,431 Burnt Store customer accounts. The two system contained 1,352 miles of water mains, ranging in size from 2 to 12 inches in diameter for the distribution mains, and from 16 to 24 inches in diameter for the transmission mains. Ninety-eight percent of the distribution piping is 4 to 12 inches in diameter.

There were 4,462 fire hydrants at the end of FY 2016.

Charlotte County Utilities Department has interconnects with neighboring water supply systems and districts that are described in sub-sections 3.1.1 through 3.1.3 below.

3.1.1 PUNTA GORDA INTERCONNECT

The Phase 1A Punta Gorda Interconnect (Kings Highway/Shell Creek Loop) consists of over twelve (12) miles of pipeline with a minimum design capacity of 6.0 mgd, above ground storage, high service pumping, chemical adjustment facilities, and tie-in points with Charlotte County Utilities Department. The geographical end points of the interconnect are the PRMRWSA's 24-inch Regional Transmission System (RTS) on Kings Highway at the Charlotte/DeSoto County line and the City of Punta Gorda's Shell Creek Water Treatment Facility on South Washington Loop Road in Charlotte County. The construction of Phase 1A was completed in October 2012. The interconnection has been used to supply water to Punta Gorda and receive water into the Charlotte County distribution system from the Punta Gorda system.

In FY 2016, Punta Gorda supplied 140 million gallons of water to Charlotte County and Charlotte County supplied 124 million gallons to Punta Gorda through this interconnect.

3.1.2 ENGLEWOOD WATER DISTRICT INTERCONNECT

The Englewood Water District (EWD)/Charlotte County Utilities Department interconnect not only provides redundancy for both water systems in the event of an emergency, but also has the potential for either utility to buy or sell excess water, if needed. The EWD interconnect facilities include two 40 hp booster pumps with a diesel generator for backup power supply. Monitoring at the interconnect facility includes chlorine residual, pressure, and flow. There is no storage or chemical dosing at this facility. By opening or closing valves, the EWD interconnect pumping station can pump water in either direction, i.e. to or from EWD. However, both entities must get permission from, and will be billed by, the PRMRWSA to receive excess water.

In FY 2015 Charlotte County completed minor modifications to the pumps and piping system that allows this facility to increase water circulation in the extreme western portion of Charlotte County Utilities Department's service area. This increased circulation at 750 gallons per minute has increased system pressure and chlorination residual levels in the area that are required to meet State delivery disinfection requirements.

Future improvements include covering the pumps and piping with a roof to protect equipment.

3.1.3 OTHER INTERCONNECTS

As a further safeguard for uninterrupted supply of water to Charlotte County citizens, Charlotte County Utilities Department has two (2) additional emergency interconnects with adjacent water distribution systems, two (2) permanent connections with the City of North Port water system, and one (1) connection with the Little Gasparilla Island. The two (2) emergency interconnects are with Charlotte Harbor Water Association and Gasparilla Island Water Association.

The connection to the Little Gasparilla Island was completed in FY 2015. Water is delivered to the island community through an eight (8) inch pipe that was installed under the inter-coastal waterway. Purchase of water by Little Gasparilla Island is made by flow through a master meter. The water distribution system is not owned or maintained by CCUD.

3.1.4 PEACE RIVER/MANASOTA REGIONAL WATER SUPPLY FACILITY

Charlotte County is a member of the PRMRWSA which is located along the Peace River in DeSoto County at approximately four (4) miles north of Charlotte County. The source water, the Peace River, is treated to remove color and turbidity, and is disinfected. The water produced by the PRMRWSA meets current U.S. Environmental Protection Agency (EPA) and the Florida Department of Environmental Protection (FDEP) drinking water requirements.

Treated water is distributed to member customers using pumps and transmission mains. The Authority completed a Regional Expansion Program in 20o9 which included a six (6) billion gallon reservoir. The reservoir was designed to store water during periods of high Peace River flow for use when the Peace River flow is low and the withdrawal limit from the river is reduced or not permitted. The allocated cost to Charlotte County for the expansion was approximately $27.7 million.

Charlotte County's allocation of the PRMRWSA produced water is currently 16.1 million gallons per day (mgd) Annual Average Daily Flow (AADF), 18.757 mgd for the peak month, and 22.54 mgd for the maximum day. Each member of the Authority has the right to request an additional allocation if they can demonstrate a need.

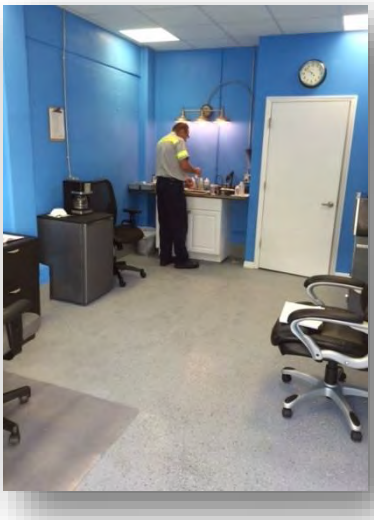
3.1.5 CHARLOTTE COUNTY UTILITIES DEPARTMENT CENTRAL/WEST COUNTY DISTRIBUTION

The Central/West County Distribution System consists of six above-ground, pre-stressed concrete storage tanks (two have been decommissioned) with an active combined capacity of 10 MG, four (4) booster pumping stations, and approximately 1,400 miles of water pipes between 2 and 24 inches in diameter. The following sections describe the system storage tanks and booster pumping stations that are located in the Central/Western Charlotte County.

3.1.6 WATER BOOSTER PUMPING STATIONS

Water booster pumping stations are strategically located around the distribution system and adjacent to storage tanks. The active booster pumping stations were evaluated by Stantec personnel on December 6, 2016. All of the equipment at the booster pumping stations is secured by chain link fences with barbed wire tops. All booster stations have the ability to increase the disinfectant concentrations in the discharge water through sodium hypochlorite and ammonium sulfate addition.

The following sections describe the operating booster pumping stations and their condition.



3.1.6.1 Gulf Cove Booster Station

Built in 1980, the station has four (4) pumps, one each rated at 50, 60, 75 and 100 horsepower (HP). The station receives flow through an aging 12-inch ductile iron pipe under the Myakka River.

The general condition of the station is good. The discharge water of the station had the following conditions at the time of the site visit:

- Flow = 1,980 gallons per minute (gpm)
- Pressure = 81 pounds per square inch (psi), setting controls the speed of the pumps

- Chlorine disinfection concentration = 4.06 parts per million (ppm)
- pH = 7.34
- Pumps (VFD) were operating at 58 Hz

The following improvements were made in the past few years:

- 2012 - Florida Power and Light (FPL) electrical service was replaced
- 2013 - Pump check valves replaced
- 2014 - Electrical switch gear replaced
- 2014 - PLC Telemetry system controls upgraded for chemical system
- 2014 - The tank exterior was repainted

- 2015 – Installed new chemical feed line between the chemical building and the chemical feed point at the above ground piping assembly leaving the site.
- 2015 - Installed monochloramine and ammonia analyzer to better adjust disinfection chemical addition. The analyzer is serviced and calibrated quarterly.
- 2015 – 5-year tank inspection, good report from CROM Engineering and Construction Services. Next inspection due 2020.
- 2015 - Installed raised bed septic disposal system to accommodate on-site bathroom facilities
- 2016 - CCUD staff renovated the old chemical storage and metering rooms into an operations room and a restroom. The use of these previously unused rooms has given the operator a safe, quiet place to work.
- November, 2016 - Upgraded PLC to include pump operations. Utility service personnel did all the work.

The following deficiencies were noted:

- A new water feed pipe across the Myakka River should be installed. Note: Planning for new water feed pipe was begun in FY 2016.

3.1.6.2 Rotonda Booster Station

Built in 1973, the station has two (2) 100-hp pumps and two (2) 65-hp pumps. The station has four (4) metering pumps for injection of ammonium sulfate and sodium hypochlorite, which is stored in four (2) 300-gallon bulk storage tanks and two (2) 1,000-gallon bulk storage tanks, respectively.

The general condition of the station is good. The station was in operation on the day of the site visit with the following observed readings on the water being supplied to the distribution system:

- Flow = 2,120 gpm
- Pressure = 75 psi, setting controls the speed of the pumps
- Chlorine disinfection concentration = 3.97 ppm
- pH = 7.20
- The storage tank level was 15.3 feet out of a total 30 feet.

The following improvements were made in the past five (5) years:

- 2013 - New pressure sustaining valve
- 2013 - New influent flow meter
- 2013 - New No. 4 pump
- 2013 - New No. 2 pump motor
- 2013 - Standby generator was moved from another Charlotte County Utilities Department facility to the Rotonda Booster Pumping Station. The old propane gas, stand-by pump engine was disengaged when the generator was installed.

- 2013 - New sodium hypochlorite tanks were installed.
- 2015 - 16-inch discharge flow meter was replaced.
- 2015 - Discharge isolation valve was installed to allow complete isolation of the pumping station from the distribution system.
- 2015 - New access gate was underway on the day of the visit.
- 2015 - Replace Sodium Hypochlorite tank.
- 2015 - New chlorine feed pump skids, one for pre-storage tank disinfection and one for post-storage tank disinfection of water.
- 2016 - A new PLC was constructed by CCUD personnel to collect data for reports. The new PLC is connected to SCADA and controls, all pumps, and chemical feed system.
- 2016 - Storage tank was drained, cleaned, and inspected per FDEP protocol of every 5 years.

The following deficiencies were noted:

- The exterior of the tank should be repainted (currently scheduled for 2017).
- Install monochloramine and ammonia analyzer as is currently installed at all of the other pumping stations.
- Remove old water plant that is adjacent to the water storage tank. A contract was awarded for demolition of old plant. Start early 2017.
- Complete 24-inch water transmission main from Ingraham Street to the Rotonda storage tank.
- Add two new shelter roofs for ammonium tank and equipment storage.

3.1.6.3 Walenda Booster Station

Built in 1994, the station now has two (2) 100 hp and three (3) 75 hp pumps and liquid-handling facilities for chlorine and ammonia injection and storage to improve chemical security and operator safety.

The general condition of the station is good. The discharge water of the station had the following conditions at the time of the site visit:

- Flow = 3,900 gpm (max. capacity 5,200 gpm)
- Pressure = 82 psi, the pressure setting controls the speed of the pumps
- Chlorine disinfection concentration = 3.99 ppm
- pH = 7.38

The following improvements were made in the past eight years:.

- 2014 - Cleaning and inspection of the interior of the concrete storage tank.
- 2015 - Painting of the exterior of the storage tank.
- 2015 - Replace Pump No. 4 and its suction valve.
- Ongoing - Checking stratification of storage tanks to confirm mixing in the tanks.
- 2016 - New chlorine storage and containment area.
- 2016 - Removed ammonia scales, converted to ultra-sonic volume measurement.

The following deficiencies were noted:

- The discharge flow meter has adjacent fittings that reduce the accuracy of the flow meter. The piping arrangement also does not allow for the optimum location of disinfection chemical injection because the pipe is buried. A stainless steel valve mixer has been purchased. Installation of the mixer and changes to the flow meter assembly is scheduled for construction in 2017. The new flow meter assembly will resolve both of those issues.

3.1.6.4 Port Charlotte Golf Course Booster Station

Built in 1966 the station had undergone a rehabilitation transformation since 2009. The general condition of the station is good with updated equipment and building furnishings.

The discharge water of the station had the following conditions at the time of the site visit:

- Flow = 2,034 gpm
- Pressure = 80 psi, setting controls the speed of the pumps
- Chlorine disinfection concentration = 4.0 ppm
- pH = 7.9

The station provides local storage and pressure boosting capability for the Central County service area east of Tamiami Trail. It can also boost chlorine residual.

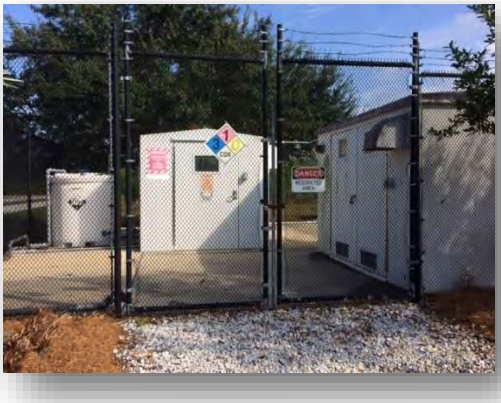
The following major upgrades were made in the last five (5) years:

- 2014 - The storage tank was cleaned and inspected; no deficiencies in the tank wall were noted in the inspection report
- 2016 - Painted storage tank
- 2014 – A combination chlorine and ammonia instantaneous reading instrument was installed between the water storage tank and the pump suction. The instrument determines if only chlorine addition is necessary to achieve the desired chloramine disinfection concentration.
- 2014 – A 70-foot pole/antennae combination was installed at the site to assist with the County's automatic meter reading initiative.
- 2015 - Replaced chemical feed lines from storage tanks to pumps to injection points.

The following deficiencies were noted:

- Patch building walls where new chemical feed lines have been installed.

3.1.7 DISINFECTION ADDITION



The Central/West County distribution system contains one disinfection booster station in a remote area of the West County. The Ingraham Boulevard chlorine/ammonia injection station monitors chlorine residual and injects addition disinfection chemicals to maintain the FDEP required levels. The injection station is enclosed in a six (6) foot chain link fence with barb wire on top.

A total chlorine residual of 4.0 milligrams per liter (mg/L) is maintained by injecting chlorine at a rate that is paced by the flow passing the station. The chlorine level and local water pressure is monitored continuously. A new chloramine addition control was installed in FY 2016.

3.1.8 STORAGE

Ground level water storage tanks are typically located at water treatment plants and booster pump stations. The tanks are designed to be filled by system pressure. The water is pumped from the storage tank and pressurized to the desired system pressure before re-entering the distribution system. The storage tanks provide the following functions for the Charlotte County Utilities Department water supply system:

- Store water in case of an interruption of service at the water treatment plant or a main transmission pipe failure
- Provide local water to booster pumping stations to provide adequate pressure for Charlotte County Utilities Department customers and for firefighting
- Meet peak demand by storing water during low-use periods for release during high-use periods.

There are four (4) operational water ground storage tanks in the main (Central/West County) Charlotte County Utilities Department service area, ranging in capacity from 1 MG to 5 MG, for a total capacity of 10 MG. The list of storage tanks and their capacities are shown in Table 3-1 below.

Table 3-1 Tank Capacities		
Booster Station Name	Ground Storage Tank Capacity (MG)	Pumps
Golf Course	1	2
Gulf Cove	2	4
Rotonda	5	4
Walenda	2	5
Total	**10**	**15**

In addition, there are six (6) 2-MG ground storage tanks (for a total capacity of 12 MG) located at the PRMRWSA. This stored amount of treated water is available to Charlotte County and the other Authority members for water supply for peak use such as fire flow or in case of a temporary loss of treatment at the PRMRWSA.

3.1.9 CONSUMER CONFIDENCE REPORT

As required by federal and state regulations for all utilities, Charlotte County Utilities Department provides accessibility to every customer to view electronically or obtain a hard copy of the annual water quality report, also known as the Consumer Confidence Report (CCR). The report tabulates the results of water quality testing to identify the level of any contaminants detected in the drinking water. All water, including bottled water, originates from rivers, lakes, streams, ponds, reservoirs, springs or wells. As water travels over land or through the ground, it dissolves naturally occurring in minerals, and it can also absorb substances that originate from animal or human activity. These contaminants may include:

- Microbial contaminants, such as viruses and bacteria;
- Inorganic contaminants, such as salts, metals, pesticides, and herbicides; which may come from a variety of sources such as agriculture, urban storm water runoff, and residential uses;
- Organic chemical contaminants, including synthetic and volatile organic chemicals; and
- Radioactive contaminants, which can be naturally occurring.

To ensure that tap water is safe to drink, the Environmental Protection Agency (EPA) prescribes regulations, which limits the concentrations of certain contaminants in water provided by public water systems. All drinking water, including bottled water, may reasonably be expected to contain at least small amounts of some contaminants. The presence of contaminants does not necessarily indicate that the water poses a health risk.

The results, as reported in the latest Customer Confidence Report, indicate the levels of tested water contaminants in the Charlotte County Utilities Department service area are safely below the maximum contaminant level allowed by federal and state regulations and orders, and in most cases, well below the level.

The most recent Consumer Confidence Report is available at www.CharlotteCountyfl.gov/dept/utilities/pages/reports.

3.1.10 OPERATIONS

Treated water from the PRMRWSA enters the main Charlotte County Utilities Department service area via three metered regional transmission mains. Although the system is looped, the flow generally continues to the Golf Course and Walenda Booster Stations, then to the Gulf Cove Booster Station, and lastly to the Rotonda Booster Station. General practice is to fill the Rotonda five (5) MG tank through a 16-inch transmission main from the Walenda Pumping Station to the Rotonda Storage Tank. This 16-inch transmission pipe also serves customers along its route. Chlorine and ammonia are injected into the system to maintain the water quality standards so it can be safely stored in the ground storage tanks. Each tank is re-filled when its level falls below the two-thirds point, unless there is reason for caution, such as during hurricane season. In such emergency situations, each tank is generally kept full.

Charlotte County Utilities Department system's integrity is maintained by sound operating and maintenance processes implemented by a well-trained staff. Anticipated capacity needs are met through careful forecasting of demands and provided by capital improvements planning. The Water Distribution workgroup is responsible for dozens of operational processes with the common goal of maintaining adequate flow rate, volume, quality, and pressure to Charlotte County Utilities Department customers. Charlotte County Utilities Department has a proactive training program for its staff. The County uses the industry recognized University of California/Sacramento study books to assist staff in obtaining their operator licenses. Taking this course is a requirement for Charlotte County Utilities Department staff taking the state certification tests.

3.1.11 MAINTENANCE

Charlotte County Utilities Department performs three (3) types of maintenance on the system: predictive, preventive, and corrective. In predictive maintenance, tests and observations are performed on equipment to predict when failure of the component might occur. An example of a Charlotte County Utilities Department predictive maintenance procedure occurs during the daily inspection of booster stations. While at the station, the operator takes infrared readings on motors and other components to measure abnormally high temperature readings. In so doing, an impending failure can be averted by addressing the cause of the temperature spike. Predictive maintenance is more suitable for equipment that is in essentially continuous operation, where abrupt failure would prove detrimental.

Preventive maintenance involves exercising components, such as valves and hydrants, changing lubricants, and replacing wearable parts on a schedule of time or usage. Preventive maintenance is more suitable for equipment that must be ready to be operated, even though it is typically not in use.

Corrective maintenance occurs when there is an abrupt failure due to pipe age or when the system is compromised by others, such as a cable installer puncturing a water main. Corrective maintenance focuses on restoring service as soon as possible, even with a temporary repair to be upgraded later. The majority of maintenance calls are corrective in nature.

Among the activities performed during FY 2016 were replacement of 9 hydrants and maintenance of 314 hydrants, including exercising, flow testing and painting; repairs of 42 line breaks on pipes of three (3) inches or larger; and replacement of two (2) valves and maintenance of 716 valves.

Existing design standards for pipes, valves, and hydrants allows the maintenance staff to be more efficient and cost effective in maintaining the system.

3.1.11.1 Service Orders

All maintenance begins with a service order (SO). Predictive and preventive SOs are generated by staff, so there is flexibility as to when they are performed. They are scheduled at such a time to be most efficient in terms of the availability of resources, especially labor.

Corrective SOs are usually generated by a customer phone call. During normal office hours, a Charlotte County Utilities Department dispatcher documents the information and contacts the appropriate repair person to respond. During off-hours, an answering service records the information and contacts the on-call line technician for response. The on-call line technician has the resources to organize a four-person crew after-hours, if needed. The level of service, from the customer's perspective, is that a live voice will respond to an emergency call, 24 hours a day, seven (7) days a week. Some corrective service orders are generated by a telemetered alarm when certain parameters are breached; for example, high water level at a storage tank. The telemetry system sends a message to the cell phone of the Chief Operator in charge of the booster stations. This procedure allows for a problem to be addressed before there has been a loss or reduction of service to the customer.

The response time by the repair crew, even to the farthest point of the service area, is less than 45 minutes. This level of service is maintained in part by distributing crews geographically to reduce response distance. To maintain this level of service during off-hours, emergency staff is equipped with cell phones to expedite communication, and wireless-enabled laptop computers. Every crew is in a vehicle that is equipped with the materials and tools to perform a wide range of maintenance activities, reducing the need for trips to the warehouse. In addition, warehouse personnel are on call 24/7 and are equipped to deliver materials and parts, as needed.

In addition to daily visual inspection, water quality tests and temperature checks, each booster station is visited at least monthly to perform mechanical and electrical tests, greasing and lubrication. Staff is able to perform repair and replacement of booster station pumps and motors, rather than relying on outsourced services, which are expensive and not as responsive. Each of the in-service booster pumping stations has a portable gantry onsite to enable pumping units and motors to be pulled and replaced quickly.

As a result of the maintenance practices in place, the booster stations, especially the pumps, are operating efficiently and during FY 2016 there were no service interruptions because a pump suddenly ceased to operate.

Water valves have been surveyed using a global positioning system (GPS). This allows for any valve to be quickly located if it needs to be shut off. In FY 2016, 716 valves were exercised to increase reliability if needed in a corrective maintenance mode. The new fixed base water meters are maintained and warranted for a 20-year replacement cycle, which is the optimum time for replacement. In FY 2016, Charlotte County Utilities Department replaced 28,452 water meters and installed 436 new meters.

3.1.11.2 Data Management

Service orders generate valuable data that can be used to improve operations and maintenance based on actual performance. Historically, data was maintained in several media, including electronic and paper-based, so it was not always easily retrievable. This condition was greatly improved with the County's implementation of a computerized maintenance management system. Known as the Enterprise Asset Management System (EAMS), it allows data to be located on a file server and be accessible to all authorized users. The system has standard reports, but custom reports can be created for specific purposes. EAMS has greatly reduced paperwork and improved efficiency. The system continues to be expanded to other County departments, and staff training continues. A County-wide needs assessment is currently underway to either revise or replace the current system.

Information being maintained includes costs to complete an SO in terms of labor, parts and equipment use, including vehicles, and outside contractors, if needed. The data can be used to generate budgets, evaluate the efficiency of processes and particular components of equipment, perform "what-if" scenarios, and many other analyses that were too cumbersome to perform in the past.

3.1.11.3 Leak Detection

At present, most main breaks are caused either by contractors excavating for other utility installations or due to aging pipe in the system. As an example, new telephone systems are being changed from copper to fiber, new electricity poles are being installed and old pole lines are being replaced by underground lines. For fiscal year 2016, the unaccounted-for water loss was 7.90% percent for the Peace River supplied Charlotte County Utilities Department distribution system, below the 10 percent industry norm.

3.1.12 WATER AUDIT

Charlotte County Utilities Department maintains a continuous, monthly water audit for its Central/West County water distribution system and the Burnt Store water distribution system. The Central/West County audit for FY 2016 is shown in Table 3-2. The audit table compares the water received from the PRMRWSA to the sum of total water billed to customers, water used for distribution system flushing, fire department use, and water loss due to identified leaks and breaks. The difference is termed unaccounted-for water loss.

Table 3-2 Charlotte County Utilities Department Unaccountable Water Report (Central/West County) FY 2016								
Month	Total Metered Water (gal)	Sold (gal)	Construction Flushing (gal)	Hydrant Flushing (gal)	Construction Fill (gal)	Line Breaks (gal)	Fire Fighting (gal)	Unaccounted Water Loss (gal) [1]
Oct-15	306,120,465	238,552,000	8,750	35,576,710	3,091	952,258	30,000	29,587,307
Nov-15	320,488,574	238,629,000	16,110	35,700,998	871	676,940	30,000	45,244,563
Dec-15	329,731,235	267,495,000	3,132	33,943,572	237	115,167	30,000	26,824,079
Jan-16	327,840,838	281,279,000	7,500	33,471,005	1,593	383,375	30,000	12,668,365
Feb-16	317,084,000	252,248,000	13,750	30,970,740	9,509	1,033,778	30,000	32,778,223
Mar-16	348,798,000	261,270,000	20,858	34,512,615	721	1,154,822	30,000	51,808,985
Apr-16	338,427,000	319,552,000	12,180	30,312,295	0	78,252	30,000	-11,557,727
May-16	338,691,000	268,342,000	0	31,236,685	0	1,213,955	30,000	37,868,360
Jun-16	294,391,000	265,338,000	0	32,826,750	4,114	2,362,126	30,000	-6,169,991
Jul-16	310,727,000	251,920,000	754220	35,450,399	63,511	425,146	30,000	22,083,724
Aug-16	301,763,000	221,718,000	1,104,190	33,656,767	312,131	882,700	30,000	44,059,212
Sep-16	291,450,000	241,645,000	522110	31,451,088	3,885	814,192	30,000	16,983,725
Total (gal)	**3,825,512,112**	**3,107,988,000**	**2,462,800**	**399,109,624**	**399,663**	**10,092,711**	**360,000**	**302,178,825**
Annual Average (gpd)	**10,452,219**	**8,491,770**	**6,729**	**1,090,463**	**1,092**	**27,576**	**984**	**825,625**

1. Negative monthly water loss occurs because all meters are not read on the same day every month.

Charlotte County Utilities Department estimates the quantity of water used for flushing the distribution system water lines by the size of the outlet and amount of time flushing has occurred. Water regulations require a minimum chloramine residual throughout the system of 0.6 ppm. A large portion of the flushing water is used to maintain chlorine residual levels in the distant, isolated parts of the distribution system.

Water loss due to leaks is estimated based on the pressure in the line before the break and the size of the pipe. Loss due to leaks and breaks is less than one (1) percent of the total FY 2016 water use.

The American Water Works Association (AWWA) considers a range of 10 to 20 percent for unaccounted-for water to be acceptable in a fully metered system. The annual average value for the unaccounted-for water in the Charlotte County Utilities Department Central/West County System is 7.90% percent.

3.1.13 REVIEW OF PREVIOUS REPORT RECOMMENDATIONS

Recommendation: Continue the ongoing program to replace existing water meters with meters that can be automatically read.

Progress: *An estimated 60% of existing meters have been replaced. Replacement efforts are ongoing.*

Recommendation: Continue to upgrade the Gulf Cove Booster Pumping Station by:

- Further progressing the replacement project for the Myakka River Pipe crossing that supplies water to the Gulf Cove Booster Pumping Station.

Progress: *The Myakka River crossing is under design. In addition, a second Myakka River crossing at the SR 776 bridge area is under evaluation and design.*

Recommendation: Continue to upgrade the Rotonda Booster Pumping Station by:

- Modifying the PLC to include the control of the VFDs.

Progress: *The PLC reconstruction was completed in November 2016.*

3.1.14 SUMMARY AND RECOMMENDATIONS

3.1.14.1 Summary

The Central/Western Charlotte County Utilities Department service area is supplied with water that is purchased from the PRMRWSA. Charlotte County is a member of the Authority, which is charged with the task of providing adequate quantity and quality water to its authority members.

The 2015 Water Quality Report confirms that the water delivered by the Charlotte County Utilities Department water distribution system meets or exceeds regulatory quality requirements. Maintaining the required chlorine disinfection concentrations throughout the system has required flushing of water mains in the extremities of the system where residential demand is small. Charlotte County Utilities Department has added disinfection chemical injection points at all of its storage tank/booster pumping stations. Charlotte County Utilities Department has also added one (1) remote chlorine injector in the distribution system.

The Charlotte County Utilities Department storage tanks are cleaned and inspected every five years. This proactive maintenance procedure has not uncovered any significant storage tank deficiencies in FY 2016. Hydrants and system valves are exercised regularly and repaired as necessary. Residential and small commercial water meters are replaced in a twenty (20) year cycle to ensure accurate readings. Large water meters are checked for accuracy yearly.

Charlotte County Utilities Department maintains five (5) interconnects with adjacent water utilities. These interconnects have proven to be valuable during emergency conditions. The latest interconnect with the City of Punta Gorda is a substantial 24-inch diameter, twelve (12) mile transmission main.

3.1.14.2 Recommendations

Recommendation: Continue the ongoing program to replace existing water meters with meters that can be automatically read.

Recommendation: Continue to upgrade the Gulf Cove Booster Pumping Station by:

- Further progressing the replacement project for the Myakka River Pipe crossing that supplies water to the Gulf Cove Booster Pumping Station.

Recommendation: Continue to upgrade the Rotonda Booster Pumping Station by:

- Demolition of the old water treatment plant.
- Installing protective roofs over exposed outside equipment.

3.2 BURNT STORE WATER SYSTEM

The Burnt Store Water System is wholly owned and operated by Charlotte County Utilities Department. The Charlotte County Utilities Department certificated water area is shown in Figure 2-1, in Section 2.1 of this report. The current service area is concentrated in the extreme southern part of Charlotte County and a small area in northern Lee County along the County border. The Burnt Store service area is approximately eight (8) square miles of land in Charlotte County and two (2) square miles in Lee County.

3.2.1 BURNT STORE REVERSE OSMOSIS WATER TREATMENT PLANT

The Burnt Store Reverse Osmosis (BSRO) Water Treatment Plant (WTP) is located in southern Charlotte County with an address of 17430 Burnt Store Road in Punta Gorda, Florida. An expansion of the facility was completed in 2009 and is currently rated at a capacity of 3.61 mgd.

The facility is staffed sixteen (16) hours per day, seven (7) days a week. Concentrate from the RO process is disposed of by means of the on-site Deep Injection Wells IW-1 and IW-2 with capacities of 0.564 mgd and 2.88 mgd, respectively. The deep injection wells' capacities are shared with the Burnt Store WRF. The facility has three (3) onsite ground storage tanks with a total capacity of 1.5 MG. The facility utilizes six (6) existing production wells with a total permitted AADF of 1,702,400 gpd. Two (2) of the wells are located outside of the treatment plant site. Two (2) of the four (4) wells that are located on the BSRO Water Treatment Plant site were placed into operation in August 2010. In November 2009, nine (9) groundwater monitoring wells were constructed and placed into operation. An additional three (3) shallow ground water monitoring wells were installed in February 2014.

The plant consists of the following components:

3.2.1.1 Source Water

Six (6) Groundwater Wells (Well No. 15 is out-of-service and is not currently permitted for withdrawals)
Six (6) Submersible Pumps
Twelve (12) Monitoring Wells

3.2.1.2 Treatment Plant

Pre-Treatment Process
- Anti-Scalant Chemical Feed System
- Sulfuric Acid Chemical Feed System
- Five (5) Cartridge Filter Vessels

Treatment Process
- Five (5) Reverse Osmosis (RO) Production Train High Pressure Pumps
- Two (2) RO Production 2 Stage Trains (500,000 gpd capacity each)
- Three (3) RO Production 2 Stage Trains (750,000 gpd capacity each)

Post Treatment Process
- Sodium Hypochlorite Chemical Feed System
- Sodium Hydroxide Chemical Feed System
- Corrosion Inhibitor Chemical Feed System (to reduce Cu, Pb, and Zn corrosion)
- Control Valve for Blended Raw Water
- Three (3) Degasification Units
- Three (3) Transfer Pumps
- Three (3) 500,000 gallon Finished Water Storage Tanks
- Two (2) Distribution High Service Pumps (medium flows)
- One (1) Distribution High Service Pump (high flows)
- One (1) Distribution Jockey Pump (low flows)

Auxiliary Power
- One (1) 1250 kW Generator servicing the original RO process building, RO process building, operations building & three (3) onsite groundwater wells
- Two (2) 80 kW Portable Generators to service four (4) remote Groundwater Wells

Process Control Stations
- One (1) operations building that is shared with the Burnt Store Water Reclamation Facility
- Three (3) Supervisory Control and Data Acquisition (SCADA) Computer Stations utilizing computer graphic monitoring screens
- Operations Testing Laboratory

Brine Disposal
- Two (2) deep injection wells with a total capacity of 3.44 mgd
- One (1) dual level deep monitoring well

3.2.1.3 Regulatory Considerations

Permit Schedule

- FDEP- Deep Injection Well IW-1 was issued on March 3, 2014 and expires on March 2, 2019.
- SWFWMD Water Use Permit (WUP) was issued on September 25, 2013 and expires on September 25, 2033.

3.2.1.4 Supply Wells

Table 3-3 lists the well specifications and permitted capacity from the SWFWMD WUP (Permit No. 3522.012).

Table 3-3 Burnt Store RO Withdrawal Points

Well I.D. No.	Diameter (in.)	Depth Total/Cased (feet bls) (1)	Permit Limit, Average (gpd)	Permit Limit, Peak Month (gpd)
RO-7	8	596/300	200,000	272,000
RO-8	8	600/304	200,000	272,000
RO-9	8	602/550	200,000	272,000
RO-11	12	650/526	367,500	471,700
RO-12	12	470/412	367,400	471,700
RO-14 *	12	650/450	367,400	471,700
RO-15 (2)	12	1050/800	-	-
RO-16	12	611/320	367,400	471,800
RO-17 *	12	650/450	367,500	471,700
RO-18 *	12	650/450	367,400	471,700
RO-19 *	12	650/450	367,400	471,700
TOTAL			3,172,000	4,117,900

* Future wells
(1) bls = below land surface (2) Well No. 15 is out-of-service. Rehabilitation of this well is being analyzed in a current wellfield study.

3.2.1.5 Water Quality

Water quality records indicate that the facility meets State Standards. Table 3-4 shows the BSRO Water Treatment Plant finished water quality. Table 3-5 shows the relationship of water withdrawn from wells, waste brine water discharged to the deep injection wells, and the finished water entering the distribution system.

Table 3-4 Burnt Store RO Water Quality Finished Water FY 2016								
Month	pH GST (Std Units)	TDS GST (mg/L)	Cond. GST (uS)	Total Cl2 GST (mg/L)	ALK GST (mg/L)	TH GST (mg/L)	Remote Sample pH (Std Units)	Total CL2 Remote Site (mg/L)
Oct-15	7.98	267.0	583.0	1.00	23	87	7.85	0.80
Nov-15	8.00	260.0	571.0	1.10	24	90	7.80	1.00
Dec-15	7.94	265.0	579.0	1.10	23	95	7.86	1.00
Jan-16	7.94	261.0	573.0	1.3	24	96	7.85	1.2
Feb-16	7.90	263.0	576.0	1.2	22	93	7.80	1.1
Mar-16	7.88	263.0	577.0	1.2	22	97	7.78	1.1
Apr-16	8.00	267.0	585.0	1.1	22	87	8.00	1.0
May-16	8.05	283.0	621.0	1.1	22	87	7.99	1.0
Jun-16	8.00	285.0	623.0	1.0	22	88	7.90	0.9
Jul-16	7.95	288.0	629.0	1.1	22	89	7.92	0.8
Aug-16	7.94	288.0	624.0	1.1	22	91	7.92	1.0
Sep-16	7.90	289.0	629.0	1.1	23	88	7.90	0.9
Annual Avg	7.96	273	598	1.1	23	91	7.88	1.0

Table 3-5 Burnt Store RO Total Water Balance FY 2016					
Month	Finished Water To Distribution (mgd)	Raw Water From Wells (mgd)	Plant Water Produced (mgd)	Injection Well IW-1 (mgd)	Injection Well IW-2 (mgd)
Oct-15	0.434	0.567	0.450	0.008	0.153
Nov-15	0.393	0.502	0.399	0.003	0.143
Dec-15	0.393	0.497	0.397	0.004	0.158
Jan-16	0.435	0.581	0.471	0.001	0.316
Feb-16	0.472	0.680	0.564	0.004	0.361
Mar-16	0.538	0.695	0.563	0.133	0.232
Apr-16	0.467	0.593	0.474	0.000	0.288
May-16	0.381	0.471	0.388	0.002	0.315
Jun-16	0.311	0.394	0.315	0.000	0.362
Jul-16	0.316	0.400	0.318	0.000	0.275
Aug-16	0.314	0.402	0.321	0.004	0.139
Sep-16	0.328	0.414	0.332	0.003	0.168

3.2.2 TREATMENT COMPONENTS AND CONDITION ASSESSMENT

An on-site review of the plant was performed by Stantec personnel on December 13, 2016. A tour of the facility was conducted by Ben Jacobson, chief operator, to review plant conditions, operations, and records.

3.2.2.1 General Observations

Access to the treatment plant is through a secure gate in a fence that surrounds the Burnt Store water and wastewater treatment plants.

The plant site is well kept. Staff does an excellent job of keeping the interior of the buildings neat and clean as is the custom for potable water treatment plants.

General observations noted during the site visit include: all valves are exercised once per year, piping is painted and clearly marked, stainless steel pipe and equipment is cleaned frequently, all compliance meters are being calibrated every six (6) months, and calibration tags are up-to-date.

The water production building, motor control building, and operations/admin building are in excellent condition.

The intake cooling air vent in the production building was adjacent to the three (3) degasifiers behind the building. This location caused the exhaust fan to pull in hydrogen sulfide that is released by the degasifiers depending on the wind direction. The existing exhaust fan was reversed to eliminate the problem.

3.2.2.2 Source Water

All wells have flow meters on their discharge pipes. Withdrawal rates meet Water Use Permit (WUP) requirements.

All wells were visited and the following general conditions and comments were generated:

- Well No. 7 - On-site, adjacent to generator. This is the oldest well and is in good condition. Minor rust was found on the stainless steel wellhead and a rusted butterfly valve operator should be painted. This well and is one (1) of the three (3) 8-inch diameter wells on-site that produce lower flows than the 12-inch wells on and off the plant site.

- Well No. 8 - On-site, near entrance. Condition is good. The pressure transducer saddle is beginning to rust and needs to be painted. The well pump was replaced in February 2015.
- Well No. 9 - On-site, near storage tanks. Condition is good. Minor rust on wellhead and BFV operator. A new well pump and motor was installed in 2016.

trailer for multiple site use. The 2013 issued WUP requires this well to be abandoned and capped. A study is underway to evaluate alternative way to bring this well back into service.

- Well No. 16 - Rear of site. Excellent condition. The skid-mounted generator has been moved to a mobile trailer for multiple site use.

All production wells are confined in fenced in areas. Well pads are not prone to flooding that would result from normal rain events due to the elevation of each pad above surrounding ground.

- Well No. 11 - Off-site on Burnt Store Road. Condition is excellent. Minor rust on wellhead stainless steel pipe. The well meter flow tube and check valve were replaced in February 2016.
- Well No. 12 - Off-site on Burnt Store Road. Condition is excellent. Minor rust on wellhead stainless steel pipe.
- Well No. 15 - Rear of site. Excellent condition. Well No. 15 is currently not in service due to suspected intrusion of poor quality water from this well's terminal strata. The generator has been moved to a mobile

3.2.2.3 Pre-treatment

All chemical feed pumps are operating and in good condition. The anti-scalant, sodium hydroxide and sodium hypochlorite chemical feed pipes occasionally leak due to the nature of the chemical. The manufacturer of the chemical feed units indicated that the connections need to be checked regularly and tightened as needed. Operators visually check the union connections and other potential sources of leaks daily.

The RO treatment process requires the addition of anti-scalant and reduction in pH by sulfuric acid addition to the raw water prior to beginning the treatment process. These two (2) chemicals are injected into the raw water pipe before it enters the treatment building.

The pH-adjusted raw water passes through one (1) of five (5) stainless steel, pressurized cartridge filters that are in excellent condition. Staff changes the 1-micron filters every six (6) months. This change is made well within the differential pressure loss across the filters that are the recommended condition to replace the filter material. No irregularities were reported and the equipment appeared to be in excellent working order at the time of site visit.

Water monitoring gauges and instrumentation are centrally mounted on a wall that is adjacent to the chemical feed pumps and the filter vessels. All of the gauges are functioning properly and are in good condition.

3.2.2.4 Chemical Storage and Feed System

Bulk storage of chemicals is in a covered area that is attached to the east end of the treatment plant building. All tanks are housed in containment areas. The tanks and piping are painted and well-marked.

Chemical feed pumps and piping are located inside the building along the wall that is common to the bulk storage area. The chemical feed pump area requires constant maintenance as would be expected for any chemical feed system. The area is inspected daily for leaks.

Eyewash and shower stations are located at the bulk storage area and the chemical feed area.

<u>Sodium Hydroxide</u>

Sodium Hydroxide (NaOH) is used to adjust the pH of the finished water prior to pumping it into the distribution system. The bulk tank and chemical feed area are in good condition. The ball valve on the sight glass for the 1,100 gallon storage tank leaks. The tank is currently not being used. The small amount of NaOH that is used is pumped directly from a plastic chemical drum in the chemical feed area. The ball valve on the sight glass of the bulk tank must be repaired before the bulk tank is placed into service.

During cold winter nights, the chief operator installs heat lamps in the chemical feed area to prevent the NaOH from turning to a gel at temperatures less than 45 degrees F. This simple, effective heating method works well.

Sulfuric Acid

The bulk sulfuric acid containment area was painted in FY 2011. The containment area is scheduled for repainting in the future.

Sodium Hypochlorite

There are two (2) bulk tanks; 1,400 and 1,100 gallons. Liquid chlorine, that is injected prior to water entering the storage tanks, is paced by chlorine analyzers on the wall of the clear well. Additional chlorine is not usually added as the flow leaves the plant, but there is the capability to do so. Chlorine addition would be injected based on the flow rate, and trimmed using another chlorine analyzer.

Ammonium

The ammonia system is not being used now because chloramines are not used for disinfection. The ability to produce chloramines was installed for use when the Burnt Store water system is expanded or connected to another water system that uses chloramines. The chemical feed pumps for this system have been stored in-doors for use as spares for other chemical feed systems.

Scale Inhibitor

A day tank and chemical feed pumps are located inside within the chemical feed area.

Corrosion Inhibitor

A small amount of corrosion inhibitor is used to reduce the dissolving of copper and zinc in the distribution system into the water. It has proven to work very well. A day tank and chemical feed pump are located near the high service pumps. Two (2) in-line static mixers were installed in the pipe leading to

the water storage tanks in 2013 to thoroughly mix chlorine, sodium hydroxide (pH adjustment), and the corrosion inhibiter.

3.2.2.5 Treatment

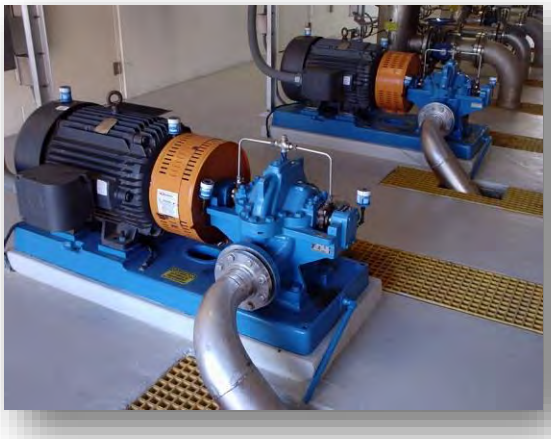
RO trains C, D, and E were new in 2009. Trains A and B are older (2007) and produce less water with higher pressure required, but are still producing good quality RO water.

Raw water is blended with RO water to produce the desired conductivity and chemical composition to improve taste. The blend valve is a 4-inch BFV that can be modulated from the operations control room.

Treatment components were found to be in good condition with the following exception: some concentrate port seals on Trains C and D leak. A membrane company technician replaced one seal and trained staff to replace other leaking seals. The leaks pose no environmental hazards or water quality issues. As part of the daily inspection, staff examines the plant pipes and tightens down pipe fitting bolts when necessary.

All pumps serving Trains A, B, C, D, and E were well painted.

Sampling sinks and instrumentation are operating properly and in good condition. The trains are alternated on a regular basis to reduce scaling in vessels.



The cleaning system is in excellent condition after being used for the first time to clean Train A in 2012. This first cleaning process went well with no problems. The efficiency of the RO members is constantly monitored. Cleaning is not performed unless water quality or membrane efficiency is substantially reduced.

3.2.2.6 Brine Disposal

RO reject concentrate is disposed of through onsite Deep Injection Wells IW-1, assigned to the BSRO facility, or IW-2 that is assigned to the Burnt Store WRF. Both wells are permitted to accept both water treatment concentrate and treated wastewater effluent.

Brine is transferred to the deep well pumping station by latent pressure in the RO trains. The pumping station and deep wells are in good condition. The pumps need to be painted.

Both injection wells have flow meters and pressure gauges that can be monitored in the control room. A mechanical integrity test was successfully performed on IW-2 in 2013. Both wells undergo mechanical integrity testing every five (5) years.

3.2.2.7 Post Treatment

Post treatment consists of removing hydrogen sulfide from the RO water and adding NaOH for pH adjustment and sodium hypochlorite for disinfection. Post treatment processes were found to be in good condition.

Three (3) degasification units that are located on top of the concrete clearwell are operated automatically or manually by staff. The clearwell was taken out of service for one (1) day and inspected inside and out on September 3, 2014. Degasifier media is expected to be in good condition and the units are performing as designed. The only significant comment in the clearwell inspection report was to paint and exercise the isolation valve between the two (2) tanks. Painting is advised, but exercising of the valve should not be forced because the valve inside one of the tanks has not been moved for many years.

All post-treatment conditions of the water are monitored by redundant analyzers that are located on the wall of the clearwell. The instruments are well organized with SCADA connection to the Wonderware program monitors in the operations building. All instrumentation is calibrated and up-to-date.

Treated water is transferred from the clearwells to the storage tanks by three (3) horizontal centrifugal pumps. Redundant and leaking air release valves that follow the pumps were removed in 2015. Two (2) additional air release valves are located within 25 feet of the removed air releases.

Pre-storage chlorine is injected in the pipe following the clearwell pumps. The finished water is stored in three (3) 500,000 gallon concrete storage tanks. This is normally the only chlorine injection point required, however, there is a post-storage tank injection point located on the distribution pipe just upstream of the main distribution flow meter.

3.2.2.8 High Service Pumps

There are two (2) medium flow pumps, one (1) high flow high service pump, and one (1) jockey pump providing flow to the distribution system. The two (2) medium flow pumps were installed in early 2012 to more accurately match the system flow needs.

Normally, the jockey pump and either of the two (2) medium flow service pumps are all that is needed to supply water and pressure to customers. The high flow service pumps are necessary for fire flow demands and are exercised when system flushing is performed.

The variable frequency (motor speed) drives on the pumps provide a constant pressure of 65 psi at the beginning of the distribution system at the water plant regardless of the water use.

3.2.2.9 Standby Power

Auxiliary power is adequately sized to run the plant. The plant generator and automatic transfer switch were part of the 2009 upgrade of the facility. The standby generator is operated for four (4) hours under load twice per month. Maintenance is performed by an outside contractor.

Two (2) generators that were attached to Wells No. 15 and 16 have been installed on trailers. These generators can now be used to power the pumps at Wells No. 11, 12, 15, and 16 through permanently mounted generator connections at each of these wells.

3.2.2.10 Injection Wells

Two (2) deep injection wells are located at the Burnt Store WRF. IW-1 is permitted to the Burnt Store Reverse Osmosis Water Treatment Plant for brine disposal that is produced by the RO treatment process. IW-2 is permitted to the Burnt Store WRF as an alternative disposal method for treated effluent. The maximum capacity of IW-1 is 0.564 mgd at a maximum rate of 392 gpm. The maximum capacity of IW-2 is 2.88 mgd at a maximum rate of 2000 gpm.

Both wells are permitted to receive brine and treated wastewater. Brine and wastewater effluent flows to one single wet well. Pumps pressurize the flow for injection into the deep injection wells.

3.2.2.11 Storage

Water storage for the Burnt Store Water System is three (3) 0.5 MG concrete storage tanks on the water treatment plant site. Storage tanks A and B were cleaned and inspected in FY 2013 and tank C was inspected in FY 2014. No sedimentation or defects were found in any tank.

3.2.3 REVIEW OF PREVIOUS REPORT RECOMMENDATIONS

Recommendation:	Relocate air intake and discharge fans in the main process building.
Progress:	*Completed. Fan was reversed to push air into the building.*
Recommendation:	Install a second jockey pump and separate operating system as stand-by in case the primary operating system malfunctions.
Progress:	*A contract was awarded to install a second jockey pump in January 2017.*
Recommendation:	Staff should continue to inspect and tighten the connections for the anti-scalant, sodium hydroxide, sodium hypochlorite, and sulfuric acid pipes on a daily basis to prevent leakage.

Progress: *Performed.*

Recommendation: Clean RO trains A and B, when necessary, based on RO train efficiency and water quality.

Progress: *Not completed. The RO trains will not be subjected to cleaning until their efficiency is substantially reduced.*

Recommendation: Determine the ultimate use of Well # 15.

Progress: *An evaluation of alternative uses for Well # 15 was ongoing in FY 2016.*

Recommendation: Continue the Brackish Wellfield Study to determine alternative raw water well locations and transmission requirements for an expanding service area.

Progress: *Ongoing in FY 2016.*

3.2.4 SUMMARY AND RECOMMENDATIONS

3.2.4.1 Summary

The BSRO Water Treatment Plant is in good/excellent condition. The treatment process requires constant maintenance of the chemical systems included in the treatment process. The Chief Operator has established a chemical system inspection routine where operators inspect chemical systems on a daily basis. Inspection results are recorded in a log. Leaks or other malfunctions are addressed immediately or referred to the Chief Operator for maintenance.

The plant facilities are clean and well organized. A computer monitor in the control building allows easy monitoring of the treatment system and treated water quality, continuously.

The 2016 Water Quality Report confirms that the water delivered to the South County distribution system meets or exceeds regulatory quality requirements. Maintaining the required chlorine disinfection concentrations throughout the system has required flushing of water mains in the extremities of the system where residential demand is small.

All three (3) water storage tanks at the BSRO Water Treatment Plant were cleaned and inspected in FY 2013 and 2014. This proactive maintenance procedure did not uncover any storage tank deficiencies.

3.2.4.2 Recommendations

Recommendation: Complete the installation of a second jockey pump and separate operating system as stand-by in case the primary operating system malfunctions.

Recommendation: Staff should continue to inspect and tighten the connections for the anti-scalant, sodium hydroxide, sodium hypochlorite, and sulfuric acid pipes on a daily basis to prevent leakage.

Recommendation: Clean RO trains A and B, when necessary, based on RO train efficiency and water quality.

Recommendation: Determine the ultimate use of Well # 15.

Recommendation: Continue the Brackish Wellfield Study to determine alternative raw water well locations and transmission requirements for an expanding service area.

3.3 SOUTH COUNTY DISTRIBUTION SYSTEM

Charlotte County Utilities Department's South County water distribution system, also known as the Burnt Store system, is wholly separated physically and geographically from the Central/Western County water distribution system. The system services the nearly built-out Burnt Store Marina residential development in Lee County and a sparsely populated but growing, residential development in Charlotte County. The water is produced by the Charlotte County Utilities Department-owned Burnt Store Reverse Osmosis (BSRO) Water Treatment Plant.

3.3.1 STORAGE

There is no water storage or booster pumping stations within the Burnt Store (South County) distribution system.

3.3.2 TRANSMISSION AND DISTRIBUTION SYSTEM

The Burnt Store distribution system consist of 64 miles of water main ranging in size from 2-inch to 20 inch diameter. Ten thousand feet of new 16-inch diameter water main was installed within the Burnt Store Road ROW in FY 2016 as part of a road widening and realignment project. Approximately 400 fire hydrants are located throughout the system.

The water main south of the plant was extended further into Lee County to serve a new commercial customer on Burnt Store Road.

3.3.3 CONSUMER CONFIDENCE REPORT

As required by Federal and State regulations of all utilities, Charlotte County Utilities Department provides accessibility to every customer to view electronically or obtain a hard copy of the annual water quality report, also known as the Consumer Confidence Report (CCR). The report tabulates the results of water quality testing to identify the level of any contaminants detected in the drinking water. All water, including bottled water, originates from rivers, lakes, streams, ponds, reservoirs, springs or wells. As water travels over land or through the ground, it dissolves naturally occurring minerals, and it can also absorb substances that originate from animal or human activity. These contaminants may include:

- Microbial contaminants, such as viruses and bacteria;
- Inorganic contaminants such as salts, metals, pesticides and herbicides that may come from a variety of sources such as agriculture, urban storm water runoff and residential uses;

- Organic chemical contaminants, including synthetic and volatile organic chemicals; and
- Radioactive contaminants, which can be naturally occurring.

To ensure that tap water is safe to drink, the EPA prescribes regulations which limit the amount of certain contaminants in water provided by public water systems. All drinking water, including bottled water, may reasonably be expected to contain at least small amounts of some contaminants. The presence of contaminants does not necessarily indicate that the water poses a health risk.

The results, as reported in the latest CCR for South County (Burnt Store), indicate the levels of tested water contaminants in the Charlotte County Utilities Department service area are safely below the maximum contaminant level allowed by federal and state regulations and orders, and in most cases, well below the level.

The most recent Consumer Confidence Report is available at *www.CharlotteCountyfl.gov/dept/utilities/pages/reports.*

3.3.4 OPERATIONS

Treated water from the BSRO Water Treatment Plant enters the South County service area through a 20-inch transmission main. The transmission system divides into 16-inch north and 16-inch south transmission pipes within the right-of way of Burnt Store Road. Due to the relatively small size of the South County distribution system, there are no booster stations, disinfection injection points, or storage tanks in the system. All disinfection, storage, and pressurization pumps of the system are located at the water treatment plant. The water treatment plant has stand-by power capacity to power the plant and high service pumps in the event of a public power failure.

Charlotte County Utilities Department system's integrity is maintained by sound operating and maintenance processes implemented by a well-trained staff. Anticipated capacity needs are met through careful forecasting of demands and provided by capital improvements planning. The Water Distribution workgroup is responsible for dozens of operational processes with the common goal of maintaining adequate flow rate, volume, quality and pressure to Charlotte County Utilities Department customers. Charlotte County Utilities Department has a proactive training program for its staff. The County uses the industry recognized University of California/Sacramento study books to assist staff in obtaining their operator licenses. Taking this course is a requirement for Charlotte County Utilities Department staff taking the state certification tests.

3.3.5 MAINTENANCE

Charlotte County Utilities Department performs three types of maintenance on all areas of its water distribution system: predictive, preventive and corrective. In predictive maintenance, tests and observations are performed on equipment to predict when failure of the component might occur. An example of a Charlotte County Utilities Department predictive maintenance procedure occurs during the daily inspection of large stations. While at the station, the operator takes infrared readings on motors and

other components to measure abnormally high temperature readings. In doing so, an impending failure can be averted by addressing the cause of the temperature spike. Predictive maintenance is more suitable for equipment that is in essentially continuous operation, where abrupt failure would prove detrimental.

Preventive maintenance involves exercising components, such as valves and hydrants, changing lubricants, and replacing wearable parts on a schedule of time or usage. Preventive maintenance is more suitable for equipment that must be ready to be operated, even though it is typically not in use.

Corrective maintenance occurs when there is an abrupt failure or when the system is compromised by others, such as a cable installer puncturing a water main. Corrective maintenance focuses on restoring service as soon as possible, even with a temporary repair to be upgraded later.

3.3.5.1 Service Orders

In the exact same manner as the Central/West County water distribution system, all maintenance in the Burnt Store distribution system begins with a service order (SO). Predictive and preventive SOs are generated by staff, so there is flexibility as to when they are performed. They are scheduled at such a time to be most efficient in terms of the availability of resources, especially labor.

Corrective SOs are usually generated by a customer phone call. During normal office hours, a Charlotte County Utilities Department dispatcher documents the information and contacts the appropriate foreman to respond. During off-hours, an answering service records the information and contacts the on-call line technician for response. The on-call line technician has the resources to organize a four-person crew after-hours, if needed. The level of service, from the customer's perspective, is that a live voice will respond to an emergency call, 24 hours a day, seven days a week. Some corrective SOs are generated by a telemetered alarm when certain parameters are breached; for example, high water level at a storage tank. The telemetry system sends a message to the cell phone of the Chief Operator in charge of the high service pumps. This procedure allows for a problem to be addressed before there has been a loss or reduction of service to the customer.

The response time by the repair crew, even to the farthest point of the service area, is less than 45 minutes. This level of service is maintained in part by distributing crews geographically to reduce response distance. To maintain this level of service during off-hours, emergency staff is equipped with cell phones to expedite communication, and wireless-enabled laptop computers. Every crew is in a vehicle that is equipped with the materials and tools to perform a wide range of maintenance activities, reducing the need for trips to the warehouse.

As a result of the maintenance practices in place and the new high service pumps that were placed into operation in FY 2013, there were no service interruptions due to pump malfunction. A stand-by jockey pump, using a redundant control system, has been designed for installation in early 2017.

Water valves in the Burnt Store water distribution system have been surveyed using a GPS. This allows for any valve to be quickly located if it must be closed.

3.3.5.2 Data Management

Service orders generate valuable data that can be used to improve operations and maintenance based on actual performance. Historically, data was maintained in several media, including electronic and paper-based, so it was not always easily retrievable. This condition was greatly improved with the County's implementation of a computerized maintenance management system. Known as the Enterprise Asset Management System (EAMS), it allows data to be located on a file server and be accessible to all authorized users. The system has standard reports, but custom reports can be created for specific purposes. EAMS has greatly reduced paperwork and improved efficiency. The system continues to be expanded to other County departments, and staff training continues. A County wide evaluation of current needs is currently underway to either revise or replace the EAMS system.

Information being maintained includes costs to complete an SO in terms of labor, parts and equipment use, including vehicles, and outside contractors, if needed. The data can be used to generate budgets, evaluate the efficiency of processes and particular components of equipment, perform "what-if" scenarios, and many other analyses that were too cumbersome to perform in the past.

3.3.5.3 Leak Detection

At present, most main breaks are caused by contractors excavating for other utility installations or infrastructure. The South County distribution system has also experienced line breaks due to pressure surges in the system. The system includes old Polyvinyl chloride (PVC) water pipes that are thinner than the current Charlotte County Utilities Department standard PVC water pipes. The thinner pipes are more brittle and susceptible to breakage. The pumps that pressurize the Burnt Store water system have been modified with VFDs to reduce pressure surges.

The unaccounted-for water loss for the fiscal year 2016 was 11.22% for the Burnt Store distribution system. A water loss percentage over 10% requires that a water loss audit be prepared using SWFWMD automated water loss calculator. A water loss reduction plan was prepared in 2015 with specific tasks to determine the source of the water loss. CCUD has been working directly with SWFWMD staff to implement the plan. Several water loss sources were discovered in 2015. The work included in the plan continued into FY 2016. Charlotte County Utilities Department has installed new meters in every residential water service and checked the accuracy of commercial water meters to try and reduce the percentage loss. The Water Distribution department performed a leak analysis throughout the Burnt Store distribution system. A few minor leaks were found. SWFWMD concedes that continued search for small leaks is a futile effort that can be stopped by CCUD, if requested by letter.

3.3.6 WATER AUDIT

Charlotte County Utilities Department maintains a continuous, monthly water audit for its Burnt Store water distribution system. The audit is calculated differently than the SWFWMD audit. The Charlotte County Utilities Department audit for the Burnt Store distribution system in FY 2016 is shown in Table 3-6. The audit table compares the water passing through the discharge meter at the BSRO Water Treatment Plant to the sum of total water billed to customers, water used for distribution system flushing,

fire department use, and water loss due to identified leaks and breaks. The remaining difference is termed unaccounted-for water loss.

Table 3-6 Charlotte County Utilities Department Unaccountable Water Report (Burnt Store RO) FY 2016

Month	Total Pumped to Distribution (gal)	Total Sold (gal)	Hydrant Flushing (gal)	Line Breaks (gal)	Construction Flushing and Fill (gal)	Total Accounted For Water (gal)	Total Unaccounted For Water (gal)
Oct-15	13,288,407	7,918,000	177,487	7,843,325	0	15,938,812	-2,650,405
Nov-15	11,602,946	9,493,000	11,866	300,090	0	9,804,956	1,797,990
Dec-15	11,992,768	9,903,000	41,135	4,205	0	9,948,340	2,044,428
Jan-16	13,316,096	11,924,000	2,183	24,635	0	11,950,818	1,365,278
Feb-16	13,531,200	11,037,000	25,564	389,068	0	11,451,632	2,079,568
Mar-16	16,507,840	12,597,000	279,982	54,330	0	12,931,312	3,576,528
Apr-16	13,848,864	14,160,000	91,950	1,992	0	14,253,942	-405,078
May-16	11,632,039	9,526,000	13,150	3,452	0	9,542,602	2,089,437
Jun-16	9,149,243	7,939,000	121,790	1,020	0	8,061,810	1,087,433
Jul-16	9,625,540	8,352,000	180,450	16,080	0	8,548,530	1,077,010
Aug-16	9,557,894	7,023,000	73,323	44,220	0	7,140,543	2,417,351
Sep-16	9,673,601	7,918,000	106,604	0	0	8,024,604	1,648,997
Total (gal)	**143,726,438**	**117,790,000**	**1,125,484**	**8,682,417**	**0**	**127,597,901**	**16,128,537**
Annual Average (gpd)	**392,695**	**321,831**	**3,075**	**23,722**	**0**	**348,628**	**44,067**

Charlotte County Utilities Department estimates the quantity of water used for flushing the distribution system water lines by the size of the outlet and amount of time flushing has occurred. Water regulations require a minimum free chlorine residual throughout the system of 0.2 ppm. A large portion of the flushing water is used to maintain chlorine residual levels in the distant, isolated parts of the distribution system.

Water loss due to leaks is estimated based on the pressure in the line before a break and the size of the pipe. Loss due to breaks was six (6) percent of the total fiscal year 2016 water use.

3.3.7 REVIEW OF PREVIOUS RECOMMENDATIONS

Recommendation: Continue to replace old "class" PVC pipe in the distribution system with new C-900 PVC pipe.

Progress: *No significant breaks resulted in no line replacement in FY 2016.*

Recommendation: Continue development of a computerized hydraulic model for the South County distribution system.

Progress: *Not completed.*

Recommendation: Continue to look for sources of unaccounted-for water loss in the Burnt Store distribution system.

Progress: *Phone conversation with SWFWMD indicating the remaining unaccounted water loss probably cannot be found.*

Recommendation: Complete the Brackish Wellfield Analysis Report.

Progress: *Task 1, 2, 3, 4 and 6 reports have been completed. A new test well will be constructed in FY 2017 to explore the potential of a new wellfield.*

3.3.8 SUMMARY AND RECOMMENDATIONS

3.3.8.1 Summary

The Charlotte County Utilities Department Burnt Store service area is supplied with water that is produced by the BSRO Water Treatment Plant.

The 2015 Water Quality Report confirms that the water delivered by the Charlotte County Utilities Department water distribution system meets or exceeds regulatory quality requirements. Maintaining the required chlorine disinfection concentrations throughout the system has required flushing of water mains in the extremities of the system where residential demand is small.

The Charlotte County Utilities Department storage tanks are cleaned and inspected every five (5) years. This proactive maintenance procedure did not uncover any significant storage tank deficiencies during the last tank inspections in 2014 and 2015. Hydrants and system valves are exercised regularly and repaired as necessary. Residential and small commercial water meters are replaced in a twenty (20) year cycle to ensure accurate readings. Large water meters are checked for accuracy yearly.

The Burnt Store service area is not connected to any other utility system.

3.3.8.2 Recommendations

Recommendation: Continue to replace old "class" PVC pipe in the distribution system with new C-900 PVC pipe.

Recommendation: Continue development of a computerized hydraulic model for the South County distribution system.

Recommendation: Complete the Brackish Wellfield Analysis Report.

4.0 WASTEWATER COLLECTION

4.1 SEWER SYSTEMS

The purpose of a wastewater collection system is to transport wastewater from customer structures to a treatment facility. The Charlotte County Utilities Department collection system is comprised of the following components:

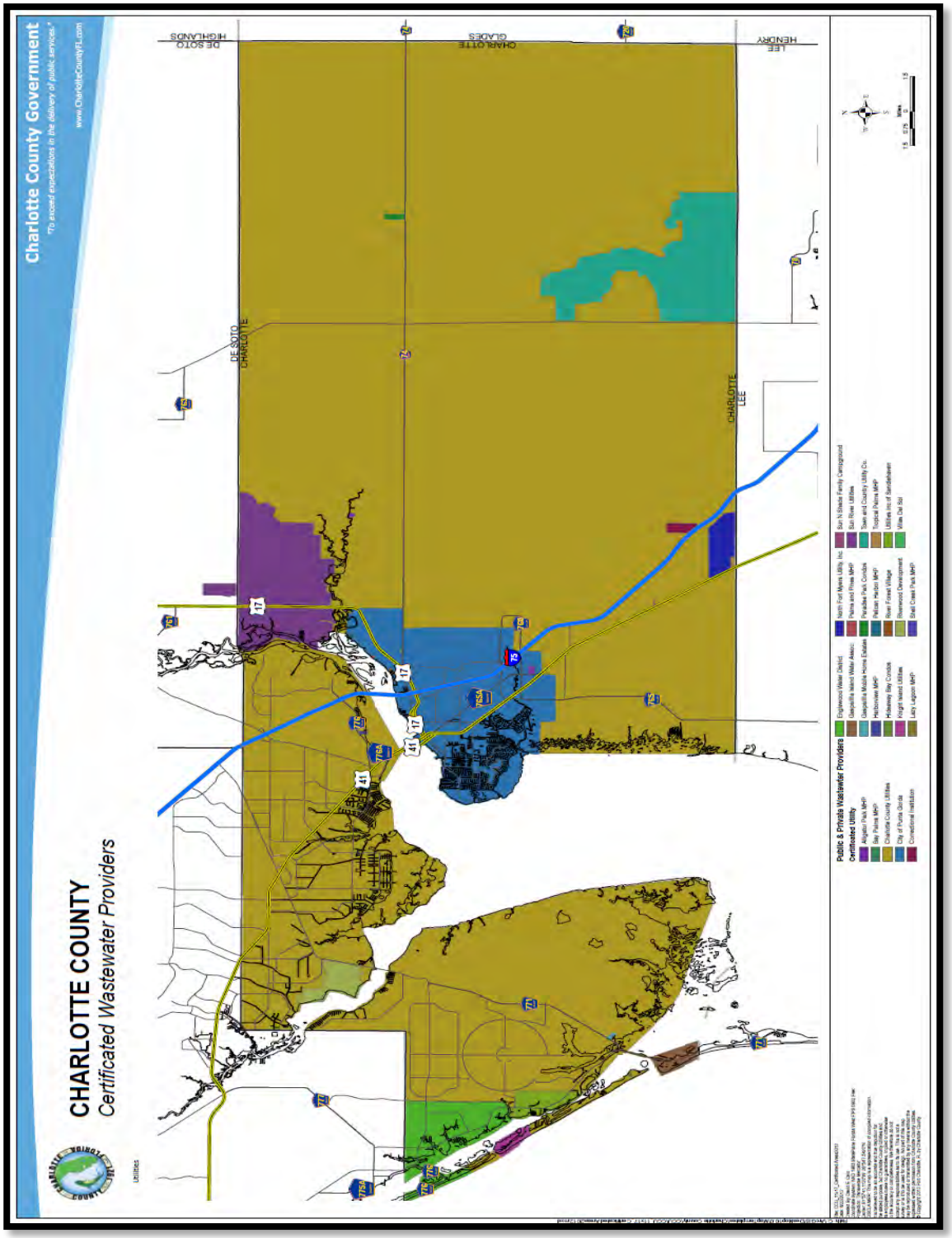
- Gravity Sewers, as the name implies, is piping that has been installed at a gradual incline (slope) that allows wastewater to flow exclusively by the energy of gravity. Gravity sewers include manholes that allow for the entry of maintenance staff and equipment. Flow in gravity sewers is always moving until it reaches a lift station or treatment plant.
- Vacuum sewers move sewage from individual services' wastewater storage tanks to a wastewater pumping station by a vacuum that is created at the pumping station site. The system uses pipes smaller than gravity sewers.
- Low Pressure Sewers (LPS), an alternative to gravity sewer, requires a small pump at each property. They cost less to construct (smaller, shallower piping) but cost more to operate and maintain (electrically driven equipment). Flows within a LPS system move only when pushed by new flow contributions.
- Force Mains, a pressure pipe joining the pump discharge at a wastewater pumping station at a low point of gravity flow.
- Lift Stations provide energy where reliance on gravity would require the gravity sewer to be unacceptably deep to maintain the proper slope. Lift stations are common in Florida because of the flat terrain.

The Charlotte County Utilities Department's Service Area is served by four (4) collection systems. Each system is tributary to a wastewater treatment plant or water reclamation facility (WRF), as listed in Table 4-1 below. The certificated area for Charlotte County Utilities Department is shown in Figure 4-1.

Table 4-1 Water Reclamation Facilities and Design Capacities

Treatment Plant	Permitted Capacity (mgd)
East Port	6.0 (current upgrades underway for increase to 9.0)
West Port	1.2
Rotonda	2.0
Burnt Store	0.5
Total	**9.7**

FIGURE 4-1 CHARLOTTE COUNTY UTILITIES DEPARTMENT CERTIFICATED WASTEWATER SERVICE AREA



At the end of FY 2016, there were 35,231 wastewater customers, an increase of 282 customers since FY 2015. These customers are served by:

- 378 miles of gravity sewer (no increase)
- 290 miles of LPS mains (no increase)
- 2,500 feet of vacuum sewers (new as part of Phase 1 sewer expansion)
- 261 miles of force mains (2,138 feet increase)
- 9,514 manholes (no increase).

Most of the gravity piping is comprised of 8-inch diameter sewers with other gravity sewers ranging in size from 6-inch to 36-inch pipe.

A portion of the Phase I sewer expansion, using vacuum sewers, went into service in July 2016 with approximately 100 homes served by vacuum sewer by the end of FY 2016. The combination vacuum/pumping station was operational in July 2016.

4.1.1 SYSTEM EXPANSION

The existing Central/West County wastewater system was hydraulically modelled using SewerGems software as part of a County-wide wastewater expansion study. The model was completed in FY 2008. The model identifies areas where capacity upgrades are needed to support future growth, as well as areas for future system expansion, based on age of existing septic systems, proximity to surface water bodies and other factors. The model is a constant work in progress as it is regularly upgraded when system changes occur.

Beginning in FY 2016, the construction of vacuum sewers was begun in the Spring Lake section of Central County. This innovative wastewater collection system will serve homes that are currently on septic/leach field systems.

Currently, Municipal Service Benefit Units (MSBUs) are the preferred method of funding wastewater expansion projects. MSBUs are created by County ordinance as a funding mechanism to provide services to defined areas. The associated project costs are evenly assessed on each property within the benefit unit as non-ad valorem assessments that appear on the property tax bills as a separate line item.

4.2 LIFT STATIONS

There were a total of 307 lift stations, 304 CCUD owned and 3 privately owned, maintained in FY 2016. The Master Lift Stations have permanent auxiliary power. Charlotte County Utilities Department has purchased standby power equipment for the rest of the system mounted on trailers with connections for these portable generators at nearly every lift station within the system. Portable pumps can be used where generator connections are not installed.

Selected and representative lift stations described below were evaluated by Stantec on December 7, 2016.

4.2.1 QUESADA MASTER LIFT STATION

The Quesada Wastewater Lift Station (Lift Station No. 37) is a master station that receives wastewater from many neighborhood stations. It has three (3) submersible, 88 HP pumps that pump directly to the East Port WRF through a long force main. The station is in good/fair condition due to its age and continual maintenance. The station contains a telemetry transmitter that allows monitoring to occur from the Charlotte County Utilities Department central office and treatment plants.

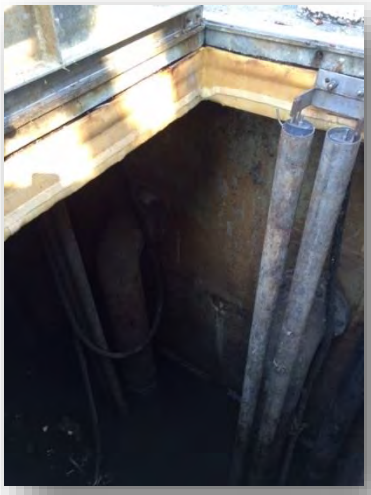
The station age is 26 years old and has received the following upgrades in between 2013 and 2016:

- New soft starters for the pumps, each with back-up power.
- Installation of an emergency wet well suction line for quick connection of a portable pump.
- New receiving station with two (2) tanks to receive liquids from Charlotte County Utilities Department maintenance service crews only.
- The existing bubbler system (used to determine level in the wet well) was placed on its own electrical feed.
- Addition of air conditioning unit in the electrical room to regulate temperature.
- General valve maintenance with replacement as necessary.
- Expanded paved parking area.
- New roof on the control building.
- LED exterior lighting.
- FY 2016: Upgrade of wastewater level monitoring system.
- FY 2016: New auto-transfer switch.

The following deficiencies were noted:

- The station building is generally in good condition except that the metal doors on the building are rusted and should be replaced.

- The wet well is constantly subject to high levels of corrosive hydrogen sulfide gas. The T-lok wet well liner is pulling away from the wall of the wet well and the concrete is exposed to the hydrogen sulfide gas. Since the wet well cannot be taken out of service due to the high flows at the station, it is recommended that a second wet well be constructed at the station as a back-up and to allow the original wet well to receive a substantial rehabilitation. Note: The station evaluation in December 2016 did not show any appreciable increase in the lining deterioration.



- The wet well is heavily matted with rags and other debris, requiring frequent maintenance.

4.2.2 ROTONDA MASTER LIFT STATION

The Rotonda Master Lift Station (LS 801) is a relatively new station that includes the current Charlotte County Utilities Department design standards for master pumping stations. The station was reconstructed and upgraded in 2010 to increase reliability and capacity for population growth in the Rotonda residential development.

The Rotonda Master Lift Station discharges directly to the Rotonda WRF through a 1,950 foot long, 12-inch diameter force main that terminates in the headworks of the Rotonda WRF. The station contains one (1) 10-foot diameter wet well, receiving flow from a 36-inch gravity sewer that becomes partially submerged at the pump-on wet well elevation. The station contains two (2) 75 hp pumps that are speed controlled to match the incoming wastewater flow. The pumps still cycle on and off, which spikes flow through the Rotonda WRF headworks.

The significant design features of this station include:

- Both pumps are variable-speed type, which allow them to vary their pumping rate to match the incoming flow rate. Although more expensive than constant-speed pumps, variable-speed pumps save on peak power usage surcharges at this station. The variable-speed pumps also reduce flow surges at the Rotonda WRF headworks.

- Permanently installed, stand-by power is supplied by a generator.
- Corrosion protection coating has been applied to the wet well walls as part of the construction. The coating is holding up very well.
- Odor control system that reduces odors that are generated due to the long sewer detention times for the wastewater that is received by this station.
- A redundant float switch is provided to trigger a high-level alarm in the wet well.
- On-demand lighting is supplied to allow ease of work without the need for handheld lighting.

- The station contains a telemetry transmitter that allows monitoring to occur from the Charlotte County Utilities Department central office and treatment plants.

The station was found to be generally in excellent condition with no deficiencies noted. Above ground piping was last repainted in 2014 to help prevent corrosion. A forced air odor control system reduces hydrogen sulfide concentrations in the wet well. The pump discharge at the time of the site was 1,500 gpm.

4.2.2.1 Lift Station 65 – South Port

This lift station is located on the site of an old treatment plant in a central location near US 41 in Port Charlotte. The overall condition of the station is good. The station contains three (3) submersible 88 HP pumps in a rectangular concrete wet well.

The station is not fenced, but the building is locked and all access hatches are locked. There is a carbon adsorption, forced air odor control system at the station, which has kept hydrogen sulfide level in the wet well to a low level. This has contributed to the good condition of the wet well even though the station has been in service for more than 20 years. The carbon adsorption unit is within a locked, fenced area.

A generator with automatic transfer switch is located in the control building. The generator is operated one time per week to ensure it is ready for standby power. The electrical and control panels are in good condition because they are enclosed in a building. The station has a SCADA system with telemetry transmitter/receiver.

The following maintenance was conducted in FY 2016:

- Installed new automatic transfer (electrical) switch.
- Carbon adsorption odor control carbon granules were replaced.

Proposed upgrades to the station include:

- Fence the entire site.
- Touch-up paint on piping as necessary.
- Repair flow meter.

4.2.3 REPRESENTATIVE LIFT STATION CONDITION ASSESSMENT

On February 24, 2016 a representative group of regional and neighborhood wastewater lift stations were toured by Stantec personnel. The purpose of the tour was to develop a general sense of the overall condition of the lift stations that are part of the Charlotte County Utilities Department wastewater collection system. The wastewater lift stations were generally found to be adequately maintained to ensure reliability. Stations are replaced or receive major rehabilitation when maintenance is no longer effective. Regional stations are given priority due to their impact on the whole service area.

4.2.3.1 Lift Station 309

This regional lift station receives flow from the entire Deep Creek subdivision service area. It contains two (2) submersible pumps with 47 HP motors, one of which was replaced new in 2014. The pumps discharge into an 8-inch and 10-inch, two (2) mile long force main and each pump has an estimated capacity of 700 gpm. The force main sends flow directly to the East Port WRF.

The station is fenced and generally well kept. Power is provided by a Florida Power & Light (FPL) 480 volt, 3-phase power service. Two (2) wet wells of 10-foot diameter are connected by a small diameter pipe. The first (old) wet well's bottom below the connecting pipe is filled with concrete to allow flow through directly to the wetwell that contains the pumps. The wetwell hatches are in good condition and provide adequate access to remove the pumps that are on a rail retrieval system. The discharge isolation valves and emergency pump connection are in a buried concrete vault that is in fair condition. The pump discharge pipes in the wet well were replaced with high density polyethylene (HDPE) in the year 2010. The pump discharge check valves were also rebuilt at the time of the HDPE installation.

A biological odor control unit with a fan draws air from the wet well and reduces hydrogen sulfide odor that is generated at this station. The air movement also reduces the concentration of hydrogen sulfide in the wetwell, which will lengthen the life of this concrete structure. The station receives wastewater with long detention times in numerous tributary pumping stations.

The pumps are started without the use of VFDs or soft starts. The electrical panel was found to be in fair condition. There is no generator on site, but the station's main power panel is equipped with a portable generator receptacle. The station contains a telemetry transmitter that allows monitoring to occur from the Charlotte County Utilities Department central office and treatment plants.

Lift Station 309 is in good condition due to constant maintenance since it was purchased by Charlotte County in 2003.

It is recommended that the condition of this critical station be kept at a high level through planned equipment upgrades. An on-site generator with automatic transfer switch would be a good addition. The addition of a protective coating in the wet well would also help prevent future degradation due to high levels of hydrogen sulfide.

4.2.3.2 Lift Station 321- Angol

This regional lift station receives flow from approximately one-third of the Deep Creek subdivision service area. It contains two (2) submersible pumps with 35 HP motors. The pumps discharge into an 8-inch, 8,500 foot long force main. The force main discharges into a gravity sewer that flows to Lift Station 309. The station was constructed in 2009 to replace an undersized station with no expansion capability that was located across the street from this station. This new station contains the current design features of a Charlotte County Utilities Department regional lift station. The station is in excellent condition.

The station is fenced and well landscaped due to its location on a lot between two residences. The rectangular wet well contains two (2) submersible pumps. Flow enters the wet well through a gravity sewer that terminates in a vertical drop pipe below the low water elevation in the wet well. The wet well hatches are in excellent condition and provide adequate access to remove the pumps that are on a rail retrieval system. There is a generator on site with an automatic starter and transfer switch should FPL power fail. The discharge isolation valves, check valves, emergency pump connection and flow meter are all located above ground for easy access and maintenance. The pump discharge pipes in the wet well are constructed of corrosion resistant HDPE and the interior of the concrete wet well is coated with a corrosion resistant polyurethane coating system. The odor control system with fan draws air from the wet well and reduces hydrogen sulfide odor that is generated in the wet well. The odor control system was modified in FY 2016 to include:

- Two stage carbon adsorption
- Hydrogen peroxide drip into wet well

No odor was detected at the discharge from the adsorption unit.

The pumps are started, stopped, and match incoming flow with the use of VFDs. The electrical and control panels are in excellent condition. The station contains a telemetry transmitter that allows monitoring to occur from the Charlotte County Utilities

Department central office and treatment plants.

The station was found to be generally in excellent condition during a recent visit.

4.2.3.3 Lift Station 864 – Coliseum

This regional lift station receives flow from the Gulf Cove residential neighborhoods west of the Myakka River. It contains two submersible pumps. The pumps discharge into an 8-inch and 10-inch force main that discharges to the West Port WRF. The station was reconstructed in 2003 to replace an undersized station with a severely deteriorated wet well and piping. This relatively new station contains the current design features of a Charlotte County Utilities Department small regional lift station. The station is in good condition.

The station has two (2) 15 HP pumps, operating without soft starts or VFDs. The site is fenced with all piping and valves located above ground. The circular wet well is approximately 30 feet deep which is deeper than most Charlotte County Utilities Department lift station wet wells. Flow enters the wet well through a gravity sewer that terminates below the low water elevation in the wet well. The wet well hatches are in excellent condition and provide adequate access to remove the pumps that are on a rail retrieval system. There is no generator on the site, but the main control panel includes a connection for a portable standby generator.

The discharge isolation valves, check valves, emergency pump connection and flow meter are all located above ground for easy access and maintenance. A permanent emergency pump suction line has been installed in the top of the wet well for quick pump suction access during a lift station failure. The pump discharge pipes in the wet well are constructed of corrosion resistant HDPE and the interior of the concrete wet well is coated with a corrosion resistant polyurethane coating system. The coating system is beginning to show its age, but it still isolates the concrete from sewer gases. There is no odor control or metering of flows at the station. At the time of the site visit, one pump running was discharging 530 gpm against 63 feet of total dynamic head. It is suspected that this station could be partly responsible for flow spikes seen at the West Port WRF. An analysis should be performed to determine whether or not VFD's would help dampen these spikes by allowing the pumps to operate for longer periods at a slower speed. The pumps run 50-75 hours per month.

The electrical and control panels are in good/fair condition. The station contains a telemetry transmitter that allows monitoring to occur from the Charlotte County Utilities Department central office and treatment plants.

4.2.3.4 Lift Station 860 – Villas

This recently constructed lift station (2009) is located east of County Road 771 in western Charlotte County. The fenced station is fully equipped with a large wet well, above ground discharge piping, air conditioned VFD drives, generator, easy access, SCADA telemetry, and an installed air suction pipe for future odor control. The overall condition of the station and its components are excellent.

The station contains two (2) submersible 35 HP pumps in a 10-foot diameter wet well. The wet well interior is coated with an epoxy coating. The station slab is raised approximately 4-feet above surrounding grade to protect it from the 100 year flood. Electrical service to the station was extended from CR 771 a considerable distance. Flow enters the station from low pressure, septic tank effluent pumps at residences. The service area is sparsely developed at this time, but water and sewer utilities are available for the lots in this subdivision.

4.2.4.1. Lift Station 301 – San Mateo (Harbor Heights)

This neighborhood lift station is the only wastewater pumping station in the Harbor Heights section of Charlotte County. It receives flow from a residential neighborhood that is near sea level. It contains two submersible pumps rated as 10 HP, 230 volt, 3-phase. The pumps are set in a relatively shallow, six (6) foot diameter wet well. The station was constructed approximately 30 years ago to serve an isolated residential development. The station discharges into the Deep Creek subdivision wastewater collection system. The station receives flow from a gravity sewer system. The general condition of the station is fair except for the power and control panel which was rebuilt in FY 2015. The station includes water service for wash-down and has a portable generator receptacle.

The station is not fenced with all piping and valves located below ground in locked chambers. The top of the wet well and valve chamber are aluminum. The circular wet well is approximately 12 feet deep which is shallower than most Charlotte County Utilities Department lift station wet wells. It is in fair condition with some concrete deterioration on the walls of the wet well. Flow enters the wet well through a gravity sewer. Piping in the wet well is all PVC and pump removal

guide rails are stainless steel. The wet well cover is in fair condition and covers the entire top of the wet well. There is no generator on the site, but the main control panel includes a connection for a portable standby generator.

The discharge isolation valves, check valves, and emergency pump connection are all located in a vault below ground. The valves and piping appear to be in good condition although rusty. There is no odor control at this remote station.

The pumps are started and stopped with motor starters. The electrical and control panel is in good condition because it was rebuilt in 2015. The station does not have a telemetry transmitter that would provide monitoring from the Charlotte County Utilities Department central office and treatment plants.

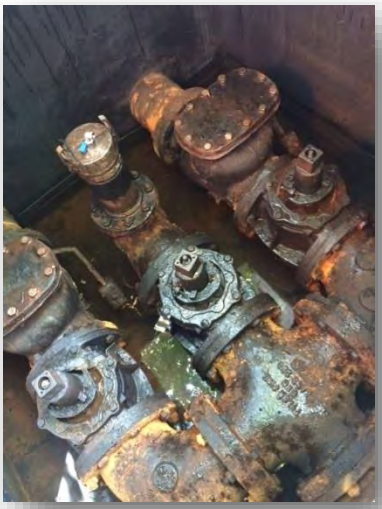
4.2.3.2 Lift Station 313 – Northern Cross (Deep Creek)

This neighborhood lift station receives residential flow from a small service area in the Deep Creek subdivision. This is one (1) of about fifteen (15) small/medium size duplex stations in the Deep Creek subdivision. All of the components of this lift station are in excellent condition. The station is fenced and has easy access with a concrete drive.

The pumping station had a history of being flooded during summer heavy rain storms. The station top was raised about two feet in 2013 and the eight (8) foot diameter wet well was coated with a protective epoxy coating. The two 25 HP pumps discharge into an 8-inch gravity sewer that eventually flows to LS 309. The pipes in the wetwell are HDPE.

There is a generator connection receptacle on the side of the control panel. In addition, there is a permanent suction and discharge connection to accommodate a portable pump if power is lost at the station. The station is fitted with telemetry for monitoring 24 hours per day.

4.2.3.3 Lift Station 406 – Burnt Store Golf Course (Cape Cole)



This small South County lift station serves a section of the Burnt Store Marina/Golf Course complex. The station is not fenced but well camouflaged under low growth shrubs. Both pumps were replaced in FY 2016. The station is powered by 480 volt, 3-phase power that is produced by a phase generator even though 3-phase power is overhead. The Sulzer/ABS pumps run 12 hours per month, each.

The discharge valves are in a vault with aluminum covers. The controls and electrical panel is original. Piping in the wet well is HDPE. The eight (8) foot wet well is corroded, but no reinforcing steel is exposed. The cast iron valves and fittings in the valve vault are corroded and are not painted.

There is no disconnect to remove the station from public power for maintenance. This disconnect should be added the next time that the power meter is removed to disconnect the power.

The station is in fair condition and is representative of most stations in the Burnt Store Marina complex. There is no fence around the station, which is generally the case for all pumping stations in the Burnt Store Marina complex.

The discharge isolation valves, check valves, and emergency pump connection are all located in a vault below ground. There is no odor control at this remote station. The pumps are started and stopped with simple on/off starters. The electrical and control panels are in good condition. The station does not contain a telemetry transmitter that would allow monitoring to occur from the Charlotte County Utilities Department central office and treatment plants.

4.2.3.4 Lift Station 408 – Cabana

This small South County lift station serves a section of the Burnt Store Lakes subdivision. The station is not fenced and located in the rear corner of a house lot. The 6 foot by 6 foot, 18 foot deep wet well is in fair condition due to corrosion of the walls and cast iron pipe discharges from the submerged pumps. The access hatch has been replaced with a non-commercial hatch. The discharge valves are in a vault and are not painted. The vault includes a portable pump discharge connection to the force main.

The station is serviced by 240 volt, 3-phase power that power two 20 HP submersible pumps. The pumps are started with across-the-line starters. Each pump runs 11 hours per month.
The station site includes SCADA telemetry and water service.

The station is in fair condition and is representative of most stations in the Burnt Store Lakes subdivision.

4.2.3.5 Lift Station No. 2 Dalton

This lift station is located on Dalton Street in one of the oldest neighborhoods of Port Charlotte. The station was constructed in 1969. The overall condition of the station is fair/poor. The building needs a new roof and the concrete block building is deteriorating. Several cracks were seen in the building walls. The station is fenced and located on a vacant lot in a residential neighborhood. It contains two (2) above ground, self-priming 15 HP pumps located in the concrete block building erected adjacent to a 6-foot diameter wet well. The building also contains discharge valves and a control panel. The concrete wet well is unlined and is showing severe wearing of the surface due to years of high levels of hydrogen sulfide inside the wetwell. The station is scheduled to be replaced by a submersible pumping station. The replacement is included in the 2017 Capital Improvement Budget.

Flow enters the station via local gravity sewers. The pumps discharge into a 4-inch force main with aging steel pipe supports in the wet well. There is no odor control at the station.

Power to the station is 240 volt, 3-phase. There is no generator or auxiliary connection at this station, but the station does contain a portable pump discharge connection. The electrical and control panels are in good condition.

4.2.3.6 Lift Station 464 – Burnt Store Colony (Mobile Home Park)

This station was constructed in 2013. It replaced an aging wastewater treatment plant that was privately owned. The station is a typical new, small pumping station with the features that have been developed in the past 15 years.

The wet well is a six (6) foot diameter by 20 foot deep wet well. The piping in the wet well is HDPE. The station is not fenced, but all equipment is locked. The station includes two 5 HP pumps powered by 230 volt, 3-phase power. The pumps are started and stopped by variable frequency drives. The pumps run 20 hours per month in the summer and 7 hours per month in the winter.

The discharge valves and pipes, including a portable pump connection, are above ground. The control panel includes a portable generator receptacle and SCADA telemetry.

The station is in excellent condition.

4.2.3.7 Lift Station 7 – Pure Oil

This small lift station is located at the rear of a gasoline station and adjacent to a residential lot. It is a typical example of small wastewater pumping station constructed in Charlotte County by the Port Charlotte developer 50 years ago. The station is in an easement behind a gas station and adjacent to a residential lot. The station serves residential and commercial areas. The overall condition of the station is fair. The station contains two (2) 20 HP self-priming pumps located above the wet well in a small concrete block building. The concrete wet well is corroded by years of hydrogen sulfide attack, but exposed reinforcement was not seen. Power service to the station is 230 volt, 3-phase. The pumps discharge into a 4-inch cast iron force main with cast iron suction pipe in the wet well. The station is not fenced, but it is secure with all panels and building door locked. There is no odor control at the station.

The main control panel is a wood box mounted on the outside of the building. The space inside the building is exposed to sewer gas because access for wet well entry and float switches are open holes in the floor of the building. A new portable generator receptacle with manual transfer switch has been recently added. A portable pump connection is located in a valve box outside of the building. The station has a telemetry transmitter/receiver.

4.2.3.8 Lift Station 22 – Lake Shore

Lift Station 22 is in an older residential area of Port Charlotte. The station was completely replaced in FY 2016. The condition of the station is excellent. This lift station includes the current Charlotte County Utilities Department's pumping station standards. The site is fenced with off-street parking. The wet well

interior walls have been protected with an epoxy coating. Pipes in the wet well are HDPE, which is not attacked by sewer gases. All ancillary components in the wet well are stainless steel. Discharge pipes and valves are above ground for easy access and maintenance.

The station contains two (2) submersible 25 HP pumps in a 6-foot diameter wet well. Buried power service to the station is 230 volt, 3-phase. Flow from the surrounding residential area enters the station via a gravity sewer with an inside drop pipe designed to limit odors from hydrogen sulfide gas. Flow is treated at the East Port WRF.

The control panel is stainless steel to ensure many years of service. The station includes a portable pump receptacle and portable pump discharge connection. The station has a telemetry transmitter/receiver.

4.2.3.9 Lift Station 877 – Ingraham

This lift station is located in the South Gulf Cove residential community of 13,000 properties in western Charlotte County. The station was constructed as part of the septic tank effluent low pressure sewer system that was installed in South Gulf Cove in the 1990's. The overall condition of the station is good.

The station is fenced and well landscaped to make it nearly invisible to adjacent residences. Two 15 HP submersible pumps are installed in an eight (8) foot diameter wet well. A forced air, odor control system has been operating at the station since its construction. The odor control system is a biological tower that requires only liquid fertilizer to keep it in good running order. The continuous operation of a forced air odor control system has resulted in a good condition of the interior of the wet well after 21 years of operation. The inlet sewer pipe discharges below the water level in the wet well. This also keeps hydrogen sulfide dissipation to a minimum.

The station does not contain VFD drives. Pumps are started with across-the-line starters. There is no generator at the site, but there is the standard Utility Department portable generator connection on the side of the motor control panel. The station's discharge valves in the valve vault were replaced in 2015. The valve vault is now in excellent condition. The electrical and control panels are in good condition. The station has a telemetry transmitter/receiver.

4.2.3.10 Lift Station 882 – Oldsmar

This lift station is located just south of South Gulf Cove in western Charlotte County. The station was constructed in 2001 to pump the wastewater from the southern western part of Placida Peninsula to the West Port WRF. The overall condition of the station is excellent.

The station contains two (2) submersible 47 HP pumps in a 10-foot diameter wet well. Buried power service to the station is 240V, 3-phase. Flow from the surrounding residential areas enter the station via a force main with an inside drop pipe designed to limit odors from hydrogen sulfide gas. The incoming force main contains a ductile iron bend in the wet well that should be replaced with a PVC or HDPE fitting. The station is surrounded by a six (6) foot chain link fence topped with barbed wire. All hatches and panels are locked.

The pump discharge piping in the wet well is HDPE with the ductile iron piping and valves located above ground. The above ground piping was installed in late 2015 by CCUD staff, thereby replacing the previous valve vault.

There is carbon adsorption odor control system at the station to minimize odors. There is no permanent generator at this station, but the station does contain a connection for portable generator quick connection. The electrical and control panels are in excellent condition. The station has a telemetry transmitter/receiver.

4.2.3.11 Lift Station 817 – "Z"

This station is in the Rotonda Development in western Charlotte County. The station is in poor condition and is scheduled for replacement or major rehabilitation in 2017. The station is contained within a chain link fence with locked gate. It is isolated from human inhabitation.

One 10 HP submersible pump is operating in the wet well. A stand-by, self-contained pump on a skid has been connected to a suction pipe that has been installed in the wet well. The discharge from the skid pump has been permanently connected to the discharge force main. This station has more than the usual amount of storage due to a second wet well that is connected to the adjacent operating wet well. The operating wet well is not plumb/level and the walls are highly corroded due to its many years of service.

The operations department monitors this station closely through its SCADA telemetry system and frequent site visits.

4.2.3.12 Lift Station 800 – Village of Holiday Lakes

This small West County lift station serves a large mobile home park. The station is not fenced and located in a common grass area along the entrance road. The station was rehabilitated in 2005. The general condition of the station is good. Like many stations, painting of ferrous metal parts is a constant task.

The wet well and control panels are locked. The 6 foot by 6 foot, 20 foot deep wet well is in good condition due to corrosion protection being applied in 2005. The discharge valves and piping are above ground. The station is fitted with an emergency pump suction pipe and discharge connection.

The station is serviced by 240 volt, 3-phase power for two (2) 10 HP submersible pumps. The pumps are started with across-the-line starters. Each pump runs 45 hours per month in the summer and 70 hours per month during the high population winter months.

The station site includes SCADA telemetry and water service.

4.3 OPERATIONS

The operations of the wastewater collection system is defined as ensuring the capacity to move all generated wastewater to its tributary treatment plant. The wastewater quantity is subject to daily, monthly, and seasonal peaks. The flat terrain of Charlotte County requires more than 300 pumping stations to transfer the wastewater from the source connections to the treatment plants.

Charlotte County Utilities Department maintains a separate department for the purpose of operating and maintaining the collection systems. Although many of the pumping stations (lift stations) are continuously monitored by Radio Telemetry Units, each station is visited frequently. Most of the daily sewer department effort is involved with maintaining the pumping stations through daily or weekly physical inspections and a proactive maintenance program.

Unforeseen pumping station failures require immediate attention. Charlotte County Utilities Department maintains two (2) 6,000-gallons tankers, three (3) 4,000-gallon tankers, and has contracts with local septage haulers to transport flows from pumping stations to the treatment plant. In addition, nearly all pumping stations include on-site standby power or portable generator receptacles that can restore power within minutes of a noted power failure. Charlotte County Utilities Department owns eleven (11) trailer

mounted portable generators and seven (7) trailer mounted portable pumps that can be dispatched in the event of a power or pump failure.

4.4 MAINTENANCE

Maintenance procedures for the wastewater collection system are similar to those followed for the water distribution systems.

4.4.1 SERVICE ORDERS

The process for generating and completing service orders in the Wastewater Collection workgroup is the same as described for the Water Distribution workgroup. As in Water Distribution, predictive and preventive Service Orders (SO) are generated internally and processed in a similar manner. Corrective SOs are generated by customer calls. The designation of an SO, as being related to wastewater or water, is determined by the dispatcher.

4.4.2 DATA MANAGEMENT

The Enterprise Asset Management System (EAMS), as described in the Water Distribution Section, is in full implementation. As its database continues to expand, it will also be shared to a greater extent than it is currently. For example, a manager will be able to query the system to determine if there are open work orders in a particular neighborhood, regardless of whether they are water or wastewater related, or whether the Public Works Department is planning to pave a street before a planned open-cut repair of a wastewater collection line. LPS customers generated about 3,465 corrective SOs in FY 2016. Lift stations generated 1,347 SOs in the same timeframe, the majority of which were generated internally by Charlotte County Utilities Department staff.

In the planning stages of a new collection system, Charlotte County Utilities Department engages an engineering consultant to perform a feasibility study that includes an economic comparison of installing a conventional or modified gravity system, with its network of lift stations and force mains, versus an LPS system and/or a vacuum system. The major components of the comparison are initial construction costs and future maintenance costs over the life of the system. Future costs are brought to present day costs, much like an annuity, and added to construction costs to determine total project cost.

The final selection of the new collection system is based upon these life cycle costs and specific needs of each area served. EAMS will allow this type of economic analysis to be performed with greater precision in future studies, because costs will be more accurately known. For example, the gravity manhole or lift station wet well to which an LPS discharges tends to be subjected to more corrosion than other locations.

An increase in hydrogen sulfide gas generation occurs when an area served by Septic Tank Effluent Pumping (STEP) systems discharges into the gravity sewer system. The increased hydrogen sulfide concentration is due to the long detention times in the STEP system as compared to a gravity system. Additional odor and corrosion control has been added to the collection system when STEP area discharge into the gravity system.

4.4.3 PREVENTATIVE MAINTENANCE

The wet wells of all lift stations are inspected regularly. Problems are addressed as they are found. This effort extends beyond the thorough inspection of representative stations, as described in Section 4.2 of this report.

The average age of the Charlotte County Utilities Department gravity system is 30 years. Older sewers were typically installed in swales, which made them more prone to infiltration. Also, design and construction standards were not as stringent as is the current practice. Pipe material and joints were constructed with material that deteriorates with time.

The older gravity sewer pipes are vitrified clay with frequent joints that are sources of infiltration. Vitrified clay pipe is resistant to corrosion but is more brittle than PVC and HDPE pipe. After many years of service, cracks develop and pieces of the clay pipe protrude into the flow stream. Although Charlotte County Utilities Department has relatively few plugged sewers, the broken clay pipe will cause blockage and must be repaired.

Charlotte County Utilities Department Wastewater Collections staff performs in-place pipe repairs to fix most of the broken pipes in the system. Most of these repairs involve a cured-in-place lining, fold-and-form lining, or PVC lining. These repair methods restore the integrity of the sewer system without requiring excavation.

The gravity sewer system provides considerable storage time during power failures to allow Charlotte County Utilities Department staff to address the issue. If there is a power failure in the Low Pressure Sewer (LPS) System, approximately 20 minutes of wastewater storage remains in the LPS system lift station wet wells. However, loss of power in the whole area results in no flow being pumped to the lift station.

Charlotte County Utilities Department has 11 trailer-mounted portable generators and seven (7) trailer-mounted portable pumps that can be dispatched in the event of a power failure. Charlotte County Utilities

Department has developed an emergency preparedness program for the various LPS systems. The program was originally implemented in the aftermath of Hurricane Charley.

Charlotte County Utilities Department has three 4,000-gallon tank trucks, which are used in conjunction with an external vendors tank trucks of similar capacity, for emergency pumping LPS tanks and lift stations. In addition, Charlotte County Utilities Department currently has two (2) tankers each with a capacity of 6,000 gallons. These tankers serve a dual purpose. They are used to transport sludge from the wastewater treatment plants, but are also available to haul raw wastewater from lift station sites during emergency conditions.

Inspections of manholes, gravity system piping and maintenance of sanitary sewer in FY 2016 included 58 laterals repairs, smoke testing to locate rainfall inflow sources, internally televised 390 feet of gravity sewer, and repaired numerous manholes when defects were discovered.

4.5 REVIEW OF PREVIOUS REPORT RECOMMENDATIONS

Recommendation:	Continue the scheduled rehabilitation of sanitary lift stations that have deteriorated due to use and hydrogen sulfide presence, including having engineering consultants conduct evaluations and perform the designs.
Progress:	*Lift station rehabilitations are performed each year.*
Recommendation:	Continue to use the wastewater lift station and force main computer model to assess the need for upgrades to the system based on anticipated demand for services.
Progress:	*Ongoing.*
Recommendation:	Continue to search for sewer Infiltration/Inflow sources and repair gravity sewers and manholes as required.
Progress:	*Work performed: 58 laterals were repaired, 390 feet of gravity sewer were televised, areas suspect of inflow sources were smoke tested, and numerous manholes were repaired.*
Recommendation:	Install odor control systems at lift stations where hydrogen sulfide concentrations cause odors and deterioration of structures.
Progress:	*Additional odor controls were added in FY 2016.*
Recommendation:	Continue acquisition of stand-by generators and pumps to maintain service during power outages when budget allows.
Progress:	*No new generators were purchased in FY 2016.*

Recommendation: In addition to having lift station rehabilitations performed by engineering consultants, continue the in-house program of performing all engineering and construction necessary for the rehabilitation of at least one lift station annually.

Progress: *LS 22 rehabilitation was designed by CCUD staff in FY 2016.*

Recommendation: Continue to repair and upgrade existing lift stations as required. Perform the following maintenance activities at the specific lift stations that were reviewed in the preparation of the 2015 Annual Report and previously not completed as follows:

Progress: *See comments for each lift station below.*

1. Quesada Master Lift Station

    - Replace the bubbler wet well level system with a more modern technology (3 years). *The bubble system components were replaced in FY 2016.*
    - Replace the metal entrance doors on the control building (1 year). *Not completed.*
    - Install a second wet well to allow maintenance of the existing wet well (5 years). *Not completed.*

2. Lift Station No. 309 – Bridgewater

    - Add on-site generator and automatic transfer switch (5 years). *Not completed.*

3. Lift Station No. 28 (864) – Coliseum

    - Analyze VFD use to determine if long term cost savings due to system efficiencies at both the lift station and at the West Port WRF can be recovered (2 years). *Not completed.*

4. Lift Station No. 2 – Dalton

    - Remove building and convert station to submersible pumps with above ground valves. (Scheduled for 2017 Capital Improvement). *Not completed.*

5. Lift Station No. 884 – Oldsmar

    - Replace ductile iron 90 degree fitting inside wet well (5 years). *Not Completed*.
    - Paint new above ground discharge piping (1 year). *Completed*.

6. Lift Station No. 817 – "Z"

    - Replace station entirely. (2 years). *Not Completed.*

7. Lift Station No. 415 – Prada

    - Sandblast and reline wet well to prevent further deterioration (1 year). *The wet well is scheduled for an integrity test in 2017.*

8. Lift Station No. 27 – McRissor

    - Replace piping inside wet well (1 year). *Completed.*
    - Sandblast and line wet well (1 year). *Completed.*
    - Remove below ground valve vault and replace with above ground piping (3 years). *Not completed.*
    - Explore options for relocating this lift station to a more suitable site (5 years). *Not completed.*

9. Lift Station No. 852 – White Marsh Boundary #1

    - Verify access easements and add a gravel access drive (1 year). *Not completed.*
    - Add a security fence to the site (2 year). *Not completed.*

10. Lift Station No. 812 – Annapolis

    - Verify access easements and add a gravel access drive (1 year). *Handrail added for access safety.*
    - Add a security fence to the site (2 year). *Not completed.*

4.6 SUMMARY AND RECOMMENDATIONS

4.6.1 SUMMARY

There were 35,231 wastewater customer accounts served by Charlotte County Utilities Department at the end of FY 2016. Individual facilities are connected to a wastewater collection system comprised of 930 miles of collection pipes, lift station force mains, and LPS force mains. The system includes 304 lift stations, 100 users connected to vacuum sewers, 261 miles of force mains, 290 miles of LPS mains and 378 miles of gravity mains.

Wastewater from each customer is transported to one of four water reclamation facilities, depending on the location of the customer. The Wastewater Collection workgroup has a maintenance program that includes inspections for condition assessment by closed-circuit TV inspections and cleaning of collection lines to restore/maintain hydraulic capacity. A site review of random, representative facilities showed them to be maintained in working order.

4.6.2 RECOMMENDATIONS

The following repairs are recommended for the stations viewed during the preparation of this report:

1. Lift Station No. 309 – Bridgewater
    - Add on-site generator and automatic transfer switch (5 years)
2. Lift Station No. 864 – Coliseum
    - Analyze VFD use to determine if long term cost savings due to system efficiencies at both the lift station and at the West Port WRF can be recovered (2 years)
3. Lift Station No. 2 – Dalton Pumping Station
    - Remove building and convert station to submersible pumps with above-ground valves (1 year)
4. Lift Station No. 884 – Oldsmar
    - Replace ductile iron 90 degree fitting inside wet well (5 years)
    - Add VFD drives to reduce peaks at West Port WRF (5 years)
5. Lift Station No. 817 – "Z"
    - Replace station entirely. (2 years)
6. Lift Station No. 65 – South Port
    - Fence around station (1 year)
    - Touch-up paint (when required)
    - Repair flow meter, connect to telemetry (2 years)

7. Lift Station No. 301 – San Mateo

    - Consider replacement of the station in another location due to lack of space and capability to fence the station at its current location (5 years)

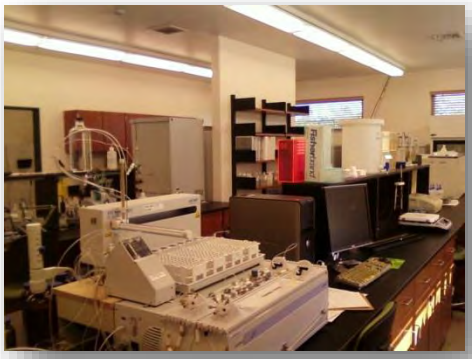
    - Add telemetry (2 years)

8. Lift Station No. 7 – Pure Oil

    - Replace with standard submersible pump station (5 years)

5.0 WASTEWATER TREATMENT FACILITIES

5.1 STATE CERTIFIED LABORATORY



The East Port Laboratory (EPLAB) is located at the East Port WRF in Central Charlotte County with an address of 3100 Loveland Boulevard, Port Charlotte, Florida. Analyses are provided for four (4) wastewater treatment facilities, one (1) Water Treatment Plant, one (1) landfill (Leachate Treatment Facility), six (6) deep injection wells, and water quality analysis is provided for the Charlotte County Utilities Department water distribution system.

EPLAB is accredited by the Florida Department of Health (FDOH) – Bureau of Laboratories, who participates with The National Environmental Laboratory Accreditation Program (NELAP) Conference Institute (TNI). The EPLAB is a member of the NELAC Institute (TNI). The laboratory has accreditation to perform the following analyses: potable water microbiology, non-potable water general, and non-potable water microbiology. Certification to perform these analyses is included under certificate number E54436, which was renewed on January 13, 2017. Three new analysis certifications were obtained in 2016: Total & E. Coliform by standard Method 9223B for drinking water, Fecal Coliform using Colilert-18 for wastewater, and Enterococci Enterolert for wastewater.

The Comprehensive QA Plan was last revised in December 2015 with an effective date of January 1, 2016. The Plan and Standard Operating Procedures are used as a reference for lab technicians and management. It is maintained and revised annually to coincide with new TNI standards in accordance with the FDOH's Environmental Laboratory Program.

An assessment of the laboratory operation is performed every two (2) years. The most recent assessment was performed by a private company, under contract with FDOH, in October 2016. The next assessment is due in October 2018.

5.1.1 SITE VISIT

A site visit of this facility was conducted on February 28, 2017 by Stantec staff. The site visit focused on a tour of the laboratory by Sandra Lavoie, EPLAB Manager and consultation with the lab manager about the changes that have taken place in FY 2016. The laboratory manager indicated that a Laboratory Information Management System (LIMS), a Web based System, had been implemented to reduce the amount of manual data transfer as samples pass through the laboratory analysis and report system. The lab manager entered the sampling data and locations into the LIMS program in 2015 and the vendor has adjusted the LIMS to meet the East Port Laboratory requirements. The LIM system was in operation on the day of the site visit. The laboratory now uses the new LIMS for most data management. The paper record method is still used for some analysis data management that is more appropriate than electronic tracking. The LIM electronic bench sheets and data are backed up hourly on the "Cloud". The laboratory staff is pleased with the LIM system, which has reduced paper work significantly and greatly reduced the chance for scribing errors.

5.1.2 ACCREDITATION REQUIREMENTS

The laboratory staff is operating under the standards set forth by The NELAC Institute (TNI), formerly known as NELAC. The 2009 TNI standards became effective July 2011. The FDOH is still using the 2003 NELAC standard because the State of Florida has not adopted the newer 2011 TNI standard. Laboratory staff must follow NELAC 2003 standards and the TNI 2011 standards. New TNI 2015 standards have been prepared, but are still not accepted by the Florida legislature to replace the TNI 2009 standards. Every laboratory in the State of Florida must follow the TNI 2009 and 2015 standards until the state legislature approved the new standards.

All employees of the laboratory engaged in making decisions affecting the quality of laboratory output are required to undergo training programs. Only laboratory personnel who are certified to perform specific analysis are allowed to perform those tests. All personnel concerned with environmental testing within the laboratory must familiarize themselves with the quality documentation described in the QA Plan.

5.1.3 LABORATORY OPERATIONS

The EPLAB is organized into five (5) main rooms; 1) sample receipt and storage, 2) un-refrigerated chemical and equipment storage, 3) administrative work stations for laboratory technicians, 4) the main laboratory benches, and 5) drinking water laboratory.

The old paper tracking system that was developed by the laboratory manager was continued in FY 2016 as a duplicate to the LIMS. The new LIMs system prepares the paper documentation forms and sample identification numbers. Forms are kept in electronic format to make revisions easy and to ensure the use of the latest form revision by all laboratory personnel.

The EPLAB processes more than 34,000 test results per year. Test results are made from on-site analysis and additional off-site testing. This is a large volume of work and tracking procedures for four (4) people to accomplish. At the beginning of FY 2016 the laboratory personnel number was down to only three people. A fourth person was hired in January 2016 to complete the full complement of four laboratory staff.

The Eastport Laboratory entered into a software licensing agreement for the LIMS in November 2014. The key to using the system is the ability to assign bar codes to each sample. Samples can be tracked through the storage, analysis, and reporting phases of the laboratory analysis. The lab manager is now able to produce daily reports of the status of all current laboratory work. The tracking system also monitors quality control results and chemical use to manage ordering of supplies.

The quality control manual was revised at the end of 2015 and is effective January 1, 2016. The comprehensive manual contains 25 section, including organization, document control, purchasing services and supplies, serving the client, control of records, data integrity, environmental conditions, calibration, handling of samples, quality assurance, and reporting methods. The TNI standards are referenced for each section of the manual, which allows for quick reference between this local document and the TNI standards.

Proficiency tests are required every six (6) months. Analysis results of test samples are sent to the FDOH for regulation compliance and compared to results of other laboratories nationwide. Ms. Lavoie is proud of the EPLAB's passing grade of being within one (1) standard of deviation of the average of all the laboratory results throughout the United States that are using the same testing vendor.

The documentation of a sample through the system was continued through paper files that are now generated by the new LIMS. Quality control procedures have been continued and chain of custody documentation is strictly adhered to.

The equipment is tested for accuracy as described in the QC Plan. Samples are arranged efficiently for analysis by batches to reduce the numbers of blanks, calibration standards, and quality control samples needed per analysis.

Staff continues to demonstrate their diligence in ensuring all laboratory data entries, chain of custody forms, bench sheets, etc. are correctly transferred to the final laboratory analysis report which is used for reporting to regulatory agencies.

Quality control is a high priority in the East Port Laboratory. In the past, laboratory analyses' data was transferred, by hand, from the bench testing to the report forms. Electronic entry of data at the laboratory station or output of an automatic analyzer directly to report forms has eliminated one (1) source of potential errors. Organization of data in an electronic form allows direct input into FDEP forms which will eliminate another source of data entry error. Currently, FDEP water quality forms are not compatible with the LIMS. It is anticipated that the FDEP forms will be updated soon. Quality Assurance by a responsible person-in-charge will still be required to check data entries.

An analysis conflict for Ammonia Nitrogen testing of wastewater samples was detected in FY 2015. The method used by the East Port Laboratory was a certified method, but the analysis was compromised by the sample distillation process that was used. The testing procedure was modified to eliminate the conflict. Confirmation was assured through duplicate analysis by another certified laboratory.

5.1.4 RECORD KEEPING

Record keeping is kept in an extremely neat and organized manner and is easily accessible.

Records are well maintained as both paper copies and electronically to meet regulatory requirements. Sampling schedules for each facility are clearly posted for staff to review and all upcoming special sampling events (i.e. Annual Effluent Analysis, Cryptosporidium, and Giardia) are clearly posted with their due dates.

The EPLAB also sends samples to other laboratories that are certified to perform tests that the EPLAB is not certified to perform. Results are received and sent to the treatment plant chief operators.

5.1.5 CERTIFICATION COMPLIANCE SCHEDULE

- The biannual FDOH review was conducted in October 2016.
- Proficiency tests occur every six (6) months.

5.1.6 2015 AUDIT REPORT RECOMMENDATIONS AND PROGRESS

Recommendation:	Implement the Laboratory Information Management System in 2016.
Progress:	*Implemented in 2016. Its numerous capabilities are being introduced into the operations of the laboratory.*
Recommendation:	Switch to an alternative testing procedure for Ammonia Nitrogen that is not affected by other materials present in wastewater.
Progress:	*Completed. A new distillation procedure was implemented.*

5.1.7 RECOMMENDATIONS

Recommendation:	Continue to expand the use of the LIM System within its capabilities.
Recommendation:	Seek certification for analysis methods using the new Gallery instrument that was deliverd in November 2016.

5.2 WASTEWATER PRETREATMENT COMPLIANCE

Charlotte County Utilities Department's Pretreatment section is comprised of the following programs:

1. Transported Waste Receiving Program
2. Restaurant Grease Interceptor Inspection Program
3. Investigation of unauthorized discharges to the wastewater system

5.2.1 TRANSPORTED WASTE RECEIVING PROGRAM

This program provides for the environmentally safe disposal of septic waste. This waste is accepted at the East Port WRF and treated to reclaimed water quality for distribution. In FY 2016, 7,418,450 gallons were accepted from 44 permitted haulers. Charlotte County Utilities Department is very proud of the service this program provides that reduces land application of waste and associated environmental effects.

5.2.2 RESTAURANT GREASE INTERCEPTOR INSPECTION PROGRAM

This program is responsible for the inspection and monitoring of grease interceptors at more than 240 restaurants and other food preparation facilities countywide. The main objective is the prevention of sanitary sewer overflows caused by fats, oils and grease (FOG). All interceptors are placed on a pump-out schedule (30, 60, 90 days, etc.) and are regularly inspected by Charlotte County Utilities Department pretreatment personnel for compliance. Plans for restaurants and other food preparation facilities are submitted to Charlotte County Utilities Department's Engineering Services Division. They are also reviewed by pre-treatment personnel for accuracy and adherence to Charlotte County Utilities Department's specifications. In FY 2016, 1,083 inspections were conducted and five (5) Notices of Violations were issued for non-compliance.

A partnership with Affordable Biofeedstock, located at the East Port WRF, has been established to treat restaurant grease transforming it to bio-diesel and other by-products. Biofeedstock receives restaurant grease directly from haulers and partially processes it for recycle use. Grease trap waste is no longer accepted by the East Port WRF.

5.2.3 INVESTIGATION OF UNAUTHORIZED DISCHARGES

The primary objective of this program is the prevention and investigation of sources that may be contributing pollutants to the waste stream and which have an adverse effect on the treatment process. When issues are reported pertaining to the treatment process at any WRF, pretreatment staff perform sampling of upstream lift stations and manholes. The staff works closely with lift station crews and plant personnel to establish the source of the illegal discharge, and take steps to eliminate the problem, up to and including fines.

5.3 BACKFLOW AND RECLAIMED SERVICES

Charlotte County Utilities Department's Backflow and Reclaimed Services are responsible for the following:

- Reclaimed Water Distribution System Monitoring
- Backflow and Cross-Connection Prevention

5.3.1 RECLAIMED WATER PROGRAM

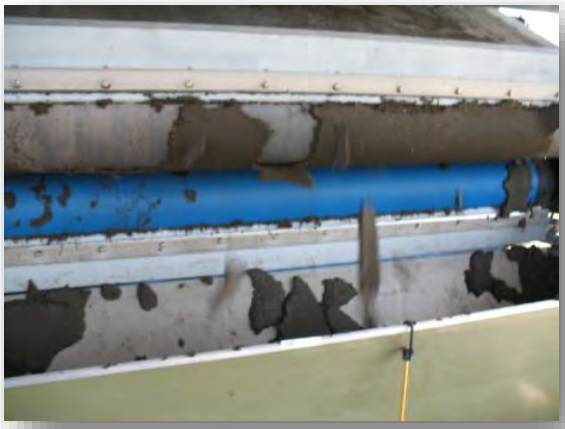
Backflow and Reclaimed Services staff is involved in documentation, inspection, and minor repairs of the reclaimed water distribution system. The reclaimed water distribution system is inspected daily to ensure that FDEP requirements are being met. Monthly inspections highlight the distribution equipment that may need repair, calibration, or replacement. An important element of the program is that reclaimed water sites are inspected yearly for possible cross-connections. Backflow and Reclaimed Services staff coordinates with reclaimed water customers to keep them updated on the reclaimed water supply, inform them of operational problems, and provide information and guidance regarding FDEP and SWFWMD rules and regulations.

5.3.2 BACKFLOW AND CROSS CONNECTION PREVENTION PROGRAM

The Backflow and Cross-Connection Prevention program utilizes two (2) types of surveys – basic backflow equipment and cross-connection to track water use. The basic backflow equipment survey is used to verify the site information of each water user. The cross-connection survey provides information on possible cross-connections and health hazard levels. The information in the surveys is used to provide the customer with an explanation of the backflow prevention that is required. A database has been created that includes information on each water user, the backflow prevention measures in place at the site, backflow testing requirements, and communication with the customer. This information satisfies the FDEP requirements for implementation of a backflow and cross-connection control program. Charlotte County Utilities Department's Cross-Connection Control Manual provides the structure by which the program can be administered and a vehicle for changes as needed in the future. The program includes testing and repair of backflow devices at County-owned facilities. This part of the program will increase as the database of backflow information increases.

FY 2016 Program Statistics:

- Hydrant Meters Repaired/Tested: 14
- Cross-Connection Inspected: 3,144
- Charlotte County Backflow Tests: 223
- Potential Cross-Connections Corrected: 3
- Commercial Sites Entered into Database: 33



5.4 WASTEWATER RESIDUALS TRANSPORT, PROCESSING AND DISPOSAL

At the East Port WRF, wastewater residuals or waste activated sludge (sludge) from the secondary clarifiers from all Utility Department facilities is discharged into a 2.05 MG aerated sludge holding tank. The aerated sludge holding tank is not operated as an aerobic digester, since the required 38 percent volatile solids reduction is not practical for an activated sludge process with an aeration solids retention time (SRT) greater than 15 days.

Sludge from all other Charlotte County Utilities Department water reclamation facilities is trucked to the East Port WRF as liquid sludge (1.5 percent dry solids) and pumped into the aerated sludge holding tank using a sludge transfer pump station at ground level. The Utilities Department provides its own sludge transport operation utilizing two (2) tankers.

Sludge is dewatered at two, 2-meter wide belt filter presses located near the aerated sludge holding tank. The dried sludge is hauled to a private compost facility that is located at the Charlotte County Landfill. The sludge is mixed with yard organic waste and composted to a Class A stabilized compost. The compost is used for sandy soil enhancement and landfill final cover material.

5.5 EAST PORT WRF AND RECLAIMED WATER SYSTEM

The East Port WRF is owned and operated by Charlotte County and has a permitted capacity of 6.0 mgd AADF. The facility is located on Loveland Boulevard in Port Charlotte on approximately 700 acres. It was acquired as part of the General Development Utilities purchase in 1991 and was upgraded and expanded in 1996.

The East Port WRF is an activated sludge wastewater treatment facility using the anoxic Modified Ludzack-Ettinger (MLE) process. It produces filtered reclaimed water for reuse on restricted irrigation sites, as well as public access irrigation sites. The restricted irrigation system consists of 315 acres onsite using slow-rate irrigation (R-002 Spray Fields). Two (2) onsite Class I deep injection wells provide disposal during wet weather, as well as alternate effluent disposal for the plant.

Fifty-one (51) acres have been set aside as an official conservation easement, and the remaining land is mainly woodlands. The site is home to more than 20 varieties of birds, including great egrets, osprey and Carolina wrens. Many other wildlife species make East Port their home. Gopher tortoises, scrub jays, bobcats, armadillos, cottontails and alligators are among the inhabitants.

5.5.1 REGULATORY CONSIDERATIONS

Permit Schedule:

- Plant Operating Permit Expiration Date: September 6, 2017
- IW-1 Permit Expiration Date: August 18, 2021
- IW-2 Permit Expiration Date: April 12, 2020.

5.5.2 WASTEWATER CHARACTERISTICS

Table 5-1 summarizes the wastewater characteristics of the East Port WRF Influent. For FY 2016, the annual average for CBOD5 was 127 mg/L and TSS was 121 mg/L. The highest monthly average CBOD5 occurred in December 2015, which showed a CBOD5 of 169 mg/L. The highest monthly average for a TSS of 162 mg/L occurred in February 2016.

Table 5-1 East Port WRF Influent Water Quality FY 2016				
Month	CBOD		TSS	
	Monthly Avg. (mg/L)	Annual Avg. (mg/L)	Monthly Avg. (mg/L)	Annual Avg. (mg/L)
Oct-15	114	133	93	217
Nov-15	132	131	82	209
Dec-15	169	131	137	207
Jan-16	148	127	101	200
Feb-16	158	121	162	153
Mar-16	152	121	154	146
Apr-16	159	124	133	138
May-16	138	127	107	129
Jun-16	93	128	103	123
Jul-16	115	131	156	122
Aug-16	74	130	122	121
Sep-16	75	127	101	121

5.5.3 DIURNAL STORAGE

There is no diurnal storage for influent flow at the East Port WRF.

5.5.4 CAPACITY

A renewed wastewater permit for the East Port WRF was issued by FDEP during FY 2013. This permit authorizes operation of the WRF through September 6, 2017 and also authorizes a planned expansion from 6.0 mgd to 9.0 mgd. The time of the complete expansion will be determined by Charlotte County Utilities Department based on projected service area growth. In the interim, the existing pretreatment (headworks) process was expanded during FY 2010 via the addition of a parallel treatment train. Charlotte County Utilities Department bid the first stage of improvements outlined in the permit renewal from 6.0 mgd to 9.0 mgd. Along with the improvements to increase capacity, the plant will receive an overhaul of its electrical control systems and rehabilitation of key plant components. Expanded Stage 1 improvements were completed in FY 2015.

The following improvements and/or additional components for Stage 1 of the permitted improvements included:

- A new 11.5 mgd mechanical bar screen to replace the original screen.
- A duplicate grit washer.
- Upgraded plant electrical distribution.

- New automatic transfer switch.
- New MCC components for the east side of the plant.
- New internal recycle pumps.
- New return activated sludge pumps.
- New grit pumps.
- Removed grit from anoxic treatment basins.
- New aerobic digester.
- New liquid sludge discharge station.
- New blowers for new digester.
- Major overhaul of both sand filters.
- New aerators for aerobic zone.
- New gates for anoxic zone.
- Replaced two (2) 2,500 gallon sodium hypochlorite tanks with one (1) 5,000 gallon tank.

The remainder of the permitted improvements that are scheduled for future construction include:

- A new splitter box to separate flows to the anoxic/aerobic treatment trains.
- Additional biological treatment train consisting of an oxidation ditch with a 0.80 MG anoxic zone and 1.90 MG aeration zone.
- New larger splitter box for the clarifiers.
- One 140-foot diameter clarifier.
- Two (2) new 0.27 MG chlorine contact basins.
- Change the 95 MG storage pond into a public access reclaimed water storage pond.
- Double the stand-by power capacity.
- Modify yard piping, pumping stations, etc.
- Construct a new high service reclaimed water pumping station for the converted 95 MG reclaimed water storage pond.
- Convert the old digester to a flow equalization holding tank.

Table 5-2 summarizes the flows received at the East Port WRF. For FY 2016, the AADF was 4.825 mgd with a maximum monthly average of 6.953 mgd in September 2016.

While the plant is currently operating close to its current rated capacity of 6.0 mgd, ongoing efforts described above will increase the design capacity to 9.0 mgd.

Table 5-2 East Port WRF Influent Flows FY 2016						
Month	Monthly Avg. (mgd)	AADF (mgd)	TMADF (mgd)	Monthly Max (mgd)	Monthly Min (mgd)	TMADF Percent Capacity (%)[1]
Oct-15	4.037	4.139	4.712	4.759	3.741	79%
Nov-15	3.852	4.121	4.181	4.005	3.732	70%
Dec-15	3.918	4.114	3.935	4.158	3.677	66%
Jan-16	4.896	4.190	4.222	7.543	3.861	70%
Feb-16	5.188	4.271	4.667	5.947	4.690	78%
Mar-16	4.549	4.305	4.878	4.958	4.300	81%
Apr-16	3.967	4.324	4.568	4.291	3.633	76%
May-16	3.727	4.338	4.081	4.340	3.494	68%
Jun-16	6.041	4.527	4.578	9.892	3.630	76%
Jul-16	4.742	4.585	4.837	6.355	4.144	81%
Aug-16	6.029	4.633	5.604	8.652	4.707	93%
Sep-16	6.953	4.825	5.908	11.335	5.027	98%

5.5.5 TREATMENT OBJECTIVES AND EFFLUENT QUALITY

There are two (2) effluent standards the East Port WRF must meet when discharging its treated wastewater. For the deep injection well and the onsite sprayfields, the annual average limits for CBOD and TSS are 20 mg/L. For the reuse system, the annual average limit for CBOD is 20 mg/L and the maximum limit for TSS is 5 mg/L. Tables 5-3 and 5-4 summarize the effluent water quality, as measured at the discharge of the two (2) chlorine contact chambers (EP 31 – no filtration and EP 32 - filtration, respectively). In addition, chlorine residual levels must be achieved at the discharge of the chlorine contact tanks. A review of the FY 2016 data shows that the East Port WRF effluent quality was well within permit limits for both standards.

Table 5-3 East Port Effluent Water Quality FY 2016 (EP 31 sample location)					
Month	CBOD		TSS		Fecal
	Monthly Avg. (mg/L)	Annual Avg. (mg/L)	Monthly Avg. (mg/L)	Annual Avg. (mg/L)	Monthly Avg. (No./100 mL)
Oct-15	No Flow	No Flow	No Flow	No Flow	No Flow
Nov-15	No Flow	No Flow	No Flow	No Flow	No Flow
Dec-15	No Flow	No Flow	No Flow	No Flow	No Flow
Jan-16	No Flow	2.25	No Flow	3.70	No Flow
Feb-16	2.00	2.13	0.40	2.05	2.00
Mar-16	No Flow	2.13	No Flow	2.05	1.00
Apr-16	No Flow	2.13	No Flow	2.05	No Flow
May-16	No Flow	2.13	No Flow	2.05	No Flow
Jun-16	No Flow	2.13	No Flow	2.05	No Flow
Jul-16	No Flow	No Flow	No Flow	No Flow	No Flow
Aug-16	No Flow	No Flow	No Flow	No Flow	No Flow
Sep-16	2.08	2.04	1.80	1.10	2

No Flow = No discharge from treatment train, all effluent filtered.

Table 5-4 East Port WRF Effluent Water Quality FY 2016 (EP 32 sample location)							
Month	CBOD			TSS			Fecal Monthly Avg. (No./ 100 mL)
	Monthly Avg. (mg/L)	Annual Avg. (mg/L)	Percent Removal (%)	Monthly Avg. (mg/L)	Annual Avg. (mg/L)	Percent Removal (%)	
Oct-15	2.04	2.20	98.2%	0.57	0.91	99.4%	<1
Nov-15	2.06	2.20	97.5%	0.56	0.92	99.3%	<1
Dec-15	2.00	2.20	98.8%	0.89	0.23	99.4%	1
Jan-16	2.00	2.19	98.6%	0.16	0.88	99.8%	<1
Feb-16	2.00	2.17	98.7%	0.32	0.85	99.8%	<1
Mar-16	2.00	2.15	98.7%	0.27	0.82	99.8%	<1
Apr-16	2.00	2.11	98.7%	0.22	0.78	99.8%	0
May-16	2.05	2.11	98.5%	0.25	0.74	99.8%	0
Jun-16	2.00	2.07	97.8%	0.13	0.64	99.9%	1
Jul-16	2.04	2.05	98.2%	0.20	0.49	99.9%	<1
Aug-16	2.01	2.02	97.3%	0.17	0.30	99.9%	<1
Sep-16	2.13	2.03	97.2%	0.84	0.33	99.2%	1

5.5.6 TREATMENT COMPONENTS AND CONDITION ASSESSMENT

A field review of the plant was performed by Stantec Consulting Services on February 8, 2017. Stantec personnel met with Henri Lafentre, lead operator and Larry Burns, chief operator, to review plant conditions, operations, and records.

Access to the facility is through a secure gate in a fence that surrounds the wastewater plant and on-site irrigation areas. In general, the plant site and irrigation fields are well maintained. Mowing of spray fields and brush clearing is nearly continuous.

A new operations building was constructed in 2012. It is a modern building that includes the office of the treatment plant division manager, the East Port Laboratory, backflow and reclaimed water coordinator, conference room, secretarial space, operations room, break room, and offices for operations staff and other related staff positions.

General observations noted during the site visit include: all valves appear to be exercised on a regular basis, process piping is painted and clearly marked, and all compliance meters are being calibrated every six (6) months and calibration tags are up-to-date.

The reclaimed water service lines to all the process components need to be repainted and marked. The existing purple paint has faded to nearly white. This work, along with other general grounds maintenance, is scheduled when Stage 1 and 2 construction is complete.

Required documents are maintained on site including:

1. Operating permits for the treatment facility and deep injection wells
2. Operator's licenses
3. Facility Logbook
4. Facility Standard and Emergency Operating Plans
5. DMRs
6. Effluent Analysis Reports
7. Annual Reuse Report
8. Pathogen Monitoring Report (Giardia and Cryptosporidium)
9. Reports required to complete the last permit application (in process)
10. Certification of the East Port Laboratory
11. Sampling Plan
12. Groundwater monitoring plan (contained in permit)
13. Laboratory results
14. Flow meter calibrations

15. Chlorine and pH meter calibrations (1/day)
16. Chain of custody forms for samples that are sent to laboratories
17. Monthly residual and marketing report (reported in dry tons/month)
18. Facility Operations and Maintenance Manuals
19. Maintenance records (EAMS electronic data system)
20. Reuse Operating Protocol
21. Facility record drawings
22. Daily temperature logs
23. Spill protocol and record of spills

The Cross-connection and Backflow Prevention Manuals are kept at the reclaimed water coordinator's office located at the East Port WRF.

5.5.6.1 Headworks

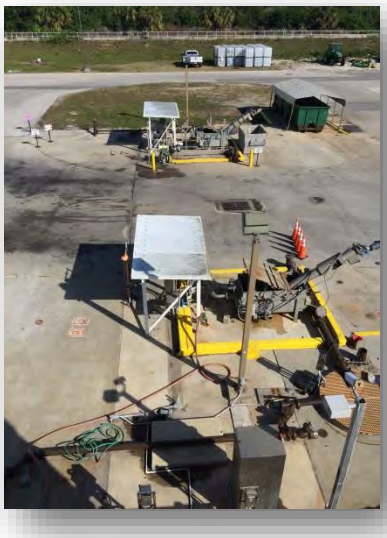
The overall condition of the headworks is good.

An extensive headworks rehabilitation project was completed in early 2011 including the repair of the influent channels and the addition of one (1) mechanical bar screen and one (1) complete grit removal system in channel No. 2. The original mechanical screen located in channel No. 1 was replaced in 2013 and the stainless steel covers were replaced in 2014. The No.2 bar screen and No. 1 grit removal system were in operation on the day of the site visit. This illustrates the ability to direct flow within the headworks to equipment in either flow channel.

The Pista Grit removal system No. 2 (installed in 2011) received new gearbox and paddles in 2015. The No. 1 Pista Grit removal system was rehabilitated in FY 2014 and was in operation on the day of the visit. Present flow does not warrant the use of two (2) grit removal systems, however, there is now operating redundancy for screening and grit removal. A third grit pump was added to the grit removal system as part of Stage 2 of the upgrade construction in 2014.

The upper concrete deck of the headworks was petted due to years of hydrogen sulfide exposure. A thorough cleaning and epoxy coating of the deck was completed in FY 2016.

The old grease dewatering building is now used for bulk storage. The screening and grit bagging system that was previously attached to the chutes that discharge into the dumpsters is a great addition to plant. This bagging system has significantly reduced the water on the floor, flies, and odors that usually accompany headworks' dumpster areas. The floor is clean and dry.



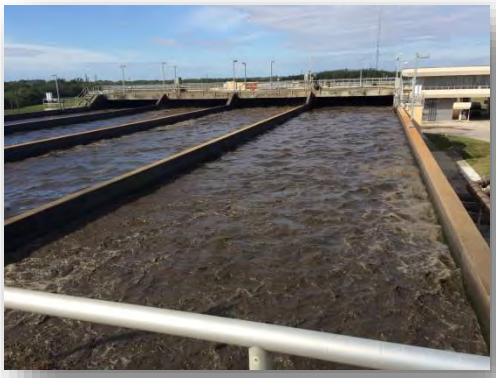
The two (2) septage pretreatment receiving stations require constant maintenance due to the high number of septage haulers that use the facilities and the nature of the waste. The septage receiving units are aging and need to be included in future capital replacement plans. Replacement of Septage Receiving Unit No. 1 moving parts was completed in FY 2016.

The septage receiving units and the adjacent driveway area collects grit and spillage of septic waste. A hose is used by the haulers to clean the area. The wash water is collected in the plant sewer system and pumped to the headworks for treatment. A steam cleaner is used by Charlotte County Utilities Department WRF staff for cleaning this area periodically.

5.5.6.2 Activated Sludge Facilities

The overall condition of the activated sludge facilities is good. The concrete is in good shape for its age and showing very little cracking or spalling. Concrete near the sluice gate at anoxic influent splitter box is cracking and should be repaired. The recycle and return activated sludge pumps were replaced in FY 2014 and additional pumps have been added. Replacement of these pumps was made after more than 20 years of service.

The anoxic zone tank contents is thoroughly mixed by four (4) submerged mixers. All four (4) anoxic mixers in the two (2) anoxic tanks were operating. Grit was removed from both anoxic tanks as part of Stage 2 of the upgrade construction in FY 2014.



There are four (4) aerators in operation in the aerated process tanks. All four (4) aerators are now operated by variable frequency drives (VFDs) which change the speed of the aerators based on input from new dissolved oxygen probes that are located in the aeration tanks. The aerators are maintained as necessary and appear to be operating more efficiently after the addition of controls in FY 2014.

Six (6) new internal recycle pumps were installed in FY 2014 to replace four (4) pumps that had exceeded their useful life. These pumps are driven by VFDs that are under the control of operators in the operation room.

The return activated sludge pumps and the waste activated sludge pumps are located between the clarifiers. The three (3) old return sludge pumps were replaced with five (5) new pumps in 2014. The waste activated sludge pumps were replaced in 2016. All pumps were in working order at the time of the site visit.

5.5.6.3 Sedimentation

The overall condition of the sedimentation process is good after new sweeps and bottom units were replaced in both clarifiers in FY 2015.

At the time of the site visit, both scum ejectors were operating normally, however, the chief operator indicated that the highly mechanical ejector pumps require constant maintenance. They are scheduled to be replaced in later stages of the construction upgrade.

The rubber bottoms on the skimmers were replaced as part of the FY 2015 repairs.

Once per week, weirs are scrubbed with calcium hypochlorite (HTH) and rotating arms are hosed down. A continuous chlorination system that is attached to the sweep arms has been researched and seen at another Florida treatment facility. The system was observed to keep the overflow weirs clear of algae growth without the operator performing a difficult task daily. Plans are to install the algae removal system in the future.

The construction of a third clarifier is part of a later stage of the proposed plant upgrade. The clarifier splitter box is also due for replacement in a later construction stage with a box that has the capacity for the new plant rating.

An excellent quality effluent was being produced by both clarifiers.

5.5.6.4 Filtration

The overall condition of the filtration system is excellent after a complete rehabilitation of both sand filters was completed in October 2013.

There are two (2) traveling bridge sand/anthracite filters which were both in operation at the time of the site visit. Turbidity results indicate that the filters are producing an excellent effluent.

A metal roof was installed over the filters in 2014 to reduce algae growth and reduce the temperature of the components of the travelling screen mechanism. The ferrous metal on the influent sluice gates needs to be painted.

5.5.6.5 Chlorination

The overall condition of the chlorination system is good.

Chlorine contact basins are in good condition. An Ultraviolet (UV) inhibiting net has been installed over the chlorine contact tanks to slow algae growth in the tanks. Ultrasonic meters continuously measure the level of water in the chlorine contact tanks.

Liquid sodium hypochlorite is used for disinfection. A liquid reagent analyzer is used to adjust chlorine feed rates and a non-reagent analyzer is used for chlorine residual compliance measurement. On the day of the site visit, turbidity was 0.484 Nephelometric Turbidity Units (NTU). Chlorine feed concentration was 3.72 mg/L and effluent residual was 3.29 mg/L (well above the required 1.0 mg/l). The pH of the effluent was 7.32.

The new skid mounted chlorine feed unit (see photo) is completely encased in a clear, hard covering for safety purposes.

There are two (2) sodium hypochlorite storage tanks with a total capacity of 6,000 gallons. One (1) storage tank was installed in 2013 with a capacity of 5,000 gallons and another 1,000-gallon tank was installed in 2014. They are well kept and meet regulatory requirements.

5.5.6.6 Solids Handling Facilities

The overall condition of the new sludge storage/digestion tanks and aeration equipment is excellent.

The EPWRF is the central dewatering and transportation facility servicing all Charlotte County Utilities Department wastewater facilities for the dewatering and hauling of all Charlotte County wastewater sludge. The dewatered sludge is transported to the Charlotte County landfill for composting. Charlotte County Utilities Department operates and owns four (4) 25-cubic yard dump trailers, two (2) 6,000 gallon tankers, and three (3) tractors for the hauling of all the sludge generated. The tankers are also used during wet weather events to support field crew's emergency pumping operations.

A new concrete sludge storage/digestion tank with three compartments was constructed in 2014. Four (4) new positive displacement blowers in sound attenuating enclosures were installed along the west wall of the new digester. Aeration coverage in the tanks is excellent. Process supporting pumps, floating decant mechanisms, and piping were also installed in 2014 as part of the plant upgrade. A new liquid sludge transfer system with spill containment was constructed in the 2014 plant upgrade.

Progressive cavity pumps withdraw thickened sludge from the digester and pump it to the two (2) belt filter presses. These liquid sludge supply pumps that discharge to the sludge dewatering units are operated by controls at the belt filter presses.

The old sludge digester has been drained for inspection. The center walkway of the old sludge holding tank is showing signs of rust and numerous aerator down-pipes have completely separated from the aerators. Generally, the old concrete tankage looks good, but should be thoroughly inspected before or during conversion to an equalization tank. Modifications to the old sludge holding tank would have been impossible to make unless the tank was emptied. Since the EPWRF is the central solids handling facility for all of the Charlotte County Utilities Department treatment plants, taking the tank offline would have a detrimental effect on all facilities' sludge removal process.

The original belt filter press was repaired in 2013 including a new control panel, new elevated walkway, new screening material, and painting of rusted ferrous metals. A second belt filter press was installed in 2011 and its belt replaced in FY 2015. An additional control panel was installed at both filters to accommodate the new location of the sludge feed pumps that are now located at the sludge digester. Both belt filter presses run five (5) days per week, eight (8) hours per day.

5.5.6.7 Effluent Storage and Disposal

The overall condition of the effluent disposal system is good.

Effluent disposal is accomplished though reclaimed water distribution, two (2) deep injection wells, and on-site spray irrigation field. There is no on-site reclaimed water storage. All users are serviced through direct distribution. Some users have on-site storage ponds. Two (2) effluent storage ponds exist on-site and are used for effluent storage prior to injection well disposal.

Effluent transfer pumps are well maintained, but are showing signs that they need to be repainted. The reclaimed water service pumps are also well kept, but paint has deteriorated around the seal spray area.

Both of the deep injection wells are well maintained and

in good working order. A current permit for IW-1 is in place until 2021. A permit renewal for IW-2 was issued on April 13, 2015 and will expire in 2020. Mechanical integrity tests were last performed in 2014 for IW-1 and 2013 for IW-2.

All valves are exercised on a regular basis. All associated meters are calibrated semi-annually and are up to date. Both effluent storage ponds were at safe levels. Both liners are in good/fair condition. The 45 MG

pond is beginning to show signs on the east side of material slippage down slope under the liner near the concrete outlet structure that has a fixed slope of 1 vertical to 3 horizontal. The 95 MG pond is showing signs on the east side that the bank material under the liner is slipping toward the bottom of the pond. If slippage continues, eventually the slopes must be reshaped to 1 vertical to 4 horizontal or a geogrid soil stabilization mat must be installed to prevent slippage of berm material.

5.5.6.8 Auxiliary Power

There is one (1) 1250-kW Caterpillar standby generator servicing the facility. The current demand on the generator is near its capacity output. The electrical efficiencies made during the Stage 1 plant upgrade and additional use of variable frequency drives has reduced motor start-up demands on the generator. Service of the generator is provided by an outside contractor. The generator is run four (4) hours under load and two (2) hours with no load, per week. The future need for an additional generator is still valid. Diesel storage tanks meet State standards.

The Motor Control Center (MCC) in the room adjacent to the generator room contains new motor controls and power systems that support the plant upgrade in FY 2014. A new additional MCC building and larger electrical power distribution system was constructed in FY 2014 as part of the Stage 1 construction.

5.5.7 RECLAIMED WATER PUMPING

Public access reclaimed water is pumped from a wet well section of CCT No.1 with the use of three, variable-speed, 100 hp vertical turbine pumps. Pressure is maintained at 88 psi at the pump station to maintain a pressure of at least 60 psi in the remote portions of the reclaimed water distribution system. The pumps operate at high speeds to match demand in the distribution system and, at other times, operate at low speeds to provide non-potable water onsite for operational and maintenance purposes. When pumping to the reclaimed water distribution system, the total flow rate varies from an average of 400 gpm to a peak flow of about 700 gpm.

5.5.8 REJECT STORAGE AND ALTERNATE DISPOSAL

Effluent that does not meet public access reuse quality is discharged into lined storage ponds as described in sub-section 5.5.9 below. The East Port WRF has two (2) Class I underground injection wells (IW-1 and IW-2) with permitted capacities of 1,420 gpm (2.045 mgd) and 5,250 gpm (7.560 mgd), respectively. These wells discharge to Class G-IV groundwater. The pumped flow splits between the two (2) injection wells by the use of a valve system that allows flow to be sent to either or both of the deep wells.

The deep injection well pumping station located on the east bank of Pond No. 1 pumps secondary effluent to the deep injection wells and to the restricted onsite slow-rate irrigation system. The pond transfer pumps located over the wet well for CCT No.2 (and bleed off from the reclaimed high service pumps) discharge to Pond No. 2 or Pond No. 1 (by changing manual valve settings), while the high service pumps (HSPs) located over the wet well for CCT No. 1 pump to the reclaimed water distribution system and the onsite non-potable water (NPW) system. A dedicated filtration system was added to the non-potable water system during FY 2007 in order to ensure that all non-potable water is filtered, regardless of the operational status of the main plant filters. No onsite storage is currently provided for reclaimed water diurnal variations.

5.5.9 WET WEATHER STORAGE

Effluent can be stored at the East Port WRF in two (2) wet-weather storage ponds with a combined capacity of 140 MG. Pond No. 1 has a capacity of 45 MG and Pond No. 2 has a capacity of 95 MG. Both ponds receive excess effluent from either CCT 1 or 2. Pond 1 and Pond 2 are inter-connected by a pipe at the bottom of the ponds. A valve in the connecting pipe is inoperable and stuck in the open position, so flow entering one (1) pond is mixed with water in the adjacent pond. The two ponds are scheduled for isolation as part of a plant upgrade beginning in 2017. The 95 MG Pond No. 2 will be converted to a reclaimed water reservoir. Water in Pond No. 1 will also be able to be transferred back through the filters for polishing and subsequent use as reclaimed water.

The 45 MG Pond No. 1, when isolated, will store effluent meeting secondary treatment requirements for disposal through the plant's on-site spray irrigation system or pumped down the deep injection wells.

In addition, two (2) 0.5 MG reclaimed water storage tanks and associated high service re-pumping stations have been constructed within the reclaimed water service area for the East Port WRF.

Both the reclaimed water high service pumps (HSPs) over the CCT No. 1 wet well and the pond transfer pumps over the CCT No. 2 wet well are variable speed. The speed of the reclaimed water HSPs are controlled by system pressure (reclaimed water demand) and high and low wet well levels. The speed of the pond transfer pumps are controlled by the wet well levels. The reclaimed HSPs and the pond transfer pumps are interconnected at their respective discharge manifolds with an in-line pressure sustaining valve that allows water to bleed off to the storage ponds when there is insufficient reclaimed water demand to maintain the water level in the CCT No. 1 wet well.

5.5.10 IRRIGATION AND OTHER RECLAIMED WATER APPLICATIONS

The existing reclaimed water system in Central/West County consisting of the East Port WRF, West Port WRF and Rotonda WRF (R-001) has a rated capacity of 9.2 mgd AADF based on permit criteria. Current users accounted for 4.3 mgd of reclaimed water capacity in FY 2016. Future reclaimed water sites in Central/Western Charlotte County may increase demand by 3.3 mgd as identified in the Master Reuse Permit application, accounting for total future capacity up to 7.6 mgd. Additionally, the restricted public access on the East Port WRF site's slow-rate irrigation system (R-002) can provide up to 2.6 mgd of reclaimed water disposal over approximately 315 acres. On-site irrigation in FY 2016 averaged 0.188 mgd.

The ultimate capacity of the reclaimed water irrigation system in the East Port WRF, West Port WRF and Rotonda WRF service areas is extensive, due to the number of residential developments, golf courses and other reclaimed water demands in the area. Table 5-5 is a listing of current major reclaimed water users from the Master Reuse Permit issued in 2014. Table 5-6 lists potential future major users identified in the Master Reuse Permit application. Additional future users may also be identified as the reclaimed water distribution system matures.

Table 5-5 Master Reuse Permit Current Major Reclaimed Water Users (Users with greater than 0.100 mgd rated capacity)

Reclaimed Water Major Users	Type of User	Rated Capacity (mgd)	FY 2016 Actual (mgd)
Kingsway Country Club	Residential Development	0.388	0.153
Maple Leaf Golf Course	Golf Course	0.388	0.015
Port Charlotte Country Club	Golf Course	0.613	0.153
Cape Haze Country Club and Windward Patio Homes	Golf Course/Residential	0.333	0.189
Coral Creek Golf Course	Golf Course	0.308	0.328
Palms Golf Course	Golf Course	0.423	0.280
Riverwood CDD	Residential/ Golf Course	0.800	0.535
Suncoast Lakes	Residential Development	0.136	0.085
Charlotte Sports Park	Athletic Complex/Park	0.446	0.052
Long Marsh Golf Club	Golf Course	0.460	0.230
TOTALS		4.295	2.020

Kingsway Country Club and the Maple Leaf Golf Course both have stormwater storage lake systems (D-001 and D-002, respectively) which are also used for reclaimed water storage. These lakes intermittently overflow (STM-001 and STM-002, respectively) to stormwater ditches that drain into the Peace River state surface waters, in accordance with existing permit conditions.

Table 5-6 East Port WRF Future Major Reclaimed Water Users			
Reclaimed Water User	Area (acres)	Rate (inches/week)	Capacity (mgd)
Deep Creek Golf Course	88	1.0	0.343
KingsGate Golf Courses	102	1.0	0.396
The Cove Golf Course (formerly Duffy's)	75	1.0	0.291
Rotonda Hills Golf Course	56	1.0	0.217
Pinemoor West Golf Club	48	1.0	0.186
Lemon Bay Golf Course	57	1.0	0.221
Murdock Village	477	1.0	1.850
North Charlotte Regional Park	33	1.0	0.127
TOTALS			3.610

An interconnect reclaimed water transmission main between the East Port, West Port, and Rotonda WRF distribution systems was completed in 2014. This master reclaimed water distribution system enables reclaimed water produced by the East Port WRF to be delivered to customers throughout Central/West Charlotte County. Golf Course irrigation that uses reclaimed water is expected to increase in western Charlotte County because of the interconnected transmission system.

5.5.11 OPERATIONS

The East Port WRF is operated to produce public access reclaimed water including biological nutrient removal, sand filtration, and chlorine disinfection. The plant has the ability to operate with the intent of producing secondary effluent without filtration. This alternative operation is only used when there is no demand for public access reclaimed water for irrigation. At this time, excess and/or unfiltered effluent is diverted to storage ponds for on-site spray irrigation or disposal in the two (2) deep injection wells on site.

The East Port WRF has the capability to accept septic tank waste into either of two (2) septage pretreatment units at the plant. This service provides a necessary waste treatment component for those local septage treatment systems that are outside of the Charlotte County Utilities Department collection system service area or are serviced by septic tank effluent pump municipal systems.

As stated previously, the East Port WRF accepts concentrated waste activated sludge (WAS) that is generated at all of the Charlotte County Utilities Department wastewater treatment plants. This eliminates the need for small, inefficient sludge treatment facilities at three (3) treatment plants. Concentrated sludge is hauled to the East Port WRF in tankers that are owned by Charlotte County Utilities Department. Two (2) belt filter presses at the East Port WRF provide redundant sludge dewatering capabilities.

Plant operators are present at the East Port WRF 24 hours per day, seven (7) days per week. The East Port WRF operators monitor all of the wastewater treatment plants within the Charlotte County Utilities

Department system 24 hours per day. Alarms can be evaluated and operators or maintenance personnel can be dispensed to take corrective action, if necessary.

5.5.12 MAINTENANCE

Routine maintenance is performed on a scheduled basis. Rehabilitation of major pieces of equipment is completed according to the Capital Improvement Plans that are revised yearly. Maintenance that is required to keep the treatment plant in compliance with regulations is performed immediately using in-house maintenance personnel or outside contractors.

The East Port WRF is undergoing extensive replacement, rehabilitation, and upgrade of all treatment processes at the plant. The upgrade work is to be completed in stages. Stages 1 and 2 have been completed. Stages 1 and 2 concentrated on repairing or replacing existing treatment units. Stages 3, 4, and 5 will increase the plant capacity to 9.0 mgd.

A new operations building was completed in 2012. This new building houses an expanded laboratory, control center, operations personnel work stations, and a separate reclaimed water system division. The old operations building has been converted to an archive storage and maintenance shop.

Additional improvements and replacement of equipment are listed in Section 5.5.4 of this report. The East Port WRF will continue to be upgraded until 9.0 mgd of capacity is achieved.

5.5.13 REVIEW OF PREVIOUS REPORT RECOMMENDATIONS

The construction of the East Port WRF upgrade Stage 1 and 2 was completed in FY 2016. Further improvements leading to a rerating of the plant to 9.0 mgd and proceeding in FY 2016 and beyond.

Recommendation:	Complete all of the planned upgrade modifications according to the permit schedule.
Progress:	*Stages 1 and 2 have been completed. Stage 5 improvements are under design.*
Recommendation:	Make modifications to the effluent storage ponds to allow one (1) pond to serve as a reclaimed water storage pond and the other pond to serve as storage for on-site spray irrigation flow or effluent to be disposed of in the plant's deep injection wells.
Progress:	*This is part of Stage 5 improvements that are under design.*
Recommendation:	Add transfer pumping capabilities to transfer stored reclaimed water to the reclaimed high pressure service pumps.
Progress:	*This part of Stage 5 improvements that are under design.*
Recommendation:	Add additional stand-by power that is necessary to operate all of the critical treatment components at the plant.

Progress: *Scheduled to be part of future Stage improvements.*

Recommendation: Coat the concrete surface of the headworks area with hydrogen sulfide resistant coating.

Progress: *The entire concrete deck at the screen elevation was power washed and a new epoxy grout surface was installed prior to Stage 1 & 2.*

Recommendation: Evaluate the structural integrity of the digester walkways and its ability to serve as an influent equalization tank.

Progress: *Not Completed.*

Recommendation: Replace the chemical feed and effluent analyzer shed building as part of the plant upgrade.

Progress: *Scheduled to be part of future Stage improvements.*

Recommendation: Complete the installation of waste activated sludge pumps.

Progress: *Completed.*

Recommendation: Replace septage receiving pre-treatment units when repair is no longer cost effective.

Progress: *Not completed.*

5.5.14 SUMMARY AND RECOMMENDATIONS

5.5.14.1 Summary

A renewed wastewater permit for the East Port WRF was issued by FDEP during FY 2013. This permit authorizes a planned expansion from 6.0 mgd to 9.0 mgd. Construction of Stage 1 of the expansion was started in 2013 and continued in 2014. The date for the complete expansion will be determined by Charlotte County Utilities Department based on actual service area growth.

Some portions of the proposed upgrade, such as the second train in the headworks, were constructed starting in FY 2010 by the addition of a parallel headworks treatment train. Along with the improvements to increase capacity, the plant is receiving an overhaul of its electrical control systems and rehabilitation of key plant components. Completion of these Stage 1 improvements occurred in FY 2016.

5.5.14.2 Recommendations

1. Make modifications to the effluent storage ponds to allow one (1) pond to serve as a reclaimed water storage pond and the other pond to serve as storage for on-site spray irrigation flow or effluent to be disposed of in the plant's deep injection wells.

2. Add transfer pumping capabilities to transfer stored reclaimed water to the reclaimed high pressure service pumps.

3. Add additional stand-by power that is necessary to operate all of the critical treatment components at the plant.

4. Evaluate the structural integrity of the digester walkways and its ability to serve as an influent equalization tank.

5. Replace the chemical feed and effluent analyzer shed building as part of the plant upgrade.

6. Replace septage receiving pre-treatment units when repair is no longer cost effective.

7. Add ladders to the chlorine contact tanks and filters.

8. Add shoulder fill on plant entrance road.

5.6 WEST PORT WRF AND RECLAIMED WATER SYSTEM

The West Port WRF is owned and operated by Charlotte County and has a permitted capacity of 1.2 mgd on an AADF basis. The facility is located on Cattle Dock Point Road in Port Charlotte on 97 acres. The plant was upgraded to its current capacity in 2004. The West Port WRF is an activated sludge wastewater treatment facility that can produce filtered reclaimed water for spray irrigation on the restricted plant property and at public access irrigation sites including golf courses. An onsite Class I deep injection well having 4.75 mgd permitted capacity provides disposal for effluent during wet weather periods.

The FY 2015 application for permit renewal included a capacity analysis report that indicated that the plant capacity would not be exceeded until 2033. The renewed permit was issued on February 25, 2016. A capacity analysis will be performed every year to confirm this conclusion.

5.6.1 REGULATORY CONSIDERATIONS

Permit Schedule

- Plant Operating Permit Expiration Date: February 24, 2021

- Deep Well (IW-1) Permit Expiration Date: April 12, 2020

5.6.2 WASTEWATER CHARACTERISTICS

Table 5-7 summarizes the wastewater characteristics of the West Port WRF influent flow. For FY 2016, the annual average for CBOD was 127 mg/L and TSS was 121 mg/L. The highest monthly average of CBOD occurred in December 2015, which showed a CBOD of 169 mg/L. The highest TSS occurred in February 2016 at 162 mg/L.

Table 5-7 West Port WRF Influent Water Quality FY 2016

Month	CBOD		TSS	
	Monthly Avg. (mg/L)	Annual Avg. (mg/L)	Monthly Avg. (mg/L)	Annual Avg. (mg/L)
Oct-15	114	133	93	217
Nov-15	82	209	82	209
Dec-15	169	131	137	207
Jan-16	148	127	101	200
Feb-16	158	121	162	153
Mar-16	152	121	154	146
Apr-16	159	124	133	138
May-16	138	127	107	129
Jun-16	93	128	103	123
Jul-16	115	131	156	122
Aug-16	74	130	122	121
Sep-16	75	127	101	121

5.6.3 DIURNAL STORAGE

The West Port WRF does not have flow equalization storage for peak hour flows.

There is one (1) 5 MG and one (1) 15 MG lined reclaimed water storage pond located at the West Port WRF. The 15 MG pond was constructed in August 2013, bringing the total storage volume to 20 MG. The storage ponds are used for reclaimed water effluent storage that is produced during the day for distribution at night or used during wet weather periods to store multiple days of reclaimed water. The stored water can either be pumped to reclaimed water irrigation sites or the deep injection well.

5.6.4 CAPACITY

The current permitted capacity for the West Port WRF is 1.2 mgd (AADF). Table 5-8 summarizes the flows received at the plant. For FY 2016, the AADF was 0.657 mgd with a maximum monthly average of

0.836 mgd in February 2016. Based on the highest TMADF of 0.769 mgd in March 2016, the West Port WRF was operating at 64% capacity.

Table 5-8 West Port WRF Influent Flows FY 2016

Month	Monthly Avg. (mgd)	AADF (mgd)[1]	TMADF (mgd)	Monthly Max Day (mgd)	Monthly Min Day (mgd)	TMDAF Percent Capacity (%)
Oct-15	0.537	0.612	0.560	0.586	0.506	47%
Nov-15	0.565	0.605	0.554	0.535	0.618	46%
Dec-15	0.583	0.599	0.562	0.651	0.531	47%
Jan-16	0.737	0.603	0.628	1.000	0.604	52%
Feb-16	0.836	0.612	0.719	0.935	0.746	60%
Mar-16	0.735	0.614	0.769	0.772	0.707	64%
Apr-16	0.653	0.616	0.741	0.737	0.574	62%
May-16	0.543	0.616	0.644	0.608	0.415	54%
Jun-16	0.617	0.623	0.604	0.758	0.470	50%
Jul-16	0.575	0.627	0.578	0.630	0.530	48%
Aug-16	0.766	0.643	0.653	1.989	0.596	54%
Sep-16	0.734	0.657	0.692	1.509	0.588	58%

[1] Permitted capacity 1.2 MGD/AADF.

5.6.5 TREATMENT OBJECTIVES AND EFFLUENT QUALITY

There are two (2) effluent standards the West Port WRF must meet when discharging its treated wastewater. For the deep injection well, the annual average limits for CBOD and TSS are 20 mg/L. For the public access reuse system, the annual average limit for CBOD is 20 mg/L and the maximum limit for TSS is 5 mg/L. Table 5-9 summarizes the effluent water quality. In addition, chlorine residual levels must be achieved at the discharge of the chlorine contact tanks. A review of the FY 2016 data shows that the West Port WRF effluent quality was well within permit limits for all standards.

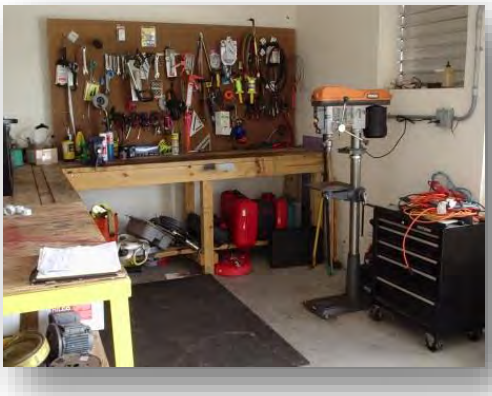
Table 5-9 West Port WRF Effluent Water Quality FY 2016							
Month	CBOD			TSS			Fecal
	Monthly Avg. (mg/L)	Annual Avg. (mg/L)	Percent Removal (%)	Monthly Avg. (mg/L)	Annual Avg. (mg/L)	Percent Removal (%)	Monthly Avg. (No./100 mL)
Oct-15	2.0	2.2	98.4%	0.4	0.9	99.9%	1
Nov-15	2.0	2.2	98.7%	0.3	0.8	99.9%	1
Dec-15	2.1	2.2	98.9%	0.4	0.8	99.9%	1
Jan-16	2.0	2.2	98.6%	0.3	0.8	99.9%	<1
Feb-16	2.0	2.2	98.9%	0.3	0.8	99.9%	<1
Mar-16	2.0	2.2	98.8%	0.3	0.8	99.9%	<1
Apr-16	2.1	2.2	98.6%	2.0	0.9	99.4%	0
May-16	2.0	2.1	98.4%	0.4	0.7	99.8%	0
Jun-16	2.2	2.1	97.4%	0.8	0.7	99.6%	0
Jul-16	2.1	2.1	97.5%	0.5	0.7	99.7%	1
Aug-16	3.1	2.1	94.7%	0.4	0.6	99.7%	8
Sep-16	2.6	2.2	95.7%	0.3	0.6	99.8%	2

5.6.6 TREATMENT COMPONENTS AND CONDITION ASSESSMENT

A field review of the plant was performed by Stantec on December 2, 2016. Stantec personnel met with Thomas Cimino, the chief operator, to review plant conditions, operations, and records.

In general, the plant site is well kept. Staff has done a good job in grounds keeping and facility appearance. The area of mowed grass on the outside of the reclaimed storage pond is an aesthetic welcome to plant visitors. The operations building and shop area is clean and organized.

Access to the facility is through a secure gate in a fence that extends to a water moat that completely surrounds the wastewater plant and reclaimed water storage ponds. There is a warning sign on the access gate and multiple warning signs outside of the moat near the property boundary.



General observations noted during the site visit include: all valves appear to be exercised on a regular basis, piping is painted and clearly marked, and all compliance meters are being calibrated every six (6) months and calibration tags are up-to-date.

Required documents are maintained on site including:

1. Operating permits for the treatment facility and deep injection wells
2. Operator's licenses
3. Facility Logbook
4. Facility Standard and Emergency Operating Plans
5. DMRs
6. Effluent Analysis Reports
7. Annual Reuse Report
8. Pathogen Monitoring Report (Giardia and Cryptosporidium every two (2) years)
9. Reports required to complete the last permit application
10. Certification of the East Port Laboratory (at East Port laboratory)
11. Sampling Plan
12. Groundwater monitoring plan (contained in permit)
13. Laboratory results
14. Flow meter calibrations
15. Chlorine and pH meter calibrations (1/day)

16. Chain of custody forms for samples that are sent to laboratories
17. Monthly residual and marketing report (reported in dry tons/month)
18. Facility Operations and Maintenance Manuals
19. Maintenance records (EAMS electronic data system)
20. Reuse Operating Protocol
21. Facility record drawings
22. Daily temperature logs
23. Spill protocol and record of spills

The Cross-connection and Backflow Prevention Manuals are kept at the reclaimed water coordinator's office located at the East Port WRF. The chief operator has prepared a binder of required documents that is readily available for anyone's inspection.

5.6.6.1 Headworks

The overall condition of the headworks was considered to be good at the time of the site visit.

All four (4) mechanical bar screens were in operation at the time of site review. The screens' housing is Type 304 stainless steel, but pin holes had developed in the housing due to the highly corrosive gases released in the headworks. The screen housings on all four (4) screens have been sand blasted and painted with epoxy paint. Most of the screen components are stainless steel. However, the few carbon steel components on the screen mechanics are a constant maintenance item. The 316 stainless steel wedge wire drums are in pristine condition.

There is a fiberglass grating over the influent flow splitter area that had been supported by two (2) carbon steel beams. These beams were replaced with aluminum beams in FY 2015. The fiberglass grating is showing no signs of deterioration.

The concrete area around the screens is cleaned twice daily by hosing blown screenings liquid into the aeration basins.

The WPWRF includes a new 24-inch influent force main and 16-inch flow meter assembly that was placed into service in January 2014.

There is no grit removal system at the facility. Grit accumulates in aeration basins and at the on-site lift station. Grit is removed periodically by vacuum trucks. While the lack of grit removal is an issue, the grit content of the wastewater entering the WPWRF is probably lower than most plants because nearly all of the flow is received from septic tank effluent pumps.

At the time of inspection, the dumpster area was found to be in a clean state with only slight leakage of water from the dumpsters to the drains under the dumpsters. The installation of screening bags in the dumpsters would contain most liquids and reduce odors.

5.6.6.2 Activated Sludge Facilities

The overall condition of the activated sludge facilities is good.

There are four (4) aeration basins. All four (4) basins were in service at the time of the site review. New fine bubble diffusers were installed in all four (4) active aeration tanks in 2013 and 2014. This has had a positive effect on the treatment process by providing a more even air flow distribution. Basin No. 3 was cleaned of grit and aerators were repaired as necessary in FY 2016. The outlet weirs of the aeration tanks require manual cleaning when debris catches on the weirs.

Four (4) Return/Waste Activated Sludge (RAS)/WAS pumps were in good operating condition. The pumps and pipes were painted with marine gloss paint five (5) years ago. The paint is holding up very well. The pumps are housed under a sheet metal roof.

All three (3) blowers were operating properly. A new soft start was added to one blower in FY 2015 to eliminate a surge in power demand.

5.6.6.3 Sedimentation

The overall condition of the sedimentation process is fair, but improving.

All four (4) clarifiers were in service at the time of inspection. All four (4) clarifiers have been placed on a schedule of inspection, repair, and painting from

2015 to 2018. Clarifier No. 1 was serviced and painted in FY 2015. Clarifier No. 2 will be serviced and painted in FY 2017. The remaining clarifiers will be serviced at a rate of one per year.

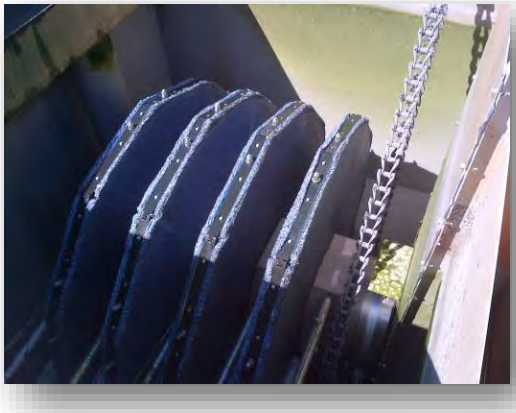
Overflow weirs are cleaned by hose daily and once per week by brushing.

The sludge return chambers on the side of each clarifier have telescoping valves that are used to adjust sludge withdrawal from the bottom of the clarifier. Floatables accumulate in these sludge boxes. These floatables in the sludge boxes are periodically removed by manually skimming these relatively small (5-foot by 5-foot) boxes from the clarifier bridge when the chambers are full.

All of the telescopic valves are operating properly.

5.6.6.4 Filtration

The overall condition of the filtration system is good.



There are three (3) Aqua Disc cloth filters. All three (3) filters were in operation at the time of the audit site visit and working properly. The chief operator stated that a higher quality effluent is obtained when all three filters are operating in parallel.

The filter cloth on Filters No. 1 and No. 2 was replaced with a new finer (5 micron) filter cloth in FY 2014 and FY 2015. The cloth on the other filter will be replaced with 5 micron cloth when replacement of its cloth is necessary.

The filters are constructed of Type 304 stainless steel, but the fiberglass grating platform between the filters is supported by carbon steel angles. The angle supports were cleaned of rust and painted in FY 2015. The paint is in good condition.

The control panels and meter readouts for Filters No. 1, No. 2 and No. 3 are housed under aluminum covers.

The turbidity sampling point is located where it receives the combined flow of all three (3) filters. The turbidity meter registered an excellent level of 1.30 NTU at the time of the site visit.

5.6.6.5 Chlorination

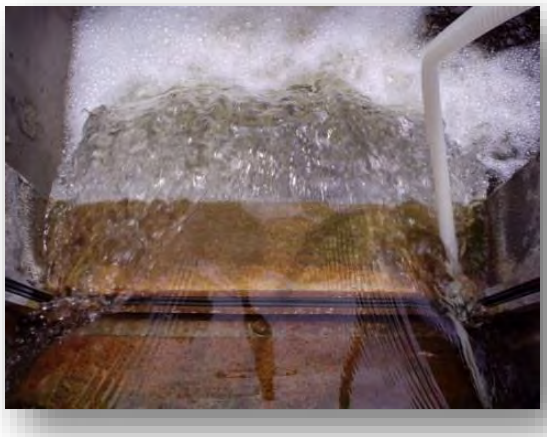
The overall condition of the chlorination system is good.

The dual sodium hypochlorite feed pumps mounted on a skid are in good condition. The chlorine is paced using the chlorine contact tank effluent meters and the effluent chlorine residual is measured by the

compliance meter. A clear plastic cover (front and sides) was installed on the chlorine feed pump skid for safety.

There are two (2) sodium hypochlorite storage tanks with a total capacity of 2,000 gallons. They are well kept and meet regulatory requirements.

There is good turbulent flow in the inlet boxes to the chlorine contact tanks to create effective mixing.



The continuously monitoring pH and chlorine analyzers are in good working order. The pH was 7.23 and the chlorine residual was 9.77 mg/L.

Only one (1) of four (4) CCTs was in use on the day of the site visit. It was calculated that a 15 minute detention time for one CCT can be obtained for peak hourly flows up to 955 gpm. A new chlorine feed system that includes two (2) chemical feed pumps for each of two CCTs has been purchased and is ready for installation in a new chlorine storage and feed area between the two chlorine contact tank structures. This will enable two (2) parallel CCTs to be operated when peak hourly flows exceed 955 gpm.

5.6.6.6 Solids Handling Facilities

The overall condition of the sludge holding tanks is good.

The four (4) RAS/WAS pumps each serve one (1) clarifier during normal operations, but valves on the inlet pipe manifold allow any pump to be used for alternative clarifier sludge pumping. Liquid sludge is transported to the East Port WRF for dewatering and delivery of dewatered sludge to the Charlotte County Landfill where Class AA compost is made for sale as a soil conditioner. The sludge handling records meet operating permit requirements.

The total sludge holding/digestion volume is divided into 1/3 and 2/3 tanks. The larger compartment has diffusers on both sides of the basin, resulting in good air distribution. The smaller holding tank has diffusers only on one (1) side of the tank. Decanting and thickening of sludge occurs in both tanks.

Sludge transfer between tanks and loading onto tanker trucks is by a sludge transfer pump. Valve changes determine where sludge is directed.

A new liquid sludge load-out station was constructed in 2013. It contains a flexible suction hose, hose rack, and adjacent sink for hand washing. There is a concrete slab to catch spills. The adjacent sludge drying beds are used for the dewatering grit that is removed from pumping stations by vacuum truck. These dried solids are periodically removed and deposited in the county landfill.

5.6.6.7 Effluent Storage and Disposal

The overall condition of the effluent disposal system is good.

Effluent disposal is accomplished through a reclaimed water distribution system and one (1) deep injection well. There is a total of 20 MG of on-site reclaimed water storage.

The West Port WRF reuse transmission main is interconnected with the Rotonda WRF reuse transmission main and the East Port WRF reclaimed water transmission system. This allows for maximum flexibility to service existing and future reclaimed water customers.

The two (2) high service reclaimed water pumps and one (1) jockey pump are in good condition. A new 16-inch pipe that transports reclaimed water from the East Port WRF to western Charlotte County was completed in FY 2014. The pipe connects directly to the storage ponds and/or the West County distribution system as system valves allow.

There are three (3) new deep well pumps. All pumps were fully functioning at the time of the inspection.

The three (3) high flow deep well pumps have a 16-inch manifold pipe that connects to the deep well and on-site irrigation pipes.

The piping from the reclaimed water pumping station wet well to the deep well pumping station wet well is adequately sized for the treatment plant capacity.

The deep injection well's monitoring system was replaced in FY 2014 and a submersible pump was placed in the well for sampling.

The effluent composite sampler and compliance monitoring equipment is working properly.

5.6.6.8 Auxiliary Power

There are two (2) 400 kW generators servicing the facility. The generator can meet the current demand for standby power. The generators are run four (4) hours under load every two (2) weeks. The small diesel and gasoline storage tanks are located next to the generators, placed in spill containment vessels, and tied down. Identification signage is good.

5.6.6.9 Electrical and Instrumentation

Operators can monitor all process functions and keep historic data on operations using the monitoring system program on local computers.

The original plant's MCC panel needs to be cleared of all components that are no longer being used. This is not a critical item, but it would make the empty panel spaces ready for future use.

5.6.7 REJECT STORAGE AND ALTERNATE DISPOSAL

There is no reject storage at the West Port WRF. Effluent that does not meet public access reclaimed water standards is injected into the on-site deep injection well.

5.6.8 WET WEATHER STORAGE

There is one (1) 5 MG and one (1) 15 MG lined storage pond located at the West Port WRF. The 15 MG pond was constructed in August 2013 as part of the Phase 2 Reclaimed Water Expansion project, bringing the total storage volume to 20 MG. The storage ponds are used for reclaimed water effluent storage that is produced during the day for distribution at night or used during wet weather periods to store multiple days of reclaimed water. The stored water can either be pumped to reclaimed water irrigation sites or the deep injection well.

5.6.9 IRRIGATION AND OTHER RECLAIMED WATER APPLICATIONS

The primary use of the reclaimed water produced by the West Port WRF is for irrigation at the Coral Creek Golf Club golf course. A seven (7) mile long, 10-inch diameter reclaimed water main was constructed by the golf course to transport reclaimed water from the West Port WRF to the golf course. This reclaimed water transmission main was later connected to the Rotonda WRF reclaimed water transmission main. This interconnect allows the reclaimed water produced by the West Port WRF to be used to irrigate other golf courses in the Rotonda development.

The northern part of the West Port WRF reclaimed water transmission main was increased in size in FY 2016 as it was relocated during a road widening project.

The construction of a new reclaimed water booster pumping station in West County on Rotonda Boulevard East was completed in 2014 as part of the Phase 2 Reclaimed Water Expansion project. This station increases the capacity to pump water to the West County from the West Port WRF and Walenda reclaimed water pumping station. The new pumping station also allows reclaimed water to be pumped from the Rotonda WRF to the West Port WRF for storage or disposal through the deep well.

5.6.10 OPERATIONS

The West Port WRF is operated to produce public access reclaimed water including cloth filtration and high level chlorine disinfection. The plant has the ability to operate with the intent of producing secondary effluent without filtration. This alternative operation is rarely used when there is no demand for public access reclaimed water for irrigation. At this time, the effluent that does not meet public access reclaimed water requirements is diverted to the deep injection well's pumping station for disposal in the deep injection well onsite.

Plant operators are present at the West Port WRF 16 hours per day. Key plant components are automatic. Continuous monitoring of the effluent allows the plant to continue to produce high quality effluent 24 hours per day. The East Port WRF operators monitor the operations of the West Port WRF 24 hours per day through a County-wide telemetry system. The Wonderware monitoring computer software was upgraded in FY 2016. Alarms can be evaluated and operators or maintenance people can be dispatched to the West Port WRF to take corrective action, if necessary. Reclaimed water that does not meet the quality standards for public access reclaimed water is automatically diverted to the deep injection well disposal at all times of the day. Water is also automatically diverted to the deep injection wells when the reclaimed water storage ponds are full.

5.6.11 MAINTENANCE

Routine maintenance is performed on a scheduled basis. Rehabilitation of major pieces of equipment is completed according to the Capital Improvement Plans that are revised yearly. Maintenance that is required to keep the treatment plants in compliance with regulations is performed immediately using in-house maintenance personnel or outside contractors.

5.6.12 REVIEW OF PREVIOUS REPORT RECOMMENDATIONS

Recommendation:	Coat the inside and outside of two (2) influent screen housings with material that will resist hydrogen sulfide attack. Plug pin holes in the Type 304 stainless steel housings prior to coating.
Progress:	*Completed.*
Recommendation:	Paint the steel supports for the walkway over the aeration tank effluent splitter box.
Progress:	*Not completed.*
Recommendation:	All four (4) clarifiers are showing signs of rust and suspect structural problems below the water line. Proceed with the scheduled repair and painting of all the clarifiers. Include leveling of clarifier overflow weirs in the work to be accomplished.
Progress:	*Clarifier No. 1 is completed. Clarifier No. 2 is scheduled for repairs and painting in 2017.*
Recommendation:	Replace fabric on Filter No. 3 with 5 micron filter fabric when replacement cloth is warranted.
Progress:	*The existing filter fabric is still in good condition.*
Recommendation:	Install new chlorine chemical feed pumps and put a second chlorine contact tank into service during periods of high flow.
Progress:	*The new sheltered area for the new chemical feed pumps has been constructed and completion of the project is scheduled for 2017.*
Recommendation:	Determine the source of flow spikes to the plant and explore means to reduce the flow peaks.
Progress:	*Not completed.*
Recommendation:	Install pump to transfer sludge from the large sludge holding tank to the smaller sludge tank.
Progress:	*The sludge truck loading pump is used to make the transfer from one tank to another. No designated transfer pump is necessary.*

5.6.13 SUMMARY AND RECOMMENDATIONS

5.6.13.1 Summary

The West Port WRF is a conventional activated sludge treatment plant with effluent filtration to produce public access reclaimed water. The effluent consistently meets public access reuse quality. Nearly all of the current reclaimed water that is produced is consumed by one primary golf course customer.

Most of the unit process tanks are made of concrete or type-304 stainless steel except for four (4) secondary clarifiers. The clarifier tanks appear to be in good condition, but the mechanical components of the clarifiers require constant paint maintenance. Clarifier No. 2 will be taken out of service in FY 2017 for major overhaul and painting. The stairways leading to the bridges of the above ground clarifiers have been painted. Their condition should be checked yearly and touch-up paint applied when necessary. It is recommended that the clarifiers be completely repainted every four (4) years with touch up of rust spots occurring every year. The inclusion of four (4) clarifiers at the West Port WRF allows for one (1) to be taken out of service for painting without impacting the effluent quality.

The sludge produced as a by-product of treatment is concentrated at the West Port WRF prior to being transferred in liquid form to the East Port WRF for sludge dewatering and final disposal at a compost facility that produces Class AA compost.

The new influent force main, reclaimed water transmission pipe from the Walenda Pumping Station and the Rotonda WRF, and the expanded reclaimed water storage ponds have added considerable value to the plant and its ability to function as a supplier of reclaimed water for the eastern section of the West County peninsula.

5.6.13.2 Recommendations

Recommendation:	Paint the steel supports for the walkway over the aeration tank effluent splitter box.
Recommendation:	All four (4) clarifiers are showing signs of rust and suspect structural problems below the water line. Proceed with the scheduled repair and painting of all the clarifiers. Include leveling of clarifier overflow weirs in the work to be accomplished.
Recommendation:	Replace fabric on Filter No. 3 with 5 micron filter fabric when replacement cloth is warranted.
Recommendation:	Install new chlorine chemical feed pumps and put a second chlorine contact tank into service during periods of high flow.
Recommendation:	Determine the source of flow spikes to the plant and explore means to reduce the flow peaks.

5.7 ROTONDA WRF AND RECLAIMED WATER SYSTEM

Charlotte County owns and operates the Rotonda WRF, located on Kendall Drive, south of Rotonda, in western Charlotte County. The facility and its associated service area were purchased from Aqua Source (a private utility) in December 2000.

Areas currently served by the Rotonda WRF include the inside of the circular Boundary Boulevard of the 7.5 square mile Rotonda development; areas filling in the northeast and northwest corners outside of the circular development; and adjacent areas along Cape Haze Boulevard. The areas served include Pine

Valley, White Marsh, Long Meadow, Broadmoor, Pinehurst, Pebble Beach, Oakland Hills and Cape Haze neighborhoods.

A phased plant expansion was completed during FY 2009 and was cleared for service by FDEP on November 19, 2009. The expanded facility has a rated treatment capacity of 2.0 mgd AADF, and a rated reclaimed water disposal capacity of 1.005 mgd (AADF basis). The rated reclaimed water disposal capacity may be increased in the future as new reclaimed water customers are added to the system. The Rotonda, West Port and East Port WRFs are connected to a reclaimed water transmission system that is permitted under a master reuse permit. The Rotonda WRF is also authorized to dispose of effluent at the 4.75 mgd deep injection well located at the Westport WRF.

5.7.1 REGULATORY CONSIDERATIONS

Permit Schedule

- Plant Operating Permit Expiration Date: May 30, 2022.

5.7.2 WASTEWATER CHARACTERISTICS

A review of the influent plant loadings for TSS and CBOD for FY 2016 indicates an average influent CBOD concentration of 97 mg/L and an average influent TSS concentration of 115 mg/L. The monthly average high concentrations for FY 2016 occurred in March 2016 with a CBOD of 133 mg/L and a TSS of 183 mg/L.

Table 5-10 summarizes the wastewater characteristics of the influent at the Rotonda WRF for FY 2016.

Table 5-10 Rotonda WRF Influent Water Quality FY 2016				
Month	$CBOD_5$		TSS	
	Monthly Avg. (mg/L)	Annual Avg. (mg/L)	Monthly Avg. (mg/L)	Annual Avg. (mg/L)
Oct-15	83	76	98	112
Nov-15	100	76	97	112
Dec-15	113	77	96	111
Jan-16	113	76	135	112
Feb-16	106	79	106	110
Mar-16	133	83	183	113
Apr-16	126	87	137	113
May-16	118	91	132	115
Jun-16	85	93	92	113
Jul-16	84	95	105	112
Aug-16	57	96	103	114
Sep-16	49	97	93	115

5.7.3 DIURNAL STORAGE

The Rotonda WRF has a 300,000 gallon, off-line influent equalization storage tank. A portion of the peak influent flows are diverted to the equalization tank by overflow weirs in the headworks structure. The equalization tank is aerated to keep the stored influent stirred and to keep it from going septic. The contents of the equalization tank are pumped to the headworks during low flow periods of the day for treatment through the normal plant process.

Reclaimed water storage includes the following onsite facilities:

1. Reuse pond with a storage capacity of 2.64 MG.
2. Ground storage tank with a storage capacity of 3.0 MG.

Rotonda WRF also has a lined reject pond with a storage capacity of 5.182 MG. Water stored within this pond does not meet reclaimed water standards and thus must be recycled through the plant for re-treatment.

5.7.4 CAPACITY

Rotonda WRF currently is permitted at a capacity of 2.0 mgd AADF. The AADF for Rotonda WRF in FY 2016 was 1.071 mgd, with a high monthly average of 1.580 in September 2016. Based on the highest TMADF of 1.320 in April 2016, the Rotonda WRF was operating at 66% of its permitted capacity.

Table 5-11 summarizes the influent flows for the Rotonda WRF.

Table 5-11 Rotonda WRF Influent Flows FY 2016

Month	Monthly Avg. (mgd)	AADF (mgd)	TMADF (mgd)	Monthly Max (mgd)	TMDAF Percent Capacity (%)
Oct-15	0.992	0.878	1.086	1.205	54%
Nov-15	0.907	0.885	1.025	1.057	51%
Dec-15	0.911	0.893	0.936	0.997	47%
Jan-16	1.326	.939	1.048	2.237	52%
Feb-16	1.348	.980	1.195	1.912	60%
Mar-16	1.143	1.008	1.273	1.334	64%
Apr-16	0.905	1.026	1.320	1.092	66%
May-16	0.766	1.038	0.938	0.885	47%
Jun-16	0.849	1.042	0.840	0.992	42%
Jul-16	0.843	1.021	0.819	1.067	41%
Aug-16	1.276	1.037	0.964	3.771	48%
Sep-16	1.580	1.071	1.233	3.672	62%

Currently, flows from 17 lift stations are diverted from the Rotonda Development to the West Port WRF's collection system. This influent flow diversion is expected to continue into the future, until such time that the Rotonda WRF has a higher customer demand for reclaimed water.

Growth trends indicate that the average growth of the population within the sewered areas in western Charlotte County is higher than elsewhere in the County. Charlotte County Utilities Department is currently monitoring new development and will readjust projected growth rates as necessary until buildout is achieved. Buildout flow is estimated to be near 3.0 mgd for the Rotonda WRF service area.

5.7.5 TREATMENT OBJECTIVES AND EFFLUENT QUALITY

All reclaimed water produced by the Rotonda WRF must meet public access level treatment standards (CBOD5 = 20 mg/L, TSS = 5 mg/L), requiring high-level disinfection. In FY 2016, the annual average CBOD5 and TSS were 2.05 and 0.34 mg/L, respectively. The CBOD5 high monthly average was 2.23 mg/L in December 2015. The monthly average maximum for TSS was 0.60 mg/L and occurred in September

2016. These CBOD5 and TSS concentrations are well within public access standards. Table 5-12 summarizes the effluent water quality for the Rotonda WRF.

Table 5-12 Rotonda WRF Effluent Water Quality FY 2016

Month	CBOD			TSS			Fecal
	Monthly Avg. (mg/L)	Annual Avg. (mg/L)	Percent Removal (%)	Monthly Avg. (mg/L)	Annual Avg. (mg/L)	Percent Removal (%)	Monthly Avg. (No./100 mL)
Oct-15	2.07	2.34	97.5%	0.30	0.64	99.7%	<1
Nov-15	2.16	2.36	97.8%	0.40	0.62	99.6%	<1
Dec-15	2.23	2.38	98.0%	0.40	0.61	99.6%	<1
Jan-16	2.00	2.37	98.2%	0.20	0.61	99.9%	<1
Feb-16	2.00	2.33	98.1%	0.20	0.57	99.8%	<1
Mar-16	2.00	2.30	98.5%	0.40	0.56	99.8%	<1
Apr-16	2.00	2.27	98.4%	0.20	0.52	99.9%	<1
May-16	2.00	2.24	98.3%	0.02	0.47	100.0%	<1
Jun-16	2.04	2.20	97.6%	0.30	0.42	99.7%	<2
Jul-16	2.05	2.16	97.6%	0.50	0.39	99.5%	<1
Aug-16	2.07	2.11	96.4%	0.50	0.36	99.5%	<1
Sep-16	2.00	2.05	95.9%	0.60	0.34	99.4%	<1

5.7.6 TREATMENT COMPONENTS AND CONDITION ASSESSMENT

A field review of the plant was performed by Stantec on January 23, 2017. Stantec personnel met with the chief operators to review plant conditions, operations, and records.

Access to the facility is through a secure gate in a fence that surrounds the wastewater plant and effluent storage ponds. The plant site is well maintained and most of the equipment is less than seven (7) years old. The exterior walls of all of the tanks were painted in 2011. Painted exterior walls and piping is beginning to show signs that repainting should be scheduled in the next two (2) years.

The plant operators continue to exercise all valves on a regular basis. All compliance meters are calibrated every six (6) months and calibration tags were up-to-date at the time of the site visit.

Required documents are maintained onsite including:

1. Operating permits for the treatment facility and deep injection wells
2. Operator's licenses
3. Facility Logbook
4. Facility Standard and Emergency Operating Plans (Guidance book created in-house)
5. DMRs
6. Effluent Analysis Reports
7. Annual Reuse Report
8. Pathogen Monitoring Report (Giardia and Cryptosporidium)
9. Reports required to complete the last permit application (in process)
10. Certification of the East Port Laboratory (at East Port laboratory)
11. Sampling Plan
12. Groundwater monitoring plan (contained in permit)
13. Laboratory results
14. Flow meter calibrations
15. Chlorine and pH meter calibrations (1/day)
16. Chain of custody forms for samples that are sent to laboratories
17. Monthly residual and marketing report (reported in dry tons/month)
18. Facility Operations and Maintenance Manuals
19. Maintenance records (EAMS electronic data system)
20. Reuse Operating Protocol
21. Facility record drawings

22. Daily temperature logs
23. Spill protocol and record of spills

The Cross-connection and Backflow Prevention Manuals are kept at the reclaimed water coordinator's office located at the East Port WRF and at the Rotonda operations building.

The above checklist was used by FDEP during their last plant visit in August 2016.

General observations noted during inspection include: all valves appear to be exercised on a regular basis, piping is painted and clearly marked, and all compliance meters were calibrated and calibration tags were up-to-date.

5.7.6.1 Headworks

The overall condition of the headworks is considered to be good, but beginning to show signs of aging. The headworks include two (2) large diameter, rotary drum screens. At the time of the Annual Report visit, both screens were operating. Screen No. 2 had new seals installed on the end of the rotating drum in 2013. Both steel drive chains and sprockets continue to wear and are replaced when necessary. These screens are critical process units. One (1) screen must be in service at all times.

Each screen rotates on four (4) drum rollers that have been replaced several times on screen No. 1 since its installation in 2009. The drum rollers support the stainless steel perforated screen as it rotates. The worn rollers were last replaced in 2013. Both screens are in operating condition at this time. The rate of rotation has been slowed to extend the life of mechanical components.

The screenings and grit dumpsters are emptied once per week. The dumpster area is clean and free of odors. The screening screw conveyors/compactors and grit dewatering units are operating as intended. A wash water spray was added to the screening compactors which improved their operation and lengthened the life of the lower bearing units. The drive motor on No. 2 screening conveyor was raised above the bottom bearings to prevent water from entering the motor when the seal bearing leaks. This motor location and with its drive belt has proven to be a better location than the manufacturer's direct drive location. These pieces of equipment are also monitored frequently for wear and operating efficiency.

Grit removal is achieved by causing the heavier grit material to settle in two (2) large concrete wet wells immediately downstream of the rotary drum screens. The settled grit and wastewater mixture is pumped through two (2) cyclone grit removal units. The organic wastewater component of the pumped mixture is returned to the wetwells. The separated grit passes to a grit slurry washer before being deposited in a dumpster bag.

The grit slurry washer includes a conveyor belt that allows the grit to shed water as it proceeds to the dumpster. The grit slurry washer produces a dry grit that is deposited in a plastic grit bag.

The chief operator noted that Lift Station No. 801 sends 1500 gpm to the Rotonda plant for about 20 minutes and then turns off for 20 to 30 minutes. The equalization tank, which serves as a means to attenuate high hourly flows, is filled through a gravity system initiated by an overflow weir at the headworks structure. The equalization tank contents are returned to the headworks for treatment at a steady flow over 24 hours using variable speed pumps. This has proven to be a valuable asset to the operation of the facility. The operation of the equalization (EQ) tank has been adjusted to respond to the intermittent discharge from Lift Station No. 801. Dry pit submersible pumps are used to return equalization tank contents to the treatment stream. Pump No. 3 was replaced in FY 2014. The EQ tank positive displacement blowers are run intermittently to save power. Oil sight glasses and fill ports were added by Charlotte County Utilities Department to improve maintenance.

5.7.6.2 Activated Sludge Facilities

The overall condition of the activated sludge facilities is good. The aeration system continues to supply adequate air to the aeration tanks. The tanks operate in plug flow which allows the operators to develop semi-anoxic zones within the tanks. The anoxic zones and the use of automatic dissolved oxygen (DO) readers to control blower speeds has contributed to the high level of treatment and conservative use of aeration horsepower. The two (2) old aeration tanks were last drained for inspection in 2012. Very little grit was found in the bottom.

The aeration trains are served by four (4) blowers. One (1) blower is used at any given time until demand dictates an increase in air distribution. Blower No. 2 received a new motor in 2014 and new bearings in 2016. The blowers are well painted and piping marked.

5.7.6.3 Membrane Bioreactor (MBR)

The overall condition of the MBR system is good and well maintained.

There are four (4) trains containing three (3) cassettes each. The cassettes are removed every year for cleaning and receive insitu concentrated chlorine bleach cleaning twice per year.

The MBR system continues to produce a high quality effluent with minimal problems. The MLVSS return/recycle pumps are in good working order.

The MBRs are cleaned once per week with a weak solution of bleach to maintain their treatment efficiency. The bleach storage tanks include spill containment vessels.

A turbidity sample is withdrawn from the MBR effluent header pipe before the flow is discharged into the chlorine contact tank splitter box.

5.7.6.4 Chlorination

The overall condition of the chlorination system is good. Both chlorine contact tanks (CCTs) are used alternately, but only one (1) is required to be in service for the required detention time under the current flow. Liquid sodium hypochlorite is used for disinfection. The three (3) chlorine feed pumps are controlled by the flow meters on the MBR effluent pipes. A chlorine analyzer is also used to check the chlorine feed rate to obtain the required chlorine residual in the reclaimed water. The chlorine is thoroughly mixed using a static mixer in the chlorine contact tank influent pipe.

The two (2) concrete chlorine contact basins are in good condition. UV filter cloth of 90% UV block has been installed over the chlorine contact tanks to conserve bleach and inhibit the growth of algae in the tanks.

There are three (3) sodium hypochlorite storage tanks with a total capacity of 5,500 gallons. They are well kept and meet regulatory requirements.

The chlorine residual on the day of the site visit was 2.61 mg/L. The compliance turbidity was an excellent 0.073 NTU. The pH of the effluent was 7.19.

5.7.6.5 Solids Handling Facilities

The overall condition of the solids handling facilities is good.

There are two (2) sludge holding tanks in use with a total capacity of nearly 170,000 gallons. Both tanks are converted clarifiers with center surface aerators. Liquid sludge is hauled to the East Port WRF for dewatering and final disposal at a Class AA compost facility located at the Charlotte County Landfill.

The decant mechanism for the sludge holding tanks was designed as telescoping valves, but the telescoping valves can only be lowered to one-half the depth of the tank. The operators have replaced the designed method of decanting

by using bottom feed submersible pumps that are suspended on ropes. A small winch should be added to each pump site for better control of the pump level. The chief operator does not see this as a high priority because decanting is done only 2 or 3 times per month.

The plant wastes thirty 5,000 gallon truck-loads of sludge per month. All sludge transport manifests are kept on site.

5.7.6.6 Effluent Storage and Disposal

The overall condition of the effluent disposal system is good.

The effluent disposal system consists of 1.005 mgd AADF slow rate public access reuse systems at two (2) golf courses.

The Rotonda WRF has the ability to send reclaimed water through the West Port/Rotonda WRF interconnection to serve both facilities' reclaimed water users. It also enables excess reuse quality effluent to be sent to West Port's reuse storage ponds or deep injection well (capacity 4.75 mgd) for final disposal. The rate of water transfer to the West Port WRF is limited by the size of the transfer pipe, long distance, and concern for the condition of the old "class" pipe that is in use between the Rotonda plant and the Palms Golf Course delivery system. The total head pressure has been reduced by the installation of a reclaimed water booster pumping station at the intersection of CR 771 and Rotonda Boulevard East in 2014. This pumping station has increased the capacity of flow from the Rotonda WRF to reclaimed water users and the deep well at the West Port WRF.

Reuse quality effluent can also be stored in the Rotonda WRF's onsite reuse storage pond and 3 MG storage tank.

5.7.6.7 Auxiliary Power

There are two (2) 800 kW generators serving the facility. The demand on the generators' capacity is more than adequate for the current facility.

Two (2) 6,000 gallon tanks for diesel supply are located on the east end of the enclosed generators. This is enough capacity for several days of fulltime generator operation.

Generator service is provided by an outside contractor. The generator is run six (6) hours under load per month and one (1) hour with no load per week.

5.7.6.8 Motor Control Center

There are three (3) MCCs at the plant plus several minor control panels that are located near equipment. All three (3) control centers are located in new or remodeled air-conditioned buildings where touch screens can be accessed to check local operations.

Dual process monitoring computer stations in the operations building allows two (2) operators to work simultaneously on reporting and plant monitoring. The system was operating and well maintained at the time of the site visit.

5.7.7 RECLAIMED WATER PUMPING

The Rotonda WRF contains two (2) sets of reclaimed water pumps. A lower pressure pumping system is designated for distribution of reclaimed water to golf course storage ponds north of the Rotonda WRF. The golf courses have their own high pressure pumps to increase the pressure for irrigation head use. The low pressure pumps are submersible pumps that are driven at varying speeds by VFDs.

The Rotonda WRF also includes a set of high pressure reclaimed water pumps that discharge directly to the Cape Haze Golf Course irrigation system. This high pressure system uses an old dual pipe force main that serves the Cape Haze Golf Course. The pipe is subject to breaks due to its age and thin walled PVC pipe. A replacement pipe line is currently being redesigned.

The high pressure pumps were last painted in 2012 and are scheduled to be repainted in 2017.

5.7.8 REJECT STORAGE AND ALTERNATE DISPOSAL

The onsite lined Reject Pond has a storage capacity of 5.182 MG. Water stored within this pond does not meet reclaimed water standards and thus must be recycled through the plant for re-treatment. A small pumping station feeds recycled flow back to the headworks for further treatment.

5.7.9 WET WEATHER STORAGE

The onsite reclaimed water pond (2.64 MG), the onsite ground storage tank (3.0 MG) and the offsite Palms Pond (7.44 MG) are available for wet weather storage of reclaimed water.

5.7.10 IRRIGATION AND OTHER RECLAIMED WATER APPLICATIONS

Since the Phase 1 plant expansion was completed in 2009, the old percolation pond has been abandoned. The existing slow-rate public access reuse system (R-002) remains in service, and utilizes an existing 12-inch diameter reclaimed water transmission main that is interconnected with the West Port WRF. Reclaimed water meeting public access water quality is currently used for reuse irrigation at golf courses and for residential/commercial irrigation. However, Rotonda WRFs reclaimed water system was connected to a master transmission system in FY 2014 that is capable of distributing reclaimed water in Central/West Charlotte County.

5.7.11 OPERATIONS

The Rotonda WRF is operated to produce public access reclaimed water by means of an MBR process. This process yields an extremely high quality effluent that receives high level chlorination before being pumped to golf course irritation sites.

Plant operators are present at the Rotonda WRF 16 hours per day, seven days per week. Key plant components and automatic, continuous monitoring of the effluent allows the plant to continue to produce high quality effluent 24 hours per day. The East Port WRF operators monitor the operations of the Rotonda WRF 24 hours per day through a county-wide telemetry system. The Wonderware monitoring computer software was upgraded in FY 2016. Alarms can be evaluated and operators or maintenance staff can be dispatched to the Rotonda WRF to take corrective action, if necessary. Water that does not meet the quality standards for public access reclaimed water is automatically diverted to the reject storage pond for further treatment until the condition causing the production of water that does not meet reclaimed water standards is corrected.

5.7.12 MAINTENANCE

Routine maintenance is performed on a scheduled basis. Rehabilitation of major pieces of equipment is completed in accordance with the Capital Improvement Plans that are revised yearly. Maintenance that is required to keep the treatment plants in compliance with regulations is performed immediately using in-house maintenance personnel or outside contractors.

5.7.13 REVIEW OF PREVIOUS ANNUAL REPORT RECOMMENDATIONS

Recommendation:	Monitor the condition of the headworks screens regularly to detect wear problem as early as possible.
Progress:	*On-going.*
Recommendation:	Paint tanks and buildings in the next two (2) years.
Progress:	*On-going.*
Recommendation:	Replace reclaimed transmission pipe to the Cape Haze Golf Course.
Progress:	*On-going.*

5.7.14 SUMMARY AND RECOMMENDATIONS

5.7.14.1 Summary

The Rotonda WRF is designed to serve the west side of the Placida Peninsula. The plant is rated at 2.0 mgd with space allocated for additional duplicate components to increase the capacity to 3.0 mgd.

The plant produces a high quality reclaimed water because of its major treatment component being Membrane Bioreactor (MBR) units. The MBR units have been operating successfully for five (5) years.

This treatment process uses more electricity than conventional secondary treatment with filtration, but has proven to be more reliable with less operator involvement.

The Rotonda WRF is permitted to provide reclaimed water for public access level landscape irrigation. The Rotonda WRF does not contain an alternative disposal method for its reclaimed water that does not meet public access reuse quality. However, excess reclaimed water can be pumped through a reclaimed water transmission main to the West Port WRF deep injection well.

Waste activated sludge concentration is provided at the Rotonda WRF. Concentrated liquid sludge is hauled to the East Port WRF for dewatering and ultimate disposal.

5.7.14.2 Recommendations

Recommendation:	Monitor the condition of the headworks screens regularly to detect wear problem as early as possible.
Recommendation:	Paint tanks and buildings in the next two (2) years.
Recommendation:	Replace reclaimed transmission pipe to the Cape Haze Golf Course.
Recommendation:	Add MBR cassette to existing trains as flow requires.

5.8 BURNT STORE WRF AND RECLAIMED WATER SYSTEM

The Burnt Store WRF was acquired with the purchase of the Florida Water Services Burnt Store Division on December 12, 2003. The plant is located along the southern border of Charlotte County on Burnt Store Road and serves six (6) developments: Burnt Store Marina, Burnt Store Colony, Burnt Store Village, Burnt Store Lakes, Pirate Harbor community, and Tern Bay development.

The plant is a conventional activated sludge plant with effluent filtration and high level chlorine disinfection. The permitted facility capacity is 0.5 mgd AADF. Effluent disposal currently occurs via a deep well injection system, an onsite percolation pond system, and reclaimed water customers. The deep injection well system is shared with the adjacent Burnt Store RO Water Treatment Plant.

The WRF is also permitted to provide reclaimed water for public access level landscape irrigation through the recently permitted (February 2017) general reuse service area, with a permitted capacity of 0.50 mgd. Currently, three (3) small reclaimed water customers are served by the Burnt Store WRF. Burnt Store Lakes, Burnt Store Colony, and Burnt Store Villages use a combined average of 0.0117 mgd drip irrigation of landscaping located along the entranceway to the developments and common areas. A large golf course

user stopped maintaining their course when the development sales stopped during the housing slow-down in 2009.

5.8.1 REGULATORY CONSIDERATIONS

Permit Schedule

- Plant Operating Permit Expiration Date: December 28, 2021.
- IW-1 Permit Expiration Date: March 2, 2019.
- IW-2 Permit Expiration date: October 17, 2021.
- A successful mechanical integrity test (MIT) was performed on IW-2 in June 2013. The next MIT will be due in 2018.

The deep injection well system disposes of treated effluent produced by the Burnt Store WRF and brine produced by the adjacent BSRO Water Treatment Plant. A common pumping station receives the treated effluent and brine streams, and is capable of pumping these streams to either deep injection well for disposal. However, the newer well, IW-2, is currently being used as the primary means of waste disposal, with the older well, IW-1, maintained as a backup. Operating personnel exercise IW-1 once per month for a minimum 24-hour period to ensure its integrity.

Flow from the WRF to the injection well pump station is by gravity and is controlled by an automated valve that maintains a designated flow setpoint. Since flow is by gravity, the amount of effluent flow that can be discharged to the deep well system is limited. Accordingly, Charlotte County Utilities Department intends to evaluate other means for transferring greater amounts of effluent flow to the deep well system as part of the plant re-rating. Effluent flow that exceeds the deep well flow setpoint is diverted to the percolation pond system by way of a splitter mechanism at the chlorine contact structure.

Injection well IW-1 has a rated capacity of 0.564 mgd. Injection well IW-2 is designed for an ultimate capacity of 9.5 mgd. However, due to supply limitations associated with available test water, the well was tested at a flow rate of 2.88 mgd. Thus, the initial capacity rating for IW-2 is 2.88 mgd. It should be noted that the well capacity rating can be increased in the future once an adequate supply of test water is available.

5.8.2 WASTEWATER CHARACTERISTICS

A review of the influent plant loadings for CBOD5 and TSS for FY 2016 indicates that the average influent CBOD5 concentration was 97 mg/L and average influent TSS concentration was 115 mg/L. The monthly average high for CBOD5 was 133 mg/L and for TSS was 183 mg/L, both occurring in March 2016. Table 5-13 summarizes the wastewater characteristics of the Burnt Store WRF influent.

Table 5-13 Burnt Store WRF Influent Water Quality FY 2016				
Month	CBOD		TSS	
	Monthly Avg. (mg/L)	Annual Avg. (mg/L)	Monthly Avg. (mg/L)	Annual Avg. (mg/L)
Oct-15	81	99	115	153
Nov-15	125	96	158	146
Dec-15	142	95	168	146
Jan-16	113	76	135	112
Feb-16	106	79	106	110
Mar-16	133	83	183	113
Apr-16	126	87	137	113
May-16	118	91	132	115
Jun-16	85	93	92	113
Jul-16	84	95	105	112
Aug-16	57	96	103	114
Sep-16	49	97	93	115

5.8.3 DIURNAL STORAGE

The Burnt Store WRF does not currently have any effluent storage facilities. Influent diurnal peak storage is provided by an in-line flow equalization tank and variable-speed pumps that pump influent at a constant rate to the aeration tanks.

5.8.4 CAPACITY

The Burnt Store WRF currently is permitted at a capacity of 0.5 mgd AADF. The AADF for Burnt Store WRF in FY 2015 was 0.339 mgd, with a high monthly average of 0.455 mgd in January 2016. Based on the highest TMADF of 0.428 in March 2016 the Burnt Store WRF was operating at 86% of its permitted capacity. This was a 15% increase of capacity then experienced in FY 2015. Influent flows are summarized in Table 5-14.

Table 5-14 Burnt Store WRF Influent Flows FY 2016					
Month	Monthly Avg. (mgd)	AADF (mgd)	TMADF (mgd)	Monthly Max (mgd)	TMADF Percent Capacity (%) [1]
Oct-15	0.309	0.321	0.349	0.400	70%
Nov-15	0.314	0.322	0.335	0.532	67%
Dec-15	0.340	0.325	0.321	0.490	64%
Jan-16	0.455	0.336	0.370	0.888	74%
Feb-16	0.443	0.342	0.413	0.560	83%
Mar-16	0.386	0.343	0.428	0.427	86%
Apr-16	0.293	0.342	0.374	0.369	75%
May-16	0.222	0.342	0.300	0.267	60%
Jun-16	0.303	0.345	0.327	0.649	65%
Jul-16	0.316	0.343	0.280	0.528	56%
Aug-16	0.330	0.341	0.316	0.544	63%
Sep-16	0.351	0.339	0.332	0.704	66%

1. Permitted capacity 0.500 mgd.

A Capacity Analysis Report (CAR) was prepared for the Burnt Store WRF in February 2016. A yearly CAR will continue to be completed to determine the need for a schedule for expansion.

5.8.5 TREATMENT OBJECTIVES AND EFFLUENT QUALITY

The Burnt Store WRF is designed to treat wastewater to two effluent standards; one for disposal in the deep injection well and percolation pond systems (CBOD5 = 20 mg/L, TSS = 20 mg/L), requiring basic disinfection; and the other for public access level treatment (CBOD5 = 20 mg/L, TSS = 5 mg/L), requiring high-level disinfection.

In FY 2016, the annual average CBOD5 and TSS were 2.2 mg/L and 0.5 mg/L, respectively, for the Burnt Store WRF. The CBOD5 high monthly average 2.6 mg/L occurred in January 2016. The TSS effluent remained nearly constant at 1.0 mg/L or less throughout FY 2016. These CBOD5 and TSS concentrations are well within public access standards. In addition, chlorine residual levels must be maintained at the discharge of the chlorine contact tanks. Table 5-15 summarizes the water quality of the Burnt Store WRF effluent.

Table 5-15 Burnt Store WRF Effluent Water Quality FY 2016							
Month	CBOD			TSS			Fecal
	Monthly Avg. (mg/L)	Annual Avg. (mg/L)	Percent Removal (%)	Monthly Avg. (mg/L)	Annual Avg. (mg/L)	Percent Removal (%)	Monthly Avg. (No./100 mL)
Oct-15	2.0	2.3	97.5%	0.1	0.6	99.9%	<1
Nov-15	2.1	2.3	98.3%	0.4	0.6	99.7%	<1
Dec-15	2.1	2.3	98.5%	0.3	0.5	99.8%	<1
Jan-16	2.6	2.3	98.4%	1.8	0.6	99.1%	<1
Feb-16	2.5	2.2	98.7%	0.7	0.6	99.7%	<1
Mar-16	2.5	2.2	98.7%	0.9	0.7	99.6%	<1
Apr-16	2.2	2.2	98.7%	0.4	0.6	99.8%	<1
May-16	2.0	2.2	98.4%	0.2	0.6	99.8%	<1
Jun-16	2.0	2.2	97.2%	0.2	0.6	99.8%	<1
Jul-16	2.0	2.2	97.1%	0.1	0.5	99.9%	<1
Aug-16	2.0	2.2	95.4%	0.1	0.5	99.9%	<1
Sep-16	2.0	2.2	94.8%	0.2	0.5	99.7%	<1

5.8.6 TREATMENT COMPONENTS AND CONDITION ASSESSMENT

A field review of the plant was performed by Stantec on December 13, 2016. Stantec personnel met with the John, Thompson, chief operator, to review plant conditions, operations, and records.

Access to the facility is through a secure gate in a fence that surrounds both the water and wastewater plants. The plant site is well kept and maintained including mowing and stowage of used equipment in suitable locations.

General observations noted during the site visit include: all valves appear to be exercised on a regular basis, piping is painted and clearly marked, and all compliance meters are being calibrated every six (6) months by in-house certified technicians or equipment manufacturer technicians.

Required documents are maintained onsite including:

1. Operating permits for the treatment facility and deep injection well
2. Operator's licenses
3. Facility Logbook
4. Facility Standard and Emergency Operating Plans

5. DMRs
6. Effluent Analysis Reports
7. Annual Reuse Report
8. Pathogen Monitoring Report (Giardia and Cryptosporidium every five (5) years per permit)
9. Reports required to complete the last permit application
10. Certification of the East Port Laboratory
11. Sampling Plan
12. Groundwater monitoring plan (contained in permit)
13. Laboratory results
14. Flow meter calibrations
15. Chlorine and pH meter calibrations (1/day)
16. Chain of custody forms for samples that are sent to laboratories
17. Monthly residual and marketing report (reported in dry tons/month)
18. Facility Operations and Maintenance Manuals
19. Maintenance records (EAMS electronic data system)
20. Reuse Operating Protocol
21. Facility record drawings
22. Daily temperature logs
23. Spill protocol and record of spills

The Cross-connection and Backflow Prevention Manuals are kept at the reclaimed water coordinator's office located at the East Port WRF.

5.8.6.1 Headworks and Flow Equalization

The overall condition of the headworks is fair. The Aquastore EQ tank is in good condition, but the internal piping is in poor condition with leaks at flanged fittings. The leaks do not pose an environmental hazard because they are inside the tank.

The influent manual screening system cannot prevent moderate-size debris from entering the facility's equalization tank, pumping systems, and process tanks. In addition, the facility's headworks does not contain a grit removal process. The lack of fine screening creates operational and mechanical problems for the equalization pumps and the RAS/WAS pumps. Staff continues to clear equalization transfer pumps and pipe lines of debris to remove clogs in the system approximately once per month. A permanent pump motor hoist system has been erected over the equalization pumps to allow safe access to the pump volute to remove clogging debris.

All debris that passes through the equalization tank eventually accumulates in process tanks and sludge digestion tanks. Floatables that are skimmed from the surface in the clarifiers are discharged to the plant lift station. The plant lift station discharges into the EQ tank. Therefore, there is no way to remove floating debris that passes through the manual bar screen except by manually screening the floatables into a bucket.

The accumulation of grit in the equalization and aeration tanks reduces treatment capacity. The last cleaning of grit from the equalization tank was six (6) years ago.

A mechanical fine screen and grit removal system is highly recommended. It is anticipated that this issue will be resolved as part of the facility upgrade to 0.750 mgd.

The equalization tank continues to show signs of rust around the upper steel rim of the tank and the piping inside the tank leaks. Removing of the rust and painting the top ring is recommended to preserve the integrity of the tank. The piping should be replaced as part of a plant upgrade.

The flow rate of the equalization pumps can be operator-adjusted variable frequency drives. The speed is periodically adjusted based on season and historical trends. The EQ pumps turn off based on the level in the tank. The return activated sludge (RAS) pumps turn on and off ten (10) minutes before/after the EQ pumps turn on and off. If the equalization tank fills, an alarm condition occurs based on a reading from an ultrasonic level sensor. If the tank is empty, the pump stops on command from the ultrasonic level sensor.

A positive displacement blower currently provides air to the EQ tank aerators to "freshen" the raw sewage and keep solids in suspension. The plant operator has chosen to intermittently aerate the EQ tank to maintain the desired dissolved oxygen concentration. The intermittent run time of the blower is by timer.

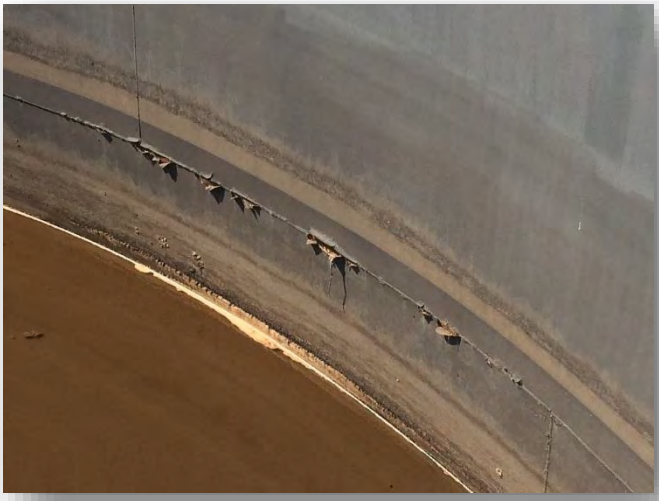
The influent sample point is clearly marked and the refrigerated influent composite sampler is in good operating order. All sample points are at permit required locations. All piping is painted and clearly marked.

5.8.6.2 Activated Sludge Facilities

The overall condition of the activated sludge facilities is good.

At the time of inspection, the aeration basins appeared to have adequate air distribution throughout the tank. Minor rust was observed on the outer rim of the aeration basins. The interior of Aeration Basin No. 2 was sand blasted and repainted in 2009. There are locations in the north sludge holding tank as part of package plant No. 1 where paint is flaking off probably due to rust at the weld. Removing the rust on any part of the aeration tanks and repainting is recommended.

The swing sluice gates between tanks do not seal well and are very difficult to open and close. When a section of the tank is shut down for repairs, there have been instances where flow continued to enter the tank through the gates. Because these gates have demonstrated a less than favorable reliability status for both operation purposes and for the safety of those who may be working inside the tank, they should be replaced during the plant upgrade.



The plant has three (3) centrifugal blowers, one (1) dedicated to the sludge digestion tank, one (1) dedicated to the aeration tanks, and the third one being on stand-by. All of the blowers are in good condition. The operation of the blowers is based on timers. There are no dissolved oxygen sensors to adjust blower operation. A soft start was added to Blower No. 1 in 2014 to reduce peak electric demand. The blower intake filters were replaced in FY 2016.

The chief operator noted that the main breaker at the centrifugal blower area trips when a third blower starts when the other two blowers are operating. This does not occur now because only two (2) blowers are used, however, this would inhibit full use of the blower capabilities in the future.

5.8.6.3 Sedimentation

The overall condition of the two (2) activated sludge clarifiers is good.

Clarifiers are in good working order and are cleaned of excessive algae growth on the weirs with a hose daily and brushed weekly. Both clarifiers were drained and inspected in 2014. All scrapper arms and rubbers were in good condition and required no rehabilitation. The flow from the effluent channel was observed on both clarifiers. During the FY 2016 inspection, flows appeared to be greater in Clarifier No. 1 than No. 2.

Scum is collected in a scum trough and sent to the plant lift station. The plant's lift station discharges to the equalization tank. Therefore, there is no means to remove scum after it enters the plant flow. The facility upgrade should include a fine mechanical bar screen at the beginning of the plant to relieve the endless accumulation of scum in the Burnt Store WRF. In the interim, it is recommended that the scum be collected and pumped to the digester where some of the scum will be removed during sludge hauling.

An operation's modification was made in FY 2014 for the return activated sludge pumps to turn on and off when the EQ tank pumps turn on and off. This helps to keep the solids concentration at the same level in the aeration tanks.

5.8.6.4 Filtration

The overall condition of the filtration system is good. The steel cloth filter tank is still in good condition, but is showing numerous rusted areas on the inside and top of the tank walls. The filter should be taken out of service and painted. A type 304 stainless steel cloth filter tank from the old Rotonda plant is currently stored at the rear of the Burnt Store WRF. This identical filter has the capability to add filtration capacity and allow for the existing filter to be taken out of service completely for painting.

There is one 0.500 mgd disc filter in operation with space for two (2) additional cloth discs. The operator indicated that although the filter is producing a good effluent, it backwashes frequently during periods of high flow. Additional cloth discs to be installed in the two (2) spare slots have been delivered to the plant for installation in 2017.

5.8.6.5 Chlorination

The overall condition of the chlorination system is good.

There are two (2) chemical feed pumps that are controlled by a new reagent-less analyzer. The pump chemical feed bases are beginning to show rust and should be painted with chlorine resistant paint.

The chlorine analyzer which measures chlorine concentration at the beginning of the chlorine contact

tank (CCT) is used to adjust chlorine feed rates to maintain regulatory residual requirements at the effluent weir. A reagent-less analyzer is the compliance monitoring analyzer that measures the chlorine residual at the discharge of the chlorine contact tank. The concrete chlorine contact basins are in good condition. A UV cover has been installed over the CCT side that is in use to inhibit algae growth. Liquid sodium hypochlorite is used for disinfection. A mixing pump has been added to the area where liquid

chlorine is added to the flow stream. This additional mixing yields a more consistent chlorine reading by the influent chlorine measuring instrument. A pump to the chlorine compliance analyzer has been added to bring a more representative effluent sample than was obtained by the old gravity feed to the analyzer.

There are two (2) sodium hypochlorite storage tanks with a total capacity of 2,200 gallons. They are well kept and meet regulatory requirements. Both tanks are in containment vessels. There is an emergency eyewash and shower located at the sodium hypochlorite storage tank and chemical feed pump area. A concrete containment wall has been constructed around the entire chlorine storage and pumping area.

5.8.6.6 Solids Handling Facilities

The overall condition of the solids handling facilities is good.

There are three (3) crescent shaped sludge holding tanks within one (1) steel ring tank with a total capacity of nearly 300,000 gallons. At the time of inspection, all three (3) of the tanks were being used and air distribution was adequate. Liquid sludge is hauled to the East Port WRF for dewatering and final disposal at the Class AA compost facility at the Charlotte County Landfill. Transport manifests are kept onsite.

The top ring of the sludge holding tank has minor rust. The interior of the section of the tank that is not full has paint flaking at the mid-level weld.

5.8.6.7 Effluent Storage and Disposal

The overall condition of the effluent disposal system is good.

Effluent disposal is accomplished through two (2) deep injection wells, reclaimed water sales, and four (4) rapid infiltration percolation ponds. The

percolation ponds are used to their maximum permitted capacity to encourage shallow groundwater recharge. The percolation ponds are alternately rested and allowed to dry. The pond bottoms are harrowed to enhance percolation. The interior of the ponds above the water line are mowed.

There are four (4) shallow monitoring wells around the IW-1 deep injection well. These shallow wells around the injection well pad were installed as part of the injection well construction. They are a requirement for construction of all injections wells. These wells should not be plugged because they may be needed in the future if any rehabilitation work is performed on either IW-1 or IW-2.

There is no onsite reclaimed water storage. All future large users must be serviced through direct distribution to the user's reclaimed water holding facility.

Effluent high-service pumps are well maintained and show no signs of deterioration. A smaller pump is currently used to supply reuse water to a few small users and provide plant water.

At the time of the site visit, the maximum disposal rate to the deep injection wells was 360 gpm. Effluent is transferred, by gravity flow, from the plant discharge to both the deep well pumping station and percolation ponds. The flow rate to the deep well pumping station wet well is through a 6-inch diameter pipe. The available head between the effluent wetwell at the chlorine contact tanks and the deep well pumping station is insufficient to move peak flows through the small 6-inch transfer pipe. Flow that does not reach the deep well overflows to the percolation ponds.

The limitation on the capability to discharge effluent to the deep well system is counterproductive and may cause overloading of the ponds when future flow increases. The ability to transfer higher flows by gravity or pumping should be investigated as part of the plant upgrade design. The current situation makes it impossible to use the full capacity of the facilities' deep wells. A smaller pump was installed to replace an existing pump in the deep well pumping station to match the current flows that flow by gravity to the wetwell. The deep well pumps need to be repainted.

All valves are exercised on a regular basis. All associated meters are calibrated semi-annually and are up to date.

Both of the deep injection wells and percolation ponds are well maintained and in good working order. IW-1 is used only one day per month to keep it active. It should be noted that there is no means of measuring the reclaimed water leaving the site. It is recommended that a reuse meter be installed on the discharge line from the reclaimed water pumps as part of the plant upgrade.

5.8.6.8 Auxiliary Power

There is a 350 kW generator servicing the facility. The demand on the generator's capacity is adequate for the current facility. Service of the generator is provided by an outside contractor. The generator is run every two (2) weeks for four (4) hours under load. Two 500 gallon steel fuel tanks with containment and tie-downs were installed at the facility in 2012.

5.8.6.9 Motor Control Center

The plant motor control center (MCC) building is a fiberglass building which is bolted to a concrete pad. The junction of the walls to the floor has been caulked. A small damp area in the northeast corner of the building has been previously noticed. There is an intake air louver near the floor in this corner that may allow small amounts of rain to enter the building. It is recommended that an enlarged concrete structure with positive surface drainage away from the building be constructed to house the existing and future MCCs when the plant is expanded.

5.8.7 RECLAIMED WATER PUMPING

Two (2) high service pumps are mounted above a clearwell following the chlorine contact tanks. Although the Burnt Store WRF has the capacity to pump 1.000 mgd (AADF) of reclaimed water, at the end of FY 2016, there were only three (3) active users that were permitted for only 0.0117 mgd.

The current use of most of the reclaimed water is for groundwater replenishment through the four (4) percolation ponds on the Burnt Store WRF site. The addition of reclaimed water users under a General Reuse Service Area, as a permit amendment in March 2017, is now permitted to service up to 0.500 mgd of reclaimed water.

5.8.8 REJECT STORAGE AND ALTERNATE DISPOSAL

No reject storage is provided at the Burnt Store WRF. Alternate disposal of reclaimed water is provided via the 0.564 mgd deep injection well IW-1, the 2.88 mgd deep injection well IW-2, and the on-site percolation ponds. The percolation pond system has a rated capacity of 0.250 mgd AADF. An average of 0.001 mgd was sent to the deep injection wells in FY 2016, while an average of 0.229 was sent to the percolation ponds.

5.8.9 WET WEATHER STORAGE

Other than the limited storage capabilities of the onsite percolation ponds, no wet-weather storage is necessary for the Burnt Store WRF.

5.8.10 IRRIGATION AND OTHER RECLAIMED WATER APPLICATIONS

In FY 2016, the reuse customers within the Burnt Store WRF service area were the Burnt Store Lakes development and Burnt Store Colony mobile home park, which use a small amount of reclaimed water for drip irrigation of landscaping located along the development entranceway and common areas.

Charlotte County Utilities Department had negotiated with the Tern Bay Development Company to supply reuse water to a proposed 27-hole golf course located north of the plant along Burnt Store Road. However, the development was affected by financial difficulty resulting from the decline in the housing market. The proposed golf course was constructed, but not maintained. Charlotte County Utilities Department's agreement with the Tern Bay Golf Course initially called for Charlotte County Utilities Department to provide an average of 300,000 gpd. A 12-inch diameter reuse main from the plant to the new golf course was constructed in 2006 as a dry line. A portion of this line is now used to service Burnt Store Lakes, Burnt Store Colony, and Burnt Store Villages.

The existing reuse pumping station wet well is equipped with an ultrasonic flow meter and primary weir device as the reclaimed water cascades into the wet well. However, this meter became obsolete when the WRF began transferring flow to the deep injection well system. Consequently, it is necessary to install a new flow meter on the reuse pump discharge line to measure reclaimed water flow leaving the site. Charlotte County Utilities Department intends to address this requirement as part of the plant upgrade.

Charlotte County Utilities Department is pursuing other potential bulk non-potable water users, such as golf courses that are also irrigated using stormwater storage ponds. In the interim, excess reclaimed water is diverted to the plant's onsite percolation ponds or a deep injection well that was constructed for that purpose. Table 5-16 lists future major reclaimed water users within the Burnt Store WRF service area.

Table 5-16 Burnt Store WRF Future Major Reclaimed Water Users

Reclaimed Water User	Type of User	Reclaimed Water Demand (mgd)
Burnt Store Marina & Golf Course	Landscape Irrigation	0.9891
Tern Bay	Landscape Irrigation	0.6982
Tuckers Grade and Interstate	Landscape Irrigation	0.1474
RV Resort at Tranquility Lake	Landscape Irrigation	0.0698
Burnt Store Lakes – Amenities	Landscape Irrigation	0.0477
Total		**1.9629**

5.8.11 OPERATIONS

The Burnt Store WRF is monitored by continuous analysis instruments. A new operations building, which is shared with the BSRO WTP staff, was completed during FY 2009. This new building houses a plant operating system that monitors critical plant operations continuously.

The flow equalization tank is useful for attenuating diurnal flow to the plant. Residual solids produced by the biological treatment process are stored in the aerobic digester at the Burnt Store WRF until being hauled in a concentrated liquid form by County staff to the East Port WRF for dewatering.

The cloth filter has operated well and fairly consistently.

Charlotte County Utilities Department has received FDEP permit approval to upgrade, improve, and rerate the facility. The existing capacity of 0.50 mgd is to be rerated to 0.75 mgd upon completion of several improvements including headworks, additional blower, RAS pump, filter disks, chlorine contact tank, and yard piping modifications. Yearly capacity analysis reports will access historical flows and flow projections to determine an approximate start date for these improvements.

5.8.12 MAINTENANCE

Routine maintenance is performed on a scheduled basis. Rehabilitation of major pieces of equipment is completed according to the Capital Improvement Plans that are revised yearly. Maintenance that is required to keep the treatment plants in compliance with regulations is performed immediately using in-house maintenance personnel or outside contractors.

5.8.13 REVIEW OF PREVIOUS ANNUAL REPORT RECOMMENDATIONS

Recommendation:	Install a mechanical screen (highest priority) and grit removal system (secondary priority) in a new headworks.
Progress:	*Pending plant upgrade.*
Recommendation:	Remove rust from the top rim of the equalization tank and repaint.
Progress:	*Not completed.*
Recommendation:	Remove grit from the bottom of the equalization tank.
Progress:	*Not completed.*
Recommendation:	Install EQ tank level monitoring to adjust the transfer pump(s) flow rates as part of the plant upgrade.
Progress:	*This will be included in the plant upgrade.*

Recommendation:	Remove rust from the outer rim of the aeration basins.
Progress:	*Not completed.*
Recommendation:	Replace aeration tank hinged sluice gates to provide adequate prevention of flow entering the adjacent tank during maintenance as part of a plant upgrade.
Progress:	*These sluice gates will be replaced during the plant upgrade.*
Recommendation:	Scum removal from the treatment system is not being accomplished. It is recommended that collected scum be sent directly to the digester for final disposal. The accumulation of scum and floatables in the aeration tanks and clarifiers will not be eliminated until fine, mechanical screens are added to the headworks.
Progress:	*No changes have been made in the handling of scum at the plant pending the upgrade.*
Recommendation:	Install two (2) additional cloth discs into the existing disc filter to increase capacity of the filter when necessary.
Progress:	*Two cloth disks are on-site for installation in December 2016.*
Recommendation:	Install a reuse meter on the discharge line from the reclaimed water pumps. There is no means of measuring public access reclaimed water flow leaving the site.
Progress:	*Meter will be added when a significant reclaimed water customer(s) is served.*
Recommendation:	Paint deep well injection pumps.
Progress:	*Not Completed.*
Recommendation:	Install a pumping system that will pump effluent to the deep injection well pumping station or increase the capacity of the gravity pipe. This will maximize the capacity of the deep injection wells' system when necessary.
Progress:	*Not completed.*
Recommendation:	Allow flow to the deep wells to be monitored in the wastewater operation room.
Progress:	*This non-critical issue was not rectified.*
Recommendation:	Replace the fiberglass MCC building with a concrete structure.
Progress:	*This will be included in plant upgrade.*

5.8.14 SUMMARY AND RECOMMENDATIONS

5.8.14.1 Summary

The Burnt Store WRF serves the extreme south end of Charlotte County along Burnt Store Road and two (2) square miles of golf course/marina residential areas inside Lee County. The plant is located on the same site as the BSRO Water Treatment Plant. The plant produces reclaimed water that meets public access reclaimed water quality.

The Burnt Store WRF has reached a percent-of-capacity use that requires designs to begin to increase the capacity of the plant. Design plans were started in 2010. However, the population growth in this part of southwest Florida stopped in 2009 and has not fully recovered to date. The treatment plant flow remains near the same flow level as it was in 2008. The FDEP is allowing a phased increased in the capacity of the Burnt Store WRF plant to meet flow. A Capacity Analysis Report is required every year to assess the previous year flows and their impact on the capabilities of the plant to meet its permitted effluent requirements. The plant continues to meet effluent requirements with almost no increase in flow.

5.8.14.2 Recommendations

Recommendation:	Install a mechanical screen (highest priority) and grit removal system (secondary priority) in the headworks.
Recommendation:	Remove rust from the top rim of the equalization tank and repaint.
Recommendation:	Remove grit from the bottom of the equalization tank.
Recommendation:	Install EQ tank level monitoring to adjust the transfer pump(s) flow rates as part of the plant upgrade.
Recommendation:	Remove rust from the outer rim of the aeration basins and repaint flaking areas at welds.
Recommendation:	Replace aeration tank hinged sluice gates to provide adequate prevention of flow entering the adjacent tank during maintenance as part of the plant upgrade.
Recommendation:	Scum removal from the treatment system is not being accomplished. It is recommended that collected scum be sent directly to the digester for final disposal. The accumulation of scum and floatables in the aeration tanks and clarifiers will not be eliminated until fine, mechanical screens are added to the headworks.
Recommendation:	Complete the installation of two (2) additional cloth discs into the disc filter to increase capacity of the filter as part of the upgrade to 0.750 mgd capacity.
Recommendation:	Install a reuse meter on the discharge line from the reclaimed water pumps before the addition of a large reuse customer.

Recommendation:	Installation of a pumping system that will pump effluent to the deep injection well pumping station or increase the capacity of the gravity pipe is recommended. This will maximize the capacity of the deep injection wells' system when necessary.
Recommendation:	Paint deep well injection pumps.
Recommendation:	Allow flow to the deep wells to be monitored in the wastewater operations room.
Recommendation:	Replace the fiberglass MCC building with a concrete structure when the plant is upgraded.

5.9 LEACHATE TREATMENT FACILITY

Charlotte County Utilities Department operates and maintains the Leachate Treatment Facility for the Charlotte County Municipal Solid Waste Management Department. The purpose of the facility is to treat and dispose of leachate produced at the Zemel Road Municipal Solid Waste Landfill. The landfill is located on a 308 acre site and accepts municipal waste from throughout the County.

5.9.1 REGULATORY CONSIDERATIONS

Permit Schedule:

- IW-I Permit Expiration Date: August 13, 2018 (Permit renewal by Charlotte County Public Works)
- Class 1 Landfill Permit Expiration Date: July 15, 2033
- The next Mechanical Integrity Test is due May 7, 2017 (by Charlotte County Public Works)

5.9.2 DIURNAL STORAGE

All leachate flow enters the plant by means of a pumping station located at the landfill. The pumped flow is stored in an EQ tank for treatment during a nine-hour day. Flow to the plant is nearly constant for 24 hours in a day because the leachate is produced at a constant rate.

5.9.3 CAPACITY

The Leachate Treatment Facility currently is permitted at a capacity of 0.150 mgd. In FY 2016, monthly average daily plant flow ranged from 0.063 mgd to 0.075 mgd. The AADF for FY 2016 was 0.069 mgd.

5.9.4 TREATMENT OBJECTIVES AND EFFLUENT QUALITY

The treated leachate meets or exceeds the final effluent standards for disposal to a 0.46 mgd deep injection well system located adjacent to the treatment plant. The landfill has a vertical bentonite (clay soil) slurry wall that blends with the natural confining layer of soil surrounding the landfill below ground. This slurry wall separates the interior landfill leachate from groundwater and lakes that surround the entire site. Leachate seeps down through the landfill to a french-drain type collection system. The collected leachate is pumped to the treatment facility via an offsite influent pump station for biophysical treatment. Influent storage is provided by a storage tank for processing during the daylight hours.

The heart of the facility is the Powdered Activated Carbon Treatment (PACT) tank system, which uses a combination of powdered activated carbon and aerobic bacteria (activated sludge) to simultaneously adsorb and metabolize the leachate contaminants. Treatment in the PACT tanks begins with an aeration cycle. Aeration is periodically shut off to permit settling of the sludge. After the settling is completed, the decant water is removed by pumping it to a decant storage tank and thence to a sand filter for final polishing. The PACT tanks are then refilled with raw leachate, additional powdered activated carbon is added (if necessary), and the aeration blower is restarted to begin the process again. After the bio-physically treated effluent passes through the sand filter, it is stored in a glass lined tank. The

unchlorinated effluent is then pumped down the deep well injection system to an approximate level of 3,000 feet below ground in a confined saltwater aquifer.

Table 5-17 summarizes the flows sent from the Leachate Treatment Facility to the deep injection well.

Table 5-17 Leachate Treatment Plant Deep Injection Well Flows FY 2016

Month	To Deep Injection Well Monthly Avg. (mgd)	Injection Rate Monthly Average (gpm)	Wellhead Pressure (psi)
Oct-15	0.063	245	17
Nov-15	0.073	235	17
Dec-15	0.073	241	17
Jan-16	0.074	232	16
Feb-16	0.075	259	16
Mar-16	0.071	257	16
Apr-16	0.066	255	17
May-16	0.072	262	17
Jun-16	0.072	252	17
Jul-16	0.061	244	18
Aug-16	0.066	345	16
Sep-16	0.066	245	17

5.9.5 TREATMENT COMPONENTS AND CONDITION ASSESSMENT

A site review of the plant was performed by Stantec on March 1, 2017. Stantec personnel met with the chief operator, to review plant conditions, operations, and records.

The plant site is well kept. Staff does a good job in grounds keeping and facility appearance.

Access to the facility is through a secure gate at the entrance to the landfill. The plant is very isolated among landfill operation buildings and yard waste composting piles.

General observations noted during the site visit include: all valves appear to be exercised on a regular basis, piping is painted and clearly marked, and all compliance meters are being calibrated

every six (6) months. Calibration tags are up-to-date.

Required documents are maintained on site including:

1. Operating permits for the treatment facility and deep injection wells
2. Operator's licenses
3. Facility Logbook
4. Facility Standard and Emergency Operating Plans
5. DMRs
6. Effluent Analysis Reports (N/A)
7. Annual Reuse Report (N/A)
8. Pathogen Monitoring Report (N/A)
9. Reports required to complete the last permit application
10. Certification of the laboratory used for sample analysis
11. Sampling Plan
12. Groundwater monitoring plan (N/A)
13. Laboratory results
14. Flow meter calibrations (twice per year)
15. Chlorine and pH meter calibrations (1/day)
16. Chain of custody forms for samples that are sent to laboratories
17. Monthly residual and marketing report (N/A)
18. Facility Operations and Maintenance Manuals
19. Maintenance records (EAMS electronic data system)
20. Reuse Operating Protocol
21. Facility record drawings
22. Daily temperature logs

Spill protocol and record of spills are kept by the owner of the plant, Charlotte County Public Works Department, and kept on file at the treatment plant office.

5.9.5.1 PACT Biological/Carbon Adsorption Treatment with Sedimentation

The plant receives flow from the landfill pumping station (PS #1) which is located at the edge of the landfill. The landfill pumping station receives flow from the plant office sanitary and the landfill underdrains outside of the slurry wall. The pumping station has a capacity of 150 gpm. The required differential between the water level on the inside and outside of the landfill slurry wall is kept greater than

is required by the landfill permit. This allows PS #1 to be out of service during a power outage without triggering a permit issue. PS #1 discharges waste into the influent holding tank 24 hours per day. The plant pumping station No. 2 pumps a constant flow from the influent receiving tank to the treatment units only when operators are present. All flow is processed Monday through Saturday. The chief operator checks on PS # 1 and the level in the influent tank via SCADA on Sundays.

The PACT system uses a combination of aerated activated sludge with carbon particle adsorption in three (3) tanks to treat the landfill leachate to a level that is sufficient for deep well injection disposal. Each PACT unit is a small package plant with its own aeration system and pumps. The aeration coverage is good with no noticeable "dead" areas. The overall condition of the three (3) PACT units is good.

Settling of the solids is accomplished by turning off the air for several hours, decanting the clear liquid on top of the PACT tanks, and pumping it to the sand filter feed tank.

The tanks still have a sufficient coat of exterior paint. The non-slip surface of the tanks' walkways were painted in 2014. The tank's exteriors were painted in FY 2015. The elevated walkways are scheduled for repainting in 2017.

In 2005 through 2008, all of the tanks received an interior coating of polyurea. This coating is holding up better than any other previously used interior coating.

There is no grit removal system at the plant. Grit is removed from the tanks, as necessary, by draining the contents and washing the grit to a submersible pump that is dropped into the bottom of the tank.

The carbon slurry that is used in the treatment process is produced by mixing bagged powder carbon with water. The carbon is added to a mixing tank by dumping bags of carbon into the top of the tank where it is hydrated. The mixed carbon/biological sludge that is generated in the PACT tanks is transferred directly to the outdoor sludge drying beds for dewatering.

A foaming problem developed when methane wells were installed at the landfill in FY 2014. The operator has managed the foam with anti-foaming agents and water sprays on the top of the PACT tanks and influent pumping station.

5.9.5.2 Filtration

The condition of the sand media filter is good. Rust on this steel tank and equipment supports has been scrapped and painted with epoxy. The interior of this tank should be painted with polyurea in the same manner as the PACT tanks.

There is no back-up for this critical piece of treatment equipment. The installation of a second similar filter in the future should be investigated to enable continuous operation of the plant and provide redundancy for filtration. The sand media and sand support system should be replaced in the

existing filter when necessary, along with removing rust and existing paint to bright metal and painting with a polyurea coating.

5.9.5.3 Chlorination

The overall condition of the remaining chlorination system is good, however, it is not in service. FDEP no longer requires chlorination of the industrial effluent that is disposed of in the deep well. An emergency eye wash and shower is located near the maintenance shop shed that is adjacent to the chlorination system.

5.9.5.4 Solids Handling Facilities

The overall condition of the solids handling facilities is good. The exterior of the sludge digestion/concentrating tank was painted in FY 2015. The use of the tank to concentrate sludge is not necessary. It has the capability of being converted to a fourth PACT treatment unit.

Staff indicated that there are no operational issues with the sludge digestion/concentrating tank. The aeration of the sludge concentrating tank was turned off at the time of the site visit.

The sludge drying beds are well maintained. The sludge is blended with cover material for the landfill.

A Bobcat loader is used for sludge removal. A small loader was purchased for maximum maneuverability within the sludge drying beds. The Bobcat dumps dried sludge into a dumpster that is hauled to the landfill when full. The Bobcat loader has significantly reduced the manual labor required to remove a foot of dry sludge from the drying beds. Unfortunately, there will always be small areas of the drying beds that must be removed by hand shovel.

5.9.5.5 Effluent Storage and Disposal

Effluent that is waiting to be pumped down the injection well is stored in an Aquastore tank. The overall condition of the effluent disposal system is good.

Two (2) dry pit submersible pumps are used to alternately inject effluent into the well. Both pumps were replaced by Charlotte County Utilities Department personnel in 2015. The HP of the pumps was increased from 7.5 HP to 12 HP. The new pumps are operating satisfactorily and not overheating on hot summer days.

The Hydro Tank that is part of the deep well disposal system was replaced with a new tank in 2011. It should have many years of useful life remaining.

5.9.5.6 Auxiliary Power

As reported in previous annual reports, this facility has no auxiliary standby power. Power outages are frequent and their occurrences require staff to respond after normal working hours to ensure the process and power are restored. Loss of power to the biological treatment process for more than a day requires that contents of the PACT units be sent to the sludge drying beds. Seed sludge from a local treatment plant must be trucked to the site to start the biological process again.

The influent pumping station at the landfill is on the same power grid as the treatment plant. The influent storage tank has a high level alarm which annunciates at the East Port WRF and turns off the influent pumping station. The operator must come to the plant to determine the cause of the high level alarm before processing of wastewater can proceed.

5.9.6 RECLAIMED WATER PUMPING

The Leachate Treatment Plant does not produce reclaimed water.

5.9.7 REJECT STORAGE AND ALTERNATE DISPOSAL

All effluent is pumped into a deep injection well. There is no alternative disposal site.

5.9.8 WET WEATHER STORAGE

There is no need for wet weather storage. The deep injection well is used six (6) days per week. An effluent storage tank does provide the necessary buffer if peak flows are experienced by the plant.

5.9.9 OPERATIONS

The Leachate Treatment Plant is very well maintained and is easily operated as a batch sequence reactor. From an operational point of view, the 0.150 mgd capacity of the leachate treatment system cannot presently be fully utilized because the leachate pump station, and/or the leachate collection system, appears to be inadequately sized to accommodate this design flow. However, the operational goal of maintaining a minimum one foot differential between the slurry wall and the leachate level is easily accomplished with the current pumping capabilities.

The Leachate Treatment Plant also receives a small amount of flow from the co-composting program at the County's Zemel Road Municipal Solid Waste Landfill. Under this program, dewatered sludge cake transported from the East Port WRF is combined with yard waste to create an organic soil conditioner. The composting operation is located on a concrete paved area located near the Leachate plant. FDEP requires the runoff from this area to be captured and treated at the Leachate plant. Accordingly, the compost facility owner constructed a drainage collection and pumping system that transfers the collected runoff from the composting operation to the Leachate plant for treatment and disposal.

5.9.10 MAINTENANCE

Routine maintenance is performed on a scheduled basis. Rehabilitation of major pieces of equipment is completed in accordance with the Capital Improvement Plans that are revised yearly. Maintenance that is required to keep the treatment plant in compliance with regulations is performed immediately using in-house maintenance personnel or outside contractors.

5.9.11 REVIEW OF PREVIOUS ANNUAL REPORT RECOMMENDATIONS

Recommendation:	Rehabilitate existing sand filter and consider installing a second sand filter in the next few years. Rehabilitation work should include emptying, sandblasting the interior, recoating with polyurea, replacement of screens, and new sand.
Progress:	*Not completed. The rehabilitation work is included in the FY 2018 capital improvement plan.*
Recommendation:	Continue to paint the interior and exterior of the PACT tanks on a regular schedule.
Progress:	*On-going.*

5.9.12 SUMMARY AND RECOMMENDATIONS

The leachate plant treats high BOD and corrosive wastewater to a level that is suitable for deep well injection. The treatment process is run as a batch operation with three (3) parallel treatment units complete with aeration and liquid decanting capabilities. Powdered carbon is added to the biological sludge aeration tanks to adsorb dissolved waste materials that are not removed by aerobic biological

treatment. A fourth tank has been used for sludge storage and concentration in the past, but it was determined that storage and concentration had little effect on the sludge dewatering process. The plant generates a bio-carbon waste that is dried on sludge drying beds and landfilled.

The tanks are steel and subject to highly corrosive wastes. The tanks were cleaned to bare metal and painted with polyurea epoxy paint that has worked well in preventing the loss of metal in the tank walls.

The treatment facility is located on the Charlotte County Zemel Road Landfill site. The plant is owned by the Charlotte County Public Works Department and operated by Charlotte County Utility personnel. Capital improvements and maintenance are subject to Public Works' discretion.

Recommendation:	Rehabilitate existing sand filter and consider installing a second sand filter in the next few years. Rehabilitation work should include emptying, sandblasting the interior, recoating with polyurea, replacement of screens, and new sand.
Recommendation:	Continue to paint the interior and exterior of the PACT tanks on a regular schedule.

6.0 RECLAIMED WATER DISTRIBUTION SYSTEM

It is the goal of Charlotte County Utilities Department to maximize the beneficial use of reclaimed water to reduce the impact on other water resources. All four (4) Charlotte County Utilities Department water reclamation facilities produce public access quality reclaimed water. Currently, all reclaimed water customers use the water for irrigation purposes. Charlotte County embarked on a SWFWMD supported reclaimed water distribution system in the central and western parts of Charlotte County in 2008. A Master Reclaimed Water Permit from FDEP was written for three (3) plants in the central and western parts of the county in 2014. In addition, a three (3) mile reclaimed transmission main, located in the South County, was constructed by a golf course community developer. A master reclaimed water permit for the South County system was applied for in November, 2016. The County-wide reclaimed water system is shown in Figure 6-1.

6.1 CENTRAL/WEST COUNTY SYSTEM

Plentiful reclaimed water at the East Port WRF and customer demands for irrigation water in unserved areas of the County was the driving force behind Charlotte County's desire to expand its reclaimed water distribution system. Prior to 2005 the reclaimed water systems were separate for each treatment plant. The reclaimed water systems including existing and potential customers were a part of the individual wastewater treatment plant's FDEP operating permits.

Charlotte County Utilities Department began the design of a reclaimed water transmission system that was customer based rather than based on individual treatment plants' service areas. The preliminary design began with the preparation of a computerized hydraulic model in 2005. The goal of the model was to determine the means to connect all three (3) Central/Western County treatment plants to one reclaimed water transmission system while serving as many potential reclaimed water customers as economically possible.

The hydraulic model of Phase 1 of the project predicted the need for two (2) strategically placed 0.5 MG reclaimed water storage tanks with pumping stations along the transmission pipe line. The storage tanks provide local storage and increase the total storage within the transmission system. Phase 1 construction of 14 miles of 16-inch and 12-inch diameter transmission pipe was completed in 2009. The two (2) pumping stations, Eagle Street and Walenda, were completed at the same time. A large golf course community and a major league baseball training complex were added to the customer base as well as numerous municipal and commercial properties along the transmission route.

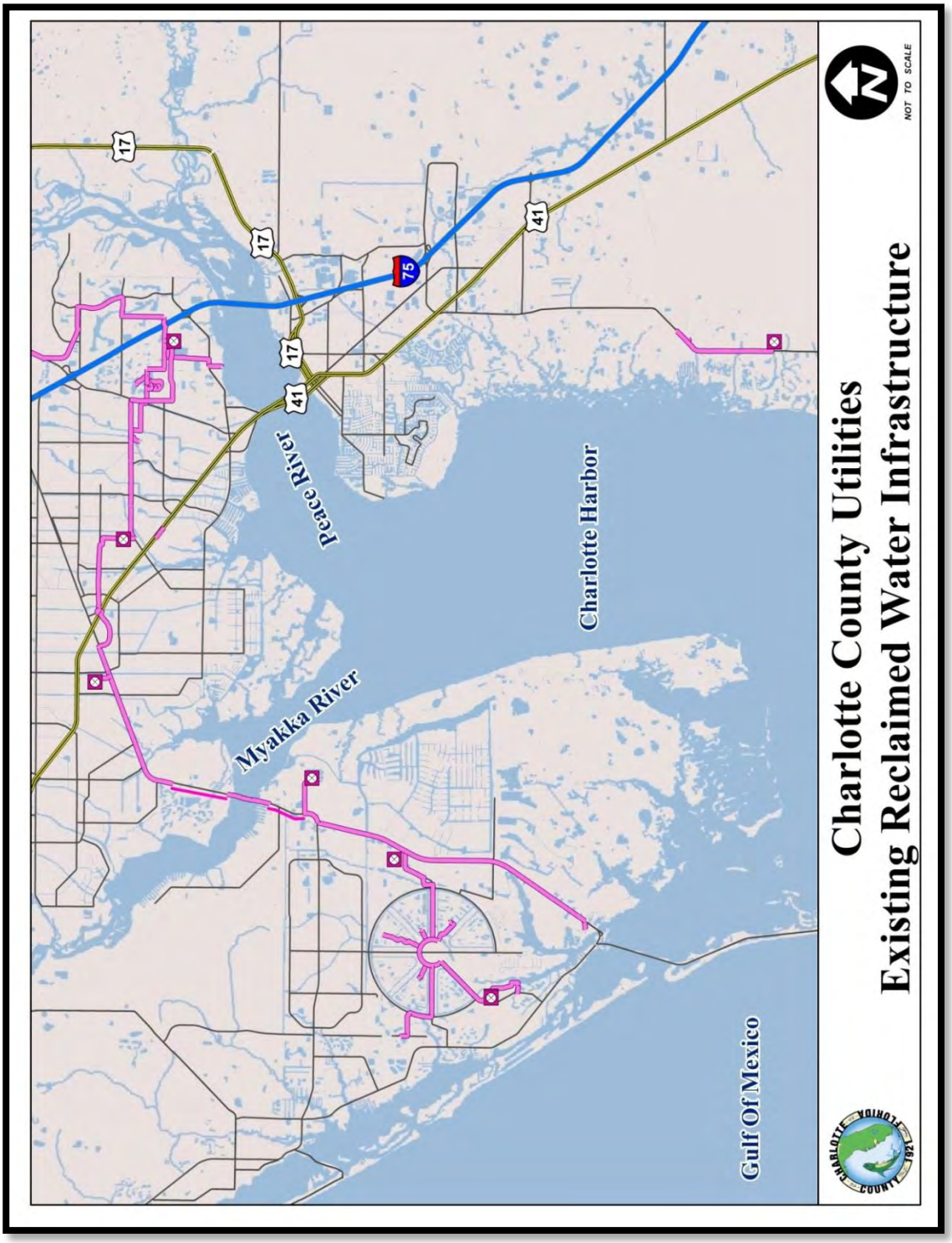


FIGURE 6-1 COUNTY-WIDE RECLAIMED WATER SYSTEM

Hydraulic modeling efforts continued into the Phase 2 area of the project in western Charlotte County. The complete system model identified the need for increased storage at the West Port WRF. The existing reclaimed water ponds at the West Port WRF were expanded to 20 MG. The West Port WRF storage ponds can be filled with reclaimed water from the East Port WRF, West Port WRF, and the Rotonda WRF. The transmission systems for all three WRFs were linked in early 2014. Phase 3 includes a 16-inch transmission pipe on CR 771 that was installed in 2016. Other Phase 3 improvements are the addition of 95 mg of storage at the East Port WRF.

Charlotte County Utilities Department anticipated the need for another pumping station along the transmission main in western Charlotte County. The hydraulic model was used to select an optimum booster pumping station site in western Charlotte County. The new booster pumping station was completed in 2014. The site of the pumping station is along the interconnected reclaimed water transmission main half way between the West Port WRF and the Rotonda WRF. The pumping station is called the Rotonda East Reclaimed Water Pumping Station.

The entire project was funded, in part, by a cooperative funding grant from the Southwest Florida Water Management District.

6.1.1 EAGLE STREET STORAGE AND PUMPING STATION

The Eagle Street storage and pumping station, constructed in 2008, is located approximately five (5) miles west of the East Port WRF along the 16-inch reclaimed transmission main. The station is located within a residential neighborhood that is near commercial businesses along the Tamiami Trail. The intent of the location is to minimize high pumping pressures at the reclaimed water source, East Port WRF, and to provide local storage for peak irrigation demands at night when the flows at the East Port WRF are lowest.

The water storage tank is a 0.5 MG, ground level concrete tank. Flow from the East Port WRF fills the tank based on a level sensor in the tank. Reclaimed water can also bypass the tank and the pumps on its way to customers further to the west.

The pumping station contains two pumps: main (125 HP) and jockey pump (60 HP). The main pump has a capacity of 1,440 gpm at 206 feet (90 psi) of head. The jockey pump has be capacity of 577 gpm at 206 feet (90 psi) of head. The intent of the pumps, with variable frequency drives, is to maintain pressure in the system for instantaneous use by customers.

The reclaimed water transmission main continues from the Eagle Street Pumping Station to the Walenda Storage Tank and Pumping Station.

6.1.1.1 Condition Assessment

On December 13, 2016, Stantec staff met with Mr. Jerry Steimle, CCUD reclaimed water coordinator, on the site of the Eagle Street Reclaimed Water Storage and Pumping Station and the Walenda Reclaimed Water Storage and Pumping Station to evaluate the condition of these two facilities. Both facilities were

constructed in 2008 to assist in the distribution of reclaimed wastewater to customers in Central/Western Charlotte County.

The facility was found to be in good condition. All of the pumping station components and its storage tank are located in a fenced area with locked gate. Each building is also locked. The two concrete block buildings were painted and piping was painted purple and marked. The facility includes the ability to add chlorine to the reclaimed water prior to storage and as it enters the distribution system. A check valve allows reclaimed water to bypass the pumps when demand is low. An inline filter is located downstream of the pumps.

Pump operations, flow, and pressure are monitored 24 hours per day by a SCADA telemetry system. The PLC and electrical control center is housed in one air conditioned building. The other building contains the pumps and chlorine chemical feed pumps.

The grounds are maintained under private contract. The grounds had numerous dropped palm fronds and tree branches that should be removed.

6.1.2 WALENDA STORAGE AND PUMPING STATION

The Walenda storage and pumping station, constructed in 2008, is located approximately 4.5 miles northwest of the Eagle Street Pumping Station along the 12-inch reclaimed transmission main. The station is located within a proposed residential/commercial neighborhood known as Murdock Village. The intent of the location is to minimize high pumping pressures at the Eagle Street Pumping Station and to provide local storage for peak irrigation demands at night when the flows at the East Port WRF are lowest.

The water storage tank is a 0.5 MG, ground level concrete tank. Flow from the East Port WRF or the Eagle Street Pumping Station fills the tank based on a level sensor in the tank. Reclaimed water can also bypass the tank and the pumps on its way to customers further to the west across the Myakka River to western Charlotte County.

The pumping station contains two pumps: main (125 hp) and jockey pump (60 hp). The main pump has a capacity of 1,440 gpm at 206 feet (90 psi) of head. The jockey pump has a capacity of 577 gpm at 206 feet (90 psi) of head. The intent of the pumps is to maintain pressure in the system for instantaneous use by customers using variable frequency motor drives.

The reclaimed transmission main continues from the Walenda Storage Tank and Pumping Station to the West Port WRF where local storage in a 20 MG open storage pond is provided. The flow from the Walenda Storage Tank can also be pumped to customers in west Charlotte County. The Rotonda East Reclaimed Water Pumping Station, in the West County, can boost pressures to serve reclaimed water customers in western Charlotte County.

6.1.2.1 Condition Assessment

The facility was found to be in good conditions. All of the pumping station components and its storage tank are located in a fenced area with locked gate. Each building is also locked. The two concrete block

buildings were painted and piping was painted purple and marked. The facility includes the ability to add chlorine to the reclaimed water prior to storage and as it enters the distribution system. Pump operations, flow, and pressure are monitored 24 hours per day by a SCADA telemetry system. The PLC and electrical control center is housed in one air conditioned building. The other building contains the pumps and chlorine chemical feed pumps. The pumps need touch up paint.

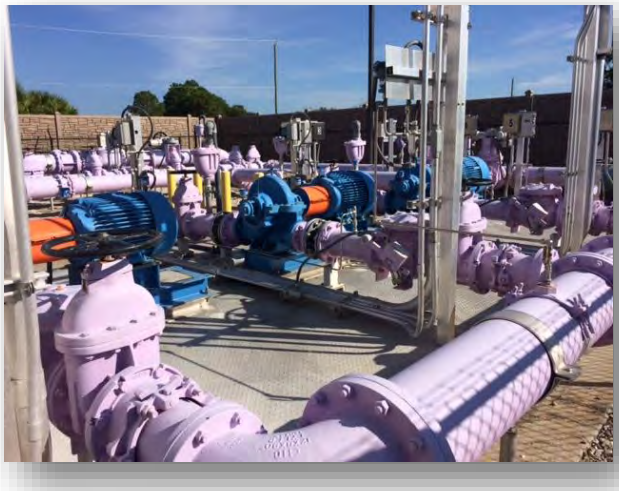
The eye wash/shower was operated to check flow. It is recommended that the eyewash be operated monthly to keep it running at full strength. A flow meter monitors flow through the station. At the time of the inspection, the pumps were not operating and 47 psi of pressure was in the transmission pipes adjacent to the station. The tank level in the storage tank was 16 feet.

The grounds were well cared for. An erosion area was found near the storage tank that appeared to be created by drainage from the roof of the storage tank. Staff will be looking into remediation of the erosion and preventing it happening again.

6.1.3 ROTONDA EAST BOOSTER PUMPING STATION

The Rotonda East Reclaimed Water Pumping Station (RERWPS) increases the beneficial use of reclaimed water that is produced by the East Port, West Port, and Rotonda WRFs. The RERWPS is part of the Phase 2 expansion of the reclaimed water distribution system in the western section of Charlotte County.

The western section of the County is the location of nine 18-hole golf courses and residential/commercial development that has marginal access to good fresh water irrigation sources. Currently, only four (4) golf courses and a few small reclaimed water customers are receiving reclaimed water for irrigation. Service of reclaimed water to the remaining golf courses was limited by the amount of reclaimed water that is produced by the two wastewater treatment plants that are located in western Charlotte County, Rotonda and West Port Water Reclamation Facilities.



Additional public access reclaimed water became available when the final leg of a reclaimed water transmission main from the East Port WRF to the western area of the County was completed in 2014. Charlotte County has increased the capacity of its west County reclaimed water distribution system by increasing the reclaimed water storage volume at the West Port WRF, installing larger transmission mains, extending mains into new service areas, and increasing the pumping capacity of the distribution system. The RERWPS is an integral part of increasing the beneficial use of reclaimed water that is produced in Charlotte County.

The Rotonda East Reclaimed Water Pumping Station is located on Rotonda Boulevard East just west of County Road (CR) 771. This site was chosen by the Charlotte County Utilities Department because it had the most flexibility for future service and the most immediate impact to serve more customers in western Charlotte County. It also immediately increased the capacity to transfer excess reclaimed water from the Rotonda WRF to the West Port storage ponds or deep injection well.

The impacts of the RERWPS on the existing and future reclaimed water distribution system and the capabilities of the RERWPS are as follows:

a. Immediate capability of boosting flows from existing West Port WRF reuse pumps to users.

b. Immediate capability of boosting Walenda Reclaimed Water Pumping Station flows to West County users.

c. Immediate capability of boosting transfer flows from Rotonda WRF to West Port WRF for storage or deep well disposal.

d. Capable of boosting flow from Walenda Pumping Station at the same time that the existing West Port WRF reuse pumps are serving southern CR 771 including Coral Creek Golf Club after the proposed 16-inch reclaimed water main is installed on State Road (SR) 776/CR 771.

e. Allows low flows to bypass the booster pumping station automatically without running the pumps.

6.1.3.1 Condition Assessment

The condition of the REPWPS is excellent. An architectural wall has been placed around the station to shield it from the highways that pass by it.

The station was completed in FY 2014. A major upgrade to the force main leading east from this station was replaced with a larger force main as part of a road widening project in 2015/2016. The result has been a reduction in the pressures experienced by the Rotonda East Booster Pumping Station. The station's PLC must be reprogramed to address the lower line pressures that will reduce the horsepower needed to serve reclaimed water customers in western Charlotte County

6.1.4 REVIEW OF PREVIOUS ANNUAL REPORT RECOMMENDATIONS

Recommendation: Add more large users to the combined reclaimed water system.

Progress: *One new golf course was added as a customer in FY 2016.*

Recommendation: Develop a comprehensive operating protocol for the entire reclaimed water system.

Progress: *Will be developed after Phase 3 is completed.*

Recommendation: Complete the upgrade of the pipe size on CR 771.

Progress: *Completed in late 2016.*

6.1.5 RECOMMENDATIONS

Recommendation: Add more large users to the combined reclaimed water system.

Recommendation: Develop a comprehensive operating protocol for the entire reclaimed water system.

6.2 SOUTH COUNTY SYSTEM

6.2.1 EXISTING PUMPING AND DISTRIBUTION SYSTEM

The South County (Burnt Store) reclaimed water system is designed to provide relatively low pressure reclaimed water to customers that have their own storage ponds and high pressure service pumps to pressurize water for irrigation. The two (2) reclaimed water pumps located at the Burnt Store WRF are constant speed pumps having a capacity of 900 gpm each. The pumps discharge into a three (3)-mile reclaimed water transmission main that was designed to serve the Tern Bay golf course community along Burnt Store Road. The golf course community has never received reclaimed water because the community has not developed as anticipated. Three (3) smaller users do receive reclaimed water at a low pressure. These customers boost the pressure with in-line pumps.

Charlotte County Utilities Department is exploring the possibility of serving another existing golf course with reclaimed water within the Burnt Store Reclaimed Water service area. The golf course is near the treatment plant, but the existing reclaimed water transmission main does not serve this golf course. A new transmission main would be required to serve this golf course.

There is no reclaimed water storage at the Burnt Store WRF and the pumps are not capable of matching demand with flow. The development of new customers would require customer storage in the same manner as was proposed by the original golf course customer.

6.2.2 REVIEW OF PREVIOUS ANNUAL REPORT RECOMMENDATIONS

Recommendation: Study the feasibility of creating reclaimed water storage at the Burnt Store WRF.

Progress: *Part of plant upgrade design.*

Recommendation: Acquire one large reclaimed water customer in the South County service area.

Progress: *Not accomplished, but feasibility ongoing.*

6.2.3 RECOMMENDATIONS

Recommendation: Study the feasibility of creating reclaimed water storage at the Burnt Store WRF.

Recommendation: Acquire one large reclaimed water customer in the South County service area.

7.0 ENGINEERING

The Engineering Division prepares or manages the preparation of engineering reports, studies, and construction designs.

7.1 CAPITAL IMPROVEMENT PROGRAM

The Capital Improvement Program is designed to plan and construct improvements to the Charlotte County Utilities Department water, wastewater, and reclaimed water systems. As the population in Charlotte County continues to grow, it is vital for Charlotte County Utilities Department to provide a plan that can handle projected growth. The following sections describe capital improvement projects in progress or initiated in FY 2016. A project is considered to be a major expenditure when the expenditure is over $100,000.

7.1.1 CAPITAL IMPROVEMENT PROJECTS – WATER SYSTEM

Table 7-1 lists the water system capital improvement projects initiated or in progress during FY 2016. The total FY 2016 budget was $8,208,000 and the total expenditure was $7,591,053. The largest expenditure was the installation of new water meters.

Table 7-1 Capital Improvement Projects in Progress or Initiated in FY 2016 Water System

Description	Funding Source (1)	Original FY 2016 Budget	FY 2016 Expenditures	Percent of Budget Expended
CCU Babcock Water Supply	Conn	$ -	$ -	
CCU Babcock Water Supply	Oper	$ -	$ -	
Meter Fixed Base System	R & R	$ -	$ 5,369,332	
Meter Fixed Base System	Oper	$ 162,000	$ 34,536	21.32%
Meter Fixed Base System	D.P.	$ 6,976,000	$ -	0.00%
New Water Distribution Ext Piping	Conn-Wtr	$ 150,000	$ 348,606	232.40%
New Water Distribution Ext Piping	Oper	$ -	$ -	
Water Distribution Piping	R & R	$ 200,000	$ 259,358	129.68%
Water Distribution Piping	Oper	$ -	$ 136	
Burnt Store Well Field	R & R	$ 300,000	$ -	0.00%
Burnt Store Well Field	Conn-Wtr	$ -	$ -	
Burnt Store Well Field	Oper	$ -	$ 197,890	
Hillsborough/Chancellor Portable Wtr Mn	Conn-Wtr	$ 300,000	$ 15,695	5.23%
Ingraham Potable Water	D.P,	$ -	$ 149,287	

Table 7-1 Capital Improvement Projects in Progress or Initiated in FY 2016 Water System				
Description	Funding Source (1)	Original FY 2016 Budget	FY 2016 Expenditures	Percent of Budget Expended
Ingraham Potable Water		$ -	$ -	
Punta Gorda, Burnt Store WTP and Babcock Wellfield	Grant	$ -	$ -	
Punta Gorda, Burnt Store WTP and Babcock Wellfield	D.P.	$ -	$ -	
2-5Million Gallon Potable Water Storage Tanks	Grant	$ -	$ -	
2-5Million Gallon Potable Water Storage Tanks	D.P.	$ -	$ -	
Booster Station R&R	R & R	$ -	$ -	
Major Water Transmission Lines	Conn-Wtr	$ -	$ 55,462	
Major Water Transmission Lines	R & R	$ -	$ 122,693	
Utility Installations for US 41 Widening	Oper	$ -	$ 41,517	
Utility Installations for US 41 Widening	R & R	$ -	$ 109,431	
Equipment Replacement/Utilities (FY16)		$ -	$ 394,661	
Charlotte Harbor Water Quality Initiative Phase 2		$ -	$ 318,702	
Water & Sewer Waterway Crossings	R & R	$ 120,000	$ 115,478	96.23%
Water & Sewer Waterway Crossings	Conn-Wtr	$ -	$ 58,269	
Totals		**$ 8,208,000**	**$ 7,591,053**	

[1]Funding sources: R & R = Renewal & Replacement Fund, S.T. = Sales Tax, Conn-Wtr = Water Connection Fee Fund, Oper = O & M Fund

7.1.2 CAPITAL IMPROVEMENT PROJECTS – WASTEWATER SYSTEM

Table 7-2 lists the wastewater system capital improvement projects initiated or in progress during FY 2014. There were numerous major expenditures, including relining wastewater collection systems, wastewater force mains, and wastewater lift stations. The total amended wastewater budget allotted for FY 2016 was $15,325,000 and the total amount spent was $ 23,558,685.

Table 7-2 Capital Improvement Projects in Progress or Initiated in FY 2016 Wastewater System				
Description	Funding Source (1)	Original FY 2016 Budget	2016 Expenditures	Percent of Budget Expended
East Port Expansion Water Reclaim Facility	Conn-Swr	$ -	$ 275,638	

Table 7-2 Capital Improvement Projects in Progress or Initiated in FY 2016 Wastewater System				
Description	Funding Source [1]	Original FY 2016 Budget	2016 Expenditures	Percent of Budget Expended
East Port Expansion Water Reclaim Facility	R & R	$ 1,210,000	$ 502,300	41.51%
Burnt Store - WW Treatment Plant	Conn-Swr	$ -	$ 844	
Burnt Store - WW Treatment Plant	D.P.	$ 3,220,000	$ -	0.00%
Burnt Store - WW Treatment Plant	Sinking	$ 56,000	$ -	0.00%
Wastewater Force Mains	Conn-Swr	$ -	$ -	
Wastewater Force Mains	Oper	$ -	$ -	
Wastewater Lift Stations	R & R	$ 600,000	$ 612,779	102.13%
Wastewater Lift Stations	Other	$ -	$ -	
Spring Lake MSBU WW Expansion	Oper	$ -	$ 362,950	
Spring Lake MSBU WW Expansion	Other	$ -	$ -	
Spring Lake MSBU WW Expansion	SRF	$ 1,477,000	$ -	0.00%
Spring Lake MSBU WW Expansion	MSBU	$ 888,000	$ 6,329,790	712.81%
Burnt Store Colony	Conn-Swr	$ -	$ -	
Wastewater Collection Infrastructure	Conn-Swr	$ 170,000	$ 148,629	87.43%
Wastewater Collection Infrastructure	Oper	$ -	$ -	
Wastewater Force Main Replacements	R & R	$ 860,000	$ 980,781	114.04%
Wastewater Force Main Replacements	Conn-Swr	$ -	$ 87,857	
Master Lift Stations	Conn-Swr	$ 500,000	$ 38,257	7.65%
Master Lift Stations	R & R	$ 500,000	$ -	0.00%
Master Lift Stations	D.P.	$ 700,000	$ -	0.00%
Rotonda WRF Ph2		$ -	$ -	
Northshore Wastewater Expansion	Grants	$ -	$ -	
Northshore Wastewater Expansion	Oper	$ (-)5,000	$ 31,772	(-)635.44%
Northshore Wastewater Expansion	MSBU	$ 6,000	$ 191,433	3190.55%
Northshore Wastewater Expansion	Dev	$ -	$ -	

Table 7-2 Capital Improvement Projects in Progress or Initiated in FY 2016 Wastewater System				
Description	Funding Source (1)	Original FY 2016 Budget	2016 Expenditures	Percent of Budget Expended
West Port WRF Monitoring Well	R & R	$ -		
Burnt Store Phase 3	D.P.	$ -	$ 195,158	
Burnt Store Phase 3	Oper	$ 134,000	$ -	0.00%
Grand Master LS - Loveland Blvd	Conn-SWR	$ -	$ 580,148	
Grand Master LS - Loveland Blvd	D.P.	$ -	$ 1,308	
Grand Master LS - Loveland Blvd	Sinking	$ 206,000	$ -	0.00%
Veterans Force Main		$ -	$ -	
Veterans Force Main		$ -	$ -	
Myakka River Crossings - Gulf Cove	Oper	$ 51,000	$ -	0.00%
Myakka River Crossings - Gulf Cove	D.P.	$ 1,472,000	$ -	0.00%
Myakka River Crossings - River to SR776	D.P.	$ 1,093,000	$ 78,322	7.17%
Myakka River Crossings - River to SR776	Sinking	$ 19,000	$ -	0.00%
Parkside Harbor North	Oper	$ -	$ -	
Parkside Harbor North	D.P.	$ -	$ -	
Burnt Store Phase 2	Conn-SWR	$ -	$ 28,305	
Burnt Store Phase 2	R & R.	$ -	$ 190,695	
Burnt Store Phase 2	Conn-Wtr	$ -	$ 32,565	
Repair, Replace, Reline Wastewater Coll. Sys.	R & R	$ 1,260,000	$ -	0.00%
West Port Water Reclamation Facility	Conn-Swr	$ -	$ -	
West Port Water Reclamation Facility	R & R	$ -	$ (-)93	
Water Transmission/Wastewater Collection Reim	Conn-Swr	$ 22,000	$ 58,832	267.42%
CCU Business Services customer Software	Oper	$ -	$ 414,863	
CCU/PW Midway-Elmira Sewer FM-Water Main	Sinking	$ 243,000	$ -	0.00%
CCU/PW Midway-Elmira Sewer FM-Water Main	Bond	$ -	$ -	
CCU/PW Midway-Elmira Sewer FM-Water Main	D.P.	$ -	$ 4,447,044	

Table 7-2 Capital Improvement Projects in Progress or Initiated in FY 2016 Wastewater System				
Description	Funding Source [1]	Original FY 2016 Budget	2016 Expenditures	Percent of Budget Expended
09-0011 - Sewer - Edgewater Phase 2	D.P.	$ -	$ 2,063,765	
09-0011 - Sewer - Edgewater Phase 2	Oper	$ 110,000	$ -	0.00%
Equipment Replacement		$ -	$ -	
Gasparilla Rd/CR 771-Wtr Main, WWFM, Reclaim	Sinking	$ 231,000	$ -	0.00%
Gasparilla Rd/CR 771-Wtr Main, WWFM, Reclaim	Bond	$ -	$ -	
Gasparilla Rd/CR 771-Wtr Main, WWFM, Reclaim	Conn-Wtr	$ -	$ -	
Gasparilla Rd/CR 771-Wtr Main, WWFM, Reclaim	Conn-Swr	$ -	$ -	
Gasparilla Rd/CR 771-Wtr Main, WWFM, Reclaim	D.P.	$ -	$ 677,684	
Parkside Harbor - US41 To Olean	Sinking	$ 51,000	$ -	0.00%
Parkside Harbor - US41 To Olean	D.P.	$ -	$ 4,492	
Parkside Elkcam Blvd - US41 to Midway	Oper	$ 104,000	$ -	0.00%
Parkside Elkcam Blvd - US41 to Midway	D.P.	$ -	$ 194,232	
Parkside Gertruce Ave and Aaron St Imp	Sinking	$ 81,000	$ -	0.00%
Parkside Gertruce Ave and Aaron St Imp	D.P.	$ -	$ 16,208	
Parkside Amborse Lane-West Tarpon	R & R	$ -	$ -	
Parkside Amborse Lane-West Tarpon	Conn-Wtr	$ -	$ -	
Parkside Amborse Lane-West Tarpon	Sinking	$ 66,000	$ -	0.00%
Parkside Amborse Lane-West Tarpon	D.P.	$ -	$ 1,582,110	
Central County Infrastructure	Conn-Swr	$ -	$ 2,389,079	
Central County Infrastructure	Oper	$ -	$ 32,281	
Central County Infrastructure	R & R	$ -	$ 1,008,471	
TOTALS		**$ 15,325,000**	**$ 23,558,685**	

[1]Funding sources: R&R = Renewal & Replacement Fund; Conn-Wtr = Water Connection Fee Fund; Oper = O & M Fund; SRF = State Revolving Fund; MSBU = Municipal Service Benefit Unit; S.T. = Sales Tax; Grant = Grant Funding; Bond = Bond Funding; Conn-Swr = Sewer Connection Fee Fund

7.1.3 CAPITAL IMPROVEMENT PROGRAM – RECLAIMED WATER SYSTEM

Table 7-3 lists the reclaimed water system capital improvement projects initiated or in progress during FY 2016. The total amount budgeted for FY 2016 was $3,950,000 and only $184,597 was expended. Major projects included in the Phase 3 reclaimed water expansion were not started in FY 2016.

Table 7-3 Capital Improvement Projects in Progress or Initiated in FY 2016 Reclaimed Water System

Description	Funding Source	Original FY 2016 Budget	2016 Expenditures	Percent of Budget Expended
Reclaimed Water Main 12 Inch East Port WRF	Conn-Swr	$ -	$ -	0.00%
Reclaimed Water Service Connection	C.P.F	$ 220,000	$ (-)63	0.00%
Reclaimed Water Expansion Phase 3	Conn-Swr	$ -	$ 59,063	0.00%
Reclaimed Water Expansion Phase 3	R & R	$ 1,865,000	$ -	0.00%
Reclaimed Water Expansion Phase 3	Grant	$ 1,865,000	$ -	0.00%
09-0011 - Reclaim - Edgewater Phase 2	D.P.	$ -	$ -	0.00%
US 41 Reclaimed Water lines	Sales tax	$ -	$ -	0.00%
US 41 Reclaimed Water lines	Conn-Wtr	$ -	$ -	0.00%
US 41 Reclaimed Water lines	Conn-Swr	$ -	$ 125,597	0.00%
US 41 Reclaimed Water lines	R & R	$ -	$ -	0.00%
Totals		**$ 3,950,000**	**$ 184,597**	

7.1.4 CAPITAL IMPROVEMENT PROGRAM – FIVE YEAR PLAN

Part of Charlotte County Utilities Department's plan to accommodate the growth taking place in Charlotte County is to develop and maintain a five-year Capital Improvement Program. Table 7-4 outlines a summary of projects which Charlotte County Utilities Department is planning to implement for the water and wastewater systems over the next five years.

Table 7-4 Capital Improvement Program 2016 Water and Sewer Project Costs (in thousands)

Project Names	Prior Yr Actual	Actual 16	FY 17	FY 18	FY 19	FY 20	FY 21	FY 22	Future Years	Total
Babcock Water Supply	$ 923	$ -							$ 46,860	$ 47,783
Meter Fixed Base System	$ 1,564	$ 5,403,868	$ 2,689	$144	$124	$206	$ 150	$ 145	$ 2,677	$ 5,411,567
Water Distribution Pipe Replacement	$ 367	$ 348,606	$ 100	$ 250	$ 250	$250	$ 250	$ 250	$ 1,250	$ 351,573

Table 7-4 Capital Improvement Program 2016 Water and Sewer Project Costs (in thousands)										
Project Names	Prior Yr Actual	Actual 16	FY 17	FY 18	FY 19	FY 20	FY 21	FY 22	Future Years	Total
Water Distribution Piping Line Extension	$ 202	$ 259,494	$ 500	$ 500	$ 500	$500	$ 500	$ 500	$ 500	$ 263,196
Burnt Store Well Field	$ -	$ 197,890	$ -	$ -	$ -	$ -	$ -	$ -	$ 1,380	$ 199,270
Hillsborough/Chancellor Portable Water Main	$ -	$ 15,695	$ 230	$ 230	$ 230	$ 230	$ 230	$ 230	$ 1,330	$ 18,405
Ingraham Potable Water	$ -	$ 149,287	$ 3,600	$ 145	$ 139	$ 133	$ 127	$ 121	$ 991	$ 154,543
PG WTP-BS-WTP and Babcock Wellfield Interconnect	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 22,500	$ 22,500
2-5 Million Gallon Potable Water Storage Tanks	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 23,000	$ 23,000
Booster Station Rehab	$ -	$ -	$ 242	$ 194	$ 500	$ 500	$ 300	$ -	$ -	$ 1,736
Major Water Transmission Lines	$ 6,620	$ 178,155	$ 413	$ 225	$ 225	$ 225	$ 225	$ 225	$ 2,400	$ 188,713
East Port Expansion Water Reclamation Facility	$ 15,849	$ 777,938	$ 698	$ -	$ -	$ -	$ -	$ -	$ 31,242	$ 825,727
Burnt Store Water Reclamation Facility	$ 4,263	$ 844	$ 111	$ 109	$ 106	$ -	$ -	$ -	$ 26,000	$ 31,433
Wastewater Force Mains	$ 3,527	$ -	$ 440	$ 1,300	$ 800	$ 400	$ 400	$ 400	$ 2,300	$ 9,567
Wastewater Lift Stations Replacement/Restoration	$ 7,203	$ 612,779	$ 600	$ 600	$ 600	$ 600	$ 600	$ -	$ -	$ 622,982
Reclaimed Water Lines	$ 16	$ 125,597	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 125,613
East & West Spring Lake WW MSBU	$ 1,988	$ 6,692,740	$ 320	$ 308	$ 296	$ 284	$ 271	$ 258	$ 2,216	$ 6,698,681
Reclaimed Water Expansion Phase 2	$ 3,857	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 3,857
Reclaimed Water Main 12 Inch East Port WRF to Harborview Rd	$ -	$ -	$ -	$ -		$ -	$ -	$ -	$ 222	$ 222
Wastewater Collections Infrastructure	$ 558	$ 148,629	$ 170	$ 170	$ 170	$ 170	$ 170	$ -	$ 170	$ 150,207
Wastewater Force Mains Replacement	$ 800	$ 1,068,638	$ 435	$ 435	$ 435	$ 435	$ 435	$ 435	$ 435	$ 1,072,483
Master Lift Stations	$ 19	$ 38,257	$ 1,000	$ 800	$ 2,000	$ 750	$ 750	$ 750	$ 5,300	$ 49,626
Rotonda Water Reclamation Facility Phase II Expansion	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 4,000	$ 4,000
Northshore Wastewater Exp MSBU	$ 141	$ 223,205	$ 1	$ 1	$ 1	$ 1	$ 1	$ 1	$ 1	$ 223,353
Reclaimed Water Service Connections	$ -	$ (63)	$ 400	$ 200	$ 200	$ 200	$ 200	$ 200	$ -	$ 1,337
West Port WRF Monitoring Well Rehab/Replacement	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 481	$ 481
Burnt Store Phase 3	$ 873	$ 195,158	$ 129	$ 124	$ 119	$ 114	$ 108	$ 102	$ 777	$ 197,504
Reclaim Water Expansion Phase 3	$ 3,020	$ 59,063	$ 4,132	$ 624	$ -		$ -	$ -	$ -	$ 66,839
Grand Master Lift Station Loveland	$ -	$ 581,456	$ 241	$ 233	$ 224	$ 214	$ 205	$ 195	$ 1,592	$ 584,360
Veterans Wastewater Force Main	$ -	$ -	$ 4,055	$ 104	$ 135	$ 130	$ 124	$ 119	$ 1,042	$ 5,709
Myakka River Crossings - Gulf Cove To River	$ -	$ -	$ 1,589	$ 109	$ 105	$ 101	$ 96	$ 91	$ 747	$ 2,838
Myakka River Crossings - River to SR 776	$ -	$ 78,322	$ 45	$ 43	$ 42	$ 40	$ 38	$ 36	$ 297	$ 78,863
Burnt Store Phase 2	$ -	$ 251,565	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 251,565
Repair, Replace, Reline Wastewater Collection Sys	$ 9,574	$ -	$ 1,260	$ 350	$ 350	$ 300	$ 300	$ 300	$ 910	$ 13,344

Table 7-4 Capital Improvement Program 2016 Water and Sewer Project Costs (in thousands)										
Project Names	Prior Yr Actual	Actual 16	FY 17	FY 18	FY 19	FY 20	FY 21	FY 22	Future Years	Total
West Port Water Reclamation Facility	$ 12,402	$ 93	$ -	$ -		$ -	$ -	$ -	$ 22,000	$ 34,495
Water Transmission/Wastewater Collection Reimb.	$ 129	$ 58,832	$ 21	$ 21	$ -	$ -	$ -	$ -	$ -	$ 59,003
Utility Installations for US 41 Widening Project	$ 6,956	$ 150,948	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 157,904
CCU Business Services Customer Billing and Database	$ 288	$ 414,863	$ 600	$ -	$ -	$ -	$ -	$ -	$ 600	$ 416,351
Midway Phase 3	$ 5	$ 4,447,044	$ 298	$ 287	$ 276	$ 265	$ 253	$ 241	$ 1,966	$ 4,450,635
Edgewater Phase 2	$ 2	$ 2,063,765	$ 213	$ 205	$ 198	$ 189	$ 181	$ 172	$ 1,407	$ 2,066,332
Gasparilla Rd/CR 771-Wtr Main, WWFM, Reclaim	$ 1,040	$ 677,684	$ 296	$ 286	$ 275	$ 264	$ 252	$ 239	$ 1,956	$ 682,292
Parkside Harbor South	$ 5	$ 4,492	$ 60	$ 57	$ 55	$ 53	$ 51	$ 51	$ 393	$ 5,217
Parkside Elkcam	$ 226	$ 194,232	$ 132	$ 128	$ 123	$ 118	$ 113	$ 107	$ 875	$ 196,054
Parkside Gertrude and Aaron Street Improvements	$ -	$ 16,208	$ 99	$ 496	$ 92	$ 88	$ 84	$ 80	$ 654	$ 17,801
Parkside Ambrose olane-West Tarpon	$ -	$ 1,582,110	$ 60	$ 58	$ 56	$ 53	$ 51	$ 48	$ 395	$ 1,582,831
Central County Infrastructure	$ -	$ 3,429,831	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 3,429,831
Equipment Replacement/Utilities (FY16)	$ -	$ 394,661	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 394,661
Charlotte Harbor Water Quality Initiative Phase 2	$ -	$ 318,702	$ 3,300	$ 1,553	$ -	$ -	$ -	$ -	$ 79,050	$ 402,605
West County Utilities Staging Area	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 3,019	$ 3,019
Equipment Replacement/Utilities (FY17)	$ -	$ -	$ 503	$ -	$ -	$ -	$ -	$ -	$ -	$ 503
Water & Sewer Waterway Crossings	$ 3,667	$ 173,747	$ 120	$ 120	$ 120	$ 120	$ 250	$ 250	$ 750	$ 179,144
Total	$86,084	$31,334,335	$29,102	$10,409	$8,746	$6,933	$6,715	$5,546	$293,685	$31,781,555

7.2 REVIEW OF DESIGNS, REPORTS, AND STUDIES

The following section describes the reports and studies prepared by the Charlotte County Utilities Department engineering section or submitted by external engineering consultants in FY 2016. The information below is a synopsis of the reports.

7.2.1 SWFWMD PUBLIC SUPPLY REPORT FOR PEACE RIVER/MANASOTA REGIONAL SUPPLY AND BURNT STORE SUPPLY

In March 2016, Stantec submitted the Burnt Store Public Supply Annual Report and the Peace River/Manasota Regional Public Supply Annual Report. The report includes the adjusted gross per capita daily water use calculation with supporting documentation.

7.2.2 ANNUAL BURNT STORE WELLFIELD REPORT

In March 2016, RMA GeoLogic submitted the Annual Burnt Store Wellfield Report. The purpose of this report is to prepare a comprehensive but concise annual report on the wellfield operation and assess the hydrological and ecological system of the wellfield site. The report summarizes water use, water levels, water quality, chloride concentration trigger levels, and an environmental evaluation for the wellfield.

7.2.3 QUARTERLY OPERATIONS REPORTS

For Water Year 2016, quarterly updates of all compliance items and upcoming regulatory requirements for all permitted facilities were submitted. The quarterly update is based on discharge monitoring reports (DMRs) and flow information provided to Stantec on a monthly basis. The quarterly report also highlights upcoming permit requirements and includes a completion schedule for required permit tasks.

7.2.4 FACILITY AUDIT REPORT UPDATE

An audit report, dated May 2016 was performed for all seven (7) Charlotte County Utilities Department facilities by Stantec. The purpose of the annual facility audit update is to review facilities' status and identify items that may be addressed in the FDEP annual inspection.

7.2.5 CAPACITY ANALYSIS REPORT

A capacity analysis letter report was prepared for the Burnt Store WRF and submitted to the FDEP in October 2015. The report compares daily wastewater flows for the preceding year to the design capacity of the plant. It also shows the effluent quality that had been produced during the same time period.

7.2.6 CHARLOTTE COUNTY UTILITIES DEPARTMENT 2015 ANNUAL REPORT

The FY 2015 Annual Report was prepared and submitted for public access on April 1, 2016.

7.2.7 LOVELAND GRAND MASTER L.S. AND INTERCEPTOR REPORT

A planning document for SRF Funding that evaluated alternatives, costs, and provided a recommendation of the preferred alternative. The report was prepared by Johnson Engineering and submitted on May 10, 2016.

7.2.8 EAST AND WEST SPRING LAKES TASK 2 REPORT

This report prepared by Tetra Tech and Johnson Engineering developed quality assurance project plans for/to prepare a water quality analysis report for the groundwater, surface water, and stormwater quality in the East and West Spring Lakes project area. Submitted December 22, 2015 (revised February 9, 2016).

7.2.9 DEEP CREEK PHASE 2 FORCE MAIN SIZE AND ROUTE REPORT

This report was prepared by Jones Edmunds in November 2016 to evaluate the force main size and route for a new wastewater force main between Lift Station No. 321 and Rampart Boulevard.

7.2.10 AREA 1 PRELIMINARY REPORT

The planning documents for SRF Funding evaluates alternatives to provide sewers to areas within the service boundary based upon different geographical features. The report, that included a cost analysis, was prepared by Giffels-Webster Engineers, Inc dated April 25, 2016.

8.0 CONSOLIDATED RECOMMENDATIONS

8.1 PLANNING RECOMMENDATIONS

8.1.1 ADMINISTRATION

Recommendation: Continue Charlotte County Utilities Department's vision to ensure safe, reliable utility service at fair and reasonable rates.

Recommendation: Continue developing and updating standards for water and sewer construction to ensure the most effective use of capital improvement funds.

Recommendation: Continue the development of options for water, sewer, and reclaimed water service in the County to meet a growing demand for municipal utility services.

Recommendation: Continue with the development of the Utilities' Information System functions to update/replace software and computer equipment to increase operating efficiencies and cost savings.

Recommendation: Continue to explore regional solutions to water and wastewater service problems for mutual benefit to Charlotte County and adjoining counties and cities.

8.1.2 WATER SYSTEM

Recommendation: Continue to update the water system computer model and use it as a planning tool for future water system improvements.

Recommendation: Continue the fixed base Water Meter Replacement Program.

Recommendation: Continue the extension of the new 24-inch transmission main from the Myakka River Bridge to the Rotonda storage tank to serve the growing demand for water in western Charlotte County.

Recommendation: Continue to integrate acquired utilities into the overall Charlotte County Utilities Department water system to maximize reliability and reduce costs to the Charlotte County Utilities Department customers.

Recommendation: Explore ways to augment the demands on the PRMRWSA treatment facility through economically feasible means including new water sources.

Recommendation: Continue to make improvements at the Rotonda Water Storage Tank/Booster Pumping Station Facilities to increase control of the pumps.

Recommendation: Plan for future water demands in the Burnt Store Area by analyzing the water distribution system using the computer water model completed in 2004, and most recently updated in 2014.

Recommendation: Complete the Burnt Store Brackish Wellfield Report.

8.1.3 WASTEWATER SYSTEM

Recommendation: Implement improvements and capacity upgrades for the BS WRF as outlined in the Capacity Analysis Report (CAR).

Recommendation: Continue the scheduled repair of sanitary lift stations that have deteriorated due to use and hydrogen sulfide presence.

Recommendation: Use the wastewater lift station and force main computer model to assess the need for upgrades to the system based on anticipated demand for services.

Recommendation: Continue to televise gravity sewers to locate inflow/infiltration (I/I). Repair gravity sewers and manholes as required.

Recommendation: Continue to provide for the disposal of septage at the East Port WRF.

Recommendation: Seek ways to increase the use of public access reuse water currently produced by Charlotte County Utilities Department water reclamation facilities.

Recommendation: Explore ways to increase access to the wastewater system.

Recommendation: Install odor control systems at lift stations where hydrogen sulfide concentrations cause odors and deterioration of structures.

Recommendation: Continue to upgrade and expand the East Port WRF to meet flow.

Recommendation: Expand public access reuse for the Burnt Store WRF reclaimed water.

Recommendation: Continue construction and plan for the next phases of sewer expansion in the Port Charlotte area.

8.1.4 RECLAIMED WATER DISTRIBUTION SYSTEM

Recommendation: Continue construction of Phase 3 of the reclaimed expansion project that was begun in FY2016 with the construction of a transmission main from the West Port WRF to the Rotonda East Reclaimed Booster Pumping Station.

Recommendation: Complete the design and construction of a future Phase 3 expansion project that includes conversion of a 95 million gallon reject storage pond at the East Port WRF to reclaimed storage and increased pumping capacity at the East Port WRF.

Recommendation: Complete preparation of a Master Reclaimed Water Permit for the south county reclaimed water system.

Recommendation: Prepare a hydraulic model to predict the impact of future demand on the South County reclaimed water transmission system.

Recommendation: Determining the feasibility of creating reclaimed water storage at the Burnt Store WRF.

8.1.5 EAST PORT LABORATORY

Recommendation: Continue to expand the use of the LIM System within its capabilities.

Recommendation: Seek certification for analysis methods using the new Gallery instrument that was delivered in November 2016.

8.2 CAPITAL IMPROVEMENTS

The following capital improvements are recommended for FY 2017 and beyond.

8.2.1 WATER DISTRIBUTION SYSTEM SERVED BY PRMRWSA

Recommendation: Continue the ongoing program to replace existing water meters with meters that can be automatically read.

Recommendation: Design and construct transmission main improvements to increase capacity across the Myakka River.

Recommendation: Continue to upgrade the Gulf Cove Booster Pumping Station by:

- Further progress on the replacement project for the Myakka River Pipe crossing that supplies water to the Gulf Cove Booster Pumping Station.

Recommendation: Continue to upgrade the Rotonda Booster Pumping Station by:

- Demolition of the old water treatment plant.
- Installing protective roofs over exposed outside equipment.

8.2.2 WATER DISTRIBUTION SYSTEM SERVED BY BURNT STORE WTP

Recommendation: Continue to replace old “class” PVC pipe in the distribution system with new C-900 PVC pipe.

Recommendation: Continue development of a computerized hydraulic model for the South County distribution system.

Recommendation: Complete the Brackish Wellfield Analysis Report.

8.2.3 WASTEWATER COLLECTION SYSTEM

Recommendation: Continue the scheduled rehabilitation of sanitary lift stations that have deteriorated due to use and hydrogen sulfide presence, including having engineering consultants conduct evaluations and perform the designs.

Recommendation: Continue to search for sewer Infiltration/Inflow sources and repair gravity sewers and manholes as required.

Recommendation: Install odor control systems at lift stations where hydrogen sulfide concentrations cause odors and deterioration of structures.

Recommendation: Continue acquisition of stand-by generators and pumps to maintain service during power outages when budget allows.

Recommendation: In addition to having lift station rehabilitations performed by engineering consultants, continue the in-house program of performing all engineering and construction necessary for the rehabilitation of at least one lift station annually.

Recommendation: Continue to repair and upgrade existing lift stations as required. Perform the following maintenance activities at the specific lift stations that were reviewed in the preparation of the 2015 Annual Report and previously not completed as follows:

1. Quesada Master Lift Station
    - Replace the metal entrance doors on the control building (1 year)
    - Install a second wet well to allow maintenance of the existing wet well (5 years)
2. Lift Station No. 309 – Bridgewater
    - Add on-site generator and automatic transfer switch (5 years)
3. Lift Station No. 864– Coliseum
    - Analyze VFD use to determine if long term cost savings due to system efficiencies at both the lift station and at the West Port WRF can be recovered (2 years)
4. Lift Station No. 2 – Dalton

- Remove building and convert station to submersible pumps with above-ground valves (1 year)

5. Lift Station No. 884 – Oldsmar
    - Replace ductile iron 90 degree fitting inside wet well (5 years)
    - Add VFD drives to reduce peaks at the West Port WRF (5 years)
6. Lift Station No. 817 – "Z"
    - Replace station entirely (2 years)
7. Lift Station No. 65 – South Port
    - Fence around station (1 year)
    - Touch-up paint
    - Repair flow meter, connect to telemetry (2 years)
8. Lift Station No. 301 – San Mateo
    - Consider replacement (5 years)
    - Add telemetry (2 years)
9. Lift Station No. 7 – Pure Oil
    - Replace with standard submersible pump station (5 years)

8.2.4 EAST PORT LABORATORY

No capital improvements are recommended.

8.2.5 EAST PORT WRF

Recommendation: Make modifications to the effluent storage ponds to allow one (1) pond to serve as a reclaimed water storage pond and the other pond to serve as storage for on-site spray irrigation flow or effluent to be disposed of in the plant's deep injection wells.

Recommendation: Add transfer pumping capabilities to transfer stored reclaimed water to the reclaimed high pressure service pumps.

Recommendation: Add additional stand-by power that is necessary to operate all of the critical treatment components at the plant.

Recommendation: Evaluate the structural integrity of the digester walkways and its ability to serve as an influent equalization tank.

Recommendation: Replace the chemical feed and effluent analyzer shed building as part of the plant upgrade.

Recommendation: Replace septage receiving pre-treatment units when repair is no longer cost effective.

Recommendation: Add ladders to the chlorine contact tanks and filters.

Recommendation: Add shoulder fill on plant entrance road.

8.2.6 WEST PORT WRF

Recommendation: Paint the steel supports for the walkway over the aeration tank effluent splitter box.

Recommendation: All four (4) clarifiers are showing signs of rust and suspect structural problems below the water line. Proceed with the scheduled repair and painting of all the clarifiers. Include leveling of clarifier overflow weirs in the work to be accomplished.

Recommendation: Replace fabric on Filter No. 3 with 5 micron filter fabric when replacement cloth is warranted.

Recommendation: Install new chlorine chemical feed pumps and put a second chlorine contact tank into service during periods of high flow.

8.2.7 ROTONDA WRF

Recommendation: Paint tanks and buildings in the next two years.

Recommendation: Replace reclaimed transmission pipe to the Cape Haze Golf Course.

8.2.8 BURNT STORE WRF

Recommendation: Proceed with plant improvements/replacement as per FDEP operations permit.

Recommendation: Install a mechanical screen (highest priority) and grit removal system (secondary priority) in the headworks.

Recommendation: Install EQ tank level monitoring to adjust the transfer pump(s) flow rates as part of the plant upgrade.

Recommendation: Replace aeration tank hinged sluice gates to provide adequate prevention of flow entering the adjacent tank during maintenance as part of a plant upgrade.

Recommendation: Scum removal from the treatment system is not being accomplished. It is recommended that collected scum be sent directly to the digester for final disposal. The accumulation of scum and floatables in the aeration tanks and clarifiers will not be eliminated until fine, mechanical screens are added to the headworks.

Recommendation: Install a reuse meter on the discharge line from the reclaimed water pumps before the addition of a large reuse customer.

Recommendation: Installation of a pumping system that will pump effluent to the deep injection well pumping station or increase the capacity of the gravity pipe. This will maximize the capacity of the deep injection well's system when necessary.

Recommendation: Allow flow to the deep wells to be monitored in the wastewater operations room.

Recommendation: Replace the fiberglass MCC building with a concrete structure when the plant is upgraded.

8.2.9 BURNT STORE RO WATER TREATMENT PLANT

Recommendation: Complete the installation of a second jockey pump and separate operating system as stand-by in case the primary operating system malfunctions.

Recommendation: Determine the ultimate use of Well # 15.

Recommendation: Continue the Brackish Wellfield Study to determine alternative raw water well locations and transmission requirements for an expanding service area.

8.2.10 CENTRAL/WEST COUNTY REUSE SYSTEM

Recommendation: Add more large users to the combined reclaimed water system

Recommendation: Develop a comprehensive operating protocol for the entire reclaimed water system.

8.2.11 SOUTH COUNTY REUSE SYSTEM

Recommendation: Study the feasibility of creating reclaimed water storage at the Burnt Store WRF.

Recommendation: Acquire one large reclaimed water customer in the South County service area.

8.3 OPERATIONS AND MAINTENANCE

The following operation and maintenance items are recommended for FY 2017 and beyond.

8.3.1 WATER DISTRIBUTION SYSTEM SERVED BY PRMRWSA

Recommendation: Continue to maintain the Rotonda Pumping Station by:

- Painting the exterior of the storage tank
- Installing monochlorine and ammonia analyzer
- Removing old water plant components

Recommendation: Continue to maintain the Walenda Booster Pumping Station by installing a new chemical static mixer and flow meter assembly in the station discharge pipe.

8.3.2 WATER DISTRIBUTION SYSTEM SERVED BY BURNT STORE WTP

Recommendation: Continue to look for sources of unaccounted-for water loss in the Burnt Store distribution system.

8.3.3 WASTEWATER COLLECTION SYSTEM

Recommendation: Continue to use the wastewater lift station and force main computer model to assess the need for upgrades to the system based on anticipated demand for services.

Recommendation: Continue to televise gravity sewers to locate I/I and repair gravity sewers and manholes as required.

Recommendation: Continue to repair and upgrade existing lift stations as required.

8.3.4 EAST PORT WRF

Recommendation: Paint reclaimed water lines throughout the plant and install placards warning of reuse water.

8.3.5 WEST PORT WRF

Recommendation: Replace fabric on Filter No. 3 with 5 micron filter fabric when replacement cloth is warranted.

Recommendation: Determine the source of flow spikes to the plant and explore means to reduce the flow peaks.

8.3.6 ROTONDA WRF

Recommendation: Monitor the condition of the headworks screens regularly to detect wear problem as early as possible.

8.3.7 BURNT STORE WRF

Recommendation: Remove rust from the top rim of the equalization tank and repaint.

Recommendation: Remove grit from the bottom of the equalization tank.

Recommendation: Remove rust from the outer rim of the aeration basins and repaint flaking areas at welds.

Recommendation: Complete the installation of two (2) additional cloth discs into the existing disc filter to increase capacity of the filter as part of the upgrade to 0.750 mgd capacity.

Recommendation: Paint deep well injection pumps.

8.3.8 BURNT STORE RO WATER TREATMENT PLANT

Recommendation: Staff should continue to inspect and tighten the connections for the anti-scalant, sodium hydroxide, sodium hypochlorite, and sulfuric acid pipes on a daily basis to prevent leakage.

Recommendation: Clean RO trains A and B, when necessary, based on RO train efficiency and water quality.

8.3.9 RECLAIMED WATER SYSTEM

Recommendation: Add large users to the Central/West and South County systems.

Recommendation: Develop a comprehensive operating protocol for the entire reclaimed water system.

Recommendation: Study the feasibility of creating reclaimed water storage at the Burnt Store WRF.