Charlotte County Utilities Department

2017 Annual Report
April 2018

Prepared by

JonesEdmunds

2017 ANNUAL REPORT

Prepared for:

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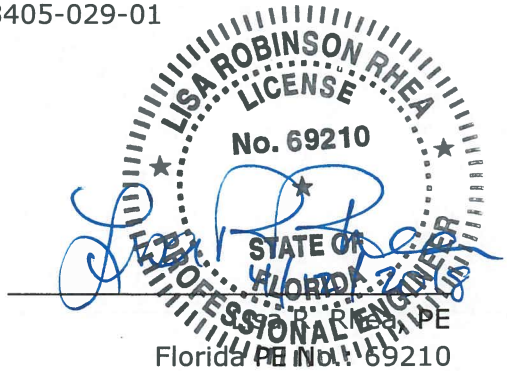

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SIGN-OFF SHEET

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ABBREVIATIONS AND ACRONYMS

Abbreviation	Definition
AC	Asbestos Cement
AAD	Annual Average Day
AADF	Annual Average Daily Flow
ASR	Aquifer Storage and Recovery
ATS	Auto Transfer Switch
AWWA	American Water Works Association
BFP	Belt Filter Press
BLS	Blow Land Surface
BOCC	Board of County Commissioners
CAR	Capacity Analysis Report
CBOD	Carbonaceous Biochemical Oxygen Demand (5 day)
CCT	Chlorine Contact Tank
CMMS	Computerized Maintenance Management System
CCR	Consumer Confidence Report
CCUD	Charlotte County Utilities Department
CCTV	Closed-Circuit Television
CIP	Capital Improvement Plan
CR	County Road
CRA	Community Redevelopment Area
DMR	Discharge Monitoring Report
DO	Dissolved oxygen
EAMS	Enterprise Asset Management System
EPA	U.S. Environmental Protection Agency
EPLAB	East Port Laboratory
EQ	Equalization
ERU	Equivalent Residential Unit
EWD	Englewood Water District
ºF	Degrees Fahrenheit
FAC	Florida Administrative Code
FDEP	Florida Department of Environmental Protection
FDOH	Florida Department of Health
FOG	Fats, Oils, and Grease
FPL	Florida Power and Light
FY	Fiscal Year
GIS	Geographical Information System
gpd	Gallons Per Day
gpm	Gallons Per Minute
GPS	Global Positioning System
GST	Ground Storage Tank
HDPE	High Density Polyethylene

Abbreviation	Definition
HMI	Human Machine Interface
HP	Horsepower
HSP	High Service Pump
I/I	Inflow/Infiltration
IR	Internal Recycle
IW	Injection Well
kVA	Kilovolt-Ampere
kW	Kilowatt
LES	Liquid Environmental Solutions
LIMS	Laboratory Information Management System
LPS	Low Pressure Sewer
LTF	Leachate Treatment Facility
MBR	Membrane Bioreactor
MCC	Motor Control Center
MG	Million Gallons
mg/L	Milligrams Per Liter
MGD	Million Gallons Per Day
MIT	Mechanical Integrity Test
mL	Milliliters
MLE	Modified Ludzack-Ettinger
MLSS	Mixed Liquor Suspended Solids
MLVSS	Mixed Liquor Volatile Suspended Solids
MSBU	Municipal Service Benefit Unit
NELAP	National Environmental Laboratory Accreditation Program
NFPA	National Fire Protection Association
O&M	Operations and Maintenance
ORP	Oxygen Reduction Potential
OSHA	Occupational Safety and Health Administration
PAC	Powdered-Activated Carbon
PACT	Powdered-Activated Carbon Treatment
PLC	Programmable Logic Controller
Ppm	Parts Per Million
PRMG	Public Resource Management Group
PRMRWSA	Peace River/Manasota Regional Water Supply Authority
PRMRWSF	Peach River/Manasota Regional Water Facility
psi	Pounds Per Square Inch
PVC	Polyvinyl Chloride
PWS	Potable Water System
QCM	Quality Control Manual
RAS RCWM	Return Activated Sludge
RCW	Reclaimed Water
RO	Reverse Osmosis
ROW	Right-Of-Way

Abbreviation	Definition
RTS	Regional Transmission System
RTU	Radio Telemetry Units
SCADA	Supervisory Control and Data Acquisition
SO	Service Order
SR	State Road
SRF	State Revolving Fund
SWFWMD	Southwest Florida Water Management District
TDH	Total Dynamic Head
TDS	Total Dissolved Solids
TMADF	Three-Month Average Daily Flow
TMDL	Total Maximum Daily Load
TNI	The National Environmental Laboratory Accreditation Conference Institute
TSS	Total Suspended Solids
µS/cm	Micro Siemens Per Centimeter.
UF/IFAS	University of Florida/Institute for Food and Agricultural Sciences
UV	Ultraviolet
VFD	Variable Frequency Drive
WAS	Waste-Activated Sludge
WBS	Water Booster Stations
WRF	Water Reclamation Facility
WUP	Water Use Permit
WTP	Water Treatment Plant

GLOSSARY

Term	Description
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 US 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 that 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 cannot 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 and 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.

Term	Description
Peak hour flow	The largest volume of wastewater flowing into a wastewater facility, or water flowing from a water facility, during any consecutive 1-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 3-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

INTRODUCTION

The Charlotte County Utilities Department (CCUD) 2017 Annual Report updates the public and bond holders on the Utility system's status and provides Utility staff with a tool for planning capital projects and improving operations. The report provides a high-level review and update of CCUD's administration organization, financial information, major events, and capital improvement program projects and the conditions and recommendations for the water treatment plants, water distribution systems, wastewater collection systems, wastewater treatment facilities, and reclaimed water (RCW) distribution systems.

ADMINISTRATION

The current five-tier rate structure was approved in 2006 by the Board of County Commissioners (BOCC) and is considered appropriate for providing services to current customers. On June 24, 2014, the BOCC approved a rate increase (water 0.75 percent, wastewater 6 percent) for fiscal years (FY) 2015, 2016, and 2017.

In 2010, CCUD began transitioning to a new fixed-base water meter system that allows CCUD staff to access real-time data via central data collectors. This technology offers several advantages to customers and CCUD staff including enhanced leak detection, the ability to address customer issues more promptly, and the ability 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. At the end of FY 2017, 96.2 percent of the customer accounts were served by the fixed-base meter system.

Since July 2014, CCUD offers customers electronic billing and payment options. In 2017, approximately 51 percent of customers paid their bills electronically and 33 percent of CCUD customers received their bills electronically.

The total Operations and Maintenance (O&M) revenue for FY 2017 was:

- $67,196,693 (water and wastewater services)
- $ 2,012,725 (connection charges)
- $ 3,525,934 (connection fees)

In FY 2017, CCUD continued to see growth with the number of active water services increasing by 1.06 percent (from 58,158 to 58,775 services) and the number of active wastewater services increasing by 3.10 percent (from 35,231 to 36,325 services). Total water sold to all customers during FY 2017 was 3,467,061,000 gallons.

WATER TREATMENT PLANTS

CCUD has two water supply sources for its two independent water distribution systems. The Department purchases water treated at the Peace River/Manasota Regional Water Supply Authority (PRMRWSA) Water Treatment Plant (WTP) to serve its Central/West distribution system and produces water at the Burnt Store Reverse Osmosis (BSRO) WTP to serve the

South County distribution system. The PRMRWSA owns and operates a surface WTP under its own water use permit, and CCUD owns and operates the BSRO WTP.

- **PRMRWSA** – Charlotte County's allocation of the PRMRWSA-produced water is currently 16.1 million gallons per day (MGD) Annual Average Daily Flow (AADF), 19.32 MGD for the peak month, and 22.54 MGD for the maximum day.
- **Burnt Store RO WTP** – Operates under Water Use Permit No. 3522, which expires in 2033. As currently configured, the BSRO WTP capacity is 3.61 MGD and has 1.5 MG of storage. Raw water is supplied by six water production wells. Concentrate from the treatment process is disposed of into two deep injection wells with a combined capacity of 3.44 MGD located on the facility site. The primary recommendations for the BSRO WTP include addressing piping and end cap leaks, evaluate the timing for cleaning/replacing membranes, and complete the GST cleaning and inspection.

WATER DISTRIBUTION

Two independent distribution systems serves the Central/West and Southern areas of Charlotte County. The PRMRWSA WTP feeds the Central/West County distribution system, and the BSRO WTP supplies water to the South County distribution system. For FY 2017, the total unaccounted-for water loss for the PRMRWSA-supplied system was 7.6 percent and for the Burnt Store system was 18.0 percent. Annual water loss over 10 percent for the Burnt Store system triggered a water audit, which includes a plan to mitigate the high loss. CCUD, in concert with the Southwest Florida Water Management District (SWFWMD), has been conducting a leak detection survey in the Burnt Store distribution system for 3 years. However, no significant leaks have been identified. In 2017 CCUD reduced the system pressure to reduce leaks and continued to investigate the issue by checking meters and water accounting system's accuracy.

In FY 2017 and for both water distribution systems, CCUD replaced 26,178 water meters, installed 841 new Advanced Metering Infrastructure (AMI) water meters, replaced 15 hydrants, performed maintenance activities (including exercising, flow testing, and painting) on 374 hydrants, repaired 62 line breaks on pipes having 3-inch diameter or larger, replaced 18 valves, and performed maintenance activities on 1,402 valves. CCUD also replaced a 16-inch asbestos cement (AC) main with a 12-inch high-density polyethylene (HDPE) main under the canal on Tournament Road and added a new main into the Maple Leaf Estates community to improve water quality.

The 2017 Consumer Confidence Reports confirm that the water delivered by both CCUD water distribution systems meets or exceeds regulatory quality requirements.

CENTRAL/WEST COUNTY DISTRIBUTION SYSTEM

At the end of FY 2017, the Central/West County distribution system consisted of approximately 1,400 miles of water main, four water-booster pumping stations (WBS) with GSTs, four transmission mains from PRMRWSA and four interconnects with neighboring water utilities. The current total GST 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 WTP.

Some recommendations for the PRMRWSA-supplied system include replacing the Chemscan process analyzer at the Port Charlotte WBS and continuing to maintain and/or upgrade the WBSs and GSTs as necessary.

South County Distribution System

At the end of FY 2017, the Burnt Store distribution system consisted of 64 miles of water main and has no interconnects with neighboring water utilities. Recommendations for the Burnt Store system include continuing to replace the old "class" PVC pipes with new C-900 PVC pipes, continuing to develop computerized hydraulic model for the distribution system, and continuing to identify sources of unaccounted water loss throughout the system.

Wastewater Collection

The CCUD wastewater collection system serves 36,325 customer accounts in four distinct collection areas. The total collection systems consist of 378.2 miles of gravity sewer, 294.7 miles of low-pressure sewers (LPS), 20.8 miles of vacuum sewer, 261 miles of force main, 310 lift stations, and 9,517 manholes. CCUD also owns tanker trucks that are available to haul wastewater from lift stations to the treatment plants during emergency situations. The complete wastewater collection system was hydraulically modeled using SEWERGEMS™ as part of a County-wide wastewater master plan. As part of the master plan, the model was last updated but not calibrated in FY 2017.

During FY 2017, all lift stations were maintained in working order. Recommendations for the CCUD wastewater collection system include continuing to rehabilitate lift stations, continuing to use the hydraulic model 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.

Laboratory Water Analyses Services

The East Port Laboratory (EPLAB) conducts most water quality testing for the County's facilities. During FY 2017, the laboratory processed more than 33,200 test results including on-site analysis and additional off-site testing. The Laboratory implemented Laboratory Information Management System (LIMS) – a data management software that generates paper documentation forms and sample identification numbers to record and track test results. The tracking system also monitors quality control results and chemical use to manage ordering of supplies. To ensure LIMS operation was reliable, the original paper tracking system continued until late 2017. The paper tracking system is still better suited for certain data analysis management than the electronic tracking.

EPLAB has excellent record of scoring high – within one standard of deviation of the national average of all laboratories – on Proficiency Testing (PT) required to maintain Laboratory Certification. The exception to this excellent record occurred on February 2017 when the Total Suspended Solids test was greater than two standard deviations, but improved to one standard deviation according to the August 2017 test results. Recommendations for EPLAB improvements include continuing to expand the use of the LIMS within its capabilities, including the use of bar codes to track samples from collection to result posting, and seeking certification for potable water Total Dissolved Solids (TDS), Sulfate, and Chloride.

WASTEWATER TREATMENT FACILITIES

CCUD owns and operates four water reclamation facilities (WRFs) for treating municipal wastewater and one landfill leachate treatment facility. Table ES 1 summarizes permit information and current percent permit capacity associated with each facility.

Table ES 1 CCUD WRFs Flow and Capacity Statistics

Treatment Plant	Permitted Capacity (MGD AADF)	AADF[1] (MGD)	Maximum TMADF[2] (MGD)	Permitted Operating Capacity[1] (%)	TMADF Operating Capacity[2] (%)
East Port WRF	6.00	4.60	6.058	77	101
West Port WRF	1.20	0.68	0.771	56	64
Rotonda WRF	2.00	1.09	1.464	54	73
Burnt Store WRF	0.50	0.30	0.381	60	76
Zemel Road Landfill Leachate Facility	0.15	0.06	NA	50	50

[1]Based on the AADF/Permitted Capacity

[2]Based on the highest 3-month average daily flow (TMADF)/Permitted Capacity which is used to help determine when a facility should begin planning for expansion

The WRFs are complex plants that require continual repair and maintenance. The main recommendation for each facility include completing the upgrades at the East Port WRF, rehabilitating the sedimentation equipment at the West Port WRF, and beginning planning for the Burnt Store WRF upgrades. Chapter 6 of this report provides more detailed information and an extensive list of recommendations.

RECLAIMED WATER DISTRIBUTION SYSTEM

CCUD encourages more beneficial use of RCW produced by the four WRFs.

CCUD developed a Master Reuse System in Central/West County, which is fed RCW from East Port, West Port, and Rotonda WRFs. The Master Reuse System contains approximately 60 miles of transmission mains, three booster stations, two GSTs, and 20 MG of additional storage capacity at the West Port WRF storage ponds. An additional 95 MG of storage is being added at the East Port WRF with the conversion of an existing reject pond to a storage pond. The Master Reuse System infrastructure is in good condition. CCUD's primary focus is to continue expanding the system to serve additional customers.

The South County RCW distribution system consists of one 3-mile-long transmission main that serves three customers. The infrastructure of the system is in good condition, although some improvements are required at the WRF.

The primary recommendations for the RCW distribution system are to develop a comprehensive operating protocol for the Master Reuse system, evaluate the installation of a mechanical actuator on the system control valve at the West Port WRF, and consider adding RCW storage at the Burnt Store WRF as part of the plant upgrade planning.

Electrical Components and Circuitry

Conditions of critical electrical components and circuitry are central to proper functioning of CCUD water, wastewater, and RCW infrastructure systems. A visual inspection of each facility as it pertains to the electrical distribution system was performed. Key electrical components assessed include main electrical switchgear, motor control centers (MCCs), and emergency generators. Chapter 8 of this report provides details of the conditions assessment of critical electrical components and circuitry.

Capital Improvement Program

As Charlotte County's population continues to grow, CCUD's ability to develop plans that address the projected growth is vital. The Engineering Division develops Capital Improvement Plan (CIP) projects for CCUD water, wastewater, and RCW infrastructure systems. Table ES 2 summarizes FY 2017 capital improvement budget dollars and expenditures for the three sectors. Details of the capital improvement budget and expenditures are contained in Chapter 9 of this report.

Table ES 2 FY 2017 Capital Improvement Budget and Expenditures

Infrastructure	Budget	Expenditure
Water	$13,910,000	$5,530,000
Wastewater	$58,363,000	$20,155,000
Reclaimed Water	$9,704,000	$3,507,000

Consolidated Recommendations

Chapter 10 consolidates all recommendations discussed throughout the Annual Report for each CCUD water, wastewater, and RCW facility visited.

1 INTRODUCTION

1.1 PURPOSE AND SCOPE

The Charlotte County Utilities Department (CCUD) prepares an Annual Report to provide the public with a Utilities status update and to fulfill Revenue Bonds requirements. The bonds issued to Charlotte County require that the County retain the services of a licensed professional engineer to verify the quality of CCUD'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.*

Table 1-1 summarizes the principal balances for CCUD bonds as of September 30, 2017.

Table 1-1 Principle Balances on CCUD Bonds

Bond Issues	Original Issuance	Current Debt	Comments
2008 Bond	Wastewater Expansion – 1998	$ 21,565,000	Wastewater Expansion Program
2011 Bond	Refinance – 2011	$ 38,270,000	Refinanced Debt
2013 Bond	Refinance – 2003A	$ 24,165,000	Refinanced Debt
2016 Bond	Refinance – 2006 & part of 2011	$ 23,900,000	Refinanced Debt
	Total Current Bond Debt	$107,900,000	
	State Revolving Fund Debt	$ 4,478,391	
	Total Long-Term Debt	$112,378,391	

The Report is divided into the following chapters:

1. **Introduction:** General information concerning the report's preparation.
2. **Administration**: Charlotte County government structure and CCUD's organization, administration programs, and financial information.
3. **Water Treatment Plants**: Description and records concerning the purchase and production of potable water and the general condition of the components.
4. **Water Distribution System**: Description of water distribution system and the general condition of components.

5. **Wastewater Collection:** Description and records concerning the collection of wastewater and the general condition of components.

6. **Wastewater Treatment Facilities**: Description and records concerning the facilities used to treat wastewater and leachate and the general condition of the components.

7. **Reclaimed Water Distribution System**: Description of reclaimed water (RCW) distribution system and the general condition of the components.

8. **Electrical Components and Circuitry**: Description of general condition of critical electrical components and circuitry at the water treatment plant, in the water distribution system, wastewater collection system, and at the wastewater treatment facilities.

9. **Engineering**: The status of the water, wastewater, and reclaimed water Capital Improvement Plan (CIP) projects and a summary of the major engineering reports completed for the County.

10. **Consolidated Recommendations**: Summary of planning recommendations, capital improvements, and operation and maintenance items for the water, wastewater, and reclaimed water systems.

1.2 AUTHORITY

Jones Edmunds' preparation of the Fiscal Year (FY) 2017 Annual Report is authorized by Charlotte County Purchase Order No. 2018001260 for File No. 18-114, Work Order No. 10.

1.3 DEMOGRAPHICS

Charlotte County is 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-tropical climate where the extreme temperatures of both summer and winter are subdued by the prevailing gulf breezes. Numerous upland and aquatic preservation areas occur in the area. Covering an area of 270 square miles and 219 linear miles of protected shoreline, Charlotte County has one of the largest protected marine estuaries.

In 2017, the Office of Economic and Demographic Research estimated the Charlotte County population at 172,720. 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 in the west third of the County, including the barrier islands abutting the Gulf of Mexico. The Port Charlotte planned residential development occupies most of Central County with some house lots having canal access to Charlotte Harbor. A large development known as Rotonda is in the west area of the County. Every lot within Rotonda is within 1/2 mile of a golf course.

A growing area 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 along many of the main corridors constitutes over 1,500 acres. Most of the commercial epicenters are along US Highway 41 and in the Murdock area of Port Charlotte. Commercial zones have also developed along Kings Highway, Rampart Boulevard, and State Road (SR) 776. Less than 0.1 percent of the County area consists of industrial development. The industrial development is primarily within the Community Redevelopment Area (CRA) in Charlotte Harbor.

1.4 MAJOR EVENTS IN 2017

CCUD is an active Charlotte County Department with projects and administrative activities underway. The following sections list significant events occurring in FY 2017.

1.4.1 GENERAL OPERATIONS

- October 1, 2016, marked the final rate increase of a 3-year plan (FY 2015, FY 2016, and FY 2017) approved by the Board of County Commissioners (BOCC) in 2014, consisting of consumption rate increases of 0.75 percent for water and 6 percent for sewer in FY 2017.

- The line extension program began in FY 2016 and continued through FY 2017. Designed to serve new customers with water, sewer, and RCW services, line extensions 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.

- September 2016, the BOCC approved proceeding with a County-wide Sewer Master Plan with Jones Edmunds. The primary goal of the project was to collaboratively develop an initial 15-year plan to implement an affordable, reliable, and efficient wastewater collection and treatment system for a sustainable environment by reducing pollution from septic tanks. The purpose of this effort is to ensure and sustain the quality of natural water resources in Charlotte County, especially Charlotte Harbor, by protecting and providing a safe water supply, a recreational haven, and an environmental resource. The Sewer Master Plan was completed in December 2017.

1.4.2 ENGINEERING

- Awarded a contract for designing the El Jobean septic-to-sewer conversion.

- Secured additional grant and low-interest funding for various projects through the State Revolving Fund (SRF). Applied for Section 319 funding and received legislative funding for the El Jobean septic-to-sewer conversion. No additional Total Maximum Daily Load (TMDL) funding was secured in FY 2017.

- With BOCC approval, had construction crew and equipment perform on-site wastewater connections, line extensions, and renewal and replacement work.

- Completed a 16-inch RCW main on Gasparilla Road and Placida Road and 12-inch RCW main on Rotonda Boulevard West as part of the RCW Expansion Phase 3.

- Completed the Burnt Store Brackish Groundwater Wellfield Study in FY 2017.

- Major construction activity for FY 2017:

  - The East Port Water Reclamation Facility (WRF) Stage 5 Improvements started July 2017 – adding a new high-service pumping station and converting the 95-million gallon (MG) reject pond to a RCW storage pond.
  - Burnt Store Phase 3 Road Widening – new water, sewer, and RCW transmission mains.
  - Gasparilla Road Widening – new water, sewer, and RCW transmission mains.
  - Edgewater Drive Phase 2 – new water, wastewater, and RCW transmission mains, and wastewater lift station; replaced water distribution and wastewater collection systems.
  - US 41 Widening – new water, wastewater, and RCW transmission mains.
  - Sunrise Waterway – wastewater and potable water replacement and stormwater control structure.
  - East and West Spring Lake Wastewater Collection System Expansion Contracts B, C, and D – replaced existing water distribution system.
  - Midway Widening Phase 3 – new water and wastewater transmission mains; replaced water distribution and wastewater collection.
  - Parkside Utility Improvements – Ambrose Street water, sewer, RCW transmission mains, and lift station replacements.
  - Cape Horn – 12-inch water main.
  - Harbor Heights – 6-inch force main.
  - Chancellor – water transmission main.
  - Miscellaneous Line Extensions.

- Major design activities for FY 2017:

  - Loveland Grand Master Lift Station and 48-inch Gravity Interceptor.
  - Myakka River – water main crossing.
  - Gulf Cove/Myakka River – water main crossing.
  - Phase 2 Charlotte Harbor Water Quality Initiative (Ackerman Countryman).
  - Chancellor Boulevard/Hillsborough Boulevard water main.
  - Cape Haze Drive water main replacement, wastewater force main, and RCW main.
  - Parkside CRA utility improvements at Gertrude – Aaron.
  - Placida Road – RCW main.
  - Gertrude Pumping Station and Tank Conversion to RCW.
  - Harbor Boulevard – water, wastewater, and RCW systems.
  - Deep Creek Sewer Force Main Replacement – to accommodate residential growth.
  - Ingraham 24-inch Water Transmission Main (part of transmission main from Walenda Pumping Station to Rotonda Storage Tank).
  - Force Main Transmission and Water Main – Spring Lake Boulevard, Ellicott Circle, and Morningstar Waterway.
  - Miscellaneous line extensions.

1.4.3 Water System Operations

- Provided 3.5 billion gallons of water to 58,775customers.
- Received 130 MG of Punta Gorda-produced water through the new CCUD/Punta Gorda 24-inch interconnect pipe. Distributed 158-MG back to Punta Gorda during their peak demand period.

1.4.4 Wastewater System Operations

- Treated 2.5 billion gallons of wastewater from 36,325 customers.
- Continued the successful program of sewer rehabilitation lining to reduce groundwater infiltration into the collection system. Work included internal TV inspection of 8,975 feet of gravity sewer, smoke testing, manhole repairs, and 44 service lateral repairs. No additional lining was completed in FY 2017.

1.4.5 RCW System Operations

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

1.4.6 Instrumentation and Control Group

- Provided PLC programming.
- Cross-trained between divisions.
- Installed and calibrated controls.

1.4.7 Operations Data Management

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

1.4.8 Reports and Studies

- CCUD presented *Charlotte Harbor Water Quality Initiative* to the BOCC to show how the sewer expansion program will help improve water quality.
- *Organizational and Operational Audit of Utilities*, KPMG, February 16, 2015. Charlotte County BOCC continued KPMG's engagement in FY 2017 to assist CCUD to develop and implement Action Plans for the 42 recommendations in the KPMG organizational and operational audit.
- *Deep Creek Force Main Size and Route Report,* Jones Edmunds, November 2016.
- *Charlotte County Water Quality Assessment Phase I: Data Analysis and Recommendations for Long-Term Monitoring*, Florida Atlantic University-Harbor Branch Oceanographic Institute, Marine Ecosystem Health Program, December 2016.
- *Burnt Store Brackish Groundwater Wellfield Study (N605)*, RMA GeoLogic Consultants, Inc., July 2017.

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2 ADMINISTRATION

2.1 COUNTY GOVERNMENT

Charlotte County government operates under an elected BOCC and an appointed County Administrator. The BOCC is responsible for the legislative duties of the County government. Five County Commissioners representing separate Districts serve on the BOCC over staggered 4-year terms.

The County Administrator is the County's chief administrative officer and is responsible for all administrative matters and operations under the authority of the BOCC. The County Administrator responsibilities include appointing County Department Directors, with final approval by the BOCC.

2.2 UTILITIES DIVISION

CCUD, a Charlotte County government department, provides potable water production and distribution, wastewater collection and treatment, and RCW distribution for irrigation within the certified service area. CCUD serves nearly 60,000 homes and businesses in the Greater Port Charlotte area, El Jobean, Gulf Cove, Englewood East, Rotonda, and Burnt Store, as well as bulk customers, including El Jobean Water Association, Riverwood Development, Inc., Encore Super Park, and Little Gasparilla Island.

CCUD maintains interconnects for emergency bulk water sales with the Charlotte Harbor Water Association, Gasparilla Island Water Association, City of North Port Utilities, and Englewood Water District. An interconnect with the City of Punta Gorda allows CCUD to provide or receive water depending on each system's demands.

CCUD's mission, vision, and values are as follows:

Mission: To provide safe, reliable drinking water, reclaimed water and wastewater service for the enrichment of the community.

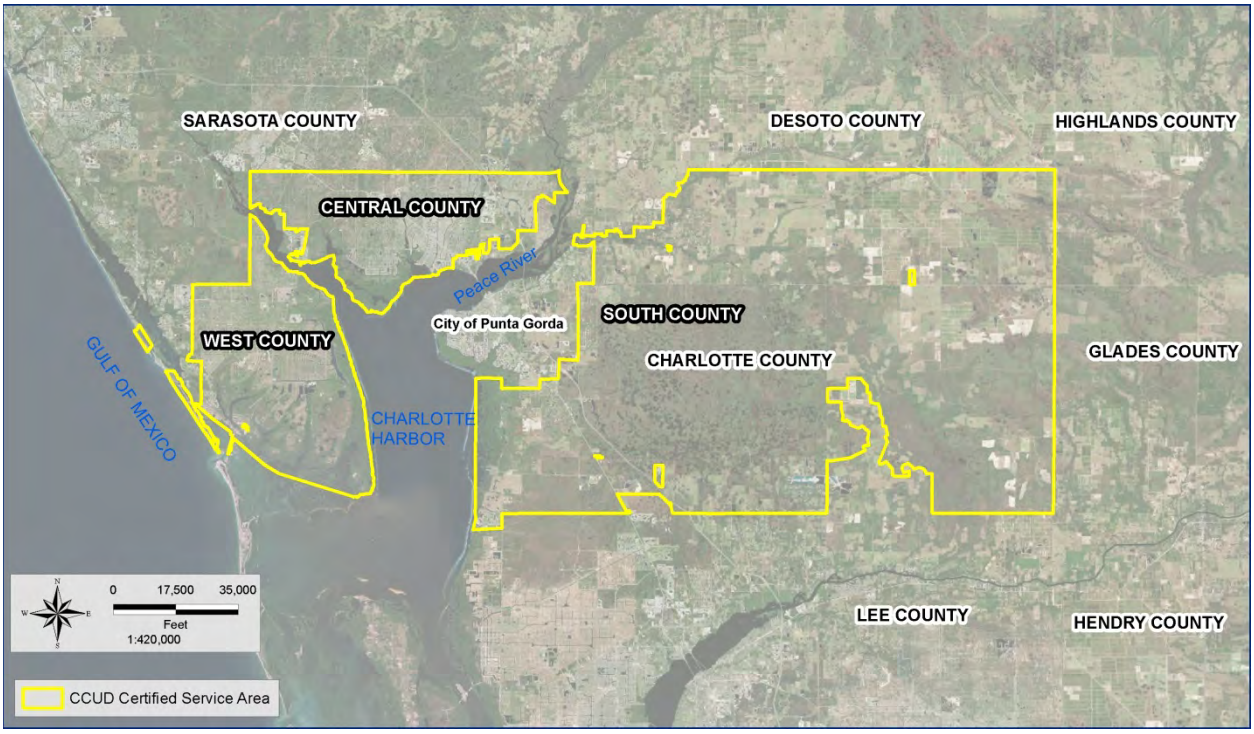
Vision: To exceed expectations in the delivery of water and sewer services.

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 CCUD certificated service area outlined in yellow.

Figure 2-1 CCUD Certified Service Area



CCUD is led by a Utilities Director, who works under the direction of the County Administrator and Deputy County Administrator. CCUD consists of four divisions: Administration, Business Services, Engineering Services, and Operations.

The Administration Division includes the Utilities Director and support staff. The Administration Division manages the overall utility and supervises all other utility divisions.

The Director's responsibilities include:

- Planning for water and wastewater needs.
- Developing potable water treatment/distribution systems.
- Developing wastewater treatment/collection systems.
- Developing reclaimed water distribution systems.
- Operating the County's water, wastewater and RCW systems.
- Instituting water conservation practices and educational programs.
- Communicating – internally and externally with customers.

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

- Customer Service
- Billing and Collections
- 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 and includes:

- Preliminary Engineering Group
- Design Group
- 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 RCW 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.
- RCW distribution including cross-connection control and water quality monitoring.
- A new Instrumentation and Controls (I&C) Group, under a supervisor, formed from existing I&C technicians in each division.
- Parts and equipment warehouse.

Financial Services are supplied by the Fiscal Services Division of the Charlotte County Budget & Administrative Services Department. CCUD pays for five personnel, led by a Financial Manager, through an inter-fund transfer.

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

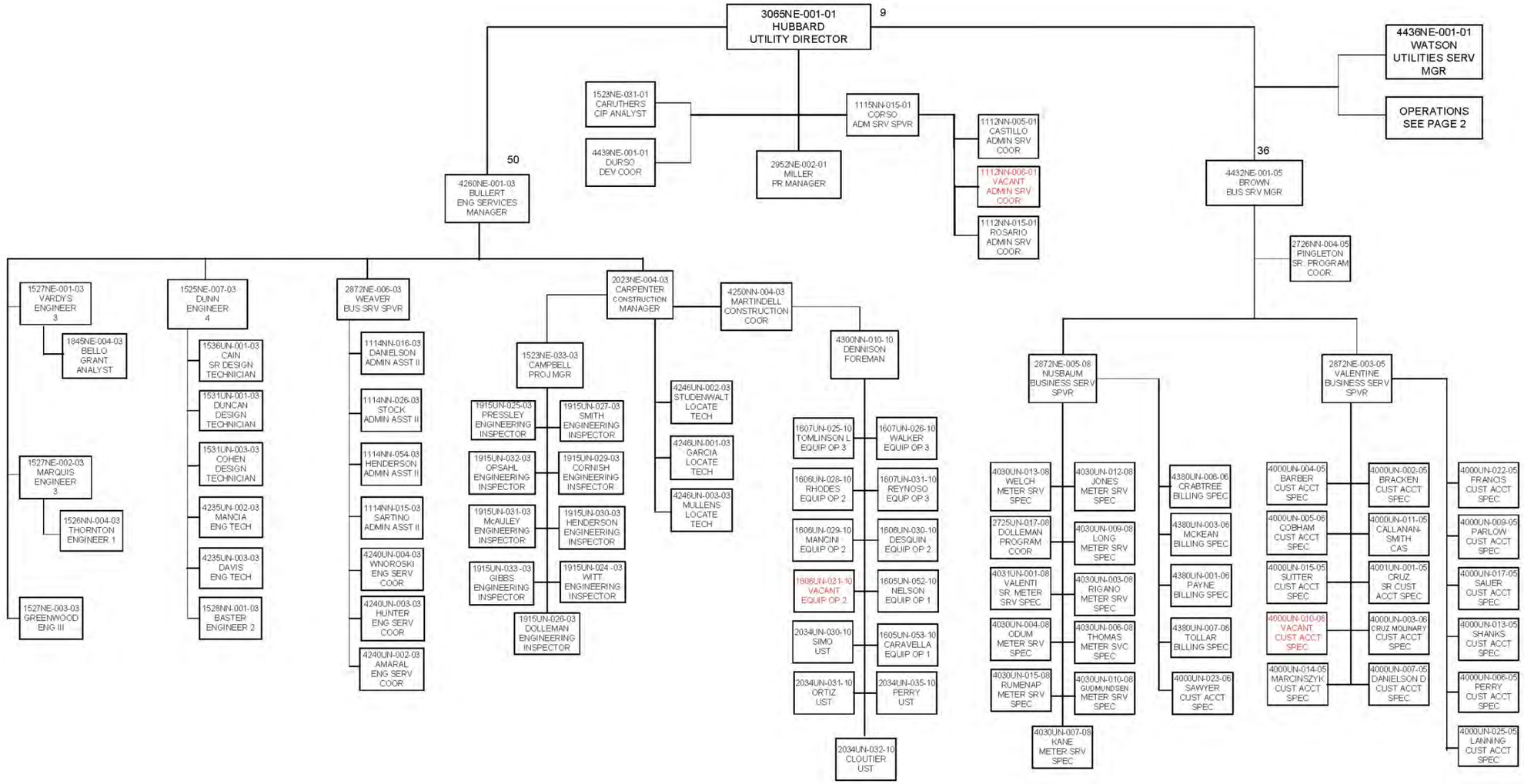
In FY 2017, the total number of positions budgeted for CCUD was 236. CCUD had 229 full-time employees at the end of September 2017.

Figure 2-2 and Figure 2-3 show the CCUD organizational structure as of September 30, 2017.

2.3 Administration Facilities

The Charlotte County Environmental Campus is located on an out-parcel of the East Port WRF. The campus includes the CCUD Administration Building, Operations Service Center/Warehouse, Charlotte County Public Works Solid Waste Division, Community Services, University of Florida Institute of Food and Agricultural Services (UF/IFAS) Extension Services Division, the Charlotte County/Punta Gorda Municipal Planning Organization, and Public Works Mosquito and Aquatic Weed Control.

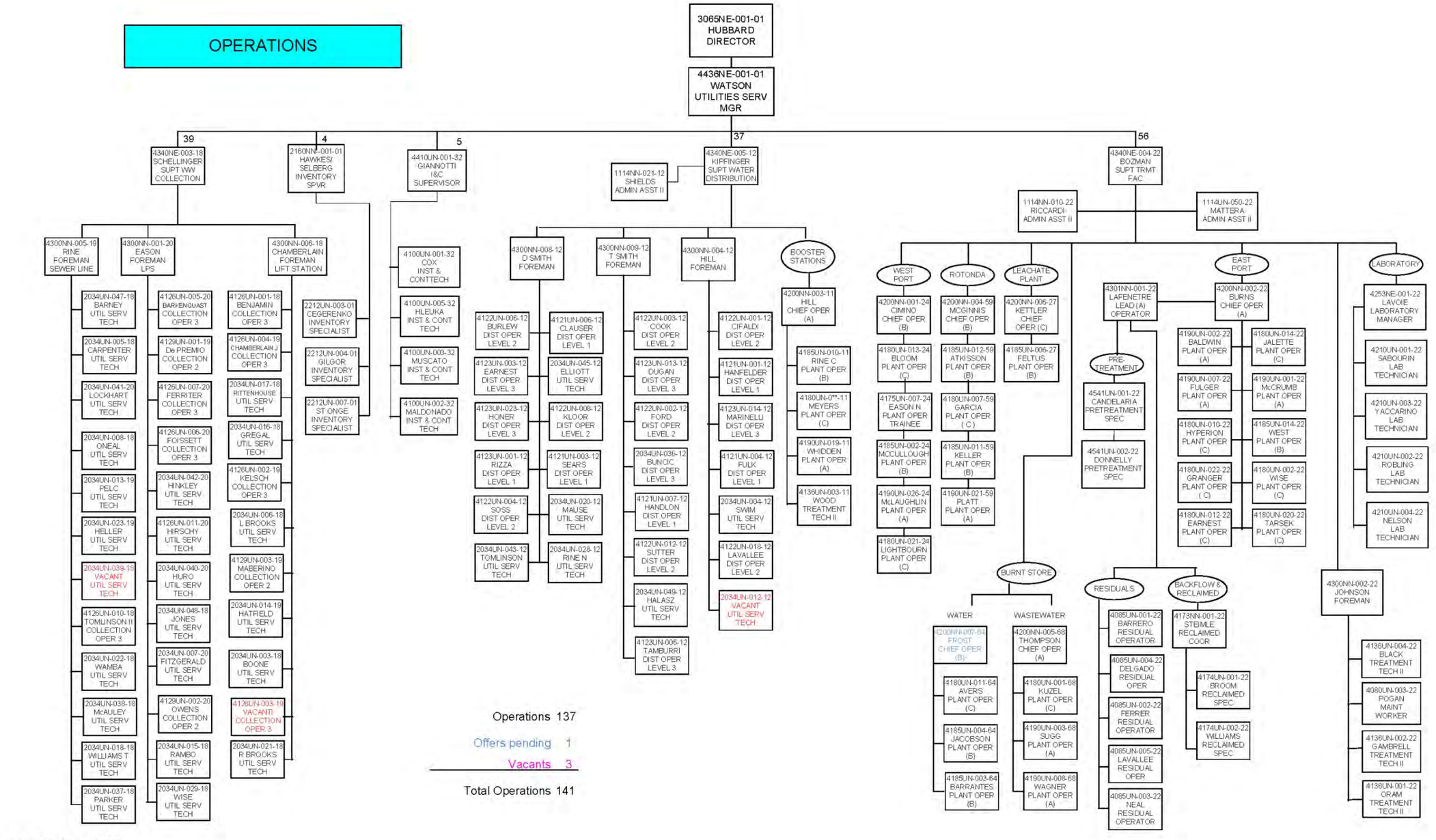
Figure 2-2 CCUD Organizational Chart – Overall



OCCUPIED FT POSITIONS	**229**
OFFERS PENDING	**1**
VACANT FT POSITIONS	**6**
VACANT PT POSITIONS	**0**
TOTAL POSITIONS	**236**

OCTOBER 2017

Figure 2-3 CCUD Organization Chart – Operations



2.4 CCUD WATER CONSERVATION EFFORTS

In 2017, CCUD continued with its outreach efforts, including oversight of the Water Conservation Programs and community education efforts discussed in the following sections.

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 the Southwest Florida Water Management District (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 SWFWMD's year-round water restrictions, by ordinance, on March 30, 2010. This ensured that Charlotte County would be consistent with SWFWMD's recommendations for year-round restrictions. SWFWMD's year-round water conservation measures went into effect July 1, 2010. SWFWMD's Phase I Water Shortage Restrictions (Moderate Water Shortage) went into effect on December 1, 2010, except in areas where local governments imposed stricter measures. In Phase I, CCUD 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 2 days per week.

2.4.2 IN-HOUSE ENFORCEMENT OF WATERING RESTRICTIONS

Enforcement of watering restrictions was approved by the BOCC in early 2008. The enforcement allows CCUD staff to progressively enforce water restrictions for CCUD 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-CCUD customers.

2.4.3 WATER RESTRICTIONS ORDINANCE

Charlotte County Ordinance 2010-016 adopted 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 Public Resource Management Group (PRMG) and as recommended by SWFWMD, CCUD's three-tier rate structure was replaced with a five-tier system in October 2006. The first tier is 0 to 5,999 gallons; the highest tier is 25,000 gallons and above.

2.4.5 EMERGENCY WATER CONSERVATION RATE

Emergency water conservation rates have not been used since June 2010 when they were replaced with CCUD conservation-based rates as discussed in Section 2.4.4.

2.4.6 REGIONAL RCW EXPANSION

CCUD's RCW system operates under a Master Reuse Permit approved by FDEP that allows CCUD to move RCW from East Port WRF, West Port WRF, and Rotonda WRF to customers. Abundant RCW at the East Port WRF and customer demands for irrigation water throughout

the central and west parts of the County were the driving forces behind CCUD's desire to expand its RCW distribution system. Using RCW for irrigation and other non-potable water needs reduces the demand for potable water, surface water, and groundwater. A Reuse Master Plan was prepared in 2005 to expand the RCW system.

Phase 1, completed in 2009, included two strategically placed 0.5-MG storage tanks and pumping stations along with 14 miles of 16-inch-diameter RCW transmission main.

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

Phase 3, which began in 2017, includes a new RCW main for Spring Lakes on Port Charlotte Boulevard and US 41 between Hillsborough Boulevard and Enterprise Boulevard and the Stage 5 RCW Improvements at East Port WRF for a 95-MG RCW storage pond and a 9-million-gallon-per-day (MGD) high-service pump station.

2.4.7 Indoor Water Conservation Kits

CCUD continues to provide customers with Indoor Water Conservation Kits during local area community outreach events. Each 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

CCUD regularly participates in water conservation-related outreach, including bill inserts, news articles, and speaking engagements within the community. CCUD funded a portion of the salary for a Florida Yards and Neighborhoods Charlotte County UF/IFAS Extension Program Assistant for the past several years. CCUD and the UF/IFAS Extension Services work jointly promoting Florida Friendly Landscaping. A donated demonstration garden is located on CCUD's Environmental Campus property. The garden is accessible to all Charlotte County residents and is maintained by Master Gardeners who are given free space at the Campus to better educate the residents.

CCUD conducted six citizen educational tours during FY 2017 at the Eastport WRF, West Port WRF, Rotonda WRF, Burnt Store WRF, and the Burnt Store Reverse Osmosis (RO) Water Treatment Plant (WTP). The tours involved promoting alternative water sources, conservation, and good stewardship of water resources.

The water/wastewater plant tours included:

- Wastewater/Water Treatment Processes
- Regulatory Requirements
- State-of-the-Art Membrane Bioreactor (MBR) and RO Technology
- Process for Producing RCW
- Treatment and Disposal of Effluent
- Biosolids and Their Disposal
- Environmental Impacts of Water Reclamation
- Alternative Water Sources

CCUD promotes an understanding of its operations through outreach programs such as:

- Water Conservation Booth at the Charlotte Harbor Nature Festival
- Presentation of the Utility for County Ambassador Program
- Handouts and Conservation Display at the Environmental Campus and Administration Building
- Engineering Availability and Business Services Presentations to Charlotte County Realtors
- Participation at Safety and Emergency Planning Fair at Heritage Oak Park Association
- 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 SWFWMD Conservation Expo
- Participation at Government Academy Day

CCUD added a new initiative to their community outreach efforts toward the end of FY 2013/2014. The importance of staying properly hydrated, "H_20 and Your Health," was developed; the program focuses on the need to stay properly hydrated, and CCUD tap water is the most economical way to do so.

2.4.9 Conservation Signs

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

2.4.10 Water Conservation Month

CCUD's annual Water Conservation Month program includes a BOCC proclamation with community outreach/educational displays at Murdock County Administration office and at the CCUD office year-round.

2.4.11 CCUD Website/Social Media

Customers can receive the latest water restrictions, conservation tips, and general CCUD current events at the Charlotte County website, *www.charlottecountyfl.gov*, and at the Administration office. CCUD 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 provides an avenue to announce public outreach events and educational tours and to make reservations online to attend events and tours.

2.5 Financial

CCUD 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. CCUD's policies, rates, and security deposits are established by the BOCC. The County Clerk of Circuit Court serves as the accountant and auditor for the BOCC and is responsible for the collection and disbursement of County funds.

2.5.1 REVENUES

The rate plan, approved by the BOCC 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 BOCC determined that the revenues based on the 2009 rates would be adequate for CCUD to meet the needs of current and future customers through FY 2014. On June 24, 2014, the BOCC approved rate increases (water 0.75 percent, wastewater 6 percent) for FY 2015, 2016, and 2017.

In 2010, CCUD embarked on a new fixed-base 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 2017, 56,752 or 96.2 percent of the accounts were served by the fixed-base meter system. The fixed-base meter system provides remote reading capabilities, event notification such as high water consumption or potential leaks, and online consumer engagement features. Water use data are securely transferred from each individual meter to the central data collectors. It is then made available to CCUD via a graphical and simple-to-use web interface, integrated with CCUD's Computerized Maintenance Management System (CMMS) and Geographic Information System (GIS) software packages. Account-specific consumption data also available to CCUD customers via a separate, easy-to-use online interface.

CCUD offers multiple methods of electronic payment and electronic billing, which has resulted in 33 percent of the County's customers receiving their bills electronically and 51 percent 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 CCUD's Business Services Division, administers the HeartShip funds.

The total Operations and Maintenance (O&M) revenue for FY 2017 water and wastewater services was $67,196,693. The total O&M connection charge revenue was $2,012,725 and total connection fee revenue was $3,525,934.

2.5.2 CCUD CUSTOMER BASE

During FY 2017, the number of active water services increased from 58,158 to 58,775, and the number of active sewer services increased from 35,231 to 36,325.

For planning purposes, the level of water and wastewater service established by CCUD 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 for FY 2017 show that annual average day (AAD) usage patterns are closer to 161 gpd of water consumption and 135 gpd of wastewater flow per ERU.

2.5.3 INSURANCE

CCUD is self-insured. The self-insurance is provided by the County and is administered by the Gehring Group, with Kurt Gehring acting as the Agent of Record. In addition, CCUD 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 CCUD 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 services. The results of this comparison, as of October 2016, assumes that water service consists of delivering 4,000 gallons of water per month through a standard (5/8-inch by 3/4-inch) meter and that sewer service flows correspond with 4,000 gallons of water per month. Table 2-1 presents the rate comparison results.

Table 2-1 Rate Comparison

Utility Systems	Water Charge ($)[1]	Wastewater Charge ($)[1]	Combined Charges ($)[1]
CCUD			
Rates as of September 30, 2017	41.30	51.39	92.69
Other Neighboring Utilities			
City of Cape Coral	32.92	57.23	90.15
City of Clearwater	30.10	39.32	69.42
DeSoto County	48.98	60.04	109.02
City of Fort Myers	29.17	72.76	101.93
City of Marco Island	52.71	51.30	104.01
City of Naples	13.69	35.98	49.67
City of North Port	34.14	53.06	87.20
City of Punta Gorda	29.16	34.99	64.15
Collier County	33.76	52.07	85.83
Englewood Water District	23.96	35.63	59.59
FGUA – Golden Gate (Collier County)	52.32	64.49	116.81
Hillsborough County	27.18	31.62	58.80
Lee County	25.67	43.85	69.52
Manatee County	17.84	41.03	58.87
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

Note: [1] The reflected residential rates were in effect September 30, 2017, are exclusive of taxes or franchise fees if any, and reflect rates charged for inside the service, unless otherwise noted.

2.7 LARGE WATER USERS

Table 2-2 lists the system's 10 largest water consumers and the corresponding percentage of total water consumption for each.

Table 2-2 CCUD Large Water Users (FY 2017)

Water Customer	Total Water Purchased (thousands of gallons)	Percentage of Total Water Sales
Riverwood[1]	48,506	1.40%
Peace River Regional Medical Center	29,589	0.85%
El Jobean Water Association[1]	26,563	0.77%
Fawcett Memorial Hospital	22,896	0.66%
Charlotte County School Board	22,877	0.66%
South Port Square	19,734	0.57%
Colonial Construction Co, Inc.	16,935	0.49%
Encore Super Park, Port Charlotte	14,704	0.42%
Little Gasparilla Water Utility[1]	14,232	0.41%
Hampton Point Limited Partnership	13,598	0.39%
Total 10 Largest Users	229,634	6.62%
All Other System Users	3,237,427	93.38%
Total FY 2016/2017 System Water Sales – All Customers	3,467,061	100.00%

Note: [1] Denotes water customers only; all others listed are both water and sewer customers of the system.

2.8 PLANNING RECOMMENDATIONS

The following tables summarize planning recommendations for CCUD's continued operations the utilities systems.

Table 2-3 Administration Planning Recommendations

Recommendation:	Continue CCUD'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 developing options for water, sewer, and RCW service in the County to meet a growing demand for municipal utility services.
Recommendation:	Continue developing 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 needs for the mutual benefit of Charlotte County and adjoining counties and cities.

Table 2-4 Water System Planning Recommendations

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 west Charlotte County.
Recommendation:	Continue to integrate acquired utilities into the overall CCUD water system to maximize reliability and reduce costs to CCUD customers.
Recommendation:	Explore ways to augment the demands on the Peace River Manasota Regional Water Supply Authority (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 reliability and control of the pumps to improve water distribution to customers.
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.

Table 2-5 Wastewater System Planning Recommendations

Recommendation:	Evaluate improvements and capacity upgrades for the Burnt Store 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 age 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 expected demand for services.
Recommendation:	Continue to televise gravity sewers and smoke test to locate source of inflow/infiltration (I/I). Repair gravity sewers and manholes as required to mitigate I/I and regain sewer and WRF capacity.
Recommendation:	Continue to provide for the disposal of septage at the East Port WRF.
Recommendation:	Install odor control systems at lift stations where hydrogen sulfide concentrations cause odors and deteriorate structures.
Recommendation:	Continue to upgrade the East Port WRF to meet growth demands and septic to sewer conversions.
Recommendation:	Continue construction and plan for the next phases of sewer expansion in the Port Charlotte area in accordance with the 2017 Sewer Master Plan.

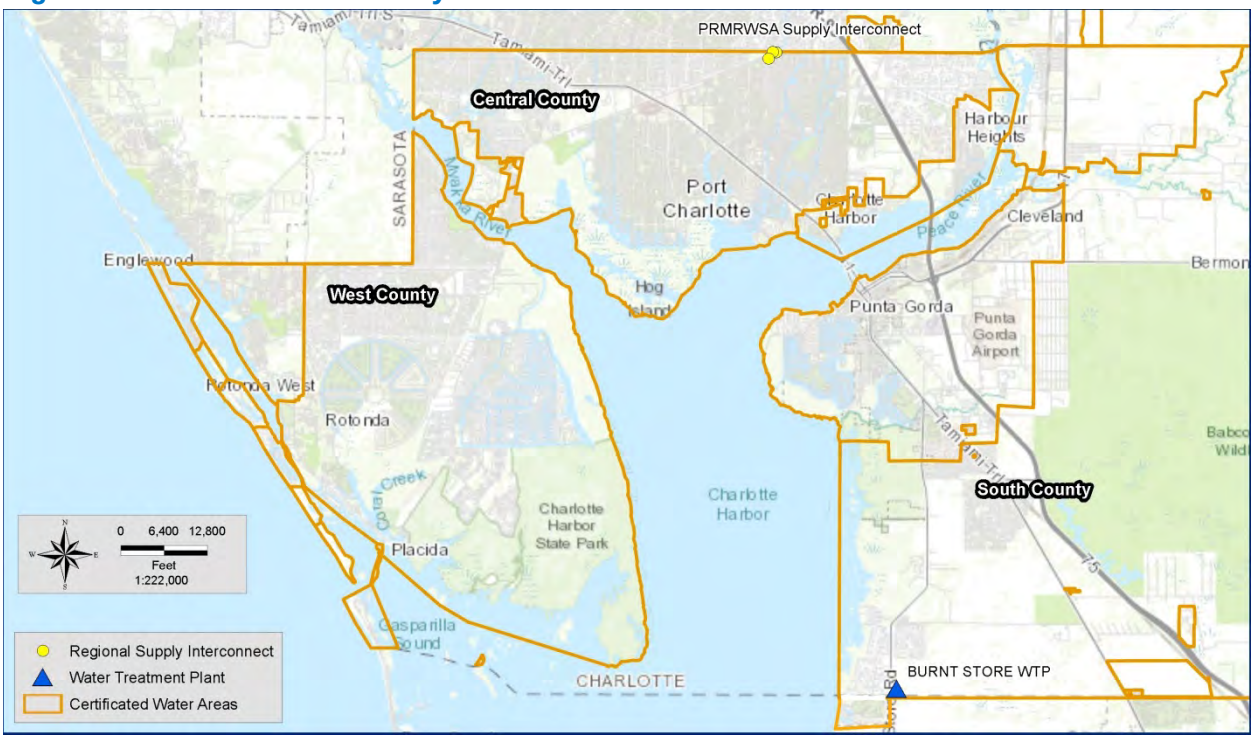
Table 2-6 RCW System Planning Recommendations

Recommendation:	Continue constructing Phase 3 of the RCW expansion project that begun in FY 2016 by constructing a transmission main from the West Port WRF to the Rotonda East RCW Booster Pumping Station.
Recommendation:	Finalize construction of the East Port WRF Stage 5 RCW Improvements that includes a 95-MG RCW storage pond and providing a 9-MGD RCW pump station.
Recommendation:	Prepare a hydraulic model to predict the impact of future demand on the South County RCW transmission system.
Recommendation:	Determine the feasibility of creating RCW storage at the Burnt Store WRF.
Recommendation:	Seek ways to increase the use of public-access RCW currently produced by CCUD WRFs including improving reliability and access for customers.
Recommendation:	Expand public-access RCW for the Burnt Store WRF.

3 WATER TREATMENT PLANTS

CCUD has two water supply sources for its two independent water distribution systems. The central and west part of Charlotte County is provided treated surface water from the Peace River/Manasota Regional Water Supply Facility (PRMRWSF). The water is purchased from the Peace River/Manasota Regional Water Supply Authority (PRMRWSA) under a multi-county water supply agreement and conveyed to the County via transmission mains. The south area of Charlotte County (South County) is supplied treated groundwater from the CCUD-owned Burnt Store ROWTP. Figure 3-1 shows the location of the CCUD WTP, PRMRWSA supply interconnect, and water service areas. This Chapter presents an overview of the PRMRWSF and a detailed discussion and assessment of the County-owned Burnt Store RO WTP.

Figure 3-1 Charlotte County Water Service Areas



3.1 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 approximately 4 miles northeast of Charlotte County. 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; a new Master Water Supply Contract was executed in 2006 by the four members and one customer – the City of North Port.

The PRMRWSA owns and operates the PRMRWSF. The source water, the Peace River, is treated via conventional surface water treatment, which consists of coagulation, flocculation, sedimentation, filtration, and disinfection. The five-step process is used to remove organics, color, and turbidity while inactivating bacteria that may be present in the

source water. The water produced by the PRMRWSA meets current US Environmental Protection Agency (EPA) and Florida Department of Environmental Protection (FDEP) drinking water requirements.

Treated water is distributed to member customers using high-pressure pumps and transmission mains. The PRMRWSA completed a Regional Expansion Program in 2009, which included the constructing a 6-billion-gallon reservoir. The reservoir is 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 16.1MGD Annual Average Daily Flow (AADF), 19.320 MGD for the peak monthly average day, and 22.54 MGD for the maximum day. However, each PRMRWSA member has 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. In this instance, the PRMRWSA is responsible for obtaining all environmental permits for the expansion to meet demands.

3.2 Burnt Store RO WTP

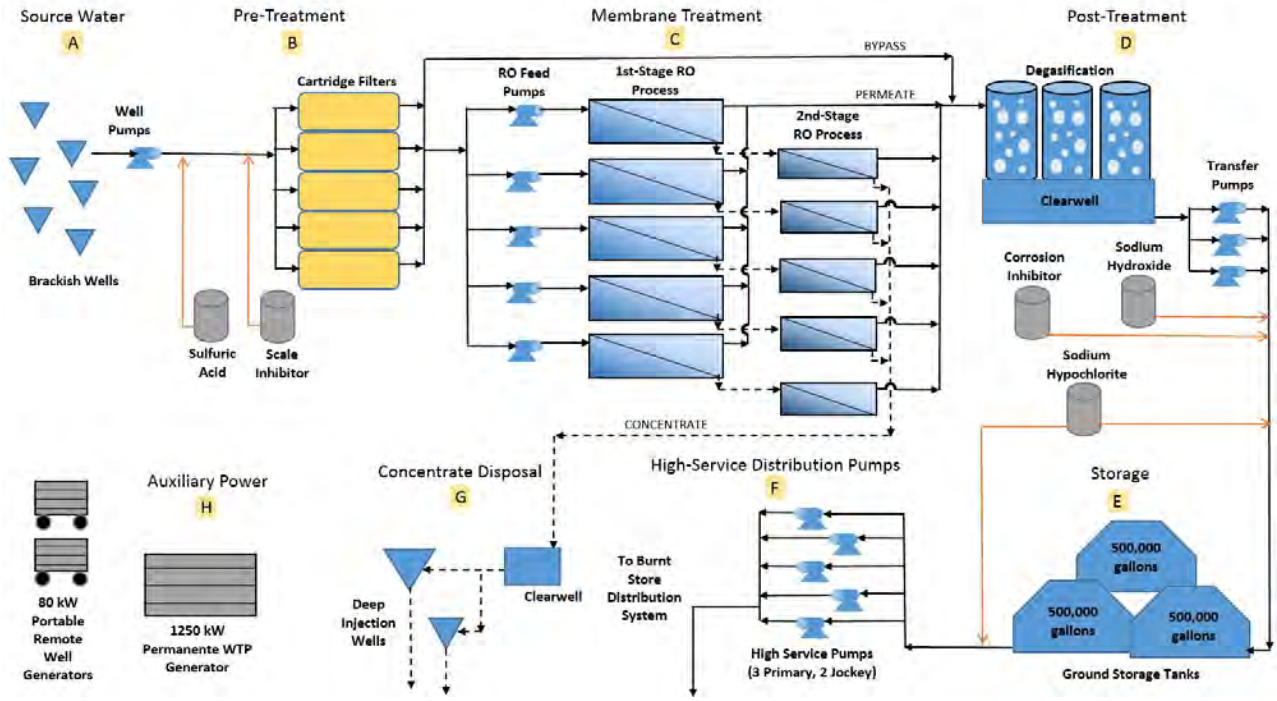
The Burnt Store RO WTP (PWS ID6080318) is owned and operated by CCUD. The South County distribution system is served by the Burnt Store RO WTP at 17430 Burnt Store Road in Punta Gorda. The Burnt Store RO WTP was expanded in 2009 and has a current treatment capacity of 3.61 MGD.

The Burnt Store RO WTP draws groundwater from six production wells. As raw source water is pumped from the production wells to the RO process room, sulfuric acid and a scale inhibitor are injected into the raw water stream to prevent membrane scaling during the RO treatment process. Downstream of the chemical injection, the pH-adjusted raw water passes through cartridge filters to remove sand and small particles present in the raw water sources. After the cartridge filters, the RO feed water passes through high-pressure RO feed pumps before entering the RO treatment trains.

The RO process separates dissolved salts from the water by forcing water through a semi-permeable membrane. The process requires significant pressure and results in two streams. The water that permeates through the membrane is referred to as permeate, and the water that remains on the feed side of the membrane is referred to as the concentrate. Two-stage processes can be used to increase the water recovery of the system by processing the concentrate of the first stage through a second stage of membranes. The concentrate is disposed of via on-site deep well injection. Approximately 12 percent of the cartridge-filtered water bypasses the membrane process for permeate stabilization, prior to post-treatment.

During post-treatment, the permeate is conveyed through packed tower degasifiers for hydrogen sulfide removal. After degasification, sodium hydroxide is added for pH adjustment, followed by a corrosion inhibitor and sodium hypochlorite for disinfection. The finished water is stored in one of three ground storage tanks (GSTs) before passing through the high-service pumps to the distribution system. Figure 3-2 shows the Burnt Store RO WTP process flow diagram.

Figure 3-2 Burnt Store RO WTP Process Flow Diagram



The Burnt Store RO WTP process consists of the following components:

A) Source Water

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

B) Pre-Treatment Process

- Sulfuric Acid Chemical Feed System
- Scale Inhibitor Chemical Feed System
- Five Cartridge Filter Vessels

C) Membrane Treatment Process

- Five RO High-Pressure Feed Pumps
- Two 2-Stage RO Trains (500,000-gpd capacity each)
- Three 2-Stage RO Trains (750,000-gpd capacity each)

D) Post-Treatment Process

- Sodium Hypochlorite Chemical Feed System
- Sodium Hydroxide Chemical Feed System
- Corrosion Inhibitor Chemical Feed System
- Control Valve for Blended Raw Water
- Three Packed Tower Degasification Units
- Three Transfer Pumps

E) Storage

- 1.5 MG consisting of three 500,000-gallon Finished Water GSTs

F) Distribution High Service Pumps

- Two Distribution High-Service Pumps (medium flows)
- One Distribution High-Service Pump (high flows)
- Two Distribution Jockey Pump (low flows)

G) Concentrate Disposal

- Two Deep Injection Wells with a Total Capacity of 3.44 MGD
- One Dual-Level Deep Monitoring Well

H) Auxiliary Power

- One 1,250-kilowatt (kW) Generator (serving the Original RO Process Building, RO Process Building, Operations Building, and three On-Site Groundwater Wells)
- Two 80-kW Portable Generators (to serve four Remote Groundwater Wells)

3.2.1.1 Regulatory Considerations

The Burnt Store RO WTP is a Category II, Plant Class B, community Potable Water System (PWS).

The permit schedule includes:

- 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.

3.2.1.2 Water Quality Monitoring

As required by federal and state regulations for all utilities, CCUD routinely and continuously monitors the quality of the raw and finished water produced at the Burnt Store RO WTP. Monitoring wells are sampled quarterly and sent to the CCUD laboratory at the East Port WRF. Water quality data from the production and monitoring wells are reported to SWFWMD and stored on the CCUD Enterprise Asset Management System (EAMS). In addition to meeting regulations, water quality parameters are used to assess the performance of the WTP and to determine maintenance events.

Table 3-1 shows the Burnt Store RO WTP finished water quality for the past year. Additional water quality data are found in the Consumer Confidence Reports discussed in Chapter 4.

Table 3-1 Burnt Store RO WTP Finished Water Quality for FY 2017

Month	pH (Std Units)*	TDS (mg/L)*	Cond. (µS/cm)*	Total Chlorine (mg/L)*	Alkalinity (mg/L)*	Total Hardness (mg/L)*	Remote Sample pH (Std Units)	Remote Sample Total Chlorine (mg/L)
Oct-16	7.9	287	624	1.2	22	84	7.9	1.0
Nov-16	7.9	287	628	1.2	22	84	7.9	1.1
Dec-16	7.9	280	609	1.1	22	83	7.9	1.0
Jan-17	8.1	281	609	1.2	22	84	8.1	1.1
Feb-17	8.0	277	607	1.1	21	87	8.1	1.0
Mar-17	8.1	282	625	1.1	21	82	8.1	1.0
Apr-17	8.0	282	612	1.2	20	88	8.1	1.0
May-17	8.2	282	615	1.3	20	85	8.1	1.1
Jun-17	8.1	285	623	1.4	20	83	8.0	1.2
Jul-17	8.1	284	615	1.5	20	82	8.0	1.3
Aug-17	8.2	286	619	1.6	21	81	8.1	1.4
Sep-17	8.2	279	578	1.5	21	83	8.1	1.3
Annual Avg.	8.1	283	614	1.3	21	84	8.0	1.1

*GST Sample Location.
Note: mg/L = milligrams per liter.
µS/cm = micro Siemens per centimeter.

3.2.1.3 Production Wells and Treatment Capacity

The SWFWMD WUP (Permit No. 3522.012) specifies the Burnt Store RO WTP's permitted well capacities. Table 3-2 lists the well specifications and permitted withdrawal capacity of the current and future wells based on average day and peak month conditions.

Table 3-2 Burnt Store RO WTP Current and Future Production Wells

Well I.D. No.	Diameter (inches)	Depth Total/Cased (feet bls)	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[1]	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

Notes: bls = below land surface.
* Future wells.
[1] Well No. 15 is out-of-service. Rehabilitation of this well was discussed in the 2017 Brackish Groundwater Wellfield Study.

The permitted maximum day operating capacity of the WTP is 3.61 MGD. Table 3-3 shows the relationship of water withdrawn from wells, waste brine water discharged to the deep

injection wells, and finished water entering the distribution system. As of 2017, the Burnt Store RO WTP is operating on average at 14 percent of its design capacity.

Table 3-3 Burnt Store RO WTP Total Water Balance FY 2017

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-16	0.395	0.502	0.404	0.003	0.096
Nov-16	0.493	0.632	0.504	0.005	0.123
Dec-16	0.450	0.569	0.461	0.002	0.111
Jan-17	0.497	0.640	0.514	0.001	0.128
Feb-17	0.530	0.674	0.542	0.005	0.135
Mar-17	0.554	0.702	0.568	0.004	0.137
Apr-17	0.529	0.659	0.538	0.004	0.128
May-17	0.414	0.539	0.432	0.003	0.108
Jun-17	0.309	0.395	0.317	0.003	0.080
Jul-17	0.310	0.339	0.321	0.002	0.082
Aug-17	0.310	0.411	0.329	0.002	0.083
Sep-17	0.360	0.443	0.360	0.001	0.089
Annual Avg.	0.400	0.500	0.400	0.003	0.100

3.2.2 Treatment Components and Conditions Assessment

Jones Edmunds personnel preformed an on-site review of the WTP on February 13, 2018. A tour of the facility was conducted by the Chief Operator to review plant conditions, operations, and records. Access to the WTP is through a secure gate in a fence that surrounds the Burnt Store RO WTP and WRF. The water production building (shared with the Burnt Store WRF), motor control building, and operations/administration building are in excellent condition. Three Supervisory Control and Data Acquisition (SCADA) computer stations use computer graphic monitoring screens located on site. The site contains a small operations testing laboratory for monitoring water quality parameters such as conductivity, pH, and temperature.

The WTP site is well kept. Staff does an excellent job of keeping the interior of the buildings neat and clean as is customary for potable WTPs. All valves throughout the WTP are exercised once per year. Process piping is painted and clearly marked indicating the raw, feed, permeate, concentrate, and finished water streams. The stainless steel pipe and equipment are cleaned frequently. All compliance meters are calibrated every 6 months, and calibration tags are up to date.

Bulk-storage chemicals are in a covered area that is attached to the east end of the WTP process building. All tanks are housed in containment areas. The tanks and piping are painted and well-marked. Eyewash and shower stations are located at the bulk storage area and the chemical feed area.

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. All chemical feed pumps are operating and in good condition. The scale inhibitor, sodium hydroxide, and sodium hypochlorite chemical feed pipes occasionally leak due to the nature of the chemicals. The manufacturer of the chemical feed units indicated that the connections need to be checked regularly and tightened as needed. The chemical feed units are discussed in more detail in the following sections.

The required documents maintained on site include:

- Monthly Operating Reports
- Operating Permits for the WTP and Deep Injection Well
- Operators' Licenses
- Facility Logbook
- Facility Standard and Emergency Operating Plans
- Well Laboratory Reports
- Sampling Plans
- Laboratory Results
- Flow Meter Calibrations
- Chlorine and pH Meter Calibrations
- Chain-of-Custody Forms
- Facility Operations and Maintenance Manuals
- Maintenance Records (EAMS electronic data system)
- Facility Record Drawings
- Daily Temperature Logs
- Spill Protocol and Record of Spills

3.2.2.1 Source Water

The WTP currently uses six production wells with a total permitted AADF of 1,702,300 gpd. All wells have flow meters on their discharge pipes, and withdrawal rates meet the WUP requirements. Two of the production wells are outside the WTP site. Two of the four production wells on the Burnt Store RO WTP site were placed into operation in August 2010. In November 2009, nine groundwater monitoring wells were constructed and placed into operation. An additional three shallow groundwater monitoring wells were installed in February 2014.

All production wells are confined in fenced areas. Well pads are elevated from the surrounding ground and are not prone to flooding that would result from normal rain events. The well observations from the conditions assessment are as follows:

- Well No. 7 is an 8-inch-diameter well, located on site adjacent to the WTP's back-up generator. This is the oldest well in operation at the WTP, but it remains in good condition.

Minor rust was observed on the stainless steel wellhead and butterfly valve operator.

- Well No. 8 is an 8-inch-diameter well, located on site near the WTP entrance. The well pump was replaced in February 2015 and is in good condition. Minor rust was observed on the pressure transducer saddle.
- Well No. 9 is an 8-inch-diameter well, located on site near the GSTs. A new well pump and motor were installed in 2016. Minor rust was observed on the wellhead and butterfly valve operator, but overall the well is in good condition.
- Well No. 11 is a 12-inch-diameter well located off site on Burnt Store Road. The well meter flow tube and check valve were replaced in February 2016 and are in excellent condition. Minor rust was observed on the wellhead stainless steel pipe.

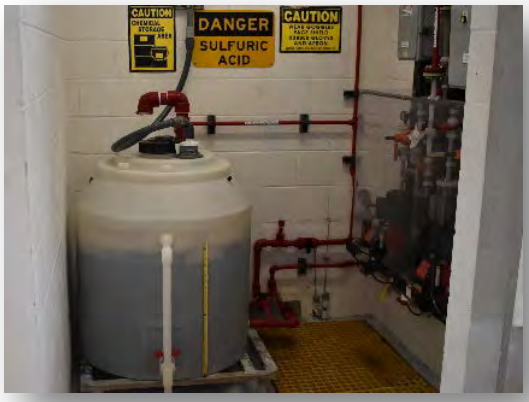
- Well No. 12 is a 12-inch-diameter well located off site on Burnt Store Road. Minor rust was observed on the stainless steel wellhead pipe, but the pump and motor are in excellent condition.
- Well No. 15 is located at the rear of the site. The well pump and piping are in excellent condition. However, 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 trailer for multiple site use. The 2013-issued WUP required this well be abandoned and capped. A study was completed in 2017 to evaluate an alternative way to bring this well back into service. The study is currently being reviewed.
- Well No. 16 is a 12-inch-diameter well located on the east side of the site. The skid-mounted generator has been moved to a mobile trailer for multiple site use. The well pump is in excellent condition.

3.2.2.2 Pre-Treatment Components

Sulfuric Acid Addition

Sulfuric acid is used to decrease the pH of the raw water and prevent calcium carbonate precipitation. The 1,000-gallon bulk sulfuric acid storage tank is outside in the covered bulk storage area. The 100-gallon sulfuric acid storage tank near the chemical meter skid is indoors near the chemical feed skid. The sulfuric acid skids contain two metering pumps. The metering

pumps are in good working condition. The concrete in the secondary containment in the bulk chemical storage area needs to be painted. The 100-gallon tank has a leak and is buckling at the top of the tank. This tank should be replaced.



Scale Inhibitor Addition

Scale inhibitor is used to prevent precipitation and scaling of carbonate, sulfate, silica, and iron onto the membrane surface. The scale inhibitor is stored in a 75-gallon tank near the scale inhibitor feed skid in the process room. The scale inhibitor skid contains two metering pumps for redundancy. The scale inhibitor system is in good condition.

Cartridge Filtration

The facility contains five stainless steel cartridge filter housing vessels. Each vessels holds 40 1-micron cartridge filters. The pressure differential of each cartridge filter vessel is monitored to determine when filters need to be replaced.

The vessels are in good condition, and the staff changes the filters within the recommended differential pressure. No irregularities were reported, and the equipment appeared to be in excellent working order at the time of the site visit.

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

3.2.2.3 Membrane Treatment Components

RO Feed Pumps

The Burnt Store RO WTP has five 2-stage RO process trains, A through E. Trains A and B were installed in 2007, and Trains C, D, and E were installed in 2009. Trains A and B are served by two horizontal split-case pumps, and Trains C, D, and E are fed by vertical turbine pumps. Each RO feed pump is painted and in good condition.

Membranes

Trains A and B are arranged in an 8:4 array: eight pressure vessels in the first stage and four pressure vessels in the second stage. Trains C, D, and E are arranged in a 14:6 array. Each pressure vessel contains seven RO membrane elements resulting in a total of 84 for Trains A and B and 120 for Trains C, D, and E. The total number of membrane elements at the Burnt Store RO WTP is 528.

Sampling and Instrumentation

Membrane performance is assessed by monitoring the pressure, recovery, and water quality of the system. Staff have the ability to monitor water quality and pressure throughout the membrane process. Sampling sinks and instrumentation are operating properly and in good condition.

Membrane Cleaning System

Over time, membranes may experience fouling due to scaling, plugging, break-through, or a number of additional factors. Reversible fouling can be mitigated by in situ cleaning of the membranes, whereas some fouling may require membrane replacement. The WTP's cleaning system is in excellent condition since cleanings are not performed unless water quality or membrane efficiency is substantially reduced.

The older trains (A and B) are still producing good quality permeate but operate at a higher pressure indicating minor fouling is occurring. A cleaning was last conducted on Train A in 2012 to reverse the effects of fouling and reduce operating pressure. Minor improvements were achieved indicating that fouling is irreversible and will eventually require membrane replacement. Treatment Trains C, D, and E are in good working condition, with the exception of some leaks on the concentrate port seals on Trains C and D. A membrane company technician replaced one seal and trained the staff to replace other leaking seals. The leaks pose no environmental hazards or water quality issues.

3.2.2.4 Post-Treatment Components

Degasification and Clearwell

Hydrogen sulfide is removed from the RO permeate via packed tower degasification. Three packed tower degasification units are located on top of the concrete clearwell and can be operated automatically or manually. One of the degasifier blowers was repaired in February 2017. The degasifier media is expected to be in good condition, and the units are performing as designed. In 2014, the clearwell was temporarily taken out of service for inspection. The clearwell inspection report noted for staff to paint and exercise the isolation valve between the two 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.

Degasified water is transferred from the clearwells to the GSTs by three horizontal centrifugal pumps. In 2013, two in-line static mixers were installed in the transfer pipe leading to the GSTs to mix sodium hydroxide, corrosion inhibitor, and sodium hypochlorite. In 2015, the redundant and leaking air release valves downstream of the pumps were removed and two additional air-release valves were placed within 25 feet of the removed air-release valves.

Sodium Hydroxide

Sodium hydroxide is used to adjust the pH of the finished water before pumping it into the distribution system. The sodium hydroxide system consists of a 1,100-gallon bulk storage tank, a chemical feed skid with two metering pumps, and a 90-gallon chemical feed tank. The skid and smaller storage tank are in the RO process room and are in good condition. The bulk storage tank is outside near the other bulk chemical storage tanks, which poses operational issues during cold weather. When temperatures are less than 45 degrees Fahrenheit (ºF), operators install heat lamps to prevent the sodium hydroxide viscosity from increasing. The current sodium hydroxide dosing rate is small enough that the bulk storage tank is not being used. The site glass gauge is broken off at the connection point at the bottom of the 1,100-gallon bulk storage tank and the ball valve on the transfer line from the bulk tank to the day tank is leaking. The ball valve should be repaired and the site glass gauge replaced before the bulk tank is placed into service.

Corrosion Inhibitor

A zinc-orthophosphate-based corrosion inhibitor is used to reduce the dissolving of copper, lead, and zinc in the distribution system. A 30-gallon tank and chemical feed pump are indoors near the high-service pumps. The system is in good condition.

Sodium Hypochlorite

The sodium hypochlorite system consists of two bulk storage tanks, one 200-gallon storage tank, two chemical metering pumps, and two injection points. Sodium hypochlorite is primarily injected before water enters the storage tanks (pre-disinfection), although operators also have the capability of injecting after the GSTs (post-disinfection) if needed to boost chlorine residual. The bulk storage tanks are outside the process room and hold 1,400 and 1,100 gallons, respectively. The smaller storage tank and chemical feed skid are in a

segment of the RO process room. The sodium hypochlorite system is in good operating condition.

Redundant analyzers that monitor all post-treatment conditions of the water are on the wall of the clearwell. The instruments are well organized with SCADA connections to the Wonderware program, which can be monitored from the operations building. Instruments and chemical feed rates can be adjusted to obtain the proper water quality. All instrumentation is calibrated and up to date.

Ammonium Sulfate

Because the distribution system currently operates with free chlorine, the ammonia system used to produce combined chlorine residual (chloramine) is not being used. Disinfection via chloramination may be used when the Burnt Store water system is expanded or connected to another water system that uses chloramines such as the PRMRWSF. In the meantime, the chemical feed pumps for this system have been stored indoors for use as spares for other chemical feed systems.

3.2.2.5 Storage

The Burnt Store RO WTP contains three 0.5-MG concrete GSTs housing a total of 1.5 MG of finished water. GSTs A and B were cleaned and inspected in FY 2013, and GST C was inspected in FY 2014. No sedimentation or defects were found in any tank. The outside of the storage tanks should be painted.

3.2.2.6 Distribution High-Service Pumps

The RO WTP has two medium-flow pumps, one high-flow high-service pump, and two jockey pumps providing flow to the distribution system. The two medium-flow pumps were installed in early 2012 to more accurately match the system flow needs. One of the jockey pumps was installed in August 2017.

Normally, the jockey pump and either of the two 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 pounds per square inch (psi) at the beginning of the distribution system at the water plant regardless of the water use. The motor on Jockey Pump A should be painted, but all the high-service pumps are operational and in good condition.

3.2.2.7 Concentrate Disposal/Deep Injection Wells

Concentrate from the RO process is disposed of by means of the on-site Deep Injection Wells IW-1 and IW-2. Both wells are permitted to accept concentrate and treated wastewater effluent. Concentrate is transferred to the deep well pumping station clearwell by latent pressure in the RO trains. There it is combined with wastewater effluent and injected into the deep wells. The maximum capacity of IW-1 is 0.564 MGD at a maximum rate of 392 gallons per minute (gpm). The maximum capacity of IW-2 is 2.88 MGD at a maximum rate of 2,000 gpm.

Both injection wells have flow meters and pressure gauges that can be monitored in the control room. Both wells undergo mechanical integrity testing every 5 years. A mechanical integrity test was successfully performed on IW-2 in 2013. A vibration analysis was also conducted for the vertical turbine injection well pumps in 2017. Due to the test results, the pumps were reprogrammed to minimize wear and appear to be functioning properly at the time of the site visit. The pumps at the station need to be painted.

3.2.2.8 Standby Power

Auxiliary power is adequately sized to run the WTP. The WTP generator and automatic transfer switch were part of the 2009 upgrade of the WTP. The standby generator is operated for 4 hours under load twice per month. An outside contractor performs the maintenance. Additional details regarding electrical components of the WTP are discussed in subsequent chapters.

Two 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 well.

3.2.3 OPERATIONS

The facility is staffed 16 hours per day, 7 days a week. The Burnt Store RO WTP operators remotely monitor the pressures in the Burnt Store distribution system 24 hours per day. Alarms can be evaluated, and operators or maintenance personnel can be deployed to take corrective action, if necessary. Since the water demand of the system does not require 24-hour production, the RO trains are regularly alternated to reduce membrane fouling.

3.2.4 MAINTENANCE

Routine maintenance is performed on a scheduled basis. Rehabilitation of major pieces of equipment is completed according to the CIP that is revised yearly. Maintenance that is required to keep the WTP in compliance with regulations is performed immediately using in-house maintenance personnel or outside contractors. 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 daily. Inspection results are recorded in a log. Leaks or other malfunctions are addressed immediately or referred to the Chief Operator for maintenance.

As part of the daily inspection, staff examines the membrane process piping and tightens pipe fitting bolts when necessary. Operators visually check the union connections and other potential sources of leaks for each chemical storage and feed system daily and tighten as needed. The staff changes the filters every 6 months or when the differential pressure across the vessel exceeds 50 psi. Membranes are cleaned or replaced as needed determined by continuous water quality and hydraulic monitoring. All three GSTs at the Burnt Store RO WTP were cleaned and inspected in FY 2013 and 2014 and did not reveal any deficiencies. GSTs are scheduled for cleaning and inspection every 5 years in accordance with FDEP Rule 62.555.350(2), FAC. As a result of the maintenance practices and the new high-service pumps that were placed into operation in FY 2013, no service interruptions due to pump malfunction occurred in 2017.

3.2.5 REVIEW OF PREVIOUS REPORT RECOMMENDATIONS

Table 3-4 summarizes the recommendations and current status from the 2016 Annual Report for the Burnt Store RO WTP.

Table 3-4 CCUD Burnt Store RO WTP 2016 Recommendations and Status

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:	*Completed. The second jockey pump was installed in 2017.*
Recommendation:	Continue to inspect and tighten the connections for the scale inhibitor, sodium hydroxide, sodium hypochlorite, and sulfuric acid pipes daily 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 No. 15.
Progress:	*An evaluation with the assistance from consultants was ongoing in FY 2017.*

Recommendation:	Continue the Brackish Wellfield Study to determine alternative raw water well locations and transmission requirements for an expanding service area.
Progress:	*An evaluation with the assistance from consultants was ongoing in FY 2017.*

3.2.6 SUMMARY AND RECOMMENDATIONS

CCUD purchases water treated at the PRMRWSF to serve its Central/West distribution system and produces water at the Burnt Store RO WTP to serve the South County distribution system. The PRMRWSF is owned, operated, and maintained by the PRMRWSA, and the Burnt Store RO WTP is owned, operated, and maintained by CCUD. Charlotte County's allocation of the PRMRWSA-produced water is currently 16.1 MGD, and the Burnt Store RO WTP permitted capacity is 3.61 MGD AADF. Overall, CCUD purchased or produced an average of 13.0 MGD of water in FY 2017. On average, the Burnt Store RO WTP is operating at 14 percent of its design capacity. CCUD routinely and continuously monitors the quality of the raw and finished water sources. Monthly operating and water quality reports indicate the water delivered to the distribution system meets or exceeds regulatory quality requirements.

Similar to other brackish groundwater RO WTPs, the process components include chemical pretreatment, cartridge filtration, membrane treatment, degasification, and post-treatment stabilization and disinfection. Chemical use and cartridge filtration are conducted as recommended. The membrane elements in Trains A and B are approximately 11 years old and have shown signs of minor membrane fouling. The membrane elements in Trains C, D, and E are 9 years old. Cleaning was conducted on Trains A and B in 2012, but little performance was recovered. Overall, the Burnt Store RO WTP is in good condition. Minor items were noted during the site visit. The WTP is clean and well organized, and staff continually performs maintenance. Recommendations from the 2016 Annual Report continue to be implemented. Table 3-5 lists the recommendations from the 2017 site visit.

Table 3-5 CCUD Burnt Store WTP – 2017 Recommendations

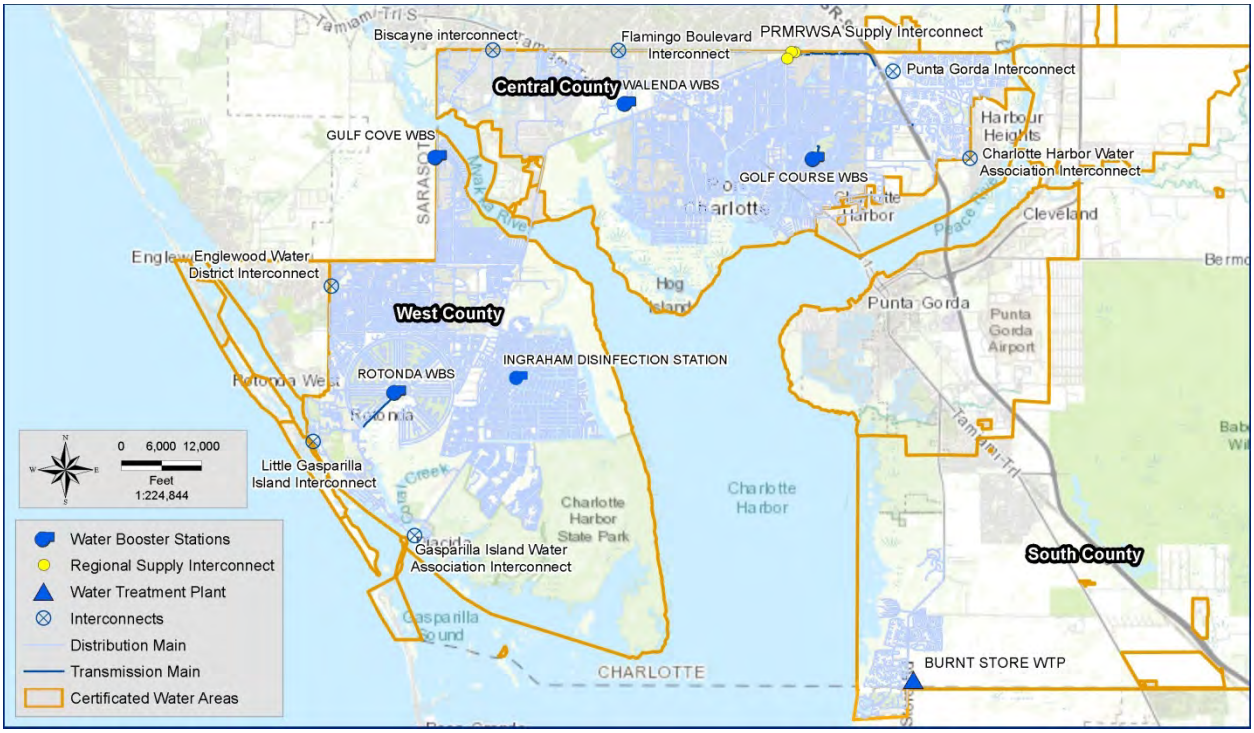
Recommendation:	Continue the Brackish Wellfield Study to determine alternative raw water well locations and transmission requirements for an expanding service area.
Recommendation:	Determine the ultimate use of Well No. 15.
Recommendation:	Continue to inspect and tighten the connections for the scale inhibitor, sodium hydroxide, sodium hypochlorite, and sulfuric acid pipes daily to prevent leakage.
Recommendation:	Replace the acid tank in RO process building.
Recommendation:	Replace multiple end caps that are leaking on Trains C and D.
Recommendation:	Evaluate the associated costs of operating at higher pressures to determine the optimum time to clean/replace membrane elements in Trains A and B. If cleaning is required, train staff on a cleaning procedure. If membrane replacement is required, obtain budgetary estimates for membrane replacement and account for the costs in the CIP.
Recommendation:	Repair the sodium hydroxide bulk storage tank gauge and ball valve.

Recommendation:	Paint the degasification towers.
Recommendation:	Replace the 100-gallon sulfuric acid tank.
Recommendation:	Paint the acid bulk storage containment area.
Recommendation:	Paint the motor on Jockey pump A.
Recommendation:	Paint the deep well injection pumps.
Recommendation:	Repair the cameras on site.
Recommendation:	Paint the GSTs.
Recommendation:	Conduct 5-year GST cleaning and inspections in accordance with FDEP Rule 62-555.350(2).

4 WATER DISTRIBUTION SYSTEM

This Chapter reviews and presents the CCUD's potable water distribution system. The water distribution system components were evaluated by Jones Edmunds personnel on February 13, 2018. The CCUD water distribution system consists of two independent systems. The larger system that serves the central and west portions of Charlotte County (referred to as Central/West County) is supplied with water from PRMRWSA and uses chloramine as the disinfectant. The smaller system that serves the south area of Charlotte County (South County) is supplied by water from the CCUD-owned Burnt Store RO WTP, which uses free chlorine as the disinfectant. Figure 4-1 shows the certificated water service area and water distribution system infrastructure.

Figure 4-1 CCUD Water Distribution System



At the end of FY 2017, CCUD had 56,330 customer accounts in the Central/West County distribution system and 2,445 Burnt Store customer accounts. The two systems contained 1,325 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 5,424 fire hydrants at the end of FY 2017.

The CCUD water distribution system consists of the following major components:

- Regional transmission mains to transport water from the PRMRWSF to the CCUD Central/West County distribution system with flow meters at connections to the Charlotte County system.
- CCUD transmission mains that supply water to the distribution mains from the regional transmission mains.

- Transmission mains in South County that transport water from the Burnt Store RO WTP to distribution mains in South County and 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 sections for maintenance purposes.
- GSTs 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.
- Water booster stations (WBSs) adjacent to GSTs and associated disinfection chemical feed facilities.
- A 24-inch check valve on the main supply line from PRMRWSF to maintain system pressures and reserve water supply if the PRMRWSF is unable to supply water and pressure during emergencies.
- Interconnects with neighboring utilities for system redundancy and system flexibility.

4.1 CENTRAL / WEST COUNTY DISTRIBUTION SYSTEM

The Central/West County distribution system water is supplied to CCUD through four PRMRWSA-owned regional transmission mains. The original pipeline is 36-inch diameter supplemented by a 12-inch line. In September 2007, a 24-inch main became operational. In August 2012, a 42-inch main became operational. The Central/West County distribution system consists of six above ground, pre-stressed concrete GSTs (two have been decommissioned) with an active combined capacity of 10 MG, four WBSs, six interconnects, and approximately 1,400 miles of water pipes between 2 and 24 inches in diameter. The following sections describe the system interconnects and WBSs in Central/West Charlotte County.

4.1.1 INTERCONNECTS

The Central/West County distribution system contains a number of interconnects with neighboring utilities. Although it is typical for some utilities to use interconnects to sell water to neighboring systems, the PRMRWSA contract restricts members from selling water supplied by the PRMRWSA outside the member's service area without permission from the Authority. Therefore, the CCUD primarily uses its interconnects for redundancy and system flexibility.

4.1.1.1 Punta Gorda Interconnect

The Phase 1A Punta Gorda Interconnect (Kings Highway/Shell Creek Loop) consists of over 12 miles of pipeline with a minimum design capacity of 6.0 MGD, above ground storage, high-service pumping, disinfection facilities, and tie-in points with CCUD. 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. Phase 1A construction was completed in October 2012. The interconnection has been used

to supply water to the City of Punta Gorda and receive water into the Charlotte County distribution system from the Punta Gorda system.

In FY 2017, Punta Gorda supplied 130 MG of water to Charlotte County, and Charlotte County supplied 158 MG to Punta Gorda through this interconnect.

Condition Assessment

Overall, the interconnect is in good condition and no deficiencies were noted.

4.1.1.2 Englewood Water District Interconnect

The Englewood Water District (EWD)/CCUD 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-horsepower (HP) booster pumps with a diesel generator for backup power supply. Monitoring at the interconnect facility includes total chlorine residual, pressure, and flow. No storage or chemical dosing is provided 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 as stipulated by the PRMRWSA contract.

In FY 2015, Charlotte County completed minor modifications to the pumps and piping system that allow this facility to increase water circulation in the west portion of CCUD's service area. A new flow meter was installed and shows the circulation is approximately 750 gpm. This change has resulted in increased system pressure and chlorination residual levels in the area that are required to meet state delivery disinfection requirements.

Over the past 3 years, one O&M improvement was completed at this interconnect – a faulty human-machine interface (HMI) was replaced in FY 2017.

Condition Assessment

Overall, the interconnect is in good condition.

The following deficiencies were noted:

- No roof is provided to protect the pumps, control panels, and piping at the site.
- The pressure gauge on Pump 2 was vibrating making it difficult to obtain a proper reading.

4.1.1.3 Other Interconnects

As a further safeguard for uninterrupted supply of water to Charlotte County citizens, CCUD has two additional emergency interconnects with adjacent water distribution systems: two permanent connections with the City of North Port water system, and one connection with

the Gasparilla Island Water Association. The two emergency interconnects are with Charlotte Harbor Water Association and Gasparilla Island Water Association.

The connection to Little Gasparilla Island was completed in FY 2015. Water is delivered to the island community through an 8-inch pipe that was installed under the intracoastal waterway. Little Gasparilla Island purchases its water by flow through a master meter. The water distribution system on Little Gasparilla Island is not owned or maintained by CCUD.

One O&M improvement was completed over the past 3 years – a flow meter at the Biscayne interconnect with North Port was replaced in FY 2017.

Condition Assessment

Overall, the interconnects are in good condition.

The following deficiency was noted:

- No meter is provided at the North Port interconnect at Flamingo Boulevard.

4.1.2 Water and Chemical Booster Stations

Water and chemical booster stations are strategically located in the distribution system and typically adjacent to GSTs. All equipment at the booster 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 booster stations operations and their respective conditions.

4.1.2.1 Port Charlotte Golf Course Booster Station

The Port Charlotte Golf Course Booster Station is at 22339 Gleneagle Terrace, Port Charlotte, FL 33952. The station provides local storage, pressure, and disinfectant boosting capability for the Central County service area east of Tamiami Trail. The station was built in 1966 and rehabilitated in 2010. The station contains a climate-controlled laboratory and electrical room, a ventilated pump and chemical feed room, and a 1-MG GST. The station is fenced and has one automatic access gate. The station contains two chemical injection systems for sodium hypochlorite and ammonium sulfate addition. Each system contains three metering pumps and two chemical storage tanks. The two 300-gallon ammonium sulfate storage tanks and two 800-gallon sodium hypochlorite tanks are under a covered shed adjacent to the pump room. The County operates the station to maintain a 4.0-mg/L disinfectant residual using a Chemscan process analyzer and a Wallace & Tiernan DEPOLOX 3 plus total chlorine analyzer. The station has a detached diesel generator for backup power supply.

The following major upgrades were made over the last 3 years:

- 2014 – The GST was cleaned and inspected; no deficiencies in the tank wall were noted in the inspection report.
- 2014 – A combination chlorine and ammonia instantaneous reading instrument was installed between the GST and the pump suction. The instrument determines the appropriate chemical to dose to maintain the proper chloramine concentration.

- 2014 – A 70-foot pole/antennae combination was installed at the site to assist with the County's automatic meter reading initiative.
- 2015 – The chemical feed lines from the bulk chemical storage tanks to pumps to injection points were replaced.
- 2016 – The GST was painted.
- 2017 – The holes penetrating the building walls from the new chemical feed lines were patched.
- 2017 – All site cameras were repaired.
- 2017 – The sodium hypochlorite skid was rebuilt.

Condition Assessment

The station is in excellent condition with updated equipment and building furnishings. Graveled areas around the station infrastructure are weeded, and landscaping is well maintained. The indoor buildings are kept clean, and tools and equipment are organized and stored properly. The high-service pumps are well maintained and functioning properly.

The following deficiency was noted:

- The Chemscan process analyzer requires constant maintenance and calibration.

4.1.2.2 Walenda Booster Station

The Walenda Booster Station is at 17177 Walenda Avenue, Port Charlotte, FL 33953. The property contains potable water and reclaimed water infrastructure including reclaimed and potable water GSTs. The potable water GST has a capacity of 2 MG. The potable water station was built in 1994 and has two 100-HP and three 75-HP pumps. The pumps and electrical components are in a ventilated room. The laboratory and office are in a climate-controlled room. The station is fenced and has two entrances with automatic gates. The station contains two liquid-handling systems for sodium hypochlorite and ammonium sulfate injection. The sodium hypochlorite system contains two 1,000-gallon bulk storage tanks and a chemical injection skid. The ammonium sulfate system consists of two 300-gallon bulk storage tanks and a chemical skid. The chemical skids for sodium hypochlorite and ammonium sulfate each contain two metering pumps and are in ventilated rooms. The bulk storage tanks are outside under covered sheds within secondary containment structures. The County operates the station to maintain a 4.0-mg/L disinfectant residual using a Hach APA 6000 ammonia/monochloramine analyzer and a

Wallace & Tiernan DEPOLOX 3 plus total chlorine analyzer. A diesel generator is in the pump room to provide backup power to the station.

The following operation and maintenance improvements were completed over the past 3 years:

- 2014 – Interior cleaning and inspection of the GST were performed.
- 2015 – The exterior of the GST was painted.
- 2015 – Pump No. 4 and its suction valve were replaced.
- 2016 – New chlorine storage and containment area was added.
- 2016 – Ammonia scales were removed and converted to ultra-sonic volume measurement.
- 2017 – A new flow meter assembly was installed to improve meter accuracy and distribution of disinfectant.
- 2017 – The 1,000-gallon sodium hypochlorite bulk tank was replaced and a containment wall was constructed.
- 2017 – All site cameras were repaired.
- 2017 – The ammonium sulfate and sodium hypochlorite skids were rebuilt.
- 2017 – Motor No. 4 was rebuilt and Motor No. 5 was replaced.
- Ongoing – Stratification of the GST is checked to confirm mixing in the tank.

Condition Assessment

The general condition of the station is good. The access roads outside the facility are aging, but inside the property are in decent condition. Graveled areas around the station infrastructure are weeded, and landscaping is well maintained. The indoor buildings are kept clean, and tools and equipment are organized and stored properly. The high-service pumps are well maintained and functioning properly.

The following deficiencies were noted:

- Exposed concrete was observed on the floor of the chemical skid rooms.
- The outside of the GST has been patched and painted in recent years. Operators are concerned about wall leaks in the interior of the tank.

4.1.2.3 Gulf Cove Booster Station

The Gulf Cove Booster Station (WBS No. 3) was built in 1980 and is at 12050 Van Lenten, Port Charlotte, FL 33981. The station receives flow through an aging 12-inch ductile iron pipe that spans under the Myakka River and feeds the 2-MG GST. The station has four high-service pumps, rated at 50, 60, 75, and 100 HP, respectively. The pumps and electrical components of the station are in a ventilated building. The station is fenced and contains two entrances with automatic gates.

The station contains two chemical injection systems for ammonium sulfate and sodium hypochlorite addition. Each skid has two chemical feed pumps for redundancy. The booster station has two 600-gallon chlorine storage tanks and two 300-gallon ammonia storage tanks. Chemical skids and associated analyzers are in ventilated buildings, and the chemical storage tanks are outside under covered sheds. The sodium hypochlorite storage tanks are double walled, and the ammonium sulfate storage tanks contain secondary containment basins for safety purposes.

Disinfectant residual is continuously monitored using a Hach 5500sc ammonia/ monochloramine analyzer. The County operates the station to maintain a 4.0- mg/L disinfectant residual. The booster station contains a diesel generator as a backup power supply.

The following operation and maintenance improvements were completed over the past 3 years:

- 2014 – Electrical switchgear was replaced.
- 2014 – The programmable logic controller (PLC) telemetry system controls were upgraded for the chemical system.
- 2014 – The tank exterior was repainted.
- 2015 – A new chemical feed line was installed between the chemical building and the chemical feed point at the above ground piping assembly leaving the site.
- 2015 – A monochloramine and ammonia analyzer was installed to better adjust disinfection chemical addition. The analyzer is serviced and calibrated quarterly.
- 2015 – The 5-year tank inspection was performed by CROM Engineering and Construction Services. Next inspection is due in 2020.
- 2015 – A raised-bed septic disposal system was installed to accommodate on-site bathroom facilities.
- 2016 – CCUD staff renovated the old chemical storage and metering rooms into an operations room and a restroom.
- 2016 – The PLC was upgraded to include pump operations.
- 2017 – A window was installed in the office to view the gate and chemical skids.
- 2017 – Exterior lighting was repaired
- 2017 – All site cameras were repaired.
- 2017 – Motor No. 2 was replaced.

Condition Assessment

The station is generally in good condition. Roads and landscaping are well maintained. Graveled areas around the facility infrastructure are weeded, the grass is cut, and the perimeter fencing is devoid of plant growth. The indoor buildings are kept clean, and tools and equipment are organized and stored properly. High-service pumps are well maintained and functioning properly. In 2016, the County began planning to install a new water feed pipe across the Myakka River. The project is ongoing.

The following deficiencies were noted:

- The pipe connecting the GST to the pump station is constructed of formed concrete, which is not industry standard.
- The concrete support on the GST influent pipe was corroded.
- Liquid was observed on the floor of the ammonium sulfate chemical injection room.
- The paint on the floor of the sodium hypochlorite injection room was eroded.
- No eye wash station is provided in the new on-site operations room.

4.1.2.4 Rotonda Booster Station

The Rotonda Booster Station (WBS No. 6) is at 46 Parade Circle, Rotonda, FL 33947. Built in 1973, the station has two 100-HP pumps, two 65-HP pumps, and a 5-MG GST. The pumps and electrical components of the station are in a ventilated building. The station also contains a separate climate-controlled building with an office and laboratory. The station is fenced and contains one gated entrance.

The station has two chemical feed systems for injecting ammonium sulfate and sodium hypochlorite. The ammonium sulfate skids are in a ventilated shed, and each contains two metering pumps for injection before and after the GST. The sodium hypochlorite skids are in a chemical room attached to the main pumping room, and each contains two metering pumps for injection before and after the GST. Ammonium sulfate is stored in two 300-gallon bulk storage tanks and sodium hypochlorite in two 1,000-gallon bulk storage tanks. The chemical storage tanks are housed within a covered structure with secondary containment chambers for safety.

Disinfectant residuals are continuously monitored using a Hach 5500sc ammonia/monochloramine analyzer. The County operates the station to maintain a 4.0-mg/L disinfectant residual. A diesel generator is available on site to provide backup power supply to the station.

The following O&M improvements were completed over the past 3 years:

- 2015 – A 16-inch discharge flow meter was replaced.
- 2015 – A discharge isolation valve was installed to allow complete isolation of the booster station from the distribution system.
- 2015 – A new access gate was installed.
- 2015 – The sodium hypochlorite tank was replaced.
- 2015 – New chlorine feed pump skids were installed – one for pre-GST disinfection and one for post-GST disinfection.
- 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 the chemical feed systems.
- 2016 – The GST was drained, cleaned, and inspected per FDEP protocol of every 5 years.
- 2017 – The exterior of the GST was painted.
- 2017 – The decommissioned lime-softening water plant adjacent to the GST was demolished.
- 2017 – Two new shelter roofs for the ammonia tank and equipment storage were constructed.
- 2017 – Security cameras were replaced.
- 2017 – The Hach 5500sc monochloramine and ammonia analyzer was installed.
- 2017 – The 1,000-gallon sodium hypochlorite bulk storage tank was replaced.
- 2017 – Pump No. 3 was rebuilt.

Condition Assessment

The station is in good condition. Roads and landscaping are in decent condition. Graveled areas around the facility infrastructure are weeded, but minor plant growth on the perimeter fencing was observed. The indoor buildings are kept clean, and tools and equipment are organized and stored properly. The County has plans to install a 24-inch water transmission main from Ingraham Street to the Rotonda GST in 2017.

The following deficiencies were noted:

- Rust on the pump bases was observed on the High-Service Pumps 1 and 3.
- The concrete flooring is exposed in the sodium hypochlorite skid feed room.
- The top of the diesel fuel storage tank for the generator is rusted and collects rainwater.

4.1.2.5 Ingraham Disinfection Station

The Central/West County distribution system contains one disinfection booster station at 14276 Ingraham Boulevard, Port Charlotte, FL 33981. The Ingraham Boulevard chlorine/ ammonia injection station monitors chlorine residual and injects additional disinfection chemicals to maintain the FDEP-required levels. The injection station is enclosed in a 6-foot chain link fence with barbed wire on top. The station contains two ventilated buildings that serve as an office and house the chemical skids. Each skid contains one metering pump. The system does not have a permanent back-up generator and relies on the sewer system pump station power adjacent to the booster station. A total chlorine residual of 4.0 mg/L is

maintained by injecting sodium hypochlorite at a rate that is paced by the flow passing the station. The chlorine level and local water pressure are monitored continuously.

The following upgrade was made over the last 3 years:

- A new chloramine-addition control was installed in 2016.

Condition Assessment

The general condition of the station is fair. The buildings are weathered but in operational condition. The landscaping is maintained.

The following deficiencies were noted:

- Chemical feed skids contain one chemical feed pump each, and redundant pumps are not on site.
- The sodium hypochlorite tank is not covered, exposing the tank and pipes to sun, which ages the material more quickly.

4.1.3 STORAGE

GSTs are typically located at WTPs and booster pump stations. The tanks are designed to be filled by system pressure. The water is pumped from the GST and pressurized to the desired system pressure before re-entering the distribution system. The GSTs provide the following functions for the CCUD water supply system:

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

Four operational potable water GSTs are within the main (Central/West County) CCUD service area, ranging in capacity from 1 MG to 5 MG, for a total capacity of 10 MG. Table 4-1 lists the GST capacity and number of pumps at each booster station.

Table 4-1 GST Capacities

Booster Station Name	GST Capacity (MG)	Number of Pumps
Golf Course	1	2
Gulf Cove	2	4
Rotonda	5	4
Walenda	2	5
Total	10	15

In addition, six 2-MG GSTs (for a total capacity of 12 MG) are at the PRMRWSF. 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 PRMRWSF.

4.1.4 OPERATIONS

Treated water from the PRMRWSF enters the main CCUD service area via four 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 5-MG tank through a 16-inch transmission main from the Walenda Booster Station to the Rotonda GST. This 16-inch transmission pipe also serves customers along its route. Sodium hypochlorite and ammonium sulfate are injected into the system to maintain proper disinfectant concentrations in the GSTs. 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.

Sound operating and maintenance processes implemented by a well-trained staff maintain the CCUD system's integrity. Expected 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 water pressure to CCUD customers. CCUD 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. CCUD requires staff to take the course before sitting for the state certification tests.

4.1.5 WATER AUDIT

CCUD maintains a continuous, monthly water audit for its Central/West County water distribution system. Table 4-2 shows the Central/West County audit results for FY 2017. The audit table compares the water received from the PRMRWSF to the sum of total water billed to customers, water used for distribution system flushing and fire department use, and water loss due to identified leaks and breaks.

CCUD 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 part per million (ppm). A large portion of the flushing water used is to maintain chlorine residual levels in the distant, isolated parts of the distribution system.

Water loss due to line breaks is estimated based on the pressure in the line before the break and the size of the pipe. At present, most main breaks are caused by contractors excavating for other utility installations or due to aging pipe in the system. For example, new telephone systems are being changed from copper to fiber, new electricity poles are being installed, and underground lines are replacing old pole lines. Loss due to line breaks is estimated at 52,941 gpd or less than 0.5 percent of the total FY 2017 water use.

The unaccounted-for water loss column is the total metered water (Column 2) minus the sum of the known usages (Columns 3 through 8). 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 CCUD Central/West County System was approximately 851,469 gpd or 7.6 percent.

Table 4-2 CCUD Unaccountable Water Report (Central/West County) FY 2017

Month	Total Metered Water (gal)	Sold (gal)	Construction Flushing (gal)	Hydrant Flushing (gal)	Construction Fill (gal)	Line Breaks (gal)	Fire Fighting (gal)	Unaccounted-for Water Loss (gal)[1]
Oct-16	321,642,000	216,372,000	0	34,129,747	0	788,727	30,000	70,321,526
Nov-16	353,918,000	271,360,000	21,910	31,392,530	803	335,810	30,000	50,776,947
Dec-16	373,250,000	285,712,999	0	36,707,525	0	4,004,924	30,000	46,795,551
Jan-17	365,560,000	331,965,000	1,176,120	34,762,765	63,299	991,892	30,000	(3,429,076)
Feb-17	341,364,000	287,515,000	16,250	31,035,445	4,893	409,278	30,000	22,353,134
Mar-17	397,129,000	286,948,000	51,903	35,091,525	12,282	848,046	30,000	74,147,244
Apr-17	381,577,000	345,813,000	1,032,850	33,340,006	68,953	382,899	30,000	909,292
May-17	373,694,000	298,161,000	1,218,702	34,504,305	36,704	3,536,491	30,000	36,206,797
Jun-17	294,410,000	285,036,000	319,670	36,606,335	12,517	1,701,582	30,000	(29,296,105)
Jul-17	306,519,000	260,143,000	350,363	36,510,860	172,461	3,585,158	30,000	5,727,158
Aug-17	296,666,000	223,198,000	5,435	34,650,005	217	1,203,864	30,000	37,578,479
Sep-17	282,222,000	249,711,000	900,750	31,344,210	5,870	1,534,859	30,000	(1,304,689)
Total (gal)	4,087,951,000	3,341,934,000	5,093,953	410,075,258	378,000	19,323,531	360,000	310,786,259
Annual Average (gpd)	**11,199,866**	**9,155,984**	**13,956**	**1,123,494**	**1,036**	**52,941**	**986**	**851,469**

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

4.2 SOUTH COUNTY DISTRIBUTION SYSTEM

The CCUD South County water distribution system, also known as the Burnt Store system, is wholly separated physically and geographically from the Central/West County water distribution system. It is owned and operated by CCUD. The current service area is concentrated in the south part of Charlotte County and a small area in north Lee County along the County border.

The Burnt Store service area is approximately 8 square miles of land in Charlotte County and 2 square miles in Lee County. 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 CCUD-owned Burnt Store RO WTP.

The Burnt Store distribution system consists of 64 miles of water main ranging in size from 2- to 20-inch diameter. As part of a road widening and realignment project, 10,000 feet of new 16-inch-diameter water main was installed within the Burnt Store Road right-of-way (ROW) in FY 2016. The water main south of the WTP was extended farther into Lee County to serve a new commercial customer on Burnt Store Road. Approximately 400 fire hydrants are located throughout the system.

4.2.1 INTERCONNECTS

The Burnt Store distribution system does not currently have interconnects with neighboring utilities. Since this is a future possibility, the County has constructed an ammonium sulfate injection system to maintain disinfectant compatibility.

4.2.2 WATER BOOSTER STATIONS

Due to the relatively small size of the South County distribution system, the system has no booster stations or disinfection injection points. All chemicals and pumps are at the Burnt Store RO WTP.

4.2.3 STORAGE

The water storage for the Burnt Store distribution system is located at the Burnt Store RO WTP; no additional storage is provided within the South County distribution system.

4.2.4 OPERATIONS

Treated water from the Burnt Store RO WTP 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 ROW of Burnt Store Road.

As with the Central/West County distribution system, forecasting and capital improvement planning is also conducted for the South County system. The Water Distribution workgroup is also responsible maintaining adequate flow rate, volume, quality, and pressure to the South County CCUD customers.

4.2.5 WATER AUDIT

CCUD maintains a continuous, monthly water audit for its Burnt Store water distribution system. The audit is calculated differently than the SWFWMD audit. Table 3-2 shows the results of the 2017 CCUD audit for the Burnt Store distribution system. The audit table compares the water passing through the discharge meter at the Burnt Store RO WTP to the sum of total water billed to customers, water used for distribution system flushing and fire department use, and water loss due to identified leaks and breaks.

CCUD 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.

At present, most main breaks are caused by contractors excavating for other utility installations or due to aging pipe in the system. The South County distribution system has 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 CCUD 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 variable-frequency drives (VFDs) to reduce pressure surges.

The unaccounted-for water loss column is the total metered water (Column 2) minus the sum of the known usages (Columns 3 through 8). The unaccounted-for water loss for FY 2017 was approximately 18 percent for the Burnt Store distribution system.

A water loss percentage over 10 percent requires that a water loss audit be prepared using a SWFWMD-automated water loss calculator. A water-loss-reduction plan was prepared in 2015 with the specific task 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 and 2017. CCUD has installed new meters in every residential water service and checked the accuracy of commercial water meters to try to reduce the percentage loss. The Water Distribution workgroup performed a leak analysis throughout the Burnt Store distribution system, and a few minor leaks were found. SWFWMD conceded that continued search for small leaks is a futile effort that can be stopped by CCUD, if requested by letter. In 2017, the City reduced the operating pressure of the system to reduce leaks and continued to investigate the issue by checking the accuracy of the meters and water accounting system.

Table 4-3 CCUD Unaccountable Water Report (South County) FY 2017

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-16	12,248,883	7,865,000	47,330	8,820	0	7,921,150	4,327,733
Nov-16	1,4803,548	11,828,000	99,240	258,844	0	12,186,084	2,617,464
Dec-16	13,941,540	10,114,000	49,374	2,440	0	10,165,814	3,775,726
Jan-17	15,419,920	14,145,000	63,120	240	0	14,208,360	1,211,560
Feb-17	14,851,904	13,074,000	494,640	220,168	0	13,788,808	1,063,096
Mar-17	17,184,059	12,328,000	79,400	6,930	0	12,414,330	4,769,729
Apr-17	15,860,101	15,037,000	38,998	0	0	15,075,998	784,103
May-17	12,832,082	10,436,000	48,260	189,360	0	10,673,620	2,158,462
Jun-17	9,257,390	8,025,000	42,200	0	0	8,067,200	1,190,190
Jul-17	9,597,520	7,596,000	62,000	193,775	0	7,851,775	1,745,745
Aug-17	9,595,296	6,624,000	63,170	658,747	0	7,345,917	2,249,379
Sep-17	10,790,304	8,055,000	26,000	21,480	0	8,102,480	2,687,824
Total (gal)	156,382,547	125,127,000	1,113,732	1,560,804	0	127,801,536	28,581,011
Annual Average (gpd)	**428,445**	**342,814**	**3,051**	**4,276**	**0**	**350,141**	**78,304**

4.3 MAINTENANCE

CCUD performs three types of maintenance on all areas of its water distribution systems: 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 CCUD 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.

4.3.1 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 CCUD 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, 7 days a week. Some corrective SOs are generated by a telemetered alarm when certain parameters are breached; for example, low system pressure. The telemetry system sends a message to the cell phone of the Chief Operator who deploys the required staff. This procedure allows for a problem to be addressed before a loss or reduction of service to the customer occurs.

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 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.

4.3.2 DATA MANAGEMENT

SOs generate valuable data that can be used to improve O&M based on actual performance. Historically, data were 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 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 underway to 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 conduct many other analyses that were too cumbersome to perform in the past.

4.3.3 MAINTENANCE ACTIVITIES

The CCUD water distribution staff perform daily visual inspections, water quality tests, and temperature checks at each of the booster stations. In addition, each booster station is visited at least monthly to perform mechanical and electrical tests, greasing, and lubrication. Staff are 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 in-service booster station has a portable gantry on site to enable pumping units and motors to be pulled and replaced quickly. As a result of the maintenance practices, the booster stations, especially the pumps, are operating efficiently, and during FY 2017 no service interruptions occurred because a pump suddenly ceased to operate.

In FY 2017, CCUD replaced 26,178 water meters and installed 841 new water meters with AMI automatic meters. The new fixed-base water meters are maintained and warranted for a 20-year replacement cycle, which is the optimum time for replacement. The existing design standards for pipes, valves, and hydrants allow the maintenance staff to be more efficient and cost-effective in maintaining the system. Water valves have been surveyed using a global positioning system (GPS), which allows any valve to be quickly located if it needs to be shut off. Staff regularly exercise hydrants and system valves to increase reliability. Large water meters are checked for accuracy yearly and repairs are conducted when necessary. Maintenance activities for FY 2017 in both County distribution systems included:

- Replaced 15 hydrants and performed maintenance on 374 hydrants, including exercising, flow testing, and painting.
- Repaired 62 line breaks on pipes 3 inches or larger.
- Replaced 18 valves and performed maintenance on 1,402 valves.
- Replaced a 16-inch asbestos cement (AC) main with a 12-inch high-density polyethylene (HDPE) main under the canal on Tournament Road.
- Bypassed deteriorated bridge pipe at Captain Cut until the new bore under the waterway is completed.
- Added a new main into the Maple Leaf Estates community to improve water quality.

- Replaced corroded Muller HBMag meters under warranty.

4.4 Consumer Confidence Reports

As required by federal and state regulations for all utilities, CCUD 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 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 stormwater runoff, and residential uses.
- Organic chemical contaminants, including synthetic and volatile organic chemicals.
- Radioactive contaminants, which can be naturally occurring.

To ensure that tap water is safe to drink, EPA regulations limit 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 CCRs for the Central/West and South distribution systems, indicate the levels of tested water contaminants in the CCUD service area are safely below the maximum contaminant level allowed by federal and state regulations and orders, and in most cases are well below the level. In addition, the CCUD Central/West County distribution system water was the recipient of the Florida Section American Water Works Association's best-tasting drinking water award.

The most recent CCRs for the Central/West (Peace River) and South (Burnt Store) distribution systems are available at *https://www.charlottecountyfl.gov/dept/utilities/Pages/Reports.aspx*.

4.5 Review of Previous Recommendations

Table 4-4 and Table 4-5 summarize the recommendations and current status from the 2016 Annual Report for the Central/West and South County distribution systems, respectively.

Table 4-4 CCUD Central/West County Distribution System – 2016 Recommendations

Recommendation:	Continue the ongoing program to replace existing water meters with meters that can be automatically read.
Progress:	*Complete.*
Recommendation:	Continue to upgrade the Gulf Cove Booster Station by further progressing the replacement project for the Myakka River pipe crossing that supplies water to the Gulf Cove Booster 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 Station by demolishing the old WTP and installing protective roofs over exposed outside equipment.
Progress:	*Complete.*

Table 4-5 CCUD South County Distribution System – 2016 Recommendations

Recommendation:	Continue to replace old "class" PVC pipe in the distribution system with new C-900 PVC pipe.
Progress:	*Ongoing.*
Recommendation:	Continue developing a computerized hydraulic model for the South County distribution system.
Progress:	*Not Complete.*
Recommendation:	Complete the Brackish Wellfield Analysis Report.
Progress:	*Report was completed and CCUD is reviewing.*

4.6 Summary and Recommendations

Charlotte County is a member of the PRMRWSA, which is charged with the task of providing adequate quantity and quality water to its Authority members. The Central/West County CCUD service area is supplied with water that is purchased from the PRMRWSA through four transmission mains. CCUD also maintains seven interconnects with adjacent water utilities. These interconnects have proven to be valuable during emergency conditions. CCUD has four water and one chemical booster stations to maintain sufficient pressures and proper disinfectant residuals throughout the system. Each WBS contains a GST, high-pressure pumps, and chemical feed systems. The total storage in the Central/West County distribution system is 10 MG, which it can supplement with additional storage located at the PRMRWSF. The CCUD GSTs are cleaned and inspected every 5 years. This proactive maintenance procedure has not uncovered any significant GST deficiencies in FY 2017. For FY 2017, the unaccounted-for water loss was 7.6 percent for the Central/West County distribution system, below the 10-percent industry standard. Maintaining the required chlorine disinfection concentrations throughout the system has required flushing water mains in the extremities of the system where residential demand is small.

The CCUD Burnt Store service area is supplied with water that is produced by the Burnt Store RO WTP. The South County distribution system does not currently have interconnects

or booster stations. The Burnt Store RO WTP has sufficient storage and pumping capacity to serve the South County customers. For FY 2017, the unaccounted-for water loss was 18 percent for the South County distribution system. Water audit investigations continued during 2017, but significant leaks have not been identified. CCUD continues to investigate.

CCUD continues to perform preventive maintenance on hydrants and valves through both distribution systems. Residential and small commercial water meters are replaced on a 20-year cycle to ensure accurate readings. Large water meters are checked for accuracy yearly. The 2016 Water Quality Reports confirm that the water delivered by the CCUD water distribution systems meets or exceeds regulatory quality requirements. Recommendations from the 2016 Annual Report continue to be implemented for the South County distribution system and the Gulf Cove booster station. Table 4-6 and Table 4-7 lists the recommendations for the Central/West and South distribution systems from the 2017 site visit.

Table 4-6 CCUD Central/West County Distribution System – 2017 Recommendations

Recommendation:	EWD Interconnect: ▪ Install canopy over pumps, panels, and piping. ▪ Install flow meter to the CCUD distribution system. ▪ Check to confirm the vibration on the pressure gauge pump No. 2 is within tolerance.
Recommendation	Other Interconnects: Install a meter at the interconnect with North Port at Flamingo Boulevard.
Recommendation:	Gulf Cove WBS: ▪ Continue to upgrade the Station by further progressing the replacement project for the Myakka River pipe crossing that supplies water to the station. ▪ Replace the concrete pipe connecting the GST to the pump station at the Gulf Cove Booster Station. ▪ Paint the concrete support on the influent pipe to the GST to prevent deterioration. ▪ Check fittings and joints for leaks in the ammonium sulfate chemical injection room. ▪ Paint the floor in the sodium hypochlorite chemical injection room to prevent concrete deterioration. ▪ Install a portable eyewash station in the new operations room.
Recommendation:	Rotonda WBS: ▪ Paint rusted bases on Booster Pumps No. 1 and 3. ▪ Modify the diesel fuel storage tank to prevent rainwater from collecting on top of the tank. ▪ Paint the concrete floors in the sodium hypochlorite injection room. ▪ Complete installation of the 24-inch water transmission main from Ingraham Street to the Rotonda GST.

Recommendation:	Walenda WBS: ▪ Paint the concrete floors in the chemical injection rooms. ▪ Replace interior liner in the Walenda GST.
Recommendation:	Conduct washout inspections at Golf Course and Walenda WBSs.
Recommendation:	Replace the Chemscan process analyzer at the Port Charlotte WBS.
Recommendation:	Conduct stratification testing on the Gulf Cove, Rotonda, Walenda, and Port Charlotte Golf Course WBS GSTs.
Recommendation:	Supply a redundant pump at the Ingraham facility.
Recommendation:	Ingraham Disinfection Station: Cover the sodium hypochlorite storage tank and associated piping to prevent sun exposure and degradation.

Table 4-7 CCUD South County Distribution System – 2017 Recommendations

Recommendation:	Continue to replace old "class" PVC pipe in the distribution system with new C-900 PVC pipe.
Recommendation:	Continue developing a computerized hydraulic model for the South County distribution system.

5 WASTEWATER COLLECTION SYSTEM

5.1 SEWER SYSTEMS

The purpose of a wastewater collection system is to transport wastewater from customer structures to a treatment facility. The CCUD collection system consists of the following components:

- **Gravity Sewer** – as the name implies, is piping installed at a gradual incline (slope) that allows wastewater to flow exclusively by the energy of gravity. Gravity sewers include manholes that allow for maintenance staff entry and equipment. Flow in gravity sewers discharges to manholes, lift stations, or a treatment plant.
- **Vacuum Sewer** – moves sewage from an individual service wastewater storage tank 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 Sewer (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 an LPS system move only when pushed by new flow contributions.
- **Force Main** – a pressured sewer pipe that conveys wastewater in a situation where gravity sewer flow is not possible. It is usually fed by a lift station.
- **Lift Station** – also referred to as pump station, is a facility designed to move wastewater from lower to higher elevations through force mains. They 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.

CCUD's Service Area is served by four collection systems. Each system is tributary to a WRF, as discussed in Chapter 6. Figure 5-1 shows the CCUD certificated service area and wastewater infrastructure.

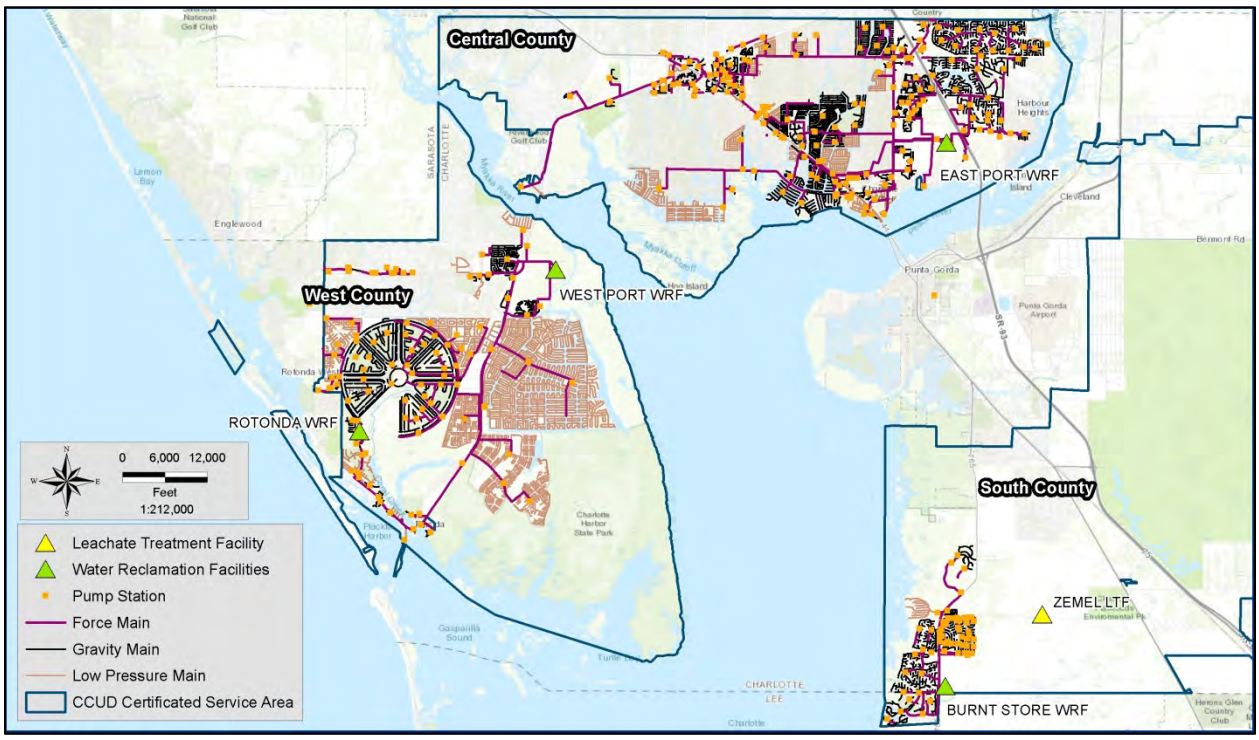
At the end of FY 2017, there were 36,325 wastewater customers, an increase of 1,094 customers since FY 2016. These customers are served by:

- 378.2 miles of gravity sewer (1,180-foot increase).
- 294.7 miles of LPS mains (24,750-foot increase).
- 20.8 miles of vacuum sewers (107,467-foot increase).
- 261 miles of force mains (2,138-foot increase).
- 9,517 manholes (3 manhole increase).
- 310 lift stations (no increase).

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

East-West Spring Lake sewer expansion went into service in 2016 and 2017 with approximately 442 homes vacuum sewered. The second (Contract D) vacuum/pumping station will go into service in FY 2018.

Figure 5-1 CCUD Certificated Wastewater Service Area



5.1.1 System Expansion

The existing South, Central, and West County wastewater systems were hydraulically modeled using SEWERGEMS™ software as part of a County-wide wastewater master plan. The model was updated in FY 2017 as part of the project but was not calibrated. The model identifies areas where capacity upgrades are needed to support future growth, as well as areas for future system expansion based on the ages of existing septic systems, proximity to surface water bodies, and other factors. The model is a constant work in progress that it is regularly updated when system changes occur.

Beginning in FY 2015, the construction of vacuum sewers began in the Spring Lake section of Central County. In FY 2017 design work began on Phase 2 Ackerman and El Jobean. This innovative wastewater collection system will serve homes that are currently on septic/leach field systems.

Currently, Municipal Service Benefit Units (MSBUs) are one of the preferred methods 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.

5.2 Lift Stations

At the end of FY 2017, there were a total of 310 lift stations. The master lift stations have permanent auxiliary power. CCUD owns portable standby power equipment and is purchasing more to improve system operations. In a catastrophic event, the ability to provide power to the rest of the collection system is limited. Connections/receptacles for these portable generators are at nearly every lift station within the system. All lift stations

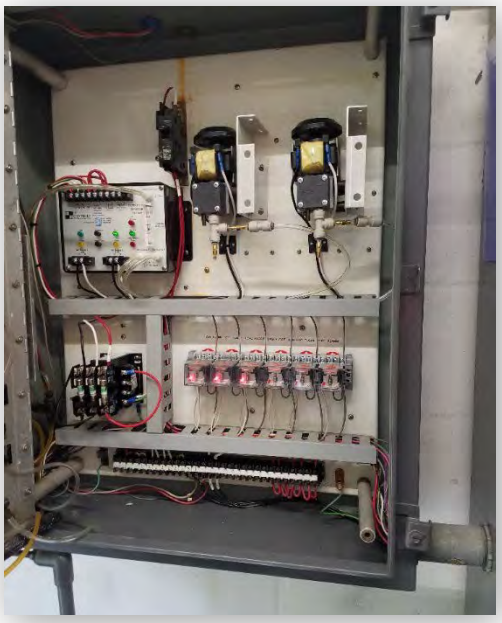
have portable pumps connections that allow wastewater pumping from wet wells during emergencies.

On February 12 and 13, 2018, Jones Edmunds personnel and CCUD Operations staff toured all regional master lift stations. The outcome of these assessments will allow CCUD to identify and prioritize maintenance, rehabilitation, or replacement work at these master lift stations.

5.2.1 Quesada Master Lift Station

The Quesada Wastewater Lift Station (Lift Station [LS] 37) is a master lift station that receives wastewater from 27 contributing pump stations. It has three 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 regular preventative maintenance. There is a carbon adsorption, forced air odor-control system at the station, which keeps the hydrogen sulfide level in the wet well low. The station contains a telemetry transmitter that allows monitoring to occur from the CCUD central office and treatment plants.

The station is 27 years old and received the following upgrades between 2013 and 2017:



- New soft starters for the pumps, each with back-up power.
- An emergency wet well suction line for quick connection of a portable pump.
- New receiving station with two tanks to receive liquids from CCUD maintenance service crews only.
- The existing bubbler system (used to determine level in the wet well) was placed on a separate electrical feed.
- An air-conditioning unit in the electrical room to regulate temperature was added.
- General valve maintenance with replacement was completed as necessary.
- The paved parking area was expanded.
- The control building's roof was redone.
- LED exterior lighting was added.
- The wastewater level monitoring system was upgraded in FY 2016.
- A new auto-transfer switch was installed in FY 2016.

The following deficiencies were noted:

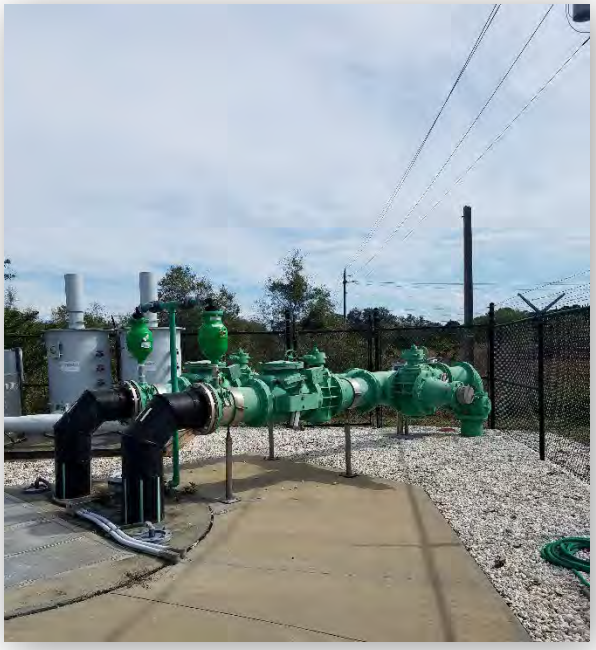
- The station building is generally in good condition except that the metal doors on the building are rusting and need to be replaced.
- The existing 180-kW stationary generator, which is operated once a week to ensure it is ready for stand-by power, is currently only capable of running two pumps at one time. Given its age, the probability of failure is higher than average; and due to the critical role as the major receptacle of many contributing lift stations, an overhaul or replacement is needed.
- The wet well is constantly subjected 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, a second wet well should 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 February 2017 did not show any appreciable increase in the lining deterioration.
- The wet well is heavily matted with rags and other debris, requiring frequent maintenance.

5.2.2 Rotonda Master Lift Station

The Rotonda Master Lift Station (LS 801) is a relatively new station that includes the current CCUD 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 1,950 linear feet of 12-inch-diameter force main that terminates at the Rotonda WRF headworks. The station consists of a 10-foot-diameter wet well that receives flow from a 36-inch gravity sewer. The 36-inch gravity main is partially submerged at the pump-on wet well elevation. The station contains two 75-HP VFD pumps that are speed controlled to match the incoming wastewater flow. The pumps at this master lift station also cycle on and off, which spikes flow through the Rotonda WRF headworks.

The significant design features of this station include:



- Variable-speed pumps that vary their pumping rate to match the incoming flow rate, save on peak power usage surcharges, and reduce flow surges at the Rotonda WRF headworks.
- Air valves to expel air from the discharge force main provide flow efficiency and minimize surges.
- An on-site generator for stand-by power.
- Corrosion-protection coating applied to the wet well walls.
- An odor-control system to reduce odors generated due to the long wastewater detention time.
- A redundant float switch to trigger a high-level alarm in the wet well.
- On-demand lighting to allow ease of work without the need for handheld lighting.
- A telemetry transmitter to allow monitoring from the CCUD central office and treatment plants.

The station is in very good condition. The above ground piping was repainted in 2014. The forced-air odor-control system reduces hydrogen sulfide concentrations in the wet well. The pump discharge at the time of the site visit was 1,500 gpm. The generator is operated once a week to ensure it is ready for stand-by power.

The following deficiency was noted:

- White scale on the wet well covers, indicating the presence of corrosive gases in the wet well.

5.2.3 South Port Master Lift Station

South Port Master Lift Station (LS 65) is in a central location near US 41 in Port Charlotte and replaced an old wastewater treatment plant. The overall condition of the station is good. The station contains three 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

levels in the wet well low. 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 an automatic transfer switch is located in the control building. The generator is operated once a week to ensure it is ready for stand-by power. The electrical and control panels are in good condition and are enclosed in the building. The station has a SCADA system with a telemetry transmitter/receiver.

The following maintenance was conducted over the past couple of years:

- 2017: Painting touched up.
- 2016: Installed new automatic transfer (electrical) switch.
- 2016: Carbon adsorption odor-control carbon granules were replaced.

Proposed upgrades to the station include:

- Fence the entire site.
- Repair the flow meter.

5.2.4 Representative Lift Station Condition Assessment

On February 12 and 13, 2018, Jones Edmunds personnel and CCUD Operations staff also toured the selected group of neighborhood lift stations to develop a general sense of the overall condition of the lift stations that are within the CCUD wastewater collection system. The outcome of the assessment will allow CCUD to identify and prioritize maintenance, rehabilitation, or replacement work at these lift stations.

5.2.4.1 Lift Station 1 – Community Center

Lift Station 1 is located on an open easement with no fencing at the intersection of Orange Street and Easy Street and receives gravity flows from the surrounding community. The station pumps are housed in a concrete building. There are visible cracks in the wall of the structure. This older station contains two above ground, self-priming 15-HP Gorman-Rupp pumps. The pumps discharge into an 8-inch 2,338-foot-long force main and are rated to deliver 530 gpm at 63 feet of total dynamic head.

The discharge isolation valves and check valves are located above ground for easy access and maintenance. The 12-foot wet well interior shows signs of corrosion from hydrogen sulfide attack. The wet well has no ventilation, so emitted gases are contained in the wet well and in the building. The station has no odor-control system and no wet well bypass receptacle. During storm events, when the water level in wet well is high, CCUD uses tanker trucks to collect and transport excess flows to the WRF. The station has no standby generator, which is not a concern since infrequent power loss only occurs during intense

electrical storms. The electrical and control panels are located outside the building and are in fair condition.

The following maintenance was conducted in FY 2017:

- Lift station inspections.
- Annual pump maintenance (two times).
- Valve maintenance (five times).
- Wet well cleaning (quarterly).

The following deficiencies were noted:

- Cracks in the concrete building.
- Corrosion of piping and wet well.
- Outdated controls.

Proposed improvements to the station include:

- Paint the above ground discharge piping.
- Repair cracks in the building.
- Provide an odor-control system.
- Replace the outdated control panel.
- Perform thorough rehabilitation of the lift station including repairing the building or replace the station with a modern submersible configuration and all new equipment.

5.2.4.2 Lift Station No. 2 – Dalton

This lift station is located on Dalton Street in one of the oldest Port Charlotte neighborhoods. The station was constructed in 1969, and the overall condition of the station is fair to poor. The building needs a new roof and the concrete block building is deteriorating. The building walls have several cracks and structural integrity may be compromised in the event of a hurricane, thereby presenting a potential safety issue to the CCUD Operations crew during emergency situations.

The station is fenced and is on a vacant lot in a residential neighborhood. It contains two above ground, self-priming 15-HP pumps inside the concrete block building, which is 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. The station is scheduled to be replaced by a submersible pumping station. The replacement is included in the FY 2018 Planned Improvements.

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.

The following maintenance was conducted in FY 2017:

- Replaced Pump No. 2 motor.
- Replaced entry fence gate.
- Sealed cracks and patched the roof and drywall.
- Performed routine bi-annual wet well cleaning.
- Performed routine annual pump and motor maintenance.

The following deficiencies were noted:

- Evidence of once-sealed cracks and/or new cracks in the building walls.
- Broken wet well hatch hinge pins.

Proposed improvements to the station include:

- Paint the above ground discharge piping.
- Repair wet well hatch hinges.
- Perform thorough rehabilitation of the lift station including repair of the building or replace the station with a modern submersible configuration with all new equipment.

5.2.4.3 Lift Station 7 – Pure Oil

This small lift station is at the rear of a gasoline station near the intersection of Tamiami Trail and Easy Street. The lift station serves residential and commercial areas to its north and west. The overall condition of the station is fair. The station contains two 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 no metal reinforcement is exposed. 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. Objectionable odors emanated from the wet well during the site visit.

The main control panel is a wooden box mounted on the outside of the building. The space inside the building is exposed to sewer gases because access for the 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.

The following maintenance was conducted in FY 2017:

- Routine bi-annual wet well cleaning.
- Routine annual pump and motor maintenance.

The following deficiencies were noted:

- Deteriorated roof overhang.
- Missing glass windowpane.
- Presence of odor.

Proposed 2018 improvements to the station include:

- Repair the roof overhang.
- Replace the glass windowpane.
- Paint the building.
- Install odor controls.
- Perform thorough rehabilitation including the improvements listed above or replace the station with a modern submersible configuration with all new equipment.

5.2.4.4 Lift Station 11 – McGuire Park

The McGuire Lift Station is at the southwest corner of McGuire Park at the intersection of Indiana Avenue and Elkcam Boulevard. It receives flow from LS 100 Intermedic and two other private lift stations as well as gravity flow from the residential portions of the neighborhood. The neighborhood is generally bounded by Picnic Street to the west, Midway Boulevard to the north, Tamiami Trail to the south, and the Elkcam waterway to the east.

The lift station was constructed in 1962 with the most recent upgrades in 2006. The overall condition of the station is well maintained with all equipment and structures in good condition. The station contains two 47-HP submersible pumps in a 10-foot-diameter concrete wet well. The wet well 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 above ground and in good condition. Power service to the station is 480 volt, 3-phase. The main control panel is in good condition.

The pumps discharge into an 8-inch force main that connects to a 24-inch force main before discharging into the East Port WRF. The station is fenced and equipped with biological odor control.

The following maintenance was conducted in the FY 2017:

- Routine bi-annual wet well cleaning.
- Routine annual pump and motor maintenance.

5.2.4.5 Lift Station 122 – Clinton

The Clinton Lift Station is north of Clinton Avenue and approximately 200 feet west of Birchcrest Boulevard. It currently serves only Charlotte County Fire Station No. 8, but the station is slated to receive low-pressure flows as septic systems in the area are converted to low-pressure collection systems.

The lift station was constructed in 2006. The overall condition of the station is well maintained with all equipment and structures in good condition. The station contains two 23-HP submersible pumps in a 6-foot-diameter concrete wet well. The wet well 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 above ground and in good condition. Power service to the station is 230 volt, 3-phase. The main control panel is solid state and in good condition.

The pumps discharge into a 6-inch force main and pump to the East Port WRF.

The station is fenced.

The following maintenance was conducted in the FY 2017:

- Routine bi-annual wet well cleaning.
- Routine annual pump and motor maintenance.

5.2.4.6 Lift Station 139 – Altoona

The Altoona Lift Station is at the northeast intersection of Edgewood Drive and Altoona Street. It receives flow from LS 20 – Lakeview, LS 23 – O'Hara, LS 63 – McGrath, and a mix of LPSs and gravity main-collected flows from the residential properties along Edgewater Drive between McIntire Street and Lakeview Boulevard. LS 131 – Pearlman, which used to discharge into this LS, was replaced in 2017 with a gravity sewer system.

The lift station was constructed in 2017. The overall condition of the station is very good with newly installed equipment and structures. The station contains two 47-HP submersible pumps in a 12-foot-diameter concrete wet well. The wet well hatches are in new 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 above ground and in new condition. Power service to the station is 480 volt, 3-phase. The main control panel is solid state and in new condition. The lift station has a telemetry transmitter/receiver.

The pumps discharge into a 12-inch force main that transmits flow to the East Port WRF. The station is fenced and is equipped with biological odor control system.

The following maintenance was conducted in FY 2017:

- Routine bi-annual wet well cleaning.
- Routine annual pump and motor maintenance.

Proposed 2018 improvements to the station include:

- Provide a stationary generator to meet Rule 62-604.400(2), FAC. The Rule requires all lift stations that receive flow directly through dedicated force mains and/or discharge through 12-inch or larger force mains, must have an in-place emergency generator.

5.2.4.7 Lift Station 309 – Bridgewater (Deep Creek Master Lift Station)

This regional lift station, purchased by Charlotte County in 2003, receives flow from the entire Deep Creek subdivision service area. It contains a 47-HP Flygt and a 50-HP Sulzer submersible pump. The pumps discharge into 8-inch and 10-inch 2-mile-long force mains.

Each pump has an estimated capacity of 700 gpm. The force mains send 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. Originally, the station had two 10-foot-diameter wet wells connected by a small-diameter pipe; however, a few years ago, one of the wet wells was converted to a manhole and the older wet well was filled with concrete to allow flow-through directly to the newer wet well containing the pumps. The wet well 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. The pump discharge pipes in the wet well were replaced with HDPE pipe in 2010. The pump discharge check valves were also rebuilt at the same time.

A biological odor-control unit with a fan draws air from the wet well and reduces the hydrogen sulfide odor generated. The air movement also reduces the concentration of hydrogen sulfide in the wet well, 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 is in fair condition. There is no generator on site, but the station's main power panel is equipped with a portable generator receptacle. Operations staff indicated that the water level in the wet well is usually high even with both pumps on. The station contains a telemetry transmitter that allows monitoring to occur from the CCUD central office and treatment plants.

LS 309 is currently in good condition.

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

The following deficiencies were noted:

- Signs of corrosion on the wet well interior wall likely due to high hydrogen sulfide concentration.
- Corrosion of piping and valves in the underground vault.

Proposed 2018 improvements to the station include:

- Provide a stationary generator.

5.2.4.8 Lift Station 402 – Matecumbe

The Matecumbe lift station is at the intersection of Matecumbe Key Road and Cape Coral Boulevard. The station serves mostly a residential area with a marina and restaurant. The overall set up of the station is poor due to equipment within a roadway.

The station contains two 10-HP self-priming pumps in a wet well at the center of the road intersection, which requires Operations staff to manage traffic during routine maintenance. Additionally, the control panel and valve vaults are surrounded by palm trees on the southeast corner of the intersection. The station is not fenced, but the panel and valve vault are padlocked.

Power service to the station is 230 volt, 3-phase. The pumps discharge into a 4-inch force main that discharges into LS 403. There is no odor control at the station. The station has a visual and aural alarm and is next to a five-story condominium.

A generator receptacle with a manual transfer switch is available with a portable pump connection in a valve box.

The following maintenance was conducted in FY 2017:

- Routine bi-annual wet well cleaning.
- Routine annual pump and motor maintenance.

The following deficiencies were noted:

- No fence.
- Poor location of the wet well.
- Inflow and infiltration issues.

Proposed 2018 improvements to the station include:

- Recommend replacing the existing station to improve the lift station function and to improve the ability for Operations staff to operate and maintain the lift station.

5.2.4.9 Lift Station 412 – Roland

LS 412, at Roland Lane, was constructed in 2011 and receives residential flow from a private development. Sixteen air induction systems that were converted to submersible grinder pumps discharge an estimated average daily flow of 7,700 gpm sewage to the station. The lift station conveys wastewater flow through a dedicated force main to the Burnt Store RO WRF. The lift station is in good condition.

The lift station contains two submersible Hydromatic pumps rated at 5 HP. The wet well interior and discharge piping are painted to prevent rusting, and there is adequate venting to prevent gas build up and corrosion in the wet well. The station has a portable generator quick connection and an emergency bypass pump connection but no permanent generator.

The following maintenance was conducted in FY 2017:

- Valve maintenance (five times).
- Wet well cleaning (quarterly).

5.2.4.10 Lift Station 415 – Prada

The Prada lift station is on a dirt road south of the intersection of Doredo Drive and Prada Drive. The station exclusively serves residential areas. The overall condition of the station is fair. The station contains two 7.5-HP submersible pumps in the 6-foot wet well. The pumps discharge into a 4-inch force main flowing to the Burnt Store RO WRF. The station is fenced. There is no odor control at the station, and objectionable odor was noted.

The main control panel has electromechanical relays and is pole-mounted. Power service to the station is 230 volt, 3-phase. A portable generator receptacle with a manual transfer switch is available as well as a portable pump connection inside the valve vault. The station has a telemetry transmitter/receiver.

The following maintenance was conducted in FY 2017:

- Routine bi-annual wet well cleaning.
- Routine annual pump and motor maintenance.

The following deficiencies were noted:

- The concrete wet well and valve vault has some corrosion.

Proposed 2018 improvements to the station include:

- Epoxy-coat the inside of the wet well.
- Refurbish or replace the aging control panel.
- Add an odor-control system.

5.2.4.11 Lift Station 420 – Pirate Harbor

This neighborhood lift station receives wastewater flow only from LPS systems in Pirate Harbor. It contains two 23-HP Flygt submersible pumps. The pumps discharge into a 6-inch force main that transmits flow directly to the Burnt Store RO WRF. The lift station is enclosed with chain-link fence topped with barbed wire. It is equipped with a 10-foot-diameter wet well, above ground discharge piping, easy access, a control panel, a telemetry transmitter/receiver, and an odor-control system. The discharge piping have been re-painted and fitted with air-release valves to eliminate air entrapment issues. Wet well top slab, hatch, and interior walls are all in good condition. Although the station does not have a stationary generator, it has generator receptacles and a transfer switch to connect a portable power supply. A flow monitor installed at the station determines pumped flow rates. The overall condition of the station and its components are in very good condition. No deficiencies were noted at this station.

The following maintenance was conducted in FY 2017:

- Replaced/rebuilt both pumps at the station.
- Valve maintenance (five times).
- Wet well cleaning (quarterly).

5.2.4.12 Lift Station 817 – Bunker Road

The Bunker Road lift station is in the Rotonda Development, near Hole 5 at The Palms golf course. It contains two 5-HP Flygt submersible pumps. The station is not fenced and is in very poor condition. There is severe soil erosion at the site with dirt filling up the uncovered valve vault. The discharge piping and isolation and check valves are essentially buried in sedimentation. There are cracks in the wet well interior walls with tree roots protruding into the wet well. Previous sealing patches inside the wet well have eroded, creating pathways for inflow and infiltration into the wet well. The piping and valves are rusty and the wet well top slab is severely corroded. Water leaks from the discharge force main inside the valve vault, and no telemetry system is installed at the lift station.

This lift station needs a thorough rehabilitation or replacement. CCUD plans to rehabilitate the station in FY 2018.

Proposed 2018 improvements to the station include:

- Recommend replacing the existing station.

5.2.4.13 Lift Station 819 – Rotonda Circle 1

Rotonda Circle 1 lift station is a 47-year-old station northwest of the intersection of Bunker Road and Rotonda Circle near the Rotonda Canal. It serves residents on Bunker Road, Bunker Lane, and Rotonda Circle. The lift station has no vehicular access and has not seen major rehabilitation work since construction. The condition of the lift station is fair to poor. There is no fence around the station, which is typical of lift stations in the Rotonda community.

The station contains two 3-HP Flygt submersible pumps in a 6-foot-diameter wet well that pump flow through a 6-inch force main that crosses the Rotonda canal. The wet well interior has cracks and corrosion.

The electrical and control panels are in fair condition. The lift station does not contain a telemetry transmitter. The station is not equipped with a generator receptacle or a portable pump discharge connection. CCUD relies on customers calling to file complaints when the high-water-level alarm goes off.

The following deficiencies were noted:

- Signs of inflow and infiltration into the wet well due to cracks in interior wall.
- Corrosion of piping.
- Outdated control panel.

Proposed 2018 improvements to the station include:

- Reseal the wet well.
- Replace or repair piping.
- Replace the control panel.
- Add telemetry.
- Perform thorough rehabilitation including the improvements listed above or replace the station with a modern submersible configuration with new equipment.

5.2.4.14 Lift Station 858 – Pine Valley Boundary

Lift Station 858 is in the southeast portion of Rotonda Circle on south Boundary Boulevard. This community lift station serves residents along Boundary Boulevard and Rotonda Circle from approximately Rotonda Boulevard South to Tournament Road.

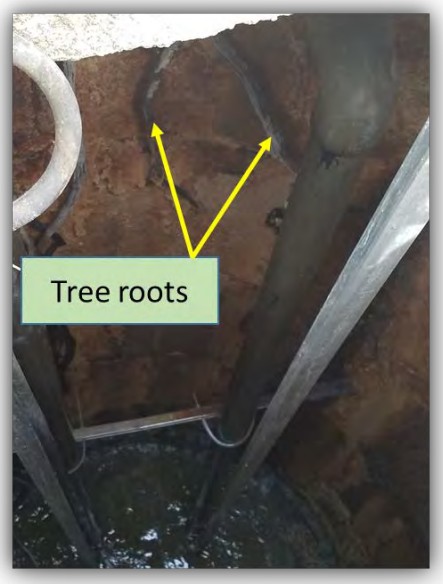
The lift station contains two 7.5-HP Sulzer submersible pumps that discharge through a 4-inch force main then into a 12-inch force main, approximately 4,100 linear feet to LS 882. The station is not fenced and is in a common grassy area behind residential properties. The 6-foot-diameter 21-foot-deep wet well has cracks and shows signs of corrosion around the top of the slab. It appears to have a high concentration of hydrogen sulfide inside the wet well for a prolonged period of time that has caused inner wall spalling and severe corrosion. Many plant roots have protruded into the wet well and may be creating a high-inflow condition. The discharge isolation valves, check valves, and fittings inside the valve vault are also corroded.

The electrical and control panel are in good condition. The station does not contain a telemetry transmitter. The station is

equipped with a generator receptacle and portable pump discharge connection. A short pipe through the wet well slab provides needed ventilation in the absence an odor-control system.

The following deficiencies were noted:

- Signs of inflow and infiltration into wet well due to cracks in interior wall.
- Roots protruding into the wet well.
- Corrosion of discharge piping, valves, and fittings
- Stones and debris collected inside valve vault.
- Outdated control panel.



Proposed 2018 improvements to the station include:

- Reseal wet well.
- Replace or repair piping.
- Replace the control panel.
- Add telemetry.

5.2.4.15 Lift Station 861 – Springs

This lift station was constructed in 2010 for future LPS systems within the planned wastewater collection area. It features two 14-HP ABS variable-speed pumps designed to convey flow to West Port WRF through a 12-inch 7,100-foot-long force main. Currently, CCUD routinely runs water through the station to verify that all components function correctly.

The site is fenced with all piping and valves located above ground. The 10-inch circular wet well is approximately 12 feet deep. 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.

The discharge isolation valves, check valves, air release valves, emergency pump connection, and flow meter are all above ground for easy access and maintenance.

The pump discharge pipes in the wet well are constructed of corrosion-resistant HDPE pipe, and the interior of the concrete wet well is coated with a corrosion-resistant polyurethane coating

system. Currently, there is no odor control or metering of flows at the station.

The station is equipped with a stationary emergency generator and a transfer switch. The electrical and control panels are in excellent condition. The station contains a telemetry transmitter. Overall, the station is in excellent condition.

5.3 OPERATIONS

The operation of the wastewater collection system requires the ability to move all service-area-generated wastewater to its tributary treatment plant. The wastewater quantity is in constant flux and it is CCUD Operations' task to understand and manage the daily, monthly, and seasonal lows and peaks. The flat terrain of Charlotte County requires more than 300 pumping stations to transfer wastewater from the customer connections to the treatment plants.

CCUD 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 (RTUs), each station is visited a minimum of once a month per FDEP requirements. 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 pump station failures require immediate attention. CCUD maintains two 6,000-gallon tankers and three 4,000-gallon tankers and has contracts with local septage haulers to transport flows from the pump stations to the treatment plants. In addition, nearly all pump stations include on-site standby power or portable generator receptacles that can restore power within minutes of a noted power failure along with bypass pump connections. CCUD owns nine trailer-mounted portable generators and five trailer-mounted portable pumps that can be dispatched in the event of a power or pump failure.

5.4 MAINTENANCE

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

5.4.1 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 SOs 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. LPS customers generated about 3,418 corrective SOs in FY 2017. Lift stations generated 1,474 SOs in the same timeframe, the majority of which were generated internally by CCUD staff.

5.4.2 DATA MANAGEMENT

The 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.

In the planning stages of a new collection system, CCUD 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 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 on these life cycle costs and the 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.

5.4.3 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 5.2 of this report.

The average age of the CCUD gravity system is 30 years. Older sewers were typically installed in swales, which made them more prone to I/I. Also, design and construction standards were not as stringent as the current practices. 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 CCUD has relatively few plugged sewers, the broken clay pipe will cause blockage and must be repaired.

CCUD Wastewater Collections staff performs in-place pipe repairs to fix most of the broken pipes in the system. Most of these repairs involve a cast-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 CCUD staff time to address the issue. If a power failure occurs in the 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.

CCUD has nine trailer-mounted portable generators and five trailer-mounted portable pumps that can be dispatched in the event of a power failure. CCUD has over 8,500 LPS systems and has developed an emergency preparedness program for the systems in the service area. The program was originally implemented in the aftermath of Hurricane Charley.

CCUD has three 4,000-gallon tank trucks, which are used in conjunction with an external vendor's tank trucks of similar capacity for emergency pumping at LPS tanks and lift stations. In addition, CCUD currently has two 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 and gravity system piping and maintenance of sanitary sewer in FY 2017 included 44 laterals repairs, smoke testing to locate rainfall inflow sources, internally televised 21,167 feet of gravity sewer, and repaired numerous manholes when defects were discovered.

5.5 Review of Previous Report Recommendations

Table 5-1 summarizes the recommendations and current status from the 2016 Annual Report for the wastewater collection system.

Table 5-1 Wastewater Collection System – 2016 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 expected demand for services.
Progress:	*Ongoing.*
Recommendation:	Continue to search for sewer I/I sources using smoke testing or closed-circuit television (CCTV) inspections, and repair gravity sewers and manholes as required.
Progress:	*Work performed: 44 laterals were repaired, 21,167 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:	*Two additional odor controls were added in FY 2017.*

Recommendation:	Continue acquisition of stand-by generators and pumps to maintain service during power outages when budget allows to meet FDEP requirements.
Progress:	*No new generators were purchased in FY 2017.*
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:	*No work performed by in-house staff in FY 2017.*
Recommendation:	Continue to repair and upgrade existing lift stations as required. Perform the maintenance activities at the specific lift stations that were reviewed in the preparation of the 2016 Annual Reports and previously not completed.
Progress:	*See comments for each lift station below.*
Recommendation:	Lift Station No. 2 – Dalton ▪ Remove the building and convert the station to submersible pumps with above ground valves. (Scheduled for 2017 Capital Improvement); however, visual inspection in preparation for FY 2017 Annual Report shows additional cracks in wall.
Progress:	*Not completed. Roof and concrete repaired in FY 2017.*
Recommendation:	Lift Station No. 7 – Pure Oil ▪ Replace with a standard submersible pump station (5 years).
Progress:	*Not Completed*.
Recommendation:	Lift Station No. 27 – McRissor ▪ Remove below-ground valve vault and replace with above ground piping (3 years). ▪ Explore options for relocating this lift station to a more suitable site (5 years).
Progress:	*Not completed.*
Recommendation:	Lift Station No. 37 – Quesada ▪ 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).
Progress:	*Not completed.*
Recommendation:	Lift Station No. 65 – South Port ▪ Fence around the station (1 year). ▪ Touch-up paint (when required). ▪ Repair flow meter, connect to telemetry (2 years).
Progress:	*Touch-up paint completed, fence and flow meter repairs not completed.*
Recommendation:	Lift Station No. 215 - Prada ▪ Sandblast and reline the wet well to prevent further deterioration (1 year).
Progress:	*The wet well is scheduled for an integrity test in 2017. Not completed.*

Recommendation:	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).
Progress:	*Not Completed.*
Recommendation:	Lift Station No. 309 – Bridgewater ▪ Add on-site generator and automatic transfer switch (5 years).
Progress:	*Not completed.*
Recommendation:	Lift Station No. 312 – Annapolis ▪ Verify access easements and add a gravel access drive (1 year). ▪ Add a security fence to the site (2 years).
Progress:	*Handrail added for access safety, security fence is not completed.*
Recommendation:	Lift Station No. 815 – "Z" ▪ Replace station entirely (2 years).
Progress:	*Not completed.*
Recommendation:	Lift Station No. 852 – White Marsh Boundary No. 1 ▪ Verify access easements and add a gravel access drive (1 year). ▪ Add a security fence to the site (2 years).
Progress:	*Not completed*.
Recommendation:	Lift Station No. 28 (864) – Coliseum ▪ Analyze VFD use to determine if long-term cost savings due to system efficiencies at the lift station and at the West Port WRF can be recovered (2 years).
Progress:	*Not completed.*
Recommendation:	Lift Station No. 884 – Oldsmar ▪ Replace ductile iron 90-degree fitting inside the wet well (5 years). *Completed.* ▪ Add VFD drives to reduce peaks at West Port WRF (5 years).
Progress:	*Fittings have been replaced, VFDs have not been installed.*

5.6 SUMMARY AND RECOMMENDATIONS

There were 36,325 wastewater customer accounts served by CCUD at the end of FY 2017. Individual facilities connected to a wastewater collection system includes 310 lift stations, 261 miles of force mains, 294.7 miles of LPS mains, 20.8 miles of vacuum sewer and 378.2 miles of gravity mains.

Wastewater from each customer is transported to one of four WRFs, depending on the location of the customer. The Wastewater Collection workgroup has a maintenance program that includes inspections for condition assessment by CCTV 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.

Table 4-6 lists the recommended repairs for the stations viewed during the preparation of this report.

Table 5-2 Wastewater Collection System – 2017 Recommendations

Recommendation:	Lift Station No. 1 – Community Center ▪ Paint the above ground discharge piping. ▪ Repair cracks in the building. ▪ Provide an odor-control system. ▪ Replace the control panel. ▪ Perform thorough rehabilitation or replace the station with modern equipment.
Recommendation:	Lift Station No. 2 – Dalton ▪ Paint the above ground discharge piping. ▪ Replace the building and/or roof. ▪ Provide an odor-control system. ▪ Repair the wet well hatch hinges. ▪ Provide an auxiliary power receptacle.
Recommendation	Lift Station No. 7 – Pure Oil ▪ Paint the building superstructure. ▪ Replace with a standard submersible pump station. ▪ Repair the roof overhang. ▪ Replace the glass windowpane. ▪ Install an odor-control system.
Recommendation:	Lift Station No. 37 – Quesada Master Lift Station ▪ Replace the metal door of building. ▪ Overhaul or replace the existing generator. ▪ Construct a backup wet well. ▪ Perform regular cleaning of the wet well.
Recommendation	Lift Station No. 65 – South Port Master Lift Station ▪ Provide a fence around the station. ▪ Repair the flow meter and connect to telemetry.
Recommendation:	Lift Station No. 139 – Altoona ▪ Install a stationary emergency generator.
Recommendation	Lift Station No. 309 – Bridgewater ▪ Paint the piping and valves in the underground vault. ▪ Install a stationary generator. ▪ Apply protective coating on inside perimeter of the wet well.
Recommendation:	Lift Station No. 402 – Matecumbe ▪ Relocate the existing lift station.
Recommendation	Lift Station No. 415 – Prada ▪ Provide an odor-control system. ▪ Paint the discharge piping and valves. ▪ Apply protective coating to the wet well interior. ▪ Refurbish or replace the motor control center (MCC).

Recommendation:	Lift Station No. 801 – Rotonda Master Lift Station ▪ Analyze effectiveness of odor-control device in removing gases from the wet well.
Recommendation	Lift Station No. 817 – Bunker Road ▪ Replace the station entirely. ▪ Provide a fence. ▪ Install a telemetry/receiver system. ▪ Replace or paint the discharge piping and valves. ▪ Fix the water leak inside valve vault. ▪ Stabilize the surrounding soils.
Recommendation:	Lift Station No. 819 – Rotonda Circle 1 ▪ Replace the control panel. ▪ Paint the discharge pipes. ▪ Reseal the wet well to reduce inflow and infiltration. ▪ Replace or repair the piping. ▪ Add a telemetry/receiver system. ▪ Perform a thorough rehabilitation of the station.
Recommendation	Lift Station No. 858 – Pine Valley Boundary ▪ Repair the interior of the wet well to reduce inflow and infiltration. ▪ Paint the discharge piping, valves, and fittings. ▪ Clean the valve vault. ▪ Replace the control panel. ▪ Add a telemetry/receiver system.

6 WASTEWATER TREATMENT FACILITIES

CCUD owns and operates four WRFs throughout Charlotte County and one leachate treatment facility (LTF) for the County landfill as shown in Figure 6-1. The East Port WRF serves Mid County, the West Port and Rotonda WRFs serve the West County service area, and the Burnt Store WRF serves the South County service area. Each WRF is unique in its design and treatment approach, so each facility needs to be evaluated independently. The WRFs are designed and permitted to treat a specific volume of wastewater expressed on an AADF basis as shown in Table 6-1.

Figure 6-1 CCUD Wastewater Treatment Facilities

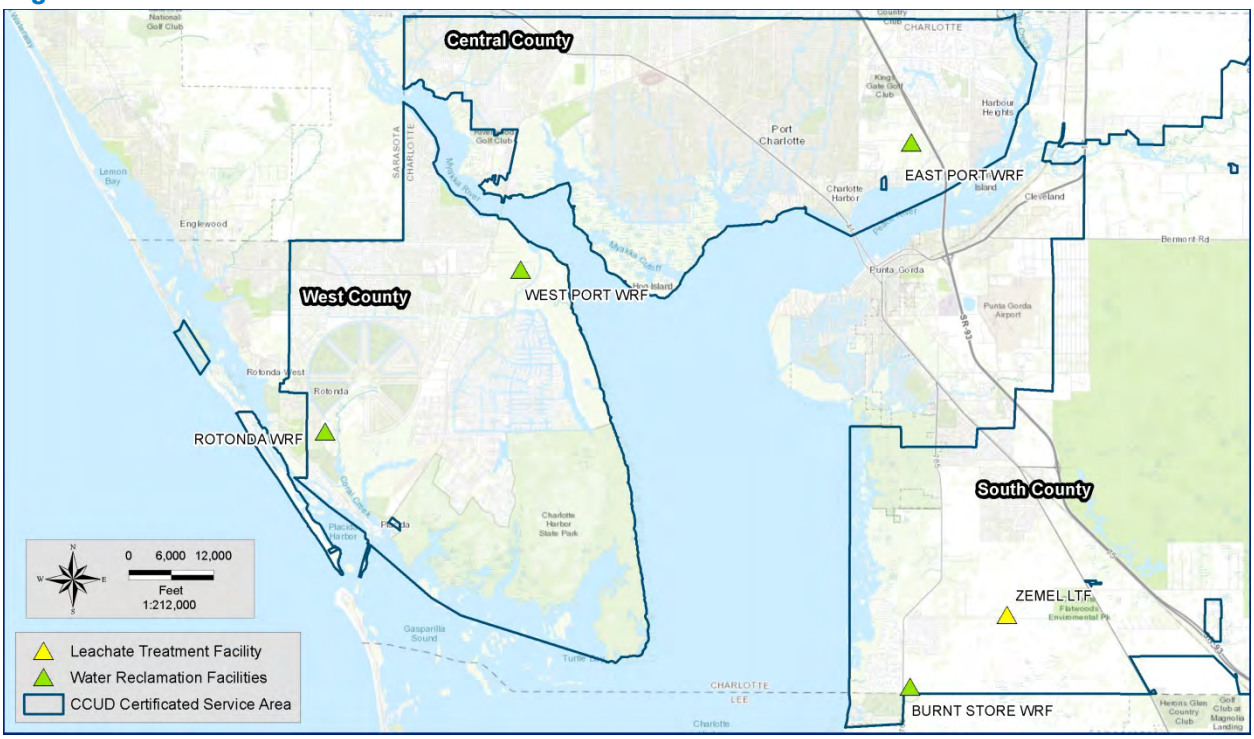


Table 6-1 CCUD Water Reclamation Facilities and Design Capacities

Treatment Plant	Permitted Capacity (MGD)
East Port	6.0*
West Port	1.2
Rotonda	2.0
Burnt Store	0.5
Total	9.7

Note: * Current upgrades are underway for an increase to 9.0.

6.1 State-Certified Laboratory

The East Port Laboratory (EPLAB) is at the East Port WRF. EPLAB provides regulatory and operational support for CCUD facilities including four WRFs, WTP, one LTF, six deep injection wells, and water distribution system monitoring.

EPLAB is a National Environmental Laboratory Accreditation Program (NELAP)-certified laboratory (Florida Department of Health [FDOH] ID E54436, which was renewed July 1, 2017) and a member of The NELAC Institute (TNI). The laboratory accreditations include performing analyses for potable water microbiology, non-potable water general, and non-potable water microbiology, which include the three new analysis certifications obtained in January 2017 for Total and E. Coliform by standard Method 9223B for drinking water, Fecal Coliform using Colilert-18 for wastewater, and Enterococci Enterolert for non-potable water.

The Quality Control Manual was last revised in January 2017 with an effective date of February 1, 2017. The Plan and Standard Operating Procedures are a reference for laboratory technicians and management. The Procedures are maintained and revised annually to coincide with new TNI standards in accordance with the FDOH's Environmental Laboratory Program.

As required by current regulations, the laboratory operation is assessed every 2 years. The most recent assessment was performed by a private company under contract with FDOH in October 2016, and the next assessment is due in October 2018.

6.1.1 Site Visit

Jones Edmunds staff visited the EPLAB on February 12, 2018; however, the Laboratory Manager, Sandra Lavoie, was unavailable. To complete our assessment, we contacted her via telephone upon her return to discuss changes in FY 2017 operations.

6.1.2 Accreditation Requirements

EPLAB operates under the standards set by TNI, Chapter 64E-1, FAC, and FDOH. New TNI standards became available in July 2016; however, Chapter 64E-1, FAC, still references the 2003 NELAC standard. Due to this, laboratory staff follows NELAC 2003 standards but have begun reviewing and implementing TNI 2016 standards as applicable. Every laboratory in Florida must follow the TNI 2003 and 2016 standards until the State Legislature approves the new standards.

EPLAB staff are engaged in making quality decisions regarding laboratory results and are required to participate in regular training programs. Only laboratory personnel who are certified to perform specific analyses 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 Quality Assurance Plan.

6.1.3 Laboratory Operations

The EPLAB work space consists of five main rooms:

1. Sample receipt and storage.
2. Un-refrigerated chemical and equipment storage.
3. Administrative work stations for laboratory technicians.

4. Main laboratory benches.
5. Drinking water laboratory.

The EPLAB processes more than 33,200 test results per year including on-site analysis and additional off-site testing. This large volume of work is tracked and processed by a full complement of five laboratory employees for all of FY 2017.

The laboratory now uses the new Laboratory Information Management System (LIMS) for data management. LIMS software prepares the paper documentation forms and sample identification numbers to record and track results. 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 reducing the possibility of error. The Laboratory Manager is now able to produce daily status reports of all current laboratory work. The tracking system also monitors quality control results and chemical use to manage ordering of supplies.

The old paper tracking system that was developed by the Laboratory Manager was continued until late 2017 as a duplicate to LIMS. The paper record method is still better suited for some data analysis management than the electronic tracking. The LIMS electronic bench sheets and data are saved in the "Cloud." The laboratory staff is pleased with the LIMS, which has reduced paper work significantly and greatly reduced the chances for scribing errors.

Quality control procedures have been continued, and chain-of-custody documentation is strictly adhered to. The Quality Control Manual (QCM) was revised in January 2017 with an effective date of February 1, 2017. The comprehensive manual contains 28 sections, including organization, document control, purchasing services and supplies, client service, control of records, data integrity, environmental conditions, calibration, sample handling, quality assurance, and reporting methods. 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 6 months to maintain EPLAB's certifications. Results from the test samples are sent to FDOH for regulation compliance and compared to results from other laboratories nationwide. Ms. Lavoie takes pride in her staff's proficiency test results, which have been within one standard of deviation of the national average of all laboratories using the County's testing vendor. The exception to this excellent record occurred in February 2017 when the Total Suspended Solids test was greater than two standard deviations, but improved to one standard deviation during the August 2017 test results.

Laboratory equipment is tested for accuracy in accordance with the QCM. 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 at EPLAB. Electronic entry of data at the laboratory station or output of an automatic analyzer directly to report forms has eliminated one 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. The FDEP forms are expected to be updated soon. Quality Assurance by a responsible person-in-charge is required to check data entries.

6.1.4 Record Keeping

Records are kept in a neat and organized manner and are easily accessible.

Paper and electronic records are well maintained to meet regulatory requirements. Sampling schedules for each facility are clearly posted for staff to review and all upcoming special sampling events (e.g., Annual Effluent Analysis, Cryptosporidium, and Giardia) are clearly posted with their due dates.

EPLAB sends some samples to other laboratories that are certified to perform tests that EPLAB is not certified to perform. Results are received and sent to the treatment plant chief operators for use in compliance reporting.

6.1.5 Certification Compliance Schedule

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

6.1.6 Review of Previous Report Recommendations

Table 6-2 CCUD EPLAB 2016 Recommendations and Status

Recommendation:	Continue to expand the use of the LIMS within its capabilities in 2017.
Progress:	*Implemented in 2016. Its numerous capabilities are being introduced into the operations of the laboratory.*
Recommendation:	Seek certification for analysis methods using the new Gallery instrument that was delivered in November 2016.
Progress:	*Received certification for three new analyses in January 2017: (1) Total coliform and E. coli by Colilert-18, (2) wastewater fecal coliform by Colilert-18, and (3) Enterococci by Enterolert.*

6.1.7 Recommendations

Table 6-3 CCUD EPLAB 2017 Recommendations

Recommendation:	Continue to expand the use of the LIMS within its capabilities, including the use of bar codes to track samples from collection to result posting.
Recommendation:	Educate sampling personnel of the need for accuracy in use of collection bottles, sample storage, and delivery to the laboratory.
Recommendation:	Hire an Analytical/Quality Assurance Specialist or Quality Assurance Officer to help the EPLAB remain in compliance.
Recommendation:	Recommend seeking certification for potable water Total Dissolved Solids (TDS), Sulfate, and Chloride.

6.2 WASTEWATER PRETREATMENT COMPLIANCE

CCUD's Pretreatment section is responsible for the following:

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

6.2.1 TRANSPORTED WASTE RECEIVING PROGRAM

CCUD is very proud of the Waste Receiving Program, which provides an environmentally safe disposal option for septic waste, reducing land application and environmental impacts. Located at the East Port WRF, the septage receiving station combines the hauled waste with plant influent to achieve RCW quality effluent and beneficial reuse of biosolids. In FY 2017, the program accepted 8,721,810 gallons from 44 permitted haulers.

6.2.2 RESTAURANT GREASE INTERCEPTOR INSPECTION PROGRAM

This program helps prevent sanitary sewer overflows in the CCUD sanitary sewer collection system by removing fats, oils, and grease (FOG) at the source. Program staff inspect and monitor grease interceptors at more than 240 restaurants and other food preparation facilities countywide to ensure compliance with the required pump-out schedule (e.g., 30, 60, 90 days) and other required maintenance. Plans for new restaurants and other food preparation facilities are reviewed by CCUD's Engineering Services Division for adherence to County specifications. In FY 2017, 971 inspections were conducted and one Notice of Violation was issued for non-compliance.

Through a partnership with Liquid Environmental Solutions (LES), the FOG is transformed into bio-diesel and other beneficial byproducts. LES receives restaurant grease directly from haulers and partially processes it for recycle use at a facility located on the East Port WRF site. FOG is not treated through the East Port WRF process.

6.2.3 INVESTIGATION OF UNAUTHORIZED DISCHARGES

Investigation and prevention of unauthorized discharges are important for protecting the treatment capabilities of WRFs and the environment. These unauthorized discharges are pollutants that enter the municipal waste stream and have an adverse effect on the treatment process. When plant operations staff report issues pertaining to the treatment process at any WRF, pretreatment staff begin investigating by sampling upstream lift stations and manholes, reviewing activities from local connections and working closely with lift station crews and plant personnel. The goal is to determine the source of the illegal discharge, take steps to eliminate the problem up to and including fines, and return the plant to normal operations.

6.3 WASTEWATER BIOSOLIDS TRANSPORT, PROCESSING AND DISPOSAL

Wastewater biosolids or waste-activated sludge (WAS) from CCUD's four WRFs are processed at the East Port WRF biosolids management and processing facility.

CCUD owns two 6,000-gallon tankers for biosolids transport operation from the West Port, Rotonda and Burnt Store WRFs. The biosolids are discharged into a 2.05-MG aerated tank for partial stabilization and decant thickening before dewatering. Biosolids dewatering is accomplished by two 2-meter-wide belt filter presses (BFPs) near the holding tank. The biosolids are dewatered to approximately 17-percent Total Solids and hauled to the compost facility at the Charlotte County Zemel Road Landfill. The dewatered biosolids are mixed with chipped yard waste and composted to achieve Class A compost, which is used as an organic amendment for sandy soil enhancement and material for landfill final cover.

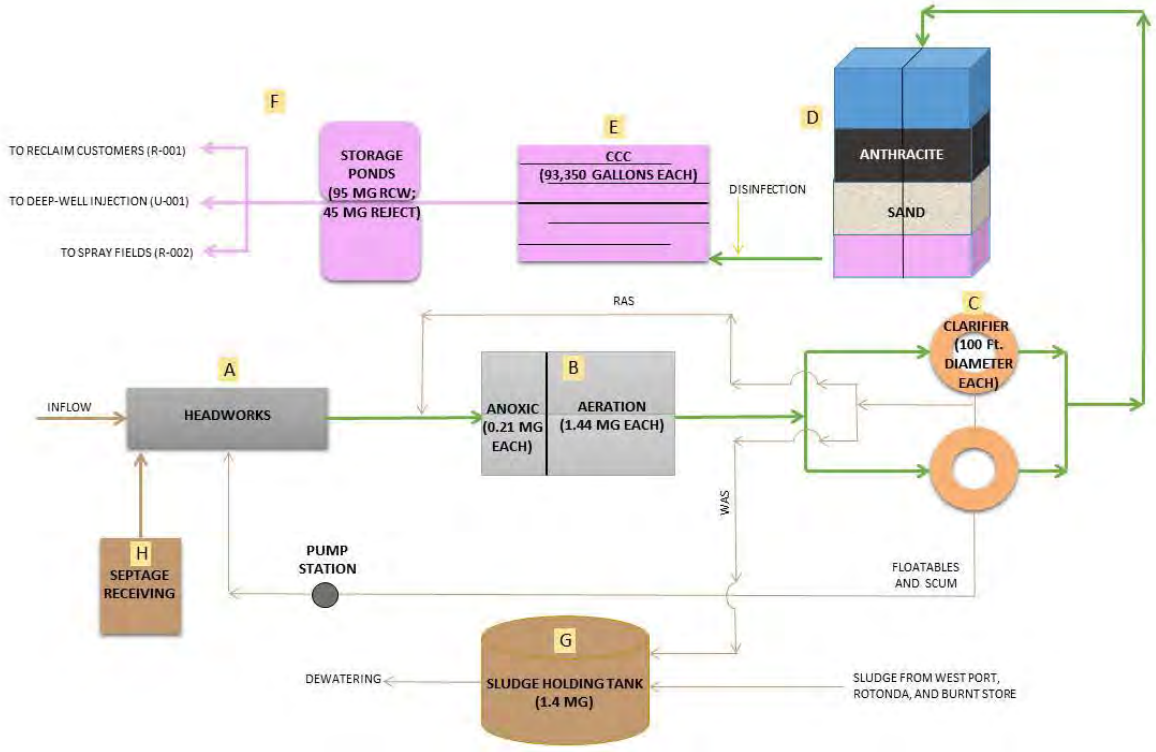
6.4 EAST PORT WRF

The East Port WRF is at 3100 Loveland Boulevard, Port Charlotte, and was acquired as part of the 1991 General Development Utilities purchase. The WRF began its current operations in 1996 and has a current permit operating capacity of 6.0 MGD AADF. East Port WRF uses an activated sludge process to treat domestic wastewater collected from the Mid County service area. Emergency power is provided by a diesel emergency generator in an on-site building with an automatic transfer switch to maintain operation of critical facilities.

This location also houses the NELAP-certified EPLAB. The WRF site includes 51 acres of conservation easement, with the remaining area consisting primarily of woodlands. The site is home to more than 20 varieties of birds, including great egrets, osprey, and Carolina wrens. Many other wildlife species including gopher tortoises, scrub jays, bobcats, armadillos, cottontails, and alligators make the East Port WRF their home.

The East Port WRF is permitted to distribute reclaimed-quality water to unrestricted-public-access reuse sites, inject into a deep well injection system, and apply to a slow-rate restricted access land application system. The WRF is classified as a Type I, Category II, Class A domestic wastewater treatment facility under FAC 62-699 and is required to meet Class III Reliability standards in accordance with FAC 62-600 and FAC 62-610. Figure 5-1 shows the East Port WRF process flow diagram. The restricted irrigation system consists of 315 acres on site using slow-rate irrigation (R-002 Spray Fields). About 45 acres of the spray field will be abandoned in 2018 for use by the Charlotte County Sheriff Department.

Figure 6-2 East Port WRF Process Flow Diagram



A) Headworks: Raw wastewater enters the WRF headworks structure where screening and grit removal take place. After screening, wastewater flows into one of the two vortex-type grit removal units for grit separation. Compacted screening and separated grit are dewatered and discharged to dumpsters for disposal. Internal plant flows from the on-site pump station are introduced and include biosolids dewatering system filtrate, tank and unit process drains, and supernatant from the aerobic digesters.

B) Biological Treatment Using Modified Ludzack-Ettinger (MLE) Process: Wastewater from the headworks splits between two treatment trains. Each train includes an anoxic basin and oxidation ditch (aeration basin) for organics and nutrient removal. Mixers keep solids suspended and homogenous in the anoxic zones. Mechanical surface agitators keep the oxidation ditches aerated. Internal recycle (IR) pumps send flow from the oxidation ditch (aeration basin) to the anoxic basins for nitrogen removal.

C) Secondary Treatment: Flow from the biological treatment process splits between two clarifiers. These provide a passive environment for solids separation. The clarifiers are skimmed to remove floatables and scum before the clarifier effluent flows over a circumferential weir. Sludge pumps send settled solids from the secondary clarifiers to two locations: to the front of the anoxic basins as return-activated sludge (RAS) to replenish the microbial community and to the digesters as WAS.

D) Tertiary Treatment – Filtration: Clarified water splits between two multi-media traveling bridge filters, containing sand and anthracite, to remove remaining

suspended solids. A metal canopy over the filters with an ultraviolet (UV) shade cloth inhibits algae growth and provides protection from sun exposure.

E) Tertiary Treatment – Disinfection: Filtered water splits between two chlorine contact chambers (CCTs) where liquid sodium hypochlorite is dosed for disinfection. CCT No. 1 is designated for RCW production that meets high-level disinfection requirements. CCT No. 2 is designated for disposal to restricted-access sites (e.g., Class I deep injection wells or spray fields) using unfiltered effluent from the secondary clarifiers that meet basic-level disinfection requirements. An ultraviolet-inhibiting net over the chamber reduces algae growth. Sodium hypochlorite is stored in two storage tanks with a total capacity of 6,000 gallons. A 5,000-gallon storage tank was installed in 2013, and a 1,000-gallon tank was installed in 2014. A liquid reagent analyzer is used to adjust chlorine feed rates, and a non-reagent analyzer is used for chlorine residual compliance measurement.

F) Effluent RCW Storage and Disposal Facilities: Reclaimed-quality water is pumped directly to distribution to the reclaimed system. Water not meeting RCW standards flows to a separate reject pond. From there, reject water can be sent to the slow-rate restricted-access RCW spray fields or the two Class I 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.

G) Aerobic Digestion: WAS is pumped from the clarifiers to the aerobic digester where blowers provide aeration to aerobically digest the sludge before dewatering using two BFPs. The sludge transfer pumps that discharge to the dewatering units are operated by controls at the BFPs. Dewatered sludge is hauled to the Charlotte County Class I landfill for disposal. The East Port WRF digester is permitted to accept waste sludge from the West Port, Rotonda, and Burnt Store WRFs.

H) Septage Receiving Stations: The WRF has two stations – one for conventional septage and one for FOG from private septage tank haulers. The receiving station materials are screened and directly pumped to the WRF headworks. The station containing FOG is screened, collected, and stored in two holding tanks and converted to biodiesel. Decant from these tanks is pumped to the headworks for treatment, and the remainder is treated by a rotating drum. The non-biodegradable waste is stored in a roll-off container and transported to the landfill for disposal.

6.4.1 Regulatory Considerations

The East Port WRF operations are regulated by FDEP under the provisions of Chapter 403, Florida Statutes and the applicable FACE rules. The following permit governs plant operations:

- Plant Operating Permit (FL0040291) Expiration Date: September 6, 2022.
- IW-1 Permit (44274-253-UO) Expiration Date: October 17, 2021:
  - The mechanical integrity test (MIT) was performed on IW-1 in October 2014. The next MIT will be due in 2019.
- IW-2 Permit (330486-002-UO/1M) Expiration Date: April 12, 2020:

- The MIT was performed on IW-2 in August 2015. The next MIT will be due in 2020.

The 2017 permit renewal for the East Port WRF issued by FDEP authorizes operation of the WRF through September 6, 2022, and a planned expansion from 6.0 MGD to 9.0 MGD.

The work was divided into stages to address the needed improvements while allowing the schedule of the expansion to be determined by CCUD based on projected service area growth:

- Stage 1 and 2 Improvements were completed in FY 2015 and addressed the headworks, biological treatment processes, tertiary treatment, sludge handling, and electrical systems.
- Stage 5 improvements were prioritized ahead of Stages 3 and 4 to enhance RCW storage and transmission capacity. Stage 5 design was completed in FY 2016, the work was bid in spring 2017, and construction completion is scheduled for the end of 2018.
- Stage 3 and 4 Improvements were designed in 2014, and include bid-ready specifications and drawings, and are scheduled for construction sometime between 2020 and 2024 depending on growth. When these final two stages are complete, the East Port WRF will have a treatment capacity of 9.0 MGD AADF. Improvements include a new flow splitter box to the three biological treatment trains, an additional oxidation ditch, a new flow splitter box for the clarifiers, a new clarifier with related RAS and WAS pumps, additional effluent filters and CCTs, chemical dosing facilities, biosolids storage, and possibly improvements to convert the old aerated sludge holding basins into a flow equalization (EQ) tank.

6.4.2 Wastewater Flows and Loads

The East Port WRF permitted capacity is 6.0 MGD AADF. In FY 2017, the AADF was 4.601 MGD, and the East Port WRF is operating at 77 percent of the plant permit capacity. The maximum monthly average flow of 7.529 MGD occurred in September 2017 due to Hurricane Irma. The highest TMADF of 6.058 MGD occurred in October 2016, which is 101 percent of the plant permit capacity demonstrating the influence of wet weather and infiltration and inflow on flows to the facility. The plant permit capacity is based on AADF, so the facility remains in compliance with the plant permitted capacity of 6.0 MGD. Although the plant is currently operating at 77-percent rated capacity of 6.0 MGD AADF, the ongoing efforts and completed plant improvement design described above are prepared to increase the design capacity of the East Port WRF to 9.0 MGD. Table 6-4 summarizes influent flows as reported on the discharge monitoring reports (DMRs).

Table 6-4 East Port WRF Influent Flows FY 2017

Month	Monthly Avg. (MGD)	AADF (MGD)[1]	TMADF (MGD)	Monthly Max (MGD)	Monthly Min (MGD)	TMADF Percent Capacity
Oct-16	5.192	4.921	6.058	10.579	4.090	101%
Nov-16	3.985	4.932	5.377	4.127	3.818	90%
Dec-16	3.830	4.925	4.336	4.001	3.451	72%
Jan-17	4.023	4.852	3.946	4.209	3.863	66%
Feb-17	4.074	4.759	3.976	4.203	3.957	66%
Mar-17	4.073	4.720	4.057	4.303	3.970	68%
Apr-17	3.759	4.702	3.969	4.019	3.553	66%
May-17	3.483	4.682	3.772	3.626	3.321	63%
Jun-17	4.989	4.594	4.077	6.482	3.393	68%
Jul-17	4.445	4.570	4.306	6.773	4.114	72%
Aug-17	5.832	4.553	5.089	11.504	4.220	85%
Sep-17	7.529	4.601	5.935	9.592	5.682	99%

[1] Permitted plant capacity 6.0 MGD.

For FY 2017, the average annual influent load for 5-day Carbonaceous Biochemical Oxygen Demand (CBOD5) was 152 mg/L and for Total Suspended Solids (TSS) was 183 mg/L. The maximum monthly average for CBOD5 was 210 mg/L in March 2017 and for TSS was 254 mg/L in April 2017, which correspond with seasonal residents and the dry season. Table 6-5 summarizes the wastewater characteristics of the East Port WRF influent as summarized in the DMRs.

Table 6-5 East Port WRF Influent Water Quality FY 2017

Month	CBOD5		TSS	
	Monthly Avg. (mg/L)	Annual Avg. (mg/L)	Monthly Avg. (mg/L)	Annual Avg. (mg/L)
Oct-16	101	126	114	122
Nov-16	150	128	114	125
Dec-16	181	129	165	128
Jan-17	205	133	226	138
Feb-17	200	137	203	142
Mar-17	210	142	226	148
Apr-17	209	146	254	158
May-17	166	148	201	165
Jun-17	114	150	184	172
Jul-17	135	152	196	176
Aug-17	96	154	175	180
Sep-17	55	152	136	183

6.4.3 Treatment Objectives and Effluent Quality

The East Port WRF is permitted to treat wastewater to two effluent standards: one for disposal to the deep injection well and the on-site sprayfields (CBOD5 = 20 mg/L, TSS = 20 mg/L), requiring basic disinfection, and the other for public access reuse levels (CBOD5 = 20 mg/L, TSS = 5 mg/L), requiring high-level disinfection.

Table 6-6 and Table 6-7 summarize the effluent water quality, as measured at the discharge of the two CCTs for EP 31 (no filtration) and EP 32 (filtration). For both locations, the chlorine residual levels must be achieved at the discharge of the CCT. A review of the FY 2017 data shows that the East Port WRF effluent quality was well within permit limits for both standards.

Table 6-6 East Port Effluent Water Quality FY 2017 (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-16	2.06	2.05	2.06	1.42	6
Nov-16	No Flow	2.05	No Flow	1.42	No Flow
Dec-16	No Flow	2.05	No Flow	1.42	No Flow
Jan-17	No Flow	2.05	No Flow	1.42	No Flow
Feb-17	No Flow	2.07	No Flow	1.93	No Flow
Mar-17	No Flow	2.07	No Flow	1.93	No Flow
Apr-17	No Flow	2.07	No Flow	1.93	No Flow
May-17	No Flow	2.07	No Flow	1.93	No Flow
Jun-17	No Flow	2.07	No Flow	1.93	No Flow
Jul-17	No Flow	2.07	No Flow	1.93	No Flow
Aug-17	2.00	2.05	3.07	2.31	0
Sep-17	4.20	2.75	14.50	6.54	2

Table 6-7 East Port WRF Effluent Water Quality FY 2017 (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-16	<2.00	2.02	98.2%	0.54	0.30	99.5%	0
Nov-16	<2.00	2.02	97.5%	0.56	0.32	99.5%	1
Dec-16	2.00	2.02	98.8%	0.68	0.36	99.6%	0
Jan-17	<2.00	2.02	98.6%	0.55	0.39	99.8%	1
Feb-17	<2.00	2.02	98.7%	0.54	0.41	99.7%	0
Mar-17	<2.00	2.02	98.7%	0.75	0.45	99.7%	1
Apr-17	<2.00	2.02	98.7%	0.33	0.46	99.9%	0
May-17	<2.00	2.02	98.5%	0.43	0.46	99.8%	0
Jun-17	<2.00	2.02	97.8%	0.52	0.51	99.7%	0
Jul-17	<2.00	2.01	98.2%	0.42	0.53	99.8%	0
Aug-17	<2.00	2.01	97.3%	0.38	0.55	99.8%	0
Sep-17	2.01	2.00	97.2%	0.36	0.51	99.7%	0

Note: mL = milliliters.

6.4.4 Treatment Components and Condition Assessment

Jones Edmunds completed an on-site review of the plant on February 12, 2018. Jones Edmunds 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 and deep injection well areas. In general, the plant site and irrigation fields are well maintained. Mowing of spray fields and brush clearing is nearly continual.

The operations building includes the office of the Treatment Facilities Division Manager, the EPLAB, Backflow and Reclaimed Water Coordinator, conference room, administrative 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 regularly exercised.
- Process piping is painted and clearly marked.
- All compliance meters are being calibrated every 6 months, and calibration tags are up to date.

Required documents maintained on site include:

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 EPLAB.
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 at the East Port WRF.

6.4.4.1 Headworks

The overall condition of the headworks is good.

The upper concrete deck of the headworks was painted due to years of hydrogen sulfide exposure. A thorough cleaning and epoxy coating of the deck was completed in FY 2016 and appears to be providing adequate coverage of the area. In FY 2017, Screen No. 1 was repaired and grit pumps were rebuilt.

The old grease dewatering building is now used for bulk storage. The screening and grit bagging system that was attached to the chutes that discharge into the dumpsters 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 septage 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 collect 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 CCUD WRF staff for cleaning this area periodically.

6.4.4.2 Flow Equalization

The East Port WRF does not have flow equalization storage for peak hour influent flows and loads, but should be included in the future plant expansion.

6.4.4.3 Biological Treatment Train – MLE Process

The overall condition of the MLE Process is good following Stage 1 and 2 Improvements in 2015 and 2016, respectively. The concrete is in good shape for its age and showing very little cracking or spalling. The anoxic zones are thoroughly mixed by four submerged mixers, and a baffle was added to both anoxic tanks to prevent aerated mixed liquor into the tank.

Four VFD-controlled surface aerators are in operation in the oxidation ditches. The aerator speed is adjusted based on the dissolved oxygen (DO) probe located at the end of the ditches. The aerators are well maintained and the DO control system is lowering power consumption and allowing a low DO at the end of the oxidation ditches to prevent DO to be pumped into the internal recycle system and back to the anoxic tanks. Six VFD-controlled internal recycle pumps were replaced in the Stage 1 and 2 Improvements and are controlled by the SCADA system based on the operators settings are also well maintained and in good working order.

The five RAS pumps are VFD-controlled. The two WAS pumps are controlled by operator settings in the SCADA system. Both pumping systems are well maintained and in good working order.

6.4.4.4 Clarifiers

The two clarifiers were rehabilitated as part of the Stages 1 and 2 upgrades in 2016, which included replacement of the clarifier scraper mechanisms. The overall condition of the sedimentation process is well maintained and clean, and the clarifiers are producing a high-quality effluent.

A "weir washer" system was installed in 2017 on Clarifier No. 1, and a weir washer will be added to Clarifier No. 2 in 2018. The weir washers eliminate the need to have O&M staff enter the clarifier effluent launders to remove algae – mitigating this safety issue. The weir washers do an excellent job keeping the clarifier effluent weirs and troughs clean. An excellent quality effluent was being produced by both clarifiers.

6.4.4.5 Filtration

The overall condition of the effluent filtration system is excellent and well maintained, and filters were rehabilitated as part of the Stage 1 and 2 Improvements.

The two traveling bridge sand/anthracite filters were both in operation at the time of the site visit. Turbidity results indicate that the filters are producing an excellent effluent for unrestricted public access reuse water.

A galvanized metal frame was installed over the filters in the Stage 1 and 2 Improvements to support a fabric roof constructed of UV shade cloth to reduce algae growth and lower the temperatures within the travelling bridge filters to produce a higher quality effluent and reducing the amount of chlorine cleaning needed to remove algae from the filters.

6.4.4.6 Disinfection

The CCTs are in good condition, well maintained and operated to produce reclaimed water for unrestricted public access reuse. A UV shade cloth was recently installed over the CCTs to reduce the loss of chlorine residual in the tanks. The previous UV shade cloth was removed by strong winds during Hurricane Irma in September 2017. Liquid sodium hypochlorite (12.5%) is used for disinfection to maintain a residual of ≥1.0 mg/L to meet unrestricted public access reuse standards. A liquid reagent chlorine residual analyzer is used to adjust chlorine feed rates, and a non-reagent analyzer is used for chlorine residual compliance measurement. The new skid-mounted chlorine feed system is encased in a clear plastic enclosure to control the spray of liquid chlorine for safety purposes. The two sodium hypochlorite storage tanks are well kept and meet regulatory requirements. The overall chemical feed systems and instrumentation are well operated and maintained to meet regulatory permit requirements.

6.4.4.7 Biosolids Handling Facilities

The overall condition of the biosolids storage/digestion tanks, associated aeration and decant equipment, piping, truck off-loading facilities, decant supernatant pumping, and BFP feed pumps at the new biosolids handling and storage tanks constructed under the Stage 1 and 2 Improvements is excellent. The facilities are well maintained and operated and receive waste biosolids from East Port, and the three other CCUD WRFs. CCUD has two tankers used for hauling liquid sludge from the other WRFs and off-load into the aerobic sludge holding tanks prior to dewatering.

Improvements to the feed piping to the two 2-meter BFPs were done under the Stage 1 and 2 Improvements, and the BFPs run 5 days per week 8 hours per day to dewater all of CCUD's biosolids for hauling and further treatment to produce a Class A Compost at the County's Zemel Road Landfill Compost Facility.

6.4.5 Reject Storage and Alternate Disposal

Excess reclaimed water or effluent not meeting RCW standards (reject water) is disposed of through two deep injection wells and a restricted access on-site slow-rate irrigation system (on-site spray field). The 45-MG effluent storage pond is used to store effluent before injection well and/or sprayfield disposal. The 45-MG liner is in good condition.

Effluent transfer pumps are well maintained but are showing signs that they need to be repainted. The irrigation pump station is located on the east bank of 45-MG pond and pumps water from the pond to the deep injection wells or the sprayfield.

Both deep injection wells are well maintained and in good working order. All valves are exercised regularly. All associated meters are calibrated semi-annually and are up to date.

6.4.6 Reclaimed Water Storage and Distribution

The East Port WRF is part of a Master Reuse System Permit that includes Rotonda and West Port WRFs. Chapter 7 discusses the overall RCW system in detail.

The RCW high-service pump (HSP) station has three VFD-controlled 100-HP vertical turbine pumps that pump RCW from a wet well adjacent to CCT No.1 into the RCW distribution system. The RCW service pumps at the end of the CCT clearwell are well maintained and operated. The speed of the RCW HSPs is controlled by system pressure (RCW demand) and high and low wet well levels. The pressure set point at the pumps is 70 psi, which helps maintain a distribution system pressure of at least 60 psi. The VFD controls allow the pumps to operate at high speeds to meet distribution system demand and at low speeds to provide non-potable water on site for operational and maintenance purposes. The total RCW flows to the distribution system can vary from 400 to 700 gpm. Each HSP is equipped with 120-micron filters for polishing RCW before entering the distribution system. These filters help prevent larger particles that may clog sprinkler systems from entering the distribution system from the RCW storage pond.

The 95-MG pond was recently drained and cleaned and the pond liner repaired and modified by CCUD staff in FY 2016/2017 for conversion to a 95-MG on-site RCW storage pond as part of the Stage 5 RCW Improvements. The Stage 5 RCW Improvements include a new automatically cleaned intake screen in the 95 MGD storage pond that provides the intake of

RCW from the pond to the new 9 MGD High Service Pump Station. The work is currently under construction and scheduled for completion in 2018.

6.4.7 Wet Weather Storage

The East Port WRF 95-MG and 45-MG storage ponds have a combined capacity of 140 MG to provide effluent storage prior to use or disposal. Sections 6.4.5 and 6.4.6 provide details on the ponds.

With FDEP approval, during Hurricane Irma in September 2017 the spray fields were flooded and the deep well pressures were exceeded to handle the increased flows.

6.4.8 Operations

The East Port WRF produces a high-quality RCW by using biological nutrient removal with an MLE process, clarification, sand filtration, and high-rate chlorine disinfection. The WRF can be operated to produce secondary effluent without filtration, but this alternative operation is only used for maintenance purposes and excess and/or unfiltered effluent is diverted to storage ponds for on-site spray irrigation or disposal in the two on-site deep injection wells.

The East Port WRF accepts septic tank waste through two septage pretreatment units. This service provides a necessary waste treatment component for local septage hauling companies that service location outside the CCUD collection system service area.

The East Port WRF accepts and treats sludge from West Port, Rotonda, and Burnt Store WRFs. Consolidating the sludge digestion in one location provides an economy of scale and allows for more efficient operations.

The East Port WRF is staffed 24 hours per day, 7 days a week by licensed operators who also monitor the other WRFs within the CCUD system 24 hours per day. Alarms are evaluated, and operators or maintenance personnel are dispatched to take corrective action, if necessary.

6.4.9 Maintenance

Routine maintenance is performed on a scheduled basis. Rehabilitation of major pieces of equipment is completed in accordance with the CIPs that are revised annually. Maintenance that is required to keep the WRF in compliance with regulations is performed immediately using in-house maintenance personnel or outside contractors.

The East Port WRF is undergoing upgrades through a five-stage expansion plan. Stage 1 and 2 Improvements have been completed. Stages 1 and 2 concentrated on repairing or replacing existing treatment units, and upgrading the WRF's electrical systems. Stage 5 RCW Improvements, which are in construction, maximize RCW production, storage, and distribution to customers within the Central and West County Master Reuse System, and the Stages 3 and 4 Improvements will increase the plant capacity from 6.0 to 9.0 MGD.

6.4.10 Review of Previous Report Recommendations

Stages 1 and 2 of the East Port WRF upgrade were completed in FY 2016. Stage 5 RCW Improvements were designed and bid for construction in FY 2017 and are in construction with completion scheduled for 2018. Other improvements leading to a rerating of the plant

to 9 MGD are designed and are scheduled to be constructed once growth and capacity issues dictate, which is currently expected for FY 2020 to FY 2024.

Table 6-8 East Port WRF 2016 Recommendations and Status

Recommendation:	Complete construction of the Stage 5 RCW Improvements to the effluent storage ponds to allow one pond to serve as a 95-MG RCW storage pond to increase reclaim water supply and reliability to customers.
Progress:	*Stage 5 RCW Improvements are in construction and will be completed in FY 2018.*
Recommendation:	Add transfer pumping capabilities to transfer RCW from CCT to the 95-MG RCW storage ponds and the new 9-MGD RCW HSPs.
Progress:	*This is part of Stage 5 Improvements in construction and will be completed in FY 2018.*
Recommendation:	Add additional stand-by power that is necessary to operate all critical treatment components at the plant including transfer pumps and reclaim water high service pumps.
Progress:	*This is part of Stage 5 RCW Improvements in construction and will be completed in FY 2018.*
Recommendation:	Evaluate the structural integrity of the digester walkways and its ability to serve as an influent EQ tank.
Progress:	*Not started. This work will be done as needed in Stages 3 and 4 or other phase.*
Recommendation:	Replace the chemical feed and effluent analyzer shed building as part of the plant upgrade.
Progress:	*Project is designed and scheduled to be part of Stage 3 and 4 Improvements construction phase.*
Recommendation:	Add shoulder fill on plant entrance road.
Progress:	*Spot was filled and delineators were added in FY 2017.*

6.4.11 Summary and Recommendations

A renewed wastewater permit for the East Port WRF was issued by FDEP during FY 2017. This permit authorizes a planned expansion from 6.0 MGD to 9.0 MGD. The date for the complete expansion will be determined by CCUD based on actual service area growth.

Table 6-9 East Port WRF 2017 Recommendations

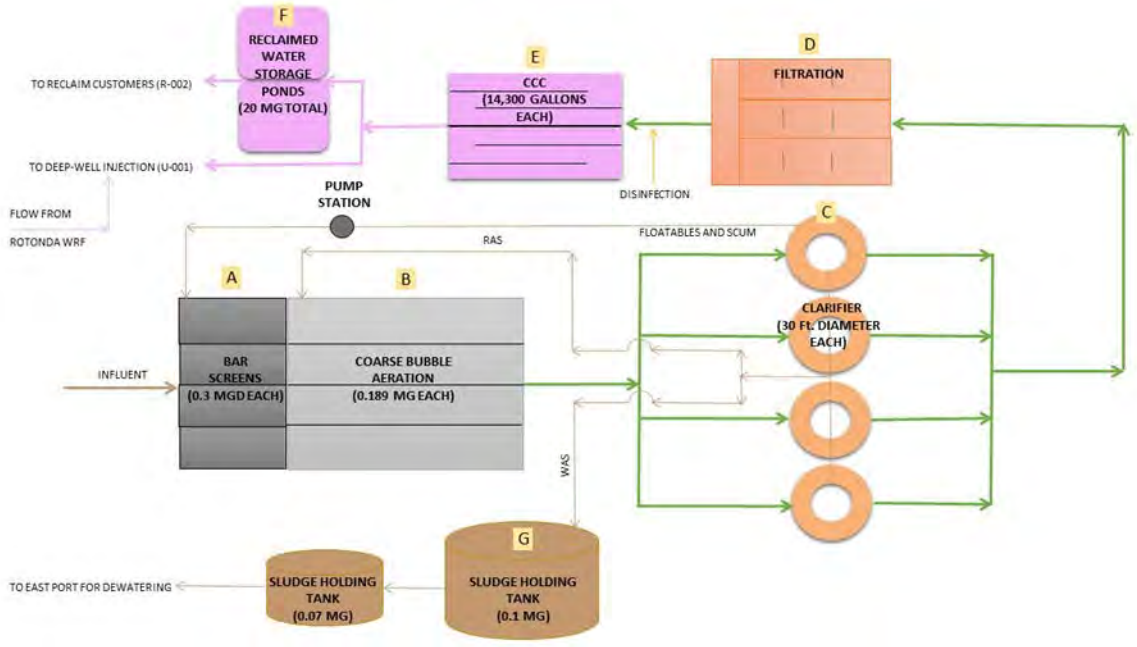
Recommendation:	Complete construction of the Stage 5 RCW Improvements to the effluent storage ponds to allow one pond to serve as a 95-MG RCW storage pond to increase reclaim water supply and reliability to customers. Project is underway and will be complete in 2018.
Recommendation:	Complete construction of the Stage 5 RCW Improvements to provide a pump wet well and HSP station to transfer stored RCW to new customers. Project is underway and will be complete in 2018.

Recommendation:	Complete construction of the Stage 5 RCW Improvements to provide an additional 1,500-kW stand-by power generator necessary to operate all critical treatment components at the plant. Project is underway and will be complete in 2018.
Recommendation:	Evaluate the structural integrity of the digester walkways and its ability to serve as an influent EQ tank.
Recommendation:	Provide new Chemical Feed and Analyzer Building for meeting high-level disinfection requirements required for producing unrestricted access public reuse water. This project is designed and will be constructed as part of the Stage 3 and 4 Improvement upgrades.
Recommendation:	Replace septage receiving pre-treatment units when repair is no longer cost effective and modify to allow septage treatment in aerated sludge holding tank and/or pump to headworks.
Recommendation:	Add automated weir washer weir cleaners to Clarifier No. 2. Addition to Clarifier No. 1 was completed in 2017.

6.5 West Port WRF

The West Port WRF is in the Gulf Cove area of West Charlotte County at 15005 Cattle Dock Point Road, Port Charlotte. This WRF was upgraded in 2005 and has a current permitted capacity of 1.20 MGD AADF. The West Port WRF uses an activated sludge process to treat domestic wastewater collected from part of the West County service area. The West Port WRF is permitted to distribute reclaimed-quality water to unrestricted-public-access reuse sites and inject into a deep well injection system. The former 0.162-MGD slow-rate restricted-access spray field permitted discharge was removed in the October 2015 permit renewal. Two diesel-powered emergency generators with automatic transfer switches provide standby power to the WRF. Figure 6-3 shows the West Port WRF process flow diagram.

Figure 6-3 West Port WRF Process Flow Diagram



A) Screening: Raw wastewater from the West County service area collection/ transmission system is screened to remove large inorganic material by four rotary influent screens. A manual bar screen is also available for bypass purposes. Screenings are collected in a dumpster and hauled to the landfill for disposal. Internal plant flows from the on-site pump station are introduced at the bar screens.

B) Biological Treatment for Organics Removal: Screened wastewater is split equally into four aeration basins where aeration and microorganisms are used to treat biodegradable material. Blowers aerate the wastewater through fine-bubble diffusers in each aeration basin.

C) Secondary Treatment: Flow from the biological treatment process is split between four secondary clarifiers for solids separation. The clarifiers are skimmed to remove floatables and scum before the effluent flows over a circumferential weir. Telescoping valves adjust sludge withdrawal from the bottom of each clarifier and convey it to the sludge return chamber. The sludge exits the return chamber where it is conveyed to the front of the aeration basins as RAS to replenish the microbial community or to the sludge holding/aerobic digestion tanks as WAS.

D) Tertiary Treatment – Filtration: Clarified water enters three automatic cleaning, disc-type cloth media filters for tertiary filtration to remove the remaining solids. The filters are housed in individual steel tanks.

E) Tertiary Treatment – Disinfection: The filtered water enters the CCTs where liquid sodium hypochlorite is dosed for disinfection. Only one chamber is currently in use.

F) Effluent Reclaimed and Disposal Facilities: Reclaimed-quality water is pumped to two lined storage ponds for storage and distribution to the reclaimed system. Excess RCW and water not meeting reclaimed standards are pumped to the Class I injection

wells by three equally sized pumps. The West Port WRF and Rotonda WRF RCW systems are interconnected, allowing Rotonda WRF to dispose of excess RCW.

G) Aerobic Digestion: WAS is pumped from the clarifiers to the sludge holding/aerobic digestion tanks where blowers provide aeration through coarse-bubble diffusers. The sludge is gravity thickened and decanted before being hauled to the East Port WRF for aerobic digestion, dewatering, and transport to the Charlotte County Zemel Road Landfill where it is processed into Class AA compost is made for sale as a soil conditioner.

6.5.1 Regulatory Considerations

The West Port WRF operations are regulated by FDEP under the provisions of Chapter 403, Florida Statutes, and the applicable FAC rules. The following permits governs plant operations:

- Plant Operating Permit (FLA014048), Expiration Date: February 24, 2021.
- Deep Well (IW-1) Permit (0330461-001-UO/1M), Expiration Date: April 12, 2020.

6.5.2 Wastewater Flows and Loads

The West Port WRF permitted capacity is 1.20 MGD AADF. In FY 2017, the AADF was 0.676 MGD and the West Port WRF is operating at 56 percent of the plant permit capacity. The maximum monthly average flow of 0.821 MGD occurred in August 2017. The highest 3-month average daily flow (TMADF) of 0.771 MGD occurred in September 2017 due to Hurricane Irma, which is 64 percent of the plant permit capacity demonstrating the influence of wet weather and infiltration and inflow to the facility. Table 6-10 summarizes influent flows as reported in the DMRs.

Table 6-10 West Port WRF Influent Flows FY 2017

Month	Monthly Avg. (MGD)	AADF (MGD)[1]	TMADF (MGD)	Monthly Max Day (MGD)	Monthly Min Day (MGD)	TMADF Percent Capacity (%)
Oct-16	0.708	0.671	0.736	1.192	0.646	61
Nov-16	0.598	0.673	0.677	0.648	0.571	56
Dec-16	0.605	0.676	0.637	0.695	0.554	53
Jan-17	0.653	0.669	0.619	0.695	0.626	52
Feb-17	0.685	0.656	0.648	0.730	0.651	54
Mar-17	0.680	0.651	0.673	0.712	0.657	56
Apr-17	0.623	0.649	0.663	0.705	0.557	55
May-17	0.559	0.650	0.621	0.602	0.525	52
Jun-17	0.684	0.656	0.622	0.807	0.510	52
Jul-17	0.719	0.668	0.654	1.000	0.646	55
Aug-17	0.821	0.672	0.741	1.670	0.634	62
Sep-17	0.774	0.676	0.771	1.531	0.650	64

[1] Permitted capacity 1.2 MGD AADF.

For FY 2017, the average annual influent load for CBOD5 was 105 mg/L and for TSS was 182 mg/L. The maximum monthly average for CBOD5 was 159 mg/L in March 2017 and for TSS was 275 mg/L in December 2016, which correspond with seasonal residents and the dry season. Table 6-11 summarizes the wastewater characteristics of the West Port WRF influent.

Table 6-11 West Port WRF Influent Water Quality FY 2017

Month	CBOD		TSS	
	Monthly Avg. (mg/L)	Annual Avg. (mg/L)	Monthly Avg. (mg/L)	Annual Avg. (mg/L)
Oct-16	63	121	115	269
Nov-16	106	118	172	261
Dec-16	137	113	275	237
Jan-17	133	112	208	230
Feb-17	149	109	219	212
Mar-17	159	109	244	203
Apr-17	149	109	255	197
May-17	106	108	168	190
Jun-17	72	106	125	183
Jul-17	65	105	111	179
Aug-17	61	105	135	183
Sep-17	59	105	159	182

6.5.3 Treatment Objectives and Effluent Quality

The West Port WRF is permitted to treat wastewater to two effluent standards: one for disposal to the deep injection well (CBOD5 = 20 mg/L, TSS = 20 mg/L), requiring basic disinfection, and the other for public access reuse levels (CBOD5 = 20 mg/L, TSS = 5 mg/L), requiring high-level disinfection.

In FY 2017, the annual average effluent CBOD5 and TSS values were 2.08 mg/L and 0.5 mg/L. The CBOD5 high monthly average of 2.62 mg/L occurred in December 2016. The TSS effluent remained below 1.0 mg/L throughout FY 2017. These CBOD5 and TSS concentrations are well within public-access reuse standards. Table 6-12 summarizes the water quality of the West Port WRF effluent.

Table 6-12 West Port WRF Effluent Water Quality FY 2017

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-16	2.18	2.2	96.6	0.3	0.6	99.7	0
Nov-16	2.16	2.21	98.0	0.5	1.0	99.7	0
Dec-16	2.62	2.25	98.1	0.9	1.2	99.7	0
Jan-17	<2.00	2.25	98.5	0.4	1.2	99.8	0
Feb-17	<2.00	2.25	98.7	0.3	1.3	99.9	0
Mar-17	<2.00	2.25	98.7	0.5	1.2	99.8	0
Apr-17	<2.00	2.24	98.7	0.4	1.2	99.8	0
May-17	<2.00	2.24	98.1	0.5	1.1	99.7	0
Jun-17	<2.00	2.23	97.2	0.4	1.1	99.7	0.1
Jul-17	<2.00	2.22	96.9	0.4	1.1	99.6	0
Aug-17	<2.00	2.13	96.7	0.3	1.1	99.8	0
Sep-17	<2.00	2.08	96.6	0.6	0.5	99.6	0

6.5.4 Treatment Components and Condition Assessment

Jones Edmunds completed an on-site review of the WRF on February 12, 2018. Our personnel met with Thomas Cimino, Chief Operator of the West Port WRF, to review plant conditions, operations, and records. 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 RCW storage ponds. A warning sign is on the access gate, and multiple warning signs are outside the moat near the property boundary.

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 RCW storage pond is an aesthetic welcome to plant visitors. The operations building and shop area is clean and organized.

The plant operators continue to exercise all valves regularly. All compliance meters are calibrated every 6 months, and calibration tags were up to date at the time of the site visit.

Required documents maintained on site include:

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 2 years).
9. Reports required to complete the last permit application.
10. Certification of EPLAB.

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 at the East Port WRF. The Chief Operator has prepared a binder of required documents that is readily available for anyone's inspection.

6.5.4.1 WRF Influent

The WRF includes a 24-inch influent force main and 16-inch flow meter assembly that have been in service since January 2014.

6.5.4.2 Headworks

The overall condition of the headworks was considered good at the time of the site visit. In FY 2017, the bottom of the headworks area was cleaned, and in FY 2018 the top of the headworks will be power washed.

Two of the four mechanical bar screens were in operation at the time of site review. The rotary screens were rebuilt in 2017 but are still having problems. Rotary Screens No. 1 and 2 have been undergoing repair since 2017. 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. Flow equalization storage would greatly reduce or eliminate the highly corrosive gasses at the headworks. To help protect the equipment, the screen housings have been sand blasted and painted with epoxy paint. Most components are stainless steel, but the few carbon components are a constant maintenance challenge. Staff cleans the screens twice daily to help delay rusting from exposure to hydrogen sulfide. The 316 stainless steel wedge wire drums are in very good condition.

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

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

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

At the time of inspection, the dumpster area was found to be clean 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.

6.5.4.3 Flow Equalization

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

6.5.4.4 Activated Sludge Facilities

The overall condition of the activated sludge facilities is good.

The WRF has four aeration basins that were in service at the time of the site review. New fine bubble diffusers were installed in all basins in 2013 and 2014. This has had a positive effect on the treatment process by providing a more even air flow distribution. However, the lack of grit removal causes problems with aeration as grit levels rise up toward the diffusers. Basin No. 3 was cleaned of grit and damaged aerators were repaired in FY 2016.

The outlet weirs of the aeration tanks require manual cleaning when debris catches on the weirs.

Four RAS/WAS pumps are in good operating condition and are under a sheet metal roof. The pumps were painted in 2017.

All three blowers were operating properly. A new soft start was added to one blower in FY 2015 to eliminate a surge in power demand. Usually, one blower provides sufficient air, so the operators cycle the blowers weekly. The plant operates between pH 6.7 and 7.0; when the pH exceeds 7.5, a second blower turns on. During summer, a timer is used to turn the blower on and off throughout the day. Using pH for operational control is not the most practical method for treating wastewater; an alternate control method including DO and oxygen reduction potential (ORP) should be evaluated.

The steel supports of the walkway over the aeration tank effluent splitter box were touched up with paint in FY 2017, and the aeration tanks will be repainted in 2018.

6.5.4.5 Sedimentation

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

All four clarifiers were in service at the time of inspection and 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, and Clarifier No. 2 was serviced and painted in FY 2017. Clarifier No. 3 is scheduled to be painted in FY 2018, and Clarifier No. 4 is scheduled in FY 2019.

Overflow weirs are hosed daily and brushed weekly to keep them clean. The overflow weirs were leveled in FY 2017.

The sludge return chambers on the side of each clarifier have telescoping valves used to adjust sludge withdrawal from the bottom of the clarifier. All telescopic valves are operating properly.

Floatables accumulate in these sludge boxes and are periodically removed by manually skimming the 5-foot-by-5-foot boxes from the clarifier bridge when the chambers are full.

6.5.4.6 Filtration

The filters are in good condition. The tanks cleaned every month with 5 gallons of bleach. A UV cover is recommended to prevent algae growth in the filters.

All three filters were in operation at the time of the site visit and working properly. All three filters have been replaced with a new 5-micron filter clothes. The Chief Operator stated that a higher-quality effluent is obtained when all three filters are operating in parallel.

The filters are constructed of 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 the three filters are under an aluminum cover.

The turbidity sampling point is located where it receives the combined flow of all three filters.

6.5.4.7 Chlorination

The overall condition of the chlorination system is excellent.

Good turbulent flow in the inlet boxes to the CCTs created effective mixing.

The continuously monitoring pH and chlorine analyzers are in good working order.

In June 2017, a new chlorine feed system with two chemical feed pumps for each CCT and new storage tanks was installed in a new chlorine storage and feed area between the two CCT structures. This will enable two parallel CCTs to operate when peak hourly flows exceed 955 gpm.

The new dosing pumps have double containment protection.

6.5.4.8 Solids Handling Facilities

The overall condition of the sludge holding tanks is good, but the capacity of the aerobic digesters is limited. Expanding the sludge holding tank storage will improve sludge decanting and thickening. The system currently cannot reach above 1-percent TSS. Sludge is transferred between tanks and loaded onto tanker trucks by a sludge transfer pump. Valve changes determine where sludge is directed.

The liquid sludge load-out pump was replaced in 2017.

6.5.4.9 Effluent Storage and Disposal

The overall condition of the effluent disposal system is good.

Effluent disposal is accomplished through an RCW distribution system and one deep injection well. A total of 20 MG of on-site RCW storage is provided.

The two HSPs and one jockey RCW pump are in good condition. A 16-inch pipe connecting the East Port WRF RCW to west Charlotte County was completed in FY 2014. The pipe connects directly to the West Port storage ponds and the West County distribution system. During 2017, a new level indictor was installed at the ponds.

Three new deep well pumps with a 16-inch manifold pipe connect to the deep well and on-site irrigation pipes. All pumps were fully functioning at the time of the inspection.

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

6.5.5 RCW Storage and Distribution

The West Port WRF has two lined RCW storage ponds – one 5 MG and one 15 MG. The storage ponds are used to store RCW produced during the day for distribution at night or to store excess RCW during wet weather periods. The stored water can be pumped to the RCW distribution system or the deep injection well.

The West Port WRF RCW system is part of the Master Reuse System that interconnects with the Rotonda WRF and the East Port WRF RCW systems. This provides flexibility to serve existing and future RCW customers. The main customer for the RCW produced at the West Port WRF is the Coral Creek Golf Club golf course, which receives RCW through a 7-mile-long, 10-inch-diameter RCW main constructed by the golf course owners.

6.5.6 Reject Storage and Alternate Disposal

The West Port WRF has no reject storage. Effluent that does not meet public access RCW standards is injected into the on-site deep injection well.

6.5.7 Wet Weather Storage

The two RCW storage ponds are used for wet weather storage of excess RCW. If the volume of RCW produced exceeds the storage capacity, the RCW is injected into the deep well.

6.5.8 Operations

The West Port WRF produces RCW using biological treatment, cloth filtration, and high level chlorine disinfection. The plant can be operated to produce secondary effluent without filtration, but this alternative operation is rarely used.

The West Port WRF is staffed 16 hours per day, 7 days per week. Key plant components are automatic, and continuous effluent monitoring allows the plant 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 SCADA software was upgraded in FY 2016. Alarms are evaluated, and operators or maintenance staff can be dispatched to the West Port WRF to address issues, if necessary. Effluent not meeting the RCW standards is automatically diverted to the deep injection well disposal. RCW is also automatically diverted to the deep injection wells when the RCW storage ponds are full.

6.5.9 Maintenance

Routine maintenance is performed on a scheduled basis. Rehabilitation of major pieces of equipment is completed in accordance with the CIPs that are revised annually. Maintenance required to keep the WRF in compliance with regulations is performed immediately using in-house maintenance personnel or outside contractors.

6.5.10 Review of Previous Report Recommendations

Table 6-13 West Port WRF 2016 Recommendations and Status

Recommendation:	Paint the steel supports for the walkway over the aeration tank effluent splitter box.
Progress:	*Scheduled for FY 2018.*
Recommendation:	All four clarifiers are showing signs of rust and suspect structural problems below the water line. Proceed with the scheduled repair and painting of all clarifiers. Include leveling of clarifier overflow weirs in the work to be accomplished.
Progress:	*Clarifier Nos. 1 and 2 are completed. Budgeted for rotation of maintenance. Clarifier No. 3 is scheduled for FY 2018.*
Recommendation:	Replace fabric on Filter No. 3 with 5-micron filter fabric when replacement cloth is warranted.
Progress:	*Scheduled for FY 2018.*
Recommendation:	Install new chlorine chemical feed pumps and put in a second CCT into service during periods of high flow.
Progress:	*Completed in June 2017.*
Recommendation:	Determine the source of flow spikes to the plant and explore means to reduce the flow peaks. This should be a collection comment.
Progress:	*This should be handled as part of the collection system assessment.*

6.5.11 Summary and Recommendations

The West Port WRF is a conventional activated sludge treatment plant with effluent filtration to produce public access RCW. The effluent consistently meets public access RCW quality. Nearly all current RCW 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 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. The clarifiers should be completely repainted every 4 years with touch-up of rust spots occurring every year. The inclusion of four clarifiers at the West Port WRF allows for one to be taken out of service for painting with minimal impact to the effluent quality.

The sludge produced as a byproduct of treatment is pumped to aerobic sludge holding tanks and then thickened at the West Port WRF before being trucked hauled in liquid form to the East Port WRF for sludge dewatering and final disposal at the compost facility that produces Class AA compost. The aerobic sludge holding tank volume is too small, and prevents proper decant thickening, resulting in a decant thickened sludge of 1-percent total solid or less. Additional sludge holding tank volume and decant thickening capabilities should be provided to allow a thickened sludge of 1.5- to 2.0-percent total solids, which will reduce sludge hauling volume by 50 to 100 percent and the resulting costs.

The new influent force main, RCW transmission pipe from the Walenda Pumping Station and the Rotonda WRF and the expanded RCW storage ponds have added considerable value to the WRF and its ability to function as a supplier of RCW for the east section of the West County peninsula. However, there are still issues with transmission of reclaimed water from East Port WRF to customers in West Port area as summarized in Chapter 7. In addition, excess RCW disposal during wet-weather events is an issue for the West Port WRF since Rotonda's excess water is pumped for co-disposal in the West Port's injection well. West Port's excess RCW flows by gravity to the irrigation wet well and to the onsite storage ponds.

Table 6-14 West Port WRF 2017 Recommendations

Recommendation:	Provide additional aerobic sludge holding tank volume and decanting capacity to improve decant thickening.
Recommendation:	Resolve hydraulic constraints in the irrigation wet well for the injection well pumps to allow disposal of excess RCW from West Port during wet weather events.
Recommendation:	Complete painting of the steel supports for the walkway over the aeration tank effluent splitter box and the aeration tanks.
Recommendation:	Complete repairs on Rotary Screen Nos. 1 and 2.
Recommendation:	Evaluate a DO or ORP control system to replace the pH control approach currently used in the aeration basins.
Recommendation:	Clarifiers are showing signs of rust and suspect structural problems below the water line. Proceed with the scheduled repair and/or replacement and painting of Clarifier Nos. 3 and 4. Include leveling of clarifier overflow weirs in the work to be accomplished.
Recommendation:	Evaluate the addition of a flow equalization tank to improve treatment plant operations.
Recommendation:	Install UV fabric cover over filters to reduce algae growth.

6.6 Rotonda WRF

The Rotonda WRF is at 3740 Kendall Road, Rotonda West. This facility was purchased by Charlotte County from a private utility, Aqua Source, in 2000. The Rotonda WRF is permitted to distribute reclaimed-quality water to unrestricted-public-access reuse sites and to use the West Port WRF deep well injection system. 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 the circular development; and

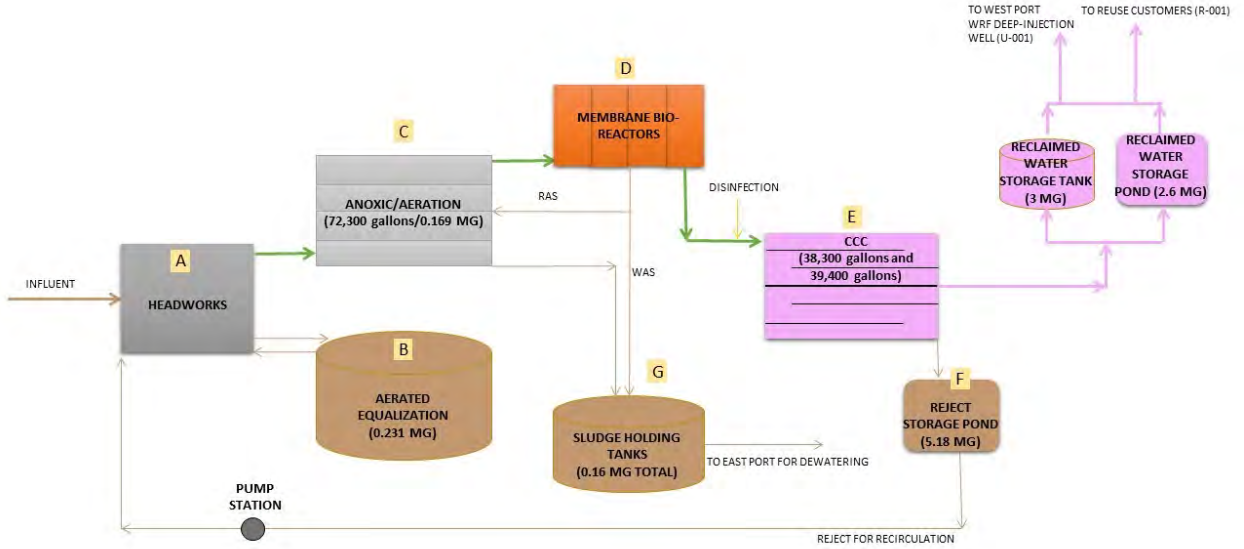
adjacent areas along Cape Haze Boulevard, Pine Valley, White Marsh, Long Meadow, Broadmoor, Pinehurst, Pebble Beach, Oakland Hills and Cape Haze neighborhoods.

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 RCW disposal capacity of 1.005 MGD AADF. The Rotonda WRF uses activated sludge in a MBR to treat wastewater.

Effluent can be distributed as RCW to unrestricted-public-access Master Reuse System or transferred to West Port for injection into a deep well injection system. Figure 6-4 shows the Rotonda WRF process flow diagram.

Two diesel-powered emergency generators in an on-site building have automatic transfer switches for providing emergency power to the WRF.

Figure 6-4 Rotonda WRF Process Flow Diagram



The Rotonda WRF treatment process consists of the following components.

A) Headworks: Raw wastewater from the West County service area enters the Rotonda WRF headworks for screening and grit removal. Two rotary drum fine screens remove larger inorganic material. Grit removal is achieved in two large concrete wet wells immediately downstream of the rotary drum screens. The settled grit and wastewater are pumped through two cyclone grit removal units to remove fine inorganics such as sand. Solids removed by these two processes are collected and hauled to the landfill for disposal. Flows for the on-site lift station are introduced here.

B) Equalization: During peak flows, excess wastewater pours over a weir at the headworks and is diverted to a 300,000-gallon EQ tank. Pumps at the EQ tank return the wastewater to the system as influent flows return during average conditions. The EQ tank is equipped with two forced-air pumps to maintain the biological medium and prevent hypoxic conditions.

C) Biological Treatment for Organics and Nutrient Removal: Wastewater from the pretreatment structure enters two activated sludge treatment trains that consist of an aeration zone, an anoxic zone, and a swing zone that can be an aeration or anoxic zone. This configuration allows the biodegradation of organics and removal of excess nitrogen. Blowers and fine-bubble diffusers are used to provide sufficient oxygen to the wastewater in the aeration zone.

D) Tertiary Treatment – Filtration: From the biological treatment process, the wastewater flows to the four MBR filtration trains. Hollow-tube membranes housed in individual cassettes provide a high level of filtration and take the place of clarifiers and gravity filters used at the other WRFs. The cassettes are periodically submerged in cleaning tanks where liquid sodium hypochlorite is added. Sludge produced in the treatment process is pumped to two locations: to the aeration basins as RAS to replenish the microbial community and to the two sludge holding/aerobic digestion tanks as WAS.

E) Tertiary Treatment – Disinfection: The filtered water enters the CCT splitter box that directs the flow into one of two CCTs. Three chlorine feed pumps introduce liquid sodium hypochlorite for RCW disinfection requirements. The chlorine is thoroughly mixed using a static mixer in the CCT influent pipe. The sodium hypochlorite is controlled by flow meters on the MBR effluent piping. The three sodium hypochlorite storage tanks have a total capacity of 5,500 gallons.

F) Effluent Reclaimed and Disposal Facilities: RCW enters the on-site 3.0-MG GST and a 2.64-MG RCW storage pond. An on-site pump station provides flow to the RCW transmission system that is interconnected with the West Port WRF to increase RCW distribution in West Charlotte County. During wet weather, excess RCW can be disposed of in the West Port WRF deep injection well. If effluent does not meet the unrestricted public-access RCW quality requirements, the flow can be diverted to an on-site lined storage pond and recirculated to the WRF headworks.

   The Rotonda WRF also has a lined reject pond with a storage capacity of 5.182 MG. Water diverted to this pond does not meet RCW standards and thus must be retreated through the WRF.

G) Aerobic Digestion: WAS pumped to the two sludge holding/aerobic digesters (170,000 gallon capacity) is gravity thickened and hauled to the East Port WRF for aerobic digestion and dewatering. The tanks are converted clarifiers with center surface aerators. Decanted supernatant recirculates to the headworks. Thickened sludge is hauled to the East Port WRF for digestion, dewatering, and final disposal at a Class AA compost facility at the Charlotte County Zemel Road Landfill.

6.6.1 Regulatory Considerations

The Rotonda WRF operations are regulated by FDEP under the provisions of Chapter 403, Florida Statutes, and the applicable FAC rules. The following permit governs plant operations:

- Plant Operating Permit (FLA014098) Expiration Date: May 30, 2022.

6.6.2 WASTEWATER FLOWS AND LOADS

The Rotonda WRF's permitted capacity is 2.0 MGD AADF. In FY 2017, the AADF was 1.088 MGD and the Rotonda WRF was operating at 54 percent of the plant permit capacity. The maximum monthly average flow of 1.608 MGD occurred in August 2017. The highest TMADF of 1.464 MGD occurred in September 2017 due to Hurricane Irma, which is 73 percent of the plant permit capacity demonstrating the influence of wet weather and infiltration and inflow on flows to the facility. Table 6-15 summarizes influent flows as reported on DMRs.

Table 6-15 Rotonda WRF Influent Flows FY 2017

Month	Monthly Avg. (MGD)	AADF (MGD)	TMADF (MGD)	Monthly Max. Day (MGD)	TMADF Percent Capacity (%)
Oct-16	1.269	1.094	1.375	2.237	115
Nov-16	0.929	1.095	1.259	1.004	105
Dec-16	0.868	1.092	1.021	0.951	85
Jan-17	0.900	1.056	0.898	0.950	75
Feb-17	0.896	1,010	0.888	0.928	74
Mar-17	0.896	0.898	0.991	0.843	75
Apr-17	0.794	0.989	0.862	0.871	72
May-17	0.802	0.952	0.831	0.952	69
Jun-17	1.314	1.030	0.970	1.727	81
Jul-17	1.222	1.062	1.113	1.579	93
Aug-17	1.608	1.090	1.382	3.732	115
Sep-17	1.562	1.088	1.464	3.318	122

For FY 2017, the average annual influent load for CBOD5 was 101 mg/L and for TSS was 127 mg/L. The maximum monthly average for CBOD5 was 147 mg/L in February 2017 and for TSS was 171 mg/L in March 2017, which correspond with seasonal residents and the dry season. Table 6-16 summarizes the wastewater characteristics of the Rotonda WRF influent.

Table 6-16 Rotonda WRF Influent Water Quality FY 2017

Month	CBOD5		TSS	
	Monthly Avg. (mg/L)	Annual Avg. (mg/L)	Monthly Avg. (mg/L)	Annual Avg. (mg/L)
Oct-16	54	95	124	117
Nov-16	106	95	115	118
Dec-16	125	96	127	121
Jan-17	140	99	154	123
Feb-17	147	102	156	127
Mar-17	146	103	171	126
Apr-17	131	103	152	127
May-17	114	103	137	127
Jun-17	77	102	107	129
Jul-17	66	101	98	128
Aug-17	56	101	101	128
Sep-17	52	101	81	127

6.6.3 Treatment Objectives and Effluent Quality

The Rotonda WRF is designed to treat wastewater to public-access reuse levels (CBOD5 = 20 mg/L, TSS = 5 mg/L), requiring high-level disinfection.

In FY 2017, the annual average effluent CBOD5 and TSS were 2.17 and 0.7 mg/L, respectively. The maximum effluent CBOD5 monthly average was 2.66 mg/L in August 2017. The monthly average maximum for TSS was 1.30 mg/L and occurred in April 2017. These CBOD5 and TSS concentrations are well within public-access standards. Table 6-17 summarizes the effluent water quality for the Rotonda WRF.

Table 6-17 Rotonda WRF Effluent Water Quality FY 2017

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-16	2.00	2.05	96.3	0.6	0.3	99.5	<1
Nov-16	2.00	2.03	98.1	0.9	0.4	99.2	<1
Dec-16	2.00	2.01	98.4	0.9	0.4	99.3	<1
Jan-17	2.00	2.01	98.6	0.6	0.5	99.6	<1
Feb-17	2.00	2.01	98.6	0.7	0.5	99.6	<1
Mar-17	2.05	2.02	98.6	1.2	0.6	99.3	<1
Apr-17	2.05	2.02	98.4	1.3	0.7	99.1	<1
May-17	2.51	2.06	97.8	1.1	0.8	99.2	<1
Jun-17	2.10	2.07	97.3	0.3	0.8	99.7	<1
Jul-17	2.37	2.09	96.4	0.3	0.7	99.7	1
Aug-17	2.66	2.14	95.3	0.3	0.7	99.7	<1
Sep-17	2.27	2.17	95.6	0.3	0.7	99.6	<1

6.6.4 Treatment Components Condition Assessment

Jones Edmunds completed an on-site review of the WRF on February 13, 2018. Our personnel met with Dan Atkisson, Chief Operator of the Rotonda WRF, 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 equipment is less than 8 years old. The exterior walls of all tanks were painted in 2011. Painted exterior walls and piping are beginning to show signs that repainting should be scheduled in a few years.

The plant operators continue to exercise all valves regularly. All compliance meters are calibrated every 6 months, and calibration tags were up to date at the time of the site visit.

Required documents maintained on site include:

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 EPLAB.
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 RCW Coordinator's office at the East Port WRF and at the Rotonda WRF Operations Building.

6.6.4.1 WRF Influent

The main influent valves are scheduled to be replaced in 2018.

6.6.4.2 Headworks

The overall condition of the headworks is considered to be good, but beginning to show signs of aging.

At the time of the site visit, both screens were operating. These screens are critical process units, and one screen must be in service at all times. Each screen rotates on four drum rollers that have been replaced several times on screen No. 1 since installation in 2009. The drum rollers support the stainless steel perforated screen as it rotates. The worn rollers were last replaced in 2016. The rate of rotation has been slowed to extend the life of mechanical components. In 2017, the drums were welded and the roller wheels, chains, and drive gears were replaced.

A wash water spray was added to the screening compactors, which improved operation and lengthened the life of the lower bearing units. The drive motor on Screening Conveyor No. 2 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.

The grit removal process operates as intended. The organic wastewater component of the pumped mixture is returned to the wet wells. 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. In 2017, Grit Pump No. 2 was replaced, and the cyclones are scheduled for replacement in 2018.

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.

6.6.4.3 Flow Equalization

The overall condition of the EQ tank is good.

The EQ tank, which attenuates high hourly flows, is filled through a gravity system initiated by an overflow weir at the headworks structure. The EQ 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 Chief Operator noted that Lift Station No. 801 sends 1,500 gpm to the Rotonda WRF for about 20 minutes and then turns off for 20 to 30 minutes. The operation of the EQ tank has been adjusted to respond to the intermittent discharge from Lift Station No. 801. Dry pit submersible pumps are used to return EQ tank contents to the treatment stream. Pump No. 3 was replaced in FY 2016. The EQ tank positive displacement blowers are run intermittently to save power. Oil sight glasses and fill ports were added by CCUD to improve maintenance.

6.6.4.4 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' operation is plug flow, which allows the operators to develop semi-anoxic zones. The anoxic zones and the use of automatic DO probes to control blower speeds have contributed to the high level of treatment while conserving energy use. The two old aeration tanks were last drained for inspection in 2012. Very little grit was found in the bottom. The aeration basins were pressure-cleaned and painted in FY 2017.

Four blowers serve the aeration trains. Generally one blower provides the needed air; when the oxygen demand increases, a second or third blower may be added. Blower No. 2 has been repaired multiple times including a new motor in 2014 and new bearings in 2016; however, the blower motor was again repaired in 2017. In 2017, work to replace Blower No. 1's motor began and will be completed during 2018. The larger blowers will be replaced in 2018 with blowers that are the correct cfm size. The blowers are well painted and piping marked.

One of the DO probes in the aeration basin was replaced in 2017.

6.6.4.5 Membrane Bioreactor (MBR)

The MBR system's overall condition is good, and it is well maintained. The MBR system continues to produce a high-quality effluent with minimal problems.

Four trains contain three cassettes each. The MBRs are cleaned once per week with a weak solution of bleach to maintain their treatment efficiency. The cassettes are cleaned in place with concentrated chlorine bleach twice a year and are removed once a year for a more in-depth cleaning.

In 2017, three mixed-liquor volatile suspended solids (MLVSS) return/recycle pump motors were replaced and are in good working order.

A turbidity sample is collected from the MBR effluent header pipe before the flow enters the CCT splitter box.

6.6.4.6 Chlorination

The overall condition of the chlorination system is good.

The two concrete CCTs are in good condition. Both CCTs are used alternately, but only one is required to meet the required contact time under current flows.

Wind from Hurricane Irma in September 2017 caused the UV filter cloth to be disconnected from the CCT. A new UV filter cloth of 90-percent UV block should be installed over the CCTs to conserve bleach and inhibit the algae growth in the tanks.

Replacement of Chlorine Storage Tank No. 3 began in 2017 and will be finished in 2018.

The chlorine feed line from the in-plant road is scheduled to be replaced in 2018.

6.6.4.7 Solids Handling Facilities

The overall condition of the solids handling facilities is good.

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 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.

6.6.4.8 Effluent Storage and Disposal

The effluent disposal system consists of 1.005 MGD AADF slow-rate public-access RCW systems at two golf courses.

The Rotonda WRF has the ability to send RCW through the West Port/Rotonda WRF interconnection to serve both facilities' RCW users. It also enables excess reclaimed-quality effluent to be sent to West Port's RCW 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 WRF and the Palms Golf Course delivery system. The total head pressure has been reduced by installing an RCW booster pumping station at the intersection of County Road (CR) 771 and Rotonda Boulevard East in 2014. This pumping station has increased the capacity of flow from the Rotonda WRF to RCW users and the deep well at the West Port WRF.

RCW quality effluent can also be stored in the Rotonda WRF on-site RCW storage pond and the 3-MG GST. The GST was drained and cleaned in 2017. The RCW storage pond is overgrown with vegetation, reducing the capacity of the pond. The storage pond is

scheduled to be dug out, cleaned, the berm will be reinforced, and the pond will be lined in 2018.

6.6.5 Reclaimed Water Storage and Distribution

The Rotonda, West Port, and East Port WRFs are connected to an RCW transmission system that is permitted under a Master Reuse permit.

RCW meeting public-access water quality is currently used for irrigation at golf courses and for residential/commercial irrigation. The Rotonda WRF contains two sets of RCW pumps – a low-pressure set and a high-pressure set:

- The low-pressure pumping system is designated for distributing RCW to golf course storage ponds north of the Rotonda WRF. The low-pressure pumps are submersible pumps driven at varying speeds by VFDs. The golf course's high-pressure pumps increase pressure for irrigation system use.
- The high-pressure RCW pumps 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 thin-walled PVC pipe is subject to breaks due to its age, and a replacement pipeline is being installed.

Since the Phase 1 plant expansion was completed in 2009, the old percolation pond has been abandoned. The existing slow-rate public-access RCW system (R-002) remains in service and uses an existing 12-inch-diameter RCW transmission main that is interconnected with the West Port WRF. However, the Rotonda WRF RCW system was connected to a master transmission system in FY 2014 that is capable of distributing RCW in Central/West Charlotte County.

The high-pressure pumps were last painted in 2012 and are scheduled to be repainted in 2018.

6.6.6 Reject Storage and Alternate Disposal

The on-site lined reject pond has a storage capacity of 5.182 MG. Water diverted to this pond does not meet RCW standards and must be retreated through the plant. A small pumping station pumps reject water back to the headworks. The pond is scheduled to be cleaned of algae in 2018.

6.6.7 Wet Weather Storage

The on-site RCW pond (2.64 MG), on-site GST (3.0 MG), and off-site Palms Pond (7.44 MG) are available for wet weather storage of RCW.

6.6.8 Operations

The Rotonda WRF produces public-access RCW by means of an MBR process. This process yields an extremely high-quality effluent that receives high-level chlorination before being pumped to the RCW distribution system.

Plant operators staff the Rotonda WRF 16 hours per day, 7 days per week. The WRF can be continuous monitored by the East Port WRF operators through a County-wide telemetry system that allows the Rotonda WRF to continue to produce RCW 24 hours per day. The

Wonderware SCADA software was upgraded in FY 2016. Alarms are evaluated, and operators or maintenance staff can be dispatched to the Rotonda WRF address issues, if necessary. Effluent not meeting RCW standards is automatically diverted to the reject storage pond for retreatment.

6.6.9 MAINTENANCE

Routine maintenance is performed on a scheduled basis. Rehabilitation of major pieces of equipment is completed in accordance with the CIPs that are revised annually. Maintenance that is required to keep the WRF in compliance with regulations is performed immediately using in-house maintenance personnel or outside contractors.

6.6.10 REVIEW OF PREVIOUS ANNUAL REPORT RECOMMENDATIONS

Table 6-18 Rotonda WRF 2016 Recommendations and Status

Recommendation:	Monitor the condition of the headworks screens regularly to detect wear problem as early as possible.
Progress:	*Ongoing.*
Recommendation:	Paint tanks and buildings in the next 2 years.
Progress:	*Ongoing.*
Recommendation:	Replace RCW transmission pipe to the Cape Haze Golf Course.
Progress:	*Ongoing.*
Recommendation:	Add MBR cassette to existing trains as flow requires.
Progress:	*Cassettes are being monitored to determine replacement schedule.*

6.6.11 SUMMARY AND RECOMMENDATIONS

The Rotonda WRF serves the west side of the Placida Peninsula. The plant's permitted capacity is 2.0 MGD with space for expansion to increase the capacity to 3.0 MGD. The WRF consistently produces high-quality RCW due to the use of MBR units; however, the treatment process is more energy intensive than conventional secondary treatment with filtration and requires a higher level of operator attention and understanding to balance flow and load through the MBR units. The O&M staff has done an excellent job maintaining the facility and the MBR membranes.

The Rotonda WRF is permitted to provide RCW to the Master Reuse system. The existing reuse pond is not lined, and berms are badly overgrown with vegetation. Additional reuse pond storage at the facility, or aquifer storage and recovery (ASR) well would be beneficial to minimize the need to send excess reuse water to West Port WRF for disposal in the deep injection well. The pumping rate of RCW to West Port WRF is limited to 1,100 gpm through the RCW transmission main. Cleaning of the lined reject pond is recommended.

Table 6-19 Rotonda WRF 2017 Recommendations

Recommendation:	Continue to maintain and operate rotary fine screens at slower rotation which is extending the life of the rollers. Monitor maintenance issues to determine if future replacement of rotary fine screens is necessary.

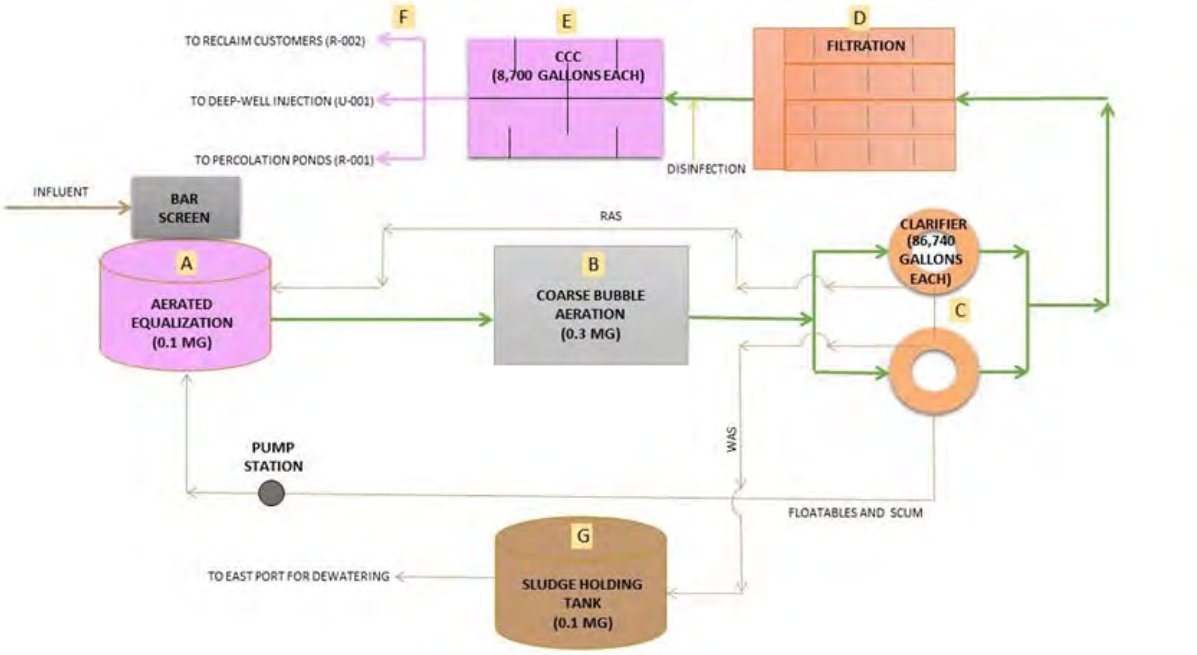
Recommendation:	Replace the main influent valves at the headworks due to corrosion.
Recommendation:	Replace the grit cyclones of the headworks.
Recommendation:	Complete painting the WRF buildings and pipes.
Recommendation:	Replace larger blowers with the correct cfm capacity blowers to lower oxygen levels and improve nitrogen removal.
Recommendation:	Add MBR cassette to existing trains as capacity needs dictate.
Recommendation:	Add metal frame and UV shade cloth to CCT 1.
Recommendation:	Replace the below-ground chlorine feed line from the on-site road to the tank.
Recommendation:	Remove vegetation, clean, reinforce the berm, and evaluate lining the RCW storage pond to increase RCW storage capacity.
Recommendation:	Clean the reject storage pond.
Recommendation:	Complete installation of RCW pipe to the Cape Haze Golf Course and RCW pipe to Placida Corridor.
Recommendation:	Evaluate ASR for additional RCW storage.

6.7 Burnt Store WRF

The Burnt Store WRF was acquired December 12, 2003, when CCUD purchased Florida Water Services' Burnt Store Division. Located in southwest Charlotte County on Burnt Store Road, the WRF serves six developments: Burnt Store Marina, Burnt Store Colony, Burnt Store Village, Burnt Store Lakes, Pirate Harbor community, and Tern Bay development.

The WRF uses conventional activated sludge with effluent filtration and high-level chlorine disinfection to produce RCW. The facility's permitted capacity is 0.5 MGD AADF. Effluent can be distributed as RCW to unrestricted-public-access reuse sites, injected into a deep well injection system, and applied to a slow-rate restricted-access land application system. The deep injection well system is shared with the adjacent Burnt Store RO WTP. Figure 6-5 shows the Burnt Store WRF process flow diagram.

Figure 6-5 Burnt Store WRF Process Flow Diagram



The Burnt Store WRF process consists of the following components:

A) Headworks and EQ Tank: Raw wastewater from the South County service area collection/transmission system enters the WRF manual bar screen and flows into the EQ tank. Blowers equipped with timers and course-bubble diffusers aerate the wastewater and suspend solids. Internal plant flows from the on-site pump station are also pumped into the EQ tank.

The EQ transfer pumps are equipped with VFDs that operators periodically adjust based on season and historical trends. The EQ tank is equipped with ultra-sonic level sensors that turn off the pumps based on a low level and trigger an alarm condition if the EQ tank level gets above the high-level alarm.

B) Activated Sludge Treatment: The activated sludge treatment occurs in two steel-ring package treatment units. The wastewater from the EQ tank enters the outer ring of a package-type treatment basin equipped with coarse-bubble diffusers where it is combined with RAS flow from the settlers. The mixed liquor suspended solids (MLSS) is aerated to achieve extended aeration treatment, and the air flowrate of the diffusers is adjusted to achieve nitrogen removal.

The plant has three centrifugal blowers: one dedicated to the aeration tanks, one dedicated to the sludge digestion tank, and one on stand-by.

C) Secondary Treatment – Sedimentation: The two steel circular secondary clarifiers are within the center of each package treatment unit for gravity solids separation. The clarifiers are skimmed to remove floatables and scum before clarifier effluent flows over a circumferential weir to the tertiary filters. Sludge pumps convey settled solids to the activated sludge tank (RAS) or the sludge holding tank (WAS). The RAS pumps turn on and turn off 10 minutes before and 10 minutes after the EQ pumps

turn on and turn off. Scum is collected in a scum trough and sent to the plant lift station where it is returned to the EQ tank.

D) Tertiary Treatment – Filtration: Clarified water from the settlers enters four disk filters, each having 5-micron cloth. The disk filter unit is installed in a steel filter tank that allows water to flow from outside the disk filters into a manifold system of the filter unit.

E) Tertiary Treatment – Disinfection: The filtered water can be sent to two CCTs where liquid sodium hypochlorite is introduced for disinfection. Two chemical feed pumps are controlled by a chlorine analyzer to dose sodium hypochlorite. The chlorine analyzer measures chlorine concentration at the beginning of the CCT and adjusts the chlorine feed rates. A reagent-less analyzer measures the chlorine residual at the CCT discharge weir for compliance with regulatory limits. A mixing pump is provided at the chemical feed point, and the chambers are baffled and sized to meet disinfection requirements. Sodium hypochlorite is stored in two tanks with a total capacity of 2,200 gallons.

F) Effluent Reclaimed and Disposal Facilities: RCW is conveyed through the unrestricted public-access reclaimed-water system via an HSP station. Two Class I deep injection wells and four percolation ponds are available for disposal of excess RCW or treated water that does not meet RCW standards.

   IW-2 is currently being used as the primary means of effluent disposal, with the older well, IW-1, maintained as a backup. Effluent flow that exceeds the deep well flow setpoint is diverted to the percolation pond system by way of a splitter mechanism at the CCT. The deep injection wells are also used for disposal of concentrate from the Burnt Store WTP RO facilities. Flows from the WTP and WRF are combined in a wet well at the injection well pumping station. Two equally sized vertical turbine pumps are used to inject water into the injection well.

G) Aerobic Digestion: Three crescent-shaped sludge holding tanks are located in one steel ring tank, providing a total capacity of nearly 300,000 gallons. Sludge is hauled to the East Port WRF and combined with the sludge from other Charlotte County WRFs for digestion and dewatering and final disposal at the Class AA compost facility located at the County's Zemel Road Landfill. One blower is dedicated to the sludge holding/aerobic digestion tank.

6.7.1 Regulatory Considerations

The Burnt Store WRF operations are regulated by FDEP under the provisions of Chapter 403, Florida Statutes, and the applicable FAC rules. The following permits govern plant operations:

- Plant Operating Permit (FLA014083), Expiration Date: December 28, 2021.
  - A CAR was prepared for the Burnt Store WRF in February 2017. A yearly CAR will continue to be completed to determine the need for a schedule for expansion.
- IW-1 Permit (271367-004-UO), Expiration Date: March 2, 2019.

- IW-2 Permit (271367-005-UO), Expiration Date: October 17, 2021.
  - The MIT was performed on IW-2 in June 2013. The next MIT will be due in 2018.

6.7.2 WASTEWATER FLOWS AND LOADS

The Burnt Store WRF's permitted capacity is 0.500 MGD AADF. In FY 2017 the AADF was 0.299 MGD and the Burnt Store WRF is operating at 60 percent of the plant permit capacity. The maximum monthly average flow of 0.402 MGD occurred in July 2017. The highest TMADF of 0.381 MGD occurred in September 2017 due to Hurricane Irma, which is 76 percent of the plant permit capacity, demonstrating the influence of wet weather and I/I on flows to the facility. Table 6-20 summarizes influent flows as reported on the DMRs.

Table 6-20 Burnt Store WRF Influent Flows FY 2016

Month	Monthly Avg. (MGD)	AADF (MGD)[1]	TMADF (MGD)	Monthly Max Day (MGD)	TMADF Percent Capacity (%)
Oct-16	0.295	0.337	0.325	0.528	65
Nov-16	0.243	0.331	0.296	0.282	59
Dec-16	0.222	0.322	0.253	0.273	51
Jan-17	0.288	0.308	0.251	0.391	50
Feb-17	0.305	0.296	0.271	0.241	54
Mar-17	0.386	0.301	0.298	0.323	60
Apr-17	0.235	0.291	0.280	0.295	56
May-17	0.170	0.287	0.235	0.237	47
Jun-17	0.305	0.287	0.237	0.494	47
Jul-17	0.402	0.294	0.294	0.787	59
Aug-17	0.393	0.299	0.366	1.107	73
Sep-17	0.348	0.299	0.381	0.577	76

[1] Permitted plant capacity 0.500 MGD.

For FY 2017, the average annual influent load for CBOD5 was 122.3 mg/L and for TSS was 154.3 mg/L. The maximum monthly average for CBOD5 was 197 mg/L and for TSS was 222 mg/L, both occurring in March 2017, which corresponds with seasonal residents and the dry season. Table 6-21 summarizes the wastewater characteristics of the Burnt Store WRF influent.

Table 6-21 Burnt Store WRF Influent Water Quality FY 2016

Month	CBOD		TSS	
	Monthly Avg. (mg/L)	Annual Avg.	Monthly Avg. (mg/L)	Annual Avg. (mg/L)
Oct-16	66.5	116.90	111.4	143.0
Nov-16	127.3	117.10	140.0	141.5
Dec-16	142.4	117.10	174.0	142.0
Jan-17	167.8	117.20	221.0	143.7
Feb-17	177.5	199.80	200.5	217.0
Mar-17	197.4	117.7	222.0	142

Month	CBOD		TSS	
Apr-17	170.3	116.4	178.5	142.9
May-17	144.5	118.2	178.3	146.6
Jun-17	86.7	119.4	132.0	150.8
Jul-17	68.3	119.2	108.5	152.1
Aug-17	63.6	120.9	92.6	152.8
Sep-17	55.7	122.3	93.0	154.3

6.7.3 WRF Treatment Objectives and Effluent Quality

The Burnt Store WRF is designed to treat wastewater to two effluent standards: one for disposal to 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 reuse levels (CBOD5 = 20 mg/L, TSS = 5 mg/L), requiring high-level disinfection.

In FY 2017, the annual average effluent CBOD5 and TSS values were 2.1 mg/L and 0.3 mg/L, respectively. The CBOD5 maximum monthly average of 2.5 mg/L occurred in March 2017. The TSS effluent annual average was 0.3 mg/L and maximum monthly average of 0.90 mg/L occurred in March 2017. These CBOD5 and TSS concentrations are well within public-access reuse standards. Table 6-22 summarizes the water quality of the Burnt Store WRF effluent.

Table 6-22 Burnt Store WRF Effluent Water Quality FY 2017

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-16	2.0	2.2	97.0	0.2	0.5	99.9%	<1
Nov-16	2.0	2.2	98.4	0.2	0.4	99.9%	<1
Dec-16	2.0	2.1	98.6	0.3	0.4	999%	<1
Jan-17	2.0	2.1	98.8	0.3	0.3	99.9%	<1
Feb-17	2.0	2.1	98.9	0.3	0.3	99.9%	<1
Mar-17	2.5	2.0	98.7	0.9	0.3	99.6%	<1
Apr-17	2.2	2.1	98.7	0.4	0.3	99.8%	<1
May-17	2.0	2.1	98.6	0.2	0.3	99.9%	<1
Jun-17	2.0	2.1	97.7	0.2	0.3	99.9%	<1
Jul-17	2.0	2.1	97.1	0.1	0.3	100%	<1
Aug-17	2.0	2.1	96.9	0.0	0.3	100%	<1
Sep-17	2.0	2.1	96.4	0.3	0.3	99.7%	<1

6.7.4 Treatment Components Condition Assessment

Jones Edmunds completed an on-site review of the plant on February 13, 2018. Our personnel met with John Thompson, Chief Operator of the Burnt Store WRF, to review plant conditions and operations and discuss 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 storage of used equipment in suitable locations.

Required documents maintained on site include:

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 5 years per permit).
9. Reports required to complete the last permit application.
10. Certification of the EPLAB.
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.

6.7.4.1 WRF Influent

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.

6.7.4.2 Headworks

The headworks overall condition is fair. Issues include insufficient treatment, lack of floatables removal, and no grit removal facilities.

The headworks does not include grit removal and influent manual screening system cannot prevent moderate-size debris from entering the facility's EQ tank, pumping systems, and process tanks.

Currently, the only way to remove floatables that pass through the manual bar screen is by using a bucket to remove them from the EQ tank.

A mechanical fine screen, scum/floatables removal, and grit removal systems are highly recommended. This issue is expected to be resolved as part of a future facility upgrade.

6.7.4.3 Flow Equalization

The Aquastore EQ tank is in good condition. Accumulation of grit (due to lack of headworks grit removal) in the EQ tank reduces treatment capacity. The grit in the EQ tank was removed by contract with US Submergent Technologies in 2017.

The EQ tank has signs of rust around the upper steel rim. Removing the rust and painting these rusted areas are scheduled in 2018. The piping internal to the tank is in poor condition with leaks at flanged fittings. The leaks do not pose an environmental hazard because they are inside the tank. The piping should be replaced as part of a plant upgrade.

A leak in the aeration header of the blower used to provide air to the EQ tank was repaired in 2017.

The EQ tank can transfer flow to the treatment process train by gravity (gravity mode) and/or by pump the EQ transfer pump station. To equalize high loads, the gravity mode allows diurnal loads to be equalized using the entire tank volume. The gravity mode uses a splitter box with gravity flow piping to split flow between the two activated sludge treatment basins. However, the piping is too small to pass the maximum daily flows so operations staff typically uses the equalization pumps and operator-adjusted setpoints to operate variable frequency drives and EQ the flow into the plant.

The lack of fine screening and grit removal creates operational and mechanical problems for the EQ and RAS/WAS pumps. Staff clears the EQ transfer pumps and pipe lines of debris monthly to remove clogs in the system. To help make this cleaning process safer, a permanent pump motor hoist system is installed over the EQ pumps to allow access to the pump volute.

Future plant upgrades should simplify the operation of the EQ tank to allow modes for flow and/or plant load equalization and to provide proper headworks treatment to reduce grit and screenings accumulation and wear in EQ tank and pumps.

6.7.4.4 Activated Sludge Facilities

The activated sludge facilities are steel ring package plants and the overall condition is good due to past maintenance and painting.

At the time of the site visit, the aeration basins appeared to have adequate air distribution throughout the tank. The tanks have minimum free-board (<1 foot) creating concerns of on-site sanitary sewer overflow at high-flow conditions or if downstream flow obstruction occurs. The metals tank basins are scheduled for painting in 2018.

All blowers and motors were rebuilt in 2017. The operation of the blowers is based on timers. There are no DO sensors to adjust the blower operation.

6.7.4.5 Sedimentation

The overall condition of the two 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.

6.7.4.6 Filtration

The effluent filtration system is a cloth media disk filter housed in a painted carbon steel tank. The overall condition of the filtration system is good.

Two additional 5-micron cloth discs were installed in the two spare slots in 2017. The operator indicated that the filter is producing a good quality effluent; however, it backwashes frequently during periods of high flow. This may be because the backwash pumps are set for 10-micron cloth, but the filter has 5-micron cloth.

6.7.4.7 Chlorination

The overall condition of the chlorination system is good. CCT No. 2 is not in service since it does not provide sufficient contact time due to the chlorine injection location.

The chemical-dosing pump bases are beginning to show rust and should be painted with chlorine-resistant paint.

The concrete CCTs are in good condition. A UV cover has been installed over the CCTs. Where liquid chlorine is added to the flow stream, a mixing pump is used to provide a more consistent chlorine reading for dosing control. A sampling pump pumps the effluent sample to the chlorine

compliance analyzer for compliance monitoring. This replaced an old gravity feed system and improved reliability.

The two sodium hypochlorite tanks are well kept and meet regulatory requirements. An emergency eyewash and shower are 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.

6.7.4.8 Solids Handling Facilities

The overall condition of the solids handling facilities is good.

The top ring of the sludge holding tank has minor rust.

6.7.4.9 Effluent Storage and Disposal

The overall condition of the effluent disposal system is good.

Effluent high-service and jockey pumps are well maintained and show no signs of deterioration. No means of measuring the RCW leaving the site are provided.

No on-site RCW storage is available. Future large users must be serviced through direct distribution to the user's RCW holding facility.

In 2017, the wastewater operation room SCADA system was connected to the deep injection well to monitor flows.

Both deep injection wells and percolation ponds are well maintained and in good working order.

Effluent flows by gravity from the plant discharge to the deep well pumping station and percolation ponds. The flow to the deep well pumping station wet well is through a 6-inch-diameter pipe, which is insufficient to move peak flows. Flow that does not reach the deep well overflows to the percolation ponds. This situation impacts the plant's ability to handle peak flows and makes it impossible to use the full capacity of the deep wells. The ability to transfer higher flows by gravity or pumping should be investigated as part of the plant upgrade design.

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 wet well. The deep well pumps were repainted in 2017, and new pumps are scheduled to be installed in 2018.

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. Operating personnel exercise IW-1 once per month for a minimum 24-hour period to ensure its integrity.

Four shallow monitoring wells around the IW-1 deep injection well were installed as part of the injection well construction. These wells should not be plugged because they may be needed if any rehabilitation work is performed on IW-1 or IW-2.

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.

Accordingly, CCUD intends to evaluate other means for transferring greater amounts of effluent flow to the deep well system as part of the plant upgrade.

6.7.5 Reclaimed Storage and Distribution

In FY 2017, the RCW customers within the Burnt Store WRF service area were the Burnt Store Lakes and Village developments and Burnt Store Colony mobile home park, which use a small amount of RCW for drip irrigation of landscaping along the development entranceway and common areas. Although the Burnt Store WRF has the capacity to pump 1.000 MGD AADF of RCW, at the end of FY 2017 these three active users were permitted for only 0.0117 MGD. The addition of RCW users under a General Reuse Service Area (permit amendment March 2017) would allow the facility to provide up to 0.500 MGD of RCW.

Two HSPs mounted above a clearwell following the CCTs are not in use. Flow to the RCW pump station was monitored by an ultrasonic flow meter and primary weir device, which became obsolete when the WRF began transferring flow to the deep injection well system. A new flow meter will need to be installed on the RCW pump discharge line to measure RCW flow leaving the site. CCUD intends to address this requirement as part of the plant upgrade.

6.7.6 Reject Storage and Alternate Disposal

No reject storage is provided at the Burnt Store WRF. Alternate disposal of RCW is provided via IW-1 (0.564 MGD deep injection well), IW-2 (2.88 MGD deep injection well), and the four on-site percolation ponds (rated capacity of 0.250 MGD AADF). Table 3-3 lists the average flow pumped into IW-1 and IW-2. In FY 2017 an average of 0.168 MGD was sent to the deep injection wells and 0.161 MGD was sent to the percolation ponds.

Table 6-23 Burnt Store WRF Injection Well Flows

Month	Injection Well IW-1 (MGD)	Injection Well IW-2 (MGD)
Oct-16	0.000	0.193
Nov-16	0.010	0.260
Dec-16	0.009	0.232
Jan-17	0.011	0.285
Feb-17	0.013	0.291
Mar-17	0.000	0.069
Apr-17	0.000	0.088
May-17	0.000	0.042
Jun-17	0.000	0.104
Jul-17	0.000	0.203
Aug-17	0.000	0.043
Sep-17	0.000	0.159
Annual Avg.	0.004	0.164

6.7.7 Wet Weather Storage

Other than the limited storage capabilities of the on-site percolation ponds, no wet-weather storage is necessary for the Burnt Store WRF.

6.7.8 Operations

The Burnt Store WRF is continuously monitored by online instrumentation through SCADA. A new operations building, which is shared with the Burnt Store RO WTP staff, was completed during FY 2009, providing a plant operating system to monitor critical operations and ensure compliance with regulatory requirements.

Plant operational staff manages the treatment process effectively and works to address maintenance items in a timely manner. The plant produces effluent meeting the requirements for RCW and injection well disposal. The flow EQ tank helps attenuate diurnal and extreme weather flows to enable proper treatment.

6.7.9 Maintenance

Routine maintenance is performed on a scheduled basis. Rehabilitation of major pieces of equipment is completed according to the CIPs that are revised annually. Maintenance that is required to keep the WRF in compliance with regulations is performed immediately using in-house maintenance personnel or outside contractors. The entire facility is scheduled to be repainted in FY 2018.

6.7.10 Review of Previous Annual Report Recommendations

Table 6-24 Burnt Store WRF 2016 Recommendations and Status

Recommendation:	Install a mechanical screen (highest priority) and grit removal system (secondary priority) in a new headworks.
Progress:	*Pending plant upgrades.*
Recommendation:	Remove rust from the top rim of the EQ tank and repaint.
Progress:	*Scheduled to be done in 2018.*
Recommendation:	Remove grit from the bottom of the EQ tank.
Progress:	*Completed in July 2017*
Recommendation:	Repair leaking piping in EQ basin.
Progress	*Pending plant upgrades.*
Recommendation:	Install EQ tank-level monitoring to adjust the transfer pump(s) flow rates.
Progress:	*Pending plant upgrades.*
Recommendation:	Remove rust from the outer rim of the aeration basins.
Progress:	*Scheduled to be done in 2018.*
Recommendation:	Replace aeration tank hinged sluice gates to provide adequate prevention of flow entering the adjacent tank during maintenance.
Progress:	*Pending plant upgrades.*

Recommendation:	Scum removal from the treatment system is not being accomplished. Collected scum should 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:	*Pending plant upgrades.*
Recommendation:	Install two additional cloth discs into the existing disc filter to increase capacity of the filter when necessary.
Progress:	*Completed in 2017.*
Recommendation:	Install an RCW meter on the discharge line from the RCW pumps. No means of measuring public-access RCW flow leaving the site is currently provided.
Progress:	*Pending plant upgrades or if a significant RCW customer(s) connects.*
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:	*Pending plant upgrades.*
Recommendation:	Paint deep well injection pumps.
Progress:	*Painted in 2017. Pumps are scheduled to be replaced in 2018.*
Recommendation:	Allow flow to the deep wells to be monitored in the wastewater operation room.
Progress:	*Completed in 2017.*
Recommendation:	Replace the fiberglass MCC building with a concrete structure.
Progress:	*Pending plant upgrades.*

6.7.11 SUMMARY AND RECOMMENDATIONS

The Burnt Store WRF serves south Charlotte County along Burnt Store Road and 2 square miles of residential golf course/marina in Lee County. The WRF shares the site with the Burnt Store RO WTP. The WRF produces RCW that meets public-access RCW requirements.

The Burnt Store WRF has reached a percent-of-capacity use that requires a CAR every year to assess the previous year flows and their impact on the capabilities of the plant to meet its permitted effluent requirements. However, the population growth in this part of southwest Florida stopped in 2009 and has not fully recovered to date. The WRF flow remains near the same flow level as it was in 2008. FDEP is allowing a phased increase in the capacity of the Burnt Store WRF plant to meet projected needs.

Many recommendations from prior annual reports will be addressed as part of the plant upgrade and are listed above in Section 6.7.10. The following recommendations should be assessed before the plant upgrade.

Table 6-25 Burnt Store WRF 2017 Recommendations

Recommendation:	Remove rust from the top rim of the EQ tank and repaint.
Recommendation:	Belowground aeration pipes are old and rusting and should be replaced.
Recommendation:	Remove rust from the outer rim of the aeration basins and repaint flaking areas at welds.
Recommendation:	Install new deep well injection pumps.
Recommendation:	Evaluate the main breaker at the blowers because it trips when three blowers are in operation.
Recommendation:	Evaluate filter back-wash pump operations specifically during high-flow events.

6.8 Leachate Treatment Facility

The LTF is operated and maintained by CCUD for the Charlotte County Municipal Solid Waste Management Department. Leachate generated by the Zemel Road Municipal Solid Waste Landfill is treated at the LTF and disposed of on site. The treatment facility and landfill share a 308-acre parcel in South County at 29751 Zemel Rd. Punta Gorda, FL 33955.

The landfill is designed to contain and collect leachate to protect surrounding groundwater and lakes. Leachate is generated as water seeps down through the solid waste, picking up dissolved and suspended solids. A vertical bentonite (clay soil) slurry wall that blends below ground with the natural confining layer of soil surrounding the landfill separates the interior landfill leachate from the natural environment. A leachate collection system installed under the waste drains the liquid to a central location where it is pumped to the treatment facility.

6.8.1 Regulatory Considerations

The LTF's construction permit was issued in 1991 as part of the Class I landfill to treat 0.25 MGD of leachate. In FY 2017, the monthly average daily flows ranged from 0.048 MGD to 0.076 MGD, and the AADF was 0.055 MGD. Operation of the plant is impacted by the following permits, which have specific reporting and monitoring requirements. Regulatory items directly related to the LTF are listed below:

- Class 1 Landfill Permit Expiration Date: July 15, 2033.
- IW-I Permit (No. 191077-003-UO/1I) Expiration Date: August 13, 2018 (Permit renewal by Charlotte County Public Works):
  - Monthly Summary Reports submitted to FDEP.
  - Quarterly Specific Injectivity Tests completed and submitted to FDEP.
  - The Mechanical Integrity Test (MIT) was performed on March 28 and 28, 2017, and submitted to FDEP in June 2017.

6.8.2 LEACHATE TREATMENT OVERVIEW

The LTF uses a Powdered Activated Carbon Treatment (PACT) batch tank treatment system, which combines powdered-activated carbon (PAC) and activated sludge (aerobic bacteria) to simultaneously adsorb and metabolize the leachate contaminants to treat the leachate to an acceptable level for deep well injection disposal.

6.8.2.1 LTF Influent

Most of the LTF's influent comes from the landfill pumping station (PS-1), which has a capacity of 150 gpm. Landfill leachate combines with the plant office sanitary sewer and the landfill underdrains outside the slurry wall. The system is designed to maintain a 1-foot static head differential between the water level on the inside and outside of the landfill slurry wall that is greater than the landfill permit requires. This approach provides operational flexibility since PS-1 can be out of service and allow leachate storage within the landfill cell without triggering a permit issue.

Leachate from PS-1 combines with runoff from the co-composting program at the County's Zemel Road Municipal Solid Waste Landfill. The composting program combines dewatered biosolids from the East Port WRF with yard waste to create an organic soil conditioner. The composting operation is located on a concrete paved area near the LTF, and FDEP requires the runoff be captured and treated at the LTF.

PS-1 pumps leachate into the influent holding tank and records daily volume with the leachate influent plant flow meter. The plant pumping station (PS-2) transfers leachate from the influent holding tank to the batch treatment tank units Monday through Friday when operators are present. On weekends, the Chief Operator monitors PS-1 and the level in the influent tank via SCADA.

6.8.2.2 PACT Biological/Carbon Adsorption Treatment

The PACT system consists of three separate tanks using aerated activated sludge with carbon particle adsorption. Each PACT tank is a small package plant with separate aeration system and pumps.

The carbon slurry used in the PACT process is made by combining bagged powder activated carbon with water. The carbon slurry is combined with the raw leachate and aerated. Aeration is periodically shut off to permit settling of the sludge. After settling is

completed, the decant water is pumped to a decant storage tank, filtered for final polishing, and stored in a glass-lined steel tank. The PACT tanks are then refilled with raw leachate, which is combined with the MLSS, additional powdered activated carbon is added (if necessary), and the aeration blower is restarted to begin the process again.

6.8.2.3 Solids Disposal

Weekly after decanting the treated leachate, the remaining solids (mixed carbon/biological sludge) from the PACT tanks are transferred directly to an outdoor sludge drying beds for dewatering. A Bobcat loader is used for sludge removal for maximum maneuverability within the sludge drying beds. Grit is removed from the batch process tanks, as necessary, and dried with biosolids. The Bobcat removes and dumps dried solids into a dumpster that is hauled to the landfill for final disposal.

6.8.2.4 Effluent Disposal

Effluent is disposed of the same day it is treated. Most of the effluent is pumped into the deep injection well, with a small volume used for dust control at the landfill.

Unchlorinated effluent is pumped down the deep injection well to an approximate depth of 2,700 feet below ground surface into a confined saltwater aquifer. The deep injection well typically operates 5 days per week, but operation can be adjusted accordingly to leachate production and effluent disposal requirements. Plant effluent can be stored and equalized in the Aquastore effluent storage tank to ensure the injection well down-hole velocity does not exceed 320 gpm.

A new program to operate Zemel Road as a Landfill Bioreactor and recycle leachate to enhance landfill biogas production at the Zemel Road Landfill has changed influent leachate flows and characteristics. However, the effluent leachate still meets or exceeds the final effluent standards required for disposal to the 0.460-MGD deep injection well system adjacent to the treatment plant. Table 6-26 summarizes the flows sent from the LTF to the deep injection well.

Table 6-26 Leachate Treatment Plant Deep Injection Well Flows FY 2017

Month	To Deep Injection Well Monthly Avg. (MGD)	Injection Rate Monthly Average (gpm)	Wellhead Pressure (psi)
Oct-16	0.065	248	17
Nov-16	0.076	261	17
Dec-16	0.062	257	16
Jan-17	0.057	258	16

Month	To Deep Injection Well Monthly Avg. (MGD)	Injection Rate Monthly Average (gpm)	Wellhead Pressure (psi)
Feb-17	0.053	254	15
Mar-17	0.050	243	16
Apr-17	0.056	258	16
May-17	0.053	255	16
Jun-17	0.052	246	17
Jul-17	0.050	252	16
Aug-17	0.056	249	17
Sep-17	0.048	246	17

6.8.3 TREATMENT COMPONENTS CONDITION ASSESSMENT

Jones Edmunds conducted a site visit at the LTF on February 13, 2018, and met with Kirk Kettler, Chief Operator, to review plant conditions, operations, and records. Access to the facility is through a secure gate at the entrance to the landfill. The plant is isolated among landfill operation buildings and adjacent to the yard waste composting facility.

The facility appears in good condition, and staff does a good job maintaining the grounds and facility appearance.

6.8.3.1 Required Documents and Records

The facility is required to maintain plant documents on site. The following summarizes the types of documents generally found at treatment plants. Due to the nature of this facility and since it is permitted under the landfill permit, some traditional documents may not be required for the LTF.

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. Reports required to complete the last permit application.
8. Certification of the laboratory used for sample analysis.
9. Sampling Plan.
10. Groundwater Monitoring Plan (N/A).
11. Laboratory results.
12. Chain-of-custody forms for samples that are sent to laboratories.
13. Facility Operations and Maintenance Manuals.
14. Maintenance records (EAMS electronic data system).
15. Facility Record Drawings.
16. 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 LTF office.

6.8.3.2 PACT Biological/Carbon Adsorption Batch Treatment Operation

The overall condition of the three PACT treatment units is good, and the facility is operating without any treatment or capacity issues. The tanks' exteriors were partially painted in 2017. The tanks' interiors are scheduled to be painted in 2018; before painting, the surfaces should be pressure washed and rust and lost paint removed, and primed.

6.8.3.3 Filtration

The sand media filter is in good condition. No back-up is provided for this critical piece of treatment equipment, which makes maintenance and repair work more difficult to coordinate. The installation of a second filter or provisions to provide temporary filtration connection should be investigated as needed based on plant operating conditions.

6.8.3.4 Solids Handling Facilities

The sludge drying beds are well maintained and sufficient drying bed area for dewatering of solids.

6.8.3.5 Effluent Storage and Disposal

The effluent disposal system is in good condition, well maintained and meets the facility needs.

LTF effluent is injected into the injection well by two dry-pit submersible pumps. The existing 12-hp pumps were installed by CCUD personnel in 2015. The pumps are operating satisfactorily and not overheating on hot summer days.

6.8.3.6 Auxiliary Power

The LTF has no auxiliary standby power, and according to discussions with staff power outages occur frequently. During off hours, the power supply is monitored through the high-level alarm at PS-1, which annunciates at the East Port WRF.

Power outages that stop the aeration process for more than a day severely impact the microorganisms and process treatment, resulting in the need for seed sludge to restart the biological process again.

6.8.4 Reject Storage and Alternate Disposal

All LTF effluent is disposed of into the deep injection well; no alternative disposal option is required.

6.8.5 Wet-Weather Storage

October to May of FY 2017 was dry with less than 15 inches of rain out of an annual average total of 67 inches countywide. The single largest storm event was Hurricane Irma, which made landfall on September 10, 2017, and deposited approximately 8 inches of rain in the Charlotte County area. Even with the heavy rains and storm conditions, the LTF was able to sufficiently process the leachate using the storage within the landfill and influent equalization tank.

6.8.6 Operations

The LTF is operated as a batch sequence reactor currently treating leachate 5 days per week, Monday through Friday, during working hours and is manually controlled by staff. During wet weather periods or following a maintenance or repair event, the Chief Operator may operate on weekends, as determined necessary to process the leachate volume. The overall system, from PS-1 to the injection well, has several capacity differences. If operated continuously, PS-1 has a pumping capacity of 0.22 MGD, the PACT process has a 0.250-MGD capacity, and the injection well has a 0.46-MGD capacity. In the event of excess flows, the operational treatment period could be extended to increase the volume treated per day. Alternately, the sludge digestion tank could be converted to a fourth PACT unit.

6.8.7 Maintenance

The Chief Operator and Assistant Operator complete routine maintenance on a scheduled basis. Emergency maintenance and/or and routine maintenance and repairs are performed using in-house Operations personnel or outside contractors to maintain regulatory compliance. A dedicated maintenance worker for the facility or scheduled maintenance worker at the facility during a specific number of days per week will mitigate issues with Operators having to focus on maintenance issues and perform the work. Rehabilitation or replacement of major pieces of equipment is included in the annual CIP updates.

6.8.8 Review of Previous Annual Report Recommendations

Table 6-27 Leachate Treatment Facility 2016 Recommendations and Status

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, and replacing screens and sand.
Progress:	*Cleaned the sand filter tank in FY 2017 and worked with the Solid Waste Operations Manager on planning the rehabilitation work. The rehabilitation work is included in the FY 2018 CIP.*
Recommendation:	Continue to paint the interior and exterior of the PACT tanks on a regular schedule.
Progress:	*Ongoing.*

6.8.9 Summary and Recommendations

The LTF treats the Zemel Road Landfill leachate and associated side streams to a level suitable for deep well injection. The treatment process runs as a batch reactor with three

parallel treatment units complete with aeration and liquid decanting capabilities. PAC is added to the biological sludge aeration tanks to achieve discharge permit limits for deep well injection. The biological waste and spent carbon solids dried on sludge drying beds and landfilled.

The LTF operational staff maintains the facility in good condition and schedule repair or replacements of existing equipment in a timely manner. The plant is owned by the Charlotte County Public Works Department and operated by CCUD personnel. Capital improvements and maintenance are coordinated with Public Works and completed at their discretion. The following summarizes the recommendations.

Table 6-28 Leachate Treatment Facility 2017 Recommendations

Recommendation:	Complete the Sand Filter Case Study with Siemens to determine the best approach to 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 replacement.
Recommendation:	Continue painting the interior and exterior of the PACT tanks on a regular schedule.
Recommendation:	Evaluate the addition of one additional maintenance staff member to meet increasing demands and minimize overtime.
Recommendation:	Add a generator to the treatment facility to keep the plant operational during power outages.

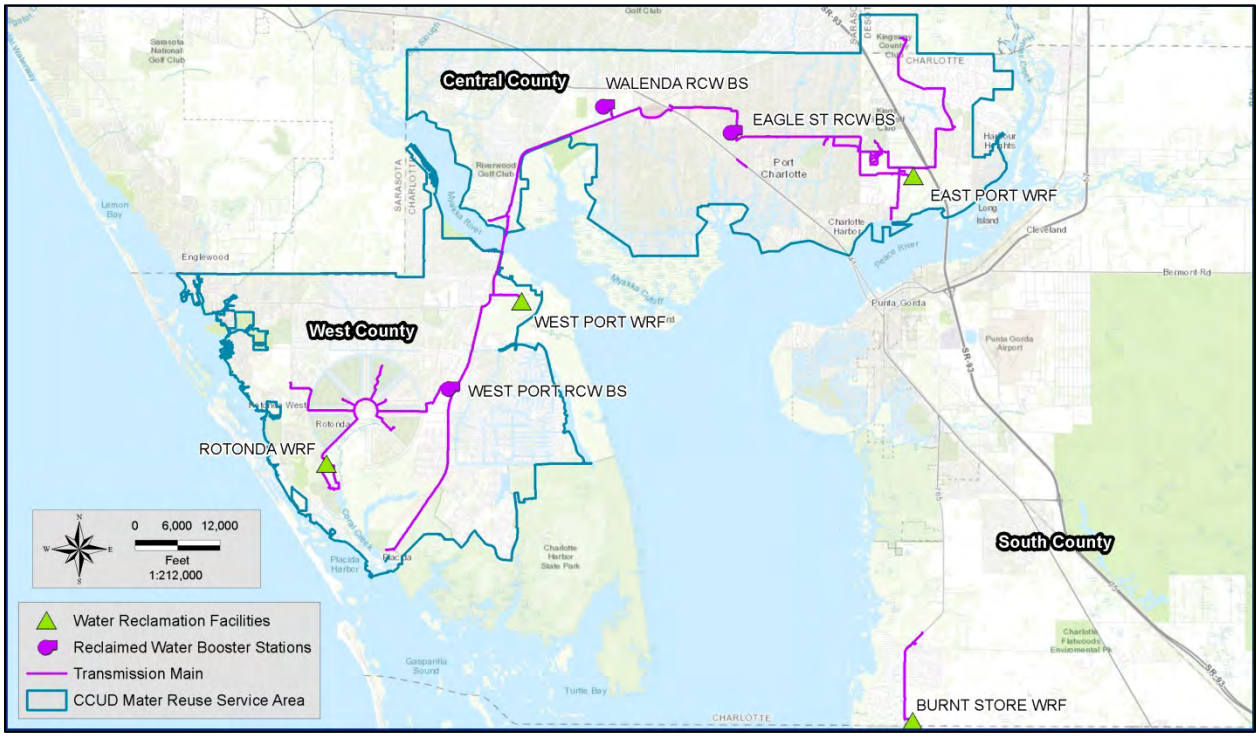
7 RECLAIMED WATER DISTRIBUTION SYSTEM

This Chapter presents the CCUD RCW distribution system components and their respective conditions. As discussed in Chapter 6, each of the CCUD WRFs produces public-access quality RCW.

CCUD's goal is to maximize the beneficial use of RCW and reduce the impact on other water resources. Currently, all RCW customers use the RCW for irrigation purposes.

In 2008, CCUD worked with SWFWMD on a cooperatively funded project to develop a RCW distribution system in central Charlotte County. To maximize RCW use and share this resource, CCUD worked with FDEP in 2014 to establish and permit a Master Reuse System for the East Port, West Port, and Rotonda WRFs after the interconnection project to link the Central and West County system together had been completed earlier that year. In south Charlotte County, a 3-mile RCW transmission main was constructed by a golf course community developer. Figure 3-2 shows the County-wide RCW system.

Figure 7-1 CCUD RCW Distribution System



7.1 CENTRAL / WEST COUNTY SYSTEM

The Central/West County System, also referred to as the Master Reuse System, receives RCW from three WRFs. The development of a Master Reuse System arose from an excess of RCW from the East Port WRF and high demands for irrigation water in other areas of the County. Before this each WRF supplied water to separate RCW distribution systems and the existing or potential customers were assigned to the individual WRF's FDEP operating permits.

The existing Master Reuse System in Central/West County has a permitted capacity of 9.2 MGD AADF based on flows from East Port WRF, West Port WRF, and Rotonda WRF (R-001). Customers used an average of 4.6 MGD of RCW in FY 2017. Future RCW sites in central/west Charlotte County are projected to increase demand by 3.0 MGD as identified in the Master Reuse Permit application, bringing the total future demand up to 7.6 MGD. Additionally, the restricted public access on the East Port WRF site's slow-rate irrigation system (R-002) provides up to 2.6 MGD of RCW disposal over approximately 315 acres. On-site irrigation in FY 2017 averaged 0.155 MGD.

In 2005, CCUD began designing a customer-based RCW transmission system rather than WRF service-area based. Preliminary design began with preparing a computerized hydraulic model. The goal of the modeling effort was to identify the means to connect the three WRFs in Central/West County to one RCW transmission system and to serve as many RCW customers as economically possible.

Phase 1 system improvements used the hydraulic modeling to identify the need for two strategically placed 0.5-MG RCW storage tanks with booster stations along the transmission main. The storage tanks provide local storage and increase the total RCW storage within the system. Phase 1 construction of 14 miles of 16-inch- and 12-inch-diameter transmission main was completed in 2009. The two booster stations, Eagle Street and Walenda, were completed at the same time. The expansion allowed a large golf course community and a major league baseball training complex to connect as well as numerous municipal and commercial properties along the transmission route.

Phase 2 system improvements used the hydraulic modeling to evaluate expansion into West County. The complete system model identified the need for increased storage at the West Port WRF so the existing RCW ponds were expanded to 20 MG. CCUD also expected the need for another booster station along the transmission main in West County, and the site was identified using the hydraulic model to maximize the impact to the RCW system. This booster station, called the Rotonda East RCW Booster Station, was completed in 2014 and is half way between the West Port WRF and the Rotonda WRF. The completion of the Rotonda East RCW Booster Station allows RCW to be conveyed from Rotonda to the West Port storage ponds and provides an alternative disposal method to the Rotonda WRF. The entire project was funded through cooperative funding from SWFWMD. By early 2014, the transmission systems for all three WRFs were linked, allowing the West Port WRF storage ponds to be filled with RCW from the East Port, West Port, and the Rotonda WRFs.

Phase 3 system improvements included a 16-inch transmission main on CR 771 installed in 2016. Other Phase 3 improvements include the addition of 95 MG of storage at the East Port WRF, which is in construction. Phases 3A through 3C include connecting additional RCW users to the Master Reuse System as presented in Table 7-1.

Table 7-1 Master Reuse System Expansion

Phase	User Name	User Type	Acreage	Reuse Application Rate (MGD)
3A	Deep Creek Golf Course	Golf Course	88	0.343
	Duffys Golf Course	Golf Course	75	0.291
	Kings Gate Golf Course	Golf Course	255	0.396
	Pine Valley Golf Course	Golf Course	60	0.093
	Pinemoor East Golf Course	Golf Course	140	0.217
	Pinemoor West Golf Course	Golf Course	120	0.186
	Rotonda Hills Golf Course	Golf Course	140	0.217
	Charlotte County Admin. Building	Residential/Commercial	22	0.013
	Franz Ross Park	Residential/Commercial	27	0.042
	McGuire Park	Residential/Commercial	5	0.008
	North Charlotte Regional Park	Residential/Commercial	82	0.127
	Port Charlotte High School	Residential/Commercial	38	0.022
	US 41 Beautification	Commercial	19	0.080
3B	Lemon Bay Golf Club	Golf Course	57	0.221
	Eagle Preserve Estates	Residential/Commercial	38	0.060
	776 Commercial Area 1	Residential/Commercial	47	0.027
	776 Commercial Area 2	Residential/Commercial	152	0.088
	776 Commercial Area 3	Residential/Commercial	23	0.013
	776 Commercial Area 4	Residential/Commercial	49	0.029
	776 Commercial Area 5	Residential/Commercial	44	0.026
	Maracalbo Park	Residential/Commercial	11	0.017
	Harold Ave Park	Residential/Commercial	41	0.064
	Parkside CRA	Residential/Commercial	252	0.147
	Sunrise Park	Residential/Commercial	41	0.064
	Springlake Park	Residential/Commercial	6	0.023
	Cattle Dock Point Rd, North Side	Residential/Commercial	88	0.051
	Cattle Dock Point Rd, South Side	Residential/Commercial	144	0.084
	Cape Haze Subdivision	Residential/Commercial	226	0.351
	Placida Harbour Condos	Residential/Commercial	19	0.029
	Portofino	Residential/Commercial	18	0.028
	Palm Point	Residential/Commercial	18	0.028
	Thunderation	Residential/Commercial	8	0.012

Phase	User Name	User Type	Acreage	Reuse Application Rate (MGD)
3C	771 Commercial Area	Residential/Commercial	43	0.025
	771 Commercial Area 2	Residential/Commercial	24	0.014
	771 Commercial Area 3	Residential/Commercial	7	0.004
	771 Commercial Area 4	Residential/Commercial	29	0.017
	771 Commercial Area 5	Residential/Commercial	16	0.009
	Landings at Coral Creek	Residential/Commercial	21	0.033
	Kiwanis Park	Residential/Commercial	31	0.048
	Murdock Village	Residential/Commercial	1,200	10851
Future US 41 Corridor	Charlotte County School Board	Residential/Commercial	16	0.032
	Charlotte County Parks & Recreation	Residential/Commercial	3	0.006
	Eagle F-1 SPE LLC	Residential/Commercial	79	0.122
	Point @ Port Charlotte LLC	Residential/Commercial	12	0.024
	Charlotte County Parks & Recreation	Residential/Commercial	3	0.005
	Charlotte County Parks & Recreation	Residential/Commercial	7	0.014
	Suncoast Baptist Church of P.C.	Residential/Commercial	7	0.014
	Suncoast Baptist Church of P.C.	Residential/Commercial	6	0.012
	Palm Tabernacle Church	Residential/Commercial	10	0.019
	M&I Regional Properties LLC	Residential/Commercial	7	0.014
	Charlotte County School Board	Residential/Commercial	18	0.034
	Birchenough, Nelson & Rita	Residential/Commercial	6	0.011
	FDOT Medians (30-foot)	Residential/Commercial	10	0.029

7.1.1 RCW Booster Stations

The Master Reuse System contains three RCW booster stations in the distribution system and is fed by three WRFs. The booster station components and condition assessments are discussed in this section. Jones Edmunds staff visited the RCW booster stations on February 13, 2018.

7.1.1.1 Eagle Street RCW Booster Station

The Eagle Street RCW Booster Station, constructed in 2008, is approximately 5 miles west of the East Port WRF along the 16-inch RCW transmission main. The station is in a residential neighborhood near Tamiami Trail. The concrete GST has a capacity of 0.5 MG. The pumping station contains one 125-hp high-service pump and one 60-hp jockey pump. The high-service pump has a capacity of 1,440 gpm at 206 feet (90 psi) total dynamic head (TDH). The jockey pump capacity is 577 gpm at 206 feet (90 psi) TDH. Each pump is controlled by a VFD to maintain system pressure for instantaneous customer use. The pumps are in a concrete building with the chemical feed pumps. The PLC and electrical control center are housed in a separate air conditioned building. The buildings and the GST are located in a fenced area with a locked gate. The facility is able to add chlorine to the RCW before storage and as it enters the distribution system. There is also an inline filter downstream of the pumps. The GST is equipped with a level sensor to regulate volume and a check valve to allow RCW to bypass the booster station when demand is low. Pump operations, flow, and pressure are monitored 24 hours per day through a SCADA telemetry system.

The following O&M improvement was completed over the past 3 years:

- The tank was painted in FY 2017.

Condition Assessment

The facility is in good condition. The two concrete block buildings were painted and piping was painted purple and marked. The grounds require constant maintenance, which are provided by a private contract.

7.1.1.2 Walenda Reclaimed Water Booster Station

The Walenda RCW Booster Station is at 17177 Walenda Avenue, Port Charlotte, approximately 4.5 miles northwest of the Eagle Street RCW Booster Station. The station was constructed in 2008 and is within a proposed residential/commercial neighborhood known as Murdock Village. The property contains potable water and RCW infrastructure including RCW and potable water GSTs. The RCW GST has a capacity of 0.5 MG. The station contains one 125-HP high-service pump and one 60-HP jockey pump, each equipped with VFDs. The main pump has a capacity of 1,440 gpm at 206 feet (90 psi) TDH. The jockey pump has a capacity of 577 gpm at 206 feet (90 psi) TDH.

The PLC and electrical control center are housed in a separate air-conditioned building. The buildings and the GST are in a fenced area. The gate and buildings are kept locked. The facility is able to add chlorine to the RCW before and after the GST. The GST is equipped with a level sensor to regulate volume and a check valve to allow RCW to bypass the

system. Pump operations, flow, and pressure are monitored 24 hours per day through a SCADA telemetry system.

Condition Assessment

The facility is in good condition. The two concrete block buildings were painted and piping was painted purple and clearly marked. The grounds were well cared for.

7.1.1.3 Rotonda East Reclaimed Water Booster Station

The Rotonda East RCW Pumping Station is on Rotonda Boulevard East just west of CR 771. This site was chosen by CCUD because it offers the most flexibility for future service and the greatest immediate impact to serve more customers in West County. It also immediately increased the capacity to transfer excess RCW from the Rotonda WRF to the West Port storage ponds or deep injection well. The station was completed in FY 2014 and does not contain a GST. The booster station draws water from the 20-MG storage pond at the West Port WRF or from the Rotonda WRF RCW storage facilities. An architectural wall shields the station from the highways.

A major upgrade to the RCW main heading east from this station was completed as part of a road-widening project in 2015/2016. The increase in pipe size resulted in lower pressures experienced by the Rotonda East RCW Booster Station.

Condition Assessment

The condition of the Rotonda East RCW booster station is excellent.

The following deficiency was noted:

- The station's PLC must be reprogrammed to address the lower line pressures caused by the RCW main upgrade. This will reduce the horsepower needed to serve RCW customers in West County resulting in energy savings.

7.1.2 STORAGE

RCW storage is provided by two GSTs at two of the RCW booster stations and RCW storage ponds at WRFs and golf courses.

The tanks are filled by system pressure and used to maintain the desired RCW system pressure during peak demand. The GSTs provide the following functions for the CCUD RCW water supply system:

- Minimize high pumping pressures at the WRFs.
- Provide local storage for nightly peak irrigation demands when the flows at the WRFs are lowest.

Each GST has a capacity of 0.5 MG, for a total capacity of 1 MG. Table 4-1 lists the GST capacity and number of pumps at each RCW booster station. In addition, the West Port WRF contains a 20-MG open storage pond that is used to supply RCW to the Master Reuse System.

Table 7-2 Booster Station GST Capacity and Pumps

Booster Station Name	GST Capacity (MG)	Number of Pumps
Eagle Street	0.5	2 (1 main, 1 jockey)
Walenda	0.5	2 (1 main, 1 jockey)
Total	1	4

RCW storage ponds are predominantly located in West Charlotte County and are filled from system pressure. Currently, operational staff at the East Port WRF monitors RCW levels in the ponds through SCADA.

7.1.3 Operations

Excess RCW from the East Port WRF fills the Eagle Street GST based on the water level. RCW can bypass the station and continue directly to customers in West County when system demands are lower. The RCW continues through the 12-inch transmission main to the Walenda Booster Station where it can be stored in the GST or bypass the station and continue west across the Myakka River to west Charlotte County for storage in the West Port WRF 20-MG pond.

The Rotonda East RCW Booster Station, constructed in 2014 in West County, is used for two main purposes – to boost pressures for RCW customers in west Charlotte County and to transfer RCW from Rotonda WRF to West Port WRF for storage or deep-well disposal.

The network of RCW booster stations minimizes high pumping pressures at the Eagle Street Booster Station and provides local storage for peak irrigation demands at night when the flows at the East Port WRF are lowest.

As currently configured, the RCW distribution system has two main operational challenges including maintaining system pressure and control valve operations:

- The system pressure challenge results from a lack of storage at the East Port WRF. RCW at this facility is only available when flows are going through the plant. The situation will improve with the completion of the Stage 5 improvements, which creates 95 MG of RCW storage on site to continuously supply the system.
- The control valve that regulates flow between West Port and East Port is located outside of the WRF fence and is manually operated. Opening and closing the valve requires 220 turns and hampers operational flexibility for the interconnected system.

To improve RCW distribution, the north part of the West Port WRF RCW transmission main was increased in FY 2016 during a road-widening project.

7.1.4 Irrigation and Other Reclaimed Water Applications

West County contains nine 18-hole golf courses and residential/commercial development that has marginal access to good fresh water irrigation sources. Currently, five golf courses and a few small RCW customers are receiving RCW for irrigation. Service of RCW to the remaining golf courses was limited by the amount of RCW that is produced by the two wastewater treatment plants in west Charlotte County, Rotonda and West Port WRFs.

The ultimate capacity of the RCW 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 RCW demands in the area. Table 7-3 lists the current major RCW users from the Master Reuse Permit issued in 2014. Table 7-4 lists the potential future major users identified in the Master Reuse Permit application. Additional future users may also be identified as the RCW distribution system matures.

Table 7-3 Master Reuse Permit Current Major RCW Users (Users with Greater than 0.100 MGD Rated Capacity)

RCW Major Users	Type of User	Rated Capacity (MGD)	FY 2017 Actual (MGD)
Kingsway Country Club	Residential Development	0.388	0.224
Maple Leaf Golf Course	Golf Course	0.388	0.110
Port Charlotte Country Club	Golf Course	0.613	0.201
Cape Haze Country Club and Windward Patio Homes	Golf Course/Residential	0.333	0.577
Coral Creek Golf Course	Golf Course	0.308	0.345
Palms Golf Course	Golf Course	0.423	0.266
Riverwood CDD	Residential/ Golf Course	0.800	0.540
Suncoast Lakes	Residential Development	0.136	0.093
Charlotte Sports Park	Athletic Complex/Park	0.446	0.070
Long Marsh Golf Club	Golf Course	0.460	0.281
Deep Creek	Golf Course	0.343	0.000
	TOTALS	4.638	2.020

Table 7-4 East Port WRF Future Major RCW Users

RCW User	Area (acres)	Rate (inches/week)	Capacity (MGD)
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	3.288

Kingsway Country Club and Maple Leaf Golf Course have stormwater storage lake systems (D-001 and D-002, respectively) that can be used for RCW storage. These lakes intermittently overflow (STM-001 and STM-002, respectively) to stormwater ditches that ultimately drain into the Peace River.

7.2 South County System

The South County (Burnt Store) RCW distribution system is designed to provide relatively low-pressure RCW to customers that have their own storage ponds and high-pressure service pumps to pressurize water for irrigation. The two RCW pumps at the Burnt Store RO WRF are constant-speed pumps having a capacity of 900 gpm each. The wet well at the Rotonda WRF is equipped with an ultrasonic flow meter and primary weir device as the RCW cascades into the wet well. However, this meter became obsolete when the WRF began transferring flow to the deep injection well system. The RCW pumps discharge into a 3-mile-long RCW transmission main that was originally designed to serve the Tern Bay golf course community along Burnt Store Road. The 12-inch transmission main was constructed in 2006 but the golf course community has never received RCW because the community has not developed as expected. Three smaller users have benefited from the transmission main and receive low-pressure RCW from the Burnt Store RO WRF. The users are currently responsible for boosting pressure to supply their systems with in-line pumps.

Condition Assessment

Overall, the system is in good condition.

The following deficiencies were noted:

- A new flow meter on the RCW discharge line is required to measure flow leaving the site. CCUD intends to address this requirement as part of the plant upgrade.
- The Burnt Store RO WRF has no RCW storage and the pumps are not capable of matching demand with flow. New customer development would require customer storage in the same manner as that proposed by the original golf course customer.
- CCUD is exploring the possibility of serving another existing golf course with RCW within the Burnt Store RCW service area. The golf course is near the treatment plant, but the existing RCW transmission main does not serve this golf course. A new transmission main would be required to serve this golf course.

7.2.1 Irrigation and Other RCW Applications

In 2005, CCUD negotiated with the Tern Bay Development Company to supply RCW to a proposed 27-hole golf course north of the WRF 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. CCUD's agreement with the Tern Bay Golf Course initially required CCUD to provide an average of 300,000 gpd.

A portion of the 12-inch transmission main is now used to provide RCW to Burnt Store Lakes, Burnt Store Colony, and Burnt Store Villages. The current customers use a small amount of RCW for drip irrigation of landscaping along the development entranceways and common areas. CCUD is pursuing other potential bulk RCW users, such as golf courses, that are also irrigated using stormwater storage ponds. In the interim, excess RCW is diverted to the WRF's on-site percolation ponds or a deep injection well that was constructed for that purpose. Table 7-5 lists future major RCW users within the Burnt Store RO WRF service area.

Table 7-5 Burnt Store WRF Future Major RCW Users

RCW User	Type of User	RCW Demand (MGD)
Burnt Store Marina & Golf	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

7.3 MAINTENANCE

The RCW 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 RCW sites are inspected yearly for possible cross-connections. The Backflow and Reclaimed Services staff coordinate with RCW customers to keep them updated on the RCW supply, inform them of operational problems, and provide information and guidance regarding FDEP and SWFWMD rules and regulations. The workgroup is also involved in documentation, inspection, and minor repairs of the RCW distribution system.

7.4 BACKFLOW AND CROSS CONNECTION PREVENTION PROGRAM

The Backflow and Cross-Connection Prevention program uses two types of surveys to monitor customer water use and type – basic backflow equipment survey and cross-connection control survey. 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 CCUD 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. CCUD'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 2017 Program Statistics:

- Hydrant Meters Repairs/Tested: 8
- Cross-Connections Inspected: 2,105
- Charlotte County Backflow Tests: 178
- Potential Cross-Connections Corrected: 3

7.5 Review of Previous Annual Report Recommendations

Table 4-4 and Table 4-5 summarize the recommendations and current status from the 2016 Annual Report for the Central/West and South County distribution systems, respectively.

Table 7-6 CCUD Central/West County RCW Distribution System – 2016 Recommendations

Recommendation:	Add more large users to the combined RCW system.
Progress:	*One new golf course was added as a customer in FY 2017.*
Recommendation:	Develop a comprehensive operating protocol for the entire RCW system.
Progress:	*Will be developed after Phase 3 is completed.*

Table 7-7 CCUD South County RCW Distribution System – 2016 Recommendations

Recommendation:	Explore feasibility of creating RCW storage at the Burnt Store RO WRF.
Progress:	*Part of plant upgrade design.*
Recommendation:	Acquire one large RCW customer in the South County service area.
Progress:	*Not accomplished, but feasibility ongoing.*

7.6 Summary and Recommendations

Over the past decade, CCUD has developed a Master Reuse System in Central/West County to address irrigation demand and excess RCW supply at the East Port WRF. The Master Reuse System is fed by the East Port, West Port, and Rotonda WRFs. The Master Reuse System contains approximately 60 miles of transmission mains, three booster stations, two 0.5-MG GSTs, and 20 MG of additional storage capacity at the West Port WRF storage ponds. CCUD has a hydraulic model of the system that is used to identify infrastructure requirements when expanding the system to additional customers. The infrastructure related to the Master Reuse System is in good condition and the primary focus of CCUD is to continue to expand the system to serve additional customers.

The South County RCW distribution system consists of one 3-mile-long transmission main that is currently serving three customers. The infrastructure of the system is in good condition, although some improvements are required at the WRF. CCUD intends to address the required improvements as part of the WRF upgrade, which will increase the functionality of the RCW system and allow CCUD to add future customers. Table 4-6 and Table 7-9 list the recommendations for the Central/West and South distribution systems from the 2017 site visit.

Table 7-8 CCUD Central/West County RCW Distribution System – 2017 Recommendations

Recommendation:	Develop a comprehensive operating protocol for the entire RCW system to provide a reliable source of reclaim water to the CCUD customer base.
Recommendation:	Evaluate the addition of mechanical actuator on the system control valve at the West Port WRF to increase operational flexibility in transferring RCW between plants.
Recommendation:	Add more large users to the combined RCW system.
Recommendation:	Replace the 2-inch meter on the 6-inch line near the Sports Complex.

Table 7-9 CCUD South County RCW Distribution System – 2017 Recommendations

Recommendation:	Study the feasibility of creating RCW storage at the Burnt Store RO WRF as the growth in the area dictates.
Recommendation:	Acquire one large RCW customer in the South County service area as part of the facility expansion and addition of RCW storage.

8 ELECTRICAL COMPONENTS AND CIRCUITRY

This Chapter evaluates critical electrical components and circuitry requiring replacement and/or upgrades at selected CCUD water treatment and distribution facilities, WRFs, and RCW distribution systems. Key electrical components assessed include main electrical switchgear, MCCs, and emergency generators.

A visual inspection of each facility as it pertains to the electrical distribution system was performed. The inspection started with the incoming service followed by any generators (if present) and the main distribution switchgear. This was a visual inspection only; no panels were opened, no conductors and switchgear internals inspected, nor were any aspects of electrical capacity reviewed since that information was not available.

The components were also viewed through an infrared inspection camera to determine any anomalous areas of elevated temperature. For electrical components, using thermography is a primary method for determining and isolating potential problem areas since higher temperature is often a direct indication of overloaded equipment, damage to equipment, or equipment requiring maintenance. Components identified as having elevated temperatures may not indicate an issue, just that their temperature is noticeably elevated over those components surrounding them. In a normal electrical system such as a panelboard, one would expect the distribution breakers within the panel to have different loadings that would cause varying temperatures of the components, but that the nominal temperature should not be significantly higher than the surrounding components. Components with a significantly elevated temperature may represent an overloaded component, a damaged component, or a component with loose or poorly secured wiring. A significantly elevated temperature may also represent poor power conditions or excessive harmonics present on the system, which could manifest themselves as excessive heat.

Additional information was obtained directly from the Operations staff via a pre-inspection survey questionnaire indicating potential issues or problems provided by Operations staff and direct interviews during the physical inspection process.

A critical aspect that relates to the condition and thereby the condition assessment for electrical distribution gear is how heavily loaded (current power usage) the infrastructure is as it relates to the rated capacities. The assessment performed did not include a load study, which would be required to determine current power usage as well as issues related to power usage patterns, any power instabilities, or power line harmonics that may affect equipment. A load study is a critical component of determining the long-term reliability of electrical systems. However, a properly executed load study for each facility would be expected to take several weeks, require specialized temporary equipment be placed into service to monitor and record power usage and demand patterns, and a thorough analysis of the data recovered.

8.1 WATER TREATMENT PLANTS

As indicated in Section 3.1, CCUD's potable water comes from two treatment plants – the PRMRWSF and the Burnt Store RO WTP. CCUD owns and operates the Burnt Store RO WTP, but purchases water from PRMRWSA for the Central/West County Service Area. As discussed in Chapter 3, the PRMRWSF supplies water to the Central/West distribution

systems of Charlotte County. The PRMRWSF is owned and operated by PRMRWSA. Since the PRMRWSF is not an asset of CCUD, it was not included in the annual review. This section summarizes the visual assessment of conditions and functioning of electrical components, systems, and instruments of the Burnt Store RO WTP.

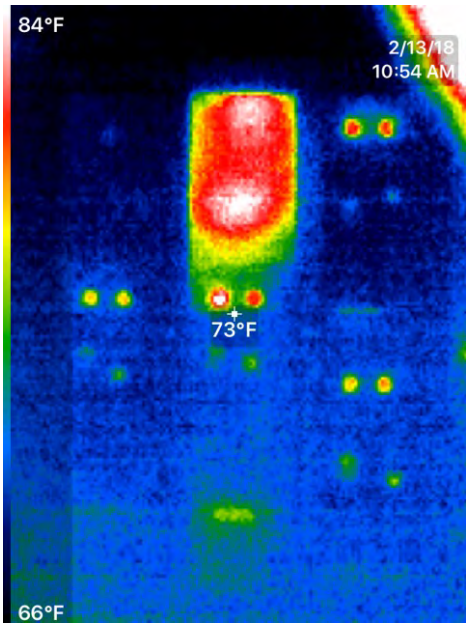
8.1.1 BURNT STORE RO WTP

The Burnt Store RO WTP (PWS ID6080318) is owned and operated by CCUD. The Burnt Store area is served by the Burnt Store RO WTP in the South County service area at 17430 Burnt Store Road, Punta Gorda, Florida. The Burnt Store RO WTP was expanded in 2009 and has a current treatment capacity of 3.61 MGD. The main electrical components of this facility include the electrical components of the RO process buildings, one 1,250-kW standby generator, and two 80-kW portable generators.

Condition Assessment

The incoming switchgear and distribution transformer were in excellent condition with no obvious signs of significant concern. The standby generator functions properly but had several issues (see below). The incoming switchgear was in good condition with minor issues (see below). Overall, the electrical equipment is in good functioning condition based on information from the Operations staff.

The following deficiencies were noted:



- The generator set is reported to have coolant seepage the drain line. New control boards are also reported as needed to help rid a trouble alarm, which appears to be superfluous and inaccurate. The fuel system is also reported to have a leak that leaves residue and fuel on the top of the fuel tank.
- The cabinet for the automatic transfer switch (ATS) contains two access panels – the front primary access panel and a rear maintenance panel. The rear maintenance panel contains a latch and lock system that was left unlocked. Opening this rear panel exposes live bus parts, creating a potential shock hazard. The rear of the cabinet contained no warning labels defining the potential hazard.
- During the infrared scanning of the equipment, one of the MCC sections showed elevated temperatures (see photograph at the right). It was later reported that this is an anomalous heat source for the transformer behind the panel. However, the MCC section contained no identifying markers notifying personnel what was behind this section.
- Panel L1 showed elevated temperatures on three separate breakers, possibly indicating an issue.

- The switchgear contains warning labels identifying parts and components behind blank cabinets as being energized. However, none of the equipment includes the appropriate arc flash labeling as required by NFPA 70E.

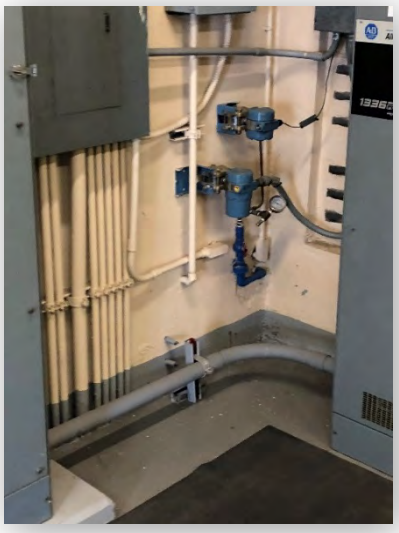
8.1.2 Summary and Recommendations

Reviewing the electrical components at this facility shows that they are in excellent condition. Considering the age of the facility, it would be unusual to find extensive deterioration in the equipment. Several issues related to the on-site generator were reported by Operations personnel and identified through visual inspection. Nothing that would specifically inhibit the operation of the generator was noted; most represent issues consistent with maintenance needed. Unsecured cabinets have the potential to create a shock hazard for personnel if not properly secured. Components were identified as having elevated temperature using thermography.

Table 8-1 Burnt Store RO WTP – 2017 Electrical Recommendations

Recommendation:	The on-site generator needs a thorough refurbishment, which should include cleaning and mechanical repairs to address issues identified.
Recommendation:	Secure all electrical switchgear to prevent unauthorized access or inadvertent exposure to live parts.
Recommendation:	Apply appropriate arc flash labeling on all switchgear in compliance with NFPA 70E to properly notify operations and maintenance personnel of the potential hazard. This may require creating a complete and thorough arc flash model using the existing switchgear to determine the energy levels present. This information would appear on the appropriate arc flash labeling as required.
Recommendation:	Perform a load study to identify any issues related to power quality, quantity, and capacity of the system. The load study would help identify deficiencies in the system, reserve capacities and potential anomalies that may affect long-term maintenance and serviceability of the equipment.

8.2 Water Distribution System



For FY 2017, the electrical components and circuitry at four WBSs were evaluated for conditions assessment. As discussed in Chapter 4, each of the CCUD's WBSs are located in the Central/West distribution system, which includes the Port Charlotte Golf Course, Walenda, Gulf Cove, and Rotonda WBSs.

8.2.1 Port Charlotte Gulf Course Booster Station

The Port Charlotte Golf Course WBS is at 22339 Gleneagle Terrace, Port Charlotte, FL 33952. The station provides local storage and pressure and disinfectant boosting capabilities for the Central County

service area east of Tamiami Trail. The station was built in 1966 and was rehabilitated in 2010.

8.2.1.1 Condition Assessment

The incoming switchgear and distribution transformer appear in excellent condition with no obvious signs of significant concern. The generator and enclosure are mounted outside on an elevated sub-base fuel tank. They are in excellent condition. However, the height of the elevated tank may pose an issue (see notes below). Overall, the electrical equipment is in excellent functioning condition based on information from the Operations staff. Infrared scanning of the equipment showed no anomalies.

The following deficiencies were noted:

- The generator is mounted on a sub-base tank that is approximately 30 to 36 inches above grade. The height of the sub-base tank makes the generator controls and switchgear much higher than would be normally found and may cause an issue with maintenance personnel, requiring additional temporary platforms or ladders to be able to access the equipment for proper servicing and maintenance (see photograph).
- The switchgear contains no labels identifying parts and components as being energized.

8.2.2 WALENDA BOOSTER STATION

The Walenda WBS is at 17177 Walenda Avenue, Port Charlotte, FL 33953. The property contains potable water and RCW infrastructure including RCW and potable water GSTs.

8.2.2.1 Condition Assessment

The incoming switchgear and distribution transformer appear in good condition with no obvious signs of significant concern. CCUD Operations staff reported that whenever the emergency generator is placed into operation, the power demand is usually greater than its rated capacity of 350 kW. The generator is physically located inside the building that also contains the electrical switchgear. Overall, the electrical equipment is in good functioning condition based on information from the Operations staff. Infrared scanning of the equipment showed no anomalies.

The following deficiencies were noted:

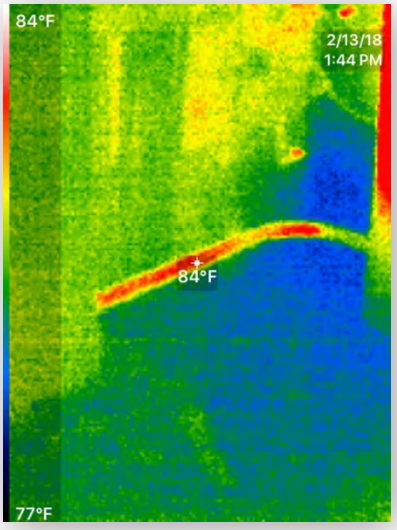
- CCUD Operations staff reported that the generator is unable to accommodate the existing loads of the facility, which is a significant concern and relates to the operational security of the facility. Additionally, since the generator is physically located inside the building that also contains the electrical switchgear, it raises concerns regarding maintenance personnel being properly notified of hazardous conditions that may exist during maintenance operations including fuels present, elevated noise level, and potentially excessive heat. This heat may also prove detrimental to the VFDs in the building since these devices are typically temperature sensitive.
- The switchgear contains warning labels identifying parts and components as being energized. However, none of the equipment includes the appropriate arc flash labeling as required by NFPA 70E.

8.2.3 Gulf Cove Booster Station

The Gulf Cove booster station (WBS #3) was built in 1980 and is at 12050 Van Lenten, Port Charlotte, FL 33981.

8.2.3.1 Condition Assessment

The incoming switchgear and distribution transformer appear in good condition with no obvious signs of significant concern. The incoming power company transformer did show signs of surficial rust. The standby generator reportedly functions properly and has no issues. The fuel system on the generator is a separate fuel tank, not a sub-base fuel tank as in many other installations throughout the County. The fuel piping and transfer system appears in good condition with no apparent signs of leakage. Overall, the electrical equipment is in good functioning condition based on information from the Operations staff, but an anomaly was detected at the functioning VFD see below.



The following deficiencies were noted:

- During the infrared scanning of equipment, the VFD showed elevated temperatures, which is reasonable since it was running. However, the temperature of the conduits supplying and leaving the ATS also showed elevated temperatures (see photograph at the right). This elevated temperature may represent a condition of excessive load on the conductors or excessive heat caused by harmonics generated from the drive.
- The switchgear contains warning labels identifying parts and components as being energized; however, none of the equipment includes the appropriate arc flash labeling as required by NFPA 70E.

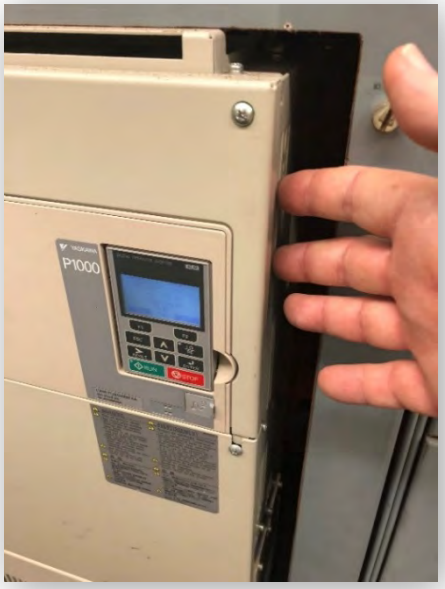
8.2.4 ROTONDA BOOSTER STATION

The Rotonda water booster station (WBS No. 6) is at 46 Parade Circle Rotonda, FL 33947. Built in 1973, the station has two 100-HP pumps and two 65-HP pumps and a 5-MG GST.

8.2.4.1 Condition Assessment

The incoming switchgear and distribution transformer appear in fair condition with no obvious signs of significant concern. The incoming power company transformer did show signs of surficial rust. The standby generator reportedly functions properly and has no issues. The generator equipment inside the enclosure showed signs of light surface corrosion and wear. Overall, the electrical equipment is in good functioning condition based on information from the Operations staff. Overall, the equipment is quite dated with several components no longer manufactured. Updates and newer equipment have been installed using the existing panels creating a potential issue (see below). Infrared scanning of the equipment showed no anomalies.

The following deficiencies were noted:



- Much of the switchgear appears to be in only fair condition and is possibly reaching the end of its service life. Many components may no longer be manufactured, making long-term maintenance an issue (see photograph at the right).
- Several of the drives have been updated to Yaskawa VFDs and were retrofitted into the existing cabinets. However, the spaces provided did not match the drives, and there is now a gap between the drive and the enclosure (see photo at right) which may be problematic. Although there appeared to be no exposed life parts, this does raise a maintenance concern and the possibility of exposed parts.
- An exterior-mounted ATS appears to be in fair condition and degraded due to exposure to weather.
- The switchgear contains no warning labels identifying parts and components as being energized.

8.2.5 SUMMARY AND RECOMMENDATIONS

The electrical components at the Port Charlotte Golf Course WBS are in excellent condition. The facility was refurbished in 2010. Thermography has identified no issues of concern based on temperature. The standby generator is reportedly undersize and needs to be replaced to meet the existing demands. Accessibility of the generator is a concern without permanent platforms in place.

The electrical components at the Walenda WBS are in good condition. The facility has faced several retrofits and upgrades over the years, which have caused some concerns as indicated in Section 8.2.2.1, especially as it relates to the sharing of the space with the generator. Thermography has identified no issues of concern based upon temperature. The standby generator is reportedly undersize and needs to be replaced to meet the existing demands.

The electrical components at the Gulf Cove WBS are in good condition. Components were identified as having elevated temperature using thermography. These elevated temperatures may be indicative of another concern as discussed in Section 8.2.3.1.

The electrical components at the Rotonda WBS are in fair condition. Components were identified as possibly being at the end of their service life because of their age. The facility has faced several retrofits and upgrades over the years, which have caused some concerns as indicated in Section 8.2.4.1. Thermography has identified no issues of concern based on temperature. The standby generator and incoming power appear in fair condition as well.

Table 8-2 CCUD Water Distribution System – 2017 Electrical Recommendations

Recommendation:	Perform an overall cleaning of each generator housing at each WBS.
Recommendation:	Secure all electrical switchgear to prevent unauthorized access or inadvertent exposure to live parts at the Gulf Cove, Rotonda, and Walenda WBSs.
Recommendation:	Further analysis of the ATS at the Gulf Cove WBS is also warranted based on the elevated temperatures of the primary and secondary conductors entering and leaving the drive to determine if this is a nominal temperature rise or if another condition exist that may be detrimental to the drive or the electrical system.
Recommendation:	Further analysis of the ATS at the Rotonda WBS is also warranted based on the degradation of the enclosure to ensure that it is functioning properly.
Recommendation:	Apply appropriate arc flash labeling on all appropriate switchgear in compliance with NFPA 70E to properly notify operations and maintenance personnel of the potential hazard. This may require creating a complete and thorough arc flash model using the existing switchgear to determine energy levels present. This information would appear on the appropriate arc flash labeling as required.
Recommendation:	Perform a load study to identify any issues related to power quality, quantity, and capacity at the Gulf Cove, Rotonda, and Walenda WBSs. The load study would help identify deficiencies in the system, reserve capacities, and potential anomalies that may affect long-term maintenance and serviceability of the equipment. Due to its size, a load study is probably not warranted for the Port Charlotte WBS.

Recommendation:	Replace the generator at the Walenda WBS with a properly sized generator to accommodate the loads and ensure reliable operation of the station.
Recommendation:	Review the generator at the Port Charlotte Golf Course WBS to ensure that Occupational Safety and Health Administration (OSHA) compliance is maintained and accessibility of the equipment is provided.

8.3 WASTEWATER TREATMENT FACILITIES

Visual condition assessments were performed at four of CCUD-owned and operated wastewater treatment facilities – East Port WRF, West Port WRF, Rotonda WRF, and Burnt Store WRF.

8.3.1 EAST PORT WRF

The East Port WRF contains one 1,250-kW generator serving the primary WRF as standby power. One 1,500-kW generator, which is not yet installed, is going to be included as part of the ongoing improvements currently under construction. One standby generator serving the administration building was relocated from another facility in used condition. There are five primary electrical switchgear locations at the facility – the administration building, the generator/MCC building, the new primary incoming switchgear building, new electrical building #2, and the blower building. The administration building has a separate service drop from the power company. The rest of the WRF is served through two new parallel transformers serving the incoming switchgear building recently constructed. The administration building, the incoming switchgear building, and electrical building #2 were all constructed within the last 5 years. The generator/MCC building is undergoing upgrades and improvements to existing original equipment and generators as well as new upgraded switchgear and generators. The blower building has been in service for several years.

8.3.1.1 Condition Assessment

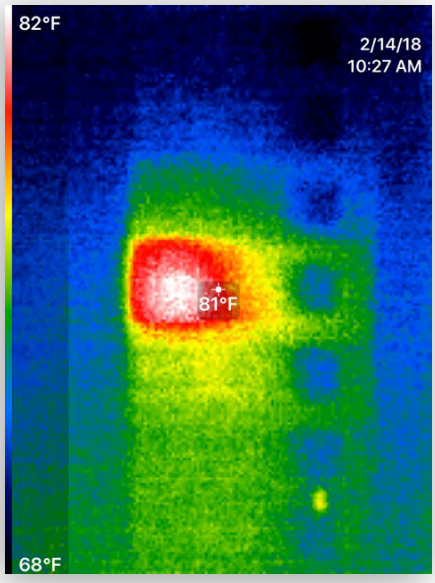
The incoming service and distribution transformers at the administration building were in excellent condition with no obvious signs of significant concern. As indicated above, these are fairly new. The standby generator functions properly and is in good condition. Since it was relocated from another location, it does show signs of wear and deterioration but with no major issues to interfere with its function. The distribution switchgear of the administration building was in excellent condition with minor

issues (see below). Overall, the electrical equipment is in good functioning condition based on information from operations staff.

The incoming switchgear building is relatively new, constructed only a few years ago. As such, all equipment is in excellent condition (see photograph at left). The facility is fed from two power company transformers, also newly installed. A thermographic survey of the facility shows no anomalies or issues.

The generator/MCC building is an existing building with older equipment and equipment currently under construction. This review will focus on the existing equipment. The existing switchgear appears to be in good condition. The switchgear includes complete arc flash labeling required by NFPA 70E. The existing 1,250-kW generator is in overall good condition but is reported to require upgrades and an overhaul. The generator set shows minor points of fluids seepage.

The distribution switchgear was in excellent condition with minor issues (see below). Overall, the electrical equipment is in good functioning condition based on information from the Operations staff. A thermographic survey indicated some issues in one of the panels (see below). The switchgear is in excellent condition. Staff report that the sound level within the building is extraordinarily high and they have posted signs requiring hearing protection in this facility. Since this facility contains only electrical switchgear, there is some concern over what is causing the high sound level (see below).



The switchgear includes complete arc flash labeling as required by NFPA 70E. A thermographic survey indicated no issues. Overall, the electrical equipment is in excellent functioning condition based on information from the Operations staff (see photograph at left). The blower building is an existing building with older equipment and upgraded installations. The existing switchgear appears to be in good condition, whereas the newly installed equipment is in excellent condition. A thermographic survey indicates no anomalies or issues.

The following deficiencies were noted:

- The power company distribution transformer appears to be merely sitting on the concrete pad and not properly anchored.

- Panel AC showed elevated temperatures on two separate breakers possibly indicating an issue that may need further investigation.
- The switchgear contains warning labels identifying parts and components as being energized. However, none of the equipment includes the appropriate arc flash labeling required by NFPA 70E.
- The generator/MCC building – Panel LE SECT 2 showed elevated temperature on one of the breakers possibly indicating an issue that may need further investigation (see photograph at right). The existing generator set showed several indications of wear and is reported by the Operations staff as needing a major overhaul including the fuel system.
- Electrical building No. 2 – this is a new facility in excellent condition. However, the building requires hearing protection because the existing switchgear emits high levels of sound, above normal levels for safety. Why the sound is being generated from the switchgear is unknown since there is no obvious source for this. It is possible that severe harmonics exist in the switchgear, which may be causing the elevated sound levels.
- The blower building – the newer switchgear contains the appropriate NFPA 70E arc flash labeling; however, the existing (older) equipment does not.

8.3.1.2 Summary and Recommendations

Reviewing the electrical components throughout the East Port WRF found they rate from good to excellent condition. Other than those deficiencies listed above, the overall assessment of the East Port WRF is that it is in good condition with much of its electrical infrastructure recently replaced. Much of this facility has been properly labeled with arc flash identification.

Table 8-3 East Port WRF – 2017 Electrical Recommendations

Recommendation:	Anchor the administration building distribution transformer as required by the manufacturer.
Recommendation:	Apply appropriate arc flash labeling on all appropriate switchgear in compliance with NFPA 70E to properly notify Operations and Maintenance personnel of the potential hazard. This may require creating a complete and thorough arc flash model using the existing switchgear to determine energy levels present. This information would appear on the appropriate arc flash labeling as required. Since much of the facility has already been labeled, it is likely that a model or the appropriate appellations may exist for much of this work.
Recommendation:	Perform a load study to identify any issues related to power quality, quantity, and capacity of the system. The load study would help identify deficiencies in the system, reserve capacities, and potential anomalies that may affect long-term maintenance and serviceability of the equipment. This is especially important in the #2 electrical building were sound levels are extraordinarily high. The identification of possible harmonics may mitigate this issue.

8.3.2 WEST PORT WRF

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 on 97 acres on Cattle Dock Point Road in Port Charlotte. The plant was upgraded to its current capacity in 2004.

8.3.2.1 Condition Assessment

The incoming switchgear and distribution transformer appear in good condition with no obvious signs of significant concern. The incoming power via overhead aerial is new and was installed within the past year. The WRF is served from two 400-kilovolt-ampere (kVA) generators connected in parallel that are fed from a subbase tank and an auxiliary tank adjacent to them (see photograph). Operations staff indicates that a new 6,000-gallon fuel tank and pad for the generators will be installed in 2018. That upgrade may eliminate one of the deficiencies (see below). Overall, the electrical equipment is in good functioning condition based on information from the Operations staff, with the exception of those deficiencies listed below. Thermography scanning of the equipment showed no anomalies.

The following deficiencies were noted:

- CCUD Operations staff reported issues with the generator paralleling equipment and indicated that some equipment drops offline and that one of the generators surges during paralleling operations.
- Operations staff also identified an issue with the power supply for the plant blowers. Reportedly, when they are called to come into service, they overload the system and trip out, bringing the blowers offline. The reason is unknown.
- A power distribution panel located within the plant's MCC is missing a protective cover. Access in the panel to activate a breaker could potentially expose personnel to live conductors (see photograph at right).
- The switchgear contains warning labels identifying parts and components as being energized. However, none of the equipment includes the appropriate arc flash labeling required by NFPA 70E.

8.3.2.2 Summary and Recommendations

The electrical components at this facility are in good-to-fair condition. The facility staff has identified several issues related to power including faulty generator paralleling and overloaded circuits when some equipment is called for. Additional code-related issues were also identified.

Table 8-4 West Port WRF – 2017 Electrical Recommendations

Recommendation:	Reviews are needed for the generator control system by the generator manufacturer as well as the paralleling switchgear manufacturer to determine the cause for the generator inconsistencies and surging.
Recommendation:	Secure all electrical switchgear to prevent unauthorized access or inadvertent exposure to live parts.
Recommendation:	Apply appropriate arc flash labeling on all appropriate switchgear in compliance with NFPA 70E to properly notify operations and maintenance personnel of the potential hazard. This may require creating a complete and thorough arc flash model using the existing switchgear to determine the energy levels present. This information would appear on the appropriate arc flash labeling as required.
Recommendation:	Perform a load study to identify any issues related to system power quality, quantity, and capacity. The load study would help identify deficiencies in the system such as the issues related to the faulty blowers and identify reserve capacities and potential anomalies that may affect long-term maintenance and serviceability of the equipment.

8.3.3 ROTONDA WRF

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

8.3.3.1 Condition Assessment

The incoming switchgear and distribution transformer appear in good condition. The plant is served from two 810-kW generators configured to operate in parallel. The Operations staff has indicated several issues with the generator switchgear and their operations (see below). Overall, the electrical equipment located in building MCC-1 is in good functioning condition based on information from the Operations staff. This equipment is labeled with the appropriate NFPA 70E arc flash warnings. Overall, the electrical equipment located in building MCC-2 is in good functioning condition based on information from the Operations staff. This equipment is also labeled with the appropriate NFPA 70E arc flash warnings. Thermography scanning of the equipment showed no significant issues.

The following deficiencies were noted:

- The generator system has been reported by operators to not function properly. Specifically, Generator No. 2 is unable to run under plant load testing.

8.3.3.2 Summary and Recommendations

Reviewing the electrical components at this facility shows that they are in good condition. The primary issue identified during this inspection was that related to the operation of the generators, primarily Generator No. 2.

Table 8-5 Rotonda WRF – 2017 Electrical Recommendations

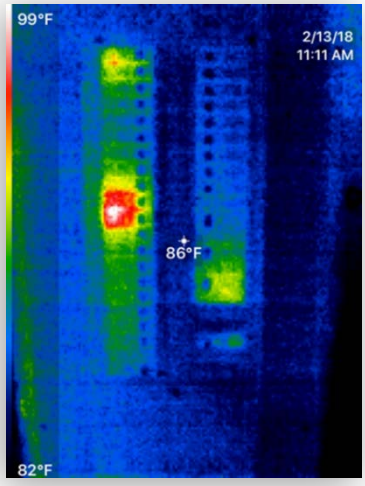
Recommendation:	The generator control system and paralleling switchgear need to be thoroughly reviewed by the generator manufacturer as well as the paralleling switchgear manufacturer to determine the cause for the generator inconsistencies and failure to operate as intended.
Recommendation:	Perform a load study to identify any issues related to power quality, quantity, and capacity of the system. The load study would help identify deficiencies in the system, identify reserve capacities and assess potential anomalies that may affect long-term operation.

8.3.4 BURNT STORE WRF

The Burnt Store WRF was acquired with the purchase of the Florida Water Services Burnt Store Division on December 12, 2003. The plant is on the south border of Charlotte County on Burnt Store Road and serves six developments – Burnt Store Marina, Burnt Store Colony, Burnt Store Village, Burnt Store Lakes, Pirate Harbor community, and Tern Bay development.

8.3.4.1 Condition Assessment

The incoming switchgear and distribution transformer appear in fair-to-good condition. The incoming power company service transformer exhibits an extensive amount of surface rust, which may soon be impacting the transformer function. The existing primary distribution switchboard outside the MCC room is also exhibiting signs of degradation from the weather. The plant is served from a single generator of an undetermined size. The generator was in good condition but exhibited signs of residual diesel fuel on top of the diesel fuel tank. This may be indicative of additional issues. Overall, the electrical equipment in Building MCC-1 is in good functioning condition based on information from the Operations staff, with the exception of those deficiencies listed below. Thermography scanning of the equipment showed a potential issue with Panel L1.



The following deficiencies were noted:

- The generator system appeared to have leaks at one time or has a current leak issue.
- Distribution Panel L1 indicates a single breaker showing excessive temperature, which may indicate an issue (see photographs above).
- The switchgear contains warning labels identifying parts and components as being energized. However, none of the equipment includes the appropriate arc flash labeling required by NFPA 70E.

8.3.4.2 Summary and Recommendations

Reviewing the electrical components at this facility shows that they are in good-to-fair condition. The electrical switchgear has some issues as discussed above; overall, these are not considered severe.

Table 8-6 Burnt Store WRF – 2017 Electrical Recommendations

Recommendation:	Review and maintain the generator for possible fluid leaks.
Recommendation:	Secure all electrical switchgear to prevent unauthorized access or inadvertent exposure to live parts.
Recommendation:	Investigate the anomalous excessive heat signature on the distribution breaker in Panel L1 to determine if an issue exists.
Recommendation:	Apply appropriate arc flash labeling on all appropriate switchgear in compliance with NFPA 70E to properly notify Operations and Maintenance personnel of the potential hazard.
Recommendation:	Perform a load study to identify any issues related to power quality, quantity, and capacity of the system. The load study would help identify deficiencies in the system, identify reserve capacities, and assess potential anomalies that may affect long-term maintenance and serviceability of the equipment.

9 ENGINEERING

The Engineering Division is responsible for preparing and managing engineering reports, studies, and construction designs.

9.1 CAPITAL IMPROVEMENT PROGRAM

The CIP is designed to plan and construct improvements to the CCUD water, wastewater, and RCW systems. As Charlotte County's population continues to grow, CCUD's ability to develop plans that address the projected growth is vital. The following section summarizes CIP projects in progress or initiated in FY 2017. A project is considered major when the expenditure is over $100,000.

9.1.1 CIP PROJECTS – WATER SYSTEM

Table 9-1 lists the water system CIP projects initiated or in progress during FY 2017. The total FY 2017 budget was $13,910,000 and the total expenditure was $5,530,000. The largest expenditure was the installation of new water meters.

Table 9-1 Water System CIP Projects in Progress or Initiated in FY 2017 ($ in Thousands)

Description	Funding Source [1]	Original FY 2017 Budget	2017 Expenditures	Percent of Budget Expended
CCUD Babcock Water Supply	Oper	$0	$0	0%
CCUD Babcock Water Supply	SRF	$0	$0	0%
Meter Fixed Base System	R & R	$5,657	$2,831	50%
Meter Fixed Base System	Oper	$265	$0	0%
Meter Fixed Base System	D.P.	$0	$0	0%
New Water Distribution Extension Piping	Conn-Wtr	$247	$1,100	445%
New Water Distribution Extension Piping	Oper	$0	$0	0%
Water Distribution Piping	R & R	$1,007	$483	48%
Water Distribution Piping	Conn-Wtr	$0	$0	0%
Burnt Store Well Field	R & R	$337	$0	0%
Burnt Store Well Field	Conn-Wtr	$153	$0	0%
Burnt Store Well Field	Oper	$0	$318	0%
Hillsborough/Chancellor Portable Water Main	Conn-Wtr	$693	$0	0%
Ingraham Potable Water	D.P.	$3,521	$34	1%
Ingraham Potable Water	Sinking	$305	$0	0%
Ingraham Potable Water	Conn-Wtr	$0	$1	0%

Description	Funding	Original	2017	Percent of
Punta Gorda, Burnt Store WTP and Babcock Wellfield	Grant	$0	$0	0%
Punta Gorda, Burnt Store WTP and Babcock Wellfield	D.P.	$0	$0	0%
Two 5-MG Potable Water Storage Tanks	Grant	$0	$0	0%
Two 5-MG Potable Water Storage Tanks	D.P.	$0	$0	0%
Booster Station R&R	R & R	$436	$0	0%
Major Water Transmission Lines	Conn-Wtr	$151	$508	336%
Major Water Transmission Lines	R & R	$0	$19	0%
Utility Installations for US 41 Widening	Oper	$0	$206	0%
Utility Installations for US 41 Widening	R & R	$1,138	$30	3%
Equipment Replacement/ Utilities (FY 2017)	Oper	$0	$0	0%
TOTAL		$13,910	$5,530	40%

[1] Funding sources: D.P. = Debt Proceeds; Grant = Grant Funding; Oper = O & M Fund; R & R = Renewal & Replacement Fund; S.T. = Sales Tax; Sinking = Sinking Fund; SRF = State Revolving Fund; Conn-Wtr = Water Connection Fee Fund.

9.1.2 CIP PROJECTS – WASTEWATER SYSTEM

Table 9-2 lists the wastewater system CIP projects initiated or in progress during FY 2017. The total wastewater budget allotted for FY 2017 was $58,363,000 and the total amount spent was $20,155,000.

Table 9-2 Wastewater System CIP Projects in Progress or Initiated in FY 2017 ($ in Thousands)

Description	Funding Source(1)	Original FY 17 Budget	2017 Expenditures	Percent of Budget Expended
East Port Expansion WRF	Conn-Swr	$0	$318	0%
East Port Expansion WRF	R & R	$991	$479	48%
Burnt Store WRF	Conn-Swr	$394	$134	34%
Burnt Store WRF	D.P.	$1,915	$0	0%
Burnt Store WRF	Sinking	$278	$0	0%
Wastewater Force Mains	Conn-Swr	$724	$768	106%
Wastewater Force Mains	R & R	$748	$0	0%
Wastewater Force Mains	Oper	$0	$0	0%

Description	Funding	Original FY 17	2017	Percent of
Wastewater Lift Stations	R & R	$1,365	$100	7%
Wastewater Lift Stations	Conn-Swr	$80	$7	9%
Spring Lake MSBU WW Expansion	Oper	$0	$659	0%
Spring Lake MSBU WW Expansion	Other	$0	$0	0%
Spring Lake MSBU WW Expansion	SRF	$435	$0	0%
Spring Lake MSBU WW Expansion	MSBU	$4,591	$5,096	111%
Burnt Store Colony	Conn-Swr	$0	$0	0%
Wastewater Collection Infrastructure	Conn-Swr	$314	$0	0%
Wastewater Collection Infrastructure	Conn-Wtr	$2	$0	0%
Wastewater Collection Infrastructure	L.E.	$0	$615	0%
Wastewater Force Main Replacements	R & R	$2,059	$541	26%
Wastewater Force Main Replacements	Conn-Swr	$305	$59	19%
Master Lift Stations	Conn-Swr	$423	$0	0%
Master Lift Stations	R & R	$1,670	$0	0%
Master Lift Stations	D.P.	$681	$0	0%
Rotonda WRF Ph2	Conn-Swr	$0	$0	0%
Northshore Wastewater Expansion	Grants	$0	$0	0%
Northshore Wastewater Expansion	Oper	$0	$1	0%
Northshore Wastewater Expansion	MSBU	$1	$0	0%
Northshore Wastewater Expansion	Dev	$0	$0	0%
West Port WRF Monitoring Well	R & R	$0	$0	0%
Burnt Store Phase 3	D.P.	$289	$56	19%
Burnt Store Phase 3	Sinking	$129	$0	0%
Grand Master LS – Loveland Blvd	Conn-Swr	$0	$131	0%
Grand Master LS – Loveland Blvd	D.P.	$5,150	$0	0%
Grand Master LS – Loveland Blvd	Sinking	$241	$0	0%

Description	Funding	Original FY 17	2017	Percent of
Veterans Force Main	Oper	$510	$0	0%
Veterans Force Main	D.P.	$3,400	$0	0%
Veterans Force Main	Sinking	$145	$0	0%
Myakka River Crossings – Gulf Cove	Oper	$192	$0	0%
Myakka River Crossings – Gulf Cove	D.P.	$1,471	$0	0%
Myakka River Crossings – Gulf Cove	Sinking	$230	$0	0%
Myakka River Crossings – River to SR776	D.P.	$1,039	$12	1%
Myakka River Crossings – River to SR776	Sinking	$91	$0	0%
Myakka River Crossings – River to SR776	Oper	$0	$0	0%
Myakka River Crossings – River to SR776	Conn-Wtr	$0	$33	0%
Parkside Harbor North	Oper	$0	$0	0%
Parkside Harbor North	D.P.	$0	$0	0%
Burnt Store Phase 2	Conn-Swr	$43	$10	23%
Burnt Store Phase 2	R & R	$174	$140	80%
Burnt Store Phase 2	Conn-Wtr	$50	$11	22%
Charlotte Harbor Water Quality Initiative Ph 3	Oper	$0	$0	0%
Charlotte Harbor Water Quality Initiative Ph 2	MSBU	$0	$78	0%
CCUD Sewer Master Plan	Oper	$0	$628	0%
CCUD Sewer Master Plan	SRF	$450	$0	0%
Repair, Replace, Reline Wastewater Coll. Sys.	R & R	$3,668	$0	0%
West Port WRF	Conn-Swr	$112	$0	0%
West Port WRF	R & R	$810	$17	2%
Water Transmission/ Wastewater Collection Reim	Conn-Swr	$21	$22	105%
CCU Business Services Customer Software	Oper	$1,126	$335	30%
Midway Phase 3	Sinking	$606	$0	0%
Midway Phase 3	Oper	$3	$0	0%
Midway Phase 3	Bond	$0	$0	0%
Midway Phase 3	D.P.	$3,407	$3,435	101%

Description	Funding	Original FY 17	2017	Percent of
09-0011 - Sewer – Edgewater Phase 2	D.P.	$951	$655	69%
09-0011 - Sewer – Edgewater Phase 2	Oper	$705	$0	0%
09-0011 - Sewer – Edgewater Phase 2	Sinking	$435	$0	0%
Equipment Replacement		$0	$0	0%
Gasparilla Rd/CR 771-Wtr Main, WWFM, Reclaim	Sinking	$571	$0	0%
Gasparilla Rd/CR 771-Wtr Main, WWFM, Reclaim	R & R	$918	$0	0%
Gasparilla Rd/CR 771-Wtr Main, WWFM, Reclaim	Conn-Wtr	$0	$0	0%
Gasparilla Rd/CR 771-Wtr Main, WWFM, Reclaim	Conn-Swr	$0	$0	0%
Gasparilla Rd/CR 771-Wtr Main, WWFM, Reclaim	D.P.	$230	$492	214%
Parkside Harbor – US 41 To Olean	Sinking	$121	$0	0%
Parkside Harbor – US 41 To Olean	D.P.	$1,414	$3	0%
Parkside Elkcam Blvd – US 41 to Midway	D.P.	$717	$1	0%
Parkside Elkcam Blvd – US 41 to Midway	Sinking	$269	$0	0%
Parkside Gertrude Ave and Aaron St Imp	Oper	$303	$0	0%
Parkside Gertrude Ave and Aaron St Imp	D.P.	$1,993	$54	3%
Parkside Gertrude Ave and Aaron St Imp	Sinking	$201	$0	0%
Parkside Gertrude Ave and Aaron St Imp	Grants	$375	$0	0%
Parkside Ambrose Lane – West Tarpon	R & R	$300	$0	0%
Parkside Ambrose Lane – West Tarpon	Conn-Wtr	$120	$0	0%
Parkside Ambrose Lane – West Tarpon	D.P.	$1,842	$555	30%
Parkside Ambrose Lane – West Tarpon	Sinking	$122	$0	0%
Central County Infrastructure	Conn-Wtr	$247	$0	0%
Central County Infrastructure	Conn-Swr	$0	$1,439	0%
Central County Infrastructure	Oper	$0	$2	0%

Description	Funding	Original FY 17	2017	Percent of
Central County Infrastructure	MSBU	$269	$0	0%
Central County Infrastructure	R & R	$712	$2,061	289%
CHWQ - Countryman & Ackerman	Oper	$3,300	$377	11%
CHWQ - US41	Oper	$0	$0	0%
West County Utilities Staging Area	C.P.F	$0	$0	0%
Mid-County 24-Inch Force Main Extension	Oper	$0	$41	0%
Mid-County 24-Inch Force Main Extension	Dev	$116	$0	0%
Mid-County 24-Inch Force Main Extension	C.P.F	$141	$640	454%
Mid-County 24-Inch Force Main Extension	SRF	$1,347	$0	0%
Water & Sewer Waterway Crossings	R & R	$311	$150	48%
Water & Sewer Waterway Crossings	Conn-Swr	$0	$0	0%
	TOTAL	$58,363	$20,155	35%

[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.

9.1.3 CIP Projects – Reclaimed Water System

Table 9-3 lists the RCW system capital improvement projects initiated or in progress during FY 2017. The total amount budgeted for FY 2017 was $9,704,000 and $3,507,000 was expended. Major projects included in the Phase 3 RCW expansion were started in FY 2017.

Table 9-3 RCW System CIP Projects in Progress or Initiated in FY 2017 ($ in Thousands)

Description	Funding Source(1)	Original FY 17 Budget (in Thousands)	2017 Expenditures (in Thousands)	Percent of Budget Expended
US 41 RCW Water lines	Sales tax	$0	$0	0%
US 41 RCW Water lines	Conn-Wtr	$89	$0	0%
US 41 RCW Water lines	Conn-Swr	$588	$7	1%
US 41 RCW Water lines	R & R	$0	$0	0%
RCW Expansion Phase 2	S.T.	$0	$0	0%
RCW Main 12 Inch East Port WRF	Conn-Swr	$0	$0	0%

Description	Funding Source[1]	Original FY 17 Budget (in	2017 Expenditures	Percent of Budget
RCW Service Connection	C.P.F.	$540	$0	0%
RCW Expansion Phase 3	Conn-Swr	$152	$3,202	2,107%
RCW Expansion Phase 3	R & R	$4,167	$298	7%
RCW Expansion Phase 3	Grant	$4,168	$0	0%
TOTAL		$9,704	$3,507	36%

[1] Funding sources: R&R = Renewal & Replacement Fund; Conn-Wtr = Water Connection Fee Fund; C.P.F. = Capital Projects Fund; S.T. = Sales Tax; Grant = Grant Funding; Conn-Swr = Sewer Connection Fee Fund.

9.1.4 CIP – 5-YEAR PLAN

CCUD develops and maintains a 5-year CIP to plan for the growth in Charlotte County. Table 9-4 summarizes projects included in CCUD's 5-year CIP for the water, wastewater, and RCW systems.

Table 9-4 Capital Improvement Program - 2017 and Future Water and Sewer Project Costs ($ in Thousands)

Project Names	Prior Years Actual	Actual 17	FY 18	FY 19	FY 20	FY 21	FY 22	FY 23	Future Years	Total
Babcock Water Supply	$923	$0	$0	$0	$0	$0	$0	$0	$46,860	$47,783
Meter Fixed Base System	$9,065	$2,831	$144	$124	$206	$150	$145	$140	$2,392	$15,197
Water Distribution Pipe Replacement	$890	$1,100	$250	$250	$250	$250	$250	$250	$750	$4,240
Water Distribution Piping Line Extension	$896	$483	$500	$500	$500	$500	$500	$0	$0	$3,879
Burnt Store Well Field	$246	$318	$0	$0	$0	$0	$0	$0	$1,380	$1,944
Hillsborough/Chancellor Potable Water Main	$358	$0	$230	$230	$230	$230	$230	$230	$870	$2,608
Ingram Potable Water	$149	$35	$145	$139	$133	$127	$121	$115	$755	$1,719
Punta Gorda WTP, Burnt Store WTP, and Babcock Wellfield Interconnect	$0	$0	$0	$0	$0	$0	$0	$0	$22,500	$22,500
Two 5-MG Potable Water Storage Tanks	$0	$0	$0	$0	$0	$0	$0	$0	$23,000	$23,000
Booster Station Rehabilitation	$0	$0	$500	$500	$300	$300	$0	$0	$0	$1,600
Major Water Transmission Lines	$6,974	$527	$225	$225	$225	$225	$225	$225	$2,250	$11,101
East Port WRF Expansion	$18,991	$797	$0	$0	$0	$0	$0	$0	$31,242	$51,030
Burnt Store WRF	$4,264	$134	$109	$106	$0	$0	$0	$0	$26,000	$30,479
Wastewater Force Mains	$3,655	$768	$1,300	$800	$400	$400	$400	$400	$1,500	$9,623
Wastewater Lift Stations Replacement/Restoration	$7,831	$107	$600	$600	$600	$600	$0	$0	$0	$10,338
RCW Lines	$142	$7	$0	$0	$0	$0	$0	$0	$0	$149
East and West Spring Lake Wastewater MSBU	$9,772	$5,755	$308	$296	$284	$271	$258	$245	$1,713	$18,902
RCW Expansion Phase 2	$3,930	$0	$0	$0	$0	$0	$0	$0	$0	$3,930

Project Names	Prior Years Actual	Actual 17	FY 18	FY 19	FY 20	FY 21	FY 22	FY 23	Future Years	Total
RCW Main 12-Inch East Port WRF to Harborview Road	$0	$0	$0	$0	$0	$0	$0	$0	$222	$222
Wastewater Collections Infrastructure	$796	$615	$170	$170	$170	$170	$0	$0	$170	$2,261
Wastewater Force Mains Replacement	$1,960	$600	$435	$435	$435	$435	$435	$0	$0	$4,735
Master Lift Stations	$99	$0	$800	$2,000	$750	$750	$750	$750	$3,800	$9,699
Rotonda WRF Phase II Expansion	$0	$0	$0	$0	$0	$0	$0	$0	$4,000	$4,000
Northshore Wastewater Expansion MSBU	$506	$1	$1	$1	$1	$1	$1	$1	$0	$513
RCW Service Connections	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
West Port WRF Monitoring Well Rehab/Replacement	$0	$0	$0	$0	$0	$0	$0	$0	$481	$481
Burnt Store Phase 3	$2,071	$56	$124	$119	$114	$108	$102	$96	$578	$3,368
RCW Expansion Phase 3	$337	$3,500	$624	$0	$0	$	$0	$0	$0	$4,461
Grand Master Lift Station Loveland	$1,045	$131	$233	$224	$214	$205	$195	$185	$1,212	$3,644
Veterans Wastewater Force Main	$0	$0	$140	$135	$130	$124	$119	$114	$809	$1,571
Myakka River Crossings – Gulf Cove To River	$0	$0	$1,389	$105	$101	$96	$91	$86	$570	$2,438
Myakka River Crossings – River to SR 776	$78	$45	$43	$42	$40	$38	$36	$34	$226	$582
Burnt Store Phase 2	$252	$161	$0	$0	$0	$0	$0	$0	$8,000	$8,413
Charlotte Harbor Water Quality Initiative Phase 3 – Harbour Heights	$0	$$0	$0	$0	$0	$0	$0	$0	$1,680	$1,680

Project Names	Prior Years Actual	Actual 17	FY 18	FY 19	FY 20	FY 21	FY 22	FY 23	Future Years	Total
Charlotte Harbor Water Quality Initiative Phase 2 – EL Jobean	$0	$78	$0	$0	$0	$0	$0	$0	$10,878	$10,878
CCUD Sewer Master Plan	$8	$628	$1	$1	$1	$1	$1	$1	$14	$656
Repair, Replace, Reline Wastewater Collection Sys	$9,574	$0	$350	$350	$300	$300	$300	$300	$530	$12,004
West Port WRF	$12,405	$17	$0	$0	$0	$0	$0	$0	$22,000	$34,422
Water Transmission/ Wastewater Collection Reimb.	$210	$22	$21	$0	$0	$0	$0	$0	$0	$231
Utility Installations for US 41 Widening Project	$7,230	$236	$0	$0	$0	$0	$0	$0	$0	$7,466
CCUD Business Services, Customer Billing, and Database	$1,147	$335	$0	$0	$0	$0	$0	$0	$600	$1,747
Midway Phase 3	$4,880	$3,435	$124	$119	$114	$108	$102	$96	$578	$9,556
Edgewater Phase 2	$4,684	$655	$205	$198	$189	$181	$172	$163	$1,072	$7,519
Gasparilla Road/CR 771 Water Main, Wastewater Force Main, RCW	$8,483	$492	$286	$275	$264	$252	$239	$226	$1,491	$12,008
Parkside Harbor South	$39	$3	$57	$55	$53	$51	$48	$45	$300	$651
Parkside Elkcam	$2,652	$1	$128	$123	$118	$113	$107	$101	$667	$4,010
Parkside Gertrude and Aaron Street Improvements	$31	$54	$496	$92	$88	$84	$80	$76	$498	$1,499
Parkside Ambrose Lane-West Tarpon	$1,640	$555	$58	$56	$53	$51	$48	$45	$302	$2,808
Central County Infrastructure	$4,582	$3,502	$0	$0	$0	$0	$0	$0	$0	$8,084
Equipment Replacement/ Utilities (FY 2016)	$395	$0	$0	$0	$0	$0	$0	$0	$0	$395

Project Names	Prior Years Actual	Actual 17	FY 18	FY 19	FY 20	FY 21	FY 22	FY 23	Future Years	Total
Charlotte Harbor Water Quality Initiative Phase 2 - Countryman and Ackerman	$319	$377	$1,553	$0	$0	$0	$0	$0	$79,050	$80,922
Charlotte Harbor Water Quality Initiative Phase 2 – US 41	$0	$0	$0%	$0	$0	$0	$0	$0	$26,938	$26,938
West County Utilities Staging Area	$0	$0	$0	$0	$0	$0	$0	$0	$3,019	$3,019
Mid-County 24-Inch Force Main Extension	$0	$681	$0	$0	$0	$0	$0	$0	$0	$681
Water and Sewer Waterway Crossings	$3,860	$150	$120	$120	$250	$250	$250	$250	$490	$5,740
TOTALS	$137,369	$28,246	$11,669	$8,390	$6,513	$6,371	$5,205	$4,174	$331,387	$539,324

9.2 Review of Design, Reports, and Studies

The following describes reports and studies prepared by CCUD Engineering or submitted by external engineering consultants in FY 2017. Prior year reports and annual reoccurring reports are also included for reference.

9.2.1 Reports Completed in FY 2017

- Burnt Store Brackish Groundwater Wellfield Study (N605)

  In July 2017, RMA GeoLogic Consultants, Inc. submitted the final report for the Burnt Store RO Plant Wellfield, which was partially funded by SWFWMD through Cooperative Funding Initiative Agreement N605.

- Charlotte County Water Quality Assessment Phase I: Data Analysis and Recommendations for Long-Term Monitoring

  A study was completed by Florida Atlantic University – Harbor Branch Oceonographic Institute in December 2016 outlining the historical and current water quality trends in Charlotte Harbor and the impacts on Charlotte Harbor due to septic effluent.

- 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.

- Environmental Report for El Jobean

  In January 2017 Jones Edmunds submitted a revised Environmental Report covering the septic to sewer conversion project in El Jobean.

- Preliminary Engineering Report for El Jobean

  In March 2017, the Engineering section completed the El Jobean Preliminary Engineering Report Revised March 2017 for the wastewater expansion project.

9.2.2 Annual Reports Completed in FY 2017

- Quarterly Operations Report

  For Water Year 2017, quarterly updates of all compliance items and upcoming regulatory requirements for all permitted facilities were submitted. The quarterly update is based on 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.

- Charlotte County Utilities Department 2016 Annual Report

  The FY 2016 Annual Report was prepared and submitted for public access on March 30, 2017.

- Capacity Analysis Report – Burnt Store WRF

  A capacity analysis letter report was prepared for the Burnt Store WRF and submitted to the FDEP in October 2016. 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.

- Capacity Analysis Report – East Port WRF

  A capacity analysis letter report was prepared for the East Port WRF and submitted to FDEP in March 2017. The report compares daily wastewater flows for the preceding year to the design capacity of the plant. It also shows the effluent quality that was produced during the same time period.

- 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.

- Facility Audit Report Update

  An audit report, dated May 2016 was performed for all seven CCUD 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.

9.2.3 Reports Completed in FY 2016

- 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 reports include the adjusted gross per capita daily water use calculations with supporting documentation.

- Loveland Grand Master Lift Station and Interceptor Report

  A planning document for SRF Funding that evaluated alternatives and costs and provided a recommendation of the preferred alternative. The report was prepared by Johnson Engineering and submitted on May 10, 2016.

- 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).

- Preliminary Engineering Report Update to FDEP Area 1 Preliminary Engineering Report – Charlotte County Design-Wastewater Expansion Phase 2 16-0001

The planning documents for SRF Funding evaluated alternatives to provide sewers to areas within the service boundary based upon different geographical features. The report, which included a cost analysis, was prepared by Giffels-Webster Engineers, Inc. dated April 25, 2016.

10 CONSOLIDATED RECOMMENDATIONS

10.1 PLANNING RECOMMENDATIONS

The following tables summarize the Planning Recommendations from Chapter 2. The information is presented based on operational functions.

Table 10-1 Administration Planning Recommendations

Recommendation:	Continue CCUD'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 developing options for water, sewer, and RCW service in the County to meet a growing demand for municipal utility services.
Recommendation:	Continue developing 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 needs for the mutual benefit of Charlotte County and adjoining counties and cities.

Table 10-2 Water System Planning Recommendations

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 west Charlotte County.
Recommendation:	Continue to integrate acquired utilities into the overall CCUD water system to maximize reliability and reduce costs to CCUD 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 reliability and control of the pumps to improve water distribution to customers.
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.

Table 10-3 Wastewater System Planning Recommendations

Recommendation:	Evaluate improvements and capacity upgrades for the Burnt Store 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 age 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 expected demand for services.
Recommendation:	Continue to televise gravity sewers and smoke test to locate source of I/I. Repair gravity sewers and manholes as required to mitigate I/I and regain sewer and WRF capacity.
Recommendation:	Continue to provide for the disposal of septage at the East Port WRF.
Recommendation:	Install odor control systems at lift stations where hydrogen sulfide concentrations cause odors and deteriorate structures.
Recommendation:	Continue to upgrade the East Port WRF to meet growth demands and septic to sewer conversions.
Recommendation:	Continue construction and plan for the next phases of sewer expansion in the Port Charlotte area in accordance with the 2017 Sewer Master Plan.

Table 10-4 RCW System Planning Recommendations

Recommendation:	Continue constructing Phase 3 of the RCW expansion project that begun in FY 2016 by constructing a transmission main from the West Port WRF to the Rotonda East RCW Booster Pumping Station.
Recommendation:	Finalize construction of the East Port WRF Stage 5 RCW Improvements that includes a 95-MG RCW storage pond and providing a 9-MGD RCW pump station.
Recommendation:	Prepare a hydraulic model to predict the impact of future demand on the South County RCW transmission system.
Recommendation:	Determine the feasibility of creating RCW storage at the Burnt Store WRF.
Recommendation:	Seek ways to increase the use of public-access RCW currently produced by CCUD WRFs including improving reliability and access for customers.
Recommendation:	Expand public-access RCW for the Burnt Store WRF.

10.2 CAPITAL IMPROVEMENTS

10.2.1 WATER TREATMENT PLANTS

The PRMRWSF is owned, operated, and maintained by the PRMRWSA and therefore CCUD does not plan for capital improvements related to this facility. Table 10-5 summarizes CIP projects associated with the Burnt Store RO WTP

Table 10-5 Burnt Store RO WTP – CIP Recommendations

Recommendation:	Continue the Brackish Wellfield Study to determine alternative raw water well locations and transmission requirements for an expanding service area.
Recommendation:	Determine the ultimate use of Well No. 15.
Recommendation:	Replace the acid tank in RO process building.

10.2.2 WATER DISTRIBUTION SYSTEM

Table 10-6 Central/West County Distribution System – CIP Recommendations

Recommendation:	Gulf Cove WBS: ▪ Continue to upgrade the Station by further progressing the replacement project for the Myakka River pipe crossing that supplies water to the station. ▪ Replace the concrete pipe connecting the GST to the pump station at the Gulf Cove Booster Station.
Recommendation:	Supply a redundant pump at the Ingraham facility.
Recommendation:	Replace the generator at the Walenda WBS with a properly sized generator to accommodate the loads and ensure reliable operation of the station.

Table 10-7 South County Distribution System – CIP Recommendations

Recommendation:	Continue to replace old "class" PVC pipe in the distribution system with new C-900 PVC pipe.
Recommendation:	Continue developing a computerized hydraulic model for the South County distribution system.

10.2.3 WASTEWATER COLLECTION SYSTEM

Table 10-8 Wastewater Collection System – CIP Recommendations

Recommendation:	Lift Station No. 1 – Community Center ▪ Provide an odor-control system. ▪ Perform thorough rehabilitation or replace the station with modern equipment.
Recommendation:	Lift Station No. 2 – Dalton ▪ Replace the building and/or roof. ▪ Provide an odor-control system.

Recommendation	Lift Station No. 7 – Pure Oil ▪ Replace with a standard submersible pump station. ▪ Install an odor-control system.
Recommendation:	Lift Station No. 37 – Quesada Master Lift Station ▪ Overhaul or replace the existing generator. ▪ Construct a backup wet well.
Recommendation	Lift Station No. 65 – South Port Master Lift Station ▪ None
Recommendation:	Lift Station No. 139 – Altoona ▪ Install a stationary emergency generator.
Recommendation	Lift Station No. 309 – Bridgewater ▪ Install a stationary generator.
Recommendation:	Lift Station No. 402 – Matecumbe ▪ Relocate the existing lift station.
Recommendation	Lift Station No. 415 – Prada ▪ Provide an odor-control system.
Recommendation:	Lift Station No. 801 – Rotonda Master Lift Station ▪ None
Recommendation	Lift Station No. 817 – Bunker Road ▪ Replace the station entirely.
Recommendation:	Lift Station No. 819 – Rotonda Circle 1 ▪ Perform a thorough rehabilitation of the station.
Recommendation	Lift Station No. 858 – Pine Valley Boundary ▪ None

10.2.4 WASTEWATER TREATMENT FACILITIES

Table 10-9 East Port WRF - CIP Recommendations

Recommendation:	Complete construction of the Stage 5 RCW Improvements to the effluent storage ponds to allow one pond to serve as a 95-MG RCW storage pond to increase reclaim water supply and reliability to customers. Project is underway and will be complete in 2018.
Recommendation:	Complete construction of the Stage 5 RCW Improvements to provide a pump wet well and HSP station to transfer stored RCW to new customers. Project is underway and will be complete in 2018.
Recommendation:	Complete construction of the Stage 5 RCW Improvements to provide an additional 1,500 kW stand-by power generator necessary to operate all critical treatment components at the plant. Project is underway and will be complete in 2018.
Recommendation:	Evaluate the structural integrity of the digester walkways and its ability to serve as an influent EQ tank.

Recommendation:	Provide new Chemical Feed and Analyzer Building for meeting high-level disinfection requirements required for producing unrestricted access public reuse water. This project is designed and will be constructed as part of the Stage 3 and 4 Improvement upgrades.
Recommendation:	Replace septage receiving pre-treatment units when repair is no longer cost effective and modify to allow septage treatment in aerated sludge holding tank and/or pump to headworks.

Table 10-10 West Port WRF – CIP Recommendations

Recommendation:	Provide additional aerobic sludge holding tank volume and decanting capacity to improve decant thickening.
Recommendation:	Resolve hydraulic constraints in the irrigation wet well for the injection well pumps to allow disposal of excess reclaimed water from West Port during wet weather events.
Recommendation:	Evaluate the addition of a flow EQ tank to improve treatment plant operations.
Recommendation:	Install UV fabric cover over filters to reduce algae growth.

Table 10-11 Rotonda WRF – CIP Recommendations

Recommendation:	Replace the grit cyclones of the headworks.
Recommendation:	Replace larger blowers with the correct cfm capacity blowers to lower oxygen levels and improve nitrogen removal.
Recommendation:	Add MBR cassette to existing trains as capacity needs dictate.
Recommendation:	Complete installation of RCW pipe to the Cape Haze Golf Course and RCW pipe to Placida Corridor.
Recommendation:	Evaluate ASR for additional RCW storage.

Table 10-12 Burnt Store WRF- CIP Recommendations

Recommendation:	Install new deep well injection pumps.

Table 10-13 Leachate Treatment Facility – CIP Recommendations

Recommendation:	Complete Sand Filter Case Study with Siemens to determine the best approach to 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, and replacing screens and sand.
Recommendation:	Add a generator to the treatment facility to keep the plant operational during power outages.

10.2.5 Reclaimed Water Distribution System

Table 10-14 Central/West County RCW Distribution System – CIP Recommendations

Recommendation:	Evaluate the addition of mechanical actuator on the system control valve at the West Port WRF to increase operational flexibility in transferring RCW between plants.

Table 10-15 South County RCW Distribution System – CIP Recommendations

Recommendation:	Study the feasibility of creating RCW storage at the Burnt Store RO WRF as the growth in the area dictates.

10.3 Operations and Maintenance

The following O&M items are recommended for FY 2017 and beyond.

10.3.1 Water Treatment Plants

Table 10-16 Burnt Store RO WTP – O&M Recommendations

Recommendation:	Continue to inspect and tighten the connections for the scale inhibitor, sodium hydroxide, sodium hypochlorite, and sulfuric acid pipes daily to prevent leakage.
Recommendation:	Replace multiple end caps that are leaking on Trains C and D.
Recommendation:	Evaluate the associated costs of operating at higher pressures to determine the optimum time to clean/replace membrane elements in Trains A and B. If cleaning is required, train staff on a cleaning procedure. If membrane replacement is required, obtain budgetary estimates for membrane replacement and account for the costs in the CIP.
Recommendation:	Repair the sodium hydroxide bulk storage tank gauge and ball valve.
Recommendation:	Paint the degasification towers.
Recommendation:	Paint the acid bulk storage containment area.
Recommendation:	Paint the motor on Jockey pump A.
Recommendation:	Paint the deep well injection pumps.
Recommendation:	Repair the cameras on site.
Recommendation:	Paint the GSTs.
Recommendation:	Conduct 5-year GST cleaning and inspections in accordance with FDEP Rule 62-555.350(2).

10.3.2 WATER DISTRIBUTION SYSTEM

Table 10-17 Central/West County Distribution System – O&M Recommendations

Recommendation:	EWD Interconnect: ▪ Install canopy over pumps, panels, and piping. ▪ Install flow meter to the CCUD distribution system. ▪ Check to confirm the vibration on the pressure gauge pump No. 2 is within tolerance.
Recommendation	Other Interconnects: Install a meter at the interconnect with North Port at Flamingo Boulevard.
Recommendation:	Gulf Cove WBS: ▪ Paint the concrete support on the influent pipe to the GST to prevent deterioration. ▪ Check fittings and joints for leaks in the ammonium sulfate chemical injection room. ▪ Paint the floor in the sodium hypochlorite chemical injection room to prevent concrete deterioration. ▪ Install a portable eyewash station in the new operations room.
Recommendation:	Rotonda WBS: ▪ Paint rusted bases on Booster Pumps No. 1 and 3. ▪ Modify the diesel fuel storage tank to prevent rainwater from collecting on top of the tank. ▪ Paint the concrete floors in the sodium hypochlorite injection room. ▪ Complete installation of the 24-inch water transmission main from Ingraham Street to the Rotonda GST.
Recommendation:	Walenda WBS: ▪ Paint the concrete floors in the chemical injection rooms. ▪ Replace interior liner in the Walenda GST.
Recommendation:	Conduct washout inspections at Golf Course and Walenda WBSs.
Recommendation:	Replace the Chemscan process analyzer at the Port Charlotte WBS.
Recommendation:	Conduct stratification testing on the Gulf Cove, Rotonda, Walenda, and Port Charlotte Golf Course WBS GSTs.
Recommendation:	Ingraham Disinfection Station: Cover the sodium hypochlorite storage tank and associated piping to prevent sun exposure and degradation.

10.3.3 WASTEWATER COLLECTION SYSTEM

Table 10-18 Wastewater Collection System – O&M Recommendations

Recommendation:	Lift Station No. 1 – Community Center ▪ Paint the above ground discharge piping. ▪ Repair cracks in the building. ▪ Replace the control panel.
Recommendation:	Lift Station No. 2 – Dalton ▪ Paint the above ground discharge piping. ▪ Repair the wet well hatch hinges. ▪ Provide an auxiliary power receptacle.
Recommendation	Lift Station No. 7 – Pure Oil ▪ Paint the building superstructure. ▪ Repair the roof overhang. ▪ Replace the glass windowpane.
Recommendation:	Lift Station No. 37 – Quesada Master Lift Station ▪ Replace the metal door of building. ▪ Perform regular cleaning of the wet well.
Recommendation	Lift Station No. 65 – South Port Master Lift Station ▪ Provide a fence around the station. ▪ Repair the flow meter and connect to telemetry.
Recommendation:	Lift Station No. 139 – Altoona ▪ None
Recommendation	Lift Station No. 309 – Bridgewater ▪ Paint the piping and valves in the underground vault. ▪ Apply protective coating on inside perimeter of the wet well.
Recommendation:	Lift Station No. 402 – Matecumbe ▪ None
Recommendation	Lift Station No. 415 – Prada ▪ Paint the discharge piping and valves. ▪ Apply protective coating to the wet well interior. ▪ Refurbish or replace the MCC.
Recommendation:	Lift Station No. 801 – Rotonda Master Lift Station ▪ Analyze effectiveness of odor-control device in removing gases from the wet well.
Recommendation	Lift Station No. 817 – Bunker Road ▪ Replace the station entirely. ▪ Provide a fence. ▪ Install a telemetry/receiver system. ▪ Replace or paint the discharge piping and valves. ▪ Fix the water leak inside valve vault. ▪ Stabilize the surrounding soils.

Recommendation:	Lift Station No. 819 – Rotonda Circle 1 ▪ Replace the control panel. ▪ Paint the discharge pipes. ▪ Reseal the wet well to reduce I/I. ▪ Replace or repair the piping. ▪ Add a telemetry/receiver system.
Recommendation	Lift Station No. 858 – Pine Valley Boundary ▪ Repair the interior of the wet well to reduce I/I. ▪ Paint the discharge piping, valves, and fittings. ▪ Clean the valve vault. ▪ Replace the control panel. ▪ Add a telemetry/receiver system.

10.3.4 WASTEWATER TREATMENT FACILITIES

Table 10-19 EPLAB - O&M Recommendations

Recommendation:	Continue to expand the use of the LIMS within its capabilities, including the use of bar codes to track samples from collection to result posting.
Recommendation:	Educate sampling personnel of the need for accuracy in use of collection bottles, sample storage, and delivery to the laboratory.
Recommendation:	Hire an Analytical/Quality Assurance specialist or Quality Assurance Officer to help the EPLAB remain in compliance.
Recommendation:	Recommend seeking certification for potable water Total Dissolved Solids (TDS), Sulfate and Chloride.

Table 10-20 East Port WRF – O&M Recommendations

Recommendation:	Add automated weir washer weir cleaners to Clarifier No. 2. Addition to Clarifier No. 1 was completed in 2017.

Table 10-21 West Port WRF – O&M Recommendations

Recommendation:	Complete painting of the steel supports for the walkway over the aeration tank effluent splitter box and the aeration tanks.
Recommendation:	Complete repairs on Rotary Screen Nos. 1 and 2.
Recommendation:	Evaluate a DO or ORP control system to replace the pH control approach currently used in the aeration basins.
Recommendation:	Clarifiers are showing signs of rust and suspect structural problems below the water line. Proceed with the scheduled repair and/or replacement and painting of Clarifier No. 3 and No. 4. Include leveling of clarifier overflow weirs in the work to be accomplished.

Table 10-22 Rotonda WRF – O&M Recommendations

Recommendation:	Continue to maintain and operate rotary fine screens at slower rotation which is extending the life of the rollers. Monitor maintenance issues to determine if future replacement of rotary fine screens is necessary.
Recommendation:	Replace the main influent valves at the headworks due to corrosion.
Recommendation:	Complete painting the WRF buildings and pipes.
Recommendation:	Add metal frame and UV shade cloth to CCT 1.
Recommendation:	Replace the below-ground chlorine feed line from the on-site road to the tank.
Recommendation:	Remove vegetation, clean, reinforce the berm, and evaluate lining the RCW storage pond to increase RCW storage capacity.
Recommendation:	Clean the reject storage pond.

Table 10-23 Burnt Store WRF – O&M Recommendations

Recommendation:	Remove rust from the top rim of the EQ tank and repaint.
Recommendation:	Belowground aeration pipes are old and rusting and should be replaced.
Recommendation:	Remove rust from the outer rim of the aeration basins and repaint flaking areas at welds.
Recommendation:	Evaluate the main breaker at the blowers because it trips when three blowers are in operation.
Recommendation:	Evaluate filter back-wash pump operations specifically during high-flow events.

Table 10-24 Leachate Treatment Facility – O&M Recommendations

Recommendation:	Continue painting the interior and exterior of the PACT tanks on a regular schedule.
Recommendation:	Evaluate the addition of one additional maintenance staff member to meet increasing demands and minimize overtime.

10.3.5 Reclaimed Water Distribution System

Table 10-25 Central / West County RCW Distribution System –O&M Recommendations

Recommendation:	Develop a comprehensive operating protocol for the entire RCW system to provide a reliable source of reclaim water to the CCUD customer base.
Recommendation:	Replace the 2-inch meter on the 6-inch line near the Sports Complex.

10.3.6 ELECTRICAL COMPONENTS

Table 10-26 Burnt Store RO WTP – Electrical O&M Recommendations

Recommendation:	The on-site generator needs a thorough refurbishment, which should include cleaning and mechanical repairs to address issues identified.
Recommendation:	Secure all electrical switchgear to prevent unauthorized access or inadvertent exposure to live parts.
Recommendation:	Apply appropriate arc flash labeling on all switchgear in compliance with NFPA 70E to properly notify operations and maintenance personnel of the potential hazard. This may require creating a complete and thorough arc flash model using the existing switchgear to determine the energy levels present. This information would appear on the appropriate arc flash labeling as required.
Recommendation:	Perform a load study to identify any issues related to power quality, quantity, and capacity of the system. The load study would help identify deficiencies in the system, reserve capacities and potential anomalies that may affect long-term maintenance and serviceability of the equipment.

Table 10-27 Water Distribution System – Electrical O&M Recommendations

Recommendation:	Perform an overall cleaning of each generator housing at each WBS.
Recommendation:	Secure all electrical switchgear to prevent unauthorized access or inadvertent exposure to live parts at the Gulf Cove, Rotonda, and Walenda WBSs.
Recommendation:	Further analysis of the ATS at the Gulf Cove WBS is also warranted based on the elevated temperatures of the primary and secondary conductors entering and leaving the drive to determine if this is a nominal temperature rise or if another condition exist that may be detrimental to the drive or the electrical system.
Recommendation:	Further analysis of the ATS at the Rotonda WBS is also warranted based on the degradation of the enclosure to ensure that it is functioning properly.
Recommendation:	Apply appropriate arc flash labeling on all appropriate switchgear in compliance with NFPA 70E to properly notify operations and maintenance personnel of the potential hazard. This may require creating a complete and thorough arc flash model using the existing switchgear to determine energy levels present. This information would appear on the appropriate arc flash labeling as required.
Recommendation:	Perform a load study to identify any issues related to power quality, quantity, and capacity at the Gulf Cove, Rotonda, and Walenda WBSs. The load study would help identify deficiencies in the system, reserve capacities, and potential anomalies that may affect long-term maintenance and serviceability of the equipment. Due to its size, a load study is probably not warranted for the Port Charlotte WBS.
Recommendation:	Replace the generator at the Walenda WBS with a properly sized generator to accommodate the loads and ensure reliable operation of the station.
Recommendation:	Review the generator at the Port Charlotte Golf Course WBS to ensure that OSHA compliance is maintained and accessibility of the equipment is provided.

Table 10-28 East Port WRF – Electrical O&M Recommendations

Recommendation:	Anchor the administration building distribution transformer as required by the manufacturer.
Recommendation:	Apply appropriate arc flash labeling on all appropriate switchgear in compliance with NFPA 70E to properly notify Operations and Maintenance personnel of the potential hazard. This may require creating a complete and thorough arc flash model using the existing switchgear to determine energy levels present. This information would appear on the appropriate arc flash labeling as required. Since much of the facility has already been labeled, it is likely that a model or the appropriate appellations may exist for much of this work.
Recommendation:	Perform a load study to identify any issues related to power quality, quantity, and capacity of the system. The load study would help identify deficiencies in the system, reserve capacities, and potential anomalies that may affect long-term maintenance and serviceability of the equipment. This is especially important in the #2 electrical building were sound levels are extraordinarily high. The identification of possible harmonics may mitigate this issue.

Table 10-29 West Port WRF – Electrical O&M Recommendations

Recommendation:	Reviews are needed for the generator control system by the generator manufacturer as well as the paralleling switchgear manufacturer to determine the cause for the generator inconsistencies and surging.
Recommendation:	Secure all electrical switchgear to prevent unauthorized access or inadvertent exposure to live parts.
Recommendation:	Apply appropriate arc flash labeling on all appropriate switchgear in compliance with NFPA 70E to properly notify operations and maintenance personnel of the potential hazard. This may require creating a complete and thorough arc flash model using the existing switchgear to determine the energy levels present. This information would appear on the appropriate arc flash labeling as required.
Recommendation:	Perform a load study to identify any issues related to system power quality, quantity, and capacity. The load study would help identify deficiencies in the system such as the issues related to the faulty blowers and identify reserve capacities and potential anomalies that may affect long-term maintenance and serviceability of the equipment.

Table 10-30 Rotonda WRF – Electrical O&M Recommendations

Recommendation:	The generator control system and paralleling switchgear need to be thoroughly reviewed by the generator manufacturer as well as the paralleling switchgear manufacturer to determine the cause for the generator inconsistencies and failure to operate as intended.
Recommendation:	Perform a load study to identify any issues related to power quality, quantity, and capacity of the system. The load study would help identify deficiencies in the system, identify reserve capacities and assess potential anomalies that may affect long-term operation.

Table 10-31 Burnt Store WRF – Electrical O&M Recommendations

Recommendation:	Review and maintain the generator for possible fluid leaks.
Recommendation:	Secure all electrical switchgear to prevent unauthorized access or inadvertent exposure to live parts.
Recommendation:	Investigate the anomalous excessive heat signature on the distribution breaker in Panel L1 to determine if an issue exists.
Recommendation:	Apply appropriate arc flash labeling on all appropriate switchgear in compliance with NFPA 70E to properly notify Operations and Maintenance personnel of the potential hazard.
Recommendation:	Perform a load study to identify any issues related to power quality, quantity, and capacity of the system. The load study would help identify deficiencies in the system, identify reserve capacities, and assess potential anomalies that may affect long-term maintenance and serviceability of the equipment.