CHARLOTTE COUNTY
FLORIDA

Charlotte County Utilities Department

2018 Annual Report
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Prepared by

JonesEdmunds

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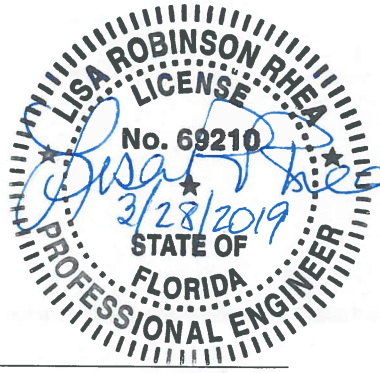

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ABBREVIATIONS AND ACRONYMS

Abbreviation	Definition
AAD	Annual Average Day
AADF	Annual Average Daily Flow
AC	Asbestos Cement
AMI	Advanced Metering Infrastructure
ARV	Air-Release Valve
ASR	Aquifer Storage and Recovery
ATS	Automatic Transfer Switch
AWWA	American Water Works Association
BCC	Board of County Commissioners
BFP	Belt Filter Press
CAR	Capacity Analysis Report
CBOD	Carbonaceous Biochemical Oxygen Demand (5 day)
CCC	Chlorine Contact Chamber
CCR	Consumer Confidence Report
CCU	Charlotte County Utilities
CCTV	Closed-Circuit Television
CDL	Commercial Driver's License
cfm	Cubic Foot per Minute
CHWA	Charlotte Harbor Water Association
CIP	Capital Improvement Program
CMMS	Computerized Maintenance Management System
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
°F	Degrees Fahrenheit
FAC	Florida Administrative Code
FDEP	Florida Department of Environmental Protection
FDOH	Florida Department of Health
FOG	Fats, Oils, and Grease
FSAWWA	Florida Section of AWWA
FY	Fiscal Year
GIS	Geographical Information System
GIWA	Gasparilla Island Water Association

Abbreviation	Definition
gpd	Gallons Per Day
gpm	Gallons Per Minute
GPS	Global Positioning System
GST	Ground Storage Tank
HDPE	High Density Polyethylene
HMI	Human Machine Interface
HOA	Homeowner Association
HP	Horsepower
HSP	High-Service Pump
I&C	Instrumentation and Controls
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
LS	Lift Station
LTF	Leachate Treatment Facility
MBR	Membrane Bioreactor
MCC	Motor Control Center
MG	Million Gallon
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
NEC	National Electrical Code
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

Abbreviation	Definition
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	Return Activated Sludge
RCW	Reclaimed Water
RO	Reverse Osmosis
ROW	Right-Of-Way
RTS	Regional Transmission System
RTU	Radio Telemetry Units
SCADA	Supervisory Control and Data Acquisition
SO	Service Order
SOP	Standard Operating Procedure
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
UCMR4	Unregulated Contaminant Monitoring Rule
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 treated 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.
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.

Term	Description
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 (CCU) 2018 Annual Report updates the public and bond holders on the utility system's status and provides CCU staff with a tool for planning capital projects and improving operations. The report provides a high-level review and update of CCU's administration organization, financial information, major events, and capital improvement program (CIP) 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 (BCC) and is considered appropriate for providing services to current customers. On June 24, 2014, the BCC approved a rate increase (water 0.75 percent, wastewater 6 percent) for fiscal years (FYs) 2015, 2016, and 2017.

In 2010, CCU began transitioning to a new fixed-base water meter system that allows CCU staff to access real-time data via central data collectors. This technology offers several advantages to customers and CCU 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 2018, 96.1 percent of the customer accounts were served by the fixed-base meter system.

Since July 2014, CCU offers customers electronic billing and payment options. In 2018, approximately 55 percent of customers paid their bills electronically and 33 percent of CCU customers received their bills electronically.

The total Operations and Maintenance (O&M) revenue for FY 2018 was:

- $68,440,929 (water and wastewater services)
- $ 2,186,679 (connection charges)
- $ 6,039,922 (connection fees)

In FY 2018, CCU continued to see growth with the number of active water services increasing by 1.02 percent (from 58,775 to 59,792 services) and the number of active wastewater services increasing by 0.88 percent (from 36,325 to 36,649 services).

WATER TREATMENT PLANTS

CCU has two water supply sources for its two independent public water systems (PWSs). CCU purchases treated water from the Peace River/Manasota Regional Water Supply Authority (PRMRWSA) for the consecutive PWS which serves Mid/West County. The PRMRWSA owns, operates, and maintains the Peace River/Manasota Regional Water Supply Facility (PRMRWSF), which has its own water use permit and provides treated surface water to neighboring counties. Charlotte County's allocation of the PRMRWSA-produced water is

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. CCU is using approximately 64 percent of the water allocated by the PRMRWSA under AADF conditions.

CCU also owns and operates the Burnt Store Reverse Osmosis (RO) Water Treatment Plant (WTP), which produces water to serve the South County distribution system. The Burnt Store RO WTP operates under Water Use Permit No. 3522, which expires in 2033. As currently configured, the Burnt Store RO WTP capacity is 3.61 MGD and has 1.5 MG of storage. On average, the Burnt Store RO WTP is operating at approximately 15 percent of its design capacity. Raw water is supplied by six water production wells. Concentrate from the treatment process is disposed of into two onsite deep injection wells with a combined capacity of 3.44 MGD. The primary recommendations for the Burnt Store RO WTP include addressing piping and end cap leaks, evaluating the timing for cleaning/replacing membranes, and completing the GST cleaning and inspections.

WATER DISTRIBUTION

Chapter 4 reviews and discusses CCU's distribution system infrastructure for its two independent PWSs. In FY 2018, CCU replaced 3,047 water meters, installed 808 new advanced metering infrastructure (AMI) water meters, replaced 13 hydrants, repaired 146 hydrants, performed maintenance activities (including exercising, flow testing, and painting) on 505 hydrants, repaired 69-line breaks on pipes 3 inches diameter or larger, replaced 13 valves, and performed maintenance activities on 1,851 valves throughout the Mid/West County and South County distribution systems. The 2018 Consumer Confidence Reports confirm that the water delivered by both CCU water distribution systems meets or exceeds regulatory quality requirements.

At the end of FY 2018, the Mid/West County distribution system consisted of approximately 1,400 miles of water main, four water-booster pumping stations (WBS) with ground storage tanks (GSTs), one chemical booster station, eight supply interconnects with PRMRWSA, and seven emergency 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 the Authority members for emergency fire flow or for general distribution during temporary loss of treatment at the PRMRWSF. For FY 2018, the total unaccounted-for water loss for the Mid/West County distribution system was 6.95 percent. The Mid/West County distribution system recommendations include performing a load study at each WBS, applying arc flash labeling on appropriate equipment, increasing the resiliency at the Gulf Cove WBS by replacing the Myakka River water main, and continuing to maintain and/or upgrade the WBSs and GSTs as necessary.

At the end of FY 2018, the South County distribution system consisted of 64 miles of water main and has no interconnects with neighboring water utilities. For FY 2018, the total unaccounted-for water loss for the South County system was 20 percent. Annual water loss over 10 percent for the South County system triggered a water audit, which includes a plan to mitigate the high loss. CCU, in concert with the Southwest Florida Water Management District (SWFWMD), has been conducting a leak detection study in South County. During FY 2018, CCU reduced the system pressure to reduce leaks and continues to investigate the issue by checking meters and the water accounting system's accuracy. Recommendations for the South County system include continuing to replace the old "class" PVC pipes with new

C-900 PVC pipes to mitigate leaks in the system, continuing to develop a computerized hydraulic model for the distribution system, and continuing to identify sources of unaccounted-for water loss throughout the system.

WASTEWATER COLLECTION

Chapter 5 presents the CCU wastewater collection system, which currently serves 36,649 customer accounts in four distinct collection areas. The total collection system consists of 379.6 miles of gravity sewer, 299.9 miles of low-pressure sewers (LPSs), 23.9 miles of vacuum sewer, 264.1 miles of force main, serviced 310 lift stations of which 13 are under service contracts from other Charlotte County departments, and approximately 7,683 manholes. CCU also owns tanker trucks that are available to haul wastewater from lift stations to the treatment plants during emergencies. 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 2018.

During FY 2018, all lift stations were maintained in working order. Recommendations for the CCU wastewater collection system include continuing to rehabilitate lift stations, continuing to use the hydraulic modeling 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.

WASTEWATER TREATMENT FACILITIES

Chapter 6 includes an overview and discussion of CCU's state-certified laboratory, water reclamation facilities (WRFs), and leachate treatment facility. The East Port Laboratory (EPLAB) conducts most water quality testing for the County's facilities. In FY 2018, the laboratory processed more than 36,581 test results including on-site analyses and additional off-site testing. The EPLAB 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 verify the 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 two standards of deviation of the national average of all laboratories – on Proficiency Testing (PT) required to maintain Laboratory Certification. During FY 2018, the laboratory obtained a certificate for the analysis of chloride. Recommendations for EPLAB improvements include continuing to expand the use of the LIMS within its capabilities, including using bar codes to track samples from collection to results posting, and seeking certification for potable water Total Dissolved Solids (TDS) and Sulfate.

CCU also owns and operates four 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. The WRFs are complex plants that require continual repair and maintenance. The main recommendation for each facility includes completing the upgrades at the East Port WRF, rehabilitating the sedimentation equipment at

the West Port WRF, and beginning the planning for the Burnt Store WRF upgrades. Chapter 6 of this report provides more detailed information and an extensive list of recommendations.

Table ES-1 CCU WRFs Flow and Capacity Statistics

Facility	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

Notes: * Design of upgrades will begin in FY 2019 for an increase to 9.0 or 12.0 MGD.

[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.

RECLAIMED WATER DISTRIBUTION SYSTEM

Chapter 7 discusses CCU's reclaimed water (RCW) distribution system. CCU continues to encourage the beneficial use of RCW, a resource produced by the four WRFs. CCU developed a Master Reuse System in Mid/West County, which is fed RCW from the East Port, West Port, and Rotonda WRFs. The Master Reuse System contains approximately 60 miles of transmission mains, three booster stations, three GSTs, and 20 MG of additional storage capacity at the West Port WRF storage ponds. An additional 95 MG of storage was added at the East Port WRF with the conversion of an existing reject pond to a reclaim storage pond. The Master Reuse System infrastructure is in good condition. CCU'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 large user customers. The infrastructure of the systems is in good condition, although some improvements are required at the Burnt Store WRF which will be done under the proposed WRF Expansion Project.

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.

ENGINEERING

As Charlotte County's population continues to grow, CCU's ability to develop plans that address the projected growth is vital. The Engineering Division develops CIP projects for CCU's water, wastewater, and RCW infrastructure systems. Table ES-2 summarizes FY 2018 capital improvement budget dollars and expenditures for the three infrastructure sectors. Details of the capital improvement budget and expenditures are contained in Chapter 8 of this report.

Table ES-2 FY 2018 Capital Improvement Budget and Expenditures

Infrastructure Sector	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 9 consolidates all recommendations discussed throughout this Annual Report for each CCU water, wastewater, and RCW facility visited.

1 INTRODUCTION

1.1 PURPOSE AND SCOPE

The Charlotte County Utilities Department (CCU) 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 CCU'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 CCU bonds as of March 2019.

Table 1-1 Principle Balances on CCU Bonds by FY 2018

Bond Issues	Original Issuance	Current Debt	Comments
2008 Bond	Wastewater Expansion – 1998	$ 21,280,000	Wastewater Expansion Program
2011 Bond	Refinance – 2011	$ 34,085,000	Refinanced Debt
2013 Bond	Refinance – 2003A	$ 19,495,000	Refinanced Debt
2016 Bond	Refinance – 2006 & part of 2011	$ 20,850,000	Refinanced Debt
	Total Current Bond Debt	$ 95,710,000	
	State Revolving Fund Debt	$ 4,293,121	
	Total Long-Term Debt	$100,003,121	

The Report is divided into the following chapters:

1. **Introduction:** General information concerning the report's preparation.
2. **Administration**: Charlotte County government structure and CCU'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. **Engineering**: The status of the water, wastewater, and reclaimed water Capital Improvement Program (CIP) projects and a summary of the major engineering reports completed for the County.

9. **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) 2018 Annual Report is authorized by Charlotte County Purchase Order No. 2019001102 for File No. 19-120, Work Order No. 17.

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.

The Office of Economic and Demographic Research estimated the Charlotte County population in 2018 at 177,987. In 2009, Port Charlotte was named "Best Place to Retire" by *Money* magazine, and the community has received similar recognition from other sources during the 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

CCU is an active Charlotte County Department with projects and administrative activities underway. The following sections list significant events occurring for FY 2018.

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 (BCC) in 2014, consisting of consumption rate increases of 0.75 percent for water and 6 percent for sewer in FY 2017. No rate increases occurred in FY 2018.

- The line extension program began in FY 2016 and continued through FY 2018. The program will be phased-out in 2019.

- September 2016, the BCC 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 and approved by the BCC.

1.4.2 ENGINEERING

- Continued designing the El Jobean septic-to-sewer conversion.

- Secured additional grant and low-interest funding for various projects through the SWFWMD Cooperative Funding Initiative (CFI) and FDEP State Revolving Fund (SRF) construction loans, respectfully.

- Clerk of the Circuit Court and County Comptroller completed an Internal Audit of CCU's Accounts Receivables in December 2017. The audit consisted of a review of existing operating policies and procedures, County Resolutions, applicable Florida Statues and Florida Administrative Rules for the accounting of receivables.

- Applied for Section 319 Total Maximum Daily Load (TMDL) funding and received legislative funding for the El Jobean septic-to-sewer conversion. No additional TMDL funding was secured in FY 2018.

- With BCC approval, construction crews perform on-site wastewater connections, line extensions, and renewal and replacement work.

- Major construction activities for FY 2018:
  - Construction of East Port WRF Stage 5 Reclaimed Water Improvements including the following: a 95 MG storage pond conversion, 9 MGD High Service Pump Station, 1,500 Kw emergency generator, electrical, instrumentation and control improvements.
  - US 41 Utility Improvements Project – This project is one of four projects intended to expand the water supply to West County. Construction will begin at CR 771 and proceed west (ongoing project).
  - Loveland Grand Master Lift Station and 48-inch Gravity Interceptor Project – Utility crews are constructing a grand master lift station and a major 48-inch wastewater gravity interceptor to transfer wastewater to the East Port WRF. This project will improve the operation and efficiency of a substantial number of lift stations in the mid-County area.
  - Harbor Blvd. Road Widening Utility Improvements.
  - Completed construction of the Cape Drive 12-inch potable water main.
  - Completed construction of Midway Widening Phase 3.
  - Completed Edgewater Drive Phase 2.
  - East and West Spring Lake Wastewater Expansion Project.
- Major design activities for FY 2018:
  - US 41 Water Main Replacement – Project design included the replacement of approximately 2.5 miles of asbestos cement (AC) 12-inch potable water main on the southbound side of US 41 between Midway Boulevard and Enterprise Drive. The design was completed in December 2018.
  - El Jobean East Wastewater Expansion Project.
  - East and West Spring Lake Wastewater Expansion Project.
  - Completed design of the Ingram 24-inch water transmission main from Gasparilla Road to the Rotonda Storage Tank.
  - Completed design of the Myakka Potable Water Booster Station.
  - Completed design of the El Jobean Vacuum Sewer Station.
  - Cape Haze Drive Wastewater Force Main and Reclaimed Water Main.
  - Olean Blvd. and Gertrude Ave. Road Widening Utility Improvements.
  - East Port WRF Request for Proposals.
  - Burnt Store WRF Request for Proposals.
  - Biscayne-Cornelius 16-inch Water Main.
  - North County Regional Park - Lift Station/Force Main.
  - El Jobean Vacuum Sewer Collection System.
  - Deep Creek Sewer Force Main Replacement.
  - Burnt Store Road Widening Phase 2.

1.4.3 Water System Operations

- Provided approximately 3.98 billion gallons of water to 59,792 customers in FY 2018.
- Received 135 MG of Punta Gorda-produced water through the new CCU/Punta Gorda 24-inch interconnect pipe. Distributed 128 MG back to Punta Gorda during their peak demand period.

1.4.4 Wastewater System Operations

- Treated 2.47 billion gallons of wastewater from 36,649 customers in FY 2018.
- Continued the successful program of sewer rehabilitation lining to reduce groundwater infiltration into the collection system. Work included internal TV inspection of gravity sewer, smoke testing, manhole repairs, and service lateral repairs.

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 upgrading the operation data management (Wonderware) for all major facilities in FY 2016. Continued installing this software on water and wastewater facility computers during 2017 and 2018.

1.4.8 Reports and Studies

- CCU presented *Charlotte Harbor Water Quality Initiative* to the BCC to show how the sewer expansion program will help improve water quality.
- *Organizational and Operational Audit of Utilities*, KPMG, February 16, 2015. Charlotte County BCC continued KPMG's engagement in FY 2017 to assist CCU 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.

- Facilities Quarterly Reports, Stantec Consulting Engineers, 2018.
- *BODR Myakka Potable Water Booster Station,* Stantec Consulting Engineers, March 2018.
- *Manchester Waterway Boat Lock Removal Plan* in the Alligator Drainage Basin area – In FY 2018, CCU completed an annual compliance report on the status of sewer connections to satisfy a Net Ecosystem Benefit requirement in accordance with Florida Department of Environmental Protection (FDEP) Permit No. 08-0210682-001.
- LA Consulting, Inc. (LAC) submitted the final report for *The Evaluation and Implementation of Maintenance and Operational Processes Found within the Utilities Department*, July 2018.

1.5 ACKNOWLEDGEMENTS

Jones Edmunds would like to acknowledge the following Charlotte County staff for providing guidance, information, and review in the preparation of this report: Stephen Bozman, Bruce Bullert, Larry Burns, Dean Campbell, Chris Carpenter, Denise Caruthers, Delmis Castillo, Thomas Cimino, Thomas Dunn, Jeremy Frost, Peter Giannotti, Drew Johnson, Stephen Kipfinger, Henri Lafenetre, Sandra Lavoie, Travis Mortimer, Craig Rudy, Bruce Schellinger, Gerard Steimle, John Thompson, Bill Thornton, Matt Trepal, Matt Valentine, Ruta Vardys, Caroline Wannall, David Watson, and Sandra Weaver.

2 ADMINISTRATION

2.1 COUNTY GOVERNMENT

Charlotte County government operates under an elected BCC and an appointed County Administrator. The BCC is responsible for the legislative duties of the County government. Five County Commissioners representing separate Districts serve on the BCC 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 BCC. The County Administrator's responsibilities include appointing County Department Directors, with final approval by the BCC.

2.2 UTILITIES DIVISION

CCU, 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. CCU serves over 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.

CCU 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 CCU to provide or receive water depending on each system's demands.

CCU'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.

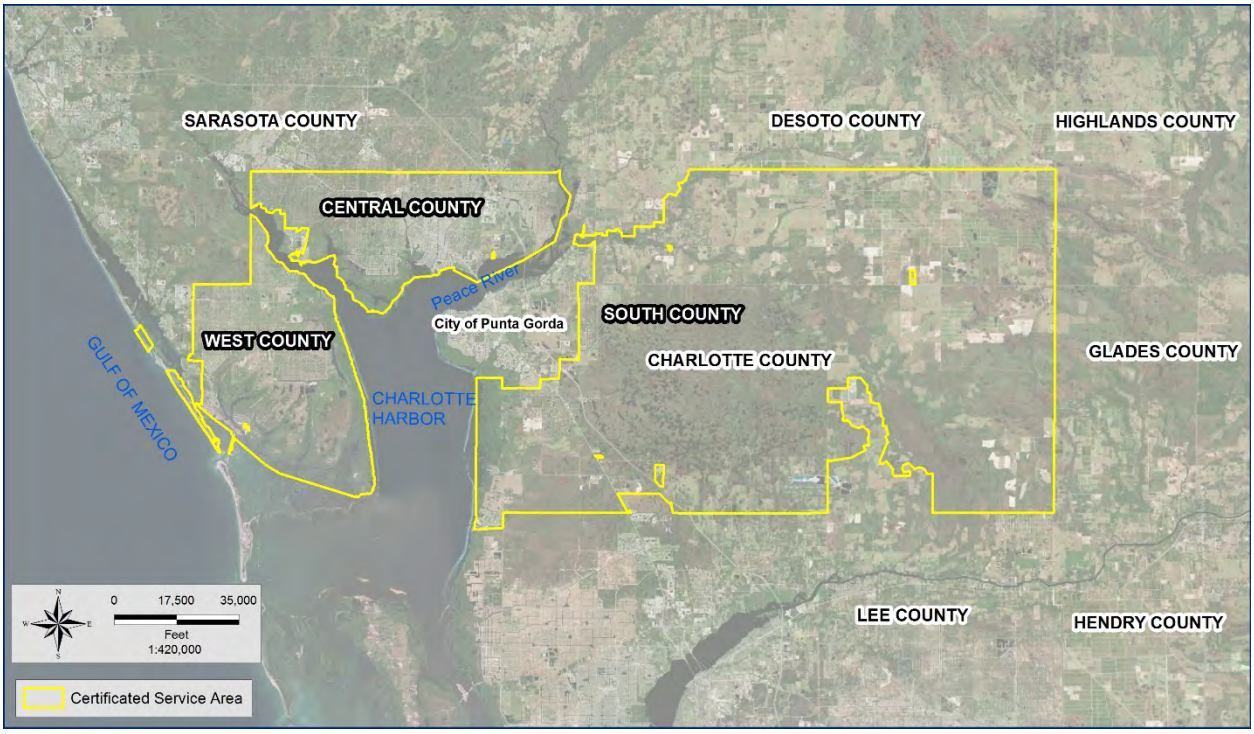
Vision: To exceed expectations in the delivery of water and sewer services.

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 CCU certificated service area outlined in yellow.

Figure 2-1 CCU Certificated Service Area



CCU is led by a Utilities Director, who works under the direction of the County Administrator and Deputy County Administrator. CCU 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 RCW 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 Services 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. CCU pays for five personnel, led by a Financial Manager, through an inter-fund transfer.

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

In FY 2018, the total number of positions budgeted for CCU was 237. CCU had 223 full-time employees at the end of October 2018.

Figure 2-2 and Figure 2-3 show the CCU organizational structure as of October 2018.

2.3 ADMINISTRATION FACILITIES

The Charlotte County Environmental Campus is located on an out-parcel of the East Port WRF. The campus includes the CCU 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 2018 CCU Organizational Chart – Overall

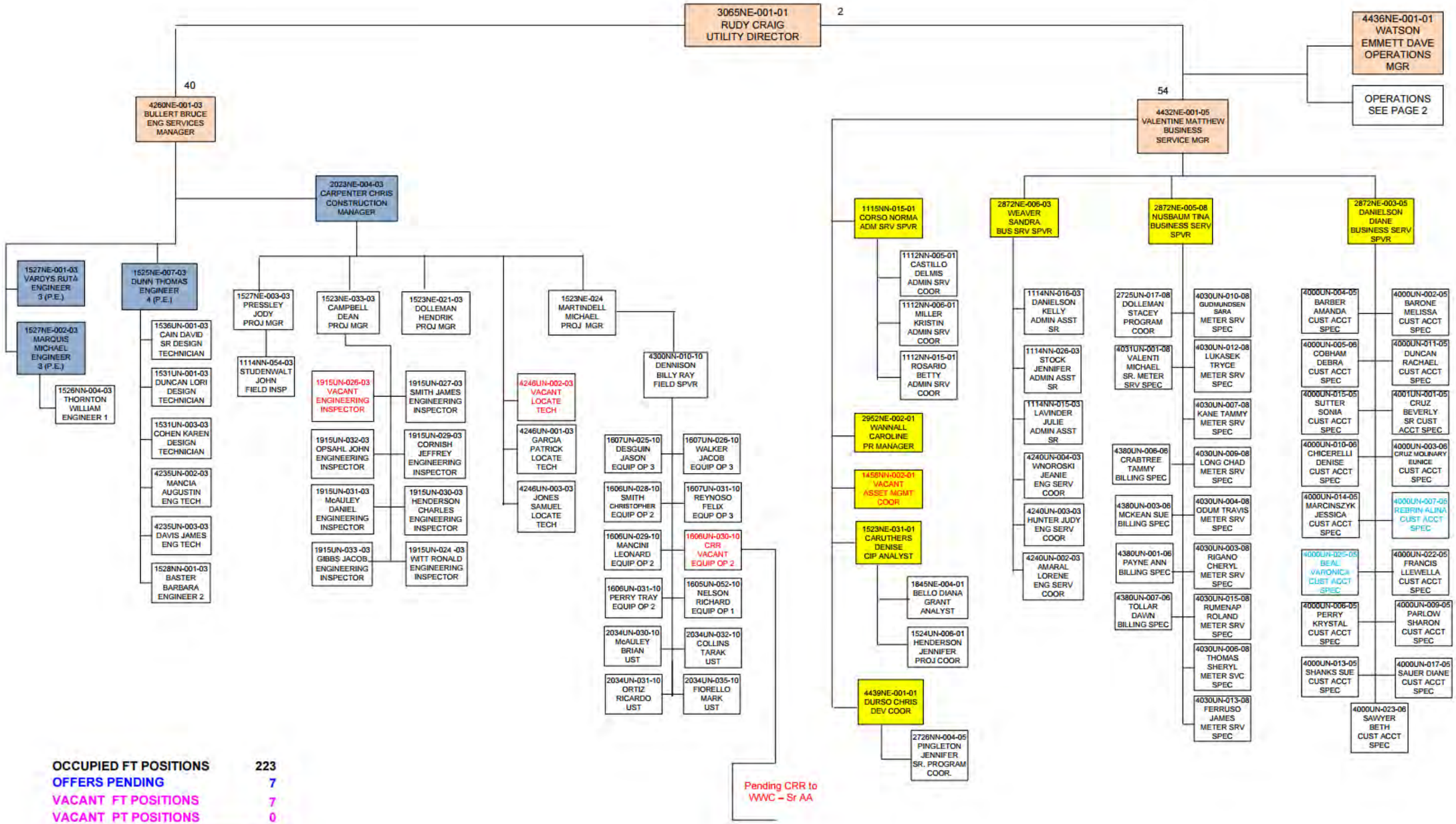
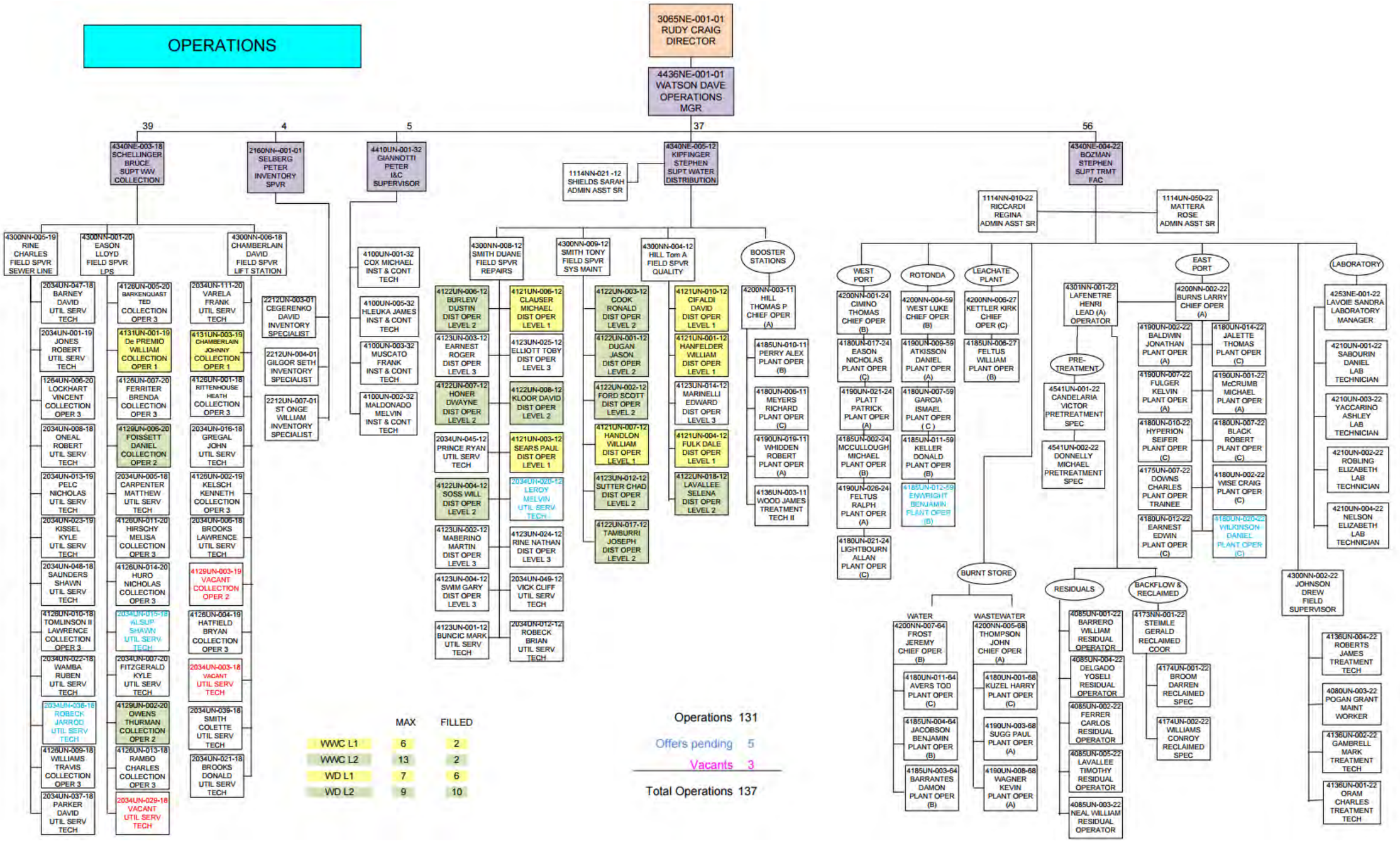


Figure 2-3 2018 CCU Organizational Chart – Operations



2.4 CCU WATER CONSERVATION EFFORTS

In 2018, CCU 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, CCU 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 (if needed). Hand watering and micro-irrigation of plants (other than laws) may be done on any day and any time.

2.4.2 IN-HOUSE ENFORCEMENT OF WATERING RESTRICTIONS

Enforcement of watering restrictions was approved by the BCC in early 2008. The enforcement allows CCU staff to progressively enforce water restrictions for CCU 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-CCU 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, CCU'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 CCU conservation-based rates as discussed in Section 2.4.4.

2.4.6 Regional RCW Expansion

CCU's RCW system operates under a Master Reuse Permit approved by FDEP that allows CCU 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 CCU'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 and continued in FY 2018, includes a new RCW main for Spring Lakes on Port Charlotte Boulevard and US Highway 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.

Reclaimed water modeling was approved in December 2018 to recommend operational and structural improvements to the RCW distribution and pumping system to improve the delivery of RCW from East Port WRF to customers in Mid and West County.

2.4.7 Indoor Water Conservation Kits

CCU 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 conservation-related information.

2.4.8 Community Outreach

CCU regularly participates in water conservation-related outreach, including bill inserts, news articles, and speaking engagements within the community. CCU funded a portion of the salary for a Florida Yards and Neighborhoods Charlotte County UF/IFAS Extension Program Assistant for the past several years. CCU and the UF/IFAS Extension Services work jointly promoting Florida Friendly Landscaping. A donated demonstration garden is on CCU'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.

CCU conducted two citizen educational tours during FY 2018 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

CCU 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
- Speaking Engagements at Homeowner Association (HOA) meetings
- 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
- Project Information Meetings for Residents and Business Owners

CCU 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 CCU tap water is the most economical way to do so.

2.4.9 Conservation Signs

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

2.4.10 Water Conservation Month

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

2.4.11 CCU Website/Social Media

Customers can receive the latest water restrictions, conservation tips, and general CCU current events at the Charlotte County website, *www.charlottecountyfl.gov*, and at the Administration office. CCU 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

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

2.5.1 REVENUES

The rate plan, approved by the BCC in 2006, incorporated projected water and wastewater demands through 2011, based on growth estimates. In September 2010, the rate increase that would have taken effect October 2010 was repealed. The BCC determined that the revenues based on the 2009 rates would be adequate for CCU to meet the needs of current and future customers through FY 2014. On June 24, 2014, the BCC approved rate increases (water 0.75 percent, wastewater 6 percent) for FY 2015, 2016, and 2017. Not rate increases went into effect in FY 2018.

In 2010, CCU 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 2018, 57,560 or 96.1 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 CCU via a graphical and simple-to-use web interface, integrated with CCU's Computerized Maintenance Management System (CMMS) and Geographic Information System (GIS) software packages. Account-specific consumption data are also available to CCU customers via a separate, easy-to-use online interface.

CCU 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 55 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 CCU's Business Services Division, administers the HeartShip funds.

The total Operations and Maintenance (O&M) revenue for FY 2018 water and wastewater services was $68,440,929. The total O&M connection charge revenue was $2,186,679 and total connection fee revenue was $6,039,922.

2.5.2 CCU CUSTOMER BASE

During FY 2018, the number of active water services increased from 58,775 to 59,792, and the number of active sewer services increased from 36,325 to 36,649. For planning purposes, the level of water and wastewater service established by CCU 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.

2.5.3 INSURANCE

CCU 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, CCU 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 CCU 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]
CCU			
Rates as of September 30, 2018	41.30	51.39	92.69
Other Neighboring Utilities			
City of Cape Coral	32.92	57.23	90.15
City of Clearwater	31.32	40.88	72.20
DeSoto County	48.98	60.08	109.06
City of Fort Myers	28.88	72.05	100.93
City of Marco Island	53.92	52.48	106.40
City of North Port	34.77	54.08	88.85
City of Punta Gorda	28.02	33.66	61.68
Collier County	34.69	53.52	88.21
Englewood Water District	24.93	37.06	61.99
Hillsborough County	27.35	31.96	59.31
Lee County	25.67	43.85	69.52
Manatee County	18.57	42.66	61.23
Okeechobee Utility Authority	39.01	50.20	89.21
Sarasota County	25.83	45.05	70.88
St. Lucie County Utilities	36.45	51.97	88.42

Note: [1] The reflected residential rates were in effect September 30, 2018, 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 CCU Large Water Users (FY 2018)

Water Customer	Total Water Purchased (thousands of gallons)	Percentage of Total Water Sales
Riverwood[1]	61,667	1.83%
Peace River Regional Medical Center	26,647	0.79%
Charlotte County School Board	26,130	0.78%
El Jobean Water Association	24,841	0.74%
South Port Square	23,000	0.68%
Fawcett Memorial Hospital	21,564	0.64%
Hampton Point Limited Partnership	15,037	0.45%
Encore Super Park, Port Charlotte	14,332	0.43%
Little Gasparilla Water Utility[1]	12,111	0.36%
Hacienda Del Mar, LLC	11,427	0.34%
Total 10 Largest Users	236,756	7.02%
All Other System Users	3,133,561	92.98%
Total FY 2017/2018 System Water Sales – All Customers	3,370,317	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 CCU's continued operations the utilities systems.

Table 2-3 Administration Planning Recommendations

Recommendation:	Continue CCU'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 CCU water system to maximize reliability and reduce costs to CCU 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 and smoke test gravity sewers to locate source(s) 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.

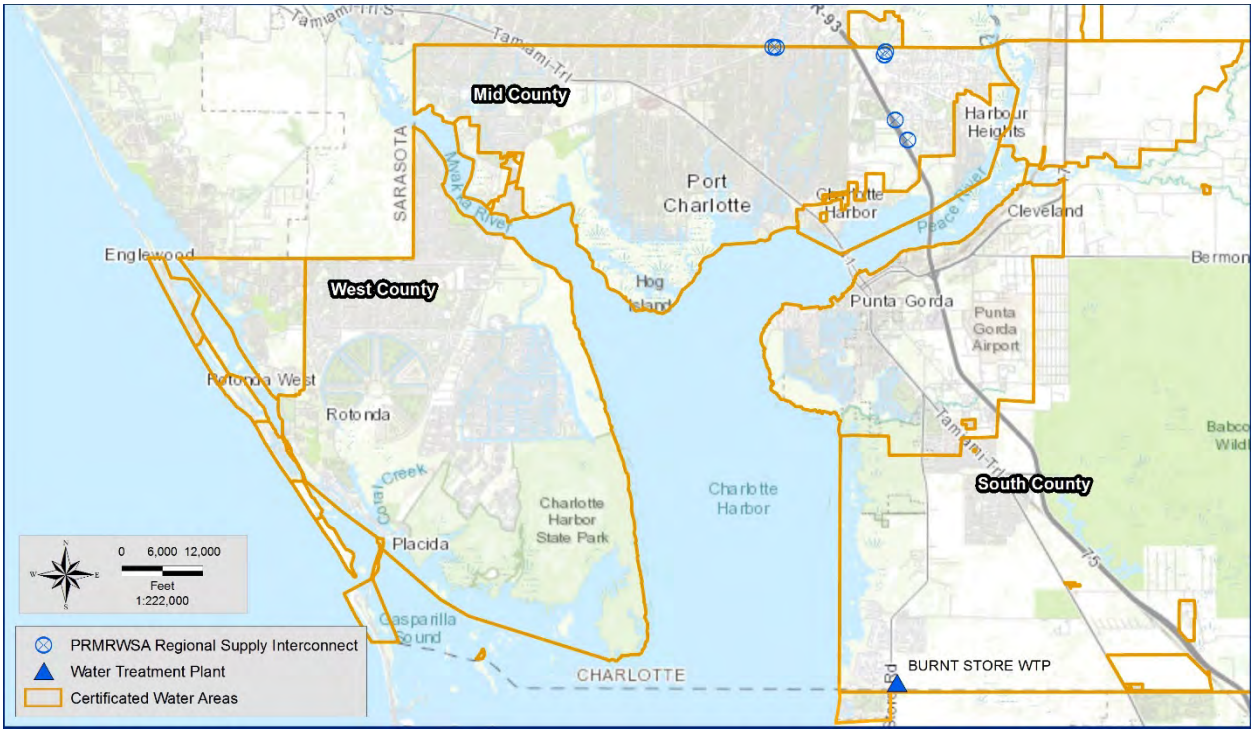
Table 2-6 RCW System Planning Recommendations

Recommendation:	Continue Phase 3 of the RCW expansion project that began 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 CCU WRFs including improving reliability and access for customers.
Recommendation:	Expand public-access RCW for the Burnt Store WRF.

3 WATER TREATMENT PLANTS

CCU has two water supply sources for its two independent public water systems (PWSs). The mid and west parts of Charlotte County are provided with 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 CCU-owned Burnt Store RO WTP. Figure 3-1 shows the Burnt Store RO WTP, PRMRWSA supply interconnect, and water service areas. This Chapter presents an overview of the PRMRWSF and a detailed 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 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 2005 with amendments in 2008 and 2015 by the four members and one customer – the City of North Port.

The PRMRWSA owns and operates the PRMRWSF which is located along the Peace River in DeSoto County approximately 4 miles northeast of Charlotte County. 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 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 from the river is reduced or not permitted. The allocated cost to Charlotte County for the expansion was approximately $27.7 million.

Charlotte County's allocation of the PRMRWSA-produced water is currently 16.1 MGD Annual Average Daily Flow (AADF), 19.320 MGD for the peak monthly average day, and 22.54 MGD for the maximum day. In FY 2018, PRMRWSA supplied Charlotte County with a total of 3,824 million gallons or approximately 10.5 MGD. 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

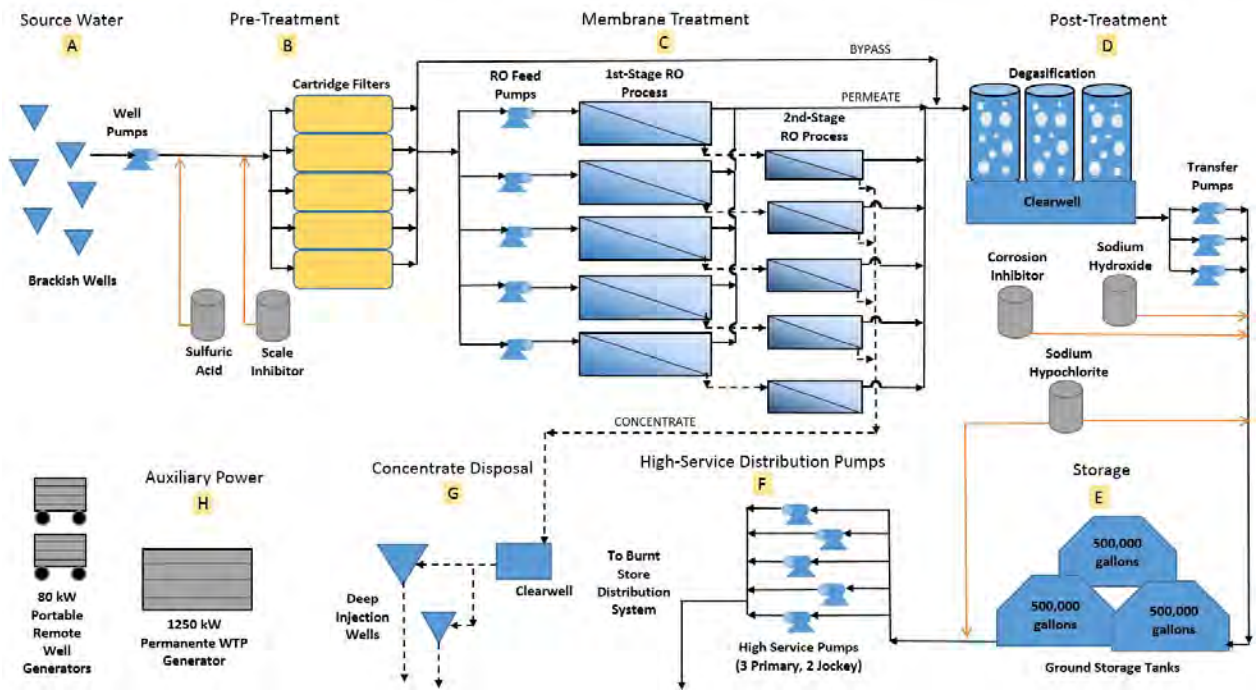
The Burnt Store RO WTP (PWS ID6080318) is owned and operated by CCU. The South County service area is served by the Burnt Store RO WTP at 17430 Burnt Store Road in Punta Gorda. The Burnt Store RO WTP was expanded in 2009 and has a permitted treatment capacity of 3.61 MGD.

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 solids 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 remaining 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 before 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 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 – 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 PWS. The permit schedule includes:

- FDEP – Deep Injection Well IW-1 was issued on March 3, 2014, and expires on March 2, 2019. The County has submitted and FDEP has reviewed a permit renewal and responded with an intent to Issue a “Notice of Draft Permit”
- 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, CCU routinely and continuously monitors the quality of the raw water and finished water produced at the Burnt Store RO WTP. Monitoring wells are sampled quarterly, and the samples are sent to the CCU laboratory at the East Port WRF. Water quality data from the production and monitoring wells are reported to SWFWMD and stored on the CCU 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 2018

Month	pH (Std Units)*	TDS (mg/L)*	Cond. (µS/cm)*	Free Chlorine (mg/L)*	Alkalinity (mg/L)*	Total Hardness (mg/L)*	Remote Sample pH (Std Units)	Remote Sample Free Chlorine (mg/L)
Oct-17	8.14	284	619	1.35	21	84	8.02	1.20
Nov-17	8.14	284	619	1.35	21	85	8.02	1.20
Dec-17	8.05	284	624	1.30	21	63	7.97	1.11
Jan-18	7.99	281	617	1.30	22	74	7.96	1.16
Feb-18	7.97	267	584	1.44	22	83	7.85	1.27
Mar-18	8.16	264	579	1.55	23	68	8.08	1.43
Apr-18	8.09	241	542	1.43	24	57	8.00	1.29
May-18	8.08	263	578	1.41	20	33	7.97	1.26
Jun-18	8.41	270	588	1.58	24	44	8.28	1.29
Jul-18	8.14	272	593	1.57	22	85	8.12	1.42
Aug-18	7.98	271	589	1.65	32	85	7.92	1.46
Sep-18	7.96	274	594	1.64	26	85	7.92	1.44
Annual Avg.	8.09	271	594	1.46	23	70	8.01	1.30

Notes: * GST Sample Location; 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 ID 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: [1] Well No. 15 is out-of-service. Rehabilitation of this well was discussed in the 2017 Brackish Groundwater Wellfield Study; bls = below land surface; * Future wells; — = Not Applicable.

The permitted maximum day operating capacity of the WTP is 3.61 MGD. Table 3-3 and Table 3-4 show the total and average monthly water flows, respectively. The tables summarize the amount of water that was bypassed around the RO process, produced from the WTP, discharged to the deep injection wells (concentrate), and conveyed to the distribution system. As of 2018, the Burnt Store RO WTP is operating on average at 15 percent of its design capacity.

Table 3-3 Burnt Store RO WTP – Total Water Balance FY 2018

Month	Raw Water From Wells (MG)	Raw Water Bypass (MG)	Total Water Produced (MG)	Total Concentrate (MG)	Finished Water To Distribution (MG)
Oct-17	17.38	1.50	14.00	3.52	13.95
Nov-17	17.51	1.52	14.14	3.52	13.94
Dec-17	18.89	1.64	15.30	3.76	15.09
Jan-18	18.75	1.63	15.16	3.75	15.01
Feb-18	17.63	1.53	14.24	3.54	14.09
Mar-18	21.10	1.82	16.99	4.29	16.78
Apr-18	18.52	1.50	14.94	3.74	14.78
May-18	14.44	1.22	11.85	2.88	11.60
Jun-18	13.28	1.14	10.80	2.66	10.66
Jul-18	13.31	1.15	10.78	2.67	10.72
Aug-18	12.70	1.07	10.02	2.51	9.87
Sep-18	12.13	1.04	9.71	2.44	9.87
Total	195.65	16.75	157.93	39.26	156.36

Table 3-4 Burnt Store RO WTP – Average Flows FY 2018

Month	Raw Water From Wells (MGD)	Raw Water Bypass (MGD)	Total Water Produced (MGD)	Total Concentrate (MGD)	Finished Water To Distribution (MGD)
Oct-17	0.561	0.048	0.452	0.113	0.450
Nov-17	0.584	0.051	0.471	0.117	0.465
Dec-17	0.609	0.053	0.494	0.121	0.487
Jan-18	0.605	0.052	0.489	0.121	0.484
Feb-18	0.629	0.055	0.508	0.126	0.503
Mar-18	0.681	0.059	0.548	0.138	0.541
Apr-18	0.617	0.050	0.498	0.125	0.493
May-18	0.466	0.039	0.382	0.093	0.374
Jun-18	0.443	0.038	0.360	0.089	0.355
Jul-18	0.430	0.037	0.348	0.086	0.346
Aug-18	0.410	0.035	0.323	0.081	0.318
Sep-18	0.404	0.035	0.324	0.081	0.329
Annual Avg.	0.537	0.046	0.433	0.108	0.429

3.2.2 Treatment Components and Condition Assessments

Jones Edmunds personnel preformed an on-site review of the WTP on February 8, 2019. A tour of the facility was conducted with 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, motor control building, and operations/administration building (shared with the Burnt Store WRF) were observed to be in good condition. The exterior of the buildings should be painted and cleaned. 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 maintained. Staff does an excellent job of keeping the interior of the buildings neat and clean as is customary for potable WTPs. 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. 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. 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 routine maintenance as would be expected for any chemical feed system. The area is inspected daily for leaks. The 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. The 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. In November 2009, nine groundwater monitoring wells were constructed and placed into operation. Two of the four production wells on the Burnt Store RO WTP site were placed into operation in August 2010. Three additional shallow groundwater monitoring wells were installed in February 2014.

All production wells are confined in fenced areas and include submersible well pumps. Flow and pressure for each of the wells are monitored through SCADA. 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 condition 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 lower quality water from this well's terminal strata. 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.

- 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

3.2.2.2.1 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 is indoors near the chemical feed skid. The sulfuric acid skid contains two metering pumps. The metering pumps are in good working condition. The concrete in the secondary containment in the bulk chemical storage area was painted in 2018, and the 100-gallon tank inside the process room was replaced.

3.2.2.2.2 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.

3.2.2.2.3 Cartridge Filtration

The facility contains five stainless-steel cartridge filter-housing vessels. Each vessel 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. The gauges are functioning properly and are in good condition.

3.2.2.3 Membrane Treatment Components

3.2.2.3.1 RO Feed Pumps

The Burnt Store RO WTP has five two-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.

3.2.2.3.2 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.

3.2.2.3.3 Sampling and Instrumentation

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

3.2.2.3.4 Membrane Cleaning System

Over time, membranes may experience fouling due to scaling, plugging, break-through, or several additional factors. Reversible fouling can be mitigated by in situ cleaning of the membranes, whereas some fouling may require membrane replacement. The WTP's membrane cleaning system has not been used in over 5 years. Operators restored the system in 2018 and will test the system's functionality in 2019.

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 the 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, except for some leaks on the concentrate port seals on Trains C and D. The leaks pose no environmental hazards or water quality issues.

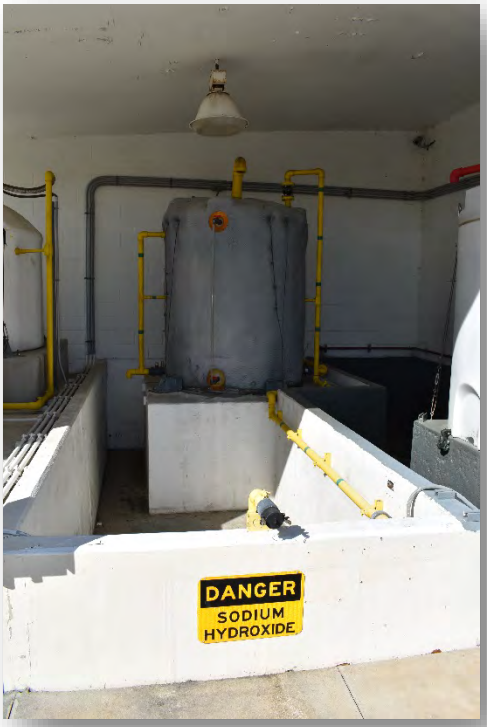
3.2.2.4 Post-Treatment Components

3.2.2.4.1 Degasification and Clearwell

Hydrogen sulfide is removed from the RO permeate via packed-tower degasification. Three packed-tower degasification units are 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 was completed in 2018.

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, two additional air-release valves were installed downstream of the pumps.

3.2.2.4.2 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 (°F), operators install heat lamps to prevent the sodium hydroxide viscosity from increasing. The glass sight gauge on the bottom of the 1,100-gallon bulk storage tank and the ball valve on the transfer line from the bulk tank were replaced in 2018 and are functioning properly.

3.2.2.4.3 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.

3.2.2.4.4 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. 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. 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 sodium hypochlorite system is in good operating condition.

Redundant analyzers that monitor 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. Instrumentation is calibrated and up to date.

3.2.2.4.5 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 are 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 (VFDs) 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 due to rust observed on the unit, but 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 were painted in 2018 but the concrete wetwell needs to be painted.

3.2.2.8 Electrical Components, Standby Power, and Circuitry

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. The distribution transformer, which provides power to the site, was in good condition with no obvious signs of significant concern.

3.2.2.8.1 RO Process Building

The incoming switchgear was in good condition with minor issues. 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 the National Fire Prevention Association (NFPA) 70E.

3.2.2.8.2 Auxiliary 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. The generator was cleaned and serviced in 2018. A high-level fuel alarm falsely trips when the fuel tank is filled, which should be corrected. Two generators that were historically attached to Wells No. 15 and 16 were converted to portable 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.

Overall, the electrical equipment is in good functioning condition based on information from the Operations staff.

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, Operations 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. The 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 2018.

3.2.5 Review of Previous Report Recommendations

Table 3-5 summarizes the recommendations and current status from the 2017 Annual Report for the Burnt Store RO WTP.

Table 3-5 Burnt Store RO WTP 2017 Recommendations and Status

Recommendation:	Continue the Brackish Wellfield Study to determine alternative raw water well locations and transmission requirements for an expanding service area.
Progress:	*Completed.*
Recommendation:	Determine the ultimate use of Well No. 15.
Progress:	*To be investigated as part of the potable water master plan.*
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:	*Completed.*
Recommendation:	Replace the acid tank in RO process building.
Progress:	*Completed.*
Recommendation:	Replace multiple end caps that are leaking on Trains C and D.
Progress:	*Ongoing – leaking end caps are periodically found and repaired.*
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 incorporate into the CIP.
Progress:	*Ongoing – staff is testing the functionality of the membrane cleaning system and developing SOPs for membrane cleaning.*
Recommendation:	Repair the sodium hydroxide bulk storage tank gauge and ball valve.
Progress:	*Completed.*
Recommendation:	Paint the degasification towers.
Progress:	*Completed.*
Recommendation:	Replace the 100-gallon sulfuric acid tank.
Progress:	*Completed.*
Recommendation:	Paint the acid bulk storage containment area.
Progress:	*Completed.*
Recommendation:	Paint the motor on Jockey pump A.
Progress:	*Not completed.*
Recommendation:	Paint the deep well injection pumps.
Progress:	*Completed.*
Recommendation:	Repair the cameras on site.
Progress:	*Not completed.*

Recommendation:	Paint the GSTs.
Progress:	*Not completed.*
Recommendation:	Conduct 5-year GST cleaning and inspections in accordance with FDEP Rule 62-555.350(2), FAC.
Progress:	*Not completed.*
Recommendation:	The on-site generator needs a thorough refurbishment, which should include cleaning and mechanical repairs to address issues identified.
Progress:	*Completed.*
Recommendation:	Secure all electrical switchgear to prevent unauthorized access or inadvertent exposure to live parts.
Progress:	*Completed.*
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.
Progress:	*Not completed.*
Recommendation:	Perform a load study to identify any issues related to power quality, quantity, and capacity of the system. The load study will help identify deficiencies in the system, reserve capacities, and potential anomalies that may affect long-term maintenance and serviceability of the equipment.
Progress:	*Not completed.*

3.2.6 Summary and Recommendations

CCU purchases water treated at the PRMRWSF to serve its Mid/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 CCU. 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, CCU purchased or produced an average of 10.9 MGD of water in FY 2018. CCU is using approximate 64 percent of its allocated supply under the PRMRWSA and the Burnt Store RO WTP is operating at approximately 15 percent of its design capacity. CCU 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.

Like 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 12 years old and have shown signs of minor membrane fouling. The membrane elements in Trains C, D, and E are 10 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.

Reviewing the electrical components at this facility shows that they are in good condition. Considering the age of the facility, finding extensive deterioration in the equipment would be unusual. Recommendations from the 2017 Annual Report continue to be implemented. Table 3-6 lists the recommendations from the 2018 site visit.

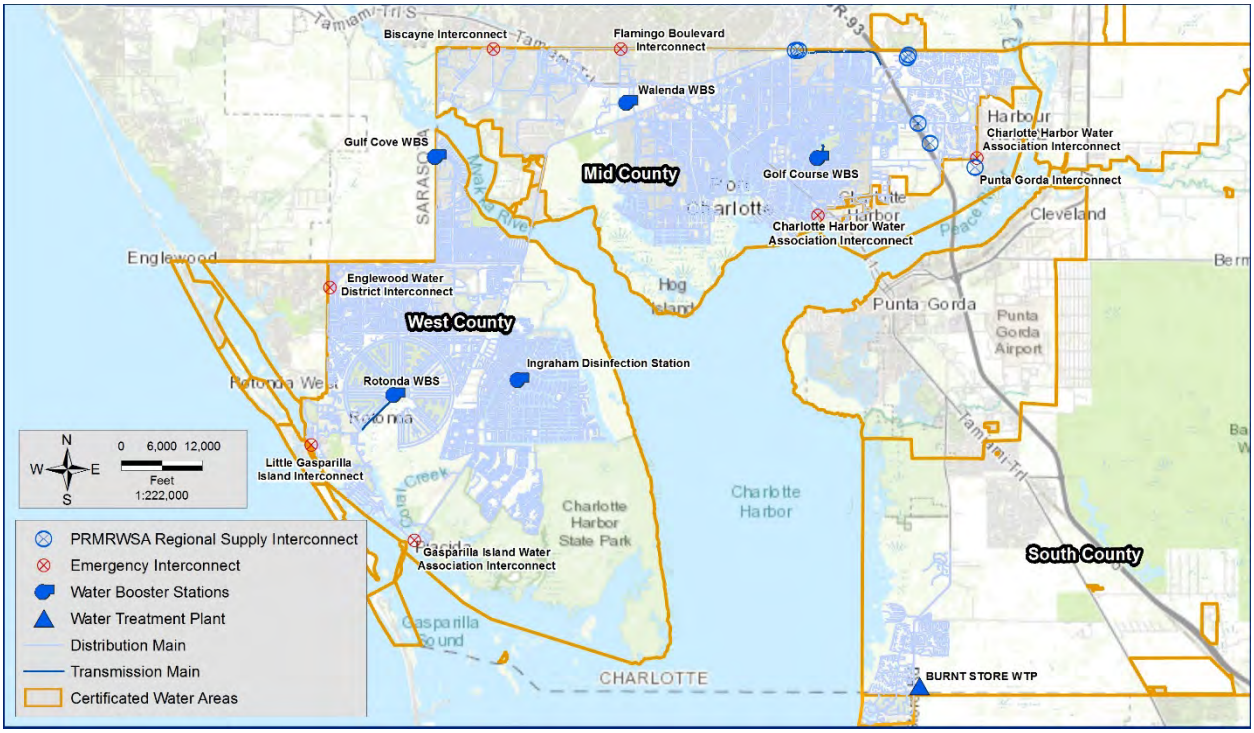
Table 3-6 Burnt Store WTP – 2018 Recommendations

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:	Paint the motor on Jockey Pump A and the bases on other motors.
Recommendation:	Replace multiple end caps that are leaking on Trains C and D.
Recommendation:	Paint the concentrate disposal wetwell.
Recommendation:	Repair the cameras on site.
Recommendation:	Paint GST A and GST B.
Recommendation:	Test the functionality of the membrane cleaning system and develop SOPs for membrane cleaning.
Recommendation:	Conduct 5-year GST cleaning and inspections in accordance with FDEP Rule 62-555.350(2), FAC.
Recommendation:	Paint the outside of the motor control center (MCC) building.
Recommendation:	Pressure wash the outside of the Operations building.
Recommendation:	County should have the fuel level alarm adjusted to accurately predict high-level conditions.
Recommendation:	Perform a load study to identify any issues related to power quality, quantity, and capacity of the system. The load study will help identify deficiencies in the system, reserve capacities, and potential anomalies that may affect long-term maintenance and serviceability of the equipment.

4 WATER DISTRIBUTION SYSTEM

This Chapter reviews the potable water distribution system infrastructure of CCU's two independent PWSs. The water distribution system components were evaluated by Jones Edmunds personnel on February 13, 2019. The larger system that serves the central and west portions of Charlotte County (referred to as Mid/West County or Peace River distribution system) is supplied with water from the PRMRWSA and uses chloramine as the disinfectant. The smaller system that serves the south area of Charlotte County (South County or Burnt Store distribution system) is supplied by water from the CCU-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 CCU Water Distribution System



At the end of FY 2018, CCU had 57,276 customer accounts in the Mid/West County distribution system and 2,516 customer accounts in the South County distribution system. The Mid/West County system contains bulk water users as listed in Chapter 2. The two systems contained 1,333.3 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 5,425 fire hydrants at the end of FY 2018.

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

- Regional transmission mains to transport water from the PRMRWSF to the CCU Mid/West County distribution system with flow meters at connections to the Charlotte County system.
- CCU 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 the 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 Mid and West County Distribution System

The Mid and West County distribution system water is supplied to CCU 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 Mid/West County distribution system consists of six aboveground, pre-stressed concrete GSTs (two have been decommissioned) with an active combined capacity of 10 MG, four WBSs, one chemical booster station, eight supply interconnects, seven emergency 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 Mid and West Charlotte County.

4.1.1 Supply Interconnects

The Mid/West County distribution system contains several interconnects with neighboring utilities. Although some utilities 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, CCU primarily uses its interconnects for redundancy and system flexibility. Table 4-1 lists the Charlotte County supply interconnects with neighboring entities.

Table 4-1 Charlotte County Supply Interconnects

Entity	Name	Approximate Location	Size
Punta Gorda	Punta Gorda Interconnect	Discovery Drive	14-inch
PRMRWSA	Kings Hwy Interconnect	10 Kings Highway	24-inch
PRMRWSA	Kings Hwy Interconnect	10 Kings Highway	12-inch
PRMRWSA	Rampart Blvd Interconnect	Rampart Boulevard	14-inch

Entity	Name	Approximate Location	Size
PRMRWSA	Luther Rd Interconnect	2300 Luther Road	12-inch
PRMRWSA	Veterans Blvd Interconnect	23751 Veterans Boulevard	12-inch
PRMRWSA	Harbor Blvd Interconnect	21453 Bachmann Boulevard	24-inch
PRMRWSA	Harbor Blvd Interconnect	21453 Bachmann Boulevard	18-inch

4.1.1.1 Punta Gorda Interconnect

The Phase 1A Punta Gorda pipeline interconnect (Kings Highway/Shell Creek Loop) consists of over 12 miles of pipeline with a minimum design capacity of 6.0 MGD, aboveground storage, high-service pumping, disinfection facilities, and tie-in points with CCU. 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 WTP on South Washington Loop Road in Charlotte County. The interconnect, which is on Discovery Drive, is used to supply water to the City of Punta Gorda during the dry-season and receive water from the Punta Gorda system during the wet season. The interconnect is owned and operated by the PRMRWSA, but the flow meter at the interconnect is used to calculate the County's water usage. In FY 2018, Punta Gorda supplied 135 MG of water to Charlotte County, and Charlotte County supplied 128 MG to Punta Gorda through this interconnect.

4.1.1.1.1 Condition Assessment

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

4.1.1.2 PRMRWSA Interconnects

The PRMRWSA interconnects are on the north and east edges of the Mid County distribution system and supply water to Mid and West County. The Kings Highway and Harbor Blvd. interconnects contain interconnect vaults and telemetry, which are owned by the PRMRWSA but can be accessed by Charlotte County. The interconnects along I-75 (Rampart, Luther, and Veterans) are buried and do not have flow monitoring at each location; rather the flow is calculated from the flow meters on Kings Highway and the Punta Gorda Interconnect flow meter.

4.1.1.2.1 Condition Assessment

The interconnects were reported to be in good condition, and no deficiencies were noted.

4.1.2 EMERGENCY INTERCONNECTS

As a further safeguard for uninterrupted water supplies to Charlotte County citizens, CCU has additional emergency interconnects with adjacent water distribution systems. These interconnects are manually operated, equipped with bi-directional flow meters, and connected to the County's advanced metering infrastructure (AMI) system. The County has two 6-inch interconnects with Charlotte Harbor Water Association (CHWA), one 16-inch and one 12-inch interconnect with the City of North Port PWS, two interconnects with the Gasparilla Island Water Association (GIWA) and one interconnect with Englewood Water District (EWD). Table 4-2 lists the County's emergency interconnects.

Table 4-2 Charlotte County Emergency Interconnects

Entity	Name	Approximate Location	Size
CHWA	CHWA Interconnect	2606 Mauritania Road	6-inch
CHWA	CHWA Interconnect	22234 Edgewater Drive	6-inch
City of North Port	Flamingo Blvd. Interconnect	W Hillsborough Boulevard	12-inch
City of North Port	Biscayne Dr. Interconnect	17 Biscayne Drive	16-inch
GIWA	GIWA Interconnect	12595 Gasparilla Road	10-inch
GIWA	GIWA WTP Interconnect	5050 Linwood Road	6-inch
EWD	Englewood Interconnect	6369 Richledge Street	12-inch

The emergency interconnects with CHWA, North Port, and GIWA require little maintenance other than exercising valves, but a flow meter at the Biscayne interconnect with the City of North Port was replaced in FY 2017. In FY 2018, the design for a new interconnect was completed in North Port interconnection with Flamingo Boulevard. The County has planned and designed to relocate the Flamingo Boulevard interconnect to the City of North Port's nearby new pump station on Hillsborough. Construction is expected to begin in FY 2019.

4.1.2.1.1 Condition Assessment

Overall, the emergency interconnects are in good condition.

4.1.2.2 Englewood Water District Interconnect

The EWD interconnect not only provides redundancy for both PWSs in the event of an emergency, but also acts as a pressure booster station. 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 CCU'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. The County replaced a faulty human-machine interface (HMI) in FY 2017 and constructed an aluminum cover over the pumps and piping at the site in FY 2018. The County also installed a new flow meter at the interconnect to monitor flows crossing SR 776 in West County.

4.1.2.2.1 Condition Assessment

Overall, the interconnect is in good condition, and one deficiency was noted:

- No roof is provided over the control panels, but a roof is planned to be installed in FY 2020.

4.1.3 Water and Chemical Booster Stations

Water and chemical booster stations are strategically located in the distribution system and typically adjacent to GSTs. The equipment at the booster stations is secured by chain link fences with barbed-wire tops. The booster stations can increase the disinfectant concentrations in the discharge water through sodium hypochlorite and ammonium sulfate addition. The following sections describe the booster station operations and their respective conditions.

4.1.3.1 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 and pressure and disinfectant boosting capability for the Mid 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. The station has a detached diesel generator for backup power supply.

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

- 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 – Site cameras were repaired.
- 2017 – The sodium hypochlorite skid was rebuilt.
- 2018 – The Chemscan process analyzer was replaced with a HACH 5500SC for ammonia monochloramine analysis.
- 2018 – A new sodium hypochlorite pump was installed, and a second pump was rebuilt.
- 2018 – The GST fill valve was rebuilt.
- 2018 – The GST manway gasket was replaced.
- 2018 – The GST inspection occurred in 2018.

4.1.3.1.1 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 incoming switchgear and distribution transformer appear in good 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 good condition. However, the height of the elevated generator may pose an issue (see notes below). Overall, the electrical equipment is in good functioning condition based on information from the Operations staff.

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 National Electrical Code (NEC)

requires that electrical equipment controls must be mounted no higher than 6 feet 7 inches above finished grade to be accessible. Otherwise, this represents a code violation.

- The switchgear contains no labels identifying parts and components as being energized.

4.1.3.2 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 larger pumps were replaced in 2010, and the smaller pumps are being investigated as part of the potable water master plan. 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 O&M improvements were completed over the past 4 years:

- 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 – 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.
- 2018 – A new liner was installed in the interior of the GST.
- 2018 – Pump No. 4 seals were replaced.

- 2018 – Pump No. 5 was rebuilt, and the suction and discharge valves were replaced.
- 2018 – New lighting was installed in the pump room.
- Ongoing – Stratification of the GST is checked to confirm mixing in the tank.

4.1.3.2.1 Condition Assessment

The general condition of the station is good. The access roads outside the facility are aging, but are in fair condition inside the property. 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 incoming switchgear and distribution transformer appear in good condition with no obvious signs of significant concern. CCU 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 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.

The following deficiencies were noted:

- The outside of the GST should be re-painted following the new liner.
- CCU 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 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.

4.1.3.3 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.

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 O&M improvements were completed over the past 4 years:

- 2015 – A new chemical feed line was installed between the chemical building and the chemical feed point at the aboveground 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. The next inspection is due in 2020.
- 2015 – A raised-bed septic disposal system was installed to accommodate the on-site bathroom facilities.
- 2016 – CCU 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 – Site cameras were repaired.
- 2017 – Motor No. 2 was replaced.
- 2018 – An eyewash station was installed.

4.1.3.3.1 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 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.

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.
- The paint on the floor of the sodium hypochlorite injection room was eroded.
- 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.

4.1.3.4 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.

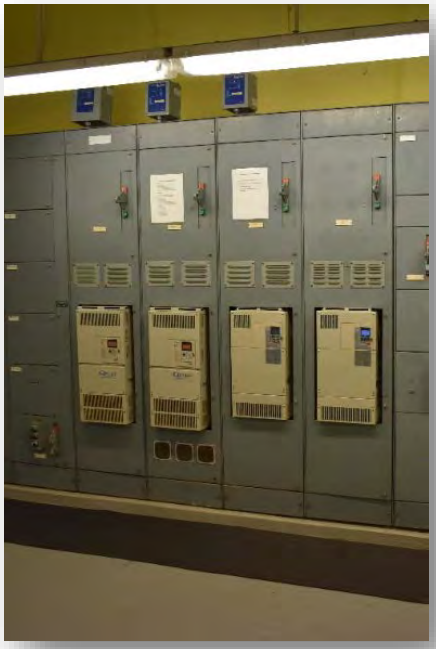
The following O&M improvements were completed over the past 4 years:

- 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 CCU personnel to collect data for reports. The new PLC is connected to the SCADA and controls the pumps and the chemical feed systems.
- 2016 – The GST was drained, cleaned, and inspected according to FDEP protocol of every 5 years.
- 2017 – The exterior of the GST was painted.
- 2017 – The decommissioned lime-softening WTP 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.
- 2018 – A containment area was constructed, and the concrete flooring was sealed in the sodium hypochlorite skid feed room.
- 2018 – A new monochloramine analyzer was installed to monitor free and total chlorine and free ammonia.
- 2018 – A distribution flow meter transmitter was replaced.
- 2018 – The manway hatch of the GST was replaced.
- 2018 – Poly containment lines for the chemical feed systems were installed for the future GST bypass station.
- 2018 – High-Service Pumps 1 and 3 were painted.
- 2018 – The top of the diesel fuel storage tank for the generator was painted.

4.1.3.4.1 Condition Assessment

The station is in good condition. Roads and landscaping are in fair 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 incoming switchgear and distribution transformer appear in fair condition. 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. The equipment is quite dated with several components no longer manufactured. 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 no life parts appear to be exposed, this does raise a maintenance concern and the possibility of exposed parts.



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.
- An exterior-mounted auto transfer switch (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.
- Gaps exist between the updated VFD drives and the enclosure.

4.1.3.5 Ingraham Disinfection Station

The Mid/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, one serves as an office and the other houses the chemical skids. Each skid contains one metering pump, and a spare is kept on site. The system does not have a permanent backup 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.

4.1.3.5.1 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:

- The sodium hypochlorite tank is not covered, exposing the tank and pipes to sun, which ages the material more quickly.
- The doorstep to the water quality testing and storage shed needs repair.

4.1.4 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 CCU 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 CCU 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 (Mid/West County) CCU service area, ranging in capacity from 1 MG to 5 MG, for a total capacity of 10 MG. Table 4-3 lists the GST capacity and number of pumps at each booster station.

Table 4-3 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 other PRMRWSA members for water supply for peak use such as fire flow or in case of a temporary loss of treatment at the PRMRWSF.

4.1.5 OPERATIONS

Treated water from the PRMRWSF enters the main CCU 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 refilled 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 operations and maintenance processes implemented by a well-trained staff maintain the CCU system's integrity. Expected capacity needs are met through careful forecasting of demands and 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 CCU customers. CCU 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. CCU requires staff to take the course before sitting for the state certification tests.

4.1.6 WATER REPORT

CCU maintains a continuous, monthly water audit for its Mid/West County water distribution system. Table 4-4 shows the Mid/West County audit results for FY 2018. The audit table compares the water received from the PRMRWSF to the sum of total water billed to customers, water for distribution system flushing and fire department uses, and water loss due to identified leaks and breaks.

CCU 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). Most 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 by 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 940,526 gallons per month or less than 0.3 percent of the total FY 2018 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 CCU Mid/West County System was approximately 22,142,634 gallons per month or 6.95 percent.

Table 4-4 CCU Unaccountable Water Report (Mid/West County) FY 2018

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[1]
Oct-17	321,801,000	222,040,000	234,506	40,225,695	164,813	530,548	50,000	58,555,438
Nov-17	335,667,000	251,898,000	31,000	37,340,088	0	335,935	50,000	46,011,977
Dec-17	349,598,000	271,282,000	1,900	36,749,257	12,107	253,630	50,000	41,249,106
Jan-18	334,007,000	294,182,000	6,280	16,676,907	285	2,389,023	50,000	20,702,505
Feb-18	307,554,000	291,501,000	82,175	13,053,040	634	1,237,507	50,000	1,629,644
Mar-18	366,146,000	332,411,000	54,328	13,868,156	586,625	160,389	50,000	19,015,502
Apr-18	349,848,000	295,820,000	794,546	18,718,204	12,256	728,215	50,000	33,724,779
May-18	320,723,000	297,152,000	639,863	30,912,671	14,709	1,536,312	50,000	-9,582,555
Jun-18	291,833,000	260,148,000	420,000	18,534,020	27,331	1,624,466	50,000	11,029,183
Jul-18	297,285,000	250,572,000	789,001	22,584,929	689	826,564	50,000	22,461,817
Aug-18	290,437,000	230,028,000	220,920	23,556,638	2,472	983,727	50,000	35,595,243
Sep-18	259,710,000	252,773,000	36,365	20,851,040	627	679,995	50,000	-14,681,027
Total (gal)	3,824,609,000	3,249,807,000	3,310,884	293,070,645	822,548	11,286,311	600,000	265,711,612
Monthly Average (gal)	**318,717,417**	**270,817,250**	**275,907**	**24,422,554**	**68,546**	**940,526**	**50,000**	**22,142,634**

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

4.2 SOUTH COUNTY DISTRIBUTION SYSTEM

The CCU South County water distribution system, also known as the Burnt Store system, is wholly separated physically and geographically from the Mid/West County water distribution system. It is owned and operated by CCU. 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 South County 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 CCU-owned Burnt Store RO WTP.

The South County distribution system consists of 64 miles of water main ranging in size from 2- to 20-inch diameter. Water main installations are expected to continue north and south of the WTP extending toward Punta Gorda and into Lee County, respectively. Approximately 400 fire hydrants exist throughout the South County distribution system.

4.2.1 INTERCONNECTS

The South County 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. The system is not currently in operation but can be implemented if interconnects are added to the South County distribution system.

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. The chemicals and pumps are at the Burnt Store RO WTP.

4.2.3 STORAGE

The water storage for the South County distribution system is 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 Burnt Store Road right-of-way.

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

4.2.5 WATER AUDIT

CCU maintains a continuous, monthly water audit for its South County water distribution system. The audit is calculated differently than the SWFWMD audit. Table 4-5 shows the results of the 2018 CCU audit for the South County 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 for distribution system flushing and fire department uses, and water loss due to identified leaks and breaks.

CCU 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 by 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 CCU standard PVC water pipes. The thinner pipes are more brittle and susceptible to breakage. The pumps that pressurize the South County distribution system have been modified with 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 6). The unaccounted-for water loss for FY 2018 was approximately 20 percent for the South County 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. CCU 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 2018. CCU 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 South County 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 CCU, if requested by letter. In 2018, 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 4-5 CCU Unaccountable Water Report (South County) FY 2018

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-17	13,771,316	7,643,000	97,842	28,604	10,000	7,779,446	5,991,870
Nov-17	13,771,260	10,434,000	190,863	798,625	10,000	11,433,488	2,337,772
Dec-17	14,913,347	9,762,000	178,248	201,680	10,000	10,151,928	4,761,419
Jan-18	14,828,957	12,091,000	34,259	0	10,000	12,135,259	2,693,698
Feb-18	13,930,256	12,181,000	11,295	0	10,000	12,202,295	1,727,961
Mar-18	16,605,152	13,576,000	142,900	0	10,000	13,728,900	2,876,252
Apr-18	14,602,250	12,153,000	267,567	50,600	10,000	12,481,167	2,121,083
May-18	11,419,126	10,706,000	201,424	270,511	10,000	11,187,935	231,191
Jun-18	10,490,080	8,027,000	71,740	0	10,000	8,108,740	2,381,340
Jul-18	10,545,504	8,519,000	5,324	10,754	10,000	8,545,078	2,000,426
Aug-18	9,687,136	7,206,000	356,120	10,857	10,000	7,582,977	2,104,159
Sep-18	9,695,744	8,212,000	15,567	39,400	10,000	8,276,967	1,418,777
Total (gal)	154,260,128	120,510,000	1,573,149	1,411,031	120,000	123,614,180	30,645,948
Monthly Average (gal)	**12,855,011**	**10,042,500**	**131,096**	**117,586**	**10,000**	**10,301,182**	**2,553,829**

4.3 MAINTENANCE

CCU performs three types of maintenance on 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 CCU 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 most 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 most 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

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 CCU 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 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 a 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 CCU 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 perform repairs 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. Because of these maintenance practices, the booster stations and especially the pumps are operating efficiently, and during FY 2018 no service interruptions occurred because a pump suddenly ceased to operate.

In FY 2018, CCU replaced 3,047 water meters and installed 808 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 2018 in both County distribution systems included:

- Completed 4,905 service orders in the distribution system.
- Responded to 199 water quality calls and 816 customer calls for leaks.
- Installed one hydrant, replaced 13 hydrants, repaired 146 hydrants, and performed maintenance on 505 hydrants, including exercising, flow testing, and painting.
- Issued and addressed 54 boil water notices and repaired 69 line breaks on pipes 3 inches or larger.
- Installed 16 new valves, replaced 13 valves, conducted three valve insertions, and performed maintenance on 1,851 valves.
- Performed 808 new line installations and cleared 39 lines.
- Tested 87 large meters and replaced five.

- Replaced 57 galvanized steel service connections.
- Upgraded one distribution system sampling point.
- Completed a project to locate, verify, update, and log blow off locations in the South County system.
- Completed the EPA's fourth Unregulated Contaminant Monitoring Rule (UCMR4) sampling of the system.
- Developed and updated a standard operating protocol (SOP) for issuing boil water notices.
- Hired a contractor to service the water booster station generators.
- Accompanied FDEP on site visits for sanitary survey inspections on both the Mid/West and South County PWSs.
- Conducted system pressure tests in the South County system to assess water loss and system break impacts.
- Began start-up testing for small meters on the new test bench apparatus.
- Installed a 10-inch insertion valve on the force main behind the Eastport WRF.

4.3.4 Staff Training and Employee Retention

CCU encourages employees and staff members to participate in training activities to maintain license requirements and attract superior staff among a competitive labor market. The following training was conducted by CCU staff:

- Six staff members sat for various FDEP operator tests.
- Two staff members passed the Level 3 FDEP Distribution Operator Test.
- One staff member obtained their commercial driver's license (CDL).
- Operators attended a control valve training with Singer on site.
- Thirteen field staff attended Asbestos Awareness class.
- Six field staff completed Asbestos Familiarization training course.
- Two staff members completed the Competent Person training for Asbestos Removal Course.
- Three staff members attended the Florida Section of the American Water Works Association (FSAWWA) Fall conference for training.
- All water distribution staff members completed respiratory fit testing.

As with many organizations, maintaining the proper amount of staff is required to complete the maintenance activities that accompany the management of a distribution system. In 2018, the following staffing changes occurred:

- One Distribution Operator and Two Water Plant Operators positions became available.
- Two Field Technician positions were filled.
- One Water Plant Operator position was filled.

4.4 Consumer Confidence Reports

As required by federal and state regulations for utilities, CCU 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 PWSs. 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 Mid/West and South distribution systems, indicate the levels of tested water contaminants in the CCU 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 CCU Mid/West County distribution system water was the recipient of the FSAWWA's Water Distribution System of the Year award for Division 6 in 2018.

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

4.5 Review of Previous Recommendations

Table 4-6 and Table 4-7 summarize the recommendations and current status from the 2017 Annual Report for the Mid/West and South County distribution systems, respectively.

Table 4-6 Mid/West County Distribution System – 2017 Recommendations and Status

	Interconnects
Recommendations:	1. Install canopy over pumps, panels, and piping at the EWD interconnect. 2. Install flow meter to the CCU distribution system at the EWD interconnect. 3. Check to confirm the vibration on the pressure gauge pump No. 2 is within tolerance at the EWD interconnect. 4. Install a meter at the interconnect with North Port at Flamingo Boulevard.
Progress:	*1. Canopy was replaced on FY 2018.* *2. Flow meter was replaced on FY 2018.* *3. Pump No. 2 was replaced in FY 2018.* *4. Designed as is scheduled for construction.*

	WBS General
Recommendations:	1. Conduct stratification testing on the Gulf Cove, Rotonda, Walenda, and Port Charlotte Golf Course WBS GSTs. 2. Perform an overall cleaning of each generator housing at each WBS. 3. Apply appropriate arc flash labeling on 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.
Progress:	1. *Quarterly testing ongoing (2.5 years of full compliance and no further issues).* 2. *Completed*. 3. *Not completed*.
	Port Charlotte Golf Course WBS
Recommendations:	1. Replace the Chemscan process analyzer. 2. 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.
Progress:	1. *Completed.* 2. *Not completed*.
	Walenda WBS
Recommendations:	1. Paint the concrete floors in the chemical injection rooms. 2. Replace interior liner in the Walenda GST. 3. Conduct washout inspection of GST. 4. Replace the generator at the Walenda WBS with a properly sized generator to accommodate the loads and ensure reliable operation of the station. 5. Secure electrical switchgear to prevent unauthorized access or inadvertent exposure to live parts. 6. Perform a load study to identify any issues related to power quality, quantity, and capacity and help identify deficiencies in the system, reserve capacities, and potential anomalies that may affect long-term maintenance and serviceability of the equipment.
Progress:	1. *Completed.* 2. *Completed.* 3. *Completed*. 4. *Not completed but is scheduled to be conducted as part of the Water Master Plan project.* 5. *Not completed.* 6. *Not completed.*

	Gulf Cove WBS
Recommendations:	1. Continue to upgrade the Station by further progressing the replacement project for the Myakka River pipe crossing that supplies water to the station. 2. Replace the concrete pipe connecting the GST to the pump station at the Gulf Cove Booster Station. 3. Paint the concrete support on the influent pipe to the GST to prevent deterioration. 4. Check fittings and joints for leaks in the ammonium sulfate chemical injection room. 5. Paint the floor in the sodium hypochlorite chemical injection room to prevent concrete deterioration. 6. Install a portable eyewash station in the new operations room. 7. Conduct washout inspection of GST. 8. Conduct further analysis of the ATS 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. 9. Secure electrical switchgear to prevent unauthorized access or inadvertent exposure to live parts. 10. Perform a load study to identify any issues related to power quality, quantity, and capacity and help identify deficiencies in the system, reserve capacities, and potential anomalies that may affect long-term maintenance and serviceability of the equipment.
Progress:	1. *The Myakka River crossing is scheduled for 2020.* 2. *Awaiting completion of Myakka River crossing.* 3. *Awaiting completion of Myakka River crossing.* 4. *Completed.* 5. *Not completed.* 6. *Completed.* 7. *Completed*. 8. *Not completed.* 9. *Not completed.* 10. *Not completed*.

	Rotonda WBS
Recommendations:	1. Paint rusted bases on Booster Pumps No. 1 and 3. 2. Modify the diesel fuel storage tank to prevent rainwater from collecting on top of the tank. 3. Paint the concrete floors in the sodium hypochlorite injection room. 4. Complete installation of the 24-inch water transmission main from Ingraham Street to the Rotonda GST. 5. Conduct further analysis of the ATS based on the degradation of the enclosure to ensure that it is functioning properly. 6. Secure electrical switchgear to prevent unauthorized access or inadvertent exposure to live parts. 7. Perform a load study to identify any issues related to power quality, quantity, and capacity and help identify deficiencies in the system, reserve capacities, and potential anomalies that may affect long-term maintenance and serviceability of the equipment.
Progress:	1. *Not completed.* 2. *Completed.* 3. *Completed.* 4. *Ongoing.* 5. *Not completed.* 6. *Not completed.* 7. *Not completed.*
Recommendations:	**Ingraham Disinfection Station** 1. Cover the sodium hypochlorite storage tank and associated piping to prevent sun exposure and degradation. 2. Supply a redundant chemical pump at the Ingraham facility.
Progress:	1. *Scheduled for FY 2020.* 2. *Completed*.

Table 4-7 South County Distribution System – 2017 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:	*Ongoing.*

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 members. The Mid/West County CCU service area is supplied with water that is purchased from the PRMRWSA through four transmission mains. CCU also maintains emergency interconnects with adjacent water utilities. These interconnects have proven to be valuable during emergency conditions. CCU has four WBSs

and one chemical booster station to maintain sufficient pressures and proper disinfectant residuals throughout the system. Each WBS contains a GST, high-pressure pumps, and chemical feed systems. At the end FY 2018, the Mid/West County system had 57,276 service connections and served a population of 143,649.

The electrical components at the Port Charlotte Golf Course WBS are in excellent condition. Without permanent platforms in place, accessibility of the generator is a concern. The electrical components at the Walenda WBS are in good condition. 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. 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 standby generator and incoming power appear in fair condition as well.

The total storage in the Mid/West County distribution system is 10 MG, which can be supplemented with additional storage at the PRMRWSF. The CCU's GSTs are cleaned and inspected every 5 years. This proactive maintenance procedure did not uncover any significant GST deficiencies in FY 2018. For FY 2018, the total water use was 3,824,609,000 gallons of water, and flushing quantities were reduced from 415 MG to approximately 296 MG in the Mid/West County distribution system. 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 South County 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. At the end of FY 2018, the South County distribution system had 2,516 service connections and served a population of 7,172. The total water use was 154,260,128 gallons of water, and flushing quantities increased from 1.1 MG to approximately 1.5 MG in the South County distribution system. Water audit investigations continued during FY 2018, but no significant leaks have been identified. CCU continues to investigate.

CCU continues to perform preventive maintenance on hydrants and valves throughout 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 CCU 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 4-8 and Table 4-9 list the recommendations for the Mid/West and South distribution systems from the 2018 site visit.

Table 4-8 Mid/West County Distribution System – 2018 Recommendations

	Interconnects
Recommendations:	▪ Install a canopy over the control panel at EWD interconnect. ▪ Complete the relocation of the North Port interconnect at Flamingo Boulevard.
	WBS General
Recommendations:	▪ Perform a load study to identify any issues related to power quality, quantity, and capacity and to help identify deficiencies in the system, reserve capacities, and potential anomalies that may affect long-term maintenance and serviceability of the equipment. ▪ Apply appropriate arc flash labeling on appropriate switchgear in compliance with NFPA 70E to properly notify O&M 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.
	Port Charlotte Golf Course WBS
Recommendations:	▪ Evaluate 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. ▪ Label the switchgear to identify parts and components that could be energized.
	Walenda WBS
Recommendations:	▪ Re-paint the outside of the GST. ▪ Replace the generator at the WBS with a properly sized generator to accommodate the loads and ensure reliable operation of the station.
	Gulf Cove WBS
Recommendations:	▪ Continue to upgrade the WBS 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 WBS. ▪ Paint the concrete support on the influent pipe to the GST to prevent deterioration. ▪ Paint the floor in the sodium hypochlorite chemical injection room to prevent concrete deterioration. ▪ Conduct further analysis of the ATS 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 exists that may be detrimental to the drive or the electrical system.

Recommendations:	**Rotonda WBS** ▪ Complete installation of the 24-inch water transmission main from Ingraham Street to the Rotonda GST. ▪ Conduct further analysis of the ATS based on the degradation of the enclosure to ensure that it is functioning properly. ▪ Replace the VFD covers to eliminate gaps between the updated VFDs and the enclosures.
Recommendations:	**Ingraham Disinfection Station** ▪ Cover the sodium hypochlorite storage tank and associated piping to prevent sun exposure and degradation. ▪ Repair the doorstep to the water quality testing and storage shed.

Table 4-9 South County Distribution System – 2018 Recommendations

Recommendation:	Continue replacing 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 CCU 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 use. Flow entering 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 a pumping station site. This system uses smaller diameter pipes than a gravity sewer system.
- **Low-Pressure Sewer (LPS)** — is an alternative to a gravity sewer system and requires a small pump at each property. This system costs less to construct (smaller dimeter pipes, shallow depth piping) but costs more to operate and maintain (electrically driven equipment). Flows within an LPS system move only when pushed by new flow contributions.
- **Force Main** – is a pressured sewer pipe that conveys wastewater in a situation where gravity sewer flow is not possible. This system component is 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. This system component provides additional energy to the system where reliance on gravity is not possible. Lift stations are common in Florida because of the flat terrain.

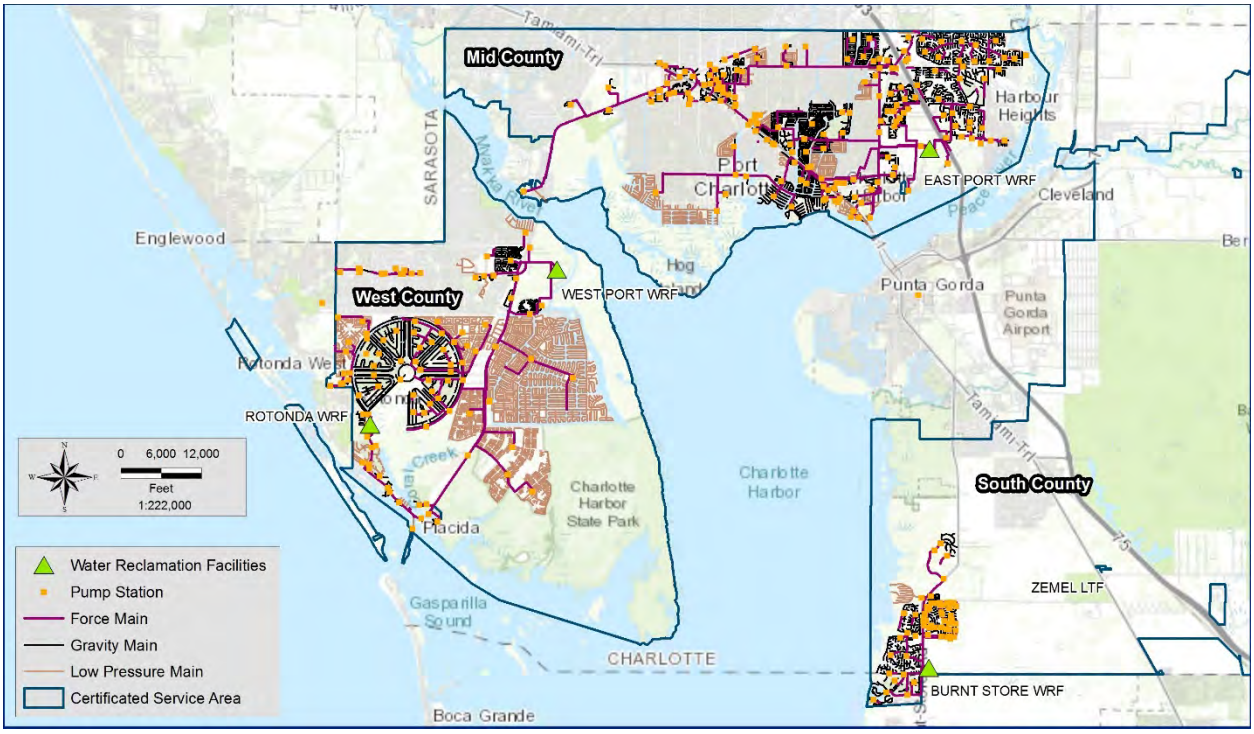
CCU's Service Area is served by four collection systems. Each system is tributary to a WRF, as discussed in Chapter 6. Figure 5-1 shows the CCU certificated service area and wastewater infrastructure.

At the end of FY 2018, there were 36,649 wastewater customers, an increase of 324 customers since FY 2017. These customers are served by:

- 379.6 miles of gravity sewer (7,332-foot increase).
- 299.9 miles of LPS mains (27,532-foot increase).
- 23.9 miles of vacuum sewers (16,368-foot increase).
- 264.1 miles of force mains (16,103-foot increase).
- 7,683 manholes (revised quantity from last year).
- 310 lift stations (no increase):
  - 297 owned lift stations (no change).
  - 13 maintained lift stations (under service contract from other County departments).

East-West Spring Lake vacuum sewer system went into service in 2016 and currently serves approximately 1,328 homes. The second (Contract D) vacuum/pumping station went into service in FY 2018 and presently serves 354 homes.

Figure 5-1 CCU Certificated Wastewater Service Area



5.1.1 System Expansion

The existing South, Mid, 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 Mid County. In FY 2017, design work began on Phase 2 Ackerman and El Jobean. This innovative wastewater collection system serves homes previously 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 2018, there were a total of 310 maintained lift stations: 297 owned by the County within their collection system and 13 additional stations not in the County's service area, but currently maintained by the wastewater collection department under service contracts. The master lift stations have permanent auxiliary power. CCU 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 allow wastewater pumping from wet wells during emergencies through a portable pump connections or an adaptor that can be installed when needed.

On February 19 and February 20, 2019, Jones Edmunds personnel and CCU Operations staff conducted site visits to three of the regional master lift stations and 15 lift stations dispersed among the West, Mid, and South portions of the County. Table 5-1 lists the 18 lift stations visited. The site-visit assessments help CCU to identify and prioritize maintenance, rehabilitation, or replacement work at these lift stations.

Table 5-1 Visited Wastewater Collection Systems – Master and Representative Lift Stations

Station No.	Location
Master Lift Stations	
LS 65 – South Port Master	415 Tamiami Trail
LS 309 – Bridgewater	Bridgewater Rd & New Castle Lane
LS 816 – Rotonda Boulevard West	300 Rotonda Boulevard West Boundary and Blvd West
Representative Lift Stations	
LS 1 – Community Center	Orange St & Easy St
LS 7 – Pure Oil	3666 Tamiami Trail Easy Street & US 41
LS 15 – Sistina	2470, Sistina St
LS 28 – Peachlove	24123 Peachland Boulevard, Peachland & Loveland Boulevard
LS 82 – Selkirk Maple Leaf Estates	2100 Kings Highway
LS 123 – KHW Walmart	Kings Highway & Sandhill Boulevard
LS 301 – San Marino	27264 San Marino Drive
LS 303 – Constantine	26173, Constantine Road & Aiden Way
LS 323 – Aysen	Aysen & Rancaqua Street
LS 415 – Prada	Prada Drive & Doredo Drive
LS 442 – Doredo 2	25191 Doredo Drive
LS 800 – Holiday Lakes	13700 Marathon Boulevard
LS 817 – Bunker Road	66 Bunker Road
LS 828 – Sweetwater	226 Wayne Road
LS 845 - David	Ingraham & David Boulevard

5.2.1 South Port Master Lift Station

South Port Master Lift Station (LS) 65 is centrally located just south of US 41 and southwest of the building located at 4157 S Tamiami Trail in Port Charlotte. The station contains three submersible 88-HP pumps in a 12-foot-diameter concrete wet well. The pumps include one Flygt and two Sulzer submersible pumps. Each pump has an estimated capacity of 1,500 gpm at approximately 100 to 111 feet of head.

Power service to the station is 480-volt, three-phase. 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 over 20 years. The carbon adsorption unit is within a locked, fenced area.

A 300-kW Cummins generator, rated at 375 kVA, with an ATS installed in 2003 is inside the control building. The generator is operated once a week each Monday to ensure it is ready for standby power. The electrical and control panels are in good condition and are enclosed inside the building. The station has a SCADA system with a telemetry transmitter/receiver.

Due to the high inflow of this station and the relatively shallow wet well, the system capacity is extremely limited. The time between a high-water alarm and sewage spill is estimated at less than 10 minutes.

The following deficiencies were noted:

- Flow meter not functional.
- No fencing or enclosure to protect the valves and piping.
- Air-release valve (ARV) is leaking.
- Check valve seats worn.
- Paint flaking and fading, showing signs of rust formation underneath.
- Generator controls exceed 6-foot-7-inch limit as required by code.
- Minor concrete wear under odor control piping and concrete pads.
- Minor fence wear including rusted poles and bent fencing.
- Frequent fats, oil and grease (FOG) and ragging found.
- Transformer directly northeast of the lift station building was not bolted down.

Proposed 2019 improvements to the station include:

- Fence the entire site.
- Repair the flow meter.
- Evaluate generator control elevations to conform to code.
- Evaluate the use of a chopper pump or grinder station to reduce ragging.
- Bolt down the transformer.

5.2.2 Bridgewater (Deep Creek) Master Lift Station

The Bridgewater Wastewater Lift Station (LS 309) is a master lift station purchased by Charlotte County in 2003 that receives wastewater from 30 County-owned pump stations and a small number of private pump stations. It contains two pumps including a 47-HP Flygt and a 50-HP Sulzer submersible pump. The pumps discharge into an 8-inch 2-mile-long force main that pumps to the East Port WRF. Each pump has an estimated capacity of 660 gpm at approximately 120 feet of head.

The station is fenced and generally well kept. Power is provided by a 480-volt, three-phase power service. The station had two 10-foot-diameter wet wells; however the southeast wet well was converted to a manhole without replacing the lid. Wastewater flows through the manhole directly to the 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 discharge connection are in an underground concrete vault. The pump discharge pipes in the wet well were replaced with high-density polyethylene (HDPE) pipe in 2010. The pump discharge check valves were also rebuilt at the same time. The wet well was last coated in the 1980s.

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. A generator is not available 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 CCU central office and treatment plants.

LS 309 currently experiences frequent infiltration during the wet season that requires manual trucking of the excessive flows.

The condition of this critical station should be kept at a high level through planned equipment upgrades. An on-site generator with an ATS should be added to this regional master lift station. The County has noted that this station is on the list for a generator to be funded by a grant, but the County is waiting for confirmation on the approval. 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.
- Seepage under the west discharge pipe in the wet well.
- No dedicated suction bypass piping.
- Substantial concrete wear around the odor-control intake piping.
- Substantial wear of the concrete control panel posts allowing rebar exposure.
- Minor wear of the fence barbed wire due to local vegetation.

Proposed 2019 improvements to the station include:

- Provide a stationary generator.
- Evaluate pump capacities for potential downsizing once the Deep Creek FM is installed.
- Coat the wet well.
- Replace concrete control panel posts with County aluminum standard.

5.2.3 Rotonda Boulevard West Master Lift Station

The Rotonda Boulevard West Master Lift Station (LS 816) was built in the 1980s. LS 816 receives wastewater from up to 16 contributing County-owned pump stations and contains two 10-HP Flygt pumps. The discharge main is a 12-inch force main that is approximately ¼ mile long and discharges to a 24-inch gravity transmission main. Each pump has an estimated capacity of 1,100 gpm at approximately 24 feet of head.

LS 816 discharges to LS 801, which directly discharges to the Rotonda WRF. The station consists of an 8-foot-diameter wet well that receives flow from a 21-inch gravity sewer and a 2 1/2-inch low pressure system force main. The station has a SCADA system with a telemetry transmitter/receiver.

The station wet well exterior and electrical equipment are in relatively good condition, the station wet well interior is in moderate condition, showing signs of corrosion; and the valve vault is in poor condition, having significant corrosion on the steel and significant mud filling. The wet well interior has sufficient storage capacity and does not see significant impacts from I/I, but the coating has worn and the concrete top slab is degraded and exposing structural rebar and wood. There is also significant wear-through of the aluminum vault cover and surrounding concrete wall base. The degradation and exposure of the vault has resulted in partially buried valves and significant corrosion of the steel vault.

Power service to the station is 230 volt, three-phase. The station is not fenced and contains no odor control in place. The proximity of the overhead power lines results in potential danger to County staff when station pumps need to be pulled with a crane truck.

The following deficiencies were noted:

- Signs of corrosion on the wet well interior wall likely due to high hydrogen sulfide concentration.
- Interior concrete slab shows wear, exposing structural rebar and wood.
- Significant wear on the valve vault including partial burial of the valves.
- No dedicated suction or discharge bypass piping.
- Phase monitors appeared to be missing.
- Missing seal-offs from the control panel conduit. This represents a significant code violation as well as a potential explosion hazard.
- Rusted and worn padlocks on the wet well hatches.

Proposed 2019 improvements to the station include:

- Coat the wet well.
- Repair or rehabilitate the concrete top slab.
- Replace the valve vault and bring to current standards or evaluate converting the valves to aboveground.
- Install seal-offs on any electrical equipment within 10 feet of the wet well to return to conformance with code.
- Evaluate the adjacent lot for future lift station conversion.

5.2.4 Representative Lift Stations Condition Assessment

On February 19 and February 20, 2019, Jones Edmunds personnel and CCU 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 CCU wastewater collection system. The outcome of the assessment will allow CCU 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 on an open easement with no fencing at the intersection of Orange Street and Easy Street and receives gravity flows from the surrounding community including a seasonal community center. The station pumps are housed in a concrete building. The wall of the structure contains visible cracks. This station, originally built in 1959, contains two aboveground, self-priming, belt-driven 15-HP Gorman-Rupp pumps that were installed in 1980. The pumps receive flow through an 8-inch gravity main and discharge into an 8-inch 2,338-foot-long force main that pumps to LS 65. Each pump has an estimated capacity of 220 gpm at approximately 65 feet of head.

The discharge isolation valves and check valves are above ground for easy access and maintenance. The 7-foot by 6-foot rectangular wet well interior shows signs of corrosion from hydrogen sulfide. The well has no ventilation, so emitted gases are contained within the wet well and the building. Power service to the station is 230-volt, three-phase. The station has no odor-control system and no dedicated well bypass piping, although there is a covered square penetration in the wall directly above the wet well cover for local pump trucks to access the well with trucks for pump out. During storm events, when the water level in wet well is high, CCU uses tanker trucks to collect and transport excess flows to the WRF. The station was recently upgraded to incorporate a portable generator receptacle in the existing electrical control panel. The electrical and control panels are outside the building and are in moderate condition. The station has a SCADA system with a telemetry transmitter/receiver.

The following deficiencies were noted:

- Cracks in the concrete building, including daylight visible through pipe penetrations.
- Corrosion of the wet well.
- Outdated controls and replacement parts and components no longer available.
- Access hatch hinge separated from wall.
- Pipe patch for leaking wye still showed signs to be leaking.
- Paint flaking/peeling.

Proposed 2019 improvements to the station include:

- Paint the aboveground discharge pump and piping.
- Repair/replace the patched wye connection.
- Repair cracks in the building.
- Seal pipe penetrations.
- Provide an odor-control system.
- Replace the outdated control panel and bring electrical up to current standards.
- 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 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, receiving flows from LS 8 which discharges into the upstream gravity sewer through a 4-inch force main and discharging to LS 65 through 4-inch and 6-inch manifold force mains. This lift station contains two aboveground, self-priming, belt-driven 15-HP Gorman-Rupp pumps. Each pump has an estimated capacity of 220 gpm at approximately 65 feet of head. The overall condition of the station is moderate. The LS 7 pumps are above the wet well in a small concrete block building. The concrete wet well is corroded by years of hydrogen sulfide exposure, and metal reinforcement is exposed near the access hatch. The wet well has an older trough design, with estimated rectangular dimensions of 80 inches by 153 inches.

Power service to the station is 230-volt, three-phase. The station is not fenced, and metal reinforcement had to be installed behind the vented window after the plexiglass panels were broken by vandals and vagrants. The building door and all panels are typically locked. The station has no odor-control system and no dedicated well suction bypass piping, although there is a circular penetration in the wall directly above the wet well cover for local pump trucks to access.

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 a manual transfer switch has been recently added. A portable pump connection is in a valve box outside of the building. The station has a SCADA system with a telemetry transmitter/receiver.

The County's easement to access the station only extends 10 to 15 feet from the curb and is currently mostly taken up with multiple electrical power poles that provide overhead electric. The County currently accesses the station through the parking lot of the adjacent gas station; however, the employee parking and dumpster often partially block this access. Additionally, the nearby overhead power lines result in potential danger to County staff when operating a crane truck in this area.

The following deficiencies were noted:

- Deteriorated roof overhang.
- Missing glass windowpanes.
- Presence of odor.
- Missing seal-offs from the control panel conduit.
- Obstructed access for crane truck.

Proposed 2019 improvements to the station include:

- Repair the roof overhang.
- Replace the glass windowpanes.
- Paint the building.
- Install odor controls.
- Install seal-offs on any electrical equipment within 10 feet of the wet well to return to conformance with code.
- Perform thorough rehabilitation including the improvements listed above or replace the station with a modern submersible configuration and all new equipment.
- Evaluate providing a dedicated access to the station.

5.2.4.3 Lift Station 15 – Sistina

The Sistina Lift Station (LS 15) is behind the house located at 2470 Sistina Street east of the intersection of Baltic Avenue and Sistina Street. It receives flow from three lift stations and low-pressure sewer systems.

The lift station was last updated in 1981. The overall condition of the station is well maintained with all equipment and structures in good condition. The station contains two 20-HP Flygt submersible pumps in an 8-foot-diameter concrete wet well. Each pump has an estimated capacity of 420 gpm at approximately 65 feet of head. The wet well hatches are in good condition and include a vent with bug screens. The wet well concrete is currently unlined and shows signs of wear along the walls and especially underneath the wet well slab. The discharge isolation valves and emergency pump connection are below ground in an adjacent valve vault and are consistently partially submerged under water due to the surrounding groundwater elevation. Power service to the station is 240-volt, three-phase. The main control panel is in good condition although it appears to be missing both seal-offs from the control panel conduit as well as an interlock between the generator breaker and the main breaker. The station has a SCADA system with a telemetry transmitter/receiver.

The high-level float at the Sistina lift station triggers a control that shuts down the nearby LS 16. The pumps discharge into an 8-inch force main that flows to the East Port WRF. The station is not fenced and is not equipped with odor control.

The lift station location also makes it difficult to access with a crane truck due to the lower elevation and the narrow easement running between the properties along Sistina Street and the golf course on the east side of the station. The property to the north of the station, 2460 Sistina Street, is currently unoccupied and could potentially be procured by the County to provide more accommodating access to the lift station or to become the new lift station location, converting the current location to a master manhole.

The following deficiencies were noted:

- No interlock between the generator breaker and the main breaker.
- Missing seal-offs from the control panel conduit.
- The open-floor design keeps the valve vault continually flooded due to the high water table in this area.
- Station location causes difficulty of access.

Proposed 2019 improvements to the station include:

- Coat the wet well or repair some of the degraded concrete.
- Install seal-offs and interlocks on electrical equipment and perform a detailed electrical code review to return to conformance with code.
- Replace the valve vault and bring to current standards or evaluate converting the valves to aboveground.
- Evaluate the adjacent lot for future lift station conversion.

5.2.4.4 Lift Station 28 – Peachlove

The Peachlove Lift Station (LS 28) is on the southeast corner of the intersection of Peachland Boulevard and Loveland Boulevard. It currently has three influent gravity mains and receives flow directly from LS 63. LS 28 discharges through an 8-inch force main into a 20-inch force main to the East Port WRF.

The station contains two 30-HP Flygt submersible pumps in a 10-foot-diameter concrete wet well. Each pump has an estimated capacity of 1,000 gpm at approximately 70 feet of head. The wet well hatches are in good condition and provide adequate access to remove the pumps that are on a rail retrieval system. The wet well lining is largely showing protection from sulfide; however, the seam areas including those in the liner and the pipe penetrations all have signs of significant seepage and wear. The discharge isolation valves and emergency pump connection are below ground in an adjacent valve vault. The pipe penetrations appear to have been sealed after the HDPE discharge piping was installed. Additionally, staff noted minor standing water in the vault despite an open drain port during a period of no rain for multiple days.

The station is fenced and has a standard carbon odor-control system. The power service to the station is 480-volt, three-phase. The station has a SCADA system with a telemetry transmitter/receiver. Minor concrete wear and structural metal rusting was observed on the control panel posts. The metal platform that the odor control unit is resting on is severely rusted and discolored, with layers of metal flaking and peeling off.

A road-widening project will begin this year that will include traffic improvements at the intersection of Peachland and Loveland Boulevards. This project will encroach much of the easement that is currently serving as the driveway into the LS 28 site. The County has made arrangements to acquire an easement from the parking lot east of the station to build a separate driveway to the facility. This will require a rearrangement of the equipment to continue to access the wet well with a crane truck. The proposed solution includes moving the odor-control unit onto the master manhole concrete pad and moving the Data Flow System

panel to the other side of the control panel, which will have the benefit of making access to the manhole. The gate would be moved on the east side of the fence to allow the direct access to the wet well.

The following deficiencies were noted:

- Minor wear of the concrete control panel posts and rusting of the structural metal supporting the posts.
- Seepage and lining wear around seams and pipe penetrations within the wet well.
- Significantly rusted odor-control base.
- Missing pressure gauge and miscellaneous piping removed from the odor-control unit.
- Valve vault drain is not functioning properly.

Proposed 2019 improvements to the station include:

- Replace concrete control panel posts with County aluminum standard.
- Re-line the wet well or specifically address the exposed penetrations and seams.
- Replace the odor-control unit base.
- Grout the valve vault at the appropriate slope.
- Evaluate and prepare for the rearrangement of the site as described above.

5.2.4.5 Lift Station 82 – Selkirk Maple Leaf Estates

The Selkirk Maple Leaf Estates Lift Station (LS 82) is within the Maple Leaf Estates senior living community just south of the intersection of East Queen's Way Road and Victoria Court. It receives gravity main-collected flows from the residential properties and discharges to LS 81 and ultimately to the East Port WRF.

The lift station was constructed in 1993 and last rehabilitated in 2005. The overall condition of the station is good with newly installed pumps and maintained structures. The station contains two 2-HP Zoller submersible pumps that were replaced in 2018. The concrete wet well is dual layered and rectangular (9 feet by 3 feet). The wet well cover is plated aluminum that is in good condition. There are 12-inch square hatches to observe the wet well, but the cover is bolted on. The pumps are not on a rail retrieval system, so the piping would need to be disconnected to pull the pump from the wet well. The discharge isolation valves

appear to be in good condition. No emergency pump connections were noted. The station is not fenced and there is no odor-control system.

Power service to the station is 230-volt, single-phase. The lift station does not have a SCADA, telemetry transmitter, or telemetry receivers. The station is seasonal and low maintenance, and the downstream master lift station, LS 83, has sufficient capacity and SCADA.

The following deficiencies were noted:

- Signs of corrosion on the wet well interior wall likely due to high hydrogen sulfide concentrations.
- Wear of the interior concrete slab, including structural concern near the supporting bolts.
- Rodent nesting observed.
- No dedicated suction or discharge bypass piping.
- Missing seal-offs from the control panel conduit.

Proposed 2019 improvements to the station include:

- Coat the wet well or repair some of the degraded concrete.
- Install seal-offs on any electrical equipment to return to conformance with code.

5.2.4.6 Lift Station 123 – KHW Walmart

The KHW Walmart Lift Station (LS 123) is between the gas station and Walmart off Kings Highway and Sandhill Boulevard. The station receives local gravity flow and discharges to LS 27. This lift station contains two 20-HP Flygt submersible pumps in a 6-foot wet well. The pumps discharge into a 4-inch force main. Each pump has an estimated capacity of 476 gpm at 82 feet of head. The station is fenced and generally well kept. Power service to the station is 480-volt, three-phase. The wet well hatches are in good condition and provide adequate access to remove the pumps, which are on a rail retrieval system. The discharge isolation valves and emergency pump connection are above ground and appear to be in good condition.

The electrical panel is in good condition. The station has no generator but the main power panel is equipped with a portable generator receptacle. The station has a SCADA system with a telemetry transmitter/receiver.

There are two major concerns with the condition of this station. First, there appears to be severe settling between the wet well and the surrounding equipment and substantial evidence of elevation changes between the wet well and the surrounding piping, valves, and control panel. This evidence is largely substantiated by significant cracking of the concrete pad, bending of the piping between the wet well and valves, disconnect of some electrical conduit exposing the wire inside, cracking of the PVC vent cap, and bending of the metal supporting the control panel. The second is the velocity in the 4-inch discharge main, which is beyond the County's level of service norms. At 472 gpm, the velocity in the 4-inch force main exceeds 10 feet per second regularly.

The following deficiencies were noted:

- Settlement impacts including, but not limited to, concrete cracking, pipe bending, PVC cracking, metal bending, and conduit separation.
- Force main velocity exceeding the County's level of service.

Proposed 2019 improvements to the station include:

- Evaluate the lift station site to determine the source of the settling and either repair with flowable fill or relocate the station to an adjacent site.
- Install a 6-inch force main to connect to the manifold 8-inch force main at King's Highway.

5.2.4.7 Lift Station 301 – San Marino

The San Marino Lift Station (LS 301) is within a County easement in front of 27257 San Marino Drive. The station serves mostly a residential area, receiving flow through an 8-inch gravity main and discharging through a 6-inch force main through LS 306, LS 309, and ultimately to East Port.

The station contains two 10-HP Davis EMU submersible pumps in a 6-foot wet well. Each pump has an estimated capacity of 228 gpm at 92 feet of head. The concrete wet well shows substantial signs of wear including aggregate exposure, although no structural rebar appeared to be exposed. The discharge isolation valves and emergency pump connection are below ground in an adjacent valve vault. The vault appears to be poorly maintained, with wood, hosing, piping pieces, and debris filling the vault and obstructing access to the isolation valves. The station is not fenced, but the panel, wet well, and valve vault are padlocked. The station does not have any odor control other than bagged deodorizing blocks.

Power service to the station is 230-volt, three-phase. The control panel was upgraded in 2014. The station has a battery backup for the high well alarm horn if power is lost, but does not have any SCADA, telemetry transmitter, or telemetry receivers. A generator receptacle with a manual transfer switch is available on the control panel. The wet well is immediately adjacent to a utility pole with low-hanging electrical lines. The nearby overhead power lines result in potential danger to County staff when station pumps need to be pulled with a crane truck.

The following deficiencies were noted:

- Signs of corrosion on the wet well interior wall likely due to high hydrogen sulfide concentration.
- Wear of the interior concrete slab, including structural concerns near the supporting bolts.
- Significant FOG and rag build-up in the wet well.
- Valve vault debris.
- Low-hanging overhead power lines.
- Missing seal-offs from the control panel conduit.

Proposed 2019 improvements to the station include:

- Coat the wet well or repair some of the degraded concrete.
- Clear out the valve vault and perform required repairs to maintain integrity.
- Install seal-offs on any electrical equipment within 10 feet of the wet well to return to conformance with code.

5.2.4.8 Lift Station 303 – Constantine

The Constantine Lift Station (LS 303) is at the southeast corner of the intersection of Constantine Road and Aden Way. The station receives residential flow from the surrounding development through three gravity inverts and discharges through a recently replaced 4-inch force main to LS 302 and ultimately to the East Port WRF.

The lift station contains a single 3-HP Flygt submersible pump that was replaced in 2016 to include a cutter impeller due to significant ragging in the system. The pump has an estimated capacity of 312 gpm at 16 feet of head.

The power service to the station is 240-volt, single-phase and is serviced through underground electric. The control panel uses an inverter to allow a three-phase generator hookup for the portable generator quick connection. No interlock was noted between the main breaker and the generator breaker. The station has an Omni-Beacon telemetry system.

The wet well is in the center of the road intersection, which requires Operations staff to manage traffic during routine maintenance and any pump pulling. The wet well has some signs of corrosion and seepage under pipe penetrations in addition to having an older conical lid design, obstructing access during the maintenance events. The County owns the adjacent lot southeast of the intersection. The design to move the lift station into the lot and the existing wet well converted to a master manhole has been completed. This would also allow for appropriate installation and access to isolation valves and bypass piping, which currently do not exist at this simplex station.

The following deficiencies were noted:

- Signs of corrosion on the wet well interior wall likely due to hydrogen sulfide concentration.
- No interlock between the generator breaker and the main breaker.
- Missing seal-offs from the control panel conduit.
- Difficult to access wet well.
- No isolation valves.

Proposed 2019 improvements to the station include:

- Coat the wet well or repair some of the degraded concrete.
- Install seal-offs and interlocks on electrical equipment and perform a detailed electrical code review to return to conformance with code.
- Evaluate the adjacent lot for future lift station conversion.
- Evaluate the installation of a secondary standby pump.

5.2.4.9 Lift Station 323 – Aysen

The Aysen Lift Station (LS 323) is northwest of the property at 25358 Aysen Drive. The station receives flow from LS 324, LS 325, and LS 326 and discharges to LS 321.

The lift station contains two 5-HP Sulzer submersible pumps in a 6-foot concrete wet well. Each pump has an estimated capacity of 132 gpm at 35 feet of head.

The power service to the station is 240-volt, single-phase. There is a portable generator hookup. No interlock was noted between the main breaker and generator breaker.

The station has a SCADA system with a telemetry transmitter/receiver. The control panel appears to have been recently painted. The surrounding vegetation caused minor difficulty in accessing the electrical equipment on the back of the control panel.

The wet well is showing signs of corrosion, with what appears to be the former lining material peeling from the walls. Discharge isolation valves and the emergency pump connection are below ground in an adjacent valve vault. The pump discharge piping appears to be travelling through the former larger pipe, with the latter acting as a casing. This pipe was filled with foam insulation, but the vault still appears to be receiving significant rust and corrosion, likely from hydrogen sulfide. This has resulted in concrete wear, including exposed structural rebar. The station is not fenced, but the panel, wet well, and valve vault are padlocked. The station does not have any odor control.

The current location has a swale running between the station and the road, which results in a flooded area to circumvent during high rain events when pumps need to be pulled. During dry events, the ditch elevation also causes access difficulty and the proximity to the road also results in road blockage. The County owns the lot directly northeast of the lift station, and design plans have recently been completed to construct this lift station conversion. This will allow easier access to the lift station from the south end of Purus Street.

The following deficiencies were noted:

- Signs of corrosion on the wet well and valve vault interior likely due to hydrogen sulfide concentrations.
- No interlock between the generator breaker and the main breaker.
- Missing seal-offs from the control panel conduit.
- Nearby vegetation.

Proposed 2019 improvements to the station include:

- Coat the wet well and seal and repair the contents of the valve vault.
- Install seal-offs and interlocks on electrical equipment and perform a detailed electrical code review to return to conformance with code.
- Proceed with lift station conversion.

5.2.4.10 Lift Station 415 – Prada

The Prada Lift Station (LS 415) is on a dirt road south of the intersection of Doredo Drive and Prada Drive. The station receives approximately 85 percent of the simplex stations in the Burnt Store area and discharges directly to Burnt Store RO WRF through a 4-inch force main.

The station contains two 7.5-HP Davis EMU submersible pumps in the 8-foot wet well. Each pump has an estimated capacity of 109 gpm at 80 feet of head. The pumps are installed on an older t-rail system. The station is fenced, but there is no odor control at the station.

Power service to the station is 230 volt, three-phase. A portable generator receptacle with a manual transfer switch is available as well as a discharge pump connection inside the valve vault. The station has a SCADA system with a telemetry transmitter/receiver.

The following deficiencies were noted:

- Signs of corrosion on the wet well and valve vault interior due to hydrogen sulfide concentrations.
- Missing seal-offs from the control panel conduit.
- The conduit was partially installed within the concrete of the wet well, possibly undermining the integrity of the concrete and resulting in difficulty performing electrical maintenance.

Proposed 2019 improvements to the station include:

- Coat the wet well and seal and repair the contents of the valve vault.
- Install seal-offs on any electrical equipment within 10 feet of the wet well to return to conformance with code.
- Evaluate upgrade to the electrical including replacing the aging control panel, updating the conduit location, and generally bringing the system up to current standards.

5.2.4.11 Lift Station 442 – Doredo 2

The Doredo 2 Lift Station (LS 442) is at the intersection of Doredo Drive and Alcazar Drive. The station receives approximately 15 percent of the simplex stations in the Burnt Store area and discharges to LS 415 and ultimately to Burnt Store RO WRF through a 4-inch force main.

LS 442 contains a single 3-HP Hydromatic submersible pump. The pump has an estimated capacity of 413 gpm at 7 feet of head and sits in a 6-foot wet well.

Power service to the station is 230 volt, three-phase. A portable generator receptacle with a mechanical interlock is available. The station does not have a SCADA system, but does have a local annunciator with 12-volt battery backup. The station experiences high flows and can often have ponding during high rain events. The system is not fenced and does not have an odor-control system. The wet well top slab, hatch, and interior walls are all in good condition.

The wet well is in the center of the road intersection, which requires Operations staff to manage traffic during routine maintenance and any pump pulling or to schedule the operations to be performed at night. The wet well has almost no signs of corrosion. The wet well access hatch is a bolt-down design. The adjacent lots to the south of the intersection are already procured by a separate entity, but the County would prefer to move the wet well out of the road and convert the existing wet well to a master manhole. The move would also allow for the installation of a stand-by pump, isolation valves, and bypass piping.

The following deficiencies were noted:

- Location of wet well and method to access hatch promote possible danger to staff.
- No isolation valves.
- No stand-by pump.
- No bypass piping.

Proposed 2019 improvements to the station include:

- Evaluate an adjacent lot for future lift station conversion.
- Evaluate the installation of a secondary stand-by pump.

5.2.4.12 Lift Station 800 – Holiday Lakes

The Holiday Lakes Lift Station (LS 800) is within the Village of Holiday Lake subdivision, west of the intersection of Delamere and Marathon Boulevard and just east of a canal crossing. The station receives flow from LS 877, low-pressure sewer systems, and local gravity mains and discharges to the West Port WRF through an 8-inch force main.

The lift station contains two 10-HP Flygt submersible pumps in a 5-foot by 5-foot concrete wet well. Each pump has an estimated capacity of 250 gpm at 75 feet of head. One of the two pumps was replaced in 2016.

The power service to the station is 230-volt, three-phase. A portable generator hookup with an interlock is between the main breaker and generator breaker. The station has a SCADA system with a telemetry transmitter/receiver. One of the conduits feeding the float wires in the control panel appears to have been recently replaced; however, the new conduit is missing a seal-off.

The wet well is showing signs of corrosion around the pipe penetrations, but the existing coating appears to be in good condition. Discharge isolation valves and emergency pump connections are above ground and adjacent to the wet well. The station is not fenced, but the panel and wet well are padlocked. 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 structure; however, there are concerns with the level of algae growth within the odor-control unit.

The lift station has required a lot of upkeep with frequent starter and pump issues. Increased flow to this lift station is expected with growth in the area, which may impact the existing storage; however, it could present more dire circumstances if the pump and starter issues persist.

The following deficiencies were noted:

- Signs of corrosion around pipe penetrations due to hydrogen sulfide concentration.
- One of the three conduits entering the control panel does not have a seal-off.
- Algae growth is interfering with the odor-control unit.

Proposed 2019 improvements to the station include:

- Coat or repair the pipe penetrations within the wet well.
- Install seal-offs on any electrical equipment within 10 feet of the wet well to return to conformance with code.
- Evaluate the odor-control unit to prevent algae growth.
- Evaluate the possibility of an on-site generator in preparation for the projected future buildout.

5.2.4.13 Lift Station 817 – Bunker Road

The Bunker Road Lift Station (LS 817) is near Hole 9 at The Palms golf course and behind 66 Bunker Road and 52 Bunker Place. It receives gravity flow from the surrounding residential subdivision and discharges to LS 816 through a 4-inch force main.

The lift station contains two 5-HP Flygt submersible pumps, with the most recent installation in 2015. Each pump has an estimated capacity of 300 gpm at approximately 20 feet of head. The pumps are installed on an older t-rail system.

The power service to the station is 240-volt, single-phase. The control panel uses an inverter to allow a three-phase generator hook up for the portable generator quick connection. No mechanical interlock was noted between the main breaker and generator breaker. The station

does not have a SCADA system, but does have sufficient storage for current demands. The control panel appears to be missing seal-offs.

The station is not fenced and has no odor control. The wet well has cracking and root intrusion. Previous sealing patches inside the wet well appear to have experienced erosion, allowing for additional I/I into this wet well. The valve vault cover is nonexistent, and the surrounding soil erosion has filled the remaining cracked concrete walls, partially burying the isolation and check valves. The pipes appear to have been sealed to prevent the water from leaking from the discharge force main into the valve vault, but there are signs of damp soil in this area.

The lift station is difficult to access with a crane truck due to the low elevation and narrow 7-foot easement. The property to the north of the station, 48 Bunker Place, is currently for sale and could become a new location for the lift station with conversion of the current wet well to a master manhole. Additionally, the area just southwest of the existing lift station should be evaluated as a higher elevation option. The change in location would allow the wet well to be easily repaired, coated, and converted to a master manhole.

The following deficiencies were noted:

- Signs of corrosion and intrusion in the wet well.
- Missing seal-offs from the control panel conduit.
- Worn and partially buried valve vault.

Proposed 2019 improvements to the station include:

- Coat the wet well and seal and repair the contents of the valve vault.
- Install interconnect and seal-offs on any electrical equipment within 10 feet of the wet well to return to conformance with code.
- Evaluate the two proposed adjacent lots for future lift station conversion.

5.2.4.14 Lift Station 828 – Sweetwater

The Sweetwater Lift Station (LS 828) is in the roundabout at the intersection of Sweetwater Drive and Wayne Road. It receives influent flows from residential low-pressure sewer systems and discharges to LS 816 through a 4-inch force main.

The lift station contains two 4.4-HP Davis EMU submersible pumps in a 6-foot-diameter wet well. Each pump has an estimated capacity of 363 gpm at approximately 13 feet of head. The pumps are installed on an older t-rail system.

The power service to the station is 230-volt, three-phase. The control panel has a generator hookup for the portable generator quick connection with mechanical interlock between the main breaker and generator breaker. The station does not have a SCADA system, but does have sufficient storage for current demands. The County has installed their standard aluminum control panel supports close to the electrical pole but has not shifted the control panel location yet.

Signs of hydrogen sulfide corrosion or wear exist on the influent manhole and in areas where the wet well coatings are separated or where pipes penetrate the walls. The station is not fenced and does not have odor control. The valve vault had standing water despite an open drain port and no recent rainfall.

Additionally, signs of corrosion were observed in the valve vault, likely due to hydrogen sulfide gas. The bypass pumping connection in the valve vault was directly tied into one of the discharge pipes instead of the combined discharge header. The valves also had significant rust and wear.

The following deficiencies were noted:

- Control panel still installed in old location.
- Wet well and valve vault corrosion.

Proposed 2019 improvements to the station include:

- Coat the wet well and seal and repair the contents of the valve vault.
- Evaluate fencing and odor control at this site
- Move the control panel and meter to the updated posts.

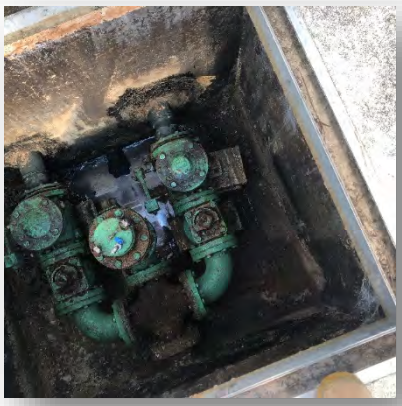
5.2.4.15 Lift Station 845 – David Lift Station

The David Lift Station (LS 845) is on David Boulevard just east of the roundabout connecting Ingraham Boulevard and David Boulevard. This lift station receives flow from residential low-pressure sewer systems, discharging to LS 841 and ultimately to the West Port WRF through a 4-inch force main. The lift station contains two 3-HP Flygt submersible pumps in an

8-foot wet well. Each pump has an estimated capacity of 266 gpm at approximately 16 feet of head. The station is not fenced and does not have odor control.

The power service to the station is 230-volt, three-phase electric. The control panel has a generator hookup for the portable generator quick connection. The station has an Omni-Beacon telemetry system.

The valve vault shows signs of rust and wear from hydrogen sulfide gas. Portions of the valve vault lid's interior were rusted through and flaking off. The wet well appeared to be in good condition with the coating showing minimal signs of wear.



The following deficiency was noted:

- Corrosion of discharge piping, valves, and fittings.

Proposed 2019 improvements to the station include:

- Replace or repair the valve vault and piping.

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 CCU 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.

CCU maintains a separate department for 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. CCU 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 in the event of a pump failure. CCU owns 10 trailer-mounted portable generators and six 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 SOs 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. A total of 8,410 corrective SOs were 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 3,399 corrective SOs in FY 2018. Lift stations generated 1,842 SOs in the same timeframe, the majority of which were generated internally by CCU 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 even more 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 specific neighborhood, regardless of whether they are water or wastewater related, or if 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, CCU 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 CCU's gravity system is nearly 40 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 CCU has relatively few plugged sewers, the broken clay pipe will cause blockage and must be repaired.

CCU 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 CCU 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.

CCU has 10 trailer-mounted portable generators and six trailer-mounted portable pumps that can be dispatched in the event of a power failure. CCU 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.

CCU 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, CCU 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 emergencies.

Inspections of manholes and gravity system piping and maintenance of sanitary sewer in FY 2018 included 53 laterals repairs, smoke testing to locate rainfall inflow sources, internally televised 129,792 feet of gravity sewer, and repaired numerous manholes when defects were discovered.

5.5 Review of Previous Report Recommendations

Table 5-2 summarizes the recommendations and current status from the 2017 Annual Report for the wastewater collection system.

Table 5-2 Wastewater Collection System – FY 2017 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: 53 laterals were repaired, 129,792 feet of gravity sewer were televised, areas suspect of inflow sources were smoke tested, and numerous manholes were repaired.*
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. One new portable pump was purchased in 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 aboveground 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 aboveground 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. 415 - 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 ATS (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.*

	Lift Station No. 864 – Coliseum
Recommendation:	▪ Analyze VFD use to determine if long-term cost savings due to system deficiencies at the lift station and at the West Port WRF can be recovered (2 years).
Progress:	*Not completed.*
	Lift Station No. 884 – Oldsmar
Recommendation:	▪ 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 36,649 wastewater customer accounts served by CCU at the end of FY 2018. Individual facilities connected to a wastewater collection system includes 310 maintained lift stations, 264.1 miles of force mains, 299.9 miles of LPS mains, 23.9 miles of vacuum sewer and 379.6 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 5-3 lists the recommended repairs for the stations viewed during the preparation of this report.

Table 5-3 Wastewater Collection System – FY 2018 Recommendations

Recommendations:	Lift Station No. 1 – Community Center ▪ Paint the aboveground discharge pump and piping. ▪ Repair/replace the patched wye connection. ▪ Repair cracks in the building. ▪ Seal pipe penetrations. ▪ Provide an odor-control system. ▪ Install seal-offs on any electrical equipment within 10 feet of the wet well to return to conformance with code. ▪ Replace the outdated control panel and bring the electrical up to current standards. ▪ Perform thorough rehabilitation of the lift station including repairing the building or replace the station with a modern submersible configuration and new equipment.

Recommendations:	Lift Station No. 7 – Pure Oil ▪ Repair the roof overhang. ▪ Replace the glass windowpanes. ▪ Paint the building. ▪ Install odor controls. ▪ Install seal-offs on any electrical equipment within 10 feet of the wet well to return to conformance with code. ▪ Perform thorough rehabilitation including the improvements listed above or replace the station with a modern submersible configuration with all new equipment. ▪ Evaluate to provide a dedicated access to the station.
Recommendations:	Lift Station No. 15 – Sistina ▪ Coat the wet well or repair some of the degraded concrete. ▪ Install seal-offs and interlocks on electrical equipment and perform a detailed electrical code review to return to conformance with code. ▪ Replace the valve vault and bring to current standards or evaluate converting the valves to aboveground. ▪ Evaluate the adjacent lot for future lift station conversion.
Recommendations:	Lift Station No. 28 – Peachlove ▪ Replace concrete control panel posts with County aluminum standard. ▪ Re-line the wet well or specifically address the exposed penetrations and seams. ▪ Replace the odor-control system base. ▪ Grout the valve vault at the appropriate slope. ▪ Evaluate and prepare for rearrangement of the site to accommodate east access.
Recommendations:	Lift Station No. 65 – South Port Master Lift Station ▪ Fence the entire site. ▪ Repair the flow meter. ▪ Evaluate generator control elevations to conform to code. ▪ Evaluate the use of a chopper pump or grinder station to reduce ragging. ▪ Bolt down the transformer.
Recommendations:	Lift Station No. 82 – Selkirk Maple Leaf Estates ▪ Coat the wet well or repair some of the degraded concrete. ▪ Install seal-offs on any electrical equipment within 10 feet of the wet well to return to conformance with code.
Recommendations:	Lift Station No. 123 – KHW Walmart ▪ Evaluate the lift station site to determine the source of the settling and either repair with flowable fill or relocate the station to an adjacent site. ▪ Install a 6-inch force main to connect to the manifold 8-inch force main at King's Highway.

Recommendations:	Lift Station No. 301 – San Marino ▪ Coat the wet well or repair some of the degraded concrete. ▪ Clear out the valve vault and perform required repair to maintain integrity. ▪ Install seal-offs on any electrical equipment within 10 feet of the wet well to return to conformance with code.
Recommendations:	Lift Station No. 303 – Constantine ▪ Coat the wet well or repair some of the degraded concrete. ▪ Install seal-offs and interlocks on electrical equipment and perform a detailed electrical code review to return to conformance with code. ▪ Evaluate the adjacent lot for future lift station conversion. ▪ Evaluate the installation of a secondary standby pump.
Recommendations:	Lift Station No. 309 – Bridgewater Master Lift Station ▪ Provide a stationary generator. ▪ Evaluate pump capacities for potential upsizing. ▪ Coat the wet well. ▪ Replace concrete control panel posts with County aluminum standard.
Recommendations:	Lift Station No. 323 – Aysen ▪ Coat the wet well and seal and repair the contents of the valve vault. ▪ Install seal-offs and interlocks on electrical equipment and perform a detailed electrical code review to return to conformance with code. ▪ Proceed with lift station conversion.
Recommendations:	Lift Station No. 415 – Prada ▪ Coat the wet well and seal and repair the contents of the valve vault. ▪ Install seal-offs on any electrical equipment within 10 feet of the wet well to return to conformance with code. ▪ Evaluate upgrading the electrical including replacing the aging control panel, updating the conduit location, and generally bringing the system up to current standards.
Recommendations:	Lift Station No. 442 – Doredo 2 ▪ Evaluate an adjacent lot for future lift station conversion. ▪ Evaluate the installation of a secondary standby pump.
Recommendations:	Lift Station No. 800 – Holiday Lakes ▪ Coat or repair the pipe penetrations within the wet well. ▪ Install seal-offs on any electrical equipment within 10 feet of the wet well to return to conformance with code. ▪ Evaluate the odor-control unit to prevent algae growth. ▪ Evaluate the possibility of an on-site generator in preparation for the projected future buildout.

Recommendations:	Lift Station No. 816 – Rotonda Boulevard West Master Lift Station ▪ Coat the wet well. ▪ Repair or rehabilitate the concrete top slab. ▪ Replace the valve vault and bring to current standards or evaluate converting the valves to aboveground. ▪ Install seal-offs on any electrical equipment within 10 feet of the wet well to return to conformance with code. ▪ Evaluate the adjacent lot for future lift station conversion.
Recommendations:	Lift Station No. 817 – Bunker Road ▪ Coat the wet well and seal and repair the contents of the valve vault. ▪ Install interconnect and seal-offs on any electrical equipment within 10 feet of the wet well to return to conformance with code. ▪ Evaluate the adjacent lot for future lift station conversion.
Recommendations:	Lift Station No. 828 – Sweetwater ▪ Coat the wet well and seal and repair the contents of the valve vault. ▪ Evaluate fencing and odor control at this site ▪ Move the control panel and meter to the updated posts.
Recommendations:	Lift Station No. 845 – David ▪ Replace or repair the valve vault and piping.

6 WASTEWATER TREATMENT FACILITIES

CCU 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. Table 6-1 shows that the WRFs are designed and permitted to treat a specific volume of wastewater expressed on an AADF basis.

Figure 6-1 CCU Wastewater Treatment Facilities

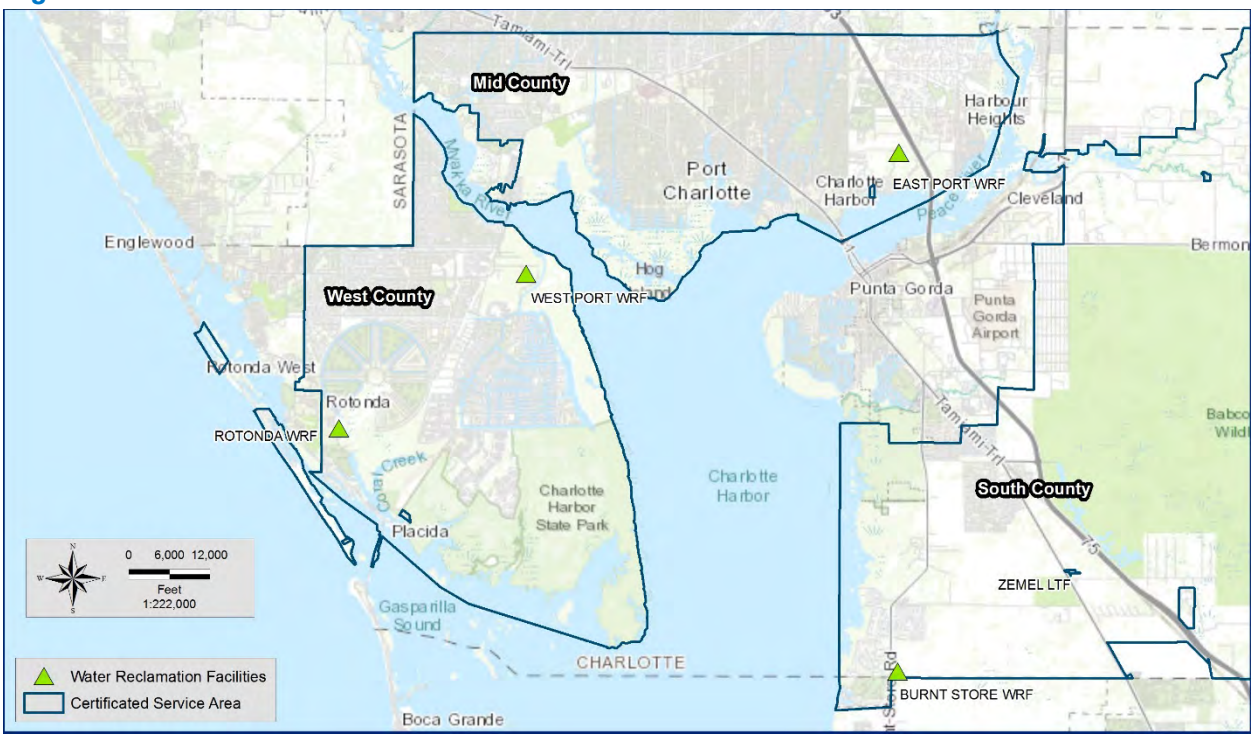


Table 6-1 CCU Water Reclamation Facilities and Design Capacities

Wastewater Treatment Facilities	P
East Port	
West Port	1
Rotonda	2
Burnt Store	0
Total	9

Note: *Design of upgrades will begin in FY 2019 and evaluate alternatives for an increase to 9.0 or 12.0 MGD Permitted Capacity.

6.1 STATE-CERTIFIED LABORATORY

The East Port Laboratory (EPLAB) is located at the East Port WRF. EPLAB provides regulatory and operational support for CCU facilities including four WRFs, one WTP, one LTF, six deep injection wells, and a potable 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 November 2018) and a member of The National Environmental Laboratory Accreditation Conference (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 Coliforms and *Escherichia coli (E. coli)* Coliforms by standard Method 9223B for drinking water, Fecal Coliform using Colilert-18 for wastewater, and *Enterococci Enterolert* for non-potable water.

The current Quality Control Manual (QCM) went into effect on September 1, 2018, and was reviewed during the October 2018 audit. The Quality Assurance Plan and SOPs are references for laboratory technicians and management. The SOPs are maintained and revised annually to coincide with new TNI standards in accordance with 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 2018, and the next assessment is due in October 2020.

6.1.1 SITE VISIT

Jones Edmunds staff visited the EPLAB on February 12, 2019, and met the Laboratory Manager, Sandra Lavoie, to discuss changes in FY 2018 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 followed NELAC 2003 standards during 2018 but requested implementing TNI 2016 standards as part of the October 2018 audit. According to the State Legislature, every laboratory in Florida must follow the most current TNI-approved 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 can 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 receiving and storage.
2. Un-refrigerated chemicals and equipment storage.
3. Administrative work stations for laboratory technicians.
4. Main laboratory benches.
5. Drinking water laboratory.

The EPLAB processed more than 36,581 test results in 2018 including on-site analysis and additional off-site testing. All results receive a quality control review before being released. This large volume of work was tracked and processed by a full complement of five laboratory employees for all of FY 2018.

The laboratory uses the 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 able to produce daily status reports of all current laboratory work through LIMS. The tracking system also monitors quality control results and chemical use to manage supplies ordering.

The old paper tracking system that was developed by the Laboratory Manager continues 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 QCM was revised in August 2018 with an effective date of September 1, 2018. 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 QCM, 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 all her staff passing the required proficiency tests within two standard deviations of the national average of all laboratories using the County's testing vendor.

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. During FY 2018, the laboratory obtained the certificate for the analysis of chloride.

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. Quality Assurance by a responsible person-in-charge is required to check data entries. 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 LIMS. The FDEP forms are expected to be updated soon.

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 WTP and WRF Chief Operators for use in compliance reporting.

6.1.5 Certification Compliance Schedule

- The biannual FDOH review was conducted in October 2018.
- Proficiency tests occur every 6 months.

6.1.6 Review of Previous Report Recommendations

Table 6-2 CCU EPLAB 2017 Recommendations and Status

Recommendation:	Seek certification for analysis methods using the new Gallery instrument that was delivered in November 2016.
Progress:	*Certification for three new analyses were incorporated into the QCM: (1) Total coliform and E. coli by Colilert-18, (2) wastewater fecal coliform by Colilert-18, and (3) Enterococci by Enterolert.*
Recommendation:	Continue to expand the use of the LIMS within its capabilities, including the use of bar codes to track samples from collection to results posting.
Progress:	*Ongoing.*
Recommendation:	Educate sampling personnel of the need for accuracy in use of collection bottles, sample storage, and delivery to the laboratory.
Progress:	*Ongoing.*
Recommendation:	Hire an Analytical/Quality Assurance Specialist or Quality Assurance Officer to help the EPLAB remain in compliance.
Progress:	*Overall staffing needs are being reviewed through the budget process.*
Recommendation:	Recommend seeking certification for potable water Total Dissolved Solids (TDS), Sulfate, and Chloride.
Progress:	*Received certification in Chloride.*

6.1.7 Recommendations

Table 6-3 CCU EPLAB 2018 Recommendations

Recommendation:	Continue implementation of the LIMS system.
Recommendation:	Continue working with sampling personnel on sampling protocol to improve the accuracy.
Recommendation:	Evaluate staffing requirements and ability to provide additional sampling support to Operations staff.
Recommendation:	Recommend seeking certification for potable water Total Dissolved Solids (TDS) and Sulfate.

6.2 Wastewater Pretreatment Compliance

CCU's Pretreatment section is responsible for the following:

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

6.2.1 Transported Waste Receiving Program

CCU is 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 2018, the septage receiving hours of operation were changed to 7:00 AM to 4:30 PM, Monday through Friday, which allows CCU staff to monitor operations. This approach prolongs the life of the equipment by ensuring compliance with disposal requirements and eliminating mixed loads that damage equipment. In FY 2018, the program accepted 8,501,747 gallons from 44 permitted haulers.

6.2.2 Restaurant Grease Interceptor Inspection Program

This program helps prevent sanitary sewer overflows in the CCU sanitary sewer collection system by removing FOG at the source. Program staff perform spot inspections and monitor grease interceptors at more than 240 restaurants and other food preparation facilities County wide to ensure compliance with the required pump-out schedule (e.g., 30, 60, 90 days) and other required maintenance. The focus has been on older buildings and facilities that might have inadequate grease interceptors. Plans for new restaurants and other food preparation facilities are reviewed by CCU's Engineering Services Division for adherence to County specifications. This coordination with the Building Department has made the program more efficient. In FY 2018, 1,390 inspections were conducted and 3 Notices of Violation were 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 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. Fortunately, no significant or categorical users are in the CCU collection system, eliminating the need for a full Industrial Pretreatment Program. 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

Partially digested biosolids from CCU's four WRFs are processed at the East Port WRF biosolids management and processing facility.

CCU owns two 6,000-gallon tankers for biosolids transportation 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 Class A for further use 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 permitted 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.

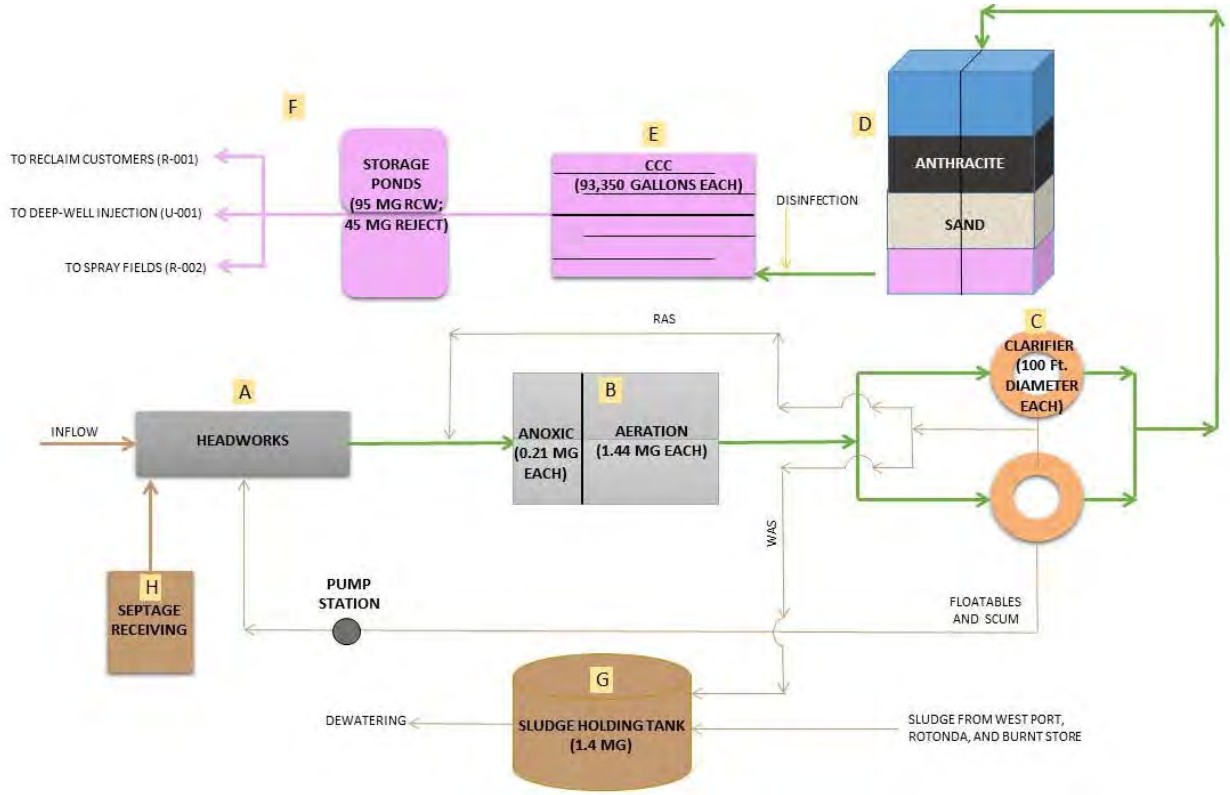
This location also houses the NELAP-certified EPLAB. The WRF site includes 51 acres of conservation easement, with the remaining area consisting primarily of woodlands. The site is home to more than 20 varieties of birds, including great egrets, osprey, and Carolina wrens. Many other wildlife species 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. 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 were abandoned in 2018 for use by the Charlotte County Sheriff Department. Figure 6-2 shows the East Port WRF process flow diagram. The key components of the East Port process are described below:

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, including biosolids dewatering system filtrate, tank and unit processes drain flows, 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.

Figure 6-2 East Port WRF Process Flow Diagram



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 waste-activated sludge (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 (CCCs) where liquid sodium hypochlorite is dosed for disinfection. CCC No. 1 is designated for RCW production that meets high-level disinfection requirements. CCC 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. A UV-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 FAC rules. The following permit governs plant operations:

- Plant Operating Permit (FL0040291) Expiration Date: September 6, 2022; includes a planned expansion from 6.0 MGD to 9.0 MGD.
- 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 by October 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 by August 2020.

The expansion work included in the 2017 Plant Operating Permit renewal was divided into stages to address the needed improvements while allowing the schedule of the expansion to be determined by CCU 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 summer of 2019.

- Stage 3 and 4 improvements were designed in 2014, including bid-ready specifications and drawings, and are scheduled for construction sometime between 2020 and 2024 depending on population growth. CCU has recently issued a request for proposals to evaluate the feasibility of sequentially upgrading the WRF from 6.0 MGD to 9.0 MGD and then to 12.0 MGD versus upgrading the WRF from 6.0 MGD to 12.0 MGD in one phase. Improvements include a new oxidation ditch flow splitter box; additional biological treatment train(s), secondary clarifier(s) with associated RAS and WAS pumps, effluent filters and CCCs, chemical dosing facilities, and biosolids storage; and possible 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 2018, the AADF was 4.687 MGD, and the East Port WRF is operating at 78 percent of the plant permit capacity. The maximum monthly average flow of 5.365 MGD occurred in May 2018. The highest 3-month average daily flow (TMADF) of 6.051 MGD occurred in October 2018, which is 101 percent of the plant permitted 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 78-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, and an option to increase capacity to 12.0 MGD will be evaluated. Table 6-4 summarizes influent flows as reported on the discharge monitoring reports (DMRs).

Table 6-4 East Port WRF Influent Flows FY 2018

Month	Monthly Avg. (MGD)	AADF (MGD)[1]	TMADF (MGD)	Monthly Max (MGD)	Monthly Min (MGD)	TMADF Percent Capacity (%)[1]
Oct-17	4.793	4.568	6.051	6.448	4.211	101
Nov-17	4.252	4.590	5.525	4.536	4.103	92
Dec-17	4.134	4.616	4.393	4.262	3.932	73
Jan-18	4.305	4.639	4.227	5.165	4.121	70
Feb-18	4.604	4.683	4.345	5.145	4.380	72
Mar-18	4.350	4.706	4.420	4.450	4.190	78
Apr-18	3.927	4.720	4.294	7.228	3.673	72
May-18	5.365	4.877	4.547	9.514	3.531	76
Jun-18	4.817	4.863	4.703	6.571	3.974	78
Jul-18	5.218	4.927	5.133	6.083	4.638	86
Aug-18	5.234	4.877	5.090	7.222	4.569	85
Sep-18	5.244	4.687	5.232	6.381	4.500	87

[1] Permitted plant capacity of 6.0 MGD.

For FY 2018, the average annual influent load for 5-day Carbonaceous Biochemical Oxygen Demand (CBOD5) was 126 mg/L and for Total Suspended Solids (TSS) was 175 mg/L. The

maximum monthly average for CBOD5 was 160 mg/L in January 2018 and for TSS was 301 mg/L in January 2018 as well, 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 2018

Month	CBOD5		TSS	
	Monthly Avg. (mg/L)	Annual Avg. (mg/L)	Monthly Avg. (mg/L)	Annual Avg. (mg/L)
Oct-17	85	151	128	124
Nov-17	117	148	163	218
Dec-17	145	145	197	192
Jan-18	160	141	301	205
Feb-18	148	137	188	202
Mar-18	155	132	253	200
Apr-18	155	128	198	183
May-18	126	124	187	187
Jun-18	122	125	152	187
Jul-18	103	122	143	176
Aug-18	99	123	144	184
Sep-18	95	126	135	175

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 unrestricted 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 CCCs for EP 31 (no filtration) and EP 32 (filtration). For both locations, the chlorine residual levels must be achieved at the discharge of the CCC. A review of the FY 2018 data shows that the East Port WRF effluent quality was well within the permit limits for both standards.

Table 6-6 East Port Effluent Water Quality FY 2018 (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-17	No Flow	3.1	No Flow	8.8	No Flow
Nov-17	No Flow	2.7	No Flow	7.7	No Flow
Dec-17	No Flow	2.7	No Flow	7.7	No Flow
Jan-18	No Flow	2.7	No Flow	7.7	No Flow
Feb-18	No Flow	2.7	No Flow	7.7	No Flow
Mar-18	No Flow	2.7	No Flow	7.7	No Flow
Apr-18	No Flow	2.7	No Flow	7.7	No Flow
May-18	6.3	3.6	1.17	6.1	<1
Jun-18	No Flow	3.6	No Flow	6.1	No Flow
Jul-18	No Flow	3.6	No Flow	6.1	No Flow
Aug-18	No Flow	4.1	No Flow	7.1	No Flow
Sep-18	No Flow	4.2	No Flow	3.4	No Flow

Note: no./100 mL = number per 100 milliliters.

Table 6-7 East Port WRF Effluent Water Quality FY 2018 (EP 32 Sample Location)

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
Oct-17	2.0	2.0	97.6	0.23	0.48	99.6	<1
Nov-17	2.0	2.0	98.3	0.18	0.45	99.9	1
Dec-17	2.0	2.0	98.6	0.25	0.41	99.8	1
Jan-18	2.1	2.0	98.7	0.45	0.40	99.9	1
Feb-18	2.1	2.0	98.6	0.41	0.39	99.8	1
Mar-18	2.1	2.0	98.6	0.64	0.38	99.7	1
Apr-18	2.2	2.0	98.6	0.33	0.38	99.8	1
May-18	4.7	2.3	96.3	0.67	0.40	99.6	1
Jun-18	3.8	2.4	96.9	0.57	0.41	99.6	1
Jul-18	2.7	2.5	97.4	0.24	0.39	99.8	1
Aug-18	6.0	2.8	93.4	0.48	0.40	99.7	1
Sep-18	5.1	2.7	94.6	0.48	0.40	99.6	1

Note: mL = milliliters.

6.4.4 Treatment Components and Condition Assessments

Jones Edmunds completed an on-site review of the plant on February 08, 2019. Jones Edmunds personnel met with Henri Lafenetre, Lead Plant 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.

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:

- Operating permits for the treatment facility and deep injection wells.
- Operator's licenses.
- Facility logbook.
- Facility Standard and Emergency Operating Plans.
- DMRs.
- Effluent Analysis Reports.
- Annual Reuse Report.
- Pathogen Monitoring Report (Giardia and Cryptosporidium).
- Reports required to complete the last permit application (in process).
- Certification of the EPLAB.
- Sampling plan.
- Groundwater monitoring plan (contained in permit).
- Laboratory results.
- Flow meter calibrations.
- Chlorine and pH meter calibrations (one/day).
- Chain-of-custody forms for samples that are sent to laboratories.
- Monthly residual and marketing report (reported in dry tons/month).
- Facility Operations and Maintenance Manuals.
- Maintenance records (EAMS electronic data system).
- Reuse Operating Protocol.
- Facility Record Drawings.
- Daily temperature logs.
- 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 moving parts on Septage Receiving Unit No. 1 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 CCU WRF staff for cleaning this area periodically.

6.4.4.2 Flow Equalization

The East Port WRF does not have flow EQ storage for peak hour influent flows and loads, but this should be evaluated and/or 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. A baffle wall was installed in both anoxic tanks to minimize short-circuiting and improve performance.

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. The DO control system helps the WRF lower its power consumption and improve the denitrification process by minimizing DO carry-over to the anoxic zone. Six VFD-controlled internal recycle pumps were replaced in the Stage 1 and 2 Improvements. These pumps are controlled by the SCADA based on operators' settings. The internal recycle pumps are well maintained and in good working order.

The five RAS pumps are VFD-controlled. The two WAS pumps are controlled by operators' 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 Stage 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 on Clarifier No. 1 and Clarifier No. 2 in 2017 and 2018, respectively. The weir washers eliminate the need to have O&M staff enter the clarifier effluent launders to remove algae, eliminating associated safety concerns. The weir washers do an excellent job keeping the clarifier effluent weirs and troughs clean. An excellent-quality effluent is being produced by both clarifiers.

6.4.4.5 Filtration

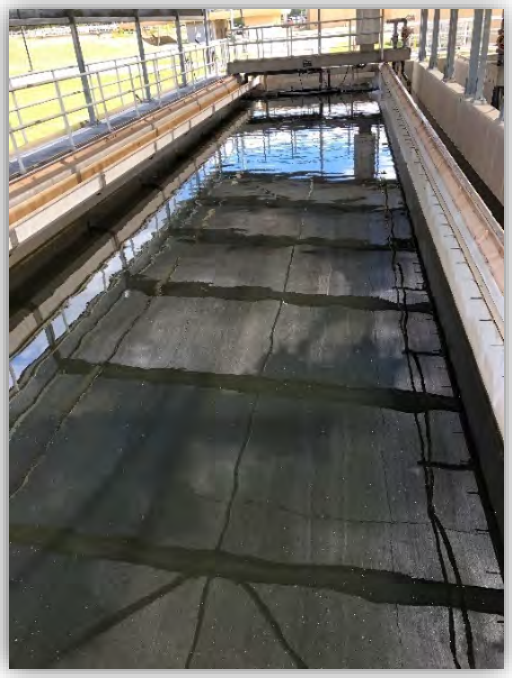
The overall condition of the effluent filtration system is excellent and well maintained. Filters were rehabilitated as part of the Stage 1 and 2 Improvements.

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. The cloth roof reduces algae growth and lowers the temperatures within the travelling bridge filters to produce a higher quality effluent and reduce the amount of chlorine cleaning needed to remove algae from the filters.

6.4.4.6 Disinfection

The CCCs 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 CCCs 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 percent) is used for disinfection to maintain a residual of ≥1.0 mg/L to meet unrestricted public-access reuse standards. In 2018, the old liquid reagent chlorine residual analyzer was replaced with a non-reagent analyzer to control chlorine feed rates. Another 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 CCU WRFs. CCU has two tankers used for hauling liquid sludge from the other WRFs and off-loading into the aerobic sludge holding tanks before dewatering.

Improvements to the feed piping to the two 2-meter BFPs were done under the Stage 1 and 2 Improvements. The BFPs run 5 days per week 8 hours per day to dewater the CCU's biosolids. Dewatered biosolids are hauled to the County's Zemel Road Landfill Compost Facility for composting.

6.4.4.8 Reject Storage and Alternate Disposal

Excess RCW 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 spray field disposal. The 45-MG pond 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 on the east bank of the 45-MG pond and pumps water from the pond to the deep injection wells or the spray field.

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.

6.4.4.9 RCW 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 CCC No.1 into the RCW distribution system. The RCW service pumps at the end of the CCC 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 CCU 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 9.0-MGD HSP station. The work is currently under construction and scheduled for completion in mid-2019.

6.4.4.10 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 before use or disposal. Sections 6.4.4.8 and 6.4.4.9 provide details on the ponds.

6.4.4.11 Electrical Components and Circuitry

The East Port WRF contains one 1,250-kW generator serving the primary WRF as standby power. One 1,500-kW generator, which was installed as part of the Stage 5 Reclaimed Water Improvements. One standby generator serving the administration building was relocated from another facility in used condition. The facility has five primary electrical switchgear locations – 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 8 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.

The incoming service and distribution transformers at the administration building are relatively new and in excellent condition with no obvious signs of significant concern. 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 showed 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 the Chief Operator reported that it requires upgrades and an overhaul. The generator set shows minor points of fluids seepage.

The distribution switchgear was in excellent condition with minor issues. Overall, the electrical equipment is in good functioning condition based on information from the Operations staff.

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 should include a complete arc flash labeling as required by NFPA 70E. Overall, the electrical equipment is in excellent functioning condition based on information from the Operations staff. 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. 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.

6.4.5 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 locations outside the CCU 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 CCU system 24 hours per day. Alarms are evaluated, and operators or maintenance personnel are dispatched to take corrective action, if necessary.

6.4.6 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 Mid and West County Master Reuse Systems. Design of future improvements will begin in 2019 and will increase the plant capacity from 6.0 to 9.0 MGD or possibly 12.0 MGD.

6.4.7 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 2019. Other improvements leading to a rerating of the plant to 9.0 MGD or 12.0 MGD are beginning design 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 2017 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. Add transfer pumping capabilities to transfer RCW from CCCs to the 95-MG RCW storage ponds and the new 9-MGD RCW HSPs.
Progress:	*Stage 5 RCW Improvements are in construction and will be completed in FY 2019.*
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 2019.*
Recommendation:	Replace the chemical feed and effluent analyzer shed building as part of the plant upgrade.
Progress:	*Project was designed as part of Stage 3 and 4 Improvements. These will be included in the East Port WRF Expansion project.*
Recommendation:	Evaluate the structural integrity of the digester walkways and the digester's ability to serve as an influent EQ tank.
Progress:	*Not started. This work will be evaluated as part of the East Port WRF Expansion Preliminary Engineering.*
Recommendation:	Add automated weir washer cleaners to Clarifier No. 2
Progress:	*Completed.*
Recommendation:	Anchor the administration building distribution transformer as required by the manufacturer.
Progress:	*The transformer contains an internal bolting system that is not visible from the outside. CCU has notified FPL, who owns and maintains the transformer, of the issue.*
Recommendation:	Apply appropriate arc flash labeling on all appropriate switchgear in compliance with NFPA 70E to properly notify O&M 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.
Progress:	*Not completed.*
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 electrical building #2 where sound levels are extraordinarily high. Identifying possible harmonics may mitigate this issue.
Progress:	*Not completed.*

6.4.8 SUMMARY AND RECOMMENDATIONS

The wastewater permit for the East Port WRF issued by FDEP in FY 2017 authorizes a planned expansion from 6.0 MGD to 9.0 MGD. The new East Port WRF Expansion will assess if an expansion to 12.0 MGD is required. The date for the complete expansion will be determined by CCU based on actual service area growth.

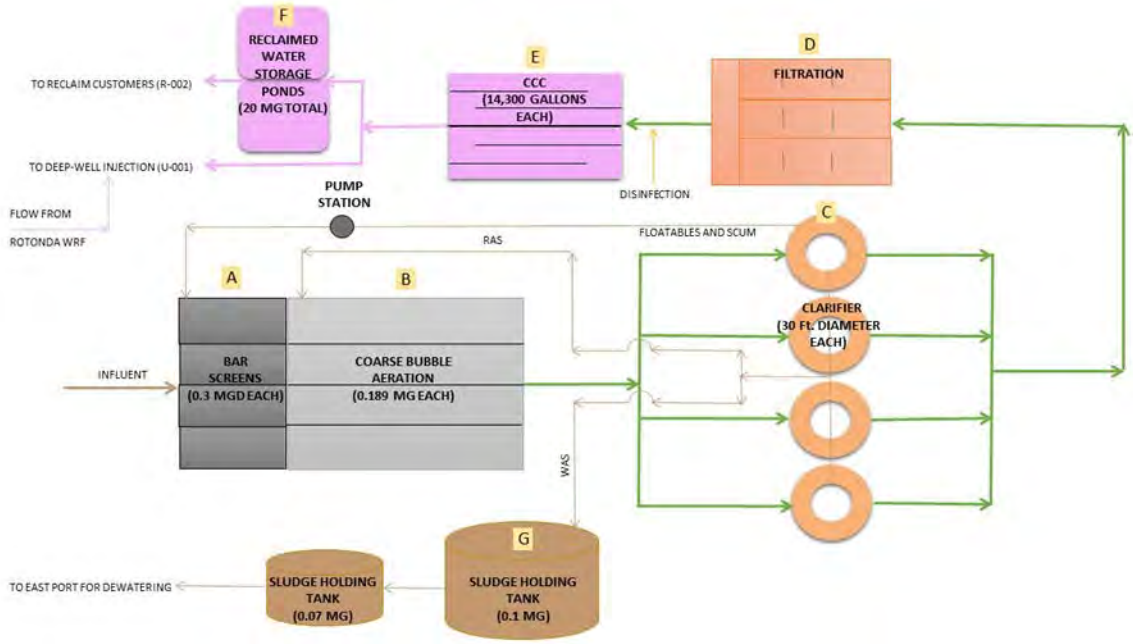
Table 6-9 East Port WRF 2018 Recommendations

Recommendation:	Complete construction of the Stage 5 RCW Improvements to the effluent storage ponds, HSP station, and 1,500-kW stand-by power generator.
Recommendation:	Work with the East Port WRF Expansion Design Engineer to evaluate the expansion from 6.0 MGD to 9.0 MGD or to 12.0 MGD. As part of the expansion include: ▪ Evaluate the structural integrity of the digester walkways and the digester's ability to serve as an influent EQ tank. ▪ Evaluate the new Chemical Feed and Analyzer Building for meeting high-level disinfection requirements required for producing unrestricted PAR water.
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:	Apply appropriate arc flash labeling on all appropriate switchgear in compliance with NFPA 70E to properly notify O&M 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 electrical building #2 where sound levels are extraordinarily high. Identifying possible harmonics may mitigate this issue.

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. Two diesel-powered emergency generators with ATSs 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 CCCs 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 compost available 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 govern 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:
  - The MIT was performed on IW-1 in August 2015. The next MIT will be due by August 2020.

6.5.2 Wastewater Flows and Loads

The West Port WRF permitted capacity is 1.20 MGD AADF. In FY 2018, the AADF was 0.685 MGD, and the West Port WRF is operating at 57 percent of the plant permit capacity. The maximum monthly average flow of 0.752 MGD occurred in February 2018. The highest TMADF of 0.746 MGD occurred in October 2017, which is 62 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 in FY 2018

Month	Monthly Avg. (MGD)	AADF (MGD)[1]	TMADF (MGD)	Monthly Max Day (MGD)	Monthly Min Day (MGD)	TMADF Percent Capacity (%)
Oct-17	0.642	0.670	0.746	0.695	0.626	62
Nov-17	0.653	0.675	0.690	0.730	0.651	57
Dec-17	0.654	0.679	0.650	0.712	0.657	54
Jan-18	0.707	0.683	0.671	0.804	0.650	56
Feb-18	0.752	0.689	0.704	0.818	0.719	59
Mar-18	0.724	0.693	0.728	0.759	0.704	61
Apr-18	0.653	0.695	0.710	0.742	0.521	59
May-18	0.692	0.706	0.690	0.984	0.562	57
Jun-18	0.683	0.706	0.676	0.890	0.598	56
Jul-18	0.707	0.705	0.694	0.811	0.637	58
Aug-18	0.667	0.692	0.686	0.827	0.611	57
Sep-18	0.685	0.685	0.686	0.800	0.616	57

[1] Permitted capacity = 1.2 MGD AADF.

For FY 2018, the average annual influent load for CBOD5 was 101.40 mg/L and for TSS was 181.90 mg/L. The maximum monthly average for CBOD5 was 124.0 mg/L in March 2018 and for TSS was 247.0 mg/L in June 2018, 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 in FY 2018

Month	CBOD		TSS	
	Monthly Avg. (mg/L)	Annual Avg. (mg/L)	Monthly Avg. (mg/L)	Annual Avg. (mg/L)
Oct-17	70.50	105.6	154.80	185.50
Nov-17	92.80	104.5	164.40	184.80
Dec-17	111.3	102.3	161.80	175.40
Jan-18	115.8	100.9	173.30	152.40
Feb-18	116.2	98.20	166.60	168.80
Mar-18	124.0	95.20	167.60	256.50
Apr-18	119.5	92.80	165.40	160.20
May-18	108.9	93.10	200.20	162.80
Jun-18	101.5	95.50	247.00	173.00
Jul-18	93.30	97.90	184.50	179.20
Aug-18	84.20	99.80	167.40	181.90
Sep-18	79.00	101.40	159.80	181.90

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 2018, the annual average effluent CBOD5 and TSS values were 2.33 mg/L and 0.6 mg/L, respectively. The CBOD5 high monthly average of 3.83 mg/L occurred in June 2018. The TSS effluent remained below 1.0 mg/L throughout FY 2018. 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 in FY 2018

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-17	2.00	2.07	97.2	0.3	0.5	99.8	<1
Nov-17	2.00	2.05	97.8	0.3	0.4	99.8	1
Dec-17	2.00	2.00	98.2	0.4	0.4	99.8	1
Jan-18	2.00	2.00	98.3	0.4	0.4	99.7	<1
Feb-18	3.22	2.10	97.2	1.5	0.5	99.1	1
Mar-18	2.16	2.12	98.3	0.5	0.5	99.8	<1
Apr-18	<2.00	2.12	98.3	0.3	0.5	99.8	1
May-18	<2.00	2.12	98.2	0.3	0.5	99.8	1
Jun-18	3.83	2.27	96.2	1.1	0.5	99.6	1
Jul-18	2.29	2.29	97.5	0.5	0.5	99.8	<1
Aug-18	2.00	2.29	97.6	0.8	0.6	99.5	1
Sep-18	2.43	2.33	96.9	0.8	0.6	99.5	<1

6.5.4 Treatment Components and Condition Assessment

Jones Edmunds completed an on-site review of the WRF on February 07, 2019. 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:

- Operating permits for the treatment facility and deep injection wells.
- Operator's licenses.

- Facility logbook.
- Facility Standard and Emergency Operating Plans.
- DMRs.
- Effluent Analysis Reports
- Annual Reuse Report.
- Pathogen Monitoring Report (Giardia and Cryptosporidium every 2 years).
- Reports required to complete the last permit application.
- Certification of EPLAB.
- Sampling Plan.
- Groundwater Monitoring Plan (contained in permit).
- Laboratory results.
- Flow meter calibrations.
- Chlorine and pH meter calibrations (one/day).
- Chain-of-Custody forms for samples that are sent to laboratories.
- Monthly residual and marketing report (reported in dry tons/month).
- Facility Operations and Maintenance Manuals.
- Maintenance records (EAMS electronic data system).
- Reuse Operating Protocol.
- Facility Record Drawings.
- Daily temperature logs.
- 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 was power washed.

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 have developed in the housing due to the highly corrosive gases released in the headworks. To help protect the equipment, the screen housings have been sand blasted and painted with epoxy paint. Other alternatives to reduce or eliminate the highly corrosive gasses at the headworks include flow equalization and chemical oxidation.

Most components are stainless steel, but the few carbon components are a constant maintenance challenge. Staff clean the screens twice daily to help delay rusting from exposure to hydrogen sulfide. The Type 316 stainless steel wedge wire drums are in very good condition.

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

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.

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 usually accumulate in aeration basins and at the on-site lift station. Grit is removed from the system periodically by vacuum trucks. Although the lack of a grit removal system is an issue, 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.

6.5.4.3 Flow Equalization

The West Port WRF does not have flow equalization storage for peak hour flows. Introducing flow equalization would improve the efficiency of plant operations.

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 continues to present a maintenance challenge since

deposited grit levels rise to block the diffusers. Basin No. 3 was cleaned of grit and damaged aerators were repaired in FY 2016.

All three blowers were operating properly. Usually, one blower is operated at a time to meet aeration requirements. The operators cycle the blowers weekly. The plant operates between a pH of 6.7 and 7.0; when the pH exceeds 7.5, a second blower turns on. During the 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 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.

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 were repainted in 2018.

6.5.4.5 Sedimentation

The overall condition of the sedimentation process is fair.

Plant operations follows a routine schedule of clarifier inspection, repair, and painting. At the time of inspection, three of the four clarifiers were in service. Clarifier No. 3 was taken offline, serviced, and painted in FY 2018. It is expected to be put online in FY 2019. Servicing and painting of Clarifier No. 4 is scheduled to follow Clarifier No. 3 in FY 2019.

Overflow weirs are hosed daily and brushed weekly to keep them clean. The overflow weirs were leveled in FY 2017. New weirs were installed in Clarifier No. 1 and Clarifier No. 2 in 2018. Clarifier No. 3 and Clarifier No. 4 are scheduled to have new weirs in FY 2019-2020.

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 are cleaned every month with 5 gallons of bleach. A UV cover was put on the filter tanks and then removed because access to the filters during maintenance activities was blocked. We recommend installing a galvanized metal frame and UV cover above each tank 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 new 5-micron filter cloths. The Chief Operator stated that a higher-quality effluent is obtained when all three filters are operating in parallel.

The filters are constructed of Type 304 stainless steel, but the fiberglass grating platform between the filters is supported by carbon steel angles. 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 CCCs created effective mixing.

The pH and chlorine analyzers are in good working order.

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

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 1.0 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.

The WRF has four emergency sludge-drying beds.

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.

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 are working properly.

6.5.4.10 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.

6.5.4.11 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.

6.5.4.12 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.

6.5.4.13 Electrical Components and Circuitry

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 couple of years. 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 above). Operations staff indicates that a new 6,000-gallon fuel tank and pad for the generators will be installed in the near future. Overall, the electrical equipment is in good functioning condition based on information from the Operations staff, except for the deficiencies listed below. Thermography scanning of the equipment showed no anomalies.

The following deficiencies were noted:

- 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 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.

6.5.5 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. 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 for disposal. RCW is also automatically diverted to the deep injection wells when the RCW storage ponds are full.

6.5.6 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.

6.5.7 REVIEW OF PREVIOUS REPORT RECOMMENDATIONS

Table 6-13 West Port WRF 2017 Recommendations and Status

Recommendation:	Provide additional aerobic sludge holding tank volume and decanting capacity to improve decant thickening.
Progress:	*Ongoing.*
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.
Progress:	*Ongoing.*
Recommendation:	Complete painting of the steel supports for the walkway over the aeration tank effluent splitter box and the aeration tanks.
Progress:	*Completed.*
Recommendation:	Complete repairs on Rotary Screen Nos. 1 and 2.
Progress:	*Ongoing.*
Recommendation:	Evaluate a DO or ORP control system to replace the pH control approach currently used in the aeration basins.
Progress:	*Not started.*
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.
Progress:	*Ongoing.*
Recommendation:	Evaluate the addition of a flow equalization tank to improve treatment plant operations.
Progress:	*Not Started.*
Recommendation:	Install UV fabric cover over filters to reduce algae growth.
Progress:	*Ongoing.*
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.
Progress:	*Completed.*
Recommendation:	Secure all electrical switchgear to prevent unauthorized access or inadvertent exposure to live parts.
Progress:	*Completed.*

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.
Progress:	*Not yet completed.*
Recommendation:	Perform a load study to identify any issues related to the 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.
Progress:	*Not yet completed.*

6.5.8 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 was taken out of service in FY 2017 for major overhaul and painting. The stairways leading to the bridges of the aboveground 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. The aerobic sludge-holding tank volume is too small and prevents proper decant thickening, resulting in a decant thickened sludge of 1-percent total solids 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 reduce 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 on-site storage ponds.

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 6-14 West Port WRF 2018 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 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:	Proceed with the scheduled repair and/or replacement and painting of Clarifier Nos. 3 and 4. Include leveling of clarifier overflow weirs.
Recommendation:	Replace the overflow weirs for all four clarifiers.
Recommendation:	Evaluate adding a flow equalization tank to improve plant operations.
Recommendation:	Install a galvanized metal frame and UV cover above each filter tank to prevent algae growth in the filters.
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 the 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.

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 membrane bioreactor (MBR) configuration to treat wastewater.

Effluent can be distributed as RCW to the 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.

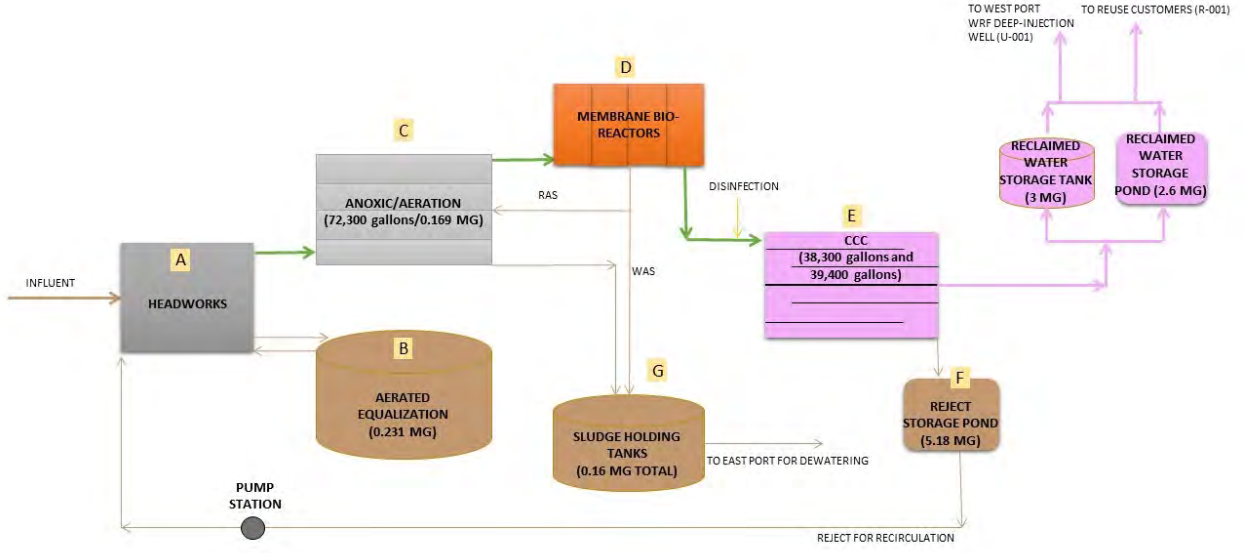
Two diesel-powered emergency generators in an on-site building have ATSs for providing emergency power to the WRF.

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 Baycor rotary drum fine screens remove larger inorganic material. Grit removal is achieved in two grit concrete tanks immediately downstream of the rotary drum screens. Settled grit is pumped through two grit cyclones and one grit "snail" washer to remove organics. 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.

Figure 6-4 Rotonda WRF Process Flow Diagram



C) Biological Treatment for Organics and Nutrient Removal: Wastewater from the pretreatment structure enters two activated-sludge treatment trains that consist of an

aerobic zone, 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 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. Each train contains three cassettes. 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 support microbial activities and to the two sludge-holding/aerobic digestion tanks as WAS.

E) Tertiary Treatment – Disinfection: The filtered water enters the CCC splitter box that directs the flow into one of two CCCs. Three chlorine feed pumps introduce liquid sodium hypochlorite for RCW disinfection requirements. The chlorine is thoroughly mixed using a static mixer in the CCC 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 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 2018, the AADF was 1.084 MGD and the Rotonda WRF was operating at 54 percent of the plant permit capacity. The maximum monthly average flow of 1.42 MGD occurred in September 2018. The highest TMADF of 1.412 MGD occurred in October 2017, which is 71 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 in FY 2018.

Table 6-15 Rotonda WRF Influent Flows in FY 2018

Month	Monthly Avg. (MGD)	AADF (MGD)[1]	TMADF (MGD)	Monthly Max. Day (MGD)	TMADF Percent Capacity (%)
Oct-17	1.067	1.071	1.412	1.639	71
Nov-17	1.043	1.081	1.224	1.261	61
Dec-17	0.997	1.092	1.036	1.639	52
Jan-18	1.012	1.066	0.935	1.032	47
Feb-18	1.130	1.047	1.003	1.336	50
Mar-18	0.975	1.033	1.039	1.026	52
Apr-18	0.844	1.028	0.983	0.955	49
May-18	1.126	1.058	0.982	2.354	49
Jun-18	1.181	1.086	1.050	1.662	53
Jul-18	1.103	1.108	1.137	1.354	57
Aug-18	1.150	1.097	1.145	1.636	57
Sep-18	1.420	1.084	1.224	2.090	61

[1] Permitted plant capacity 2.0 MGD.

For FY 2018, the average annual influent load for CBOD5 was 101.8 mg/L and for TSS was 129.8 mg/L. The maximum monthly average for CBOD5 was 149.0 mg/L in March 2018 and for TSS was188.0 mg/L in March 2018, which correspond with seasonal residents and the dry season. Table 6-16 summarizes the wastewater characteristics of the Rotonda WRF influent in FY 2018.

Table 6-16 Rotonda WRF Influent Water Quality in FY 2018

Month	CBOD5		TSS	
	Monthly Avg. (mg/L)	Annual Avg. (mg/L)	Monthly Avg. (mg/L)	Annual Avg. (mg/L)
Oct-17	68.0	102.3	102.0	125.1
Nov-17	79.0	100.0	116.0	125.2
Dec-17	125.0	102.3	127.0	125.1
Jan-18	129.0	97.7	166.0	123.5
Feb-18	134.0	100.0	180.0	129.7
Mar-18	149.0	101.3	188.0	130.1
Apr-18	130.0	101.7	163.0	132.3
May-18	101.0	100.2	128.0	131.9
Jun-18	93.7	101.0	119.0	134.2
Jul-18	75.7	100.3	95.2	133.4
Aug-18	67.1	101.1	82.4	131.7
Sep-18	57.5	101.8	70.3	129.8

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 and TSS = 5 mg/L), requiring high-level disinfection.

In FY 2018, the annual average effluent CBOD5 and TSS were 2.05 and 0.30 mg/L, respectively. The maximum effluent CBOD5 monthly average was 2.29 mg/L in March 2018. The monthly average maximum for TSS was 0.90 mg/L and occurred in November and December 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 in FY 2018

Month	CBOD5			TSS			Fecal Monthly
	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-17	2.10	2.18	96.8%	0.40	0.70	100.0	<1
Nov-17	2.00	2.18	97.3%	0.90	0.70	99.7%	<1
Dec-17	2.04	2.19	98.0%	0.90	0.70	99.8%	<1
Jan-18	2.00	2.01	98.4%	0.00	0.10	99.9%	1
Feb-18	2.00	2.01	98.5%	0.00	0.40	99.8%	<1
Mar-18	2.29	2.04	98.5%	0.20	0.40	99.9%	<1
Apr-18	2.23	2.06	98.3%	0.20	0.40	99.9%	<1
May-18	2.00	2.06	98.0%	0.10	0.40	99.9%	<1
Jun-18	2.07	2.06	97.8%	0.10	0.40	99.9%	<1
Jul-18	2.00	2.05	97.3%	0.10	0.00	99.9%	<1
Aug-18	2.00	2.05	97.0%	0.10	0.40	99.9%	<1
Sep-18	2.00	2.05	96.5%	0.20	0.30	99.6%	<1

6.6.4 Treatment Components and Condition Assessments

Jones Edmunds completed an on-site review of the WRF on February 07, 2019. Our personnel met with Luke West, 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 WRF and effluent storage ponds. The facility site is well maintained, and most equipment is less than 10 years old. 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:

- Operating permits for the treatment facility and deep injection wells.
- Operator's licenses.
- Facility logbook.
- Facility Standard and Emergency Operating Plans (guidance book created in-house).
- DMRs.
- Effluent Analysis Reports.
- Annual Reuse Report.
- Pathogen Monitoring Report (Giardia and Cryptosporidium).
- Reports required to complete the last permit application (in process).
- Certification of the EPLAB.
- Sampling Plan.
- Groundwater Monitoring Plan (contained in permit).
- Laboratory results.
- Flow meter calibrations.
- Chlorine and pH meter calibrations (one/day).
- Chain of custody forms for samples that are sent to laboratories.
- Monthly residual and marketing report (reported in dry tons/month).
- Facility Operations and Maintenance Manuals.
- Maintenance records (EAMS electronic data system).
- Reuse Operating Protocol.
- Facility record drawings.
- Daily temperature logs.
- 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 two main influent valves were scheduled to be replaced in 2018. However, it was deferred to FY 2019 to allow the facility to procure a manually operated slide gate for each valve for better isolation of the drum screens.

6.6.4.2 Headworks

The overall condition of the headworks is 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 always be in service. 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 with its drive belt has proven to be a better location than the manufacturer's direct drive location. The drive motor of Screening Conveyor No. 1 was replaced in January 2019. 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 "snail" washer before being deposited into a dumpster bag. The grit "snail" washer includes a conveyor belt that allows the grit to shed water as it proceeds to the dumpster. The grit "snail" washer produces a dry grit that is deposited into a plastic grit bag. In 2017, Grit Pump No. 2 was replaced, and the cyclones are scheduled for replacement in 2019.

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 0.3-MG 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. The EQ tank positive displacement blowers are run intermittently to save power. Oil sight glasses and fill ports were added by CCU to improve maintenance.

6.6.4.4 Activated Sludge Facilities

The overall condition of the activated sludge facilities is good.

The aeration tanks operate in a plug flow regime with aerobic, anoxic, and swing 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.

The aeration system continues to supply adequate air to the aeration tanks. Four blowers serve the aeration trains. Generally, one blower meets air requirements. Additional units are brought online during higher demands. 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. During the site visit, only Blower No. 2 and Blower No. 4 were in

service. Blower No. 1 has been taken offline for service since 2017 and is expected to be put back online in FY 2019. Blower No. 5 will be replaced after Blower No. 1 is put back in service. The blowers are well painted, and piping is marked.

One of the DO probes in the aeration basin was replaced in 2017. All four probes are functioning properly.

6.6.4.5 Membrane Bioreactor

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.

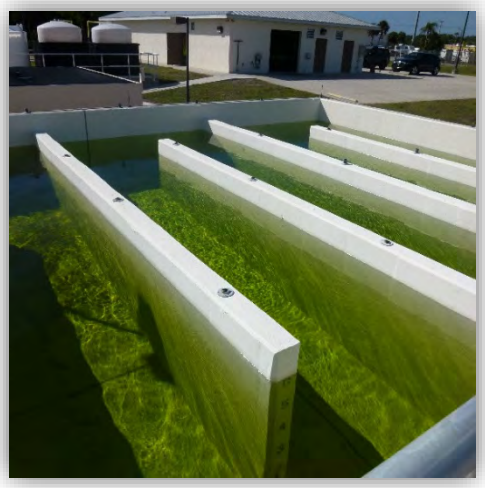
Four trains contain three cassettes each. The MBRs are cleaned once per week with a weak solution of bleach to maintain their treatment efficiency. The cassettes are cleaned in place with concentrated chlorine bleach twice a year and are removed once a year for a more in-depth cleaning.

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 CCC splitter box. All turbidity meters were replaced in 2018.

6.6.4.6 Chlorination

The overall condition of the chlorination system is good.



The two concrete CCCs are in good condition. Both CCCs 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 CCC. A new UV filter cloth of 90-percent UV block cover was installed in 2018 over the CCCs to conserve bleach and inhibit algae growth.

Replacement of Chlorine Storage Tank No. 3 began in 2017 and finished in 2018. Prominent feed pumps No. 1 and No. 3 were replaced in 2018. Replacement of feed pump No. 3 is scheduled in FY 2019.

The chlorine feed line from the in-plant road was 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 two or three times per month.

Sludge load-out pumps were operating properly. They are scheduled for repainting in FY 2019.

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 can 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 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 3.0-MG GST. The GST was drained and cleaned in 2017. RCW from the GST can be pumped to pressurized reuse customers using two HSPs and one jockey pump. The motor of one of the two HSPs is taken offline for repair. The jockey pump was replaced in 2018.

The RCW storage pond is overgrown with vegetation, reducing the capacity of the pond. The storage pond is scheduled to be dug out and cleaned, the berm reinforced, and the pond lined in 2019.

6.6.4.9 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. The motor of pump No. 2 was replaced in 2018. 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 can distribute RCW in Mid/West Charlotte County.

The high-pressure pumps were last painted in 2018.

6.6.4.10 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 2019.

6.6.4.11 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.

6.6.4.12 Electrical Components and Circuitry

The incoming switchgear and distribution transformer appear in good condition. The plant is served from two 810-kW generators configured to operate in parallel. Last year, the Operations staff indicated several issues occurred with the generator switchgear and their operations, but these have not been resolved. 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.

6.6.5 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 continuously 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.

6.6.6 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.

6.6.7 Review of Previous Annual Report Recommendations

Table 6-18 Rotonda WRF 2017 Recommendations and Status

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.
Progress:	*Ongoing.*

Recommendation:	Replace the main influent valves at the headworks due to corrosion.
Progress:	*Ongoing.*
Recommendation:	Replace the grit cyclones of the headworks.
Progress:	*Ongoing.*
Recommendation:	Paint tanks, buildings, and pipes in the next 2 years.
Progress:	*Ongoing.*
Recommendation:	Replace larger blowers with the correct cubic-foot-per-minute (cfm)-capacity blowers to lower oxygen levels and improve nitrogen removal.
Progress:	*Ongoing.*
Recommendation:	Add an MBR cassette to existing trains as capacity needs dictate.
Progress:	*Cassettes are being monitored to determine replacement schedule.*
Recommendation:	Add metal frame and UV shade cloth to CCC 1.
Progress:	*Ongoing.*
Recommendation:	Replace the below-ground chlorine feed line from the on-site road to the tank.
Progress:	*Complete.*
Recommendation:	Remove vegetation, clean, reinforce the berm, and evaluate lining the RCW storage pond to increase RCW storage capacity.
Progress:	*Ongoing.*
Recommendation:	Clean the reject storage pond.
Progress:	*Ongoing.*
Recommendation:	Complete installation of RCW pipe to the Cape Haze Golf Course and RCW pipe to Placida Corridor.
Progress:	*Ongoing.*
Recommendation:	Evaluate aquifer storage and recovery (ASR) for additional RCW storage.
Progress:	*Ongoing.*
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.
Progress:	*Resolved.*
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.
Progress:	*Not yet implemented.*

6.6.8 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 Operations 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 an 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. Reviewing the electrical components at this facility shows that they are in good condition.

Table 6-19 Rotonda WRF 2018 Recommendations

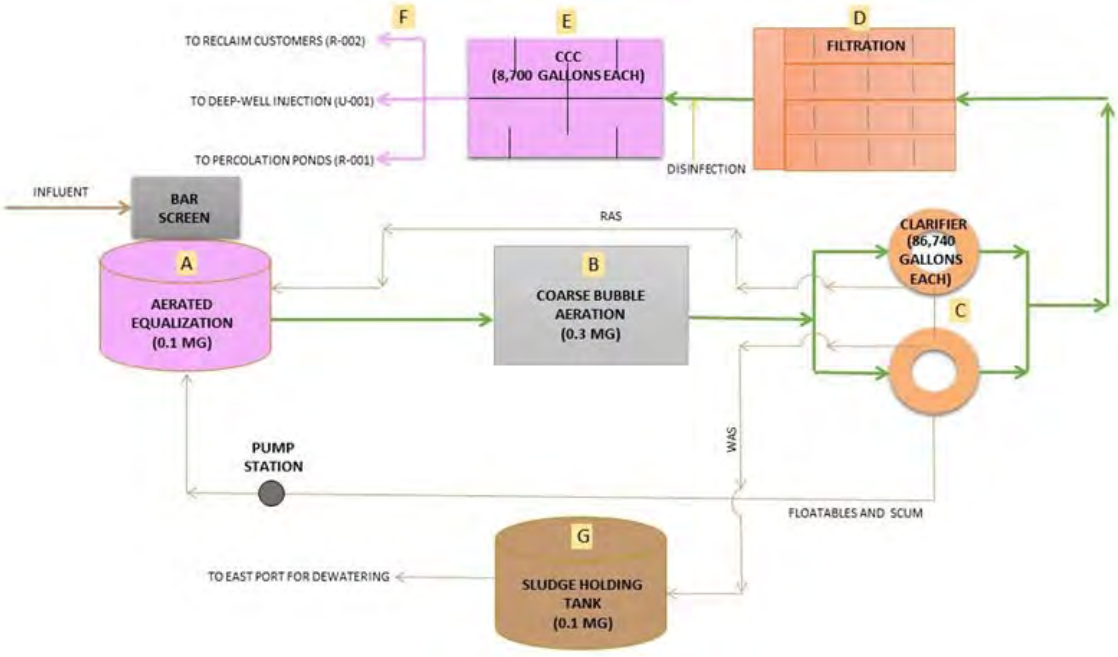
Recommendation:	Continue to maintain and operate rotary fine screens at slower rotation, which is extending the life of the rollers. Monitor maintenance issues to determine if future replacement of rotary fine screens is necessary.
Recommendation:	Complete the replacement of the two main influent valves at the headworks due to corrosion.
Recommendation:	Replace the grit cyclones of the headworks.
Recommendation:	Paint tanks, buildings, and pipes in the next 2 years.
Recommendation:	Complete the repairs of Blower No. 1 and put it back in service.
Recommendation:	Replace Blower No. 5 with the correct cfm-capacity blower to lower oxygen levels and improve nitrogen removal.
Recommendation:	Add an MBR cassette to existing trains as capacity needs dictate.
Recommendation:	Add galvanized metal frame and UV shade cloth to CCC 1.
Recommendation:	Replace hypochlorite feed pump No. 3.
Recommendation:	Add a small winch to each decant pump in the sludge-holding tanks for better control of the pump level.
Recommendation:	Repaint sludge load-out pumps.
Recommendation:	Remove vegetation, clean, reinforce the berm, and evaluate lining the RCW storage pond to increase RCW storage capacity.
Recommendation:	Evaluate different aeration systems for the RCW storage pond.
Recommendation:	Clean the reject storage pond.
Recommendation:	Complete installation of RCW pipe to the Cape Haze Golf Course and to the Placida Corridor.
Recommendation:	Evaluate ASR for additional RCW storage.
Recommendation:	Replace motherboard and refrigerator unit in the effluent sampler.
Recommendation:	Improve the operation of the generators, primarily Generator No. 2.
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.

6.7 BURNT STORE WRF

The Burnt Store WRF was acquired December 12, 2003, when CCU 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 coarse-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) are aerated to achieve extended aeration treatment, and the air flowrate of the diffusers is adjusted to achieve nitrogen removal.

   The plant has three Gardner Denver centrifugal blowers: one dedicated to the aeration tanks, one dedicated to the sludge digestion tank, and one on stand-by. A fourth smaller blower provides air to the EQ tank.

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 10 minutes before and turn off 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 filter cloths. 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 CCCs 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 CCC and adjusts the chlorine feed rates. A reagent-less analyzer measures the chlorine residual at the CCC 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 RCW 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 CCC. 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 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 the other Charlotte County WRFs for digestion, dewatering, and final disposal at the compost facility 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 Capacity Analysis Report (CAR) was prepared for the Burnt Store WRF in December 2018. 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.
  - An application for renewal was submitted to FDEP in September 2018, and a draft permit was received in December 2018.
- IW-2 Permit (271367-005-UO), Expiration Date: October 17, 2021.
  - The MIT was performed on IW-2 in 2018.

6.7.2 Wastewater Flows and Loads

The Burnt Store WRF's permitted capacity is 0.500 MGD AADF. In FY 2018, the AADF was 0.308 MGD and the Burnt Store WRF is operating at 62 percent of the plant permit capacity. The maximum monthly average flow of 0.350 MGD occurred in February 2018. The highest TMADF of 0.339 MGD occurred in March 2018, which is 68 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 in FY 2018

Month	Monthly Avg. (MGD)	AADF (MGD)[1]	TMADF (MGD)	Monthly Max Day (MGD)	TMADF Percent Capacity (%)
Oct-17	0.306	0.300	0.349	0.404	69.8
Nov-17	0.276	0.303	0.310	0.336	62.0
Dec-17	0.283	0.308	0.288	0..316	57.6
Jan-18	0.327	0.311	0.295	0.383	59.0
Feb-18	0.350	0.315	0.320	0.395	64.0
Mar-18	0.340	0.311	0.339	0.384	67.8
Apr-18	0.282	0.315	0.324	0.327	64.8
May-18	0.308	0.327	0.310	0.528	62.0
Jun-18	0.311	0.327	0.300	0.384	60.0
Jul-18	0.302	0.319	0.307	0.402	61.4
Aug-18	0.307	0.312	0.307	0.403	61.4
Sep-18	0.309	0.308	0.306	0.418	61.2

Note: [1] Permitted plant capacity 0.500 MGD.

For FY 2018, the average annual influent load for CBOD5 was 120.1 mg/L and for TSS was 152.5 mg/L. The maximum monthly average for CBOD5 was 198.4 mg/L and for TSS was 215.3 mg/L, both occurring in March 2018, 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 in FY 2018

Month	CBOD5		TSS	
	Monthly Avg. (mg/L)	Annual Avg. (mg/L)	Monthly Avg. (mg/L)	Annual Avg. (mg/L)
Oct-17	74.3	123.0	111.7	154.3
Nov-17	122.9	122.6	153.2	155.4
Dec-17	121.2	120.9	165.3	154.7
Jan-18	165.5	120.7	203.3	153.2
Feb-18	187.8	121.5	215.3	154.5
Mar-18	198.4	121.6	215.0	153.9
Apr-18	178.3	122.3	204.3	156.0
May-18	111.3	119.5	156.0	154.2
Jun-18	79.6	118.9	115.5	152.8
Jul-18	80.7	119.9	110.0	152.9
Aug-18	63.9	120.0	103.3	153.8
Sep-18	57.8	120.1	76.9	152.5

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 2018, the annual average effluent CBOD5 and TSS values were 1.4 mg/L and 0.3 mg/L, respectively. The CBOD5 maximum monthly average of 2.1 mg/L occurred several times during FY 2018. The TSS maximum monthly average of 0.9 mg/L occurred in January and February 2018. 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 in FY 2018

Month	CBOD5			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-17	2.0	2.1	97.3	0.1	0.3	99.9	<1
Nov-17	2.1	2.1	98.2	0.2	0.3	99.9	<1
Dec-17	2.1	2.0	98.3	0.3	0.3	99.8	<1
Jan-18	2.1	2.1	98.7	0.9	0.3	99.6	<1
Feb-18	2.1	2.1	98.9	0.9	0.4	99.6	<1
Mar-18	2.0	2.0	99.0	0.3	0.3	99.9	<1
Apr-18	2.0	2.0	98.9	0.3	0.3	99.9	<1
May-18	2.0	2.0	98.2	0.3	0.3	99.8	<1
Jun-18	2.0	2.0	97.5	0.2	0.3	99.8	<1
Jul-18	2.1	2.0	97.3	0.1	0.3	99.9	<1
Aug-18	1.0	1.4	98.4	0.2	0.3	99.8	<1
Sep-18	1.0	1.4	98.3	0.1	0.3	99.9	<1

6.7.4 Treatment Components and Condition Assessments

Jones Edmunds completed an on-site review of the plant on February 8, 2019. Our personnel met with Kevin Wagner, Shift 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 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:

- Operating permits for the treatment facility and deep injection well.
- Operator's licenses.
- Facility logbook.
- Facility Standard and Emergency Operating Plans.
- DMRs.
- Effluent Analysis Reports.
- Annual Reuse Report.
- Pathogen Monitoring Report (Giardia and Cryptosporidium every 5 years per permit).
- Reports required to complete the last permit application.
- Certification of the EPLAB.
- Sampling Plan.

- Groundwater Monitoring Plan (contained in permit).
- Laboratory results.
- Flow meter calibrations.
- Chlorine and pH meter calibrations (one/day).
- Chain-of-custody forms for samples that are sent to laboratories.
- Monthly residual and marketing report (reported in dry tons/month).
- Facility Operations and Maintenance Manuals.
- Maintenance records (EAMS electronic data system).
- Reuse Operating Protocol.
- Facility Record Drawings.
- Daily temperature logs.
- 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 condition. 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. It consists of one manually cleaned bar rack. Issues with the headworks include insufficient treatment, lack of floatables removal, and no grit removal facilities.

The headworks does not include grit removal and the 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 and 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 US Submergent Technologies in 2017.

The EQ tank has signs of rust around the upper steel rim. Removing rust and painting rusted areas was not done in 2018 as scheduled and is rescheduled for 2019. Internal piping is in poor condition with leaks at flanged fittings. The leaks do not pose an environmental hazard because they are inside the tank. The piping should be replaced as part of a plant upgrade.

A leak in the aeration header of the EQ tank blower was repaired in 2017. One of the drop diffusers inside the EQ tank is damaged.

The EQ tank can transfer flow to the treatment process train by gravity (gravity mode) and/or pumped using the EQ transfer pump station. 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 capacity of the gravity piping is too small to pass the maximum daily flows. As such, Operations staff pump the raw wastewater from the EQ tank to the two aeration basins.

The lack of fine screening and grit removal creates operational and mechanical problems for the EQ tank and 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 consisting of two aeration tanks and two secondary clarifiers. The overall condition is good.

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

overflowing during high-flow conditions or if a downstream flow obstruction occurs. Rust was removed from the metal tanks and the tanks were painted 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 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.

The two RAS/WAS pumps are in good condition and operating properly. A control valve is used to control RAS and WAS flows.

6.7.4.6 Filtration

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. CCC 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 CCCs are in good condition. A UV cover has been installed over the CCC No. 1. 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 meeting regulatory requirements. An emergency eyewash and shower are 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. Two tanks are aerated to provide partial sludge stabilization and the third tank is normally used for thickening and decanting. Hook-up connections are provided for trucks to transport thickened sludge to East Port WRF for further processing. A bottom feed submersible pump suspended on a winch is used to decant supernatant back to the front end of the facility for treatment.

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 HSPs and jockey pumps are well maintained and show no signs of deterioration. No means of measuring the RCW leaving the site is 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.

The 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. One of the injection well pumps was replaced 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, IW-2 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.

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

6.7.4.10 Reclaimed Storage and Distribution

In FY 2018, the RCW customers within the Burnt Store WRF service area were the Burnt Store Lakes, the Burnt Store Colony mobile home park, and the Village developments, which use a small amount of RCW for drip irrigation of landscaping along the development entranceways and common areas. Although the Burnt Store WRF has the capacity to pump 1.000 MGD AADF of RCW, 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 are mounted above a clear well following the CCCs but are not in use. Instead, one booster pump is used to satisfy the demand of the three customers.

Flow to the RCW pump station is 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. CCU intends to address this requirement as part of the plant upgrade.

6.7.4.11 Reject Storage and Alternate Disposal

No reject storage is provided at the Burnt Store WRF. Alternate disposal of RCW is provided via IW-1 and IW-2 (3.444-MGD deep injection maximum daily flow permitted capacity), and the four on-site percolation ponds (rated capacity of 0.250-MGD AADF). Table 6-23 lists the average flow pumped into IW-1 and IW-2. In FY 2018, an average annual flow of 4.531 MG was sent to the deep injection wells and 0.161 MG was sent to the percolation ponds.

Table 6-23 Burnt Store WRF Injection Well Flows

Month	Injection Well IW-1 (MG)	Injection Well IW-2 (MG)	Total Injection Well (MG)
Oct-17	0.000	3.937	3.937
Nov-17	0.002	2.644	2.646
Dec-17	0.000	4.879	4.879
Jan-18	0.000	4.766	4.766
Feb-18	0.001	5.051	5.052
Mar-18	0.000	4.787	4.787
Apr-18	0.000	5.702	5.702
May-18	0.000	4.929	4.929
Jun-18	0.005	4.124	4.129
Jul-18	0.027	4.171	4.198
Aug-18	0.002	4.596	4.598
Sep-18	0.002	4.752	4.754
Annual Avg.	0.003	4.528	4.531

Note: Recall the Burnt Store WRF Injection Wells also receive the concentrate flows from the Burnt Store RO WTP.

6.7.4.12 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.

6.7.4.13 Electrical Components and Circuitry

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, except for the deficiencies listed below.

The following deficiencies were noted:

- The generator system appeared to have leaks at one time or has a current leak issue.
- 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.

6.7.5 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 in FY 2009. The operations building houses the WRF operating system which is used to monitor critical operations and maintain compliance with regulatory requirements.

Plant Operations 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.

The Burnt Store WRF is staffed 8 hours per day, 7 days per week. The WRF can be continuously monitored by the East Port WRF operators through a County-wide telemetry system that allows the Burnt Store WRF to continue to produce RCW 24 hours per day.

6.7.6 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 was scheduled to be repainted in FY 2018. Painting of the facility has started and will continue through FY 2019.

6.7.7 Review of Previous Report Recommendations

Table 6-24 Burnt Store WRF 2017 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:	*Ongoing.*
Recommendation:	Repair leaking internal piping, aeration header, and fittings 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 and repaint flaking areas at welds.
Progress:	*Ongoing.*
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 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 or if a significant RCW customer(s) connects.*
Recommendation:	Install new deep well injection pumps.
Progress:	*One pump was replaced. The other pump is still in operation.*
Recommendation:	Replace the fiberglass MCC building with a concrete structure.
Progress:	*Pending plant upgrades.*
Recommendation:	Review and maintain the generator for possible fluid leaks.
Progress:	*Completed.*
Recommendation:	Secure all electrical switchgear to prevent unauthorized access or inadvertent exposure to live parts.
Progress:	*Completed.*
Recommendation:	Investigate the anomalous excessive heat signature on the distribution breaker in Panel L1 to determine if an issue exists.
Progress:	*Completed.*
Recommendation:	Apply appropriate arc flash labeling on all appropriate switchgear in compliance with NFPA 70E to properly notify O&M personnel of the potential hazard.
Progress:	*Not completed.*
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.
Progress:	*Not completed.*

6.7.8 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.

Reviewing the electrical components at this facility shows that they are in good-to-fair condition. The electrical switchgear has some issues as discussed previously; overall, these are not considered severe.

Many recommendations from prior annual reports will be addressed as part of the plant upgrade and are listed above in Section 6.7.7. The following recommendations should be assessed before the plant upgrade.

Table 6-25 Burnt Store WRF 2018 Recommendations

Recommendation:	Install a mechanical screen (highest priority) and grit removal system (secondary priority) in a new headworks.
Recommendation:	Remove rust from the top rim of the EQ tank and repaint.
Recommendation:	Repair leaking internal piping, aeration header, and fittings in EQ basin.
Recommendation:	Install EQ tank-level monitoring to adjust the transfer pump(s) flow rates.
Recommendation:	Remove rust from the outer rim of the aeration basins and repaint flaking areas at welds.
Recommendation:	Replace aeration tank hinged sluice gates to provide adequate prevention of flow entering the adjacent tank during maintenance.
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.
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.
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.
Recommendation:	Replace the old deep well injection pumps.
Recommendation:	Replace the fiberglass MCC building with a concrete structure.
Recommendation:	Evaluate the main breaker at the blowers to prevent tripping when three blowers are in operation.

Recommendation:	Evaluate filter back-wash pump operations, specifically during high-flow events.
Recommendation:	Apply appropriate arc flash labeling on all appropriate switchgear in compliance with NFPA 70E to properly notify O&M 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.

6.8 LEACHATE TREATMENT FACILITY

The LTF is operated and maintained by CCU 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 Road, 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 2018, the monthly average daily flows ranged from 0.0527 MGD to 0.0806 MGD, and the AADF was 0.063 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):
  - Draft Permit and Notice of Intent received December 2018
  - Monthly Summary Reports submitted to FDEP.
  - Quarterly Specific Injectivity Tests completed and submitted to FDEP.
  - The MIT was performed in 2017, next MIT is due in 2022.

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 leachate can be stored within the landfill cell in the event PS-1 is temporarily out of service.

Leachate from PS-1 combines with runoff from the co-composting program at the County's Zemel Road 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 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 a separate aeration system and pumps.

The carbon slurry used in the PACT process is made by combining bagged PAC 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 PAC 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 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 6 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 the Zemel Road Landfill as a Landfill Bioreactor and recycle leachate to enhance landfill biogas production at the 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 Facility Deep Injection Well Flows – FY 2018

Month	To Deep Injection Well Monthly Avg. (MGD)	Injection Rate Monthly Average (gpm)	Wellhead Pressure (psi)
Oct-17	0.0527	253	16
Nov-17	0.0528	253	16
Dec-17	0.0608	240	16
Jan-18	0.0659	246	15
Feb-18	0.0585	250	16
Mar-18	0.0549	248	16
Apr-18	0.0550	249	16
May-18	0.0618	248	17
Jun-18	0.0667	248	17
Jul-18	0.0776	246	18
Aug-18	0.0806	232	18
Sep-18	0.0725	227	18

6.8.3 Treatment Components and Condition Assessments

Jones Edmunds conducted a site visit at the LTF on February 12, 2019, 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 the facility appearance.

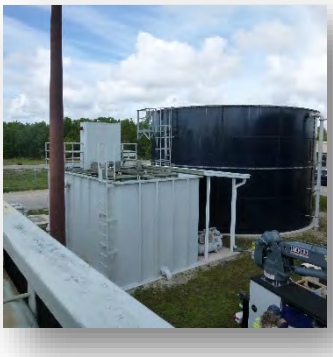
The facility is required to maintain plant documents on site. The following summarizes the types of documents generally found at treatment plants. Due to the nature of this facility and since it is permitted under the landfill permit, some traditional documents may not be required for the LTF.

- Operating permits for the treatment facility and deep injection wells.
- Operator's licenses.
- Facility logbook.
- Facility Standard and Emergency Operating Plans.
- DMRs.
- Effluent Analysis Reports (N/A).
- Reports required to complete the last permit application.
- Certification of the laboratory used for sample analysis.
- Sampling Plan.
- Groundwater Monitoring Plan (N/A).
- Laboratory results.
- Chain-of-custody forms for samples that are sent to laboratories.
- Facility Operations and Maintenance Manuals.
- Maintenance records (EAMS electronic data system).
- Facility Record Drawings.

- 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.

6.8.3.1 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.



6.8.3.2 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.

6.8.3.3 Solids Handling Facilities

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

6.8.3.4 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 CCU personnel in 2015. The pumps are operating satisfactorily and not overheating on hot summer days.

6.8.3.5 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.

6.8.3.6 Reject Storage and Alternate Disposal

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

6.8.3.7 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 County-wide. 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 EQ tank.

6.8.4 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.

6.8.5 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.

6.8.6 REVIEW OF PREVIOUS ANNUAL REPORT RECOMMENDATIONS

Table 6-27 Leachate Treatment Facility 2017 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:	Complete the Sand Filter Case Study with Siemens to determine the best approach to rehabilitate the 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, replacing screens, and replacing sand.
Progress:	*Completed but without second filter installation.*

Recommendation:	Continue painting the interior and exterior of the PACT tanks on a regular schedule.
Progress:	*Currently performing rust treatment in the tanks.*
Recommendation:	Evaluate adding one additional maintenance staff member to meet increasing demands and minimize overtime.
Progress:	*Not accomplished but feasibility ongoing.*
Recommendation:	Add a generator to the treatment facility to keep the plant operational during power outages.
Progress:	*Not accomplished.*

6.8.7 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 are 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 CCU 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 2018 Recommendations

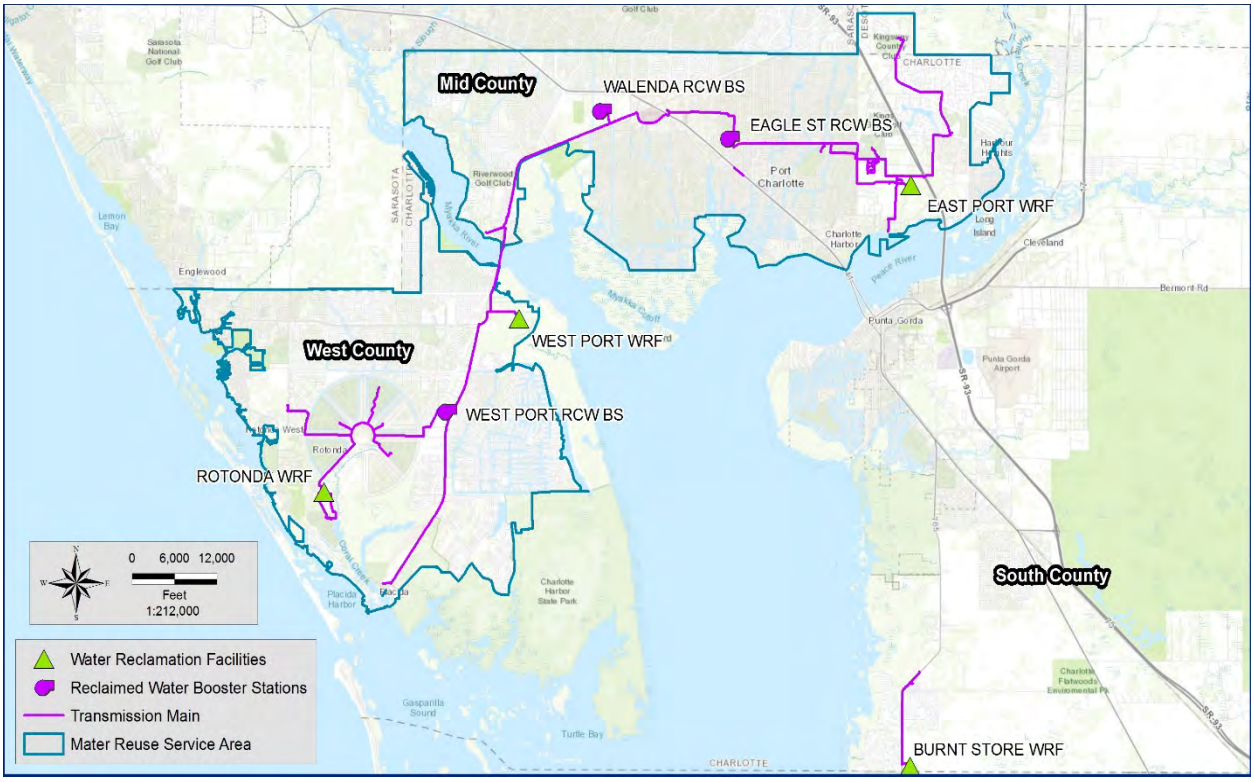
Recommendation:	Evaluate adding one additional maintenance staff member to meet increasing demands and minimize overtime.
Recommendation:	Add a generator to the treatment facility to keep the plant operational during power outages.
Recommendation:	Evaluate the installation of a sensor lift.

7 RECLAIMED WATER DISTRIBUTION SYSTEM

This Chapter presents the CCU RCW distribution system components and condition assessments of those system components. As discussed in Chapter 6, each of the CCU WRFs produces public-access-quality RCW. CCU'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, CCU worked with SWFWMD on a cooperatively funded project to develop an RCW distribution system in Mid County. To maximize RCW use and share this resource, CCU worked with FDEP in 2014 to establish and permit a Master Reuse System for the East Port, West Port, and Rotonda WRFs once the Mid and West County systems were interconnected earlier that year. In South County, a developer constructed a 3-mile RCW transmission main from the Burnt Store WRF to a golf course. Figure 7-1 shows the County-wide RCW system.

Figure 7-1 CCU RCW Distribution System



7.1 MID / WEST COUNTY SYSTEM

The Mid/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 at the East Port WRF and high demands for irrigation water in the west portion of the County.

Before the interconnection, each WRF supplied water to separate RCW distribution systems and the existing or potential customers were assigned to the individual WRFs' FDEP operating permits. The existing Master Reuse System in Mid/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 2.9 MGD of RCW in FY 2018. Future RCW sites in Mid

and West Charlotte County are projected to increase demand by 3.0 MGD as identified in the Master Reuse Permit application. 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 187 acres. On-site irrigation in FY 2018 averaged 0.042 MGD.

In 2005, CCU 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 infrastructure needed to connect the three WRFs in Mid and West County into 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. 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 expansions into West County. The complete system model identified the need for increased storage at the West Port WRF and the existing RCW ponds were expanded to 20 MG. CCU also undertook the development of a third booster pump station in West County to maximize delivery of RCW to West County. The Rotonda East RCW Booster Station was funded through the County and 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.

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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	1.851
Future Hwy 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 12, 2019.

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. Effective March 1, 2019, the Walenda Booster Station now operates a pressurized portion of the RCW system along US Highway 41 between Enterprise

Boulevard and Cornelius Boulevard, allowing continuous pressurized service for reclaimed customers in this area.

The concrete GST has a capacity of 0.5 MG. The pumping station contains one 125-HP HSP and one 60-HP jockey pump. The HSP 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 currently unused chemical feed pumps. The Programmable Logic Controller (PLC) and electrical control center are housed in a separate air-conditioned building. The buildings and the GST are in a fenced area with a locked gate. The facility can add chlorine to the RCW before storage and as it enters the distribution system. However, the chlorine chemical injection system, including pumps and bulk storage tank, are no longer needed because incoming water has sufficient chlorine.

An inline filter is 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. Pump operations, flow, and pressure are monitored 24 hours per day through a County-wide SCADA telemetry system.

The following O&M improvements were completed over the past 4 years:

- The tank was painted in FY 2017.
- The tank was inspected in 2018. Minor screen damage was repaired.

Condition Assessment

The electrical room equipment, pump room equipment, and tank were found in good condition. The piping was painted purple and clearly marked. The outside paint on some brick surfaces of the electrical building was deteriorated. Decommissioning of the on-site chlorine injection system should be evaluated. The grounds require constant maintenance, which is 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 RCW and potable water infrastructure including RCW and potable water GSTs. The RCW GST has a capacity of 0.5 MG. The station contains one 125-HP HSP 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 can add chlorine to the RCW before and after the GST. However, the on-site chlorine chemical injection system, including pumps and bulk storage tank, are no longer needed because incoming and outgoing water have sufficient chlorine.

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.

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

- The tank was inspected in FY 2018 and minor screen damage was repaired.

Condition Assessment

The electrical room equipment, pump room equipment, and tank are in good condition. The two concrete block buildings were painted, and piping was painted purple and clearly marked. Decommissioning of the on-site chlorine injection system should be evaluated. The grounds are well maintained.

7.1.1.3 West County RCW Booster Station

The West County RCW Pump Station (also called Westport Reclaimed Pump Station or Rotonda East RCW Booster Station) is on Rotonda Boulevard East just west of CR 771. The station was completed in FY 2014 and does not contain a GST. The booster station may draw 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. The station is currently not used as part of the West County reclaimed system. Its status will be re-evaluated upon completion of the Stage 5 project.

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 West County RCW Booster Station.

Condition Assessment

The condition of the West County RCW Booster Station is excellent.

The following deficiencies were noted:

- The station's PLC is being evaluated as part of the RCW modeling effort to reduce the energy needed to serve RCW customers in West County, which would result in operational cost savings.
- The station's hydraulics must be evaluated to update the operating protocol and improve the usefulness of the station to operators. Adding a storage tank and SCADA improvements may be considered.

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. A third 3.0-MGD GST is at the Rotonda WRF.

The tanks are filled by system feed and used to maintain the desired RCW system pressure during peak demand. The GSTs provide the following functions for the CCU 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 at the RCW booster stations have a capacity of 0.5 MG, for a total capacity of 1 MG. Table 7-2 lists the GST capacity and number of pumps at each active 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 filled from system pressure. Currently, Operations staff at the East Port WRF monitors RCW levels in the ponds through SCADA.

Condition Assessment

The unlined storage pond at the Rotonda WRF has a 2.4-MG capacity. However, the pond lost approximately 50 percent of its capacity due to high percolation because the pond is unlined. The Rotonda WRF Chief Operator expressed concerns about the condition of part of the berm around one of the pond walls. This portion of the berm is weakened, and steps are being taken to evaluate and strengthen it. The other RCW storage ponds and GSTs were found to be in good condition.

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 Eagle Street Booster 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 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 the following operational challenges including maintaining system pressure and control valve operations:

- Low system pressures result from multiple open-discharge users and the lack of storage at the East Port WRF. RCW at this facility is only available when flows are moving through the WRF; however, completion of the Stage 5 improvements, a 95-MG RCW storage and new HSP facilities at the East Port WRF, will resolve these challenges.
- Moving water to customers in West County from East Port WRF, which may be due to an intermediate section of transmission mains with reduced diameter (12 inches).
- The control valve that regulates flow between West Port and East Port is 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, the 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 for FY 2018. 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) in FY 2018.

RCW Major Users	Type of User	Rated Capacity (MGD)	FY 2018 Actual (MGD)
Kingsway Country Club	Residential Development	0.388	0.155
Maple Leaf Golf Course	Golf Course	0.388	0.025
Port Charlotte Country Club	Golf Course	0.613	0.182
Cape Haze Country Club and Windward Patio Homes	Golf Course/Residential	0.333	0.510
Coral Creek Golf Course	Golf Course	0.308	0.325
Palms Golf Course	Golf Course	0.423	0.329
Riverwood CDD	Residential/ Golf Course	0.800	0.661
Suncoast Lakes	Residential Development	0.136	0.094
Charlotte Sports Park	Athletic Complex/Park	0.446	0.059
Long Marsh Golf Club	Golf Course	0.460	0.401
Deep Creek	Golf Course	0.343	0.213
	TOTALS	4.638	2.954

Table 7-4 East Port WRF Future Major RCW Users

RCW User	Area (acres)	Rate (inches/week)	Capacity (MGD)
Kings Gate 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
Murdock Village	477	1.0	1.850
		TOTALS	2.940

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 where the RCW cascades into the wet well. However, the 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 RCW 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 and remarks were noted:

- A new flow meter on the RCW discharge line is required to measure flow leaving the site. CCU 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.
- CCU 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.
- RCW demand is expected to grow within the next 2 years proportionally to the surrounding area development. The Chief Operator mentioned a few new developments in the area such as Lamar Development and Myriad RV Park, and three golf courses that are being restored. Upgrades are expected to be required to keep pace with demand, including new transmission mains.
- Additionally, new demands for RCW are expected from existing developments due to saltwater intrusion in their wells (e.g., the Marina). Plant upgrades will be required to supply these new demands.

7.2.1 Irrigation and Other RCW Applications

In 2005, CCU 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. CCU's agreement with the Tern Bay Golf Course initially required CCU 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. CCU 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 Course	Landscape Irrigation	0.9891
Tern Bay	Landscape Irrigation	0.6982
Tuckers Grade and Interstate	Landscape Irrigation	0.1474
RV Resort at Tranquility Lake	Landscape Irrigation	0.0698
Burnt Store Lakes – Amenities	Landscape Irrigation	0.0477
	TOTAL	1.9629

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 inform customers with the required description of the backflow prevention. A CCU database has been created that includes information on each water user, the backflow prevention measures in place at their site, backflow testing requirements, and communication with the customer. This information

satisfies the FDEP requirements for implementation of a Backflow and Cross-Connection Prevention Program. CCU'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 2018 Program Statistics:

- Hydrant Meters Repairs/Tests: 8
- Cross-Connections Inspected: 4,160
- Charlotte County Backflow Tests: 240
- Potential Cross-Connections Corrected: 3

7.5 Review of Previous Annual Report Recommendations

Table 7-6 and Table 7-7 summarize the recommendations and status from the 2017 Annual Reports for the Mid/West and South County distribution systems, respectively.

Table 7-6 Mid/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 CCU customer base.
Progress:	*Ongoing.*
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.
Progress:	*Not accomplished, but feasibility ongoing.*
Recommendation:	Add more large users to the combined RCW system. *Deep Creek Golf Course was supplied 0.213 MGD in FY 2018.*
Progress:	*The number of Master Reuse Permit major RCW users increased by 9.1 percent from FY 2017 to FY 2018.*
Recommendation:	Replace the 2-inch meter on the 6-inch line near the Sports Complex.
Progress:	*Not accomplished.*

Table 7-7 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.
Progress:	*Feasibility ongoing.*
Recommendation:	Acquire one large RCW customer in the South County service area as part of the facility expansion and addition of RCW storage.
Progress:	*Not accomplished, but feasibility ongoing.*

7.6 Summary and Recommendations

Over the past decade, CCU has developed a Master Reuse System in Mid/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, a 3 MG tank at Rotonda WRF, and 20 MG of additional storage capacity at the West

Port WRF storage ponds. CCU 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 CCU 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. CCU intends to address the required improvements as part of the WRF upgrade, which will increase the functionality of the RCW system and allow CCU to add future customers. Table 7-8 and Table 7-9 list the recommendations for the Mid/West and South distribution systems from the 2018 site visit. Table 7-10 addresses the recommendations made regarding the Backflow and Cross-Connection Prevention Program.

Table 7-8 Mid/West County RCW Distribution System – 2018 Recommendations

Recommendation:	Develop a comprehensive operating protocol for the entire RCW system to provide a reliable source of reclaim water to the CCU 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:	Evaluate adding another GST to provide storage in West County due to the large number of RCW bulk users.
Recommendation:	Replace the 2-inch meter on the 6-inch line near the Sports Complex.
Recommendation:	Complete connection of Lemon Bay Golf Course as RCW bulk user in West County.
Recommendation:	Evaluate adding piping connections (including controls, pumps, valves, meters, etc.) to increase the number of RCW small users in Mid County.
Recommendation:	Repair the weak berm around the pond wall at the Rotonda WRF.

Table 7-9 South County RCW Distribution System – 2018 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.
Recommendation:	Evaluate the treatment capacity against the future demands associated with rapid development in the area and due to saltwater intrusion in existing private wells.

Table 7-10 Backflow and Cross-Connection Prevention Program – 2018 Recommendations

Recommendation:	Evaluate the establishment of a program to track cross-connection inspections.

8 ENGINEERING

The Engineering Division is responsible for preparing and managing engineering reports, studies, and construction designs.

8.1 CAPITAL IMPROVEMENT PROGRAM

The CIP is designed to plan and construct improvements to the CCU water, wastewater, and RCW systems. As Charlotte County's population continues to grow, CCU's ability to develop plans that address the projected growth is vital. The following section summarizes CIP projects in progress or initiated in FY 2018. A project is considered major when the expenditure is over $100,000.

8.1.1 CIP PROJECTS – WATER SYSTEM

Table 8-1 lists the water system CIP projects initiated or in progress during FY 2018. The total FY 2018 budget was $1,994,000 and the total expenditure was $1,356,000. The largest expenditure was the installation of new water distribution piping.

Table 8-1 Water System CIP Projects in Progress or Initiated in FY 2018 ($ in Thousands)

Description	Funding Source[1]	Original FY 2018 Budget	2018 Expenditures	Percent of Budget Expended
Meter Fixed Base System	Oper	$144	$66	46%
New Water Distribution Ext Piping	L.E.	$250	$623	249%
Water Distribution Pipe Replacement	R & R	$500	$250	50%
Hillsborough/Chancellor Portable Wtr Mn	Conn-Wtr	$230	$ -	0%
Ingraham Potable Water	Sinking	$145	$ -	0%
Ingraham Potable Water	Conn-Wtr	$ -	$37	0%
Booster Station R&R	R & R	$500	$ -	0%
Major Water Transmission Lines	Conn-Wtr	$ -	$380	0%
Major Water Transmission Lines	R & R	$225	$ -	0%
	TOTAL	$1,994	$1,356	68%

[1] Funding sources: D.P. = Debt Proceeds; Oper = O&M Fund; L.E = Line Extension; R&R = Renewal & Replacement Fund; Sinking = Sinking Fund; Conn-Wtr = Water Connection Fee Fund.

8.1.2 CIP Projects – Wastewater System

Table 8-2 lists the wastewater system CIP projects initiated or in progress during FY 2018. The total wastewater budget allotted for FY 2018 was $22,193,000 and the total amount spent was $18,196,000.

Table 8-2 Wastewater System CIP Projects in Progress or Initiated in FY 2018 ($ in Thousands)

Description	Funding Source	Original FY 2018 Budget	2018 Expenditures	Percent of Budget Expended
East Port Expansion Water Reclaim Facility	Conn-Swr	$ -	$(112)	0%
Burnt Store - WW Treatment Plant	Sinking	$109	$ -	0%
Wastewater Force Mains	D.P.	$900	$ -	0%
Wastewater Force Mains	R & R	$400	$ -	0%
Wastewater Force Mains	Conn-Swr	$ -	$423	0%
Wastewater Lift Stations	R & R	$600	$23	4%
Spring Lake MSBU WW Expansion	Oper	$ -	$1,470	0%
Spring Lake MSBU WW Expansion	MSBU	$320	$3,685	1152%
Wastewater Collection Infrastructure	L.E.	$170	$1,143	672%
Wastewater Force Main Replacements	R & R	$300	$64	21%
Wastewater Force Main Replacements	Conn-Swr	$135	$3	2%
Master Lift Stations	R & R	$800	$ -	0%
Northshore Wastewater Expansion	MSBU	$1	$ -	0%
Burnt Store Phase 3	Sinking	$124	$ -	0%
Grand Master LS - Loveland Blvd	U.C.P.F	$ -	$6,144	0%
Grand Master LS - Loveland Blvd	Sinking	$233	$ -	0%
Veterans Force Main	D.P.	$3,400	$ -	0%
Veterans Force Main	Sinking	$145	$ -	0%
Myakka River Crossings - Gulf Cove	D.P.	$1,280	$ -	0%
Myakka River Crossings - Gulf Cove	Sinking	$109	$ -	0%
Myakka River Crossings - River to SR 776	Sinking	$43	$ -	0%

Description	Funding Source	Original FY 2018 Budget	2018 Expenditures	Percent of Budget Expended
Myakka River Crossings - River to SR776	Conn-Wtr	$ -	$112	0%
Burnt Store Phase 2	Conn-Wtr	$10	$11	110%
Burnt Store Phase 2	Conn-Swr	$9	$10	111%
Charlotte Harbor Water Quality Initiative Ph 2	BP	$ -	$297	0%
Charlotte Harbor Water Quality Initiative Ph 2	Oper	$ -	$35	0%
Charlotte Harbor Water Quality Initiative Ph 2	Conn-Swr	$3,300	$ -	0%
Charlotte Harbor Water Quality Initiative Ph 2	SUB	$4,760	$ -	0%
CCU Sewer Master Plan	Oper	$1	$31	3100%
Repair, Replace, Reline Wastewater Coll. Sys.	R & R	$350	$ -	0%
West Port Water Reclamation Facility	R & R	$ -	$6	0%
Water Transmission/Wastewater Collection Reim	Conn-Swr	$21	$ -	0%
Utility Installations for US 41 Widening	C.P.F.	$ -	$(618)	0%
Utility Installations for US 41 Widening	Oper	$ -	$12	0%
CCU Business Services Customer Software	Oper	$ -	$7	0%
Midway Phase 3	Sinking	$287	$ -	0%
Midway Phase 3	Bond	$ -	$519	0%
09-0011 - Sewer - Edgewater Phase 2	D.P.	$ -	$16	0%
Gasparilla Rd CR 771-CR 776 to Rotonda Blvd	Sinking	$286	$ -	0%
Parkside Harbor - US41 To Olean	Sinking	$57	$ -	0%
Parkside Harbor - US41 To Olean	U.C.P.F	$ -	$1,874	0%
Parkside Elkcam Blvd	Sinking	$128	$ -	%
Parkside Gertruce Ave and Aaron St Imp	D.P.	$400	$ -	0%
Parkside Gertruce Ave and Aaron St Imp	Sinking	$96	$ -	0%
Parkside Olean Blvd (US41 to Easy) Imp	U.C.P.F	$1,688	$ -	0%
Parkside Amborse Lane-West Tarpon	D.P.	$ -	$24	0%
Parkside Amborse Lane-West Tarpon	Sinking	$58	$ -	0%

Description	Funding Source	Original FY 2018 Budget	2018 Expenditures	Percent of Budget Expended
Central County Infrastructure	Conn-Swr	$ -	$1,317	0%
Central County Infrastructure	R & R	$ -	$868	0%
CHWQ - Countryman & Ackerman	Oper	$1,553	$71	5%
Mid-County 24-Inch Force Main Extension	U.C.P.F	$ -	$756	0%
Water & Sewer Waterway Crossings	R & R	$120	$5	4%
	TOTAL	$22,193	$18,196	82%

[1] Funding sources: R&R = Renewal & Replacement Fund; Conn-Wtr = Water Connection Fee Fund; BP = British Petroleum; Oper = O & M Fund; SRF = State Revolving Fund; MSBU = Municipal Service Benefit Unit; S.T. = Sales Tax; Sinking = Sinking Fund; Grant = Grant Funding; Bond = Bond Funding; Conn-Swr = Sewer Connection Fee Fund; U.C.P.F. = Utility Capital Projects Fund; DEV = Developer Proceeds.

8.1.3 CIP Projects – Reclaimed Water System

Table 8-3 lists the RCW system capital improvement projects initiated or in progress during FY 2018. The total amount budgeted for FY 2018 was $200,000 and $6,167,000 was expended.

Table 8-3 RCW System CIP Projects in Progress or Initiated in FY 2018 ($ in Thousands)

Description	Funding Source	Original FY 2018 Budget	2018 Expenditures	Percent of Budget Expended
US 41 Reclaimed Water Lines	Conn-Swr	$0	$3	0%
Reclaimed Water Service Connection	Conn-Swr	$0	$49	0%
Reclaimed Water Service Connection	DEV	$100	$0	0%
Reclaimed Water Service Connection	G.P.	$100	$0	0%
Reclaimed Water Expansion Phase 3	Conn-Swr	$0	$ 1,823	0%
Reclaimed Water Expansion Phase 3	R & R	$0	$4,292	0%
Reclaimed Water Expansion Phase 3	Grant	$0	$0	0%
	TOTAL	$200	$6,167	0%

[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; DEV = Developer Proceeds.

8.1.4 CIP – 5-YEAR PLAN

CCU develops and maintains a 5-year CIP to plan for the growth in Charlotte County. Table 8-4 summarizes projects included in CCU's 5-year CIP for the water, wastewater, and RCW systems.

Table 8-4 Capital Improvement Program – 2018 and Future Water and Sewer Project Costs ($ in Thousands)

Project Names	Prior Years Actual	Actual FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024	Future Years	Total
Meter Fixed Base System	$9,065	$66	$0	$0	$0	$0	$0	$0	$0	$9,131
Potable Water Line Extensions	$890	$623	$500	$250	$250	$300	$300	$0	$5,700	$8,813
Water Distribution Piping Line Extension	$896	$250	$500	$500	$500	$500	$500	$0	$5,700	$9,346
Burnt Store Well Field	$246	$0	$0	$0	$0	$0	$0	$0	$845	$1,091
Hillsborough/Chancellor Portable Water Main	$358	$0	$0	$0	$0	$0	$0	$0	$2,000	$2,358
Ingraham Potable Water Booster Station	$149	$37	$0	$0	$0	$0	$0	$0	$0	$186
PG WTP-BS-WTP and Babcock Wellfield Interconnect	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
2-5 Million Gallon Potable Water Storage Tanks	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Booster Station Rehab	$0	$0	$500	$300	$300	$0	$0	$0	$0	$1,100
Major Water Transmission Lines	$6,974	$380	$225	$225	$225	$250	$250	$0	$4,225	$12,754
East Port Expansion Water Reclamation Facility	$18,991	$112	$0	$0	$0	$0	$0	$0	$44,307	$63,186
Burnt Store Water Reclamation Facility	$4,264	$0	$109	$106	$0	$0	$0	$0	$69,456	$73,935
Wastewater Force Mains Expansionary	$3,655	$423	$250	$250	$250	$250	$250	$0	$4,000	$9,328

Project Names	Prior Years Actual	Actual FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024	Future Years	Total
Wastewater Lift Stations Replacement/ Restoration	$7,831	$23	$600	$600	$500	$430	$600	$0	$9,000	$19,584
Reclaimed Water Lines	$142	$3	$150	$150	$150	$150	$150	$0	$2,250	$3,145
Spring Lake MSBU Wastewater Expansion	$9,772	$5,155	$308	$296	$284	$271	$258	$0	$0	$16,344
Reclaimed Water Expansion Phase 2	$3,930	$0	$0	$0	$0	$0	$0	$0	$0	$3,930
Reclaimed Water Main 12 Inch East Port WRF to Harborview Rd	$0	$0	$0	$0	$0	$0	$0	$0	$222	$222
Wastewater Line Extensions	$796	$1,143	$1,000	$1,250	$1,250	$1,250	$1,250	$0	$18,750	$26,689
Wastewater Force Mains Replacement - Deep Creek	$1,960	$67	$285	$435	$435	$435	$435	$0	$6,525	$10,577
Master Lift Stations	$99	$0	$250	$250	$250	$250	$250	$0	$4,000	$5,349
Rotonda Water Reclamation Facility Phase II Expansion	$0	$0	$0	$0	$0	$0	$0	$0	$4,000	$4,000
Northshore Wastewater Exp MSBU	$506	$0	$1	$1	$1	$1	$1	$0	$0	$511
Reclaimed Connections for County Facilities	$0	$49	$100	$200	$0	$0	$0	$0	$0	$349
West Port WRF Monitoring Well Rehabilitation/ Replacement	$0	$0	$0	$50	$0	$0	$50	$0	$250	$350
Burnt Store Phase 3	$2,071	$0	$119	$114	$108	$102	$96	$0	$578	$3,188

Project Names	Prior Years Actual	Actual FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024	Future Years	Total
Reclaim Water Expansion Phase 3	$337	$6,115	$0	$0	$0	$0	$0	$0	$0	$6,452
Grand Master Lift Station & Gravity Interceptor - Loveland	$1,045	$6,144	$0	$0	$0	$0	$0	$0	$0	$7,189
Veterans Wastewater Force Main	$0	$0	$0	$0	$0	$0	$0	$0	$3,710	$3,710
Myakka River 24-inch Water Main	$0	$0	$1,280	$0	$0	$0	$0	$0	$0	$1,280
Myakka Potable Water Booster Station	$78	$112		$0	$0	$0	$0	$0	$0	$190
Burnt Store Phase 2	$252	$21	$55	$0	$0	$0	$0	$0	$8,000	$8,328
Charlotte Harbor Water Quality Initiative Phase 3 - Harbour Heights	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Charlotte Harbor Water Quality Initiative Phase 2 - EL Jobean	$0	$332	$0	$0	$0	$0	$0	$0	$0	$32
Charlotte County Utilities - Sewer Master Plan	$8	$31	$0	$0	$0	$500	$400	$0	$900	$1,839
Repair, Replace, Reline Wastewater Collection System	$9,574	$0	$150	$150	$150	$150	$150	$0	$2,250	$12,574

Project Names	Prior Years Actual	Actual FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024	Future Years	Total
West Port Water Reclamation Facility	$12,405	$6	$0	$0	$0	$0	$0	$0	$22,722	$35,133
Water Transmission/ Wastewater Collection Reimbursement	$210	$0	$500	$500	$500	$500	$500	$0	$7,500	$10,210
Utility Installations for US 41 Widening Project	$7,230	$606	$0	$0	$0	$0	$0	$0	$0	$6,624
CCU Business Services Customer Billing and Database	$1,147	$7	$0	$799		$800	$800	$0	$4,800	$8,353
Midway Phase 3	$4,880	$519	$0	$0	$0	$0	$0	$0	$0	$5,399
Edgewater Phase 2	$4,684	$16	$0	$0	$0	$0	$0	$0	$0	$4,700
Gasparilla Rd/CR 771- Water Main, Wastewater Force Main, Reclaimed Force Main	$8,483	$0	$0	$0	$0	$0	$0	$0	$0	$8,483
Parkside - Harbor Blvd – US 41 to Olean Improvements	$39	$1,874	$0	$0	$0	$0	$0	$0	$0	$1,913
Parkside Elkcam	$2,625	$0	$123	$118	$113	$107	$101	$0	$768	$3,982
Parkside - Gertrude and Aaron Street Improvements	$31	$0	$0	$0	$0	$0	$0	$0	$0	$31
Parkside - Olean Blvd (US 41 to Easy) Improvements	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0

Project Names	Prior Years Actual	Actual FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024	Future Years	Total
Parkside - Ambrose Lane-West Tarpon Improvements	$1,640	$24	$0	$0	$0	$0	$0	$0	$0	$1,664
Mid County Infrastructure	$4,582	$2,185	$0	$0	$0	$0	$0	$0	$0	$6,767
Charlotte Harbor Water Quality Initiative Phase 2 - Countryman & Ackerman	$319	$71	$0	$0	$0	$0	$0	$0	$0	$390
Charlotte Harbor Water Quality Initiative Phase 2 - US41	$0	$0	$0	$0	$0	$0	$0	$0	$939	$939
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	$756	$0	$0	$0	$0	$0	$0	$0	$756
Utility Equipment Replacements	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Utility Improvements US 41 - SB Enterprise to Midway	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Waterway Crossings for Public Works (Water & Sewer)	$3,860	$5	$120	$120	$120	$120	$120	$0	$2,460	$6,925
TOTALS	$136,051	$25,719	$7,125	$6,664	$5,386	$6,366	$6,461	$0	$238,876	$432,648

8.2 REVIEW OF DESIGN, REPORTS, AND STUDIES

The following describes reports and studies prepared by CCU Engineering or submitted by external engineering consultants in FY 2017. Prior year reports and annual reoccurring reports are also included for reference.

8.2.1 REPORTS COMPLETED IN FY 2018

- BODR Myakka Potable Water Booster Station Study

  In March 2018, Stantec Consulting Engineers submitted the final report for a 24-inch transmission main coming from the Walenda Water Booster Station and storage tank, across the Myakka River, to the Rotonda Booster Station in West Charlotte County.

8.2.2 ANNUAL REPORTS COMPLETED IN FY 2018

- Quarterly Operations Report

  For Water Year 2018, quarterly updates of all compliance items and upcoming regulatory requirements for all permitted facilities were submitted. The quarterly update is based on Discharge Monitoring Reports (DMRs) and flow information provided to Stantec on a monthly basis. The quarterly report also highlights upcoming permit requirements and includes a completion schedule for required permit tasks.

- Charlotte County Utilities Department 2017 Annual Report

  The FY 2017 Annual Report was prepared and submitted for public access April 2018.

- Capacity Analysis Report – Burnt Store WRF

  A capacity analysis letter report was prepared for the Burnt Store WRF and submitted to FDEP in December 2018. 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.

- Annual Burnt Store Wellfield Report

  In March 2018, RMA GeoLogic submitted the Annual Burnt Store Wellfield Report. This report is a comprehensive but concise annual report on the wellfield operation and assesses 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.

8.2.3 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 Oceanographic 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.

8.2.4 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 Discharge Monitoring Reports (DMRs) and flow information provided to Stantec on a monthly basis. The quarterly report also highlights upcoming permit requirements and includes a completion schedule for required permit tasks.

- 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 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. This report is a comprehensive but concise annual report on the wellfield operation and assesses 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 CCU facilities by Stantec. The annual facility audit update reviews the facilities' status and identifies items that may be addressed in the FDEP annual inspection.

9 CONSOLIDATED RECOMMENDATIONS

9.1 PLANNING RECOMMENDATIONS

The following tables summarize the Planning Recommendations from Chapter 2. The information is presented based on operational functions.

Table 9-1 Administration Planning Recommendations

Recommendation:	Continue CCU'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 exploring regional solutions to water and wastewater service needs for the mutual benefit of Charlotte County and adjoining counties and cities.

Table 9-2 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 CCU water system to maximize reliability and reduce costs to CCU 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 9-3 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 and smoke test gravity sewers to locate source(s) 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 9-4 RCW System Planning Recommendations

Recommendation:	Continue Phase 3 of the RCW expansion project that began 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 CCU WRFs including improving reliability and access for customers.
Recommendation:	Expand public-access RCW for the Burnt Store WRF.

9.2 CAPITAL IMPROVEMENTS

9.2.1 WATER TREATMENT PLANTS

The PRMRWSF is owned, operated, and maintained by the PRMRWSA, and therefore, CCU does not plan for capital improvements related to this facility. Table 9-5 summarizes CIP projects associated with the Burnt Store RO WTP.

Table 9-5 Burnt Store RO WTP – CIP Recommendations

Recommendation:	Determine the ultimate use of Well No. 15.
Recommendation:	Perform a load study to identify any issues related to power quality, quantity, and capacity of the system. The load study will help identify deficiencies in the system, reserve capacities, and potential anomalies that may affect long-term maintenance and serviceability of the equipment.

9.2.2 WATER DISTRIBUTION SYSTEM

Table 9-6 Mid/West County Distribution System – CIP Recommendations

Recommendations:	**Interconnects** ▪ Install a canopy over the control panel at the EWD interconnect. ▪ Complete the relocation of the North Port interconnect at Flamingo Boulevard.
Recommendations:	**WBS General** ▪ Perform a load study to identify any issues related to power quality, quantity, and capacity and to help identify deficiencies in the system, reserve capacities, and potential anomalies that may affect long-term maintenance and serviceability of the equipment. ▪ Apply appropriate arc flash labeling on appropriate switchgear in compliance with NFPA 70E to properly notify O&M 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.
Recommendations:	**Port Charlotte Golf Course WBS** ▪ Evaluate 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.
Recommendations:	**Walenda WBS** ▪ Replace the generator at the WBS with a properly sized generator to accommodate the loads and ensure reliable operation of the station.

Recommendations:	**Gulf Cove WBS** ▪ Continue to upgrade the WBS 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 WBS. ▪ Conduct further analysis of the ATS 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 exists that may be detrimental to the drive or the electrical system.
Recommendations:	**Rotonda WBS** ▪ Complete installation of the 24-inch water transmission main from Ingraham Street to the Rotonda GST. ▪ Conduct further analysis of the ATS based on the degradation of the enclosure to ensure that it is functioning properly.
Recommendation:	**Ingraham Disinfection Station** ▪ Cover the sodium hypochlorite storage tank and associated piping to prevent sun exposure and degradation.

Table 9-7 South County Distribution System – CIP Recommendations

Recommendation:	Continue replacing 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.

9.2.3 Wastewater Collection System

Table 9-8 Wastewater Collection System – CIP Recommendations

Recommendations:	**Lift Station No. 1 – Community Center** ▪ Provide an odor-control system. ▪ Install seal-offs on any electrical equipment within 10’ of the wet well to return to conformance with code. ▪ Perform thorough rehabilitation of the lift station including repairing the building or replace the station with a modern submersible configuration with all new equipment.

	Lift Station No. 7 – Pure Oil
Recommendations:	▪ Install an odor-control system. ▪ Install seal-offs on any electrical equipment within 10 feet of the wet well to return to conformance with code. ▪ Perform thorough rehabilitation including the improvements listed above or replace the station with a modern submersible configuration and new equipment. ▪ Evaluate a dedicated access to the station.
	Lift Station No. 15 – Sistina
Recommendation:	▪ Replace the valve vault and bring to current standards or evaluate converting the valves to aboveground. ▪ Evaluate the adjacent lot for future lift station conversion.
	Lift Station No. 28 – Peachlove
Recommendations:	▪ Replace concrete control panel posts with County aluminum standard. ▪ Re-line the wet well or specifically address the exposed penetrations and seams. ▪ Replace the odor-control system base. ▪ Evaluate and prepare for rearrangement of the site to accommodate east access.
	Lift Station No. 65 – South Port Master Lift Station
Recommendations:	▪ Evaluate generator control elevations to conform to code. ▪ Evaluate the use of a chopper pump or grinder station to reduce ragging.
	Lift Station No. 82 – Selkirk Maple Leaf Estates
Recommendation:	▪ Install seal-offs on any electrical equipment within 10 feet of the wet well to return to conformance with code.
	Lift Station No. 123 – KHW Walmart
Recommendations:	▪ Evaluate the lift station site to determine the source of the settling and either repair with flowable fill or relocated the station to an adjacent site. ▪ Install a 6-inch force main to connect to the manifold 8-inch force main at King's Highway.
	Lift Station No. 301 – San Marino
Recommendation:	▪ Install seal-offs on any electrical equipment within 10 feet of the wet well to return to conformance with code.
	Lift Station No. 303 – Constantine
Recommendations:	▪ Install seal-offs and interlocks on electrical equipment and perform a detailed electrical code review to return to conformance with code. ▪ Evaluate the adjacent lot for future lift station conversion. ▪ Evaluate the installation of a secondary standby pump.

	Lift Station No. 309 – Bridgewater Master Lift Station
Recommendations:	▪ Provide a stationary generator. ▪ Evaluate pump capacities for potential upsizing. ▪ Replace concrete control panel posts with County aluminum standard.
	Lift Station No. 323 – Aysen
Recommendations:	▪ Install seal-offs and interlocks on electrical equipment and perform a detailed electrical code review to return to conformance with code. ▪ Proceed with lift station conversion.
	Lift Station No. 415 – Prada
Recommendations:	▪ Install seal-offs on any electrical equipment within 10 feet of the wet well to return to conformance with code. ▪ Evaluate upgrading the electrical including replacing the aging control panel, updating the conduit location, and generally bringing the system up to current standards.
	Lift Station No. 442 – Doredo 2
Recommendations:	▪ Evaluate an adjacent lot for future lift station conversion. ▪ Evaluate the installation of a secondary standby pump.
	Lift Station No. 800 – Holiday Lakes
Recommendations:	▪ Install seal-offs on any electrical equipment within 10 feet of the wet well to return to conformance with code. ▪ Evaluate the odor-control unit to prevent algae growth. ▪ Evaluate the possibility of an on-site generator in preparation for the projected future buildout.
	Lift Station No. 816 – Rotonda Blvd. West Master Lift Station
Recommendations:	▪ Install seal-offs on any electrical equipment within 10 feet of the wet well to return to conformance with code. ▪ Evaluate the adjacent lot for future lift station conversion. ▪ Replace the valve vault and bring to current standards or evaluate converting the valves to aboveground.
	Lift Station No. 817 – Bunker Road
Recommendations:	▪ Install interconnect and seal-offs on any electrical equipment within 10 feet of the wet well to return to conformance with code. ▪ Evaluate the adjacent lots for future lift station conversion.
	Lift Station No. 828 – Sweetwater
Recommendations:	▪ Evaluate fencing and odor control at this site. ▪ Move the control panel and meter to the updated posts.
	Lift Station No. 845 – David
Recommendation:	▪ Replace or repair the valve vault and piping.

9.2.4 WASTEWATER TREATMENT FACILITIES

Table 9-9 CCU EPLAB – CIP Recommendations

Recommendation:	Evaluate staffing requirements and ability to provide additional sampling support to Operations staff.
Recommendation:	Recommend seeking certification for potable water Total Dissolved Solids (TDS) and Sulfate.

Table 9-10 East Port WRF – CIP Recommendations

Recommendation:	Complete construction of the Stage 5 RCW Improvements to the effluent storage ponds, HSP station, and 1,500-kW stand-by power generator.
Recommendation:	Work with the East Port WRF Expansion Design Engineer to evaluate the expansion from 6.0 MGD to 9.0 MGD or to 12.0 MGD. As part of the expansion include: ▪ Evaluate the structural integrity of the digester walkways and the digester's ability to serve as an influent EQ tank. ▪ Evaluate the new Chemical Feed and Analyzer Building for meeting high-level disinfection requirements required for producing unrestricted PAR water.
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:	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 the 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 9-11 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 RCW from West Port during wet-weather events.
Recommendation:	Evaluate adding a flow EQ tank to improve treatment plant operations.
Recommendation:	Replace the overflow weirs for all four clarifiers.
Recommendation:	Install a galvanized metal frame and UV cover above each filter tank to prevent algae growth in the filters.

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 the 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 9-12 Rotonda WRF – CIP Recommendations

Recommendation:	Replace the grit cyclones of the headworks.
Recommendation:	Replace Blower No. 5 with the correct cfm-capacity blower 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 to the Placida Corridor.
Recommendation:	Evaluate ASR for additional RCW storage.
Recommendation:	Evaluate different aeration systems for the RCW storage pond.
Recommendation:	Replace hypochlorite feed pump No. 3.
Recommendation:	Add a small winch to each decant pump in the sludge-holding tanks for better control of the pump level.
Recommendation:	Replace motherboard and refrigerator unit in the effluent sampler.
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 9-13 Burnt Store WRF – CIP Recommendations

Recommendation:	Install a mechanical screen (highest priority) and grit removal system (secondary priority) in a new headworks.
Recommendation:	Install EQ tank-level monitoring to adjust the transfer pump(s) flow rates.
Recommendation:	Replace aeration tank hinged sluice gates to provide adequate prevention of flow entering the adjacent tank during maintenance.
Recommendation:	Evaluate adding fine mechanical screens to the headworks.
Recommendation:	Install an RCW meter on the discharge line from the RCW pumps to measure public-access RCW flow leaving the site.
Recommendation:	Install a pumping system that will pump effluent to the deep injection well pumping station or increase the capacity of the gravity pipe to maximize the capacity of the deep injection wells' system.
Recommendation:	Replace the old deep well injection pumps.
Recommendation:	Replace the fiberglass MCC building with a concrete structure.

Recommendation:	Apply appropriate arc flash labeling on all appropriate switchgear in compliance with NFPA 70E to properly notify O&M 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.

Table 9-14 Leachate Treatment Facility – CIP Recommendations

Recommendation:	Evaluate the installation of a sensor lift.

9.2.5 Reclaimed Water Distribution System

Table 9-15 Mid/West County RCW Distribution System – CIP Recommendations

Recommendation:	Evaluate adding another GST to provide storage in West County due to the large number of RCW bulk users.
Recommendation:	Complete connection of Lemon Bay Golf Course as an RCW bulk user in West County.
Recommendation:	Evaluate adding piping connections (including controls, pumps, valves, meters, etc.) to increase the number of RCW small users in Mid County.

Table 9-16 South County RCW Distribution System – CIP Recommendations

Recommendation:	Evaluate the treatment capacity against the future demands associated with rapid development in the area and due to saltwater intrusion in existing private wells.

Table 9-17 Backflow and Cross-Connection Prevention Program – CIP Recommendations

Recommendation:	Evaluate establishing a program to track cross-connection inspections.

9.3 Operations and Maintenance

The following O&M items are recommended for FY 2018 and beyond.

9.3.1 Water Treatment Plants

Table 9-18 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:	Paint the motor on Jockey Pump A and the bases on other motors.
Recommendation:	Replace multiple end caps that are leaking on Trains C and D.
Recommendation:	Paint the concentrate disposal wet well.
Recommendation:	Repair the cameras on site.
Recommendation:	Paint GST A and GST B.
Recommendation:	Test the functionality of the membrane cleaning system and develop SOPs for membrane cleaning.
Recommendation:	Conduct 5-year GST cleaning and inspections in accordance with FDEP Rule 62-555.350(2), FAC.
Recommendation:	Paint the outside of the MCC building.
Recommendation:	Pressure wash the outside of the Operations building.
Recommendation:	County should have the fuel-level alarm adjusted to accurately predict high-level conditions.

9.3.2 Water Distribution System

Table 9-19 Mid/West County Distribution System – O&M Recommendations

Recommendation:	**Port Charlotte Golf Course WBS** ▪ Label the switchgear to identify parts and components that could be energized.
Recommendation:	**Walenda WBS** ▪ Re-paint the outside of the GST.
Recommendations:	**Gulf Cove WBS** ▪ Paint the concrete support on the influent pipe to the GST to prevent deterioration. ▪ Paint the floor in the sodium hypochlorite chemical injection room to prevent concrete deterioration.
Recommendation:	**Rotonda WBS** ▪ Replace the VFD covers to eliminate gaps between the updated VFDs and the enclosures.
Recommendation:	**Ingraham Disinfection Station** ▪ Repair the doorstep to the water quality testing and storage shed.

9.3.3 WASTEWATER COLLECTION SYSTEM

Table 9-20 Wastewater Collection System – O&M Recommendations

Recommendations:	**Lift Station No. 1 – Community Center** ▪ Paint the aboveground discharge pump and piping. ▪ Repair/replace the patched wye connection. ▪ Repair cracks in the building. ▪ Seal pipe penetrations. ▪ Replace the outdated control panel and bring electrical up to current standards.
Recommendations:	**Lift Station No. 7 – Pure Oil** ▪ Repair the roof overhang. ▪ Replace the glass windowpanes. ▪ Paint the building.
Recommendations:	**Lift Station No. 15 – Sistina** ▪ Coat the wet well or repair some of the degraded concrete. ▪ Install seal-offs and interlocks on any electrical equipment within 10 feet of the wet well to return to conformance with code.
Recommendation:	**Lift Station No. 28 – Peachlove** ▪ Grout the valve vault at appropriate slope.
Recommendations:	**Lift Station No. 65 – South Port Master Lift Station** ▪ Fence the entire site. ▪ Repair the flow meter. ▪ Bolt down transformer.
Recommendation:	**Lift Station No. 82 – Selkirk Maple Leaf Estates** ▪ Coat the wet well or repair some of the degraded concrete.
Recommendation:	**Lift Station No. 123 – KHW Walmart** ▪ None.
Recommendations:	**Lift Station No. 301 – San Marino** ▪ Coat the wet well or repair some of the degraded concrete. ▪ Clear out the valve vault and perform required repair to maintain integrity.
Recommendation:	**Lift Station No. 303 – Constantine** ▪ Coat the wet well or repair some of the degraded concrete.
Recommendation:	**Lift Station No. 309 – Bridgewater Master Lift Station** ▪ Coat the wet well.
Recommendation:	**Lift Station No. 323 – Aysen** ▪ Coat the wet well and seal and repair the contents of the valve vault.
Recommendation:	**Lift Station No. 415 – Prada** ▪ Coat the wet well and seal and repair the contents of the valve vault.

Recommendation:	**Lift Station No. 442 – Doredo 2** ▪ None
Recommendation:	**Lift Station No. 800 – Holiday Lakes** ▪ Coat or repair the pipe penetrations within the wet well.
Recommendations:	**Lift Station No. 816 – Rotonda Blvd. West Master Lift Station** ▪ Coat the wet well. ▪ Repair or rehabilitate the concrete top slab.
Recommendation:	**Lift Station No. 817 – Bunker Road** ▪ Coat the wet well and seal and repair the contents of the valve vault.
Recommendation:	**Lift Station No. 828 – Sweetwater** ▪ Coat the wet well and seal and repair the contents of the valve vault.
Recommendation:	**Lift Station No. 845 – David** ▪ None.

9.3.4 WASTEWATER TREATMENT FACILITIES

Table 9-21 EPLAB - O&M Recommendations

Recommendation:	Continue implementation of the LIMS system.
Recommendation:	Continue working with sampling personnel on sampling protocol to improve the accuracy.

Table 9-22 West Port WRF – O&M Recommendations

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:	Proceed with the scheduled repair and/or replacement and painting of Clarifier Nos. 3 and 4. Include leveling of clarifier overflow weirs.
Recommendation:	Secure all electrical switchgear to prevent unauthorized access or inadvertent exposure to live parts.

Table 9-23 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:	Complete the replacement of the two main influent valves at the headworks due to corrosion.
Recommendation:	Paint tanks, buildings, and pipes in the next 2 years.
Recommendation:	Complete the repairs of Blower No. 1 and put it back in service.
Recommendation:	Add galvanized metal frame and UV shade cloth to CCC 1.
Recommendation:	Repaint sludge load-out pumps.

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:	Improve the operation of the generators, primarily Generator No. 2.

Table 9-24 Burnt Store WRF – O&M Recommendations

Recommendation:	Remove rust from the top rim of the EQ tank and repaint.
Recommendation:	Repair leaking internal piping, aeration header, and fittings in EQ basin.
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 to prevent tripping when three blowers are in operation.
Recommendation:	Evaluate filter back-wash pump operations, specifically during high-flow events.

9.3.5 Reclaimed Water Distribution System

Table 9-25 Mid/West County RCW Distribution System –O&M Recommendations

Recommendation:	Repair the weak berm around the pond wall at the Rotonda WRF.