Charlotte County Utilities Department

2020 Annual Report
March 2021

Prepared by

JonesEdmunds

2020 ANNUAL REPORT

Prepared for:

Charlotte County Utilities Department

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Certificate of Engineering Authorization #1841

Jones Edmunds Project No.: 03405-029-04

March 2021

SIGN-OFF SHEET

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ABBREVIATIONS AND ACRONYMS

Abbreviation	Definition
AADF	Annual Average Daily Flow
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
BOD	Carbonaceous Biochemical Oxygen Demand (5 day)
CAR	Capacity Analysis Report
CCC	Chlorine Contact Chamber
CCR	Consumer Confidence Report
CCTV	Closed-Circuit Television
CCU	Charlotte County Utilities
CDL	Commercial Driver's License
CDOC	Continuing Demonstrations of Capability
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
°F	Degrees Fahrenheit
DMR	Discharge Monitoring Report
DO	Dissolved Oxygen
EAMS	Enterprise Asset Management System
EPA	US Environmental Protection Agency
EPLAB	East Port Laboratory
EQ	Equalization
ERP	Emergency Response Plan
ERU	Equivalent Residential Unit
EWD	Englewood Water District
FAC	Florida Administrative Code
FDEP	Florida Department of Environmental Protection
FDOH	Florida Department of Health
FEMA	Federal Emergency Management Agency
FOG	Fat, Oil, and Grease
FSAWWA	Florida Section of AWWA
FY	Fiscal Year
GIS	Geographical Information System

GIWA	Gasparilla Island Water Association
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	Homeowners Association
HP	Horsepower
hPa	Hectopascal
HSP	High-Service Pump
HSPS	High-Service Pump Station
I&C	Instrumentation and Controls
I/I	Inflow/Infiltration
IDOC	Initial Demonstrations of Capability
IR	Internal Recycle
IW	Injection Well
kVA	Kilovolt-Ampere
kW	Kilowatt
lb/day	Pounds per Day
LES	Liquid Environmental Solutions
LIMS	Laboratory Information Management System
LPS	Low-Pressure Sewer
LS	Lift Station
LTF	Leachate Treatment Facility
µS/cm	Micro Siemens Per Centimeter
MADF	Maximum Average Daily Flow
MBR	Membrane Bioreactor
MCC	Motor Control Center
MDF	Maximum Daily Flow
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
mm	Millimeter
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
PRMRWSA	Peace River/Manasota Regional Water Supply Authority
PRMRWSF	Peach River/Manasota Regional Water Facility
PRV	Pressure-Reducing Valve
psi	Pounds Per Square Inch
PVC	Polyvinyl Chloride
PWS	Potable Water System
QAS	Quality Assurance Specialist
RAS	Return-Activated Sludge
RO	Reverse Osmosis
ROW	Right-Of-Way
RRA	Risk and Resilience Assessment
RTS	Regional Transmission System
RTU	Radio Telemetry Units
RWBS	Reclaimed Water Booster Stations
SCADA	Supervisory Control and Data Acquisition
SDS	Safety Data Sheet
SF	Square Feet
SRT	Sludge Retention Time
SM	Standard Method
SO	Service Order
SOP	Standard Operating Procedure
SR	State Road
SRF	State Revolving Fund
SRS	Septage Receiving Station
SWFWMD	Southwest Florida Water Management District
TDH	Total Dynamic Head
TDS	Total Dissolved Solids
TMADF	3-Month Average Daily Flow
TMDL	Total Maximum Daily Load
TNI	The National Environmental Laboratory Accreditation
TSS	Total Suspended Solids
UCMR4	Unregulated Contaminant Monitoring Rule
UF/IFAS	University of Florida/Institute for Food and Agricultural
UV	Ultraviolet
VFD	Variable-Frequency Drive
WAS	Waste-Activated Sludge
WBS	Water Booster Stations

WRF	Water Reclamation Facility
WTP	Water Treatment Plant
WUP	Water Use Permit

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 that 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.

Term	Description
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.
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 3 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) 2020 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 distribution systems.

ADMINISTRATION

The Board of County Commissioners (BCC) periodically reviews and determines the appropriate rate structure for providing services to current customers. On February 12, 2019, the BCC approved to increase water, sewer, and reclaimed water rates at 7 percent across the board effective April 1, 2021.

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 and the ability to address customer issues more promptly. 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 2020, more than 99.6 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 2020, approximately 65 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 2020 was:

- $ 77,041,602 (water and wastewater services).
- $ 5,320,295 (connection charges).
- $ 13,814,114 (connection fees).

In FY 2020, CCU continued to see growth with the number of active water customers increasing by 2.20 percent (from 61,287 to 62,638) and the number of active wastewater customers increasing by 2.51 percent (from 39,762 to 40,759).

WATER TREATMENT PLANTS

CCU has two water supply sources for its two independent public water systems (PWSs). CCU is a member government and purchases treated water from the Peace River Manasota Regional Water Supply Authority (PRMRWSA) for the consecutive PWS that 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. In 2020, CCU used 11.1 MGD AADF or approximately 69 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 Million Gallons (MG) of storage. On average, the Burnt Store RO WTP is operating at an average annual capacity of 0.59 MGD or approximately 16 percent of its design capacity. Raw water is supplied by six water production wells. Concentrate from the treatment process is disposed of into two on-site deep injection wells with a combined capacity of 3.44 MGD. The primary recommendations for the Burnt Store RO WTP include performing a load study, applying appropriate arc-flash labeling, and implementing the recommendations from CCU's Risk and Resilience Assessment (RRA) report (CCU, March 2020).

WATER DISTRIBUTION

Chapter 4 reviews and discusses CCU's distribution system infrastructure for its two independent PWSs. At the end of FY 2020, the Mid/West County system had 59,934 service connections and served a population of approximately 150,272. The Mid/West County distribution system consists of approximately 1,464 miles of water main, six active water-booster pumping stations (WBS) with ground storage tanks (GSTs), eight supply interconnects with PRMRWSA, and seven emergency interconnects with neighboring water utilities. The current total GST capacity for this system is 10 MG. The PRMRWSA also has an additional 12 MG of storage capacity available to PRMRWSA members for emergency fire flow or for general distribution during temporary loss of treatment at the PRMRWSF. For FY 2020, the total unaccounted-for water loss for the Mid/West County distribution system was 6.58 percent. The Mid/West County distribution system recommendations include continuing the load studies at the WBSs, applying arc-flash labeling on appropriate equipment, increasing the resiliency at the Gulf Cove WBS by replacing the Myakka River water main, and implementing the recommendations from CCU's RRA report (CCU, March 2020).

At the end of FY 2020, the South County distribution system had 2,703 service connections and served a population of approximately 7,308. The South County distribution system consists of 53 miles of water main and has no interconnects with neighboring water utilities. For FY 2020, the total unaccounted-for water loss for the South County system was 12.6 percent, triggering a water audit, which includes a plan to mitigate the high loss. CCU completed a water loss investigation to identify sources of water loss in FY 2020. Recommendations for the South County system include continuing to replace the old "class" polyvinyl chloride (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 investigating the potential to install interconnects with neighboring utilities to increase system resiliency.

CCU performs preventive maintenance on hydrants and valves throughout both distribution systems. In FY 2020, CCU replaced 13 hydrants, repaired 47 hydrants, and performed maintenance on 648 hydrants; repaired 56-line breaks on pipes 3 inches diameter or larger; and installed six new valves, replaced six valves, and performed maintenance activities on

1,100 valves throughout the Mid/West County and South County distribution systems. The 2020 Consumer Confidence Reports confirms that the water delivered by both CCU water distribution systems meets or exceeds regulatory quality requirements.

WASTEWATER COLLECTION

Chapter 5 presents the CCU wastewater collection system, which currently serves 40,759 customer accounts in four distinct collection areas. The total collection system consists of 365 miles of gravity sewer, 381 miles of low-pressure sewers (LPSs), 24 miles of vacuum sewer, 2 vacuum stations, 186 miles of force main, 318 maintained lift stations (304 owned by CCU), and approximately 7,600 manholes. Wastewater from each customer is transported to one of four water reclamation facilities (WRFs), depending on the location of the customer. The Wastewater Collection workgroup has a maintenance program that includes condition assessment inspections by closed-circuit television (CCTV) and cleaning of collection lines to restore/maintain hydraulic capacity. CCU also owns tanker trucks that are available to haul wastewater from lift stations to the treatment plants during emergencies. CCU used their wastewater collection system hydraulic model to identify deficiencies and improvements throughout the system.

During FY 2020, a site review of random, representative facilities showed them to be maintained in working order. Recommendations for the CCU wastewater collection system mainly 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, four WRFs, and the Zemel Road leachate treatment facility (LTF). The East Port Laboratory (EPLAB) conducts most water quality testing for the County's facilities. The EPLAB is certified to conduct analyses by the Florida Department of Health (FDOH) according to The NELAC Institute (TNI) Standards. During FY 2020, the EPLAB participated in and passed two TNI/FDOH-mandated Proficiency Testing studies. In FY 2020, the laboratory processed 7,674 samples performing 29,954 analyses and also performed additional field sampling and sample courier service responsibilities. With the additional services, staffing requirements may need to be evaluated so that laboratory analysis services are not negatively impacted by work hours spent performing field sampling and/or courier services. The EPLAB uses Laboratory Information Management System (LIMS) – a data management software that generates paper documentation forms and sample identification numbers to record and track test results.

Table ES-1 summarizes permit information and current percent permit capacity associated with each WRF. The WRFs are complex plants that require continual repair and maintenance. In FY 2020, the WRFs were operating within their permit limits for flow and effluent quality. The main recommendations include completing the upgrades and expansion at the East Port WRF, completing the expansion plans for the Burnt Store WRF, evaluating improvements for biosolids handling facilities at all four WRFs, and conducting a Facilities Master Plan to determine the appropriate projects that should be completed at the Rotonda and West Port WRFs based on updated flow projections.

The LTF uses powder-activated carbon (PAC) to treat the leachate originating from the Zemel Road Class 1 landfill. The LTF has a capacity of 0.25 MGD and conveys treated effluent to a deep injection well. The plant is operating within its permitted treatment capacity, but several improvements are recommended to maintain operations. The primary recommendations include repairing the effluent storage tank, replacing polymer feed and blower systems, and evaluating the need for an additional staff member. Chapters 6 and 9 of this report provide 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] (%)	Maximum TMADF Operating Capacity[2] (%)
East Port WRF	6.00[a]	4.4	5.10	73	85
West Port WRF	1.20	0.71	0.76	59	63
Rotonda WRF	2.00	1.07	1.33	54	66
Burnt Store WRF	0.50[b]	0.32	0.37	64	74

Notes: [a] Design of upgrades to 12.0 MGD began in FY 2019. Construction activities will commence after the design is complete in two phases – Phase 1: Construction of upgrades from 6 MGD to 9 MGD; and Phase 2: Construction of upgrades from 9 MGD to 12 MGD.

[b] Design for expansion to 2.5 MGD began in FY 2019.

[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 distribution systems including the Master Reuse System serving Mid/West County and the South County reclaimed water distribution system. The Master Reuse System is fed by the East Port, West Port, and Rotonda WRFs. The Master Reuse System contains approximately 81 miles of transmission mains, three reclaimed water booster stations (RWBSs), three GSTs with a total volume of 4.0 MG, and four storage ponds with a total volume of 117 MG. The Master Reuse System infrastructure is in good condition; however, it requires more pipe hydraulic capacity to allow more reclaimed water to be transferred to major users in West County. The South County reclaimed water 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 Burnt Store WRF. These improvements are being investigated as part of the Burnt Store WRF expansion project.

CCU's primary focus is to encourage the beneficial use of reclaimed water and continue expanding the system to serve additional customers. The primary recommendations for the reclaimed water distribution system are to develop a County-wide Reclaim Water Master Plan (currently being completed under the 2019 East Port WRF Expansion Project) to identify immediate, short-term, and long-term improvements and capital improvement project (CIP) planning; develop a comprehensive operating protocol for the Master Reuse System; install throttling control valves at all current major reclaimed water users with pond discharges in the Mid and West County areas; install certified staff gauges for pond water surface elevations

for all pond discharges; develop an operational protocol for using the West Port RWBS; and include reclaimed water storage and high-service pump facilities at the Burnt Store WRF as part of the expansion project.

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 reclaimed water infrastructure systems. Table ES-2 summarizes the FY 2020 capital improvement budget dollars and expenditures for the three infrastructure sectors. The budget includes multi-year CIPs; therefore, expenditures occur over multiple years. Chapter 8 of this report provides details of the capital improvement budget and expenditures.

Table ES-2 FY 2020 Capital Improvement Budget and Expenditures

Infrastructure Sector	Budget	Expenditure
Water	$ 10,141,000	$ 2,175,000
Wastewater	$83,961,000	$10,585,000
Reclaimed Water	$ 1,805,000	$ 346,000

CONSOLIDATED RECOMMENDATIONS

Chapter 9 consolidates all recommendations discussed throughout this Annual Report for each CCU water, wastewater, and reclaimed water facility visited during this assessment.

1 INTRODUCTION

1.1 PURPOSE AND SCOPE

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 operations. 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 2020.

Table 1-1 Principal Balances on CCU Bonds by FY 2020

Bond Issues	Original Issuance	Current Debt	Comments
2008 Bond	Wastewater Expansion – 1998	$20,685,000	Wastewater Expansion Program
2011 Bond	Refinance – 2011	$25,165,000	Refinanced Debt
2013 Bond	Refinance – 2003A	$9,910,000	Refinanced Debt
2016 Bond	Refinance – 2006 and part of 2011	$14,585,000	Refinanced Debt
	Total Current Bond Debt	$70,345,000	
	State Revolving Fund (SRF) Debt	$55,226,769	
	Tax-Exempt Commercial Paper	$1,201,400	
	Total Long-Term Debt	$126,773,169	

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**: Descriptions 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**: Descriptions 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 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) 2020 Annual Report is authorized by Charlotte County Purchase Order No. 2021000657, Work Order No. 33.

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 summer and winter are subdued by the prevailing gulf breezes. Numerous upland and aquatic preservation areas occur in the area. Charlotte Harbor includes one of the world's largest protected marine estuaries encompassing 270 square miles with 219 miles of natural shoreline.

The Office of Economic and Demographic Research estimated the Charlotte County population in 2020 at 187,904. 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 residential 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 half 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 DEVELOPMENT OF CCU

In the mid-1950s, the Mackle brothers of Miami, Florida, began to purchase large tracts of land in the Mid and West County areas. The Mackle brothers, later known as General Development Corporation (GDC), platted the area for residential development communities, generally quarter-acre residential lots with some commercial areas along main corridors such as US Highway 41. Most of the GDC developments in the area were supplied water from the GDC-owned and operated Peace River water treatment facility, which was constructed in the 1970s and managed by GDC's subsidiary General Development Utilities (GDU).

In 1991, Charlotte County purchased the GDU assets, forming the initial core of the CCU system in Mid County and in the Gulf Cove and South Gulf Cove areas of West County. The purchase included water infrastructure including three water booster stations (WBSs), three ground storage tanks (GSTs), and approximately 610 miles of watermains serving approximately 28,500 water connections. The purchased wastewater infrastructure included three treatment plants (South Port and East Port in Mid County and West Port in West County) along with associated transmission lines and collection systems consisting of 140 miles of gravity and low-pressure mains, 56 lift stations, and 61 miles of force mains serving approximately 11,000 sewer connections. CCU eventually grew to operate wastewater, potable water, and leachate treatment plants.

CCU's has continued to upgrade its active WTP, WBSs, and WWTPs over the years as well as expand its collection and distribution system infrastructure as necessary to serve residents, meet demands, treat flows, and maintain permit requirements. The major expansions to the CCU system are listed below and more detailed improvements can also be found in previous Annual Reports.

- In 1991, CCU purchased the GDU assets establishing the CCU water and wastewater systems.
- The Leachate Treatment Facility (LTF) was first permitted in 1991. The plant is owned by Charlotte County Solid Waste and operated by CCU.
- In 1992, CCU established interconnects with North Port-at Flamingo Boulevard and Biscayne Boulevard, and at Harbor Boulevard.
- CCU constructed Walenda WBS consisting of a 2-million gallon (MG) GST in 1994.
- CCU started its reuse program on August 16, 1994 in Mid County.
- Rampart Utilities in Mid County, consisting of gravity collection and transmission lines serving 1,400 connections, was acquired in 1999.
- The Five Lands WTP was acquired in 1998 and decommissioned in April 2007.
- Aqua-Source Utilities in West County, including the Rotonda WWTP and gravity and lower-pressure collection systems totally 3,400 connections, was acquired in fall 2000.
- The 24-inch transmission main and interconnect from the PRMRWSF along Kings Highway to the DeSoto County line was completed in 2001.
- Florida Water Services in Mid County, including a collection system that serves 3,400 sewer connections in the Deep Creek area, was acquired in 2003.
- Florida Water services in South County, including the Burnt Store WRF and WTP and gravity sewer collection systems and pump stations in the Deep Creek area, was acquired in 2003.
- The Rotonda WTP #3 was converted to a WBS in 2005.

- The Rotonda, Gulf Cove, and Golf Course WBS were upgraded in 2007 with new chemical feed systems.
- A potable water system interconnect was established with the Englewood Water District (EWD) in 2007.
- The Gertrude WBS and GST were decommissioned in 2008.
- The reclaimed water Phase 1 expansion was completed in 2009 and included two strategically placed 0.5-MG storage tanks and pumping stations along with 14 miles of 16-inch-diameter reclaimed water transmission main.
- The reclaimed water Phase 2 expansion was completed in 2014, which included approximately 2 miles of 16-inch transmission pipe, additional storage at the West Port WRF in West County, and the construction of the West County reclaimed water booster station along the interconnect between the reclaimed water systems for the Rotonda and West Port WRFs.
- The reclaimed water Phase 3 expansion began in 2017 and was completed in FY 2020. It included a new reclaimed water main for Spring Lakes on Port Charlotte Boulevard and US 41 between Hillsborough Boulevard and Enterprise Boulevard and the Stage 5 Improvements at East Port WRF for a 95-MG reclaimed water storage pond and a 9-million-gallon-per-day (MGD) High Service Pump Station (HSPS).

1.5 MAJOR EVENTS

CCU is an active Charlotte County Department with projects and administrative activities underway. The following sections list significant events occurring within FY 2020.

1.5.1 GENERAL OPERATIONS

- On April 14, 2020, the Board of County Commissioners (BCC) adopted Ordinance #2020-014 creating new Utility Extension Standards and repealing or rescinding all prior code provisions, ordinances, and resolutions in conflict.
- Charlotte County contracted with Jones Edmunds to provide the services required to implement the selected enterprise CityWorks Computerized Asset Management and Maintenance/Work solutions. Services include, but are not limited to, software/database configuration, workflow definition/configuration, integration, and training. Additionally, LA Consulting, Inc. continued to work with CCU and other County Departments to further define and refine work processes and activities that parallel and aide the implementation of the new CityWorks solutions.
- On September 15, 2020, at the Utilities Quarterly Update, the BCC approved Resolution 2020-139 to extend sewer lines along the US Highway (US) 41 corridor to certain developed properties and authorized CCU to offer financing for water and sewer services to certain development property owners.
- In response to the COVID-19 Pandemic, CCU suspended customer shut offs and late fees; staggered shift start times for staff; closed the payment center for walk-ins and moved to appointment-only visits; assigned 50+ employees to work from home; hired temporary staff; and formed a Joint Information Staff Center.
- In July 2020, the BCC supported the additional personnel requests for 18 new Utility positions to be added to the FY 2021 budget.

- On January 13, 2021, the BCC directed CCU to begin the design and planning process for the Lakeview Septic-to-Sewer Expansion Project. CCU began planning for the project area and will begin design in Summer 2021.
- CCU staff is working with Kimley Horn to address a consent order that required CCU to develop a written capacity, management, operation, and maintenance (CMOM) program and fully implement the program in accordance with Florida Department of Environmental Protection (FDEP) and US Environmental Protection Agency (EPA) requirements.

1.5.2 ENGINEERING

- Additional grant and low-interest funding were secured for various projects through the SWFWMD Cooperative Funding Initiative (CFI) and FDEP State Revolving Fund (SRF) construction loans.

- CCU acquired land and continues with the design for expansion/replacement of the Burnt Store WRF, including the treatment facility, reclaimed water storage, and pumping for expected growth in the community. CCU is continuing to design the East Port WRF expansion 9.0-/12.0-MGD facilities.

- Major construction activities in FY 2020:

    - Ackerman Septic-to-Sewer Conversion Project – The Charlotte County BCC determined that, due to aged septic systems and water quality problems, central sewer will be installed, and each developed property will be required to connect to the sewer after it is installed. A portion of the cost of the sewer collection system will be funded by special assessments against each property to be served. The remaining costs will be subsidized by the County. The Ackerman Project was awarded in November of 2020 and is scheduled to begin construction of the Vacuum Station and Zones 1 and 2 of the collection system in April 2021.
    - The El Jobean Vacuum Station has been constructed, and construction of the wastewater collection system began in Summer 2020. Construction is scheduled to be complete in August 2021.
    - El Jobean Septic-to-Sewer Project – The Charlotte County BCC approved the contract for the El Jobean Vacuum Station. All of the easements were obtained, and the plans were finalized. Construction of the collection system improvements and new vacuum station began in 2019. The station was complete in 2020, and the collection system improvements are ongoing.
    - US 41 Southbound Utility Improvements from Enterprise Drive to Morningstar Waterway – This project includes removing and replacing the existing 12-inch water main along southbound US 41. These improvements are planned as a result of the proposed Florida Department of Transportation (FDOT) sidewalk and drainage improvement project along southbound US 41. Total project length is approximately 3 miles. The project started in August 2019. The field construction of the US 41 project was completed in February 2021.
    - Coliseum Force Main Replacement Project – This project involved removing and installing 12-inch polyvinyl chloride (PVC) and high-density polyethylene (HDPE) sewer force mains within the utility easement on the pond and rear lots along Coliseum Boulevard. The project was completed in Fall 2020.

- Loveland Grand Master Lift Station and 48-inch Gravity Interceptor Project – Utility crews are constructing a 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. Work in the Kings Highway area requires some traffic disruption as crews install the pipeline. The installation also requires temporarily draining the stormwater retention ponds along Kings Highway. Although dewatering is a common practice when installing pipes, due to the County's high-water table, draining stormwater ponds is unusual. While designing the pipeline, engineers chose to run pipes below the ponds to avoid impacting Kings Highway as much as possible. The pipeline will cross beneath the road at some point, and advance notice and detour information will be provided as needed. Contractor: Kiewit Infrastructure South Co. Estimated completion: Winter 2021. This project is ongoing and scheduled to complete in December 2021.
- Construction continued on East Port WRF Stage 5 Reclaimed Water Improvements project including a 95-MG storage pond conversion, a 9-MGD HSPS, a 1,500-kilowatt (kW) emergency generator, and electrical, instrumentation, and control improvements. This work was completed in FY 2019 with final performance testing scheduled for March 2020. This project completed construction in November of 2020 and final closeout in January 2021.
- Construction of Myakka potable water booster station was completed in 2020.
- Construction of the Ingram 24-inch water main was completed in the first quarter of 2020.
- Cape Haze Drive Reclaimed Water and Force Main project was awarded in April 2020. Construction started in June 2020 and should be completed in Spring 2021.
- Ramblewood Water Line Extension was completed in 2020.
- Block 3696 S Access Road Force Main was completed in 2020.
- Harbor Boulevard utility improvements were completed in 2020.
- The rehabilitation of Lift Station (LS) 815 was completed.
- The FDOT Toledo Blade force main was relocated.
- Coliseum 8-inch and 12-inch asbestos cement force main replacements were completed.
- Olean Boulevard and Gertrude Avenue utility improvements continued in 2020.
- Burnt Store Road Widening Phase 2 continued in 2020.
- Deep Creek sewer force main replacement continued in 2020.

- Major design activities in FY 2020:

  - CCU has begun design for the East Port WRF expansions to 9.0- and to 12.0-MGD facilities.
  - CCU has begun design for the Burnt Store WRF expansion from 0.5- to 2.5-MGD facilities including a buildout scenario of 7.5 MGD.
  - The design of the Hillsborough-Flamingo 12-inch water main was completed in FY 2020, and the project is waiting for recommendations to proceed in the Water Master Plan.
  - Midway Boulevard (Ellicott to Lakeview) 24-inch force main and 16-inch water main (design on hold).

- CCU completed the design of the Quesada Force Main Replacement Project. This project will replace approximately 3,000 linear feet of 12-inch and 20-inch force main in an area that has shown a tendency to fail. The project will begin in Spring 2021.
- CCU completed the design of the Easy Street Force Main Project. This project will replace approximately 2,000 linear feet of 6-inch force main in the LS 1 basin. This is one of the oldest sections of the CCU infrastructure. This project will begin in Spring 2021.
- CCU completed the design for the construction of LS 2 with a force main and water main. This project replaces old undersized infrastructure and provides a new water main system to provide fire protection in the LS 2 collection basin.
- CCU designed the 776 Biscayne to Sports Park force main replacement.

1.5.3 Water System Operations

- CCU provided approximately 4.22 billion gallons of water to 62,638 connections in FY 2020.
- CCU received 156.5 MG of Punta Gorda-produced water through the CCU/Punta Gorda 24-inch interconnect pipe. CCU distributed 156.1 MG back to Punta Gorda during their peak demand period.

1.5.4 Wastewater System Operations

- CCU treated 2.38 billion gallons of wastewater from 40,759 customers in FY 2020.
- CCU continued the successful program of sewer rehabilitation to reduce groundwater infiltration into the collection system. Work included internal CCTV inspection of gravity sewer, smoke testing, manhole repairs, and service lateral repairs.

1.5.5 Reclaimed Water System Operations

- CCU provided irrigation water to golf courses, one professional sports park, and numerous residential and commercial customers in 2020. CCU continues to identify new users and improve operations.

1.5.6 Instrumentation and Control Group

- CCU provided programmable logic controller (PLC) programming.
- CCU cross-trained between divisions.
- CCU installed and calibrated controls.

1.5.7 Operations Data Management

- CCU completed a Supervisory Control and Data Acquisition (SCADA) Master Plan study to determine future needs and to pursue cost-efficient alternatives for a consolidated system approach.
- CCU operations staff, in conjunction with McKim & Creed began migrating the SCADA system from Wonderware to VTSCADA at all plant facilities.

1.5.8 Reports and Studies

- CCU has been developing a Water Master Plan with Jones Edmunds to prioritize capital improvement projects for the water treatment and distribution systems and document CCU's water conservation efforts.

- CCU and Jones Edmunds completed a risk and resilience assessment for the water system and updated their emergency response plan to comply with the America's Water Infrastructure Act (AWIA) of 2018.
- CCU is currently working with McKim and Creed to design the Burnt Store WRF Expansion project to treat wastewater flows in South County.
- CCU is amending the South County portion of the Sewer Master Plan with various consultants as part of the Burnt Store WRF expansion project.
- CCU is currently working with Jones Edmunds to design the East Port WRF Expansion project to treat wastewater flows in Mid County.
- CCU and Jones Edmunds are developing a Reclaimed Water Master Plan to prioritize capital improvement projects for the reclaimed water distribution systems.
- In addition, CCU continues to work with various consultants to prepare quarterly reports for each WRFs, prepare operating permit renewals for WRFs, and deep injection wells.
- CCU completed a Cybersecurity Audit of its systems with McKim & Creed and Crimson Resolve.
- CCU is working with Kimley Horn to develop a CMOM program per the requirements of the FDEP consent order.
- Operations staff began working with Hazen-Sawyer to update its Pre-treatment and FOG programs and ordinances.

1.6 ACKNOWLEDGEMENTS

Jones Edmunds would like to acknowledge the following Charlotte County staff for providing guidance, information, and review in the preparation of this report: Tod Avers, Stephen Bozman, Bruce Bullert, Michael McCrumb, Chris Carpenter, Denise Caruthers, Delmis Castillo, Johnny Chamberlain, Thomas Cimino, Matthew Couturiaux, Thomas Dunn, Scott Ericson, William Feltus, Jeremy Frost, Peter Giannotti, Stephen Kipfinger, Henri Lafenetre, Sandra Lavoie, Norma Rogers, Craig Rudy, Bruce Schellinger, Kenneth Stecher, John Thompson, Bill Thornton, Matt Valentine, Ruta Vardys, Caroline Wannall, Dave 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 DEPARTMENT

CCU, a Charlotte County government department, provides potable water production and distribution, wastewater collection and treatment, and reclaimed water 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 reclaimed water distribution systems.
- Operating the County's water, wastewater, and reclaimed water 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 Operations Manager, is responsible for the operation and maintenance of all County-owned and -operated water, wastewater, and reclaimed water facilities including:

- Water and wastewater treatment facilities.
- Water distribution systems including booster pumping stations, storage tanks, fire hydrants, valves, and the entire water distribution piping.
- Wastewater collections including lift stations, vacuum stations, and wastewater collection systems.
- Reclaimed water distribution systems 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 2020, the total number of positions budgeted for CCU were 257. CCU had 227 full-time employees at the end of September 2020.

Figure 2-2 and Figure 2-3 show the CCU organizational structure as of October 2020.

2.3 ADMINISTRATION FACILITIES

The Charlotte County Environmental Campus is 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 2020 CCU Organizational Chart – Overall

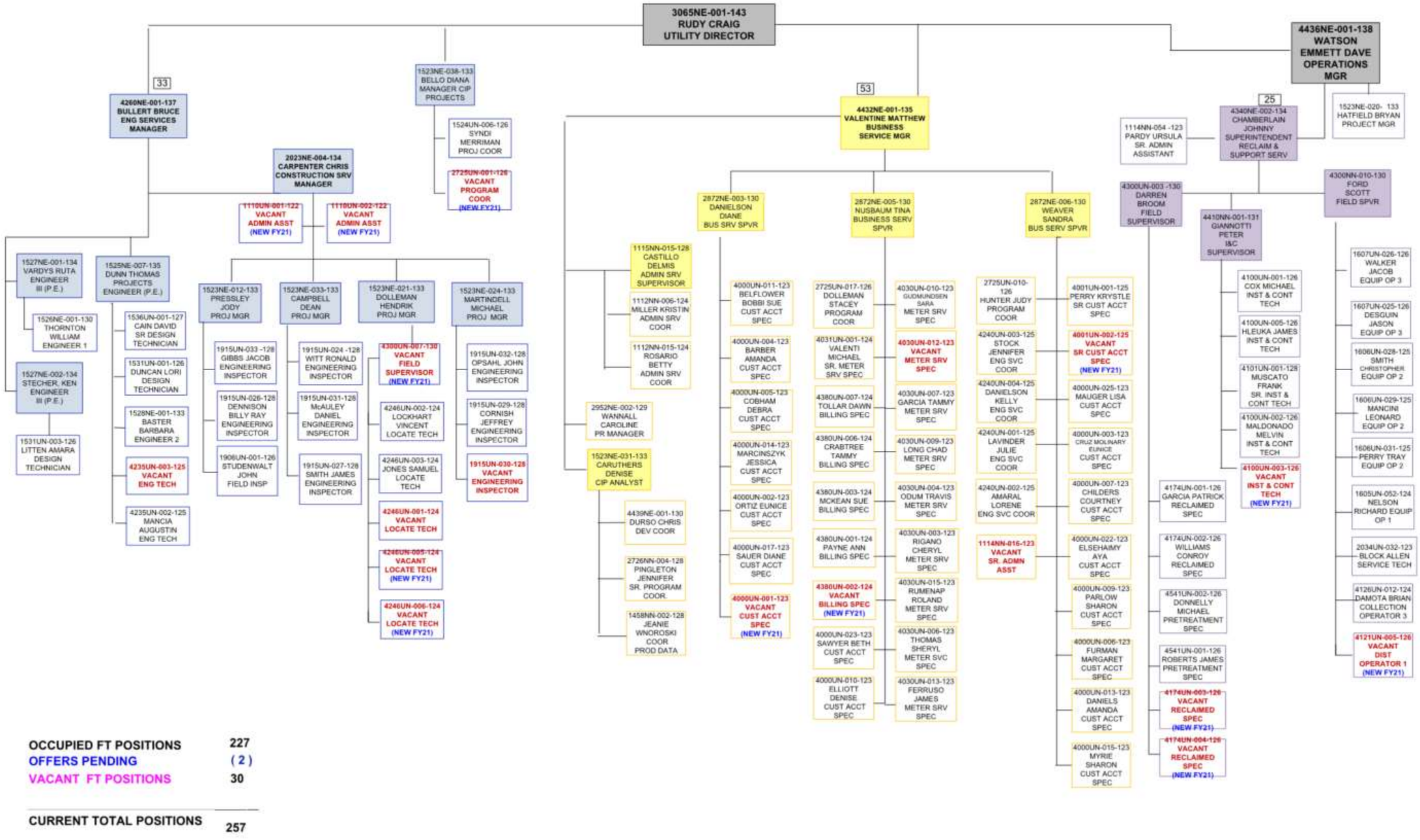
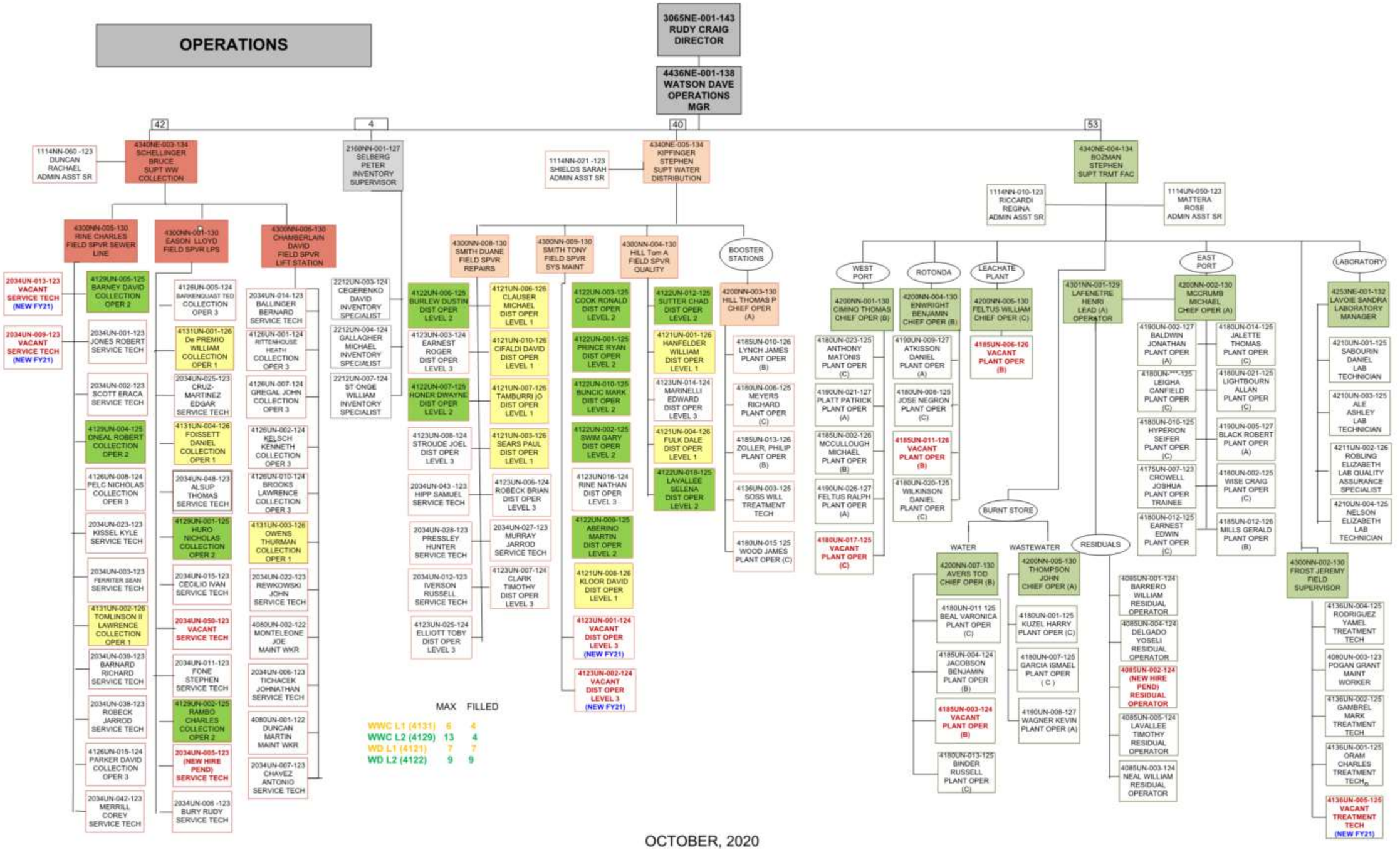


Figure 2-3 2020 CCU Organizational Chart – Operations



2.4 CCU WATER CONSERVATION EFFORTS

In 2020, 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 lawns) 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 at *https://www.charlottecountyfl.gov/departments/utilities/about-utilities/conservation/water-restriction.stml.*

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 Reclaimed Water Use and Expansion

Another method for conserving water supplies is to encourage the use of reclaimed water. Using reclaimed water for irrigation and other non-potable water needs reduces the demand for potable water, surface water, and groundwater. CCU started its reuse program on August 16, 1994, when the first customer was signed to the East Port Water WRF. The County's other treatment facilities were eventually upgraded to provide reclaimed water to meet customer demands in other parts of the County. In 2005, CCU began designing a customer-based reclaimed water transmission system rather than WRF service-area-based system. 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 reclaimed water transmission system and to serve as many customers as economically possible. Today, CCU has two reclaimed water systems one serves the areas of Mid and West County and one serves the South County area. CCU's Mid/West County system operates under a Master Reuse Permit approved by FDEP that allows CCU to move reclaimed water from East Port WRF, West Port WRF, and Rotonda WRF to customers. Abundant reclaimed water 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 reclaimed water distribution system.

Over the years, the hydraulic model continued to be improved and used as a tool to expand the reuse system throughout the County. In January 2020, a Technical Memorandum (TM) was completed by Jones Edmunds, which documented the updates to the CCU reclaimed water hydraulic model, model verification, current operations, and analyses and recommendations for reclaimed water system improvements to maximize conveyance of reclaimed water to existing and future customers. CCU and Jones Edmunds have continued this effort and are currently developing the CCU reclaimed water master plan to prioritize capital improvement projects for the reclaimed water systems.

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 other 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 three citizen educational tours during FY 2020 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. Due to the pandemic, additional tours at all facilities were postponed.

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 Reclaimed Water
- 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. The combined charges remained the same in 2018. On February 12, 2019, the BCC approved to increase water, sewer, and reclaimed water rates at 7 percent across the board effective April 1, 2021.

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 2020, 62,386 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 and 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 65 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 2020 water and wastewater services was $77,041,602. The total O&M connection charge revenue was $5,320,295, and total connection fee revenue was $13,814,114.

2.5.2 CCU CUSTOMER BASE

During FY 2020, the number of active water services increased from 61,048 to 62,637, and the number of active sewer services increased from 39,762 to 40,759. 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, the insurance coverage is adequate for 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 April 2020, assumes that water service consists of delivering 4,000 gallons of water per month through a standard (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 ($)	Wastewater Charge ($)	Combined Charges ($)
CCU:			
Rates as of April 2020	47.28	62.82	110.10
Other Neighboring Utilities:			
City of Marco Island (outside City)	48.52	77.38	125.90
FGUA – North Fort Myers	57.54	57.54	115.08
Desoto County	59.23	55.04	114.27
City of Fort Myers (outside City)	38.53	71.49	110.02
City of Marco Island (inside City)	53.92	52.48	106.40
City of North Port (outside City)	41.57	63.45	105.02
City of Venice	49.20	54.89	104.09
City of Fort Myers (inside City)	30.86	71.49	102.35
City of North Port (inside City)	36.16	62.82	98.98
FGUA – Lehigh Acres	37.62	60.91	98.53
St. Lucie County Utilities	38.70	57.77	96.47
Collier County	36.05	55.07	91.12
City of Cape Coral	32.92	57.23	90.15
Okeechobee Utility Authority	38.51	50.20	88.71
City of Punta Gorda (outside City)	40.82	42.08	82.90
City of Sarasota	31.31	51.54	82.85
City of Clearwater	32.55	42.52	75.07
Sarasota County	25.83	46.89	72.72
Lee County	25.67	43.85	69.52
Bonita Springs Utility	26.81	41.64	68.45
Englewood Water District	26.95	40.70	67.65
City of Naples (outside City)	17.85	46.91	64.76
Pinellas County	27.32	36.80	64.12
Manatee County	18.57	42.66	61.23
City of Bradenton	26.45	33.43	59.88

Utility Systems	Water Charge ($)	Wastewater Charge ($)	Combined Charges ($)
City of Punta Gorda (inside City)	23.37	33.66	57.03
Hillsborough County	28.31	28.31	56.62
City of Naples (inside City)	14.28	37.53	51.81

Note: The reflected residential rates were in effect April 2020, 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 and Table 2-3 lists the 10 largest water consumers for the Mid/West and South County distribution systems, respectively.

Table 2-2 CCU Mid/West County Large Water Users (Year 2020)

Water Customer	Total Water Purchased (thousands of gallons)
Riverwood[1]	90,274
El Jobean Water Association	20,707
Fawcett Memorial Hospital	20,062
Charlotte County School Board	17,517
Little Gasparilla Water Utility[1]	15,818
Bayfront Health – Port Charlotte	12,608
Bayfront Health – Port Charlotte	8,420
Bayfront Health – Port Charlotte	7,890
Placida Harbour Club	7,599
South Port Square	7,251
Total 10 Largest Users	208,146

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

Table 2-3 CCU South County Large Water Users (Year 2020)

Water Customer	Total Water Purchased (thousands of gallons)
SHM Burnt Store, LLC	5,492
Keel Club Condo Assn Inc.	1,274
Vsta Dl Sol Rst@Bs Mrna Condo	713
BOCC – Public Works	655
Foselli, Lawrence	392
SHM Burnt Store, LLC	341
Lennar Homes, LLC	273
G&R Lambert, LLC	205
Lennar Homes, LLC	181
Lennar Homes, LLC	180
Total 10 Largest Users	9,706

2.8 PLANNING RECOMMENDATIONS

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

Table 2-4 Administration Planning Recommendations

Recommendation:	Continue CCU's vision to ensure safe, reliable utility services at fair and reasonable rates.
Recommendation:	Continue developing and updating standards for water and sewer construction to ensure the most effective use of CIP funds.
Recommendation:	Continue developing options for water, sewer, and reclaimed water service in the County to meet the 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 the adjoining counties and cities.

Table 2-5 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:	Begin investigating alternatives and improvements to the fixed base water meter system.
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 2020.
Recommendation:	Create a water system O&M Manual with operating protocols based on EPA and AWWA best practices.

Table 2-6 Wastewater System Planning Recommendations

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 construction and plan for the next phases of sewer expansion in the Port Charlotte area in accordance with the 2017 Sewer Master Plan.
Recommendation:	Continue working towards an operational CMOM program.
Recommendation:	Create O&M Manuals for all wastewater plants per EPA guidelines.

Table 2-7 Reclaimed Water System Planning Recommendations

Recommendation:	Seek ways to increase the use of reclaimed water currently produced by CCU WRFs including improving reliability and access for customers.
Recommendation:	Continue to update the reclaimed water system computer model and use it as a planning tool for future system improvements.
Recommendation:	Prepare a hydraulic model to predict the impact of future demand on the South County reclaimed water transmission system.
Recommendation:	Create a reclaimed system O&M manual with operating protocols.

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 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 on 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 consisting 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 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 2020, PRMRWSA supplied Charlotte County with a total of 4,056 MG or approximately 11.1 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

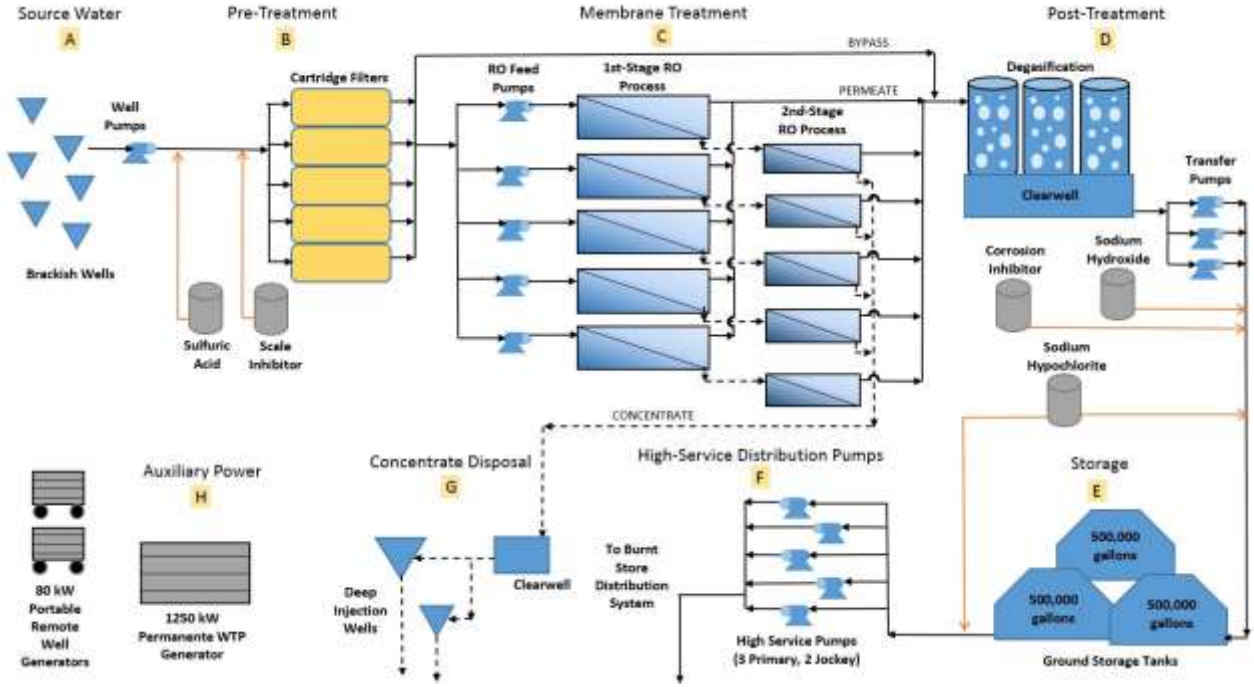
The Burnt Store RO WTP (PWS ID6080318) is owned and operated by CCU. The South County service area is served by the Burnt Store RO WTP at 17430 Burnt Store Road in Punta Gorda. The Burnt Store RO WTP was expanded in 2009 and has a permitted treatment capacity of 3.61 MGD.

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 the 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 9 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 GSTs before passing through the HSPs 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 HSPs
  - Two Distribution HSPs (medium flows)
  - One Distribution HSP (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-kW Generator (Serving the Original RO Process Building, RO Process Building, Operations Building, and Three On-Site Groundwater Wells)
  - Two 80-kW Portable Generators (Serving four Remote Groundwater Wells)

3.2.1 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 (Underground Injection Control [UIC] Permit No.: 0271367-007-UO/1I) was issued on May 14, 2019, and expires on May 14, 2024.
- SWFWMD Water Use Permit (WUP) was issued on September 25, 2013, and expires on September 25, 2033.

3.2.1.1 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 2020

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-19	7.89	280	603	1.53	21	84	7.89	1.30
Nov-19	7.85	279	599	1.62	21	86	7.83	1.41
Dec-19	7.81	276	599	1.66	21	86	7.77	1.48
Jan-20	7.93	277	600	1.63	21	90	7.87	1.45
Feb-20	7.92	279	602	1.64	23	88	7.91	1.42
Mar-20	7.87	277	599	1.63	24	88	7.88	1.43
Apr-20	7.87	279	602	1.59	23	86	7.86	1.35
May-20	7.85	279	602	1.56	22	89	7.85	1.35
Jun-20	7.77	284	612	1.42	23	95	7.81	1.28
Jul-20	7.80	284	610	1.43	23	87	7.85	1.24
Aug-20	7.87	284	611	1.44	24	87	7.93	1.29
Sep-20	7.72	282	609	1.37	23	103	7.81	1.23
Annual Avg.	7.84	280	604	1.54	22	89	7.85	1.35

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

3.2.1.2 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	1,050/800	—	—
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: * Future wells; [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; — = 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 2020, the Burnt Store RO WTP is operating on average at 16 percent of its design capacity.

Table 3-3 Burnt Store RO WTP – Total Water Balance FY 2020

Month	Raw Water From Wells (MG)	Raw Water Bypass (MG)	Total Water Produced (MG)	Total Concentrate (MG)	Finished Water To Distribution (MG)
Oct-19	15.10	1.42	12.40	3.09	12.49
Nov-19	17.47	1.61	14.18	3.49	12.84
Dec-19	18.00	1.66	14.60	3.55	14.00
Jan-20	19.42	1.79	15.76	3.88	15.83
Feb-20	18.76	1.73	14.68	3.73	14.93
Mar-20	22.56	2.06	18.33	4.48	18.43
Apr-20	21.18	1.94	17.21	4.18	16.85
May-20	19.10	1.77	15.52	3.81	15.75
Jun-20	14.95	1.41	12.16	2.96	12.02
Jul-20	16.11	1.52	13.08	3.21	13.25
Aug-20	14.37	1.37	11.68	2.88	11.94
Sep-20	14.89	1.42	12.02	3.00	12.08
Total	211.92	19.69	171.62	42.26	170.42

Table 3-4 Burnt Store RO WTP – Average Flows FY 2020

Month	Raw Water From Wells (MGD)	Raw Water Bypass (MGD)	Total Water Produced (MGD)	Total Concentrate (MGD)	Finished Water to Distribution
Oct-19	0.503	0.047	0.413	0.103	0.403
Nov-19	0.582	0.054	0.473	0.116	0.428
Dec-19	0.600	0.055	0.487	0.118	0.452
Jan-20	0.647	0.060	0.525	0.129	0.511
Feb-20	0.647	0.060	0.524	0.131	0.515
Mar-20	0.752	0.069	0.611	0.149	0.595
Apr-20	0.706	0.065	0.574	0.139	0.562
May-20	0.637	0.059	0.517	0.127	0.508
Jun-20	0.498	0.047	0.405	0.099	0.401
Jul-20	0.537	0.051	0.436	0.107	0.427
Aug-20	0.479	0.046	0.389	0.096	0.385
Sep-20	0.496	0.047	0.401	0.100	0.403
Annual Avg.	0.590	0.055	0.480	0.118	0.466

3.2.2 Treatment Components and Condition Assessments

Jones Edmunds personnel performed an on-site review of the WTP on December 14, 2020. 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. A secondary access gate for redundancy is being investigated as part of the Burnt Store WRF expansion project. The perimeter of the site

requires some maintenance including filling holes under the fence caused by burrowing animals, clearing debris off the fence, and creating a cleared path on the northwest fence line. The site has a significant amount of brush and woods to the east of the WTP, which should be maintained to prevent on-site wildfires. The process building, storage room, motor control building, and Operations/Administration building (shared with the Burnt Store WRF) were observed to be in good condition. The exterior of the motor control buildings should be painted, the process and operation building should be cleaned, and the gutters of the process building should be cleared of debris as needed. Secondary containment should be installed underneath the chemical drums in the storage room. Three SCADA computer stations use on-site computer graphic monitoring screens. The site contains a small operations testing laboratory for monitoring water quality parameters such as conductivity, pH, and temperature.

Overall, 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 chemical tanks are in a covered area that is attached to the east end of the WTP process building. During the site visit, we noted that the ceiling of the chemical storage area should be scraped and painted. The chemical tanks have proper secondary containment areas, but the containment area for the sodium hypochlorite should be repainted. The chemical tanks and piping are painted and well-marked. Eyewash and shower stations are at the bulk storage area and the chemical feed area and are in good condition.

The chemical feed pumps and piping are 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 and pump functionality. 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
- Operators' Licenses
- Facility Logbook
- Facility Operating Plans
- Well Laboratory Reports
- Sampling Plans
- Laboratory Results
- Flow Meter Calibrations
- Chlorine and pH Meter Calibrations
- Chain-of-Custody Forms
- Facility O&M Manuals
- Maintenance Records
- Facility Record Drawings
- Daily Temperature Logs
- Spill Protocol and Record of Spills

3.1.1.1 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. Three of the monitoring wells are on site. 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 on site 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 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 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 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 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 off site on Burnt Store Road. A small burrow was found under the concrete, which should be filled to prevent concrete cracking. Minor rust was observed on the stainless-steel wellhead pipe, but the pump and motor are in excellent condition.

- Well No. 15 is 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 on the east side of the site. The well pump is in excellent condition.

3.2.2.1 Pre-Treatment Components

Sulfuric Acid Addition

Sulfuric acid is used to decrease the pH of the raw water and prevent calcium carbonate precipitation. The 1,000-gallon bulk sulfuric acid storage tank is outside in the covered bulk storage area. The 100-gallon sulfuric acid storage tank 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.

Scale Inhibitor Addition

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

Cartridge Filtration

The facility contains five stainless-steel cartridge filter-housing vessels. Each 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, which is typically completed two times per year. 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.

3.2.2.2 Membrane Treatment Components

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.

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. The membrane elements in Trains A and B are approximately 14 years old and have shown signs of minor membrane fouling. The membrane elements in Trains C, D, and E are 12 years old.

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.

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 are planning to test the system's functionality in the future.

The older trains (A and B) are still producing good-quality permeate but operate at a higher pressure, indicating minor fouling is occurring. 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 port seals should be replaced.

3.2.2.3 Post-Treatment Components

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 but should be inspected and potentially cleaned or replaced pending the inspection. In 2014, the clearwell was temporarily taken out of service for inspection. The clearwell inspection report noted for staff to paint the clearwell and exercise the isolation valve between the two tanks. The clearwell valve was exercised by staff and found to be operational in 2019. The outside of the clearwell should be painted.

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. It is recommended that these injection points be labeled. In 2015, two additional air-release valves (ARVs) were installed downstream of the pumps. We recommend that the pumps and piping be covered to prevent sun damage and to prolong the equipment life.

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.

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 HSPs. The system is in good condition.

Sodium Hypochlorite

The sodium hypochlorite system consists of two bulk storage tanks, one 200-gallon storage tank, two chemical metering pumps, and two injection points. The two bulk storage tanks are outside the process room and hold 1,400 and 1,100 gallons, respectively. The chemical containment area for the bulk storage tanks requires periodic painting. 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. Operations staff reported that the conductivity meter requires periodic replacement. We recommend the cover of the analyzer panel be extended to prevent water from contacting the equipment during rain events.

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.

3.2.2.4 Storage and Distribution HSPs

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 2019. No sedimentation or defects were found in any tank. The outside of GST B was painted in 2019. The outside of GST A was cleaned and painted in 2020.

The RO WTP has one high-flow HSP (Pump A), two medium-flow pumps (Pumps B and C), and two jockey pumps (Jockey Pumps A and B) 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 55 pounds per square inch (psi) at the beginning of the distribution system at the WTP regardless of the water use. At the time of the site visit, the HSPs were operational and in good condition.

3.2.2.5 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.

3.2.2.6 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. CCU's most recent risk and resilience assessment (RRA) recommended bollards be installed around the influent transformer box.

RO Process Building and Motor Control Center (MCC) 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. The block wall in the northwest corner of the MCC building is eroded and should be repaired and painted. The floor near the electrical equipment is marked with hazard tape, but none of the equipment includes the appropriate arc flash labeling as required by National Fire Protection Association (NFPA) 70E.

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 2020. 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, the 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. GSTs A and B at the Burnt Store RO WTP were cleaned and inspected in FY 2013 and did not reveal any deficiencies. GST C was cleaned and inspected in FY 2019 and did not show any deficiencies. GSTs are scheduled for cleaning and inspection every 5 years in accordance with FDEP Rule 62.555.350(2), Florida Administrative Code (FAC). As a result of the maintenance practices and the HSPs that were placed into operation in FY 2013, no service interruptions due to pump malfunction occurred in 2020.

3.2.5 Review of Previous Report Recommendations

Table 3-5 summarizes the recommendations and current status from the 2019 Annual Report for the Burnt Store RO WTP.

Table 3-5 Burnt Store RO WTP 2019 Recommendations and Status

Recommendation:	Determine the ultimate use and/or replacement of Well No. 15.
Progress:	To be investigated as part of the potable water master plan.
Recommendation:	Perform yard maintenance around the perimeter fencing and well pads.
Progress:	Ongoing.
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:	Ongoing.
Recommendation:	Install secondary containment under the chemical drums in the storage room.
Progress:	Not complete.
Recommendation:	Scrape and paint the ceiling of the bulk storage containment area.
Progress:	Not complete.
Recommendation:	Paint the concrete of the sodium hypochlorite secondary containment area.
Progress:	Not complete.
Recommendation:	A small burrow was found under the concrete at Well No. 12, which should be filled to prevent future cracking.
Progress:	Ongoing.
Recommendation:	Replace multiple end caps that are leaking on Trains C and D.
Progress:	Ongoing – leaking end caps are periodically found and repaired.
Recommendation:	Install a cover over the transfer pumps and piping near the degasifier towers to prevent sun damage and prolong equipment life.
Progress:	Not complete.
Recommendation:	Extend the cover of the analyzer panel attached to the wetwell to prevent water from contacting the equipment during rain events.
Progress:	Not complete.
Recommendation:	Repair HSP C.
Progress:	Complete.
Recommendation:	Paint the concentrate disposal wetwell.
Progress:	Not complete.
Recommendation:	Clean and paint GST A.
Progress:	Complete.
Recommendation:	Paint the outside of the MCC building.
Progress:	Not complete.
Recommendation:	Repair and paint the northwest inside wall of the MCC building.
Progress:	Not complete.
Recommendation:	Pressure wash the outside of the Operations building.
Progress:	Ongoing.

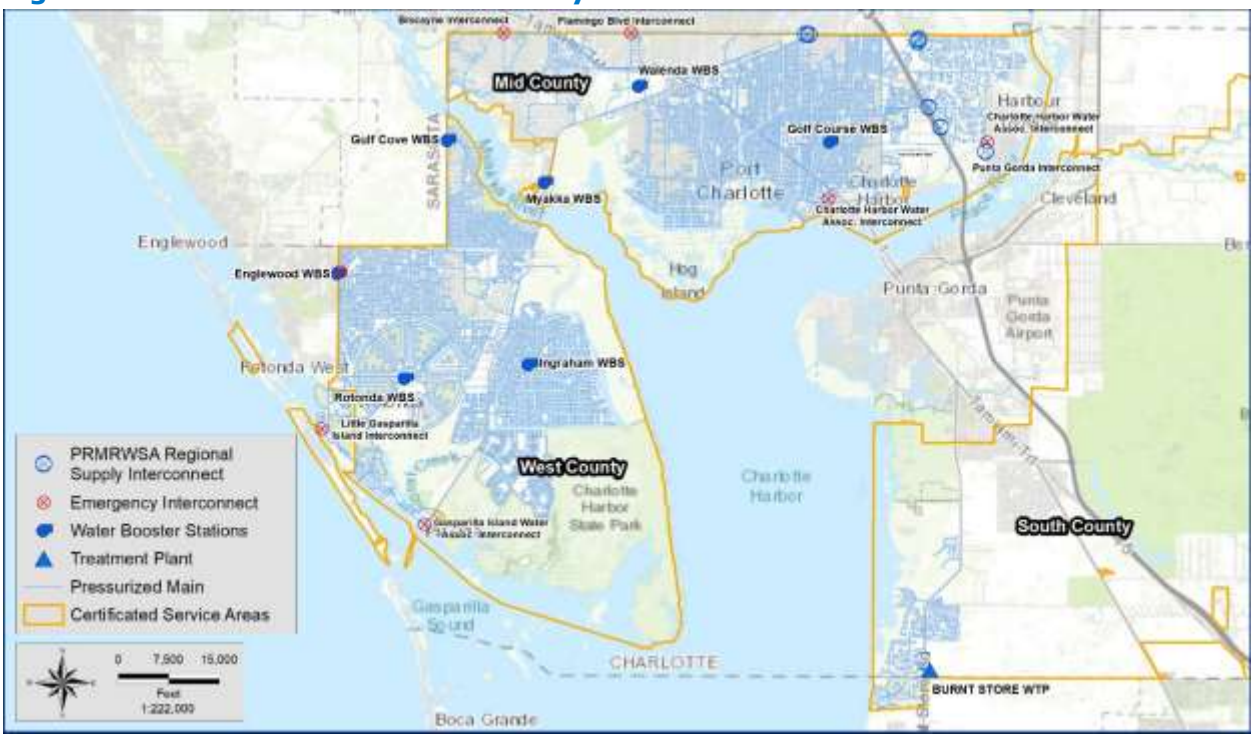
Recommendation:	Install bollards around the influent transformer box.[1]
Progress:	Not complete.
Recommendation:	Apply appropriate arc flash labeling on all switchgear in compliance with NFPA 70E to properly notify O&M personnel of the potential hazard. This may require creating a complete and thorough arc flash model using the existing switchgear to determine the energy levels present. This information would appear on the appropriate arc flash labeling as required.
Progress:	Not complete.
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 complete.
Recommendation:	Update standard operating procedure (SOP) for chemical deliveries, required chain of custody forms, and verification system for proper chemical delivery.[1]
Progress:	Not complete.
Recommendation:	Identify a backup chemical and fuel supplier in the event of a chemical or fuel shortage.[1]
Progress:	Complete.
Recommendation:	Develop a wildfire Emergency Response Plan (ERP), identify fire hydrant locations, and coordinate with Fire Department for training for critical assets.[1]
Progress:	Not complete.
Recommendation:	Develop an incident action checklist for operating without the support of SCADA.[1]
Progress:	Not complete.

[1] Recommendation from the *Charlotte County RRA Report* (March 2020).

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 December 14, 2020. 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 Systems



At the end of FY 2020, CCU had 59,934 customer accounts in the Mid/West County distribution system and 2,703 customer accounts in the South County distribution system. The Mid/West County system contains bulk water users as listed in Chapter 2. Based on CCU GIS data, the two systems contained approximately 1,520 miles of water mains, ranging in size from 1.5 to 24 inches in diameter for the distribution mains and from 4 to 36 inches in diameter for the transmission mains. Ninety-six percent of the distribution piping is 4 to 12 inches in diameter. At the end of FY 2020, CCU had 5,389 fire hydrants.

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/West County distribution system water is supplied to CCU through four PRMRWSA-owned regional transmission mains. The original pipeline is a 36-inch-diameter line 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 four aboveground, pre-stressed concrete GSTs with an active combined capacity of 10 MG, six WBSs, one chemical booster station, eight supply interconnects, seven emergency interconnects, and approximately 1,464 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 metered supply interconnects with neighboring entities.

Table 4-1 Charlotte County Metered Supply Interconnects

Entity	Name	Approximate Location	Size
PRMRWSA	Discovery Drive Meter Station	Discovery Drive	24-inch
PRMRWSA	Kings Highway Meter Station	10 Kings Highway	24-inch
PRMRWSA	Kings Highway Meter Station	10 Kings Highway	12-inch
PRMRWSA	Harbor Boulevard Interconnect	21453 Bachmann Boulevard	24-inch

3.2.5.1 Discovery Drive Meter Station

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, and the flow meter at the interconnect is used to calculate the County's water usage. In FY 2020, Punta Gorda supplied 156.5 MG of water to Charlotte County, and Charlotte County supplied 156.1 MG to Punta Gorda through this interconnect.

Condition Assessment

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

4.1.1.1 PRMRWSA Supply Connections

The PRMRWSA Supply Connections 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 Boulevard connections contain interconnect vaults and telemetry, which are owned by PRMRWSA but can be accessed by Charlotte County. The connections along I-75 (Rampart, Luther, and Sandhill) 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.

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 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 Boulevard Interconnect	W Hillsborough Blvd	12-inch
City of North Port	Biscayne Drive 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 at the North Port interconnection with Flamingo Boulevard. The County relocated the Flamingo Boulevard interconnect to the City of North Port's nearby new pump station on Hillsborough Boulevard. The project was completed in FY 2019.

Condition Assessment

The emergency interconnects were reported to be in good condition.

4.1.1 Water Booster Stations

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 are used to increase the flow, pressure, and disinfectant concentrations throughout the system. As previously discussed, CCU has repurposed or discontinued the Gertrude (WBS #1) and Fivelands (WBS #5) booster stations. The following sections describe the active booster station operations and their respective conditions.

4.1.2.1 Port Charlotte Golf Course – WBS #2

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:

- 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.
- 2019 – A new monochloramine analyzer was installed at the station.
- 2019 – A platform was installed to access the generator.
- 2019 – A faulty distribution pressure transmitter was replaced.
- 2019 – A leak was repaired on the influent main.
- 2019 – New 800-gallon sodium hypochlorite tanks were installed.
- 2019 – The area around the chemical storage tanks was upgraded.
- 2019 – Operations staff labeled WBS equipment in support of the CMMS project.
- 2020 – The on-site ice machine used for sample preservation was replaced.
- 2020 – Arc-flash labeling has been added to the electrical switch gear.

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 perimeter of the site requires some maintenance including filling holes under the fence caused by burrowing animals and clearing debris off the fence. The indoor buildings are kept clean, and tools and equipment are organized and stored properly. The HSPs 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. Overall, the electrical equipment is in good functioning condition based on information from the Operations staff.

4.1.2.2 Gulf Cove – WBS #3

The Gulf Cove Booster Station 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 HSPs, rated at 50, 60, 75, and 100 horsepower (HP). 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 sodium hypochlorite storage tanks and two 300-gallon ammonium sulfate 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 3 years:

- 2018 – An eyewash station was installed.
- 2019 – The GST was relined, painted, and inspected. The 5-year washout test was conducted on the GST.
- 2019 – The sodium hypochlorite tank was replaced.
- 2019 – Operations staff labeled WBS equipment in support of the CMMS project.
- 2020 – Repaired perimeter fencing from hog damage.
- 2020 – Pump No. 4 was replaced.
- 2020 – The generator radiator was replaced.
- 2020 – Through coordination with CROM, the leaking GST was assessed and fixed.

Condition Assessment

The station is generally in good condition. Roads and landscaping are well maintained. Graveled areas around the facility infrastructure are weeded and the grass is cut. The perimeter of the site requires some maintenance including filling holes under the fence caused by burrowing animals and clearing debris off the fence. The indoor buildings are kept clean, and tools and equipment are organized and stored properly. The HSPs 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 and in the permitting phase.

The incoming switchgear and distribution transformer appear in good condition with no obvious signs of significant concern. The incoming power company transformer shows 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 tank is undersized and is insufficient to provide the County's minimum required 72 hours of operation during a storm event. It should be increased to hold additional fuel. 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 influent pipe leading to the GST and the GST were leaking at the time of the site visit, but the County is actively working with CROM to address the issues.
- The electrical conduit providing power to the east entrance gate camera is not properly secured.
- Conduit in the chemical containment area is broken loose from its connection.

4.1.2.3 Walenda – WBS #4

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 3 years:

- 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.
- 2019 – New LED lighting was installed in the pump room.
- 2019 – Stratification of the GST was checked to confirm mixing in the tank.
- 2019 – A GST inspection was completed.
- 2019 – The facility's diesel fuel supply was updated.
- 2019 – Operations staff labeled WBS equipment in support of the CMMS project.
- 2020 – GST level control was upgraded to a radar-based system.
- 2020 – Arc-flash labeling has been added to the electrical switchgear.
- 2020 – Realigned the motor and replace the seals and bearings for Pump No. 5.
- 2020 – Installed new 24-inch influent line with flow meter and in-line mixer.
- 2020 – Installed conduit and wires for the chemical feed to the new influent line.
- 2020 – Replaced the No. 1 sodium hypochlorite storage tank due to a leak.

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 perimeter of the site requires some maintenance including filling holes under the fence caused by burrowing animals and clearing debris off the fence. The indoor buildings are kept clean, and tools and equipment are organized and stored properly. The HSPs are well maintained and functioning properly.

The incoming switchgear and distribution transformer appear in good condition with no obvious signs of significant concern. CCU staff reported that the existing on-site standby generating system is slightly undersized for a full load of the facility. 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 tank inspection found an issue in the tank bonding that will require multi-layer stripping before the tank can be repainted.

- CCU Operations staff confirmed 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. Staff has also indicated that the fuel system for the generator is sufficiently sized and functioning properly to handle the current loading.
- A minor National Electric Code (NEC) violation exists at the east gate where the existing electrical conduit is improperly supported and detached. This conduit supports the intrusion detection system.

4.1.2.4 Rotonda – WBS #6

The Rotonda Booster Station 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 skid 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 skid 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 is in two 1,000-gallon bulk storage tanks. The chemical storage tanks are housed within a covered structure with secondary containment chambers for safety.

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

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

- 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 – HSP Nos. 1 and 3 were painted.
- 2018 – The top of the diesel fuel storage tank for the generator was painted.
- 2019 – Motor No. 3 was replaced in December.
- 2019 – The feed piping to the GST was replaced after the Ingraham transmission main was completed.
- 2019 – Operations staff labeled WBS equipment in support of the CMMS project.
- 2020 – A contractor installed retaining walls for a new GST manway access port.
- 2020 – Couplings were replaced on Pump No. 1 and No. 4.

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 to poor 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. Interviews with County staff reported an unresolved issue. During the last maintenance cycle, the incoming main breaker for the facility would not re-close. After several attempts, maintenance personnel were able to get the breaker to close and maintain position. However, this is an indication that the breaker has an issue and likely may fail soon. A review of the site by the electrical engineer found an unresolved issue from the last annual report. Several of the drives have been updated to Yaskawa VFDs and were retrofitted into the existing MCC 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 live parts appear to be exposed, this does raise a maintenance concern and the possibility of exposed parts. Staff has indicated that the CIP contains a project to replace all of the main switchgear in this facility either this fiscal year or next.

The following deficiencies were noted:

- Much of the switchgear appears to be in fair-poor 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 automatic 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.

4.1.2.5 Ingraham – WBS #7

The Mid/West County distribution system contains one disinfection booster station at 14276 Ingraham Boulevard, Port Charlotte, FL 33981. The Ingraham Boulevard sodium hypochlorite/ammonium sulfate 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 upgrades were made over the last 3 years:

- 2019 – A new flow meter was installed.
- 2019 – A new canopy was installed over the sodium hypochlorite storage tank.
- 2020 – A new transmitter was installed on the flowmeter at the station.

Condition Assessment

The general condition of the station is fair. The buildings are weathered but in operational condition. The landscaping is maintained. The electrical components at the Ingraham Disinfection Station are in good condition. Interviews with County staff reported no unresolved issues. A review of the site by the electrical engineer found no issues.

The following deficiency was noted:

- The doorstep to the water-quality testing and storage shed needs repair.

4.1.1.1 Englewood – WBS #8

The EWD interconnect not only provides redundancy for EWD and CCU in the event of an emergency, but also acts as a water-pressure booster station. The EWD WBS includes two 40-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 at this time. By opening or closing valves, the EWD interconnect pumping station can pump water in either direction, i.e., to or from EWD. However, EWD and CCU must both 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 FDEP 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. A new Dupolox 400M total chlorine meter was installed in FY 2019, and CCU is currently updating their permit to include chlorine addition at this location to improve water quality and reduce flushing in the area.

Condition Assessment

Overall, the interconnect is in good condition, but the lighting fixtures should be lowered so the cover does not block the illumination of the pumps and equipment.

4.1.2.6 Myakka – WBS #9

The Myakka Booster Station is at 4070 Railroad Avenue, Port Charlotte, FL 33953. The property includes a potable water booster station and a wastewater vacuum collection station. The potable water station was built in 2020 and has three 40-HP pumps. The HSPs are skid mounted for future removal and use at other sites. The pumps, electrical components, and water-quality testing appurtenances are in a climate-control room. The station is fenced and has one entrance with a manual gate. The station contains two liquid-handling systems for sodium hypochlorite and ammonium sulfate injection. The sodium hypochlorite system contains one double-walled 500-gallon bulk storage tank and a chemical injection skid. The ammonium sulfate system consists of one double-walled 120-gallon bulk storage tank 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 stored outside and covered by an awning. The County intends to operate 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 provides backup power to the station.

4.1.3 STORAGE

GSTs are typically located at WTPs and booster pump stations and are cleaned and inspected every 5 years. 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 to 5 MG, for a total capacity of 10 MG. Table 4-3 lists the GST capacities and number of HSPs and chemical feed pumps at each booster station.

Table 4-3 WBS GST Capacities, HSPs, and Chemical Feed Pumps

Booster Station Name	GST Capacity (MG)	Number of HSPs	Number of Chemical Pumps
Port Charlotte Golf Course	1	2	6
Gulf Cove	2	4	4
Walenda	2	5	4
Rotonda	5	4	8
Ingraham	0	0	2
Englewood	0	2	0
Myakka	0	3	4
Total	10	15	28

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.

4.1.2 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 Port Charlotte Golf Course and Walenda Booster Stations, then to the Gulf Cove and Myakka Booster Stations, and lastly to the Rotonda Booster Station. General practice is to fill the Rotonda 5-MG tank through the new Ingraham 24-inch transmission main from a 16-inch water main from the Walenda Booster Station. The 16-inch transmission pipe also serves customers along its route; however, the 24-inch transmission main has no customers connected to the main.

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 O&M 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.

4.1.4 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 2020. The audit table compares the water received from the PRMRWSF to the sum of the 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 66,000 gallons per month or less than 0.25 percent of the total FY 2020 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 22,249,857 gallons per month or 6.58 percent.

Table 4-4 CCU Unaccountable Water Report (Mid/West County) FY 2020

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] (gal)
Oct-19	331,034,000	256,901,000	112,900	28,478,728	22,023	1,067,832	50,000	44,401,517
Nov-19	324,744,000	282,584,000	1,158,150	26,659,254	6,899	250,180	50,000	14,035,517
Dec-19	328,667,000	262,764,000	1,279,555	26,471,795	4,327	1,375,734	50,000	36,721,589
Jan-20	344,074,000	294,986,000	145,205	26,037,749	6,405	505,211	50,000	22,343,430
Feb-20	325,240,000	299,669,000	493,227	22,450,757	25,335	1,565,203	50,000	986,478
Mar-20	394,784,000	292,755,000	696,545	21,002,829	13,590	905,061	50,000	79,360,975
Apr-20	363,142,000	347,665,000	751,600	33,261,065	15,790	764,454	50,000	(19,365,909)
May-20	366,743,000	316,190,000	125,700	25,800,780	7,228	215,893	50,000	24,353,399
Jun-20	324,958,000	277,196,000	2,185,585	24,695,070	37,986	1,072,655	50,000	19,720,704
Jul-20	340,846,000	298,744,000	353,210	27,346,518	15,695	876,098	50,000	13,460,479
Aug-20	316,586,000	278,884,000	1,397,730	40,632,337	12,219	243,978	50,000	(4,634,264)
Sep-20	295,824,000	233,030,000	582,167	25,811,028	560	735,873	50,000	35,614,372
Total (gal)	4,056,642,000	3,441,368,000	9,281,574	328,647,910	168,057	9,578,172	600,000	266,998,287
Monthly Average (gal)	338,053,500	286,780,667	773,465	27,387,326	14,005	798,181	50,000	22,249,857

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 serves 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 53 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 319 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 improvements 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 2020 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 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 uses (Columns 3 through 8). The unaccounted-for water loss percentage for FY 2020 was approximately 12.6 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 sources of observed water loss. Since 2015, CCU has been working directly with SWFWMD staff to implement the plan and has mitigated several sources of water loss by completing the following:

- Installed new fixed base meters in every residential water service and checked the accuracy of commercial water meters.
- Performed a leak analysis throughout the South County distribution system.
- Reduced the operating pressure of the system to reduce leaks.
- Continued to investigate the issue by checking the accuracy of the meters and water accounting system.

Following these efforts, SWFWMD conceded that continued search for small leaks is a futile effort that can be stopped by CCU, if requested by letter.

In 2019, Jones Edmunds completed a water loss investigation of the South County distribution system and determined that the primary source of water loss was background leakage from the distribution system. Although the investigation determined that the leakage volume was within the expected range for the South County distribution system based on physical characteristics such as distribution main length, service connections, and operating pressure, the leakage volume was determined to be over the 10-percent threshold due to the relatively low amount of water supplied, which is a result of the snowbird-driven water use demands observed for many of the residential areas within the system. The investigation also noted that residential meters may be underreporting water use system wide and recommended CCU continue its meter testing and replacement program to identify and replace residential meters that are not performing adequately.

Table 4-5 CCU Unaccountable Water Report (South County) FY 2020

Month	Total Metered Water (gal)	Total Sold (gal)	Construction Flushing (gal)	Hydrant Flushing (gal)	Construction Fill (gal)	Line Breaks (gal)	Fire Department (gal)	Total Unaccounted-For Water (gal)
Oct-19	12,313,281	8,952,000	0	990,651	0	4,320	10,000	2,356,310
Nov-19	12,663,647	10,934,000	0	512,198	0	18,061	10,000	1,189,388
Dec-19	13,826,258	10,056,000	0	534,975	0	4,851,990	10,000	-1,626,707
Jan-20	15,656,216	12,804,000	0	533,197	0	1,080	10,000	2,307,939
Feb-20	14,759,228	13,638,000	0	994,572	0	24,480	10,000	92,176
Mar-20	18,255,232	12,824,000	60,195	579,375	2,392	205,751	10,000	4,573,519
Apr-20	16,852,160	12,802,000	0	463,865	0	1,440	10,000	3,574,855
May-20	15,574,912	13,411,000	0	21,500	0	388,359	10,000	1,744,053
Jun-20	11,837,312	9,623,000	0	60,000	0	74,162	10,000	2,070,150
Jul-20	13,067,456	11,566,000	0	7,000	0	68,435	10,000	1,416,021
Aug-20	11,765,056	9,943,000	252,480	70,800	7,338	87,444	10,000	1,393,994
Sep-20	11,911,040	8,836,000	166,500	642,625	280	70,460	10,000	2,185,175
Total (gal)	168,481,798	135,389,000	479,175	5,410,758	10,010	5,795,982	120,000	21,276,873
Monthly Average (gal)	14,040,150	11,282,417	39,931	450,897	834	482,999	10,000	1,773,073

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 an abrupt failure occurs 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 stored on a file server and 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 EAMS.

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

4.3.3 Maintenance Activities

The 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 that 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.

In 2019, CCU started testing the new AMI automatic meters for accuracy. Testing continued in 2020; results show a 3-percent failure rate at low, medium, and high flow. 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 2020 in both County distribution systems included:

- Completed 5,048 SOs within the distribution systems.
- Responded to 184 water quality calls and 754 customer calls for leaks.
- Replaced 13 hydrants, repaired 47 hydrants, and performed maintenance on 648 hydrants, including exercising, flow testing, and painting.
- Issued and addressed 121 boil water notices, and repaired 56 line breaks on pipes 3 inches or larger.
- Installed six new valves, replaced six valves, conducted six valve insertions, and performed maintenance on 1,100 valves.
- Performed 86 new line installations, and cleared 33 lines.

- Tested 78 large meters and replaced four.
- Replaced 58 galvanized-steel service connections.
- Upgraded two distribution system sampling points.
- Installed a new 24-inch influent line, with flow meter, mixer, and chemical feed at the Walenda WBS.
- Conducted operational testing of the Myakka WBS.
- Began bench testing the domestic meters in Burnt Store for accuracy.
- Updated the ERP.

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:

- One employee attended Florida Water and Pollution Control Operators Association (FW&PCOA) online short school for Level 2 Distribution System Operator (DSO).
- All supervisors attended Interacting with Citizens journalist training.
- Staff members participated in Ambassador and Charlotte County University training.

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 2020, the following staffing changes occurred:

- One new operator was hired.
- Two new staff members were hired for fire hydrant maintenance.
- Two staff members retired.

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 County 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 for the third year in a row.

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 2019 Annual Report for the Mid/West and South County distribution systems, respectively. Table 4-8 summarizes the general recommendations that apply to both distribution systems.

Table 4-6 Mid/West County Distribution System – 2019 Recommendations and Status

	Interconnects
Recommendation:	Lower the lighting under the canopy to illuminate the pumps and equipment at the EWD interconnect.
Progress:	Incomplete.
	WBS General
Recommendations:	1. 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. 2. Apply appropriate arc-flash labeling on appropriate switchgear in compliance with NFPA 70E to properly notify O&M personnel of a 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. CCU has begun this process for its WBSs. 2. CCU has completed labeling for the Port Charlotte Golf Course WBS and has scheduled it for Gulf and Rotonda WBSs in 2021.

	Port Charlotte Golf Course WBS
Recommendations:	1. Perform yard maintenance around the perimeter fencing. 2. Label the switchgear to identify parts and components that could be energized.
Progress:	1. Ongoing. 2. Completed.
	Walenda WBS
Recommendations:	1. Perform yard maintenance around the perimeter fencing. 2. Replace the generator at the WBS with a properly sized generator to accommodate the loads and maintain reliable operation of the station. 3. Fix the leak on the seal of Pump 3. 4. Repair the bonding and re-paint the GST. 5. Replace the missing cover on the junction box. 3. Fix unsupported and damaged conduits throughout the facility.
Progress:	1. Ongoing. 2. Not completed. 3. Completed. 4. Scheduled for completion. 5. Completed. 6. Completed.
	Gulf Cove WBS
Recommendations:	1. Perform yard maintenance around the perimeter fencing. 2. Continue to upgrade the WBS by further progressing the replacement project for the Myakka River pipe crossing that supplies water to the WBS. 3. Replace the concrete pipe connecting the GST to the pump station at the WBS. 4. Paint the floor in the sodium hypochlorite chemical injection room to prevent concrete deterioration. 5. Increase the size of the fuel tank to hold additional fuel. 6. Fix the leak on the influent pipe to the GST. 7. Fix the leak on HSP No. 2. 8. Pump out the water in the vault containing the HSP feed piping. 9. Secure the electrical conduit for the gate camera. 10. Provide additional support for the flex conduit bearing the video surveillance system. 11. Repair conduit in the chemical feed system.
Progress:	1. Ongoing. 2. Scheduled for completion. 3. Scheduled for completion. 4. Not completed. 5. Not completed. 6. Completed. 7. Completed. 8. Ongoing. 9. Not completed. 10. Not completed. 11. Not completed.

	Rotonda WBS
Recommendations:	1. Conduct further analysis of the ATS based on the degradation of the enclosure to verify that it is functioning properly. 2. Replace the VFD covers to eliminate gaps between the updated VFDs and the enclosures. 3. Clean the small oil spill inside the generator enclosure. 4. Paint the wall that contains the HMI in the pump room. 5. Replace the incoming breaker as soon as possible. The failure of this specific device may render the station out of service for an extended period. 6. Further recommend that the gaps surrounding the VFDs be mitigated to prevent potential contact with live parts.
Progress:	1. Scheduled for completion. 2. Not completed. 3. Completed. 4. Completed. 5. Scheduled for completion. 6. Scheduled for completion.
	Ingraham Disinfection Station
Recommendations:	1. Repair the doorstep to the water quality testing and storage shed.
Progress:	1. Not completed.

Table 4-7 South County Distribution System – 2019 Recommendations and Status

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.

Table 4-8 General Distribution System – 2019 Recommendations and Status

Recommendation:	Identify options to increase resilience of the South County system considering interconnects with neighboring utilities or alternative water supplies.[1]
Progress:	CCU is investigating the feasibility of installing interconnects with the City of Punta Gorda and Lee County.
Recommendation:	Identify options to increase resilience of the West County water supply (consider redundant water mains or capped wells).[1]
Progress:	Ongoing.
Recommendation:	Update SOP for chemical deliveries, require chain of custody forms, and verification system for proper chemical delivery.[1]
Progress:	Ongoing.

Recommendation:	Develop a wildfire ERP, identify fire hydrant locations, and coordinate with Fire Department for trainings for critical assets.[1]
Progress:	Ongoing.
Recommendation:	Update the ERP for pipe failure for all critical assets.[1]
Progress:	Ongoing.
Recommendation:	Identify a backup chemical and fuel supplier in the event of a chemical or fuel shortage.[1]
Progress:	Completed.
Recommendation:	Develop water quality models for each of their distribution systems.[1]
Progress:	Ongoing.
Recommendation:	Develop an ERP for operating without the support of SCADA.[1]
Progress:	Ongoing.
Recommendation:	Develop a procedure and obtain the equipment for transporting key chemicals (fuel and chlorine) from one site to another if required in an emergency.[1]
Progress:	Completed.
Recommendation:	Link contamination detection to SCADA to immediately shut down or lockout any pump in operation.[1]
Progress:	Ongoing.

Note: [1] Recommendation from RRA Report (March 2020).

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:

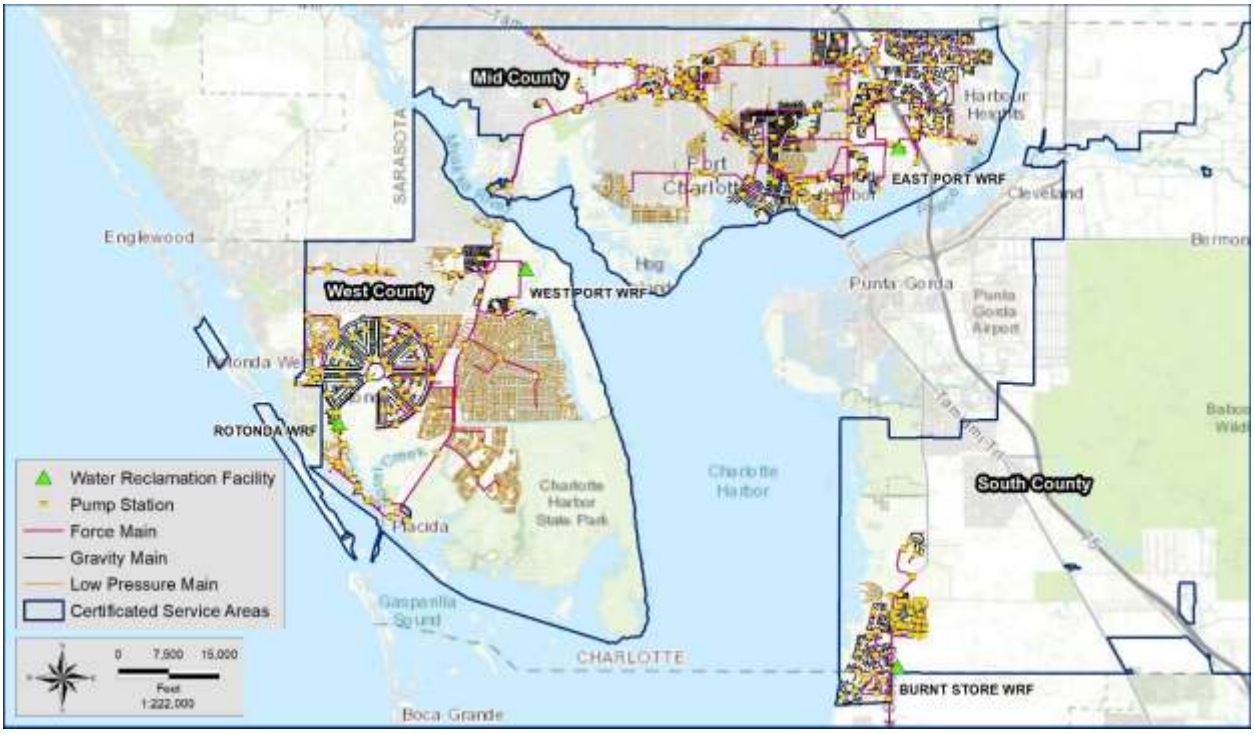
- **Gravity Sewer** – as the name implies, is piping installed at a gradual incline (slope) that allows wastewater to flow exclusively by the energy of gravity. Gravity sewers include manholes that allow for maintenance staff entry and equipment use. Flow entering gravity sewers discharges to manholes, 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.
- **Vacuum Station** – houses a collection tank, discharge pumps to send the sewage to the treatment plant, controls to automate the station, and vacuum pumps that create a negative pressure in the vacuum mains.

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

At the end of FY 2020, CCU had 40,759 wastewater customers, an increase of 997 customers since FY 2019. Based on CCU's GIS data, these customers are served by:

- 365 miles of gravity sewer.
- 381 miles of LPS mains.
- 24 miles of vacuum sewers.
- 186 miles of force mains.
- 7,596 manholes.
- 304 lift stations including 2 vacuum stations.

Figure 5-1 CCU Wastewater Collection Systems



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 upgrades needed for future system expansions.

The model is a constant work in progress that it is regularly updated when system changes occur. Most recently, the County is improving the reliability of the model in the Mid County area. The updates to the model will aid in sizing planned infrastructure improvements in the Deep Creek and Ackerman neighborhoods as well as to aid in the implementation of the Regional Transmission System Interceptor and Grand Master Loveland Lift Station near the East Port WRF.

5.2 Lift Stations

At the end of FY 2020, the system had a total of 318 CCU maintained lift stations –304 owned by CCU. The other 14 stations are owned by the County, 11 of which are outside the CCU service area. Twelve master lift stations (Nos. 37, 59, 65, 99, 143, 321, 801, 815, 860, 861, 873, and 874) have permanent auxiliary power. CCU owns portable standby power equipment; through FY 2020, initial steps have been taken toward Federal Emergency Management Agency (FEMA) grant funding agreements to provide funding for 24 additional generators that will be dispersed throughout the lift stations strategically based on need. Of the 24, 14 are planned to be stationary generators and 10 are planned to be trailer-mounted generators. 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 wetwells during

emergencies through a portable pump connection or an adaptor that can be installed when needed.

Jones Edmunds personnel and CCU Operations staff conducted site visits January 27 through 29, 2020, to three of the master lift stations and 15 lift stations dispersed among areas of the County where construction was planned that would most significantly impact the pumps' hydraulic performance. Table 5-1 lists the 18 lift stations visited. The site-visit assessments will 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	Behind 4157 S Tamiami Trail
LS 83 – Maple Leaf Master	Off the southeast corner of So. Queen's Way Road in the Maple Leaf Estates Residential Subdivision
LS 139 – Altoona	Edgewater Drive & Altoona Street
Representative Lift Stations	
LS 3 – Gardner	Ott Circle & Gardner Drive north of Ott Circle Park
LS 6 – Higgs	Across from 21184 Higgs Drive
LS 9 – Church	Behind St. Vincent de Paul (2499 Gates Avenue)
LS 17 – Beach	North of Sinclair Street & Harbor Boulevard
LS 18 – Jr. High	Orlando Boulevard & Midway Boulevard by Midway Park
LS 27 – McGrissor	Veterans Boulevard & Kings Highway
LS 28 – Peachlove	Peachland Boulevard & Loveland Boulevard
LS 55 – Meadow Park	Essex Avenue & Lake View Boulevard
LS 59 – Skylark (Vacuum)	598 Skylark Lane NW, Azalea Avenue & Skylark Lane
LS 64 – Sandhill Pines	Across from 1423 Loveland Boulevard
LS 77 – Windstar	Edgewater Drive & Tarpon Boulevard
LS 88 – Common Medical	Behind 2625 So. Tamiami Trail
LS 93 – Wawa	Behind 20273 Midway Boulevard
LS 122 – Clinton	Clinton Avenue east of Charlotte County Fire/EMS Station 8 (21500 Clinton Avenue)
LS 303 – Constantine	Constantine Road & Aden Way

5.2.1 Master Lift Station 65 – South Port Master

South Port Master Lift Station is centrally located just south of US 41 and southwest of the building at 4157 S Tamiami Trail in Port Charlotte. LS 65 currently receives flow from over 23 different lift stations, surrounding gravity lines, and LPS lines. The station discharges through a 16-inch force main. The flow is then conveyed to the East Port WRF.

The station contains three submersible Flygt model CP3300 88-HP submersible pumps with 454-millimeter (mm) impellers in a 12-foot-diameter, 19-foot-deep, lined concrete wetwell. The pumps have an estimated capacity range between 1,974 and 2,116 gpm at approximately 73 to 82 feet of head (based on the County's latest drawdown reports that Operations staff had available at the time of the site visit). The wetwell wall and hatches are in good condition. The discharge isolation valves, emergency dedicated pump suction, and emergency discharge connection are above grade adjacent to the wetwell.

The station is not fenced other than the odor-control unit, but the building and all access hatches are locked. The site has no significant lighting other than building lights, but the building housing the generator and panels has indoor lighting. The odor-control system at the station is a carbon adsorption, forced-air system, which has kept hydrogen sulfide levels in the wetwell low. This has contributed to the relatively good condition of the wetwell even though the station has been in service for over 20 years. The carbon adsorption unit is within a locked, fenced area that has barbed wire. Power service to the station is 480-volt, three-phase with a pad-mounted transformer east of the station. A 300-kW Cummins generator, rated at 375 kilovolt-amperes (kVA), with an ATS 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. The station has a water hose bibb for washdown.

Due to the high inflow of this station and the relatively shallow wetwell, 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:

- Installed pumps will be running off their performance curve after the Remote Transmission System (RTS) and Grand Master Lift Station (GMLS) construction.
- The flow meter is not functional.
- No fencing or enclosure to protect the valves and piping.
- Generator controls exceed the 6-foot-7-inch limit as required by code.
- Signs of fats, oil, and grease (FOG) and ragging found.

Proposed 2021 improvements to the station include:

- Evaluate updating the pumps to a lower head pump selection to avoid future run-out condition.
- Repair the flow meter.
- Fence the entire site.
- Evaluate generator control elevations to conform to code.
- Evaluate the use of a chopper pump or grinder station to reduce ragging, if necessary.

5.2.2 Master Lift Station 83 – Maple Leaf Master

The Maple Leaf Master Lift Station is within the Maple Leaf Estates Residential Community in the southeast corner of the property area, northwest of S. Queen's Way Road and Nipigon Trail. LS 83 receives wastewater from six pump stations in the area. LS 83 discharges through a 10-inch force main that is conveyed to the East Port WRF.

The station contains two 47-HP Flygt Model 3201 submersible pumps with 457-mm impellers in a 12-foot-diameter lined concrete wetwell. The pumps have an estimated capacity of 611 gpm at approximately 99 to 102 feet of head (based on the County's latest drawdown reports that Operations staff had available at the time of the site visit). The wetwell lining and hatches are in good condition and provide adequate access to remove the pumps using the rail retrieval system. The discharge isolation valves and the emergency dedicated

pump discharge connection are below ground in an adjacent valve vault that is locked with a padlock. The valve vault hatches and walls are in good condition.

The station is fenced, and access hatches are locked. The station has no dedicated sight lighting. An odor-control system is on site adjacent to the wetwell. The power service to the station is 480-volt, three-phase, with a pad-mounted transformer northeast of the station outside the fence. The station has a SCADA system with a telemetry transmitter/receiver. The control panel has seal-offs as well as a portable generator receptacle with mechanical interlock between the main breaker and generator. The station has a potable water hose bibb for washdown.

The following deficiencies were noted:

- Reduced security from low fence with lack of barbed wire.
- Operators expressed concern about the odor-control system's performance.

Proposed 2021 improvements to the station include the following tasks:

- Evaluate the security of the site including adding barbed wire to the fence.
- Evaluate the on-site odor-control system and consider upgrading the unit or evaluating a simplistic HIVENT unit, if appropriate.

5.2.3 Master Lift Station 139 – Altoona

The Altoona Lift Station is at the northeast corner of the intersection of Edgewater Drive and Altoona Street. This station receives wastewater from surrounding LPSs as well as three County-owned stations (LS 20 Lakeview; LS 23 O'Hara; and LS 60 McGrath). LS 139 discharges through a 12-inch force main to the Southport Master Lift Station (LS 65), which flows directly to the East Port WRF.

The station contains two 47-HP ABS/Sulzer model XFP100J-CH1-PE 350/4-J-60FM submersible pumps in a 10-foot-diameter, 25-foot-deep, lined concrete wetwell. Each pump has a design capacity of 302.93 gpm at 60.66 feet of head. The wetwell lining is largely unaffected by hydrogen sulfide, and the wetwell hatches are in good condition and provide adequate access to remove the pumps from the lift station's rail retrieval system. The

discharge isolation valves, emergency dedicated pump suction, and emergency discharge connection are all above grade to the east of the wetwell.

The station is fenced, has site lighting, and has a bio-trickling tower odor-control system. The power service to the station is 480-volt, three-phase with a pole-mounted transformer east of the station outside of the fence. The station has a SCADA system with a telemetry transmitter/receiver as well as a Telemetry Control Unit inside the panel. The control panel has seal-offs as well as a portable generator receptacle with a mechanical interlock between the main breaker and generator breaker. The station has a potable water hose bibb for washdown.

The odor-control blower motor was replaced since the last site visit. The Operations staff noted that the unit had been running as designed since.

The following deficiencies were noted:

- No significant deficiencies were noted, and the FY 2019 issues appear to have been resolved.

Proposed 2021 improvements to the station include:

- No recommendations made.

5.2.4 Representative Lift Stations' Condition Assessments

Jones Edmunds personnel and CCU Operations staff also toured the selected group of neighborhood lift stations on January 27 through 29, 2021, to develop a general sense of the overall condition of the lift stations that are within the CCU wastewater collection system, focusing on stations whose pump performance would be significantly impacted by upcoming construction. 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 3 – Gardner

The Gardner Lift Station is southeast of the north intersection of Ott Circle and Gardner Drive just north of Ott Circle Park. The lift station serves residential and commercial areas to its north and west and receives flows from the surrounding gravity as well as LS 4 and LS 13, both of which discharge into the upstream gravity sewer through 6-inch force mains. Flow from LS 3 is conveyed to LS 65 South Port Master and is ultimately conveyed to the East Port WRF.

The station contains two 20-HP Flygt model 3152 dry-pit installation pumps with 434-mm impellers. The wetwell is 21 feet 7 inches deep. Each pump has a design capacity of 758 gpm at 50 feet of head. The concrete wetwell is corroded by years of hydrogen sulfide exposure, and metal reinforcement is exposed near the access hatch. The emergency dedicated pump suction and the emergency discharge connection are above grade north of the wetwell. The site's dedicated suction and discharge connections were being used by an on-site bypass pump at the time of the site visit.

The station is fenced, and access hatches are locked. The station does not have dedicated site lighting. The station has no odor control, although no significant odor was present on the morning of the site visit. The wetwell and dry-pit have screened vents. Power service to the station is 240-volt, three-phase, with a pole-mounted transformer southwest of the station. The station has a SCADA system with a telemetry transmitter/receiver. The control panel does not have seal-offs. A portable generator receptacle was present, but no mechanical interlock between the main breaker and generator breaker was installed. The station has a hose bibb for washdown.

The County's property in this area extends to the entirety of Ott Circle Park. While access to the station is not obstructed, adjacent property could be evaluated if the County desired to replace this with a more accessible, submersible lift station.

The following deficiencies were noted:

- Missing seal-offs from the control panel conduit.
- Missing mechanical interlock between the main breaker and generator breaker.
- One of the pumps was inoperable during the site visit, requiring a bypass pump to be installed on site and gate to be opened overnight.
- Dry-pit design requires confined space entry, resulting in delays for pump repair and replacement.

Proposed 2021 improvements to the station include:

- Install seal-offs on the wetwell control panel to conform with code.
- Install mechanical interlock between the main breaker and generator breaker to conform with code.
- Acquire confined-space entry to perform pump repairs; enforce methods to secure station overnight when bypass pump is in operation.
- Evaluate possibilities for using adjacent land to convert the station to a submersible station.

5.2.4.2 Lift Station 6 – Higgs

The Higgs Lift Station is across the street from 21184 Higgs Drive near the southwest corner of the intersection of Salem Avenue and Higgs Drive. LS 6 receives flow from surrounding gravity lines. LS 6 discharges through a 12-inch force main to LS 65, and the flow is ultimately conveyed to the East Port WRF.

The station contains two 10-HP Flygt Model 3127 submersible pumps with 484-mm impellers in a 6-foot-diameter, 19-foot-11-inch-deep, lined concrete wetwell. Each pump has an estimated capacity of 369 gpm at approximately 46 feet of head (based on the County's latest drawdown reports that Operations staff had available at the time of the site visit). The wetwell lining is in good condition and appears to be largely unaffected by hydrogen sulfide. The wetwell hatches are in good condition and provide adequate access to remove the pumps from the rail retrieval system. The discharge isolation valves and the emergency dedicated pump discharge connection are above grade adjacent to the wetwell.

The station is fenced, and access hatches are locked. The station does not have dedicated lighting. The station has a Siemens Carbon Adsorber odor-control system. The power service to the station is 240-volt, three-phase with a pole-mounted transformer northeast of the station outside of the fence. The control panel has seal-offs and is equipped with a portable generator receptacle with a mechanical interlock between the main breaker and generator breaker. The station has a SCADA system with a telemetry transmitter/receiver. The station has a potable water hose bibb for washdown.

The following deficiencies were noted:

- Inadequate lighting is available for evaluating the control panel or wetwell.
- Pumps will experience deadheading and require the lag pump to operate after the completion of the RTS and GMLS construction.

Proposed 2021 improvements to the station include:

- Evaluate site lighting for lift station employee serviceability.
- Evaluate updating the pump to a higher-head pump to avoid deadheading after the RTS and GMLS construction.

5.2.4.3 Lift Station 9 – Church

The Church Lift Station is behind the St. Vincent de Paul Society at 2499 Gates Avenue directly south of the Gates Avenue and Beverly Avenue intersection. LS 9 receives flow from surrounding gravity and Hernando Lift Station (LS 10). LS 9 discharges to an 16-inch force main that manifolds to a 20-inch force main directly influent to the East Port WRF.

The station contains two 29-HP Flygt model CP3201 dry-pit installation pumps with 454-mm impellers. The concrete wetwell is 16-foot by 9-foot and 16 feet 10 inches deep. The pumps have an estimated capacity range between 1,464 gpm and 1,487 gpm at approximately 67 to 77 feet

of head (based on the County's latest drawdown reports that Operations staff had available at the time of the site visit). The access hatches are in fair condition with some signs of corrosion, metal, and exposure between the hatch and concrete. The emergency dedicated pump suction and the emergency discharge connection are above grade adjacent to the wetwell.

The station is fenced. The station has no dedicated site lighting. The station has no odor control, although no significant odor was present at the site visit. The wetwell and dry-pit have screened vents. The power service to the station is 480-volt, three-phase, with a pole-mounted transformer adjacent to the site. The station has a SCADA system with a telemetry transmitter/receiver. The control panel has seal-offs and is equipped with a portable generator receptacle with a mechanical interlock between the main breaker and generator breaker. The station has a potable water hose bibb for washdown.

The following deficiencies were noted:

- Concrete corrosion in the wetwell and concrete separation around the wetwell access hatch.
- Installed pumps will be running off their performance curve after the RTS and GMLS construction.
- Dry-pit design requires confined space entry, resulting in delays to the pump repair and replacement.
- Operations staff noted issues with force main flows fighting against each other during heavy rain events.

Proposed 2021 improvements to the station include:

- Evaluate updating the pumps to a lower head pump selection to avoid future run-out conditions.
- Evaluate possible options for converting the station to submersible; otherwise evaluate concrete repair and restoration for the site.
- Evaluate system curve conditions in high rain events to ensure efficient pump selection.

5.2.4.4 Lift Station 17 – Beach

The Beach Lift Station is northeast of the intersection of Sinclair Street and Harbor Boulevard. LS 17 receives flows from the surrounding gravity collection system. The station conveys flows through a 6-inch force main that manifolds to a 12-inch force main, which then flows to the South Port Master Lift Station (LS 65) before being conveyed to the East Port WRF.

The station contains two 14.07-HP ABS/ Sulzer XFP100E-CB1.3-PE105/4 submersible pumps with 8.86-inch impellers in a 6-foot by 6-foot, 18-foot 11-inch-deep, lined concrete wetwell. The pumps have an estimated capacity range between 332 and 364 gpm at approximately 60 to 63 feet of head (based on the County's latest drawdown reports that Operations staff had available at the time of the site visit).

The wetwell lining is largely unaffected by hydrogen sulfide. The wetwell hatches are in fair condition with signs of rust and wear, but provide adequate access to remove the pumps from the installed rail retrieval system. The discharge isolation valves, dedicated pump suction, and dedicated discharge connection are all above grade to the southwest of the wetwell.

The station is fenced, has no site lighting, and has a HIVENT odor-control system. The power service to the station is 240-volt, three-phase with a pole-mounted transformer across the street from the station. The station has a SCADA system with a telemetry transmitter/receiver. The control panel has seal-offs and is equipped with a portable generator receptacle with a mechanical interlock between the main breaker and generator breaker. The station has a potable water hose bibb for washdown.

The following deficiencies were noted:

- No site lighting present on site.
- Installed pumps will experience deadheading after completion of the RTS and GMLS construction.

Proposed 2021 improvements to the station include:

- Evaluate site lighting for lift station employee serviceability.
- Evaluate updating the pumps to higher-head pumps to avoid deadheading after the RTS and GMLS construction.

5.2.4.5 Lift Station 18 – Jr. High

The Jr. High Lift Station is directly west of the intersection of Midway Boulevard and Orlando Boulevard by Midway Park. The station receives flow from the surrounding local gravity system. LS 18 conveys flow through a 6-inch force main to Beacon (LS 16) and ultimately to the East Port WRF through the force main along Olean Blvd.

The lift station contains two 5-HP Hydromatic S4SD500M3-4 submersible pumps with 6.75-inch impellers in a 6-foot-diameter, 23-foot-6-inch-deep, lined concrete wetwell. The pumps have an estimated capacity range between 423 and 617 gpm at approximately 29 to 30 feet of head (based on the County's latest drawdown reports that Operations staff had available at the time of the site visit). The wetwell hatches are in good condition and provide adequate access to remove the pumps along the lift station rail retrieval system. The wetwell lining is largely unaffected by hydrogen sulfide. The discharge isolation valves, dedicated pump suction, and emergency discharge connection are all above grade to the south of the wetwell.

The station is fenced and has dedicated site lighting. No odor control was present on site, but the wetwell has a screened vent and no odors were present at the time of the site visit. The power service to the station is 240-volt, three-phase, with a pole-mounted transformer across the street from the station. The station has a SCADA system with a telemetry transmitter/receiver as well as a Telemetry Control Unit inside the panel. The control panel has seal-offs and is equipped with a portable generator receptacle with a mechanical interlock between the main breaker and generator breaker. The station has a potable water hose bibb for washdown.

The following deficiencies were noted:

- Installed pumps will be running off their performance curve after the RTS and GMLS construction.

Proposed 2021 improvements to the station include:

- Evaluate updating the pumps to a lower-head pump selection to avoid future run-out conditions.

5.2.4.6 Lift Station 27 – McGrissor

The McGrissor Lift Station is at the north corner of the intersection of Kings Highway and Veterans Boulevard. This station receives wastewater from the Cracker Barrel Lift Station (LS 29) and a private lift station serving the Mobile Home Park. LS 27 discharges through a 6-inch force main that manifolds to a 12-inch force main and flows directly to the East Port WRF along Loveland Boulevard.

The station contains two 10-HP Flygt Model CP3127 submersible pumps with 483-mm impellers in an 8-foot-diameter, lined concrete wetwell. The pumps have an estimated capacity range between 160 and 169 gpm at approximately 69 to 71 feet of head (based on the County's latest drawdown reports that Operations staff had available at the time of the site visit). The wetwell lining is largely unaffected by hydrogen sulfide. The wetwell hatches are in good condition and provide adequate access to remove the pumps from the lift station's rail retrieval system, if parking is available. Access to the wetwell from a truck's pump crane is best achieved through an adjacent parking space; however, if the space is occupied at the time of the County visit, accessing the pumps could be difficult. The discharge isolation valves and the dedicated-pump discharge connection are below ground in an adjacent valve vault that is locked with a padlock. The valve vault hatches are in good condition.

The station is not fenced and has no dedicated sight lighting, although a light pole in the adjacent parking lot is near the valve vault. No odor control is provided on site, but the wetwell has a screened vent and no odor was noticeable the morning of the site visit. The power service to the station is 240-volt, three-phase with an adjacent pole-mounted transformer directly southeast of the station. The station has a SCADA system with a telemetry transmitter/receiver. The control panel has seal-offs and is equipped with a portable generator

receptacle with a mechanical interlock between the main breaker and the generator breaker. The station has a potable water hose bibb for washdown.

The following deficiencies were noted:

- Access to the pumps could be made difficult if adjacent parking is unavailable.
- The wetwell had standing water at the time of the site visit despite days without rain.
- Installed pumps will be running off their performance curve after the RTS and GMLS construction.

Proposed 2021 improvements to the station include:

- Evaluate proprietary access to the pump wetwell.
- Evaluate modifying the valve vault grouting to allow proper drainage.
- Evaluate updating the pumps to a lower-head pump selection to avoid future run-out conditions.

5.2.4.7 Lift Station 28 – Peachlove

The Peachlove Lift Station is on the southeast corner of the intersection of Peachland Boulevard and Loveland Boulevard. The station currently receives flow from the surrounding commercial gravity system and the Harold Recreation Center Lift Station (LS 63). LS 28 discharges to an 8-inch force main that manifolds to a 12-inch and ultimately to a 20-inch force main that feeds directly to the East Port WRF through the force main along Loveland Boulevard.

The station contains two 29-HP Flygt Model CP3201 submersible pumps with 454-mm impellers in a 10-foot-diameter, lined concrete wetwell. Each pump has an estimated capacity of 950 gpm at approximately 70 feet of head. The wetwell hatches are in good condition and provide adequate access to remove the pumps on the rail retrieval system. The rails stop a short distance from the top of the wetwell and are composed of two rails welded together that appear to be buckling at the connection point and causing some difficulty when reinstalling the pumps into the wetwell once maintenance or inspection is complete. The wetwell lining is somewhat unaffected by hydrogen sulfide; however, the seams all have signs of seepage and wear including those in the liner and the pipe penetrations. The discharge isolation valves and dedicated-pump discharge connections are below ground in an adjacent valve vault that is locked with a padlock.

The station is fenced and has no dedicated site lighting. The station has a HIVENT odor-control system installed on the wetwell. The power service to LS 28 is 480-volt, three-phase, and a pole-mounted transformer is south of the site. The station has a SCADA system with a telemetry transmitter/receiver. The control panel has seal-offs and is equipped with a portable generator receptacle with a mechanical interlock between the main breaker and generator

breaker. The control panel enclosure's proximity to the seal-offs makes them very difficult to maintain. The station has a potable water hose bibb for washdown; however, its use has been obstructed by the presence of an electronic hose end timer.

The following deficiencies were noted:

- Minor wear of the concrete meter and disconnect switch posts.
- Rusting of the structural metal supporting the disconnect switch posts.
- Installed pumps will be running off their performance curve after the RTS and GMLS construction.
- The pump rails are not continuously even and end before the top of access hatch.
- Some seepage and lining wear around seams and pipe penetrations within the wetwell are apparent.

Proposed 2021 improvements to the station include:

- Replace concrete control panel posts with County aluminum standard.
- Evaluate updating the pumps to a lower-head pump selection to avoid future run-out conditions.
- Evaluate replacing pump rails with single, continuous rails that reach the access hatch when pumps replaced.
- Evaluate re-lining the wetwell or specifically address the exposed penetrations and seams.

5.2.4.8 Lift Station 55 – Meadow Park

The Meadow Park Lift Station is on the north corner of the intersection of Essex Avenue and Lake View Boulevard. LS 55 receives flow from the surrounding gravity and LPS systems. LS 55 discharges through a 6-inch force main to LS 65 where the flow is conveyed to the East Port WRF.

The station contains two 20-HP Flygt Model 3152 submersible pumps with 454-mm impellers in a 6-foot-diameter, 17-foot-8-inch-deep, lined concrete wetwell. The pumps have an estimated capacity range between 264 and 81 gpm at approximately 95 to 100 feet of head (based on the County's latest drawdown reports that Operations staff had available at the time of the site visit). The wetwell lining is largely unaffected by hydrogen sulfide; however, signs of grease and significant odor were noticed at the time of the site visit. The odor had an oil smell to it, and the operators questioned whether it was resulting from the school or a pump seal issue. The wetwell hatches are in good condition and provide adequate access to remove the pumps on the rail retrieval system. The discharge isolation valves and dedicated-pump discharge connections are below ground in an adjacent valve vault that is locked with a padlock.

The station has a slatted fence without barbed wire. The station has no dedicated site lighting. No odor control is provided on site, but the wetwell does have a screened vent. The power service to the station is 240-volt, three-phase, with a pole-mounted transformer across the street from site. The station has a SCADA system with a telemetry transmitter/receiver. The control panel is equipped with a portable generator receptacle but has no mechanical interlock between the main breaker and generator breaker. The control panel has seal-offs. The station has a potable water hose bibb for washdown.

The following deficiencies were noted:

- Strong odor noticed on site.
- Odor on site had an oil smell to it.
- No surge-protection device appeared to be present.
- No mechanical interlock is present.
- Staff noted that the County plans to reroute this station to the force main feeding LS 139.

Proposed 2021 improvements to the station include:

- Evaluate odor control or simplistic HIVENT system for the lift station site.
- Evaluate the odor whether it is a pump issue, including if a pump seal might have blown.
- Evaluate implementing a surge-protection device on the main breaker.
- Install a mechanical interlock between the generator breaker and main breaker to return to code conformance.

5.2.4.9 Lift Station 59 (Vacuum Station) – Skylark

The Skylark Lift Station is at 598 Skylark Lane. This vacuum lift station receives flow from the vacuum collection system in the surrounding area through four 10-inch vacuum lines, collecting from approximately 1,873 homes in the surrounding area split between three sub-sections (B1-B4: 1,095. C1-C5: 734. D1-D2: 44). LS 59 discharges through a 6-inch force main that converts to a 12-inch and ultimately a 20-inch force main and transmits flow to East Port WRF directly through the force main along Olean Boulevard.

The station contains two 50-HP Cornell centrifugal Model 4514T-VC18DB pumps inside the building. Each pump has a design capacity of 725 gpm at 137.4 feet of head.

A 5,000-gallon Augusta Fiberglass Vacuum Tank in the lower level of the building has a design pressure of 5 psi. Six 15-HP Busch Mink model MM 1502 A VA6 vacuum pumps, each rated at 200 hectopascal (hPa) with a max rate of 600 cubic meters per hour, force flow into the vacuum tank.

The building contains a dedicated pump crane for removing pumps and valves from the lower level. The crane appears aligned with the pumps, but does not appear aligned with the valves. The discharge isolation valves are overhead in the lower level and only accessible by the dedicated overhead crane in the building.

The station is gated and surrounded by a block wall. The station has indoor site lighting and a mulch bed odor-control system using bark media. The power service to the station is 480-volt, three-phase. A 300.0-kW Cummins generator, rated at 375.0 kVA, with an ATS, is installed within the fence on the west end of the site with a 519-gallon fuel tank. The generator is operated once a week each Monday to verify standby power capabilities. The station has a SCADA system with a telemetry transmitter/receiver.

The following deficiencies were noted:

- The crane pump on site is not aligned with the valves.
- Some of the valves are vertically below the common discharge line and meter, making them difficult to access with the crane.
- The access for tank maintenance is at the top of the tank without a dedicated access point.
- The overhead door to pull the vacuum pumps is relatively short and has a low ceiling.
- The installed pumps will be running off their performance curve after the RTS and GMLS construction.

Proposed 2021 improvements to the station include:

- Evaluate modifying the overhead crane with a trolley for lateral movement.
- Evaluate a catwalk or dedicated ladder for accessing the top of the tank for maintenance.
- Evaluate a portable hoist or dedicated overhead crane for easier access to the vacuum pumps.
- Verify the vacuum station site is in accordance with Occupational Safety and Health Administration (OSHA) and County safety and confined-space requirements.
- Evaluate updating the pumps to a lower-head pump selection to avoid future run-out conditions.

5.2.4.10 Lift Station 64 – Sandhill Pines

The Sandhill Pines Lift Station is directly across from the residence at 1423 Loveland Boulevard. This station receives flow from the surrounding gravity system. LS 64 discharges through a 4-inch force main that manifolds into a 20-inch force main, and the flow is conveyed along Loveland Boulevard to the East Port WRF.

The station contains two 7.5-HP Flygt Model 3127 submersible pumps with 212-mm impellers in a 6-foot-diameter lined concrete wetwell. The pumps have an estimated capacity range between 142 and 178 gpm at approximately 38 to 41 feet of head (based on the County's latest drawdown reports that Operations staff had available at the time of the site visit). The wetwell lining is largely unaffected by hydrogen sulfide; however, significant grease was noticed during the site visit. The wetwell hatches are in good condition and provide adequate access to remove the pumps from the lift station rail retrieval system. The discharge isolation valves and the emergency dedicated pump discharge connections are below ground in an adjacent valve vault. The vault valve vault appeared to be significantly deep.

The station is fenced and has no dedicated site lighting. No odor control is provided on site, but the wetwell does have a gooseneck vent. The power service to the station is 230-volt, three-phase with a pole-mounted transformer north of the station outside the fence. The station has a SCADA system with a telemetry transmitter/receiver. The control panel has seal-offs and is equipped with a portable generator receptacle with a mechanical interlock between the main breaker and generator breaker. The station has a potable water hose bibb for washdown.

The following deficiencies were noted:

- Installed pumps will run off their performance curve after the RTS and GMLS construction.
- A small driveway apron is near the road but no driveway connects the station and the lift station, resulting in a grassy area that could become muddy and cause vehicles to get stuck.
- The station experiences short pump run times as current flows are limited due to sparse population in the area.

Proposed 2021 improvements to the station include:

- Evaluate updating the pumps to a lower-head pump selection to avoid future run-out conditions.
- Evaluate installing additional driveway between the apron at the road and the lift station.
- Evaluate whether a smaller impeller diameter might be worth considering while the flow demands are still low.

5.2.4.11 Lift Station 77 – Windstar

The Windstar Lift Station is southwest of the intersection of Edgewater Drive and Tarpon Boulevard. The station receives flow from a nearby park by gravity and discharges through a 10-inch force main that becomes a 12-inch force main before discharging to LS 65 where flow ultimately is conveyed to the East Port WRF.

LS 77 contains two 7.5-HP Flygt Model 3127 submersible pumps with 485-mm impellers operated on variable frequency drives in an 6-foot-diameter, 20-foot-deep, lined concrete wetwell. The pumps have an estimated capacity range between 422 and 493 gpm at approximately 43 to 49 feet of head (based on the County's latest drawdown reports that Operations staff had available at the time of the site visit). The wetwell lining is largely unaffected by hydrogen sulfide, though noticeable grease buildup was apparent, and the wetwell hatches are in good condition and provide adequate access to remove the pumps on the rail retrieval system. The discharge

isolation valves and the emergency dedicated-pump discharge connection are below ground in an adjacent valve vault that is locked with a padlock.

LS 77 is surrounded by a block wall on three sides (west, south, and east). The station has no dedicated site lighting. No odor control is provided on site, but the wetwell has a screened vent. Power service to the station is 240-volt, single-phase. The station has a SCADA system with a telemetry transmitter/receiver. The control panel has seal-offs and is equipped with a portable generator receptacle with a mechanical interlock between the main breaker and generator breaker. The station has no hose bibb on site for washdown.

The following deficiencies were noted:

- Installed pumps will experience deadheading after completion of the RTS and GMLS construction.

Proposed 2021 improvements to the station include:

- Evaluate updating the pumps to higher-head pumps to avoid deadheading after the RTS and GMLS construction.

5.2.4.12 Lift Station 88 – Common Medical

The Common Medical Lift Station is off S. Tamiami Trail behind Akumin (2625 Tamiami Trail). LS 88 receives flow from the local residential and commercial gravity systems and discharges through a 6-inch force main that becomes a 20-inch force main, and the flow is conveyed along Olean Boulevard to the East Port WRF.

The lift station contains a 5-HP Liberty Pumps Model LGH05 submersible pump with a 6.6-mm impeller and a 12.1-HP ABS Model XFP100E submersible pump with a CB1 impeller in a 6-foot-diameter, 19-foot-3-inch-deep, polymer/plastic wetwell. The pumps have an estimated capacity range between 185 and 211 gpm at approximately 49 to 51 feet of head (based on the County's latest drawdown reports that Operations staff had available at the time of the site visit). The wetwell lining is largely unaffected by hydrogen sulfide. The wetwell hatches

and valve vault hatches are in good condition. The discharge isolation valves are below ground in an adjacent valve vault that is locked with a padlock. The emergency discharge connection is above grade southwest of the wetwell.

The station is fenced and has no dedicated site lighting, although a power pole with a light is immediately south of the station for the adjacent lot. No odor control is provided on site, but the wetwell has a screened vent. The power service to the station is 240-volt, three-phase with a pad-mounted transformer adjacent to the station outside the fence. The station has a SCADA system with a telemetry transmitter/receiver. The control panel has seal-offs and is equipped with a portable generator receptacle with a mechanical interlock between the main breaker and generator breaker. The station has no hose bibb on site for washdown.

The following deficiencies were noted:

- Installed pumps will be running off their performance curve after the RTS and GMLS construction.

Proposed 2021 improvements to the station include:

- Evaluate updating the pumps to a lower-head pump selection to avoid future run-out conditions.

5.2.4.13 Lift Station 93 – Wawa

The Wawa Lift Station is on S. Ellicott Circle behind the Wawa (20273 Midway Boulevard). It receives flow from surrounding residential and commercial gravity. LS 93 discharges through a 6-inch force main which manifolds into a 20-inch force main, and the flow is conveyed along Olean Boulevard to the East Port WRF.

The station contains two 23-HP Flygt Model 3153 submersible pumps with 274-mm impellers in a 10-foot-diameter, 13-foot-3-inch-deep, lined concrete wetwell. The wetwell lining is largely unaffected by hydrogen sulfide. The wetwell hatches are in good condition and provide adequate access to remove the pumps from the lift

station's rail retrieval system. The discharge isolation valves, the emergency dedicated pump suction, and the emergency discharge connection are all above grade southeast of the wetwell.

The station is fenced and has dedicated site lighting. The station has a HIVENT odor-control system installed on the wetwell and also has a bio-trickling tower odor-control system on site. The power service to the station is 480-volt, three-phase with a pad-mounted transformer southeast of the station outside the fence. The station has a MiniCAS system with a Telemetry Control Unit inside the panel. The control panel has seal-offs and is equipped with a portable generator receptacle with a mechanical interlock between the main breaker and generator breaker. The station has a potable water hose bibb for washdown.

The following deficiencies were noted:

- Installed pumps will be running off their performance curve after the RTS and GMLS construction.

Proposed 2021 improvements to the station include:

- Evaluate updating the pumps to a lower-head pump selection to avoid future run-out conditions.

5.2.4.14 Lift Station 122 – Clinton

The Clinton Lift Station is east of Charlotte County Fire/EMS Station 8 (21500 Clinton Avenue) on Clinton Avenue. It receives influent flows from the fire station and from surrounding gravity and LPS systems. LS 122 discharges to a 6-inch force main and ultimately is conveyed to the East Port WRF through the 20-inch force main along Peachland Boulevard and Loveland Boulevard.

The lift station contains two 23-HP Flygt Model 3152 submersible pumps with 267-mm impellers in a 6-foot-diameter, 11-foot-9-inch-deep, lined concrete wetwell. The pumps have an estimated capacity range of between 212 and 247 gpm at approximately 80 to 84 feet of head (based on the County's latest drawdown reports that Operations staff had available at the time of the site visit). The wetwell lining is largely unaffected by hydrogen sulfide. The wetwell hatches are in good condition and provide adequate access to remove the pumps from the lift station's rail retrieval system. The discharge isolation valves, dedicated pump suction, and the emergency discharge connection are above grade to the east of the wetwell.

The station is fenced and does not have dedicated site lighting. No odor control is provided on site, but the wetwell has a screened vent. The power service to the station is 240-volt, three-phase. Neither a transformer nor meter were visible in the vicinity; operators suspect that power may come from the adjacent fire station. The station has a SCADA system with a telemetry transmitter/receiver. The control panel has seal-offs and is equipped with a portable generator receptacle with a mechanical interlock between the main breaker and generator breaker. The station has a water hose bibb for washdown.

The following deficiency was noted:

- Installed pumps will be running off their performance curve after the RTS and GMLS construction.

Proposed 2021 improvements to the station include:

- Evaluate updating the pumps to a lower head pump selection to avoid future run-out conditions.

5.2.4.15 Lift Station 303 – Constantine

The Constantine Lift Station is at the southeast corner of the intersection of Constantine Road and Aden Way. The station receives residential flow from the surrounding development through gravity inverts, discharges to the Mauritania Lift Station (LS 302), and ultimately flows to the East Port WRF through the Bridgewater Lift Station (LS 309).

LS 303 contains a single 3-HP Flygt Model 3085 submersible pump with a 436-mm cutter impeller. The pump is installed in a 6-foot-diameter, lined concrete wetwell. The wetwell lining is largely unaffected by hydrogen sulfide but does show some signs of corrosion. The wetwell has an older conical lid design that can obstruct access during maintenance events. The wetwell manhole opening is in good condition. Although guiderails appear to have been included in this station, they end some distance below the manholed conical lid, which may present some difficulty removing and resetting the pumps. The station does not have discharge isolation valves, an emergency dedicated pump suction connection, nor an emergency discharge connection.

The site is not fenced, does not have dedicated site lighting, and has no odor-control or wetwell venting. The power service to the station is 240-volt, single-phase and is serviced through underground electric. The station has an Omni-Beacon telemetry system. The control panel does not have seal offs, but is equipped with a portable generator receptacle. No mechanical interlock is provided between the main breaker and generator breaker. The control panel uses an inverter to allow a three-phase generator hookup for the portable generator quick connection. No hose bibb is provided on site for washdown.

The wetwell is in the center of the road intersection, which requires Operations staff to manage traffic during routine maintenance and any pump removal. The County owns the adjacent lot southeast of the intersection. The design to move the lift station into the lot and the existing wetwell converted to a master manhole has been completed. The new design includes isolation valves and bypass piping, which currently do not exist at this simplex station.

The following deficiencies were noted:

- No interlock between the generator breaker and the main breaker.
- Missing seal-offs from the control panel conduit.
- Difficult-to-access wetwell.
- No isolation valves.

Proposed 2021 improvements to the station include:

- Install seal-offs and interlocks on electrical equipment and perform a detailed electrical code review to return to conformance with code.
- Evaluate the installation of a secondary standby pump.
- Prepare for construction of improved design noted by Operations staff.

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 CCU Operations staff is tasked 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, many

pump stations include on-site standby power or portable generator receptacles that can be used during power failures and 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. Through FEMA grants, the County is pursuing an additional 14 stationary generators and 10 trailer-mounted generators.

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 maintenance (PM) SOs are generated internally and processed in a similar manner. A total of 11,253 corrective SOs were generated by customer calls during FY 2020, almost double the 6,665 from FY 2019. Designating the SO as being related to wastewater or water is determined by the dispatcher. Table 5-2 denotes the FY 2020 SOs by source and issuer:

Table 5-2 Service Orders – FY 2020

System/Issue	Customer Calls	PM Service Orders
Low-Pressure Sewer	3,059	812
Sewer Lines	762	496
Lift Stations	3,633	1,749
Vacuum Sewer	167	575

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 open work orders exist 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.

During 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 wetwells 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 gravity system is nearly 50 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 wetwells.

CCU currently has 10 trailer-mounted portable generators and six trailer-mounted portable pumps that can be dispatched in the event of a power failure. The FEMA grant being completed will add 14 stationary generators and 10 trailer-mounted generators when fully executed. CCU 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.

5.5 REVIEW OF PREVIOUS REPORT RECOMMENDATIONS

Table 5-3 summarizes the recommendations and current status from the 2019 Annual Report for the wastewater collection system.

Table 5-3 Wastewater Collection System – FY 2019 Recommendations and Status

Recommendation:	Continue the scheduled rehabilitation of sanitary lift stations that have deteriorated due to use and hydrogen sulfide presence, including overseeing the evaluation and design of each improvement.
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 acquisition of stand-by generators and pumps to maintain service during power outages when budget allows to meet FDEP requirements.
Progress:	*FEMA grant funding is underway for the procurement of 24 new generators.*
Recommendation:	Continue to repair and upgrade existing lift stations as required. Perform the maintenance activities at the specific lift stations that were inspected for each former Annual Report and previously not completed.
Progress:	*See comments for each lift station below.*
Recommendation:	<u>Master Lift Station No. 309 – Bridgewater</u> ▪ Provide a stationary generator. ▪ Coat the wetwell. ▪ Replace concrete control panel posts with County aluminum standard. ▪ Replace/repair check valves. ▪ Replace pumps and other related equipment.
Progress:	▪ FEMA grant will provide generator FY 2021. ▪ Check valves are scheduled to be replaced after the force main improvements. ▪ Pump and related equipment scheduled to be replaced this year.
Recommendation:	<u>Master Lift Station No. 801 – Field</u> ▪ Evaluate the security of the site including securing stone footing underneath and around fence, and ensuring gates are locked at all times.
Progress:	▪ Evaluation Complete.

	Master Lift Station No. 816 – Rotonda Boulevard West
Recommendation:	▪ Coat the wetwell. ▪ Repair or rehabilitate the concrete top slab. ▪ Modify the valve vault to allow full access to the valves and to prevent them from being buried. ▪ Evaluate relocation or proper protection of the power equipment. ▪ Install seal-offs on any electrical equipment within 10 feet of the wetwell to return to conformance with code. ▪ Evaluate the adjacent lot for future lift station conversion.
Progress:	▪ Concrete top slab repaired. ▪ Valve vault modified. ▪ Seal-offs installed.
	Lift Station No. 7 – Pure Oil
Recommendation:	▪ Repair the roof overhang. ▪ Replace the glass windowpanes. ▪ Evaluate odor control opportunities. ▪ Install seal-offs on any electrical equipment within 10 feet of the wetwell 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. ▪ Evaluate current pump performance to verify that it is operating efficiently. ▪ Remove existing aerial power supply and install underground supply.
Progress:	▪ Roof overhang repaired. ▪ Glass windowpanes replaced. ▪ Pump performance evaluated.
	Lift Station No. 12 – Plaza
Recommendation:	▪ Install shocks or springs on existing hatch or evaluate replacing hatches. ▪ Evaluate site lighting for lift station employee serviceability.
Progress:	▪ Site lighting evaluated.
	Lift Station No. 28 – Peachlove
Recommendation:	▪ Replace concrete control panel posts with County aluminum standard. ▪ Re-line the wetwell or specifically address the exposed penetrations and seams. ▪ Grout the valve vault at the appropriate slope for proper draining. ▪ Correct the leak in the valve vault piping. ▪ Evaluate replacing the guide rails with a single rail of the correct length.
Progress:	No actions completed.

	Lift Station No. 113 – Kerrigan
Recommendation:	▪ Replace the pipe supports.
Progress:	▪ Pipe supports replaced.
	Lift Station No. 123 – KHW Walmart
Recommendation:	▪ Evaluate further repair and secure the site with flowable fill. ▪ Evaluate repairing the on-site infrastructure damaged by the former settling. ▪ Evaluate relocating the driveway.
Progress:	▪ Further repair evaluated and flowable fill complete. ▪ On-site infrastructure damaged by former settling evaluated. Site compacted and pad/cap repoured.
	Lift Station No. 139 – Altoona
Recommendation:	▪ Verify the odor control is tied into SCADA and evaluate the cause of the breaker tripping.
Progress:	▪ Breaker tripping was resolved. Not enough points to tie the odor control into SCADA.
	Lift Station No. 143 (Vacuum Station) – Harbor Vac
Recommendation:	▪ Evaluate stairs or similar access to generator to return to conformance with the NEC. ▪ Evaluate modifying the overhead crane to use a trolley for lateral movement. ▪ Evaluate a catwalk or ladder for accessing the top of the tank for maintenance. ▪ Evaluate a portable hoist or dedicated overhead crane for easier access to the vacuum pumps. ▪ Verify the vacuum station site is in accordance with all OSHA and County safety and confined space requirements.
Progress:	▪ Overhead crane has been evaluated and is being engineered. ▪ Easier access to vacuum pumps has been evaluated. ▪ Verified vacuum station is in accordance with OSHA and County safety and confined space requirements.
	Lift Station No. 303 – Constantine
Recommendation:	▪ Coat the wetwell 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 installation of a secondary standby pump. ▪ Prepare for construction of improved design noted by Operations staff.
Progress:	▪ No actions completed.

	Lift Station No. 415 – Prada
Recommendation:	▪ Coat the wetwell and seal and repair the contents of the valve vault. ▪ Evaluate replacing the valve vault with all above-grade discharge piping for easier maintenance and to prevent any confined space concerns. ▪ Install seal-offs on any electrical equipment within 10 feet of the wetwell to return to conformance with code. ▪ Evaluate an upgrade to the electrical equipment including replacing the aging control panel, updating the conduit location, and generally bringing the system up to current standards. ▪ Evaluate replacing or fixing the leaking check valve.
Progress:	▪ Leaking check valve repaired.
	Lift Station No. 417 – Wonran
Recommendation:	▪ Monitor the station as flows continue to increase. ▪ Evaluate replacing the guide rails with a single rail of the correct length. ▪ Evaluate if a smaller impeller diameter might be worth considering while the flows remain low.
Progress:	▪ No actions completed.
	Lift Station No. 442 – Doredo 2
Recommendation:	▪ Evaluate an adjacent lot for future lift station conversion or install a method to allow generator access during a flooding event. ▪ Evaluate the installation of a secondary stand-by pump.
Progress:	▪ No actions completed.
	Lift Station No. 817 – Bunker Road
Recommendation:	▪ Coat the wetwell and seal and repair the contents of the valve vault. ▪ Install interconnect and seal-offs on any electrical equipment within 10 feet of the wetwell to return to conformance with code. ▪ Repair the dead front panel or modify to bring back to conformance with OSHA, NEC, and County safety requirements. ▪ Evaluate the two proposed adjacent lots for future lift station conversion.
Progress:	▪ A lot was purchased for access.
	Lift Station No. 818 – Harbor West
Recommendation:	▪ Evaluate if a smaller impeller diameter might be worth considering while the flows remain low.
Progress:	▪ Evaluation completed.

	Lift Station No. 828 – Sweetwater
Recommendation:	▪ Coat the wetwell and seal and repair the contents of the valve vault. ▪ Evaluate the fencing and odor control. ▪ Grout the valve vault at the appropriate slope for proper draining. ▪ Evaluate installation of SCADA or Omni-Beacon system for remote monitoring or control.
Progress:	▪ No actions completed.
	Lift Station No. 884 – Wiltshire
Recommendation:	▪ Evaluate lengthening the driveway to reduce the slope or provide a smoother access point to prevent damage to vehicles or generators. ▪ Evaluate the benefit of an uninstalled spare or keeping an emergency pump connection on site when only one pump is installed ▪ Evaluate if a smaller impeller diameter might be worth considering while the flows remain low.
Progress:	▪ Driveway was evaluated and determined not enough room to reduce slope or provide smoother access point. ▪ Smaller impellers were evaluated and as site can be used for dump, the impellers are well suited.

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

WRFs	Permitted Capacity (MGD)
East Port	6.0[a]
West Port	1.2
Rotonda	2.0
Burnt Store	0.5[b]
Total	9.7

Notes:

[a] Design of upgrades to 12.0 MGD began in FY 2019. Construction activities will commence after the design is complete in two phases – Phase 1: Construction of upgrades from 6 MGD to 9 MGD; and Phase 2: Construction of upgrades from 9 MGD to 12 MGD.

[b] Design for expansion to 2.5 MGD began in FY 2019.

6.1 STATE-CERTIFIED LABORATORY

The East Port Laboratory (EPLAB) is a part of CCU and is 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 the potable water distribution systems.

EPLAB is a National Environmental Laboratory Accreditation Program (NELAP)-certified laboratory (Florida Department of Health [FDOH] ID E54436, which was renewed July 1, 2020) and a member of The National Environmental Laboratory Accreditation Conference (NELAC) Institute (TNI). The current EPLAB staff includes the Laboratory Manager, Laboratory Quality Assurance Specialist (QAS), and three additional laboratory support personnel (laboratory technicians). The laboratory accreditations include performing analyses for potable water microbiology, non-potable water general chemistry, and non-potable water microbiology.

6.1.1 SITE VISIT

Jones Edmunds staff visited the EPLAB on February 22, 2021, and met with the Laboratory Manager, Sandra Lavoie, and the Laboratory QAS, Elizabeth Robling, to discuss changes in FY 2020 operations.

6.1.2 ACCREDITATION REQUIREMENTS

EPLAB operates in compliance with the 2016 Environmental Laboratory Sector Standards set by TNI and in accordance with Chapter 64E-1, FAC (Certification of Environmental Testing Laboratories), FDEP Quality Assurance requirements (Chapter 62-160, FAC), and FDOH Environmental Laboratory Certification requirements.

The EPLAB Quality Control Manual was revised in January 2021 following an on-site FDOH assessment and went into effect on February 1, 2021. The Quality Assurance Plan and in-house 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. A review of internal laboratory documentation shows that SOPs for all certified methods were reviewed and revised (as needed) during 2020. Review of personnel records indicates that all laboratory staff received appropriate quality assurance, SOP, and data integrity training. The Quality Integrity System Report was completed in December 2020. The annual Ethics and Data Integrity training for all laboratory staff in the EPLAB was completed on September 23, 2020. Hardcopies of the most current Quality Assurance Plan and SOPs are readily available to EPLAB staff in the laboratory. A Master List of all documents currently in use in the laboratory including effective date, revision number, and location is maintained by the QAS.

All laboratory personnel are required to obtain certification to perform specific analyses in the laboratory including documentation of Initial and Continuing Demonstrations of Capability

(IDOC/CDOC) and analysis of Proficiency Testing samples. Review of internal laboratory documentation indicates that all IDOC/CDOC records are complete and up to date. During FY 2020, the EPLAB participated in and passed two TNI/FDOH-mandated Proficiency Testing studies.

As required by current TNI standards and FDEP regulations, laboratory operations are assessed every 2 years as a part of the continuing certification process. The most recent assessment was performed by a private company under contract with FDOH (Shepherd Technical Services) in October 2020, and the next assessment is due in October 2022. Seven deficiencies were noted during the FDOH audit. EPLAB developed and submitted a Corrective Action Plan to Shepherd Technical Services in December 2020 in response to the findings.

The 2020 Annual Management Review (required by TNI Standards) notes that a laboratory audit was also performed by a representative from Stantec Consulting on February 20, 2020. No deficiencies were noted during the Stantec audit.

In addition, no deficiencies were noted by Jones Edmunds during the February 2020 laboratory site visit.

6.1.3 Laboratory Operations

The EPLAB workspace consists of five main rooms:

1. Sample receiving and storage.
2. Un-refrigerated chemicals and equipment storage.
3. Administrative workstations for laboratory technicians.
4. Main laboratory benches.
5. Drinking water laboratory.

The EPLAB received and analyzed 7,674 samples (29,954 analyses) during FY 2020, slightly more than the 7,220 samples (28,762 analyses) received during FY 2019. The Laboratory Manager indicated that the increase in sample load was due to the continuing long-term monitoring program for Spring Lake and additional groundwater monitoring well sampling that began in early 2020 for the East Port and Burnt Store facilities. Current laboratory staffing appears to be appropriate for the expected analytical workload for the current fiscal year. However, in addition to laboratory analytical services, EPLAB has also taken on additional field sampling and sample courier service responsibilities in 2020. With these additional services, staffing requirements may need to be evaluated so that laboratory analyses services are not negatively impacted by work hours spent performing field sampling and/or courier services.

The laboratory uses the EthoSoft web-based X-LIMS (Laboratory Information Management System) for data management. Data in the LIMS and on all computers used in the laboratory are backed-up on a daily basis by the County's IT Department and to the EthoSoft off-site

server ("the Cloud"). All analytical data are also downloaded annually by the QAS onto an external hard drive for long-term storage.

The LIMS software is used to prepare paper documentation forms and to assign unique sample identification numbers to samples for recording and tracking results. The LIMS can be used to track samples 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 LIMS is also capable of monitoring quality control results and chemical use to manage supplies ordering. The data processing and reporting capabilities of the LIMS could be expanded. However, this would require support from the software company or from the County's IT group with hours set aside to work exclusively on data transfer and report set-up and implementation.

A hardcopy tracking system, developed by the Laboratory Manager, is also used in conjunction with LIMS for those analytes not suited to electronic tracking.

Quality assurance procedures are well documented, and all laboratory personnel have received documented training on all quality assurance/control protocols. Chain-of-custody documentation is strictly adhered to during sample receipt and handling. The Quality Control Manual was revised in January 2021 to include corrective actions implemented as a result of the October 2020 FDOH audit. The new effective date for the Quality Control Manual is February 1, 2021. 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 Quality Control Manual, which allows for quick reference between this local document and the TNI standards.

Proficiency tests are required every 6 months to maintain EPLAB's certifications. Results from the test samples are sent to FDOH for regulation compliance and compared to results from other laboratories nationwide. Ms. Lavoie takes pride in 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 Quality Control Manual. 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 2019, the laboratory obtained the following certifications:

- Ammonia-Nitrogen by EPA Method 350.1 (November 2018).
- Ammonia-Nitrogen by Standard Method (SM) 4500-NH3 D-2011 (September 2018).
- Nitrate-Nitrogen, Nitrite-Nitrogen, and Total Nitrate-Nitrite by SM 4500-NO3-H/SM 4500-NO2-B (November 2018).
- Sulfate by ASTM D516-11 (September 2018).

No new method certifications were added during FY 2020.

The laboratory 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 hand-entered data entries. All data are reviewed and approved by the Laboratory Manager or QAS before being released to the client or FDEP.

Organization of data in an electronic format would allow direct input into FDEP forms, which would 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.

EPLAB sends some samples to outside laboratories that are certified to perform tests that EPLAB is not certified to perform. Copies of FDOH certifications for the outside laboratories are maintained by the QAS. Laboratory results from the outside laboratories are received, reviewed, and forwarded to the WTP and WRF Chief Operators for use in compliance reporting.

6.1.4 Record Keeping

The Quality Assurance Manual and SOPs are kept in a neat and organized manner and are easily accessible to all laboratory personnel. Safety Data Sheets (SDSs) required by the Hazard Communication Standard (29 CFR 1910.1200(g)) are available for all chemicals used in the laboratory. Personnel records, including documentation of training and IDOC/CDOC, are maintained by the Laboratory Manager and QAS. All sample data are cross-referenced to sampling information, standards and reagent information, and analysis logbooks using Chain-of-Custody and the assigned unique sample ID. Electronic data are backed up daily, and historical data are archived on an external hard-drive. 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.

6.1.5 Certification Compliance Schedule

- The biannual FDOH review was conducted in October 2020. The next FDOH assessment is scheduled for October 2022.
- Proficiency tests typically occur every 6 months. The last tests were conducted in August 2020 and the next set of proficiency testing is scheduled for the first quarter in 2021.
- The 2020 Annual Management Review was submitted on February 18, 2021, as required by the TNI Standards.

6.1.6 Review of Previous Report Recommendations

Table 6-2 CCU EPLAB FY 2019 Recommendations and Status

Recommendation:	Continue implementation of the LIMS system. Evaluate hiring IT support that can work exclusively on the set-up and implementation of the LIMS or purchase a service package from the vendor to do the set-up of laboratory-specific forms and reports with remote installation.
Progress:	Although some progress has been made in the LIMS implementation, time constraints on laboratory personnel due to sample load as well as instrument integration issues appear to have slowed progress. IT support or vendor technical support has yet been provided.

Recommendation:	Evaluate staffing requirements and the ability to provide sampling services. The Laboratory Manager indicated that the EPLAB may be taking over field sampling services since current field samplers are changing departments and duties and will no longer be available to collect and/or transport samples. This includes spill sampling, water-quality sampling, groundwater sampling, surface water sampling, miscellaneous sampling, and sample transport. Current laboratory staffing appears to be appropriate for the expected analytical workload for FY 2020. Adding sampling services may require at least one additional EPLAB staff member.
Progress:	Ongoing. In the 2020 Annual Management Report, the Laboratory Manager indicates that EPLAB has taken on additional sampling and courier services as expected. However, the additional duties are putting a burden on current laboratory personnel and making it difficult to complete all analyses within approved sample holding times.
Recommendation:	Educate sampling personnel on the need for accuracy in use of collection bottles, sample storage, and delivery to the laboratory.
Progress:	Ongoing but sampling personnel have shown much improvement.
Recommendation:	Recommend seeking certification for potable water Total Dissolved Solids (TDS) and Sulfate.
Progress:	Ongoing. Currently, sufficient sample load to warrant these certifications for this matrix are not apparent.

6.2 WASTEWATER PRETREATMENT COMPLIANCE

CCU's Pretreatment workgroup 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 (SRS) combines the hauled waste with plant influent to achieve reclaimed water-quality effluent and beneficial reuse of biosolids. Once on site, septage haulers enter a code to activate the SRS and then another code to identify their hauled septage as either In-County or Out-of-County septage for billing purposes.

In FY 2019, the SRS hours of operation were changed to 7:00 a.m. to 4:30 p.m., 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 2019, the program accepted 7,670,994 gallons from 41 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 maintain compliance with the required pump-out schedule (e.g., 30, 60, or 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 2020, 1,789 work orders were completed including 1,292 grease trap inspections, 472 grease trap re-inspections, 14 spill sample inspections, and 11 new installation inspections.

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 the 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-sludge holding tank for partial stabilization and decant thickening before dewatering. Biosolids dewatering is accomplished by two Ashbrook, 2-meter-wide belt filter presses (BFPs) near the holding tank. The biosolids are dewatered to approximately 17-percent total solids (TS) and hauled in County-owned 35-cubic yard dump trailers to the Synagro compost facility at the Charlotte County Zemel Road Landfill. The dewatered biosolids are mixed with chipped yard waste, composted to Class A standards, and distributed and marketed for organic amendment for sandy soil enhancement and material for landfill final cover.

6.4 EAST PORT WRF

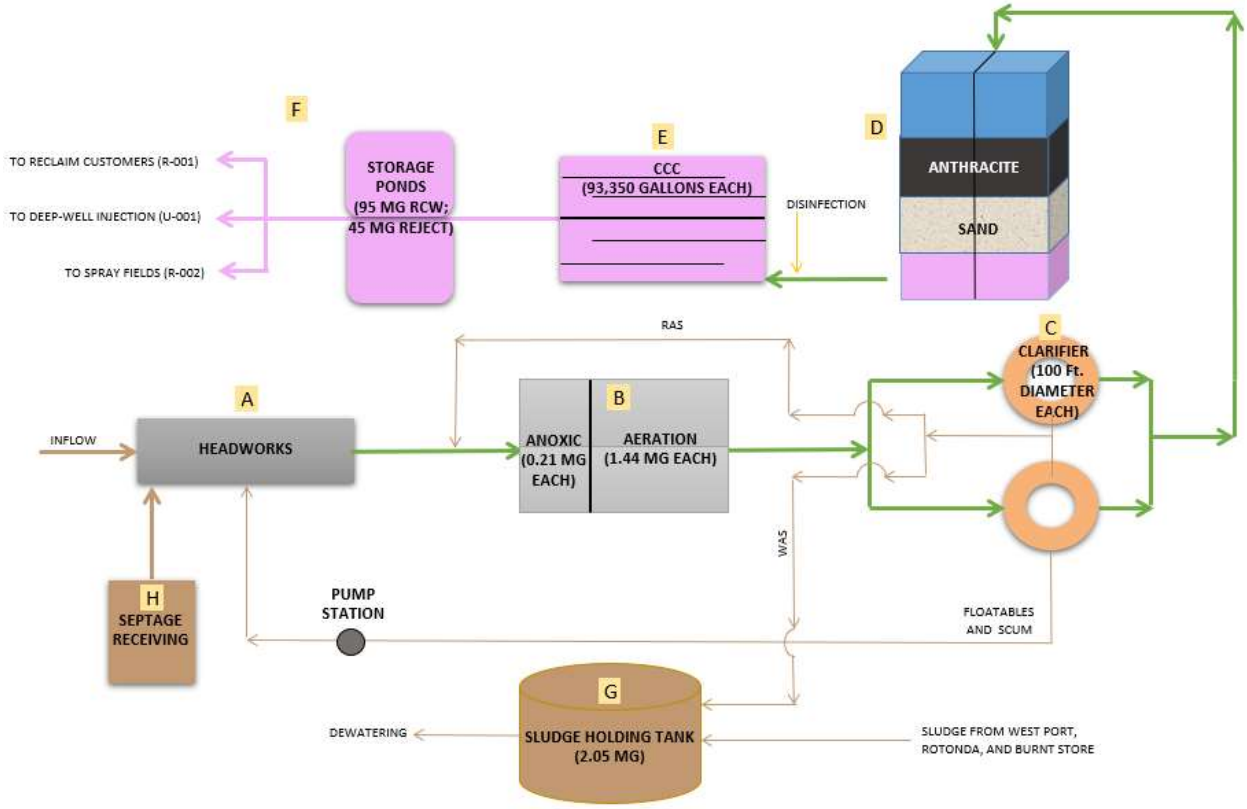
The East Port WRF is at 3100 Loveland Boulevard, Port Charlotte, Florida, and was acquired as part of the 1991 GDU purchase. The WRF began its current operations in 1996 and has a current permitted operating capacity of 6.0 MGD AADF. East Port WRF uses a 2-stage activated-sludge process to treat domestic wastewater collected from the Mid-County service area. Emergency power is provided by two diesel emergency generators in an on-site building with an ATS 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 8.79-MGD AADF of reclaimed-quality water to the Master Reuse System (R-001) for unrestricted-public-access reuse, inject 9.60-MGD AADF into a deep well injection system (U-001), and apply 1.70 MGD AADF to a slow-rate restricted-access land application system (R-002). 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 Chapters 62-600 and 62-610, FAC. The restricted irrigation system consists of 187 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 in the following sections.

Figure 6-2 East Port WRF Process Flow Diagram



A) Headworks: Raw wastewater enters the WRF headworks structure where mechanical 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 No. 1 are introduced back to the headworks, including septage, biosolids dewatering system filtrate, tank and unit process drain flows, and supernatant decant from the aerobic digesters.

B) Biological Treatment: Wastewater from the headworks splits between two treatment trains configured in a 2-Stage Anoxic/Aerobic, Modified Ludzack-Ettinger (MLE) Process. Each train includes an anoxic basin and oxidation ditch (aeration basin) for organics and Total-Nitrogen removal. Mixers keep solids suspended and homogenous in the anoxic zones. Mechanical surface agitators keep the oxidation ditches aerated and maintain a channel velocity to keep mixed liquor in suspension. Internal recycle (IR) pumps send mixed liquor rich in Nitrate-Nitrogen from the oxidation ditch (aeration basin) to the anoxic basins to enhance Total-Nitrogen removal.

C) Clarification: Flow from the biological treatment process splits between two clarifiers. The clarifiers provide a passive environment for solids separation. The clarifiers are skimmed to remove floating materials and scum, which are discharged to the aerobic digester for treatment. The clarifier effluent flows over a circumferential weir into a final effluent weir trough. Weir washers travel along the scum skimmer to remove algae from the weirs and trough. Settled solids from the secondary clarifiers are pumped to the front of the anoxic basins as return-activated sludge (RAS) to replenish

the microbial community and to the aerobic digesters as waste-activated sludge (WAS).

D) Filtration: Clarified water splits between two multi-media (sand and anthracite) traveling bridge filters to remove remaining Total Suspended Solids (TSS) to a level at or below 5 mg/L TSS to meet requirements for high-level disinfection. A metal canopy over the filters was designed for use with an ultraviolet (UV) shade cloth to inhibit algae growth within the filter and provide equipment protection from sun exposure. Filter backwash is sent to In-Plant Pump Station No. 2, which pumps backwash water to the headworks structure.

E) Disinfection: Filtered water splits between two chlorine contact chambers (CCCs) where liquid sodium hypochlorite is dosed for disinfection. CCC No. 1 is designated for reclaimed water 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) that meet basic-level disinfection requirements. Sodium hypochlorite is stored in one storage tank with a total capacity of 6,000 gallons. Non-reagent analyzers are used to adjust chlorine feed rates and for chlorine residual compliance measurement.

F) Reuse and Disposal Facilities: Transfer pumps (Nos. 1, 2, and 3) in the clearwell of CCC No. 2 pump reclaimed water to the 95-MG reclaimed water Storage Pond. High-service pump station (HSPS) No. 1 is in the clearwell of CCC No. 1 and pumps reclaimed water to the plant-water system 8-inch force main loop. The clearwell of CCC No. 1 and No. 2 are connected by a 4-foot-wide slide gate that is normally open. The gate is currently inoperable and held in the open position. The 95-MGD reclaimed water pond is connected to the 9-MGD HSPS No. 2 via a 30-inch suction line. This pump station pumps directly to the 36-inch distribution line that feeds the Mid and West County public access reclaimed water system. The WRF's public-access reuse system is operated in accordance with the WRF's Monitoring and Operating Protocol for the Reclaimed Water System (latest version).

Water not meeting reclaimed water standards is rejected to the 45-MG reject pond by opening and closing automated valves. From the 45-MG pond, reject water can be sent to the slow-rate restricted-access reclaimed water sprayfields 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) Biosolids Handling: WAS is pumped from the clarifiers to the 2.0-MG sludge holding tank where blowers provide aeration to aerobically digest the sludge before dewatering using two Ashbrook 2-Meter BFPs. The East Port WRF digester is permitted to accept waste sludge from the West Port, Rotonda, and Burnt Store WRFs. The County owns two 6,000-gallon tanker trucks that make daily hauls from the other three WRFs and off-load into the East Port WRF digester. Operations staff decant the digested sludge several times a week, and the supernatant is pumped backed to the headworks. The sludge transfer pumps at the digester are operated by control panels at each BFP to pump thickened WAS to the dewatering units. Sludge is dewatered to 17-percent TS and is hauled to the Charlotte County Zemel Road Class I Municipal Landfill for disposal at the Synagro Biosolids and Yard Waste Co-Compost Facility.

H) Septage Receiving Stations: The WRF has two Lakeside Raptor Septage Receiving Stations for domestic septage tank haulers to off-load septage. The septage haulers are provided unique access codes for off-loading and invoice generation. Septage haulers enter their access code in the receiving station control panel, the valve opens to allow off-load, and the flow-meter records the septage volume for billing each hauler. The system allows for fast off-loading, minimal operations oversight, and administrate features to collect and record hauler data for invoicing. The septage is screened and directly pumped to the WRF headworks.

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 permits govern plant operations:

- Plant Operating Permit (FL0040291) – Expiration Date: September 6, 2022.
  - The 2017 Plant Operating Permit renewal was divided into expansion 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 2016 and addressed upgrading the electrical, I&C, and SCADA systems for future expansion. Process treatment components upgrades included the headworks screens and grit pumps, biological treatment process – DO control system, effluent filter rebuilds, and addition of the 2.0-MG sludge holding tank and related biosolids improvements.
  - Stage 5 Improvements were prioritized ahead of Stages 3 and 4 to enhance reclaimed water storage in the 95-MG pond and increase the transmission capacity to 9 MGD to provide more reclaimed water to Mid and West County. Stage 5 design work was bid in Spring 2017, construction was completed in FY 2019, and operation training was provided in March 2020.
  - Stage 3 and 4 Improvements included a 9-MGD expansion (originally designed in 2014), which is currently being re-evaluated by CCU staff and Jones Edmunds to determine which components now require capacities of 12 MGD based on current flows and growth projections. The improvements include a 12 MGD headworks, equalization tank, additional biological treatment train, clarifier, effluent filter, chemical feed system, and additional biosolids storage, dewatering and associated electrical, I&C, and SCADA improvements. The Stage 3 and 4 Improvements are planned to be bid in Fall 2021, with construction completed at the end of 2023.
- IW-1 Permit (44274-253-UO) – Expiration Date: October 17, 2021
  - CCU should submit an application for a 5-year operating permit renewal for IW-1 in FY 2021.
  - The previous mechanical integrity test (MIT) was performed on IW-1 in October 2019. The next MIT will be due by October 2024.
- IW-2 Permit (330486-002-UO/1M) – Expiration Date: April 12, 2020
  - CCU submitted a permit renewal application on January 15, 2020, which is under review by FDEP UIC group.
  - The previous MIT was performed on IW-2 in July 2020. The next MIT will be due by August 2025.

6.4.2 Wastewater Flows and Loads

The East Port WRF permitted capacity is 6.0-MGD AADF. In FY 2020, the AADF was 4.40 MGD, and the East Port WRF was operating at 73 percent of the plant permit capacity. The maximum average daily flow (MADF) occurred in September 2020 at 5.33 MGD. The highest TMADF of 5.10 MGD occurred in October 2019, which is 85 percent of the plant permitted capacity. 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 73 percent of the 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, with completed plans to increase capacity to 12.0 MGD. Table 6-3 summarizes the influent flows as reported in the Discharge Monitoring Reports (DMRs).

Table 6-3 East Port WRF Influent Flows FY 2020

Month	MADF (MGD)	AADF (MGD)[1]	TMADF (MGD)	MDF (MGD)	TMADF Percent Capacity (%)
Oct-19	4.38	4.58	5.10	5.61	85
Nov-19	4.17	4.59	4.31	4.39	72
Dec-19	4.08	4.58	4.21	4.69	70
Jan-20	4.40	4.58	4.22	4.55	70
Feb-20	4.59	4.55	4.35	4.91	73
Mar-20	4.30	4.54	4.43	4.56	74
Apr-20	3.94	4.52	4.28	4.55	71
May-20	4.01	4.53	4.08	4.34	68
Jun-20	4.80	4.57	4.25	6.19	71
Jul-20	4.19	4.48	4.33	4.82	72
Aug-20	4.62	4.32	4.54	5.23	76
Sep-20	5.35	4.40	4.71	7.55	79

Notes: MDF = Maximum daily flow.

[1] Permitted plant capacity of 6.0 MGD; measured at monitoring site FLW-01.

At the end of FY 2020, the average annual influent load for 5-day Carbonaceous Biochemical Oxygen Demand (BOD) was 6,018 pounds per day (lb/day) and for TSS was 7,774 lb/day. The maximum monthly average BOD load was 7,598 lb/day in February 2020. The maximum monthly average TSS load was 9,083 lb/day in January 2020. Table 6-4 summarizes the wastewater characteristics of the East Port WRF influent as reported in the DMRs.

Table 6-4 East Port WRF Influent Water Quality FY 2020

Month	BOD		TSS	
	Monthly Avg. Concentration (mg/L)[1]	Monthly Avg. Load (lb/day)	Monthly Avg. Concentration (mg/L)[1]	Monthly Avg. Load (lb/day)
Oct-19	162	5,803	246	8,917
Nov-19	182	6,332	254	8,825
Dec-19	197	6,845	253	8,824
Jan-20	198	7,235	249	9,083
Feb-20	199	7,598	237	9,082
Mar-20	192	6,923	210	7,548
Apr-20	170	5,548	230	7,554
May-20	155	5,186	180	5,983
Jun-20	130	5,121	178	7,016
Jul-20	150	5,258	162	5,709
Aug-20	132	5,074	175	6,712
Sep-20	118	5,297	173	8,033

Note: [1] Measured at monitoring site INF-01.

6.4.3 Treatment Objectives and Effluent Quality

The East Port WRF is designed to treat wastewater to three effluent standards: one for disposal to the deep injection wells (U-001 and U-002), one for public-access reuse (R-001) levels requiring high-level disinfection, and one for the on-site sprayfields (R-002) requiring basic level disinfection. Table 6-5 lists the flows and primary water quality requirements for each effluent reuse and disposal method. Currently, the WRF has 100-percent backup to the reuse system with disposal to U-001.

Table 6-5 East Port WRF Effluent Requirements

Reuse/Disposal Method	R-001	R-002	U-001
Max Flow (MGD)	8.792[a]	1.70[a]	9.6[a]
Max BOD (mg/L)	20[a] /30[b] / 45[c] /60[d]	20[a] /30[b] / 40[c] /60[d]	20[a] /30[b] / 45[c] /60[d]
Max TSS (mg/L)	5[d]	20[a] /30[b] / 45[c] /60[d]	20[a] /30[b] / 45[c] /60[d]
Total Fecal (#/mL)	25[d]	200[a] /200[e] /800[d]	Not applicable

Notes: Statistical Bases: [a]annual average; [b]monthly average; [c]weekly average; [d]single sample; [e]monthly geometric mean.

Table 6-6 summarizes the effluent flow and water quality of the East Port WRF. The East Port WRF is producing a high-quality reclaimed water and operating within the permitted flow limits. In FY 2020, the annual average effluent flow for to the master reuse system (R-001) and sprayfields (R-002) were 1.5 MGD and 0.01 MGD AADF, respectively. Wells IW-1 and IW-2 (U-001) totaled 2.56 MGD AADF, which is below the permitted capacity of 9.6 MGD AADF. The maximum single sample BOD and TSS values were 2.7 mg/L and 3.8 mg/L, respectively, showing no violations of the single-sample limits for BOD or TSS were recorded in FY 2020. Consequently, the BOD and TSS annual average, monthly, and weekly concentration requirements were also met in FY 2020. The maximum fecal coliform counts

rarely exceeded 1 per 100 milliliters (1/100mL) and were well within public-access reuse standards.

Table 6-6 East Port WRF Effluent Flow and Water Quality

Month	Reuse and Disposal Method				Water Quality		
	R-001 Monthly Avg. Flow (MGD)[1]	R-002 Monthly Avg. Flow (MGD)[2]	IW-1 Monthly Avg. Flow (MGD)[3]	IW-2 Monthly Avg. Flow (MGD)[4]	Maximum BOD Conc. (mg/L)[5]	Maximum TSS Conc. (mg/L)[6]	Maximum Fecal Count (#/100mL)[5]
Oct-19	1.6	0	0.4	3.5	2.7	0.3	<1
Nov-19	1.8	0	0.3	2.1	<2.0	0.4	<1
Dec-19	0.5	0	0.4	2.9	<2.0	0.6	3.1
Jan-20	1.3	0	0.2	1.3	<2.0	0.8	<1
Feb-20	1.1	0	0.1	0.9	<2.0	0.5	<1
Mar-20	2.4	0.1	0.2	2.0	<2.0	0.8	<1
Apr-20	2.6	0	0.0	0.1	<2.0	0.6	<1
May-20	2.2	0	0.2	1.5	<2.0	3.3	<1
Jun-0	1.3	0	0.4	3.6	<2.0	3.8	<1
Jul-20	1.5	0	0.3	2.5	<2.0	0.4	<1
Aug-20	1.2	0	0.2	2.2	<2.0	02.4	<1
Sep-20	0.5	0	0.5	4.8	<2.0	0.2	<1

Note: [1]Monitoring site FLW-02; [2]Monitoring site FLW-04; [3] Monitoring site FLW-03; [4] Monitoring site FLW-05; [5] Monitoring sites EFA-01 and EFA-02; [6] Monitoring sites EFA-02 and EFB-01.

6.4.4 Treatment Components and Condition Assessments

Jones Edmunds completed an on-site review of the plant on January 21, 2021. Jones Edmunds personnel met with Steve Bozman – Treatment Facilities Division Manager, Mike McCrumb – Wastewater Superintendent, Henri Lafenetre – Lead Plant Operator, and Johnny Chamberlain – Backflow and Reclaimed Water Coordinator 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 the on-site irrigation and deep injection well areas. The WRF site, stormwater pond, and sprayfield sites are routinely mowed and brush cleared and are well maintained.

The Operations building includes the office of the Treatment Facilities Division Manager, the EPLAB, the Backflow and Reclaimed Water Coordinator, a 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 O&M 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 WRF Influent Sampling Location

The East Port WRF monitored influent water quality and flow for permit compliance. The influent water quality sampling location (INF-01) and flow monitoring (FLW-01) locations at the East Port WRF are clearly marked, and the refrigerated influent composite sampler and flow meter are in good operating condition.

6.4.4.2 Headworks

The overall condition of the headworks is good. The adjacent old grease dewatering building is now demolished, and the piping from the new GMLS and Interceptor is ready to be connected to the existing headworks. 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 reaching their useful life and are included in the 12-MGD WRF upgrade.

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.

6.4.4.3 Flow Equalization

The East Port WRF currently does not have flow EQ storage for peak-hour influent flows and loads. However, the 1.48-MG cast-in-place concrete tank that was the old aerobic digester is being modified and retrofitted to provide an influent EQ Tank for the 9-MGD plant expansion design.

6.4.4.4 Biological Treatment

The overall condition and operation of the MLE process is good following the Stage 1 and 2 Improvements in 2016. Four VFD-controlled surface aerators are in operation in the oxidation ditches. The aerator speed is adjusted based on the dissolved oxygen (DO) probe 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 IR pumps were replaced in the Stage 1 and 2 Improvements. These pumps are controlled by the SCADA based on operators' settings. The IR pumps are well maintained and in good working order.

6.4.4.5 Clarification

In 2016 the two clarifiers were rehabilitated as part of the Stage 1 and 2 upgrades, 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. 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.

The existing scum ejectors will be replaced with a cost-effective scum-pumping system as part of future plant expansion to 9 MGD.

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.

6.4.4.6 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 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. However, the cloth rips in the wind and will be replaced with roof panels bolted to the galvanized frame for the 9-MGD expansion.

6.4.4.7 Disinfection and Effluent Sampling

The CCCs are in good condition, well maintained, and operated to produce reclaimed water for unrestricted public-access reuse. CCC No. 1 was recently painted to improve high-level disinfection. Liquid Sodium Hypochlorite (12.5 percent) is stored in a 6,000-gallon dual-containment tank and 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 overall chemical feed systems and instrumentation are well operated and maintained to meet regulatory permit requirements. The effluent flow and monitoring locations (EFA-01 and EFA-02) are clearly marked, and the refrigerated effluent composite samplers are in good operating condition.

6.4.4.8 Reuse, Disposal, and Storage

Reuse Facilities

Effluent that meets reclaimed water standards from the East Port WRF is conveyed to CCU's Master Reuse System (discussed in Chapter 7) using the reclaimed water HSPSs. The East Port WRF has two reclaimed water HSPS. The reclaimed water HSPS No. 1 has three VFD-controlled 100-HP vertical turbine pumps that pump reclaimed water from the clearwell adjacent to CCC No. 1 into the WRF plant water system. The reclaimed water service pumps are well maintained and operated. 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 O&M purposes.

The reclaimed water HSPS No. 2 has five VFD-controlled pumps, can pump 9.0 MGD at 108 psi, and was completed in 2019 as part of the Stage 5 Improvements. The system includes four 120-micron self-cleaning filters manufactured by ORIVAL and was submitted as a value-engineering substitution. The units are currently bypassed due to failure in fall 2020. The bypass around these filters is not impacting reclaimed water quality to end users.

The East Port WRF also contains a 95-MG lined storage pond which provides reclaimed water and wet weather storage. In FY 2016/2017 the 95-MG pond was drained and cleaned, and the pond liner repaired. In 2019, a new

automatically cleaned intake screen feeding HSPS No. 2 was installed in the pond as part of the Stage 5 improvements.

Reject Storage and Alternate Disposal

Excess reclaimed water or effluent not meeting reclaimed water standards (reject water) is disposed of through two deep injection wells and a restricted-access, on-site slow-rate irrigation system (on-site sprayfield). Effluent transfer pumps are well maintained but are showing signs that they need to be repainted. CCU also contains a 45-MG lined effluent storage pond which is used to store effluent before injection well and/or sprayfield disposal and also serves as additional wet weather storage. The 45-MG pond liner is in good condition.

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

Wet-weather Storage

The on-site 95-MG reclaimed water pond and 45-MG reject storage pond are available for wet-weather storage of reclaimed water.

6.4.4.9 Biosolids Handling Facilities

The overall condition of the biosolids storage/digestion tanks, associated 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 are good. The facilities receive waste biosolids from East Port and the three other CCU WRFs and are well maintained and operated. CCU has two tankers used for hauling liquid sludge from the other WRFs and off-loading into the aerobic sludge-holding tanks before dewatering.

The Lead Operator noted the capacity of the aerobic digesters and the BFP to handle biosolids from all four facilities is starting to become an issue where sufficient time to allow tank decanting is limited due to the increased sludge flows. In addition, when a BFP is down for

service, insufficient digester capacity is available to allow decanting. CCU is investigating this issue under the East Port WRF Expansion design project.

6.4.4.10 Electrical Components and Circuitry

The East Port WRF contains one 1,250-kW generator serving the primary WRF as standby power. An additional 1,500-kW generator 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, the 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 had upgrades and improvements to existing original equipment 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 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 was constructed only a few years ago. As such, all equipment is in excellent condition. 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 new equipment installed under Stage 5, and Stage 1 & 2 Improvements. 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 following briefly lists minor issues at other locations throughout the plant. None of these constitute a significant issue but are documented here for reference and for future action. Most of them do represent minor NEC violations:

- Headworks – Several conduits were broken or damaged and need to be replaced or repaired.
- Blower Building – Most of the equipment is new and not yet in service as part of another ongoing project upgrading the system. However, legacy equipment will need to be removed.
- Electrical Building# 1 – As recognized in a previous report, the VFDs within this building are extraordinarily loud and hearing protection is required. The appropriate signs and warnings need to be provided.
- Electrical Building# 2 – Panel LE section 2 circuit #63 should be investigated for possible fault.
- Clarifier No. 1 – Shows unsupported conduit that needs to be properly supported per code.
- Chlorine Contact Tanks – The chlorine pump on Tank No. 1 and 2 are missing flex support; have broken cable connectors and are missing waterproof covers.
- Chlorine Feed Room – Unsupported conduits need to be properly supported.
- Irrigation Pump Station – CCU staff reported several issues with the existing breakers. These include not having a proper actuation handle, which prevents them from being operated without opening the cover, in violation of the NEC. This represents a significant issue and should be remedied immediately. The switchgear in this station is also in fairly poor condition, reaching the end of its reasonable service life and should be considered for replacement in the near future.

6.4.5 Operations

The East Port WRF produces a high-quality reclaimed water by using biological nutrient removal with an MLE process, clarification, effluent sand/anthracite 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 IWs.

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 East Port, West Port, Rotonda, and Burnt Store WRFs. The East Port WRF sludge-holding capacity has experienced issues in 2019 and 2020 when receiving increased volumes of waste sludge from all four WRFs. The limited sludge-storage capacity results in reducing the frequency of sludge hauling trips to the East Port WRF from the other facilities, which reduced wasting volumes and frequency and, as a result, reduced performance. As part of the undergoing planned East Port WRF expansion, the sludge-storage capacity at the East Port WRF will be increased to handle projected volumes of sludge from the East Port WRF and the other facilities and additional sludge dewatering provided. Sludge thickening to 4- to 5-percent TS can be evaluated at the other facilities to reduce waste sludge volumes (up to a factor of 3), reduce number of hauling events, and reduce required volume at the East Port WRF sludge aerobic digester.

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.

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 reclaimed water Improvements were completed in FY 2019 and put into operation in March 2020. The expansion to 9.0 MGD and the 12.0-MGD design are currently in-progress. The 9-MGD expansion construction is currently planned for FY 2022 to FY 2023, and the future construction expansion to 12.0 MGD will be done as funding, growth, and development dictate. Table 6-9 summarizes the 2019 recommendations and status of each item.

Table 6-7 East Port WRF 2019 Recommendations and Status

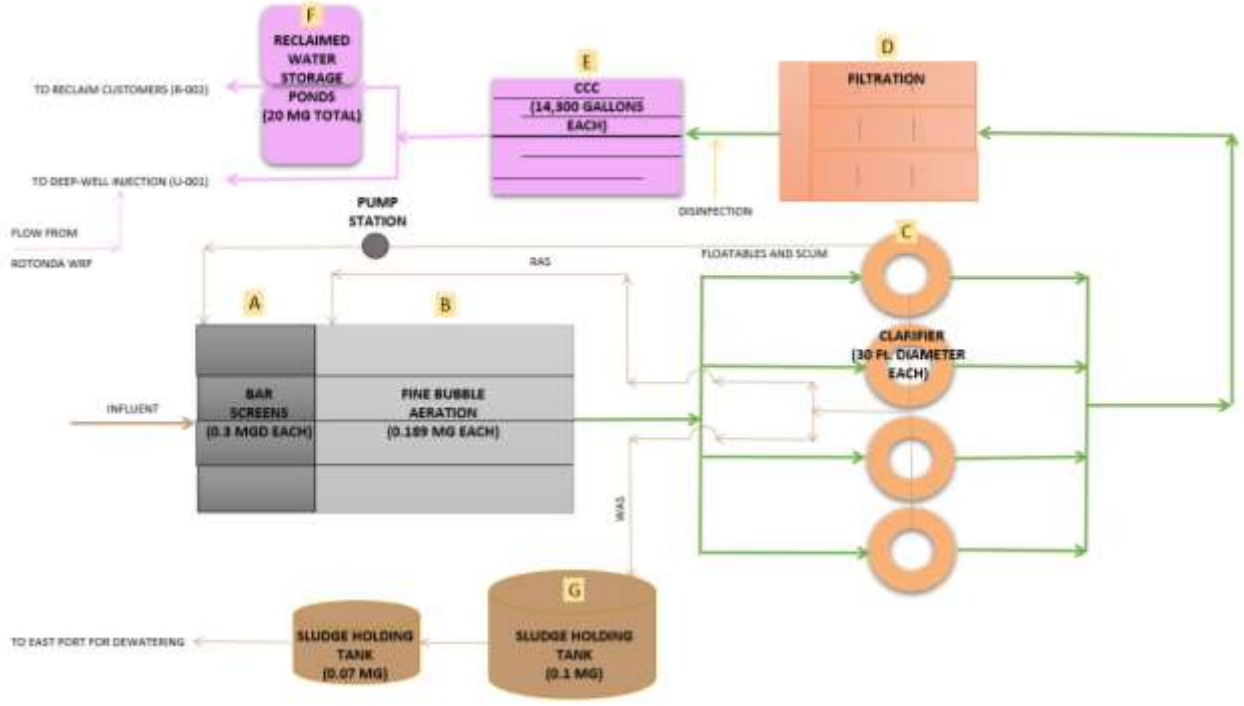
Recommendation:	Replace the chemical feed and effluent analyzer shed building as part of the plant upgrade.
Progress:	Included as part of the 9-MGD expansion design.
Recommendation:	Evaluate the structural integrity of the digester walkways and the digester's ability to serve as an influent EQ tank.
Progress:	Included as part of the 9-MGD expansion design.

Recommendation:	Add additional biosolids-handling capacity (including aerobic digesters, BFP, and ancillary equipment) as part of the plant upgrade.
Progress:	Included as part of the 9-MGD expansion design.
Recommendation:	Evaluate cost-effective disposal alternatives for dewatered biosolids other than hauling off to Synagro and the landfill as part of the plant upgrade.
Progress:	Included as part of the 12-MGD expansion design.
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.
Progress:	Included as part of the 12-MGD expansion design.
Recommendation:	Evaluate the addition of a fourth sludge bay to the 2.05-MG aerated storage tank.
Progress:	Included as part of the 9-MGD expansion design.
Recommendation:	Evaluate the addition of a biosolids dewatering press at East Port WRF.
Progress:	Included as part of the 9-MGD expansion design.

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, Florida. 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) Headworks: Raw wastewater from the West County service area collection/ transmission system enters the headworks where it 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: 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) Clarification: Flow from the biological treatment process is split between four secondary clarifiers for solids separation. The clarifiers have rotating skimmer arms 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) 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) Disinfection: The filtered water enters the CCCs where liquid Sodium Hypochlorite is dosed for disinfection. Only one chamber is currently in use.

F) Reuse and Disposal Facilities: Reclaimed-quality water is pumped to two lined storage ponds for storage and distribution to the reclaimed system. Excess reclaimed water

and water not meeting reclaimed standards are pumped to the Class I injection well by three equally sized pumps. The West Port and Rotonda reclaimed water systems are interconnected, allowing Rotonda WRF to dispose of excess reclaimed water using the injection well.

G) Biosolids Handling: WAS is pumped from the clarifiers to the sludge-holding 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, 2026.
- Deep Well (IW-1) Permit (0330461-001-UO/1M) – Expiration Date: April 12, 2020:
  - CCU submitted a permit renewal application on January 15, 2020, which is under review by FDEP UIC group.
  - The last MIT was performed on IW-1 in June 2020. The next MIT will be due by June 16, 2025.

6.5.2 Wastewater Flows and Loads

The West Port WRF permitted capacity is 1.20 MGD AADF. At the end of FY 2020, the AADF was 0.71 MGD, and the West Port WRF was operating at 59 percent of the plant permit capacity. The MADF occurred in September 2020 at 0.83 MGD. The highest TMADF of 0.76 MGD occurred in March 2020, which is 63 percent of the plant permit capacity, demonstrating the influence of wet weather and I&I to the facility. Table 6-8 summarizes influent flows as reported in the DMRs.

Table 6-8 West Port WRF Influent Flows in FY 2020

Month	MADF (MGD)	AADF (MGD)[1]	TMADF (MGD)	MDF (MGD)	TMADF Percent Capacity (%)[1]
Oct-19	0.64	0.64	0.64	0.73	53
Nov-19	0.67	0.65	0.65	0.73	54
Dec-19	0.69	0.66	0.66	0.80	55
Jan-20	0.74	0.68	0.70	0.78	58
Feb-20	0.79	0.70	0.74	0.86	62
Mar-20	0.75	0.71	0.76	0.81	63
Apr-20	0.67	0.71	0.73	0.71	61
May-20	0.64	0.70	0.69	0.68	57
Jun-20	0.72	0.70	0.68	0.81	56
Jul-20	0.68	0.70	0.68	0.75	57
Aug-20	0.68	0.70	0.69	0.77	58
Sep-20	0.83	0.71	0.73	1.37	61

[1] Permitted capacity = 1.2 MGD AADF, measured at monitoring site FLW-01.

In FY 2020, the average annual influent load for BOD was 564 lb/day and for TSS was 907 lb/day. The maximum monthly average BOD load was 760 lb/day occurring in March 2020. The maximum monthly average TSS load was 1,282 lb/day in February 2020, which corresponds with seasonal residents and the dry season. Table 6-9 summarizes the wastewater characteristics of the West Port WRF influent.

Table 6-9 West Port WRF Influent Water Quality in FY 2020

Month	BOD		TSS	
	Monthly Avg. Concentration (mg/L)[1]	Monthly Avg. Load (lb/day)	Monthly Avg. Concentration (mg/L)[1]	Monthly Avg. Load (lb/day)
Oct-19	86	446	166	853
Nov-19	85	468	177	971
Dec-19	96	540	151	847
Jan-20	106	660	166	1,039
Feb-20	104	686	193	1,282
Mar-20	123	760	194	1,195
Apr-20	122	678	160	890
May-20	111	564	193	985
Jun-20	84	474	126	706
Jul-20	85	469	119	659
Aug-20	86	488	123	699
Sep-20	82	531	116	753

Note: [1] Measured at monitoring site INF-01.

6.5.3 Treatment Objectives and Effluent Quality

The West Port WRF is designed to treat wastewater to two effluent standards: one for disposal to the deep injection well (U-001) and the other for public-access reuse (R-002) which requires high-level disinfection. Table 6-10 lists the flow and primary water quality requirements for each effluent reuse and disposal method.

Table 6-10 West Port WRF Effluent Requirements

Reuse/Disposal Method	R-002	U-001
Max Flow (MGD)	Report[a,b]	4.75[e]
Max BOD (mg/L)	20[a] /30[b] / 45[c] /60[d]	20[a] /30[b] / 45[c] /60[d]
Max TSS (mg/L)	5[d]	20[a] /30[b] / 45[c] /60[d]
Total Fecal (#/mL)	25[d]	Not applicable

Notes: Statistical Bases – [a]annual average; [b]monthly average; [c]weekly average; [d]single sample; [e]instantaneous maximum.

Table 6-11 summarizes the effluent flow and water quality of the West Port WRF. In FY 2020, the annual average effluent flow for the reuse system (R-002) was 0.54 MGD. The maximum daily flow of the underground injection well (U-001) was 2.93 MGD, indicating that the WRF is meeting its effluent flow requirements. The maximum single-sample BOD and TSS values were 2 mg/L and 5 mg/L, respectively, showing no violations of the single-sample limits for

CBOD or TSS were recorded in FY 2020. Consequently, the BOD and TSS annual average, monthly, and weekly concentration requirements were also met in FY 2020. The maximum fecal coliform counts rarely exceeded 1/100mL except for two events occurring in October and September of 2020.

Table 6-11 West Port WRF Effluent Flow and Water Quality

Month	Reuse and Disposal Method		Water Quality		
	R-002 Monthly Avg. Flow (MGD)[1]	U-001 Max. Day Flow (MGD)[2]	Maximum BOD Conc. (mg/L)[3]	Maximum TSS Conc. (mg/L)[4]	Maximum Fecal Count (#/100mL)[3]
Oct-19	0.63	0.34	<2.0	1.1	49
Nov-19	0.39	0.61	<2.0	0.8	<1
Dec-19	0.59	1.33	<2.0	0.8	<1
Jan-20	0.35	0.88	<2.0	1.1	<1
Feb-20	0.39	1.76	<2.0	1	<1
Mar-20	0.69	0.12	<2.0	1.8	<1
Apr-20	0.60	0.03	<2.0	1.4	<1
May-20	0.59	0.18	<2.0	1.4	<1
Jun-20	0.56	2.41	<2.0	1.5	<1
Jul-20	0.69	1.58	<2.0	1.5	<1
Aug-20	0.51	1.62	<2.0	1.2	<1
Sep-20	0.43	2.93	<2.0	5	31

Notes: [1] Monitoring site FLW-04; [2] Monitoring site FLW-02;[3] Monitoring sites EFA-01 and EFA-02; [4] Monitoring site EFB-01.

6.5.4 Treatment Components and Condition Assessment

Jones Edmunds completed an on-site review of the WRF on January 20, 2021. 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 completely surrounding the WRF and reclaimed water 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 and maintained. Staff has done a good job in grounds-keeping and facility appearance. The area of mowed grass on the outside of the reclaimed water storage pond is an aesthetic welcome to plant visitors. The Operations building and shop area are 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 SOPs 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 O&M 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 Sampling Location

The WRF includes a 24-inch influent force main and 16-inch flow meter assembly that have been in service since January 2014. The influent water quality sampling location (INF-01) and flow monitoring locations are clearly marked, and the refrigerated influent composite sampler and flow meter are in good operating condition.

6.5.4.2 Headworks

The overall condition of the headworks structure was considered good at the time of the site visit. The County was in the process of replacing the existing rotary drum screens at the time of the visit, with two of the four screens removed for replacement and half of the top of the headworks structure recoated. The other two existing screens will be removed, the rest of the top of the headwork structure coated, and all four screens will be replaced once the new screens are delivered to the WRF. The bottom of the headworks structure and dumpster appeared to be clean and orderly.

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 accumulates in aeration basins and at the on-site lift station. Grit is removed from the system periodically by vacuum trucks. The Chief Operator indicated that the vacuum truck has easier access to the outer basins than the inner basins that require more physical labor to remove grit.

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 EQ storage for peak-hour flows. Introducing flow EQ would improve the efficiency of plant operations. An alternative would be to install VFDs on the major lift stations that directly pump to the WRF. These alternatives should be reviewed as part of the facilities master plan.

6.5.4.4 Biological Treatment

The overall condition of the activated-sludge facilities is good. The mixed liquor suspended solids (MLSS) are sampled every morning by the Operations staff. 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. The Chief Operator indicated that by the end of FY 2022, each basin will be sequentially taken out of service, drained, inspected, and cleaned of grit.

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. 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. 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 Clarification

Although most of the unit process tanks are made of concrete or Type 304 stainless steel, the four secondary clarifiers are comprised of carbon steel and require constant paint maintenance. The overall condition of the clarification process is good. High sudden increases in influent flows can cause issues with the clarifier performance when one of the four clarifiers are out of service. Plant Operations staff follows a routine schedule of clarifier inspection, repair, and painting. At the time of inspection, all four clarifiers were in service. Clarifier No. 4 was taken offline, serviced, and painted in 2020; the effluent launder/overflow weir was replaced in FY 2021 and the clarifier was put back into service in FY 2021 a week before our visit. The stairways leading to the bridges of the aboveground clarifiers have also been painted.

Overflow weirs are hosed daily and brushed weekly to keep them clean. The overflow weirs were leveled in FY 2017. At the time of the site visit, the effluent launder/overflow weir on Clarifier No. 4 appeared unleveled as the skimmer arm was not contacting the water surface while operating. The Chief Operator stated that the effluent launder/overflow weir will be adjusted and leveled. If the skimmer arm still does not contact the water surface, the rubber on the skimmer can be replaced with longer pieces. New weirs were installed in Clarifier No. 1 and Clarifier No. 2 in 2018. Clarifier No. 3 and Clarifier No. 4 received new weirs in FY 2020 and FY 2021, respectively.

The sludge return chambers on the side of each clarifier have telescoping valves used to adjust sludge withdrawal from the bottom of the clarifier. The sludge is then conveyed to the four RAS/WAS pumps which are housed under a sheet-metal roof. Floatables accumulate in the sludge chambers and are periodically removed by manually skimming the 5-foot-by-5-foot boxes from the clarifier bridge when the chambers are full. The telescopic valves were operating properly, and the RAS/WAS pumps are in good operating condition. The pumps were painted in 2017.

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. The filter water surface, exposed interior equipment, and interior tank walls are sprayed with a bleach solution one or twice a week by Operations staff

to prevent algae growth. Regular bleach spraying mitigates algae growth but may cause long-term issues in with exposed components such as motors. It is recommended CCU investigate other methods for controlling algae in the facilities master plan.

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 with some staining and rust on some exposed components that are not stainless steel such as the motors.

The control panels and meter readouts for the three filters are under an aluminum cover. The turbidity sampling point is located to receive the combined flow of all three filters. Both the control panels and turbidimeter are in fair condition.

6.5.4.7 Disinfection and Effluent Sampling

The overall condition of the chlorination system is excellent. Only one CCC was in operation at the time of the site visit. Good turbulent flow in the inlet boxes to the CCCs created effective mixing. The pH and chlorine analyzers are in good working order. Plant operators clean the analyzer assemblies at regular intervals to remove any algae buildup. They also periodically alternate the CCCs to clean them.

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 gpm. The new dosing pumps have double-containment protection.

The CCC effluent is monitored by the effluent composite water quality sampler (EFA-01). The overall condition of the effluent monitoring, storage, and disposal system is good.

6.5.4.8 Reuse, Disposal, and Storage

Reuse Facilities

The West Port WRF reclaimed water pump station feeds part of the Master Reuse System that interconnects with the Rotonda WRF and the East Port WRF reclaimed water systems. The station contains two reclaimed water HSPs and one jockey pump. The Chief Operator noted that the pump shafts of this pump station are fairly worn and will need to be rebuilt or replaced by FY 2022. Jones Edmunds recommends an inspection of these pumps by the manufacturer to determine the extent of the work required. This provides flexibility to serve existing and future reclaimed water customers. The main customer for the reclaimed water produced at the West Port WRF is the Coral Creek Golf Club Golf Course, which receives reclaimed water through a 7-mile-long, 10-inch-diameter main constructed by the golf course owners. Chapter 7 provides additional information about the Master Reuse System.

The West Port WRF has two lined reclaimed water storage ponds – one 5 MG and one 15 MG. The stored water can be pumped to the reclaimed water distribution system or the deep injection well. The reclaimed water ponds were full at the time of the inspection, and effluent was diverted for deep well injection disposal. The ponds had some algae growth at the time of inspection. The Chief Operator reported that they plan to add some fine bubble diffusers to the pond in the future.

Reject Storage and Disposal

Effluent that does not meet public-access reclaimed water standards is conveyed to a clearwell for disposal via a deep injection well. Three new deep-well pumps are used to convey effluent through a 16-inch manifold pipe into the deep well. All compliance monitoring equipment and pumps were fully functioning and in good condition at the time of the inspection.

Wet-Weather Storage

The on-site reclaimed water ponds provide up to 20 MG for wet-weather storage of reclaimed water.

6.5.4.9 Biosolids Handling

The sludge produced as a byproduct of treatment is pumped to aerobic sludge-holding tanks and then gravity thickened at the West Port WRF before being truck hauled in liquid form to the East Port WRF for sludge dewatering and final disposal at the compost facility. The overall condition of the sludge-holding tanks is good, but the aerobic sludge-holding tank volume is too small and prevents proper decant thickening, resulting in a decant thickened sludge of 1-percent TS 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 TS, which will reduce the sludge-hauling volume by 50 to 100 percent and reduce hauling costs. CCU is evaluating the feasibility of adding more biosolids-handling capacity at the West Port WRF to handle biosolids generated at the West Port and Rotonda WRFs.

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.

6.5.4.10 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-kVA generators connected in parallel that are fed from a subbase tank and an auxiliary tank adjacent to them. A new 6,000-gallon fuel tank and pad for the generators was installed in 2020. 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 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).

- County Staff reported that the existing blowers at the West Port WRF do not operate properly when running under the generator. Staff has been able to successfully operate the blowers using a specific procedure, but this should not be necessary if the electrical equipment were properly functioning as designed.
- Other minor issues include damaged or missing conduit in the headworks and the deep well. Clarifier No. 4 is also missing some conduit components that need to be replaced. A conduit of the pumping building has a hose rack and hose bib attached to it that has pulled the conduit away from the electrical box. These all represent minor NEC violations.

6.5.5 Operations

The West Port WRF produces reclaimed water 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 with continuous effluent monitoring allowing 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 reclaimed water standards is automatically diverted to the deep injection well for disposal. Reclaimed water is also automatically diverted to the deep injection wells when the reclaimed water 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 6-12 West Port WRF 2019 Recommendations and Status

Recommendation:	Provide additional aerobic sludge holding tank volume and decanting capacity to improve decant thickening.
Progress:	Not started.
Recommendation:	Resolve hydraulic constraints in the irrigation wetwell for the injection well pumps to allow disposal of excess reclaimed water from West Port during wet-weather events.
Progress:	Ongoing.

Recommendation:	Replace Rotary Screen Nos. 1, 2, 3, and 4.
Progress:	Ongoing. Under construction.
Recommendation:	Replace electrical panel of Rotary Screen No. 4.
Progress:	Ongoing. Under construction.
Recommendation:	Evaluate a DO or ORP control system to replace the pH control approach currently used in the aeration basins.
Progress:	Not complete but will be reviewed as part of the facilities master plan.
Recommendation:	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:	Completed. Clarifier No. 4 weir needs to be leveled.
Recommendation:	Replace the overflow weirs for all clarifiers.
Progress:	Completed, but Clarifier No. 4 weir needs to be leveled.
Recommendation:	Evaluate the addition of a flow equalization tank to improve treatment plant operations.
Progress:	Not started.
Recommendation:	Install a galvanized-metal frame and UV fabric cover over each filter tank to minimize algae growth.
Progress:	To be re-evaluated as part of the facilities master plan.
Recommendation:	Secure all electrical switchgear to prevent unauthorized access or inadvertent exposure to live parts.
Progress	Ongoing.
Recommendation:	Investigate blower electrical system to determine why the blowers will not run under generator power. The capacity on site should be sufficient.
Progress	Fixed.
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 the energy levels present. This information would appear on the appropriate arc flash labeling as required.
Progress:	Ongoing.
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 and to identify reserve capacities and potential anomalies that may affect long-term maintenance and serviceability of the equipment.
Progress:	Ongoing.

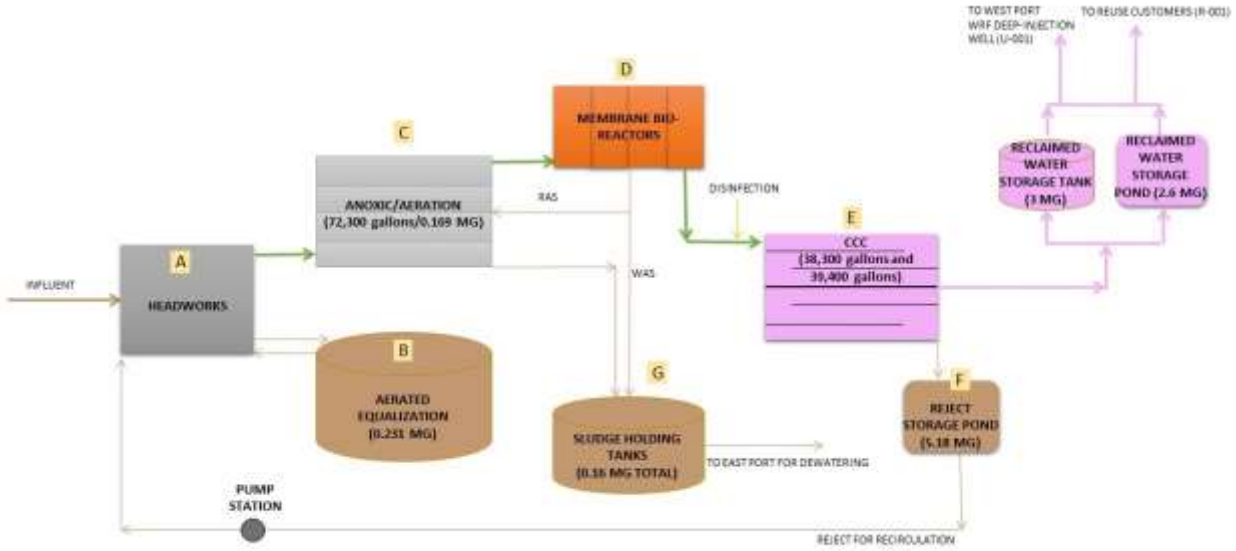
6.6 ROTONDA WRF

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. The Rotonda WRF serves the west side of the Placida Peninsula including 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 reclaimed water disposal capacity of 1.005 MGD AADF. The site has space for expansion to increase the capacity to 3.0 MGD. The Rotonda WRF uses activated sludge in a membrane bioreactor (MBR) configuration to treat wastewater.

Effluent can be distributed as reclaimed water 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.

Figure 6-4 Rotonda WRF Process Flow Diagram



The Rotonda WRF treatment process consists of the following components.

A) Headworks: Raw wastewater from the West County service area enters the Rotonda WRF headworks for screening and grit removal. Two 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 from the on-site lift station are introduced here.

B) Flow 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 to average conditions. The EQ tank is equipped with two forced-air pumps to maintain the biological medium and prevent hypoxic conditions.

C) Biological Treatment: 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) 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 secondary clarifiers and tertiary 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 tanks as WAS.

E) 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 reclaimed water 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) Reuse and Disposal Facilities: Reclaimed water enters the on-site 3.0-MG GST and a 2.64-MG reclaimed water storage pond. An on-site pump station provides flow to the reclaimed water transmission system that is interconnected with the Master Reuse System. During wet weather, excess reclaimed water can be disposed of in the West Port WRF deep injection well. If effluent does not meet the unrestricted-public-access reclaimed water 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 is diverted to this pond when it does not meet the reclaimed water standards and must be retreated through the WRF.

G) Biosolids Handling: WAS pumped to the two sludge-holding tanks (170,000-gallon total 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 2020, the AADF was 1.07 MGD and the Rotonda WRF was operating at 54 percent of the plant permit capacity. The MADF of 1.70 MGD occurred in September 2020. The highest TMADF of 1.33 MGD occurred in September 2020, which is 67 percent of the plant permit capacity, demonstrating the influence of wet weather and I&I on flows to the facility. Table 6-13 summarizes influent flows as reported on DMRs in FY 2020.

Table 6-13 Rotonda WRF Influent Flows in FY 2020

Month	MADF (MGD)	AADF (MGD)[1]	TMADF (MGD)	MDF (MGD)	TMADF Percent Capacity (%)
Oct-19	0.93	0.93	0.93	1.25	47
Nov-19	0.88	0.91	0.91	0.95	45
Dec-19	0.95	0.92	0.92	1.31	46
Jan-20	1.04	0.95	0.96	1.14	48
Feb-20	1.16	0.99	1.05	1.37	52
Mar-20	0.97	0.99	1.06	1.11	53
Apr-20	0.83	0.97	0.99	0.89	49
May-20	0.78	0.94	0.86	0.84	43
Jun-20	1.34	0.99	0.98	1.90	49
Jul-20	1.12	1.00	1.08	1.52	54
Aug-20	1.17	1.02	1.21	1.64	60
Sep-20	1.70	1.07	1.33	2.92	66

[1] Permitted plant capacity 2.0 MGD.

In FY 2020, the average annual influent load for BOD was 794 lb/day and for TSS was 857 lb/day. The maximum monthly average for BOD load was 1,066 lb/day occurring in September 2020 but also exceeded 1,000 lb/day in the winter months. The maximum monthly average TSS load was 1,354 lb/day occurring in September 2020, which corresponds with seasonal residents. Table 6-14 summarizes the wastewater characteristics of the Rotonda WRF influent in FY 2020.

Table 6-14 Rotonda WRF Influent Water Quality in FY 2020

Month	BOD		TSS	
	Monthly Avg. Concentration (mg/L)[1]	Monthly Avg. Load (lb/day)	Monthly Avg. Concentration (mg/L)[1]	Monthly Avg. Load (lb/day)
Oct-19	80	614	104	809
Nov-19	85	623	114	836
Dec-19	115	933	142	1,177
Jan-20	121	1,020	140	1,179
Feb-20	105	1,013	109	1,066
Mar-20	93	730	50	389
Apr-20	100	689	58	393
May-20	102	658	61	393
Jun-20	57	538	41	387
Jul-20	92	906	133	1,303
Aug-20	80	743	105	993
Sep-20	79	1,066	100	1,354

Note: [1] Measured at monitoring site INF-01.

6.6.3 Treatment Objectives and Effluent Quality

The Rotonda WRF is designed to treat wastewater for two effluent standards: one for disposal to the deep injection well (U-001) and the other for a slow-rate public-access system (R-001) which requires high-level disinfection. Table 6-15 lists the flow and primary water quality requirements for each effluent reuse and disposal method.

Table 6-15 Rotonda WRF Effluent Requirements

Reuse/Disposal Method	R-001	U-001
Maximum Flow (MGD)	Report[a,b]	4.75[a]
Maximum BOD (mg/L)	20[a] /30[b] / 45[c] /60[d]	Not applicable
Maximum TSS (mg/L)	5.0[d]	Not applicable
Total Fecal (#/100mL)	25[d]	Not applicable

Notes: Statistical Bases: [a]annual average; [b]monthly average; [c]weekly average; [d]single sample.

Table 6-16 summarizes the effluent flow and water quality of the Rotonda WRF. In FY 2020, the annual average effluent flow for the slow-rate public-access system (R-001) was 0.87 MGD. The maximum daily flow of the well was 2.93 MGD, which included the West Port WRF flows, and indicates that the WRF is meeting its effluent flow requirements. The maximum single sample BOD and TSS values were 4.5 mg/L and 1.5 mg/L, respectively, showing no violations of the single-sample limits for BOD or TSS were recorded in FY 2020. Consequently, the BOD and TSS annual average, monthly, and weekly concentration requirements were also met in FY 2020. The maximum fecal coliform counts never exceeded 1/100mL and were well within public-access reuse standards.

Table 6-16 Rotonda WRF Effluent Flow and Water Quality

Month	Reuse and Disposal Method		Water Quality		
	R-001 Monthly Avg. Flow (MGD)[1]	U-001 Maximum Daily Flow (MGD)[2]	Maximum BOD Conc. (mg/L)[3]	Maximum TSS Conc. (mg/L)[4]	Maximum Fecal Count (#/100 mL)[3]
Oct-19	0.97	0.34	3.1	0.2	<1
Nov-19	0.89	0.61	2.5	1.5	<1
Dec-19	0.96	1.33	4.5	0.9	<1
Jan-20	1.05	0.88	3.8	0.2	<1
Feb-20	0.77	1.76	3.8	0.3	<1
Mar-20	0.64	0.12	3.0	0.3	<1
Apr-20	0.55	0.03	2.8	0.3	<1
May-20	0.52	0.18	2.5	0.3	<1
Jun-20	1.02	2.41	< 2.0	0.2	<1
Jul-20	0.81	1.58	< 2.0	0.2	<1
Aug-20	0.88	1.62	3.1	0.3	<1
Sep-20	1.42	2.93	< 2.0	0.3	<1

Note: [1] Monitoring site FLW-03; [2] Monitoring site FLW-02 at Westport WRF;[3] Monitoring sites EFA-01; [4] Monitoring site EFB-01.

6.6.4 Treatment Components and Condition Assessments

Jones Edmunds completed an on-site review of the WRF on January 20, 2021. Our personnel met with Kevin Enwright, 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.
- Operators' 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 O&M 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 and at the Rotonda WRF Operations building.

6.6.4.1 WRF Influent Sampling Location

The influent water quality sampling location (INF-01) and flow monitoring (FLW-01) locations are clearly marked, and the refrigerated influent composite sampler and flow meter are in good operating condition. The two main influent valves to the headworks screens are inoperable and were scheduled to be replaced in 2019. However, this was deferred to FY 2021 to allow the facility to procure the equipment necessary to isolate the drum screens. An actuator was added to Screen No. 1 in FY 2019.

6.6.4.2 Headworks

The overall condition of the headworks is good to fair but beginning to show signs of aging; the planning stages for an evaluation of the rotary screens to be rehabilitated or replaced/rebuilt to increase their reliability and performance should begin in FY 2022 as part of the facilities master plan.

At the time of the site visit, one screen was operating. These screens are critical process units. 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 chain and sprockets of Screen No. 2 were replaced in FY 2019.

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 wetwells. 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 were scheduled for replacement in FY 2020, which was not completed at the time of the inspection so these should be replaced in FY 2021.

The screenings and grit dumpsters are emptied once per week. The dumpster area is clean and free of odors. The screening Screw Conveyor/Compactor No. 1 and grit dewatering units are operating as intended. The screening screw conveyor/compactors have been removed and drop chutes have been installed in their place.

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 VFD 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. The EQ tank was painted in FY 2019.

6.6.4.4 Biological Treatment

The overall condition of the activated sludge facilities is good. The aeration tanks operate in a plug flow regime with anoxic, aerobic, 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 aeration tanks are run at a mixed-liquor suspended-solids concentration of 3,500 to 4,000 mg/L. 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. A thick layer of foam was on the water surface in the anoxic zone at the time of inspection.

The aeration system continues to supply air to the aeration tanks. The facility has four multi-stage centrifugal Hoffman blowers to serve the aeration trains with room for five total blowers. 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, we observed that Blower Nos. 2 and 5 had the motor installed but the blower was removed. Blower Nos. 1 and 4 were replaced in FY 2020 and FY 2019, respectfully.

The installed blower and motors were in good condition. Blower No. 5 is expected to be replaced in FY 2021.

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

6.6.4.5 Filtration: 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 deep cleaning.

The four MBR blowers and the four permeate pumps were running and in good condition with some of the components requiring repainting.

In 2017, three mixed-liquor volatile suspended solids (MLVSS) return/recycle pump motors were replaced and are in good working order. The frame on the MLVSS Return/Recycle Pump No. 2 was being rehabilitated at the time of the visit, and the frame and skid floor will be repainted in FY 2021 when completed.

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.

In May 2019, HDR, Inc. conducted a membrane evaluation and made the following observations and/or recommendation:

- The membranes are in good condition except for some cracked potting headers.
- The slack should be adjusted within the next few months.
- Purchase a few module blanks for top and bottom headers and wait to observe membrane effluent turbidity spikes, which would indicate that one of the cracked potting headers has breached the membrane integrity. Remove the compromised membrane module and install module blanks in its place until the new purchased membrane module is received. Once the new membrane module is received, install the new membrane in the middle of

the cassette and move an existing module where the compromised module was. This could prolong the new membrane module potting header life.

- Continue monitoring and trending membrane permeability data and add temperature to the data collected weekly so permeability can be corrected with temperature to account for seasonal changes in water viscosity.
- Constantly monitor membrane permeability trend, especially for Train Nos. 3 and 4, for which end of life is estimated to be 2024 and 2026, respectively, as this trend can either accelerate or decelerate.
- A year before scheduled replacement (currently estimated in 2023 for Train No. 3), order membrane modules. Install new membranes modules in Train No. 1. Do not install new membrane modules with existing membrane modules in the same train. Move the existing membrane modules from Train No. 1 to Train No. 4. Train No. 4 will then have six membrane cassettes, which will extend the life of the membranes.

6.6.4.6 Disinfection and Effluent Sampling

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. Leaks were noted around chlorine pipe fittings due to the continuous exposure to sunlight. The other storage tanks are still in place with two new tanks and secondary containment on site ready for replacement at the time of the inspection.

Prominent Feed Pumps Nos. 1 and 3 were replaced in FY 2018. Prominent Feed Pump No. 2 was replaced in FY 2019. Prominent Feed Pump No. 1 was removed at the time of inspection and will be replaced in FY 2021. The two total chlorine analyzers were replaced in FY 2019. The chlorine feed line from the in-plant road was replaced in 2018.

6.6.4.7 Reuse, Disposal, and Storage

Reuse Facilities

Reclaimed water meeting public-access water quality is sent to the Master Reuse System using the HSPs at HSPS No.1 and HSPS No.2. HSPS No.1 uses two low pressure submersible pumps with VFDs to provide reclaimed water to golf course storage ponds north of the Rotonda WRF. The golf course's high-pressure pumps then increase pressure for irrigation system use. HSPS No.2 contains 2 HSPs and 1 jockey pump which are primarily used to convey reclaimed water to golf courses south of the WRF. One of the two HSPs was replaced

in FY 2019. The HSP No. 2 was removed at the time of inspection and is being rebuilt and replaced in FY 2021. The jockey pump was replaced in FY 2018.

Reclaimed water quality effluent can also be stored in the Rotonda WRF on-site 3.0-MG GST and unlined reclaimed water storage pond. The GST was drained and cleaned in 2017. Reclaimed water from the GST can be pumped to pressurized reuse customers using HSPS No. 2. The unlined reclaimed water storage pond has a reduced capacity of approximately 50 percent due to high percolation into the ground because the pond is unlined. In 2018, the Rotonda WRF Chief Operator expressed concerns about the condition of part of the berm around one of the pond walls. Jones Edmunds is evaluating this pond and will make recommendations as part of the 2021 Reclaimed Water Master Plan.

Effluent Disposal Facilities

As mentioned previously, the Rotonda WRF provided reclaimed water to the Master Reuse System. This also allows for excess reclaimed-quality effluent to be sent to West Port's reclaimed water storage ponds or deep injection well (capacity 4.75 MGD) for final disposal. The Rotonda WRF also contains an on-site lined reject pond has a storage capacity of 5.182 MG. Water diverted to this pond does not meet reclaimed water standards and must be retreated through the WRF. A small pumping station pumps reject water back to the headworks. The pond is scheduled to be cleaned of algae in FY 2022.

Wet-weather Storage

The on-site reclaimed water 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 reclaimed water.

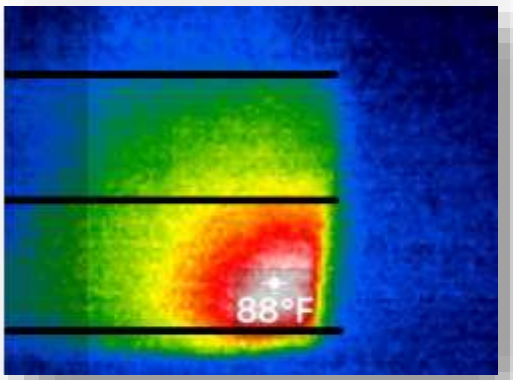
6.6.4.8 Biosolids Handling Facilities

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 were repainted in FY 2019.

6.6.4.9 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 now been resolved. Overall, the electrical equipment 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 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.

The following deficiency was noted:



- A two-pole circuit breaker in an unlabeled 480-V panel (breaker #28/30) showed during the thermal inspection that one of the two poles was reading a much higher temperature than the other. This is extremely uncharacteristic of a two-pole breaker system since the expected current between both sides of the breaker should be the same (see photograph). The imbalance in temperature between the two contact points may indicate that one of the sides of the breakers is failing or that the connection is loose or impaired. A loose or impaired connection may increase the potential for an arc-flash failure.

6.6.5 Operations

The WRF consistently produces high-quality reclaimed water 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.

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 reclaimed water 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 to address issues, if necessary. Effluent not meeting reclaimed water 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 6-17 Rotonda WRF 2019 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:	Repairs of Screen No. 2.
Progress:	Not Started.
Recommendation:	Replace the grit cyclones of the headworks.
Progress:	Not Started.
Recommendation:	Replace screening Screw Conveyor/Compactor No. 2.
Progress:	Completed.
Recommendation:	Paint tanks, buildings, and pipes in the next 2 years.
Progress:	Ongoing.
Recommendation:	Complete the repairs of Blower No. 1 and put it back in service.
Progress:	Completed.
Recommendation:	Replace Blower No. 5 with the correct cubic-foot-per-minute (cfm)-capacity blowers to lower oxygen levels and improve Nitrogen removal.
Progress:	Completed.
Recommendation:	Add an MBR cassette to existing trains as capacity needs dictate.
Progress:	Cassettes are being monitored to determine a replacement schedule.
Recommendation:	Add galvanized metal frame and UV shade cloth to CCC 2.
Progress:	Ongoing.
Recommendation:	Replace hypochlorite Feed Pump No. 3.
Progress:	Completed.
Recommendation:	Add protection to chlorine storage tanks and piping from direct sunlight.
Progress:	Completed.

Recommendation:	Add a small winch to each decant pump in the sludge-holding tanks for better control of the pump level.
Progress:	Ongoing.
Recommendation:	Remove vegetation, clean, reinforce the berm, and evaluate lining the reclaimed water storage pond to increase storage capacity.
Progress:	Ongoing.
Recommendation:	Evaluate different aeration systems for the reclaimed water storage pond.
Progress:	Not Started.
Recommendation:	Clean the reject storage pond.
Progress:	Ongoing.
Recommendation:	Complete installation of reclaimed water pipe to the Cape Haze Golf Course and Placida Corridor.
Progress:	Ongoing.
Recommendation:	Evaluate ASR for additional reclaimed water storage.
Progress:	Not started.
Recommendation:	Improve the operation of the generators, primarily Generator No. 2.
Progress:	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 operation.
Progress:	Not yet implemented.
Recommendation:	Investigate the temperature imbalance in the poles of the 480V panel, breaker #28/30 as soon as possible. Either repair the connection or replace the defective breaker.
Progress:	Not started.
Recommendation:	Adjust the membrane slack within the new few months
Progress:	Not completed.
Recommendation:	Purchase a few module blanks for top and bottom headers and wait to observe membrane effluent turbidity spikes, which would indicate that one of the cracked potting headers has breached the membrane integrity. Remove the compromised membrane module and install module blanks in its place until new purchased membrane module is received. Once the new membrane module is received, install the new membrane in the middle of the cassette and move an existing module where the compromised module was. This could prolong the new membrane module potting header life.
Progress:	Not started.
Recommendation:	Continue monitoring and trending membrane permeability data and add temperature to the data collected weekly so permeability can be corrected with temperature to account for seasonal changes in water viscosity.
Progress:	Ongoing; started in FY 2021
Recommendation:	Constantly monitor membrane permeability trend, especially for Train Nos. 3 and 4, for which end of life is estimated to 2024 and 2026, respectively, as this trend can either accelerate or decelerate.
Progress:	Ongoing; started.

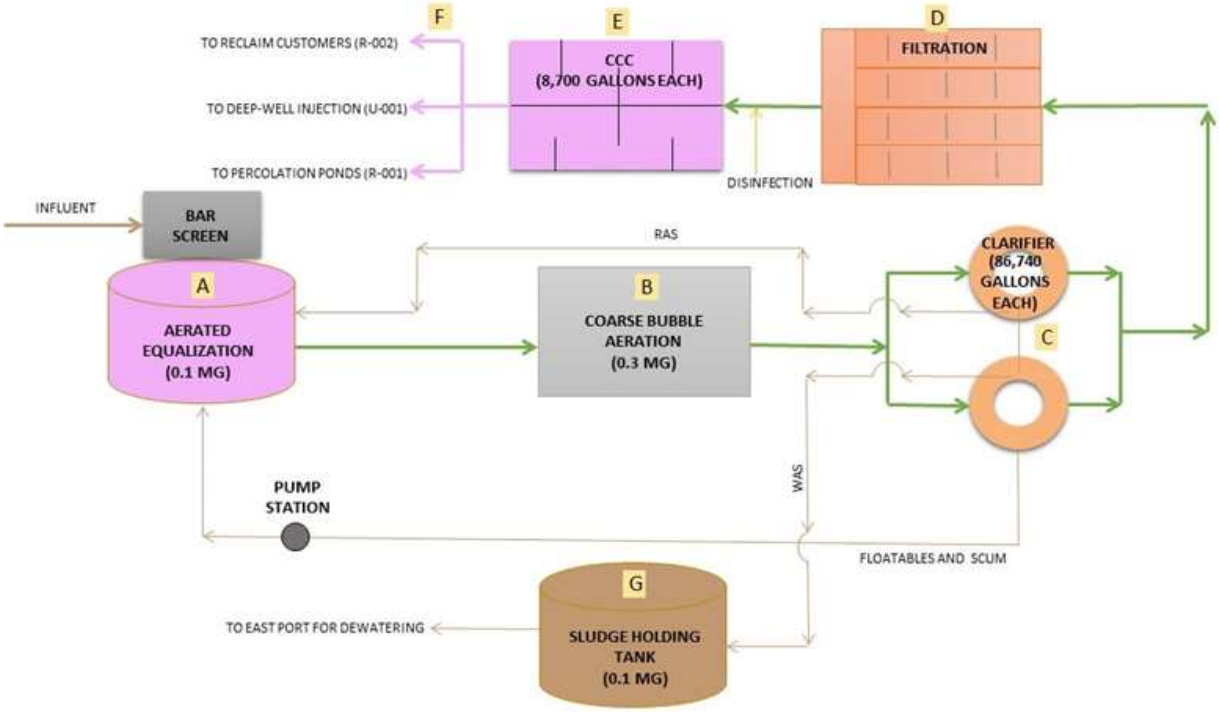
Recommendation:	A year before scheduled replacement (currently estimated in 2023 for Train No. 3), order membrane modules. Install new membrane modules in Train No. 1. Do not install new membranes modules with existing membrane modules in the same train. Move the existing membrane modules from Train No. 1 to Train No. 4. Train No. 4 will then have six membrane cassettes, which will extend the life of the membranes.
Progress:	Not started; cassettes should be interchangeable so they can be rotated and allow more even loading and use.

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 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 uses conventional activated sludge with effluent filtration and high-level chlorine disinfection to produce reclaimed water. The facility's permitted capacity is 0.5 MGD AADF. Effluent can be distributed as reclaimed water 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 Flow EQ: 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) Biological 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 MLSS are aerated to achieve extended aeration treatment, and the air-flow rate 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) Clarification: 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) 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) 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. A mixing pump is provided at the chemical feed point, and the chambers are baffled and sized to meet disinfection requirements. 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. Sodium hypochlorite is stored in two tanks with a total capacity of 2,200 gallons.

F) Reuse and Disposal: Effluent water meeting reclaimed water standards is conveyed through the unrestricted-public-access reclaimed water system via a HSP station. The HSP station consists of two large HSPs and two smaller jockey pumps. Effluent water not meeting reclaimed standards is conveyed to two Class I deep injection wells, and four percolation ponds are available for disposal of excess reclaimed water or treated water that does not meet reclaimed water standards.

   IW-2 is currently being used as the primary means of effluent disposal, with the older well, IW-1, maintained as a backup. Currently, a maximum of 380 gpm can be diverted to the deep well. 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 wetwell at the injection well pumping station. Two equally sized vertical turbine pumps are used to inject water into the injection well.

G) Biosolids Handling: 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.
  - CCU is currently in the design phase of the Burnt Store expansion project and will submit an application for substantial modification of the existing facility and renewal

of the existing facility permit to FDEP for review. In addition, an updated Capacity Analysis Report (CAR) and O&M Performance Report (OMPR) will also be required.

- IW-1 Permit (271367-004-UO) – Expiration Date: May 14, 2024.
  - The last MIT was performed on IW-1 in June 2015. CCU is performing maintenance on well components to address an annular system issue and will perform the MIT after the issue is resolved. The work is expected to occur in 2021.
- IW-2 Permit (271367-005-UO) – Expiration Date: October 17, 2021.
  - CCU should submit an application for a 5-year operating permit renewal for IW-2 in FY 2021.
  - The last MIT was performed on IW-2 in 2018, and the next MIT is scheduled for 2023.

6.7.2 Wastewater Flows and Loads

The Burnt Store WRF's permitted capacity is 0.500-MGD AADF. In FY 2020, the AADF was 0.32 MGD, and the Burnt Store WRF is operating at 64 percent of the plant permit capacity. The MADF occurred in September 2020 at 0.67 MGD. The highest TMADF of 0.37 MGD occurred in March 2020, which is 74 percent of the plant permit capacity. Table 6-18 summarizes influent flows as reported on the FY 2020 DMRs.

As the data show, 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. Historically, WRF flows were consistent but a substantial population growth has been observed in this area in recent years. CCU is in the design phase for the expansion of this WRF, which will increase the capacity of the Burnt Store WRF plant through a phased approach to meet projected needs.

Table 6-18 Burnt Store WRF Influent Flows in FY 2020

Month	MADF (MGD)	AADF (MGD)[1]	TMADF (MGD)	MDF (MGD)	TMADF Percent Capacity (%)
Oct-19	0.28	0.32	0.32	0.40	63
Nov-19	0.29	0.32	0.28	0.32	55
Dec-19	0.32	0.32	0.30	0.55	59
Jan-20	0.36	0.32	0.32	0.44	64
Feb-20	0.40	0.32	0.36	0.47	72
Mar-20	0.35	0.32	0.37	0.40	74
Apr-20	0.28	0.32	0.35	0.34	69
May-20	0.27	0.32	0.30	0.34	61
Jun-20	0.36	0.33	0.31	0.61	61
Jul-20	0.28	0.32	0.31	0.37	61
Aug-20	0.26	0.31	0.30	0.34	60
Sep-20	0.36	0.32	0.30	0.67	60

Note: [1] Permitted plant capacity 0.500 MGD; measured at monitoring site FLW-01.

For FY 2020, the average annual influent load for BOD was 335 lb/day and for TSS was 434 lb/day. The maximum monthly average BOD load was 570 lb/day occurring in February 2020. The maximum monthly average TSS load was 671 lb/day in February 2020, which corresponds with seasonal residents and the dry season. Table 6-19 summarizes the wastewater characteristics of the WRF influent.

Table 6-19 Burnt Store WRF Influent Water Quality in FY 2020

Month	BOD		TSS	
	Monthly Avg. Concentration[1] (mg/L)	Monthly Avg. Load (lb/day)	Monthly Avg. Concentration[1] (mg/L)	Monthly Avg. Load (lb/day)
Oct-19	95	209	246	297
Nov-19	126	301	313	397
Dec-19	137	350	458	453
Jan-20	171	540	628	617
Feb-20	173	570	621	671
Mar-20	158	473	495	628
Apr-20	170	417	470	476
May-20	146	320	338	388
Jun-20	88	283	407	437
Jul-20	84	196	240	287
Aug-20	81	170	188	258
Sep-20	71	191	239	301

Note: [1] Measured at monitoring site INF-01.

6.7.3 WRF Treatment Objectives and Effluent Quality

The Burnt Store WRF is designed to treat wastewater to three effluent standards: one for disposal to the deep injection wells (U-001), one for the percolation pond systems (R-001) which requires basic disinfection and contains a nitrate limit, and one for public-access reuse (R-002) which requires high-level disinfection. Table 6-20 lists the flow and primary water quality requirements for each effluent reuse and disposal method.

Table 6-20 Burnt Store WRF Effluent Requirements

Reuse/Disposal Method	R-001	R-002	U-001
Max Flow (MGD)	0.25[a]	2.2603[a]	3.444[d]
Max BOD (mg/L)	20[a] /30[b] / 45[c] /60[d]	20[a] /30[b] / 45[c] /60[d]	20[a] /30[b] / 45[c] /60[d]
Max TSS (mg/L)	20[a] /30[b] / 45[c] /60[d]	5[d]	20[a] /30[b] / 45[c] /60[d]
Total Fecal (#/mL)	200[a] /200[e] /800[d]	25[d]	Not applicable

Notes: Statistical Bases: [a]annual average; [b]monthly average; [c]weekly average; [d]single sample; [e]monthly geometric mean.

Table 6-21 summarizes the effluent flow and water quality of the Burnt Store WRF. In FY 2020, the annual average effluent flow for the percolation ponds (R-001) and reuse system (R-002) were 0.14 MGD and 0.0042 MGD, respectively. The MDF of the well was 0.45 MGD indicating that the WRF is meeting its effluent flow requirements. The maximum single-sample BOD and TSS values were 2.1 mg/L and 1.4 mg/L, respectively, showing no violations of the single-sample limits for BOD or TSS were recorded in FY 2020. Consequently, the BOD and TSS annual average, monthly, and weekly concentration requirements were also met in

FY 2020. The maximum fecal coliform counts rarely exceeded 1/100mL and were well within public-access reuse standards.

Table 6-21 Burnt Store WRF Effluent Flow and Water Quality

Month	Reuse and Disposal Method			Water Quality		
	R-001 Monthly Avg. Flow[1] (MGD)	R-002 Monthly Avg. Flow[2] (MGD)	U-001 Max Day Flow[3] (MGD)	Maximum BOD Conc.[4] (mg/L)	Maximum TSS Conc. [5] (mg/L)	Maximum Fecal Count[5] (#/100mL)
Oct-19	0.09	0.004	0.35	<2.0	0.4	<1
Nov-19	0.11	0.003	0.34	<2.0	0.4	<1
Dec-19	0.11	0.003	0.38	<2.0	0.5	<1
Jan-20	0.20	0.003	0.42	<2.0	1.4	<1
Feb-20	0.17	0.004	0.43	<2.0	0.9	<1
Mar-20	0.18	0.005	0.41	<2.0	0.5	<1
Apr-20	0.12	0.004	0.34	<2.0	0.3	<1
May-20	0.17	0.004	0.31	<2.0	0.4	<1
Jun-20	0.21	0.003	0.33	<2.0	0.5	<1
Jul-20	0.13	0.006	0.35	2.1	0.8	<1
Aug-20	0.09	0.008	0.40	<2.0	1.2	<1
Sep-20	0.13	0.004	0.45	<2.0	1.2	6.3

Notes: [1] Monitoring site OTH-01; [2] Monitoring site OTH-02; [3] Monitoring site OTH-03; [4] Monitoring site EFA-01; [5] Monitoring sites EFA-01 and EFA-02.

6.7.4 Treatment Components and Condition Assessments

Jones Edmunds completed an on-site review of the plant on January 14, 2020. Our personnel met with Harry Kuzel, 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.
- Operators' 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 Sampling Location

The influent water quality sampling location (INF-01) is clearly marked, and the refrigerated influent composite sampler is in good operating condition. The influent flow monitoring location (FLW-01) is clearly marked, and the flow meter is in good operating condition.

6.7.4.2 Headworks

The headworks overall condition is poor. It consists of one manually cleaned bar rack. The headworks does not include grit removal and the influent manual-screening system cannot prevent moderate-sized 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.

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 weekly during the peak season and biweekly during the off-peak season. The staff also clears the pipelines of debris annually to remove clogs in the system.

6.7.4.3 Flow Equalization

The Aquastore EQ tank is in poor condition. The EQ tank has signs of rust around the upper steel rim, which likely originates from the RO WTP waste line. Internal piping is in poor condition with leaks at flanged fittings, and one of the drop diffusers inside the EQ tank has been damaged and is no longer secure. Since no grit-removal facilities are provided, grit accumulation occurs in the EQ tank and reduces treatment capacity. The grit accumulation is currently being managed by having a vendor periodically pump out the grit in the EQ tank while in operation.

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.

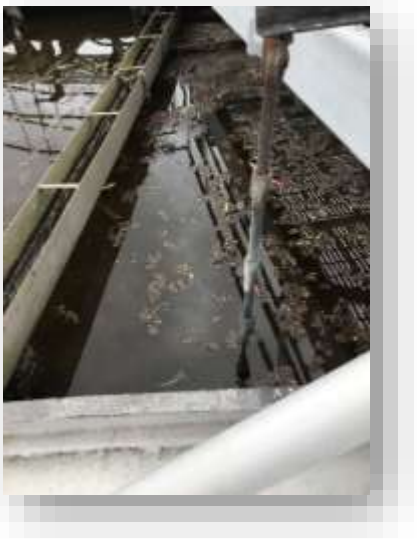
The equalization pumps are also in poor condition and cannot wait until the WRF expansion; therefore, they will be replaced in 2021. The system is capable of pumping 400 gpm with one pump running at a time. The pumps send water to the splitter box, and the raw effluent runs by gravity to the aeration basin. The flow does not reach a 2-foot-per-second velocity, and the Operators have problems with the 12-inch feed pipes clogging.

Due to these operational concerns and the condition of the headworks and EQ tank, CCU is re-designing the Burnt Store headworks as part of the Burnt Store expansion project.

6.7.4.4 Biological Treatment

The activated-sludge facilities are steel-ring package plants consisting of two aeration tanks and two secondary clarifiers. At the time of the site visit, the aeration basins appeared to have adequate air distribution throughout the tank. All blowers were rebuilt in 2017. The operation of the blowers is based on timers, but no DO sensors are provided to adjust blower operation. The hinged sluice gates separating the two aeration tanks are not functioning as intended, allowing wastewater to flow to the adjacent tank during maintenance. The tanks have minimum free-board (<1 foot), creating concerns of overflowing during high-flow conditions or if a downstream flow obstruction occurs.

6.7.4.5 Clarification



The clarifier portions of the tanks are in good working order and cleaned of excessive algae growth on the weirs as needed, a significant amount of floatables pass through the headworks and collect in the clarifiers. The floatables are returned to the headworks and accumulate in the WRF until they are manually removed. The two RAS/WAS pumps that draw solids from the bottom of the tanks are in poor condition and operating at their end of lifetime. The County continues to maintain and repair these systems until the WRF expansion is completed.

Overall, the tanks appear to be in good condition and were recently painted. The Burnt Store WRF expansion project has identified that these tanks could likely be repurposed during the preliminary design discussions.

6.7.4.6 Filtration

The effluent filtration system is a cloth-media disk filter with 5-micron cloths, housed in a painted carbon-steel tank and controlled by a series of backwash actuators. The backwash actuators were replaced in 2019 and are in excellent condition. The operator indicated that the filter is producing a good-quality effluent but backwashes frequently during periods of high flow, which can cause overflows to the CCC. However, the overall condition of the filtration system is good though it is not sized to meet future flow conditions.

6.7.4.7 Disinfection and Effluent Sampling Station

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 concrete CCCs are in good condition. A UV cover has been installed over CCC No. 1. A submersible mixing pump is used to enhance chlorine mixing. A sampling pump is used to pump CCC effluent to the chlorine analyzer for compliance monitoring, which replaced an old gravity-fed 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. Two new diaphragm chlorine metering pumps were installed in FY 2019.

The effluent monitoring locations (EFA-01 and EFA-02) are clearly marked, and the refrigerated effluent composite sampler is in good operating condition.

6.7.4.8 Reuse, Disposal, and Storage

As mentioned previously, the Burnt Store WRF has three permitted effluent reuse and disposal options including public-access reuse (R-002), deep injection well (UIC), and a percolation pond system (R-001). Effluent meeting reclaimed water standards is conveyed to the reclaimed water customers within the Burnt Store WRF service area if the demand is present. If the effluent does not meet reclaimed water standards or the demand is not present in the reuse system, the effluent is conveyed to the deep injection well or percolation ponds.

Reuse Facilities

The Burnt Store WRF reuse facilities include a reclaimed water pump station and clearwell, which are in overall good condition. The reclaimed water pump station is located above the clearwell following the CCCs. Two HSPs and two booster pumps are used to convey up to 0.5 MGD AADF of reclaimed water to customers. The booster pumps are currently used to satisfy demand in the reuse system, but the two large HSPs are working properly and are tested regularly. The reclaimed water HSPs and jockey pumps are well maintained and show no signs of deterioration. Flow to the reclaimed water 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 is needed to monitor the pump discharge line and measure reclaimed water flow. In addition, no on-site reclaimed water storage is available, which will require future major reclaimed water users to be served through direct distribution to the user's reclaimed water holding facility or require storage to be added on site. These limitations will be addressed in the design of the Burnt Store WRF expansion project. Chapter 7 provides additional information about the Burnt Store Reuse System.

Effluent Disposal Facilities

The Burnt Store WRF also has two alternate options for disposing of excess reclaimed water or effluent not meeting reclaimed water standards including two injection wells (IW-1 and IW-2) and four on-site percolation reuse ponds. IW-1 has a rated capacity of 0.564 MGD. 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.

The deep injection wells are well maintained and in good working order, but some improvements and flow limitations have been noted on the system. The improvements include the replacement of an IW pump in 2018 and a 16-inch valve on the IW-2 inlet line in FY 2019. The deep well pumping station is limited to 380 gpm since the effluent flows by gravity to the wetwell 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 WRF's ability to handle peak flows and limits the capacity of the deep wells.

Operations personnel exercise IW-1 once per month for a minimum of 24 hours to maintain 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.

Table 6-22 lists the average flow pumped into IW-1 and IW-2 and the total monthly volumes sent to the deep wells and percolation ponds. As the data show, the wells are well within their rated capacities, and IW-2 is the primary well used for disposal. In FY 2020, a total volume of approximately 65.9 MG was sent to the deep injection wells and 52.1 MG were sent to the percolation ponds.

Table 6-22 Burnt Store WRF Average and Total Injection Well Flows

Month	IW-1 (MGD)	IW-2 (MGD)	Total IW Flow (MGD)	Total IW Volume (MG)	Total Pond Volume (MG)
Oct-19	0.000	0.194	0.194	6.10	2.73
Nov-19	0.000	0.186	0.186	5.57	3.35
Dec-19	0.000	0.209	0.209	6.47	3.48
Jan-20	0.003	0.150	0.153	4.64	6.35
Feb-20	0.001	0.231	0.232	6.69	4.84
Mar-20	0.000	0.167	0.167	5.18	5.63
Apr-20	0.000	0.178	0.178	5.36	3.55
May-20	0.000	0.112	0.112	3.48	5.24
Jun-20	0.000	0.153	0.153	4.60	6.31
Jul-20	0.000	0.152	0.152	4.71	4.12
Aug-20	0.000	0.187	0.187	5.80	2.70
Sep-20	0.000	0.241	0.241	7.22	3.78
Annual Avg	0.000	0.180	0.180	—	—
Annual Total	—	—	—	65.9	52.1

Note: Recall that the Burnt Store WRF IWs also receive the concentrate flows from the Burnt Store RO WTP.

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. Limitations have been reported in the percolation ponds that have been attributed to the high groundwater conditions in the area.

As part of the WRF upgrades, CCU intends to evaluate other means for transferring greater amounts of effluent flow to the deep well, such as increasing the size of the piping and investigating the need for additional storage, additional filtration, and other redundancies to comply with the corresponding regulations.

Wet-weather Storage

The on-site percolation ponds are available for limited wet-weather storage of reclaimed water at the Burnt Store WRF.

6.7.4.9 Biosolids Handling

The overall condition of the biosolids-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.

6.7.4.10 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 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 fiberglass MCC building should be replaced with a concrete structure.
- The main breaker trips when two blowers are started simultaneously.

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 reclaimed water 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 6 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 reclaimed water 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 was completed in FY 2019.

6.7.7 REVIEW OF PREVIOUS REPORT RECOMMENDATIONS

Table 6-23 Burnt Store WRF 2020 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:	Pending plant upgrades.
Recommendation:	Repair leaking internal piping, aeration header, and fittings in EQ basin.
Progress:	Pending plant upgrades.
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 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 reclaimed water 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:	Evaluate the main breaker at the blowers to prevent tripping.
Progress:	Pending plant upgrades.
Recommendation:	Evaluate filter back-wash pump operations, specifically during high-flow events.
Progress:	Pending plant upgrades.
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:	Pending plant upgrades.

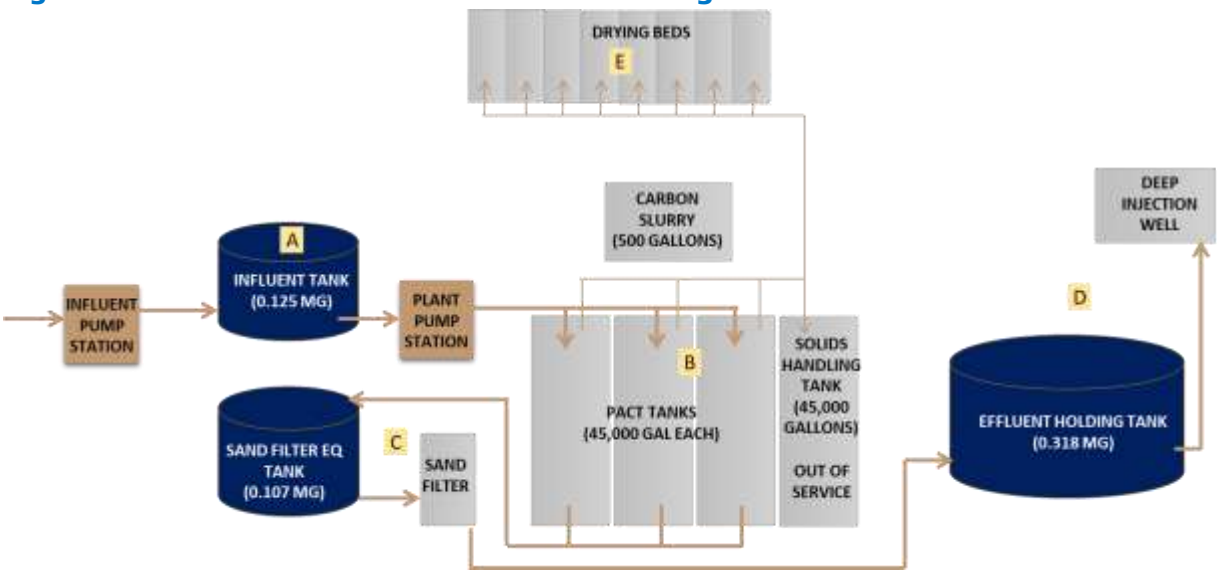
Recommendation:	Perform a load study to identify any issues related to power quality, quantity, and capacity of the system. The load study would help identify deficiencies in the system, identify reserve capacities, and assess potential anomalies that may affect long-term maintenance and serviceability of the equipment.
Progress:	Pending plant upgrades.

6.8 LEACHATE TREATMENT FACILITY

The Leachate Treatment Facility (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 LTF.

Figure 6-6 Zemel Road LTF Process Flow Diagram



The Zemel Road LTF consists of the following components:

A) Influent: Most of the LTF influent originates from the landfill collection system and is conveyed to the LTF through the landfill pump station (PS-1). The landfill leachate is combined with the plant office sanitary sewer, landfill underdrain flows, and runoff from the composting operation. The flows are conveyed through the influent flow meter and enter a steel circular influent-holding tank. The plant pumping station (PS-2) transfers leachate from the influent holding tank to the powder-activated carbon treatment (PACT) system.

B) PAC Treatment: The batch reactor PACT system consists of three separate tanks using aerated activated sludge with carbon particle adsorption. Each PACT tank is a small package plant with separate PAC feed and aeration systems. PAC is mixed with water to form a carbon slurry before combining with the raw leachate. The solution is then aerated to promote aerobic digestion and is followed by a sludge-settling period.

C) Filtration: After settling is completed, the decant water is pumped to the filter feed tank and gravity fed through a sand filter for final polishing. The filter effluent is conveyed to a glass-lined steel effluent storage tank.

D) Effluent Disposal: The LTF effluent is conveyed from the effluent storage tank to a deep injection well and disposed of in a confined saltwater aquifer at an approximate depth of 2,700 feet below ground surface.

E) Solids Disposal: After decanting the treated leachate, a portion of the solids (mixed carbon/biological sludge) from the PACT tanks are conveyed to the outdoor sludge-drying beds for dewatering. Once dry, the solids are conveyed to a dumpster and hauled to the landfill for final disposal.

6.8.1 Regulatory Considerations

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

- Class 1 Landfill Permit – Expiration Date: July 15, 2033.
- IW-I Permit (No. 191077-003-UO/1I) – Expiration Date: October 25, 2024 (Permit renewal by Charlotte County Public Works).
  - New permit issued in October 25, 2019.
  - 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 Flows

The LTF's construction permit was issued in 1991 as part of the Class I landfill to treat 0.25 MGD of leachate. The current UIC permit specifies a maximum wellhead pressure of 39 psi, a peak flow rate of 320 gpm, and a maximum injection volume of 0.46 MGD. Table 6-24 summarizes the flows sent from the LTF to the deep injection well. In FY 2020, the maximum wellhead pressure, peak flow rate, and maximum daily injection volume were within permit limits, and the LTF treated a total of 22.8 MG in FY 2020.

Table 6-24 LTF Deep Injection Well Flows – FY 2020

Month	Maximum Wellhead Pressure (psi)	Peak Injection Rate (gpm)	Maximum Daily Flow (MGD)	Total Monthly Flow (MG)
Oct-19	26	250	0.09	1.86
Nov-19	26	250	0.09	1.44
Dec-19	26	250	0.98	1.73
Jan-20	26	252	0.12	1.83

Month	Maximum Wellhead Pressure (psi)	Peak Injection Rate (gpm)	Maximum Daily Flow (MGD)	Total Monthly Flow (MG)
Feb-20	27	250	0.17	2.06
Mar-20	27	250	0.15	1.89
Apr-20	26	270	0.12	2.15
May-20	25	261	0.12	1.90
Jun-20	26	229	0.11	1.50
Jul-20	26	229	0.12	2.14
Aug-20	26	197	0.14	2.24
Sep-20	27	225	0.15	2.08

6.8.3 Treatment Objectives and Effluent Quality

The LTF uses a PACT batch tank treatment system, which combines 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. The treated leachate is sampled daily for pH, weekly for fecal coliform, TSS, and total alkalinity and monthly for TOC, TDS, BOD, COD, TN, TKN, nitrate, lead, and chlorides. In addition, treated leachate is sampled and analyzed for the Primary and Secondary Drinking Water parameters semiannually. Table 6-25 summarizes the LTF effluent quality goals prior to disposal of the treated leachate.

Table 6-25 Effluent Quality Goals

Parameter	Effluent Quality Goal
pH	6.0 – 9.5 s.u.
TSS	20 mg/L
BOD	20 mg/L
COD	Acceptable BOD/COD ratio

Note: s.u. = standard units.

A 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 over the years. However, the effluent leachate still meets acceptable final effluent standards for disposal to the 0.460-MGD deep injection well system adjacent to the treatment plant.

6.8.4 Treatment Components and Condition Assessments

Jones Edmunds conducted a site visit of the LTF on December 14, 2020, and met with William Feltus, 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 permit for the deep injection well.
- Operators' licenses.
- Facility logbook.
- Facility Standard and Emergency Operating Plans.
- MORs.
- 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 O&M 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.

6.8.4.1 LTF Influent

The influent flow is a combination of raw leachate from the landfill collection system, sanitary sewer, and 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. Since the area is remote and no wastewater collection infrastructure is provided in the vicinity, the sanitary sewer from the plant office is also treated at the LTF.

The landfill collection system contains a network of underdrains, trenches, vertical excavations, and a slurry wall to capture and contain leachate seeping through the landfill. The LTF operators are not responsible for the landfill collection system but work with the Solid Waste Operations Manager to balance the flow since LTF operators must maintain a static head differential between the water level on the inside and outside of the landfill slurry wall to keep an inward groundwater gradient across the slurry wall. This operation is completed to prevent leachate from leaving the site as required by permit. The landfill leachate combines with the plant office sanitary sewer and the landfill underdrains outside the slurry wall and enters the influent pump station.

6.8.4.2 Influent Pump Station

The overall condition of the influent pump station (PS-1) is in good condition. PS-1 is manually controlled and operated to maintain a 1-foot water level difference across the slurry wall. It has a capacity of approximately 150 gpm. Although the influent is primarily fed by the gravity-

driven network, a significant amount of storage is within the landfill collection system, which provides some operational flexibility for the LTF and can be used if PS-1 is temporarily out of service.

The influent pumps convey leachate into the 125,000-gallon influent holding tank and through the influent plant flow meter to record the daily influent leachate volumes. A high-level sensor automatically shuts-off the pump in the No. 1 Pump Station to prevent overfilling of the raw leachate tanks. At the time of the site visit, the influent holding tank had some panels that need to be replaced and were scheduled for replacement in early 2021.

6.8.4.3 PAC Treatment

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.

The PACT system uses a combination of PAC and active aerobic bacteria to simultaneously adsorb and metabolize leachate contaminants. The LTF contains three parallel treatment units each consisting of a 45,000-gallon tank, chemical feed, aeration, and pumping systems. Approximately 30,000 gallons of raw leachate are pumped from the influent storage tank into the PACT tank for chemical addition, mixing, holding, and settling. One hundred pounds of fresh PAC and 3,500 mL of phosphoric acid are added to each PACT tank. The contents are mixed by aeration for approximately 7 hours. Approximately 135 mL of polymer is added to each PACT tank to assist in settling out the carbon and biomass from the effluent. The material in the PACT tanks settles for approximately 1 hour. After settling is completed, the decant water is pumped to the filter equalization storage tank. The carbon sludge remains in each PACT tank and is reactivated when the next batch of leachate is introduced for processing. Waste sludge is removed from the PACT tanks as necessary (typically weekly) by pumping to the sludge drying beds.

The three PACT units are in good-to-poor condition. The tanks' exteriors and interiors are in good condition since they were partially

painted in FY 2017 and completed in FY 2018. Surfaces were pressure washed and rust and lost paint were removed and primed before painting was completed. The polymer feed systems and blower air intakes for the treatment trains should be replaced.

6.8.4.4 Filtration

The filter EQ tank is a glass-lined steel tank with a capacity of 107,000 gallons. The filter feed stream flows by gravity through the sand filter system and is pumped from the sand filter to the effluent storage tank. The sand filter compressor was replaced in FY 2020, but the mechanical parts of the sand filter remain in poor condition and should be replaced. No back-up is provided for the 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.

6.8.4.5 Effluent Storage and Disposal

The effluent disposal system contained a storage tank, submersible pumps, and a deep injection well. LTF effluent is stored and equalized in an effluent storage tank so that the injection well down-hole flow does not exceed 320 gpm. LTF effluent is pumped from the effluent storage tank into the injection well by two dry-pit submersible pumps. Effluent is typically 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. The deep injection well typically operates 6 days per week, but operation can be adjusted according to leachate production and effluent disposal requirements.

The effluent storage and disposal systems are in fair condition and are properly maintained to meet the facility needs. The effluent storage tank has minor degradation toward the top of the tank that needs to be repaired but remains operable. The existing 12-HP pumps were installed by CCU personnel in 2015. The pumps are operating satisfactorily and not overheating on hot summer days.

6.8.4.6 Solids Handling Facilities

The LTF has a sludge digestion tank that historically was used for solids handling but is no longer in operation. Today, waste solids (mixed carbon and biological waste sludge) are conveyed directly from the PACT tanks and allowed to dry through evaporation. The LTF contains eight 725-square-foot (approximately 5,800 square feet total) sludge drying beds. 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 use as cover on the landfill. The sludge drying beds are well maintained and sufficient drying bed area for dewatering of solids.

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

6.8.4.8 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.

6.8.5 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. Adding maintenance staff can support the efforts made by the Chief Operator to appropriately respond to unexpected events.

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.

6.8.6 MAINTENANCE

The LTF is owned by the Charlotte County Public Works – Solid Waste Division (CCPWSWD) and operated by CCU personnel. 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, which are coordinated with Public Works and completed at their discretion.

6.8.7 REVIEW OF PREVIOUS ANNUAL REPORT RECOMMENDATIONS

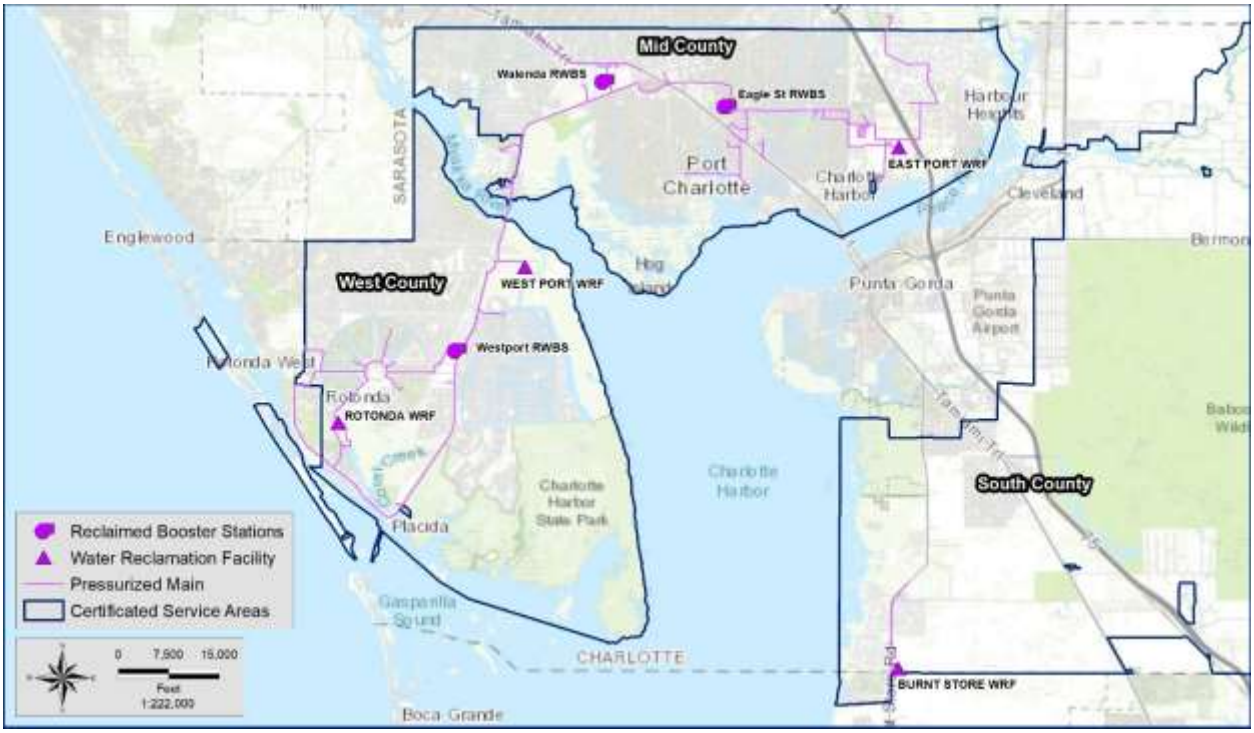
Table 6-26 LTF 2019 Recommendations and Status

Recommendation:	Evaluate adding one additional maintenance staff member to meet increasing demands and minimize overtime.
Progress:	Ongoing.
Recommendation:	Add a generator to the treatment facility to keep the plant operational during power outages.
Progress:	Currently being pursued through FEMA grants.
Recommendation:	Repair the influent holding tank.
Progress:	Scheduled for 2021.
Recommendation:	Replace the sand filter compressor.
Progress:	Completed.

7 RECLAIMED WATER DISTRIBUTION SYSTEM

One of CCU's goals is to maximize the beneficial use of reclaimed water and reduce the impact on other water resources. This Chapter presents the CCU reclaimed water distribution system components and condition assessments of those system components and reviews CCU's backflow and cross-connection prevention program. Similar to the water distribution system discussed in Chapter 4, CCU operates two reclaimed water distribution systems. The Mid/West County distribution system water is supplied public-access-quality reclaimed water from the East Port, West Port, and Rotonda WRFs and the South County reclaimed water distribution system is fed by the Burnt Store WRF. Figure 7-1 shows the County-wide reclaimed water distribution systems.

Figure 7-1 CCU Reclaimed Water Distribution Systems



At the end of FY 2020, the two systems contained approximately 84 miles of reclaimed water mains providing service to 65 reclaimed water customers in the Mid/West County distribution system and three customer accounts in the South County distribution system. The CCU reclaimed water distribution system consists of the following major components:

- Transmission mains that supply reclaimed water to bulk users and distribution mains serving pressurized customers.
- Reclaimed water booster stations (RWBSs) adjacent to GSTs for maintaining distribution system pressures.
- Lined and unlined ponds at the WRFs for reclaimed water storage during periods of reduced demand.
- Pond discharge sites that allow the operators to remotely shut off the flow of reclaimed water to bulk customers using irrigation ponds.

7.1 MID/WEST COUNTY SYSTEM

CCU's Mid/West County reclaimed water system operates under a Master Reuse Permit approved by FDEP that allows CCU to move reclaimed water from East Port WRF, West Port WRF, and Rotonda WRF to customers. The development of a Master Reuse System arose from an excess of reclaimed water 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 reclaimed water distribution systems, and the existing or potential customers were assigned to the individual WRF 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). The Mid/West County reclaimed distribution system consists of two aboveground, pre-stressed concrete GSTs with an active combined capacity of 1 MG and three RWBSs.

7.1.1 RECLAIMED WATER BOOSTER STATIONS

The Mid/West County Master Reuse System contains three active RWBSs in the Mid/West County distribution system, two of which include 0.5-MG GSTs. The booster stations are used to maintain the flow and pressure throughout the system and work in conjunction with the reclaimed pumping stations at the WRFs. Jones Edmunds staff visited the RWBSs on January 14, 2021, and describe the RWBS components and condition assessments in this section.

7.1.1.1 Eagle Street – RWBS

The Eagle Street RWBS, constructed in 2008, is approximately 5 miles west of the East Port WRF along the 16-inch reclaimed water transmission main. The station is within a fenced area in a residential neighborhood near Tamiami Trail and contains two concrete buildings and a 0.5-MG concrete GST. The GST is equipped with a level sensor to regulate volume and a check valve to allow reclaimed water to bypass the station.

The RWBS contains one 125-HP HSP and one 60-HP jockey pump. The HSP has a capacity of 1,440 gpm at 206 feet and 90 psi total dynamic head (TDH) but is currently set at 82 psi. 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 housed in a concrete building along with unused chemical feed pumps. An inline filter is downstream of the HSPs, but is currently in bypass mode.

Pump operations, flow, and pressure are monitored 24 hours per day through a County-wide SCADA telemetry system. The PLC and electrical control center are housed in a separate air-conditioned building. Operators have the ability to add sodium hypochlorite before and after the reclaimed water enters the GST, but the incoming water has sufficient chlorine residuals and is no longer needed. Therefore, CCU

is evaluating removing the chemical injection system, including chemical feed pumps and bulk storage tank, at the station.

In March 2019, the Walenda RWBS was modified to provide pressure to the reclaimed water system along US Highway 41 between Enterprise Boulevard and Cornelius Boulevard. This modification also provided additional pressure for reclaimed customers in the Eagle Street neighborhood and reduced the dependency on the Eagle Street RWBS. Now CCU staff use the Eagle Street RWBS to provide pumping and storage as needed to meet system demands.

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

- The tank was inspected in 2018.

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 grounds require constant maintenance, which is provided by a private contractor.

7.1.1.2 Walenda RWBS

The Walenda RWBS is at 17177 Walenda Avenue, Port Charlotte, approximately 4.5 miles northwest of the Eagle Street RWS. The station was constructed in 2008 and is within a proposed residential/commercial neighborhood known as Murdock Village.

The site is fenced and contains reclaimed and potable water infrastructure including reclaimed and potable water GSTs. The gates and buildings are kept locked. The reclaimed water GST has a capacity of 0.5 MG and is equipped with a level sensor and bypass check valve. The RWBS 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 and 90 psi TDH, but is currently operating at 75 psi. The jockey pump has a capacity of 577 gpm at 206 feet (90 psi) TDH. The pumps and chemical feed system are in a concrete building. An inline filter is downstream of the pumps; however, this filter mechanism is currently in bypass mode.

Pump operations, flow, and pressure are monitored 24 hours per day through a SCADA telemetry system. The PLC and electrical control center are housed in a separate air-conditioned building. Similar to the Eagle Street RWBS, operators can add sodium hypochlorite to the reclaimed water before and after the GST, but the chemical feed system is no longer required since operational changes have improved the chlorine residuals in the distribution system.

The Walenda station is available for pumping and storage but currently operates in an as-needed mode by CCU staff based on system demands. The hydraulic modeling for the reclaimed water system indicates that the Walenda station will be an essential component for meeting the future reclaimed water demands.

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

- 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 piping was painted purple and is clearly marked. Removal of the on-site chlorine injection system is being evaluated. The grounds are well maintained.

7.1.1.3 Gertrude RWBS

The Gertrude site is at 21131 Gertrude Avenue, Port Charlotte, approximately 4.6 miles northwest of the East Port WRF. The station was originally used for the potable water system but was decommissioned in 2008. CCU is currently rehabilitating the site for use as a RWBS. The site currently consists of a 0.5-MG GST and 600-square-foot concrete building. The GST was previously cleaned and lined in 2004. The addition of the station will increase the resilience of the Master Reuse System, provide operational flexibility, and provide pressure and reclaimed water storage in the surrounding area.

Condition Assessment

Two HSPs within the building will need to be evaluated and possibly replaced before placing the facility in operation. The electrical components will need to be upgraded including a new RTU and piping reconfigured to tie into the Master Reuse System. The integrity of the structures should be assessed including the roof of the building, which is in poor condition.

7.1.1.4 Rotonda Blvd East RWBS

The Rotonda Blvd East RWBS is on Rotonda Boulevard East just west of CR 771. The station was completed in FY 2014 and is an in-line RWBS that does not contain a GST. An architectural wall and chain link fence shield the station from the highway, and access gates are kept locked. The RWBS contains one 100-HP high-head HSP and two 40-HP low-head HSPs, each equipped with VFDs. The high-head pump has a capacity of 972 gpm at 200 feet TDH. The low-head pumps have a capacity of 1,045 gpm at 85 feet TDH. Pump operations, flow, and pressure can be monitored 24 hours per day through a SCADA telemetry system. The PLC and electrical control center are housed under a covered area. The station is currently not used; however, it will be necessary as the County's reclaimed water demands continue to increase in West County.

This is a complex pump station with multiple operational configurations. The RWBS was configured to allow operation in multiple modes, which include pumping from Mid County to West County, pumping from Rotonda WRF to West Port WRF, or pumping from West Port WRF to the West County customers. CCU staff are evaluating the hydraulics of this station to improve the operational configurations and settings for the RWBS.

Condition Assessment

The physical condition of the RWBS was excellent except for HSP No. 2, which was out of service, and minor pipe painting that is scheduled for FY 2021.

7.1.2 Storage

Reclaimed water storage is provided by a combination of lined and unlined storage ponds at the WRFs and GSTs in the distribution system. Table 7-1 lists the storage capacity and type for each of the reclaimed water storage sites. The ponds and tanks are filled during off-peak and low reclaimed water demand periods and then drawn from and pumped to customers as demand increases. Currently, Operations staff at the East Port WRF monitors reclaimed water levels in the ponds and GSTs through SCADA.

Table 7-1 Reclaimed Water Storage Capacity and Location

Site	Location	Storage Type	Storage Capacity (MG)
East Port WRF	Mid County	Lined Pond	95.0
West Port WRF	West County	Lined Pond	20.0
Rotonda WRF	West County	GST Unlined Pond	3.0 2.4*
Walenda RWBS	Mid County	GST	0.5
Eagle Street RWBS	Mid County	GST	0.5
		Total	121.4

*Approximately half of the capacity is currently usable.

The GSTs at the Walenda and Eagle Street sites are filled by system feed and used to maintain the distribution system pressure during peak demand. The GSTs also provide the following functions for the CCU reclaimed 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.

7.1.3 Current and Future Reclaimed Water Customers

Currently, most customers use the reclaimed water for irrigation purposes. CCU's reclaimed water customers are a combination of bulk users who receive water through pond discharges then repump as needed for irrigation and direct pressurized customers whose irrigation systems are connected to the reuse system.

West County contains nine 18-hole golf courses and residential/commercial developments that have marginal access to good freshwater irrigation sources. Currently, five golf courses and a few small reclaimed water customers are receiving reclaimed water for irrigation.

Service of reclaimed water to the remaining golf courses is limited by the amount of reclaimed water that is produced by the two WRFs in west Charlotte County, the Rotonda WRF, and the West Port WRF. The ultimate capacity of the reclaimed water system in the East Port WRF, West Port WRF, and Rotonda WRF service areas is extensive due to the number of residential developments, golf courses, and other reclaimed water demands in the area.

Table 7-2 and Table 7-3 list the agreement amounts for current and future reclaimed water users in Mid and West County, respectively. The County has signed agreements for current reclaimed water customers equaling 5.35 MGD of reuse in the Mid/West County system. The County also has identified future users who may use another 6.995 MGD of reclaimed water indicating a total demand of 12.35 MGD in Mid and West County.

Table 7-2 Current and Future Mid County Reclaimed Water Users

Reclaim Sites	Pond/ Direct	Current/ Future User	Agreement Amount (MGD)
Auto Zone – 19682 Cochran	Direct	Future	0.002
Biscayne	Direct	Future	0.099
CCCS – Sheriff's Office	Direct	Current	0.011
CCCS Parks – 1120 O'Donnell	Direct	Current	0.002
CCCS Parks – 1185 O'Donnell	Direct	Current	0.050
CCCS Parks – Franz Ross	Direct	Current	0.048
CCCS Parks – Sports Park	Pond	Current	0.250
CCPW – Harbor Blvd	Direct	Future	0.010
Charlotte Convenience (7-11)	Direct	Current	0.002
Charlotte Crossing	Direct	Current	0.005
Deep Creek Golf Club	Pond	Current	0.180
Kings Gate Golf Course	Pond	Future	0.130
Kingsway Country Club (GC)	Pond	Current	0.230
Kravin Chikin	Direct	Future	0.002
Maple Leaf Estates	Pond	Current	0.230
Marylou Homeowners Assoc.	Direct	Current	0.038
Midwestern Construction Inc.	Direct	Current	0.007
MRT Landscaping	Direct	Current	0.025
Murphy Oil USA # 7360 – Cochran	Direct	Current	0.001
Myakka RV Park	Direct	Current	0.040
Port Charlotte GC – Golf Links	Pond	Current	0.613
Redding Lawncare & Landscaping, Inc.	Direct	Current	0.002
Riverwood (CDD)	Pond	Current	1.200
Sonoma Preserve	Pond	Future	0.260
Suncoast Lakes Homeowners	Direct	Current	0.067
Sunnydell Commons II	Direct	Current	0.004
Wal-Mart # 721	Direct	Future	0.018
Waste Management	Direct	Current	0.008
West Port Project	Ponds	Future	1.500
Current Mid County Reclaimed Water Agreements			3.013
Total Mid County Reclaimed Water Agreement Amounts			5.034

Table 7-3 Current and Future West County Reclaimed Water Users

Reclaim Sites	Pond/ Direct	Current/ Future User	Agreement Amount (MGD)
Anglers Club	Direct	Future	0.020
Bel Aire	Direct	Future	0.100
Boca Vista	Direct	Current	0.008
Cape Haze Resort	Direct	Future	0.042
CCPW – 10320 Winborough	Direct	Current	0.001
CCPW – 8110 Wiltshire	Direct	Current	0.001
CCPW – 8400 Wiltshire	Direct	Current	0.001
CCPW – 9100 Winborough	Direct	Current	0.001
CCPW – Winchester/Sunset	Direct	Current	0.020
Coast Concrete	Direct	Current	0.060
Colonial Concrete	Direct	Current	0.008
Coral Caye (Placida Commons)	Direct	Current	0.095
Coral Creek Air Park	Direct	Current	0.045
Coral Creek Club	Pond	Current	0.310
Coral Creek Landings	Direct	Current	0.120
Dollar General – 322 Ingram	Direct	Current	0.002
Eagle Preserve Estates	Direct	Future	0.084
Fellowship Church	Direct	Current	0.027
Fiddlers Green	Direct	Future	0.037
Future Mixed Use	Pond	Future	1.000
Gulf Cove United Methodist Church	Direct	Current	0.012
Hacienda Del-Mar	Direct	Current	0.105
Hammocks	Direct	Future	0.060
Harbor West	Pond	Current	0.144
Hills Golf Club	Direct	Future	0.540
Lemon Bay Golf Course	Pond	Current	0.340
Meadows & Villas Conserv. Area – Robin	Direct	Current	0.002
Meadows & Villas Conserv. Area – Rot Tr	Direct	Current	0.002
Placida Bay Estates	Direct	Future	0.059
Placida Harbour	Direct	Future	0.019
Placida Pointe	Direct	Future	0.043
Preserve at Windward Condominium	Direct	Current	0.005
RGP Links Golf Club	Direct	Current	0.290
RGP Long Marsh North	Pond	Current	0.225
RGP Long Marsh South	Pond	Current	0.225
RGP Palms Golf Club	Pond	Current	0.290

Reclaim Sites	Pond/ Direct	Current/ Future User	Agreement Amount (MGD)
Rotonda Lakes	Direct	Future	0.022
Rotonda NW Golf Club	Direct	Future	0.463
Rotonda Sands	Pond	Future	1.427
Safe Cove Boat Storage	Direct	Current	0.003
South Gulf Cove	Direct	Future	0.409
Thunderation	Direct	Future	0.017
Windward Patio Homes	Direct	Current	0.250
Current West County Reclaimed Water Agreement Amount			2.340
Total West County Reclaimed Water Agreement Amount			7.314

7.1.4 Discharge Valve Stations

Many of the large reclaimed water users are golf courses and golf course communities that receive reclaimed water through pond discharge valve stations. These stations generally contain the following:

- A flow meter.
- Gate valves with motorized valve actuators.
- Pond-level indicators.
- Pressure-indicating transmitters.
- Isolation valves.
- Air-relief valves.
- Telemetry and SCADA.

A majority of the pond discharge stations include a valve with a motorized actuator that allows CCU to remotely open or close the valve via SCADA. Most of the motorized actuators also allow the valve to be partially opened to a specified percent-open setting, which throttles the reclaimed water discharge to maintain either a set flow rate or system pressure. Motorized valves without a percent-open setting only have an open or closed setpoint, which does not allow control of flow or system pressure.

The discharge ponds also include pond-level indicators to prevent too much reclaimed water from being conveyed to the ponds and leading to overflows. Some community developments such as Kingsway Country Club, Maple Leaf Golf Course, and Deep Creek Golf Club have stormwater storage lake systems (D-001, D-002, and D-003, respectively) that are also used for reclaimed water storage. These lakes contain adjustable weir gates and intermittently overflow to stormwater ditches that ultimately drain into the Peace River. Maintaining an adequate level in these lakes to avoid overflowing is a high priority for CCU staff. Table 7-4 summarizes the current pond discharge reclaimed water customers, their control valve type, and whether they are identified in the master reuse permit as a stormwater storage lake.

Table 7-4 Existing Pond Discharges

Reclaimed Water Customer	Pond Discharge Type
Central County Customers	
Riverwood CDD	Control Valve, Electronic Throttling
Port Charlotte Golf Course	Control Valve, Electronic Throttling
CC Parks Department Sports Park	Control Valve, Electronic Throttling
Maple Leaf Estates*	Manual Valve, Manual Throttling
Deep Creek Golf Club*	Control Valve, Electronic Throttling
Kingsway Country Club*	Control Valve, Electronic Throttling
West County Customers	
Lemon Bay Golf Course	Control Valve, Electronic Throttling
Coral Creek Club	Control Valve, Electronic Throttling
RGP Palms Golf Course	Control Valve, Electronic Throttling
RGP Long Marsh South	Control Valve, Electronic Throttling
RGP Long Marsh North	Control Valve, Electronic Throttling
Harbor West	Control Valve, Electronic Throttling

*Permitted stormwater storage lake system.

7.1.5 OPERATIONS

High-quality reclaimed water produced at the East Port, West Port, and Rotonda WRFs is stored in the on-site storage ponds or off-site GSTs during periods of low demand. Currently, the East Port WRF produces the most reclaimed water within the Mid and West County Master Reuse System. The East Port WRF contains two reclaimed water HSP stations, although HSP No. 2 serves as the primary pump station for conveying reclaimed water from the 95-MG storage pond to Mid and West County, and HSP No. 1 is used for plant water and as a backup to HSP No. 2. CCU attempts to maintain a minimum system pressure of 50 psi to all customers. The direct pressurized and pond customers in Mid County are primarily supplied from the East Port WRF since demand is higher in West County. The Walenda and Eagle Street RWBSs are available for reclaimed water pumping and storage and operate as needed by CCU staff based on system demands. The reclaimed water in the GSTs are recirculated to maintain water quality.

The West County portion of the master reuse system is primarily supplied by the West Port and Rotonda WRFs, but also is fed water from East Port WRF via the Master Reuse System. The West Port WRF has two lined reclaimed water storage ponds used to store reclaimed water produced during the day for distribution at night or to store excess reclaimed water during wet-weather periods. West Port WRF contains one reclaimed pump station that is used to convey flows to the Master Reuse System. Rotonda WRF has an unlined reclaimed storage pond and GST on site and operates two different reclaimed water pump stations. The reclaimed infrastructure at these WRFs are used to provide reclaimed water to pressure and the customers through the Master Reuse System and are operated together with constant communication by the operations personnel.

7.2 SOUTH COUNTY SYSTEM

The South County reclaimed water distribution system is provided reclaimed water from the Burnt Store WRF. In South County, a 3-mile-long reclaimed water transmission along Burnt Store Road serves as the primary conveyance pipe of the reclaimed water system. The transmission main was originally constructed in 2006 to serve the community Heritage Landings (previously known as Tern Bay golf course) but never received reclaimed water because the community did not develop as expected. However, three smaller users benefited from the transmission main and currently receive low-pressure reclaimed water from the Burnt Store WRF. As mentioned in Chapter 6, the reuse system is currently permitted for 2.26 MGD; however significant limitations exist for providing the flows of this quantity including reclaimed water supply, pumping capacity, and storage capacity.

Several large developments are underway or planned in South County that will significantly increase the wastewater and reclaimed water flows in the service area. In 2019, the County engaged the services of consultants McKim & Creed and Jones Edmunds to design an expansion of the Burnt Store WRF. The project will address the current pumping and storage limitations and allow CCU to connect more users to the Burnt Store reclaimed water distribution system.

7.2.1 RECLAIMED WATER BOOSTER STATIONS

The South County reclaimed water distribution system does not currently contain any RWBS; rather, the pump capacity is provided solely from the Burnt Store WRF reclaimed water pump station. The station contains two constant-speed high-service pumps with a capacity of 900 gpm each. The reclaimed water pumps discharge into a 3-mile-long 12-inch reclaimed water transmission main that conveys reclaimed water to customers that have their own storage ponds and HSPs to pressurize water for irrigation.

7.2.2 STORAGE

The South County reclaimed water distribution system has limited storage since no storage exists within the distribution system and the storage at the WRF is limited to the clearwell underneath the reclaimed water pump station.

7.2.3 CURRENT AND FUTURE RECLAIMED WATER CUSTOMERS

Currently, three reclaimed water customers are in South County and use a small amount of reclaimed water for drip irrigation of landscaping along the development entranceways and common areas. CCU is pursuing other potential bulk reclaimed water users, such as golf courses, that have expressed interest in using reclaimed water in irrigation storage ponds, like the Mid/West County system. Table 7-5 lists the current and potential future major reclaimed water users within the Burnt Store WRF service area. The current and future reclaimed water users do not have signed agreements with CCU but indicate that future demands could exceed 7 MGD.

Table 7-5 South County Current and Potential Future Reclaimed Water Users

Reclaim Sites	Pond / Direct	Current/ Future User	Reclaimed Amount (MGD)
Burnt Store Lakes	Direct	Current	0.05
Burnt Store Colony	Direct	Current	TBD
Burnt Store Villages	Direct	Current	TBD
Tiny Home Division	Direct	Future	TBD
Burnt Store Marina & Golf Course	Pond	Future	2.0
Heritage Landings Golf & Country Club	Pond	Future	2.5
Heritage Landing Area	TBD	Future	1.95
Seminole Lakes Golf & Country Club	Pond	Future	0.5
Tranquility Lake RV Resort	TBD	Future	0.07
Total Current and Future Reclaimed Water Amount			7.07

7.2.4 Discharge Valve Stations

Currently, no pond discharge valve stations are in the South County reclaimed water distribution system.

7.2.5 Operations

The WRF's pump station is used to convey reclaimed water from the Burnt Store WTF to the 3-mile-long 12-inch reclaimed water transmission main along Burnt Store Road. The system is operated at relatively low pressure and users are currently responsible for boosting pressure to supply their systems with in-line pumps.

As with the Mid/West County distribution system, forecasting and CIP planning are also conducted for the South County system. The Burnt Store WRF operators are currently responsible for maintaining the reclaimed components since the vertical infrastructure components are on site. As the system continues to expand, the Reclaimed Water Distribution workgroup will be responsible for maintaining the South County system.

7.3 Maintenance

The reclaimed water distribution system is inspected and monitored daily to meet FDEP requirements. Monthly inspections highlight the distribution equipment that may need repair, calibration, or replacement. An important element of the program is that reclaimed water sites are inspected yearly for possible cross-connections. The Backflow and Reclaimed Services staff coordinate with reclaimed water customers to keep them updated on the reclaimed water supply, inform them of operational problems, and provide information and guidance regarding FDEP and SWFWMD rules and regulations. The workgroup is also involved in documentation, inspection, and minor repairs of the reclaimed water 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 is being 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 2020 Program statistics:

- Hydrant Meters Repairs/Tests: 17
- Cross-Connections Inspected: 3,933
- Charlotte County Backflow Tests: 231
- Potential Cross-Connections Corrected: 0

7.5 Review of Previous Annual Report Recommendations

Table 7-6 through Table 7-8 summarize the recommendations and status from the 2019 Annual Reports for the Mid/West and South County distribution systems, respectively.

Table 7-6 Mid/West County Reclaimed Water Distribution System 2019 Recommendations and Status

Recommendation:	Develop a comprehensive operating protocol for the Master Reuse System to provide a reliable source of reclaimed water to the CCU customer base.
Progress:	Ongoing. The reclaimed water model has been updated and analyses are being performed for operational and capital improvements.
Recommendation:	Install throttling control valves at all current major users with pond discharges in the Mid and West County areas.
Progress:	In progress.
Recommendation:	Evaluate adding another GST to provide storage in West County due to the large number of reclaimed water users.
Progress:	Not accomplished, but feasibility analyses are ongoing.
Recommendation:	Evaluate installing a motorized valve assembly in the easement on Cattle Dock Point Road east of SR 776 to provide operational flexibility from West Port WRF.
Progress:	In progress.
Recommendation:	Installation of a pressure-reducing valve (PRV) near the intersection of Cape Haze Drive and Westwind Drive as part of the Cape Haze Road Reclaimed Water project to allow Rotonda Pump Station No. 2 to continue supplying pressure to the area and to send excess flow to the Placida Road Corridor reclaimed water users.
Progress:	In progress.
Recommendation:	Install certified staff gauges for pond water surface elevations for all pond discharges to allow valve controls and level indicators to be accurately adjusted.
Progress:	Ongoing.

Recommendation:	Install elevation sensors on the weirs at Deep Creek, Kingsway, and Maple Leaf to alert CCU via SCADA when the discharge weir is adjusted.
Progress:	Completed.
Recommendation:	Evaluate adding piping connections (including controls, pumps, valves, meters, etc.) to increase the number of reclaimed water small users in Mid County.
Progress:	Ongoing.
Recommendation:	Evaluate adding another GST to provide storage in West County due to the large number of reclaimed water bulk users.
Progress:	Not accomplished, but feasibility analyses are ongoing.
Recommendation:	Upgrade the pump stations to contain pumps with a design point of 335 gpm at 60 psi (139 feet of head) and operate on VFDs to maintain the setpoint. This upgrade will allow the West Port WRF to contribute to meeting reclaimed water user demands (flows) with increased pressures.
Progress:	To be evaluated as part of the reuse master plan.
Recommendation:	Evaluate adding piping connections (including controls, pumps, valves, meters, etc.) to increase the number of small reclaimed water users in Mid County.
Progress:	Ongoing.

Table 7-7 South County Reclaimed Water Distribution System 2019 Recommendations

Recommendation:	Study the feasibility of increasing pumping capacity and creating reclaimed water storage at the Burnt Store WRF as the growth in the area dictates.
Progress:	Ongoing. The Burnt Store WRF is currently under expansion plans that include the addition of a HSPS and reclaimed water storage.
Recommendation:	Acquire one large reclaimed water customer in the South County service area as part of the facility expansion and addition of reclaimed water storage.
Progress:	Ongoing. A pipeline is being constructed to serve Burnt Store Marina.
Recommendation:	Evaluate the treatment capacity against the future demands associated with rapid development in the area and saltwater intrusion in existing private wells.
Progress:	Ongoing. A design project to expand the treatment capacity in the Burnt Store WRF was initiated in 2019.

Table 7-8 Backflow and Cross-Connection Prevention Program 2019 Recommendations

Recommendation:	Complete implementation of an asset management program, such as *Cityworks*, as a tool to track cross-connection inspections.
Progress:	Ongoing.

8 ENGINEERING

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

8.1 CAPITAL IMPROVEMENT PROGRAM

The CIP is designed to plan and construct improvements to the CCU water, wastewater, and reclaimed water 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 2020. 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 2020. The total FY 2020 budget was $10,141,000 and the total expenditure was $2,175,000. The largest expenditure was the installation of the Ingraham 24-inch water main.

Table 8-1 Water System CIP Projects in Progress or Initiated in FY 2020 ($ in Thousands)

Description	Funding Source[1]	Original FY 2020 Budget	2020 Expenditures	Percent of Budget Expended
New Water Distribution Ext Piping	L.E.	$ —	$2	0%
Water Distribution Pipe Replacement	R & R	$ —	$ —	0%
Ingraham Potable Water	Conn-Wtr	$423	$113	27%
Ingraham Potable Water	SRF	$3,367	$ —	0%
Hillsborough Potable Water Transmission	Conn-Wtr	$150	$160	0%
Potable Water Master Plan	Oper	$ —	$202	0%
Major Water Transmission Lines	Conn-Wtr	$881	$282	32%
Major Water Transmission Lines	R & R	$48	$1	2%
Myakka River 24" Water Main	Conn-Wtr	$3,091	$ —	0%
Myakka River 24" Water Main	SRF Pending	$ —	$ —	0%
Myakka Potable WBS	SRF	$1,586	$ —	0%
Myakka Potable WBS	Conn-Wtr	$595	$1,415	238%
Totals		$10,141	$2,175	21%

[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 2020. The total wastewater budget allotted for FY 2020 was $83,961,000 and the total amount spent was $10,585,000.

Table 8-2 Wastewater System CIP Projects in Progress or Initiated in FY 2020 ($ in Thousands)

Description	Funding Source	Original FY 2020 Budget	2020 Expenditures	Percent of Budget Expended
Wastewater Force Mains	Oper	$ —	$ —	0%
Wastewater Force Mains	Conn-Swr	$444	$ —	0%
Spring Lake MSBU WW Expansion	Oper	$ —	$13	0%
Spring Lake MSBU WW Expansion	Grants	$ —	$ —	0%
Spring Lake MSBU WW Expansion	SRF	$ —	$ —	0%
Spring Lake MSBU WW Expansion	MSBU	$ —	$30	0%
Wastewater Collections Infrastructure	L.E.	$ —	$36	0%
Wastewater Force Main Replacement – Deep Creek	R & R	$935	$81	9%
Wastewater Force Main Replacement – Deep Creek	Conn-Swr	$-	$122	0%
Wastewater Force Main Replacement – Deep Creek	SRF	$1,514	$ —	0%
Wastewater Force Main Replacement – Deep Creek	SRF Pending	$1,620	$ —	0%
Master Lift Stations	Conn-Swr	$1,338	$159	12%
Grand Master LS - Loveland Blvd	U.C.P.F	$1,625	$434	27%
Grand Master LS – Loveland Blvd	Conn-Swr	$206	$ —	0%
Grand Master LS – Loveland Blvd	SRF	$10,917	$-	0%
Burnt Store Phase 2	Conn-Wtr	$27	$26	96%
Burnt Store Phase 2	Conn-Swr	$35	$8	23%
Burnt Store Phase 2	R & R	$22	$6	27%
Burnt Store Phase 2	U.C.P.F	$3,000	$2,260	75%
Charlotte Harbor Water Quality Initiative Ph 2 – El Jobean	BP	$3,895	$1,495	38%

Description	Funding Source	Original FY 2020 Budget	2020 Expenditures	Percent of Budget Expended
Charlotte Harbor Water Quality Initiative Ph 2 – El Jobean	Grants	$1,451	$ —	0%
Charlotte Harbor Water Quality Initiative Ph 2 – El Jobean	SRF	$3,760	$ —	0%
Charlotte Harbor Water Quality Initiative Ph 2 – El Jobean	MSBU	$ —	$1,059	0%
Burnt Store WRF Expansion	Conn-Swr	$ —	$235	0%
Burnt Store WRF Expansion	Pending SRF	$4,200	$ —	0%
East Port WRF Expansion	Pending SRF	$30,120	$ —	0%
East Port WRF Expansion	Conn-Swr	$ —	$294	0%
Cape Haze Sewer & Reclaim Transmission	Conn-Swr	$ —	$9	0%
Cape Haze Sewer & Reclaim Transmission	R & R	$2,100	$900	0%
East Port WRF Reclaimed Pond Aeration	Oper	$ —	$241	0%
Water Transmission/Wastewater Collection Reimbursement	Conn-Wtr	$1,000	$38	4%
Water Transmission/Wastewater Collection Reimbursement	Conn-Swr	$2,000	$198	10%
CCU Business Services Customer Software	Oper	$851	$49	6%
Midway Phase 3	D.P.	$ —	$ —	0%
09-0011 - Sewer - Edgewater Phase 2	D.P.	$ —	$ —	0%
Parkside Harbor – US 41 To Olean	U.C.P.F	$783	$(16)	-2%
Parkside Gertrude Ave and Aaron St Imp	U.C.P.F	$3,629	$1,757	48%
Parkside Olean Blvd (US 41 to Easy) Imp	U.C.P.F	$2,441	$ —	0%
Central County Infrastructure	Conn-Swr	$ —	$44	0%
Central County Infrastructure	SRF	$ —	$ —	0%
Central County Infrastructure	R & R	$ —	$51	0%
Central County Infrastructure	Oper	$ —	$3	0%

Description	Funding Source	Original FY 2020 Budget	2020 Expenditures	Percent of Budget Expended
CHWQ - Countryman & Ackerman	Oper	$211	$318	151%
CHWQ – Countryman & Ackerman	SRF	$1,123	$28	2%
CHWQ – Countryman & Ackerman	R & R	$ —	$1	0%
Equipment Additions for Utilities	Oper	$ —	$ —	0%
UW 41 Southbound Utility Improvements	R & R	$3,855	$ —	0%
Relocation Needs Utility Pipe Replace	R & R	$ —	$52	0%
SCADA System Upgrades	Oper	$ —	$94	0%
Water & Sewer Waterway Crossings	R & R	$379	$559	147%
Water & Sewer Waterway Crossings	Conn-Wtr	$240	$1	0%
Water & Sewer Waterway Crossings	Conn-Swr	$240	$ —	0%
	TOTAL	$83,961	$10,585	13%

[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 reclaimed water system CIP projects initiated or in progress during FY 2020. The total amount budgeted for FY 2020 was $1,805,000, and $346,000 was expended.

Table 8-3 Reclaimed Water System CIP Projects in Progress or Initiated in FY 2020 ($ in Thousands)

Description	Funding Source	Original FY 2020 Budget	2020 Expenditures	Percent of Budget Expended
Reclaimed Water Lines	Conn-Swr	$1,034	$ —	0%
Reclaimed Water Lines	R & R	$ —	$ —	0%
Reclaimed Water Service Connections County Facilities	Conn-Swr	$771	$ —	0%
Reclaimed Water Expansion Phase 3	Conn-Swr	$ —	$1	0%

Description	Funding Source	Original FY 2020 Budget	2020 Expenditures	Percent of Budget Expended
Reclaimed Water Expansion Phase 3	R & R	$ —	$345	0%
Reclaimed Water Expansion Phase 3	Grant	$ —	$ —	0%
Reclaimed Water Expansion Phase 3	SRF	$ —	$ —	0%
	TOTAL	$1,805	$346	19%

[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; SRF = State Revolving Fund.

8.1.4 CIP – 5-YEAR PLAN

CCU develops and maintains a 5-year CIP to plan for the growth in Charlotte County. CCU also maintains a 20-year capital needs assessment project list developed as part of their master plans. Table 8-4 summarizes projects included in CCU's 5-year CIP for the water, wastewater, and reclaimed water systems.

Table 8-4 Capital Improvement Program – 2020 and Future CCU Project Costs ($ in Thousands)

Project Names	Prior Years Actual	Actual FY 2020	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	FY 2026	Future Years	Total
Potable Water Line Extensions	$2,069	$2	$ —	$ —	$ —	$ —	$ —	$ —	$ —	$2,071
Water Distribution Piping Line Extension	$1	$ —	$500	$500	$500	$500	$-	$-	$5,700	$7,701
Ingraham Potable Water Booster Station	$3,697	$113	$ —	$ —	$ —	$ —	$ —	$ —	$ —	$3,810
Hillsborough Potable Water Transmission	$1	$160	$ —	$ —	$ —	$ —	$ —	$ —	$ —	$161
Potable Water Master Plan	$ —	$202	$ —	$ —	$ —	$ —	$ —	$ —	$ —	$202
Major Water Transmission Lines	$7,728	$282	$225	$250	$250	$250	$ —	$ —	$4,000	$12,985
Wastewater Force Mains Expansionary	$4,618	$-	$250	$250	$250	$250	$ —	$ —	$3,750	$9,368
Reclaimed Water Lines	$516	$-	$150	$150	$150	$150	$ —	$ —	$2,100	$3,216
Spring Lake MSBU Wastewater Expansion	$17,131	$43	$152	$144	$136	$129	$ —	$ —	$921	$18,656
Wastewater Line Extensions	$1,889	$36	$ —	$ —	$ —	$ —	$ —	$ —	$ —	$1,925
Wastewater Force Mains Replacement – Deep Creek	$2,603	$203	$ —	$ —	$ —	$ —	$ —	$ —	$ —	$2,806
Master Lift Stations	$270	$159	$250	$250	$250	$250	$-	$-	$3,750	$5,179
Reclaimed Connections for County Facilities	$-	$-	$ —	$ —	$ —	$ —	$ —	$ —	$ —	$ —
Reclaim Water Expansion Phase 3	$4,282	$346	$ —	$ —	$ —	$ —	$ —	$ —	$ —	$4,628
Grand Master Lift Station & Gravity Interceptor – Loveland	$12,127	$434	$ —	$ —	$ —	$ —	$ —	$ —	$ —	$12,561

Project Names	Prior Years Actual	Actual FY 2020	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	FY 2026	Future Years	Total
Myakka River 24-inch Water Main	$ —	$ —	$ —	$ —	$ —	$ —	$ —	$ —	$ —	$ —
Myakka Potable Water Booster Station	$1,612	$1,415	$ —	$ —	$ —	$ —	$ —	$ —	$ —	$3,027
Burnt Store Phase 2	$440	$2,300	$ —	$ —	$ —	$ —	$ —	$ —	$ —	$2,740
Charlotte Harbor Water Quality Initiative Phase 2 – EL Jobean	$731	$2,554	$ —	$ —	$ —	$ —	$ —	$ —	$ —	$3,285
Burnt Store WRF Expansion	$25	$235	$ —	$ —	$ —	$ —	$ —	$ —	$ —	$260
East Port WRF Expansion	$41	$294	$ —	$ —	$ —	$ —	$ —	$ —	$ —	$335
Cape Haze Sewer & Reclaim Transmission	$1	$909	$ —	$ —	$ —	$ —	$ —	$ —	$ —	$910
East Port WRF Reclaimed Pond Aeration	$ —	$ —	$ —	$ —	$ —	$ —	$ —	$ —	$ —	$241
Water Transmission/ Wastewater Collection Reimb.	$231	$236	$1,000	$1,000	$1,000	$1,000	$1,000	$ —	$7,000	$12,467
CCU Business Services Customer Billing and Database	$1,482	$49	$-	$800	$800	$800	$ —	$ —	$4,000	$7,931
Midway Phase 3	$8,315	$ —	$ —	$ —	$ —	$ —	$ —	$ —	$ —	$8,315
Edgewater Phase 2	$329	$ —	$ —	$ —	$ —	$ —	$ —	$ —	$ —	$329
Parkside – Harbor Blvd – US 41 to Olean Improvements	$686	$(16)	$ —	$ —	$ —	$ —	$ —	$ —	$ —	$670
Parkside – Gertrude and Aaron Street Improvements	$114	$1,757	$ —	$ —	$ —	$ —	$ —	$ —	$ —	$1,871

Project Names	Prior Years Actual	Actual FY 2020	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	FY 2026	Future Years	Total
Parkside – Olean Blvd (US 41 to Easy) Improvements	$ —	$ —	$ —	$ —	$ —	$ —	$ —	$ —	$ —	$ —
Central County Infrastructure	$8,256	$98	$ —	$ —	$ —	$ —	$ —	$ —	$ —	$8,354
Charlotte Harbor Water Quality Initiative Phase 2 – Countryman & Ackerman	$833	$347	$ —	$ —	$ —	$ —	$ —	$ —	$ —	$1,180
Utility Equipment Replacements	$193	$ —	$ —	$ —	$ —	$ —	$ —	$ —	$ —	$193
Utility Improvements US 41 – SB Enterprise to Midway	$ —	$ —	$ —	$ —	$ —	$ —	$ —	$ —	$ —	$ —
Relocation Needs Utility Pipe Replace	$ —	$52	$ —	$ —	$ —	$ —	$ —	$ —	$ —	$52
SCADA System Upgrades	$ —	$94	$ —	$ —	$ —	$ —	$ —	$ —	$ —	$94
Waterway Crossings for Public Works(Water & Sewer)	$4,121	$560	$120	$120	$120	$120	$ —	$ —	$2,340	$7,501
TOTALS	$84,342	$13,105	$2,647	$3,464	$3,456	$3,449	$1,000	$-	$33,561	$145,024

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 2020. Prior year reports and annual reoccurring reports are also included for reference.

8.2.1 Reports Completed in FY 2020

- Facilities Quarterly Reports, Stantec, 2020 – The quarterly update reports are based on DMRs and flow information provided to Stantec monthly. The quarterly report highlights upcoming permit requirements and includes a completion schedule for required permit tasks.
- Manchester Waterway Boat Lock Removal Plan Annual Report – CCU completed an annual compliance report on the status of sewer connections in the Alligator Drainage Basin area to satisfy a Net Ecosystem Benefit requirement in accordance with FDEP Permit No. 08-0210682-001.
- Charlotte County Utilities Department 2019 Annual Report, Jones Edmunds, March 2020 – The annual report is conducted to provide the public with a utilities status update and to fulfill Revenue Bonds requirements for CCU.
- Charlotte County Utilities SCADA Master Plan – McKim & Creed, March 2020 – The primary goal of this plan is to define and document a road map for the implementation of the technology, practices, and organization required to meet CCU's short-term goals and long-term vision for SCADA.
- Water Systems Risk and Resilience Assessment, Jones Edmunds, March 2020 – An RRA was completed on the utilities water systems in fulfillment of AWIA which must be completed every 5 years.
- Charlotte County Utilities Emergency Response Plan, Jones Edmunds, September 2020 – CCU's ERP was updated to reflect the findings of the RRA and to fulfill AWIA requirements.
- Charlotte County Cyber Security Audit (2020) – In December 2020, McKim & Creed, in association with CrimsonResolve, completed the first cybersecurity audit of the Charlotte County SCADA system. The report assessed the County's cybersecurity components to fulfill AWIA requirements.
- East Port WRF IW-2 Operating Permit Renewal Application, Stantec, January 2020. – The report and application renewal were prepared to continue operations of the East Port IW.
- East Port WRF IW-2 Mechanical Integrity Test Report, Stantec, July 2020. – The MIT test and report were prepared to fulfill the FDEP UIC permit requirements, which must be completed every 5 years.
- West Port WRF IW-1 Operating Permit Renewal Application, Stantec, January 2020.
- West Port WRF IW-1 Mechanical Integrity Test Report, Stantec, June 2020.

8.2.2 Reports Completed in FY 2019

- Facilities Quarterly Reports, Stantec, 2019.
- Charlotte County Utilities Department 2018 Annual Report

8.2.3 Reports Completed in FY 2018

- Capacity Analysis Report – Burnt Store WRF
- Charlotte County Utilities Department 2017 Annual Report

9 CONSOLIDATED RECOMMENDATIONS

9.1 PLANNING RECOMMENDATIONS

The following tables summarize the Planning Recommendations from the FY 2020 annual report. The recommendations have been compiled from each chapter and summarized for each CCU workgroup.

9.1.1 ADMINISTRATIVE

Table 9-1 Administration Planning Recommendations

Recommendation:	Continue CCU's vision to ensure safe, reliable utility services 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 reclaimed water 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.
Recommendation:	Conduct a security assessment and update the security protocol plan.[1]
Recommendation:	Verify that Murdock Building meets Category 3 or higher building standards.[1]
Recommendation:	Develop/update the Business Continuity Plan (BCP).[1]
Recommendation:	Become a member of an intrastate mutual aid and assistance program.[1]
Recommendation:	Implement certain permissions/restrictions for accessing the CCU GIS data such as allowing Consultants and Contractors temporary access to the data while working for CCU on each project.[1]
Recommendation:	Recommend that USB port slots be removed from select desktops to limit the vulnerability of the SCADA system.[1]
Recommendation:	Develop a cybersecurity culture through training and internal programs.[1]
Recommendation:	Require equipment vendors for HMI, field controllers, field devices, etc., and software suppliers for data management to provide information on cybersecurity and updates for their products.[1]
Recommendation:	Weigh the options for automation in future designs to consider cyber threats and include manual components where applicable to increase infrastructure resilience.[1]
Recommendation:	Develop training on operational responses including conducting 'table-top' exercises regularly and evaluating performance on malevolent events and emergency response. Include exercises with local water utilities and local law enforcement to test contingency.[1]

[1] Recommendation from RRA Report (March 2020).

9.1.2 Water Treatment Plants

Table 9-2 Water System Planning Recommendations

Recommendation:	Update SOP for chemical deliveries and require chain of custody forms and verification system for proper chemical delivery.[1]
Recommendation:	Develop a wildfire ERP, identify fire hydrant locations, and coordinate with Fire Department for trainings for critical assets.[1]
Recommendation:	Update the ERP for pipe failure for all critical assets.[1]
Recommendation:	Identify a backup chemical and fuel supplier in the event of a chemical or fuel shortage.[1]
Recommendation:	Develop an ERP for operating without the support of SCADA.[1]
Recommendation:	Develop a procedure and obtain the equipment for transporting key chemicals (fuel and chlorine) from one site to another if required in an emergency.[1]
Recommendation:	Link contamination detection to SCADA to immediately shut down or lockout any pump in operation.[1]
Recommendation:	Develop an operating protocol for disinfection system conversion once an interconnect is constructed with a neighboring system using chloramine.

[1] Recommendation from RRA Report (March 2020).

9.1.3 Water Distribution System

Recommendation:	Continue to update the water system hydraulic 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 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 2020.
Recommendation:	Identify options to increase resilience of the South County system considering interconnects with neighboring utilities such as the City of Punta Gorda or Lee County and investigate alternative water supplies.[1]
Recommendation:	Identify options to increase resilience of the West County water supply (consider redundant water mains or capped wells).[1]
Recommendation:	Develop water quality models for each of their distribution systems.[1]
Recommendation:	Create a water system O&M Manual and operating protocols.

[1] Recommendation from RRA Report (March 2020).

9.1.4 WASTEWATER COLLECTION SYSTEM

Table 9-3 Wastewater Collection System Planning Recommendations

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 construction and plan for the next phases of sewer expansion in the Port Charlotte area in accordance with the 2017 Sewer Master Plan.
Recommendation:	Install odor-control systems at lift stations where hydrogen sulfide concentrations cause odors and deteriorate structures.
Recommendation:	Use the CCU hydraulic model to evaluate updating the pumps to a lower-head pump selection to avoid future run-out condition, specifically for Lift Stations 9, 18, 27, 28, 59, 64, 65, 88, 93, and 122.
Recommendation:	Use the CCU hydraulic model to evaluate updating the pump to a higher-head pump to avoid deadheading after the RTS and GMLS construction, specifically for Lift Stations 6, 17, and 77.
Recommendations:	<u>Master Lift Station No. 65 – South Port</u> ▪ Evaluate updating the pumps to a lower-head pump selection to avoid future run-out condition. ▪ Evaluate generator control elevations to conform to code. ▪ Evaluate the use of a chopper pump or grinder station to reduce ragging, if necessary.
Recommendations:	<u>Master Lift Station No. 83 – Maple Leaf</u> ▪ Evaluate the security of the site including adding barbed wire to the fence. ▪ Evaluate on-site odor control and consider upgrading unit or evaluating simplistic HIVENT unit, if appropriate.
Recommendations:	<u>Lift Station No. 27 – McGrissor</u> ▪ Evaluate proprietary access to the pump wetwell. ▪ Evaluate modifying the valve vault grouting for proper drainage.
Recommendations:	<u>Lift Station No. 28 – Peachlove</u> ▪ Evaluate replacing pump rails with single, continuous rails that reach the access hatch when pumps are replaced. ▪ Evaluate re-lining the wetwell or specifically address the exposed penetrations and seams.

Recommendations:	Lift Station No. 55 – Meadow Park ▪ Evaluate odor control or simplistic HIVENT system for lift station site. ▪ Evaluate whether the odor is a pump issue, including whether a pump seal might have blown. ▪ Evaluate implementing a surge-protection device on the main breaker.
Recommendations:	Lift Station No. 59 (Vacuum Station) – Skylark ▪ Evaluate modifying the overhead crane with a trolley for lateral movement. ▪ Evaluate a catwalk or dedicated ladder for accessing the top of the tank for maintenance. ▪ Evaluate a portable hoist or dedicated overhead crane for easier access to the vacuum pumps.
Recommendations:	Lift Station No. 64 – Sandhill Pines ▪ Evaluate installing additional driveway between the apron at the road and the lift station. ▪ Evaluate whether a smaller impeller diameter might be worth considering while the flow demands are still low.
Recommendations:	Lift Station No. 303 – Constantine ▪ Evaluate installing a secondary standby pump.
Recommendations:	Continue working towards an operational CMOM program.

9.1.5 WASTEWATER TREATMENT FACILITIES

Table 9-4 WRF Planning Recommendations

Recommendation:	Evaluate the need for technical support from the software company or from the County's IT group with hours set aside to work exclusively on data transfer and report set-up and implementation to expand and optimize the LIMS capabilities.
Recommendation:	The EPLAB has taken on additional field sampling and sample courier service responsibilities in 2020. With the additional services, staffing requirements may need to be evaluated so that laboratory analysis services are not negatively impacted by work hours spent performing field sampling and/or courier services.
Recommendation:	Evaluate cost-effective disposal alternatives for dewatered biosolids other than transporting to Synagro and the landfill as part of the plant upgrade.
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 the headworks.
Recommendation:	Complete the design of the East Port WRF expansion project, and proceed to construction to address increased wastewater flows.
Recommendation:	Apply for the permit renewal for IW-1 at the East Port WRF.
Recommendation:	Prepare a Facilities Master Plan to assess and prioritize CIPs for the West Port and Rotonda WRFs based on future planning.

Recommendation:	Prepare a study to evaluate adding a flow EQ tank or installing VFDs on the major lift station contributors to improve plant operations and manage peak flows and flow surges at the West Port WRF.
Recommendation:	Evaluate a DO or ORP control system to replace the pH-control approach currently used in the aeration basins at the West Port WRF.
Recommendation:	Evaluate different aeration systems for the reclaimed water storage pond at the Rotonda WRF.
Recommendation:	Evaluate ASR for additional reclaimed water storage at the Rotonda WRF.
Recommendation:	Continue the design of the Burnt Store WRF expansion project and proceed with construction to address increased wastewater flows.
Recommendation:	Evaluate adding an additional maintenance staff member to meet increasing demands and minimize overtime at the LTF.
Recommendation:	Create O&M Manuals for each plant based on EPA criteria.

9.1.6 Reclaimed Water Distribution System

Table 9-5 Reclaimed Water System Planning Recommendations

Recommendation:	Prepare a hydraulic model to predict the impact of future demand on the South County reclaimed water transmission system.
Recommendation:	Evaluate adding another GST to provide storage in West County due to the large number of bulk reclaimed water users.
Recommendation:	Evaluate adding piping connections (including controls, pumps, valves, meters, etc.) to increase the number of small users in Mid County.
Recommendation:	Seek ways to increase the use of reclaimed water currently produced by CCU WRFs including improving reliability and access for customers.
Recommendation:	Complete implementation of an asset management program, such as CityWorks, as a tool to track cross-connection inspections.
Recommendation:	Create a reclaimed water system O&M Manual and operating protocols.

9.2 Capital Improvements

The following tables summarize the CIPs that were identified and recommended during the FY 2020 condition assessments. Capital improvement recommendations refer to items that are expected to exceed $100,000 to accomplish. The recommendations have been compiled from each chapter and are summarized for each CCU Workgroup.

9.2.1 Administrative Buildings

Table 9-6 East Port Environmental Campus - CIP Recommendations

Recommendation:	Install full-coverage bulletproof glass in the customer service and payment center.[1]
Recommendation:	Install a keypad access gate to separate the Administration Building from the Operations Service Center area.[1]

[1] Recommendation from RRA Report (March 2020).

9.2.2 WATER TREATMENT PLANTS

Table 9-7 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.
Recommendation:	Install a secondary site access gate in the event that the main access gate roadway is inaccessible.[1]

[1] Recommendation from RRA Report (March 2020).

9.2.3 WATER DISTRIBUTION SYSTEM

Table 9-8 Mid/West County Distribution System – CIP Recommendations

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:	River Crossings ▪ Install redundant water main across the Myakka River.[1] ▪ Install the Myakka WBS along SR 776 to increase the quantity of water that can be conveyed to West County from the SR 776 transmission main (in-progress).[1]
Recommendations:	Port Charlotte Golf Course WBS ▪ Evaluate the generator at the Port Charlotte Golf Course WBS to verify that 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 maintain reliable operation of the station. ▪ Upgrade chain link fencing as installed at other WBSs.[1]

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.[1] ▪ 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. ▪ Increase the size of the fuel tank to hold additional fuel.
Recommendations:	Rotonda WBS ▪ Conduct further analysis of the ATS based on the degradation of the enclosure to verify that it is functioning properly. ▪ 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.

[1] Recommendation from RRA Report (March 2020).

Table 9-9 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.
Recommendation:	Investigate the feasibility of installing interconnects with neighboring utilities.[1]

[1] Recommendation from RRA Report (March 2020).

9.2.4 Wastewater Collection System

Table 9-10 Wastewater Collection System – CIP Recommendations

Recommendations:	Lift Station No. 3 – Gardner ▪ Evaluate possibilities for using adjacent land to convert the station to a submersible station.
Recommendations:	Lift Station No. 9 – Church ▪ Evaluate possible options for converting the station to submersible; otherwise evaluate concrete repair and restoration for the site.

9.2.5 WASTEWATER TREATMENT FACILITIES

Table 9-11 EPLAB – CIP Recommendations

Recommendation:	Evaluate staffing requirements and ability to provide additional sampling support to Operations staff.
Recommendation:	Evaluate hiring IT support that can work exclusively on the set-up and implementation of the LIMS or purchase a service package from the vendor to do the set-up of laboratory-specific forms and reports with remote installation.

Table 9-12 East Port WRF – CIP Recommendations

Recommendation:	Replace the irrigation pumping station electrical switchgear.
Recommendation:	Complete the 9.0-MGD WRF expansion and size the new headworks facility for the 12-MGD expansion.
Recommendation:	Provide influent EQ tank by retrofitting 1.48-MG tank.
Recommendation:	Replace and relocate the septage-receiving stations and pump septage into the EQ tank.
Recommendation:	Convey Digester Decant, In-Plant Pump Station No. 1, and No. 2 Plant Recycle flows into EQ Tank.
Recommendation:	Provide two additional clarifiers for 9-MGD expansion.
Recommendation:	Replace reclaimed water automated back-washable filters and include permanent bypass line.
Recommendation:	Provide fixed panels over the effluent filter frames.
Recommendation:	Provide a fixed-panel cover over the CCC.
Recommendation:	Provide additional storage for the aerobic sludge holding tank.
Recommendation:	Provide additional sludge dewatering unit(s).

Table 9-13 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 wetwell for the injection well pumps to allow disposal of excess reclaimed water from West Port during wet-weather events.
Recommendation:	Finish replacement of Rotary Screen Nos. 1, 2, 3, and 4.
Recommendation:	Finish replacement of the electrical panel of Rotary Screen No. 4.
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:	Complete the 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 blowers unable to properly operate when energized by the generators. This study can support the efforts made by the County to identify reserve capacities and potential anomalies that may affect long-term maintenance and serviceability of the equipment.

Table 9-14 Rotonda WRF – CIP Recommendations

Recommendation:	Complete the replacement of the two main influent valves at the headworks due to corrosion.
Recommendation:	Install a manually operated slide gate for each influent valve for isolation.
Recommendation:	Replace the grit cyclones of the headworks.
Recommendation:	Add an MBR cassette to existing trains as capacity needs dictate.
Recommendation:	Add galvanized metal frame and UV shade cloth to the CCCs.
Recommendation:	Add a canopy over the chlorine storage tanks to protect from direct sun light.
Recommendation:	Add a small winch to each decant pump in the sludge-holding tanks for better control of the pump level.
Recommendation:	Complete installation of the reclaimed water pipe to the Cape Haze Golf Course and to the Placida Corridor.

Table 9-15 Burnt Store WRF – CIP Recommendations

Recommendation:	The previous CIP recommendations have been consolidated and incorporated into the Burnt Store WRF expansion project.

Table 9-16 Leachate Treatment Facility – CIP Recommendations

Recommendation:	Repair the effluent storage tank.
Recommendation:	Add a generator to the treatment facility to keep the plant operational during power outages.
Recommendation:	Replace polymer feed systems for each PACT unit.
Recommendation:	Replace blower air intakes for each PACT unit.
Recommendation:	Rehabilitate the sand filter/replace mechanical components.

9.2.6 Reclaimed Water Distribution System

Table 9-17 South County Reclaimed Water Distribution System – CIP Recommendations

Recommendation:	Create additional reclaimed water storage at the Burnt Store WRF.
Recommendation:	Increase the treatment capacity and storage at the Burnt Store WRF to supply future demands and saltwater intrusion in existing private wells.

9.3 OPERATIONS AND MAINTENANCE

The following tables summarize the O&M items that were identified and recommended during the FY 2020 condition assessments. O&M recommendations refer to items that can be completed by CCU staff or within the Operations budgets (i.e., tasks that are expected to be less than $100,000). The recommendations have been compiled from each chapter and summarized for each CCU Workgroup.

9.3.1 WATER TREATMENT PLANTS

Table 9-18 Burnt Store RO WTP – O&M Recommendations

Recommendation:	Perform yard maintenance around the perimeter fencing.[1]
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:	Install secondary containment under the chemical drums in the storage room.
Recommendation:	Scrape and paint the ceiling of the bulk storage containment area.
Recommendation:	Paint the concrete of the sodium hypochlorite secondary containment area.
Recommendation:	Replace multiple end caps that are leaking on Train Nos. C and D.
Recommendation:	Install a cover over the transfer pumps and piping near the degasifier towers to prevent sun damage and prolong equipment life.
Recommendation:	Extend the cover of the analyzer panel attached to the wetwell to prevent water from contacting the equipment during rain events.
Recommendation:	Paint the concentrate disposal wetwell.
Recommendation:	Paint the outside of the MCC building.
Recommendation:	Paint the northwest inside wall of the MCC building.
Recommendation:	Apply appropriate arc-flash labeling on all 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 the energy levels present. This information would appear on the appropriate arc-flash labeling as required.
Recommendation:	Continue maintenance of controlled burns on the property to maintain shrub growth and fire buffer around wells.[1]
Recommendation:	Install bollards around the influent transformer box.[1]
Recommendation:	Install fire hose connections on the well piping.[1]
Recommendation:	Develop an ERP for valve failure in the clearwell and begin exercising the valve.[1]

[1] Recommendation from RRA Report (March 2020).

9.3.2 WATER DISTRIBUTION SYSTEM

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

Recommendations:	Interconnects ▪ Lower the lighting fixtures under the canopy to illuminate the pumps and equipment at the EWD interconnect. ▪ Add an intrusion alarm to the CCU RTU panels.[1] ▪ Install bollards around the equipment.[1]
Recommendation:	Port Charlotte Golf Course WBS ▪ Perform yard maintenance around the perimeter fencing.[1] ▪ Clearly label chemical storage tanks and fill valves.[1] ▪ Evaluate the generator at the Port Charlotte Golf Course WBS to verify that OSHA compliance is maintained and accessibility of the equipment is provided. ▪ Label the switchgear to identify parts and components that could be energized.
Recommendation:	Walenda WBS ▪ Perform yard maintenance around the perimeter fencing.[1] ▪ Fix the leak on the seal of Pump No. 3. ▪ Repair the bonding and re-paint the GST. ▪ Replace the missing cover on the junction box. ▪ Trim tree limbs on the northwest corner of the pump room.[1] ▪ Install bollards around the WBS effluent pipe.[1] ▪ Clearly label chemical storage tanks and fill valves.[1] ▪ Add additional signage indicating "No Trespassing, Violators will be Prosecuted" along fencing.[1]
Recommendations:	Gulf Cove WBS ▪ Perform yard maintenance around the perimeter fencing. ▪ Paint the floor in the sodium hypochlorite chemical injection room to prevent concrete deterioration. ▪ Fix the leak on the influent pipe to the GST. ▪ Fix the leak on HSP No. 2. ▪ Pump out the water in the vault containing the HSP feed piping. ▪ Secure the electrical conduit for the gate camera. ▪ Provide additional support for the flexible conduit bearing the video surveillance system. ▪ Repair conduit in the chemical feed system. ▪ Repair the two non-working cameras.[1] ▪ Clearly label chemical storage tanks.[1] ▪ Continue to monitor water quality entering the Gulf Cove WBS.[1]

Recommendation:	Rotonda WBS ▪ Replace the VFD covers to eliminate gaps between the updated VFDs and the enclosures. ▪ Clean the small oil spill inside the generator enclosure. ▪ Paint the wall that contains the HMI in the pump room. ▪ Replace the incoming breaker as soon as possible. The failure of this specific device may render the station out of service for an extended period. ▪ Further recommend that the gaps surrounding the VFDs be mitigated to prevent potential contact with live parts. ▪ Install bollards around the monitoring equipment.[1] ▪ Clearly label chemical storage tanks and fill valves.[1] ▪ Develop an ERP for WBS bypass and operations without laboratory and control room.[1]
Recommendation:	Ingraham Disinfection Station ▪ Repair the doorstep to the water quality testing and storage shed.

[1] Recommendation from RRA Report (March 2020).

9.3.3 Wastewater Collection System

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

Recommendation:	▪ Increase the site lighting at LS Nos. 6 and 17 for staff serviceability.
Recommendations:	Master Lift Station No. 65 – South Port ▪ Repair the flow meter. ▪ Fence the entire site.
Recommendations:	Lift Station No. 3 – Gardner ▪ Install seal-offs on wetwell control panel to conform with code. ▪ Install mechanical interlock between main breaker and generator breaker to conform with code. ▪ Acquire confined-space entry to perform pump repairs; enforce methods to secure station overnight when bypass pump is in operation.
Recommendations:	Lift Station No. 28 – Peachlove ▪ Replace concrete control panel posts with County aluminum standard.
Recommendations:	Lift Station No. 55 – Meadow Park ▪ Install a mechanical interlock between the generator breaker and main breaker to return to code conformance.
Recommendations:	Lift Station No. 59 (Vacuum Station) – Skylark ▪ Verify the vacuum station site is in accordance with OSHA and County safety and confined-space requirements.

Recommendations:	Lift Station No. 303 – Constantine ▪ Install seal-offs and interlocks on electrical equipment and perform a detailed electrical code review to return to conformance with code. ▪ Prepare for construction of improved design noted by Operations staff.

9.3.4 WASTEWATER TREATMENT FACILITIES

Table 9-21 EPLAB - O&M Recommendations

Recommendation:	Continue implementation of LIMS.
Recommendation:	Continue working with sampling personnel on sampling protocols; in particular, sample labeling in the field, correct completion of chain-of-custody information, and sample submittal.

Table 9-22 East Port WRF - O&M Recommendations

Recommendation:	Replace the chemical feed and effluent analyzer shed building as part of the plant upgrade.
Recommendation:	Convey Digester Decant, In-Plant Pump Station No. 1, and No. 2 Plant Recycle flows into the EQ Tank after expansion is complete.

Table 9-23 West Port WRF - O&M Recommendations

Recommendation:	Level the effluent launder/overflow weir of Clarifier No. 4.
Recommendation:	Inspect the reclaimed water HSP pumps to evaluate condition of shafts and other components.
Recommendation:	Secure all electrical switchgear to prevent unauthorized access or inadvertent exposure to live parts.

Table 9-24 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 repairs of Screen No. 2.
Recommendation:	Complete replacement of Blower No. 2.
Recommendation:	Replace Blower No. 5 with the correct cfm-capacity blower to lower oxygen levels and improve Nitrogen removal.
Recommendation:	Paint tanks, buildings, and pipes in the next 2 years.
Recommendation:	Adjust the membrane slack within the new few months.
Recommendation:	Continue monitoring and trending membrane permeability data and add temperature to the data collected weekly so permeability can be corrected with temperature to account for seasonal changes in water viscosity.

Recommendation:	Constantly monitor membrane permeability trend, especially for Train Nos. 3 and 4, for which end of life is estimated to be 2024 and 2026, respectively, as this trend can either accelerate or decelerate.
Recommendation:	Investigate the temperature imbalance in the poles of the 480-V panel, breaker #28/30 as soon as possible. Either repair the connection or replace the defective breaker.
Recommendation:	Remove vegetation, clean, reinforce the berm, and evaluate lining the reclaimed water storage pond to increase reclaimed water storage capacity.
Recommendation:	Clean the reject storage pond.
Recommendation:	Purchase a few module blanks for top and bottom headers and wait to observe membrane effluent turbidity spikes, which would indicate that one of the cracked potting headers has breached the membrane integrity. Remove the compromised membrane module and install module blanks in its place until new purchased membrane module is received. Once the new membrane module is received, install the new membrane in the middle of the cassette and move an existing module where the compromised module was. This could prolong the new membrane module potting header life.
Recommendation:	A year before scheduled replacement, order membrane modules. Install new membrane modules in Train No. 1. Do not install new membrane modules with existing membrane modules in the same train. Move the existing membrane modules from Train No. 1 to Train No. 4. Train No. 4 will then have six membrane cassettes, which will extend the life of the membranes.

Table 9-25 Burnt Store WRF – O&M Recommendations

Recommendation:	Perform maintenance and equipment replacement as necessary until the WRF expansion can be completed.

Table 9-26 Leachate Treatment Facility – O&M Recommendations

Recommendation:	Repair the effluent storage tank.
Recommendation:	Replace polymer feed systems for each PACT unit.
Recommendation:	Replace blower air intakes for each PACT unit.
Recommendation:	Rehabilitate the sand filter/replace mechanical components.

9.3.5 Reclaimed Water Distribution System

Table 9-27 Mid/West County Reclaimed Water Distribution System –O&M Recommendations

Recommendation:	Develop an operational protocol for the Mid/West County Master Reuse System once the East Port WRF HSP No. 2 is completed and online. CCU staff intend to operate the reclaimed water system under a select number of operational configurations and will determine their preferred method for meeting their reclaimed water demands using the hydraulic model.
Recommendation:	Install throttling control valves at all current major reclaimed water users with pond discharges in the Mid and West County areas.
Recommendation:	Install a PRV near the intersection of Cape Haze Drive and Westwind Drive as part of the Cape Haze Road Reclaimed Water Project to allow Rotonda PS No. 2 to continue supplying its high-pressure service area and to send excess flow to the Placida Road Corridor reclaimed water users.