Charlotte County Utilities Department

2021 Annual Report
March 2022

Prepared by

JonesEdmunds

2021 ANNUAL REPORT

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SIGN-OFF SHEET

This document, titled 2021 Annual Report, was prepared by Jones Edmunds & Associates, Inc. with the assistance of Charlotte County Utilities Department. Some information included was collected during Jones Edmunds' field observations of facilities. Other information, including financial and statistical information, was provided by Charlotte County Utilities Department staff. The material in the report reflects Jones Edmunds' best judgment in light of the information available to it at the time of preparation. Any use that a third party makes of this report, or any reliance on or decisions made based on it, are the responsibilities of such third parties. Jones Edmunds accepts no responsibility for damages, if any, suffered by any third party resulting from decisions made or actions based on this report.

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ABBREVIATIONS AND ACRONYMS

Abbreviation	Definition
AADF	Annual Average Daily Flow
ACFM	Actual Cubic Feet Per Minute
AMI	Advanced Metering Infrastructure
AMP	Asset Management Plan
ARV	Air-Release Valve
ASR	Aquifer Storage and Recovery
ATS	Automatic Transfer Switch
AWIA	America's Water Infrastructure Act of 2018
AWT	Advanced Wastewater Treatment
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

Abbreviation	Definition
FOG	Fat, Oil, and Grease
FSAWWA	Florida Section of AWWA
FY	Fiscal Year
GIS	Geographical Information System
GIWA	Gasparilla Island Water Association
GMLS	Grand Master Lift Station
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

Abbreviation	Definition
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
SFWMD	South Florida Water Management District
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

Abbreviation	Definition
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 that is required by the US Environmental Protection Agency and Florida Department of Environmental Protection and 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 resulting from 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.

Term	Description
Headworks	The *front end* of a wastewater treatment plant that removes items from wastewater that cannot be removed by the treatment process.
Lift station (pumping station)	A structure equipped with pumps to impart energy to convey wastewater through a force main.
Low pressure sewer	An alternative to gravity sewers that requires a small pump at each property. Piping is small and shallow and can be constructed to follow the contours of the land as opposed to deeper and larger pipes necessary to accommodate the slopes required for gravity sewers.
Peak day flow	The largest volume of wastewater flowing into a wastewater facility or water flowing from a water facility during any consecutive 24-hour period.
Peak hour flow	The largest volume of wastewater flowing into a wastewater facility or water flowing from a water facility during any consecutive 1-hour period.
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 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 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 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) 2021 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 increasing water, sewer, and reclaimed water rates by 7 percent per year, recurring over a 3-year period. The first year was April 1, 2019, the second year was April 1, 2020, and the third and final year was April 1, 2021.

The total Operations and Maintenance (O&M) revenue for Fiscal Year (FY) 2021 was:

- $ 82,967,081 (water and wastewater services).
- $ 6,740,821 (connection charges).
- $ 16,700,564 (connection fees).

In FY 2021, CCU continued to see growth with the number of active water customers increasing by 2.8 percent (from 62,638 to 64,413) and the number of active wastewater customers increasing by 3.5 percent (from 40,759 to 42,230).

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 2021, CCU used 11.4 MGD AADF or approximately 70 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 0.58 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 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 2021, the Mid/West County system had 60,041 service connections and served a population of approximately 153,158. 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 2021, the total unaccounted-for water loss for the Mid/West County distribution system was 7.5 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 2021, the South County distribution system had 2,887 service connections and served a population of approximately 7,330. The South County distribution system consists of 53 miles of water main and has no interconnects with neighboring water utilities. For FY 2021, the total unaccounted-for water loss for the South County system was 13.7 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 2021. 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 2021, CCU replaced one hydrant, repaired 106 hydrants, and performed maintenance on 516 hydrants; repaired 69 line breaks on pipes 3 inches in diameter or larger; and installed one new valve, replaced 37 valves, and performed maintenance activities on 1,807 valves throughout the Mid/West County and South County distribution systems. The 2021 Consumer Confidence Reports confirm 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 42,230 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, two 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 2021, 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 four WRFs and the Zemel Road leachate treatment facility (LTF). 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 2021, the WRFs were generally operating within their permit limits for flow and were operating within limits for effluent quality. The primary 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.

Table ES-1 CCU WRFs Flow and Capacity Statistics

Facility	Permitted Capacity (MGD AADF)	AADF1 (MGD)	Maximum TMADF2 (MGD)	Permitted Operating Capacity1 (%)	Maximum TMADF Operating Capacity2 (%)
East Port WRF	6.00[a]	4.52	5.30	75	88
West Port WRF	1.20	0.75	0.78	63	65
Rotonda WRF	2.00	1.14	1.42	57	71
Burnt Store WRF	0.50[b]	0.32	0.34	64	78

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.

The Zemel Road 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 and filter storage tanks 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.

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 88 miles of transmission mains, three reclaimed water booster stations (RWBSs), three GSTs with a total volume of 4.0 MG, and three storage ponds with a total volume of approximately 113 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 Countywide 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 CIP project 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 RWBSs; 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 2021 CIP 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 CIP budget and expenditures.

Table ES-2 FY 2021 CIP Budget and Expenditures

Infrastructure Sector	Budget	Expenditure
Water	$250,000	$255,000
Wastewater	$13,771,000	$21,605,000
Reclaimed Water	$150,000	$71,000

UTILITY SUPPORT SERVICES

Chapter 9 discusses support services for CCU services including state-certified laboratory testing, asset management (CityWorks), and Operation and Information Technology (Supervisory Control and Data Acquisition [SCADA] and Cybersecurity).

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 2021, the EPLAB participated in and passed two TNI/FDOH-mandated Proficiency Testing studies. In FY 2021, the laboratory processed 7,848 samples performing 28,810 analyses and 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.

Jones Edmunds is working with CCU to implement the CityWorks Enterprise Asset Management System (EAMS) to track work and status of assets across the County. This work is in conjunction with implementation of CityWorks in other departments within the County to standardize the work and asset tracking process in a robust system with capabilities to schedule routine maintenance and tasks, identify and track hot spots and issues with infrastructure, and report on key performance indicators.

Operation and Information Technology refers to CCU's SCADA and Cybersecurity infrastructure. CCU uses SCADA to monitor and control facility operations. Several facilities represent multiple projects involving different engineers, bid contractors, and SCADA system integrators. This has resulted in a SCADA system of mixed hardware, software, and architectures that include diverse and separate operations. A SCADA Master Plan was completed in FY 2020.The primary goal of the SCADA Master Plan was to define and document a road map for the implementation of the technology, practices, and organizations required to meet CCU's short-term and long-term goals for SCADA. Chapter 9 includes recommendations from the SCADA Master Plan.

CONSOLIDATED RECOMMENDATIONS

Chapter 10 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 2021.

Table 1-1 Principal Balances on CCU Bonds by FY 2021

Bond Issues	Original Issuance	Current Debt	Comments
2008 Bond	Wastewater Expansion – 1998	$20,370,000	Wastewater Expansion Program
2011 Bond	Refinance – 2011	$4,985,00	Refinanced Debt
2013 Bond	Refinance – 2003A	$4,995,000	Refinanced Debt
2016 Bond	Refinance – 2006 and part of 2011	$11,370,000	Refinanced Debt
2021 Bond	Refinance – 2011	$15,935,000	Refinanced Debt
	Total Current Bond Debt	$57,655,000	
	State Revolving Fund (SRF) Debt	$61,319,065	
	Tax-Exempt Commercial Paper	$600,000	
	Total Long-Term Debt	**$119,574,065**	

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 the 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 the 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. **Utility Support Services**: Descriptions and records concerning the laboratory facilities, asset management, and information technologies.
10. **Consolidated Recommendations**: Summary of planning recommendations, capital improvements, and operation and maintenance (O&M) items for the water, wastewater, and reclaimed water systems.

1.2 AUTHORITY

Jones Edmunds' preparation of the Fiscal Year (FY) 2021 Annual Report is authorized by Charlotte County Purchase Order No.2022000883, Work Order No. 3.

1.3 DEMOGRAPHICS

Charlotte County is on the southwest coast of Florida approximately 96 miles south of Tampa. It covers 694 square miles and contains approximately 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 are 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 2021 at 190,570. 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 15-percent built 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 water mains 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 has continued to upgrade its active water treatment plant (WTP), WBSs, and wastewater treatment plants (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 low-pressure collection systems totaling 3,400 connections, was acquired in Fall 2000.
- The 24-inch transmission main and interconnect from the Peace River/Manasota Regional Water Supply Facility (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 Burnt Store area, was acquired in 2003.
- The Rotonda WTP #3 was converted to a WBS in 2005.
- The Rotonda, Gulf Cove, and Golf Course WBSs 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 approximately 10 miles of 16-inch-diameter reclaimed water transmission main and 4 miles of 12-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 construction of the West County reclaimed WBS 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 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) and installation of three reclaimed water transmission mains (approximately 5.5 miles of 16-inch-diameter main along Placida Road, approximately 1.5 miles of 16-inch-diameter main along Cape Haze Drive, and approximately 1 mile of 12-inch-diameter main along Rotonda Boulevard West).

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 2021.

1.5.1 General Operations

- 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 November 24, 2020, the Board of County Commissioners (BCC) adopted Ordinance #2020-045 modifying the existing ordinance to comply with the Southwest Florida Water Management District (SWFWMD) year-round water conservations and to add water shortage plan provisions distinguishing between water management districts in Charlotte County.
- In response to the COVID-19 Pandemic, on April 14, 2020, the BCC temporarily suspended customer shut-offs and late fees until the emergency declaration termination and CCU 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. On July 2021, customer shut-offs and late fees were reinstated.

- CCU staff worked with Kimley-Horn to develop a written capacity, management, operation, and maintenance (CMOM) program and roadmap to address a Consent Order from the Florida Department of Environmental Protection (FDEP). CCU is currently working with various consultants to fully implement the program in accordance with FDEP and US Environmental Protection Agency (EPA) requirements.

1.5.2 ENGINEERING

- CCU secured additional grant and low-interest funding monies 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 2021:

  - Ackerman Septic-to-Sewer Conversion Project – Project to address water-quality issues via replacement of aged septic systems with centralized sewer collection systems. Partially funded by the State of Florida based on individual property assessments. Construction of the vacuum station and Zones 1 and 2 are currently under construction with the project scheduled to complete in 2022.
  - The El Jobean Vacuum Station was completed in November 2021 and is currently in service.
  - El Jobean Septic-to-Sewer Project – Project to address water-quality issues via replacement of aged septic systems with centralized sewer and vacuum collection systems. Partially funded by the State of Florida based on individual property assessments. Construction of Phase 3 began in February 2022. The project is scheduled to complete in 2022.
  - US 41 Southbound Utility Improvements from Enterprise Drive to Morningstar Waterway – This project included removing and replacing the existing 12-inch water main along southbound US Highway 41. These improvements are planned because of the proposed Florida Department of Transportation (FDOT) sidewalk and drainage improvement project along southbound US Highway 41. Total project length is approximately 3 miles. The project started in August 2019. The field construction of the US Highway 41 project was completed in February 2021.
  - Loveland Grand Master Lift Station (GMLS) and 48-inch Gravity Interceptor Project – Utility crews completed construction of a master lift station and a major 48-inch wastewater gravity interceptor to transfer wastewater to the East Port WRF. This project improved the operation and efficiency of a substantial number of lift stations in the Mid County area. Construction completion was for February 2022. This project is currently in the testing and finalization stages and should be finished in FY 2022.
  - 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 project completed final closeout in January 2021.
  - Construction of Myakka potable WBS was completed in 2020. The project was finalized in FY 2021.
  - Cape Haze Drive Reclaimed Water and Force Main Project was awarded in April 2020. Construction started in June 2020. The project was completed in July 2021.
  - Olean Boulevard and Gertrude Avenue utility improvements continued in 2021.
  - Burnt Store Road Widening Phase 2 continued in 2021.
  - Deep Creek sewer force main replacement Phase 1 is complete. Phase 2 continued in 2021.
  - Easy Street Force Main Replacement was completed in November 2021 to replace approximately 1,980 feet of 6-inch wastewater force main.
  - Rehabilitation of Lift Station 2 was completed in January 2021 including the replacement of 6-inch force main and 8-inch water main along Conway Boulevard.
  - The Quesada Force Main Replacement Project completed design in February 2021 for the replacement of approximately 780 linear feet of 12-inch wastewater force main and 1,841 linear feet of 20-inch wastewater force main that runs along Quesada Boulevard from the Master Lift Station to the Lion Heart waterway. Construction commenced in 2021.

- Major design activities in FY 2021:

  - CCU has continued the design for the East Port WRF expansions to 9.0- and to 12.0-MGD facilities. This project is currently designed as an advanced water treatment (AWT) expansion to 9.0 MGD.
  - 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. This project is currently designed as an AWT expansion to 2.5 MGD.
  - The design of the Hillsborough-Flamingo 12-inch water main was completed in FY 2020. However, construction of the project is pending recommendations from the Potable Water Master Plan, which will be completed in FY 2022.
  - The design of Midway Boulevard (Ellicott to Lakeview) 24-inch force main and 16-inch water main is currently on hold.
  - CCU completed the design of the Quesada Force Main Replacement Project in February 2021. The project is now under construction. Project details are noted in the major construction activities list above.
  - 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 Lift Station 1 basin. This is one of the oldest sections of the CCU infrastructure. This project began in Spring 2021.
  - CCU completed design for the SR 776 Force Main Replacement project from Biscayne Drive to Charlotte Sports Park.

1.5.3 Water System Operations

- CCU provided approximately 4.33 billion gallons of water to 62,928 connections in FY 2021.

1.5.4 Wastewater System Operations

- CCU treated 2.44 billion gallons of wastewater from 42,230 customers in FY 2021.
- CCU continued the successful program of sewer rehabilitation to reduce groundwater infiltration into the collection system. Work included internal closed-circuit television (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 2021. 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 CIP projects for the water treatment and distribution systems and document CCU's water conservation efforts. The document is expected to be complete in May 2022.
- CCU is currently working with McKim & Creed to design the Burnt Store WRF AWT 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 AWT Expansion project.
- CCU is currently working with Jones Edmunds to design the East Port WRF AWT Expansion project to treat wastewater flows in Mid County.
- CCU and Jones Edmunds are developing a Reclaimed Water Master Plan to prioritize CIP projects for the reclaimed water distribution systems.
- CCU continues to work with various consultants to prepare quarterly reports for each WRF and prepare operating permit renewals for the WRFs and deep injection wells.
- CCU is developing a CMOM program in compliance with the requirements of the FDEP Consent Order.
- Operations staff began working with Hazen-Sawyer to update its Pre-Treatment and Fat, Oil, and Grease (FOG) programs and ordinances. The updated ordinances are scheduled to be presented to the BCC in 2022.
- CCU is developing O&M manuals for all treatment facilities and systems in compliance with EPA guidelines.

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: Dan Atkisson, Tod Avers, Bruce Bullert, Dean Campbell, Chris Carpenter, Denise Caruthers, Delmis Castillo, David Chamberlain, Johnny Chamberlain, Thomas Cimino, Thomas Dunn, Kevin Enwright, William Feltus, Jeremy Frost, Peter Giannotti, Thomas P. Hill, Natalie Hinger, Robert Jones, Stephen Kipfinger, Henri Lafenetre, Sandra Lavoie, Michael McCrumb, Tina Nausbaum, Krystle Perry, Norma Rogers, Bruce Schellinger, Kenneth Stecher, 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. We are proud of the wide range of exceptional services that we provide our customers 24 hours a day, 7 days a week, all 365 days a year!

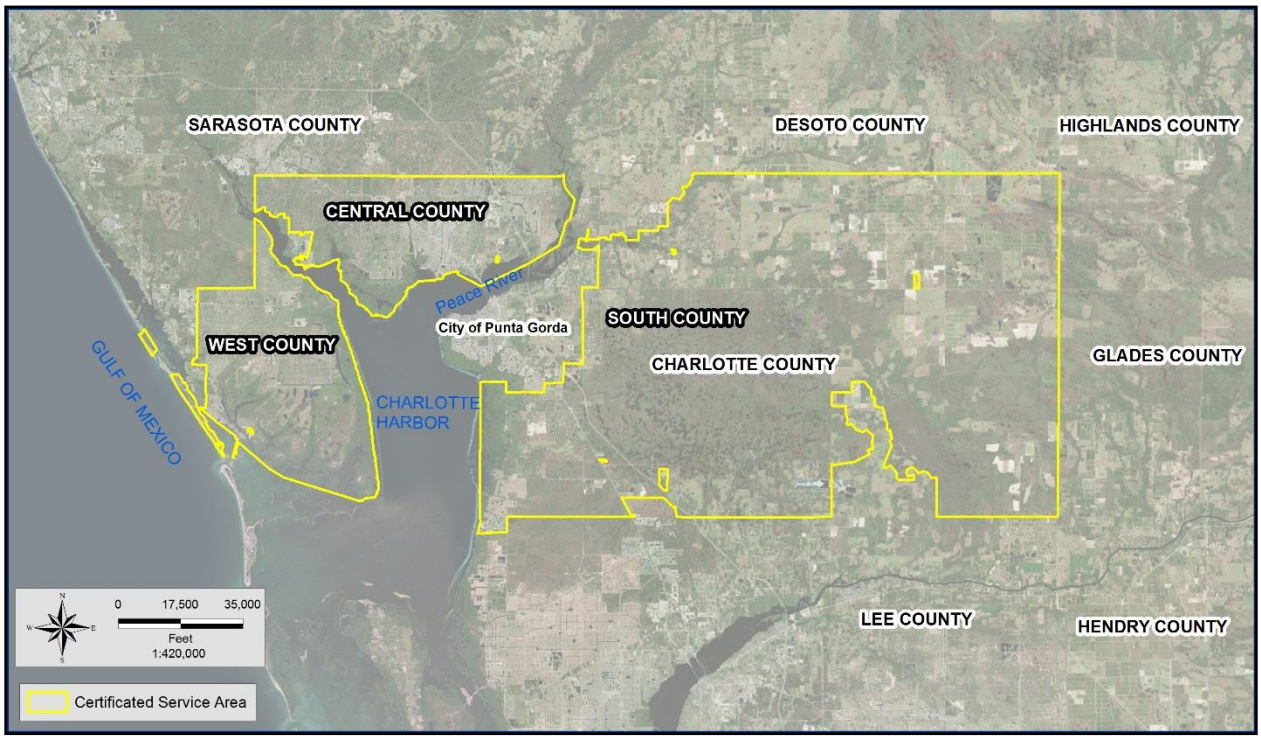
Vision: To enrich our community's quality of life by providing reliable utility services that fulfill future demands.

Values:

- **Committed** – to public and environmental safety as good stewards of what we have been given.
- **Accountable** – to the public through transparency and honesty.
- **Resourceful** – efficiencies through collaboration, teamwork, technology, and defined processes.
- **Energetic** – by providing exemplary service that exceeds our community's expectations.
- **Supportive** – by striving to meet the needs of the public and our environment.

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 O&M 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, low-pressure sewer, and gravity sewer piping systems.
- Reclaimed water distribution systems including cross-connection control and water-quality monitoring.
- An Instrumentation and Controls (I&C) Group, under a supervisor, formed from existing I&C technicians in each division.
- A Vacuum Sewer Group, under a supervisor, for operation and maintenance of vacuum sewer pipe and vacuum stations.
- A 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 Information Technology (IT) Department to assist with upgrading and maintaining hardware and software systems.

In FY 2021, the total number of positions budgeted for CCU were 256. CCU had 237 full-time employees at the end of September 2021.

Figure 2-2 and Figure 2-3 show the CCU organizational structure as of December 2021.

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 2021 CCU Organizational Chart – Overall

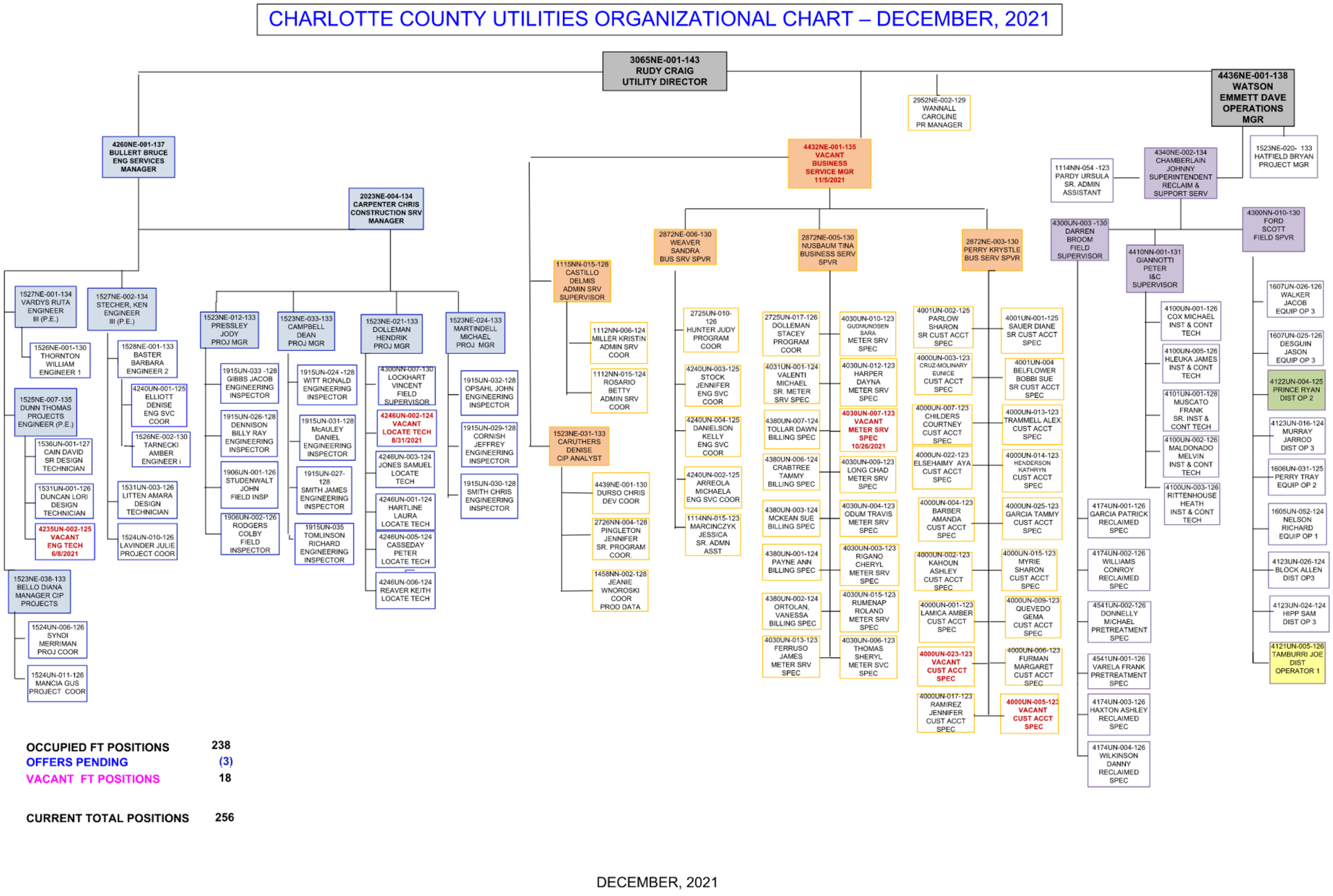
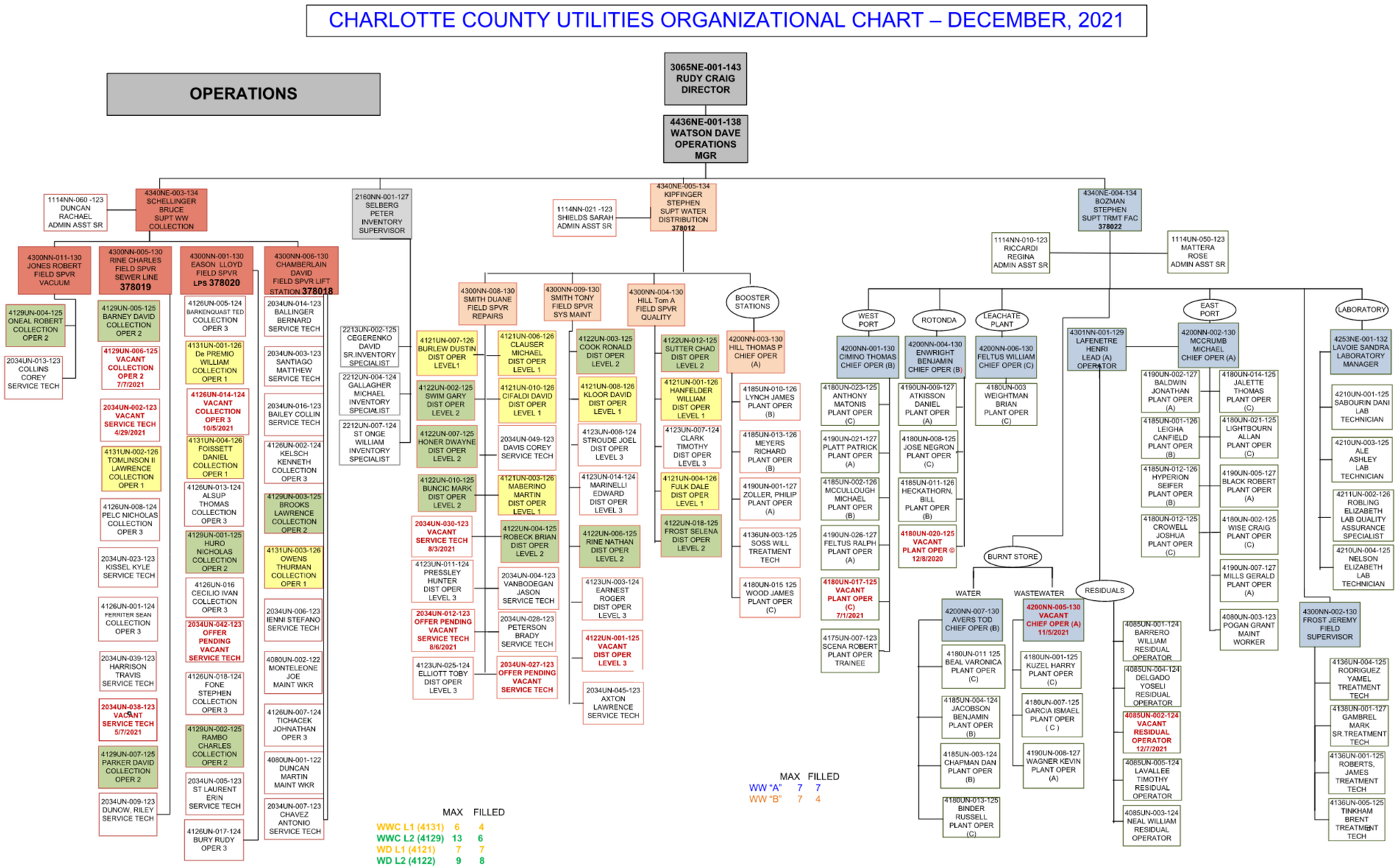


Figure 2-3 2021 CCU Organizational Chart – Operations



2.4 CCU WATER CONSERVATION EFFORTS

In 2021, 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

For the portion of Charlotte County where CCU provides service, Charlotte County follows current SWFWMD Conservation Measures as posted on their website *https//www.SWFWMD.state.fl.us/.* For portions of Lee County where CCU provides service, Charlotte County follows SFWMD Conservation Measures as posted on their website *https://www.sfwmd.gov/community-residents/landscape-irrigation*.

2.4.2 IN-HOUSE ENFORCEMENT OF WATERING RESTRICTIONS

The BCC approved enforcement of watering restrictions 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

On November 24, 2020, the BCC adopted Ordinance #2020-045 modifying the existing ordinance to comply with the SWFWMD year-round water conservations and to add water shortage plan provisions distinguishing between water management districts in Charlotte County. 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

CCU uses a five-tier rate structure where the water user pays different prices per unit of water delivered depending on the amount used, with a higher price charged for larger quantities.

2.4.5 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 a 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. Today, the Master Reuse System is kept fully pressurized to allow customers to withdraw reclaimed water when needed.

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 CIP projects for the reclaimed water systems.

2.4.6 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 UF/IFAS Extension Services work jointly to promote 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 conducts citizen educational tours to the Burnt Store Reverse Osmosis (RO) WTP and CCU's four wastewater reclamation facilities (WRFs). The purpose of the tours is to promote alternative water sources, water conservation, and good stewardship of water resources. Due to the pandemic, tours at all facilities were postponed through FY 2021.

The water/wastewater plant tours included:

- Water/Wastewater 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 such as schools and camps.
- Participation at Government Academy Day.
- Project Information Meetings for Residents and Business Owners.
- H_2O and Your Health Program – for proper hydration by drinking CCU tap water.

2.4.7 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.

2.4.8 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. 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

On February 12, 2019, the BCC approved to increase water, sewer, and reclaimed water rates at 7 percent per year through 2021. Current rates, effective as of April 1, 2021, represent the third and final year of rate increases from the 2019 approval.

CCU offers multiple methods of electronic billing and payment, which has resulted in 49 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 O&M revenue for FY 2021 water and wastewater services was $82,967,081. The total O&M connection charge revenue was $6,074,821, and the total connection fee revenue was $16,700,564.

2.5.2 CCU Customer Base

During FY 2021, the number of active water services increased from 62,637 to 64,569, and the number of active sewer services increased from 40,759 to 42,088. 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. 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 2021 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 2021	50.58	67.22	117.80
Other Neighboring Utilities:			
City of Arcadia (outside City)	65.95	67.11	133.06
City of Marco Island (outside City)	48.52	77.38	125.90
Desoto County	59.23	55.04	114.27
City of Fort Myers (outside City)	38.53	71.49	110.02
City of North Port (outside City)	43.23	64.73	107.96
FGUA – North Fort Myers	48.73	58.42	107.15
City of Venice	50.79	56.09	106.88
City of Marco Island (inside City)	53.92	52.48	106.40
FGUA – Lake Fairways and Pine Lakes	48.73	57.65	106.38
City of North Port (inside City)	37.62	67.22	104.84
City of Fort Myers (inside City)	30.86	71.49	102.35
FGUA – Lehigh Acres	38.26	61.86	100.12
St. Lucie County Utilities	39.85	59.52	99.37
Collier County	36.73	56.65	93.38
City of Arcadia (inside City)	48.34	44.50	92.84
Okeechobee Utility Authority	40.07	52.23	92.30
City of Cape Coral	32.92	57.23	90.15
City of Punta Gorda (outside City)	42.36	43.64	86.00
City of Sarasota	32.39	53.37	85.76
City of Naples (outside City)	17.85	64.54	82.39
Sarasota County	27.40	51.53	78.93
City of Clearwater	33.85	44.24	78.09
Bonita Springs Utility	26.81	47.34	74.15
Lee County	25.67	43.85	69.52
Englewood Water District	26.95	40.70	67.65

Utility Systems	Water Charge ($)	Wastewater Charge ($)	Combined Charges ($)
Hillsborough County	29.73	36.09	65.82
Pinellas County	30.72	32.11	62.83
Manatee County	18.57	42.66	61.23
City of Bradenton	26.99	34.09	61.08
City of Punta Gorda (inside City)	24.25	34.92	59.17
City of Naples (inside City)	14.28	37.53	51.81

Note: The reflected residential rates were in effect April 2021, 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 in FY 2021 for the Mid/West and South County distribution systems, respectively.

Table 2-2 CCU Mid/West County Large Water Users

Water Customer	Total Water Purchased (thousands of gallons)
Riverwood[1]	58,047
El Jobean Water Association	27,230
Little Gasparilla Water Utility[1]	16,224
Fawcett Memorial Hospital	13,107
Shorepoint Health – Port Charlotte	10,799
Shorepoint Health – Port Charlotte	10,486
Port Charlotte Village	10,413
Fawcett Memorial Hospital	10,040
Placida Harbour Club	9,256
Encore Super Park	8,562
Total 10 Largest Users	**174,164**

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

Table 2-3 CCU South County Large Water Users

Water Customer	Total Water Purchased (thousands of gallons)
Grande Isle Towers I & II Condo Associates Inc.	3,337
WCI Communities, Inc.	3,316
Florida Design Communities	2,626
SHM Burnt Store, LLC	2,138
SHM Burnt Store, LLC	1,863
Keel Club Condo Association	1,506
Vista Del Sol Restaurant	1,364
Acapulco Gardens LLC	959
Spinnaker Club Condos	949
Marina Towers Improvement Company	879
Total 10 Largest Users	**18,937**

2.8 PLANNING RECOMMENDATIONS

Table 2-4 through Table 2-7 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 models and use them as planning tools 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 2021.
Recommendation:	Create a water system O&M Manual with operating protocols based on EPA and American Water Works Association (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 in compliance with EPA guidelines.

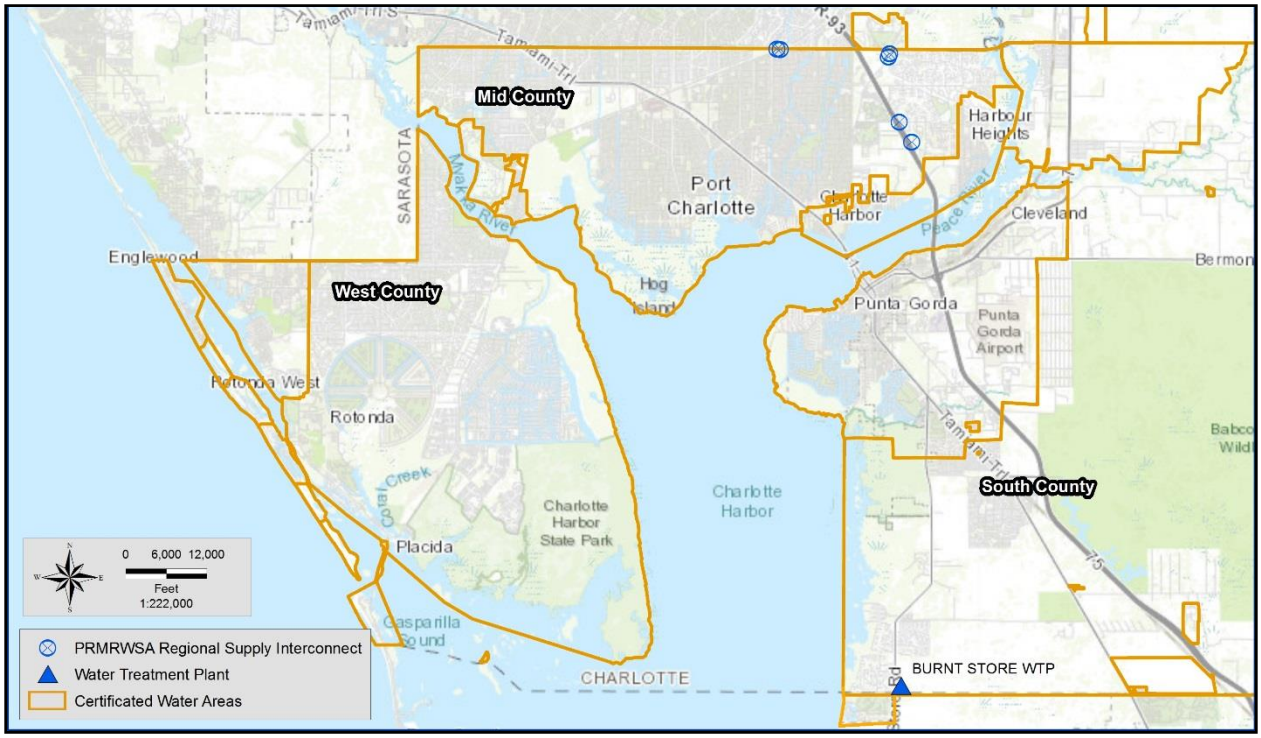
Table 2-7 Reclaimed Water System Planning Recommendations

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 models and use them as planning tools for future system improvements.
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 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 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 2021, PRMRWSA supplied Charlotte County with a total of 4,158 MG or approximately 11.4 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

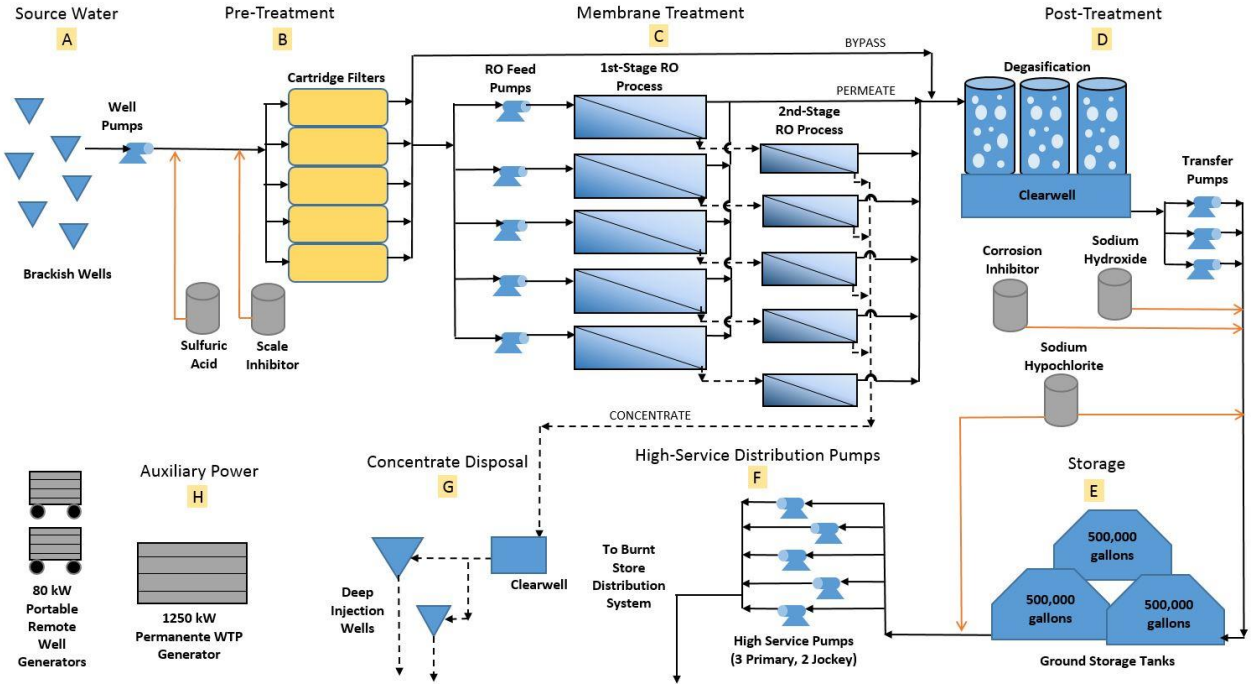
The Burnt Store RO WTP (PWS ID6080318) is owned and operated by CCU. The South County service area is served by the Burnt Store RO WTP at 17430 Burnt Store Road in Punta Gorda. The Burnt Store RO WTP was expanded in 2009 and has a permitted treatment capacity of 3.61 MGD.

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 high-service pumps (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 Pumps (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. According to Chapter 62-4.090, Florida Administrative Code (FAC), a permit renewal application should be submitted at least 60 days before the expiration date.
- FDEP – Deep Injection Well IW-2 (UIC Permit No.: 0271367-006-UO/1X) was issued on October 18, 2016, and expired on October 17, 2021. A permit renewal application (UIC Permit No.: 0271367-008-UO/1X) was submitted to FDEP on July 27, 2021.
- 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 the CityWorks 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 FY 2021. 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 2021

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-20	7.71	281	606	1.44	21	84	1.27	7.80
Nov-20	7.66	276	597	1.46	21	86	1.30	7.76
Dec-20	7.65	276	598	1.52	21	86	1.42	7.75
Jan-21	7.66	273	592	1.49	21	90	1.40	7.74
Feb-21	7.68	273	594	1.43	23	88	1.31	7.78
Mar-21	7.67	275	596	1.48	24	88	1.34	7.74
Apr-21	7.73	277	601	1.42	23	86	1.32	7.74
May-21	7.80	284	611	1.39	22	89	1.23	7.78
Jun-21	7.70	289	619	1.37	23	95	1.25	7.73
Jul-21	7.67	289	618	1.47	23	87	1.37	7.69
Aug-21	7.69	290	621	1.35	24	87	1.22	7.71
Sep-21	7.79	294	629	1.38	23	103	1.28	7.79
Annual Avg.	**7.70**	**281**	**607**	**1.43**	**22**	**89**	**7.75**	**1.31**

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 (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 2021, 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 2021

Month	Raw Water from Wells (MG)	Raw Water Bypass (MG)	Total Water Produced (MG)	Total Concentrate (MG)	Finished Water to Distribution (MG)
Oct-20	15.46	1.46	12.56	3.09	12.75
Nov-20	17.25	1.61	13.98	3.44	13.67
Dec-20	17.06	1.59	13.92	3.34	14.39
Jan-21	19.77	1.82	16.10	3.91	16.26
Feb-21	19.61	1.80	15.99	3.85	15.68
Mar-21	22.19	2.02	18.07	4.36	17.64
Apr-21	19.87	1.78	16.15	3.89	15.82
May-21	19.96	1.83	16.26	3.90	16.35
Jun-21	14.58	1.34	11.86	2.87	11.69
Jul-21	14.83	1.38	12.09	2.92	11.97
Aug-21	14.33	1.35	11.62	2.79	11.61
Sep-21	14.94	1.43	12.20	2.94	11.93
Total	**209.86**	**19.41**	**170.80**	**41.31**	**169.76**

Table 3-4 Burnt Store RO WTP – Average Flows FY 2021

Month	Raw Water from Wells (MGD)	Raw Water Bypass (MGD)	Total Water Produced (MGD)	Total Concentrate (MGD)	Finished Water to Distribution (MGD)
Oct-20	0.515	0.049	0.419	0.103	0.411
Nov-20	0.575	0.054	0.466	0.115	0.456
Dec-20	0.569	0.053	0.464	0.111	0.464
Jan-21	0.659	0.061	0.537	0.130	0.525
Feb-21	0.701	0.064	0.571	0.138	0.560
Mar-21	0.740	0.067	0.602	0.145	0.588
Apr-21	0.662	0.059	0.538	0.130	0.527
May-21	0.665	0.061	0.542	0.130	0.527
Jun-21	0.486	0.045	0.395	0.096	0.390
Jul-21	0.479	0.045	0.390	0.094	0.386
Aug-21	0.462	0.044	0.375	0.090	0.375
Sep-21	0.498	0.048	0.407	0.098	0.398
Annual Avg.	**0.584**	**0.054**	**0.475**	**0.115**	**0.467**

3.2.2 Treatment Components and Condition Assessments

Jones Edmunds personnel performed an on-site review of the WTP on January 31, 2022. A tour of the facility was conducted with the Chief Operator to review plant conditions, operations, and records. Access to the WTP is through a secure gate in a fence that surrounds the Burnt Store RO WTP and WRF. The 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 Center (MCC) Building, and Operations/Administration Building (shared with the Burnt Store WRF) were observed to be in good condition. The exterior of the MCC Building 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 beneath 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 and secondary containment are in a covered area that is attached to the east end of the WTP process building. 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 knife gate valve operator. The operator reported that valves are typically exercised.
- 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. A new pressure transducer was ordered for replacement in FY 2021 but is still pending shipping.
- 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. A new check valve was ordered for replacement in FY 2021 but is still pending shipping.
- 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 secondary containment structure 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; a membrane-cleaning autopsy is scheduled for FY 2022 to determine and implement the most effective cleaning strategy.

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. We recommend that the degasification tower and media be scheduled for cleaning and inspection.

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. These injection points should 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

Since the distribution system currently operates with free chlorine, the ammonia system used to produce combined chlorine residual (chloramine) is not being used. CCU is planning to convert the existing sodium hypochlorite disinfection system to a chloramine disinfection system for future use and interconnect compatibility; the project is scheduled to begin FY 2022.

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, inspected, and received new interior coating in FY 2022; 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 match the system flow needs more accurately. 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 where 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 is in good condition with minor issues. The switchgear contains warning labels identifying parts and components behind blank cabinets as being energized. 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. In FY 2021, the building exterior was pressure washed.

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 FY 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. The operator indicated that daily membrane operation typically includes Trains A and B plus one additional train, whereas Trains C, D, and E alternate operations each week.

The Chief Operator also indicated that the security camera displays for the site are currently in the on-site laboratory, as opposed to the Operations Office Building, where staff typically monitors the plant. The laboratory is also shared with Burnt Store WRF staff. Relocation of the security camera displays to the Operations Office Building should be considered.

3.2.4 MAINTENANCE

Routine maintenance is performed on a scheduled basis. Groundwater wells are visually inspected daily and well valves are exercised yearly. Generators are serviced and tested monthly. 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. The Chief Operator has established a chemical system inspection routine where operators inspect the 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 change the cartridge 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 2022 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), 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 FY 2021.

3.2.5 Review of Previous Report Recommendations

Table 3-5 summarizes the recommendations and status from the 2020 Annual Report for the Burnt Store RO WTP.

Table 3-5 Burnt Store RO WTP 2020 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:	Paint the concentrate disposal wetwell.
Progress:	Not 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:	Complete.
Recommendation:	Install bollards around the influent transformer box.[1]
Progress:	Not complete.

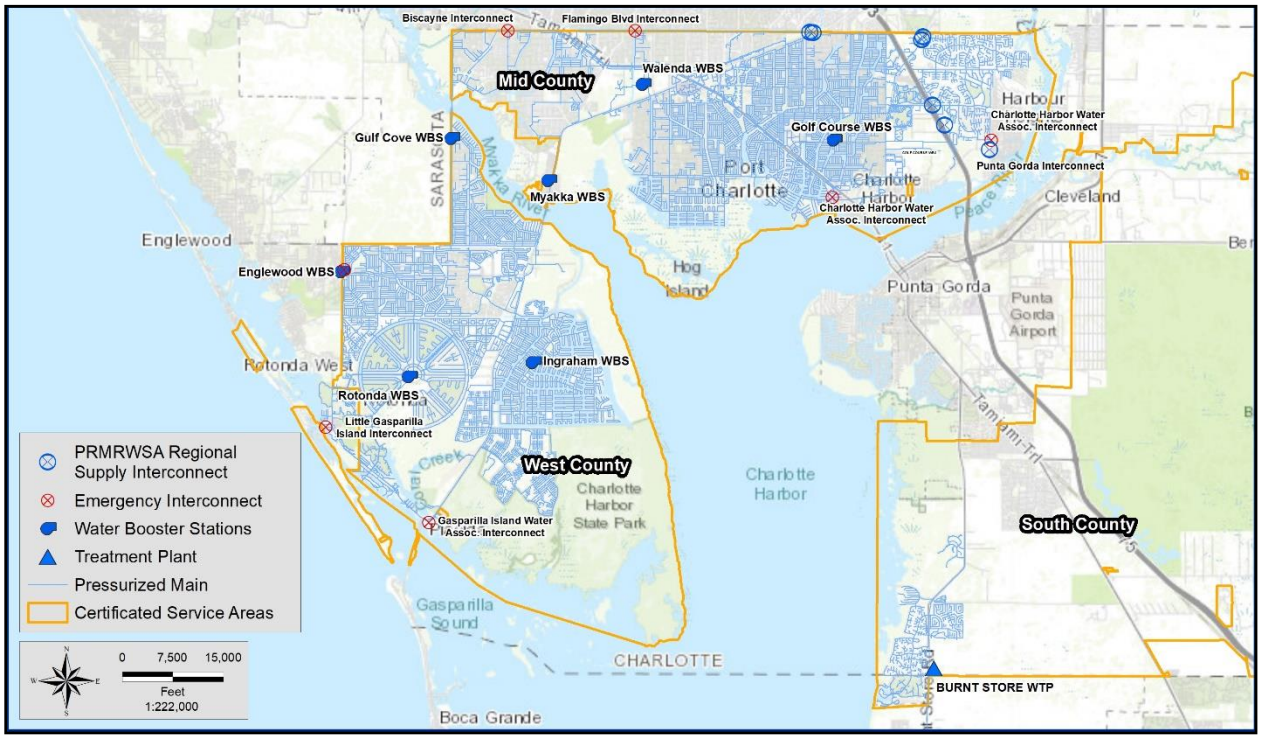
Recommendation:	Apply appropriate arc flash labeling on all switchgear in compliance with NFPA 70E to properly notify O&M personnel of the potential hazard. This may require creating a complete and thorough arc flash model using the existing switchgear to determine the energy levels present. This information 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:	Load study complete. Pending arc flash labeling.
Recommendation:	Update standard operating procedure (SOP) for chemical deliveries, required chain of custody forms, and verification system for proper chemical delivery.[1]
Progress:	The operators updated the protocols to physically observe bulk storage tank deliveries and keep the bulk storage tank feed lines locked when not in use.
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. Jones Edmunds personnel evaluated the water distribution system components on January 25, 2022. 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 2021, CCU had 60,041 customer accounts in the Mid/West County distribution system and 2,887 customer accounts in the South County distribution system. The Mid/West County system contains bulk water users listed in Chapter 2. Based on FY 2020 CCU geographic information system (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 2021, CCU had 5,518 fire hydrants. At the time of this report, CCU is working with Jones Edmunds on a separate ongoing project to update the GIS system(s).

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.
- 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. Based on FY 2020 CCU data, 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. At the time of this report, CCU is working with Jones Edmunds on a separate ongoing project to update the GIS system(s). 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

4.1.1.1 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 is on Discovery Drive and is owned and operated by the PRMRWSA, which was historically 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. As of FY 2021, this seasonal operation has ceased, and the interconnect is only used to supply CCU water from PRMRWSA.

Condition Assessment

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

4.1.1.2 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; instead, 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.

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.

4.1.2 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, Florida 33952. The station provides local storage, pressure, and disinfectant boosting capability for the Mid County service area east of Tamiami Trail. The station was built in 1966 and rehabilitated in 2011. 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 900-gallon sodium hypochlorite tanks are under a covered shed adjacent to the pump

room. The County operates the station to maintain a 4.0-milligrams per list (mg/L) disinfectant residual. The station has a detached diesel generator for backup power supply.

The following O&M upgrades were made over the last 3 years:

- 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 900-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.
- 2021 – Chemical injection piping wall connection was sealed.

According to Operations staff, a security upgrade is budgeted for FY 2022, including fencing, lighting, and camera upgrades.

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.

Additionally, an electrical equipment site visit assessment was conducted by a Jones Edmunds electrical engineer on February 17, 2022. The Operations staff reported no issues. The review of the plant showed systems in good condition and well maintained.

No deficiencies were noted.

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, Florida 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:

- 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 repaired.
- 2020 – Cleaned generator fuel tank.
- 2020 – Repaired tank leak.
- 2021 – Cut and reinstalled drain line screen to remove debris, and adjusted discharge area to accept flows.
- 2021 – Tank repaired in 2020 went into service.
- 2021 – Motor No. 4 was replaced.

According to Operations staff, a generator replacement project is budgeted for FY 2022, including a new generator and fuel tank sized to support five 150-horsepower (HP) pumps. A security upgrade is also budgeted for FY 2022, including fencing, lighting, and camera upgrades.

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. Three of the four HSPs are well maintained and functioning properly with Pump #2 out of service. 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.

Additionally, an electrical equipment site visit assessment was conducted by a Jones Edmunds electrical engineer on February 17, 2022. The Operations staff reported that several VFDs have failed attributed to power-quality issues. Internal investigations resulted in apparent anomalies with the third leg (phase C) of the three-phase power system. VFD #4 was recently replaced because of these issues. The staff contacted Florida Power & Light (FPL) for assistance and after a period of monitoring the system, FPL reported no issues. These power system discrepancies appear to continue with no obvious sign or cause identified. These types of intermittent faults can very often be hard to detect but represent a significant cost and operations impact.

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 Pump Building requires repainting.
- HSP #2 is out of service with a bad rotating assembly.
- The perimeter fence was rusted out to the north of the GST and at the east gate.
- The electrical equipment is missing the appropriate arc flash labeling.
- The ammonia chemical feed room exhaust fan is severely corroded and will not function.
- The pressure transducer at the back of the GST is not properly anchored or supported and is being supported by the conduits.

4.1.2.3 Walenda – WBS #4

The Walenda Booster Station is at 17177 Walenda Avenue, Port Charlotte, Florida 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:

- 2019 – Installed new light-emitting diode (LED) lighting on site.
- 2019 – Checked stratification of the GST to confirm mixing in the tank.
- 2019 – Completed a GST inspection.
- 2019 – Updated the facility's diesel fuel supply.
- 2019 – Operations staff labeled WBS equipment in support of the CMMS project.
- 2020 – Upgrade GST level control to a radar-based system.
- 2020 – Added arc-flash labeling to the electrical switchgear.
- 2020 – Realigned the motor and replaced 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.
- 2020 – Repaired a faulty uninterruptible power supply (UPS) causing low pressure.
- 2021 – Installed a new HACH 5500 SC analyzer to replace the HACH 6000 unit.
- 2021 – Programmed the influent chemical control for pre-chlorination.
- 2021 – Replaced seals, bearings, and O-rings in pump No. 3.
- 2021 – Modified the yard piping to south along Walenda Avenue. A 16-inch check valve was removed and replaced with straight piping. This modification was performed to accommodate large development (future) to the immediate south of the Walenda WBS.

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.

- The chemical injection skid containment areas appeared to feature open-floor sumps filled with rocks. Staff indicated that the floor sumps were abandoned water meter boxes. To comply with regulations, the floor sumps should be properly surfaced and/or sealed.

According to Operations staff, tank re-coating is budgeted for FY 2022; a generator upgrade is budgeted for FY 2023, including a new generator and fuel tank; MCC/pump upgrades are budgeted for FY 2022/2023.

4.1.2.4 Rotonda – WBS #6

The Rotonda Booster Station is at 46 Parade Circle, Rotonda, Florida 33947. Built in 1973, the station has two 100-HP pumps, two 60-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:

- 2019 – Replaced Motor No. 3 in December.
- 2019 – Replaced the feed piping to the GST 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 – Replaced couplings on Pumps No. 1 and No. 4.
- 2021 – Bypassed the storage tank for liner replacement.

- 2021 – Repaired the generator.
- 2021 – Installed a mixer in the GST.
- 2022 – Repainted aboveground piping.

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 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 the main switchgear in this facility this fiscal year or next. Additionally, MCC/pump upgrades are budgeted for FY 2022/2023.

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.
- Foam spacers are 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, Florida 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.
- 2021 – A new flow meter was installed to replace a failed one.
- 2021 – The doorstep to the water-quality testing and storage shed was repaired.

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.

No deficiencies were noted at the time of the site visit.

4.1.2.1 Englewood – WBS #8

The EWD interconnect not only provides redundancy for EWD and CCU during an emergency, but also acts as a water-pressure booster and/or chemical dosing 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, free ammonia residual, pressure, and flow. 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.

In FY 2019, a new Dupolox 400M total chlorine meter was installed.

In FY 2021, a new canopy was built beside the existing canopy. Also, CCU incorporated chemical injection of sodium hypochlorite and ammonium sulfate into the existing permit.

In February 2022, CCU installed a chemical dosing system including the following:

- One double-walled 500-gallon sodium hypochlorite storage tank.
- One double-walled 120-gallon ammonium sulfate storage tank.
- One in-line chemical mixer with two chemical injection quills.
- Two built-in-house chemical injection skids.
- One eyewash station.

Condition Assessment

Overall, the interconnect is in good condition, but the lighting fixtures should be turned or lowered so that 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, Florida 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 Wallace & Tiernan DEPOLOX 3 plus total chlorine analyzer. A diesel generator provides backup power to the station.

The following upgrades were made over the last 3 years:

- 2021 – Increased the suction pressure setpoint.
- 2021 – Rebuilt Pump No. 1.

4.1.3 STORAGE

GSTs are typically 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	4
Myakka	0	3	4
Total	**10**	**15**	**30**

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.

4.1.4 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 CIP project 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.

4.1.5 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 2021. 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 2,019,147 gallons per month or less than 0.01 percent of the total FY 2021 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). 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 26,037,020 gallons per month or 7.51 percent.

Table 4-4 CCU Unaccountable Water Report (Mid/West County) FY 2021

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-20	326,481,000	239,968,000	755,350	26,686,034	5,460	1,810,637	50,000	57,205,519
Nov-20	318,727,000	278,445,000	749,280	24,922,840	0	233,547	50,000	14,326,333
Dec-20	340,516,000	258,692,000	2,984,195	26,181,433	60,778	13,805,250	50,000	38,742,344
Jan-21	349,918,000	310,559,000	843,690	26,062,711	138,284	867,796	50,000	11,396,519
Feb-21	324,897,000	278,216,000	106,500	22,885,569	4,041	764,552	50,000	11,396,519
Mar-21	395,347,000	298,261,000	251,485	27,484,413	478,387	297,310	50,000	68,524,405
Apr-21	380,785,000	346,919,000	1,500	27,371,768	700	350,934	50,000	6,091,098
May-21	423,515,000	344,414,000	53,985	30,668,270	3,025	847,847	50,000	47,477,873
Jun-21	350,001,000	341,977,000	108,375	27,978,632	8,212	285,838	50,000	-20,407,057
Jul-21	320,443,000	278,446,000	57,750	29,911,150	2,744	2,194,420	50,000	9,780,936
Aug-21	319,891,000	238,761,000	954,200	31,335,920	26,918	1,475,257	50,000	47,287,705
Sep-21	307,366,000	252,655,000	1,471,870	42,669,360	75,168	1,296,376	50,000	9,148,226
Total (gal)	4,157,887,000	3,467,313,000	8,338,180	344,158,100	803,717	24,229,764	600,000	312,444,239
Monthly Average (gal)	346,490,583	288,942,750	694,848	28,679,842	66,976	2,019,147	50,000	320,453,563

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 sparsely populated but growing residential developments along Burnt Store Road and Tucker's Grade to the northwest. The water is produced by the CCU-owned Burnt Store RO WTP.

Based on FY 2020 CCU GIS data, 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 are throughout the South County distribution system. At the time of this report, CCU is working with Jones Edmunds on a separate ongoing project to update the GIS system(s).

4.2.1 INTERCONNECTS

The South County distribution system does not 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 2021 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 2021 was approximately 13.67 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.

Table 4-5 CCU Unaccountable Water Report (South County) FY 2021

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-20	12,560,746	9,370,000	0	171,000	0	195,400	10,000	2,814,346
Nov-20	13,495,360	11,927,000	0	26,260	0	68,112	10,000	1,463,988
Dec-20	14,210,560	10,832,000	0	76,500	0	483,980	10,000	2,808,080
Jan-21	16,084,416	14,948,000	0	42,200	133,497	552,300	10,000	398,419
Feb-21	15,515,584	12,605,000	0	6,000	0	1,362,795	10,000	1,531,789
Mar-21	17,457,216	14,121,000	0	10,246	0	5,160	10,000	3,310,810
Apr-21	15,650,880	14,771,000	0	8,026	0	9,509	10,000	852,345
May-21	16,170,688	13,512,000	0	58,852	0	119,070	10,000	2,470,766
Jun-21	11,516,608	11,390,000	0	540,000	0	16,080	10,000	(439,472)
Jul-21	11,792,640	9,205,000	0	6,400	0	3,515	10,000	2,567,725
Aug-21	11,432,000	8,972,000	0	37,900	0	44,400	10,000	2,367,700
Sep-21	11,754,240	8,939,000	0	20,790	0	7,350	10,000	2,777,100
Total (gal)	167,640,938	140,592,000	0	1,004,174	133,497	2,867,671	120,000	22,923,596
Monthly Average (gal)	13,970,078	11,716,000	0	83,681	11,125	238,973	10,000	1,910,300

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 that CCU continue its meter testing and replacement program to identify and replace residential meters that are not performing adequately.

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 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 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 Countywide 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. Due to these maintenance practices, the booster stations and especially the pumps are operating efficiently.

As part of ongoing maintenance, CCU periodically tests water meters for accuracy. The 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 2021 in both County distribution systems included:

- Completed 5,972 SOs within the distribution systems.
- Responded to 170 water-quality calls and 921 customer calls for leaks.
- Replaced one hydrant, repaired 106 hydrants, and performed maintenance on 516 hydrants, including exercising, flow testing, and painting.
- Issued and addressed 145 boil water notices and repaired 69 line breaks on pipes 3 inches or larger.
- Installed one new valve, replaced 37 valves, conducted one valve insertion, and performed maintenance on 1,807 valves.
- Tested 82 large meters.
- Replaced 12 galvanized-steel service connections.
- Upgraded four distribution system sampling points.
- Completed operational testing of the Myakka WBS.
- Replaced all tough pads.
- All booster stations underwent a security assessment.
- All booster stations were inspected by the Safety Committee.

4.1.3 Staff Training and Employee Retention

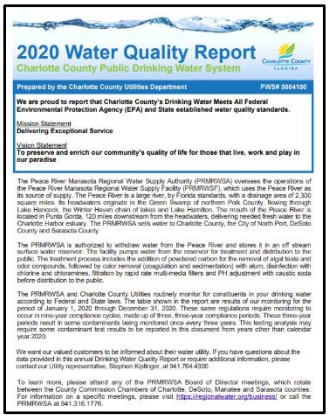
CCU encourages employees and staff members to participate in training activities to maintain license requirements and attract superior staff among a competitive labor market. The following training was conducted by CCU staff:

- One employee attended the Florida Water Resources Council (FWRC) conference in 2021.
- Three staff members attended Asbestos Supervisor training at Training, Research, and Education for Environmental Occupations (TREEO).
- Three employees attended Florida Water and Pollution Control Operators Association (FW&PCOA) online short school for Level 2 Distribution System Operator (DSO).
- All staff were trained on brass fittings.

As with many organizations, maintaining the proper number of staff is required to complete the maintenance activities that accompany the management of a distribution system. In 2021, the following staffing changes occurred:

- Two new staff members were hired.
- One new service technician was hired.
- One temporary employee was hired.
- Two high school interns were temporarily hired.

4.2 CONSUMER CONFIDENCE REPORTS



2020 Water Quality Report

Charlotte County Public Drinking Water System

Prepared by the Charlotte County Utilities Department PWS# 5084100

We are proud to report that Charlotte County's Drinking Water Meets All Federal Environmental Protection Agency (EPA) and State established water quality standards.

Mission Statement
Delivering Exceptional Service

Vision Statement
To preserve and enrich our community's quality of life for those that live, work and play in our paradise

The Peace River Manasota Regional Water Supply Authority (PRMRWSA) oversees the operations of the Peace River Manasota Regional Water Supply Facility (PRMRWSF), which uses the Peace River as its source of supply. The Peace River is a large river, by Florida standards, with a drainage area of 2,300 square miles. Its headwaters originate in the Green Swamp of northern Polk County, flowing through Lake Hancock, the Winter Haven chain of lakes and Lake Hamilton. The mouth of the Peace River is located in Punta Gorda, 120 miles downstream from the headwaters, delivering needed fresh water to the Charlotte Harbor estuary. The PRMRWSA sells water to Charlotte County, the City of North Port, DeSoto County and Sarasota County.

The PRMRWSA is authorized to withdraw water from the Peace River and stores it in an off stream surface water reservoir. The facility pumps water from the reservoir for treatment and distribution to the public. The treatment process includes the addition of powdered carbon for the removal of algal taste and odor compounds, followed by color removal (coagulation and sedimentation) with alum, disinfection with chlorine and chloramines, filtration by rapid rate multi-media filters and PH adjustment with caustic soda before distribution to the public.

The PRMRWSA and Charlotte County Utilities routinely monitor for constituents in your drinking water according to Federal and State laws. The table shown in the report are results of our monitoring for the period of January 1, 2020 through December 31, 2020. These same regulations require monitoring to occur in nine-year compliance cycles, made up of three, three-year compliance periods. These three-year periods result in some contaminants being monitored once every three years. This testing analysis may require some contaminant test results to be reported in this document from years other than calendar year 2020.

We want our valued customers to be informed about their water utility. If you have questions about the data provided in this annual Drinking Water Quality Report or require additional information, please contact our Utility representative, Stephen Kyllingen, at 941.764.4300.

To learn more, please attend any of the PRMRWSA Board of Director meetings, which rotate between the County Commission Chambers of Charlotte, DeSoto, Manatee and Sarasota counties. For information on a specific meetings, please visit https://regionalwater.org/business/ or call the PRMRWSA at 941.316.1776.

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, in 2020, the CCU Mid/West County distribution system water was the recipient of the Florida Section of AWWA's (FSAWWA) Water Distribution System of the Year award for Division 6 for the third consecutive year.

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*.

4.4 REVIEW OF PREVIOUS RECOMMENDATIONS

Table 4-6 and Table 4-7 summarize the recommendations and 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 – 2020 Recommendations and Status

	Interconnects
Recommendation:	Reinstall (turn or lower) the lighting fixture 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. Completed. 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 No. 3. 4. Repair the bonding and re-paint the GST. 5. Replace the missing cover on the junction box. 6. 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 – 2020 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 – 2020 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:

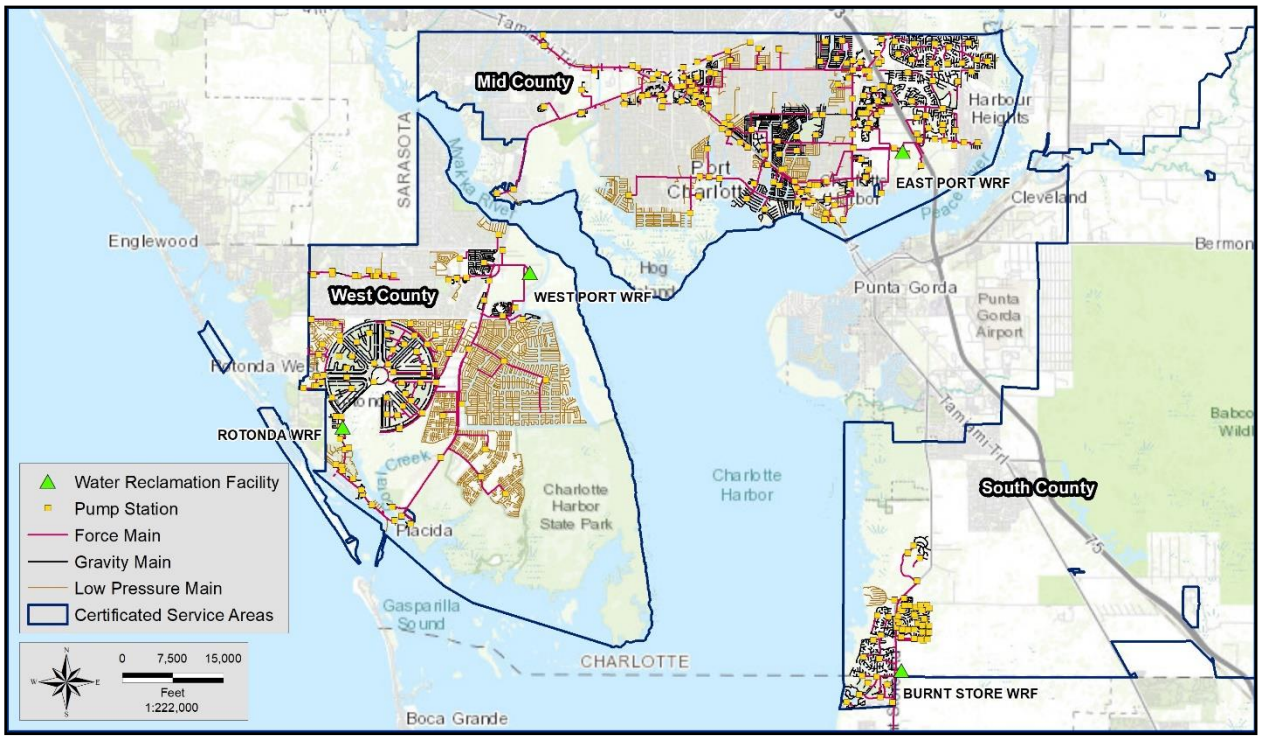
- **Gravity Sewer** – as the name implies, is piping installed at a gradual incline (slope) that allows wastewater to flow exclusively by the energy of gravity. Gravity sewers include manholes that allow maintenance staff entry and equipment use. Flow entering gravity sewers discharges to manholes, lift 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-diameter 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 2021, CCU had 42,230 wastewater customers, an increase of 1,471 customers since FY 2020. At the time of this report, CCU is working with Jones Edmunds on a separate ongoing project to update the GIS system(s). Based on FY 2020 CCU GIS data, the wastewater collection system primarily features the following:

- 365 miles of gravity sewer.
- 381 miles of LPS mains.
- 24 miles of vacuum sewers.
- 186 miles of force mains.
- 7,596 manholes.
- 317 lift stations.
- Three 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 Countywide wastewater master plan. The model has been incrementally and continuously updated since 2017. 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 aiding in implementing the RTS Interceptor and Loveland GMLS near the East Port WRF.

5.2 Lift Stations

At the end of FY 2021, the system had a total of 317 CCU-maintained lift stations – 303 owned by CCU. Vacuum stations are not included in the lift station count. Section 5.3 discusses the vacuum stations. The other 14 stations are owned by the County, 11 of which are outside the CCU service area. Ten master lift stations (LSs 37, 45, 65, 139, 309, 321, 422, 801, 815, and 816) have permanent auxiliary power. LSs 45, 139, 309, 422, and 816 did not have permanent auxiliary power as of FY 2021. CCU owns portable standby power equipment; through FY 2021, steps have been taken toward Federal Emergency Management Agency (FEMA) grant funding agreements to provide funding for 24 additional generators that will be strategically dispersed throughout the lift stations based on need. Of the 24 additional generators, 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 on January 31 and February 1, 2022, to three master lift stations, 13 representative lift stations, and two vacuum stations, as selected by CCU staff. Selected stations were dispersed among areas of the County where construction was planned that would most significantly impact the pumps' hydraulic performance. Table 5-1 lists the 16 lift stations visited; Section 5.3 addresses the vacuum stations. 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
LS 309 - Bridgewater	Bridgewater Road and New Castle Lane
LS 422 - Heritage Landings Master	Heritage Landings Boulevard and Rosebud Lane
LS 816 - Boulevard West	300 Rotonda Boulevard West
LS 1 - Community Center	Orange Street and Easy Street
LS 2 – Dalton	Dalton Avenue and Sharon Circle
LS 7 - Pure Oil	3666 Tamiami Trail at Easy Street
LS 18 – Jr. High	Midway Boulevard and Orlando Boulevard
LS 20 - Lakeworth	Lakeworth Boulevard and Joseph Street
LS 24 - Charlotte Square	2150 Tamiami Trail at Forrest Nelson
LS 44 - Liberty Elementary	370 Atwater Street at Liberty Elementary School
LS 45 - Woodbury	625 Woodbury Drive at Paulson Drive
LS 150 - Maracaibo	Maracaibo Street at McKim Avenue
LS 303 - Constantine	Constantine Street at Aden Way
LS 442 – Doredo	25191 Doredo Drive
LS 809 - Placida Harbor	11000 Placida Road
LS 813 – Marina	115 Rotonda Circle

5.2.1 Master Lift Station 309 – Bridgewater (Deep Creek)

The Bridgewater Wastewater Master Lift Station (LS 309) is northwest of the intersection of Bridgewater Road and Newcastle Lane. This station, purchased by Charlotte County in 2003, receives wastewater from 28 County-owned pump stations in the Deep Creek Area (LSs 300 through 308 and LSs 310 through 328), a small number of private pump stations, and an elementary school. However, this is subject to change in FY 2022 when the Deep Creek force main is constructed. The station discharges through an 8-inch force main that conveys flow to the East Port WRF.

The station contains two recently replaced pumps – one replaced in April 2019 and one in January 2020 – each 45-HP Flygt Model NP3202.185 submersible pumps with 460-millimeter (mm) impellers. The pumps are in a 10-foot-diameter, 20-foot-8-inch-deep concrete wetwell. Each pump has an estimated capacity of 660 gpm at approximately 120 feet of head.

The wetwell hatches are in good condition and provide adequate access to remove the pumps on the rail-retrieval system. The wetwell was last coated in the 1980s. The discharge 8-inch Dezurik plug valves, 8-inch Kennedy check valves, and dedicated discharge are in an underground concrete vault north of the wetwell. The pump discharge check valves are in fair condition but have wear and sticking and require repair and replacement.

A biological odor-control unit with a fan draws air from the wetwell and reduces the hydrogen sulfide odor generated. Additionally, the wastewater flowing to this lift station is also treated for odor by Hydrogen Peroxide addition at LS 321 Angol. The air movement also reduces the concentration of hydrogen sulfide in the wetwell, which will lengthen the life of this concrete structure. The station receives wastewater with long detention times in numerous tributary pumping stations.

The station is fenced and generally well kept, although gaps between the gravel and the bottom of the fence in some areas create easy access for small animals. Power is provided by a 480-volt, three-phase power service. The station contains a telemetry transmitter that allows monitoring to occur from the CCU central office and treatment plants.

The pumps are started without the use of VFDs or soft starts. The station's control panel is scheduled for replacement in FY 2022 but is currently equipped with a portable generator receptacle. This station is scheduled to be equipped with a permanent stationary generator with an ATS in FY 2022. Operations staff have historically indicated that the water level in the wetwell is usually high even with both pumps on. LS 309 currently experiences frequent infiltration during the wet season that requires manual trucking of the excessive flows.

The condition of this critical station should be kept at a high level through planned equipment upgrades.

The following deficiencies were noted:

- Signs of corrosion on the wetwell interior wall likely due to high hydrogen sulfide concentration.
- Corrosion of piping and valves in the underground vault.
- Seepage under the west discharge pipe in the wetwell.
- Substantial concrete wear around the odor-control intake piping.

Proposed improvements to the station include:

- Provide a stationary generator.
- Coat the wetwell and evaluate structural improvement.
- Replace concrete control panel and posts with County aluminum standard.
- Replace/repair piping and check valves in the underground vault.
- Replace pumps and other related equipment.

5.2.2 Master Lift Station 422 – HL Master

The Heritage Landings Master Lift Station (LS 422) is in the Heritage Landings subdivision at the intersection of Heritage Landings Boulevard and Rosebud Lane. This master lift station, built in 2021, receives wastewater from the surrounding residential area.

This station contains two 20-HP Sulzer model XFP-PE4-100J-PE56 4J-FM submersible pumps with 359-mm impellers inside a 28-foot-deep, 8-foot-diameter concrete wetwell. Each pump has an estimated capacity of 1,440 gpm at approximately 97.5 feet of head. The station's wetwell exterior and electrical equipment are in excellent condition and show no signs of corrosion. The wetwell hatches are in good condition and provide adequate access to remove the pumps on the 2-inch cylindrical-rail retrieval system. The discharge isolation valves are above grade. Discharge is pumped into an 8-inch force main then sent to the Burnt Store WRF.

The wetwell is vented and contains an odor-control unit. The biological odor-control unit with a blower draws air from the wet-well and reduces the hydrogen sulfide odor generated.

Power is provided by a 480-volt, three-phase power service. The station contains a telemetry transmitter that allows monitoring to occur from the CCU central office and treatment plants. The master lift station contains a 125-kW Cummins generator with a Hennig 631-gallon fuel tank. The generator has a PowerCommand, which allows remote monitoring and control of the generator. The control panel has seal-offs and is equipped with a portable generator receptacle.

The site is fenced and has proper lighting within the fenced area. No deficiencies were noted at this station.

5.2.3 Master Lift Station 816 – Rotonda Boulevard West

The Rotonda Boulevard West Master Lift Station (LS 816) is west of a residential complex at 300 Rotonda Boulevard West, northwest of the intersection of Rotonda Boulevard West and Boundary Boulevard. LS 816, built in the 1980s, receives wastewater from 10 pump stations in the Rotonda area. The station discharge main is a 12-inch force main that is approximately 1/4 mile long and discharges to a 24-inch gravity transmission main. LS 816 receives flow from a 21-inch gravity sewer and a 2-1/2-inch LPS force main and discharges flow to the Field Lift Station (LS 801), which discharges to the Rotonda WRF.

This station contains two 10-HP Flygt model NP3127 submersible pumps with 488-mm impellers inside a 10-foot-diameter, 21-foot-9-inch-deep concrete wetwell. Each pump has an estimated capacity of 1,125 gpm at approximately 24 feet of head.

The station wetwell exterior and electrical equipment are in relatively good condition, and the station wetwell interior is showing signs of corrosion. The valve vault cover was recently replaced with a concrete slab and updated hatches; however, significant mud is filling the valve vault and partially covers the valves. The new concrete slab appears to be partially covering some of the valve bolts, which may cause future maintenance issues. The wetwell interior has sufficient storage capacity and does not incur significant impacts from I/I; however, the coating is worn and the concrete top slab is degraded, exposing structural rebar and wood. The valve vault's surrounding concrete wall base exhibits significant wear-through. The degradation and exposure of the vault has resulted in partially buried valves.

The station is not fenced and does not have site lighting or odor control, although the wetwell is vented. Power service to the station is 230 volts, three-phase. The station has a potable water hose bibb for washdown. The station has a SCADA system with a telemetry transmitter/receiver. The County indicated that design was being completed to allow this station to be upgraded and moved to the south side of the road.

The following deficiencies were noted:

- Signs of corrosion on the wetwell interior wall likely due to high hydrogen sulfide concentration.
- Interior concrete slab shows wear, exposing structural rebar and wood.
- Valve vault includes partial burial of the valves.
- No dedicated suction or discharge bypass piping.
- Phase monitors appeared to be missing.

- The low height of the aerial power supply to the electrical meter possesses a potential electrical hazard.
- Missing seal-offs from the control panel conduit. This represents a significant code violation as well as a potential explosion hazard.

Proposed improvements to the station include:

- 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 relocating the power supply underground.
- Install seal-offs on any electrical equipment within 10 feet of the wetwell to conform with current codes.
- Evaluate the adjacent lot for future lift station conversion.

5.2.4 Representative Lift Stations/Vacuum Stations' Condition Assessments

Jones Edmunds personnel and CCU Operations staff also toured the selected group of neighborhood lift stations on January 31 and February 1, 2022, 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 1 – Community Center

The Community Center lift station (LS 1) is northeast of the seasonal community center at 3725 Easy Street, southwest of the intersection of Orange Street and Easy Street. This lift station receives gravity flows from the surrounding community including the seasonal community center. The station discharges into a 6-inch force main that pumps to the South Port Master (LS 65), which conveys flow to the East Port WRF.

The station is housed in a concrete building on an open easement with no fencing. The wall of the structure contains visible cracks. This station, originally built in 1959, contains two aboveground, self-priming, belt-driven 15-HP Gorman-Rupp pumps that were installed in 1980. Each pump has an estimated capacity of 220 gpm at approximately 65 feet of head. The 13-foot 9-inch depth, 7-foot by 6-foot rectangular wetwell interior shows signs of corrosion from hydrogen sulfide. The wetwell has no ventilation, so emitted gases are contained within the wetwell and the building. The 4-inch Dezurik plug valves and 4-inch Kennedy check valves are above the pumps.

Power service to the station is 230-volt, three-phase. The station has no odor-control system and no dedicated well bypass piping, although a covered square penetration in the wall is directly above the wetwell cover for local pump trucks to access the well for pump out. During storm events when the water level in the wetwell is high, CCU uses tanker trucks to collect and transport excess flows to the WRF. The station was recently upgraded to incorporate a portable generator receptacle in the electrical control panel. The electrical and control panels are outside the building and are in moderate condition. The station has a SCADA system with a telemetry transmitter/receiver.

The following deficiencies were noted:

- Cracks in the concrete building, including daylight visible through pipe penetrations.
- Corrosion of the wetwell.
- Access hatch hinge separated from wall.
- Pipe patch for leaking wye still showed signs to be leaking.
- Pump and pipe paint flaking/peeling.

Proposed improvements to the station include:

- Paint the aboveground discharge pump and piping.
- Repair/replace the patched wye connection.
- Repair cracks in the building.
- Seal pipe penetrations.
- Provide an odor-control system.
- Replace the outdated control panel and bring electrical up to current standards.
- Perform thorough rehabilitation of the lift station including repairing the building or replace the station with a modern submersible configuration and all new equipment.

5.2.4.2 Lift Station 2 – Dalton

The Dalton Lift Station is north of Sharon Circle Park, northwest of the intersection of Sharon Circle and Dalton Boulevard. The station was rebuilt in 2021 and receives wastewater from the surrounding residential area. The station discharges through a 6-inch force main to South Port Master (LS 65), which conveys flow to the East Port WRF.

The station contains two 5-HP Sulzer model XFP-100C-CB1.4-PE 35/4 submersible pumps inside an 8-foot-diameter, 23-foot 8-inch-deep wetwell. Each pump has an estimated capacity of 440 gpm at approximately 28 feet of head.

The lined concrete wetwell is in excellent condition and is vented. The wetwell hatches are in good condition and provide adequate access to remove the pumps on the 2-inch cylindrical-rail retrieval system. The 6-inch APCO plug valves, 6-inch Kennedy check valves, and dedicated suction and discharge connections are above grade, west of the wetwell.

Power to the station is 230-volt, three-phase and a pole-mounted transformer feeds the station. No generator is onsite, but a portion of the concrete pad can be used for a generator at this station in the future. The control panel has seal-offs and is equipped with a portable generator receptacle. The station contains a portable pump discharge and suction connection. The electrical and control panels are in good condition.

The station has barbed wire fencing and is on an unimproved parking lot in a residential neighborhood. No deficiencies were noted at this station.

5.2.4.3 Lift Station 7 – Pure Oil

The Pure Oil Lift Station (LS 7) is north of the gas station on the northeast corner of the intersection of Tamiami Trail and Easy Street. The lift station serves residential and commercial areas to its north and west, receiving flows from the Judd Lift Station (LS 8), which discharges into the upstream gravity sewer through a 4-inch force main and is conveyed to LS 65 South Port Master then through the 16-inch Westchester force main to the East Port WRF.

The station is housed in a concrete building and contains two aboveground, self-priming, belt-driven 20-HP Gorman-Rupp model T4A3B pumps providing a 48-amp draw. Each pump has an estimated capacity of 440 gpm at approximately 50 feet of head. The 13-foot-deep, 6-foot-by-13-foot-diameter concrete wet well is corroded by years of hydrogen sulfide exposure, and metal reinforcement is exposed near the access hatch. The wetwell has an older trough design and is not vented. The station has no odor control and no dedicated well suction bypass piping, although a circular penetration in the wall directly above the wetwell cover is available for local pump trucks to access. The space inside the building is exposed to sewer gases because access for the wetwell entry and float switches are open holes in the floor of the building.

Power service to the station is 230-volt, three-phase, and a pole-mounted transformer directly west feeds the station. The site does not have a potable water spigot for pump cleaning and maintenance. The main control panel is a wooden box mounted outside of the building. A portable generator receptacle with a manual transfer switch was added in recent years. A

portable pump connection is in a valve box outside of the building. The station has a SCADA system with a telemetry transmitter/receiver.

The station is not fenced, and metal reinforcement had to be installed behind the vented window after the plexiglass panels were broken by vandals. The building door and panels are typically locked, and the station has internal building lighting. The County's easement to access the station only extends 10 to 15 feet from the curb and is currently mostly obstructed with multiple electrical power poles that provide overhead electric. The County currently accesses the station through the parking lot of the adjacent gas station; however, the employee parking, a parked food truck, and a dumpster often partially block this access. Additionally, the nearby overhead power lines present potential danger to County staff when operating a crane truck in this area.

The following deficiencies were noted:

- Odor noted on site.
- Missing seal-offs from the control panel conduit.
- Obstructed access for a crane truck.
- Existing aerial power supply should be replaced with an underground supply.

Proposed improvements to the station include:

- Evaluate odor-control opportunities.
- Install seal-offs on any electrical equipment within 10 feet of the wetwell to conform with current codes.
- Evaluate possibilities for a dedicated access to the station.
- Perform thorough rehabilitation including the improvements listed above or replace the station with a modern submersible configuration and all new equipment.

5.2.4.4 Lift Station 18 – Jr. High

The Jr. High Lift Station (LS 18) is east of Midway Park, directly southwest of the intersection of Midway Boulevard and Orlando Boulevard. The station receives flow from the surrounding local gravity system and low-pressure sewer. 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 Boulevard.

The lift station contains two 5-HP Hydromatic S4SD500M3-4 submersible pumps with 6.75-mm impellers in a 6-foot-diameter, 23-foot-6-inch-deep, lined concrete wetwell. Each pump has an estimated capacity of 617 gpm at approximately 30 feet of head.

The wetwell hatches are in good condition and provide adequate access to remove the pumps along the 2-inch cylindrical-rail retrieval system. The wetwell lining is in good condition. The 6-inch Dezurik plug valves, 6-inch Kennedy check valves, and dedicated pump suction and discharge connections are all above grade to the south of the wetwell.

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 station has barbed wire fencing and 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 following deficiencies were noted:

- Rust was observed at the site under valves and flanges, indicating rain is entering through pitting between the bolts and flanges.

Proposed improvements to the station include:

- Perform routine maintenance including tightening bolts and touch-up painting.

5.2.4.5 Lift Station 20 – Lake Worth

The Lake Worth Lift Station (LS 20) is on Lake Worth Boulevard between Juniper Street and Joseph Street. This station, constructed in 1981, receives flow from the surrounding residential area along with low-pressure sewer and discharges through a 6-inch force main that connects to a 10-inch force main to convey flow to the Altoona Lift Station (LS 139) then to the East Port WRF.

The station contains two 9.4 HP Flygt Model 3126 submersible pumps with 461-mm impellers inside a 6-foot-diameter, 10-foot-9-inch-deep, lined, concrete well. Each pump has an estimated capacity of 440 gpm at approximately 50 feet of head.

The wetwell exterior is in relatively good condition, and the interior is not showing any signs of corrosion. The station has

a valve vault east of the wetwell housing 6-inch plug Dezurik valves, dedicated discharge, and 6-inch Kennedy check valves. The interior valve vault wall is in poor condition with cracks; the bottom is filled with stones indicating leakage.

The station has a SCADA system with a telemetry transmitter/receiver. The electrical equipment is in relatively good condition.

The site is completely fenced and does not have dedicated lighting. A HIVENT odor-control system is installed above the wetwell and dedicated bypass suction. The power service at the station is 230-volts, three-phase, with a pole-mounted transformer across the street from the station. The control panel is equipped with a portable generator receptacle with a mechanical interlock between the generator and main breaker. The station has a reclaim water hose bibb.

The following deficiencies were noted:

- Missing seal-offs from the control panel conduit. This represents a significant code violation as well as a potential explosion hazard.

Proposed improvements to the station include:

- Install seal-offs on any electrical equipment within 10 feet of the wetwell to conform with current codes.

5.2.4.6 Lift Station 24 – Charlotte Square

The Charlotte Square Lift Station (LS 24) is northeast of Abbe's Donut Nook at 2150 Tamiami Trail, north of the intersection of Forrest Nelson Boulevard and Tamiami Trail. The station receives residential and commercial flow from the surrounding area, low-pressure sewer, and the Eckerd Lift Station (LS 92) and discharges to the Quesada Lift Station (LS 37) to convey flow to the East Port WRF.

LS 24 contains two 3-HP ShinMaywa 4CNWX42.2T2E submersible pumps inside a lined concrete 6-foot-diameter, 19-foot-10-inch deep wetwell. Each pump has an estimated capacity of 100 gpm at 47 feet of head.

The wetwell is very corroded, and the lining is separated from the wall in some places. Additionally, the surface of the liquid in the well shows some signs of grease. The wetwell is an older design in which the valve vault is not separated by a wall and is instead a shelf built into the side of the wetwell (shown in bottom left photo). This design can be dangerous to operators who need access during high-water levels in addition to confined space issues and sulfide exposure. The 4-inch Dezurik plug valves and 4-inch Kennedy check valves are on this shelf.

The site is not fenced in, does not have dedicated lighting, and does not have an odor-control device. The hatches are in good condition and are padlocked for safety. The hatch above the

valve vault is difficult to open. The power service to the station is 208-volt, three-phase and is powered by a nearby pad-mounted transformer just south of the wetwell. The station has a SCADA system with a telemetry transmitter/ receiver as well as a telemetry control unit inside the panel. The control panel does not have seal-offs but is equipped with a portable generator receptacle. A mechanical interlock is between the generator and main braker. A potable water hose bibb is at the site for washdown.

The following deficiencies were noted:

- Heavy corrosion of the lined concrete.
- The station experiences flooding during storm events and the valves are on the shelf of the wetwell without dedicated discharge.
- Missing seal-offs from the control panel conduit. This represents a significant code violation as well as a potential explosion hazard.

Proposed improvements to the station include:

- Evaluate the wetwell for lining replacement and potential structural repair.
- Evaluate construction of a separate, isolated valve vault for operator safety, including standard dedicated discharge.
- Install seal-offs on any electrical equipment within 10 feet of the wetwell to conform with current codes.

5.2.4.7 Lift Station 44 – Liberty Elementary

The Liberty Elementary Lift Station (LS 44) is in front of Liberty Elementary School at 370 Atwater Street, northeast of the intersection of Wilkie Avenue and Atwater Street. The station receives flow from the surrounding low-pressure sewer system as well as from the elementary school and residential area. LS 44 conveys flow through a 4-inch force main to the East Port WRF.

The lift station contains two 20-HP Flygt submersible pumps with 454-mm impellers in a 6-foot-diameter, 10-foot-2-inch-deep wetwell. Each pump has an estimated capacity of 454 gpm at approximately 45 feet of head.

The wetwell is extremely corroded and has cracks along the lining of the wall, including a portion that appears to be half-collapsed. The wetwell hatch is in good condition and provides adequate access to remove the pumps along the 2-inch cylindrical-rail retrieval system. An odor was present at the time of the site visit but the wetwell is vented. The 4-inch discharge Dezurik plug valves and 4-inch Mueller check valves are in an adjacent lined valve vault with a dedicated discharge. Corrosion is slightly evident within the vault surrounding the check valves. The hatch of the valve vault is in good condition.

The power service to the station is 230-volt, three-phase, with a pole-mounted transformer. The control panel has seal-offs and is equipped with a portable generator receptacle. The control panel is in fair condition. The station has a SCADA system with a telemetry transmitter/receiver.

The site has barbed-wire fencing. The overall condition of the fencing is fair; some barbed wire disconnects occur and a gap between the gravel and the bottom of the fence creates easy access for small animals. The only access to the lift station is across the sidewalk through the school entrance, which does not allow vehicular access.

The following deficiencies were noted:

- The wetwell is partially collapsed and needs repair in addition to the wetwell lining needs to be repaired.
- Check valves are rusted.
- Being located next to the school makes access difficult during peak school traffic.

Proposed improvements to the station include:

- Perform thorough rehabilitation including some form of structural improvement and lining repair.
- Evaluate the replacement of the check valves.
- Evaluate possibilities for a dedicated access to the station.

5.2.4.8 Lift Station 45 – Woodbury

The Woodbury Lift Station (LS 45) is across the street from Full Spectrum Retirement at 630 Woodbury Drive, south of the intersection of Paulson Drive and Woodbury Drive. This station, built in 1983, receives wastewater from the Kia LS, LS#102, LS #127 Grand Oaks Plaza, LS# 110 Bridle Ridge, and the surrounding privately-owned commercial properties along US 41. Discharge is through a 6-inch force main to Quesada (LS 37) where flow is conveyed to the East Port WRF.

LS 45 contains two 10-HP Flygt model 3127 submersible pumps with 432-mm impeller. The pumps are installed in a 6-foot-diameter, 18-foot-3-inch-deep, lined, concrete wetwell. Each pump has an estimated capacity of 176 gpm at approximately 24 feet of head.

The wetwell exterior and electrical equipment are in relatively good condition but the wetwell interior is showing signs of corrosion and odor. The station has a dedicated discharge in the valve vault that also houses a 6-inch AFC plug valve and 6-inch Mueller check valve. The interior valve vault is in good condition and is made of concrete with dry dirt at the bottom.

The site is completely fenced and does not have dedicated lighting. No odor-control system was on site. The power service at the station is 480 volts, three-phase, with a pole-mounted transformer across 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 is equipped with a portable generator receptacle with a mechanical interlock between the generator and main breaker. The station has a potable water hose bibb for washdown.

The following deficiencies were noted:

- Missing seal-offs from the control panel conduit. This represents a significant code violation as well as a potential explosion hazard.
- Odor problem.
- Broken invert coming to station.

Proposed improvements to the station include:

- Install seal-offs on any electrical equipment within 10 feet of the wetwell to return to conformance with current electrical codes.
- Evaluate incorporating a simplistic HIVENT odor-control unit, if appropriate.
- Rehabilitate the invert coming to the station.

5.2.4.9 Lift Station 150 – Maracaibo

The Maracaibo Lift Station (LS 150) is northwest of the intersection of McKim Avenue and Maracaibo Street. This station, recently built between 2019 and 2021, receives wastewater from the surrounding low-pressure sewer and gravity system and conveys flow to the East Port WRF.

The lift station contains two 2.5-HP Liberty Model LGH 023 submersible pumps with 5.86-mm impellers in a 4-foot-diameter, 20-foot-8-inch-deep, lined wetwell. Each pump has an estimated capacity of 47 gpm at approximately 11 feet of head.

The wetwell is in excellent condition and provides adequate access to remove the pumps along the lift station single cylindrical-rail retrieval system. The site has a dedicated suction and discharge connection. The 2-inch discharge Dezurik plug valves and 2-inch Kennedy check valves are in an underground lined vault north of the station. The valve vault is in excellent condition.

The power service to the station is 240-volt, single-phase, with a pole-mounted transformer. The control panel has seal-offs, is equipped with a portable generator receptable, and is in excellent condition. The station has a SCADA system with a telemetry transmitter/receiver. The station has barbed wire fencing and is in excellent condition. No deficiencies were noted at this station.

5.2.4.10 Lift Station 303 – Constantine

The Constantine Lift Station (LS 303) is across the street from 26168 Constantine Road 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 Master Lift Station (MLS 309).

LS 303 contains a single 3-HP Flygt Model NP3085 submersible pump with a 465-mm cutter impeller that was replaced in 2020. The pump has an estimated capacity of 312 gpm at 16 feet of head and sits in a 6-foot-diameter 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 manhole conical lid, which may present some difficulty when removing and resetting the pumps. The station has no discharge isolation valves, emergency dedicated pump suction connection, or 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 served 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 the generator breaker. The control panel uses an inverter to allow a 3-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 convert the existing wetwell 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.

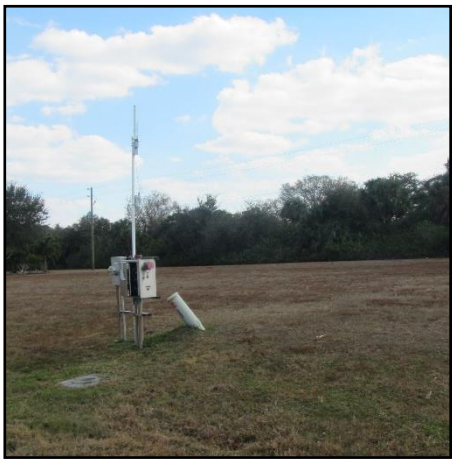
The following deficiencies were noted:

- 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 improvements to the station include:

- Install an interlock on the electrical equipment and perform a detailed electrical code review to return to conformance with code.
- Install seal-offs and perform a detailed electrical code review to return to conformance with code.
- Perform thorough rehabilitation on the wetwell and prepare for construction of the improved design to allow safe access.
- Prepare for construction of the improved design to allow safe access, inclusion of appropriate valves, and inclusion of bypass piping.

5.2.4.11 Lift Station 442 – Doredo 2



The Doredo 2 Lift Station (LS 442) is approximately at 25191 Doredo Drive, south of the intersection of Doredo Drive and Alcazar Drive. This station, built in 2011, receives flows from approximately 15 percent of the simplex stations in the Burnt Store area and discharges to LS 412 and ultimately to the Burnt Store WRF through a 4-inch force main.

LS 442 contains a single 3-HP Hydromatic submersible pump with a 7-inch impeller. The pump has an estimated capacity of 413 gpm at 7 feet of head and sets in a 6-foot wetwell.

Power service to the station is 230-volt, 3-phase. A portable generator receptacle with a mechanical interlock is available. The station does not have a SCADA system but does have a local annunciator with a 12-volt battery backup. The station experiences high flows and can often have ponding during high-rain events. The system is not fenced and does not have an odor-control system. The wetwell top slab, hatch, and interior walls are in good condition.

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

The following deficiencies were noted:

- Location of the wetwell and method to access hatch promotes possible danger to staff.
- No isolation valves.
- No stand-by pump.
- No bypass piping.

Proposed improvements to the station include:

- Evaluate an adjacent lot for future lift station conversion to allow safe access and inclusion of appropriate valves and bypass piping.
- Evaluate the installation of a secondary stand-by pump.

5.2.4.12 Lift Station 809 – Placida Harbor

The Placida Harbor Lift Station (LS 809) is at 11000 Placida Road inside the Placida Harbor residential community southeast of the intersection of Gaspar Drive and Placida Road. This station, built in 1986, receives wastewater from LS 810, LS 811, and the surrounding residential community and discharges through a 6-inch force main that ties into a 12-inch force main where flow is conveyed to the Rotonda WRF.

The station contains two 7.5-HP ShinMaywa model 4CNWX45.512E submersible pumps inside a 6-foot-diameter, 21-foot-deep concrete wetwell. Each pump has an estimated capacity of 387 gpm at approximately 46 feet of head. The pumps were inoperable at the time of the site visit, and a temporary bypass pump was set up to convey flow through the dedicated discharge in the valve vault north of the station.

The station wetwell exterior and electrical equipment are in poor condition, and the station wetwell interior is showing signs of corrosion. The 6-inch Dezurik plug valves and 6-inch Kennedy check valves are in the adjacent valve vault.

The station does not have a secured perimeter fence but is behind a partial fence out of sight where the residential community's trash cans are stored. Gates prevent unauthorized access into the community. The station does not have dedicated lighting. No odor control was present on site, but the wetwell has a screened vent. The power service to the station is 230 volts, 3-phase. The control panel is equipped with portable a generator receptacle and a mechanical interlock between the generator and main breaker. The station has a SCADA system with a telemetry cellular transmitter/receiver for notification of pump start fails, high-wetwell conditions and power failures.

The following deficiencies were noted:

- Missing seal-offs from the control panel conduit. This represents a significant code violation as well as a potential explosion hazard.
- The lift station was operating on a bypass pump at the time of the site visit.
- Omni Beacon telemetry unit has a battery backup.
- Poor lift station access.
- Missing water service near the station.

Proposed improvements to the station include:

- Install seal-offs on any electrical equipment within 10 feet of the wetwell to return to conformance with current electrical codes.
- Repair the station and replace pumps and pump bases as necessary to return to standard operation.
- Install battery backups to provide redundancy for signaling to Operations staff.
- Replace or repair the high-level alarm to allow notification to Operations staff.
- Evaluate incorporating a dedicate access for Operations staff, including access for pump trucks.
- Evaluate incorporating a water service near the station.

5.2.4.13 Lift Station 813 – Marina

The Marina Lift Station (LS 813) is at 115 Rotonda Circle across from the Rotonda Golf and Country Club, south of the intersection of Golfview Road and Rotonda Circle. This station, built in the 1970s, receives flows from LS 812, as well as the surrounding residential area and discharges through a 4-inch force main to LS 801 where the flow is conveyed to the Rotonda WRF.

The station contains two 3.7-HP ABS/Sulzer model XFP100C-CB1.5-PE28/4 submersible pumps that were installed in May 2021, in a 6-foot-diameter, 18-foot-deep, concrete wetwell. The pumps have an estimated capacity of 175 gpm at approximately 19 feet of head. A dedicated discharge is west of the station.

The wetwell has an open top, uncovered, and is surrounded by hand railing. The 4-inch discharge piping contains a 4-inch AFC plug valve and 4-inch Onyx duckbill check valve.

The station is not fenced but is housed in a wooden building that has dedicated lighting. The station does not have an odor-control system. During the site visit, we observed that the building needs to be aerated before entering. The power service to the station is 230-volts, 3-phase and is powered by a pad-mounted transformer at the driveway entrance leading to the lift station. The station has a SCADA system with a telemetry transmitter/receiver. The control panel does not have seal-offs but is equipped with

a portable generator receptacle. The mechanical interlock is on the dead front of the panel, allowing the potential for it to be accidentally overridden. No water service is provided at the site.

The following deficiencies were noted:

- Missing seal-offs from the control panel conduit.
- The lift station building needs to be aerated before entering.
- Mechanical interlock was secured to the dead front instead of behind it, allowing potential for it to be overridden.
- Uncovered wetwell provides safety concern and excess sulfide corrosion and exposure.

Proposed improvements to the station include:

- Install seal-offs on any electrical equipment within 10 feet of the wetwell and perform a detailed electrical code review to return to conformance with current electrical codes.
- Evaluate the option of rehabilitating the lift station to meet standard codes.
- Secure the mechanical interlock behind the dead front to between the generator and the main breaker.
- Evaluate covering the wetwell temporarily until full rehabilitation or replacement of the station can be coordinated.

5.3 VACUUM STATIONS

At the end of FY 2021, the system had three vacuum stations, with a fourth in design, all owned by CCU. All three stations have permanent auxiliary power and on-site trailer-mounted generators capable of providing full power for 3 to 5 days.

During site visit assessments conducted by Jones Edmunds personnel and CCU staff on January 31 and February 1, 2022, two vacuum stations were evaluated, as selected by CCU staff. Table 5-2 lists the vacuum stations visited. The site visit assessments will help CCU to identify and prioritize maintenance, rehabilitation, or replacement work at these lift stations.

Table 5-2 Visited Wastewater Collection Systems – Vacuum Stations

Station No.	Location
VS 1 – Skylark (LS 59)	598 Skylark Lane NW
VS 2 – El Jobean (LS 99)	4070 Railroad Avenue

5.3.1 VS 1 – SKYLARK (FORMERLY LS 59)

The Skylark Vacuum Station (LS 59) is at 598 Skylark Lane NW, southwest of the intersection of Azalea Avenue NW and Skylark Lane NW. This vacuum lift station receives flow from the vacuum collection system in the surrounding area through four 10-inch vacuum lines. LS 59 discharges through a 6-inch metered force main that converts to a 12-inch and ultimately a 20-inch force main and transmits flow to the RTS leading 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 137.5 feet of head, but the pumps recently had their impellers trimmed to 34-feet TDH @725 gpm and their VFDs modified to account for the improvements made to the system curve after the RTS and GMLS construction.

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 for 353 actual cubic feet per minute (ACFM) of displacement, force flow into the vacuum tank. A permanent overhead crane has been installed for removing these vacuum pumps.

The building contains a dedicated pump crane for removing the discharge 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, 3-phase. A 300-kW Cummins generator, rated at 375 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 morning 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 County noted an access platform for this was being designed.

Proposed improvements to the station include:

- Evaluate modifying the overhead crane with a trolley for lateral movement.
- Complete design to implement access to the top of the tank for maintenance.

5.3.2 VS 2– El Jobean (Formerly LS 99)

The El Jobean Vacuum Station (LS 99) is at 4070 Railroad Avenue, south of the intersection of Weeksonia Avenue and Railroad Avenue. The vacuum lift station receives flow from the vacuum collection system in the surrounding area, including residential units and three restaurants, through three 8-inch vacuum lines. LS 99 discharges through a 6-inch metered force main that converts to an 8-inch and ultimately a 12-inch force main and transmits flow directly to LS 37.

The station contains two 25-HP Cornell centrifugal Model 4NHTA-VC18DB pumps inside the building. Each pump has a design capacity of 419 gpm at 101 feet of head. The pumps recently had their impellers replaced to account for the improvements made to the system curve after the RTS and GMLS construction.

A 2,900-gallon Duratech vacuum tank in the lower level of the building has a design pressure of 5 psi. Three 10-HP Busch Mink model MM 1502 A VA6 vacuum pumps, each rated for 353 ACFM of displacement, force flow into the vacuum tank.

The building has a dedicated pump crane for removing the discharge pumps and valves from the lower level. 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, 3-phase. A 300-kW Cummins generator with an ATS is installed within the fence on the west side 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 telemetry transmitter/receiver.

The following deficiencies were noted:

- 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.

Proposed improvements to the station include:

- Evaluate a catwalk or dedicated ladder for accessing the top of the tank for maintenance.
- Verify the vacuum station site is in accordance with Occupational Safety and Health Administration (OSHA) and County safety and confined-space requirements.
- Evaluate a portable hoist or dedicated overhead crane for easier access to the vacuum pumps.
- Evaluate fall protection needs while removing pumps for maintenance and repair.

5.4 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 with understanding and managing 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 and vacuum stations) are continuously monitored by 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 in addition to the 15 lift stations with existing permanent generators. Through FEMA grants, the County is preparing for delivery of an additional 14 stationary generators and 10 trailer-mounted generators.

5.5 Maintenance

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

5.5.1 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 6,833 corrective SOs were generated by customer calls during

FY 2021, compared to 6,665 from FY 2020. Designating the SO as being related to wastewater or water is determined by the dispatcher. Table 5-3 denotes the FY 2021 SOs by source and issuer:

Table 5-3 Service Orders – FY 2021

System/Issue	Customer Calls	PM Service Orders
Low-Pressure Sewer	3,160	605
Sewer Lines	592	401
Lift Stations	2,853	2,289
Vacuum Sewer	228	963

5.5.2 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 a low-pressure 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.

5.5.3 Preventative Maintenance

The wetwells of all lift stations and vacuum 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 has been approved, and the County is preparing for the addition of 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.

5.6 Review of Previous Report Recommendations

Table 5-4 summarizes the recommendations and status since the 2020 Annual Report for the wastewater collection system.

Table 5-4 Wastewater Collection System – FY 2020 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:	▪ Multiple work orders are ongoing for this progress.
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 new generators. Improvements are actively being made at various lift stations in preparation of these 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.

	Master Lift Station No. 65 – South Port Master
Recommendation:	▪ 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.
Progress:	▪ County evaluated and determined no pump replacements would be performed at this time. ▪ No action. ▪ Survey performed but fencing not completed. ▪ No action. ▪ No action.
	Master Lift Station No. 83 – Maple Leaf Master
Recommendation:	▪ 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.
Progress:	▪ The County determined that no action was required due to the guard shack near the site. ▪ The County changed the Carbon, but still evaluating odor control options.
	Master Lift Station No. 139 – Altoona
Recommendation:	▪ No significant deficiencies were noted, and the FY 2019 issues appear to have been resolved.
Progress:	▪ No action required.
Recommendation:	Lift Station No. 3 – Gardner ▪ 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.
Progress:	▪ Not completed. ▪ The County will be installing a generator at this location, so no interlock has been incorporated. ▪ The County changed the wiring to prevent confined space requirements. ▪ No action.
	Lift Station No. 6 – Higgs
Recommendation:	▪ 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.
Progress:	▪ No action. ▪ The County evaluated and a bid package for the replacement of this pump has been issued.

	Lift Station No. 9 – Church
Recommendation:	▪ 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.
Progress:	▪ The County evaluated and determined no pump replacements would be performed at this time. ▪ The County is designing alternative station. ▪ The County has rerouted this station to Olean to fix pump operation.
	Lift Station No. 17 – Beach
Recommendation:	▪ 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.
Progress:	▪ The County is designing alternative station. ▪ The County evaluated and a bid package for the replacement of this pump has been issued.
	Lift Station No. 18 – Jr. High
Recommendation:	▪ Evaluate updating the pumps to a lower-head pump selection to avoid future run-out conditions.
Progress:	▪ County evaluated and determined no pump replacements would be performed at this time.
	Lift Station No. 27 – McGrissor
Recommendation:	▪ 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.
Progress:	▪ County has evaluated and determined no optimal solution exists. ▪ County has cleared drainage. ▪ County evaluated and determined no pump replacements would be performed at this time.
	Lift Station No. 28 – Peachlove
Recommendation:	▪ 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.
Progress:	▪ No action. ▪ County evaluated and a bid package for the replacement of this pump has been issued. ▪ County evaluated and a bid package for the replacement of these rails has been issued. ▪ The evaluation was completed in FY 2021.

	<u>Lift Station No. 55 – Meadow Park</u>
Recommendation:	▪ 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.
Progress:	▪ The evaluations were completed in FY 2021.
	<u>Lift Station No. 59 (Vacuum Station) – Skylark</u>
Recommendation:	▪ 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.
Progress:	▪ The County evaluated and no further modification is planned at this time. ▪ The County is coordinating design of access platform for top of tank. ▪ Overhead crane has been installed. ▪ Appropriate OSHA signage has been included onsite. ▪ County evaluated, replaced the pump impellers, and modified the VFDs.
	<u>Lift Station No. 64 – Sandhill Pines</u>
Recommendation:	▪ 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.
Progress:	▪ County evaluated and determined no pump replacements would be performed at this time. ▪ County has not completed the driveway or smaller diameter evaluations.
	<u>Lift Station No. 77 – Windstar</u>
Recommendation:	▪ Evaluate updating the pumps to higher-head pumps to avoid deadheading after the RTS and GMLS construction.
Progress:	▪ County evaluated and determined no pump replacements would be performed at this time.
	<u>Lift Station No. 88 – Common Medical</u>
Recommendation:	▪ Evaluate updating the pumps to higher-head pumps to avoid deadheading after the RTS and GMLS construction.
Progress:	▪ County evaluated and a bid package for the replacement of this pump has been issued.

	Lift Station No. 93 – Wawa
Recommendation:	▪ Evaluate updating the pumps to a lower-head pump selection to avoid future run-out conditions.
Progress:	▪ County evaluated and determined no pump replacements would be performed at this time.
	Lift Station No. 122 – Clinton
Recommendation:	▪ Evaluate updating the pumps to a lower head pump selection to avoid future run-out conditions.
Progress:	▪ County evaluated and determined no pump replacements would be performed at this time.
	Lift Station No. 303 – Constantine
Recommendation:	▪ 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 action has been performed. ▪ No action has been performed. ▪ The County is coordinating design of alternate pump station placement.

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. This Chapter presents each facility independently since each WRF is unique in its design and treatment approach. In addition, this Chapter reviews CCU's wastewater pre-treatment and biosolids handling and disposal programs. Table 6-1 lists permitted treatment capacities of CCU's WRFs.

Figure 6-1 CCU Wastewater Treatment Facilities

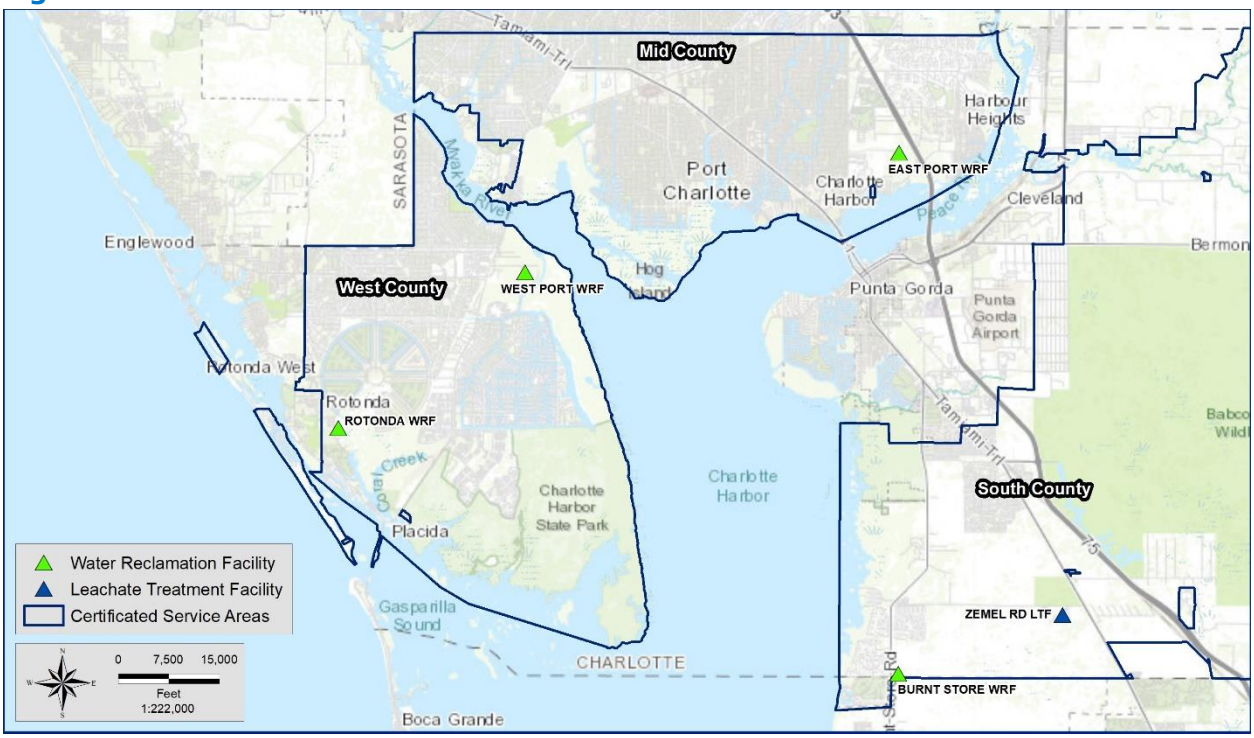


Table 6-1 CCU Water Reclamation Facilities and Design Capacities

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 a phased upgrade expansion 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 WASTEWATER PRETREATMENT COMPLIANCE

CCU has a wastewater pretreatment program for receiving and collecting septage and fats, oils, and grease (FOG) within the collection system to serve their residents with septic systems, enhance treatment, and prevent overflows in the collection system. CCU's Pretreatment Program includes:

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

6.1.1 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 allowed CCU staff to better 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 2021, the program accepted 9,109,034 gallons from 42 permitted haulers.

6.1.2 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 2021, 2,127 work orders were completed including 1,710 grease trap inspections, 362 grease trap re-inspections, 41 spill sample inspections, and 14 new installation inspections.

Through a partnership with Liquid Environmental Solutions (LES), the FOG is transformed into biodiesel 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.

6.1.3 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.

6.2 EAST PORT WRF

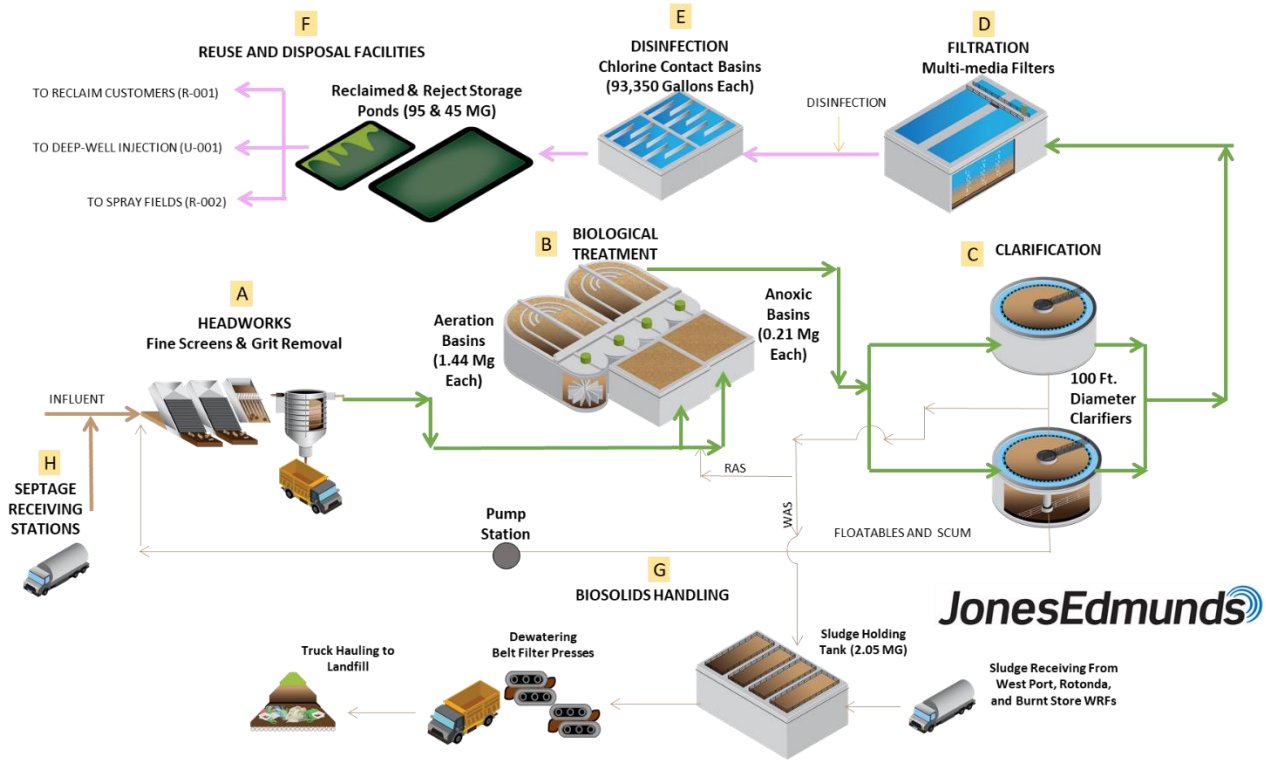
The East Port WRF is at 3100 Loveland Boulevard, Port Charlotte, Florida, and acquired as part of the 1991 GDU purchase. The WRF began its current operations in 1996 with a current permitted operating capacity of 6.0 MGD AADF. East Port WRF uses a two-stage activated-sludge process to treat domestic 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 in the case of electrical power failure.

The East Port WRF is also the location of a NELAP-certified EPLAB at the main operations building. 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 fields 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 In-Plant 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 quiescent environment to promote solids separation. The clarifiers are skimmed to remove floating materials and scum, which are sent to the aerobic digester for treatment. The clarifier effluent flows over a circumferential weir into a final effluent launder 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 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 CCC No. 1 clearwell 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 spray fields or the two Class I injection wells (IW-1 and IW-2) with permitted capacities of 1,420 gpm (2.045 MGD) and 5,250 gpm (7.560 MGD), respectively.

G) 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 flowmeter 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.

6.2.1 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 – dissolved oxygen (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 2022, with construction completed at the end of 2023.
- IW-1 Permit (0330486-002-UO/1M) – Expiration Date: October 17, 2021
  - A permit renewal application and supporting documents for a 5-year operating permit renewal for IW-1 was submitted in July 2021. The application is in the Request for Additional Information (RAI) process.
  - The previous mechanical integrity test (MIT) was performed on IW-1 on September 5, 2019. The next MIT will be due by September 4, 2024.
- IW-2 Permit (0330486-003-UO/1M) – Expiration Date: May 4, 2026
  - The previous mechanical integrity test (MIT) was performed on IW-2 on July 2, 2020. The next MIT will be due by July 1, 2025.

6.2.2 Wastewater Flows and Loads

The East Port WRF permitted capacity is 6.0-MGD AADF. In FY 2021, the AADF was 4.52 MGD, and the East Port WRF was operating at 75 percent of the plant permit capacity. The maximum average daily flow (MADF) occurred in September 2021 at 7.55 MGD. The highest TMADF of 5.30 MGD occurred in September 2021, which is 88 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 6-2 summarizes the influent flows as reported in the Discharge Monitoring Reports (DMRs).

Table 6-2 East Port WRF Influent Flows FY 2021

Month	MADF (MGD)	AADF (MGD)[1]	TMADF (MGD)	MDF (MGD)	TMADF Percent Capacity (%)
Oct-20	4.63	4.42	4.86	5.28	81
Nov-20	4.93	4.48	4.96	7.28	83
Dec-20	4.45	4.51	4.67	5.00	78
Jan-21	4.30	4.51	4.56	4.52	76
Feb-21	4.18	4.47	4.31	4.54	72
Mar-21	4.16	4.46	4.21	4.42	70
Apr-21	4.08	4.47	4.14	4.36	69
May-21	3.66	4.44	3.97	3.99	66
Jun-21	3.92	4.37	3.89	4.57	65
Jul-21	5.52	4.48	4.37	9.39	73
Aug-21	5.13	4.52	4.86	7.19	81
Sep-21	5.25	4.52	5.30	7.75	88

Notes: MDF = Maximum daily flow.

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

At the end of FY 2021, the average annual influent load for 5-day Carbonaceous Biochemical Oxygen Demand (BOD) was 5,784 pounds per day (lb/day) and for TSS was 6,804 lb/day. The maximum monthly average BOD load was 7,087lb/day in June 2021. The maximum monthly average TSS load was 9,670 lb/day in July 2021. Table 6-3 summarizes the wastewater characteristics of the East Port WRF influent as reported in the DMRs.

Table 6-3 East Port WRF Influent Water Quality FY 2021

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-20	116	4,492	150	5,791
Nov-20	110	4,518	123	5,129
Dec-20	131	4,881	147	5,465
Jan-21	186	6,678	198	7,084
Feb-21	183	6,470	224	7,888
Mar-21	158	5,467	227	7,887
Apr-21	184	6,238	200	6,799
May-21	164	4,924	178	5,352
Jun-21	182	5,983	194	6,435
Jul-21	151	7,087	197	9,670
Aug-21	154	6,712	171	7,613
Sep-21	136	5,956	148	6,541

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

6.2.3 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 spray fields (R-002) requiring basic level disinfection. Table 6-4 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 6-4 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 6-5 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 2021, the annual average effluent flow for to the master reuse system (R-001) and spray fields (R-002) were 1.6 MGD and 1.7 MGD AADF, respectively. Wells IW-1 and IW-2 (U-001) totaled 2.75 MGD AADF, which is below the permitted capacity of 9.6 MGD AADF. The maximum single sample BOD and TSS values were 9.9 mg/L and 1.1 mg/L, respectively, showing no violations of the single-sample limits for BOD or TSS were recorded in FY 2021. Consequently, the BOD and TSS annual average, monthly, and weekly concentration requirements were also met in FY 2021. The maximum fecal coliform counts

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

Table 6-5 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-20	1.2	0	0.2	2.4	<2.0	0.4	<1
Nov-20	1.0	0	0.4	4.0	2.5	0.8	<1
Dec-20	1.0	0.05	0.5	2.7	<2.0	0.7	<1
Jan-21	1.1	0.1	0.2	2.1	2.3	0.5	<1
Feb-21	1.6	0.1	0.2	1.9	<2.0	0.7	<1
Mar-21	2.4	0	0.2	2.3	9.9	1.0	<1
Apr-21	3.0	0	0.1	1.0	9.5	1.1	<1
May-21	3.0	0	0.0	0.4	2.6	0.8	<1
Jun-21	2.6	0	0.0	0.0	<2.0	0.5	<1
Jul-21	0.9	0	0.4	4.1	2.7	0.9	<1
Aug-21	0.7	0	0.4	3.9	3.5	1.0	<1
Sep-21	0.7	0	0.5	4.9	3.1	0.8	<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.

6.2.4 Treatment Components and Condition Assessments

Jones Edmunds completed an on-site review of the plant on February 4, 2022. Jones Edmunds personnel met with the Chief Operator, Mike McCrumb, 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 spray field sites are routinely mowed, 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.

6.2.4.1 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.

6.2.4.2 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 has been 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. At the top of the headworks, the hose bibb was disconnected and no longer in use.

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 9.0-MGD WRF upgrade.

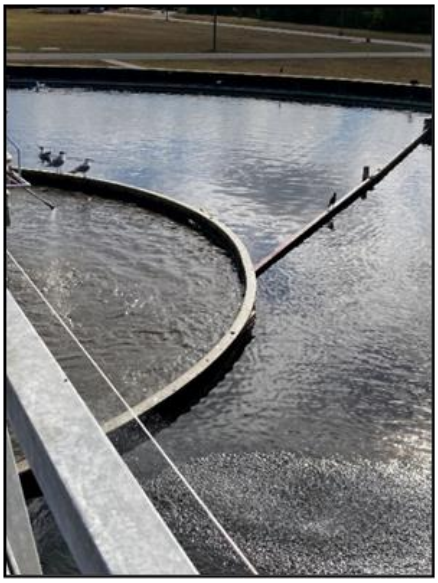
The septage receiving units and the adjacent driveway area collect grit and spillage of septic waste. A hose is used by the haulers to clean the area. The wash water is collected in the plant sewer system and pumped to the headworks for treatment. A steam cleaner is used by CCU WRF staff for cleaning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

6.2.4.3 Flow Equalization

The East Port WRF currently does not have flow Equalization (EQ) storage for peak-hour influent flows and loads. However, the 1.48-MG cast-in-place concrete tank that previously served as the aerobic digester is being modified and retrofitted to serve as an influent EQ Tank as part of the 9-MGD plant expansion design.

6.2.4.4 Biological Treatment

The overall condition and operation of the MLE process are 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 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. At the time of the site visit on February 4, 2022, Oxidation Ditch No. 2 anoxic zone was observed to have areas where a significant amount of floatable solids were gathered and forming an island on the water surface. A mixer may not have been in service at the time of the visit. Smaller areas were also observed at Oxidation Ditch No. 1. If this issue persists, we recommend adding plant water spraying to coax a better mixing zone and prevent floatable solids from collecting.



6.2.4.5 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.

6.2.4.6 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 and was backwashing 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.

6.2.4.7 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. CCC No. 2 was drained during the time of the site visit. 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.

6.2.4.8 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 fouling issues. 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 that 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 spray field). Effluent transfer pumps are well maintained but are showing signs that they need to be repainted. CCU also maintains a 45-MG lined effluent storage pond that is used before injection well and/or spray field disposal. It also serves as additional wet weather storage. The 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 spray field. Both deep injection wells are well maintained and in good working order. All valves are exercised regularly. All associated meters are calibrated semi-annually and are up to date.

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.

6.2.4.9 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 in 2020 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. This issue is being resolved as part of the 9.0-MGD expansion with the addition of another digester and a dewatering unit.

Operators on site noted the belts on the BFPs are replaced every 2 years and no operational issues currently exist.

6.2.4.10 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 in 2020. 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 and their supports to the handrails and elsewhere were broken or damaged and need to be replaced or repaired.
- Oxidation Ditches Controller Panels – The screens on the controllers for the probes at the effluent of the oxidation ditches are showing some signs of sun damage and we recommend that sunshields be installed over the front of the three-sided enclosures
- Blower Building – Most of the equipment is new and in service as part of the GMLS.
- 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.
- 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 poor condition, reaching the end of its reasonable service life and should be considered for replacement soon.

6.2.5 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 serve 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, 2020, and 2021 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. The operators at West Port and Rotonda WRFs have also expressed concerns with the limited capabilities to haul sludge by truck to East Port WRF resulting in a reduction in the ability to waste sludge at the West Port and Rotonda WRFs.

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 total solids (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.

6.2.6 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.

6.2.7 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 6-6 summarizes the 2020 recommendations and status of each item.

Table 6-6 East Port WRF 2020 Recommendations and Status

Recommendation: Progress:	▪ Apply for the permit renewal for IW-1 at the East Port WRF. ▪ Permit renewal application submitted July 2021 is currently under FDEP review.
Recommendation: Progress:	▪ Replace the irrigation pumping station electrical switchgear. ▪ Not complete.
Recommendation: Progress:	▪ Provide influent EQ tank by retrofitting 1.48-MG tank. ▪ Pending WRF expansion.
Recommendation: Progress:	▪ Replace and relocate the septage-receiving stations and pump septage into the EQ tank. ▪ Pending WRF expansion.
Recommendation: Progress:	▪ Convey Digester Decant, In-Plant Pump Station No. 1, and No. 2 Plant Recycle flows into EQ Tank. ▪ Pending WRF expansion.
Recommendation: Progress:	▪ Provide two additional clarifiers. ▪ Pending WRF expansion.
Recommendation: Progress:	▪ Replace reclaimed water automated back-washable filters and include permanent bypass line. ▪ Complete.

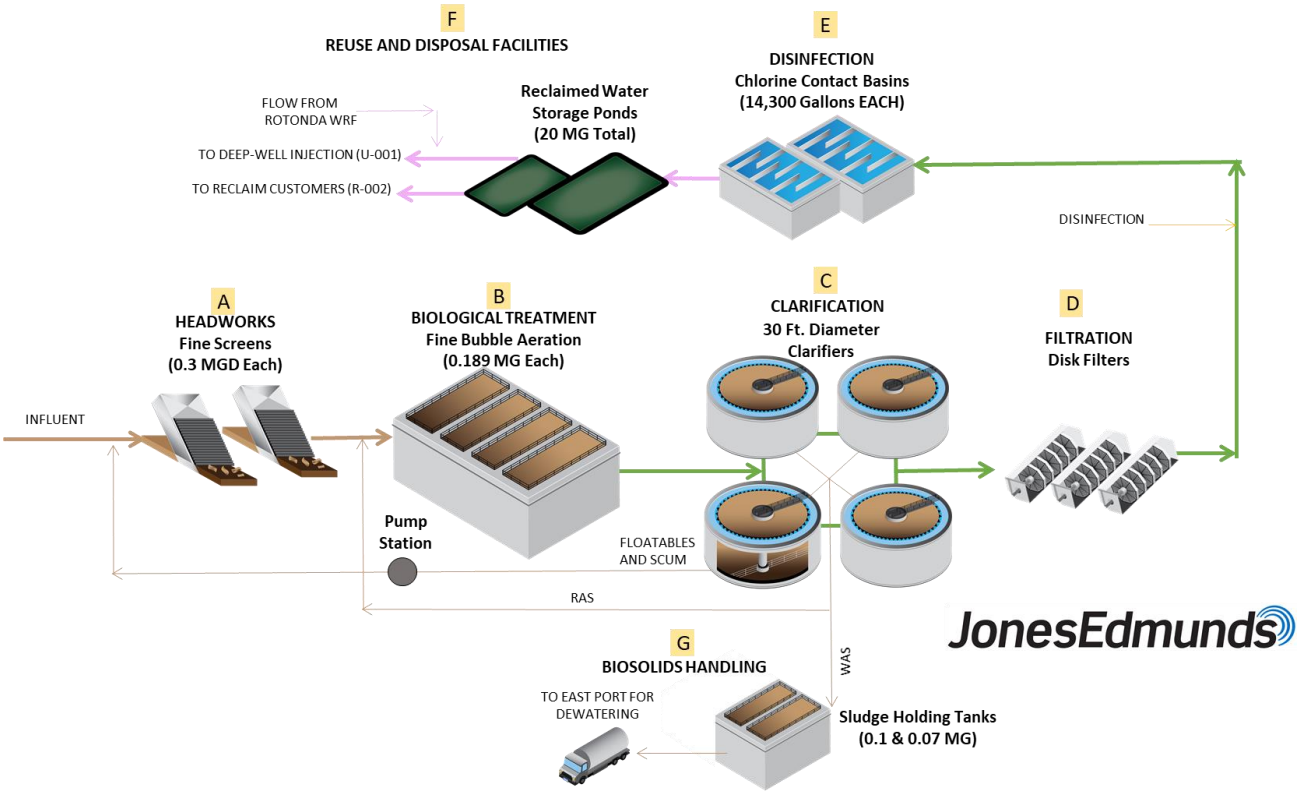
Recommendation: Progress:	▪ Provide fixed panels over the effluent filter frames. ▪ Pending WRF expansion.
Recommendation: Progress:	▪ Provide a fixed panel cover over the CCC. ▪ Not complete.
Recommendation: Progress:	▪ Provide additional storage for the aerobic sludge holding tank. ▪ Pending WRF expansion.
Recommendation: Progress:	▪ Replace the chemical feed and effluent analyzer shed. ▪ Pending WRF expansion.
Recommendation: Progress:	▪ Provide additional sludge dewatering unit(s). ▪ Pending WRF expansion.

6.3 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.

6.3.1 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 (0330461-002-UO/1M) – Expiration Date: May 4, 2026.
  - The last MIT was performed on IW-1 on June 17, 2020. The next MIT will be due by June 16, 2025.

6.3.2 Wastewater Flows and Loads

The West Port WRF permitted capacity is 1.20 MGD AADF. At the end of FY 2021, the AADF was 0.75 MGD, and the West Port WRF was operating at 67 percent of the plant permit capacity. The MADF occurred in July 2021 at 0.84 MGD. The highest TMADF of 0.78 MGD occurred in January and February 2021, which is 65 percent of the plant permit capacity, demonstrating the influence of wet weather and I/I to the facility. Table 6-7 summarizes influent flows as reported in the DMRs.

Table 6-7 West Port WRF Influent Flows in FY 2021

Month	MADF (MGD)	AADF (MGD)[1]	TMADF (MGD)	MDF (MGD)	TMADF Percent Capacity (%)[1]
Oct-20	0.71	0.71	0.74	0.77	62
Nov-20	0.78	0.72	0.77	1.10	64
Dec-20	0.78	0.73	0.76	0.87	63
Jan-21	0.79	0.73	0.78	0.85	65
Feb-21	0.77	0.73	0.78	0.83	65
Mar-21	0.75	0.73	0.77	0.83	64
Apr-21	0.72	0.74	0.74	0.81	62
May-21	0.65	0.74	0.70	0.71	59
Jun-21	0.62	0.73	0.66	0.65	55
Jul-21	0.84	0.74	0.70	1.45	58
Aug-21	0.81	0.75	0.75	1.31	63
Sep-21	0.78	0.75	0.81	0.98	67

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

In FY 2021, the average annual influent load for BOD was 775 lb/day and for TSS was 1,438 lb/day. The maximum monthly average BOD load was 1,321 lb/day occurring in March 2021. The maximum monthly average TSS load was 3,177lb/day in March 2021, which corresponds with seasonal residents and the dry season. Table 6-8 summarizes the wastewater characteristics of the West Port WRF influent.

Table 6-8 West Port WRF Influent Water Quality in FY 2021

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-20	79	463	111	111	646
Nov-20	96	667	124	124	867
Dec-20	97	618	118	118	753
Jan-21	105	668	132	132	841
Feb-21	188	1,164	381	381	2,373
Mar-21	216	1,321	522	522	3,177
Apr-21	206	1,176	473	473	2,703
May-21	138	723	328	328	1,722
Jun-21	98	508	143	143	738
Jul-21	79	558	135	135	945
Aug-21	94	658	147	147	1,048
Sep-21	91	572	103	103	643

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

6.3.3 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 6-9 lists the flow and primary water quality requirements for each effluent reuse and disposal method.

Table 6-9 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 6-10 summarizes the effluent flow and water quality of the West Port WRF. In FY 2021, the annual average effluent flow for the reuse system (R-002) was 0.473 MGD. The maximum daily flow of the underground injection well (U-001) was 3.07 MGD, indicating that the WRF is meeting its effluent flow requirements. The maximum single-sample BOD and TSS values were 3.9 mg/L and 1.6 mg/L, respectively, showing no violations of the single-sample limits for BOD or TSS were recorded in FY 2021. Consequently, the BOD and TSS annual average,

monthly, and weekly concentration requirements were also met in FY 2021. The maximum fecal coliform counts rarely exceeded 1/100mL except for two events occurring in November and December of 2021. In 2021, fecal coliform counts exceeded single-sample limits only 3 consecutive days in December; however, compliance was maintained by discharging effluent via U-001.

Table 6-10 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-20	0.55	0.40	<2.0	3.0	<1
Nov-20	0.40	2.68	<2.0	1.3	58
Dec-20	0.24	2.47	3.9	0.8	2,420
Jan-21	0.28	1.70	<2.0	1.1	<1
Feb-21	0.42	0.68	<2.0	0.9	<1
Mar-21	0.81	0.17	2.4	1.1	<1
Apr-21	0.76	0.12	<2.0	0.7	<1
May-21	0.66	0.02	2.4	1.2	<1
Jun-21	0.52	0.02	<2.0	1.1	2
Jul-21	0.16	2.60	2.9	1.3	2
Aug-21	0.39	3.07	<2.0	1.6	<1
Sep-21	0.31	2.68	<2.0	1.2	<1

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

6.3.4 Treatment Components and Condition Assessment

Jones Edmunds completed an on-site review of the WRF on February 3, 2022. 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 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.
- Operators' 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.

6.3.4.1 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.

6.3.4.2 Headworks

The overall condition of the headworks structure was considered good at the time of the site visit. In 2021, the County completed a headworks rehabilitation project where the headworks structure, pumps, and piping were re-coated, all four drum screens were replaced, and four new chain-operated influent valves were installed. 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.

6.3.4.3 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. Flow EQ should be considered as part of the West Port WRF expansion.

6.3.4.4 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—three were in service at the time of the site review. Basin No. 4 was out of service for cleaning and aeration improvements; the diffusers were serviced, and the concrete floor was visible as a result of the cleaning. 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 typically operates between a pH of6.6 and 6.7 but adjusts seasonally by running an additional blower. 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.

6.3.4.5 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 fair. High sudden increases in influent flows can cause further issues with the clarifier performance when one of the four clarifiers are out of service. The installation of submerged stamford baffling in the clarifiers could aid with sludge settlement and prevent solids from billowing up the walls and potentially entering the effluent launder.

The rubber on the skimmer arms on most or all the clarifiers appeared to not evenly contact the water surface when it traveled around the clarifier which may indicate the skimmer arm and mechanism may not be level. At the time of the site visit, the Chief Operator indicated that an WRF expansion contract will be awarded in 2022 where new clarifiers will be designed, and that staff replaced some of the skimmer rubber in 2021 but intends to install new longer rubber to make better contact the water surface until the expansion. The feed well had noticeable foam that would occasionally exist from the feed well into the main part of the clarifier that would remain in the main clarifier area contained by the scum baffle but not sufficiently removed by the uneven skimmer arms.

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. The stairways leading to the bridges of the aboveground clarifiers were painted in 2020.

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, water was not flowing over the effluent launder/overflow weirs as designed, at various locations on most or all the clarifiers, as indicated by visible algae growth. It was also observed that in some cases of algae growth, the weirs were already adjusted to the minimum effluent launder height and the launder may not be fully level as well as the skimmer arms. The Chief Operator stated that the effluent launder/overflow weir may be addressed prior to the plant expansion if issues with compliance occur. According to 2021 DMR data, West Port WRF effluent water quality complies with FDEP permit conditions. 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.

6.3.4.6 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. The filter will likely be replaced as part of the future expansion.

Two filters were in operation at the time of the site visit and working properly. The third filter was out of service for routine cleaning. 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, which were replaced in 2021. The motor chains were in good condition and appeared to be functioning properly in the operational filters.

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.

6.3.4.7 Disinfection and Effluent Sampling

The overall condition of the chlorination system is excellent. Only CCC No. 2 was in operation at the time of the site visit. CCC No. 1 was reported to be in good working condition. Each CCC has two trains. 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 Chief Operator indicated that CCU plans to replace the chemical storage tanks and associated piping in 2022.

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.

6.3.4.8 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 two reclaimed HSPs were recently replaced in 2021.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 in the last annual report update 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. The pumps, motors, and piping were re-painted in 2021.

Wet-Weather Storage

The on-site reclaimed water ponds provide up to 20 MG for wet-weather storage of reclaimed water. At the time of the site visit, the pond linings appeared to be in good condition.

6.3.4.9 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. Typically, two are used for the onsite collection system and two are used for emergency plant operations.

The Chief Operator indicated that the plant is experiencing limited hauling issues with sludge hauling services, and excess sludge stored in the biosolids-handling facilities has not exceeded system capacity. The situation is being closely monitored by operations staff. The expansion of the storage and dewatering at the biosolids handling facilities at East Port WRF is currently part of the ongoing 9.0-MGD expansion project to increase the receiving capacity from West Port WRF.

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 was installed a few years ago. 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. Additionally, an electrical equipment site visit assessment was conducted by the Jones Edmunds electrical engineer on February 17, 2022. No specific issues were reported by operations staff. The incoming power to the plant was upgraded a few years ago and would have sufficient capacity for a significant plant upgrade; however, it was noted that the internal power systems would require upgrades.

Overall, the following deficiencies were noted:

- A lighting 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). This has been a recurring violation noted for the past several years.
- Clarifier No. 4 is missing an LB-type conduit cover
- Headworks/aeration basin has conduits on the north wall where the conduit supports have broken providing unsupported conduit.

6.3.5 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.

6.3.6 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.

6.3.7 Review of Previous Report Recommendations

Table 6-11 West Port WRF 2020 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 wet well for the injection well pumps to allow disposal of excess reclaimed water from West Port during wet-weather events.
Progress:	▪ Ongoing.
Recommendation:	▪ Inspect the reclaimed water HSP pumps to evaluate condition of shafts and other components.
Progress	▪ Not started.
Recommendation:	▪ Replace Rotary Screen Nos. 1, 2, 3, and 4.
Progress:	▪ Completed in 2022.
Recommendation:	▪ Replace electrical panel of Rotary Screen No. 4.
Progress:	▪ Complete.
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 future WRF expansion.
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 the clarifiers weir needs to be leveled.
Recommendation:	▪ Evaluate the addition of a flow equalization tank to improve treatment plant operations.
Progress:	▪ Will be reviewed as part of the future WRF expansion.
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 future WRF expansion.
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.

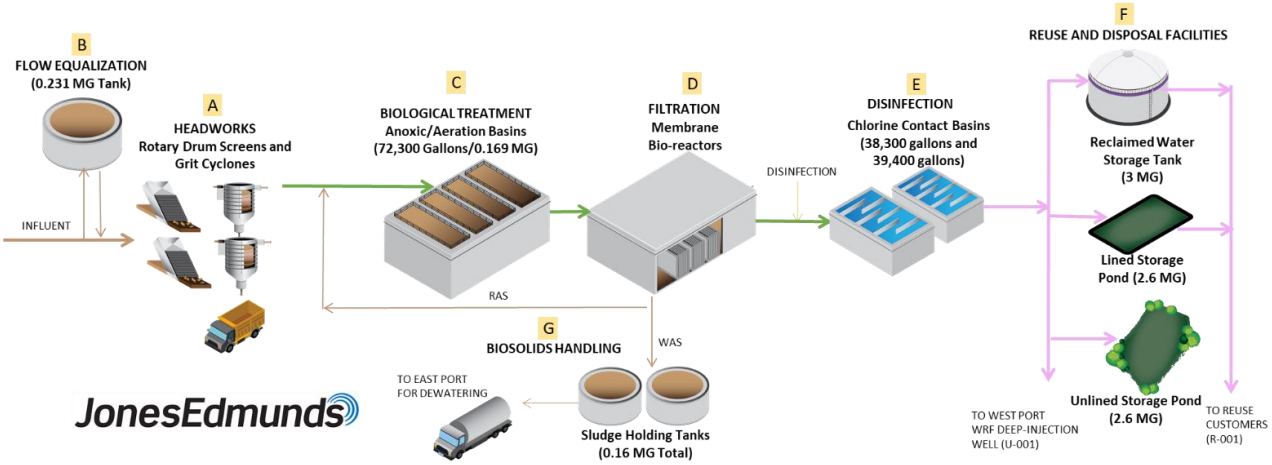
6.4 ROTONDA WRF

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 emptied and refilled with sodium hypochlorite during cleaning events. 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 usable capacity of 4,080 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.

6.4.1 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, 2027.

6.4.2 Wastewater Flows and Loads

The Rotonda WRF's permitted capacity is 2.0 MGD AADF. In FY 2021, the AADF was 1.14 MGD and the Rotonda WRF was operating at 57 percent of the plant permit capacity. The MADF of 1.48 MGD occurred in August 2021. The maximum TMADF of 1.42 MGD occurred in September 2021, which is 71 percent of the plant permit capacity, demonstrating the influence of wet weather and I/I on flows to the facility. Table 6-12 summarizes influent flows as reported on DMRs in FY 2021.

Table 6-12 Rotonda WRF Influent Flows in FY 2021

Month	MADF (MGD)	AADF (MGD)[1]	TMADF (MGD)	MDF (MGD)	TMADF Percent Capacity (%)
Oct-20	1.12	1.09	1.33	1.27	67
Nov-20	1.25	1.12	1.36	2.02	68
Dec-20	1.22	1.14	1.20	1.57	60
Jan-21	1.15	1.15	1.21	1.26	60
Feb-21	1.10	1.15	1.16	1.21	58
Mar-21	1.01	1.15	1.09	1.09	54
Apr-21	0.95	1.16	1.02	1.10	51
May-21	0.83	1.16	0.93	0.89	47
Jun-21	0.75	1.11	0.84	0.85	42

Month	MADF (MGD)	AADF (MGD)[1]	TMADF (MGD)	MDF (MGD)	TMADF Percent Capacity (%)
Jul-21	1.36	1.13	0.98	2.14	49
Aug-21	1.48	1.16	1.20	2.46	60
Sep-21	1.41	1.14	1.42	2.04	71

[1] Permitted plant capacity 2.0 MGD.

In FY 2021, the average annual influent load for BOD was 1,080 lb/day and for TSS was 1,305 lb/day. The maximum monthly average for BOD load was 2,486 lb/day occurring in November 2021. BOD load typically exceeded 1,000 lb/day in the winter months. The maximum monthly average TSS load was 4,077 lb/day occurring in September 2021, which corresponds with seasonal residents. Table 6-13 summarizes the wastewater characteristics of the Rotonda WRF influent in FY 2021.

Table 6-13 Rotonda WRF Influent Water Quality in FY 2021

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-20	118	1,092	206	1,892
Nov-20	239	2,486	388	4,077
Dec-20	116	1,207	146	1,528
Jan-21	131	1,250	154	1,460
Feb-21	133	1,210	157	1,421
Mar-21	105	874	84	708
Apr-21	117	924	86	679
May-21	103	708	75	518
Jun-21	110	688	76	474
Jul-21	89	906	92	924
Aug-21	67	778	74	846
Sep-21	70	836	96	1,133

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

6.4.3 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 6-14 lists the flow and primary water quality requirements for each effluent reuse and disposal method.

Table 6-14 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 6-15 summarizes the effluent flow and water quality of the Rotonda WRF. In FY 2021, the annual average effluent flow for the slow-rate public-access system (R-001) was 0.92 MGD. The maximum daily flow of the well was 3.07 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 3.1 mg/L and 1.2 mg/L, respectively, showing no violations of the single-sample limits for BOD or TSS were recorded in FY 2021. Consequently, the BOD and TSS annual average, monthly, and weekly concentration requirements were also met in FY 2021. The maximum fecal coliform counts never exceeded 1/100mL and were well within public-access reuse standards.

Table 6-15 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-20	0.84	0.40	<2.0	0.50	<1
Nov-20	0.98	2.68	<2.0	0.20	<1
Dec-20	0.90	2.47	<2.0	0.30	<1
Jan-21	0.82	1.70	<2.0	0.10	<1
Feb-21	0.81	0.68	2.1	0.50	<1
Mar-21	0.72	0.17	<2.0	0.30	<1
Apr-21	0.68	0.12	2.7	0.40	<1
May-21	0.57	0.02	3.1	0.20	<1
Jun-21	0.52	0.02	2.6	0.20	<1
Jul-21	1.33	2.60	2.2	1.20	<1
Aug-21	1.53	3.07	<2.0	0.60	<1
Sep-21	1.36	2.68	2.2	0.80	<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.

6.4.4 Treatment Components and Condition Assessments

Jones Edmunds completed an on-site review of the WRF on February 3, 2022. 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 the equipment is in working condition; however, the membrane bioreactor filters are nearing the end of their normal lifecycle. Painted exterior walls and piping are beginning to show signs that repainting should be scheduled in a few years. A portion of the above-grade piping and HSPS No. 1 were repainted in 2021. This project is ongoing, and the remainder of the above-grade piping is currently being repainted in 2022.

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.

6.4.4.1 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 2022 and FY2023, and these valves will be replaced as part of a headworks improvement and rehabilitation/replacement project currently under design. An actuator was added to Screen No. 1 in FY 2019.

6.4.4.2 Headworks

The overall condition of the headworks is fair to poor. The headworks is undergoing an improvement and rehabilitation/ replacement project that will include new piping and fine screens as well other improvements to the headworks.

At the time of the site visit, both screens were operational. These screens are critical process units. Each screen rotates on four drum rollers that 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 drum screen roller drive and drum gears were replaced in 2021 for each unit.

In 2020, the screening handlers (conveyors, compactors, etc.) have been replaced with stainless steel and half-pipe corrugated HDPE chutes. The replacement system is operating as intended.

The grit removal process operates as intended. The organic wastewater component of the pumped mixture is returned to the wet wells. Separated grit slurry is pumped to two cyclone units where the grit is further concentrated. The separated grit passes to a grit "snail" washer before being deposited into a dumpster. The grit "snail" washer includes a conveyor system that allows the grit to shed water as it proceeds to the dumpster. In 2017, Grit Pump No. 2 was replaced, and the cyclones are scheduled for replacement in FY 2022 as part of the headworks improvement project.

The screenings and grit dumpsters are emptied once per week. The dumpster area is clean and with minor presence of odors.

6.4.4.3 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.

6.4.4.4 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. The aeration basins were pressure-cleaned and painted in FY 2017. A minimal 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 No. 2 was removed from service as the motor was installed but the blower had been 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 was replaced in FY 2021.

One of the DO probes in the aeration basin was replaced in 2017. All four probes are functioning properly. One DO probe controller screen was severely faded and degraded by UV from the sunlight, and other screens showed similar signs of UV damage. The controllers with the damaged screen likely transmits data to plant operations staff via SCADA; however, the damaged controllers should be replaced for field operational purposes. We also recommended to install sun shields on the front of all the controller three sided enclosures to extend the life of existing equipment.

6.4.4.5 Filtration: Membrane Bioreactor

The MBR system continues to produce a high-quality effluent. The system contains four trains with three membrane cassettes each. The MBRs are cleaned once per week with a weak solution of bleach to maintain their treatment efficiency. The cassettes are periodically cleaned in place with concentrated chlorine bleach twice a year and are removed once a year for deep cleaning. The MBR system is in fair condition except for skid frame No. 2 which is in poor condition. 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 checked and 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.

6.4.4.6 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. During the site visit, one of the cloths was removed from the CCC.

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. UV inhibitor coating should be applied to the piping. Two new storage tanks with secondary containment were installed FY 2021. All storage tanks feature polyethylene open-top tank secondary containment. Small-diameter corrugated HDPE drain piping coming from the secondary containments appeared to be in fair condition, and the in-line valves were open during the site visit. The tank piping to the feed pumps is exposed to the sunlight and did not appear to have secondary containment piping. A pipe break to one of these pipes could result in the tank fully draining and spilling on the ground and create environmental concerns. We recommend that CCU review the drain piping to ensure operations follows applicable regulations or add secondary containment piping (double walled piping).

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 replaced in FY 2021. The two total chlorine analyzers were replaced in FY 2019. The metal backplates for the chlorine analyzers have experienced substantial corrosion and staining and should be replaced. The chlorine feed line from the in-plant road was replaced in 2018.

6.4.4.7 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 three vertical turbine 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 rebuilt and replaced in FY 2021. The jockey pump was replaced in FY 2018. Both HSPSs and above ground piping were repainted in FY 2021.

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 recommends this pond be filled with compacted with suitable soil and replaced with a ground storage tank as part of the 2021 Reclaimed Water Master Plan.

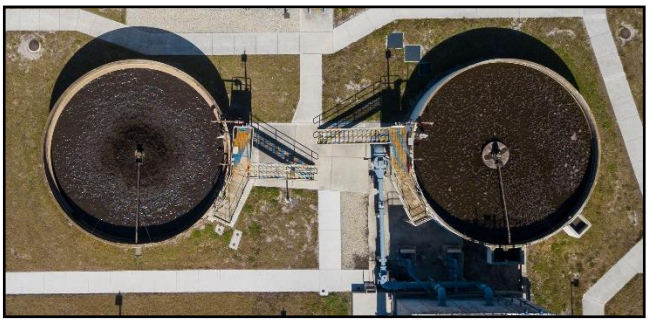
Effluent Disposal Facilities

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.

6.4.4.8 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. Currently, decanting is done daily for 10 to 12 hours per day to attempt to maintain holding tank capacity. 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 as a temporary solution.

Sludge load-out pumps were operating properly. They were repainted in FY 2019. The Chief Operator indicated that the plant is experiencing limited sludge hauling capabilities and excess sludge stored in the biosolids handling facilities has not exceeded system capacity. The situation is being closely monitored by operations staff. The expansion of the storage and

dewatering at the biosolids handling facilities at East Port WRF is currently part of the ongoing 9.0-MGD expansion project to increase the receiving capacity from Rotunda WRF.

6.4.4.9 Electrical Components and Circuitry

Generally, the overall condition of the plant was good, although there are significant signs of deterioration in many systems. The incoming switchgear and distribution transformer appear in good condition. The plant is served from two 810-kW generators configured to operate in parallel. In FY 2019, the Operations staff indicated several issues occurred with the generator switchgear and their operations, but these have now been resolved. Review of the electrical equipment in building MCC-1 and associated generator set revealed no issues. 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 deficiencies were noted:

- A two-pole circuit breaker in an unlabeled 480-V panel (breaker #28/30) showed during a 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.
- The EQ tank pumping station east of the headworks contains three pumps. These pumps are submersible-style pumps but are mounted above ground on a pad. Because these pumps are intended for submersible use, they come with a flexible power cord that is connected at the motor housing. These power cords are unsupported, unprotected from damage, and lay across the concrete slab creating a potential hazard. Of much greater concern is the physical connection where these flexible cords attach to the motors. Normally, these would be supported if they were installed in a submersible condition, but mounted as they are these cords are unsupported and the insulation around them is severely degraded causing a potential fault condition.

- Atop the headworks are two rotary drum screens. There appear to be old instrumentation/power connections on the side of each of them. Whatever was originally there has been removed, but the conductors in the wiring were simply abandoned in place. Whether these were live conductors was not determined, but even if abandoned they are considered to be a hazard unless identified as out of service or removed.
- Atop the headworks, flexible conduit feeding a solenoid actuator was corroded and failed.
- The biosolids handling facility has a floating mixer that is being fed from flexible cordage. The mixer is currently operational and meets NEC however this cordage is wholly unsupported except for one small clip.
- The blower assemblies adjacent to the SPR tank uses flexible conduit to provide power to the motor operated valves. This conduit is longer than 6 feet and is unsupported.

- At the chlorine contact tank above the inlet splitter box are two outdoor receptacles intended for wet weather use. They are both missing covers.
- The on-site lift station west of the SPR tank is reported to handle implant wastewater flows. The conduit traveling from the wetwell to the control panel adjacent does not contain conduit seal-offs in violation of the NEC since this is considered a classified area. In addition, the conduits leaving the slab at the base of the control panel have become detached leaving exposed unprotected wires.
- At the base of the reclaimed GSR is a waterproof receptacle missing its waterproof cover.

6.4.5 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 has been replaced with VTSCADA. 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.

6.4.6 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 Annual Report Recommendations

Table 6-16 Rotonda WRF 2020 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:	▪ Adjust the membrane slack.
Progress:	▪ Not completed. Discussion with operations staff indicated this recommendation should be made a priority based on the condition of the membranes.
Recommendation:	▪ Replace the main influent valves at the headworks due to corrosion.
Progress:	▪ Pending ongoing headworks improvement project.
Recommendation:	▪ Repairs of Screen No. 2.
Progress:	▪ Rebuilt mechanical components.
Recommendation:	▪ Replace the grit cyclones of the headworks.
Progress:	▪ Pending ongoing headworks improvement project.
Recommendation:	▪ Install a manually operated slide gate for each influent valve for isolation.
Progress:	

	▪ Pending ongoing headworks improvement project
Recommendation:	▪ Paint tanks, buildings, and pipes in the next 2 years.
Progress:	▪ Pipes painted. Other work ongoing.
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:	▪ Add protection to chlorine storage tanks and piping from direct sunlight.
Progress:	▪ Not started.
Recommendation:	▪ Add a small winch to each decant pump in the sludge-holding tanks for better control of the pump level.
Progress:	▪ Not started.
Recommendation:	▪ Remove vegetation, clean, reinforce the berm, and evaluate lining the reclaimed water storage pond to increase storage capacity.
Progress:	▪ Not started.
Recommendation:	▪ Evaluate different aeration systems for the reclaimed water storage pond.
Progress:	▪ Not started.
Recommendation:	▪ Clean the reject storage pond.
Progress:	▪ Ongoing. Survey was conducted by CCU staff.
Recommendation:	▪ Complete installation of reclaimed water pipe to the Cape Haze Golf Course and Placida Corridor.
Progress:	▪ Completed.
Recommendation:	▪ Evaluate ASR for additional reclaimed water storage.
Progress:	▪ Evaluation completed by ASRus to be incorporated into the Reclaimed Master Plan.
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:	▪ 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.

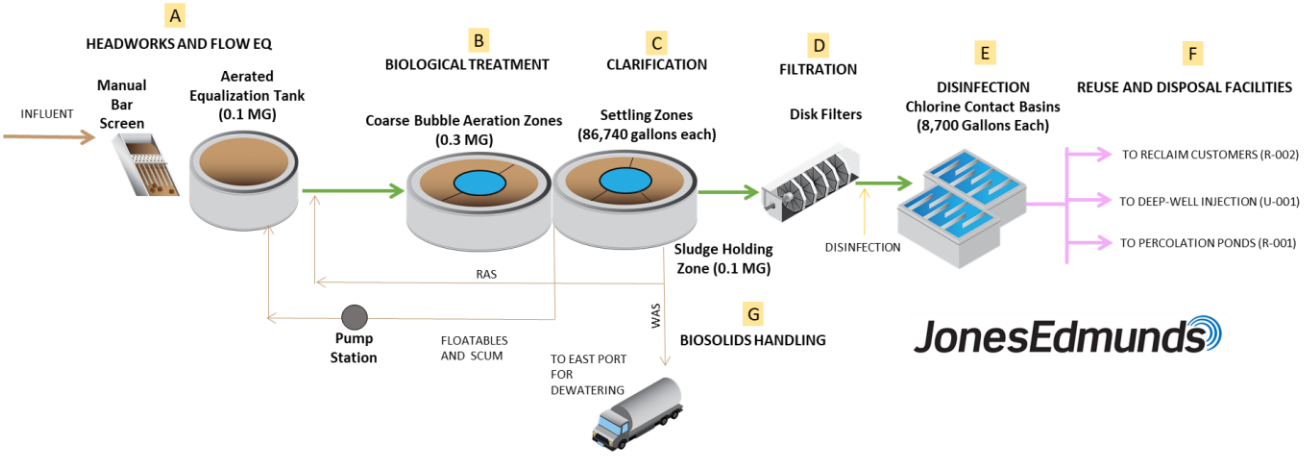
Recommendation:	▪	A year before scheduled replacement (currently estimated in 2023 for Train No. 3), order membrane modules. Install new membrane modules in Train No. 1. Do not install new membranes modules with existing membrane modules in the same train. Move the existing membrane modules from Train 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.
Recommendation:	▪	Complete replacement of Blower No. 2.
Progress:	▪	Motor was replaced. Blower pending repair.
Recommendation:	▪	Add an MBR cassette to existing trains as capacity needs dictate.
Progress:	▪	Staff monitoring capacity. Additional train not yet needed.

6.5 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.

6.5.1 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, 2026.
- IW-1 Permit (0271367-007-UO/1I) – Expiration Date: May 14, 2024.
  - The last MIT was performed on IW-1 on June 5, 2020. The next MIT is due by June 4, 2025.
- IW-2 Permit (0271367-006-UO/1X) – Expiration Date: October 17, 2021.
  - A permit renewal application for a 5-year operating permit renewal for IW-2 was submitted in July 2021. The application is in the Request for Additional Information (RAI) process.
  - The last MIT was performed on IW-2 on May 31, 2018, and the next MIT is due by May 30, 2023.

6.5.2 Wastewater Flows and Loads

The Burnt Store WRF's permitted capacity is 0.500-MGD AADF. In FY 2021, 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 July 2021 at 1.14 MGD. The maximum TMADF of 0.39 MGD occurred in December 2020, which is 78 percent of the plant permit capacity. Table 6-17 summarizes influent flows as reported on the FY 2021 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 6-17 Burnt Store WRF Influent Flows in FY 2021

Month	MADF (MGD)	AADF (MGD)[1]	TMADF (MGD)	MDF (MGD)	TMADF Percent Capacity (%)
Oct-20	0.38	0.33	0.33	0.51	67
Nov-20	0.39	0.34	0.38	0.76	75
Dec-20	0.40	0.34	0.39	0.50	78
Jan-21	0.33	0.34	0.37	0.37	74
Feb-21	0.39	0.34	0.37	0.44	74
Mar-21	0.28	0.33	0.33	0.36	67
Apr-21	0.25	0.33	0.31	0.31	62
May-21	0.18	0.32	0.24	0.27	47
Jun-21	0.21	0.31	0.21	0.40	42
Jul-21	0.40	0.32	0.26	1.14	52
Aug-21	0.31	0.32	0.31	0.83	61
Sep-21	0.32	0.32	0.34	0.53	69

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

For FY 2021, the average annual influent load for BOD was 317 lb/day and for TSS was 434 lb/day. The maximum monthly average BOD load was 620 lb/day occurring in February 2021. The maximum monthly average TSS load was 781 lb/day in March 2021, which corresponds with seasonal residents and the dry season. Table 6-18 summarizes the wastewater characteristics of the WRF influent.

Table 6-18 Burnt Store WRF Influent Water Quality in FY 2021

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-20	78	225	108	314
Nov-20	114	363	145	464
Dec-20	134	432	181	593
Jan-21	165	429	191	524
Feb-21	194	620	213	683
Mar-21	223	548	319	781
Apr-21	172	357	240	491
May-21	129	188	204	297
Jun-21	98	164	213	370
Jul-21	66	212	98	344
Aug-21	57	127	81	182
Sep-21	66	142	104	164

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

6.5.3 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 6-19 lists the flow and primary water quality requirements for each effluent reuse and disposal method.

Table 6-19 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 6-20 summarizes the effluent flow and water quality of the Burnt Store WRF. In FY 2021, the annual average effluent flow for the percolation ponds (R-001) and reuse system (R-002) were 0.11 MGD and 0.0045 MGD, respectively. The MDF of the well was 0.46 MGD indicating that the WRF is meeting its effluent flow requirements. The maximum single-sample BOD and TSS values were 3.6 mg/L and 11.5 mg/L, respectively. The maximum single sample TSS limit is 5 mg/L, however, only applies for discharge to R-002, which was not used that day; no other single samples exceeded 5 mg/L. Therefore, no violations of the single-sample limits for BOD or TSS were recorded in FY 2021. Consequently, the BOD and TSS annual average, monthly, and weekly concentration requirements were also met in FY 2021. The maximum fecal coliform counts rarely exceeded 1/100mL and were well within public-access reuse standards. The plant experienced an unusually high fecal coliform sample of 58.3 mg/L; however, it was within compliance.

Table 6-20 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-20	0.12	0.003	0.45	2.2	0.3	<1
Nov-20	0.12	0.002	0.44	<2.0	2.3	<1
Dec-20	0.11	0.001	0.41	2.8	0.8	<1
Jan-21	0.11	0.003	0.42	<2.0	3.0	<1
Feb-21	0.08	0.003	0.43	3.6	4.9	<1
Mar-21	0.12	0.006	0.36	2.0	1.0	<1
Apr-21	0.10	0.008	0.36	2.1	0.8	<1
May-21	0.06	0.012	0.31	<2.0	0.5	3
Jun-21	0.08	0.006	0.34	<2.0	0.2	<1
Jul-21	0.24	0.001	0.44	<2.0	0.7	<1

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)
Aug-21	0.13	0.006	0.46	2.6	11.5	58.3
Sep-21	0.11	0.003	0.41	<2.0	1.2	2

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.

6.5.4 Treatment Components and Condition Assessments

Jones Edmunds completed an on-site review of the plant on January 31, 2022. Our personnel met with Henri Lafenetre, Chief Operator of the Burnt Store WRF, to review plant conditions and operations and discuss records. Access to the facility is through a secure gate in a fence that surrounds 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.

6.5.4.1 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.

6.5.4.2 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.

6.5.4.3 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 and motors were replaced in January 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.

6.5.4.4 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.

6.5.4.5 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 passes through the headworks and collects 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 Chief Operator reported issues with the drives and chains being faulty. The chains were last replaced in December 2021. 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.

6.5.4.6 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 cloths were replaced in 2021. 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.

6.5.4.7 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. At the time of site visit, it was in poor condition and appeared to be torn, but the Chief Operator indicated that installation of a new UV cover was pending shipping. 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.

6.5.4.8 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 hydraulic and 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 6-21 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 2021, 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 6-21 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-20	0.000	0.194	0.194	6.10	2.73
Nov-20	0.000	0.186	0.186	5.57	3.35
Dec-20	0.000	0.209	0.209	6.47	3.48
Jan-21	0.003	0.150	0.153	4.64	6.35
Feb-21	0.001	0.231	0.232	6.69	4.84
Mar-21	0.000	0.167	0.167	5.18	5.63
Apr-21	0.000	0.178	0.178	5.36	3.55
May-21	0.000	0.112	0.112	3.48	5.24
Jun-21	0.000	0.153	0.153	4.60	6.31
Jul-21	0.000	0.152	0.152	4.71	4.12
Aug-21	0.000	0.187	0.187	5.80	2.70
Sep-21	0.000	0.241	0.241	7.22	3.78

Month	IW-1 (MGD)	IW-2 (MGD)	Total IW Flow (MGD)	Total IW Volume (MG)	Total Pond Volume (MG)
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.

6.5.4.9 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.

6.5.4.10 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.

6.5.5 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.

6.5.6 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.

6.5.7 Review of Previous Report Recommendations

Table 6-22 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.
Recommendation:	▪	Increase the treatment capacity and storage at the Burnt Store WRF to supply future demands and saltwater intrusion in existing private wells
Progress:	▪	Pending plant upgrades.
Recommendation:	▪	Develop an ERP for valve failure in the clearwell and begin exercising the valve.
Progress:	▪	Pending plant upgrades.

6.6 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.

6.7 Leachate Treatment Facility

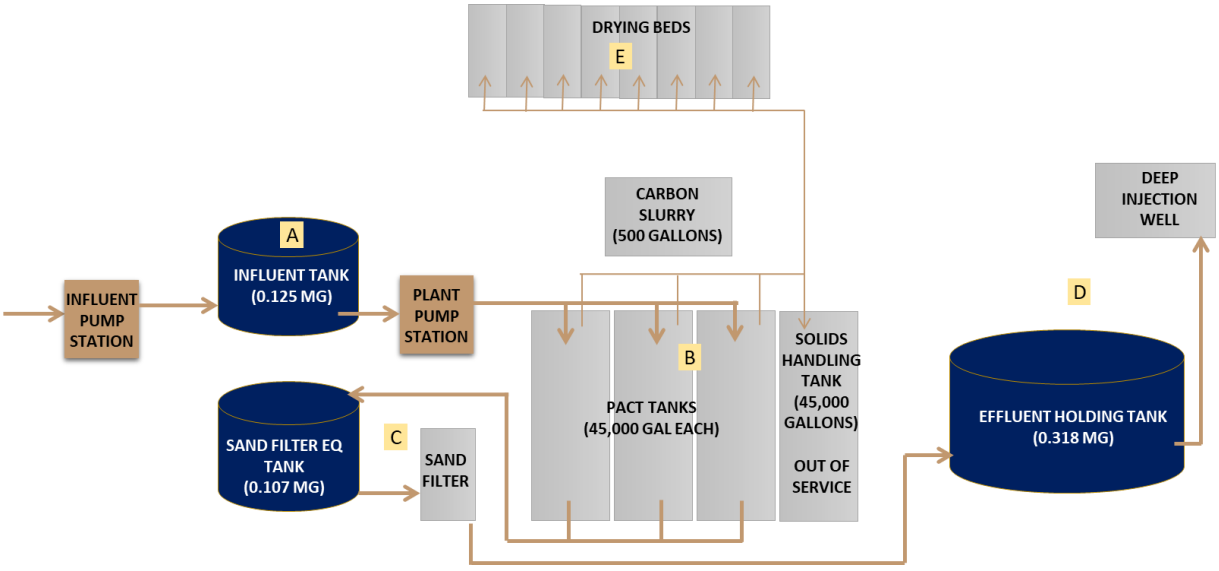
The Leachate Treatment Facility (LTF) is operated and maintained by CCU for the Charlotte County Municipal Solid Waste Management Department. Leachate generated by the Zemel Road Municipal Solid Waste Landfill is treated at the LTF and disposed of on site. The treatment facility and landfill share a 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 shows the LTF process flow diagram.

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.

6.7.1 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 and MW-1 Permit (No. 191077-004-UO/1I) – Expiration Date: October 25, 2024 (Permit renewal by Charlotte County Public Works):
  - New permit issued on 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.

6.7.2 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 6-23 summarizes the flows sent from the LTF to the deep injection well. In FY 2021, the maximum wellhead pressure, peak flow rate, and maximum daily injection volume were within permit limits, and the LTF treated a total of 16.14 MG.

Table 6-23 LTF Deep Injection Well Flows – FY 2021

Month	Maximum Wellhead Pressure (psi)	Peak Injection Rate (gpm)	Maximum Daily Flow (MGD)	Total Monthly Flow (MG)
Oct-20	28	211	0.1134	2.00
Nov-20	27	230	0.1087	1.52
Dec-20	26	200	0.1009	1.52
Jan-21	26	202	0.0928	0.64
Feb-21	26	231	0.1143	1.48
Mar-21	23	194	0.0950	1.73
Apr-21	26	205	0.0921	1.51
May-21	26	227	0.1084	0.21
Jun-21	25	223	0.0836	1.48
Jul-21	26	182	0.0953	1.37
Aug-21	27	203	0.0871	1.45
Sep-21	27	197	0.0983	1.23

6.7.3 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 6-24 summarizes the LTF effluent quality goals prior to disposal of the treated leachate.

Table 6-24 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.

6.7.4 Treatment Components and Condition Assessments

Jones Edmunds conducted a site visit of the LTF on January 31, 2022, 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.

6.7.4.1 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.

6.7.4.2 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 were replaced in 2021.

6.7.4.3 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.

6.7.4.4 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.

6.7.4.5 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.

6.7.4.6 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.

6.7.4.7 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.

6.7.4.8 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.

6.7.5 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.

6.7.6 Maintenance

The LTF is owned by the Charlotte County Public Works Solid Waste Division 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 focusing on maintenance issues and performing 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.

6.7.7 Review of Previous Annual Report Recommendations

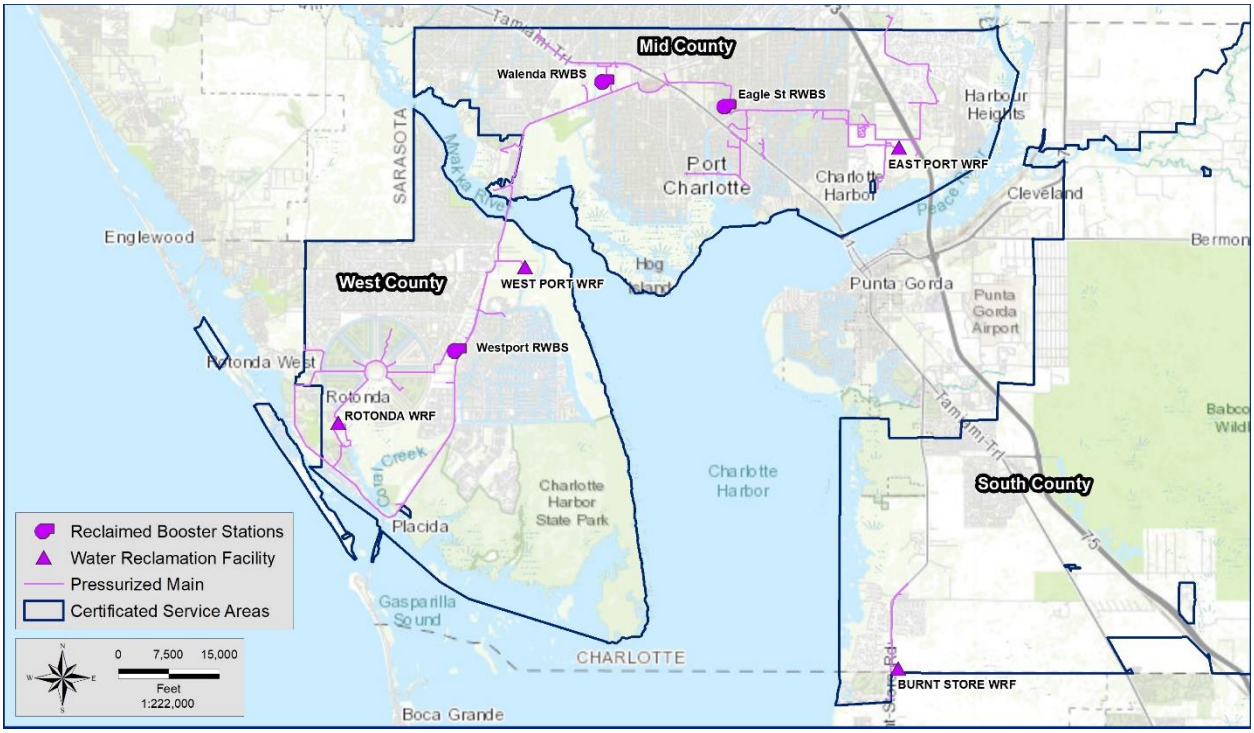
Table 6-25 LTF 2020 Recommendations and Status

Recommendation:	▪ Repair the effluent storage tank.
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:	▪ Replace polymer feed systems for each PACT unit.
Progress:	▪ Completed.
Recommendation:	▪ Replace blower air intakes for each PACT unit.
Progress:	▪ Completed.
Recommendation:	▪ Replace the sand filter compressor.
Progress:	▪ Completed.
Recommendation:	▪ Rehabilitate the sand filter/replace mechanical components.
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 systems 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 2021, the two systems contained approximately 84 miles of reclaimed water mains providing service to 69 reclaimed water customers in the Mid/West County distribution system and five 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 9.6 MGD AADF in combined 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; currently, the system operates at a target pressure of 95 psi. Jones Edmunds staff visited the RWBSs on January 25, 2022, 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. Operations staff indicated this booster station is used when transferring flow to West County. More specifically, the Eagle Street RWBS supplements pressure and flow during times of high demand when the GST at Walenda RWBS operates at low-water level.

The RWBS contains one 125-HP HSP and one 60-HP jockey pump. The HSP has a pumping capacity of 1,440 gpm and the jockey pump has a pumping capacity of 577 gpm. 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 pumps; however, this filter mechanism 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 can inject sodium hypochlorite after the reclaimed water enters the GST, but disinfection at this location is not currently needed.

A modification to the Walenda RWBS in 2019 provided additional pressure for commercial reclaimed customers in the Eagle Street area and reduced the dependency on the Eagle Street RWBS.

No O&M improvements were completed at the RWBS over the past 3 years.

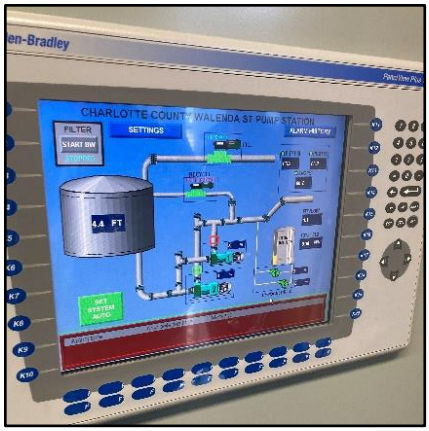
Condition Assessment

The electrical room equipment, pump room equipment, and tank were found in good condition. The piping was painted purple but needed repainting. At the time of site visit, the grounds had heavy overgrowth that requires attention.

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 West Port. 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.

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. The RWBS contains one 125-HP HSP and one 60-HP jockey pump, each equipped with VFDs. At the time of site visit, the 60-hp pump was being repaired. The HSP has a pumping capacity of 1,440 gpm and the jockey pump has a pumping capacity of 577 gpm. 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. Like the Eagle Street RWBS, operators can inject sodium hypochlorite after the reclaimed water enters the GST, but disinfection at this location is not currently needed.

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.

Condition Assessment

The electrical room equipment, pump room equipment, and tank are in good condition. The piping was painted purple but needed repainting. The grounds are well maintained. A small leak in the recirculation valve requires repair.

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 evaluating the rehabilitation of 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

This station was not assessed as part of this site visit. Condition assessments and recommendations from previous CCU Annual Reports related to Gertrude RWBS are being consolidated into the 2021 Reclaimed Master Plan.

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 100-HP HSP has a pumping capacity of 972 gpm and the 40-HP HSPs have a pumping capacity of 1,045 gpm each. 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 used to help maintain system pressure in West County and back pressure to Mid County; however, this RWBS can also be used to help convey flows 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. The RWBS is scheduled to be painted in 2022.

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. Currently, Operations staff at the East Port WRF

monitors reclaimed water levels in the ponds and GSTs through SCADA. The Master Reuse System is now operated as a pressurized system to allow customers to draw reclaimed water when needed. The WRF ponds and GSTs are kept full to meet customer demands. Excess reclaimed flows are conveyed to deep injection wells or other permitted disposal methods as specified in the WRF's permits.

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 Lined Pond	15.0 5.0
Rotonda WRF	West County	GST Unlined Pond	3.0 2.64*
Walenda RWBS	Mid County	GST	0.5
Eagle Street RWBS	Mid County	GST	0.5
		Total	**116.6****

* Approximately half of the capacity is currently usable.
** Values exclude reject pond storage.

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 and 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 7.70 MGD of reuse in the Mid/West County system. The County also has identified future users who may use another 3.74 MGD of reclaimed water, indicating a total demand of 11.44 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)
Aaron Street Medical	Direct	Future	0.015
Auto Zone - 19681 Cochran	Direct	Future	0.002
BJs Wholesale Club	Direct	Current	0.011
Biscayne Landings	TBD	Future	0.099
Burger King - Murdock	Direct	Current	0.001
CCCS - Sheriff's Office	Direct	Current	0.011
CCCS Parks - 1120 Centennial Blvd (Aquatic)	Direct	Current	0.002
CCCS Parks - 1185 Centennial Blvd (Ball Fields)	Direct	Current	0.050
CCCS Parks - Franz Ross	Direct	Current	0.048
CCCS Parks - McGuire Park & (LS # 11)	Direct	Current	0.006
CCCS Parks - Sports Park	Pond	Current	0.446
CCPW - Edgewater Median 1	Direct	Current	0.010
CCPW - Edgewater Median 2	Direct	Current	0.010
CCPW - Edgewater Median 3	Direct	Current	0.010
CCPW - Edgewater Median 4	Direct	Current	0.010
CCPW - Edgewater Median 5	Direct	Current	0.010
CCPW - Edgewater Median 6	Direct	Current	0.010
CCPW - Edgewater Median 7	Direct	Current	0.010
CCPW - Edgewater Median 8	Direct	Current	0.010
CCPW - Elkam Blvd 1	Direct	Current	0.010
CCPW - Elkam Blvd 2	Direct	Current	0.010
CCPW - Harbor Blvd	Direct	Future	0.010
CCPW - Olean 1	Direct	Future	0.010
CCPW - Olean 2	Direct	Future	0.010
CCPW - Olean 3	Direct	Future	0.010
CCPW - Toledo Blade North of US 41	Direct	Current	0.004
CCPW - US 41 Revitalization PC Blvd	Direct	Current	0.010
CCPW - US 41 south of PC Blvd	Direct	Current	0.002
CCU - LS # 59 Skylark Vac Station	Direct	Future	0.005
CCU - LS # 99 El Jobean Vac Station	Direct	Current	0.001
Charlotte Convenience (7-11)	Direct	Current	0.002
Charlotte Crossing	Direct	Current	0.005
Deep Creek Golf Club	Pond	Current	0.343
Family Dollar - Rampart	Direct	Future	0.001
Florida Department of Transportation 1	Direct	Current	0.001
Florida Department of Transportation 2	Direct	Current	0.001
Florida Department of Transportation 3	Direct	Current	0.001
Gulf Cove United Methodist Church	Direct	Current	0.012
Kingsway Country Club (GC)	Pond	Current	0.388
Kravin Chikin	Direct	Future	0.002
Maple Leaf Estates	Pond	Current	0.388

Reclaim Sites	Pond/ Direct	Current/ Future User	Agreement Amount (MGD)
Marylou Homeowners Assoc.	Direct	Current	0.038
MRT Landscaping	Direct	Current	0.025
Murphy Oil USA # 7360 - Murdock	Direct	Current	0.001
Myakka RV Park	Direct	Current	0.040
Pt Char G. C. - Golf Links	Pond	Current	0.613
Pt. Charlotte Church of Christ	Direct	Future	0.001
Rick Johnson Auto	Direct	Future	0.000
Riverwood (GC)	Pond	Current	1.200
Suncoast Lakes Home Owners	Direct	Current	0.136
Sunnydell Commons II	Direct	Future	0.004
TAMIAMI INVESTMENT PARTNERS, LLC	Direct	Future	0.001
Tommy's Car Wash	Direct	Future	0.002
Wal-Mart # 721	Direct	Future	0.018
Waste Management	Direct	Future	0.008
West Port Community District	Pond	Future	0.450
Current Mid County Reclaimed Water Agreements			3.973
Total Mid County Reclaimed Water Agreement Amounts			4.532

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	0.050
Bel Aire	Direct	Future	0.100
Boca Vista	Direct	Current	0.008
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 - Gasparilla Road	Direct	Future	0.010
CCPW - Winchester / Sunset	Direct	Current	0.020
Coast Concrete	Pond	Current	0.060
Colonial Concrete	Direct	Current	0.008
Coral Caye (Placida Commons)	Direct	Current	0.095
Coral Creek Air Park (BK IV AS LLC)	Direct	Current	0.045
Coral Creek Club	Pond	Current	0.308
Dollar General - 322 Ingram	Direct	Current	0.002
Fellowship Church	Direct	Current	0.027
Hacienda Del-Mar	Direct	Current	0.105
Hammocks	Direct	Future	0.060
Harbor West	Pond	Current	0.144
Hills Golf Club	Pond	Future	0.540

Reclaim Sites	Pond/ Direct	Current/ Future User	Agreement Amount (MGD)
Landings at Coral Creek	Direct	Current	0.120
Lemon Bay Golf Course	Pond	Current	0.342
Meadows & Villas Conservation Area – Robin	Direct	Current	1.315
Meadows & Villas Conservation Area – Rot Tr	Direct	Current	0.002
Placida Harbor	Direct	Future	0.019
Preserve at Windward Condominium	Direct	Current	0.005
RGP Links Golf Club	Pond	Current	0.333
RGP Long Marsh North	Pond	Current	0.230
RGP Long Marsh South	Pond	Current	0.230
RGP Palms Golf Club	Pond	Current	0.423
Rotonda NW Golf Club	Pond	Future	0.463
Rotonda Sands	Pond	Future	1.427
Safe Cove Boat Storage	Direct	Future	0.003
South Gulf Cove	Pond	Future	0.409
Current West County Reclaimed Water Agreements			3.726
Total West County Reclaimed Water Agreement Amounts			6.906

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
Mid 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 is 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 is 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 and upgrade the WRF to meet advanced AWT standards.

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/16-inch reclaimed water transmission main that conveys reclaimed water to customers via direct irrigation system delivery or to on-site storage ponds to meet customer-controlled irrigation schedules.

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 under 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 reach 3.5 MGD.

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

Reclaim Sites	Pond/ Direct	Current/ Future User	Agreement Amount (MGD)
Burnt Store Colony 1	Direct	Current	0.008
Burnt Store Colony 2	Direct	Current	0.008
Burnt Store Lakes	Direct	Current	0.048
Burnt Store Marina & GC	Pond	Future	1.920
CCPW - Cape Horn	Direct	Current	0.0001
CCPW -Burnt Store Village Landscape	Direct	Current	0.004
Dollar General (Burnt Str)	Direct	Future	0.003
Heritage Landings	Pond	Future	1.500
RV Resort (Tranquility Bay)	TBD	Future	0.070
Tuckers Grade	TBD	Future	TBD
Current South County Reclaimed Water Agreements			0.068
Total South County Reclaimed Water Agreement Amounts			3.561

7.2.4 Discharge Valve Stations

Currently, no pond discharge valve stations are in the South County reclaimed water distribution system. However, the Burnt Store Marina is scheduled to become the first pond delivery reclaimed user in South County in FY 2022.

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 supplying their systems with in-line pumps to boost pressure.

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, 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 2021 Program statistics:

- Hydrant Meters Repairs/Tests: 25
- Cross-Connections Inspected: 2,394
- Charlotte County Backflow Tests: 414
- 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 2020 Annual Report for the Mid/West and South County distribution systems, respectively.

Table 7-6 Mid/West County Reclaimed Water Distribution System 2020 Recommendations and Status

Recommendation:	▪ Develop a comprehensive operating protocol or O&M manual for the Master Reuse System to provide a reliable source of reclaimed water to the CCU customer base.
Progress:	▪ Ongoing. Some operational items may be addressed in the Reclaimed Master Plan.
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:	▪ Evaluated as part of the Reclaimed Master Plan.
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:	▪ Evaluation complete and currently in design.
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:	▪ Complete. A bypass was also installed.

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:	▪ Evaluate adding piping connections (including controls, pumps, valves, meters, etc.) to increase the number of reclaimed water small users in Mid County.
Progress:	▪ Ongoing, but CCU is currently focused on adding large users and large developments.
Recommendation:	▪ Upgrade the necessary reclaimed water pumps to produce higher flowrates and pressures and meet current and future reclaimed water user demands.
Progress:	▪ To be evaluated as part of the Reclaimed Master Plan.
Recommendation:	▪ Seek ways to increase the use of reclaimed water currently produced by CCU WRFs including improving reliability and access for customers.
Progress:	▪ Ongoing.

Table 7-7 South County Reclaimed Water Distribution System 2020 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.
Recommendation:	▪ Create additional reclaimed water storage at the Burnt Store WRF.
Progress:	▪ Will be addressed as part of plant expansion.
Recommendation:	▪ Increase the treatment capacity and storage at the Burnt Store WRF to supply future demands and saltwater intrusion in existing private wells.
Progress:	▪ Will be addressed as part of plant expansion.
Recommendation:	▪ Prepare a hydraulic model to predict the impact of future demand on the South County reclaimed water transmission system.
Progress:	▪ Completed as part of the Reclaimed Master Plan.

Table 7-8 Backflow and Cross-Connection Prevention Program 2020 Recommendations

Recommendation:	▪ Complete implementation of EAMS, such as *CityWorks,* for utilization 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 2021. 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 2021. The total FY 2021 budget was $250,000 and the total expenditure was $255,000.

Table 8-1 Water System CIP Projects in Progress or Initiated in FY 2021 ($ in Thousands)

Description	Funding Source[1]	Original FY 2021 Budget	2021 Expenditures	Percent of Budget Expended
Potable Water Master Plan	Oper	$ —	$173	0%
Major Water Transmission Lines	Conn-Wtr	$250	$1	0%
Major Water Transmission Lines	R & R	$ —	$1	0%
Myakka River 24" Water Main	Conn-Wtr	$ —	$1	0%
Myakka Potable Water Booster Station	Conn-Wtr	$ —	$79	0%
Totals		$250	$255	102%

[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 2021. The total wastewater budget allotted for FY 2021 was $13,771,000 and the total amount spent was $21,605,000.

Table 8-2 Wastewater System CIP Projects in Progress or Initiated in FY 2021 ($ in Thousands)

Description	Funding Source	Original FY 2021 Budget	2021 Expenditures	Percent of Budget Expended
Wastewater Force Mains	Conn-Swr	$250	$34	14%
Spring Lake MSBU WW Expansion	MSBU	$ —	$17	0%
Wastewater Force Main Replacements	R & R	$39	$1,876	4810%
Wastewater Force Main Replacements	Conn-Swr	$ —	$176	0%
Master Lift Stations	Conn-Swr	$750	$23	3%
Grand Master LS - Loveland Blvd	U.C.P.F	$ —	$5,343	0%
Grand Master LS - Loveland Blvd	Conn-Swr	$196	$ —	0%
Burnt Store Phase 2	Conn-Wtr	$ —	$8	0%
Burnt Store Phase 2	Conn-Swr	$ —	$5	0%
Burnt Store Phase 2	R & R	$ —	$3	0%
Burnt Store Phase 2	U.C.P.F	$ —	$422	0%
Charlotte Harbor Water Quality Initiative Ph 2	BP	$ —	$37	0%
Charlotte Harbor Water Quality Initiative Ph 2	MSBU	$42	$4,091	0%
Burnt Store WRF Expansion	Conn-Swr	$ —	$1,360	0%
East Port WRF Expansion	Conn-Swr	$ —	$1,113	0%
Cape Haze Sewer & Reclaim Transmission	Conn-Swr	$ —	$11	0%
Cape Haze Sewer & Reclaim Transmission	R & R	$ —	$1,186	0%
Water Transmission/Wastewater Collection Reim	Conn-Wtr	$500	$ —	0%
Water Transmission/Wastewater Collection Reim	Conn-Swr	$500	$ —	0%
Parkside Gertruce Ave and Aaron St Imp	U.C.P.F	$ —	$660	0%
CHWQ - Countryman & Ackerman	Oper	$ —	$422	0%
CHWQ - Countryman & Ackerman	MSBU	$423	$1,920	454%
CHWQ - Countryman & Ackerman	Conn-Wtr	$190	$14	7%
CHWQ - Countryman & Ackerman	Restore	$3,737	$ —	0%

Description	Funding Source	Original FY 2021 Budget	2021 Expenditures	Percent of Budget Expended
CHWQ - Countryman & Ackerman	R & R	$5,282	$1,910	36%
Relocation Needs Utility Pipe Replace	R & R	$1,742	$230	0%
SCADA System Upgrades	Oper	$ —	$481	0%
US41 Commercial Corridor Utilities Expansion	R & R	$ —	$1	0%
US41 Commercial Corridor Utilities Expansion	Conn-Wtr	$ —	$4	0%
US41 Commercial Corridor Utilities Expansion	Conn-Swr	$ —	$33	0%
Water & Sewer Waterway Crossings	R & R	$ —	$225	0%
Water & Sewer Waterway Crossings	Conn-Wtr	$60	$ —	0%
Water & Sewer Waterway Crossings	Conn-Swr	$60	$ —	0%
	TOTAL	$13,771	$21,605	157%

[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 2021. The total amount budgeted for FY 2021 was $150,000, and $71,000 was expended.

Table 8-3 Reclaimed Water System CIP Projects in Progress or Initiated in FY 2021 ($ in Thousands)

Description	Funding Source	Original FY 2021 Budget	2021 Expenditures	Percent of Budget Expended
US 41 Reclaimed Water Lines	Conn-Swr	$150	$ —	0%
Reclaimed Water Expansion Phase 3	Conn-Swr	$ —	$54	0%
Reclaimed Water Expansion Phase 3	R & R	$ —	$17	0%
	TOTAL	$150	$71	47%

[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 2021	FY 2022	FY 2023	FY 2024	FY 2025	FY 2026	Future Years	Total
Potable Water Master Plan	$202	$173	$ —	$ —	$ —	$ —	$ —	$ —	$375
Major Water Transmission Lines	$8,010	$2	$250	$250	$250	$250	$250	$3,475	$12,737
Wastewater Force Mains Expansionary	$4,618	$34	$600	$600	$600	$600	$600	$ —	$7,652
Reclaimed Water Lines	$516	$ —	$150	$150	$150	$150	$150	$1,800	$3,066
Spring Lake MSBU Wastewater Expansion	$17,174	$17	$ —	$ —	$ —	$ —	$ —	$ —	$17,191
Wastewater Force Mains Replacement - Deep Creek	$2,806	$2,052	$37	$35	$33	$31	$31	$207	$5,232
Master Lift Stations	$429	$23	$750	$750	$750	$750	$750	$ —	$4,202
Reclaimed Connections for County Facilities	$49	$ —	$ —	$ —	$ —	$ —	$ —	$ —	$49
Reclaim Water Expansion Phase 3	$4,628	$71	$ —	$ —	$ —	$ —	$ —	$ —	$4,699
Grand Master Lift Station & Gravity Interceptor - Loveland	$12,561	$5,343	$186	$177	$167	$157	$157	$953	$19,701
Myakka River 24" Water Main	$ —	$1	$ —	$ —	$ —	$ —	$ —	$ —	$1
Myakka Potable Water Booster Station	$3,027	$79	$ —	$ —	$ —	$ —	$ —	$ —	$3,106
Burnt Store Phase 2	$2,740	$438	$ —	$ —	$ —	$ —	$ —	$ —	$3,178
Charlotte Harbor Water Quality Initiative Phase 2 - EL Jobean	$3,285	$4,128	$40	$38	$36	$34	$34	$226	$7,821
Burnt Store WRF Expansion	$260	$1,360	$51,480	$ —	$ —	$ —	$ —	$ —	$53,100

Project Names	Prior Years Actual	Actual FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	FY 2026	Future Years	Total
East Port WRF Expansion	$335	$1,113	$ —	$ —	$ —	$ —	$ —	$ —	$1,448
Cape Haze Sewer & Reclaim Transmission	$910	$1,197	$ —	$ —	$ —	$ —	$ —	$ —	$2,107
Water Transmission/Wastewater Collection Reimb.	$467	$ —	$1,000	$1,000	$1,000	$1,000	$1,000	$5,000	$10,467
CCU Business Services Customer Billing and Database	$1,531	$ —	$800	$800	$800	$800	$800	$2,400	$7,931
Parkside - Gertrude and Aaron Street Improvements	$1,871	$660	$ —	$ —	$ —	$ —	$ —	$ —	$2,531
Charlotte Harbor Water Quality Initiative Phase 2 - Countryman & Ackerman	$1,180	$4,266	$12,010	$18	$17	$133	$240	$2,257	$20,121
Utility Equipment Replacements	$193	$ —	$ —	$ —	$ —	$ —	$ —	$ —	$193
Relocation Needs Utility Pipe Replace	$52	$230	$1,742	$1,742	$1,742	$1,742	$1,742	$ —	$8,992
Scada System Upgrades	$94	$481	$ —	$ —	$ —	$ —	$ —	$ —	$575
Harbor View Rd Widening - Utility	$ —	$ —	$ —	$ —	$13,125	$ —	$ —	$ —	$13,125
US 41Commercial Corridor Utilities Expansion	$ —	$38	$ —	$ —	$ —	$ —	$ —	$ —	$38
Waterway Crossings for Public Works (Water & Sewer)	$4,681	$225	$120	$120	$ —	$ —	$ —	$ —	$5,146
TOTALS	$79,973	$21,931	$69,165	$5,680	$18,670	$5,647	$5,754	$16,318	$223,138

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 2021. Prior year reports and annual reoccurring reports are also included for reference.

8.2.1 Reports Completed in FY 2021

- CCU 2020 Annual Report, Jones Edmunds, March 2021.
- Unaccounted Water Investigation for the Burnt Store Service Area, Jones Edmunds, January 2021.
- Burnt Store WRF Permit Renewal Application and Authorization for Substantial Modifications, Jones Edmunds, July 2021. The application included multiple supplemental reports for continued operations and expansion of the Burnt Store WRF.
- CCU Security Risk Assessment Report, CTCH Security Business Consulting LLC, April 2021.

8.2.2 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 the America's Water Infrastructure Act of 2018 (AWIA) requirements that 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.

8.2.3 Reports Completed in FY 2019

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

9 UTILITY SUPPORT SERVICES

9.1 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.

9.1.1 ACCREDITATION AND CERTIFICATIONS

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. As required by current TNI standards and FDEP regulations, the EPLAB must assess laboratory operations every 2 years, conduct annual management reviews, and perform proficiency tests every 6 months as a part of the continuing certification process. 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. Results from the test samples are sent to FDOH for regulation compliance and compared to results from other laboratories nationwide. EPLAB staff typically excel at proficiency tests usually passing within two standard deviations of the national average. The frequency of reviews, tests, and audits conducted at the EPLAB and required for maintaining certifications and CCU goals are listed herein:

- The Laboratory Manager performs a Management Review of the EPLAB quality system and environmental testing activities each year, as required by the TNI Standards.
- An engineering consultant performs an operations review of the EPLAB on an annual basis.
- FDOH requires a lab audit every 2 years. The most recent biannual FDOH assessment was conducted by Shepherd Technical Services (a private company under contract with FDOH) in October 2020. The next FDOH assessment is scheduled for October 2022.
- Proficiency tests are conducted semi-annually, typically in August and February. The August 2021 and next set of proficiency testing is scheduled for the first quarter in 2022.
- Internal audits are completed periodically for ensuring system quality.

Table 9-1 lists the current certifications of the EPLAB, which are renewed July 1 each year.

Table 9-1 Laboratory Certifications

Analyte	Method/Tech	Category	Matrix
Escherichia coli	SM 9223 B	Microbiology	Drinking Water
Total coliforms	SM 9223 B	Microbiology	Drinking Water
Ammonia as N	EPA 350.1	General Chemistry	Non-potable Water
Ammonia as N	SM 4500-NH3 D-2011	General Chemistry	Non-potable Water
Biochemical oxygen demand (BOD)	SM 5210 B	General Chemistry	Non-potable Water
Carbonaceous BOD (CBOD)	SM 5210 B	General Chemistry	Non-potable Water
Chloride	SM 4500-Cl^- E	General Chemistry	Non-potable Water
Conductivity	EPA 120.1	General Chemistry	Non-potable Water
Enterococci	ENTEROLERT / QUANTI-TRAY	Microbiology	Non-potable Water
Fecal coliforms	COLILERT®-18	Microbiology	Non-potable Water
Fecal coliforms	SM 9222 D	Microbiology	Non-potable Water
Kjeldahl nitrogen - total	EPA 351.2	General Chemistry	Non-potable Water
Nitrate as N	EPA 353.2	General Chemistry	Non-potable Water
Nitrate as N	SM 4500-NO3 H	General Chemistry	Non-potable Water
Nitrite	SM 4500-NO2-B	General Chemistry	Non-potable Water
Nitrite as N	EPA 353.2	General Chemistry	Non-potable Water
Phosphorus, total	EPA 365.4	General Chemistry	Non-potable Water
Residue-filterable (TDS)	SM 2540 C	General Chemistry	Non-potable Water
Residue-nonfilterable (TSS)	SM 2540 D	General Chemistry	Non-potable Water
Sulfate	ASTM D516-11	General Chemistry	Non-potable Water
Total nitrate-nitrite	EPA 353.2	General Chemistry	Non-potable Water
Total nitrate-nitrite	SM 4500-NO3 H	General Chemistry	Non-potable Water

Note: SM – Standard Method; ASTM - American Society for Testing and Materials.

9.1.2 Quality Assurance and Quality Control

The EPLAB has implemented a robust quality system that encompasses Quality Assurance (QA) and Quality Control (QC) activities. The EPLAB staff maintain a comprehensive guidance document, referred to as the *Quality Manual*, to document the processes and steps of QA/QC. The EPLAB Quality Manual was revised in January 2022 to include corrective actions implemented because of the October 2020 FDOH audit; the revised version (3.7) has been effective since February 2, 2022.

The document 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 Manual, which allows for quick reference between this local document and the TNI standards. In addition, staff have also developed in-house standard operating procedures (SOPs) for select tasks. The SOPs are maintained and revised annually to coincide with new TNI standards in accordance with FDOH's Environmental Laboratory Program. Hardcopies of the most current Quality Manual 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.

QA 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. Laboratory equipment is tested for accuracy in accordance with the Quality Manual. Samples are arranged efficiently for analysis by batches to reduce the numbers of blanks, calibration standards, and QC samples needed per analysis.

Electronic entry of data at the laboratory station or output of an automatic analyzer directly to report forms has eliminated one source of potential errors. Organization of data in an electronic 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. QA 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. Laboratory results from the outside laboratories are received, reviewed, and forwarded to the WTP and WRF Chief Operators for use in compliance reporting.

9.1.3 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. Copies of FDOH certifications for the outside laboratories are maintained by the QAS. 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.

9.1.4 Data Management

The laboratory uses the EthoSoft web-based X-LIMS (Laboratory Information Management System) for data management. 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 can 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. A hardcopy tracking system, developed by the Laboratory Manager, is also used in conjunction with LIMS for those analytes not suited to electronic tracking. Data in the LIMS and on all computers used in the laboratory are backed-up daily 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.

9.1.5 Laboratory Operations and Site Visit

Jones Edmunds staff visited the EPLAB on January 31, 2022, and met with the Laboratory Manager, Sandra Lavoie, and the Laboratory QAS, Elizabeth Robling, to discuss operations in FY 2021. The Laboratory Manager reviews the WRF's permits, provides operators with pre-labeled sampling bottles, and coordinates sampling events to account for the lab's staffing and analytical capabilities, sample holding times, and water quality compliance schedules. During FY 2021, the EPLAB received 7,848 samples and conducted 28,810 analyses. EPLAB sends some samples to outside laboratories that are certified to perform tests that EPLAB is not certified to perform. The EPLAB used external laboratories to process an additional 2,480 analyses for a total of 31,290 analyses.

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 WRFs. The number of samples and analyses required from the laboratory are expected to increase with the AWT upgrades which require frequent sampling of total phosphorus (TP), which is a labor-extensive process due to the digestion steps. In addition to laboratory analytical services, EPLAB has also taken on additional field sampling and sample courier service responsibilities as of 2020. With these additional services, staffing requirements and equipment needs should be evaluated so that laboratory analyses services are not negatively impacted by work hours spent performing field sampling and/or courier services.

The following reviews, tests, reports, and trainings were completed in FY 2021:

- The annual Management Review of the EPLAB quality system and environmental testing activities was submitted in February 2021.

- Kimley Horn and Associates performed an operational review of the EPLAB. No deficiencies were noted during the visit.
- The EPLAB participated in and passed two TNI/FDOH-mandated Proficiency Testing studies (in February 2021 and August 2021). Staff achieved a score of 100 percent. The next set of proficiency testing is scheduled for the first quarter in 2022.
- The Quality Integrity System Report was completed in December 2021.
- The annual Ethics and Data Integrity training for all laboratory staff in the EPLAB was completed on August 12, 2021.

The EPLAB workspace consists of five main rooms:

- Sample receiving and storage.
- Un-refrigerated chemicals and equipment storage.
- Administrative workstations for laboratory technicians.
- Main laboratory benches.
- Drinking water laboratory.

No deficiencies were noted by Jones Edmunds during the January 2022 laboratory site visit. The areas are kept clean and orderly, and staff does an excellent job of maintaining the workspaces. Review of internal laboratory documentation indicates that all IDOC/CDOC records are complete and up to date, SOPs for all certified methods were reviewed and revised (as needed) during 2021 and all laboratory staff received appropriate quality assurance, SOP, and data integrity training. As noted by the Laboratory QAS, 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.

9.1.6 Review of Previous Report Recommendations

Table 9-2 CCU EPLAB FY 2020 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:	▪ Update personnel on new sampling procedures including the need for accuracy in use of collection bottles, sample storage, and delivery to the laboratory.
Progress:	▪ Reoccurring.
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.

9.2 ASSET MANAGEMENT

Asset management is the practice of managing capital assets to minimize cost of operations to owners and establish individual level(s) of service to be delivered. Asset management plans (AMPs) are developed as a tool to record all the owner's asset management practices and strategies. Typically, an EAMS such as CityWorks is used to manage asset data.

According to the *Reference Guide for Asset Management Tools* (June 2020), EPA has identified that an AMP should include the following components:

- Introduction – Identifies goals, strategic plan, mission statement, and other relevant background information.
- Staff Information – Identifies system staffing structure and asset management team. Includes stakeholder education and outreach.
- Level of Service – Defines the system operation and expectations for customer service delivery.
- Asset Inventory – Identifies and evaluates system assets. Includes evaluation of criticality, probability/consequence of failure, and remaining useful life.
- Operation and Maintenance – Identifies and tracks applicable operating procedures and required maintenance routines.
- Capital Improvements – Identifies short- and long-term asset rehabilitation and replacement projects based on Asset Inventory and O&M data.
- Financial Strategy – Determines if system revenue(s) will be adequate to fund current and future O&M and Capital Improvements. This component reasonably ensures the desired LOS is economically feasible.

- Compliance – Identifies and tracks requirements for system compliance with respect to federal and state guidelines.
- Preparedness – Identifies emergency procedures to maintain system operations such as emergency power backup.

The EPA Reference Guide also identifies the following as additional components that may be included to increase the value and effectiveness of an AMP, although they are not noted as required: energy management, water efficiency, climate change, regional planning, and multi-sector asset management.

CCU does not currently have an AMP, however over recent years, BCC has taken a forward approach in continuing to develop its Strategic Plan. The Charlotte County Strategic Plan is updated every fiscal year, and includes goals, initiatives, and highlighted past achievements for identified "strategic focus areas." In 2020, the BCC streamlined the Strategic Plan by narrowing the number of focus areas from nine to four. The current Strategic Plan focus areas are described as follows:

- Public Services – to maintain a safe and healthy community by delivering essential services from skilled, professional, and dedicated public servants.
- Economic and Community Development – to create a business climate that promotes a diversified, growing economy consistent with sustainable growth management plans, environmental stewardship, and enhanced quality of life.
- Infrastructure - to build and maintain countywide infrastructure that meets our evolving needs and enhances our community appearance, improves public safety, and protects our natural resources.
- Efficient and Effective Government - to manage fiscally sound county operations with a culture of transparency, accountability, citizen engagement and innovation.

In 2020, Charlotte County retained Jones Edmunds to implement CityWorks EAMS in support of the County's Strategic Plan. CityWorks EAMS will be used to standardize the work and asset tracking process in a robust system with capabilities to schedule routine maintenance and tasks, identify and track hot spots and issues with infrastructure, and report on key performance indicators across County Departments. Initially, CityWorks will be implemented in the Utilities, Facilities, and Public Works Departments.

As part of these efforts, Jones Edmunds and CCU began with a review of current GIS data, as CityWorks is built on the spatial data for assets in the system. The Jones Edmunds team recommended GIS database schema edits to bring the data in conformance with industry standards as well as adding the necessary fields for CityWorks use. Part of the scope included development of a vertical asset schema for the CCU plants, which organizes specific plant assets into database tables that are then related to the physical plant location or room where they reside, which is then captured spatially within the GIS. Polygons for plant process areas were created as part of this project for this purpose. The CCU team is currently developing the final list of assets, both vertical assets for plants, and linear assets such as pipes, valves, hydrants, etc. The GIS data will be published to the database to be used by CityWorks and will become the database of record for all work done within the County.

Over the past year, Jones Edmunds met with the various groups within CCU including Water Distribution, Wastewater Collection, Engineering, Reclaimed Water, Treatment Facilities, and

Instrumentation and Control to learn about current workflow processes and work that is done on the CCU assets (scheduled and routine maintenance, emergency maintenance asset replacement, etc.). These meetings, combined with the 2018 departmental work process evaluation performed by LA Consulting, assist in configuring CityWorks to capture the work and needed information for the EAMS. Configuration includes the elements of:

- Domain and Groups set up to determine how information can be shared across department boundaries.
- GIS configuration and Map Development specifically configured for CCU staff to use in the field.
- Work Orders, which will reflect activities performed.
- Service Requests, which will capture internal and external requests for information on the CCU assets.
- Inspections, which will hold custom questions and information routinely checked for assets in the system.
- Crews, which provides efficient association of costs to each Work Order.
- Projects, to streamline activity tracking.
- Inboxes, which will support the major workflow activity tracking for each department.
- Dashboards and Reporting, which will employ both out-of-the-box and custom reports for data analysis and data mining.
- Storeroom, the CityWorks warehousing add-on that tracks materials influx, use and stock on hand. Different Storerooms will be set up for the CCU Storerooms as well as each of the trucks and their rolling stock.

The effort also includes integration with two global and three Utilities-specific software packages in use at the County. Eden integration has been completed and will allow for an up-to-date employee record for assigning work in CityWorks. PublicStuff will soon be connected to CityWorks such that a complaint filed by a citizen or entered via a call center will result in a Service Request assignment within CityWorks for one of the CCU departments as applicable. An integration with Banner, the customer information system, will be designed to cut down on duplication of work entered between the two systems. An integration with SCADA will allow the creation of Work Orders based on alarms and equipment run times. Finally, the effort will integrate CityWorks with GraniteNET so that the County can more easily pass information between CityWorks and the CCTV pipe inspection system.

The current schedule for full implementation is for CCU to go-live with the software in Summer 2022. Before the go-live, a small group of "super users" will be trained and will spend time doing User Acceptance Testing. Following a testing period, the system can be tweaked with necessary adjustments to accommodate needs of CCU, then the remainder of CityWorks users will be trained on the updated system. Setup of the CityWorks add-on Performance Budgeting will follow go-live for users. This is the facet of CityWorks that will assist with planning and budgeting for future fiscal years, as well as the ability to compare planned effort versus actual effort across departments.

9.3 Operation and Information Technology

CCU operates facilities 24 hours per day, 365 days per year, to provide safe drinking water for Charlotte County while collecting and treating wastewater so it can be distributed for beneficial re-use by reclaimed customers. An integral part of daily operations involves monitoring and controlling facilities using the SCADA system, either on site or remotely; many smaller facilities such as lift stations are primarily operated remotely. Of equal importance is the Utility's ability to concurrently operate the numerous processes involved. Automation of these tasks, as for most cases in the CCU system, allow CCU to deliver their utility services at the lowest feasible cost to the customer. However, automated systems are more susceptible to network threats, so cybersecurity should be considered and evaluated as a forefront issue for every SCADA or network improvement.

The existing CCU utility systems include many acquired assets. Several facilities represent multiple projects involving different engineers, bid contractors, and SCADA system integrators. This has resulted in a SCADA system of mixed hardware, software, and architectures that includes diverse and separate operations. Supporting and maintaining information for sharing and use can become problematic even for the most basic operations. CCU completed the SCADA Master Plan (McKim & Creed, March 2020) to improve this situation with a goal of standardizing hardware and software platforms and improving the overall system operations.

The primary goal of the SCADA Master Plan was 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.

CCU's short-term SCADA goals include:

- Assess CCU's current SCADA infrastructure.
- Identify equipment and systems that are inefficient, aging, or obsolete.
- Evaluate the best, most cost-effective options for improvements for equipment, communications, and software.
- Recommend standards for equipment, communications, and software.
- Identify and cost projects to implement these goals.

CCU's long-term SCADA goals include:

- Bring all services onto a common SCADA platform to be shared throughout CCU.
- Provide a central location to monitor all CCU operations during non-business hours and during weather emergencies.
- Expand SCADA services to supplement future utility service expansions in the most efficient manner.
- Provide management with timely operational data to better monitor and optimize operations.
- Provide SCADA data to integrate with other County software packages, such as the new EAMS.

These goals were used in the SCADA Master Plan to develop recommendations to incorporate into CCU's current and future planning, CIP, and O&M programs. Many improvements are

inter-related. Specific recommendations from the SCADA Master Plan are included in Chapter 10 and are summarized as follows:

- Conduct a cybersecurity audit of the SCADA system to assess the vulnerability of the system and prepare for AWIA compliance.
- Establish and implement new CCU standards for software, equipment, and communications. These standards will help minimize the number of platforms in use by CCU, reducing the investment in spare parts and the training requirements as well as improving the knowledge and efficiency of the maintenance staff. This will also allow CCU to better manage and control future SCADA project implementations.
- Define and implement new policies and procedures for changes in management, contingency, and disaster recovery.
- Migrate from the two SCADA software platforms currently in use at CCU to a single SCADA platform provided by Trihedral's VTScada. CCU began converting to VTScada in 2021 and should continue to implement VTScada in accordance with the SCADA Master Plan.
- Upgrade the control systems equipment at CCU major facilities as outlined in the SCADA Master Plan. Some of this work can be accomplished as stand-alone projects and other work can be implemented as part of planned CIP projects.
- Work with the County IT Department to expand the County's fiber optic network to include all major CCU facilities, specifically the Rotonda WRF and Burnt Store facilities. Expansion to include smaller facilities (existing and future) should be included as it is deemed cost-effective.
- Establish a Central Command Center at the East Port WRF. The Central Command Center would give CCU greater day-to-day operational flexibility and would provide monitoring and control of remote facilities during an extreme weather event.
- Integrate the new SCADA system with other CCU systems such as LIMS, EAMS, and GIS. This integration will decrease manual data entry and related errors, increase efficiency and automation of the process, and provide an infrastructure to apply analytics and artificial intelligence.

10 CONSOLIDATED RECOMMENDATIONS

10.1 PLANNING RECOMMENDATIONS

Table 10-1 through Table 10-7 summarize the Planning Recommendations from the FY 2021 Annual Report. The recommendations have been compiled from each chapter and summarized for each CCU workgroup.

10.1.1 ADMINISTRATIVE

Table 10-1 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:	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:	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]

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

10.1.2 WATER TREATMENT PLANTS

Table 10-2 Water System Planning Recommendations

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:	Upgrade the ammonia feed system and prepare for monochloramine conversion of the Burnt Store system.
Recommendation:	Evaluate the feasibility of relocating the security camera displays from the lab to the operations office building.

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

10.1.3 WATER DISTRIBUTION SYSTEM

Table 10-3 Water System Planning Recommendations

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 AMI 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.
Recommendation:	Investigate and review of the Gulf Cove WBS power system to identify and repair components as necessary to resolve the issue.

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

10.1.4 WASTEWATER COLLECTION SYSTEM

Table 10-4 Wastewater Collection System Planning Recommendations

Recommendation:	Develop a capacity, management, operations, and maintenance (CMOM) program to better manage the collection system, investigate capacity limitations, and improve responsiveness to sanitary sewer overflows. The program should focus on high LOS and regulatory compliance.
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.
Recommendations:	Master Lift Station No. 65 – South Port ▪ Evaluate generator control elevations to conform to code. ▪ Evaluate the use of a chopper pump or grinder station to reduce ragging, if necessary.
Recommendations:	Master Lift Station No. 83 – Maple Leaf ▪ Evaluate on-site odor control and consider upgrading unit or evaluating simplistic HIVENT unit, if appropriate.
Recommendations:	Master Lift Station No. 816 – Boulevard West ▪ Evaluate relocating power supply underground. ▪ Evaluate the adjacent lot for future lift station conversion.
Recommendations:	Lift Station No. 7 – Pure Oil ▪ Evaluate Odor Control opportunities. ▪ Evaluate possibilities for a dedicated access to the station.
Recommendations:	Lift Station No. 24 – Charlotte Square ▪ Evaluate the wet well for replacement of lining and potential structural repair. ▪ Evaluate construction of a separate, isolated valves vault for operator safety, including standard dedicated discharge.
Recommendations:	Lift Station No. 28 – Peachlove ▪ Evaluate re-lining the wetwell or specifically address the exposed penetrations and seams.
Recommendations:	Lift Station No. 44 – Liberty Elementary ▪ Evaluate the replacement of the check valves. ▪ Evaluate possibilities for a dedicated access to the station.
Recommendations:	Lift Station No. 45 – Woodbury ▪ Evaluate incorporating a simplistic HIVENT odor control unit, if appropriate.

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. 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. 442 – Doredo 2 ▪ Evaluate an adjacent lot for future lift station conversion to allow safe access, inclusion of appropriate valves, and inclusion of bypass piping. ▪ Evaluate the installation of a secondary stand-by pump.
Recommendations:	Lift Station No. 809 – Placida Harbor ▪ Evaluate incorporating a dedicated access for operations staff, including access for pump trucks. ▪ Evaluate incorporating a water service near the station.
Recommendations:	Lift Station No. 813 – Marina ▪ Evaluate the option of rehabbing the lift station to meet standard codes. ▪ Evaluate covering wet well temporarily until full rehabilitation or replacement of station can be coordinated.
Recommendations:	Vacuum Station No. 1 – Skylark (Formerly LS 59) ▪ Evaluate modifying the overhead crane with a trolley for lateral movement. ▪ Complete design to implement access to the top of the tank for maintenance.
Recommendations:	Vacuum Station No. 2 – El Jobean (Formerly LS 99) ▪ Evaluate a catwalk or dedicated ladder for accessing the top of the tank for maintenance. ▪ Verify the vacuum station site is in accordance with Occupational Safety and Health Administration (OSHA) and County safety and confined-space requirements. ▪ Evaluate a portable hoist or dedicated overhead crane for easier access to the vacuum pumps.
Recommendation:	▪ Continue working toward an operational CMOM program.

10.1.5 WASTEWATER TREATMENT FACILITIES

Table 10-5 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:	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:	Complete 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.

10.1.6 Reclaimed Water Distribution System

Table 10-6 Reclaimed Water System Planning Recommendations

Recommendation:	Maintain updated hydraulic models for Mid/West and South County to predict the impact of future demand on the reclaimed water transmission systems.
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:	Create a reclaimed water system O&M Manual and operating protocols.

10.1.7 Utility Support Services

Table 10-7 Utility Support Services – Planning Recommendations

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:	Develop Change Management/Version Control Standards.[1]
Recommendation:	Develop Contingency and Disaster Recovery Plan.[1]
Recommendation:	Develop Transition Plan for Lift Station Sites.[1]
Recommendation:	Hire New I&C Staff.[1]
Recommendation:	Utilize CityWorks implementation to develop Utility AMP to track water, wastewater, and reclaimed distribution systems and facilities.
Recommendation:	Continue to convert as-builts and incorporate complete projects into the existing GIS system. When possible, require contractors to provide as-built shapefiles as part of major construction project close-out.

[1] Recommendations from SCADA Master Plan (McKim & Creed, March 2020).

10.2 Capital Improvements

Table 10-8 through Table 10-21 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.

10.2.1 Administrative Buildings

Table 10-8 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).

10.2.2 Water Treatment Plants

Table 10-9 Burnt Store RO WTP – CIP Recommendations

Recommendation:	Determine the ultimate use of Well No. 15.

10.2.3 WATER DISTRIBUTION SYSTEM

Table 10-10 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. Generator reportedly scheduled for replacement. ▪ 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. New fuel tank and generator reportedly scheduled for installation.
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 10-11 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).

10.2.4 WASTEWATER COLLECTION SYSTEMS

Table 10-12 Sewer and Lift Station Systems – CIP Recommendations

Recommendation:	<u>Master Lift Station No. 309 – Bridgewater (Deep Creek)</u> ▪ Provide a stationary generator. ▪ Coat the wetwell and evaluate structural improvements ▪ Replace concrete control panel and posts with County Aluminum standard.
Recommendations:	<u>Master Lift Station No. 816 – Rotonda Boulevard</u> ▪ Coat the wet well. ▪ Repair or rehabilitate the concrete top slab.
Recommendations:	<u>Lift Station No. 1– Community Center</u> ▪ Replace the outdated control panel and bring electrical up to current standards. ▪ Perform thorough rehabilitation of the lift station including repairing the building or replace the station with a modern submersible configuration and all new equipment.
Recommendations:	<u>Lift Station No. 3 – Gardner</u> Evaluate possibilities for using adjacent land to convert the station to a submersible station.
Recommendations:	<u>Lift Station No. 7 – Pure Oil</u> ▪ Evaluate possibilities for a dedicated access to the station. ▪ Perform thorough rehabilitation including the improvements listed above or replace the station with a modern submersible configuration and all new equipment.
Recommendations:	<u>Lift Station No. 9 – Church</u> ▪ Evaluate possibilities for converting the station to submersible; otherwise evaluate concrete repair and restoration for the site.
Recommendations:	<u>Lift Station No. 24 –Charlotte Square</u> ▪ Evaluate the wet well for replacement of lining and potential structural repair. ▪ Evaluate construction of a separate, isolated valve vault for operator safety, including standard dedicated discharge.
Recommendations:	<u>Lift Station No. 44 –Liberty Elementary</u> ▪ Perform thorough rehabilitation including some form of structural improvement and lining. ▪ Evaluate the replacement of the check valves. ▪ Evaluate possibilities for a dedicated access to the station.
Recommendations:	<u>Lift Station No. 45 – Woodbury</u> ▪ Evaluate incorporating a simplistic HIVENT odor control unit, if appropriate. ▪ Rehabilitate the invert coming into the station.

Recommendations:	Lift Station No. 303 –Constantine ▪ Perform thorough rehabilitation on wetwell and prepare for construction of improved design to allow safe access. ▪ Prepare for construction of improved design to allow safe access, inclusion of appropriate valves, and inclusion of bypass piping.
Recommendations:	Lift Station No. 442 –Doredo 2 ▪ Evaluate an adjacent lot for future lift station conversion to allow safe access, inclusion of appropriate valves, and inclusion of bypass piping. ▪ Evaluate the installation of a secondary stand-by pump.
Recommendations:	Lift Station No. 809 –Placida Harbor ▪ Evaluate incorporating a dedicated access for operations staff, including access for pump trucks. ▪ Evaluate incorporating a water service near the station.
Recommendations:	Lift Station No. 813 – Marina ▪ Evaluate the option of rehabilitating the lift station to meet standard codes.

Table 10-13 Vacuum System – 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.

10.2.5 WASTEWATER TREATMENT FACILITIES

Table 10-14 East Port WRF – CIP Recommendations

Recommendation:	The previous CIP recommendations have been consolidated and incorporated into the East Port WRF expansion project.
Recommendation:	Provide a fixed panel cover over the CCC.

Table 10-15 West Port WRF – CIP Recommendations

Recommendation:	Provide additional aerobic sludge-holding tank volume and decanting capacity to improve decant thickening.
Recommendation:	Resolve hydraulic constraints in the irrigation wet well for the injection well pumps to allow disposal of excess reclaimed water from West Port during wet-weather events.
Recommendation:	Install a galvanized metal frame and UV cover above each filter tank to prevent algae growth in the filters.
Recommendation:	Check leveling on all four clarifier effluent launders and skimmer arms and re-level as necessary.
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 10-16 Rotonda WRF – CIP Recommendations

Recommendation:	Previous recommendations for the headworks including influent valves, flow control, grit cyclones, and screens should be addressed as part of the headworks improvement project at Rotonda WRF.
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 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 10-17 Burnt Store WRF – CIP Recommendations

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

Table 10-18 Leachate Treatment Facility – CIP Recommendations

Recommendation:	Repair the effluent storage tank.
Recommendation:	Repair filter feed pump tank.

10.2.6 Reclaimed Water Distribution System

Table 10-19 Reclaimed Water Distribution System – CIP Recommendations

Recommendation:	CIP recommendations to improve capacities of treatment, storage, and pumping in the Mid/West County and South County systems for future demands are being developed as in the Reclaimed Master Plan.

10.2.7 Utility Support Services

Table 10-20 EPLAB – CIP Recommendations

Recommendation:	Investigate the benefit of purchasing analytical equipment to process more total phosphorus samples expected from the AWT upgrades at the WRFs.
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 10-21 Operation and Information Technology – CIP Recommendations

Recommendation:	Add Headworks PLC at Rotonda WRF to SCADA.
Recommendation:	Add PLCs at East Port WRF to SCADA.
Recommendation:	Build the Central Control Center at East Port WRF.
Recommendation:	Complete Cybersecurity Audit.
Recommendation:	Convert to VTScada Software (Major Facilities).
Recommendation:	Convert to VTScada Software (remote sites).
Recommendation:	Develop Lift Station/Reclaim Station Design Standards.
Recommendation:	Develop SCADA Specifications and Standards.
Recommendation:	Improve Septage Billing at East Port WRF.
Recommendation:	Replace PLC at Gulf Cove WBS, Walenda WBS, Englewood WBS, Golf Course WBS, Myakka WBS, Ingraham Disinfection Station, & Rotonda WRF.
Recommendation:	Install fiber at Burnt Store WTP, Gulf Cove WBS, Walenda WBS, Englewood WBS, Golf Course WBS, Ingraham Disinfection Station, El Jobean Vacuum Station, Harbor Vacuum Station, Spring Lake Vacuum Station, Rotonda RWBS, West Port RWBS, Walenda RWBS, Eagle Street RWBS, Burnt Store WRF, Rotonda WRF.
Recommendation:	Remove CCTV from Control Panels at East Port WRF.
Recommendation:	Replace ControlNet Network at Burnt Store WTP.
Recommendation:	Replace DH+ Network at West Port WRF.
Recommendation:	Replace Reclaim Site Control Panels.
Recommendation:	Replace Switches at East Port WRF.

Note: All recommendations from SCADA Master Plan (McKim & Creed, March 2020).

10.3 Operation and Maintenance

Table 10-22 through Table 10-32 summarize the O&M items that were identified and recommended during the FY 2021 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.

10.3.1 Water Treatment Plants

Table 10-22 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:	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 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.
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).

10.3.2 WATER DISTRIBUTION SYSTEM

Table 10-23 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).

10.3.3 WASTEWATER COLLECTION SYSTEMS

Table 10-24 Wastewater Collection System – O&M Recommendations

Recommendation:	Master Lift Station No. 65 – South Port ▪ Repair the flow meter. ▪ Fence the entire site.
Recommendation:	Master Lift Station No. 309 – Bridgewater (Deep Creek) ▪ Replace/repair piping and check valves in underground vault. ▪ Replace pumps and other related equipment.
Recommendations:	Master Lift Station No. 816 – Rotonda Boulevard ▪ Modify valve vault to allow full access to the valves and to prevent them from being buried. ▪ Install seal-offs on any electrical equipment within 10 feet of the wetwell to confirm with current electrical codes.
Recommendations:	Lift Station No. 1 – Community Center ▪ Paint the aboveground discharge pump and piping. ▪ Repair/replace the patched wye connection. ▪ Repair cracks in the building. ▪ Seal pipe penetrations. ▪ Provide an odor-control system.
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. 7 – Pure Oil ▪ Evaluate odor-control opportunities. ▪ Install seal-offs on any electrical equipment within 10 feet of the wetwell to conform with current codes.
Recommendations:	Lift Station No. 18 – Jr. High ▪ Perform routine maintenance including tightening bolts and touch-up painting.
Recommendations:	Lift Station No. 20 – Lake Worth ▪ Install seal-offs on any electrical equipment within 10 feet of the wetwell to conform with current codes.
Recommendations:	Lift Station No. 28 – Peachlove ▪ Replace concrete control panel posts with County aluminum standard.
Recommendations:	Lift Station No. 44 – Woodbury ▪ Install seal-offs on any electrical equipment within 10 feet of the wetwell to conform with current codes.
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. 303 – Constantine ▪ Install interlock on electrical equipment and perform a detailed electrical code review to return to conformance with code. ▪ Install seal-offs and perform a detailed electrical code review to return to conformance with code.
Recommendations:	Lift Station No. 809 –Placida Harbor ▪ Install seal-offs on any electrical equipment within 10 feet of the wetwell to return to conformance with current electrical codes. ▪ Repair the station and replace pumps and pump bases as necessary to return to standard operation. ▪ Install battery backups to provide redundancy for signaling to operations staff. ▪ Replace or repair high level alarm to allow notification to operations staff.
Recommendations:	Lift Station No. 813 – Marina ▪ Install seal-offs on any electrical equipment within 10 feet of the wetwell and perform a detailed electrical code review to return to conformance with current electrical codes. ▪ Secure the mechanical interlock behind the dead front to be located between generator and main breaker. ▪ Evaluate covering wet well temporarily until full rehabilitation or replacement of station can be coordinated.

10.3.4 WASTEWATER TREATMENT FACILITIES

Table 10-25 East Port WRF – O&M Recommendations

Recommendation:	Convey Digester Decant, In-Plant Pump Station No. 1, and No. 2 Plant Recycle flows into the EQ Tank after expansion once expansion complete.
Recommendation:	Paint aboveground piping within the next 2 to 3 years at Headworks.
Recommendation:	Replace Hose bibs connections at Headworks.
Recommendation:	Replace insultation for Probe SC100 piping on Oxidation Ditch No. 2.
Recommendation:	Include more bird deterrents near Clarifiers.
Recommendation:	Rails for backwash mechanism at Filters are in fair condition but wall support is beginning to rust. It is recommended that the wall support be painted.
Recommendation:	Replace base of pump heads at both the High Service Pump Station No. 1 and Pond Transfer Pumps.
Recommendation:	Paint Sludge Transfer Pumps and associated pipes within the next 3 to 5 years.
Recommendation:	Provide sun shield for control panel at HSPS No. 2.
Recommendation:	Coat and repaint the RCW meter pipes at HSPS No. 2.
Recommendation:	Replace the irrigation pumping station electrical switchgear.

Table 10-26 West Port WRF – O&M Recommendations

Recommendation:	Check leveling on all four clarifier effluent launders and skimmer arms and relevel as necessary.

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 10-27 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:	Add UV protection to the sides of the chlorine storage tanks to protect from direct sun light.
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 as soon as possible. These membranes are at the end of their life cycle and this maintenance is critical for their longevity.
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, since 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 10-28 Burnt Store WRF – O&M Recommendations

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

Table 10-29 Leachate Treatment Facility – O&M Recommendations

Recommendation:	Add a generator to the treatment facility to keep the plant operational during power outages.

10.3.5 Reclaimed Water Distribution System

Table 10-30 Reclaimed Water Distribution System –O&M Recommendations

Recommendation:	Develop an operational protocol for the Mid/West County Master Reuse 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 and future major reclaimed water users with pond discharges.

10.3.6 Utility Support Services

Table 10-31 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 10-32 Operation and Information Technology – O&M Recommendations

Recommendation:	Revise Fiber Optic Network for Physical Redundancy at East Port WRF.
Recommendation:	Integrate MBR System into SCADA at Rotonda WRF.
Recommendation:	Integrate SCADA into LIMS.

Note: All recommendations from SCADA Master Plan (McKim & Creed, March 2020).