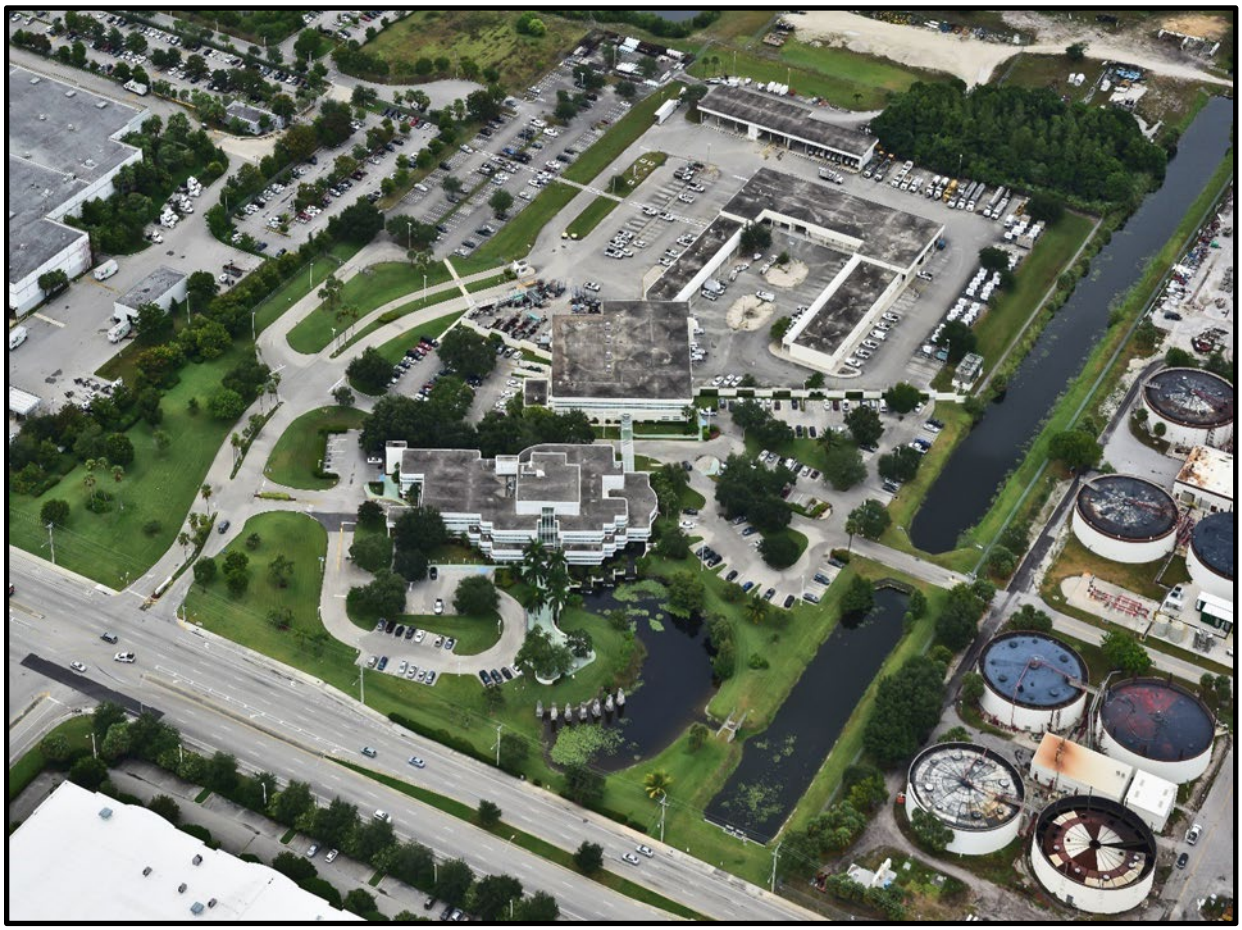
BROWARD COUNTY WATER AND WASTEWATER SERVICES

ANNUAL REPORT

FISCAL YEAR 2022

"Our Best in Every Drop"



Final Report Prepared July 2023 by Brown and Caldwell, Inc. and Cordova Rodriguez & Associates, Inc.

BROWARD COUNTY FLORIDA

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Section 1 Introduction

The purpose of this Engineer's Report for Water and Wastewater Services (WWS) of Broward County, Florida (County) is to provide the following:

- A review of the management and organization of WWS, which operates the County's water and wastewater systems (collectively, the Utility)
- A description of the Utility.
- A financial review of the Utility regarding historical and prospective debt service coverage, insurance requirements, and future system funding needs; and
- A summary of projections of future impacts on the Utility, projections of revenues and expenses, and a review of the planned capital improvements of the Utility.

This report provides descriptions and observations of the Utility; the primary operating activities including the retail water and wastewater system, which provides water and/or sewer service to approximately 57,693 customers accounts; the North Regional Wastewater System (NRWWS), which provides transmission, treatment and disposal services to other utilities on a wholesale basis; the Regional Raw Water System, which provides raw water to other utilities; the water and wastewater capital improvement program (CIP); and the financial operations of the Utility.

Section 2 Administration and Management

2.1 History and Organization of Water and Wastewater Services

The Broward County Utilities Division (the incipient organization leading to the current WWS) was established on January 31, 1962, with the County's purchase of a small, investor-owned water and wastewater utility. Between 1962 and 1975, the County acquired additional private utilities. In 1972, the Utility commenced construction of the North Regional Wastewater Treatment Plant (NRWWTP), and in 1975, the Utility began providing wholesale wastewater treatment service to Large Users (LUs), which include certain municipalities and utility districts in northern Broward County. In 1976, the County established uniform rates throughout its service areas to achieve fiscal consolidation.

The water utility service area is divided into three separate geographic districts; District 1 is served by Water Treatment Plant (WTP) 1A, District 2 is served by WTP 2A and District 3 is served by purchased water from the City of Hollywood, Florida.

Subsequent reorganizations created the current WWS consisting of five divisions. These divisions are Water and Wastewater Operations, Water and Wastewater Engineering, Water Management, Water and Wastewater Information Technology, and Business Operations. WWS operates within the Public Works Department, and is responsible for planning, construction, operation, maintenance, customer service, water management, and financial management of the Utility. Currently, WWS employs 420 people, including 25 certified water operators, 26 certified wastewater operators, 17 registered professional engineers, and 1 certified public accountant. Included are 8 employees who are dual-certified as both water and wastewater operators. In addition, numerous employees hold recognized industry-specific certifications. An organizational chart, Figure 2-1, is provided below.

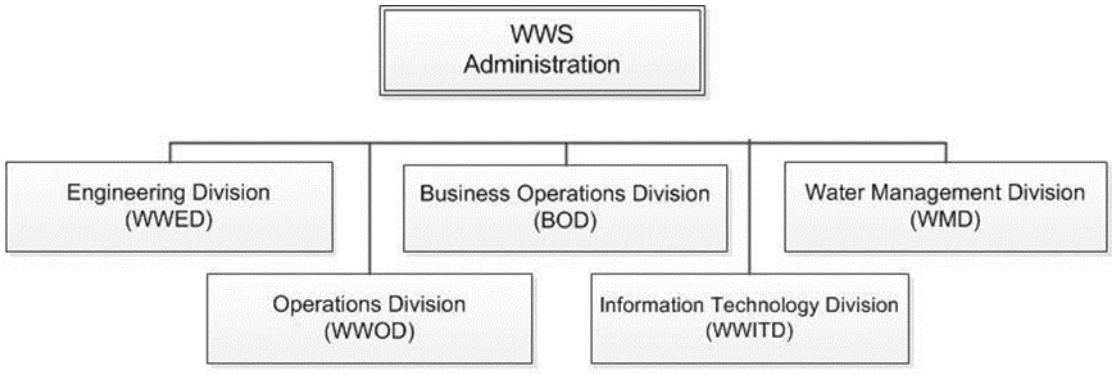

Figure 2-1. Water and Wastewater Services Organizational Chart

Under the County Code of Ordinances, the County exercises exclusive jurisdiction, control and supervision over the utility system or any part of a utility system owned, operated, or maintained by the County. The Board of County Commissioners of Broward County, Florida (the Board) has the specific legal authority to fix, charge, and collect from its customers, rates, fees, and charges, and to acquire, construct, finance and operate the Utility without supervision or regulation by any other political subdivision of the State (provided that compliance with applicable environmental rules and regulations as described herein is accomplished).

2.2 Mission

The mission of WWS is to perform as a benchmark comprehensive utility providing exceptional retail and regional water and wastewater management services and programs to its customers; and supporting continuous improvement while maintaining the quality of life in Broward County through sound environmental practices.

The overall goals established by WWS are as follows:

- To provide high quality and cost-effective services.
- To treat customers professionally and with the utmost respect.
- To operate the facilities and execute programs in a manner that protects the environment.
- To protect and enhance the natural resources of Broward County.
- To create and maintain a workplace in which employees are provided the opportunity to develop to their maximum potential.
- To maintain honesty and integrity in every aspect of the operation.

2.3 Water and Wastewater Services Administration

Water and Wastewater Services Administration manages and directs the activities of the five WWS divisions: Engineering, Operations, Business Operations, Information Technology, and Water Management. Administration approves operating and capital budgets, assures rates, fees, and charges are sufficient to support fund activities and debt service requirements, while providing appropriate coverage to maintain or enhance bond ratings; and develops and implements financing plans for the successful implementation of the capital plan and policies to ensure environmentally safe water resources. Administration coordinates activities to identify efficiencies and synergies to reduce overall costs and enhance the delivery of services.

Administration also manages relationships with Large Users of the North Regional Wastewater System and the Regional Raw Water System. Administration coordinates the response to information requests from the County Commission and the general public. Administration promotes water conservation programs to benefit customers, preserve water resources and protect the environment; and monitors legislative and regulatory issues at local, regional, state and federal levels.

WWS Administration highlights included:

- Water and Wastewater Services' water and sewer utility bonds maintained strong ratings—"Aa1", "AA+" and "AA+" — from the three major rating services: Moody's, Fitch, and Standard & Poor's.

The Retail Rates increased compared to the previous fiscal year.

- The Regional Rates for wastewater and raw water were recalculated in conformance with Large User Agreements and recommended rates were approved by the Board for Fiscal Year 2023.

2.4 Water and Wastewater Operations Division

Water and Wastewater Operations Division (WWOD) is committed to supplying high quality raw and potable water; providing reliable water distribution and wastewater collection services; operating dependable transmission, treatment, and disposal of wastewater services to Large Users in the north region of the County; and ensuring all services are delivered in a safe, efficient and cost-effective manner.

WWOD operates and maintains water treatment plants, re-pumping and storage facilities, lift stations, underground water distribution and sewage collection systems, and other support facilities. The division is responsible for the preparation and submittal of reports to comply with federal, state and local requirements (such as the Safe Drinking Water Act) and to ensure the reliable production of high-quality, safe, potable drinking water for our citizens. The division provides raw water from two regional wellfields to five Large Users and to Broward County's retail operations, as well as operates two retail wellfields that supply water to the County's 1A and 2A Water Treatment Plants.

WWOD is also responsible for providing wastewater transmission, treatment and disposal services to 11 Large Users and Broward County through the operation and maintenance of a regional wastewater treatment facility and related regional pumping stations. The division operates a reclaimed water facility, which provides reclaimed water to both industrial and retail customers. In addition, WWOD operates a state-certified laboratory, an Industrial Pretreatment Program (IPP) and provides a critical environmental service through operating and maintaining a Septage Receiving Facility.

2.5 Water and Wastewater Engineering Division

Water and Wastewater Engineering Division (WWED) is committed to the administration and management of the WWS Capital Improvement Program (CIP) by ensuring that projects, which provide cost-effective, reliable infrastructure, inclusive of water distribution, wastewater collection, water treatment, wastewater treatment and raw water production, are implemented and available to meet current and projected demands.

WWED is also responsible for coordination of developer-donated facilities, maintenance of record information for water and wastewater facilities, and administration of water and sewer easements and permits required to connect to the water and wastewater plants operated by WWS. WWED also provides general water and wastewater engineering support for Broward County to ensure compliance with the County's minimum standards for construction and integrity of WWS systems.

WWED administers the following projects:

- The Local Utility Program (LUP) consists of numerous smaller localized utility replacement projects that cover an overall area of 1,479 acres and include installation of approximately 54 miles of pipeline. Construction started in 2009. Each project is designed based on its Utility Analysis Zone (UAZ). The estimated construction cost of this project is $107 million over the next 5 years.
- Septic Tank Elimination Program (STEP), which will address the removal of all septic tanks within WWS service areas by year 2029. Current STEP projects are estimated to be over $94 million over the next 5 years.

- North Regional Wastewater Treatment Plant (NRWWTP) is currently undergoing a comprehensive rehabilitation and resilience improvements to replace and/or rehabilitate aging infrastructure. The rehabilitation will be accomplished in several phases. The first phase of improvements began in 2017. Improvements include effluent disposal rehabilitation and are estimated to be over $322 million over the next five years.
- Water treatment improvement, repair and replacements will improve reliability. These improvements are estimated at $59 million over the next five years.
- Regional master pump station rehabilitation will address aging facilities and increase reliability of the NRWWTP transmission system. An estimated $41 million will be dedicated to this effort over the next five years. Similarly, upgrades to the retail wastewater pump stations are budgeted at $19 million over the next five years.

2.6 Water Management Division

Water Management Division (WMD) is committed to developing, managing, operating, and maintaining the surface and groundwater resources within our service area to provide recharge for water supply and wetlands; saltwater intrusion abatement; drainage and flood control; and environmental enhancements.

WMD programs in engineering, management and development review provide for the planning, design, construction and right-of-way management of waterways, culverts, pump stations and water control structures that provide surface and ground water recharge, flood protection, saltwater intrusion abatement and urban water supply. Water supply planning, well site assessments, and permitting services are provided to apply for, obtain, and assure compliance with public water supply and diversion and impoundment water use permits.

2.7 Business Operations Division

Business Operations Division (BOD) is committed to supporting all WWS divisions by providing exceptional customer service and timely and accurate billing services; supporting sound financial management; fiscal planning and rate development; and providing efficient and effective support services.

BOD provides accounting services for all divisions of WWS to provide timely financial reporting, ensure compliance with federal and state laws, professional accounting standards, and County policies and procedures. The division provides customer services including meter reading and meter repair, monthly billing and collection of revenues. The division operates a warehouse for materials and supplies used in the operation and maintenance of utility infrastructure. BOD coordinates materials management, purchasing and contract administration functions for all operational and administrative activities in WWS. In addition, BOD performs grounds and building maintenance services for over 200 locations owned and operated by WWS throughout the County. The division also coordinates the budgeting activities of all divisions of WWS, supports the development of fiscal plans and rates and fees, and charges for the services provided by WWS.

2.8 Water and Wastewater Information Technology Division

Water and Wastewater Information Technology Division (WWITD) is committed to providing WWS divisions with current industry standard technologies to automate business functions efficiently and effectively and to provide a high level of service support for those systems.

WWITD provides specialized automation services to the water and wastewater utility by acquiring, developing, and maintaining the latest technology solutions on its proprietary utility and SCADA networks. WWITD is responsible for desktop, server, and network support for the WWS segment of the County's administrative network.

The WWITD Director also manages the safety and physical security programs for WWS staff and facilities, which have been designated as critical infrastructure by United States Department of Homeland Security.

Section 3 Retail Water and Wastewater Utilities System

This section describes the water and wastewater retail system including the service area, results of certain physical inspections of representative utility physical assets, and review of the renewal and replacement program.

3.1 General Description

The retail water system supplies potable water to retail customers in several sections of the County and to one significant bulk water user. A summary of the Retail Water and Wastewater systems is presented in Table 3-1. Over the past ten years, the number of customers served by WWS has increased from 56,529 customers (accounts) to its present retail base of 57,693 customers. Broward County's total population is approximately 1.95 million. Of this amount, WWS's customer base represents a population of approximately 241,000. The City of Coconut Creek, a sale for resale customer, has approximately 57,000 residents. Including the City of Coconut Creek, the retail water system serves approximately 14.9% of Broward County's total population.

In the past ten years, the retail wastewater customer base has grown from 47,799 customers (connections) to its present base of 51,206 customers as shown in Table 3-1. This represents an increase of 7.13%. This number will continue to grow through the County's extension of sanitary sewers into currently unsewered areas. Treatment, transmission, and disposal management is provided by the County-operated North Regional Wastewater System (the "Regional Wastewater System" discussed in Section 4 and collectively with the retail wastewater system the "Wastewater System") and by the Southern Regional Wastewater System operated by the City of Hollywood.

Table 3-1. Summary of Retail Water System and Retail Wastewater System					
System Component	**Units**	**Fiscal Year 2013**	**Fiscal Year 2022**	**Change**	**Percent Change**
Water System:					
Customer Base	Customers	56,529	57,693	1,164	2.06%
Water Service Area	Square Miles	41.10	41.00	(0.10)	-0.24%
Water Lines	Miles	714.00	743.70	29.70	4.16%
Water Plant Capacity:					
Plant Capacity	MGD[2]	46.00	56.00	10.00	21.74%
Avg. Daily Production[1]	MGD[2]	19.33	20.20	0.87	4.50%
Max. Daily Production	MGD[2]	23.09	24.10	1.02	4.42%
Purchased Water	MGD[2]	6.55	6.13	(0.42)	-6.41%
Wastewater System:					
Customer Base	Customers	47,799	51,206	3,407	7.13%
Wastewater Service Area	Square Miles	40.70	40.40	(0.30)	-0.74%

[1] Water demand management efforts were implemented in 2007. These consist of water conservation initiatives including, when necessary, year-round lawn watering restrictions. Reduced water demand translates to reduced billed wastewater.
[2] MGD = Million Gallons Per Day.

Source: Broward County Water and Wastewater Services

3.2 Service Area and Customer Base

The retail water system is divided into three service areas known as Districts 1, 2 and 3. These areas collectively cover approximately 41 square miles. Additionally, operations within District 2 include water sales to the City of Coconut Creek, which re-sells it to its customers.

WWS operates two water treatment plants (WTPs). Located in District 1 and District 2, the plants have a combined physical water treatment capacity of 56 MGD (million gallons per day). Treatment capacity, however, is constrained by available raw water supply. WWS holds a 20-year term consumptive use permit from the South Florida Water Management District (SFWMD) for conventional raw water supply from the Biscayne Aquifer and a longer duration permit for waters identified as “alternative water supplies (AWS)”. Based on the current permit, the Biscayne Aquifer’s (the commonly used surficial aquifer system) annual average allocation is 27.45 MGD through Fall 2040, which includes Districts 1, 2 and the North Regional Wellfield.

Additionally, 6.0 MGD of AWS from the C-51 Reservoir, which is intended to be supplied through the Biscayne Aquifer wells at the South Regional, District 1, and District 2/North Regional Wellfields, is permitted for supply through December 27, 2065. The Utility’s five-year Capital Improvement Program (CIP) is predicated upon these allocations. Water for District 3 is provided by the City of Hollywood through a water for resale agreement.

The County has a reserved allocation of 7.42 MGD of Upper Floridan Aquifer withdrawals within District 1 and District 2/North Regional permits. These reservations are not permitted and are backup options. No facilities to treat this high-chloride water source are planned because current

demand projections can be met by the traditional Biscayne Aquifer water sources and the newly permitted C-51 Reservoir offset allocation.

The water distribution systems in the three Districts contain approximately 749 miles of water distribution and transmission mains ranging in diameter from 2-inches to 54-inches. Figure 3-1 shows the geographic location of each service district and the City of Coconut Creek. Table 3-2 summarizes information on the production wells, treatment plants, and water system storage capacity in each district.

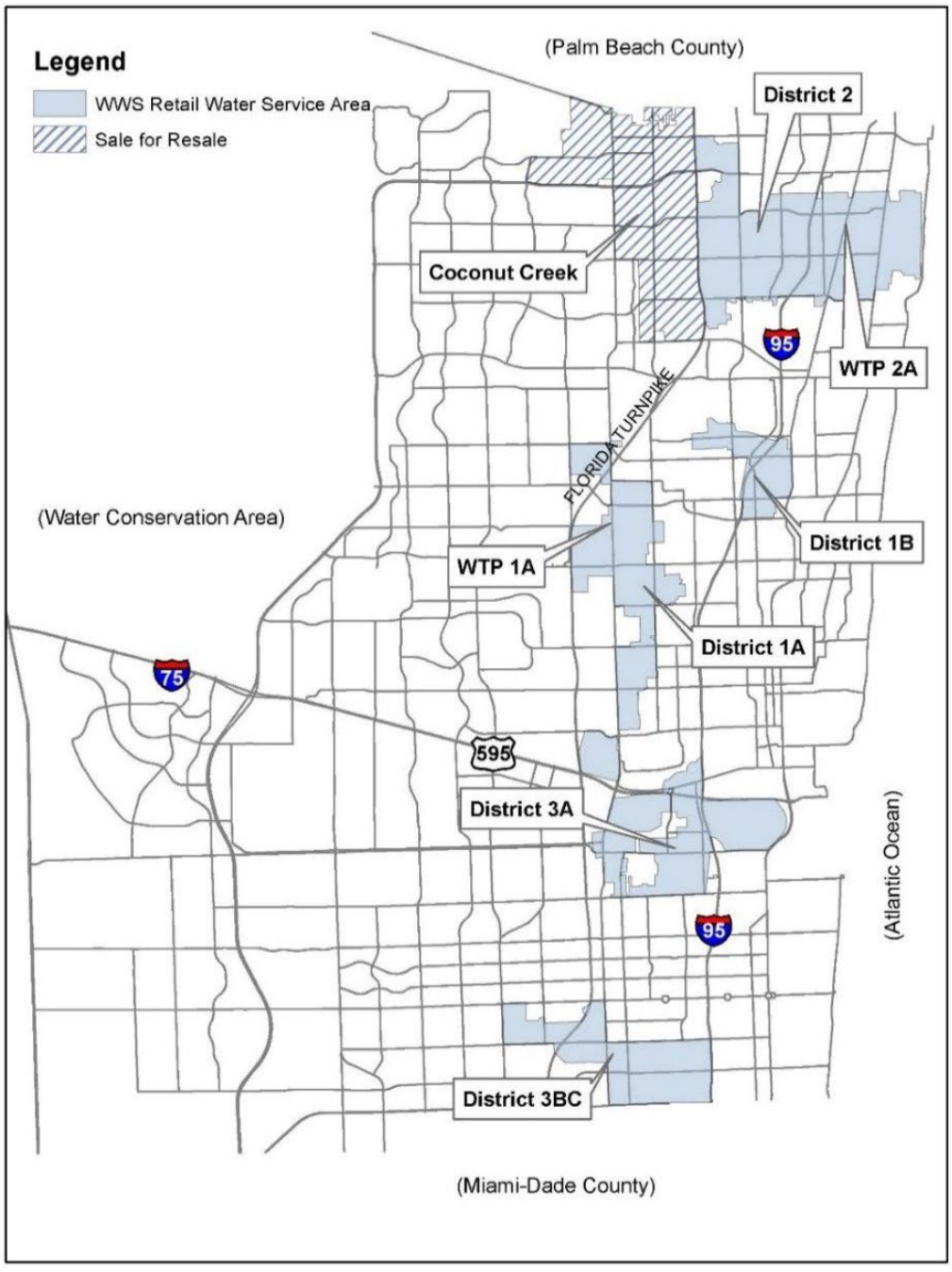

Figure 3-1. WWS Retail Water Service Areas
Source: Broward County Water and Wastewater Services

Table 3-2. Summary of Retail Water System Facilities and Capabilities as of September 30, 2022

	District 1	District 2	District 3	Total
Production Wells:	9	7	0	16
Wellfield Firm Capacity, (MGD)[1,2]	19.60	21.30	0	40.90
Treatment Plants[3]	1	1	0	2
Permitted Plant Capacity (MGD)[2,4]	16.00	30.00	0.00	46.00
Current Permitted Allocation (MGD)[2,4]	10.04	17.41[5]	0.00	27.45
Storage Capacity (Million Gallons)[3]	7.20	10.50	8.50	26.02
Distribution Mains (Miles)	247.80	260.10	235.80	743.70
Service Area (Square Miles)	11.90	14.80	14.30	41.00
Purchased Water (MGD)[2]	0.00	0.00	6.13	6.13
Produced Water (MGD)[2]	6.80	13.40	0.00	20.20

[1] Firm Capacity refers to the available flow with the largest well in each district out of service.

[2] MGD = Million Gallons Per Day

[3] Includes clearwells on site and distribution storage facilities.

[4] Permit allocations are less than permitted treatment plant capacity.

[5] Combined permits with North Regional Wellfield and includes finished water sold to Coconut Creek.

Source: Broward County Water and Wastewater Services

The water system supplies water primarily to retail customers, but also serves the City of Coconut Creek under a resale agreement. Without prior approval by the County, the City of Coconut Creek is prohibited from buying or otherwise providing water within its service area from any source other than the County during the term of the resale agreement and cannot provide more than 100,000 gallons per day of water to any customer unless approved by the County. Presently, there appears to be no practical or economic incentive for the City of Coconut Creek to pursue development of its own facility or to develop alternative sources of supply. The County cannot charge rates to Coconut Creek greater than those charged to other customers in the same class. Billing based upon water meter readings is provided monthly.

A historical summary of treated water sold and consumption data, including service to the City of Coconut Creek, is shown in Table 3-3. Values for annual average daily consumption will differ from the sum of production plus purchased water due to system losses.

Table 3-3. Summary of Treated Water Sold as of September 30, 2022					
Fiscal Year	**Average Number of Units[1]**	**Average Number of Metered Customers[2]**	**Total Billed Treated Water (1,000 GAL)**	**Total Billed Water for Resale (1,000 GAL)[3]**	**Annual Average Daily Consumption (MGD)**
2013	87,928	56,529	8,279,722	1,699,799	22.67
2014	88,305	56,538	8,449,062	1,754,927	23.15
2015	89,066	56,591	8,738,889	1,789,374	23.94
2016	88,712	56,695	8,502,167	1,736,453	23.29
2017	89,605	57,037	8,714,099	1,844,111	23.87
2018	90,559	57,314	8,756,729	1,885,328	23.99
2019	90,234	57,310	8,964,965	2,029,009	24.56
2020	90,231	57,693	8,829,810	2,029,803	24.19
2021	91,364	57,921	8,343,924	1,863,639	22.86
2022	91,496	58,064	8,868,938	2,044,921	24.30

[1] The term "unit" means individual living unit for residential (single family), multifamily, hotel/motel and mobile home categories. Several units may be served through one connection. For commercial, the term means the number of connections.
[2] Included in Average Number of Metered Customers are sewer only customers.
[3] Included in the total water billed; primarily represents service to the City of Coconut Creek

Source: Broward County Water and Wastewater Services

Table 3-4 presents a five-year history of water usage by customer type.

Table 3-4. Water Usage – Five Year History (1,000 gallons) as of September 30, 2022					
Customer Class	**Fiscal Year 2018**	**Fiscal Year 2019**	**Fiscal Year 2020**	**Fiscal Year 2021**	**Fiscal Year 2022**
Residential	4,418,260	4,556,088	4,592,337	4,511,089	4,583,576
Commercial	2,078,129	1,969,407	1,810,299	1,636,305	1,882,829
Irrigation	375,012	410,461	397,371	332,891	357,612
Sale For Resale	1,885,328	2,029,009	2,029,803	1,863,639	2,044,921
Total	**8,756,729**	**8,964,965**	**8,829,810**	**8,343,924**	**8,868,938**

Source: Broward County Water and Wastewater Services

The retail wastewater system service area covers approximately 40 square miles with approximately 455 miles of gravity sewers, 246 lift stations, 8 retail master pump stations and 115 miles of force mains. Figure 3-2 shows the service districts for the retail wastewater system. Table 3-5 presents retail wastewater system characteristics. A 10-year summary of the Retail Wastewater System customers and billed wastewater flows is presented in Table 3-6.

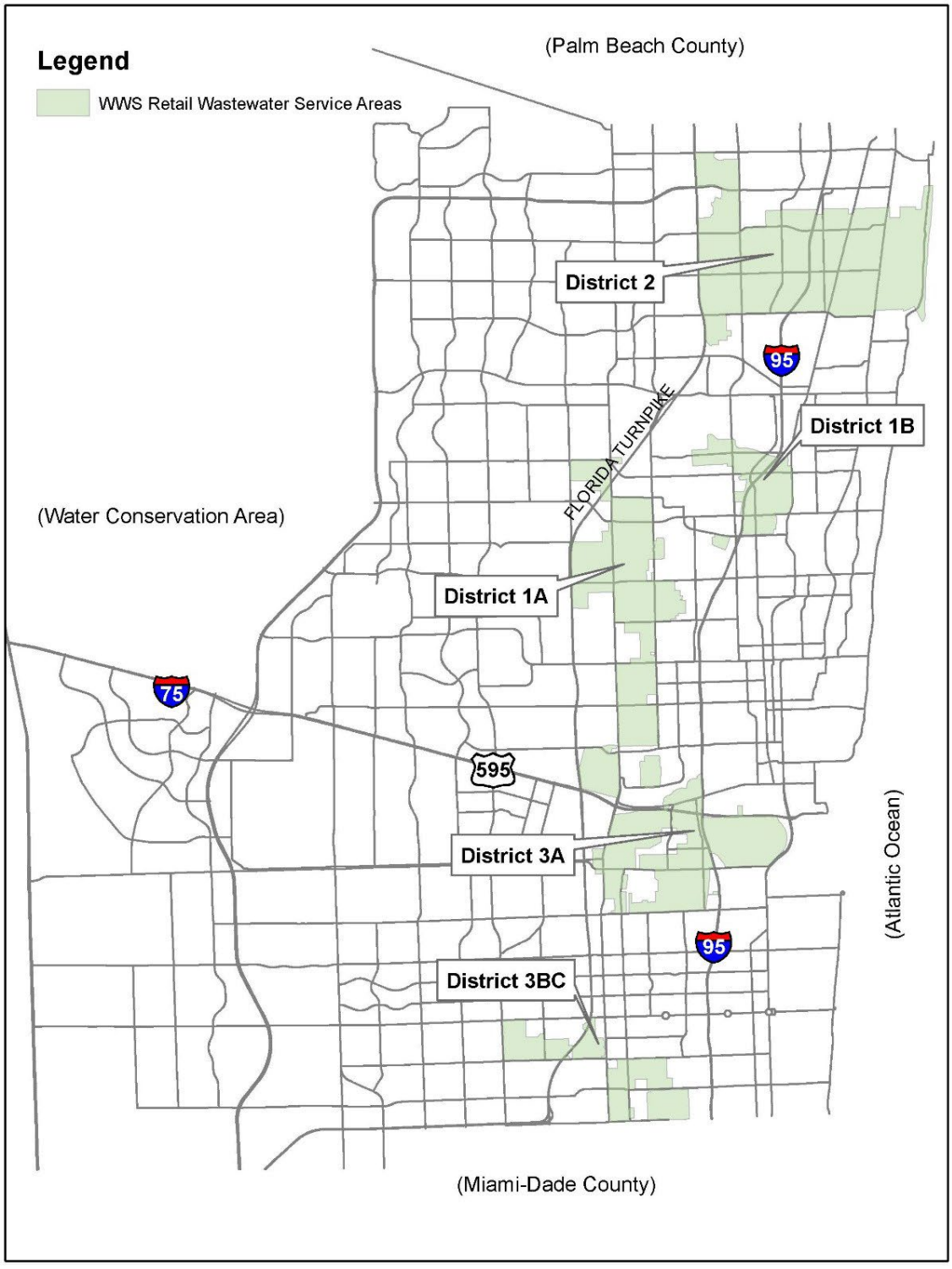

Figure 3-2. WWS Retail Wastewater Service Areas
Source: Broward County Water and Wastewater Services

Table 3-5. Retail Wastewater System Characteristics as of September 30, 2022

	District 1	District 2	District 3	Total
Service Area (Square Miles)	12.9	15.7	11.8	40.4
Gravity Sewer (Miles)	187.7	177.4	90.3	455.4
Lift Stations	76	103	67	246
Force Mains (Miles)	42.9	37	35.1	115
Retail Master Pump Stations	0	5	3	8

Source: Broward County Water and Wastewater Services

Table 3-6. Summary of Billed Wastewater - Retail as of September 30, 2022

Fiscal Year	Average Number of Units[1]	Average Number of Metered Customers	Total Billed Treated Wastewater (1,000 GAL)	Annual Average Daily Flow (MGD)
2013	78,020	47,799	4,996,843	13.69
2014	79,466	48,873	5,165,058	14.15
2015	80,995	49,643	5,372,243	14.72
2016	81,144	49,999	5,339,240	14.63
2017	82,105	50,547	5,445,514	14.92
2018	83,141	50,832	5,385,410	14.75
2019	82,989	50,850	5,928,824	16.24
2020	83,441	51,206	5,813,777	15.93
2021	83,856	51,394	5,653,808	15.49
2022	84,191	51,538	5,777,795	15.83

[1] The term "unit" means individual living unit for residential (single family), multifamily, Hotel / Motel, and mobile home categories. Several units may be served through one connection. For commercial, the term means the number of connections and does not include large users

Source: Broward County Water and Wastewater Services

3.3 Water System Regulatory Requirements

The Safe Drinking Water Act (SDWA, 1974) and the Safe Drinking Water Act Amendments (SDWAA, 1986) authorized the United States Environmental Protection Agency (EPA) to establish national primary and secondary drinking water standards to regulate maximum permissible levels of contaminants in finished drinking water. These standards were incorporated into the State of Florida's Water Quality Regulations beginning in 1993 and modified to address state-specific concerns. By doing this and meeting other specific requirements, the State was given the primary authority (primacy) to enforce SDWA requirements within its borders. The Florida Department of Environmental Protection (FDEP) is the state agency with primary enforcement responsibility.

The Water and Wastewater Operations Division (WWOD) tri-annually performs a complete analysis of primary and secondary drinking water standards on raw and finished water as required under applicable sections of the SDWA and the State of Florida's Water Quality Regulations (Chapter 62-550, Florida Administrative Code (FAC)). No maximum contaminant levels (MCLs) were exceeded. WWS tests raw water quality only for the development of baseline data and as required under the Ground Water Rule as described hereinafter MCL limitations do not apply for any raw water monitoring outside of fecal indicator triggered monitoring required under the Ground Water Rule.

The annual Consumer Confidence Report, which summarizes the results of drinking water quality testing results, is available at https://www.broward.org/WaterServices/WaterQuality/Pages/WaterQualityReportLatest.aspx

The Disinfectants and Disinfection Byproducts Rule (D/DBPR) requires all water treatment plants to comply with MCLs for byproducts of several common disinfectants. For WWS water treatment plants, byproducts of chlorine and chloramines, specifically total trihalomethanes (TTHMs) and five haloacetic acids (HAA5), are of primary interest. Stage II of this rule requires that the rolling annual average of TTHM and HAA5 levels be below their respective MCLs at each sampling site in the distribution system. Since Stage II compliance reporting began in February 2012, WWS' WTPs have satisfied all D/DBPRs requirements.

The Ground Water Rule (GWR) was promulgated in 2009. This rule, which was adopted by reference in FAC 62-550.828 in December 2011, provides two compliance options: triggered monitoring and 4-log virus treatment/inactivation. Triggered monitoring uses sampling under a separate Total Coliform Rule (TCR) to trigger additional sampling requirements for raw water wells if needed. If any of the wells test positive for one of three fecal indicators, action must be taken, which typically includes issuing a precautionary boil water order for the affected area.

Groundwater plants that achieve approved certification of 4-log (99.99%) virus treatment are not required to conduct triggered monitoring, but instead must maintain treatment conditions specified in its 4-log treatment authorization. Presently, the 1A WTP, 2A WTP and 3A WTP (storage tank) are utilizing certified 4-log treatment/inactivation to comply with the GWR.

In FY 2022, WWOD maintained continuous compliance with the Ground Water Rule throughout the 1A, 2A, 3A, and 3BC systems.

In March 2023, the EPA announced a proposed National Primary Drinking Water Regulation (NPDWR) to establish MCLs and MCLGs for six per- and polyfluoroalkyl substances (PFAS). While no actions are required until the NPDWR is finalized, the EPA does anticipate finalization

by the end of 2023 and the public comment period ended in May 2023 (Docket ID: EPA-HQ-OW-2022-0114). The proposed MCLs (enforceable) and MCLGs (health-based and non-enforceable) can be found in Table 3-7 Below.

Table 3-7. Summary of Proposed MCLs and MCLGs as of the Public Comment Period Completion on May 30, 2023

Compound	Proposed MCL (enforceable levels)	Proposed MCLG
PFOA	4.0 parts per trillion	Zero
PFOS	4.0 parts per trillion	Zero
PFNA	1.0 (unitless) Hazard Index	1.0 (unitless) Hazard Index
PFHxS		
PFBS		
HFPO-DA (GenX Chemicals)		

The MCLs and MCLGs for PFNA, GenX Chemicals, PFHxS, and PFBS are calculated using the Hazard Index (HI) Formula which essentially takes the monitored concentration of each compound and divides it by the health-based water concentration that the EPA as established. The total of these four values is the HI and it cannot exceed 1.0.

The proposed rule also requires that public water systems monitor for the above listed PFAS, notify the public of the levels of these PFAS, and reduce the levels of these PFAS in drinking water if they are found to exceed the standards.

The FDEP is currently working to develop new rules regarding potable reuse to be included in the Potable Reuse section of the Florida Administrative Code (FAC), notice of which was published June 9, 2023. This upcoming rule applies to rules for potable reuse based on the recommendations of the Potable Reuse Commission's 2020 report "Advancing Potable Reuse in Florida: Framework for the Implementation of Potable Reuse in Florida". The potable reuse rules will address contaminants of emerging concern and ensure potable reuse water meets or exceeds federal and Florida drinking water quality standards. The new rules, once developed, will be listed under Chapter 62-565 of the FAC.

3.4 Water Supply

The primary source of water supply for WWS is the Biscayne Aquifer. A summary of the County's wellfield water use permits from the SFWMD is provided in Table 3-8. Presently, WWS operates wellfields to supply water to Water Treatment Plants 1A and 2A, with firm capacities of 19.6 and 21.3 MGD, respectively. Additional water is provided to Water Treatment Plants 2A by the North Regional Wellfield, which has a firm capacity of 18.1 MGD. A physical description of the regional system and its wellfields is provided in Section 5. Water for District 3 is provided primarily by the City of Hollywood.

In 1979, the Biscayne Aquifer was designated as a "sole source" drinking water supply by the United States Environmental Protection Agency (EPA). In this context "sole source" does not mean only source; rather, it refers to primary source. Alternatives exist. The water in the aquifer is primarily replenished by rainfall but is also recharged by water flowing from Lake Okeechobee and conservation areas through an extensive regional water conveyance system. Presently, the Biscayne Aquifer is also the primary source of raw water supply for municipalities in Broward

County, Miami-Dade County, Monroe County, and the southern portion of Palm Beach County.

Section 3.2 of the Source Specific Criteria of the South Florida Water Management District (SFWMD) Applicant's Handbook for Water Use Permit Applications (September 2015) limits raw water usage from the Biscayne Aquifer for public water supply to the maximum quantity of water withdrawn over a consecutive 12-month period during the five years preceding April 1, 2006. This regulation is generally referred to as the 2007 Regional Water Availability Rule (RWAR). Water supplies necessary to satisfy any demand which exceeds the maximum allowable withdrawal must come from an alternative water supply (AWS) source, such as captured/stored water, the Upper Floridan Aquifer, harvested stormwater or reclaimed wastewater to offset withdrawal impacts to the Everglades Water Bodies.

Due to the reliability and cost-effectiveness of the relatively shallow Biscayne Aquifer, this aquifer is expected to remain the County's primary source of raw water supply. Should future growth in water demand necessitate an increase in supply (beyond the limitations of the Water Availability Rule), Broward County can access waters from the Floridan Aquifer (a deeper, brackish aquifer), or from captured stormwaters, or both.

With regard to the latter alternative, a captured stormwater regional water supply project known as the C-51 Reservoir has been planned and partially constructed. The County, Palm Beach County, several municipalities, and the SFWMD are moving forward with an option for this regional water storage reservoir project located in Palm Beach County. This project would expand the availability of Biscayne Aquifer raw water by offsetting impacts to the Regional Water System. The project is being constructed by a private sector company known as Palm Beach Aggregates, LLC and would be operated by a not-for-profit entity. The program as envisioned would capture stormwater currently lost to tide for re-introduction into the hydrological system during dry periods, thereby expanding the regional water supply quantity and satisfying the RWAR.

The Broward County Board of County Commissioners approved Resolution No. 2015-195 on April 7, 2015 supporting the C-51 Reservoir Project and encouraged water utilities to consider participating in the project to secure alternative water supply and receive long-term raw water permit allocations from the South Florida Water Management District. Broward County Commission approved the Capacity Allocation Agreement with Palm Beach Aggregates, LLC on March 14 and May 2, 2017 (with revisions), the First Amendment on March 28, 2019, and the Second Amendment on January 28, 2020.

The C-51 Reservoir project requires the participation of other utilities to ensure economic feasibility for the private sector owner. The necessary threshold of signed Capacity Allocation agreements with Palm Beach Aggregates, LLC, was reached in the summer of 2020. Financing of the project was completed in February 2021 allowing for the formal groundbreaking of construction. Currently the next milestone date includes May 2023 for substantial completion, October 2023 for operational testing, and January 2024 for commencement of operations.

3.5 Water Supply Regulatory Requirements

The volume of raw water withdrawal from the Utility's wellfields is regulated by the SFWMD. Each wellfield is governed by a Water Use Permit (WUP) that stipulates the annual and monthly withdrawals that are allocated to each wellfield. As stated previously, the 2007 RWAR requirements limit withdrawals from the Biscayne Aquifer to the highest consecutive 12-month period in the five years prior to April 2006. Water demand above the Biscayne limitation will be

supplied by an AWS. The County has accounted for the uncertainty that this rule represents in the water supply planning process by pursuing various AWS options, such as the treatment of brackish upper Floridan Aquifer water, regional system water availability offsets using C-51 reservoir water storage, use of reclaimed water to offset potable water irrigation uses, and encouragement of system-wide water conservation.

The potential need to develop the AWS will have implications for future treatment technologies, capital investments, and operation and maintenance costs. The Utility will evaluate the fiscal and environmental factors associated with each potential alternative supply source and will make timely decisions concerning water source and treatment development.

The County is permitted by the SFWMD to withdraw approximately 43.09 MGD of groundwater from their combined Biscayne Aquifer wellfields, including the retail and regional raw water wellfields. The County holds three permits from the SFWMD for Wellfield 1A, the 2A/North Regional Wellfield (NRW), and the South Regional Wellfield (SRW). The permit for the combined 2A/NRW wellfields was renewed for a 20-year duration in October 2020 and the permit for the District 1A wellfield was renewed for a 20-year permit duration in September 2020. The Biscayne Aquifer and emergency Floridan Aquifer allocations expire in the fall of 2040. These permits also contain a total of 3.0 MGD of C51 offsets that separately expire after a 50-year term in December 2065.

The SFWMD renewed the SRW permit on March 7, 2018. The permit was issued with an expiration date of December 27, 2065 as a result of the inclusion of AWS from the C-51 Reservoir. However, the renewal of the base condition (not including offset water from the C-51 Reservoir) will be required prior to March 7, 2038. The SRW permit governs the withdrawal of raw water from the Biscayne aquifer for sale to coastal raw water Large Users (Dania Beach, Hallandale Beach, Hollywood and FPL) and the permit allocation is based on the projection of raw water demands for each Large User.

Table 3-8. Summary of SFWMD Wellfield Permits as of September 30, 2022			
Description	**1A**	**2A/NRW**	**SRW Temp**
Permit Period:			
Issuance	9/15/2020	10/29/2020	3/7/2018
Total Biscayne Aquifer Allocations[1]:			
Annual Average Daily (MGD)	10.0	17.4	15.6
Maximum Month (MG)	10.9	19.1	17.5
Biscayne Aquifer Withdrawals			
Annual Average Daily (MGD)	10.0	17.4	15.6
Maximum Monthly (MGD)	10.9	19.1	17.5
Expiration	9/15/2040	10/29/2040	3/7/2023[2]
C51 Reservoir Offset			
Annual Average Daily (MGD)	1.0	2.0	5.0
Maximum Monthly (MGD)	1.1	2.2	5.6
Total Biscayne Allocation with C51 Reservoir Offset			
Total Average Daily (MGD)	10.9	17.4	16.6
Total Maximum Month (MG)	11.9	19.1	18.6
Expiration	12/27/2065	12/27/2065	12/27/2065
Floridan Aquifer Wells[3]			
Annual Average Daily (MGD)	2.86	4.56	-
Maximum Monthly (MG)	3.1	5	-
Number of Wells – proposed	4 [4]	4	-
Diameter (Inches)	16	16	-
Depth (Feet)	1,200	1,200	-
Expiration	9/15/2040	10/29/2040	-

[1] Includes temporary allocations from the SFWMD that would expire once the C-51 Reservoir becomes operational.

[2] Permit for SRW expires on December 27, 2065 for the C-51 Reservoir offset flows; base condition must be re-permitted by March 7, 2038. Permit includes first five-year allocation of 15.6 MGD average daily demand and 17.5 MGD maximum monthly.

[3] Implementation dates for Floridan aquifer alternative water supply development continue to be extended due to demand management efforts and lower than expected growth.

[4] Construction of two test wells was completed in 2014.

Source: Broward County Water and Wastewater Services

Monitoring of wellfield and individual well withdrawals, groundwater levels, and chloride concentrations are required as part of the WUPs issued for each wellfield. Monitoring information is reported to the SFWMD in their ePermitting system monthly to ensure each permit remains compliant.

Long-term water supply in South Florida may also be affected by the Comprehensive Everglades Restoration Plan (CERP) undertaken by the U.S. Army Corps of Engineers (ACOE) in coordination with the SFWMD and by regional water supply planning undertaken by the SFWMD

and the FDEP. The intent of CERP is to provide multiple benefits to the South Florida ecosystem.

While restoration of the Everglades is a primary objective of the plan, it also includes a provision for ensuring a reliable, adequate supply of fresh water for use by the environment, public water supply and agriculture while maintaining flood protection. The effect of CERP will be to reserve water resources for restoration of the Everglades without impacting existing legal users.

Implementation through the Lower East Coast Water Supply Plan (LECWSP) accounts for future needs of water utilities by utilization of new surface water reservoirs and by implementation of Aquifer Storage and Recovery (ASR) wells. A decision by the State to endeavor to acquire the property owned and farmed by US Sugar as part of the CERP may limit the option of utilities to store and use excess stormwater as an alternative to water supply.

New water supply technologies could be delayed or could be less effective than SFWMD and ACOE expect. Recognizing this, the Utility has taken multiple steps to ensure that a continuous adequate raw water supply is available:

- The County actively participated in the Lower East Coast Regional Water Supply Plan (LECWSP) Update, which was completed in October 2018. The next update to the Plan has already begun in 2022.
- The County is actively participating in the CERP and the SFWMD regulatory revision process.
- A new surface water pump station has been designed to improve the effectiveness of the existing raw water recharge system by increasing aquifer recharge through the canal system.
- The County currently operates a 10 MGD wastewater reuse facility to reduce potable water demand for non-potable uses. The County is presently expanding the facility to 26 MGD.
- The County continues to implement the Integrated Water Resources Plan (IWRP) to maximize the utilization of available water.
- The County continues to review potential use of the Upper Floridan Aquifer as an Alternative Water Supply (AWS) and/or storage source.
- The County is engaged with the SFWMD and Palm Beach Aggregates to develop C- 51 Storage Reservoir Project as an alternative water source to offset Regional Water impacts. The County purchased 6 MGD from Phase I of this project.
- The County continues to promote water conservation within the utility service areas and County-wide.

3.6 Overview of the Water System Facilities

3.6.1 District 1

District 1 has a combined service area of 11.9 square miles, FDEP permitted treatment plant capacity of 16 MGD, and 247.8 miles of water distribution and transmission mains. WWS maintains District 1 water system interconnections with the City of Fort Lauderdale, the City of Tamarac, the

City of Plantation, and the City of Lauderhill to provide for emergency potable water supply.

3.6.2 District 2

District 2 includes the Utility's largest wholesale water customer, the City of Coconut Creek. The District, not including the City of Coconut Creek, has a service area of 14.8 square miles, a FDEP permitted treatment plant capacity of 30 MGD and contains 260.1 miles of water distribution and transmission mains. The facilities of District 2 are interconnected with the City of Deerfield Beach, the Town of Hillsboro Beach, the City of Pompano Beach, and Palm Beach County, to provide for emergency water supply.

The County has an agreement with the City of Coconut Creek under which the County has agreed to provide the City of Coconut Creek with potable water for a term that exceeds by one year, the last payment of any potable water system debt obligation of the County. The City of Coconut Creek constitutes approximately 22% of the total potable water consumption by customers of the Utility and pays compensation amounting to 5% of the Utility's gross water revenues. The agreement provides that, except by written consent of the County or for emergency purposes, the City of Coconut Creek will not purchase water other than from the County or pump water into its water distribution system from its own facilities. The County has agreed not to sell water to anyone else within the defined service area and the City of Coconut Creek is not permitted to increase its water service area without the written consent of the County.

3.6.3 District 3

District 3 is the southernmost service area of the County and is geographically separated into subdistricts referred to as 3A and 3BC. 3A and 3BC receive potable water through connections principally with the City of Hollywood. District 3 has a combined service area of approximately 14.3 square miles and contains 235.8 miles of transmission and distribution mains. Subdistrict 3A has interconnects with the City of Fort Lauderdale, the City of Hollywood, and the City of Dania Beach, to provide for emergency water supply. Subdistrict 3BC has interconnects with the City of Hollywood for its primary water supply, and the cities of Pembroke Pines and Miramar to provide emergency potable water supply.

3.7 Overview of the Retail Wastewater System Facilities

3.7.1 District 1

District 1 has a service area of 12.9 square miles and includes 187.7 miles of gravity collection sewers and 76 lift stations. There are 42.9 miles of force mains. Transmission, treatment and disposal of wastewater are provided through the Utility's Regional Wastewater System.

3.7.2 District 2

The size of the District 2 service area is 15.7 square miles. The collection system consists of 177.4 miles of gravity sewer, 103 lift stations, 5 retail master pump stations, and 37 miles of force mains. Transmission, treatment, and disposal of wastewater are provided through the Utility's Regional Wastewater System.

3.7.3 District 3

District 3 serves an area of 11.8 square miles. The gravity collection system has 90.3 miles of gravity sewer, 66 lift stations and 3 retail master pump stations. The force main network contains 35.1 miles of pipe that delivers the wastewater from this area to the Southern Regional Wastewater Treatment Facility operated by the City of Hollywood. District 3A and District 3BC wastewater is treated by the City of Hollywood under a Large User wastewater agreement with the County. The County has 5.883 MGD of reserved capacity in the Southern Regional Wastewater Treatment Plant. The City of Hollywood has 55.5 MGD of plant capacity.

The agreement between the County and the City of Hollywood contains several major provisions including identification of the service area; requirements for the use of metering devices; reserve capacity requirements; restrictions on excessive flows; and charges for damages to the system. Debt service and operation and maintenance costs are paid on an actual flow basis. The agreement can be terminated by either party with a 365-day notice, if all financial requirements have been met. The City of Hollywood may not terminate the agreement, unless there shall be a readily available alternative means of treating and disposing of County wastewater.

3.8 Visual Inspection and Review

The visual inspection includes the water treatment plants for District 1 and 2 and the former District 3 Water Treatment Plan (WTP) (currently operated as a pumping station and booster chlorination facility), as well as distribution system storage and pumping stations 3B and 3C (part of the 3BC system). These inspections were performed by Cordova Rodriguez & Associates.

3.8.1 Water Treatment Plant 1A

WTP 1A was originally constructed in 1960 with a treatment capacity of 3.0 MGD, which was expanded to 10.5 MGD in 1979, and then to 16.0 MGD in 1994. Overall, the plant is in good condition. Water quality standards were maintained at WTP 1A throughout the year. During the visual inspection of the plant, it was operating in a satisfactory manner. The following summarizes the observations resulting from the visual inspection performed on April 21, 2023, by Cordova Rodriguez & Associates:

- District 1 Raw Water Wells – Biscayne Aquifer
    - Well 1 rehabilitation was completed three years ago and, overall, was in good condition. The wellhead and associated piping and valves were in good condition. The electrical equipment was in good condition. The fencing enclosure was in good condition.
    - Well 2 rehabilitation was completed three years ago, and, overall, was in good condition. The wellhead and associated piping and valves were in good condition. Electrical equipment was in good condition. The concrete slab was in good condition. The fencing enclosure was in good condition.
    - Well 3 was rehabilitated recently, and, overall, was in good condition. The wellhead and above ground associated piping and valves appeared to be in good condition At the time of the inspection, the well was online and operational. Electrical equipment was in good condition. The concrete slab was in good condition.
    - Well 4 rehabilitation was completed three years ago, and overall, was in good condition.

The wellhead and associated piping and valves were in good condition. Electrical equipment was in good condition and was not replaced. The concrete slab was in good condition. The fencing enclosure was in good condition.

- Well 5 was in good condition. The rehabilitation was completed recently in Fiscal Year 2022. The door to the building is showing extensive signs of corrosion. The wellhead and associated piping and valves were in good condition. The pump shaft underwent rehabilitation. At the time of inspection, Well 5 was offline awaiting bacteriological testing. Electrical equipment was in good condition. The concrete slab was in good condition. The fencing enclosure was in good condition.

- Well 6 was in fair condition. The wellhead and associated piping and valves were in good condition with minor rust. Corrosion was noted around the pump shaft and piping. The pump shaft and piping were removed due to leaks. At the time of the inspection, Well 6 was still offline and awaiting repairs. Electrical equipment was in good condition. The concrete slab was in good condition. The fencing enclosure was in good condition.

- Well 7 rehabilitation was completed recently, and overall, was in good condition. The wellhead and associated piping and valves appeared to be in good condition. Corrosion around the pump shaft and piping was observed. The electrical equipment was in good condition. The concrete slab was in good condition. The fencing enclosure was in good condition.

- Well 8 was in fair condition. The door to the building had holes from corrosion and is to be replaced. The concrete structure housing the well has minor cracks. The wellhead and associated piping and valves appeared to be in good condition. Minor corrosion was noted around the pump shaft and piping. Electrical equipment was in good condition. The concrete slab was in good condition. The fencing enclosure was in good condition.

- Well 9 was in fair condition. The wellhead and associated piping and valves appeared to be in good condition. Minor corrosion was noted around the pump shaft and piping, and evidence of leaks was observed. Electrical equipment was in good condition. The concrete slab was in good condition. The door to the building had holes from corrosion, and the walls were cracking. Immediate rehabilitation of the structure housing for Well 9 is needed. The fencing enclosure was in good condition.

- District 1 Floridan Aquifer Wells

  - Floridan Well 1 is an on-site well; off-site development and testing phase were completed. Permanent wellhead equipment was not in place at the time of the inspection, just a sample tap. There are currently no plans for a permanent wellhead.

  - Floridan Well 2 is an on-site well; development and testing phase were completed. Permanent wellhead equipment was not in place at the time of the inspection, just a sample tap. There are currently no plans for a permanent wellhead.

  - Treatment Unit 1 (softener unit) was in good condition. This unit was online at the time of inspection. The basin components, including the cone, rake, mixers, and launders were in good condition. The drive, electrical equipment, and instruments appeared to

be in good condition. Auxiliary pumps and associated piping, valves, and equipment were in good condition. At the time of the inspection, a raw water valve was recently installed.

- Treatment Unit 2 was offline for scheduled routine maintenance during the time of the site inspection. The interior, including the visible parts of the cone and paddle mixers, were showing signs of corrosion but remains in operational condition. Effluent launders were replaced 3 years ago and remain in good condition. The new motor, new gear box and drive were replaced a year ago. Electrical equipment and instruments appeared to be in good condition. Auxiliary pumps and associated piping, valves, and equipment were in good condition. Sludge cycling pumps were replaced 3 years ago. At the time of inspection, Treatment Unit 2 was offline, and Treatment Unit 1 was online due to 6-month rotational use.

- Filters

  - Filter 1 was in good condition. The piping and valves were in very good condition. Effluent launders were in very good condition. The control panel on the filter deck appeared to be in good condition. The overall structure appeared to be in very good condition.

  - Filter 2 was in good condition. The piping and valves were in very good condition. Effluent launders were in very good condition. The control panel on the filter deck appeared to be in good condition. The overall structure appeared to be in very good condition.

  - Filter 3 was in good condition. The piping and valves were in very good condition. Effluent launders were in very good condition. The control panel on the filter deck appeared to be in good condition. The overall structure appeared to be in very good condition.

  - Filter 4 was in good condition. The piping and valves were in very good condition. Effluent launders were in very good condition. The control panel on the filter deck appeared to be in good condition. The overall structure appeared to be in very good condition.

  - Filter 5 was in good condition. The piping and valves were in very good condition. Effluent launders were in very good condition. The control panel on the filter deck appeared to be in good condition. The overall structure appeared to be in very good condition.

  - Filter 6 was in good condition. The piping and valves were in very good condition. Effluent launders were in very good condition. The control panel on the filter deck appeared to be in good condition. The overall structure appeared to be in very good condition.

  - Filter 7 was in good condition. The piping and valves were in very good condition. Effluent launders were in very good condition. The control panel on the filter deck appeared to be in good condition. The overall structure appeared to be in very good condition.

  - Filter 8 was in good condition. The piping and valves were in very good condition. Effluent launders were in very good condition. The control panel on the filter deck appeared to be in good condition. The overall structure appeared to be in very good condition.

- The filter backwash pumps, piping, valves, gauges, and appurtenances remain in excellent condition. Some of the filter effluent valve actuators and most of the turbidity meters were recently replaced. The remaining filter effluent valve actuators and turbidity meters were in good condition. All systems were online and functional.

- The four clearwell transfer and backwash pumps as well as the piping, valves, gauges, appurtenances, and associated structures appeared to be in good condition. Backwash compressor No. 2 and 1 were recently replaced. The control panel appeared to be new and in good condition. At the time of the inspection, backwash pump No. 1 was offline undergoing rehabilitation.

- High Service Pumping

  - High service pumps No. 3 and 5 appeared to be in good condition. Pumps, piping, valves, gauges, appurtenances, and associated structures appeared to be in good condition. High service pump No. 3 had new check valves and new bearings. High service pumps No. 3 and 5 underwent recent motor replacement.

  - High service pumps No. 1, 4, and 6 appeared to be in good condition. High service pump No. 2 is out of service at the time of inspection awaiting motor replacement. High service pumps No. 2, 4, 6 appeared to have corrosion at base. Pumps, piping, valves, gauges, appurtenances, and associated structures appeared to be in good condition. High service pump electrical gear appeared to be in good condition. High service pump No. 1 underwent recent motor replacement and was put in service in May 2023.

- Solids handling

  - The gravity thickener structure and auxiliary pumps appeared to be in good condition.

  - The spare solids holding tank appeared to be in good condition. This structure continues to be put into service only on an as-needed basis.

  - Vacuum filters 1 and 2 were in service at the time of the inspection. Belts, motors, vacuum pumps, and electrical equipment appeared to be in good condition. There were no drum leaks present at the time of inspection. Both filters have undergone repairs and maintenance since the last inspection. Overall, vacuum filters 1 and 2 are in good condition.

- Chemical feed and storage systems

  - The carbon dioxide feed system, including refrigerated storage tanks and solution feeder panels, appeared to be in good overall condition.

  - The ferric chloride system and pumps were operational. Bulk and day storage tanks were in fair condition. The associated electrical panels showed signs of corrosion but were functional. The system, including the electrical panel, is scheduled for full

replacement.

- The dry polymer mixing units and distribution systems were in good condition. Make down and dilution units appeared to be in very good condition. Metering pumps and piping were in good condition. Electrical panels were in good condition.
- The lime slaking and feed systems appeared to be in good condition. Both lime slakers were recently rehabilitated and replaced. The lime silo dust collector system with new laser level sensors and new LED lights remains in excellent condition. Both feeders were in service at the time of the inspection. The lime silo, vibrator, rotary valve, and dosing unit appeared to be in operational condition. Slakers and pumps, and slurry pumps remain operational. Much of the equipment was covered in dust from the lime and the filters were recently changed.
- The fluoride pump and tank were operational; pumps appeared to be new and in excellent condition. Bulk and day storage tanks appeared to be intact and functional. The hoses and the day tank recently underwent replacement. Metering pumps were functional. Electrical equipment was in good condition. The system remains scheduled for replacement.
- The sodium hypochlorite storage and distribution system remain in good condition. Storage tanks were in good condition. Containment area flooring was under rehabilitation at the time of the inspection. The transfer pumps were new and in excellent condition. Metering pumps remain in good condition.
- The gaseous ammonia system remains in excellent condition. The new ammonia system was installed and was in use. New regulators were recently installed. New pressure gauges were recently installed. New ammonia gas lines were being installed. Bulk storage tanks were in very good condition. The three ammoniators were functional and in good condition.

- Backup generators, diesel tanks and associated equipment remain in good condition after a recent rehabilitation.
- The new electrical switchgear room remains in excellent condition.

Plant modifications to be performed in FY 2024:

- Replacement of all electrical systems in chemical building

3.8.2 Water Treatment Plant 2A

WTP 2A was originally constructed in 1975 with a treatment capacity of 20 MGD. In FY 1994, the treatment capacity was expanded to 40 MGD with permitted capacity of 30 MGD. Water quality standards were maintained at WTP 2A throughout the year. Overall, the plant is in good condition and appeared to be operating satisfactorily at the time of the site inspection. The following summarizes the observations performed for major subsystems resulting from the visual inspection performed on May 1, 2023, by Cordova Rodriguez & Associates.

- District 2 Raw Water Wells – Biscayne Aquifer

- Well 4 was rehabilitated recently and is in good overall condition. The security fencing was in good condition. At the time of the inspection, there was water present at the concrete base of the well. The wellhead and associated motor, pump shaft, piping and valves appeared to be in good condition. A new meter was recently installed. The electrical equipment was in good condition. The concrete slab was in good condition. The concrete slab base was raised to match the new flood level map.
- Well 6 was rehabilitated recently and is in good overall condition. A new motor was installed during the rehabilitation. This well is housed in a building. The building was intact and in good condition. The wellhead and associated pump shaft, piping and valves were in good condition per recent rehabilitation. The electrical equipment was in good condition.
- Well 7 was in good overall condition. The security fencing was in good condition. The wellhead and associated motor, pump shaft, piping and valves appeared to be in good condition, minor signs of corrosion still present at time of inspection. Electrical equipment was in good condition. The concrete slab was in good condition.
- Well 8 was in excellent overall condition. The wellhead and associated pump shaft, piping and valves appeared to be in good condition. The electrical equipment was in excellent condition. The concrete slab and security fencing were in excellent condition. This well is an underground well.
- Well 9 was in excellent overall condition. At the time of the inspection, the well was out of service due to the motor undergoing replacement. The wellhead and associated pump shaft, piping and valves appeared to be in good condition. The electrical equipment was in excellent condition. The concrete slab and security fencing were in excellent condition. This well is an underground well.
- Well 10 was rehabilitated recently and was in good overall condition and recently painted. The wellhead, associated motor, and pump shaft were in good condition with evidence of minor corrosion at the column base. The piping and valves appeared to be in good condition. A new meter was recently installed. Electrical equipment was in good condition. The concrete slab and security fencing were in good condition. The concrete slab base was raised to match the new flood level map.
- Well 11 was rehabilitated recently and was in good overall condition. The wellhead and associated motor, pump shaft, piping and valves appeared to be in good condition with evidence of minor leaks and corrosion at the column base. The electrical equipment was in good condition. The concrete slab and security fencing were in good condition. The concrete slab base was raised to match the new flood level map.

- Treatment Unit 1 was in good overall condition and was recently rehabilitated. The unit was online at the time of the inspection and is working. The interior, including the visible parts of the cone and mixer, were in good condition. Effluent launders were new and in excellent condition. The drive unit was new and in excellent condition. Electrical equipment and instruments also appeared to be in good condition. Auxiliary pumps and associated piping, valves, and equipment were in good condition. The drive unit for the mixer was new and in excellent condition. The effluent pipe from Treatment Unit to flume needs to be replaced.

- Treatment Unit 2 was in good overall condition and was recently rehabilitated. The unit was offline at the time of the inspection and is on standby. The interior, including the visible parts of the cone and mixer, were in good condition. Effluent launders were new and in excellent condition. The drive unit was new and in excellent condition. Electrical equipment and instruments also appeared to be in good condition. Auxiliary pumps and associated piping, valves, and equipment were generally in good condition. All stainless steel is new and in excellent condition. The effluent pipe from the Treatment Unit to the flume needs to be replaced.

- Filters

  - All six filters appeared to be in good overall condition. Effluent launders were in good condition. Filter media appeared level and uniform. The piping and valves in the filter gallery were in good condition. The overall structure for the filters appeared to be in good condition. Electrical panels were in good condition. No issues were identified with instrumentation. Evidence of minor leaks was present but have been repaired and new piping installed.

- Filter backwash fill pumps 3 and 4, along with associated motor, piping, valves, gauges, and appurtenances, appeared to be in fair to good condition. Filter backwash fill pumps 1 and 2 were replaced and are operational and in good condition. The backwash storage tank was in good condition.

- Clearwell transfer pumps 3 and 4 and associated motor, piping, valves, gauges, and appurtenances appeared to be in good condition. Pumps 1 and 2 are in service at the time of inspection. Transfer pumps underwent a recent electrical upgrade. Electrical equipment appeared to be in good condition.

- High service pumps (HSPs) 1 and 3-8 (HSP 2 does not exist) appeared to be in good condition. At the time of the inspection, pumps 3 and 4 are offline until electrical repairs are completed. Pumps 1, 3, 4, and 5 are the main pumps, and they share the same building. The electrical panels for pumps 1, 3, 4, and 5 are currently in the process of being replaced. At the time of the inspection, the Variable Frequency Drives (VFDs) for Pumps 4 and 5 completed construction. Pumps 6, 7, and 8 are backups, and they share a separate building. At the time of inspection Pump No. 6 was offline and out of service due to ongoing control panel repairs. Pumps, motors, piping, valves, gauges, appurtenances, and associated structures all appeared to be in good condition. Electrical gear appeared to be in fair to good condition. Minor concrete spalling still present but, per previous report, the County has already scheduled this to be addressed.

- Solids handling

  - Gravity thickener 1: the structure, rake and drive, and auxiliary pumps appeared to be in good condition and in service at the time of inspection.

  - Gravity thickener 2: the structure, rake and drive, and auxiliary pumps appeared to be in good condition and out of service at the time of inspection undergoing repairs. All three associated decant pumps were recently replaced.

  - Vacuum filters and associated vacuum pumps and electrical equipment appeared to be in good condition. At the time of the inspection, vacuum drum 3 underwent recent rehabilitation.

- Chemical feed and storage systems
  - The carbon dioxide feed system, including refrigerated storage tanks and solution feeder panels, appeared to be in good condition. Pumps were exposed and in fair condition, with corrosion still evident around the pump bases and motors.
  - The ferric chloride feed and storage system was in good condition. Metering pumps were functional. The piping was in good condition. At the time of the inspection, the system is scheduled for replacement.
  - The dry polymer make-down and feed systems were in good overall condition. Make-down and dilution units appeared to be functional. Metering pumps were in good condition. At the time of the inspection, Metering Pump No. 4 was offline due to rehabilitation. Units are underutilized as not much polymer is needed for this treatment process.
  - Lime slakers 1 and 2 were in excellent condition. The feed systems appeared to be in good condition. The lime silo, vibrator, rotary valve, and dosing unit were in good condition. Slakers were functional.
  - The fluoride feed and storage systems were recently replaced and repaired and were in good overall condition. Bulk and day storage tanks appeared intact and functional. Metering pumps were functional. Electrical and mechanical equipment appeared to be functional. At the time of the inspection, the system was scheduled for replacement.
  - The sodium hypochlorite feed and storage system appeared to be in good condition. Storage tanks were in good condition. Containment area flooring was in good condition. Metering pumps and transfer pumps were in good condition. Bulk Tank No. 5 recently replaced and is in excellent condition. At the time of the inspection, Day Tank No. 2 was out of service due to leaks.
  - The sodium hydroxide system has never been placed into service and at the time of the inspection, it is not anticipated to be put into service within the foreseeable future.
  - The gaseous ammonia system is in good overall condition. Ammoniators and bulk storage tanks were in good condition. Control panels are in excellent condition and underwent recent rehabilitation.
  - The diesel fuel storage system is in good condition. Bulk storage tanks were in very good condition.
  - The containment area for the chemical tanks was under construction at the time of inspection. Construction, including new piping, new valves, and repair to concrete, is scheduled to be completed before the end of 2023.
- Backup generators and associated equipment appeared to be in good overall condition. Recent repairs completed.
- A brand new 5 MG ground storage tank was recently construction and was in service. The 5-year visual inspection of the County's ground storage tanks was completed in August 2018; this also includes the two clearwells at WTP 2A.
- The backwash tank was generally in good condition.

<u>Plant modifications performed in FY 2023 (at the time of this report) were:</u>

- Lime Slaker No. 1 upgrade – Completed.
- Switchgear Replacement

3.8.3 Water Distribution System 3A

In December 2001, the City of Hollywood began providing water for resale to the County in System 3A. The water treatment facilities were removed and replaced with re-pumping facilities. This facility stores finished water supplied by the City of Hollywood and repumps it to the 3A distribution system, which includes the Fort Lauderdale/Hollywood International Airport.

The existing 3A facility includes one 2.0-million-gallon ground storage tank, one 2.5 million-gallon ground storage tank, a high service pump station, temporary disinfection storage and feed facilities and temporary disinfection compliance analyzer building. The existing facility has received four-log virus treatment certification.

The facility was inspected by Cordova Rodriguez & Associates on April 19, 2023. Construction at the site, including a 2.5-million-gallon ground storage tank, a 5,750-gallon diesel storage tank, and an improved 3A plant building, was being completed at time of the inspection.

Once the new components of the 3A plant building are operational, the existing high service pump station, temporary disinfection storage and feed facilities, and temporary disinfection compliance analyzer building will be removed. The County reports that the construction of the new 3A facilities will become operational by the end of 2023.

Based on the April 19, 2023 inspection and discussion with 3A plant staff, the existing facilities are operational and will provide reliable service until the new facilities are placed into service.

Observations from the site visit are summarized below.

- The control room includes computer workstations that allow the operators to monitor and control the remote facilities. Workstations were in good condition.
- High service pumps 1 through 4 are horizontal split-case pumps. The pumps, motors and valves were in good overall condition.
- High service pump 1 is a dual drive pump equipped with both a diesel-engine and electric motor. The engine appeared to be in good condition. This pump remained out of use at time of inspection due to leakage.
- Electrical gear and panels serving the HSPs appeared to be in fair condition.
- The 2 MG ground storage tank appeared to be in good condition.
- The inflow meter and associated piping, valving, and instrumentation were in good operating condition. No corrosion or rust present at the time of inspection.
- The temporary disinfection storage and feed facilities appeared to be in good condition and still in use at the time of the inspection.

- The temporary generator present on site is in good condition. The Facility is fed by this generator until generator building construction is completed and the installation of a permanent generator is completed.

Planned modifications to be performed in FY 2024 are:

- New Booster Pump Station for 3A
- New alarm system
- New generator building and generator
- Additional layer of asphalt
- SCADA configuration for pumps

3.8.4 Water Distribution System 3BC

The 3B area of the 3BC distribution system water supply is fed primarily by the City of Hollywood through two 12-inch potable water interconnects. A separate connection from the City of Pembroke Pines supplies water to the North Perry Airport perimeter. The County owns and operates in-line booster pump stations to increase the pressure from the City of Hollywood interconnects to approximately 80-psi. The booster pump stations are as follows:

- Pump Station I3B8 – Located within the City of Hollywood Public Works facility at 1600 South Park Road, Hollywood
- Pump Station I3B9 – Located at 1751 SW 57th Avenue, Hollywood

The booster pump stations were inspected on April 19, 2023. Observations from the site visit are summarized below.

- Pump Station I3B8:
  - Pump station I3B8 is equipped with one constant speed motor driven horizontal split-case pump. The station underwent and completed rehabilitation recently.
  - The pump was operational and in excellent condition. The pump underwent recent rehabilitation and was replaced.
  - New check valves, gate valves, and isolation valves were installed during rehabilitation. A new flow meter was installed.
  - The pump station is equipped with one liquid ammonium sulfate (LAS) storage tank and two sodium hypochlorite storage tanks and feed pumps to boost disinfectant residual. The disinfection system is operational and appeared in good condition.
  - The two sodium hypochlorite storage tanks were replaced with new double walled tanks.
  - SCADA panel was in good condition.
  - The flooring should be replaced for safety reasons.
- Pump Station I3B9:

- Pump station I3B9 is equipped with one constant speed motor driven horizontal split-case pump. At the time of inspection, the station was online and in use.
- The pump, discharge gate valve and check valve were replaced in 2021 and were in good condition.
- The pump station was operational. The sodium hypochlorite storage tanks with leakage were replaced and remain in good condition.
- The motor appeared to be in good condition. At time of inspection, it was in use. Associated parts have received rehabilitation.
- The pump station is equipped with one LAS storage tank and two sodium hypochlorite storage tanks and feed pumps to boost disinfectant residual. The disinfection system was operational, previous issues with leakage were addressed and resolved.
- New check valves, gate valves, and a flow meter were installed during rehabilitation.
- The SCADA panel was in good condition.
- Rehabilitation of the station's equipment was completed in early 2023.
- The building housing the pump station components was observed to have structural issues that may require rehabilitation. There were cracks present on the walls, concrete spalling, cracks along the foundation, and portions of rebar were exposed.
- The station equipment, piping, valves were in good condition overall.

3.8.5 3B Storage and Pumping Facility

The 3B storage and pumping facility was inspected April 19, 2023. In general, the 3B facility appeared to be in good condition. Observations from the site inspection are provided below.

- High service pumps 1 through 3 are horizontal split-case pumps. The pumps, motors and valves appeared to be in good condition at the time of inspection.
- High service pump 1 was recently replaced, includes a new pump, motor, and associated piping and valves. It is in excellent condition.
- High service pump 2 was recently replaced, includes new pump, motor, and associated piping and valves. It was in excellent condition.
- High service pump 3 was removed from service at time of inspection. Operations staff stated the pump is not needed to maintain distribution system pressure.
- High service pump 4 was removed from site and capped.
- The 2.5-million-gallon ground storage tank appeared to be in good condition, with minor hairline cracks. The exterior coating on the tank is in poor condition. The County plans on repainting the exterior.
- The pump station was equipped with a diesel engine generator. The generator and associated equipment appeared to be in good condition.

- The tank is filled through an altitude valve and isolation valve equipped with an electric actuator located in an underground vault. The altitude valve, isolation valve, and electric actuator were replaced. A clay valve was recently installed. All other planned improvements were completed.
- The sodium hypochlorite and LAS storage and feed systems were in excellent condition.
- The recirculation pump along with diffusers within the storage tank to enhance mixing to minimize thermal stratification within the tank were in excellent condition.
- The underground vault that includes chlorine and ammonia injection assemblies on the tank effluent pipe supplying the high service pumps were in excellent condition.
- The instrumentation to monitor the disinfection process was in excellent condition.
- The high service pumps and the new disinfection facilities can be monitored and controlled via the SCADA system.
- The pump building exterior was in good condition. At the time of the inspection, minor concrete cracks were visible.
- At the time of the inspection, water intrusion and moisture damage were present in the generator room due to roof damage. The roof of the structure needs minor repairs. The generator manufacturer to provide shield for generator starter to protect against water intrusion.
- Temporary sodium hypochlorite tanks to be removed during ongoing rehabilitation project.
- Analyzers to be replaced in the near future.

3.8.6 3C Storage and Pumping Facility

The 3C facility was a water treatment plant that was replaced with water storage tank and pump station in 2010. The pump station is supplied with water from the City of Hollywood. The facility includes the following:

- 1.5-million-gallon ground storage tank.
- Pump building that includes the following:
  - Three horizontal split case motor driven pumps equipped with VFDs.
  - Sodium hypochlorite room containing sodium hypochlorite storage and feed system along with a water softening system and softened water storage tank intended for diluting the sodium hypochlorite from 12% to 6% to minimize sodium hypochlorite degradation.
  - Ammonia storage room containing anhydrous ammonia storage and feed system.
  - Diesel engine generator on 650-gallon belly tank.
  - Air-conditioned electrical room containing VFDs, motor control center, main distribution panelboard, automatic transfer switch and remote telemetry unit control panel.

- Control valve vault containing altitude valve and plug valve with electrical actuator to control tank filling.
- Meter vault no. 1 that includes a magnetic flow meter to measure the water supplied by the City of Hollywood.
- Meter vault no. 2 that includes a magnetic flow meter to measure the water conveyed by the pump station into the 3C water distribution system.
- The facility is equipped with a SCADA system to allow staff to monitor and control the facility from the 3A control room.

The 3C storage and pumping facility was inspected April 14, 2023. In general, the 3C facility appeared to be in good condition. Observations from the site visit are provided below.

- The exterior walls of the water tank appeared to be in good condition.
- The exterior paint on the water tank was in poor condition. Repainting efforts are currently in the bid phase.
- High service pumps No. 1 and No. 2, along with associated motor and valves, appeared to be in good condition and working. New check valves were installed, and the motors of pumps No. 1 and No. 2 were replaced.
- High service pump No. 3 along with associated motor and valves appeared to be in good condition and working. Pump No. 3 and the motor were recently replaced and rehabilitated.
- The sodium hypochlorite storage tanks were in good condition. A ladder installed on the outside of the tank had major corrosion and rust.
- The sodium hypochlorite transfer/tank mixing pumps appeared to be in good condition. At the time of inspection, all hypochlorite systems were online.
- The water softening system was not being utilized at the time of inspection.
- The sodium hypochlorite system control panel appeared to be in good condition.
- The County plans on installing a LAS system in 2023 to replace the anhydrous ammonia system. At the time of inspection, the new LAS system was under construction.
- The diesel engine generator appeared to be in good condition.
- The VFDs, motor control center, main distribution panelboard, automatic transfer switch and remote telemetry unit control panel appeared to be in good condition.
- The pump building exterior appeared to be in good condition.
- Exhaust fans were in good condition aside from leakage due to rain intrusion. County staff addressed and resolved the issue.

3.8.7 Retail Lift Stations

There are 245 lift stations (LS) operated by the County. Ten retail stations were rehabilitated in FY 22. A representative set of 20 lift stations were inspected by Cordova Rodriguez & Associates. On April 11, 2023, *LS 10E, 10F, 30C, 30E1, 31D,* and *32D* were inspected. On April 20, 2023, *LS 27B1, 29A, 29E, 24E2, 25B1,* and *11A* were inspected. On April 25, 2023, *LS 30M, 30K, 31C, 10D,*

50D, 50S, 56A1 and *56C* were inspected. Overall, the mechanical and electrical components (control panels, variable frequency drives, motor control centers, generators, telemetry units, pumps, pipes, and accessories) appeared to be in fair to good condition, as described on the following pages. Overall, the lift station signs were in good condition, except a few that were in poor to fair condition. The following is a summary of the observations made during the visual inspection of the lift stations.

LS 56A1 - This submersible pump lift station was in overall good condition. At the time of inspection, no pump issues were reported. The wet well and valve vault were in good condition. The piping and valves had minor rust but were in good condition. Valve vault had some water present at the time of inspection due to rain. The liner of the wet well requires rehabilitation. Some minor rust was observed on pipes in the wet well. Coating on all piping requires rehabilitation. The electrical panel was in good condition. The water service was in good condition.

LS 56C - This submersible pump lift station was in overall good condition. At the time of inspection, no pump issues were reported. The wet well and valve vault were in good condition. The piping and valves had minor rust but were in good condition. Valve vault had some water present at the time of inspection due to rain. The liner of the wet well requires rehabilitation. Some minor rust was observed on pipes in the wet well. Coating on all piping requires rehabilitation. The electrical panel was in good condition. The water service was in good condition.

LS 27B1 – This submersible pump lift station was in overall good condition. At the time of inspection, no pump issues were reported. The wet well and valve vault were in good condition. The piping and valves had minor rust but were in good condition. Valve vault had some water present at the time of inspection due to rain. The wet well was in good condition. The liner of the wet well needs rehabilitation. The electrical panel and water service were in good condition. The water service is undersized, currently one inch in diameter. The station is on the list for future rehabilitation.

LS 30K - This submersible pump lift station was in good overall condition. At the time of inspection, no pump issues were reported. The wet well and valve vault were in good condition. The piping and valves had minor rust but were in good condition. Valve vault had some water present at the time of inspection due to rain. The liner of the wet well requires rehabilitation. Some minor rust was observed on pipes in the wet well. Coating on all piping requires rehabilitation. The electrical panel was in good condition. The water service was in good condition.

LS 30M - This submersible pump lift station was in excellent condition overall. At the time of inspection, no pump issues were reported. The wet well and valve vault were in excellent condition. The piping and valves were in excellent condition. Valve vault had some water present at the time of inspection due to rain. The wet well and associated piping were in excellent condition. The electrical panel and water service were in excellent condition. The station underwent rehabilitation recently.

LS 31C - This submersible pump lift station was in excellent condition overall. At the time of inspection, no pump issues were reported. The wet well and valve vault were in excellent condition. The piping and valves were in excellent condition. Valve vault had some water present at the time of inspection due to rain. The wet well and associated piping were in excellent condition. The electrical panel and water service were in excellent condition. The station

underwent rehabilitation recently.

LS 29A - This submersible pump lift station was in overall good condition. At the time of inspection, no pump issues were reported. The wet well and valve vault were in good condition. The piping and valves had minor rust but were in good condition. Valve vault had some water present at the time of inspection due to rain. The wet well was in good condition. The liner of the wet well needs rehabilitation. Some minor rust was observed on pipes in the wet well. All coating on piping requires rehabilitation. The electrical panel was in good condition but may require rehabilitation due to age. The water service was in good condition.

LS 29E - This submersible pump lift station was in overall good condition. At the time of inspection, no pump issues were reported. The wet well and valve vault were in good condition. The piping and valves had minor rust but were in good condition. Valve vault had some water present at the time of inspection due to rain. The wet well was in good condition. The liner of the wet well needs rehabilitation. Some minor rust was observed on pipes in the wet well, the coating on pipes requires rehabilitation. The electrical panel and water service were in good condition but may require rehabilitation due to age.

LS 10D - This submersible pump lift station was in overall good condition. At the time of inspection, no pump issues were reported. The wet well and valve vault were in good condition. The piping and valves had minor rust but were in good condition. Valve vault had some water present at the time of inspection due to rain. The liner of the wet well requires rehabilitation. Some minor rust was observed on pipes in the wet well. Coating on all piping requires rehabilitation. The electrical panel was in good condition. The water service was in good condition.

LS 10E - This submersible pump lift station was in overall good condition. At the time of inspection, no pump issues were reported. The wet well and valve vault were in good condition. The piping and valves had minor rust but were in good condition. Valve vault had no water present at the time of inspection. Some minor rust was observed on pipes in the wet well. The electrical panel was in good condition. The water service was in good condition. The station is on the list for future rehabilitation.

LS 10F - This submersible pump lift station was in overall fair condition. At the time of inspection, no pump issues were reported. The wet well and valve vault were in good condition. The piping and valves had minor rust but were in fair condition. Valve vault had no water present at the time of inspection. The liner of the wet well requires rehabilitation. Some minor rust was observed on pipes in the wet well. Coating on all piping requires rehabilitation. The electrical panel was in good condition. The water service was in good condition. The station is on the list for future rehabilitation.

LS 11A - This submersible pump lift station was in overall good condition. At the time of inspection, no pump issues were reported. The wet well and valve vault were in good condition. The piping and valves had minor rust but were in good condition. Valve vault had some water present at the time of inspection due to rain. The wet well was in good condition. The liner of the wet well needs rehabilitation. Some minor rust was observed on pipes in the wet well. The water service was in good condition.

LS 30C - This submersible pump lift station was in excellent condition overall. At the time of inspection, no pump issues were reported. The wet well and valve vault were in excellent condition. The piping and valves were in excellent condition. Valve vault had no water present at the time of inspection. The wet well and associated piping were in excellent condition. The electrical panel and water service were in excellent condition. The station underwent rehabilitation in 2023.

LS 30E1 - This submersible pump lift station was in overall fair condition. At the time of inspection, no pump issues were reported. The wet well and valve vault were in fair condition. The piping and valves had major rust and were in fair condition. Valve vault had no water present at the time of inspection. The liner of the wet well requires rehabilitation. Some minor rust was observed on pipes in the wet well. Coating on all piping requires rehabilitation. The concrete pad is in poor condition, with multiple cracks on the concrete pad. The electrical panel was in fair condition. The water service was in good condition. The station is on the list for future rehabilitation.

LS 31D - This submersible pump lift station was in excellent condition overall. At the time of inspection, no pump issues were reported. The wet well and valve vault were in excellent condition. The piping and valves were in excellent condition. Valve vault had no water present at the time of inspection. The wet well and associated piping were in excellent condition. The electrical panel and water service were in excellent condition. The station underwent rehabilitation in 2022.

LS 50S - This submersible pump lift station was in good overall condition. At the time of inspection, no pump issues were reported. The wet well and valve vault were in good condition. The piping and valves had minor rust but were in good condition. Valve vault had some water present at the time of inspection due to rain. The liner of the wet well requires rehabilitation. Some minor rust was observed on pipes in the wet well. Coating on all piping requires rehabilitation. The electrical panel was in good condition. The water service was in good condition.

LS 25B1 - This submersible pump lift station was in overall good condition according to the maintenance staff. At the time of inspection, the station was inaccessible due to construction occurring on private property.

LS 32D - This submersible pump lift station was in overall fair condition. At the time of inspection, no pump issues were reported. The wet well and valve vault were in fair condition. The piping and valves had minor rust but were in fair condition. The valve vault had no water present at the time of inspection. The liner of the wet well requires rehabilitation. Some minor rust was observed on pipes in the wet well. Coating on all piping requires rehabilitation. The electrical panel was in good condition. The water service was in good condition. The station is on the list for future rehabilitation.

LS 50D - This submersible pump lift station was in overall good condition. At the time of inspection, no pump issues were reported. The wet well and valve vault were in good condition. The piping and valves had minor rust but were in good condition. Valve vault had some water present at the time of inspection due to rain. The liner of the wet well requires rehabilitation. Some minor rust was observed on pipes in the wet well. Coating on all piping requires rehabilitation. The electrical panel was in good condition. The water service was in good condition, although undersized.

LS 24E2 - This submersible pump lift station was in excellent condition overall. At the time of inspection, no pump issues were reported. The wet well and valve vault were in excellent condition. The piping and valves were in excellent condition. Valve vault had some water present at the time of inspection due to rain. The wet well and associated piping were in excellent condition. The electrical panel and water service were in excellent condition. The station underwent rehabilitation in 2022.

Section 4 Regional Wastewater System

This section describes the North Regional Wastewater System (NRWWS) including the service area, visual inspection and review of the renewal and replacement program. Visual Inspection and Review were conducted by Cordova Rodriguez & Associates.

4.1 General Description

WWS owns and operates the North Regional Wastewater Treatment Plant (NRWWTP), which has provided contract wholesale wastewater services to Large Users plus the County since 1974. The current Large Users include the Cities of Coconut Creek, Coral Springs, Deerfield Beach, Lauderhill, North Lauderdale, Oakland Park, Pompano Beach and Tamarac; and, North Springs Improvement District (NSID), Parkland Utilities, and Royal Waterworks. Service is also provided to WWS Districts 1 and 2 retail wastewater systems. The NRWWS includes 11 master pumping stations and approximately 66 miles of force mains. All the wastewater collected from retail Districts 1 and 2 and Large User customers are treated at the NRWWTP located in Pompano Beach, Florida. The plant has a permitted treatment capacity of 95 MGD of which 87.1314 MGD has been reserved by the Large Users and the County. During Fiscal Year 2022, the annual average daily flow rate at the NRWWTP was approximately 65.1 MGD, and the plant currently has sufficient capacity to meet the projected demands of all Large Users and the County to at least the year 2035.

The Large User agreements are substantially similar. Each is for a term that exceeds by one year, the last payment of any wastewater system debt obligation applicable to the NRWWS. In addition to stipulating points of connection and establishing minimum quality limitations on all wastewater, the agreements designate reserve capacity in the plant for each user and provide for the method to charge each user for the availability and provision of service. The agreements also require the Large Users to deliver all wastewater collected from their customers to the County system. Monthly, each user is billed a fixed charge depending upon the user's reserve capacity in the plant. This fixed charge is designated to recover each Large User's equitable share of debt service including required coverage (1.2 x principal and interest). The operation and maintenance costs associated with provision of treatment and transmission service, also billed monthly to each Large User, are based upon the Large User's pro rata usage of the NRWWS. Additionally, the contracts provide restrictions on excessive and peak flows, limitations on types of waste allowed to be discharged, and requirements to pay for damages caused by a Large User.

The NRWWTP was designed and constructed in accordance with a master plan approved by regulatory authorities specifically to encourage the use of regional, technologically advanced wastewater treatment processes and to discourage development and use of smaller, less efficient systems. A difficult permitting process, outstanding contractual obligations with the County, and high capital costs of constructing and operating a new facility, should discourage any Large Users from abandoning the NRWWS. The agreements as executed by the Large Users are binding and can only be terminated upon mutual consent of the County and the Large User.

The NRWWTP utilizes an activated sludge treatment process for liquid treatment and an anaerobic digestion system for handling the biosolids produced from the liquid treatment process. After digestion, the sludge is dewatered and disposed of by landfilling and land spreading.

The effluent from the liquid treatment process is either chlorinated and pumped through the outfall pipe into the Atlantic Ocean, disposed of in on-site deep injection wells, or chlorinated and filtered via the County's 10 MGD reclaimed water system (recently expanded to 26 MGD). The reclaimed water is used for irrigation and industrial process water at the Septage Receiving Facility and the NRWWTP, as well as for landscape irrigation at a nearby commerce center.

4.2 Service Area and Customer Base

Figure 4-1 shows the NRWWS service area. All wastewater collected from retail Districts 1 and 2 and from all Large User customers is treated at the NRWWTP located in Pompano Beach, Florida.

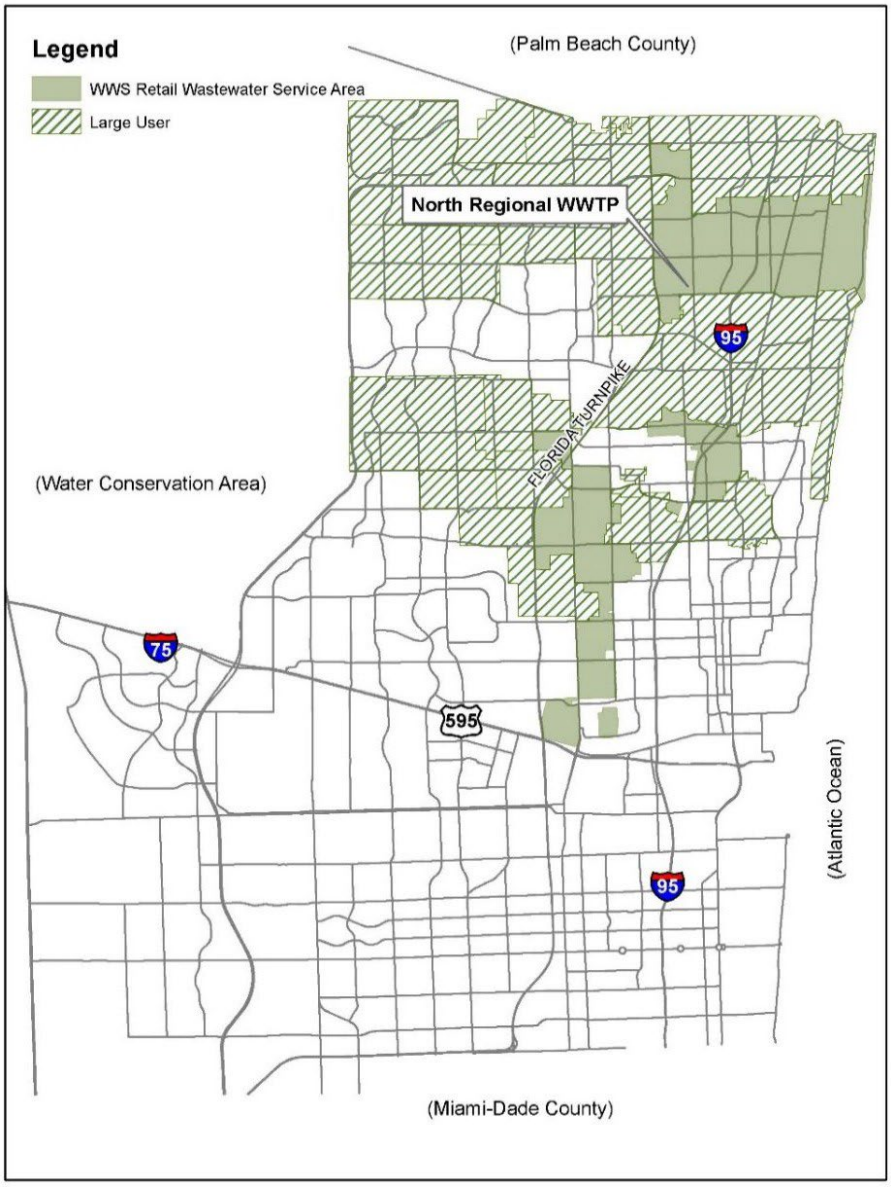

Figure 4-1. WWS Wastewater Large User Service Areas

Source: Broward County Water and Wastewater Services

The NRWWS service area provides service to 35% of the population in the County through its wholesale treatment services to Large Users and services to the County's retail customers in Districts 1 and 2. (District 3 treatment is provided by contract with the City of Hollywood at the South Regional Wastewater System.) Service is provided pursuant to individual, contractual agreements between the County and each Large User. Generally, such agreements specify each Large User's reserve capacity in the plant and provisions for billing and payment for service. As noted, the Large Users and WWS have currently subscribed to 87.015 MGD of the 95 MGD of treatment and disposal capacity.

Table 4-1 provides a summary of historical Large User wastewater flow rates for treatment and disposal. The reserve capacity for each Large User of the NRWWS is shown in Table 4-2. Table 4-3 provides information on the wastewater annual flows for the past five years. Collectively, the system users will not exceed permitted plant capacity through at least 2035. As such, obligations to individual Large Users for wastewater flows do not currently constitute an issue from the standpoint of available plant capacity.

Table 4-1. Summary of Historical Large User Wastewater Average Monthly Flow for Treatment and Disposal (1,000 Gallons) as of September 30, 2022

Large User	FY 2020	FY 2021	FY 2022	Change From 2021 to 2022	% of Change
Coconut Creek	132,891	140,189	134,863	(2,162)	(1.58)
Coral Springs	239,796	235,329	211,713	(23,616)	(10.04)
Deerfield Beach	177,117	172,228	163,602	(8,626)	(5.01)
Lauderhill	204,501	197,651	187,459	(10,193)	(5.16)
North Lauderdale	105,237	102,641	100,267	(5,538)	(5.23)
NSID	113,158	120,976	120,711	(264)	(0.22)
Oakland Park	46,643	37,114	29,245	(7,869)	(21.20)
Parkland Utilities	6,793	8,153	6,894	(1,259)	(15.45)
Pompano Beach	472,915	422,231	411,964	(10,267)	(2.43)
Royal Waterworks	9,110	9,480	8,896	(584)	(6.16)
Tamarac	209,427	213,480	194,598	(18,882)	(8.84)
Subtotal	**1,717,588**	**1,659,472**	**1,570,212**	**(89,260)**	**(5.38)**
Broward County	420,875	417,038	410,674	(6,364)	(1.53)
Total	**2,138,463**	**2,076,510**	**1,980,886**	**(95,624)**	**(4.61)**

Source: Broward County Water and Wastewater Services

Table 4-2. North Regional Wastewater System Reserve Capacity as of September 30, 2022 (MGD)

Large User	Capacity	
	Treatment	Transmission
Broward County	19.4200	19.4200
Coconut Creek[1]	6.5400	4.4100
Coral Springs	9.7900	9.7900
Deerfield Beach	8.5000	8.5000
Lauderhill	7.1000	7.1000
North Lauderdale	4.4000	4.4000
N S I D	3.5300	3.5300
Oakland Park	1.5200	1.5200
Parkland Utilities	0.3814	0.3814
Pompano Beach[1]	17.000	N/A
Royal Waterworks	0.4500	0.4500
Tamarac	8.5000	8.5000
Total	**87.1314**	**68.0014**

[1] All of Pompano Beach and portions of Coconut Creek do not use the North Regional Wastewater System transmission facilities; these wastewater flows are transmitted through separate pipelines.

Source: Broward County Water and Wastewater Services

Table 4-3. Summary of Large User Wastewater Treatment Annual Flows Five-Year History as of September 30, 2022 (1,000 Gallons)

Large User (LU)	Fiscal Year 2018	Fiscal Year 2019	Fiscal Year 2020	Fiscal Year 2021	Fiscal Year 2022
Coconut Creek	1,530,733	1,470,974	1,594,695	1,682,269	1,618,356
Coral Springs	3,093,525	2,727,304	2,877,555	2,823,947	2,540,559
Deerfield Beach	2,115,602	1,943,149	2,125,405	2,066,737	1,963,225
Lauderhill	2,389,407	2,178,516	2,454,006	2,371,814	2,249,502
North Lauderdale	1,453,814	1,383,177	1,262,840	1,231,696	1,203,201
NSID	1,233,566	1,223,263	1,357,893	1,451,706	1,448,534
Oakland Park	568,404	481,467	559,710	445,371	350,941
Parkland	73,016	75,676	81,519	97,838	82,725
Pompano Beach	5,601,593	5,117,970	5,674,980	5,066,770	4,943,569
Royal Waterworks	109,795	90,041	109,320	113,757	106,755
Tamarac	2,721,749	2,325,017	2,513,127	2,561,762	2,335,179
Total LU	**20,891,204**	**19,016,554**	**20,611,050**	**19,913,667**	**18,842,546**
Broward County	4,985,673	4,500,075	5,050,502	5,004,458	4,928,088
Total LU and County	**25,876,877**	**23,516,629**	**25,661,552**	**24,918,125**	**23,770,634**

Source: Broward County Water and Wastewater Services

4.3 Wastewater System Regulatory Requirements

Operations of the NRWWTP are regulated by the EPA, the Florida Department of Environmental Protection (FDEP) and the Broward County Environmental Protection and Growth Management Department (EPGMD). Regulatory requirements are focused on effluent management, sludge disposal, reclaimed water, and industrial pretreatment.

In Fiscal Year 2022, the North Regional Wastewater Treatment Plant (NRWWTP) had no permit violations. The NRWWTP is in compliance with permit requirements.

4.4 Wastewater Effluent Management

The NRWWTP currently disposes of treated effluent via an open ocean outfall and deep injection wells. Additionally, a portion of the effluent is treated to public-access quality and distributed for reuse via a reclaimed water system. The open ocean outfall is regulated through the Federal National Pollutant Discharge Elimination System (NPDES) permit program, administered by the FDEP. Deep injection wells are permitted by the FDEP Underground Injection Control Section.

The County's facility permit from the FDEP rates the NRWWTP at 95 MGD and acknowledges 66 MGD of effluent disposal capacity through the ocean outfall. The current NRWWTP permit was issued on March 2, 2018, with a monitoring start date of May 1, 2018 and an expiration date of March 1, 2023. The County has submitted the permit renewal package which is currently under review by FDEP.

The FDEP continues to promote a reduction of nutrients in the face of opposition to ocean discharges from interested groups. The agency has worked with the wastewater utilities with ocean outfalls (including Broward County) to realize such nutrient reduction through the Leah Schad Memorial Ocean Outfall Program, which became the law effective July 1, 2008. This law requires that the disposal of effluent through ocean outfalls be largely eliminated by 2025. After that year, Broward County will be able to continue use of the ocean outfall for discharge of peak wastewater flows, so long as 5% of the cumulative baseline annual flow is not exceeded.

In addition to the limitations on outfall usage, the act seeks to cause an increase in the development of reclaimed water systems in southeast Florida. The County is presently completing the expansion of the 10 MGD reclaimed water filters to 26 MGD, as well as sending additional secondary effluent to Pompano Beach OASIS facility to fully comply with this requirement.

To meet the near-term advanced wastewater treatment requirements of the rule, the County has reduced outfall discharges via diversion to the existing deep injection well system and implemented cumulative nutrient reduction strategies including modifying the existing treatment process for increased biological nutrient removal. The County also has added two additional injection wells and booster pumps to increase injection well disposal capacity.

As previously noted, the effluent management system includes Class I deep injection wells. The Operation Permit for Injection Wells 1 through 6 was issued on December 28, 2022 and is valid for five years. Additionally, Injection Wells 7 and 8 were constructed in 2014-2016.

In parallel, FDEP informed the County (by letter dated, July 8, 2020, that the County must construct High Level Disinfection (HLD) facilities and place into service within five years of receipt of the letter. The County disagreed with this regulatory agency determination and challenged it through an administrative law hearing. The County prevailed in the administrative law hearing and, on June 7, 2022, the FDEP rescinded their letter requiring HLD at the NRWWTP.

Although construction of Injection Wells 7 and 8 is complete, construction-related issues have delayed long-term operation. The County will be requesting operational testing of wells 7 and 8 from FDEP including the plan to repair the surface seepage caused by construction related issues.

Further, and as previously noted, the County's effluent management program includes a 10 MGD system (presently being expanded to 26 MGD) which provides disinfected reclaimed water for industrial, and landscape uses. As a requirement of the Leah Schad Memorial Ocean Outfall Program described above, the County will be required to increase production of reclaimed water by 2025. The County has entered into agreement with Palm Beach County (PBC) for the bulk purchase of up to 15 MGD of reclaimed water. This agreement, along with other increases in reclaimed water usage both from the NRWWTP and from reclaimed water produced at the Pompano Beach OASIS facility, will enable the County to achieve the mandated 20.45 MGD of additional reclaimed water production.

At the time of this report, the Florida Clean Waterways Act (SB-712) has been signed and took effect July 1, 2023. This rule amends F.A.C. 62-600 – Domestic Wastewater Facilities to include additional requirements related to collection systems. The purpose of this rule is for sanitary sewer overflow (SSO) prevention and asset management guidelines. This rule requires all Florida utilities adopt and implement plans for continuous collection system assessment, repair and replacement. It should be noted that, at the time of this report, the exact deadline for submission of planning documentation has not been established and will likely be either June 30, 2024 or at the time of permit renewals.

4.5 Biosolids Management

Pollutant concentrations in wastewater residuals are regulated by both federal and state sludge regulations. The federal regulation that currently regulates disposal is 40 CFR Part 503. The Part 503 rule regulates five categories of wastewater residuals disposal: agricultural land application, non-agricultural land application, distribution and marketing, monofils, and surface disposal. WWS currently employs landfilling and land-spreading for wastewater residuals disposal. The County has a current contract to dispose of biosolids by land application.

The County is currently managing most biosolids by land application of the treated residuals. Land application is a beneficial reuse of this wastewater treatment byproduct and is subject to both federal and state regulations. The County currently produces Class B residuals allowable for application to non-food agricultural sites.

Starting July 1, 2023, Florida Statute 403.0674 was created to establish a biosolids grant program within the Department of Environmental Protect (DEP) which authorizes the department to provide grants to counties and municipalities that are working on projects to convert wastewater residuals to Class AA biosolids. The Department will review to confirm that the project minimizes the migration of nutrients and other pollutants that degrade water quality. The same House Bill, also in effect starting July 1, 2023, also amended Florida Statute 403.0855. This statue states that land application site permits may not be authorized for Class B biosolids within the subwatershed of a waterbody that is listed as impaired for nitrogen or phosphorous unless the municipality can prove that the biosolids will not add to the nutrient load in the impaired subwatershed. Starting on November 1, 2023, the Department will publish yearly updated maps designating the subwatersheds protected by this amended subsection.

In August 2010, revisions to the state regulations governing the treatment and disposal of

biosolids, Chapter 62-640 F.A.C., went into effect. The NRWWTP became subject to the new regulations upon renewal of the facility's operating permit in January 2013. New land application sites were permitted under these new regulations. In June 2021, revisions to the state regulations governing the treatment and disposal of biosolids, Chapter 62-640 F.A.C., went into effect. The NRWWTP became subject to the new regulations of the facility's operating permit issued in March 2018. While land application continues to be an option, permitting of sites will likely be at greater distances, potentially making hauling to new disposal sites costlier. The County has secured alternate disposal capacity at a nearby Class I landfill and continues to investigate cost-effective, long-term biosolids management alternatives. Disposal at the landfill meets all current federal, state, and local regulations and, since the landfill cogenerates electricity from its methane gas production, this disposal option is currently the most carbon neutral.

4.6 Wastewater Large User Agreements

The County is under obligation to provide Large Users with capacity under the terms of Large User Agreements (Agreements) it has executed with the cities of Coconut Creek, Coral Springs, Deerfield Beach, Lauderhill, North Lauderdale, Oakland Park, Pompano Beach and Tamarac, the North Springs Improvement District (NSID), and the private utility companies of Parkland Utilities, Inc. and Royal Waterworks. The Agreements provide for wastewater transmission, treatment, and disposal services. The Agreements terminate at the end of the County's fiscal year following the date all obligations, notes or bonds at any time issued for the NRWWTP and associated transmission and disposal facilities, or any part thereof, are retired or satisfied. The current Large User reserved capacity in the NRWWTP is set forth in Table 4-2.

The Agreements are substantially alike in form and a summary of significant provisions follows:

A. Provisions Pertaining to Connection to the County System. The Agreements require that during the term of the Agreement, each user, except the City of Oakland Park, will deliver all existing water flows collected by it to the County. Oakland Park sends a portion of their flow to the City of Fort Lauderdale's wastewater treatment plant. The outstanding contractual obligations with the County and high capital costs of constructing and operating a new facility capable of meeting current effluent quality requirements may discourage any withdrawal of users from the NRWWS.

   The Agreements also identify the points of connection of the users' systems to the County's system, and state that the user will convey to the County land needed by the County for the point of connection and access thereto. The users agree to maintain their own systems, the elevation and pressure of which are required to be sufficient to deliver wastewater to the County's facility without backing up or reversing flow. The users' systems must include provisions to prevent excessive peak flow rates and extended periods of no flow. Each of the users must list estimates of its future flows in the Agreement and the user must submit annual updates of these estimates to the County. The County is required to use these estimates to plan future treatment capacity and to determine whether facilities should be extended or modified. The County's obligation to provide service is limited to the capacities reserved by users, which may be increased or decreased by amendment or modification to the Agreements. The Agreements allow users to lease or sell excess capacity to other users, subject to the County's approval. The County is required to install and maintain a meter at each point of connection to determine the volume and rates of flow and to inspect the meters at least annually to

determine the accuracy thereof. The Agreements provide for credits or additional charges in the event of the inaccuracy of the meters. If the meters are inoperative, the users are required to pay an amount based on the average flow of the prior month.

B. Provisions Relating to Discharge Sampling. The Agreements specify quality limitations for wastewater discharges. A user's failure to comply with these limitations places the user in default under this Agreement and allows the County either to initiate programs to bring the user's discharge into compliance at the user's expense or to seek damages from the user. A user's system must include a sampling station and the user must, upon receipt of written request from the County, submit a complete laboratory analysis of a composite sample of combined wastes leaving the user's facilities. The County and the user may enter into an agreement whereby the County would accept wastewater with a strength or other characteristic that exceeds parameters listed in an existing agreement. In this case, the County may impose surcharges on the system supplying such a wastewater.

C. Provisions Pertaining to Charges. The County is required to conduct an annual review of the costs of providing service to users, which will provide the preliminary basis for establishing fees, rates, and other charges for the next succeeding fiscal year. The fees and rates charged to the users constitute the full cost of the transmission, treatment and disposal services provided to the users, including operation and maintenance charges and debt service charges for both the NRWWTP and the NRWWS transmission facilities, and include an Improvement Repair and Replacement Surcharge. Such fees, rates and charges are required to be set at a public hearing by the Board, which must be held after 30 days' written notice to the users. The Board is required to consider recommendations of the individual users or the advisory board, which is composed of representatives from each of the users. The operation and maintenance charges applicable to the NRWWTP or the transmission system are included in the monthly rate charged to the users based upon the users' actual monthly flow in thousands of gallons. The rate is to be set by dividing the total annual budgeted operation and maintenance expense for each fiscal year by the number of gallons estimated to be treated or transmitted in that fiscal year and is to be adjusted at year end to reflect the actual number of gallons treated and actual operation and maintenance expense. This adjustment is either collected from, or remitted to, the Large Users in the subsequent year.

The debt service charge included in monthly rates charged to the Large Users include principal, interest and coverage requirements on debt obligations issued at any time for the NRWWS and is computed by determining the ratio of the amount of capacity reserved by the user to the amount reserved by all users. The debt service charge for the NRWWS transmission facilities is computed by reference to transmission reserved capacity in the same manner. A user's contribution to the Improvement, Repair and Replacement Surcharge, which is part of the monthly rate charged to users, may not exceed 10% of that user's monthly bill. In addition, the Agreements provide for additional charges if a customer requests additional transmission or treatment capacity or if the monthly flow of a user exceeds the capacity reserved by such user for three consecutive months. A user that fails to pay the monthly bill within 45 days of its due date is required to pay an interest penalty on the unpaid balance; and if the payment is not made within 60 days, the user is in default of the Agreement and the County may enforce the Agreement by suit. The

users agree to establish service charges or other means of obtaining funds sufficient to enable them to pay the monthly charge.

D. Provisions Pertaining to Additional Obligations of Both Parties. The Agreements provide that the County will extend and expand its NRWWS to provide for the user's scheduled flow. The users must deliver their wastewater to the County facilities for treatment and the County must accept all wastewater flows collected by the users, provided the amount of such flow does not exceed the capacity reserved by such users.

E. Provisions Pertaining to Violations and Exceptions to the Terms of Agreements. If a user violates the Agreement, the County must give written notice of the violation and allow a reasonable time to correct the violation. The user must correct the violation within the stated time. If either party violates the Agreement, that party becomes liable to the other for any expense, loss or damage occasioned by such violation, provided that any payment by the County to a user for violation of any provision of the Agreement shall be from any legally available source other than the revenues pledged to any bondholders. If there is a dispute concerning a violation that cannot be settled, the user will pay the full amount billed, and the amount in dispute will be escrowed or held in a joint trust, interest-bearing bank account and held pending settlement of such dispute. Each user agrees to hold the County harmless from costs and expenses incurred by such user or the County in any litigation resulting from the improper introduction of materials by such user into the County facility. Any temporary cessation of wastewater transmission and treatment services caused by an act of God, a fire, strikes, casualty, necessary maintenance work, breakdown of or injury to machinery, pumps or pipeline shall not constitute a breach of the Agreement. The County is required to accept and dispose of wastewater transmitted by the users, if physically possible, regardless of the degree of treatment available, until written notice to the contrary is received from a government agency.

F. Provisions Relating to the Term of the Agreements and Cancellation. The users and the County were bound by the Agreements at the date of their execution. The County and each user may terminate their Agreements by mutual written consent. Otherwise, the Agreements terminate at the end of the County's next full fiscal year after all obligations issued at any time during the term of the Agreements for the NRWWS have been retired or satisfied.

4.7 Visual Inspection and Review

4.7.1 Master Lift Stations

Five Master Lift Stations (MLS 452, 455, 456, 458 and 460) were inspected on May 04, 2023, by Cordova Rodriguez & Associates. Master lift stations were selected based on their previous inspection history, and on a rotation. Priority was given to stations with the longest time since the last inspection. Summaries of the findings at each station are presented below.

- MLS 452 - The inline booster-type station was in good overall condition. This station is comprised of three primary high service pumps. At the time of inspection, Pump No. 2 was offline due to issues with the motor. Valve issues prevented the motor from being changed. Pumps, motors, and interior station piping were in fair condition with minor rust present. All

three of the pump bases were in fair condition, with corrosion and rust present. Pump control valves and actuators were in good condition. The isolation valves were in poor condition due to leakage. All valves, including check valves, require replacement. All exhaust fans require replacement. The backup power diesel generator appeared to be in good condition after undergoing recent repairs. This site has an above-ground diesel tank with a containment area that requires paint but is otherwise in good condition. At the time of inspection, a new diesel day tank was installed inside the facility. Electrical control panels were in good working condition, but new electrical control panels were on-site awaiting installation. The building interior and exterior were in good condition. The air conditioning unit was new and in excellent condition. The fencing and driveway were in good condition and were within Lauderhill Facility. This station is scheduled to commence rehabilitation soon.

- MLS 455 - This inline booster-type station was in poor overall condition. At the time of inspection, only three of the four pumps were on site. Pump No. 1 was off-site undergoing repairs. Pump No. 2 was offline due to VFD issues. Pump No. 3 and 4 were online and operational, with Pump No. 3 leaking at the time of inspection. All piping associated with the pumps were in poor condition, with major corrosion and rust present. All four of the pump bases were in poor condition, with major corrosion and rust present. Pump control valves and actuators appeared to be in poor condition with major rust present and the other valves were in fair condition. The backup power diesel generator appeared to be working and in good condition. This site has an above-ground double-walled diesel tank and day tank, which were in good condition at the time of inspection. The diesel day tank was undersized. Electrical control panels appeared to be in fair condition and are currently undergoing upgrades. In the current state, this station is not prepared for the rainy season. There is currently no on-site valve shut off and the nearest valve is two miles away. This station requires immediate rehabilitation.

- MLS 456 - The inline booster-type station was in excellent overall condition. Pumps, motors, and interior station piping were in excellent condition. Pump control valves and actuators appeared to be in excellent condition. Other valves were in excellent condition as well and all pumps, primary and jockey pumps, are new. The pump bases were in excellent condition. The backup power diesel generator was in excellent condition. This site had an above-ground double-walled diesel tank and day tank which were in excellent condition at the time of inspection. The new seal water system was in excellent condition. At time of inspection, a trip hazard was observed due to a temporary suction transmitter in the mag-meter vault pit. This station underwent rehabilitation recently.

- MLS 458 – The inline booster-type station was in good overall condition. This station is comprised of three primary high service pumps. The pumps, motors, and interior station piping were in fair condition with rust and corrosion present. The pump bases were in fair condition with minor rust present. Pump control valves, other valves, and actuators appeared to be in good condition. There was rust present on the welds of incoming pipes. The valves on Pump No. 1 and 3 require immediate replacement. At the time of inspection, A/C units in the electrical room were not working and were undergoing repairs. Electrical control panels appeared to be in fair condition and are also currently undergoing upgrades. The backup power diesel generator appeared to be in good condition. This site has an above-ground ground diesel tank which was undergoing replacement. At the time of inspection, a temporary above-ground ground diesel tank was in use. The building interior and exterior were in fair condition. The roof requires repairs immediately. The fencing and driveway were in good condition. At the time of inspection, the sprinkler irrigation system was not working and was awaiting repairs. This station was scheduled to commence rehabilitation soon after the inspection.

- MLS 460 - The inline booster-type station was in good overall condition and underwent rehabilitation within the last ten years. This station is comprised of three primary high service pumps. The pumps, motors, and interior station piping were in good condition. The pump bases were in good condition. All valves, including pump control valves, and actuators were in good condition. The backup power diesel generator appeared to be in good condition. This site has an above-ground ground diesel tank which was undergoing replacement. At the time of inspection, a temporary above-ground ground diesel tank was in use. Electrical control panels appeared to be in good working condition. The building interior and exterior were in good condition. The fencing and driveway were in good condition. At the time of inspection, the sprinkler irrigation system was not working and was awaiting repairs.

4.7.2 North Regional Wastewater Treatment Plant

The visual inspection of the NRWWTP was performed on April 18, 2023, for the headworks, treatment modules, ocean outfall pump station, deep injection well pump station, thickener building, reclaimed water facilities, and backup generators. The inspection consisted of visual observation of selected major process units and supporting equipment to generally establish the condition and functionality of major unit processes. In general, equipment appeared to function as intended. Based on the facility's ability to continuously meet permit requirements, the facility appears to be operated in a sound manner. A summary of key observations for each process area are as follows:

- Headworks
  - In general, the headworks equipment appeared to be in fair to good condition and functioning normally. All five bar screens were replaced as of 2021. As previously noted, the headworks structure should undergo routine inspections for concrete degradation and subsequent repair.
  - Transformers 9 and 10 were replaced and remain operational.
  - Four of the five grit removal structures are constructed and awaiting installation of equipment. The fifth grit removal structure (for Module A) remains under construction.
  - The aeration basin influent pipes from the grit removal structure to Module A have completed construction. Module A completed conversion of the module from mechanical mixers to diffused air in February 2023. Venturi meters remain on schedule for replacement in an upcoming, separate facility resilience improvements project (NRWWTP Facility Improvements – Biological).
  - At the time of the inspection, flow gates repair is currently ongoing.
  - We still recommend implementing an annual inspection of the headworks by a qualified structural professional should be performed on a routine basis.
- Treatment Module A
  - Module A was online and in service. At the time of the inspection, Module A was overall in excellent condition. The fine bubble diffuser completed installation.
  - The basin had concrete cracks and spalls on the underside of the walkways. All previously ongoing rehabilitation was completed.

- Clarifiers were found to be in good condition. Rehabilitation of three clarifiers was completed. Clarifiers A-1, A-2, and A-4 rehabilitation was completed.
- The Return Activated Sludge (RAS) pump station appeared to be in fair condition. Pumps, piping, and valving showed corrosion. The RAS and WAS pump stations are scheduled for rehabilitation under the upcoming NRWWTP Facility Improvements – Biological project. It is anticipated to start in the next year.
- Waste Activated Sludge (WAS) pumps and piping appeared to be in fair to good condition.

- Treatment Module B
  - Module B was out of service and in overall good condition.
  - The exterior walls of basin structures remain in good condition.
  - At the time of the inspection, mixers/motors were undergoing ongoing replacement to be replaced with fine bubble diffusers.
  - Clarifiers were in excellent condition. Corrosion was noted at the handwheels located on the top of the RAS pump building. At the time of inspection all clarifiers had underwent rehabilitation and replacement.
  - The RAS pumping station appeared to be in fair to good condition. The pumps, piping, and valving showed light corrosion.
  - The WAS pumps and piping appeared to be in fair to good condition.
  - The RAS and WAS pump stations are scheduled for rehabilitation under the upcoming NRWWTP Facility Improvements – Biological project.
- Treatment Module C
  - Module C was in service and in overall good condition. The new blowers were operational and in good condition.
  - The exterior walls of aeration basin structures, piping, and equipment all appeared to be in good condition.
  - Clarifier C-1 remains on schedule to be rehabilitated later this year (2023).
  - The RAS pump station was in good condition. Pumps, piping, and valving showed light corrosion.
  - The WAS pumps and piping appeared to be in fair to good condition.
  - The RAS and WAS pump stations are scheduled for rehabilitation under the upcoming NRWWTP Facility Improvements – Biological project.
- Treatment Module D
  - Module D was in service and in overall good condition.

- The exterior walls of basin structures appeared to be in good condition. At the time of the inspection, mixers/motors were recently replaced with fine bubble diffusers.
- Clarifiers were in good condition. Minor corrosion was noted. At the time of the inspection, clarifiers underwent rehabilitation recently.
- The RAS pumping station appeared to be in fair to good condition. The pumps, piping, and valving showed light corrosion.
- The WAS pumps and piping appeared to be in fair to good condition.
- The RAS and WAS pump stations are scheduled for rehabilitation under the upcoming NRWWTP Facility Improvements – Biological project.

- Treatment Module E
  - Module E was in service and in overall good condition.
  - The exterior walls of aeration basin structures, piping, and equipment all appeared to be in good condition.
  - Clarifiers were in good condition, with all showing minor to moderate corrosion in the drive mechanisms.
  - The RAS pump station, in general, appeared to be in good condition. The pumps, piping and valving showed minor to moderate corrosion.
  - The WAS pumps and piping appeared to be in good condition.
  - The RAS and WAS pump stations are scheduled for rehabilitation under the upcoming NRWWTP Facility Improvements – Biological project.
  - The Module E blowers were installed and awaiting startup at the time of the inspection.
- Ocean Outfall Pump Station
  - The Outfall pumps appeared functional and in good condition at the time of the inspection.
- Electrical equipment
  - The motors, liquid rheostat system, and associated heat exchangers appeared to be in good condition. Liquid rheostat for Pump No. 6 and No.4 were replaced during the 2021 annual inspection.
  - The wet well's concrete repairs were completed.
  - The sodium hypochlorite feed system appeared to be in good condition.
- Deep Injection Well Pump Station
  - The five pumps appeared functional and in good condition. The motors and supporting electrical equipment appeared to be in good condition.

- The VFDs were replaced and are operational.

- Water Reuse System
  - The reuse system pumping station appeared to be in good condition. The expansion project was completed and pending final start up.
  - The new self-backwashing sand filters and feed pumps were completed and awaiting start-up.
  - The reuse chlorine contact chamber and the new reuse chlorine contact chamber were in good to excellent condition.
  - The new high-head and low-head reuse pumps were installed and were in excellent condition.
  - The new Electrical Building 2 (EDB2) was constructed, and electrical equipment was installed but it was not in operation pending start up and final testing.

- Digester Complex
  - The facility has eight digesters, seven digesters appeared to be functional and in fair to good condition. The cover on the secondary digester was replaced and the internal gas mixing system remained under rehabilitation under the current construction project. At the time of the inspection, Digester No. 1 was out of service undergoing rehabilitation. Digester No. 3 and 2 underwent and completed rehabilitation. Digester No. 5 is scheduled for complete rehabilitation of internal and external components, although a start day has not been scheduled yet.
  - Progressive cavity sludge pumps appeared were in fair condition and remained under rehabilitation as part of the current construction project.
  - The North digester building electrical room was still being refurbished under the current construction project.
  - The boilers were replaced under the current construction project. Boiler No. 4 was undergoing replacement which is scheduled for completion in 2023.
  - Methane gas piping was in good condition and underwent recent rehabilitation. The piping system requires constant repairs due to age and the corrosive nature of the gas.

- Biosolids Processing
  - The Dissolved Air Floatation (DAF) thickeners appeared to be in fair to good condition and functional. DAF thickeners 3 and 4 were rehabilitated after the last inspection in 2021 and were in use at the time of this inspection. Reuse water piping was in good condition. The associated pressure tanks appeared to be in fair to good condition. DAFT Tanks 1, 2, 5, and 6 received new skimmer equipment and pressurization tank systems previously. This included removal of obsolete polymer feed system.
  - All belt filter presses, their drive motors and associated equipment were in fair condition and functional. At the time of the inspection, belt replacements were still ongoing. The

supporting polymer feed system components, including pumps, tanks, piping, and electrical gear, appeared to be in fair condition. Electrical equipment was in good condition. Demolition of Belt press 9 was completed. Two centrifuges were installed under the current construction project and are still awaiting start up. Two belt filter presses were replaced and are waiting on the centrifuges for startup. The remaining six belt presses are currently receiving new sludge feed grinders and pumps with VFDs, polymer units and spray water pumps. This work is expected to be completed by the end of 2023.

- Backup generators:
  - The backup generators and associated equipment appeared to be in good condition and operational.
  - The diesel fuel storage system was in good condition. This includes a new fuel system for the EDB2.
- Cogeneration System
  - The Cogeneration system appeared to be in good condition, and it was in operation at the time of the site inspection. A regular maintenance schedule was implemented.
- Fats, Oils, and Grease (FOG) Facility
  - The FOG tank, equipment and associated appurtenances appeared to be in good condition and operational.

Plant Modifications performed in FY 2023:

- Complete startup for the two new centrifuges.
- Replacement of two belt presses.
- Continue the replacement of the belt press Polymer systems (started in 2022).
- Continue with replacement of belt press sludge feed pumps with VFDs and new grinders (started in 2022).
- Complete commissioning New Electrical Building no. 2 (EDB2).
- Continue with the replacement of Thickener BWAS pumps.
- Complete installation of diffused air system to Module A, then follow by Module B.
- Continue and complete total rehabilitation of two clarifiers.

Plant Modifications for FY 2024:

- Fine Bubble Improvements project.
- NRWWTP Facility Improvements – Biological project.

4.7.3 Septage Receiving Facility

The Septage Receiving Facility receives domestic waste from septic tanks, portable toilets, vacuum trucks, grease traps, sporadically some leachate from landfills, etc. The waste is separated into two categories: liquids and solids. The equipment, which must be maintained, includes transfer pumps and electrical control panels, a diesel generator set, biofilters and miscellaneous valves.

The Septage Receiving Facility was inspected on April 26, 2023. The facility, inclusive of liquid pumps, solids discharges area, liquid discharge area, and office building, appeared to be in good working condition. At time of inspection, there was rust and corrosion present on pipes associated with pumps. The valves and piping on effluent conduit have rust and corrosion present. Rehabilitation is recommended. Retaining walls in washout bay and solid bay need rehabilitation.

Facility modifications for FY 2024:

- Construction of new administrative building and reconfiguration of pump locations.

Section 5 Regional Raw Water Supply

There are currently two wellfields operated by Broward County as part of the regional system, the North Regional Wellfield (NRW) and South Regional Wellfield (SRW). This section describes the regional raw water supply system, including the Large Users, physical descriptions, and permit limitations.

5.1 General Description

The Biscayne aquifer, currently the County's primary source of drinking water, is subject to saltwater intrusion. In 1986, the County adopted the Regional Raw Water Supply (RRWS) Program, which called for centralized wellfields located further inland to ensure a long-term water supply for Broward County coastal communities. Under the program, wellfields and raw water delivery systems were financed, constructed, and operated as regional water supply system supporting large raw water users. The Large Users currently purchasing raw water from the regional supply system are Dania Beach, Deerfield Beach, Hallandale Beach, Florida Power and Light Corporation (FPL), Hollywood and WWS District 2. The two regional supply wellfields (NRW and SRW) were constructed using general County revenues and the assets were contributed to the Utility. Figure 5-1 depicts the regional wellfield locations and service areas. Physical descriptions of the NRW and the SRW are presented in Tables 5-1 and 5-2.

Table 5-1. NRW Physical Descriptions

Well No.	Size (in)	Depth (ft.)	Casing Depth (ft.)	Type of Casing	Normal Yield (GPM)	Capacity (GPM)	Service Status
1	20	170	112	PVC	1400	1400	ON LINE
2	20	130	116	PVC	1400	1400	ON LINE
27	20	130	95	PVC	1400	1400	ON LINE
29	20	130	94	PVC	1400	1400	ON LINE
30	20	121	92	PVC	1400	1400	ON LINE
31	20	121	92	PVC	1400	1400	ON LINE
32	20	120	88	PVC	1400	1400	ON LINE
33	20	121	92	PVC	1400	1400	ON LINE
45	20	112	94	PVC	1400	1400	ON LINE
46	20	170	131	PVC	1400	1400	ON LINE

Source: Broward County Water and Wastewater Services

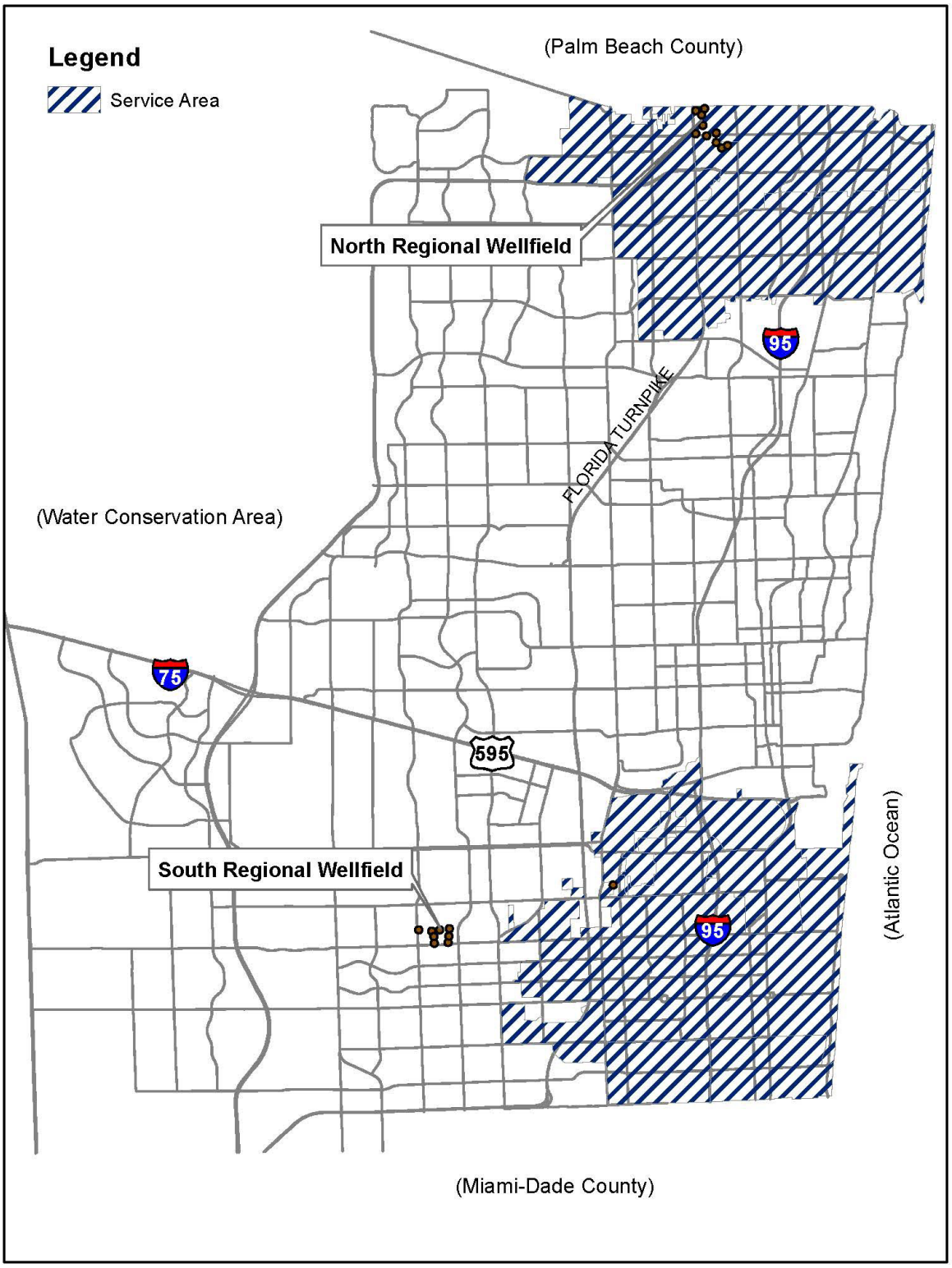

Figure 5-1. Regional Raw Water Service
Source: Broward County Water and Wastewater Services

Table 5-2. SRW Physical Descriptions							
Well No.	**Size (in)**	**Depth (ft.)**	**Casing Depth (ft.)**	**Type of Casing**	**Normal Yield (GPM)**	**Capacity (GPM)**	**Service Status**
5	20	110	75	PVC	2083	1400	ABANDONED*
6	20	110	75	PVC	2083	1400	ABANDONED*
17	12	115	81	PVC	2800	2800	ONLINE
18	12	140	80	PVC	2800	2800	ONLINE
19	12	140	80	PVC	2800	2800	ONLINE
20	12	140	80	PVC	2800	2800	ONLINE
21	12	140	80	PVC	2800	2800	ONLINE
22	12	140	80	PVC	2800	2800	ONLINE
23	12	140	80	PVC	2800	2800	ONLINE
24	12	140	80	PVC	2800	2800	ONLINE
*Abandoned due to saltwater intrusion.							
Source: Broward County Water and Wastewater Services							

5.2 North Regional Wellfield

The NRW includes ten 2 MGD Biscayne aquifer wells and approximately 39,000 linear feet of pipeline, ranging from 12-inches to 48-inches in diameter. A permit application combining the District 2A retail wellfield and NRW permits was renewed by the SFWMD and issued in October 2020. The permitted Biscayne Aquifer withdrawal capacity of the 2A/NRW is 17.41 MGD on an annual average basis and 580.55 MG as a maximum month value. The permit expires in the year 2040. The well casings at the NRW are set in the Biscayne Aquifer at a depth of approximately 100 feet below land surface. The NRW has two emergency generators capable of powering pumps for six wells. Usage data for the NRW are presented in Table 5-3. All wells in the NRW have PVC casings.

Table 5-3. Large User Actual Flow North Regional Raw Water Flow Distribution (1,000 Gallons) as of September 30, 2022			
Fiscal Year	**Deerfield**	**Broward County**	**NRWF**
FY 2018	201,839	2,214,666	2,416,505
FY 2019	210,076	2,246,130	2,456,206
FY 2020	202,519	2,487,015	2,689,534
FY 2021	194,695	1,267,003	1,461,698
FY 2022	201,883	1,258,916	1,460,799
Source: Broward County Water and Wastewater Services			

5.3 South Regional Wellfield

The SRW includes eight 4-MGD wells, approximately 83,000 linear feet of transmission pipeline, ranging in size from 20-inches to 42-inches in diameter. The SRW has two emergency generators capable of powering pumps for six of the wells (three wells per generator). The remaining wells have connections for a portable generator. The SRW permit was renewed in 2018 and is currently operating under a temporary permitted capacity of the 533.17 MG on a maximum month basis and 15.64 MGD on an annual average basis. The temporary condition is assumed to cease in 2023 when the C-51 Reservoir becomes operational, and limits increase to 16.62 MGD and a maximum month limit of 566.19 MG. The Biscayne allocation requires renewal in 2038 while the C51 allotment is valid through 2065. Wells 5 and 6 were formerly associated with WTP 3A and were abandoned in 2015. The well casings at the SRW are set in the Biscayne Aquifer at a depth of approximately 100 feet below land surface. Usage data for the SRW are presented in Table 5-4. All wells in the SRW have PVC casings.

Table 5-4. Large User Actual Flow South Regional Raw Water Flow Distribution (1,000 Gallons) as of September 30, 2022

Fiscal Year	Hallandale	Hollywood	Dania	FPL	Total SRW
FY 2018	1,355,383	1,624,035	775,255	492,914	4,247,587
FY 2019	1,322,896	1,673,027	807,445	72,650	3,876,018
FY 2020	1,403,559	1,641,419	789,337	-	3,834,315
FY 2021	1,464,210	1,642,746	879,406	6,673	3,993,035
FY 2022	1,511,186	1,647,666	968,068	144,067	4,270,987

Source: Broward County Water and Wastewater Services

5.4 Contractual Agreements

The contractual agreements with each of the Large Users are substantially similar. The agreements do not have expiration dates, except for the City of Hollywood agreement, which has a four-year term with an automatic renewal for four years unless otherwise terminated. The Large User Agreements provide for a method to charge each user a pro rata share of system operations and maintenance costs. Historical and projected revenues for the raw water system are shown in Table 7-7 and generally represent less than 1% of Utility revenues. As noted, the capital costs of system construction were funded using general County revenues.

5.5 Large Users

The North and South Regional Wellfields serve different areas in Broward County. The NRW serves the City of Deerfield Beach and the County's District 2 WTP. The SRW serves the Cities of Dania Beach, Hollywood, and Hallandale Beach, as well as Florida Power and Light.

5.6 Regional Raw Water Supply Regulations

The volume of raw water withdrawal from the Utility's regional raw water supply wellfields is regulated by the SFWMD. Each wellfield is governed by a water use permit that stipulates the raw

water annual and maximum month withdrawals. These permits are reissued for periods of 5 to 20 years. The permit for the combined 2A/NRW was renewed in October 2020 for a 20-year period. The 20-year renewal of the SRW permit was similarly granted in March 2018. Both permits include C51 offset allocation that are valid for a 50-year term that expire in December 2065.

Monitoring of well pumpage and groundwater levels in proximity to wetlands and saltwater intrusion is conducted to comply with specific limiting conditions of the regional wellfield water use permits.

For wells that are in service, the County operation personnel regularly monitor pH, alkalinity, hardness, iron, chloride, color, heterotrophic plate count (HPC), coliforms, quarterly wellfield protection monitoring and annual analysis to comply with the SDWA as well as the FDEP. All water quality regulations are enforced by the FDEP. Groundwater levels around the wellfield footprints and chloride concentrations in the Biscayne Aquifer production zone and at depths below production zone also are monitored and reported to the SFWMD on a monthly basis as part of consumptive use permit compliance.

5.7 Visual Inspection and Review

5.7.1 North Regional Wellfield

Overall, the ten wells and two generators of the NRW were in good to excellent condition upon visual inspection on May 1, 2023. For most wells, pipe coatings, vaults, surrounding concrete areas, and fencing were in good condition. The following is a summary of the observations from the visual inspection for each well.

- Well 1 - Well 1 was in good condition. Security fencing and locked vault hatches were undamaged. The wellhead and associated piping and valves appeared to be in good condition with minor signs of corrosion on the wellhead. The sump pumps appeared to be in good condition. Only minimal standing water by the wellhead was observed. The emergency generator building exterior was in good condition. There was water present inside of the generator room due to water intrusion from the access hatch on roof. A key card lock entry was installed on the gate, but it was not in use at the time of the inspection. Electrical equipment was in good condition. The asphalt driveway was in good condition.
- Well 2 - Well 2 was in good condition. Security fencing and locked vault hatches were undamaged. At time of inspection, the fence was getting stuck when opening and closing. The wellhead and associated piping and valves appeared to be in good condition with very minimal signs of corrosion. The electrical panel and equipment appeared to be in good condition. The sump pumps also appeared to be in good operational condition as the well vault showed no obvious signs of flooding. The vault had some minor concrete spalling on the exterior southwest corner. The asphalt and driveway within the enclosure was in fair condition with visible cracks.
- Well 27 - Well 27 was in good condition. Security fencing and locked vaults hatches were in good condition. The wellhead and associated piping and valves appeared to be in good condition with very minimal signs of corrosion. Electrical equipment was in good condition. The sump pumps appeared to be in good condition as the well vault showed no obvious evidence of flooding. A key card lock entry was installed on the gate, but it was not in use at the time of the inspection. A quick connect system for emergency generator was installed. The asphalt driveway was in fair condition with some cracks present in multiple locations.
- Well 29 - Well 29 was in good condition. Security fencing and locked vault hatches were in good condition. The wellhead and associated piping and valves appeared to be in good condition. Electrical equipment was in good condition. The sump pumps appeared to be in

operational condition as the well vault showed no obvious evidence of flooding. A key card lock entry was installed on gate, but it was not in use at the time of the inspection. A quick connect system for emergency generator was installed. The asphalt driveway was in fair condition with small cracks present in multiple locations.

- Well 30 - Well 30 was in excellent condition. Security fencing and locked vault hatches were in good condition. The wellhead and associated piping and valves appeared to be in good condition. The electrical panel and equipment appeared to be in good condition. The sump pumps also appeared to be in good condition at the time of inspection. A key card lock entry was installed on gate, but it was not in use at the time of the inspection. A quick connect system for emergency generator was installed. The concrete driveway was in good condition with minor cracks due to joint spacing.
- Well 31 - Well 31 was in excellent condition. Security fencing and locked vault hatches were in good condition. The wellhead and associated piping and valves appeared to be in good condition with minor signs of corrosion. Electrical equipment was in good condition. The sump pumps appeared to be in good condition at the time of the inspection. A key card lock entry was installed on gate, but it was not in use at the time of the inspection. A quick connect system for emergency generator was installed. A crack was observed on the north side of the concrete vault. The concrete driveway was in good condition with minor cracks due to joint spacing.
- Well 32 - Well 32 was out of service at the time of inspection. Security fencing and locked vault hatches were in good condition. One portion of the fence was twisted due to a tree in the adjacent property. The wellhead and associated piping and valves appeared to be in excellent condition. The sump pumps appeared to be in good condition. The emergency generator building interior and exterior were in good condition. Electrical equipment, including the backup generator, was in good condition. The concrete driveway was in good condition. A key card lock entry was installed on gate, but it was not in use at the time of the inspection. This well is currently undergoing scheduled rehabilitation.
- Well 33 - Well 33 was in excellent condition. Security fencing and locked vault hatches were in good condition. The wellhead and associated piping and valves appeared to be in excellent condition. Electrical equipment was in good condition. The sump pumps appeared to be in good condition at the time of inspection. A key card lock entry was installed on gate, but it was not in use at the time of the inspection. A crack was observed on the north side of the concrete vault. The concrete driveway was in good condition.
- Well 45 - Well 45 was in good condition. Security fencing and locked vault hatches were undamaged. The wellhead and associated piping and valves appeared to be in good condition with some signs of corrosion. Electrical equipment was in good condition. The sump pumps appeared to be in good condition with minor standing water around the wellhead. A key card lock entry was installed on gate, but it was not in use at the time of the inspection. The asphalt driveway was in fair condition with visible cracks.
- Well 46 – Well 46 was in good condition. Security fencing and locked vaults were undamaged. The wellhead and associated piping and valves appeared to be in good condition, with minimal signs of corrosion. Electrical equipment was in good condition. The sump pumps appeared to be in good condition at the time of inspection. A key card lock entry was installed on gate, but it was not in use at the time of the inspection. The asphalt driveway was in fair condition with cuts and cracks.

5.7.2 South Regional Wellfield

Overall, the eight wells and two generators of the SRW were in good condition upon visual inspection on April 19, 2023. For most wells, pipe coatings, vaults, surrounding concrete areas, and fencing were in good condition. The following is a summary of the observations from the

visual inspection for each well.

- Well 17 - Well 17 was in good condition overall. The wellhead and associated piping and valves were in good condition except for the blowoff valve which shows signs of corrosion. Security fencing and locked vault hatches were undamaged. The electrical panel and equipment appeared to be in good condition. The sump pumps also appeared to be in good, operational condition. Cracks present on the concrete surrounding the hatches were observed. A new flow meter was recently installed.
- Well 18 - Well 18 was in good condition overall. The wellhead and associated piping and valves were in good condition. At the time of inspection, the pump and associated motor were replaced. The new piping and valves appeared to be in good condition. Security fencing and locked vault hatches were in good condition. The sump pumps appeared to be in good condition. The electrical panel and equipment appeared to be in good condition. Generator No. 1 was in fair condition with open work orders for repairs ongoing. The main control panel for the generator was in good condition. However, the roof in the generator room appeared to be in poor condition with signs of leaks. The roof in the generator room is scheduled for rehabilitation.
- Well 19 - Well 19 was in good condition overall. The wellhead, piping, valves, and flow meter were recently replaced and were in excellent condition. At the time of inspection, there was minor rust present on the valves. Security fencing and locked vault hatches were in good condition. The electrical panel and equipment appeared to be in good condition. The sump pumps also appeared to be in good, operational condition. The well was on at the time of the site inspection.
- Well 20 - Well 20 was in good condition overall. The wellhead and associated piping and valves were in good condition. Security fencing and locked vault hatches were in good condition. The electrical panel and equipment appeared to be in good condition. The sump pumps also appeared to be in good condition.
- Well 21 - Well 21 includes a fenced enclosure with the well and associated equipment and a generator building. The well and associated equipment were in good condition overall. The generator and roof of the generator building were in fair condition. The wellhead and associated piping and valves appeared to be in excellent condition. The flow meter was recently replaced. Security fencing and locked vault hatches were in good condition. The sump pumps appeared to be in good operational condition as the well vault showed no obvious signs of flooding. There are significant cracks on the outer concrete slab of the vault. The electrical panel and equipment appeared to be in good condition. Generator No. 2 appeared to be in fair condition, the underground belly diesel tank is leaking and requires replacement. At the time of inspection, the ceiling inside generator room was in poor condition and early signs of mold were present. The roof on the generator building appeared to be in poor condition, with reported leaks by the County staff.
- Well 22 - Well 22 was in good condition overall. The piping and valves appeared to be in good condition, with some corrosion noted on the wellhead flange. At the time of the inspection, Well 22 was offline due to the pump motor being out of service awaiting replacement. Security fencing and locked vault hatches were in good condition. The electrical panel and equipment appeared to be in good condition. The sump pumps also appeared to be in good, operational condition. A new flow meter was recently installed. At the time of the inspection, Well 22 was

undergoing rehabilitation.

- Well 23 - Well 23 was in good condition. The piping and valves appeared to be in good condition with corrosion noted on the wellhead flange. Security fencing and locked vault hatches were in good condition. The electrical panel and equipment appeared to be in good condition. The sump pumps also appeared to be in good condition with pipes and valves recently replaced. There are significant cracks on the outer concrete slab of the vault. At the time of the inspection, the Spaulding Flow Meter Digital display was not working and requires replacement.
- Well 24 - Well 24 was in good condition. The piping appeared to be in good condition, with minor rust noted on the wellhead flange. Security fencing and locked vault hatches were in good condition. Erosion underneath the fence to the north creates a significant opening. The electrical panel and equipment appeared to be in good condition. The sump pumps also appeared to be in good condition.

Section 6 Capital Improvement Program

This section includes descriptions of the 5-year Capital Improvement Program (CIP) for the Retail Water and Wastewater Systems and the Regional Wastewater and Water Supply Systems.

6.1 Description of the Capital Improvement Program

As part of the growth management efforts mandated by State law, the County initiated planning efforts to accommodate future growth and compliance with regulatory requirements. The latest revision was completed in 2014 and addresses the need for services and facilities based upon anticipated build-out conditions of the service area in the year 2025. It is noted that the Utility conducts an annual CIP review process wherein all projects are thoroughly vetted, estimated, and scheduled. Each review builds upon prior analyses and utilizes new planning data when available. A Retail Water and Wastewater Master Plan was completed in August 2016. This Master Plan is currently being utilized to develop water and wastewater improvements for the WWS retail service areas.

As noted, the Utility develops a 5-year CIP recognizing costs associated with the condition of the system, future growth, and regulatory requirements. Table 6-1 presents the current CIP categorized by expenditure category. The Board approved the CIP for fiscal years 2023 through 2027 in September 2022. The 5-year CIP shown in Table 6-1 reflects the Board approved CIP. Projects remain open until all related construction activities are complete. The budgets by capital project type through Fiscal Year 2027 are presented in Table 6-2.

Table 6-1. Capital Improvement Program (CIP) Projected as of September 30, 2022

Capital Budgets	Water Treatment	Water and Sewer Mains	Wastewater Treatment	Regional Transmission	Engineering Services & Misc.	Total
Projected Unspent Prior Budget[1]	$23,503,574	$114,548,262	$156,091,400	$12,972,130	$44,350,315	$351,465,681
2023	13,946,860	27,238,840	46,063,940	8,807,170	12,906,990	108,963,800
2024	1,425,000	71,822,000	38,462,000	11,400,000	3,575,000	126,684,000
2025	1,450,000	33,884,000	69,589,100	500,000	3,550,000	108,973,100
2026	7,450,000	22,892,600	10,500,000	500,000	3,550,000	44,892,600
2027	10,850,000	4,050,000	1,100,000	6,737,300	11,050,000	33,787,300
Totals	$58,625,434	$274,435,702	$321,806,440	$40,916,600	$78,982,305	$774,766,481
Five Year CIP Funding:						
Bonds FY 2023-2027	$32,991,233	$91,057,318	$267,796,752	$32,179,300	$27,600,000	$451,624,603
Cash FY 2023-2027 [2]	6,934,201	139,982,384	4,400,000	2,000,000	43,882,305	197,198,890
Beyond FY 2027 [3]	18,700,000	43,396,000	49,609,688	6,737,300	7,500,000	125,942,988
Totals	58,625,434	274,435,702	321,806,440	40,916,600	78,982,305	774,766,481

[1] Unspent prior budget totals are estimated as of September 30, 2022.

[2] Cash reflects net revenues, capital recovery charges, large user contributions, and grants.

[3] Reflects effects of construction period. It is currently expected that $649M of the $775M program will be spent by 2027. Since the construction period extends beyond 2027, the remaining $126M will be spent in subsequent years.

Source: Broward County Water and Wastewater Services

Table 6-2 Capital Projects Budgets by Type Through Fiscal Year 2027	
	Budget
Water Treatment	
Water Treatment Plant Expansion	$11,450,000
Water Treatment Plant IRR[1] & Misc. Projects	$47,175,434
Water Treatment Subtotal	**$58,625,434**
Water Distribution and Sewer Collection	
Neighborhood & Local Utility Projects (NP & LUP)	$107,465,455
Retail Sewer Main Improvements	$93,950,737
Retail Water Main Improvements	$15,045,638
Misc. Main Improvements	$5,919,381
Potable Water Storage Improvements	$32,786,513
Lift Station Improvements	$19,267,978
Water Distribution and Sewer Collection Subtotal	**$274,435,702**
Wastewater Treatment	
NRWWTP Effluent Disposal /Treatment Enhancements	$264,922,494
NRWWTP Equipment Rehabilitation	$50,752,703
Wastewater Plant IRR[1] & Misc. Projects	$6,131,243
Wastewater Treatment Subtotal	**$321,806,440**
Regional Transmission	
Master Pump Station Improvements	$26,057,698
Force Main Improvements	$14,858,902
Regional Transmission Subtotal	**$40,916,600**
Engineering/Misc. Services	**$78,982,305**
GRAND TOTAL	**$774,766,481**

[1] IRR = Improvement, Repair and Replacement
Source: Broward County Water and Wastewater Services

The estimated funding requirements for this 5-year period ending Fiscal Year 2027 are expected to be met by net revenues, debt proceeds, capital recovery charges, contributions from Large Users, grants, and future borrowings. The Utility currently forecasts cash financing approximately 25% of the actual funding requirements. Many of the projects and improvements in the CIP are in the planning stages with cost estimates that are preliminary and contracts that have not been awarded. Projects included in the plan have been prioritized to maintain an affordable rate structure.

The County is presently considering increasing funding for certain projects during preparation of the 2023 CIP update. The total updated CIP could be increased above the CIP presented in Tables 6-1 and 6-2. However, much of these costs will be carried over to years beyond the 5-year CIP

period. (Note that debt service coverage ratios for both the current CIP, and the potential higher estimated CIP will always be maintained within Bond Covenant requirements.)

The County plans to continue to prioritize projects as needed to maintain an affordable rate structure. Proposed rates are annually presented to the Board for discussion at an August workshop with action taken at the September budget hearings. Current projections anticipate level rate increases of approximately 4% annually through Fiscal Year 2027. The County issued $199.265 million in bonds in Fiscal Year 2022.

6.2 Retail Water and Wastewater System Improvements

The 5-year CIP for the retail water and wastewater systems has the principal objective of upgrading/rehabilitating or replacing water treatment and distribution systems, sewage collections systems, and extending sanitary sewers to currently non-sewered customers.

6.3 Water Treatment

The 5-year CIP includes $59 million to improve Water Treatment Plants 1A and 2A, which includes repair and replacement of process equipment, chemical and electrical systems, security improvements, and energy efficiency upgrades.

6.4 Neighborhood Program (NP)

The Neighborhood Program (NP) was initiated by the County in 1993. The program upgraded the infrastructure in what were unincorporated neighborhoods. The improvements included upgrades to the existing water and sewer system, installation of drainage, new pavement, swales and landscaping.

6.5 Local Utility Program (LUP)

WWS began implementing local utility improvement projects by Utility Analysis Zones (UAZ) in mid-2009. Where the NP included drainage, landscaping and sidewalk improvements, which were paid for from County general funds, the LUP projects focus solely on water and sanitary sewer improvements. The total cost estimate for these improvements is nearly $274 million dollars over the 20 plus years project life. The 5-year CIP includes $107 million dollars for neighborhood and LUP projects.

6.6 Other Including Mains, Lift Station Improvements and Potable Storage

The CIP includes $166 million for water and wastewater main improvements to address aging water and wastewater lines; increase transmission and distribution capacities, and to extend service to new customers. The CIP also includes $12 million of retail wastewater lift station rehabilitation projects to increase the reliability of the wastewater collection system and prevent the occurrence of sanitary sewer overflows.

6.7 Regional Wastewater Treatment

Under current regulations, the Utility is required to reduce the nutrient loadings discharged to the

ocean outfall between 2009 and 2025, and to eliminate use of the outfall, except as a back-up discharge that is part of a functioning reuse system. These were estimated to result in plant process improvement requirements with estimated costs ranging from $766 million to $889 million in accordance with the Effluent Disposal Master Plan (November 2010). With amendments to the Ocean Outfall legislation in 2013, allowing peak flows to continue discharging through the outfall, the construction of additional injection wells with associated high-level disinfection was no longer mandatory by 2025. The compliance with the additional required reclaimed water production was met through the agreement with Palm Beach County (PBC) wherein WWS would supply bulk reclaimed water to customers in PBC (executed in April 2016). As a result, the estimated costs for ocean outfall compliance are expected to be substantially reduced to approximately $170 million. It is noted that this estimate will be variable depending upon regulatory agency actions in the future.

The County has included funding $265 million of funding in the 5-year CIP to address these improvements. Various other system utility Improvement, Repair and Replacement (IRR) projects are budgeted at approximately $57 million. These improvements will address solids handling, biological process, controls, structures, electrical and other related plant improvements.

Future capital needs associated with the potential requirement to add high level disinfection for existing deep injection wells and/or to construct additional deep injection wells are not included in the 5-year CIP. It is anticipated that adequate time for planning and funding for these requirements will be available when (and if) this requirement is mandated for the NRWWTP.

6.8 Regional Wastewater Transmission

The CIP includes a series of master pump station improvements to ensure adequate system capacity and reliability in the regional transmission system. The CIP anticipates investing approximately $41 million for improvements to the master pump stations, wastewater meters, and air release valves. A new Regional Wastewater Transmission System Master Plan was completed in 2021. The Plan recommends potential future capital improvements required to maintain the regional system into the future.

Section 7 Financial Conditions

This section describes the financial operations of WWS, including rates and charges; revenue and cost projections; a utility service cost comparison; and a summary of insurance coverage.

7.1 Overview of Financial Operations

WWS collects payments from retail and wholesale customers to recover the costs of providing water and wastewater services. In general, there are three types of customers: (1) retail water and wastewater; (2) wholesale raw water; and (3) wholesale wastewater. Revenue collection from each customer type is described as follows.

Retail Water and Wastewater Customers. WWS provides water and wastewater services to customers in several sections of the County and water services to one significant retail water customer, the City of Coconut Creek. These customers comprise about 14.9% of Broward County's population.

Operating, administrative, and general maintenance costs of the retail portion of WWS are recovered from retail customers through charges for potable water service, wastewater service, reclaimed water service, customer connections, and other utility-related services. Capital costs for system development, large maintenance projects, and renewal and replacement projects are funded through net revenues, bond proceeds, developer contributions, contributions from other Broward County utilities, and capital recovery charges.

All charges are developed by WWS and approved by the Broward County Board of County Commissioners. The Board has specific legal authority to set and collect rates, fees and charges from its customers and to acquire, construct, finance, and operate WWS.

The existing rate structure for retail water and wastewater customers is based on meter size and water consumption. The County encourages retail customers to conserve water through the retail water and wastewater rate schedules that set higher water rates for levels of water consumption beyond basic use. The current water rate schedule is composed of four tiers as follows.

1. Rates for basic use
2. Rates for normal use
3. Rates for discretionary use
4. Rates for excessive use

The Board adopted new water and wastewater rates for retail customers effective October 1, 2022. The average monthly water and wastewater bills of a residential customer consuming 5,000 gallons per month during the Fiscal Years 2019 to 2023 are presented in Table 7-1. The 5,000 gallons is the average monthly metered water use of Broward County's retail residential customers. As noted in Table 7-1, the water and wastewater bill in Fiscal Year 2023 is $74.05 per month for the average water-using residential customer and is a three percent increase from Fiscal Year 2022.

Table 7-1. WWS Water and Wastewater Monthly Utility Bill for a Residential Customer Using 5,000 Gallons per Month

Fiscal Year	Water Charges				Wastewater Charges				Total	
	Fixed[1]	Volume	Total	Percent Change	Fixed	Volume	Total	Percent Change	Dollars	Percent Change
2019	$16.79	$10.36	$27.15	2.8%	$19.88	$20.55	$40.43	3.2%	$67.58	3.0%
2020	$17.13	$10.68	$27.81	2.4%	$20.54	$21.30	$41.84	3.5%	$69.65	3.1%
2021	$17.13	$10.68	$27.81	0.0%	$20.54	$21.30	$41.84	0.0%	$69.65	0.0%
2022	$17.19	$10.81	$28.00	0.7%	$21.20	$21.85	$43.05	2.9%	$71.05	2.0%
2023[2]	$18.72	$11.43	$30.15	7.68%	$21.60	$22.30	$43.90	1.97%	$74.05	4.22%

[1] Includes customer charge.
[2] Based on rates adopted by the Board effective October 1, 2022.

Source: Broward County Water and Wastewater Services

The minimum monthly fixed charges and the volume charges for most retail services as of October 1, 2022 are provided in Tables 7-2 and 7-3, respectively. The charges address water service, wastewater service, irrigation water service, reclaimed water service, and fire protection service. There is also a customer charge per account per month of $5.10 that is applied to the water portion of the bill.

Other miscellaneous charges are not included in the tables but are included in the County's rate resolutions. They include a high strength industrial wastewater surcharge, a minimum monthly service charge, capital recovery charges per equivalent residential unit (ERU), customer deposits, and other specific service charges. Capital recovery charges underwrite the investment in additional capacity needed to serve new developments.

Table 7-2. Broward County Schedule of Retail Rates Minimum Monthly Charges per Account Effective October 1, 2022			
Service Location or Type	**Meter Size (inches)**	**Water ($)**	**Wastewater ($)**
Residential	5/8" Residential	13.62	21.60
	1 (ARC* < /=20,000 GAL)	13.62	21.60
	1 (ARC* >20,000 GAL)	38.87	50.35
	1 ½	72.78	129.89
Commercial, Municipal and Institutional	5/8	20.02	29.27
	1	47.04	77.47
	1 ½	105.71	160.28
	2	271.51	451.57
	3	526.46	1,156.45
	4	4,133.16	2,238.20
	6	9,295.10	13,754.48
	8	10,572.13	14,908.40
Retail Water Sales for Resale	Per Meter	69,945.19	
Multi Family and Mobile Home (per unit)	All sizes	10.92	16.89
Hotels and Motels (per dwelling unit)	All sizes	7.34	11.09
Recreational Vehicles (per dwelling unit)	All sizes	8.21	12.66
Water Private Fire Protection	All sizes	139.30	
Irrigation	5/8	16.69	
	1	33.00	
	1 ½	90.64	
	2	201.26	
	3	444.37	
	4	1,966.15	
Reclaimed Water	5/8	13.25	
	1	13.25	
	1 ½	72.78	
	2	252.83	
	3	511.13	
	4	4,805.08	
	6	8,806.10	
	8	10,572.13	

* ARC stands for customer's actual residential average monthly consumption during the previous calendar year.

Source: Broward County Water and Wastewater Services

Table 7-3. Broward County Schedule of Retail Rates Volume Charge (1,000 Gallons) Effective October 1, 2022

Customer Class (all meter sizes unless noted)	Water		Wastewater	
	Volume (per 1,000 gals)	Charge ($)	Volume (per 1,000 gals)	Charge ($)
Single Family Residential	0-3	1.73	0-15	4.46
	4-6	3.12	Over 15	No Charge
	7-12	7.37		
	Over 12	8.93		
Commercial, Municipal and Institutional	0 – 75% of Avg Consumption	4.23	All volumes	4.46
	Over 75% of Avg Consumption	8.54		
Sale for Resale	Water Treatment Charge	2.74		
	Water Transmission Charge	0.15		
Multi Family and Mobile Home (per unit)	0-2	1.73	0-8	4.46
	3-4	3.12		
	5-6	7.37		
	Over 6	8.93	Over 8	No Charge
Hotels and Motels (per unit)	0 – 75% of Avg Consumption	4.44	All volumes	4.46
	Over 75% of Avg Consumption	9.03		
Recreational Vehicles (per unit)	0 – 75% of Avg Consumption	4.44	All volumes	4.46
	Over 75% of Avg Consumption	9.03		
Private Fire Protection	All volumes	7.37		
Irrigation				
5/8" meter	0-8	7.41		
	Over 8	8.97		
1" meter	0-22	7.41		
	Over 22	8.97		
1 ½" meter	0-55	7.41		
	Over 55	8.97		
2 to 3" meter	0-142	7.41		
	Over 142	8.97		
Reclaimed Water	All Volumes	0.85		

Source: Broward County Water and Wastewater Services

In the event additional water restrictions are imposed, the County has instituted an automatic adjustment to the water service portion of the bill that reduces the water quantities at which increased rates are applied to encourage customers to reduce consumption. These water quantities are provided in Table 7-4. The automatic rate adjustment was adopted by the Board as a method to maintain the revenues required for operations while water consumption is curtailed. The SFWMD imposes phased restrictions as drought conditions warrant to achieve targeted water use reductions.

Table 7-4. Automatic Rate Adjustments for Periods of Mandated Water Restrictions

Customer Class and Block	Water Consumption Thresholds in 1,000 Gallons per Month		
	Standard	Drought	Extreme Drought
Single Family (all meter sizes)			
First Tier	0-3	0-2	1
Second Tier	4-6	3-5	2-4
Third Tier	7-12	6-9	5-6
Final Tier	Over 12	Over 9	Over 6
Multi-Family (per dwelling unit, all meters)			
First Tier	0-2	1	1
Second Tier	3-4	2-3	2
Third Tier	5-6	4-5	3
Final Tier	Over 6	Over 5	Over 3
Irrigation			
5/8" Meter, First Tier	0-8	0-4	0-2
5/8" Meter, Second Tier	Over 8	Over 4	0ver 2
1" Meter, First Tier	0-22	0-11	0-5
1" Meter, Second Tier	Over 22	Over 11	Over 5
1 1/2" Meter, First Tier	0-55	0-27	0-14
1 1/2" Meter, Second Tier	Over 55	0ver-27	Over 14
2" and Over Meter, First Tier	0-142	0-71	0-35
2" and Over Meter, Second Tier	Over 142	Over 71	Over 35
Commercial, Municipal, Institutional, Hotels, Motels and Recreational Vehicles			
First Tier	0-75%	0-60%	0-45%
Second Tier	Over 75%	Over 60%	Over 45%

Source: Broward County Water and Wastewater Services

With the automatic adjustment, the higher water rates established for larger consumption levels are applied at lower levels of consumption. The result is that customers who do conserve as required may experience a reduction in their water bills. Conversely, customers who fail to achieve reductions will pay even greater amounts for water consumed than they would otherwise pay

without the adjustment. As targeted reductions increase, the associated water use levels at which increased rates become effective decrease.

A summary of retail billing volumes from 2018 to 2022 is provided in Table 7-5.

Table 7-5. Retail Water and Wastewater Billing Volumes as of September 30, 2022 (1,000 Gallons)

Fiscal Year	Retail Water Service			Wastewater Service
	County	Coconut Creek	Total	
2018	6,871,401	1,885,328	8,756,729	5,385,410
2019	6,935,956	2,029,009	8,964,965	5,928,824
2020	6,869,365	2,029,803	8,899,168	5,813,777
2021	6,480,285	1,863,639	8,343,924	5,653,808
2022	6,824,017	2,044,921	8,868,938	5,777,795

Source: Broward County Water and Wastewater Services

Wholesale Raw Water Customers. There are six wholesale water customers located in Broward County, including WWS District 2, that purchase raw water from WWS. The wholesale water agreements provide for a method to charge each customer a pro rata share of raw water system operations and maintenance costs. The capital cost to construct the raw water pumping and transmission system was funded using general County revenues.

Wholesale Wastewater Customers. There are 12 utilities within Broward County that receive wholesale wastewater transmission, treatment, and disposal services from WWS through the NRWWS. Charges for wholesale wastewater customers are defined by an agreement between the County and each wholesale customer. The total customer charge consists of a charge for operation and maintenance costs based on wastewater flow; a charge for debt service costs based on the customer's reserve capacity; and a surcharge for improvement, repair, and replacement costs assessed as a percentage of the first two charges. The charge for operation and maintenance cost is adjusted annually to reflect each user's proportionate share of actual costs during the fiscal year. The wholesale wastewater customer rates used to calculate the charges from Fiscal Years 2019 to 2023 are provided in Table 7-6.

Table 7-6. Water and Wastewater Services – History of Wholesale Wastewater Rates Associated with the NRWWS as of September 30, 2022

Fiscal Year	O&M (Per 1,000 gallons)		Debt Service (Per MGD)		IR&R
	Treatment	Transmission	Treatment	Transmission	Surcharge
2019	$0.944	$0.171	$22,441.40	$6,922.31	5%
2020	$0.982	$0.179	$23,963.44	$6,921.31	5%
2021	$1.050	$0.205	$21,359.89	$6,586.86	5%
2022	$1.081	$0.207	$21,359.38	$6,585.89	5%
2023	$1.147	$0.224	$24,713.62	$8,173.93	5%

Source: Broward County Water and Wastewater Services

The wholesale wastewater customer rates are reviewed and adjusted annually by the County as part of the budget process. The rates are based on the County's estimation of total costs and total flows. Debt service requirements (including required coverage) for the NRWWS are allocated to each wholesale customer in proportion to the customer's reserved capacity. A surcharge of up to 10% is added to fund improvements, repairs, and replacements to the NRWWS. Currently the surcharge is 5%. These funds are maintained separately from the Renewal, Replacement, and Improvement (RR&I) Fund established by resolutions of the Board authorizing the issuance of bonds for the Utility (collectively, the "Bond Resolutions").

Renewal, Replacement, and Improvement Fund. Presently, the RR&I Fund is required by the Bond Resolution to maintain a minimum balance of 5% of the previous year's revenues, as defined by the Bond Resolution, or a greater amount if recommended by the Consulting Engineer. Based on the financial statement for the Fiscal Year ended September 30, 2022, the 2022 total revenues were $166 million. Five percent of Fiscal Year 2022 revenues is approximately $8.3 million. The current balance in the RR&I Fund is $8.3 million consistent with the requirement of the Bond Resolution.

7.2 Revenue Projections

Historic WWS revenues and costs from Fiscal Years 2018 to 2022 and projected revenues and costs from Fiscal Years 2023 to 2027 were provided by the County. Annual 2018 to 2027 revenues from all WWS customers, wholesale wastewater customers (NRWWTP large users), wholesale raw water customers, and treated water sales to the City of Coconut Creek (sale for resale water) are provided in Table 7-7.

Beginning in Fiscal Year 2023, forecasted revenue from wholesale wastewater customers is expected to comprise about 28% of total WWS revenue and wholesale raw water revenue is expected to comprise less than 1%. Treated water sales to the City of Coconut Creek are referred to in this Section as "Sales for Resale Water" and comprise about 5% of total WWS revenue. The remaining customer revenue, comprising about 66% of total WWS revenue, is expected from retail water and wastewater sales to County residents and businesses.

Table 7-7 Historical and Projected Revenue from NRWWTP Large Users, Raw Water Sales, and Sale for Resale Water (In 1,000s)

	Historical					Projected				
Revenue Source and Percent	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**
Total WWS Revenue	$140,483	$145,746	$156,042	$152,144	$166,059	$176,000	$182,246	$189,250	$196,530	$204,097
Large User Revenues (excluding Broward County)	$34,773	$36,016	$42,761	$43,362	$47,344	$48,819	$51,882	$53,284	$54,729	$56,918
Percent of Total WWS Revenue	24.8%	24.7%	27.4%	28.5%	28.5%	27.7%	28.5%	28.2%	27.8%	27.9%
Regional Raw Water Revenues	$866	$1,062	$908	$738	$858	$908	$911	$915	$922	$931
Percent of Total WWS Revenue	0.6%	0.7%	0.6%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%
Treated Water Sales to City of Coconut Creek (Sale for Resale Water)	$6,975	$7,258	$8,372	$7,715	$7,882	$8,197	$8,442	$8,737	$9,043	$9,360
Percent of Total WWS Revenue	5.0%	5.0%	5.4%	5.1%	4.7%	4.7%	4.6%	4.6%	4.6%	4.6%

Source: Broward County Water and Wastewater Services

Historical and projected WWS revenues and costs from Fiscal Years 2018 to 2027 are provided in Table 7-8. Also presented are the historical and projected Net Revenue, Debt Service, and Debt Service Coverage. The data and assumptions used to project annual water and wastewater revenues and expenditures from Fiscal Years 2023 to 2027 are provided as follows.

- Fiscal Year 2022 was used as the base year from which projections were developed. The annual water and wastewater revenues and expenditures were based on Fiscal Year 2022 actual values from WWS financial statements prepared as of September 30, 2022.
- Fiscal Year 2023 revenues and expenditures were projected based upon the rates approved by the County, which were implemented on October 1, 2022 and estimated expenses through Fiscal Year 2023.
- Revenues for Fiscal Years 2023 through 2027 were based on the projected average annual number of customers, historical average consumption per customer, and projected retail service rates.
- Because WWS operates a mature system with expectations of limited future growth, the growth rates in the retail customer base beginning in Fiscal Year 2023 were estimated to be 1% annually for water customers and 1% annually for wastewater customers.
- Retail rate increases from Fiscal Years 2024 through 2027 of approximately 4% or less per year for both retail water and wastewater will be necessary to meet the projected revenues as presented in Table 7-7 and Table 7-8. New rates were approved by the Board and became effective on October 1, 2022. If any other needed future retail rate increase is not approved, the coverage ratios would be lower than those presented in Table 7-8.
- The water and wastewater annual operation and maintenance costs were forecast beginning with the budgeted levels for Fiscal Year 2023. For 2023, these costs were increased by 5% from the previous year. From 2024 through 2027, the costs were increased by 5% from the previous year. The revenue forecast for the wholesale wastewater customers is projected to recover costs as defined under the wholesale wastewater customer agreements.
- An estimate of interest income is projected annually from Fiscal Year 2023 through Fiscal Year 2027. Interest income is generated from three main sources: debt service reserve fund, general reserve fund, and investments of fund balances as permitted under the Bond Resolution.
- The audited financial statements as of September 30, 2022 present the computation of debt service coverage on all outstanding revenue bonds as 1.54 for Fiscal Year 2022, which is sufficient to meet the bond covenant requirement of 120% coverage for all debt service obligations. In addition, a Balance Available for Renewal, Replacement and Capital Expenditures of approximately $27.4 million was generated during Fiscal Year 2022.

Table 7-8 Schedule of Historical and Projected Net Revenues, Debt Service ($1,000) and Debt Service Coverage
Includes 4% Annual Retail Rate Increase FY24 - FY27

	Historical					Projected				
Revenues:	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**
Water	$ 51,788	$ 54,856	$ 54,872	$ 53,618	$57,628	$ 60,509	$ 62,930	$ 65,447	$ 68,065	$ 70,787
Wastewater	80,976	83,942	91,727	92,306	98,947	104,795	108,987	113,346	117,880	122,595
Other[1]	5,661	4,506	7,311	6,006	7,845	7,923	8,003	8,083	8,164	8,245
Interest Income	2,058	2,442	2,132	214	1,639	2,772	2,327	2,374	2,421	2,470
Total Revenues	**$ 140,483**	**$ 145,746**	**$ 156,042**	**$ 152,144**	**$166,059**	**$ 176,000**	**$ 182,246**	**$ 189,250**	**$ 196,530**	**$ 204,097**
Current Expenses:										
Water Transmission & Distribution	$ 12,450	$ 13,410	$ 12,528	$ 11,339	$12,660	$ 13,293	$ 14,091	$ 14,795	$ 15,535	$ 16,312
Water Source of Supply, Treatment & Pumping	10,619	11,438	10,685	9,671	10,849	11,391	12,075	12,679	13,313	13,978
Wastewater Collection &Transmission	11,794	12,332	12,681	13,057	14,167	14,875	15,768	16,556	17,384	18,253
Wastewater Treatment	18,637	19,337	19,692	19,804	22,595	23,725	25,148	26,406	27,726	29,112
Customer Service	5,833	6,222	5,908	6,589	7,105	7,460	7,908	8,303	8,718	9,154
Administrative/General	15,522	16,877	21,232	19,181	20,643	21,675	22,976	24,124	25,331	26,597
Total Current Expenses	**$ 74,855**	**$ 79,616**	**$ 82,726**	**$ 79,641**	**$ 88,019**	**$ 92,420**	**$ 97,965**	**$ 102,863**	**$ 108,007**	**$ 113,407**
Net Revenues	**$ 65,628**	**$ 66,130**	**$ 73,316**	**$ 72,503**	**$ 78,040**	**$ 83,580**	**$ 84,281**	**$ 86,386**	**$ 88,523**	**$ 90,691**
Debt Service - Senior Lien Debt:										
Series 2009-A Bonds	$ 2,363	$ 1,985	$ 1,984	$ 1,700	$ -	$ -	$ -	$ -	$ -	$ -
Series 2012-A Bonds	9,037	8,723	3,670	3,755	3,757	56	56	56	56	56
Series 2012-B Bonds	11,057	16,371	16,370	14,271	14,271	-	-	-	-	-
Series 2012-C Bonds	4,622	-	-	-	-	-	-	-	-	-
Series 2015-A Bonds	2,113	2,113	2,113	2,113	2,113	2,113	2,113	2,113	2,113	2,113
Series 2015-B Bonds	6,885	6,885	6,885	9,515	11,209	11,208	11,210	11,211	11,210	11,205
Series 2019-A Bonds	-	-	8,731	10,583	10,583	10,583	10,583	10,583	10,583	10,583
Series 2019-B Bonds	-	-	2,997	3,633	3,633	3,633	3,633	3,633	3,633	3,633
Series 2022-A Bonds	-	-	-	-	5,030	8,013	8,013	8,013	8,013	8,013
Series 2022-B Bonds	-	-	-	-	-	17,288	17,352	17,280	17,204	17,131
Total Debt Service	**$ 36,077**	**$ 36,077**	**$ 42,750**	**$ 45,570**	**50,596**	**$ 52,894**	**$ 52,960**	**$ 52,889**	**$ 52,812**	**$ 52,734**
Debt Coverage Senior Lien	**1.82**	**1.83**	**1.71**	**1.59**	**1.54**	**1.58**	**1.59**	**1.63**	**1.68**	**1.72**

[1] Other Revenue includes the Customer Service Charge and Miscellaneous Fees.

Source: Broward County Water and Wastewater Services

7.3 Comparison of Customer Water and Sewer Charges by South Florida Municipalities and Counties

Table 7-9 shows the current water and wastewater monthly service charges for residential customers of municipalities and the County, as well as Miami-Dade and Palm Beach Counties.

Table 7-9. Comparative Monthly Water and Wastewater Charges as of 12/31/2022 (Based on Usage of 5,000 Gallons Per Month for a 5/8-inch meter)

Utility	Water *	Sewer	Total
Davie	46.69	79.89	126.58
Wilton Manors	58.92	57.19	116.11
Sunrise (outside City)[1]	51.64	63.10	114.74
Oakland Park	53.05	53.12	106.17
Fort Lauderdale (outside City)	38.08	64.59	102.66
Dania Beach[1]	35.00	58.82	93.82
Sunrise (inside City)[1]	41.32	50.48	91.80
Hollywood	30.38	59.55	89.92
Parkland	27.79	61.49	89.28
Pompano Beach (outside City)	39.95	45.53	85.48
Miramar	37.00	47.74	84.74
Cooper City	32.78	49.80	82.58
Fort Lauderdale	30.46	51.67	82.13
North Lauderdale[1]	32.30	47.25	79.55
Margate (outside City)[1]	39.22	39.93	79.15
North Springs Improvement District	36.09	39.61	75.70
Coral Springs	25.31	48.18	73.49
Plantation	24.79	47.37	72.16
Coconut Creek[1]	40.22	30.56	70.78
Pembroke Pines[1]	32.79	37.95	70.74
Hallandale Beach	27.66	42.95	70.61
Broward County (WWS)	**25.05**	**43.90**	**68.95**
Pompano Beach (inside City)	31.96	36.42	68.38
Royal Waterworks	28.88	36.71	65.59
Lauderhill	23.81	41.65	65.46
Margate (inside City)[1]	31.38	31.94	63.32
Coral Springs Improvement District	30.40	30.40	60.80
Tamarac[1]	19.32	40.27	59.59
Deerfield Beach	29.74	26.80	56.54
Average Water & Sewer for Broward	34.55	47.06	81.61
Water Only			
Hillsboro[1]	34.41	-	34.41
Sewer Only			
Pembroke Park[1]	-	58.09	58.09
Lauderdale By the Sea	-	45.81	45.81
Tri-County Utilities			
Palm Beach County	25.55	34.19	59.74
Miami-Dade County	17.67	33.92	51.59

[1] The rates did not change from 2022 to 2023

* Water rates do not include customer charge fee

Source: Broward County Water and Wastewater Services

7.4 Insurance Coverage

WWS is exposed to various risks related to alleged torts; theft of, damage to, and destruction of assets; errors and omissions; injuries to employees; and natural disasters. WWS purchases its own insurance policies, as well as participates in some of the County's programs.

Liability Protection - As a Florida governmental agency, WWS is afforded protection by sovereign immunity as set forth in FL statute §768.28. The statute sets forth a tort cap of $200,000 per individual claim or judgement and $300,000 for claims arising out of the same incident or occurrence.

Property Insurance Polices Protecting WWS - WWS purchases a property insurance policy to protect its' approximately $621 million in assets. The primary property insurance purchased by WWS affords $150,000,000 in coverage per occurrence with a deductible of $250,000 for all other perils. In addition, the County property insurance program covers an additional $350,000,000 of WWS assets above the $150,000,000 primary WWS property policy. Coverage for property losses emanating from "Terrorism" are covered up to $350,000,000 per occurrence (deductible is $250,000). Losses attributable to a named windstorm (hurricane) are subject to a limit of $50,000,000 per occurrence with a deductible subject to 7.5% of the Total Insured Value "TIV" of Property Damage/Extra Expense involved in each occurrence. Flood losses that occur in non-special flood hazard zones are subject to a limit of $10,000,000 each occurrence/aggregate with a minimum deductible of $250,000. WWS purchases a separate National Flood Insurance Program policy for facilities located within Special Flood Hazard Zones. In the event a windstorm or flood is declared a federal disaster, WWS, as a public entity, would be eligible for public assistance under the FEMA disaster program.

Storage Tank Liability - WWS carries a pollution liability insurance policy with coverage limits of $2,000,000 per occurrence and $10,000,000 in the aggregate. WWS is responsible for the first $10,000 of each loss under this policy.

County's Self-Insurance Program - WWS participates in the County's self-insured programs for its Workers' Compensation, Health Insurance, Auto Liability and General Liability claims. Workers' Compensation benefits are provided in accordance with Florida State Statutes by the County's Self-insurance fund. The County purchases excess insurance to protect the self-insurance fund from catastrophic losses. The excess insurance coverage provides full statutory benefits above the County's self-insured retention of $2,000,000 per occurrence. There is no aggregate.

WWS makes payments for the County's Self-Insurance Programs to the Self-Insurance Fund based on actuarial estimates of the amounts needed to pay prior and current year claims and to fund reserves for all WWS losses. The estimated liabilities for self-insured losses were determined by independent actuarial valuations performed as of September 30, 2022. Liabilities include an amount for claims that have been incurred but not reported (IBNR). Claim liabilities are calculated considering the effects of inflation, recent claim settlement trends (including frequency and payout amounts), and other economic and social factors. The claim liability estimates also include amounts for incremental adjustment expenses as well as estimated recoveries from salvage or subrogation.

Broward County Water and Wastewater Services (WWS) bond covenants require that customary insurance be carried on the physical assets of the system and coordinates coverage through the County's Master Property program. The term of the present policy is from March 1, 2023 to March 1, 2024.

This year, Broward County continued to provide insurance coverage with a dedicated tower specific to Water and Wastewater Services locations that provide comprehensive protection for its physical assets valued at $621 million. Coverage is provided through ACE American Insurance Company, an admitted A++ XV superior carrier rated by AM Best, as the lead carrier providing $25 million of Windstorm coverage on a per occurrence basis. The coverage provided through ACE is designed for water utility operations and provides $25 million of Equipment Breakdown coverage and $10 million of flood coverage including storm surge for physical assets located in Zone X. Physical assets located outside of non-flood hazard area identified and individual policies have been written through National Flood Insurance Program (NFIP) along with a sublimit of $1 million through ACE for locations in Zone A and V.

As depicted in Figure 7-1, WWS has an independent tower, separate from Aviation (BCAD) and the County (including Port Everglades).

Figure 7-1. WWS Insurance Tower

The Risk Management Division renewed Broward County's insurance program on March 1, 2023. The premium for Water and Wastewater Insurance Property Program renewal is $1,636,000. The values on the Water and Wastewater property schedule are up 9.15%. The annual premium on this program is up 22.62%, which equates to a rate increase of 13.47%.

Significant insured damages from Hurricane Ian, Hurricane Michael, and Hurricane Maria have placed increased pressure on the reinsurance market to recoup losses. Additionally, upward pressure on property premiums is reinforced by high levels of economic inflation, a noted increase in natural catastrophes, and continued global demand for construction materials and construction related activities.