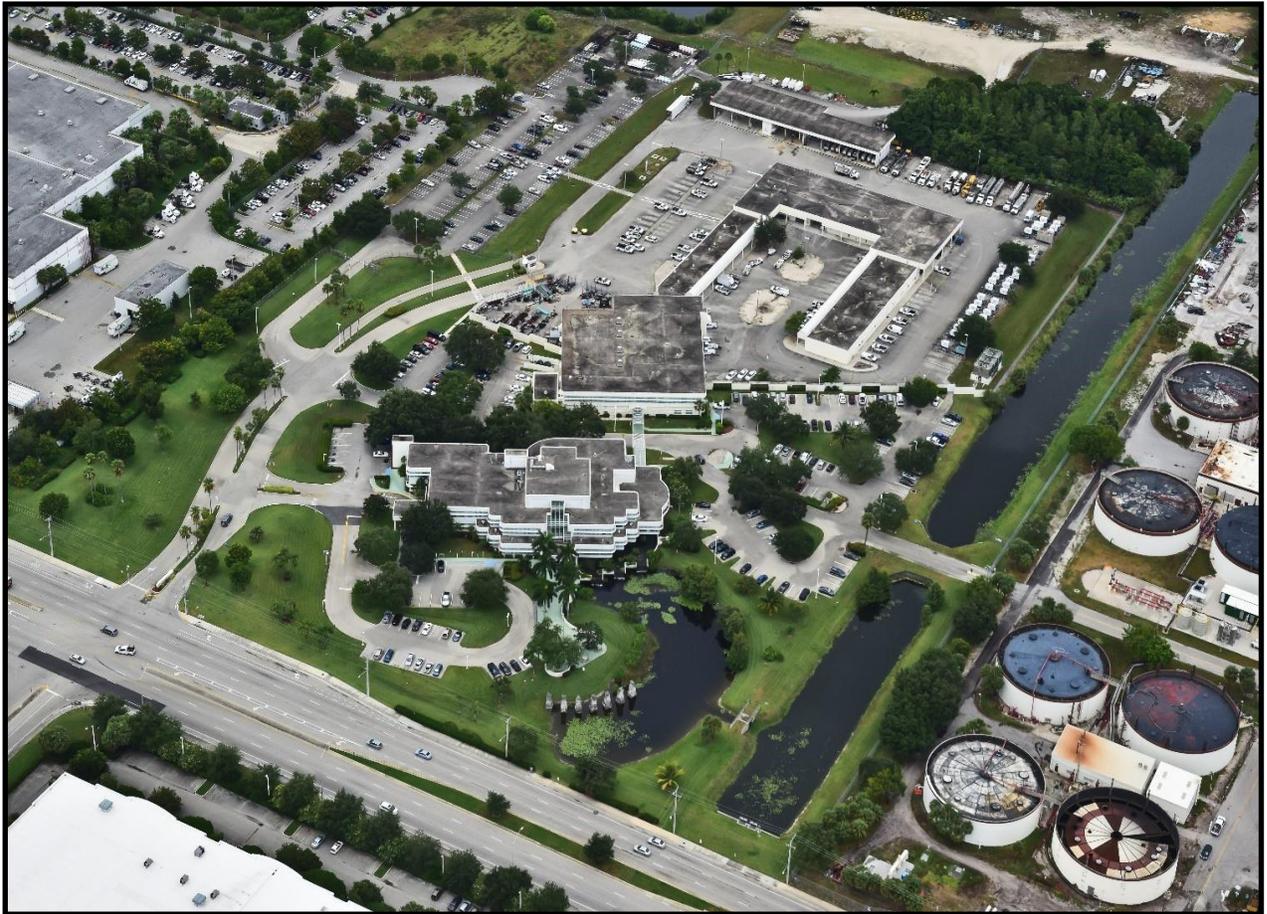


BROWARD COUNTY WATER AND WASTEWATER SERVICES

ANNUAL REPORT FISCAL YEAR 2020

"Our Best in Every Drop"



Report Prepared August 2021 by
Hazen and Sawyer



Table of Contents

Section 1 Introduction 1-1

Section 2 Administration and Management 2-2

2.1 History and Organization of Water and Wastewater Services 2-2

2.2 Mission..... 2-3

2.3 Water and Wastewater Services Administration..... 2-3

2.4 Water and Wastewater Operations Division 2-4

2.5 Water and Wastewater Engineering Division 2-4

2.6 Water Management Division 2-5

2.7 Business Operations Division..... 2-5

2.8 Water and Wastewater Information Technology Division 2-6

Section 3 Retail Water and Wastewater Utilities System..... 3-1

3.1 General Description 3-1

3.2 Service Area and Customer Base 3-2

3.3 Water System Regulatory Requirements 3-8

3.4 Water Supply 3-9

3.5 Water Supply Regulatory Requirements 3-10

3.6 Overview of the Water System Facilities 3-12

 3.6.1 District 1 3-12

 3.6.2 District 2 3-13

 3.6.3 District 3 3-13

3.7 Overview of the Retail Wastewater System Facilities 3-13

 3.7.1 District 1 3-13

 3.7.2 District 2 3-13

 3.7.3 District 3 3-13

3.8 Visual Inspection and Review 3-14

 3.8.1 Water Treatment Plant 1A 3-14

 3.8.2 Water Treatment Plant 2A 3-18

 3.8.3 Water Distribution System 3A 3-21

 3.8.4 Water Distribution System 3BC 3-23

 3.8.5 3B Storage and Pumping Facility..... 3-24

 3.8.6 3C Storage and Pumping Facility..... 3-24

 3.8.7 Retail Lift Stations..... 3-26



Table of Contents

Section 4 Regional Wastewater System	4-1
4.1 General Description	4-1
4.2 Service Area and Customer Base	4-2
4.3 Wastewater System Regulatory Requirements	4-5
4.4 Wastewater Effluent Management	4-5
4.5 Biosolids Management.....	4-6
4.6 Wastewater Large User Agreements	4-6
4.7 Visual Inspection and Review	4-9
4.7.1 Master Lift Stations.....	4-9
4.7.2 North Regional Wastewater Treatment Plant.....	4-10
4.7.3 Septage Receiving Facility	4-16
Section 5 Regional Raw Water Supply	5-1
5.1 General Description	5-1
5.2 North Regional Wellfield.....	5-3
5.3 South Regional Wellfield	5-4
5.4 Contractual Agreements	5-4
5.5 Large Users	5-4
5.6 Regional Raw Water Supply Regulations.....	5-4
5.7 Visual Inspection and Review	5-5
5.7.1 North Regional Wellfield	5-5
5.7.2 South Regional Wellfield.....	5-6
Section 6 Capital Improvement Program.....	6-1
6.1 Description of the Capital Improvement Program	6-1
6.2 Retail Water and Wastewater System Improvements.....	6-4
6.3 Water Treatment.....	6-4
6.4 Neighborhood Program (NP).....	6-4
6.5 Local Utility Program (LUP).....	6-4
6.6 Other Including Mains, Lift Station Improvements and Potable Storage	6-5
6.7 Regional Wastewater Treatment.....	6-5
6.8 Regional Wastewater Transmission	6-5
Section 7 Financial Conditions.....	7-1
7.1 Overview of Financial Operations.....	7-1
7.2 Revenue Projections.....	7-7
7.3 Comparison of Customer Water and Sewer Charges by South Florida Municipalities and Counties..	7-11



7.4 Insurance Coverage..... 7-12

List of Figures

Figure 2-1. Water and Wastewater Services Organizational Chart 2-2
 Figure 3-1. WWS Retail Water Service Areas 3-3
 Figure 3-2. WWS Retail Wastewater Service Areas 3-6
 Figure 4-1. WWS Wastewater Large User Service Areas..... 4-2
 Figure 5-1. Regional Raw Water Service Areas 5-2
 Figure 7-1. WWS Insurance Tower 7-13

List of Tables

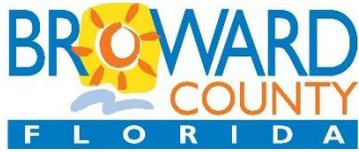
Table 3-1. Summary of Retail Water System and Retail Wastewater System 3-2
 Table 3-2. Summary of Water System Facilities and Capabilities as of September 30, 2020 3-4
 Table 3-3. Summary of Treated Water Sold as of September 30, 2020 3-5
 Table 3-4. Water Usage – Five Year History (1,000 gallons) as September 30, 2020 3-5
 Table 3-5. Retail Wastewater System Characteristics as of September 30, 2020 3-7
 Table 3-6. Summary of Billed Wastewater - Retail as of September 30, 2020 3-7
 Table 3-7. Summary of SFWMD Wellfield Permits as of September 30, 2020 3-11
 Table 4-1. Summary of Historical Large User Wastewater Average Monthly Flow for Treatment and Disposal (1,000 Gallons) as of September 30, 2020 4-3
 Table 4-2. North Regional Wastewater System Reserve Capacity as of September 30, 2020 (MGD) 4-4
 Table 4-3. Summary of Large User Wastewater Treatment Annual Flows Five-Year History as of September 2020 (1,000 Gallons) 4-4
 Table 5-1. NRW Physical Descriptions 5-1
 Table 5-2. SRW Physical Descriptions 5-3
 Table 5-3. Large User Actual Flow North Regional Raw Water Flow Distribution (1,000 Gallons) as of September 30, 2020 5-4
 Table 5-4. Large User Actual Flow South Regional Raw Water Flow Distribution (1,000 Gallons) as of September 30, 2020 5-5
 Table 6-1. Capital Improvement Programs as of September 30, 2020 6-2
 Table 6-2. Capital Projects Budgets by Type Through Fiscal Year 2025 6-3



Table of Contents

Table 7-1. WWS Water and Wastewater Monthly Utility Bill for a Residential Customer Using 5,000 Gallons per Month.....	7-2
Table 7-2. Broward County Schedule of Retail Rates Minimum Monthly Charges per Account Effective October 1, 2020	7-3
Table 7-3. Broward County Schedule of Retail Rates Volume Charge (1,000 Gallons) Effective October 1, 2020	7-4
Table 7-4. Automatic Rate Adjustments for Periods of Mandated Water Restrictions.....	7-5
Table 7-5. Retail Water and Wastewater Billing Volumes as of September 30, 2020 (1,000 Gallons)	7-6
Table 7-6. Water and Wastewater Services – History of Wholesale Wastewater Rates Associated with the NRWWS as of September 30, 2020	7-6
Table 7-7. Historical & Projected Ratios of Large Users’ Revenues and Wastewater Revenues (1,000s).....	7-8
Table 7-8. Schedule of Historical and Projected Revenues, Expenses, and Debt Service in \$1,000 and Debt Service Coverage	7-10
Table 7-9. Comparative Monthly Water and Wastewater Charges as of 12/31/2020 (Based on Usage of 5,000 Gallons Per Month for a 5/8-inch meter)	7-11





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 3 certified public accountants. 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.

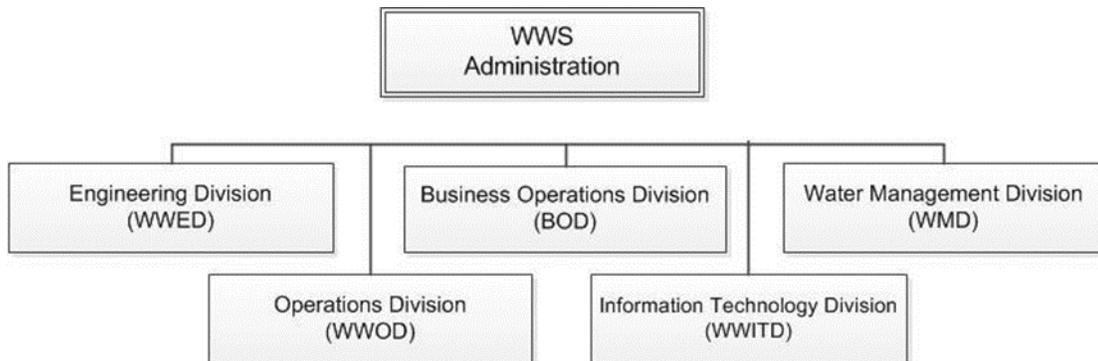


Figure 2-1. Water and Wastewater Services Organizational Chart

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 approximately 3.1% 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 2020.



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 \$137 million over the next 5 years.
- NRWTP Effluent Disposal comply with the Ocean Outfall Legislation. Proposed facilities operational modifications are under review.



- 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 at \$101 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 are estimated at \$227 million over the next five years.
- Potable water storage and pumping facilities rehabilitation and upgrades will address added system capacity and reliability. These improvements are estimated at \$15 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 \$31 million will be dedicated to this effort over the next five years. Similarly, upgrades to the retail wastewater pump stations are budgeted at \$14 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 efficiently and effectively automate business functions 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 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 decreased from 58,773 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 241,248. The City of Coconut Creek, a sale for resale customer, has approximately 61,248 residents. Including the City of Coconut Creek, the retail water system serves approximately 15.5% of Broward County's total population.

In the past ten years, the retail wastewater customer base has grown from 44,856 customers (connections) to its present base of 51,206 customers as shown in Table 3-1. This represents an increase of 14.16%. 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.



Section 3 – Retail Water and Wastewater Utilities System

Table 3-1. Summary of Retail Water System and Retail Wastewater System					
System Component	Units	Fiscal Year 2011	Fiscal Year 2020	Change	Percent Change
Water System:					
Customer Base	Customers	58,773	57,693	(1,080)	(1.84%)
Water Service Area	Square Miles	40.99	41.00	0.01	0.02%
Water Lines	Miles	699.44	741.90	42.46	6.07%
Water Plant Capacity:					
Plant Capacity	MGD ²	46.00	56.00	10.00	21.74%
Avg. Daily Production ¹	MGD ²	19.76	20.58	0.82	4.15%
Max. Daily Production	MGD ²	22.43	25.34	2.91	12.97%
Purchased Water	MGD ²	6.04	6.58	0.15	2.48%
Wastewater System:					
Customer Base	Customers	44,856	51,206	6,350	14.16%
Wastewater Service Area	Square Miles	40.63	40.40	(0.23)	(0.57)
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



Section 3 – Retail Water and Wastewater Utilities System

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 742 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.

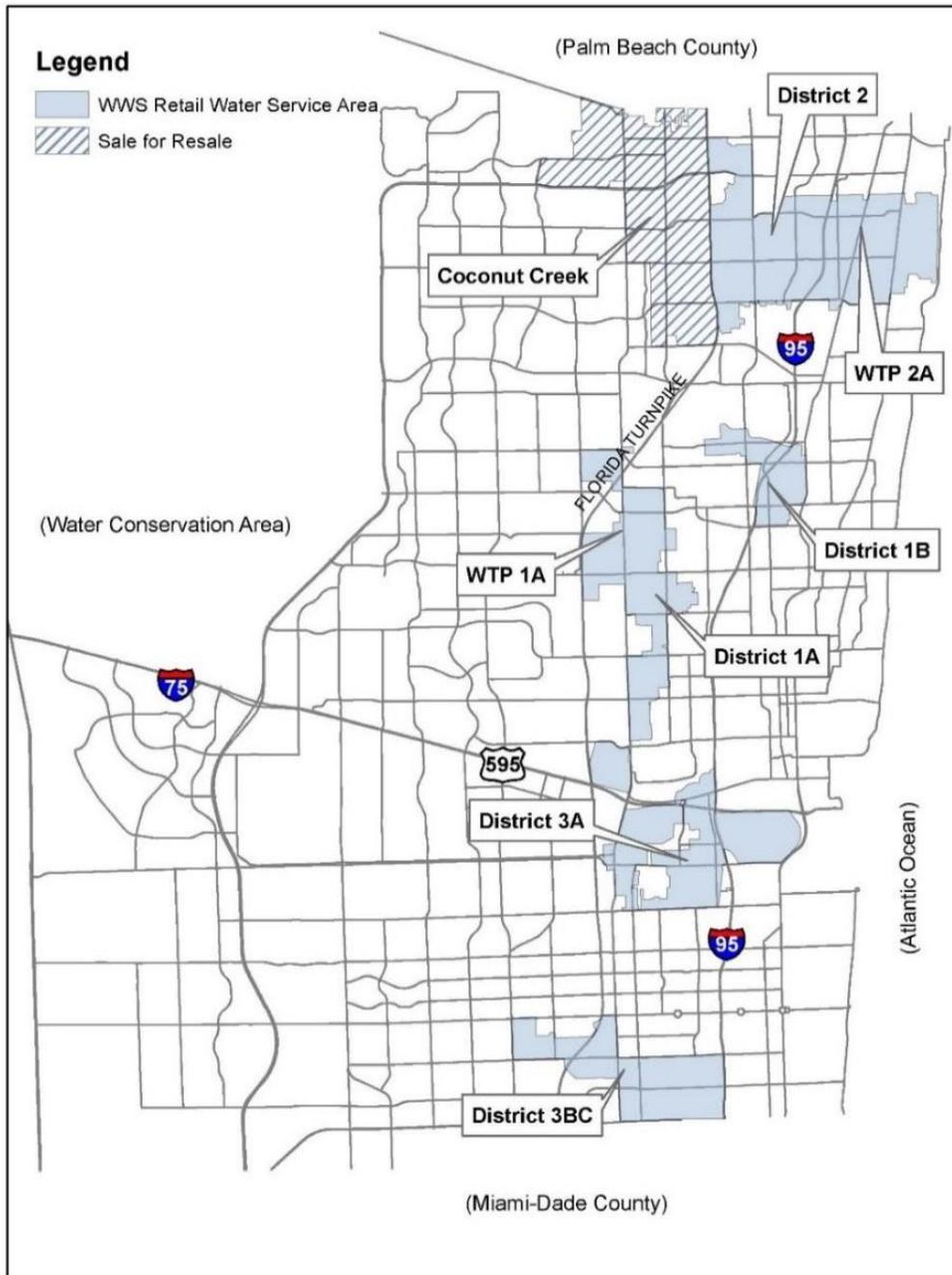


Figure 3-1. WWS Retail Water Service Areas

Source: Broward County Water and Wastewater Services



Section 3 – Retail Water and Wastewater Utilities System

Table 3-2. Summary of Retail Water System Facilities and Capabilities as of September 30, 2020				
	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	6.20	8.50	6.00	20.70
Distribution Mains (Miles)	247.60	259.50	234.70	741.80
Service Area (Square Miles)	11.90	14.80	14.30	41.00
Purchased Water (MGD) ²	0.00	0.00	6.58	6.58
Produced Water (MGD) ²	7.18	13.40	0.00	20.58
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.



Section 3 – Retail Water and Wastewater Utilities System

Table 3-3. Summary of Treated Water Sold as of September 30, 2020					
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)
2011	92,208	58,773	8,616,736	1,731,297	23.61
2012	88,344	56,503	8,339,560	1,643,812	22.85
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

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, 2020					
Customer Class	Fiscal Year 2016	Fiscal Year 2017	Fiscal Year 2018	Fiscal Year 2019	Fiscal Year 2020
Residential	4,457,821	4,550,496	4,418,260	4,556,088	4,592,337
Commercial	1,924,866	1,920,261	2,078,129	1,969,407	1,810,299
Irrigation	383,027	399,232	375,012	410,461	397,371
Sale For Resale	1,736,453	1,844,111	1,885,328	2,029,009	2,029,803
Total	8,502,167	8,714,100	8,756,729	8,964,965	8,829,810

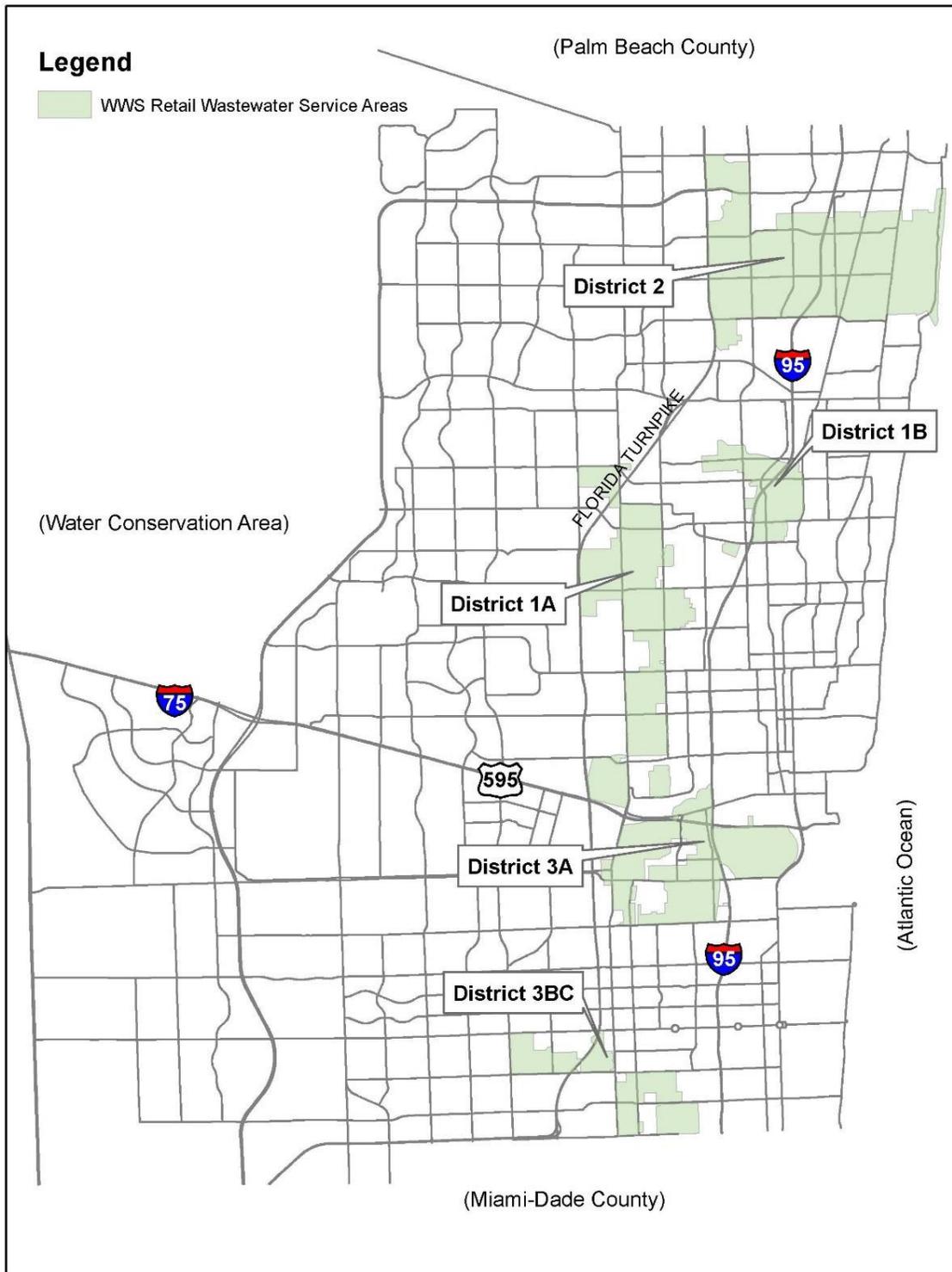
Source: Broward County Water and Wastewater Services

The retail wastewater system service area covers approximately 40 square miles with approximately 455 miles of gravity sewers, 242 lift stations, 8 retail master pump stations and 113 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.



Section 3 – Retail Water and Wastewater Utilities System

Figure 3-2. WWS Retail Wastewater Service Areas



Source: Broward County Water and Wastewater Services



Section 3 – Retail Water and Wastewater Utilities System

Table 3-5. Retail Wastewater System Characteristics as of September 30, 2020				
	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	90.2	455.3
Lift Stations	76	103	66	245
Force Mains (Miles)	42.9	35.8	35.1	113.8
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, 2020				
Fiscal Year	Average Number of Units ¹	Average Number of Metered Customers	Total Billed Treated Wastewater (1,000 GAL)	Annual Average Daily Flow (MGD)
2011	74,691	44,856	4,891,742	13.40
2012	77,247	46,911	4,872,721	13.35
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
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, one Treatment Technique (TT) violations was noted, and no Action Levels were exceeded during FY 2020. WWS tests raw water quality only for the development of baseline data and as required under the Ground Water Rule as described on the following page. 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/>.

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 2020, WWOD maintained continuous compliance with the Ground Water Rule throughout the 1A, 2A, and 3BC systems. System 3A experienced what is referred to as "a treatment technique violation" on September 18, 2020 due to a problem with an uninterrupted power supply at the facility. Testing and continuous monitoring showed the water was in compliance with drinking water standards and safe to drink.



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 3-7. Presently, WWS operates wellfields to supply water to Water Treatment Plants 1A and 2A, with firm capacities of 19.6 and 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). 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 would be built 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.

The proposed C-51 Reservoir 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 September 2022 for substantial completion, October 2022 for operational testing, and January 2023 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.

Section 3 – Retail Water and Wastewater Utilities System

Table 3-7. Summary of SFWMD Wellfield Permits as of September 30, 2020			
Description	1A	2A/NRW	SRW Temp
Permit Period:			
Issuance	9/15/2020	10/29/2020	3/7/2018
Total Biscayne Aquifer Allocations¹:			
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 Wells³			
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	3/17/2023
<p>¹ Includes temporary allocations from the SFWMD that would expire once the C-51 Reservoir becomes operational.</p> <p>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.</p> <p>³ Implementation dates for Floridan aquifer alternative water supply development continue to be extended due to demand management efforts and lower than expected growth.</p> <p>⁴ Construction of two test wells was completed in 2014.</p> <p>Source: Broward County Water and Wastewater Services</p>			

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.



Section 3 – Retail Water and Wastewater Utilities System

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), which was complete in October 2018.
- 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 committed to the purchase of 6 MGD from Phase I or 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 248 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 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 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 for 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 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 miles of gravity sewer, 103 lift stations, 5 retail master pump stations, and 35.8 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 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 Hazen and Sawyer.

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 July 22, 2021:

- District 1 Raw Water Wells – Biscayne Aquifer
 - Well 1 rehabilitation was completed two 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.
 - Well 2 rehabilitation was completed two 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.
 - Well 3 was rehabilitated recently, and overall, was in good condition. The wellhead and associated piping and valves appeared to be in good condition. Electrical equipment was in good condition. The concrete slab was in good condition.
 - Well 4 rehabilitation was completed two 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.
 - Well 5 was in fair condition. This well is due for rehabilitation in Fiscal Year 2022. The door to the building was showing signs of corrosion. The wellhead and associated piping

Section 3 – Retail Water and Wastewater Utilities System

and valves appeared to be in good condition. 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.

- Well 6 was in good condition. The wellhead and associated piping and valves were in good condition. Corrosion was noted around the pump shaft and piping. Electrical equipment was in good condition. The concrete slab was in good condition.
- Well 7 rehabilitation was completed two years ago, and overall, was in good condition. The wellhead and associated piping and valves appeared to be in good condition. Corrosion was noted around the pump shaft and piping was observed. Electrical equipment was in good condition. The concrete slab was in good condition.
- Well 8 was in good condition. The door to the building had holes from corrosion. 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.
- Well 9 was in fair condition. The door to the building had holes from corrosion, and the walls were cracking. 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.
- District 1 Floridan Aquifer Wells
 - Floridan Well 1 is an on-site well; development and testing phase have been completed. Permanent wellhead equipment was not in place at the time of the inspection, only a sample tap.
 - Floridan Well 2 is an on-site well; development and testing phase have been completed. Permanent wellhead equipment was not in place at the time of the inspection, only a sample tap.
 - Treatment Unit 1 (softener unit) was in good condition. Unit was online at the time of inspection. The basin components, including the cone, rake, mixers, and launders are 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.
 - Treatment Unit 2 was offline for maintenance during the time of the site visit. Staff was removing lime sludge from the unit during the inspection. The interior, including the visible parts of the cone and paddle mixers, were showing signs of corrosion. Effluent launders were replaced last year and in good condition. The drive appeared to be in poor condition. Plans to install a new motor, new gear box and drive as part of the maintenance are underway. 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 last year.



Section 3 – Retail Water and Wastewater Utilities System

- Filters.
 - Filter 1 was in good condition. 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. 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. 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. 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. 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. 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. 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. 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 appeared to be 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.
- The four clearwell transfer and backwash pumps as well as the piping, valves, gauges, appurtenances, and associated structures appeared to be in good condition. Transfer pump No. 4 was out of service due to a malfunctioning foot valve, at the time of the site visit, but scheduled for repair. The control panel appeared to be new and in good condition.
- High Service Pumping
 - High service pumps 3 and 5 appeared to be in good condition. Pumps, piping, valves, gauges, appurtenances, and associated structures appeared to be in good condition.



Section 3 – Retail Water and Wastewater Utilities System

- High service pumps 1, 2, 4, and 6 appeared to be in good condition. 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.
- 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 is currently only put into service on an as-needed basis.
 - Vacuum filter 2 was in service at the time of the visit. Vacuum filter 1 was out of service and being rehabilitated. Belts, motors, vacuum pumps, and electrical equipment appeared to be in good condition. Overall, vacuum filters 1 and 2 are in fair 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. Electrical panels showed signs of corrosion but were functional. The system is scheduled for 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. One lime slaker was installed in Fiscal Year 2021 and the second one is expected to be installed in Fiscal Year 2022. A new lime silo dust collector system with new laser level sensors and new LED lights were recently installed. Only one feeder was in service at the time of the visit. The lime silo, vibrator, rotary valve, and dosing unit appeared to be in fair condition. Slakers and pumps, and slurry pumps were operational. Minor corrosion was present on equipment, and much of the equipment was covered in dust from the lime.
 - The fluoride pump and tank are currently operational; pumps appear to be new and in excellent condition. Bulk and day storage tanks appeared to be intact and functional. Metering pumps were functional. Electrical equipment was in good condition. The system is scheduled for replacement.
 - The sodium hypochlorite storage and distribution system were in good condition. Storage tanks were in good condition. Containment area flooring was in good condition. Transfer pumps were new and in excellent condition. Metering pumps are in good condition.
 - The gaseous ammonia system is generally in good condition. Bulk storage tanks are in very good condition. The three ammoniators are functional and in good condition.
- Backup generators, diesel tanks and associated equipment appeared to be in good condition.



Section 3 – Retail Water and Wastewater Utilities System

- New electrical switchgear room was in excellent condition.

Plant modifications performed in FY 2021:

- Slaker # 1 replacement of (Stainless Steel)
- Two new sludge recirculating pumps
- Well # 3 rehabilitation completed
- Well # 6 rehabilitation begun
- 1B1 new 1.5 MGD storage tank and chemical building - 80% completed
- New high service pump # 3 and # 4 installed at 1A1 Station
- SCADA system upgrade
- 1A1 Storage tank painted

Plant modifications to be performed in FY 2022:

- Well # 6 rehabilitation
- Vacuum Filter # 1 rehabilitation
- Elevated Storage Tank Demolition
- New 1A2 1.5 MGD Storage tank and pumping system

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 visit. The following summarizes the observations performed for major subsystems resulting from the visual inspection performed on July 19, 2021.

- District 2 Raw Water Wells – Biscayne Aquifer
 - Well 4 was rehabilitated about a year ago and is in good condition. The security fencing was in good condition. The wellhead and associated motor, pump shaft, piping and valves appeared to be in good condition. Electrical equipment was in good condition. The concrete slab was in good condition.
 - Well 6 was rehabilitated about a year ago and 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 rehabilitation. Electrical equipment was in good condition.
 - Well 7 was in good condition. The security fencing was in good condition. The wellhead and associated motor, pump shaft, piping and valves appeared to be in good condition,



Section 3 – Retail Water and Wastewater Utilities System

- showing only minor signs of corrosion. Electrical equipment was in good condition. The concrete slab was in good condition.
- Well 8 was in excellent condition. The wellhead and associated pump shaft, piping and valves appeared to be in good condition. 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 condition. The wellhead and associated pump shaft, piping and valves appeared to be in good condition. 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 in good condition and recently painted. The wellhead, associated motor, and pump shaft were in fair condition with evidence of minor corrosion at the column base. 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. This well site is due for rehabilitation next Fiscal Year.
 - Well 11 was in good condition and recently painted. 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. Electrical equipment was in good condition. The concrete slab and security fencing were in good condition. This well site is due for rehabilitation next Fiscal Year.
- Treatment Unit 1 was recently rehabilitated and is in overall good condition and the unit was offline at the time of the inspection and was being prepared to get back in service. 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.
 - Treatment Unit 2 was in overall good condition and was recently rehabilitated. The unit was online at the time of the inspection. 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.
 - Filters: All six filters appeared to be in good condition. Effluent launders were in good condition. Filter media appeared level and uniform. 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 witnessed but repairs are scheduled.
 - Filter backwash fill pumps 1, 2, 3 and 4 along with associated motor, piping, valves, gauges, and appurtenances appeared to be in fair to 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 were not in service at the time of inspection and were scheduled to be out of service to be upgraded.. Electrical equipment appeared to be in fair condition.



Section 3 – Retail Water and Wastewater Utilities System

- High service pumps (HSPs) 1 and 3-8 (HSP 2 does not exist) appeared to be in good condition. 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 to be removed and replaced soon. Variable Frequency Drives (VFDs) for Pumps 4 and 5 were being added under construction. Pumps 6, 7, and 8 are backups, and they share a separate building. 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. Some minor concrete spalling was observed that County has already scheduled to be addressed.
- Solids handling
 - Gravity thickener 1: the structure, rake and drive, and auxiliary pumps appeared to be in good condition.
 - Gravity thickener 2: the structure, rake and drive, and auxiliary pumps appeared to be in good condition.
 - Vacuum filters and associated vacuum pumps and electrical equipment appeared to be 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 condition. Pumps were exposed and in fair condition, with corrosion evident around the pump bases and motors.
 - The ferric chloride feed and storage system was in good condition. Metering pumps were functional. Piping was in good condition. The system is scheduled for replacement.
 - The dry polymer make down and feed systems were in good condition. Make down and dilution units appeared to be functional. Metering pumps were in good condition. Units are underutilized as not much polymer is needed for this treatment process.
 - Lime slaker 1 was recently replaced and was in good condition. Lime slaker 2 was in fair condition but is scheduled for replacement. 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 system were in fair condition. Bulk and day storage tanks appeared intact and functional. Metering pumps were functional. Electrical and mechanical equipment appeared to be functional. The system is 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 were in good condition. Minor to moderate corrosion was observed on transfer pump equipment in the bulk storage area.
 - The sodium hydroxide system has never been placed into service and is not anticipated to be put into service within the foreseeable future.



Section 3 – Retail Water and Wastewater Utilities System

- The gaseous ammonia system is in good condition. Ammoniators and bulk storage tanks were in good condition. Control panels were being rehabilitated at the time of inspection.
- The diesel fuel storage system is in good condition. Bulk storage tanks were in very good condition.
- Backup generators and associated equipment appeared to be in good condition.
- A brand new 5 MG ground storage tank recently constructed was in service, and the second existing 5 MG is to be rehabilitated soon. The 5-year visual inspection of the County's ground storage tanks were completed in August 2018; this also includes the two clearwells at WTP 2A.
- The backwash tank was generally in good condition.

Plant modifications performed in FY 2021 were:

- Well 4 rehabilitate to include an electrical upgrade

Plant modifications to be performed in FY 2022 are:

- Building #1 A/C replacement
- Vacuum 1 Hyflo Valve replacement
- Lime Slaker #2 replacement
- Backwash fill pump 1 replacement
- Backwash fill pump 2 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, 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 Hazen and Sawyer on July 28, 2021. Construction at the site is ongoing. Construction includes the following:

- 2.5-million-gallon ground storage tank
- 5,750-gallon diesel above ground fuel storage tank
- 3A plant building that contains the following:
 - Five horizontal split-case high service pumps
 - Sodium hypochlorite and liquid ammonium sulfate disinfection facilities



Section 3 – Retail Water and Wastewater Utilities System

- Instrumentation to document compliance for the four-log virus treatment certification
- Backup power generator
- Electrical room
- Laboratory

Once the new facilities 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 2021.

Based on the July 28, 2021 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.

- Control room includes computer workstations that allow the operators to monitor and control the remote facilities. Workstations are in good condition.
- High service pumps 1 through 4 are horizontal split-case pumps. The pumps, motors and valves were in good 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.
- 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, with minor signs of corrosion.
- The temporary disinfection storage and feed facilities appeared to be in good condition.

Modifications performed in FY 2021 are:

- New Feed Valve installed at Hollywood line intake
- New 2.5 MGD Storage Tank and Pumping System
- New Booster Pump station for System 3A
- Dania Vault repairs completed

Planned modifications to be performed in FY 2022 are:

- New 2.5 MGD Storage Tank and Pumping Station .
- New Booster Pump Station for 3A
- New lightning monitoring and alarm system



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 July 28, 2021. 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 pump was operational. The pump was in poor condition.
 - The County plans to replace the pump and valves by the end of calendar year 2021. The replacement isolation gate valve and check valve were located on-site awaiting installation by County staff.
 - 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 fair condition.
 - SCADA panel was in good condition.
- Pump Station I3B9:
 - Pump station I3B9 is equipped with one constant speed motor driven horizontal split-case pump.
 - The pump, discharge gate valve and check valve were replaced in 2021 and are in good condition.
 - The pump station was not operating due to a leak in one of the sodium hypochlorite storage tanks.
 - The motor appeared to be aging and from the original pump. It is functional and appeared to be in fair condition.
 - 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 not operational due to a leak in one of the sodium hypochlorite tanks. The County plans to replace the tank in 2021.
 - The SCADA panel was in good condition.



3.8.5 3B Storage and Pumping Facility

The 3B storage and pumping facility was inspected July 28, 2021. In general, the 3B facility appeared to be in good condition. Observations from the site visit 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.
- High service pump 1 was replaced within the last year.
- High service pump 2 was recently replaced as part of the ongoing construction project that replaced the disinfection facilities with new sodium hypochlorite and LAS storage and feed systems.
- High service pump 3 has been removed from service. Operations staff stated the pump is not needed to maintain distribution system pressure.
- High service pump 4 had been removed.
- 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 pump station is 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 County plans to replace the altitude valve, isolation valve and electric actuator within the next 12 months.
- The County is nearing completion of operational testing of a recently constructed upgrade project. The project included the following key elements:
 - A new sodium hypochlorite and LAS storage and feed systems.
 - A recirculation pump along with diffusers within the storage tank to enhance mixing to minimize thermal stratification within the tank.
 - A new underground vault that includes chlorine and ammonia injection assemblies on the tank effluent pipe supplying the high service pumps.
 - New instrumentation to monitor the disinfection process.
- 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.

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



Section 3 – Retail Water and Wastewater Utilities System

- 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 July 28, 2021. 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 is in poor condition.
- High service pumps 1 and 2 along with associated motor and valves appeared to be in fair condition.
- High service pump 1 has heavy corrosion. The County has purchased a new pump to replace the existing pump 1. The new pump is located at the pump station awaiting County staff installation.
- The sodium hypochlorite storage tanks were in good condition.
- The sodium hypochlorite transfer/tank mixing pumps appeared to be in good condition.
- The water softening system is not presently being utilized.
- The sodium hypochlorite system control panel appeared to be in good condition.
- The County plans on installing a LAS system in 2021 to replace the anhydrous ammonia system.
- 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.



Section 3 – Retail Water and Wastewater Utilities System

- The pump building exterior appeared to be in good condition.
- Exhaust fan EF-2, located in the pump room, appeared to be leaking an oily substance. County staff noted the issue for maintenance.

3.8.7 Retail Lift Stations

There are 242 lift stations operated by the County. A representative set of 21 lift stations were inspected by Hazen and Sawyer. On July 12, 2021, *LSs 21A2, 21D2, 22A1, 24E3-1, 24E3-2, 27D, 45C, 51F, 51G, 56B1 and 56B1-1* were inspected. On July 13, 2021, *LSs 10L, 30A2, 30G3, 30L, 30M1, 31D1, 31E, 32A1, 50C1 and 50F* 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 10L - This submersible pump lift station was in good condition. No pump issues were reported. The wet well and valve vault hatches were in good condition. Piping was in good condition and valving was in fair condition, with signs of rusting on the valves. Valve vault had a few inches of water at the time of site visit. The wet well and wet well liner were in good condition. The electrical panel and water service were in good condition, with minor signs of corrosion on the electrical panel.

LS 21A2 - This submersible pump lift station was rehabilitated in 2020-2021 and is in excellent condition. No pump issues were reported. The wet well and valve vault hatches were in excellent condition. Piping and valving were in excellent condition. Valve vault was dry at the time of site visit. The wet well was in excellent condition, with the liner in excellent condition. The electrical panel and water service were in excellent condition.

LS 21D2 - This submersible pump lift station was in fair condition. No pump issues were reported. The wet well and valve vault hatches were in fair condition. Piping and valving, and wet well walls were showing signs of corrosion. Valve vault was dry at the time of site visit. The wet well was in fair condition. The electrical panel and water service were in good condition.

LS 22A1 - This submersible pump lift station was in fair condition. No pump issues were reported. The wet well was in poor condition, with corrosion on the walls and is located in a parking lot where residents drive over. The wet well vent is in poor condition, with corrosion observed. Piping and valving were in fair condition. Valve vault was dry at the time of site visit. Coating on valve piping and valves was coming off. The electrical panel and water service were in good condition.

LS 24E3-1 - This submersible pump lift station was in fair condition. No pump issues were reported. The wet well and valve vault hatches were in good condition. Piping and valving were in fair condition. Valve vault was dry at the time of site visit but showed some corrosion. The wet well and wet well liner were in fair condition, with signs of corrosion on the coating. The electrical panel and water service were in good condition.

LS 24E3-2 - This submersible pump lift station was in good condition. No pump issues were reported. The wet well and valve vault hatches were in good condition. Piping and valving were in fair condition. Valve vault was dry at the time of site visit. The wet well was in fair condition,



Section 3 – Retail Water and Wastewater Utilities System

with signs of corrosion. The electrical panel was in fair condition but showed signs of corrosion. The water service was in good condition.

LS 27D - This submersible pump lift station was in good condition. No pump issues were reported. The wet well and valve vault hatches were in fair and good condition, respectively. Piping and valving were in good condition. Valve vault was dry at the time of site visit. The wet well was in fair condition, with the liner in poor condition due to concrete spalling on the walls. The electrical panel was in excellent condition and the fencing and water service were in good condition.

LS 30A2 - This submersible pump lift station was in fair condition. No pump issues were reported. The wet well and valve vault hatches were in good condition. Piping and valving were in fair condition, with signs of corrosion. Valve vault had a few inches of rainwater at the time of site visit. The wet well and wet well liner were in fair condition. The electrical panel, fencing, driveway and water service were in good condition.

LS 30G3 - This submersible pump lift station was in good condition. No pump issues were reported. The wet well and valve vault hatches were in good condition. Piping was in fair conditions, with signs of corrosion. and valving was in good condition. Valve vault had about an inch of water at the time of site visit. The wet well was in good condition. The electrical panel and water service were in good condition.

LS 30L - This submersible pump lift station was in good condition. No pump issues were reported. The wet well and valve vault hatches were in good condition. Valving was in good condition. Piping was in fair condition, with signs of corrosion. Valve vault was dry at the time of site visit. The wet well was in good condition. The electrical panel, fencing, water service, and driveway were in good condition.

LS 30M1 - This submersible pump lift station was in good condition. No pump issues were reported. The wet well and valve vault hatches were in good condition. Piping was in fair condition and valving was in good condition. Valve vault was dry at the time of site visit. The wet well and wet well liner were in fair condition, with signs of corrosion on wet well walls. The electrical panel and water service were in good condition.

LS 31D1 - This submersible pump lift station was in good condition. No pump issues were reported. The wet well and valve vault hatches were in fair condition. Piping and valving were in fair condition, with signs of corrosion. Valve vault was dry at the time of site visit. The wet well and the liner were in fair condition. The electrical panel and water service were in good condition.

LS 31E - This submersible pump lift station was in good condition. No pump issues were reported. The wet well and valve vault hatches were in good condition. Piping and valving were in good condition. Valve vault was dry at the time of site visit. The wet well and the liner were in good condition. The electrical panel, fencing, driveway, and water service were in good condition.

LS 32A1 - This submersible pump lift station was in good condition. No pump issues were reported. The wet well and valve vault hatches were in fair condition. Piping and valving were in good condition. Valve vault was in good condition. The wet well and wet well line were in fair condition. The electrical panel was in fair condition, with signs of corrosion. The water service was in good condition.



Section 3 – Retail Water and Wastewater Utilities System

LS 45C - This submersible pump lift station was in good condition. No pump issues were reported. The wet well and valve vault hatches were in good condition. Piping and valving were in good condition. Valve vault was dry at the time of site visit. The wet well was in good condition, with the liner in good condition. The electrical panel and water service were in good condition.

LS 50C1 - This submersible pump lift station was in good condition. No pump issues were reported. The wet well and valve vault hatches were in good condition. Piping and valving were in good condition. Valve vault was dry at the time of site visit. The wet well was in good condition, with the liner in good condition. The electrical panel and water service were in good condition.

LS 50F - This submersible pump lift station was in good condition. No pump issues were reported. The wet well and valve vault hatches were in good condition. Piping was in good condition and valving was in good condition. Valve vault was dry at the time of site visit. The wet well and wet well liner were in fair condition. The electrical panel, fencing, water service, and driveway were in good condition.

LS 51G - This submersible pump lift station was in good condition. No pump issues were reported. The wet well and valve vault hatches were in good condition. Piping and valving were in good condition, with minor rusting and signs of corrosion. Valve vault was wet at the time of site visit and the junction box cover was missing, but the vault was in fair condition. The wet well was in fair condition, with the liner in good condition. The electrical panel and water service were in good condition. The concrete pad edge has exposed rebar and corroded lifting eyes, but in good condition.

LS 51F - This submersible pump lift station was in good condition. No pump issues were reported. The wet well and valve vault hatches were in good condition. Piping and valving were in good condition. The wet well was in good condition. The electrical panel, fencing, driveway, and water service were in good condition. The backflow preventer is missing additional supports.

LS 56B1 - This submersible pump lift station was in good condition. No pump issues were reported. The wet well and valve vault hatches were in good condition. Piping and valving showed signs of rusting inside the valve vault. Coating on valve piping and valves showed minor signs of corrosion. Valve vault was wet at the time of site visit. The wet well and wet well line were in fair condition, with signs of corrosion on the walls. The electrical panel and water service were in good condition.

LS 56B1-1 - This submersible pump lift station was in good condition. No pump issues were reported. The wet well and valve vault hatches were in good condition. Piping and valving were in good condition. Valve vault was dry at the time of site visit. The wet well was in good condition, with the liner in good condition. The electrical panel, fencing, water service, and driveway were in good condition.



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 Hazen and Sawyer.

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 87.015 MGD has been reserved by the Large Users and the County. During Fiscal Year 2020, the annual average daily flow rate at the NRWWTP was approximately 70.3 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



Section 4 – Regional Wastewater System

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 (presently under expansion to 26 MGD). The reclaimed water is used for irrigation and industrial process water at the Septage Receiving Facility and the NRWTP, 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 NRWTP located in Pompano Beach, Florida.

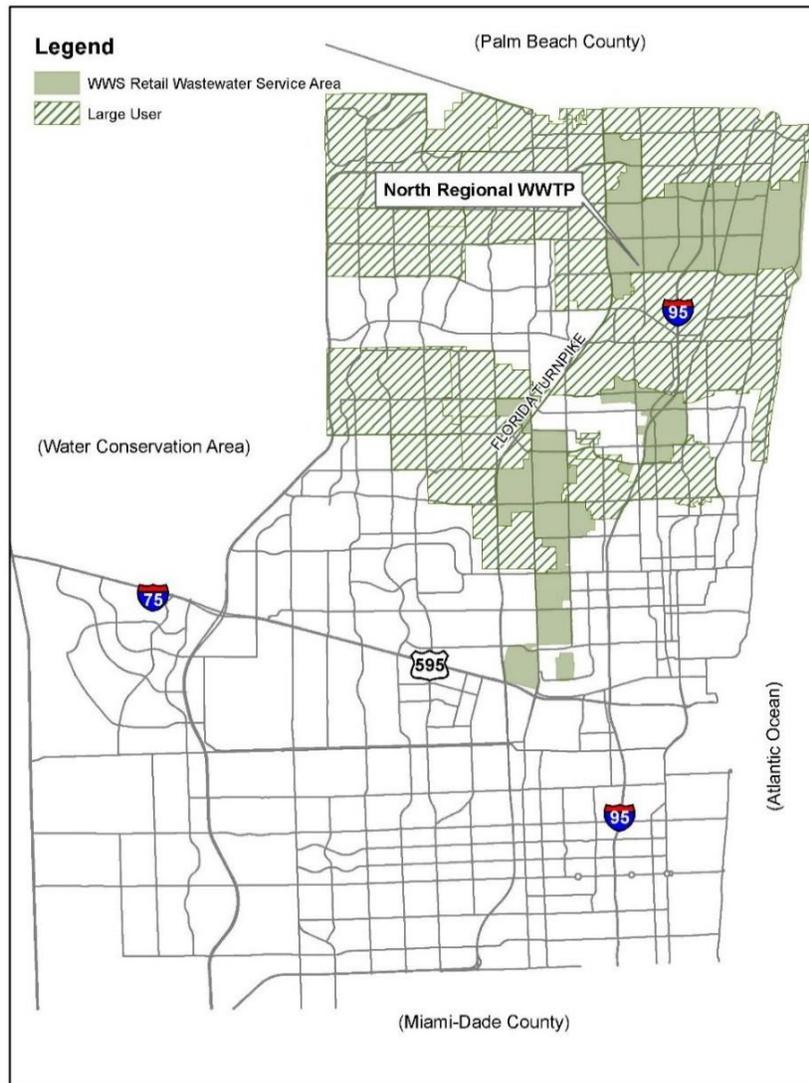


Figure 4-1. WWS Wastewater Large User Service Areas

Source: Broward County Water and Wastewater Services



Section 4 – Regional Wastewater System

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 user 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.

Large User	FY 2018	FY 2019	FY 2020	Change From 2019 to 2020	% of Change
Coconut Creek	127,561	122,581	132,891	10,310	8.41
Coral Springs	257,794	227,275	239,796	12,521	5.51
Deerfield Beach	176,300	161,929	177,117	15,188	9.38
Lauderhill	199,117	181,543	204,501	22,958	12.65
North Lauderdale	121,151	115,265	105,237	(10,028)	(8.70)
NSID	102,797	101,939	113,158	11,219	11.01
Oakland Park	47,367	40,122	46,643	6,521	16.25
Parkland Utilities	6,085	6,306	6,793	487	7.72
Pompano Beach	466,799	426,498	472,915	46,417	10.88
Royal Waterworks	9,150	7,503	9,110	1,607	21.41
Tamarac	226,812	193,751	209,427	15,676	8.09
Subtotal	1,740,933	1,584,712	1,717,588	132,876	8.38
Broward County	415,473	375,006	420,875	45,869	12.23
Total	2,156,406	1,959,718	2,138,462	178,745	9.12
Source: Broward County Water and Wastewater Services					



Section 4 – Regional Wastewater System

Table 4-2. North Regional Wastewater System Reserve Capacity as of September 30, 2020 (MGD)		
Large User	Capacity	
	Treatment	Transmission
Broward County	19.420	19.420
Coconut Creek ¹	6.540	4.410
Coral Springs	9.790	9.790
Deerfield Beach	8.500	8.500
Lauderhill	7.100	7.100
North Lauderdale	4.400	4.400
NSID	3.530	3.530
Oakland Park	1.520	1.520
Parkland Utilities	0.265	0.265
Pompano Beach ¹	17.000	N/A
Royal Waterworks	0.450	0.450
Tamarac	8.500	8.500
Total	87.015	67.885

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 2020 (1,000 Gallons)					
Large User (LU)	Fiscal Year 2016	Fiscal Year 2017	Fiscal Year 2018	Fiscal Year 2019	Fiscal Year 2020
Coconut Creek	1,512,213	1,491,846	1,530,733	1,470,974	1,594,695
Coral Springs	3,255,671	2,782,075	3,093,525	2,727,304	2,877,555
Deerfield Beach	2,380,200	2,258,300	2,115,602	1,943,149	2,125,405
Lauderhill	2,270,030	2,251,942	2,389,407	2,178,516	2,454,006
North Lauderdale	1,285,778	1,391,289	1,453,814	1,383,177	1,262,840
NSID	1,101,064	1,089,904	1,233,566	1,223,263	1,357,893
Oakland Park	515,203	478,666	568,404	481,467	559,710
Parkland	70,875	70,721	73,016	75,676	81,519
Pompano Beach	4,904,800	4,795,360	5,601,593	5,117,970	5,674,980
Royal Waterworks	113,410	100,330	109,795	90,041	109,320
Tamarac	2,747,855	2,668,874	2,721,749	2,325,017	2,513,127
Total LU	20,157,099	19,379,307	20,891,204	19,016,554	20,611,050
Broward County	5,131,540	4,735,923	4,985,673	4,500,075	5,050,502
Total LU and County	25,288,639	24,115,230	25,876,877	23,516,629	25,661,552

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 2020, 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 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 affect 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.

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. Finally, the County is expanding the reclaimed water system to fulfill the total reclaimed water requirement under the outfall legislation.

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 October 5, 2015 and is valid for five (5) years. Additionally, injection wells 7 and 8 were constructed in 2014-2016 and are permitted through October 9, 2019. The County submitted the requisite permit renewal applications in a timely manner and the applications are presently under review by FDEP. Operations of Injection Wells 1 through 6 are administratively extended during the review period.



In parallel, FDEP has 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 disagrees with this regulatory agency determination and is challenging it through administrative procedures. Resolution of the challenge cannot be predicted with certainty, but it is expected that the process will be complete in the third quarter of 2021.

Although construction of injection wells 7 and 8 is complete, construction-related issues have delayed long term operation. The County developed a repair plan and recently received FDEP approval of the repair plan for injection wells 7 and 8.

The County's effluent management program currently includes a 10 MGD system providing 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 NRWWT 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. This project is currently under construction and is scheduled for completion in the year 2021.

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, monofills, 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 produces Class B residuals allowable for application to non-food agricultural sites.

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 NRWWT 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. 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



Section 4 – Regional Wastewater System

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 NRWTP and associated transmission and disposal facilities, or any part thereof, are retired or satisfied. The current Large User reserved capacity in the NRWTP 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 Ft. 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 NRWTP 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 NRWTP 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 455, 456, 458, 460 and 462*) were inspected on July 14, 2021 by Hazen and Sawyer. Master lift stations were selected based on their previous inspection history, and on a rotation; with priority given to stations with the longest time since the last inspection. Master lift stations appeared to be in fair to excellent condition and operating satisfactorily. A summary of the findings at each station is presented below.

MLS 455 - The inline booster-type station was in fair overall condition. All four pumps and respective piping appeared to be in fair condition, with pump No. 4 experiencing loud vibrations. Two of four pump bases were in poor condition, and the other two had recently been rehabilitated. Pump control valves and actuators appeared to be in fair condition, other valves were in fair condition. The backup power diesel generator was temporarily out of service due to ongoing replacement of transfer switch, a portable generator was in place. This site has an above-ground double-walled diesel tank, which was in fair condition. Electrical control panels appeared to be in fair working condition. The seal water system is in poor condition. The building interior and exterior were in fair condition. Fencing and driveway were in good condition.

MLS 456 - The inline booster-type station was rehabilitated three years ago and in excellent overall condition. Pumps, motors, and interior station piping were in excellent condition. Pump control valves and actuators were in excellent condition, other valves were in excellent condition as well. The backup power diesel generator appeared to be in excellent condition. This site has an above-ground diesel tank with a containment area, which were in excellent condition. Electrical control panels were in excellent working condition, but one panel was not replaced during the rehabilitation and is in fair condition. The building interior and exterior were in excellent condition. Fencing and driveway were in excellent condition.



MLS 458 - The inline booster-type station was in good overall condition. Pumps, motors, and interior station piping were in good condition with signs of leaking on the liquid rheostats.

Pump control valves and actuators appeared to be in good condition, other valves were in good condition as well, with new instrumentation on all three pumps. Pump bases were in poor condition, with signs of rusting and corrosion. This site has an on-site lift station that appeared to be in fair condition. The backup power diesel generator was out of service at the time of site visit, but a temporary portable generator was on site. This site has a buried diesel tank. Electrical control panels appeared to be in fair working condition. A new PLC was seen on site for installation. The seal water system was broken at the time of site visit. The building interior and exterior were in fair condition, with missing hurricane hardening on some of the exterior openings. Four exhaust fans on the roof were recently replaced except two. Fencing and driveway were in good condition.

MLS 460 - The inline booster-type station was in good overall condition. Pumps, motors, and interior station piping were in good condition. Pump control valves and actuators appeared to be in good condition, other valves were in good condition as well. New suction transmitters were recently replaced on influent line. The backup power diesel generator appeared to be on good condition. . This site has a buried diesel tank. This site has an on-site lift station that appeared to be in fair condition. Electrical control panels appeared to be in fair working condition, with loose wiring in the electrical room and around the outdoor air conditioning unit. The building interior and exterior were in fair condition, with paint, pressure washing and hurricane hardening on exterior openings needs. Fencing and driveway were in fair condition.

MLS 462 - The inline booster-type station was in fair overall condition. Pumps, motors, and interior station piping were in fair condition. Pump bases were in poor condition and corroding out. Pump control valves and actuators appeared to be in fair condition, other valves were in fair condition as well. This site has an on-site lift station that appeared to be in fair condition. The backup power diesel generator appeared to be in good condition. This site has an above-ground ground diesel tank, which appeared to be in good condition. Electrical control panels appeared to be in fair working condition. The building interior and exterior were in good condition, with hurricane hardening needed for all exterior openings. Fencing and driveway were in fair condition. The air conditioning was not working properly at the time of site visit. The drainage on the roof appeared to be poor with collected rainwater and clogged drain scuppers.

4.7.2 North Regional Wastewater Treatment Plant

The visual inspection of the NRWTP was performed on July 8, 2021 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. Five bar screens have now been replaced; bar screen no. 2 is



Section 4 – Regional Wastewater System

pending startup. The headworks structure should undergo routine inspections for concrete degradation and subsequent repair.

- Transformers 9 and 10 are replaced and operational.
- Four of the five grit removal structures are constructed and awaiting installation of equipment. The fifth grit removal structure (for Module A) is under construction.
- As a facility resilience improvement project, the 54” aeration basin influent pipes from the grit removal facilities to Modules B and C were constructed and are in operation. Also, the aeration basin influent pipes from the grit removal structure to Module A are under construction. Venturi meters are scheduled for replacement in an upcoming, separate facility resilience improvements project (NRWWTP Facility Improvements – Biological).
- An updated inspection of the headworks by a qualified structural professional should be performed on a routine basis.
- Treatment Module A
 - Module A was out of service for fine bubble diffuser installation. The basin has concrete cracks and spalls on the underside of the walkways. Access to the walkways was blocked off.
 - Clarifiers were in good condition. Rehabilitation of three clarifiers is ongoing. Clarifier A-3 was recently rehabilitated (2016) and Clarifiers A-1, A-2, and A-4 rehabilitation is ongoing.
 - 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.
 - Waste Activated Sludge (WAS) pumps and piping appeared to be in fair to good condition.
- Treatment Module B
 - Exterior walls of basin structures appeared to be in good condition. Unit motors for mixers were in fair condition, with several motors showing signs of wear, tear and aging. The mixers are scheduled for replacement by fine bubble diffusers in the next three months.
 - Clarifiers were in good condition, with all showing moderate corrosion in the area of the drive mechanisms and light corrosion was noted on the skimmer arm. Corrosion was also noted at the handwheels located on the top of the RAS pump building. Clarifier B-1 and B-3 are scheduled for maintenance as soon as the module is taken out of service for the Fine Bubble project (scheduled for Q3 2021). Clarifier B-2 is undergoing rehabilitation and Clarifier B-4 was rehabilitated in 2018.



Section 4 – Regional Wastewater System

- RAS pumping station appeared to be in fair to good condition. Pumps, piping and valving showed light corrosion. The RAS and WAS pump stations are scheduled for rehabilitation under the upcoming NRWTP Facility Improvements – Biological project.
- WAS pumps and piping appeared to be in fair to good condition.
- Treatment Module C
 - Module C was in service and in overall good condition. The new blowers were operational and in excellent condition.
 - Clarifier Nos. C-2, C-3, and C-4 were recently rehabilitated (2019). Clarifier C-1 is scheduled for rehabilitation later this year.
 - The RAS pump station is in good condition. Pumps, piping and valving showed light corrosion. The RAS and WAS pump stations are scheduled for rehabilitation under the upcoming NRWTP Facility Improvements – Biological project.
 - The WAS pumps and piping appeared to be in fair to good condition.
- Treatment Module D
 - Exterior walls of basin structures appeared to be in good condition. Unit motors for mixers were in fair to good condition, with several motors showing signs of wear, tear and aging. Mixers/motors will be removed and replaced with fine bubble diffusers under the upcoming Fine Bubble Improvements project.
 - Clarifiers were in good condition. Minor corrosion was noted.
 - RAS pumping station appeared to be in fair to good condition. Pumps, piping and valving showed light corrosion. The RAS and WAS pump stations are scheduled for rehabilitation under the upcoming NRWTP Facility Improvements – Biological project.
 - WAS pumps and piping appeared to be in fair to good condition.
- Treatment Module E
 - 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 area of the drive mechanisms.
 - The RAS pump station in general appeared to be in good condition. Pumps, piping and valving showed minor to moderate corrosion.
 - WAS pumps and piping appeared to be in good condition.
 - The Module E blowers are under construction for future provision of air to Module D. Two blowers were added but are not in operation yet.
- Ocean Outfall Pump Station



Section 4 – Regional Wastewater System

- The Outfall pumps appeared functional and in good condition.
- Outfall Pump No. 4 was out of service while the liquid rheostat was being replaced but was scheduled for startup later during the day of inspection
- Electrical equipment:
 - The motors, liquid rheostat system, and associated heat exchangers appeared to be in good condition. Liquid rheostat for Pump No. 6 was recently replaced and liquid rheostat for Pump No. 4 was installed and preparing for startup.
 - The wet well is presently undergoing concrete repairs. Additional concrete spalling and exposed rebar was discovered during construction and will be scheduled for repair. In parallel, the County is continuing with the future replacement of this pump station.
 - 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 are presently being replaced. IW Pump No. 4 is not in service while the VFD is constructed.
 - The louvers and hurricane shutters on the building were replaced in the last month.
- Water Reuse System
 - The reuse system pumping station appeared to be in good condition and under an expansion project.
 - The new self-backwashing sand filters and feed pumps were constructed this year and are in excellent condition.
 - The reuse chlorine contact chamber and the new reuse chlorine contact chamber are in good to excellent condition.
 - The new high- head and low- head reuse pumps are installed and are in excellent condition.
 - The new Electrical Building 2 was constructed, and electrical equipment was installed but was not operational at the time of the site visit.
- 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 has been replaced and the internal gas mixing system is being constructed under the current construction project. Two primary digesters will undergo rehabilitation once the secondary digester is placed back in service, followed by a fourth digester.



Section 4 – Regional Wastewater System

- Progressive cavity sludge pumps appeared are in fair condition but are presently being replaced under the construction project.
- The North digester building electrical room is being refurbished under the current construction project.
- The boilers are under replacement under the current construction project. All boilers have been replaced except for Boiler No. 4 which is scheduled for 3Q 2021.
- Methane gas piping was in good condition; piping system was being rehabilitated at the time of inspection. Repairs are constant in the piping system due to age and the corrosive nature of the gas.
- Biosolids Processing
 - The Dissolved Air Flootation (DAF) thickeners appeared to be in fair to good condition and functional. DAF thickener 3 and 4 were out of service for rehabilitation during the visit. 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 will receive new skimmer equipment and pressurization tank systems under the current construction project. The polymer feed system serving the DAF thickeners was removed under the current construction project.
 - All belt filter presses, and their drive motors and associated equipment were in fair condition and functional. 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. Belt press 9 was demolished. Two centrifuges are being installed under the current construction project. Two belt filter presses are scheduled for replacement under the current construction project. The remaining six belt presses will receive new sludge feed grinders and pumps with VFDs, polymer units and spray water pumps.
- 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. The two recently constructed above-ground bulk storage tanks were in excellent condition.
- Cogeneration System
 - The Cogeneration system appeared to be in excellent condition. The Cogeneration system was offline at the time of the site visit.
- 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 2021:

- Electrical building transformer #1 Bus duct replacement.
- Replacement of generator fuel storage tanks.
- Outfall motor #1 & #2 reconditioned.
- Outfall Motor #2 reconditioned. completed
- Installation of new out fall motor 1000 HP. completed
- Installation and replacement of Outfall #6 Motor controller.
- Replacement of 5 deep well motor VFD's (5 completed) project ongoing 60% completed
- Replacement of deep-well Strainers 1,2,3 and 5 (4 pending) project ongoing. 80% completed
- Installation of new louvers and hurricane shutters on injection well pump station
- Replacement of three fume hoods
- Rehabilitation of Fog Pumps, replacement of Lobes. completed
- Replacement of Thickener grinder pumps completed
- Replacement of Reuse / Thickener 3-Air Compressors. completed
- Rehabilitation of clarifiers in Module C.

Plant Modifications for FY 2022:

- Replacement of fume hoods
- New electrical building no. 2
- Installation of hypochlorite feed lines
- Total rehabilitation of three clarifiers
- Installation of diffused air system to A and B modules,
- Replacement of the five-ocean outfall motor liquid rheostat controllers.
- Replacement of exhaust fans.
- Replacement of five bar screens and screw presses(installed) Note 2- waiting on start-up
- Replacement of DAFT Tanks 1, 2 5 and 6 skimmer equipment and pressurization tank systems
- Replacement of Thickener BWAS pumps
- Installation of two new centrifuges
- Replacement of two belt presses
- Replacement of the belt press Polymer systems.
- Replacement of belt press sludge feed pumps with VFDs and new grinders
- Replacement of the SCADA system.



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 July 1, 2021. The facility, inclusive of liquid pumps, solids discharges area, liquids discharge area, and office building appeared to be in good working condition.

Facility modifications for FY 2021:

- Installation of lightning prediction and alarm system adjustments (complete)

Facility modifications for FY 2022:

- Construction of new administrative building



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.

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

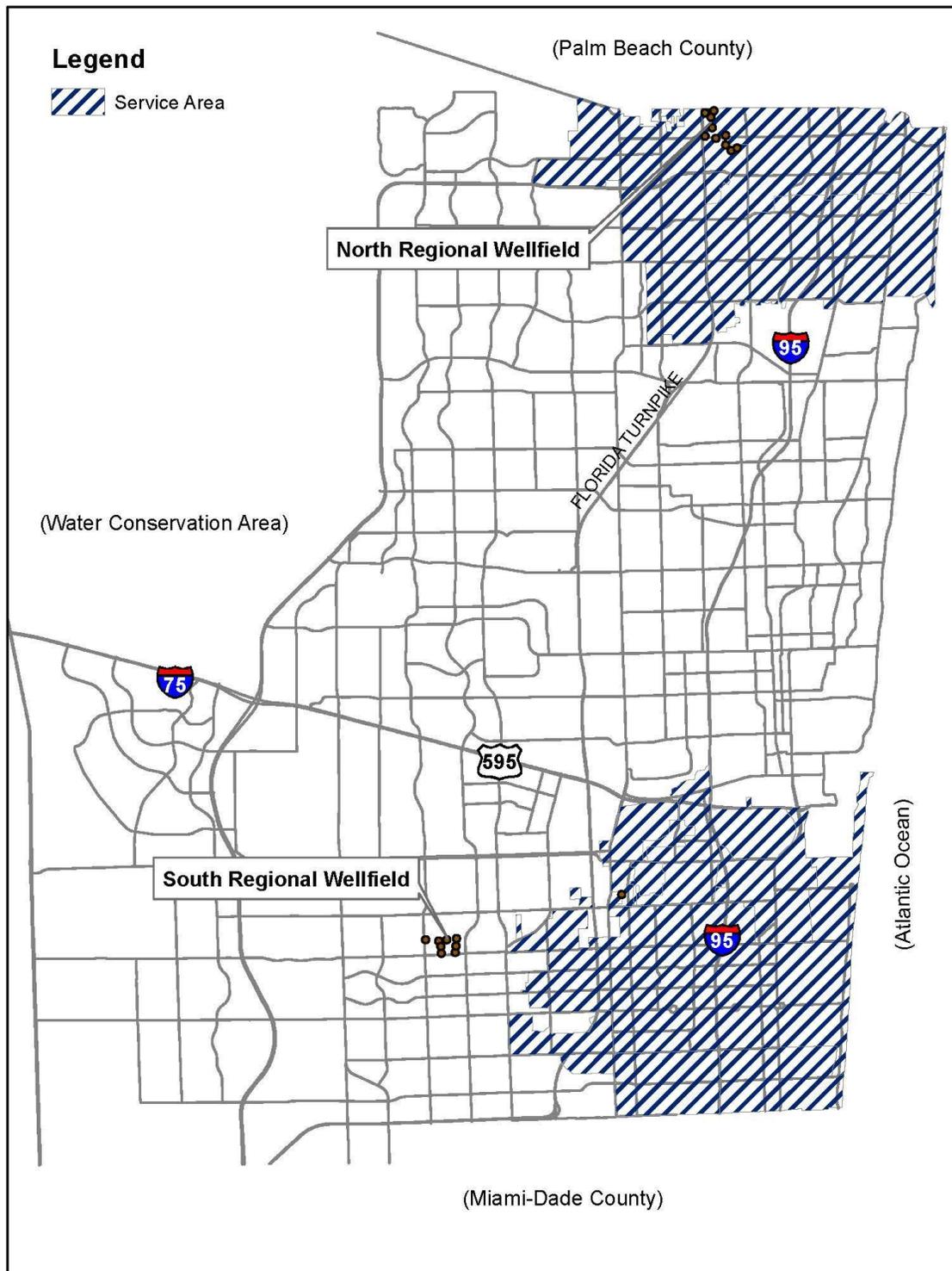


Figure 5-1. Regional Raw Water Service

Source: Broward County Water and Wastewater Services



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.

Fiscal Year	Deerfield	Broward County	NRWF
FY 2016	208,115	2,159,405	2,367,520
FY 2017	193,873	2,146,048	2,339,921
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

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.

Fiscal Year	Hallandale	Hollywood	Dania	FPL	Total SRW
FY 2016	1,148,577	1,344,525	660,040	526,610	3,679,752
FY 2017	1,363,827	1,401,756	647,368	437,357	3,850,308
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
FY2020	1,403,559	1,641,419	789,337	-	3,834,315

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 July 30 and 31, 2021. 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 vaults were undamaged. A new key card lock entry had recently been installed on the gate. The wellhead and associated piping and valves appeared to be in good condition. The sump pumps appeared to be in good condition as the well vault showed no obvious evidence of flooding. The emergency generator building interior and exterior were in good condition. Electrical equipment, including the backup generator, was in good condition.

Well 2 - Well 2 was in good condition. Security fencing and locked vaults were undamaged. A new key card lock entry had recently been installed on the gate. The wellhead and associated piping and valves appeared to be in good condition, with very minimal signs of corrosion. Electrical panel and equipment appeared to be in good condition. The sump pump 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.

Well 27 - Well 27 was recently rehabilitated and in good condition. Security fencing and locked vaults were undamaged. 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. Well 27 was recently placed back into service.

Well 29 - Well 29 was in excellent condition. Security fencing and locked vaults were undamaged. 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 operational condition as the well vault showed no obvious evidence of flooding.



Well 30 - Well 30 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 very minimal signs of corrosion. Electrical panel and equipment appeared to be in good condition. The sump pump also appeared to be in good, operational condition as the well vault showed no obvious signs of flooding.

Well 31 - Well 31 was in excellent condition. Security fencing and locked vaults were undamaged. 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 operational condition as the well vault showed no obvious evidence of flooding.

Well 32 - Well 32 was in excellent condition. Security fencing and locked vaults were undamaged. The wellhead and associated piping and valves appeared to be in excellent condition. The sump pumps appeared to be in operational condition as the well vault showed no obvious evidence of flooding. The emergency generator building interior and exterior were in good condition. Electrical equipment, including the backup generator, was in good condition.

Well 33 - Well 33 was in excellent condition. Security fencing and locked vaults were undamaged. 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, operational condition as the well vault floor showed no obvious evidence of flooding.

Well 45 - Well 45 was in good condition. Security fencing and locked vaults were undamaged. A new key card lock entry had recently been installed on the gate. The pavement looked like it had been cut to run wiring to the electrical panel. 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 good, operational condition as the well vault floor showed no obvious evidence of flooding.

Well 46 - Well 46 was in good condition. Security fencing and locked vaults were undamaged. A new key card lock entry had recently been installed on the gate. 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, operational condition as the well vault floor showed no obvious evidence of flooding.

5.7.2 South Regional Wellfield

Overall, the eight wells and two generators of the SRW were in good condition upon visual inspection on July 23, 2021. 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. The pump and motor, flow meter, piping, valves, and pipe supports were recently replaced. Security fencing and vault locks were undamaged. Electrical panel and equipment appeared to be in good condition. The sump pump also appeared to be in good, operational condition as the well vault showed no obvious signs of flooding.

Well 18 - Well 18 was in good condition. Most of the components inside of the vault were replaced



Section 5 – Regional Raw Water Supply

during a recent rehabilitation project. This included the pump, pump base, motor, flow meter, piping, and valves. The new piping and valves appeared to be in good condition. Security fencing and vault locks were undamaged. The sump pump appeared to be in good, operational condition as the well vault showed no obvious signs of flooding. Electrical panel and equipment appeared to be in good condition. The Generator 1 was in good condition. 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 reported leaks by the County staff.

Well 19 - Well 19 was in good condition. The pump and motor, flow meter, piping, valves, and pipe supports were recently replaced. Security fencing and vault locks were undamaged. Electrical panel and equipment appeared to be in good condition. The sump pump also appeared to be in good, operational condition as the well vault showed no obvious signs of flooding.

Well 20 - Well 20 was in good condition. The pump and motor, flow meter, piping, valves, and pipe supports were recently recoated. Security fencing and vault locks were undamaged. Electrical panel and equipment appeared to be in good condition. The sump pump also appeared to be in good, operational condition as the well vault showed no obvious signs of flooding.

Well 21 - Well 21 was in good condition. The pump and motor, flow meter, piping, valves, and pipe supports were recently recoated. Most of the components inside of the vault were replaced. This included the pump, pump base, motor, piping, and valves. The new piping and valves appeared to be in good condition. Security fencing and vault locks were undamaged. The sump pump appeared to be in good, operational condition as the well vault showed no obvious signs of flooding. Electrical panel, equipment, and Generator 2 appeared to be in good condition. However, the roof in the generator room appeared to be in poor condition, with reported leaks by the County staff.

Well 22 - Well 22 was in good condition. The piping around the pump base was resealed last year during a sanitary survey. The piping and valves appeared to be in good condition, with minor corrosion noted on wellhead flange. Security fencing and vault locks were undamaged. Electrical panel and equipment appeared to be in good condition. The sump pump also appeared to be in good, operational condition as the well vault showed no obvious signs of flooding.

Well 23 - Well 23 was in good condition. The piping and valves appeared to be in good condition, with minor corrosion noted on wellhead flange. Security fencing and vault locks were undamaged. Electrical panel and equipment appeared to be in good condition. The sump pump also appeared to be in good, operational condition as the well vault showed no obvious signs of flooding.

Well 24 - Well 24 was in fair condition. The piping appeared to be in good condition, with minor corrosion noted on wellhead flange. There was a leak at the base of the air release valve. Security fencing and vault locks were undamaged. Electrical panel and equipment appeared to be in good condition. The well vault showed no obvious signs of flooding.



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 2021 through 2025 in September 2020. 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 2025 are presented in Table 6-2.



Section 6 - Capital Improvement Program

Table 6-1. Capital Improvement Programs as of September 30, 2020						
Capital Budgets	Water Treatment	Water & Sewer Mains	Wastewater Treatment	Regional Transmission	Engineering Services & Misc.	Total
Unspent Prior Budget¹	\$ 13,270,033	\$ 100,148,484	\$ 186,841,107	\$ 15,099,754	\$ 8,736,646	\$ 324,096,024
2021	8,625,060	37,174,750	7,055,560	7,013,450	41,758,690	101,627,510
2022	3,690,000	57,243,120	30,187,000	500,000	5,175,000	96,795,120
2023	12,800,000	24,790,000	28,189,100	12,100,000	10,000,000	87,879,100
2025	3,425,000	46,220,000	48,400,000	6,500,000	3,550,000	108,095,000
2025	2,450,000	17,330,000	20,800,000	500,000	3,550,000	44,630,000
Totals	\$ 44,260,093	\$ 282,906,354	\$ 321,472,767	\$ 41,713,204	\$ 72,770,336	\$ 763,122,754
Five-Year CIP Funding						
Bonds FY 2020-2025	\$13,373,600	\$ 167,556,565	\$ 281,204,200	\$ 26,063,450	\$ 30,750,000	\$ 518,947,815
Cash FY 2020-2025 ²	7,060,954	69,569,789	6,479,467	8,649,754	35,520,336	127,280,300
Beyond 2025 ³	23,825,539	45,780,000	33,789,100	7,000,000	6,500,000	116,894,639
Totals	\$ 44,260,093	\$ 282,906,354	\$ 321,472,767	\$ 41,713,204	\$ 72,770,336	\$ 763,122,754
¹ Unspent prior budget totals are as a September 30, 2020. ² Cash reflects net revenues, capital recovery charges, large user contributions and grants. ³ Reflects effects of construction period. It is currently expected that \$646M of the \$763M program will be spent by 2025. Since the construction period extends beyond 2025, the remaining \$117M will be spent in subsequent years. The amount to be spent during the construction period and beyond FY 25 may be revised once the impact of COVID-19 on system FY 21 revenues is known.						
Source: Broward County Water and Wastewater Services						



Table 6-2. Capital Projects Budgets by Type Through Fiscal Year 2025	
Water Treatment	Budget
Water Treatment Plant Expansion	\$ 750,000
Water Treatment Plant IRR ¹ & Misc. Projects	\$ 43,510,093
Water Treatment Subtotal	\$ 44,260,093
Water Distribution and Sewer Collection	
Neighborhood & Local Utility Projects (NP & LUP)	\$ 137,018,594
Retail Sewer Main Improvements	\$ 100,676,513
Retail Water Main Improvements	\$10,367,248
Miscellaneous Main Improvements	\$ 5,952,973
Potable Water Storage Improvements	\$ 15,185,974
Lift Station Improvements	\$ 13,705,052
Water Distribution and Sewer Collection Subtotal	\$ 282,906,354
Wastewater Treatment	
NRWWTP Facility Enhancements	\$ 227,039,675
NRWWTP Equipment Rehabilitation	\$ 89,637,592
Wastewater Plant IRR ¹ & Misc. Projects	\$ 4,795,500
Wastewater Treatment Subtotal	\$ 321,472,767
Regional Transmission	
Master Pump Station Improvements	\$ 31,205,417
Force Main Improvements	\$ 10,507,787
Regional Transmission Subtotal	\$ 41,713,204
Engineering/Miscellaneous Services	\$ 72,770,336
GRAND TOTAL	\$ 763,122,754
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 2025 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 2021 CIP update. The Outfall/Effluent Pump Station, for example, is currently carried at \$38 million, which previously assumed a certain outcome of an undefined regulatory process (the



assumption is that the State does not require High Level Disinfection in the future). Should such disinfection be required, the cost of the pump station would approach \$78 million, a \$40 million increase. The County is presently considering budget adjustments for the pump station under the 2021 CIP update and may further increase the budget in future years as planning and design progresses.

Additionally, the construction costs of sodium hypochlorite (\$13.2 million) and the addition of generators for the Effluent Pump Station (\$22 million) may also be added in future fiscal funding years. The total updated CIP could be increased to approximately \$838.3 million dollars (approximately \$75.2 million above the CIP presented in Tables 6-1 and 6-2). However, as stated in Note 3 of Table 6-1, much of these costs will be carried over to years beyond the 5-year CIP period. Assuming the above-mentioned projects remain at the high end of the current estimates, and the construction extends beyond 2025, the remaining \$117 million can be assumed to be spent in years that follow the 2025 date. (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 3% annually through Fiscal Year 2025. The County estimates it will issue approximately \$175 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 \$44 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 \$275 million dollars over



the 20 plus years project life. The 5-year CIP includes \$137 million dollars for neighborhood and LUP projects.

6.6 Other Including Mains, Lift Station Improvements and Potable Storage

The CIP includes \$116 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. Potable water storage improvements, \$15 million, are included for replacing existing aging systems and enhancing water storage capacities to meet current and future demands. The CIP also includes \$14 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 \$227 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 \$94 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 NRWTP.

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. Currently, a new Regional Wastewater Transmission System Master Plan is underway and is anticipated to be completed by mid-2021. The Plan will recommend 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 15.5% 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 average monthly water and wastewater bills of a residential customer consuming 5,000 gallons per month during the fiscal years 2017 to 2021 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 2021 was \$69.65 per month for the average water-using residential customer and is unchanged from Fiscal Year 2020.



Fiscal Year	Water Charges				Wastewater Charges				Total	
	Fixed ¹	Volume	Total	Percent Change	Fixed	Volume	Total	Percent Change	Dollars	Percent Change
2017	\$ 16.01	\$ 9.81	\$ 25.82		\$ 18.69	\$ 19.30	\$ 37.99		\$ 63.81	
2018	\$ 16.36	\$ 10.06	\$ 26.42	2.3%	\$ 19.26	\$ 19.90	\$ 39.16	3.1%	\$ 65.58	2.8%
2019	\$ 16.79	\$ 10.36	\$ 27.15	2.8%	\$ 19.88	\$ 20.55	\$ 40.43	3.2%	\$ 67.58	3.0%
2020 ²	\$ 17.13	\$ 10.68	\$ 27.81	2.4%	\$ 20.54	\$ 21.30	\$ 41.84	3.5%	\$ 69.65	3.1%
2021 ²	\$ 17.13	\$ 10.68	\$ 27.81	0.0%	\$ 20.54	\$ 21.30	\$ 41.84	0.0%	\$ 69.65	0.0%

¹ Includes customer charge
² Based on rates adopted by the Board effective October 1, 2019
Source: Broward County Water and Wastewater Services

The minimum monthly fixed charges and the volume charges for most retail services as of October 1, 2019 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 \$4.54 that is applied to the water portion of the bill. For Fiscal Year 2021, WWS retail water and wastewater rates did not increase.

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.

Service Location or Type	Meter Size (inches)	Water (\$)	Wastewater (\$)
Residential	5/8" Residential	12.59	20.54
	1 (ARC* < /=20,000 GAL)	12.59	20.54
	1 (ARC* >20,000 GAL)	36.26	47.67
	1 ½	72.78	129.89
Commercial, Municipal and Institutional	5/8	18.74	27.48
	1	43.43	37.50
	1 ½	97.65	152.01
	2	248.31	428.65
	3	511.30	1,156.45
	4	4,780.05	2,238.20
	6	8,806.10	13,754.48
	8	10,572.13	14,908.40
Retail Water Sales for Resale	Per Meter	65,563.42	
Multi Family and Mobile Home (per unit)	All sizes	10.43	16.16
Hotels and Motels (per dwelling unit)	All sizes	6.93	11.09
Recreational Vehicles (per dwelling unit)	All sizes	7.76	11.92
Water Private Fire Protection	All sizes	128.82	
Irrigation	5/8	15.49	
	1	30.67	
	1 ½	84.65	
	2	194.91	
	3	444.37	
	4	1,966.15	
Reclaimed Water	5/8	12.86	
	1	12.86	
	1 ½	72.78	
	2	252.83	
	3	511.13	
	4	4,805.08	
	6	8,806.10	
	8	10,572.13	

Source: Broward County Water and Wastewater Services



Table 7-3. Broward County Schedule of Retail Rates Volume Charge (1,000 Gallons) Effective October 1, 2019				
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	1.62	0-15	4.26
	4-6	2.91	Over 15	No Charge
	7-12	6.82		
	Over 12	8.25		
Commercial, Municipal and Institutional	0 – 75% of Avg Consumption	4.15	All volumes	4.26
	Over 75% of Avg Consumption	8.30		
Sale for Resale	Water Treatment Charge	2.51		
	Water Transmission Charge	0.12		
Multi Family and Mobile Home (per unit)	0-2	1.62	0-8	4.26
	3-4	2.91		
	5-6	6.82	Over 8	No Charge
	Over 6	8.25		
Hotels and Motels (per unit)	0 – 75% of Avg Consumption	4.15	All volumes	4.26
	Over 75% of Avg Consumption	8.30		
Recreational Vehicles (per unit)	0 – 75% of Avg Consumption	4.15	All volumes	4.26
	Over 75% of Avg Consumption	8.30		
Private Fire Protection	All volumes	6.82		
Irrigation				
5/8" meter	0-8	6.85		
	Over 8	8.30		
1" meter	0-22	6.85		
	Over 22	8.30		
1 ½" meter	0-55	6.85		
	Over 55	8.30		
2 to 3" meter	0-142	6.85		
	Over 142	8.30		
Reclaimed Water	All Volumes	0.77		

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	Over 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	Over 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 2016 to 2020 is provided in Table 7-5.

Fiscal Year	Retail Water Service			Wastewater Service
	County	Coconut Creek	Total	
2016	6,765,714	1,736,453	8,502,167	5,339,240
2017	6,869,988	1,844,111	8,714,099	5,445,514
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

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. For Fiscal Year 2021, WWS increased the wholesale raw water charge by 3.10%.

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 Year 2017 to 2021 are provided in Table 7-6. The overall increase in the wholesale wastewater rates from 2020 to 2021 was 1.41%.

Fiscal Year	O&M (Per 1,000 gallons)		Debt Service (Per MGD)		IR&R
	Treatment	Transmission	Treatment	Transmission	Surcharge
2017	\$ 0.855	\$ 0.162	\$ 15,924.67	\$ 5,301.99	5%
2018	\$ 0.868	\$ 0.177	\$ 14,554.52	\$ 6,077.47	5%
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%

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, 2020, the 2020 total revenues were \$156 million. Five percent of Fiscal Year 2020 revenues is approximately \$7.8 million. The current balance in the RR&I Fund is \$7.8 million consistent with the requirement of the Bond Resolution.

7.2 Revenue Projections

Historic WWS revenues and costs from 2016 to 2020 and projected revenues and costs from 2021 to 2025 were provided by the County. Annual 2016 to 2025 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 2021, 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.

Section 7 – Financial Conditions

Table 7-7. Historical & Projected Ratios of Large Users’ Revenues and Wastewater Revenues (1,000s)

Revenue Source and Percent	Historical					Projected				
	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Total WWS Revenue	132,838	138,546	140,483	145,746	156,042	158,199	162,776	167,488	172,339	177,334
Large User Revenues	33,868	34,834	34,773	36,016	42,761	44,284	45,613	46,753	48,155	49,600
Percent of Total WWS Revenue	25.5%	25.1%	24.8%	24.7%	27.4%	28.0%	28.0%	27.9%	27.9%	28.0%
Regional Raw Water Revenues	857	803	866	1,062	908	915	922	931	940	958
Percent of Total WWS Revenue	0.6%	0.6%	0.6%	0.7%	0.6%	0.6%	0.6%	0.6%	0.5%	0.5%
Sale for Resale/Water	6,247	6,688	6,975	7,258	8,372	8,000	7,402	7,475	7,550	7,587
Percent of Total WWS Revenue	4.7%	4.8%	5.0%	5.0%	5.4%	5.1%	4.5%	4.5%	4.4%	4.3%

Source: Broward County Water and Wastewater Services



Historical and projected WWS revenues and costs from 2016 to 2025 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 2021 to 2025 are provided as follows.

- Fiscal Year 2020 was used as the base year from which projections were developed. The annual water and wastewater revenues and expenditures were based on Fiscal
- Year 2020 actual values from WWS financial statements prepared as of September 30, 2020.
- Fiscal Year 2021 revenues and expenditures were projected based upon the rates approved by the County, which were implemented October 1, 2019 and estimated expenses through Fiscal Year 2021.
- Revenues for Fiscal Years 2021 through 2025 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 2021 were estimated to be 1% annually for water customers and 1% annually for wastewater customers.
- Retail rate increases from Fiscal Years 2022 through 2025 of approximately 3% 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. The Board has not yet considered these rate increases. If any 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 2021. For 2021, these costs were increased by 3% from the previous year. From 2022 through 2025, the costs were increased by 3% 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 2021 through Fiscal Year 2025. 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, 2020 present the computation of debt service coverage on all outstanding revenue bonds as 1.71 for Fiscal Year 2020, 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 \$30.6 million was generated during Fiscal Year 2020.



Section 7 – Financial Conditions

Table 7-8. Schedule of Historical and Projected Revenues, Expenses, and Debt Service in \$1,000 and Debt Service Coverage

Revenues:	Historical					Projected				
	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Water	\$ 48,106	\$ 50,620	\$ 51,788	\$ 54,856	\$ 54,872	\$ 55,695	\$ 57,366	\$ 59,087	\$ 60,860	\$ 62,685
Wastewater	76,890	79,411	80,976	83,942	91,727	94,020	96,841	99,746	102,738	105,821
Other ¹	7,417	7,507	5,661	4,506	7,311	7,384	7,458	7,533	7,608	7,684
Interest Income	425	1,008	2,058	2,442	2,132	1,100	1,111	1,122	1,133	1,145
Total Revenues	\$ 132,838	\$ 138,546	\$ 140,483	\$ 145,746	\$ 156,042	\$ 158,199	\$ 162,776	\$ 167,488	\$ 172,339	\$ 177,334
Current Expenses:										
Water Transmission & Distribution	\$ 11,441	\$ 11,100	\$ 12,450	\$ 13,410	\$ 12,528	\$12,904	\$ 13,291	\$ 13,690	\$ 14,100	\$ 14,523
Water Source of Supply, Treatment & Pumping	9,817	9,468	10,619	11,438	10,685	11,006	11,336	11,676	12,026	12,387
Wastewater Collection & Transmission	11,262	12,134	11,794	12,332	12,681	13,061	13,453	13,857	14,273	14,701
Wastewater Treatment	17,724	18,803	18,637	19,337	19,692	20,283	20,891	21,518	22,164	22,828
Customer Service	4,953	5,429	5,833	6,222	5,908	6,085	6,268	6,456	6,650	6,849
Administrative/General	14,920	15,940	15,522	16,877	21,232	21,869	22,525	23,201	23,897	24,614
Total Current Expenses	\$ 70,117	\$ 72,874	\$ 74,855	\$ 79,616	\$ 82,726	\$ 85,208	\$ 87,764	\$ 90,397	\$ 93,109	\$ 95,902
Net Revenues	\$ 62,721	\$ 65,672	\$ 65,628	\$ 66,130	\$ 73,316	\$ 72,992	\$ 75,012	\$ 77,091	\$ 79,230	\$ 81,432
Debt Service: Senior Lien Debt:										
Series 2005-A Bonds										
Series 2009-A Bonds	\$2,367	\$ 2,363	\$ 2,363	\$ 1,985	\$ 1,984	\$ 1,700	\$ -	\$ -	\$ -	\$ -
Series 2012-A Bonds	8,251	8,253	9,037	8,723	3,670	3,755	3,757	3,767	3,761	3,763
Series 2012-B Bonds	5,523	5,523	11,057	16,371	16,370	14,271	14,271	14,263	14,270	14,268
Series 2012-C Bonds	10,940	10,942	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	6,885	6,885	9,515	11,209	11,208	11,210	11,211
Series 2019-A Bonds	-	-	-	-	8,731	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
Total Debt Service	\$ 36,079	\$ 36,079	\$ 36,077	\$ 36,077	\$ 42,750	\$ 45,570	\$ 45,566	\$ 45,567	\$ 45,570	\$ 45,571
Debt Coverage Senior Lien	1.74	1.82	1.82	1.83	1.71	1.60	1.65	1.69	1.74	1.79
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 12/31/2020 (Based on Usage of 5,000 Gallons Per Month for a 5/8-inch meter)			
Utility	Water	Sewer	Total
Sunrise (outside City) ¹	51.64	63.10	114.74
Davie	40.58	75.68	116.26
Wilton Manors	50.30	54.49	104.79
Oakland Park	50.00	50.71	100.71
Dania Beach ¹	35.00	58.82	93.82
Sunrise (inside City) ¹	41.32	50.48	91.80
Fort Lauderdale (outside City)	32.29	56.41	88.70
Hollywood ¹	28.74	56.36	85.10
North Lauderdale ¹	32.30	47.25	79.55
Parkland	26.38	59.10	85.48
Margate (outside City)	39.22	39.93	79.15
Miramar	34.88	45.00	79.88
Coconut Creek ¹	40.22	30.56	70.78
Pembroke Pines	31.80	36.81	68.61
Cooper City	28.69	42.57	71.26
Broward County (WWS)¹	27.81	41.84	69.65
Plantation ¹	24.34	44.70	69.04
Pompano Beach (outside City)	36.16	38.58	74.74
North Springs Improvement District	36.09	32.31	68.40
Coral Springs	24.46	46.55	71.01
Fort Lauderdale	25.83	45.13	70.96
Hallandale Beach ¹	26.06	41.28	67.34
Tamarac	21.80	42.75	64.55
Margate (inside City)	31.38	31.94	63.32
Lauderhill	22.41	39.25	61.66
Royal Waterworks ¹	27.98	35.92	63.90
Pompano Beach (inside City)	28.93	30.86	59.79
Deerfield Beach ¹	28.25	24.53	52.78
Coral Springs Improvement District	27.57	27.57	55.14
Average Water & Sewer for Broward	32.84	44.50	77.34
Water Only			
Hillsboro ¹	34.41		34.41
Sewer Only			
Pembroke Park ¹	-	58.09	58.09
Lauderdale By the Sea ¹	-	41.32	41.32
Tri-County Utilities			
Palm Beach County	24.57	30.04	54.61
Miami-Dade County	16.23	31.16	47.39

¹ The rates did not change from 2019 to 2020

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 Policies Protecting WWS - WWS purchases a property insurance policy to protect its' approximately \$533 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 5% of the Total Insured Value 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 \$25,000 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, 2020. 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, 2020 to March 1, 2021.

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 \$533 Million. Coverage is provided through ACE American Insurance Company, an admitted A++ XV carrier rated by AM Best, as the lead carrier providing \$50 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 \$1Million 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 property insurance program on March 1st, 2021. The premium for the Water and Wastewater Insurance Property Program renewal is \$1,130,000 for an overall rate increase of 3.67%, this is inclusive of a decrease in values of 2.02%. This is the fourth time since 2012 that Broward County will see a rate increase. Significant insured damages from Hurricane Harvey, Hurricane Irma and Hurricane Maria have placed increased pressure on the reinsurance market to recoup losses.

By way of comparison, the noted rate increase of 3.67% compares favorably based on preliminary data. Similar sized markets to Broward County with significant prior losses are experiencing rate increases of 25%, and up to 10% increases with no reported losses. Water and Wastewater Services insured physical assets comprise 8.2% of Broward County's assets.

