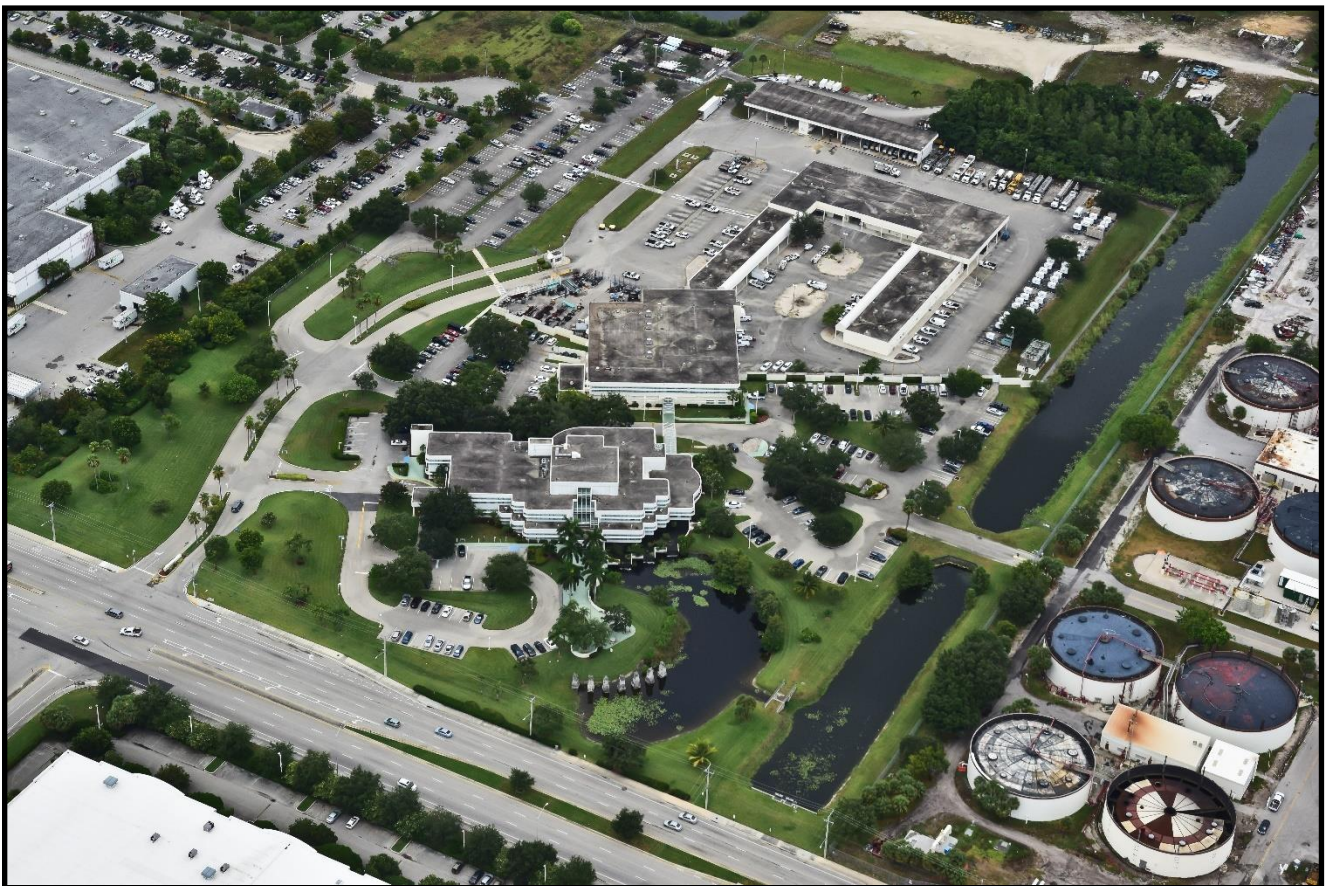


**BROWARD COUNTY
WATER AND WASTEWATER SERVICES
ANNUAL REPORT
FISCAL YEAR 2018**

"Our Best in Every Drop"



Final Report Prepared July 2019 by
Brown and Caldwell, Inc.



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Section 1 Introduction

1.1 Purpose of the Report

The purpose of this Annual Report from Consulting Engineers for Water and Wastewater Services (referred throughout as WWS or County) 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 57,314 customers and sewer only to approximately 2,806 customers; the North Regional Wastewater System, 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

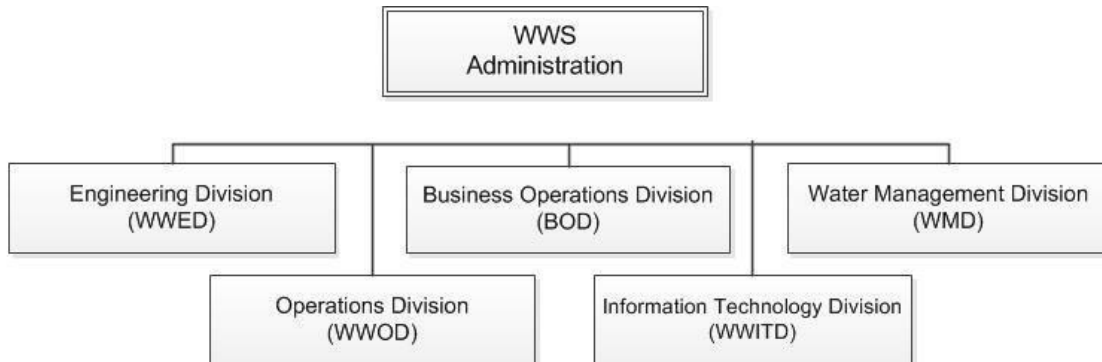
Section 2 Administration and Management

2.1 History and Organization of Water and Wastewater Services

The Broward County Utilities Division 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). In 1976, to achieve fiscal consolidation, the County established uniform rates throughout its service areas. The water utility service area is divided into 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 Water and Wastewater Services (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 401 people, including 19 certified water operators, 25 certified wastewater operators, 17 registered professional engineers, two professional geologists and two certified public accountants. There are seven 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 environmental impacts are regulated as described herein).

Section 2 - Administration and Management

2.2 Mission

The mission of Water and Wastewater Services (WWS) is multi-faceted. WWS is committed to performing 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.

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.

Section 2 - Administration and Management

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% as 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 2018.
- In May of 2016, Palm Beach County Water Utilities Department (PBCWUD) and Broward County Water and Wastewater Services (WWS) formed a partnership to construct a cooperative project that will utilize reclaimed water and conserve drinking water supplies in South Florida. The partnership highlights the commitment of both County governments to water conservation. The partnership will be implemented through an interlocal agreement that has been approved by both County Boards, and both Utilities are now actively engaged in the initial design of the project within their respective service areas. The partnership represents the most effective way to achieve Florida's 'Ocean Outfall Rule' that requires increased beneficial reclaimed water capacity and distribution. The project will provide up to 15 million gallons per day of reclaimed water to Palm Beach County to meet increasing demands throughout its reclaimed water service area. Through the utilization of this alternative water supply for irrigation needs, drinking water supplies will be conserved for future use.

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

Section 2 - Administration and Management

operates a reclaimed water facility, which provides reclaimed water to both industrial and retail customers. In addition, WWOD operates a state-certified laboratory, a nationally-recognized Industrial Pretreatment Program (IPP) and provides a critical environmental service through operating and maintaining a Septage Receiving Facility.

WWOD's Fiscal Year (FY) 2018 highlights included:

- The North Regional Wastewater Treatment Plant (NRWWTP) being awarded the First Place Winner of the Earle B. Phelps Award for "Outstanding Water and Wastewater Treatment Plant Performance" in the secondary treatment category by the Florida Water Environment Association (FWEA).
- Receiving the FWEA Large Collection System Award, which recognizes Wastewater Utilities who use Best Management Practices (BMP) and are considered outstanding in the maintenance and operation of their collection systems.
- Receiving the American Water Works Association Outstanding Water Distribution System Award. The award recognizes outstanding performance during the preceding year, which merits special recognition by the Section. WWOD demonstrated that it performs quality water system maintenance procedures through the efficient use of labor, materials, equipment, and innovative methods to keep its distribution system in good working condition to minimize health hazards.
- Rehabilitation of Raw water well number 4 at Water Treatment Plant 1A..
- The NRWWTP continuing to exceed the effluent ocean outfall nutrient reduction goals established by the State of Florida in response to the Ocean Outfall Legislation.
- Rehabilitation of several clarifiers (A3, B4, etc.) at the NRWWTP including a portion of the influent gates (bar screen #5). Deep well injection pump and motor number 1 and strainer assembly numbers 2 and 5 were rebuilt.
- Continued participation in public outreach campaigns such as FROG (fats, rags, oils, and grease reduction).

Water and Wastewater Engineering Division

Water and Wastewater Engineering Division (WWED) is committed to managing the WWS Capital Improvement Program (CIP) by ensuring that cost-effective, reliable infrastructure is available in a timely manner to meet current and projected demands, and capacities for raw water, potable water, sanitary sewer, and storm drainage within WWS' service areas.

WWED is responsible for developing and implementing the CIP for services provided by WWS including water, wastewater and drainage. The division is also responsible for coordination of developer-donated facilities, maintenance of record information on water and wastewater facilities, administration of water and sewer easements, and administration of permits to connect

Section 2 - Administration and Management

to the water and wastewater plants operated by WWS. WWED also provides general water and wastewater engineering support for Broward County. These processes 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 \$164 million.
- NRWTP Effluent Disposal and Treatment Enhancements to comply with the Ocean Outfall Legislation and proposed facilities operational modifications are estimated at \$241 million over the next five years
- Septic Tank Elimination Program, which will address the removal of all septic tanks within WWS service areas by year 2022.
- NRWTP Facilities Improvements is a comprehensive restoration project for the treatment plant, which will address aging infrastructure and processes and will be accomplished in several phases. The first phase of improvements began in 2017 and are scheduled to be completed by 2021.
- Potable water and pumping facilities rehabilitation and upgrades will address added system capacity and reliability. Required modifications are estimated at \$44 million over the next five years.
- Regional pump station rehabilitation will update aging facilities and increase reliability of the NRWTP transmission system. An estimated \$29 million will be dedicated to this effort over the next five years. Similarly, upgrades to the retail wastewater are budgeted at \$24 million over the next five years.

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.

Section 2 - Administration and Management

WMD highlights include:

- Managing north County surface water to recharge the Biscayne aquifer, inhibit coastal saline water intrusion and provide environmental enhancement.
- Providing support to water supply and water resource development programs, including the Broward County Water Supply Facility Work Plan Update, Broward County Comprehensive Plan Goals, Policies and Objectives and supporting document updates, C-51 Reservoir Project, Integrated Water Resources Management Master Plan, Broward County Water Resources Task Force/Technical Team and the Broward County Water Advisory Board/Technical Advisory Committee.
- Preparing South Florida Water Management District Annual Alternative Water Supply, Reclaimed Status, and Unaccounted-for Water Reports, and submittal of information to the Water Supply Project Database (WaSUP).
- Collection, analyses and tracking of wellfield withdrawals and surface water pumpage, water levels and chloride concentration sampling information required under Consumptive Use Permits for District 1A, District 2A/ North Regional Wellfield (NRW), South Regional Wellfield (SRW) and the Northern Recharge System.
- Providing hydrogeological technical support to WWOD and WWED for water supply and wastewater disposal projects.
- Providing assistance and technical support in the development of models to evaluate the impacts of predicted sea level rise on the District 2A wellfield, the potential benefit of the C-51 Reservoir and potential use of the Floridan Aquifer System as an Alternative Water Supply.

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

Section 2 - Administration and Management

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, and publishes an award-winning WWS employee newsletter.

BOD highlights included:

- Promoted the “Toilet Rebate” Program for water customers to replace inefficient high flow toilets with WaterSense high efficiency low flow toilets.
- Prepared annual financial statements.
- Worked with Water and Wastewater Information Technology Division to upgrade the Utility Billing Customer Information System.
- Managed the contract for utility bill printing, data processing, and mailing services.
- Performed regular and preventive maintenance at WWS grounds & facilities, and completed capital improvements at WWS Administrative Complex.

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.

WWITD highlights included:

- PeacePlus 9 was chosen to replace the aging Energy 7 platform as the Utility Billing Customer Information System for WWS. The project was completed in 2018 with the successful application and infrastructure upgrade from Energy 7 to PeacePlus 9, transitioning all daily activities for the customer service and bill payment functions to the new billing platform.
- Lablynx is used by WWOD to monitor the quality of the water for both the water and wastewater treatment plants, logging water test results for reporting compliance with EPA rules. The Lablynx infrastructure and software was upgraded to keep this system up to date with new hardware and supported software levels insuring the necessary data can be logged and reported; keeping WWS in reporting compliance with all government agencies.

Section 2 - Administration and Management

- Business Operations Division (BOD) requested the configuration of a Lock Box for customer invoice payments. WWITD partnered with BOD to implement a Lock Box with Wells Fargo to process customer payments electronically. Implementation of the Lock Box streamlined the payment process allowing consistent timely deposits and increased security around the payment process. Approximately 135,000 payments are processed with a dollar volume of \$33 million annually.
- General Ledger (GL) Translation for Maximo. To reduce steps to manually sync Maximo with PeopleSoft, the GLs were translated from the previous Advantage systems GL structure to the current PeopleSoft GL structure. This also prepares Maximo to be integrated with PeopleSoft in the near future.
- Upgrade to the Uninterrupted Power Supply (UPS) in the Incident Command Center (ICC). The previous UPS in the ICC was no longer adequate to maintain the IT systems it provided electricity to long enough to switch to generator power when loss of commercial power was interrupted. As this is WWS' disaster recovery site, maintaining mission critical systems is important. A new UPS with more capacity was installed to allow more time for generators to come online. The new UPS also provides more time for WWITD to bring systems down gracefully in the event of generator or switch failure, reducing the possibility of corruption or other issues when servers shut down abruptly.
- WWITD is continually looking to new technologies to improve operations and streamline processes. This year, the decision was made to move WWS' offsite backups to Microsoft Azure Government Cloud. By moving the backups to the Azure cloud, we reduce our cost and reliance on magnetic media, which deteriorates over time, and WWS gains multiple redundant copies offsite by how Microsoft Azure Cloud backs the data up in their datacenters. All data is secure having been encrypted in transit and encrypted at rest.

To continue to enhance the IT security posture at WWS, a ForeScout Network Access Control (NAC) appliance was added to the Utility Network. The NAC will allow WWITD to manage what devices can attach to the Utility Network and staff will be alerted to any rogue devices allowing WWITD to remediate quickly and efficiently.

- Water Treatment Sites 1A, 2A, 3A and 3B Security Hardening. Each of these sites had performed a Vulnerability Assessment in prior years. Many of the suggested findings were addressed to continue to mitigate potential threats to WWS facilities and potable water. Some examples included fence upgrades and repairs, surveillance improvements and repairs, and process review and improvements.

Section 3 – Retail Water and Wastewater Utilities System

Section 3 Retail Water and Wastewater Utilities System

This section describes the water and wastewater retail system including the service area, results of the physical inspection, 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. Over the past 10 years, the County's retail water system changed from 58,287 customers (accounts) to its present retail base of 57,314, as shown in Table 3-1. Broward County's total population is approximately 1.94 million. Of this amount, WWS' customer base represents a population of approximately 212,280 . The City of Coconut Creek, a sale for resale customer, has approximately 59,400 residents. Including the City of Coconut Creek, the retail water system serves approximately 14% of Broward County's total population.

In the past 10 years, the retail wastewater customer base has grown from 43,591 customers (connections) to its present base of 50,832 customers, as shown in Table 3-1. This represents an increase of 17%. This number will continue to grow through the County's extension of sanitary sewers into currently un-sewered 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. A summary of the Retail Water and Wastewater systems is presented in Table 3-1.

Over a 10-year period, the average daily production has been steady. This is attributable to the County's water conservation efforts, including year-round lawn irrigation restrictions. Water conservation became increasingly important following a series of droughts from 2007 through 2009.

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 2009	Fiscal Year 2018	Change	Percent Change
Water System					
Customer Base	Customers	58,287	57,314	-973	-1.67%
Water Service Area	Square Miles	40.99	41.00	0.01	0.02%
Water Lines	Miles	696.31	726.60	30.29	4.35%
Water Plant Capacity:					
Plant Capacity	MGD ¹	46.00	56.00	10.00	21.74%
Avg. Daily Production ²	MG ¹	20.29	22.21	1.92	9.46%
Max. Daily Production ²	MGD ¹	22.75	24.23	1.48	6.51%
Purchased Water	MGD ¹	7.11	6.55	-.56	-7.88%
Wastewater System					
Customer Base	Customers	43,591	50,832	7,241	16.61%
Wastewater Service Area	Square Miles	40.63	40.30	-0.33	-.81%
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					

Service Area and Customer Base

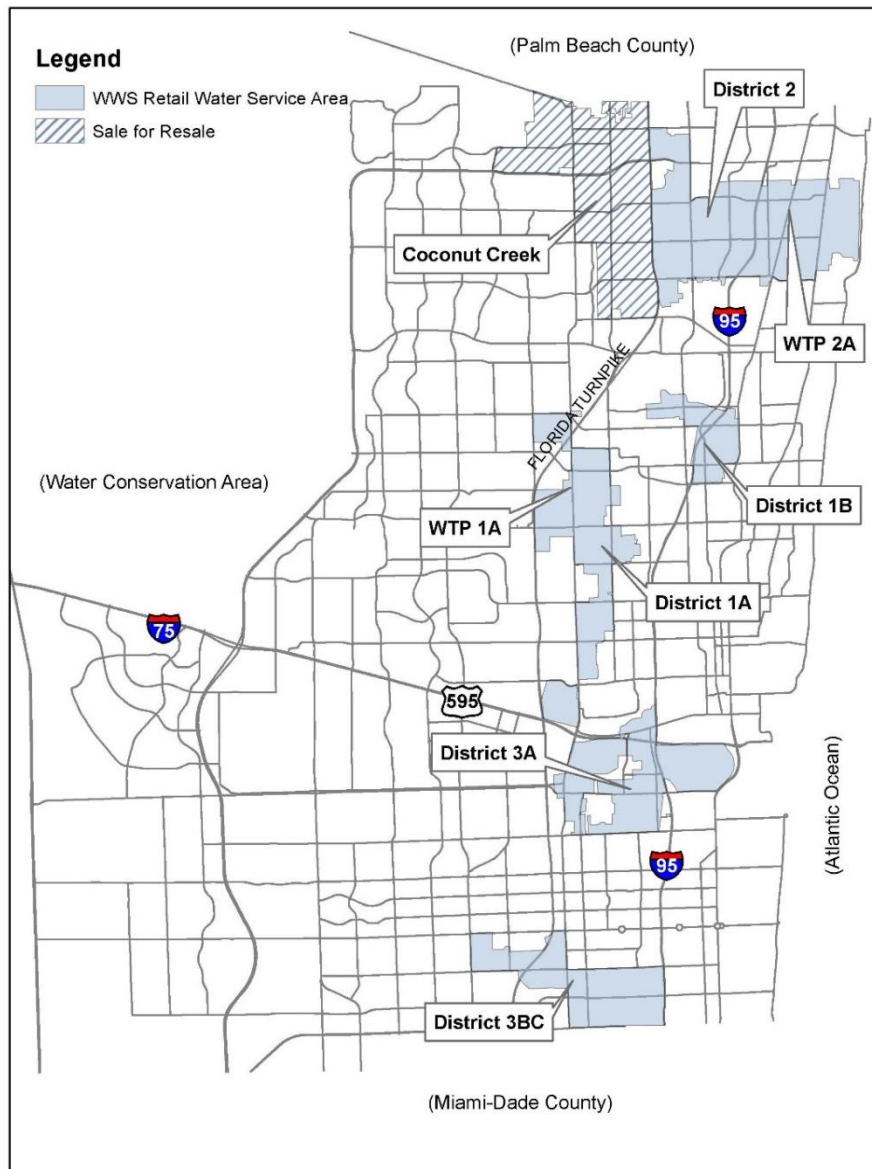
The retail water system is divided into three service areas - Districts 1, 2 and 3, which collectively cover approximately 41 square miles. Additionally, District 2 sells finished water to the City of Coconut Creek, which re-sells it to its customers. Two Water Treatment Plants (WTPs), one each in District 1 and District 2, have a combined permitted water treatment capacity of 56 MGD (million gallons per day). Potable water production is constrained by 20-year term consumptive use permits from the South Florida Water Management District (SFWMD) for withdrawal of Biscayne aquifer raw water. Based on the current 20-year permits, annual allocations from the Biscayne aquifer to serve District 1 and District 2 total 27.5 MGD through March 2028 including the raw water production from North Regional wellfield. An alternative water supply allocation of 8.4 MGD from the Floridan aquifer also is included in the 20-year permitted consumptive use withdrawal

Section 3 - Retail Water and Wastewater Utilities System

for Districts 1 and 2, for demand above the Biscayne aquifer allocation. The Utility's 5-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 distribution systems in the three Districts contain approximately 727 miles of water distribution and transmission mains with diameters ranging from 2-inch to 54-inch. Figure 3-1 shows the geographic location of each service district, as well as the finished water Large User (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 Water System Facilities and Capabilities as of September 30, 2018

	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	40.00	0	56.00
Current Permitted Allocation (MGD) ^{2,4}	10.04	17.50 ⁵	0	27.54
Storage Capacity (Million Gallons) ³	6.20	8.50	6.00	20.70
Distribution Mains (Miles)	248	255	224	727
Service Area (Square Miles)	11.90	14.80	14.30	41.00
Purchased Water (MGD) ²	0	0	6.58	6.58
Produced Water (MGD) ²	7.45	12.94	0	20.40

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, which expires as described in Section 3.5. 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 does not 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.

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Table 3-3 Summary of Treated Water Sold as of September 30, 2018

Fiscal Year	Average Number of Units¹	Average Number of Metered Customers²	Total Billed Treated Water (1,000 GAL)	Total Billed Water for Resale (1,000 GAL)³	Annual Average Daily Consumption (MGD)
2009	92,870	58,287	9,001,466	1,872,821	24.66
2010	93,183	58,323	8,628,876	1,754,856	23.64
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

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.

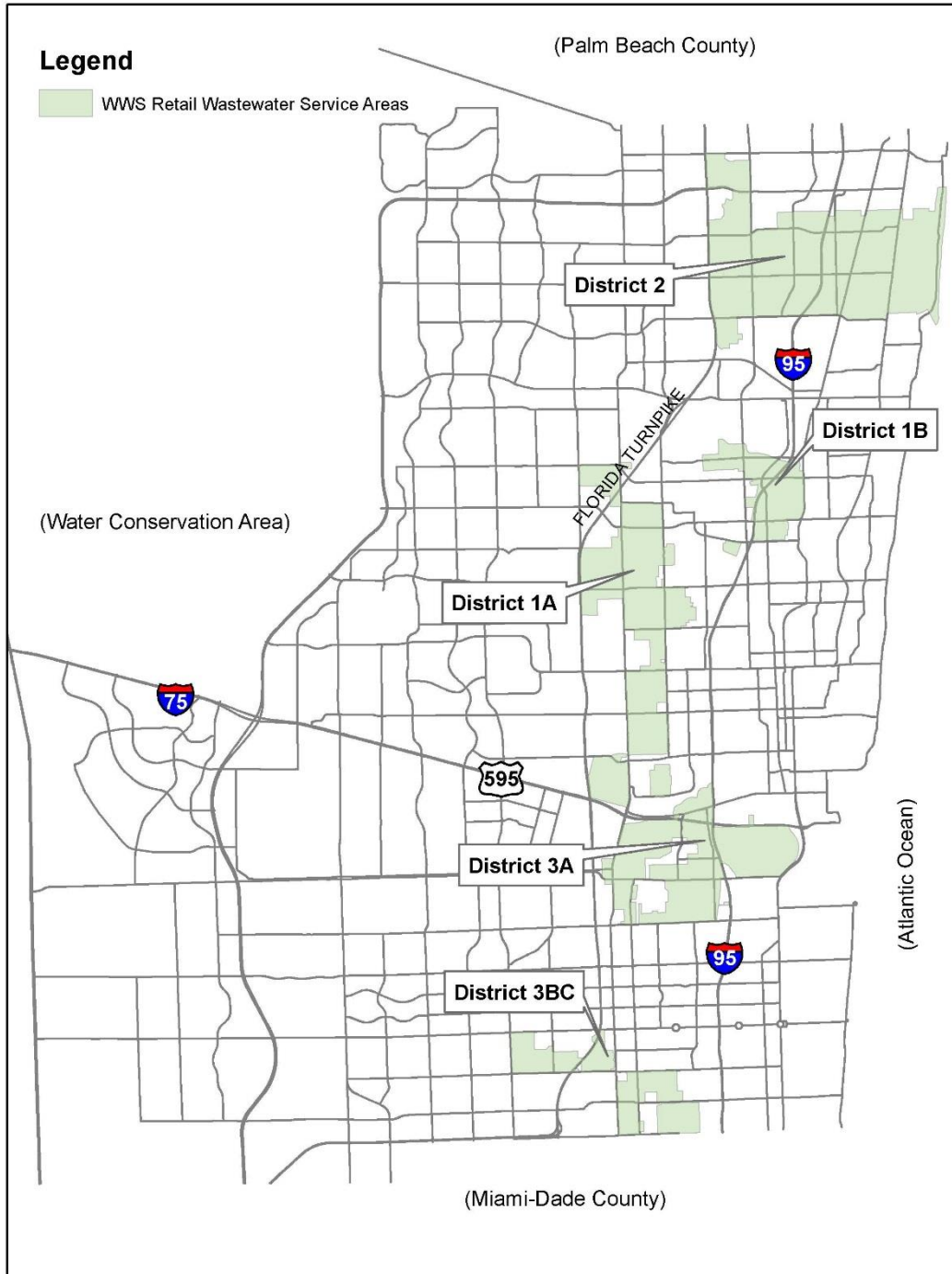
³ Included in the total water billed; primarily represents service to the City of Coconut Creek

Source: Broward County Water and Wastewater Services

The retail wastewater system service area covers approximately 40 square miles with approximately 450 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 3-4 presents retail wastewater system characteristics. A 10-year summary of the Retail Wastewater System customers and billed wastewater flows is presented in Table 3-5. Table 3-6 presents a five-year history of water usage by customer type.

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Figure 3-2 WWS Retail Wastewater Service Areas



Source: Broward County Water and Wastewater Services

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**Table 3-4 Retail Wastewater System Characteristics
as of September 30, 2018**

	District 1	District 2	District 3	Total
Service Area (Square Miles)	12.9	15.7	11.8	40.4
Gravity Sewer (Miles)	187.5	173.8	88.5	449.8
Lift Stations	76	101	65	242
Force Mains (Miles)	42.8	35.3	34.9	113.0
Retail Master Pump Stations	0	5	3	8

Source: Broward County Water and Wastewater Services

**Table 3-5 Summary of Billed Wastewater - Retail
as of September 30, 2018**

Fiscal Year	Average Number of Units ¹	Average Number of Metered Customers	Total Billed Treated Wastewater (1,000 GAL)	Annual Average Daily Flow (MGD)
2009	74,146	43,591	4,828,210	13.23
2010	74,547	44,953	4,744,985	13.00
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

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

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**Table 3-6 Water Usage - Five Year History (1,000 gallons)
Through September 2018**

Customer Class	Fiscal Year 2014	Fiscal Year 2015	Fiscal Year 2016	Fiscal Year 2017	Fiscal Year 2018
Residential	4,463,289	4,587,014	4,457,821	4,550,495	4,418,260
Commercial	1,868,525	1,961,350	1,924,866	1,920,261	2,078,129
Irrigation	362,321	401,151	383,027	399,232	375,012
Sale for Resale	1,754,927	1,789,374	1,736,453	1,844,111	1,885,328
Total¹	8,449,062	8,738,889	8,502,167	8,714,099	8,756,729

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.

Source: Broward County Water and Wastewater Services

3.2 Water System Regulatory Requirements

Current Water Quality Regulations

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 regulations 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) performs the analyses for 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, no Treatment Technique (TT) violations were noted, and no Action Levels were exceeded during FY 2018. 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 <http://www.broward.org/WaterServices/WaterQualityReport>

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

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five haloacetic acids (HAA5), are of primary concern. 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, whereas previously they were averaged over the entire system. Since Stage II compliance began in February 2012, WWS' water treatment plants have remained in compliance with D/DBPRs requirements.

The Ground Water Rule 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. Triggered monitoring uses sampling under the existing 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 system. Groundwater plants that provide 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. The current FAC 62-550.828 became effective on August 5, 2016; it was revised to adopt the revisions to EPA's Public Notification Rule relating to the Revised Total Coliform Rule (RTCR) published in the July 1, 2015 version of 40 C.F.R. 141, Subpart Q.

Currently, the County is in the process of implementing 4-log virus treatment in its 3A system. Improvements at the 1A WTP are complete, and 4-log treatment is currently in operation in the 1A system. Improvements at the 2A water treatment facility are complete and improvements at the 3A facility are in the construction phase. In FY 2018, WWOD maintained continuous compliance with the Ground Water Rule.

The EPA published the revised Total Coliform Rule (RTCR) in 78 FR 10269 on February 13, 2013 and minor corrections in 79 FR 10665 on February 26, 2014. Florida adopted the RTCR by reference under F.A.C. 62-550.830 on July 7, 2015; the current revised version of F.A.C. 62-550.830 became effective on August 5, 2016. The current version of F.A.C. 62-550.830 includes revisions from EPA's Public Notification Rule, as previously mentioned.

Florida currently has primacy for the revised rule, except for certain sections that cover systems serving less than or equal to 1,000 people. The RTCR is different from the old TCR in the following major ways:

- Systems were required to submit a formal sample siting plan (sample collection schedule and all sample sites, including sites for routine and repeat monitoring) by March 31, 2016 and start sampling per the plan starting on April 1, 2016, unless otherwise specified in 40 C.F.R. Part 141, Subpart Y.
- Total coliforms no longer trigger a violation, only *E. coli*. Acute violation of the MCL for *E. coli* includes:
 - If the system has an *E. coli*-positive repeat sample following a total coliform-positive routine sample.
 - If the system has a total coliform-positive repeat sample following an *E. coli*-positive routine sample.

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- If the system fails to take all required repeat samples following an *E. coli*-positive routine sample.
- If the system fails to test for *E. coli* when any repeat sample tests positive for total coliform.
- Assessment and corrective action required based on monitoring results.
- Exceedance of the 5.0% total coliform threshold results in one of the following:
 - Utility must conduct Level 1 assessment if this is the first exceedance of the 5% total coliform threshold in the last 12 months. It is a basic examination of the source water, treatment, distribution system and relevant operational practices.
 - The State or another outside agency must conduct a Level 2 assessment if there is more than one Level 1 assessment triggered in a 12-month period, *E. coli* is detected, or certain monitoring violations occur. Level 2 assessments are more in-depth versions of Level 1 assessments.
 - Failure to assess and correct identified deficiencies is a Treatment Technique (TT) violation.
- Public Notification (PN) is required for failure to assess/correct and for acute *E. coli* violations.

The EPA requires utilities to periodically collect occurrence and concentration data of substances that are being considered for future regulation under the Unregulated Contaminant Monitoring Rule (UCMR). Monitoring requirements for unregulated contaminants, 40 CFR Part 141, Section 40, for owners and operators of a public water system (PWS) has been revised to include new contaminants to be reported if the minimum reporting levels are met or exceeded; this is for PWSs subject to the UCMR. 40 CFR Part 141, Section 40 was revised on December 20, 2016 per 81 FR 92688.

On May 5, 2014, updated cross-connection control rules under FAC 62-555.330, 62-555.360, and FAC 62-555.900 came into effect. These rules allow a dual check valve to be used in lieu of a reduced pressure principle-type backflow preventer (RPZ) at residences where an auxiliary (reclaimed or other) water source is present, reduce the required testing frequency for RPZs installed at residences from once a year to once every two years, and requires utilities to report cross-connection control compliance on a new two-page form. WWS is required to prepare and submit this form each year.

3.3 Water Supply

The primary source of water supply for WWS is the Biscayne aquifer. Presently, WWS operates wellfields to supply water to the District 1A and 2A Water Treatment Plants, with firm capacities (largest well out of service) of 19.6 and 21.3 MGD, respectively. Additional water is provided to

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District 2 from the North Regional wellfield with a firm capacity of 18.1 MGD. A physical description of the regional system and its wellfields is provided in Section 5. Finished 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 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. In northern Broward County, WWS operates four water control districts that move water from the Hillsboro Canal through an extensive network of secondary canals to recharge the Biscayne aquifer and inhibit the movement of coastal saline water into active water supply wellfields. Presently, in addition to the Utility, the Biscayne aquifer is also the primary source for raw water supplies for the municipalities in Broward County, Miami-Dade County, Monroe County, and the southern portion of Palm Beach County.

The South Florida Water Management District (SFWMD) Applicant’s Handbook for Water Use Permit Applications (September 2015), Section 3.2.1. E.3.a. 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 limitation of Biscayne aquifer withdrawals was nicknamed the Regional Water Availability Rule. Water supplies necessary to satisfy any demand which exceeds the Rule must come from an alternative water supply source, such as captured/stored water, the Upper Floridan aquifer, harvested stormwater or reclaimed wastewater. These alternative water supply sources are then used to offset withdrawal impacts above the Rule limit and prevent induced seepage out of the Everglades Water Bodies.

Due to the “withdrawal and treatment” cost-effectiveness of the relatively shallow Biscayne aquifer, this aquifer is expected to remain the County’s primary source of raw water supply. Future water supply beyond what can be provided from the Biscayne aquifer may come from the C-51 Reservoir or other water sources such as the brackish Upper Floridan aquifer.

The proposed C-51 Reservoir located in western Palm Beach County has the potential to deliver a significant amount of water for future public water supply in Broward and Miami-Dade Counties. Phase 1 of this project is projected to supply up to 35 MGD of water to the regional water supply system, and Phase 2 is projected to supply up to 96 MGD to the environment.

The Broward County Board of County Commissioners approved Resolution No. 2015-195 on April 7, 2015 supporting the C-51 Reservoir Project and encouraging 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. On May 2, 2017, the Board of County Commissioners approved the "Agreement for Capacity Allocation in Phase 1 of the C-51 Reservoir" between the County and Palm Beach Aggregates, LLC for a total of 6 million gallons per day at a capital cost of \$4.60 per gallon. To date, the Cities of Dania Beach and Hallandale Beach have each purchased 1.0 MGD and the City of Sunrise has purchased 5.0 MGD of C-51 Reservoir Phase I. Miami-Dade County is actively pursuing the purchase of the remaining 22.0 MGD to provide recharge water to serve both as public water supply offset and environmental recharge.

The C51 Reservoir project will expand the availability of Biscayne aquifer by offsetting impacts to the regional water system. The County will make use of the water made available by the C-51 Reservoir Project first before development of the brackish Upper Floridan aquifer water source.

3.4 Water Supply Regulatory Requirements

The volume of raw water withdrawn from the Utility's wellfields is regulated by the SFWMD. Each wellfield is governed by a Consumptive Use permit that stipulates the annual and monthly withdrawals that are allocated to each wellfield. As stated above, the 2007 Regional Water Availability Rule 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 aquifer limitation will need to be supplied by an alternative water source. The County has accounted for the uncertainty that this rule represents in the water supply planning process by pursuing various alternative water supply 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 an alternative water source 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's Utility is permitted by the SFWMD to withdraw approximately 27.5 million gallons of Biscayne aquifer groundwater from District 1, District 2 and North Regional wellfields and an additional 16.6 million gallons from the South Regional wellfield to support area Large Users. The Utility holds three permits from the SFWMD: District 1A wellfield, District 2A/North Regional Wellfield (NRW), and the South Regional Wellfield (SRW). The District 1A and combined 2A/NRW wellfield permits were issued for 20-year durations in April and March, respectively, of 2008 and will be due for renewal in the corresponding months of 2028.

An application to renew the SRW permit was submitted in October 2007 prior to permit expiration and was renewed in March 2018. 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 "base condition water use" of 11.62 million gallons per day through year 2038 and includes an allocation for purchased C-51 Reservoir offset water above the base condition water use through year 2065. The permit also establishes a 5-year temporary allocation between March 2018 and March 2023 of 15.64 million gallons per day from the Biscayne aquifer to allow for facilities associated with the C-51 Reservoir to be completed and put into operation.

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

Table 3-7 on the following page summarizes the Consumptive Use Permit allocations for each of the County Utility wellfields.

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Table 3-7 Summary of SFWMD Wellfield Permits as of September 30, 2018					
Description	Wellfield				
	1A	2A/NRW	SRW Temp.	SRW Base Cond.	SRW C-51
Permit Period:					
Issuance	4/10/2008	3/13/2008	3/7/2018	3/7/2018	3/7/2018
Expiration	4/10/2028	3/13/2028	3/7/2023	3/7/2038	12/27/2065
Duration (years)	20	20	5	20	47
Total Allocations:					
Annual Average Daily (MGD)	13.9	22.1	15.64	11.6	5.0
Maximum Month (MG)	461.0	738.0	533.2	396.1	178.3
Maximum Day (MGD)	15.2	24.3	17.5	13.0	5.9
Biscayne Aquifer Allocations					
Annual Average Daily (MGD)	10.0	17.5	15.64	11.6	5.0
Maximum Month (MG)	333.0	585.2	533.2	396.1	178.3
Maximum Monthly (MGD)	10.9	19.2	17.5	13.0	5.9
Floridan Aquifer Allocations					
Annual Average Daily (MGD)	3.9	4.6	---	---	---
Maximum Month (MG)	128.0	152.0	---	---	---
Maximum Monthly (MGD)	4.2	5.0	---	---	---
Number of Wells – proposed	4 ¹	4	---	---	---
Diameter (Inches)	16	16	---	---	---
Depth (Feet)	1,200	1,200	---	---	---
Proposed Implementation Date	2025	2027	---	---	---
<i>Modification^{2,3}</i>					
1. Two Floridan Test Wells were completed in 2014.					
2. Implementation dates for Floridan aquifer alternative water supply development continue to be extended due to demand management efforts and lower than expected growth.					
3. Implementation Date as submitted in the SFWMD WaSUP Database.					
Source: Broward County Water and Wastewater Services					

Long-term water supply in South Florida may also be affected by the Comprehensive Everglades Restoration Plan (CERP) undertaken by the U.S. Army Corps of Engineers (ACOE) in coordination with the SFWMD and by regional water supply planning undertaken by the SFWMD and the FDEP. The intent of CERP is to provide multiple benefits to the South Florida ecosystem. While restoration of the Everglades is a primary objective of the plan, it also includes a provision for ensuring a reliable, adequate supply of fresh water for use by the environment, public water

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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 Regional Water Supply Plan and CERP account for future needs of water utilities by utilization of new surface water reservoirs and by implementation of Aquifer Storage and Recovery 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 assure that a continuous adequate raw water supply is available:

- The County is actively participating in the Lower East Coast Regional Water Supply Plan, 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 recharged by three existing pump stations through the canal system.
- The County has constructed and operates a 10 MGD wastewater reuse facility to support potable water demand reduction.
- The County continues to implement the Integrated Water Resources Plan to maximize the utilization of available water. Current projects include the design of an interconnect between the C-1 and C-2 Canals.
- The County continues to review potential use of the Upper Floridan aquifer as an alternative raw water supply source and/or storage source.
- The County is actively engaged with the SFWMD and Palm Beach Aggregates and other municipal participants to fully develop the C-51 Storage Reservoir Project as a water source to offset potential regional water impacts.
- The County continues to promote water conservation within the utility service areas and County-wide.

3.5 Overview of the Water System Facilities

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 water supply.

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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 40 MGD and contains 255 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 20% of the total potable water consumption by customers of the Utility, and pays compensation amounting to 4.7% of the Utility's gross 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.

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 224 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 water supply.

3.6 Overview of the Retail Wastewater System Facilities

District 1

District 1 has a service area of 12.9 square miles and includes 187.5 miles of gravity collection sewers and 76 lift stations. There are 42.8 miles of force mains. Transmission, treatment and disposal of wastewater are provided through the Utility's Regional Wastewater System.

District 2

The size of the District 2 service area is 15.7 square miles. The collection system consists of 173.8 miles of gravity sewer, 101 lift stations, five retail master pump stations, and 35.3 miles of force mains. Transmission, treatment and disposal of wastewater are provided through the Utility's Regional Wastewater System.

District 3

District 3 serves an area of 11.8 square miles. The gravity collection system has 88.5 miles of gravity sewer, 65 lift stations and three retail master pump stations. The force main network contains 34.9 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.

3.7 Visual Inspection and Review

The visual inspection includes the water treatment plants for District 1 and 2 and the former District 3 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 Brown and Caldwell accompanied by WWS staff.

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 finally 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 plant is clean and well maintained. The following summarizes the observations resulting from the visual inspection performed on May 22, 2019:

- District 1 Raw Water Wells – Biscayne Aquifer
 - Well 1 was being rehabilitated during the time of the site visit. The wellhead and associated piping and valves were being replaced. The electrical equipment was in good condition and will remain.
 - Well 2 was in good condition. The wellhead and associated piping and valves were in excellent condition. Minor corrosion was noted around the pump shaft and piping. Electrical equipment was in good condition. The concrete slab was in good condition.

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- Well 3 was in good condition, but is scheduled to be rehabilitated. 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 4 was recently rehabilitated. Electrical equipment was in good condition and was not replaced. The concrete slab was in good condition.
- Well 5 was in good condition. This wellhead is within a building. The wellhead and associated piping and valves appeared to be in good condition. Wellhead drain pipe was loose and in the process of being repaired. Corrosion was noted around the pump shaft and piping. Electrical equipment was in excellent condition. The concrete slab was in good condition.
- Well 6 was in good condition. This wellhead is within a building. The wellhead and associated piping and valves were in excellent 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 was recently rehabilitated. 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 8 was in good condition. The wellhead and associated piping and valves appeared to be in good condition. The check valve was recently replaced. Pump shaft was leaking and showed some light corrosion. Electrical equipment was in good condition. The concrete slab was in good condition.
- Well 9 was in fair condition. The wellhead and associated piping and valves appeared to be 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.

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 off-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 interior, including the cone, mixer and launders are in good condition. The

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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 under rehabilitation during the time of the site visit. The interior, including the visible parts of the cone and mixer, were in good condition. Effluent launders showed moderate corrosion in several locations. The drive appeared to be in fair condition. 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 will be replaced.

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 very 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 very 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 very good condition, piping and valves were in very good condition. Effluent launders were in very good condition. The control panel on the filter deck

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appeared to be in good condition. The overall structure appeared to be in very good condition.

- Filter 8 was in very good condition, piping and were in 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 have already been replaced. The remaining filter effluent valve actuators and turbidity meters will soon be replaced.
- Four clearwell transfer and backwash pumps and all piping, valves, gauges, appurtenances, and associated structures appeared to be in excellent condition. Control Panel was recently replaced as part of the switchgear room project that was recently finalized.
- 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.
 - 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 recently rehabilitated last year, while vacuum filter 1 is scheduled to be rehabilitated next year. These units were in good condition, belt 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 excellent condition.

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- The ferric chloride system and pumps were operational; two chemical pumps and one transfer pump have already been replaced; other pumps are slated to be replaced soon. Bulk and day storage tanks were functional.
- The dry polymer makedown and feed systems were in good condition. Makedown and dilution units appeared to be intact and functional. Metering pumps were functional. This system is scheduled for rehabilitation next year.
- The lime slaking and feed systems appeared to be in fair condition. 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.
- The fluoride (HFS) pump and tank are currently operational; one pump has been replaced and other pumps are slated to be replaced soon. Bulk and day storage tanks appeared to be intact and functional. Metering pumps were functional. Electrical and mechanical equipment was extensively corroded inside the day tank/metering room. This system is scheduled for rehabilitation next year.
- The sodium hypochlorite feed and storage system was in good condition. Storage tanks were in good condition. Containment area flooring was in good condition. Transfer pumps were in excellent condition. Metering pumps are in very good condition.
- The Chlorine system overall is 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.
- New electrical switchgear room was in excellent condition.
- Operations building air conditioning system will soon need to be replaced due to aging.

Plant modifications for FY 2019 & FY 2020:

- SCADA computers replacement (ongoing)
- Security system improvements (ongoing)
- Rehabilitation of Lime Slakers (complete)
- Construction of new electrical switchgear (complete)

Section 3 - Retail Water and Wastewater Utilities System

- Demolition of 1B-2 elevated tank (ongoing)
- Demolition of on-site 0.3 MG ground storage tank (ongoing)
- Treatment Unit 2 Rehabilitation project (ongoing)
- Chemical Feed System Modifications (ongoing)
- Vacuum filter 2 Rehabilitation (complete)
- Wellheads improvement project (ongoing)
- Rehabilitation of 1A-1 site (ongoing)
- Rehabilitation of 1B-1 site (ongoing)

Plant modifications to be initiated for FY 2020:

- Vacuum filter 1 rehabilitation

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 May 21, 2019.

- District 2 Raw Water Wells – Biscayne Aquifer
 - Well 4 was inaccessible during the time of the site visit due to construction inside the water treatment plant.
 - Well 6 was in good condition. This well is housed in a building. The building was intact and in good condition. The wellhead and associated pump shaft, piping and valves appeared to be in good condition. Minor corrosion was noted at the drive shaft. Electrical equipment was in good condition.
 - Well 7 was inaccessible during the time of the site visit due to construction inside the water treatment plant.
 - Well 8 was in excellent condition. The security fencing was in excellent condition. The wellhead and associated motor, pump shaft, piping and valves appeared to be in excellent condition. Electrical equipment was in excellent condition. The concrete slab was in excellent condition.

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- Well 9 was in excellent condition. The security fencing was excellent condition. The wellhead and associated pump shaft, piping and valves appeared to be in excellent condition. Electrical equipment was in excellent condition. The concrete slab was in excellent condition.
- Well 10 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. Electrical equipment was in good condition. The concrete slab was in good condition.
- Well 11 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 with very minor corrosion noted on pipe flange. Electrical equipment was in good condition. The concrete slab was in good condition.
- Treatment Unit 1 was operational at the time of the visual inspection. Effluent launders showed minor corrosion in several locations. Electrical equipment and instruments also appeared to be in good condition. Auxiliary pumps and associated piping, valves, and equipment were in good condition.
- Treatment Unit 2 was in good condition. The interior, including the visible parts of the cone and mixer, was in good condition. Effluent launders showed minor corrosion in several locations. The drive appeared to be in good 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. This treatment unit is scheduled for rehabilitation.
- Filters: All six filters appeared to be in good condition. Filter media appeared level and uniform, piping and valves in the filter gallery were in good condition. Effluent launders were in good condition. The overall structure appeared to be in good condition. No issues were identified with instrumentation.
 - 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.
- All four clearwell transfer pumps and associated motor, piping, valves, gauges, and appurtenances appeared to be in good condition. Electrical equipment appeared to be in fair condition.
- High service pumps (HSPs) 1 and 3-8 (HSP 2 does not exist) appeared to be in good condition. Pumps, motors, piping, valves, gauges, appurtenances, and associated structures appear to be in good condition. Electrical gear appeared to be in fair to good condition.
- Solids handling

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- Gravity thickener 1: the structure, rake and drive, and auxiliary pumps appeared to be in excellent 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.
 - The ferric chloride feed and storage system was in good condition. The bulk storage tank appeared to be intact and functional. Metering pumps were functional.
 - The dry polymer makedown and feed systems were in good condition. Makedown and dilution units appeared to be intact and functional. Metering pumps were functional.
 - The lime slaking and feed systems appeared to be in good condition. The lime silo, vibrator, rotary valve, and dosing unit were in excellent condition. Slakers were functional.
 - The fluoride (HFS) feed and storage system was 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 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. Transfer pump equipment in the day tank room was in the process of being rehabilitated. Two of the four transfer pumps located in the bulk storage area were out of service at the time of the inspection.
 - The sodium hydroxide system has never been placed into service and is not anticipated to be put into service within the foreseeable future.
 - The gaseous ammonia system is in good condition. Bulk storage tanks were in very good condition. Ammoniators were in very good condition.
 - The diesel fuel storage system is in excellent condition. Bulk storage tanks were in very good condition.

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- Backup generators and associated equipment appeared to be in good condition.
- The 1 and 5 MG ground storage tanks, including their exterior coating, appeared to be in good condition. 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 2018 were:

- Installation of lighting improvements for the plant (ongoing)
- Repair of the roof on the lime silo tower and replace bag house (complete)
- Rehabilitation of chemical feed systems (in design)
- Rehabilitation of switchgear at high service pump room at building No.1 (ongoing)

Plant modifications to be performed in FY 2019 & FY 2020:

- Treatment Unit 2 Rehabilitation project (scheduled)
- Chemical Feed System Modifications (in design)
- Repair of clearwell spalling, repaint clearwell and treatment units (ongoing)
- Construction of a new 5 MG ground storage tank (ongoing)
- Repair of the roof on the lime silo tower and replace bag house (complete)
- Rehabilitation of switchgear at high service pump room at building No.1 (ongoing)

Water Distribution System 3A

In December 2001, the City of Hollywood began providing water for resale to the County in System 3A. Then re-pumping facilities consisting of high service pumps supplying the 3A distribution system, which includes the Fort Lauderdale/Hollywood International Airport, were constructed at the site of the former WTP 3A.

The 3A facility was inspected on May 24, 2019. In general, the 3A facility appeared to be in fair condition. Observations from the site visit are provided below.

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High service pump 1 appeared to be in good condition. The pump appeared to be in good condition, with minor corrosion noted around the pump base. The diesel engine backup drive associated with this pump appeared to be in good condition.

High service pump 2 appeared to be in good condition. The discharge isolation valves and check valves appeared to be in excellent condition. The VFD for this pump appeared to be in good condition.

High service pump 3 appeared to be in good condition. The discharge isolation valves, check valves, and piping were in good condition. Electrical gear serving this pump appeared to be functional.

High service pump 4 appeared to be in good condition. The discharge isolation valves and check valves appear to have been recently replaced. Electrical gear serving this pump appeared to be functional.

The 2 MG ground storage tank appeared to be in good condition.

The inflow meter and associated piping, valving, and instrumentation continue to function in good condition.

The temporary sodium hypochlorite feed and storage system appeared to be in excellent condition. The chlorinator unit was in good condition. Construction has been completed to incorporate 4-log virus treatment at this facility.

The ammonia storage and feed system appeared to be in good condition. The control panel inside the ammonia storage building had moderate corrosion.

The diesel fuel storage system has been removed and replaced with a new one which appeared to be in excellent condition and containment appeared to be in good condition.

Underground diesel tank has been emptied and is out of service.

New portable diesel generator appeared to be in excellent condition.

Planned modifications to be performed in FY 2019 & FY 2020 are:

Demolition of the existing treatment plant and adjacent plant building has been completed, which included:

- Upflow treatment units
- Greenleaf filter
- Backwash recovery pond

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- Permuted treatment unit
- Lime slaker
- Ferric chloride and secondary containment

Construction of 4-log disinfection improvements, including an upgraded permanent hypochlorite system and a new HSP room (new building) (ongoing)

Construction of a new building to house a new generator (ongoing)

Construction of a new by-pass system (ongoing)

Implementation of new site lighting system (ongoing)

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 interconnect treatment stations located at the City's south system perimeter (on Pembroke Road at Park Road and at S.W. 57th Avenue). A separate connection from the City of Pembroke Pines supplies water to the North Perry Airport perimeter. These facilities are remotely monitored and controlled via SCADA equipment/instrumentation. The 3B and 3C storage and pumping facilities were inspected by Brown and Caldwell on May 24, 2019.

3B Storage and Pumping Facility

Overall, the four distribution high service pumps (HSPs) and their associated piping and valving appeared to be in good condition. It was reported that pumps 2 and 3 appeared to have insufficient head capacity to pump into the system. HSPs 1 and 2 name plates are illegible and HSP 4's name plate is missing. At the time of the site investigation, HSP 1 was out of service. The 2.5 MG ground storage tank appeared to be in good condition, with minor hairline cracks. The actuated valve for ground storage tank influent line was recently replaced along with the actuator. The backup generator and associated equipment appeared to be in fair condition. The temporary sodium hypochlorite system appeared to be in good condition and is only connected to HSP 3. The temporary sodium hypochlorite system is scheduled to be replaced with a permanent system in the future. This project will include the upgrade of the HSPs and the ability to control both the sodium hypochlorite system and HSPs separately on SCADA. The pump building exterior was in good condition.

3C Storage and Pumping Facility

The 3C storage and pumping facility currently consists of a 1.5 MG ground storage tank and three high service pumps, VFD controls, sodium hypochlorite disinfection system and emergency standby diesel engine with generator housed in a concrete building structure. The facility is

Section 3 - Retail Water and Wastewater Utilities System

equipped with a SCADA system to allow staff to monitor and control the facility operation remotely. The entire site is fenced with a decorative fence in the front of the facility and a standard chain link fence approximately 6-foot high on the sides and back of the property; north and west portions of the chain link fence have 15-inch high barbwire.

The concrete storage tank exterior walls appeared to be in good condition. The tank plate was not located. Overall, the three distribution high service pumps at the 3C facility appear to be in good condition. Pumps 1 and 3 had some minor corrosion on the top half of the casing. The ground storage tank appeared to be in good condition. The sodium hypochlorite storage tanks were in good condition. The sodium hypochlorite transfer/tank mixing pumps appeared to be in good condition; staff reported that the turnover of chemical in the tank was sufficient to maintain hypochlorite quality and strength. The sodium hypochlorite visual calibration tube was colored due to use and age, thus making it difficult to be read. The ammonia system, ammoniators, and chlorine analyzers were in good condition. The backup generator appeared to be in excellent condition. The pump building exterior was in good condition.

Retail Lift Stations

There is a total of 242 lift stations operated by the County. A representative set of 20 lift stations were inspected by Brown and Caldwell. On May 14, 2019, LSs 10B, 10E2, 20A, 21B, 21D1, 21J, 23A, 24C, 24E, 24G, 25A, 27A, 27E, 28, 30A, 31A, 45D, 50C, 56A and 65 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. The following serves as a summary of the observations made during the visual inspection of the lift stations:

- LS 10B This submersible pump lift station was in good condition. No pump issues were reported. The wetwell and valve vault hatches were in good condition. Piping and valving were in fair condition, with some corrosion attacking the coating inside the valve vault. 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, were in good condition.
- LS 10E2 This submersible pump lift station was in good condition. No pump issues were reported. The wetwell and valve vault hatches were in good condition. Piping and valving were in good condition. The valve vault was submerged at the time of site visit. The valve vault piping and valves had much of the coating peeling off, and the lined of the vault was in poor conditions. The electrical panel, fencing, water service, and driveway were in good condition.
- LS 20A This submersible pump lift station was in good condition. No pump issues were reported. The wetwell 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.

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- LS 21B This submersible pump lift station was in good condition. No pump issues were reported. The wetwell and valve vault hatches were in good condition. Piping and valving were in excellent condition inside the valve vault. 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 excellent condition.
- LS 21D1 This submersible pump lift station was in fair condition. No pump issues were reported. The wetwell and valve vault hatches were in fair condition. Piping and valving were in fair condition, with some corrosion evident on the coating inside the valve vault. Valve vault was dry at the time of site visit. The wet well was in fair condition, with the liner delaminated in several locations. The electrical panel and water service were in fair condition.
- LS 21J This submersible pump lift station was in fair condition. No pump issues were reported. The wetwell and valve vault hatches were in good condition. Piping and valving were in fair condition inside the valve vault. Valve vault was dry at the time of site visit. The wet well was in good condition; however, it appeared that a liner was never applied. The electrical panel water service was in good condition.
- LS 23A This submersible pump lift station was in fair condition. No pump issues were reported. The wetwell and valve vault hatches were in good condition. Piping and valving were in fair condition, with some corrosion inside the valve vault. Valve vault was submerged at the time of site visit. The wet well was in fair condition, with the liner delaminated in several locations. The electrical panel, water service, and driveway were in good condition.
- LS 24C This submersible pump lift station was in good condition. No pump issues were reported. The wetwell and valve vault hatches were in good condition. Piping and valving were in fair condition inside the valve vault. Valve vault was partially submerged with sand at the time of site visit. The wet well was not inspected since it was placed in the middle of the road and it could not be opened. The electrical panel and water service were in good condition.
- LS 24E This submersible pump lift station was in good condition. No pump issues were reported. The wetwell and valve vault hatches were in good condition. Piping and valving were in fair condition, but corrosion was evident on the coating inside the valve vault. Valve vault was submerged at the time of site visit. The wet well was in fair condition, with the liner in almost completely delaminated. The electrical panel and water service were in good condition.
- LS 24G This submersible pump lift station was in good condition. No pump issues were reported. The wetwell and valve vault hatches were in good condition. Piping and valving were in fair condition, with some delamination on the walls inside the valve vault. Valve vault was dry at the time of site visit. The wet well was in fair condition, with the liner exhibiting some delamination. The electrical panel and water service were in good condition.

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- LS 25A This submersible pump lift station was in fair condition. No pump issues were reported. The wetwell and valve vault hatches were in poor condition and it was reported that they were damaged by the contractor working in the area. Piping and valving were in fair condition, but there was some corrosion on the coating inside the valve vault. Valve vault was submerged with sand at the time of site visit. The wet well was in fair condition, with the liner in fair condition. The electrical panel and water service were in fair condition.
- LS 27A This submersible pump lift station was in good condition. No pump issues were reported. The wetwell and valve vault hatches were in good condition. Some of the piping was configured to be aboveground, which was in good condition. Piping and valving were in poor condition, with corrosion visibly evident on the coating inside the valve vault. Valve vault was dry at the time of site visit. The wet well was in fair condition, with the liner in fair condition. The electrical panel and water service were in good condition. The perimeter concrete wall was in fair condition.
- LS 27E This submersible pump lift station was in excellent condition. No pump issues were reported. The wetwell and valve vault hatches were in excellent 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.
- LS 28 This submersible pump lift station was in good condition. No pump issues were reported. The wetwell 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 good condition, with the liner in excellent condition. The electrical panel and water service were in good condition.
- LS 30A This submersible pump lift station was in good condition. No pump issues were reported. The wetwell and valve vault hatches were in good condition. Piping and valving were in fair condition. Valve vault was submerged 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 31A This submersible pump lift station was in good condition. No pump issues were reported. The wetwell and valve vault hatches were in good condition. Piping and valving were in fair condition, with some corrosion evident on the coating inside the valve vault. Valve vault was dry at the time of site visit. The wet well was in good condition, but the liner exhibited some delamination. The electrical panel, fencing, and water service were in good condition.
- LS 45D This submersible pump lift station was in good condition. No pump issues were reported. The wetwell 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 and the liner were in good condition. The electrical panel and water service were in good condition.
- LS 50C This submersible pump lift station was in good condition. No pump issues were reported. The wetwell and valve vault hatches were in good condition. Piping and

Section 3 - Retail Water and Wastewater Utilities System

valving were in fair condition. Valve vault was submerged at the time of site visit. The wet well and the liner were in good condition. The electrical panel, fencing, water service, and driveway were in good condition. There was a coaxial cable protruding from the ground inside the lift station limits, which was left there by the cable company.

LS 56A This submersible pump lift station was in excellent condition. No pump issues were reported. The wetwell and valve vault hatches were in good condition. Piping and valving were in good condition. Valve vault was submerged 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.

LS 65 This submersible pump lift station was in good condition. No pump issues were reported. The wetwell 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

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.

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, Lauderdale, North Lauderdale, Oakland Park, Pompano Beach and Tamarac; and, North Springs Improvement District (NSID), Parkland Utilities, and Royal Utilities. Service is also provided to WWS Districts 1 and 2 retail wastewater systems. The NRWWS includes 11 master pumping stations and approximately 66.3 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 2018, the annual average daily flow rate at the NRWWTP was approximately 71.7 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 to the County. Monthly, each user is billed a fixed charge depending upon the user's reserve capacity in the plant. This fixed charge is designated to recover each Large User's equitable share of debt service including required coverage (1.2 x principal and interest). The operation and maintenance costs associated with provision of treatment and transmission service, also billed monthly to each Large User, are based upon the Large User's pro rata usage of the NRWWS. Additionally, the contracts provide restrictions on excessive and peak flows, limitations on types of waste allowed to be discharged, and requirements to pay for damages caused by a Large User.

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

The NRWWTP utilizes an activated sludge treatment process for liquid treatment and an anaerobic digestion system for handling the biosolids produced from the liquid treatment process. After digestion, the sludge is dewatered and disposed of by landfilling and land spreading. The effluent from the liquid treatment process is either chlorinated and pumped through the outfall pipe into the Atlantic Ocean, disposed of in on-site deep injection wells, or chlorinated and filtered

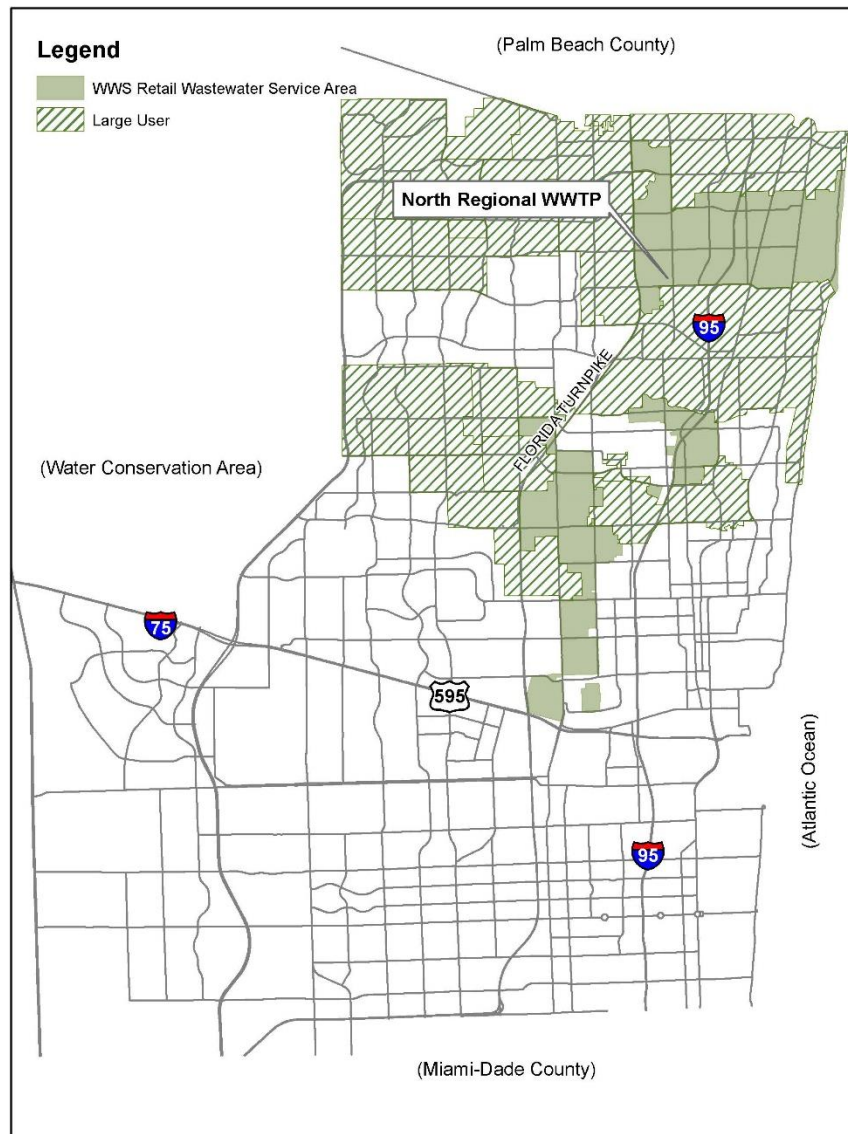
Section 4 - Regional Wastewater System

via the County's 10 MGD reclaimed water system. The reclaimed water is used for irrigation and industrial process water at the Waste-to-Energy Plant (Wheelabrator North Broward Plant), the Septage Receiving Facility and the NRWWTP, as well as for landscape irrigation at a nearby commerce center.

Service Area and Customer Base

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

Figure 4-1 WWS Wastewater Large User Service Areas



Source: Broward County Water and Wastewater Services

Section 4 - Regional Wastewater System

The NRWWS service area provides service to 35% of the population in the County through providing 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.

Table 4-1 Summary of Historical Large User Wastewater Average Monthly Flow for Treatment and Disposal (1,000 Gallons)					
Large User	FY 2016	FY 2017	FY 2018	Change From Prior Year	% of Change
Coconut Creek	126,018	124,321	127,561	3,240	2.61
Coral Springs	271,306	231,840	257,794	25,954	11.19
Deerfield Beach	198,350	188,192	176,300	(11,892)	(6.32)
Lauderhill	189,169	187,662	199,117	11,455	6.10
North Lauderdale	107,148	115,941	121,151	5,210	4.49
NSID	91,755	90,825	102,797	11,972	13.18
Oakland Park	42,934	39,889	47,367	7,478	18.75
Parkland Utilities	5,906	5,893	6,085	192	3.26
Pompano Beach	408,733	399,613	466,799	67,186	16.81
Royal Utilities	9,451	8,361	9,150	789	9.44
Tamarac	228,988	222,406	226,812	4,406	1.98
Subtotal	1,679,758	1,614,942	1,740,933	125,990	7.81
Broward County	427,628	394,660	415,473	20,813	5.27
Total	2,107,386	2,009,602	2,156,406	146,803	7.31
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, 2018 (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
N S I D	3.530	3.530
Oakland Park	1.520	1.520
Parkland Utilities	0.265	0.265
Pompano Beach ¹	17.000	N/A
Royal Utilities	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.		
Source: Broward County Water and Wastewater Services		

Table 4-3 Summary of Large User Wastewater Treatment Annual Flows Five-Year History as of September 2018 (1,000 Gallons)					
Large User (LU)	Fiscal Year 2014	Fiscal Year 2015	Fiscal Year 2016	Fiscal Year 2017	Fiscal Year 2018
Coconut Creek	1,469,596	1,479,397	1,512,213	1,491,846	1,530,733
Coral Springs	2,645,025	2,597,792	3,255,671	2,782,075	3,093,525
Deerfield Beach	2,050,891	2,023,739	2,380,200	2,258,300	2,115,602
Lauderhill	2,269,385	2,164,841	2,270,030	2,251,942	2,389,407
North Lauderdale	1,515,225	1,359,362	1,285,778	1,391,289	1,453,814
NSID	1,010,832	1,030,656	1,101,064	1,089,904	1,233,566
Oakland Park	536,527	513,792	515,203	478,666	568,404
Parkland	76,065	77,485	70,875	70,721	73,016
Pompano Beach	5,230,870	4,604,300	4,904,800	4,795,360	5,601,593
Royal Utilities	104,544	95,037	113,410	100,330	109,795
Tamarac	3,006,553	2,671,066	2,747,855	2,668,874	2,721,749
Total LU	19,915,513	18,617,467	20,157,099	19,379,307	20,891,204
Broward County	5,360,913	4,839,080	5,131,540	4,735,923	4,985,673
Total LU and County	25,276,426	23,456,547	25,288,639	24,115,230	25,876,877
Source: Broward County Water and Wastewater Services					

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4.2 Wastewater System Regulatory Requirements

Operations of the NRWWT 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 2018, the North Regional Wastewater Treatment Plant (NRWWTP) had no permit violations. The NRWWT is in compliance with effluent quality standards.

4.3 Wastewater Effluent Management

The NRWWT 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 NRWWT at 95 MGD and acknowledges 66 MGD of effluent disposal capacity through the ocean outfall. The current NRWWT permit was issued on March 2, 2018 and becomes fully enforceable in March 2023.

The FDEP continues to promote a reduction of nutrients in the face of opposition to ocean discharges from interested groups. They have worked with the wastewater utilities with ocean outfalls (including Broward County) to reduce the economic impact of the Leah Schad Memorial Ocean Outfall Program, which became the law effective July 1, 2008. Initially, this law required that the disposal of effluent through ocean outfalls be eliminated by 2025. In 2013, the Florida Legislation passed the following amendments to the act:

- Allows peak flow backup discharges not exceeding 5% of the facility's cumulative baseline flow, measured on a 5-year rolling average and requires that such discharges meet the FDEP's applicable secondary waste treatment and water-quality-based effluent limitations.
- A detailed plan was submitted to FDEP in July 2013, which identified technically, environmentally and economically feasible reuse options. The plan included an analysis of the costs associated with meeting state and mandated nutrient reduction requirements, and the detailed schedule for implementation of all necessary actions. Required FDEP, SFWMD and the outfall utilities to consider the above information for adjusting, as needed, the reuse requirements, and required FDEP to report to the Legislature any changes that may be necessary in the reuse requirements by February 15, 2015. This was accomplished.

In order to meet the advanced wastewater treatment requirements, the County has implemented cumulative nutrient reduction strategies including modifying the existing treatment process to augment biological nutrient removal and reduce outfall discharges via diversion to the existing deep injection well system.

In addition to the ocean outfall, the effluent management system also includes six Class I deep injection wells. The Operation Permit 0334636-001-006-UO/1M for Injection Wells 1 through 6

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was issued on October 5, 2015 and is valid for five years. There are also two additional Class I deep injection wells that are under operational testing under permit 0334636-007-008-UC/1M that was issued April 5, 2017 and is valid until April 4, 2022.

Minimum Treatment Standards - Technology Based Effluent Limitations (TBELs) (62-600.420, F.A.C) requires all domestic wastewater facilities to provide, at a minimum, secondary treatment of wastewater prior to reuse or disposal; except as specifically required by other Department rules or Florida Statutes. Subsection 62-600.420(2), F.A.C. amended on February 8, 2016 requires the following for surface water disposal via open ocean outfalls:

- CBOD₅
 - The annual average shall not exceed 25.0 mg/L
 - The monthly average shall not exceed 25.0 mg/L
 - The weekly average shall not exceed 40.0 mg/L
 - The maximum-permissible concentration in any single sample shall not exceed 60.0 mg/L
 - And the monthly average percent removal shall not be less than 85%.
- Total Suspended Solids (TSS)
 - The annual average shall not exceed 30.0 mg/L
 - The monthly average shall not exceed 30.0 mg/L
 - The weekly average shall not exceed 45.0 mg/L
 - The maximum-permissible concentration in any single sample shall not exceed 60.0 mg/L
 - And the monthly average percent removal shall not be less than 85%.

The County's effluent management program currently includes a 10 MGD system providing highly treated 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 and has developed an Interlocal Agreement with Palm Beach County to beneficially reuse up to 15 MGD of reclaimed water. Long-term effluent management improvements include combinations of injection wells, Biscayne aquifer recharge, Floridan aquifer recharge, offsite Large User reuse, and residential reuse. An increase in the consumptive use permit raw water allocation for the water treatment facilities may be authorized by the SFWMD when effluent management results in the potential beneficial reuse of the reclaimed water.

4.4 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, last revised on December 23, 2015. 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

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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 NRWTP 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.

4.5 Wastewater Large User Agreements

The County is under obligation to provide Large Users with capacity under the terms of Large User Agreements (Agreements) it has executed with the cities of Coconut Creek, Coral Springs, Deerfield Beach, Lauderhill, North Lauderdale, Oakland Park, Pompano Beach and Tamarac, the North Springs Improvement District (NSID), and the private utility companies of Parkland Utilities, Inc. and Royal Utilities. 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

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Agreement and the user must submit annual updates of these estimates to the County. The County is required to use these estimates to plan future treatment capacity and to determine whether facilities should be extended or modified. The County's obligation to provide service is limited to the capacities reserved by users, which may be increased or decreased by amendment or modification to the Agreements. The Agreements allow users to lease or sell excess capacity to other users, subject to the County's approval. The County is required to install and maintain a meter at each point of connection to determine the volume and rates of flow and to inspect the meters at least annually to determine the accuracy thereof. The Agreements provide for credits or additional charges in the event of the inaccuracy of the meters. If the meters are inoperative, the users are required to pay an amount based on the average flow of the prior month.

- B. Provisions Relating to Discharge Sampling. The Agreements specify quality limitations for wastewater discharges. A user's failure to comply with these limitations places the user in default under this Agreement and allows the County either to initiate programs to bring the user's discharge into compliance at the user's expense or to seek damages from the user. A user's system must include a sampling station and the user must, upon receipt of written request from the County, submit a complete laboratory analysis of a composite sample of combined wastes leaving the user's facilities. The County and the user may enter into an agreement whereby the County would accept wastewater with a strength or other characteristic that exceeds parameters listed in an existing agreement. In this case, the County may impose surcharges on the system supplying such a wastewater.
- C. Provisions Pertaining to Charges. The County is required to conduct an annual review of the costs of providing service to users, which will provide the preliminary basis for establishing fees, rates and other charges for the next succeeding fiscal year. The fees and rates charged to the users constitute the full cost of the transmission, treatment and disposal services provided to the users, including operation and maintenance charges and debt service charges for both the NRWWTP and the NRWWS transmission facilities, and include an Improvement Repair and Replacement Surcharge. Such fees, rates and charges are required to be set at a public hearing by the Board, which must be held after 30 days' written notice to the users. The Board is required to consider recommendations of the individual users or the advisory board, which is composed of representatives from each of the users. The operation and maintenance charges applicable to the NRWWTP or the transmission system are included in the monthly rate charged to the users based upon the users' actual monthly flow in thousands of gallons. The rate is to be set by dividing the total annual budgeted operation and maintenance expense for each fiscal year by the number of gallons estimated to be treated or transmitted in that fiscal year, and is to be adjusted at year end to reflect the actual number of gallons treated and actual operation and maintenance expense. This adjustment is either collected from, or remitted to, the Large Users in the subsequent year.

The debt service charge included in monthly rates charged to the Large Users include principal, interest and coverage requirements on debt obligations issued at any time for

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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.

4.6 Visual Inspection and Review

Master Lift Stations

Five Master Lift Stations (MLS 410, 450, 455, 458, and 460) were inspected on May 16, 2019 by Brown and Caldwell. 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 good to excellent condition and operating satisfactorily. A summary of the findings at each station is presented below.

- MLS 410 The inline booster-type station was in good 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. Pump three was scheduled to be replaced soon due to aging. This site has an on-site lift station that appeared to be in good condition. The backup power diesel generator appeared to be in good condition. This site has an above-ground diesel tank with a containment area, which were in good condition. Electrical control panels appeared to be in good working condition. The building interior and exterior were in good condition.
- MLS 450 The inline booster-type station was in excellent condition since it was recently rehabilitated. 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. The backup power is provided from WTP 1A; thus, this site does not have a backup emergency generator on-site. This site has an above-ground diesel tank with a containment area, which were in good condition. Electrical control panels were in excellent working condition. The building interior and exterior were in excellent condition.
- MLS 455 The inline booster-type station was in fair condition. Pumps, motors, and interior station piping were in good condition. However, two out of the four pump supporting bases were completely corroded and were being replaced at the time of inspection. Pump control valves and actuators appeared to be in fair condition, other valves were in good condition. The backup power diesel generator appeared to be in good condition. This site has an above-ground diesel tank with a containment area, which were in good condition. Electrical control panels appeared to be in good working condition. The building interior and exterior were in good condition.
- MLS 458 The inline booster-type station was in good 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. This site has an on-site lift station that appeared to be in good condition. The backup power diesel generator appeared to be in fair condition. This site has an above-ground diesel tank with a containment area, which were in good condition. Electrical control

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panels appeared to be in good working condition. The building interior and exterior were in good condition.

MLS 460 The inline booster-type station was in good 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 fair condition, with effluent ball valves showing signs of deterioration. This site has an on-site lift station that appeared to be in good condition. The backup power diesel generator appeared to be in good condition. This site has an underground ground diesel tank, which was in good condition. Electrical control panels appeared to be in good working condition. The building interior and exterior were in good condition.

North Regional Wastewater Treatment Plant

The visual inspection of the NRWTP was performed on May 23, 2019 for the headworks, treatment modules, ocean outfall pump station, deep injection well pump station 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, headworks equipment appeared to be in fair to good condition and functioning normally, with the exception of the odor control, and wet scrubber that is not utilized and will be removed/demolished. Two bar screens have been replaced and the other three bar screens will soon be replaced. Concrete work for gates has been completed. New grit removal structures and system were being constructed at the time of site visit. Venturi meters were in good condition. Overall, the headworks building appeared to be structurally sound, but an inspection by a qualified professional to evaluate its condition should be performed.

- Treatment Module A
 - Aeration basin structures and piping appeared to be in fair condition. It was pointed out that rebar is exposed on the bottom of the aeration basins, which could not be verified since the structure was functioning at the time of inspection. Cracks and spalls in concrete walkway supports were observed. Aeration unit motors were in fair to good condition, with several motors showing signs of wear, tear and aging. Removal of the existing aerator motors and gear reduction drives during the planned future conversion to fine-bubble aeration should resolve these issues.

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- Clarifiers were in good condition, with all showing moderate corrosion in the area of the drive mechanisms, and very minor corrosion on the skimmer arm. Rehabilitation of three clarifiers is scheduled in the near future.
- Return Activated Sludge (RAS) pumping station appeared to be in good condition. Pumps, piping and valving showed light corrosion.
- Waste Activated Sludge (WAS) pumps and piping appeared to be in good condition.
- Treatment Module B
 - Aeration basin structures appeared to be in good condition. Aeration unit motors were in fair to good condition, with several motors showing signs of wear, tear and aging. Removal of the existing aerator motors and gear reduction drives during the planned future conversion to fine-bubble aeration will resolve these issues.
 - 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.
 - RAS pumping station appeared to be in fair to good condition. Pumps, piping and valving showed light corrosion.
 - WAS pumps and piping appeared to be in good condition.
- Treatment Module C
 - Aeration basin was empty at the time of inspection. Grit removal was being performed. Aeration basin structures, piping, and equipment appeared to be in good condition. Cracks and spalls in concrete walkway were observed. Corrosion was noted on conduit pipe. New aeration piping and blowers were being installed on the east side of the existing structures.
 - Clarifiers C-3 and C-4 were under rehabilitation. The rest of the clarifiers were in good condition, with all showing moderate corrosion in the area of the drive mechanisms, and very light corrosion on the skimmer arm. Corrosion was also noted at the handwheels located on the top of the RAS pumps building.
 - RAS pumping station appeared to be in good condition. Pumps, piping and valving showed light corrosion.
 - WAS pumps and piping appeared to be in good condition.

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- Treatment Module D
 - Aeration basin structures and piping appeared to be in good condition. Cracks and spalls in concrete walkway supports were observed. Aeration unit motors were in fair to good condition, with several motors showing signs of wear, tear and aging. Removal of the existing aerator motors and gear reduction drives during the planned future conversion to fine-bubble aeration will resolve these issues.
 - Clarifiers were in good condition, with all showing moderate corrosion in the area of the drive mechanisms and very minor corrosion on the skimmer arm. Corrosion was also noted at the base of a gate stem located on the top of the RAS pump building.
 - RAS pumping station appeared to be in good condition. Pumps, piping and valving showed light corrosion.
 - WAS pumps and piping appeared to be in good condition.
- Treatment Module E
 - Aeration basin structures, piping, and equipment 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.
 - RAS pumping 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.
- Ocean Outfall Pump Station
 - Outfall pumps appeared functional and in good condition.
 - Electrical equipment: The motors, liquistat system, and associated cooling units appeared to be functioning in a satisfactory manner.
 - Chlorine contact basins associated with the outfall were in good condition. 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.

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- Water Reuse System
 - The reuse system pumping station appeared to be in good condition.
 - The self-backwashing sand filters were in excellent condition.
 - The reuse chlorine contact chambers appeared to be in good condition.
 - The high-head and low-head reuse pumps appeared to be in good condition.

- Digester Complex
 - All eight digesters appeared to be functional and in good condition. Digester P-3 has a new compressor, heater sludge pump and grinder.
 - Progressive cavity (Moyno) sludge pumps appeared to be in good condition.
 - The digester cluster electrical gear appeared to be in good condition.
 - Methane gas piping was in poor to fair condition; piping system was out of service at the time of inspection due to leakage issues. Repairs are constant in the piping system due to age.

- Biosolids Processing
 - The Dissolved Air Flootation (DAF) thickeners appeared to be in fair condition and functional. DAF thickeners 1, 3 and 4 had their skimmer chains replaced. All six DAF units have new reuse water piping. The associated pressure tanks appeared to be in good condition. Polymer feed system serving the DAF thickeners is not being used.
 - 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. Upgrades to electrical equipment were being performed at the time of the inspection.

- 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. Bulk storage tanks were in good condition. Two new above-ground bulk storage tanks were being installed at the time of inspection.

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- Work was being performed on the MCCs at the time of the inspection.
- Cogeneration System
 - The Cogeneration System appeared to be in excellent condition and functional.
- Fats, Oils, and Grease (FOG) Facility
 - The FOG tank, equipment and associated appurtenances appeared to be in excellent condition and operational.

Plant modifications performed in FY 2018:

- Replacement of 20 underground reuse valves throughout the plant (complete)
- New Injection well booster pump stations (complete)
- Replacement of generator No.4 (complete)
- New Boilers 4 and 8 (complete)
- New heat exchangers for FOG pumps (complete)
- Replacement of cover at Digester P-3 (complete)
- Replacement of six 10,000-gallon underground diesel tanks with two 30,000 gallon above-ground tanks (ongoing)
- Improvements to the Ocean Outfall Pump Station system (ongoing)
- Replacement of the SCADA system (ongoing)

Plant modifications for FY 2019:

- Aboveground Aeration Basin Influent lines (ongoing)
- Modules A, B & D diffused air system (ongoing)
- Replacement of grit capture system (five units) and Modules A, B, and C influent piping (ongoing)
- Automatic bar screen rehabilitation (five units) (ongoing)
- Demolition of old dewatering building

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- Demolition of existing grit removal System (ongoing)
- Reuse Expansion (ongoing)

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 May 23, 2019. 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 2018:

- Demolition of existing equipment, fencing and access ways required (complete)
- Wetwell rehabilitation and replacement of cover (complete)
- Installation of new biofilter odor control system (complete, but not in operation)
- Implementation of landscaping and irrigation system improvements (complete)
- Installation of Raptor Septage Complete Treatment Plant (complete, but not in operation)

Facility modifications for FY 2019:

- Design of new administrative building

WWS Administrative Complex

BOD performs grounds and building maintenance services at the WWS Administrative Complex. BOD will complete a visual inspection of the WWS Administrative Complex outside of the Annual Report as needed.

Section 5 - Regional Raw Water Supply

Section 5 Regional Raw Water Supply

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

5.1 General Description

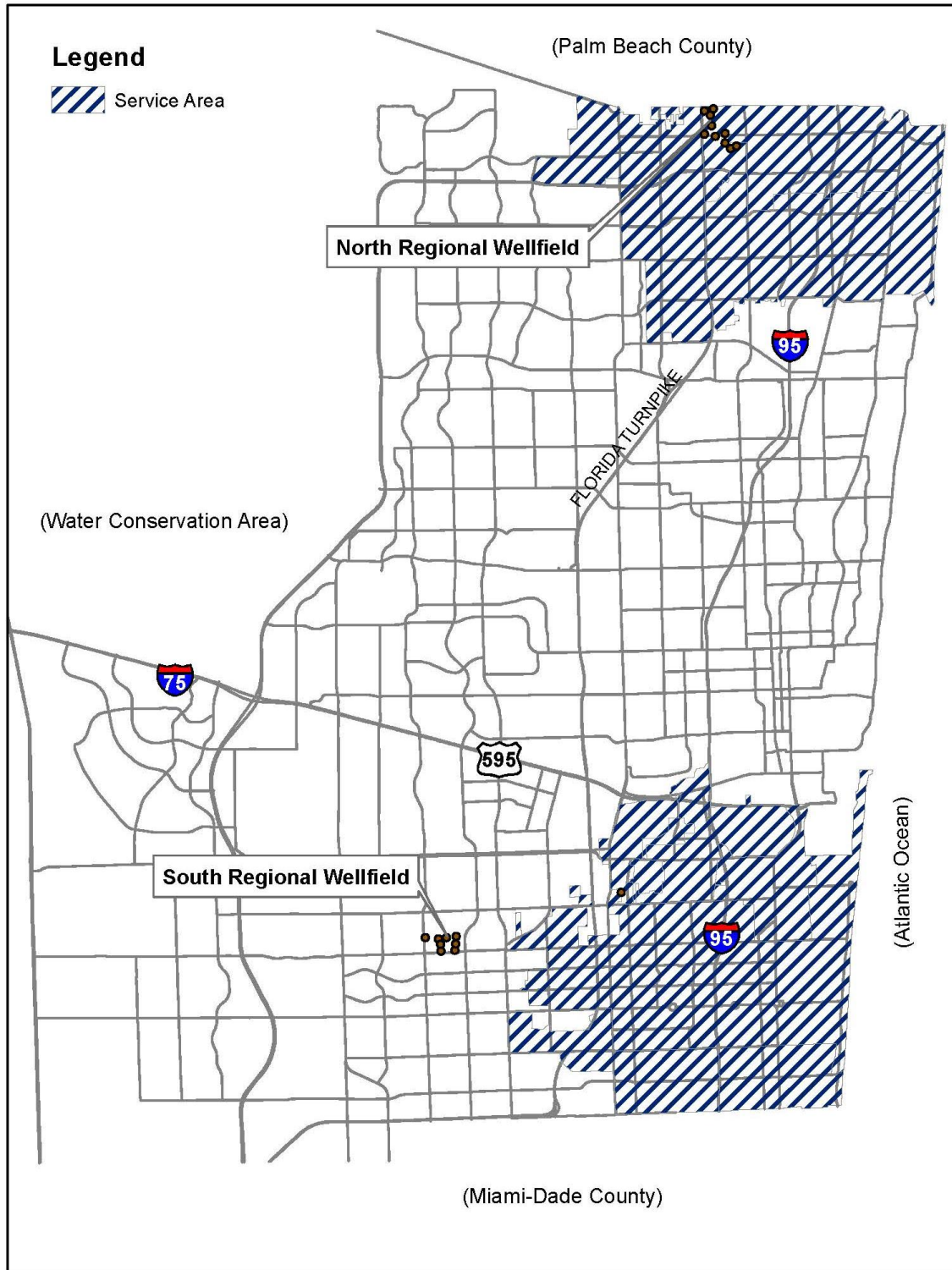
The Biscayne aquifer, currently the County's primary source of drinking water, is subject to saltwater intrusion. In 1986, the County adopted the Regional Raw Water Supply (RRWS) Program, which called for centralized wellfields located further inland to ensure a long-term water supply for Broward County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

Table 5-1 NRW Physical Descriptions							
Well No.	Size (in)	Depth (ft.)	Casing Depth (ft.)	Type of Casing	Normal Yield (GPM)	Capacity (GPM)	Service Status
1	20	170	112	PVC	1400	1400	ON LINE
2	20	130	116	PVC	1400	1400	ON LINE
27	20	130	95	PVC	1400	1400	OFF 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

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Figure 5-1 Regional Raw Water Service Areas



Source: Broward County Water and Wastewater Services

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Table 5-2 SRW Physical Descriptions

Well No.	Size (in)	Depth (ft.)	Casing Depth (ft.)	Type of Casing	Normal Yield (GPM)	Capacity (GPM)	Service Status
5	20	110	75	PVC	2083	1400	ABANDONED*
6	20	110	75	PVC	2083	1400	ABANDONED*
17	12	115	81	PVC	2800	2800	OFFLINE
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 in 2015.*

Source: Broward County Water and Wastewater Services

5.2 North Regional Wellfield

The NRW includes ten 2 MGD Biscayne aquifer wells and approximately 30,000 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 approved by the SFWMD and issued in March 2008. The permitted Biscayne aquifer withdrawal capacity of the 2A/NRW is 19.2 MGD on a maximum month basis and 17.5 MGD on an annual average basis. The permit expires in the year 2028. The well casings at the NRW are set in the Biscayne Aquifer at a depth of approximately 100 feet below land surface. The NRW has two emergency generators capable of powering pumps for six wells. Usage data for the NRW are presented in Table 5-3. All wells in the NRW have PVC casings.

Table 5-3 Large User Actual Flow North Regional Raw Water Flow Distribution (1,000 Gallons)			
Fiscal Year	Deerfield	Broward County	NRWF
FY 2014	207,310	2,364,710	2,572,020
FY 2015	205,344	2,141,714	2,347,058
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
Source: Broward County Water and Wastewater Services			

5.3 South Regional Wellfield

The SRW includes eight 4 MGD wells, approximately 79,000 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 SFWMD issued a renewal of the SRW March 2018. The permit outlines allocations for a five-year temporary period, base condition and alternative water supply. The 5-year temporary allocation of 15.6 MGD is designed to support the wellfield large users until the C-51 Reservoir project is complete and operational. The base condition allocation of 11.6 MGD is the Raw Water Availability Rule limit on withdrawals from the Biscayne aquifer for the SRW and the alternative water supply allocation of 5.2 MGD represents the additional water, above the base condition limit, that will be available because of recharge offset water delivered from the C-51 Reservoir project to the wellfield.

As indicated in Table 5-2 above, 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. All wells in the SRW have PVC casings. Usage data for the SRW are presented in Table 5-4.

Section 5 - Regional Raw Water Supply

Table 5-4 Large User Actual Flow South Regional Raw Water Flow Distribution (1,000 Gallons)

FISCAL YEAR	Hallandale	Hollywood	Dania	FPL	SRWF
FY 2014	1,177,573	1,405,356	632,706	674,546	3,890,181
FY 2015	1,206,252	1,380,709	644,968	526,307	3,758,236
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

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 7-6 and generally represent less than one percent 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 five to 20 years. The permit for the combined 2A/NRW was issued in March 2008 for a 20-year period. The permit for the SRW permit was issued March 2018. The permit has three expiration dates: a 5-year temporary, which expires March 2023, a base condition allocation, which expires March 2038, and an alternative water supply allocation, which expires December 27, 2065.

Monitoring of well pumpage, 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

North Regional Wellfield

Overall, the NRW appeared to be in good operating condition and in good to excellent physical condition. Most wells pipe coating appeared to be intact, and the vaults and surrounding concrete areas pressure washed as part of annual maintenance. The following summarizes the observations resulting from the visual inspection performed on May 21, 2019.

- Well 1 Well 1 was in good condition. Security fencing and locked vaults were intact. The wellhead and associated piping and valves appeared to be in good condition. Electrical equipment, including the backup generator serving Wells 1, 2, and 46, was in very good condition. The sump pumps appeared to be in operational condition – the well vault showed no obvious evidence of flooding. The emergency generator building’s AC unit has been replaced. The emergency generator building interior and exterior were in very good condition.
- Well 2 Well 2 was in excellent condition. Security fencing and locked vaults were intact. The wellhead and associated piping and valves appeared to be in excellent condition. Electrical equipment was in excellent condition. The sump pumps appeared to be in operational condition – the well vault showed no obvious evidence of flooding. The vault had some minor concrete spalling on the exterior southwest corner.
- Well 27 Well 27 was in good condition. Security fencing and locked vaults were intact. The wellhead and associated piping and valves appeared to be in very good condition. Electrical equipment was in very good condition. The sump pumps appeared to be in operational condition – the well vault showed no obvious evidence of flooding.
- Well 29 Well 29 was in excellent condition. Security fencing and locked vaults were intact. The wellhead and associated piping and valves appeared to be in excellent condition. Electrical equipment was in very good condition. The sump pumps appeared to be in operational condition – the well vault showed no obvious evidence of flooding.
- Well 30 Well 30 was in excellent condition. Security fencing and locked vaults were intact. The wellhead and associated piping and valves were in excellent condition. Electrical equipment was in very good condition. The sump pumps appeared to be in operational condition – the well vault showed no obvious evidence of flooding.

Section 5 - Regional Raw Water Supply

- Well 31 Well 31 was in excellent condition. Security fencing and locked vaults were intact. The wellhead and associated piping and valves appeared to be in very good condition. Electrical equipment was in very good condition. The sump pumps appeared to be in operational condition – the well vault showed no obvious evidence of flooding.
- Well 32 Well 32 was in very good condition. Security fencing and locked vaults were intact. The wellhead and associated piping and valves appeared to be in good condition. Electrical equipment was in very good condition. The sump pumps appeared to be in operational condition – the well vault showed no obvious evidence of flooding. The emergency generator building exterior was in very good condition.
- Well 33 Well 33 was in very good condition. Security fencing and locked vaults were intact. The wellhead and associated piping and valves appeared to be in good condition. Electrical equipment was in very good condition. The sump pumps appeared to be in operational condition – the well vault floor was slightly wet at the time of the inspection; water possibly coming from the ARV outlet, which is a normal occurrence.
- Well 45 Well 45 was in excellent condition. Security fencing and locked vaults were intact. The wellhead and associated piping and valves appeared to be in excellent condition. Electrical equipment was in very good condition. The sump pumps appeared to be in operational condition – the well vault showed no obvious evidence of flooding.
- Well 46 Well 46 was in good condition. Security fencing and locked vaults were intact. The wellhead and associated piping and valves appeared to be in very good condition. Electrical equipment was in very good condition. The sump pumps appeared to be in operational condition – the well vault floor was slightly wet at the time of the inspection; water possibly coming from the ARV outlet, which is a normal occurrence.

South Regional Wellfield

Overall, the SRW appeared to be in fair to good condition. Most wells pipe coating appeared to be in very good condition, and the vaults and surrounding concrete areas appeared to be in good condition. The following summarizes the observations resulting from the visual inspection performed on May 24, 2019. Wells 17 and 18 were out of service and were being rehabilitated at the time of the site visit.

Well 17 Well 17 was in good condition. Security fencing and locked vaults were intact. The piping and valves appeared to be in good condition, with the wellhead having been removed due to the rehabilitation project going on at the time of the inspection. Electrical equipment was in good condition. The sump pumps appeared to be in operational condition – the well vault showed no obvious evidence of flooding.

Well 18 Well 18 was in good condition. Security fencing and locked vaults were intact. The piping and valves appeared to be in good condition. The wellhead was removed, as well as the pump at the time of the inspection due to the ongoing rehabilitation project. Electrical equipment was in good condition, including the backup generator serving this well and wells 17 and 19. The sump pumps appeared to be in operational condition – the well vault showed no obvious evidence of flooding. The interior and exterior of the generator building were in good condition.

Well 19 Well 19 was in good condition. Security fencing and locked vaults were intact. The wellhead and associated piping and valves appeared to be in good condition. Electrical equipment appeared to be in good condition. The sump pumps appeared to be in operational condition – the well vault showed no obvious evidence of flooding.

Well 20 Well 20 was in good condition. Security fencing and locked vaults were intact. The wellhead and associated piping and valves appeared to be in good condition. Electrical equipment was in good condition. The sump pumps appeared to be in operational condition – the well vault showed no obvious evidence of flooding.

Well 21 Well 21 was in good condition. Security fencing and locked vaults were intact. The wellhead and associated piping and valves appeared to be in good condition. Electrical equipment was in very good condition, including backup generator serving this well and wells 20 and 23. The sump pumps appeared to be in operational condition – the well vault showed no obvious evidence of flooding.

Section 5 - Regional Raw Water Supply

- Well 22 Well 23 was in good condition. Security fencing and locked vaults were intact. The wellhead and associated piping and valves appeared to be in good condition. Electrical equipment was in very good condition. The sump pumps appeared to be in operational condition – the well vault showed no obvious evidence of flooding.
- Well 23 Well 22 was in good condition. Security fencing and locked vaults were intact. The wellhead and associated piping and valves appeared to be in good condition, with minor corrosion noted on wellhead flange. Electrical equipment was in very good condition. The sump pumps appeared to be in operational condition – the well vault showed no obvious evidence of flooding. This site has the capacity to be connected to a portable generator set.
- Well 24 Well 24 was in good condition. Security fencing and locked vaults were intact. The wellhead and associated piping and valves appeared to be in good condition. Electrical equipment was in very good condition. The sump pumps appeared to be in operational condition – the well vault showed no obvious evidence of flooding. The severe erosion from well flushing was observed. This site has the capacity to be connected to a portable generator set.

Section 6 - Capital Improvement Program

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. The revision completed in 2014 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 new 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 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 2019 through 2023 in September 2018. The 5-year CIP reflects the total estimated project costs for each project, which is expected to be initiated within the 5-year plan regardless of the estimated time required to design and complete construction of the project. Projects remain open until all related construction activities are complete. The budgets by capital project type through Fiscal Year 2023 are presented in Table 6-2.

Section 6 - Capital Improvement Program

Table 6-1 Capital Improvement Program as of September 30, 2018						
Capital Budgets	Water Treatment	Water and Sewer Mains	Wastewater Treatment	Regional Transmission	Engineering Services & Misc.	Total
Unspent Prior Budget	\$21,512,344	\$131,121,504	\$245,818,965	\$17,245,830	\$6,090,390	\$421,789,033
2019	1,459,420	41,493,870	67,011,050	7,364,490	4,260,460	121,589,290
2020	850,000	74,084,510	5,600,000	500,000	3,563,580	84,598,090
2021	16,845,000	13,724,000	800,000	14,000,000	3,563,580	48,932,580
2022	800,000	41,780,000	57,354,000	500,000	3,513,580	103,947,580
2023	300,000	16,650,000	800,000	500,000	3,513,580	21,763,580
Totals	\$41,766,764	\$318,853,884	\$377,384,015	\$40,110,320	\$24,505,170	\$802,620,153
Five Year CIP Funding:						
Bonds FY						
2019-2023	24,000,000	82,654,881	234,100,000	34,000,000	-	374,754,881
Cash FY 2019-						
2023 ¹	5,000,000	158,946,000	6,054,000	5,000,000	16,054,000	191,054,000
Beyond 2023 ²	12,766,764	77,253,003	137,230,015	1,110,320	8,451,170	236,811,272
Totals	41,766,764	\$318,853,884	\$377,384,015	\$40,110,320	\$24,505,170	\$802,620,153
¹ Cash reflects net revenues, capital recovery charges, large user contributions, and grants						
² Reflects effects of construction period. It is currently expected that \$427M of the \$803M program will be spent by 2023. Since the construction period extends beyond 2023, the remaining \$376M will be spent in subsequent years.						
Source: Broward County Water and Wastewater Services						

Section 6 - Capital Improvement Program

Table 6-2 Capital Projects Budgets by Type Through Fiscal Year 2023

	Budget
Water Treatment	
Water Treatment Plant Expansion	\$19,432,862
Water Treatment Plant IRR ¹ & Misc. Projects	\$22,333,902
Water Treatment Subtotal	\$41,766,764
Water Distribution and Sewer Collection	
Neighborhood & Local Utility Projects (NP & LUP)	\$164,366,473
Retail Sewer Main Improvements	\$76,381,726
Retail Water Main Improvements	\$8,644,744
Misc. Main Improvements	\$1,637,700
Potable Water Storage Improvements	\$44,319,239
Lift Station Improvements	\$23,504,002
Water Distribution and Sewer Collection Subtotal	\$318,853,884
Wastewater Treatment	
NRWWTP Effluent Disposal /Treatment Enhancements	\$241,313,340
NRWWTP Equipment Rehabilitation	\$135,994,190
Wastewater Plant IRR ¹ & Misc. Projects	\$76,485
Wastewater Treatment Subtotal	\$377,384,015
Regional Transmission	
Master Pump Station Improvements	\$29,069,873
Force Main Improvements	\$11,040,447
Regional Transmission Subtotal	\$40,110,320
Engineering/Misc. Services	\$24,505,170
GRAND TOTAL	\$802,620,153
<i>1 IRR = Improvement, Repair and Replacement</i>	
<i>Source: Broward County Water and Wastewater Services</i>	

The estimated funding requirements for this 5-year period ending Fiscal Year 2023 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 at least 33% 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 have not yet been awarded. The County plans 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

Section 6 - Capital Improvement Program

action taken at the September budget hearings. Current projections anticipate level rate increases of approximately three percent annually through Fiscal Year 2019. The County estimates it will issue approximately \$234.5 million in bonds in 2019.

The County reviews and updates the CIP annually and includes separate estimates for the Water and Wastewater Systems. The total cost of the CIP could vary from these annual estimates depending upon future demands, regulatory requirements, actual contract awards and other economic factors.

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 \$42 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) has been completed. Initiated by the County in 1993, the program upgraded the infrastructure in what were unincorporated neighborhoods. The improvements include upgrades to the existing water and sewer system, installation of drainage, new pavement, swales and landscaping. The final bid pack, Hillsboro Pines, was completed in Fiscal Year 2017. The remaining funding for this program, \$1.2 million, is to address sewer installations within Hillsboro Pines that were not included in the original project.

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 by 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 next 20 plus years. The 5-year CIP includes \$164 million dollars for UAZ projects.

6.6 Other Including Mains, Lift Station Improvements and Potable Storage

The CIP includes \$87 million for water and wastewater main improvement projects to address aging water and wastewater lines, increase transmission and distribution capacities, and extend service to new customers. Forty-four (44) million dollars of potable water storage improvements are included for replacing existing aging systems and enhancing water storage capacities to meet current and future demands. The CIP also includes \$24 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. The Multi-District Inflow and Infiltration Program is continuing with \$6 million budgeted for repairs to the wastewater collection system.

Section 6 - Capital Improvement Program

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 after December 31, 2025. 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. With the amendment to the Ocean Outfall legislation in 2013, and the Interlocal Agreement (ILA) between Broward County and Palm Beach County (PBC) whereby Broward County will supply bulk reclaimed water to PBC, estimated costs are expected to be substantially reduced to approximately \$170 million. This ILA was fully executed in April 2016. The County has included funding in the 5-year CIP to address these improvements. Various other system utility capital and improvement, repair and replacement (IRR) projects are budgeted at approximately \$136 million and include digester improvements, grit removal improvements, control center upgrades, general improvements and replacements.

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 \$40 million for improvements to the master pump stations, retail wastewater meters, and regional air release valves. Funds have been made available for a new Regional Wastewater Transmission System Master Plan, which is scheduled to begin in 2019.

Section 7 Financial Conditions

This section describes financial operations of the utility; rates, fees and charges; revenue projections; a comparison of utility service costs with other utilities; and adequacy of insurance coverage.

7.1 Overview of Financial Operations

Operating and general maintenance costs of the retail portion of the Utility are recovered through service charges, connection charges and miscellaneous fees and charges. 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 municipalities and capital recovery charges.

User charges and fees are developed by WWS and approved by the Broward County Board of County Commissioners. The Board has specific legal authority to fix charges and collect rates, fees and charges from its customers and to acquire, construct, finance and operate the Utility. The existing rate structure for retail customers is based on meter size and consumption. The County, as a matter of policy, on an annual basis reviews revenue requirements and institutes required rate increases.

The current retail water and wastewater rates were approved by the Board in September 2018 and became effective October 1, 2018. These rates are presented in Tables 7-1, 7-2 and 7-3. The Rate Resolutions also address rates for irrigation, reclaimed water, septage and high strength industrial wastewater surcharge, an emergency rate adjustment for water conservation during drought conditions, capital recovery charges per equivalent residential unit (ERU), customer deposits and specific service charges. Capital recovery charges underwrite the investment in additional capacity needed to serve new (additional) customers.

Table 7.1 Broward County Water and Sewer Monthly Service Costs for a Residential Customer Using 5,000 Gallons per Month										
Fiscal Year	Water Fixed Charge ¹	Water Volume Charge	Water Total	% Change From Prev. Year	Sewer Fixed Charge	Sewer Volume Charge	Sewer Total	% Change From Prev. Year	Total Water and Sewer	Total % Change From Prev. Year
2015	15.14	9.34	24.48	2.4%	17.46	18.30	35.76	3.4%	60.24	3.0%
2016	15.54	9.53	25.07	2.4%	18.12	18.70	36.82	3.0%	61.89	2.7%
2017	16.01	9.81	25.82	3.0%	18.69	19.30	37.99	3.2%	63.81	3.1%
2018	16.36	10.06	26.42	2.3%	19.26	19.90	39.16	3.1%	65.58	2.8%
2019 ²	16.79	10.36	27.15	2.8%	19.88	20.55	40.43	3.2%	67.58	3.0%

¹ Includes customer charge.

² Based on rates adopted by the Board effective October 1, 2018.

Source: Broward County Water and Wastewater Services

Section 7 – Financial Conditions

7-2 Broward County Schedule of Retail Rates Minimum Monthly Charges by Customer Class and Meter Size Effective October 1, 2018			
Customer Class	Meter Size (inches)	Water (\$)	Wastewater (\$)
Residential	5/8" Residential	12.37	19.88
	1" Residential	35.29	46.19
Commercial, Municipal and Institutional	5/8	18.25	26.56
	1	42.44	71.09
	1 1/2	95.38	147.04
	2	242.40	414.50
	3	511.13	1,156.45
	4	4,655.63	2,238.20
	6	8,806.10	13,754.48
Sale for Resale	4 or less	4,656.63	-
	6	8,806.10	-
	8	10,572.13	-
	10+	61,017.64	-
Multi-Family and Mobile Home (per unit)	All sizes	10.11	15.69
Hotels and Motels (per unit)	All sizes	6.71	11.09
Recreational Vehicles (per unit)	All sizes	7.52	11.48
Private Fire Protection	All Sizes	124.81	-
Irrigation	5/8	15.68	-
	1	31.19	-
	1 1/2	84.65	-
	2	194.91	-
	3	444.37	-
Reclaimed Water	4	1,966.15	-
	5/8	12.37	-
	1	12.37	-
	1 1/2	72.78	-
	2	242.40	-
	3	511.13	-
	4	4,655.63	-
6	8,806.10	-	
8	10,572.13	-	

Source: Broward County Water and Wastewater Services

Section 7 – Financial Conditions

Table 7-3 Broward County Schedule of Retail Rates Volume Charge (1,000 Gallons) by Customer Class and Meter Size Effective October 1, 2018					
Customer Class (all Meter sizes unless noted)	Water		Wastewater		
	Volume (per 1,000 Gals)	Charge (\$)	Volume (per 1,000 Gals)	Charge (\$)	
Residential	0-3	1.58	0 - 15	4.11	
	4-6	2.81	Over 15	No Charge	
	7-12	6.64			
	Over 12	8.04			
Commercial, Municipal and Institutional	0 - 75% of Avg Consumption	4.01	All Volumes	4.11	
	Over 75% of Avg. Consumption	8.18			
Sale for Resale	Water Treatment Charge	2.51	N/A	-	
	Water Transmission Charge	0.11	N/A	-	
Multi-Family and Mobile Homes (per unit)	0-2	1.58	0-8	4.11	
	3-4	2.81			
	5-6	6.64	Over 8	No Charge	
	Over 6	8.04			
Hotels and Motels (per unit)	0 - 75% of Avg Consumption	4.01	All Volumes	4.11	
	Over 75% of Avg. Consumption	8.18			
Recreational Vehicles (per unit)	0 - 75% of Avg Consumption	4.01	All Volumes	4.11	
	Over 75% of Avg. Consumption	8.18			
Private Fire Protection	All Volumes	6.64	N/A	-	
Irrigation	5/8" meter	0-8	6.63	N/A	
		Over 8	8.05	N/A	
	1" meter	0-22	6.63	N/A	-
		Over 22	8.05	N/A	-
	1 1/2" meter	0-55	6.63	N/A	-
		Over 55	8.05	N/A	-
	2 to 3" meter	0-142	6.63	N/A	-
		Over 142	8.05	N/A	-
Reclaimed Water	All Volumes	0.70	N/A	-	

Source: Broward County Water and Wastewater Services

Section 7 – Financial Conditions

Since 1994, the average residential use of water decreased from 220 gpd (gallons per day) to 177 gpd. The decrease appears to be related to ongoing water restrictions and water conservation initiatives of Broward County and the South Florida Water Management District (SFWMD). In Fiscal Year 2010, WWS completed a Rate Study, which determined that the treatment plant must produce 206 gpd of water to deliver 185 gpd to the average residential customer. Converting the daily demand to the maximum average daily flow (a factor of 1.33x), yields the requirement of 274 gpd of plant capacity necessary to serve an ERU (equivalent residential unit). In addition, the ratio of billed water to treated wastewater was 1.13x, yielding a requirement of 209 gpd of wastewater treatment capacity per ERU.

For Fiscal Year 2018, the capital recovery charges are \$1,590 and \$2,010 for water and sewer, respectively. At the beginning of the Neighborhood Projects, the County adopted the policy of not charging for the first ERU for sewer per customer.

Charges for Large Users of the NRWWS are defined by the Large User agreements, and consist of charges for operation and maintenance costs assessed based on flows, debt service costs assessed based on reserve capacity, and improvement, repair, and replacement fund costs that are assessed as a percentage of other charges. The charges for operation and maintenance costs are adjusted annually to reflect each user's proportionate share of actual costs during the fiscal year.

7.2 Water and Wastewater Rates and Charges

The County continues to encourage retail customers to conserve water. The County established a rate schedule that sets higher water rates for levels of consumption beyond basic use. As a result of the 2010 Rate Study, an additional rate tier was implemented. The current rate schedule is composed of four tiers:

- Rates for basic use
- Rates for normal use
- Rates for discretionary use
- Rates for excessive use

As noted in Table 7-1, there was an approximately 3% increase in the average monthly residential bill of 5,000 gallons from Fiscal Year 2018 to Fiscal Year 2019. Tables 7-2 and 7-3 show the minimum monthly fixed charges and volume charges for all customer classes based upon rates approved by the County, which went into effect October 1, 2018. A 5-year summary of billing volumes is shown in Table 7-4.

Section 7 – Financial Conditions

Table 7-4 Retail Water and Wastewater Billing Volumes as of September 30, 2018 (1,000 Gallons)				
Fiscal Year Ended 9/30	Treated Retail	Coconut Creek	Treated Water Total ¹	Wastewater Water
2014	6,694,051	1,754,927	8,448,978	5,165,058
2015	6,949,511	1,789,374	8,738,885	5,372,243
2016	6,764,038	1,736,453	8,500,491	5,339,017
2017	6,861,976	1,844,111	8,706,087	5,442,216
2018	6,871,401	1,885,328	8,756,729	5,385,410

Source: Broward County Water and Wastewater Services

In the event additional water restrictions are imposed, the County has instituted an automatic adjustment, as noted in Table 7-5, to the water quantities at which increased rates are applied to encourage customers to reduce consumption. 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 reductions of water used.

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 levels at which increased rates become effective decrease.

Section 7 – Financial Conditions

Table 7-5 Automatic Rate Adjustments for Periods of Mandated Water Restrictions			
Customer Class and Block	Restrictions Per Unit Per Month (1,000 gallons)		
	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 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%
<i>Source: Broward County Water and Wastewater Services</i>			

The NRWWS Large Users' 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 Large User in proportion to their 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 Fund established by resolutions of the Board authorizing the issuance of bonds for the Utility (collectively, the "Bond Resolutions") to provide a reserve for the Utility.

Section 7 – Financial Conditions

Presently, the Renewal, Replacement and Improvement Fund is required by the Bond Resolution to maintain a minimum balance of five percent of the previous year's revenues, as defined by the Bond Resolution, or a greater amount if recommended by the Consulting Engineer. Five percent of Fiscal Year 2018 revenues are approximately \$7 million. Based on the financial statement for the Fiscal Year ended September 30, 2018, the 2018 total revenues were \$140,483,000. The current balance in the Renewal, Replacement and Improvement Fund is \$7 million, consistent with the requirement of the bond resolution.

7.3 Revenue Projections

Annual water and wastewater revenues and expenditures for Fiscal Year 2018 are based on actual values from financial statements prepared as of September 30, 2018. Fiscal year 2019 revenues and expenditures have been projected based upon the rates approved by the County, which were implemented October 1, 2018 in conjunction with estimated expenses through Fiscal Year 2019. Revenues for Fiscal Years 2019 through 2023 have been based on average annual number of customers, historical average consumption and the retail service rates shown in Table 7-3.

The Utility operates a mature system with limited future growth expected. Growth rates in the retail water and retail wastewater system customer base beginning in Fiscal Year 2018 have been estimated at 1% annually for water and 1% annually for wastewater. Operation and Maintenance costs are forecast at budgeted levels for Fiscal Year 2018 and assumed to increase by an average of 2% annually for both water and wastewater beginning in Fiscal Year 2019. Retail rate increases from Fiscal Years 2019 through 2023 of approximately 3% or less per year for both retail water and wastewater are necessary to meet the projected revenues as presented in Table 7-6 and Table 7-7. The Board has not yet considered these rate increases. If any retail rate increase is not approved, coverage would be reduced. The revenue forecast for the Large Users of the NRWWS has been projected to recover costs as defined under the Large User agreement.

Table 7-6 shows historical and projected ratios of Large User's (regional and resale) revenues to total revenues. Proposed 2019 debt service assumes a 4.5% interest rate per annum and maturities over a 25-year period, back-loaded to support levelized total debt service payments. In Fiscal Year 2018, the total revenues generated by the Utility were sufficient to meet the bond covenant requirement of 120% coverage of all debt service obligations. The audited financial statements at September 30, 2018 present the computation of debt service coverage on all outstanding revenue bonds as 1.82 for Fiscal Year 2018. In addition, a Balance Available for Renewal, Replacement and Capital Expenditures of approximately \$29.6 million was generated during Fiscal Year 2018. Table 7-7 presents the Historical and Projected Net Revenue Debt Service and Debt Service Coverage.

An estimate of interest income is projected annually from Fiscal Year 2019 through Fiscal Year 2023. 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.

Table 7-6 Historical and Projected Ratios of Large Users' Revenues and Wastewater Revenues (in 1,000s)

	Historical					Projected				
	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Total Revenues ¹	123,983	132,139	132,838	138,546	140,483	146,998	153,673	156,746	159,881	163,079
Large User Revenues (Excluding Broward County)	32,413	34,417	33,868	34,834	34,773	38,600	42,846	44,131	45,234	46,591
Percentage Large User to Total Revenues	26.1%	26.0%	25.5%	25.1%	24.8%	26.3%	27.9%	28.2%	28.3%	28.6%
Regional Raw Water Revenues	945	849	857	803	866	893	901	910	919	937
Percentage Regional Raw Water Total Revenues	0.8%	0.6%	0.6%	0.6%	0.6%	0.6%	0.6%	0.6%	0.6%	0.6%
Sale for Resale/Water ²	5,938	6,053	6,247	6,688	6,975	7,080	7,150	7,221	7,293	7,329
Percentage Sale for Resale Revenues to Total Revenues	4.8%	4.6%	4.7%	4.8%	5.0%	4.8%	4.7%	4.6%	4.6%	4.5%

¹ Total Revenues do not include interest earned on the construction account.

² Principally Sales to City of Coconut Creek

Source: Broward County Water and Wastewater Services

Section 7 – Financial Conditions

Table 7-7 Schedule of Historical and Projected Net Revenues, Debt Service and Debt Service Coverage (\$1,000)

	Historical					Projected				
	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Revenues:										
Water	\$ 45,453	\$ 47,796	\$ 48,106	\$ 50,620	\$ 51,788	\$ 52,983	\$ 54,572	\$ 56,210	\$ 57,896	\$ 59,633
Wastewater	70,385	76,159	76,890	79,411	80,976	84,700	\$ 92,660	\$ 94,756	\$ 96,904	\$ 99,106
Other	7,869	7,893	7,417	7,507	5,661	\$ 5,718	\$ 5,775	\$ 5,833	\$ 5,891	\$ 5,950
Interest Income	276	291	425	1,008	2,058	2,079	2,099	2,120	2,142	2,163
Total Revenues	\$ 123,983	\$ 132,139	\$ 132,838	\$ 138,546	\$ 140,483	\$ 145,479	\$ 155,107	\$ 158,919	\$162,833	\$ 166,852
Current Expenses:										
Water Transmission & Distribution	\$ 10,024	\$ 11,258	\$ 11,441	\$ 12,404	\$ 13,582	\$ 13,989	\$ 14,409	\$ 14,697	\$ 14,991	\$ 15,291
Water Source of Supply, Treatment & Pumping	9,060	7,317	9,817	9,497	9,488	9,773	10,066	10,267	10,472	10,682
Wastewater Collection & Transmission	9,200	11,004	11,262	11,824	11,794	12,148	12,512	12,762	13,018	13,278
Wastewater Treatment	15,373	17,321	17,724	18,324	18,637	19,196	19,772	20,167	20,571	20,982
Customer Service	4,765	4,782	4,953	5,291	5,833	6,008	6,188	6,312	6,438	6,567
Administrative/General	14,041	15,203	14,920	15,534	15,521	15,987	16,466	16,796	17,131	17,474
Total Current Expenses	\$ 62,463	\$ 66,885	\$ 70,117	\$ 72,874	\$ 74,855	\$ 77,101	\$ 79,414	\$ 81,002	\$ 82,622	\$ 84,274
Net Revenues	\$ 61,520	\$ 65,254	\$ 62,721	\$ 65,672	\$ 65,628	\$ 68,378	\$ 75,693	\$ 77,917	\$ 80,211	\$ 82,577
Debt Service:										
Senior Lien Debt:										
Series 2005-A Bonds	\$ 2,457	\$ 1,979								
Series 2009-A Bonds	10,326	8,773	\$ 2,367	\$ 2,363	\$ 2,363	\$ 1,985	\$ 1,984	\$ 1,700	\$ -	\$ -
Series 2012-A Bonds	8,252	8,252	8,251	8,253	9,037	8,723	8,725	8,810	8,812	8,823
Series 2012-B Bonds	5,523	5,523	5,523	5,523	11,057	16,371	16,370	14,271	14,271	14,263
Series 2012-C Bonds	10,941	10,945	10,940	10,942	4,622	-	-	-	-	-
Series 2015-A Bonds		411	2,113	2,113	2,113	2,113	2,113	2,113	2,113	2,113
Series 2015-B Bonds		1,339	6,885	6,885	6,885	6,885	6,885	9,515	11,209	11,208
Series 2019-A Bonds						3,482	10,553	10,553	10,553	10,553
Total Debt Service	\$ 37,499	\$ 37,222	\$ 36,079	\$ 36,079	\$ 36,077	\$ 39,559	\$ 46,630	\$ 46,962	\$ 46,958	\$ 46,960
Debt Coverage Senior Lien	1.64	1.75	1.74	1.82	1.82	1.73	1.62	1.66	1.71	1.76

Source: Broward County Water and Wastewater Services

7.4 Comparison of Utilities Service Costs for Municipalities and the Unincorporated Area in Broward County

Table 7-8 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 7-8 Comparative Rate Survey as of 12/31/2018 (Based On Usage of 5,000 Gallons Per Month for a 5/8" meter)			
Utility	Water	Sewer	Total
Sunrise (outside City)	51.64	63.10	114.74
Davie	39.70	74.07	113.77
Wilton Manors	50.94	48.79	99.73
Oakland Park	49.49	49.90	99.39
Dania Beach ¹	35.00	58.82	93.82
Sunrise (inside City)	41.32	50.48	91.80
Fort Lauderdale (Outside City)	30.95	51.89	82.84
Hollywood ¹	26.93	54.27	81.20
North Lauderdale ¹	32.30	47.25	79.55
Parkland	25.39	53.01	78.40
Margate (outside City)	38.33	39.06	77.39
Miramar	31.73	40.85	72.58
Coconut Creek ¹	40.22	30.56	70.78
Pembroke Pines	32.25	37.33	69.58
Cooper City ¹	27.36	41.56	68.92
Broward County (WWS)	27.15	40.43	67.58
Plantation	23.83	43.75	67.58
Pompano Beach (outside City)	32.75	34.18	66.93
NSID ¹	36.09	30.28	66.37
Coral Springs	22.83	43.46	66.29
Fort Lauderdale	24.76	41.51	66.27
Hallandale Beach ¹	25.32	40.48	65.80
Tamarac ¹	21.80	42.75	64.55
Margate (inside City)	30.71	31.25	61.96
Lauderhill	21.32	37.36	58.68
Royal Utility	26.68	31.24	57.92
Pompano Beach (inside City)	26.20	27.34	53.54
Deerfield Beach ¹	28.25	24.53	52.78
CSID ¹	25.01	25.01	50.02
Average Water & Sewer for Broward	31.94	42.57	74.51
Water Only			
Hillsboro	34.41		34.41
Sewer Only			
Pembroke Park		53.90	53.90
Lauderdale by the sea		41.32	41.32
Tri-County Utilities			
Palm Beach County	23.52	28.72	52.24
Miami Dade County	13.67	27.59	41.26
¹ The rates did not change from 2017 to 2018			

7.5 Insurance Coverage

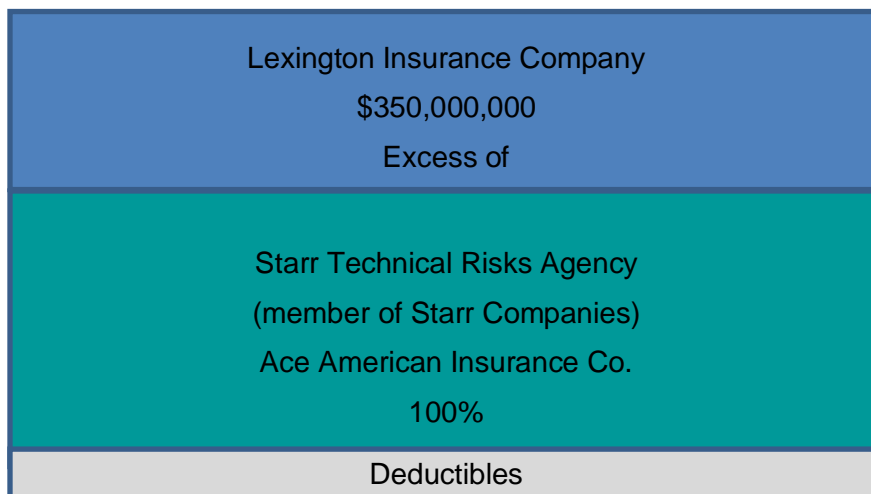
Broward County Water and Wastewater Services (WWS) bond covenants require that customary insurance be carried on the physical assets of the system and coordinates coverage through the County's Master Property program. The term of the present policy is from February 1, 2019 to February 1, 2020.

Broward County has a large portion of property values located in Special Flood Hazard Areas. The County and WWS have taken steps to mitigate and protect the physical assets, so they are more resistant to catastrophic events and flooding.

This year, Broward County continued to provide coverage with a dedicated tower specific to WWS locations that provide comprehensive protection for its physical assets valued over \$539 Million. Coverage is provided through ACE American Insurance Company, an admitted A++ XV carrier rated by AM Best, as their 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 Zone X – have been identified and individual policies have been written through National Flood Insurance Program (NFIP).

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 February 1st, 2019. The premium for the County's Insurance Program renewal is \$17,535,429 for a combined/overall rate increase of only 7.31%. This is the first 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 increase compares favorably based on preliminary data. Similar sized markets with sustained damages are seeing an upward rate increase of 25% and up to 10% increases from similar markets with no reported losses.

WWS' insured physical assets comprise 9.6% of Broward County's assets. WWS recognized a premium increase of 8.4% on their dedicated property renewal.

The four major above-ground water and wastewater facilities and their estimated values, as provided by WWS as of June 2019, are as follows:

Table 7-9 Estimated Value of Aboveground Water and Wastewater Facilities	
Facility	FY 2018 Estimated Bldg. Value (\$1,000s)¹
NRWWTP Complex	\$956,683
Water Treatment Plant 2A	\$112,551
Water Treatment Plant 1A	\$73,159
3A Repump Station	\$16,883
<i>1: Note: Values may not reflect all improvements done at each facility.</i>	
<i>Source: Broward County Water and Wastewater Services</i>	

The building values for each facility were based on values provided in previous years' annual reports, increased by three percent. To aid in determining insurance coverage needs, in July 2016, Broward County completed an external survey to estimate fair market value, replacement value, and appropriate insured value for physical assets of the system.

Appendix A

Table A-1 Water and Wastewater Services Water Production, Wastewater Treatment, and Regional Raw Water (Millions Gallons)										
	FY-2009	FY-2010	FY-2011	FY-2012	FY-2013	FY-2014	FY-2015	FY-2016	FY-2017	FY-2018
Water Production										
Plant 1A	2,835	2,865	2,635	2,672	2,613	2,608	2,739	2,670	2,708	2,547
Plant 1B	0	0	0	0	0	0	0	0	0	0
Plant 2A	4,571	4,555	4,572	4,259	4,444	4,364	4,588	4,498	4,699	4,965
Plant 3A	0	0	0	0	0	0	0	0	0	0
Plant 3B	0	0	0	0	0	0	0	0	0	0
Plant 3C	0	0	0	0	0	0	0	0	0	0
Broadview	0	0	0	0	0	0	0	0	0	0
Purchased Water From Municipality	2,597	2,203	2,204	2,187	2,390	2,515	2,293	2,402	2,170	2,385
Total Water Production	10,003	9,623	9,411	9,118	9,447	9,487	9,620	9,570	9,577	9,897
Wastewater Treatment										
North Regional WWTP	23,793	23,852	21,762	25,989	24,777	25,276	23,457	25,289	24,115	25,877
WW Flows to Hlwd. Regional Treatment	1,162	1,069	958	1,158	1,142	1,308	1,248	1,284	1,294	1,378
Total Wastewater Treatment	24,955	24,921	22,720	27,147	25,919	26,584	24,705	26,573	25,409	27,255
Regional Raw Water										
	6,438	6,374	7,196	6,669	6,455	6,462	6,105	6,047	6,204	6,664
Notes:										
1. Water for 1B and Broadview produced by 1A.										
2. Water for 3B/3C purchased from Hollywood (after October 15, 1996).										
Source: Broward County Water and Wastewater Services										

Table A - 2
Water and Wastewater Services
Average Number of Accounts as of September 30,2018

Consumer & Meter Size (inches)	WATER			SEWER		
	Number of Units	Number of Accounts	Average Consumption per Month (1,000 Gallons)	Number of Units	Number of Accounts	Average Consumption per Month (1,000 Gallons)
Residential Single Family						
5/8"	46,912	46,863	228,879	43,046	43,008	215,176
1"	1,848	1,777	25,767	1,902	1,864	28,519
1 1/2"	182	71	1,651	233	179	5,049
2"	124	5	394	152	33	1,865
TPK Residential Single Family						
5/8"	36	19	60	33	16	57
1 1/2"	69	2	306	36	1	28
2"	146	2	259	275	1	1,102
Residential Multi-Family, Hotel & RVs	33,717	2,025	124,073	33,106	1,874	120,910
Commercial						
5/8"	2,481	2,480	13,418	1,977	1,977	10,867
1"	1,205	1,152	17,494	812	812	13,451
1 1/2"	698	696	25,339	568	566	20,538
2"	1,096	623	63,666	716	464	48,769
3"	423	76	5,836	270	22	4,506
4"	10	10	26,132	9	9	8,224
6"	6	6	7,963	1	1	1,604
Irrigation						
5/8"	288	288	2,453	2	2	0
1"	275	275	5,544	1	1	32
1 1/2"	202	202	9,653	-	-	0
2"	120	120	13,601	-	-	0
Sale for Resale						
10"	7	7	157,111	-	-	0
TOTAL	89,845	56,699	729,598	83,139	50,830	480,696

Source: Broward County Water and Wastewater Services

Water & Wastewater Services
Activity Based Costing (ABC) Report
Disaggregation of Operating & Maintenance Expenses
FOR THE TWELVE MONTHS ENDED SEPTEMBER 30, 2018 (FY18 Q4 Report)

OPERATION AND MAINTENANCE EXPENSES:	RETAIL WATER	RETAIL WASTEWATER	WHOLESALE RAW WATER	WHOLESALE TREATMENT	WHOLESALE TRANSMISSION	WWS ADMIN, WWITD & BOD	ENGINEERING	TOTAL
Personal Services	\$ 4,647,897	\$ 2,381,169	\$ 98,377	\$ 5,816,763	\$ 655,657	\$ 7,260,597	\$ 1,730,136	\$ 22,590,596
Utility Services	1,333,702	4,355,786	414,161	3,236,155	696,436	565,460	1,513	10,603,213
Material & Supplies	1,360,176	649,994	50,200	1,715,693	295,511	1,436,453	35,826	5,543,852
Chemicals	2,352,596	-	-	794,151	-	-	-	3,146,746
Motor Pool	358,370	244,801	-	207,210	44,796	95,617	34,537	985,330
Contractual Services	482,400	39,263	27,009	3,344,360	70,799	2,249,727	153,439	6,366,997
Purchased Insurance	-	-	-	-	-	1,228,766	-	1,228,766
County Administrative Service	-	-	-	-	-	4,439,910	-	4,439,910
Purchased Water	6,062,435	-	-	-	-	-	-	6,062,435
Rental & Leases	11,251	2,481	-	9,403	-	20,702	2,265	46,103
Travel	-	-	-	169	-	23,676	9,379	33,224
Other	1,415,688	556,869	259,084	1,097,056	152,220	601,769	(45,794)	4,036,892
Educational Courses	5,679	5,259	-	20,791	1,356	34,403	14,658	82,146
Computer Maintenance	-	-	-	-	-	121,598	-	121,598
IRR & Expensed Projects	-	-	-	-	-	-	-	-
SUBTOTAL O & M EXPENSES	18,030,196	8,235,622	848,831	16,241,751	1,916,774	18,078,678	1,935,957	65,287,809
OPERATING OVERHEAD:								
SECTION ADMINISTRATION	-	-	-	-	-	-	-	-
DIVISION ADMINISTRATION	1,711,214	781,628	80,561	1,541,476	181,918	1,340,719	-	5,637,516
ONE CALL	-	-	-	-	-	-	-	-
PAINT SHOP	-	-	-	-	-	-	-	-
HEAVY EQUIPMENT	-	-	-	-	-	-	-	-
GENERATORS	-	657,293	-	-	-	-	-	657,293
LAB	559,666	2,915	23,319	854,073	17,490	-	-	1,457,463
SUBTOTAL OPERATING O/H	2,270,880	1,441,836	103,880	2,395,549	199,407	1,340,719	-	7,752,271
TOTAL EXPENSES BEFORE ALLOCATION	20,301,076	9,677,458	952,712	18,637,299	2,116,181	19,419,397	1,935,957	73,040,080
ALLOCATION:								
CUSTOMER SERVICE	2,703,530	2,371,603	58,335	583,349	116,670	(5,833,486)	-	-
WWS ADMINISTRATION	6,096,784	2,906,318	286,117	5,597,122	635,528	(13,585,911)	(1,935,957)	-
SUBTOTAL ALLOCATION	8,800,314	5,277,920	344,452	6,180,470	752,198	(19,419,397)	(1,935,957)	-
TOTAL OPERATING EXPENSES	29,101,390	14,955,378	1,297,163	24,817,770	2,868,379	-	-	73,040,080
RETAIL SHARE OF REGIONAL COST	489,441	5,172,833	-	-	-	-	-	5,662,274
TOTAL COST	\$ 29,590,831	\$ 20,128,211	\$ 1,297,163	\$ 24,817,770	\$ 2,868,379	\$ -	\$ -	\$ 78,702,354

SOURCE: BROWARD COUNTY WATER & WASTEWATER FUND

Table A - 4
Water & Wastewater Services
Water & Wastewater Fund
Statement of Net Assets
September 30, 2018, 2017, 2016, 2015, and 2014 (In Thousands)

	FY 2018	FY 2017	FY 2016	FY 2015	FY 2014
ASSETS					
Current Assets:					
Cash & Cash Equivalents	9,013	8,920	7,627	13,305	27,881
Investments	52,182	58,339	80,498	85,915	56,591
Accounts Receivable (Net)	18,840	20,169	16,698	18,235	14,873
Due From Other County Funds	194	459	0	0	0
Due From Other Governments	0	17	0	18	0
Inventory	9,364	9,044	8,845	8,694	8,511
Prepaid items	551	395	427	1,337	1,568
Total Current Unrestricted Assets	90,144	97,343	114,095	127,504	109,424
Restricted Assets:					
Current Restricted Assets	34,790	34,539	34,254	40,717	45,727
Total Current Assets	124,934	131,882	148,349	168,221	155,151
Noncurrent Assets:					
Noncurrent Restricted Assets	43,679	43,394	43,359	42,952	81,043
Capital Assets:					
Utility Plant in Service	1,227,900	1,217,919	1,194,686	1,143,447	1,124,870
Land	4,936	4,936	4,936	4,936	4,936
Construction in Progress	192,845	147,017	111,473	101,079	63,231
Equipment	33,577	32,273	31,401	28,688	27,270
Total Capital Assets	1,459,258	1,402,145	1,342,496	1,278,150	1,220,307
Less Accumulated Depreciation	(621,612)	(588,807)	(553,472)	(520,093)	(485,842)
Total Capital Assets, Net	837,646	813,338	789,024	758,057	734,465
Total Noncurrent Assets	881,325	856,732	832,383	801,009	815,508
TOTAL ASSETS	1,006,259	988,614	980,732	969,230	970,659
DEFERRED OUTFLOWS OF RESOURCES	30,309	32,752	34,002	31,639	13,445
LIABILITIES					
Current Liabilities:					
Payable From Unrestricted Assets:					
Accounts Payable and Accrued Liabilities	20,195	12,028	13,991	6,827	3,547
Due to Other County Funds	20	234	404	-	-
Due to Other Governments	3,766	3,223	5,571	4,032	3,091
Compensated Absences	1,922	1,776	1,685	1,744	1,759
Total Payable from Unrestricted Assets	25,903	17,261	21,651	12,603	8,397
Payable From Restricted Assets:					
Accounts Payable and Accrued Liabilities	0	0	22	9,442	11,257
Accrued Interest Payable	10,721	10,870	10,999	8,352	11,897
Revenue Bonds Payable	14,635	14,340	14,080	13,875	13,705
Customer Deposits	9,434	9,329	9,153	9,048	8,898
Total Payable from Restricted Assets	34,790	34,539	34,254	40,717	45,757
Total Current Liabilities	60,693	51,800	55,905	53,320	54,154
Noncurrent Liabilities:					
Revenue Bonds Payable, including Discount & Premiums	485,967	504,052	521,843	539,373	535,928
Compensated Absences	1,835	2,006	1,914	1,815	1,865
Other Post Employment Benefits	1,229	896	830	762	690
Net Pension Liability	24,382	23,309	21,315	14,067	9,798
Total Noncurrent Liabilities	513,413	530,263	545,902	556,017	548,281
TOTAL LIABILITIES	574,106	582,063	601,807	609,337	602,435
DEFERRED INFLOWS OF RESOURCES	2,202	1,411	528	1,988	5,898
NET POSITION					
Net Investment in Capital Assets	380,096	347,941	316,526	270,706	271,569
Restricted For:					
Debt Service Reserve	14,635	14,340	14,080	13,875	13,705
Renewal, Replacement and Improvement	6,927	6,642	6,607	6,200	6,130
Unrestricted	58,602	68,969	75,186	98,763	84,397
Total Net Assets	\$460,260	\$437,892	\$412,399	\$389,544	\$375,801

Table A - 5
Water & Wastewater Services
Water & Wastewater Fund
Statement of Revenue, Expense, and Changes in Net Position
September 30, 2018, 2017, 2016, 2015, and 2014

	FY 2018	FY 2017	FY 2016	FY 2015	FY 2014
Operating Revenue:					
Retail Services:					
Water	50,922	\$ 49,817	\$ 47,249	\$ 46,947	\$ 44,508
Wastewater	43,242	41,727	39,968	38,999	35,740
Septic Charges	2,961	2,850	3,054	2,743	2,232
Other Services	5,237	6,888	6,953	7,473	6,932
	102,362	101,282	97,224	96,162	89,412
Wholesale Services:					
Water	866	803	857	849	945
Wastewater	34,773	34,834	33,868	34,417	32,413
Total Operating Revenue	138,001	136,919	131,949	131,428	122,770
Operating Expenses:					
Personal Services	30,741	29,999	27,066	24,405	23,081
Utilities Services	16,451	16,225	16,424	15,712	14,927
Chemicals	3,147	3,224	3,184	3,225	3,281
County Services	4,219	4,015	3,827	4,052	3,339
Material and Supplies	5,632	5,408	5,773	5,628	4,923
Motor Pool	1,352	1,188	1,161	1,322	1,245
Contractual Services	7,865	8,496	9,933	10,294	8,423
Other	5,448	4,319	2,749	2,247	2,583
Total Operating Expense (Excluding Depreciation)	74,855	72,874	70,117	66,885	61,802
Operating Income Before Depreciation	63,146	64,045	61,832	64,543	60,968
Depreciation Expense	34,079	36,282	34,328	34,962	34,730
Operating Income	29,067	27,763	27,504	29,581	26,238
Non-Operating Revenues (Expense):					
Grants	9	17	0	18	11
Interest Income	1,055	1,099	444	351	394
Interest Expense, Net of Capitalized Interest	(13,581)	(15,699)	(14,052)	(16,385)	(16,964)
Other Income	491	643	505	469	941
Bond Issuance Costs	0	0	0	(1,506)	0
Discontinued Project Costs	(547)	(390)	(185)	(1,344)	(499)
Gain/(Loss) on Disposal of Capital Assets	122	143	93	71	25
Other Expense	(27)	(44)	(23)	(36)	(32)
Total Non-Operating Income (Expense)	(12,478)	(14,231)	(13,218)	(18,362)	(16,124)
Income Before Capital Contributions and Transfers	16,589	13,532	14,286	11,219	10,114
Capital Contributions	6,045	11,961	8,569	8,046	6,600
Transfer Out	0	0	0	(5,522)	0
Change in Net Position	22,634	25,493	22,855	13,743	16,714
Total Net Position - Beginning, as Restated (1)	437,626	412,399	389,544	375,801	359,087
Total Net Position - Ending	\$ 460,260	\$ 437,892	\$ 412,399	\$ 389,544	\$ 375,801

(1) The FY2017 beginning net position in the table above was restated due to the implementation of GASB Statement No. 75, Accounting and Financial Reporting for Postemployment Benefits Other Than Pensions.

(1) The FY2014 beginning net position in the table above was restated due to the implementation of GASB Statement No. 68, Accounting and Financial Reporting for Pensions - as an amendment of GASB Statement No. 27 and GASB Statement No. 71, Pension Transition for Contributions Made Subsequent to the Measurement Date - an amendment of GASB Statement No. 68.

Table A - 6
Water & Wastewater Services
Water & Wastewater Fund
Statement of Cash Flows
September 30, 2018, 2017, 2016, 2015, 2014

	FY 2018	FY 2017	FY 2016	FY 2015	FY 2014
Cash Flows From Operating Activities:					
Cash Received from Customers	140,946	132,464	133,830	128,787	121,370
Cash Payments to Suppliers for Goods and Services	(44,621)	(44,559)	(40,726)	(43,305)	(38,988)
Cash Payments to Employees for Services	(28,817)	(28,059)	(26,662)	(24,838)	(23,439)
Other Cash Received (Paid)	491	621	505	469	941
Net Cash Provided by Operating Activities	67,999	60,467	66,947	61,113	59,884
Cash Flows From Non-Capital Financing Activities:					
Transfers Out	-	-	-	(5,522)	-
Noncapital Grants	26	-	16	-	11
Net Cash Provided By Non-Capital Financing Activities	26	-	16	(5,522)	11
Cash Flows From Capital and Related Financing Activities:					
Proceeds from Bond Refunding	-	-	-	653	-
Payment to Refunded Bond Escrow Agent	-	-	-	(748)	-
Payment of Bond Issuance Costs	-	-	(85)	(546)	-
Acquisition and Construction of Capital Assets	(42,639)	(49,483)	(55,540)	(48,355)	(33,708)
Proceeds from Sale of Capital Assets	104	169	94	71	69
Capital Recovery Fees	2,146	1,527	2,394	3,120	4,093
Capital Surcharges Contributed from Other Governments	1,877	1,752	1,874	1,743	1,662
Principal Paid on Revenue Bonds	(14,340)	(14,080)	(13,875)	(13,705)	(13,360)
Interest Paid on Revenue Bonds	(21,590)	(21,869)	(19,352)	(26,892)	(23,965)
Other Debt Service Cost Paid	(27)	(44)	(23)	(36)	(43)
Net Cash Used For Capital and Related Financing Activities	(74,469)	(82,028)	(84,513)	(84,695)	(65,252)
Cash Flows From Investing Activities:					
Purchase of Investment Securities	(167,059)	(346,437)	(225,562)	(235,835)	(166,287)
Proceeds from Sale and Maturities of Investment Securities	173,042	328,907	239,984	232,437	150,090
Interest and Dividends on Investments	916	1,015	399	721	409
Net Cash Provided By Investing Activities	6,899	(16,515)	14,821	(2,677)	(15,788)
Net Increase (Decrease) In Cash & Cash Equivalents	455	(38,076)	(2,729)	(31,781)	(21,145)
Cash & Cash Equivalents, Beginning of Period	40,946	79,022	81,751	113,532	134,677
Cash & Cash Equivalents, End of Period	41,401	40,946	79,022	81,751	113,532
Cash and Cash Equivalents - Unrestricted Assets	9,013	8,920	7,627	13,305	27,881
Cash and Cash Equivalents - Restricted Assets	32,388	32,026	71,395	68,446	85,651
Total Cash & Cash Equivalents	41,401	40,946	79,022	81,751	113,532
Reconciliation of Operating Income to Net Cash Provided by Operating Activities:					
Operating Income	29,067	27,763	27,504	29,581	26,238
Adjustments to Reconcile Operating Income to Net Cash provided by (used for) Operating Activities:					
Depreciation	34,079	36,282	34,328	34,962	34,730
Miscellaneous Non-Operating Income (Expense)	491	643	505	469	941
Decrease (Increase) in Assets and Deferred Outflows of Resources:					
Accounts Receivable	1,460	(3,396)	1,590	(3,732)	(1,428)
Due From Other County Funds	265	(459)	-	-	-
Inventory	(320)	(199)	(151)	(183)	(441)
Prepaid Items	(156)	(49)	14	(223)	197
Deferred Outflows on Other Post-Employment Benefits	(40)	-	-	-	-
Deferred Outflows on Pensions	41	(1,222)	(4,835)	(873)	(1,312)
Increase (Decrease) in Liabilities and Deferred Inflows of Resources:					
Accounts Payable	538	106	1,121	(419)	(23)
Accrued Liabilities	18	36	(659)	74	191
Due Other Governments	545	(2,340)	1,529	941	(167)
Customer Deposits	105	176	105	150	195
Compensated Absences	(25)	183	40	(65)	39
Other Post Employment Benefits	72	66	68	72	73
Net Pension Liability	1,068	1,994	7,248	4,269	(5,247)
Deferred Inflows on Post-Employment Benefits	17	-	-	-	-
Deferred Inflows on Pensions	774	883	(1,460)	(3,910)	5,898
Total Adjustments	38,932	32,704	39,443	31,532	33,646
Net Cash Provided By Operating Activities	67,999	60,467	66,947	61,113	59,884

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