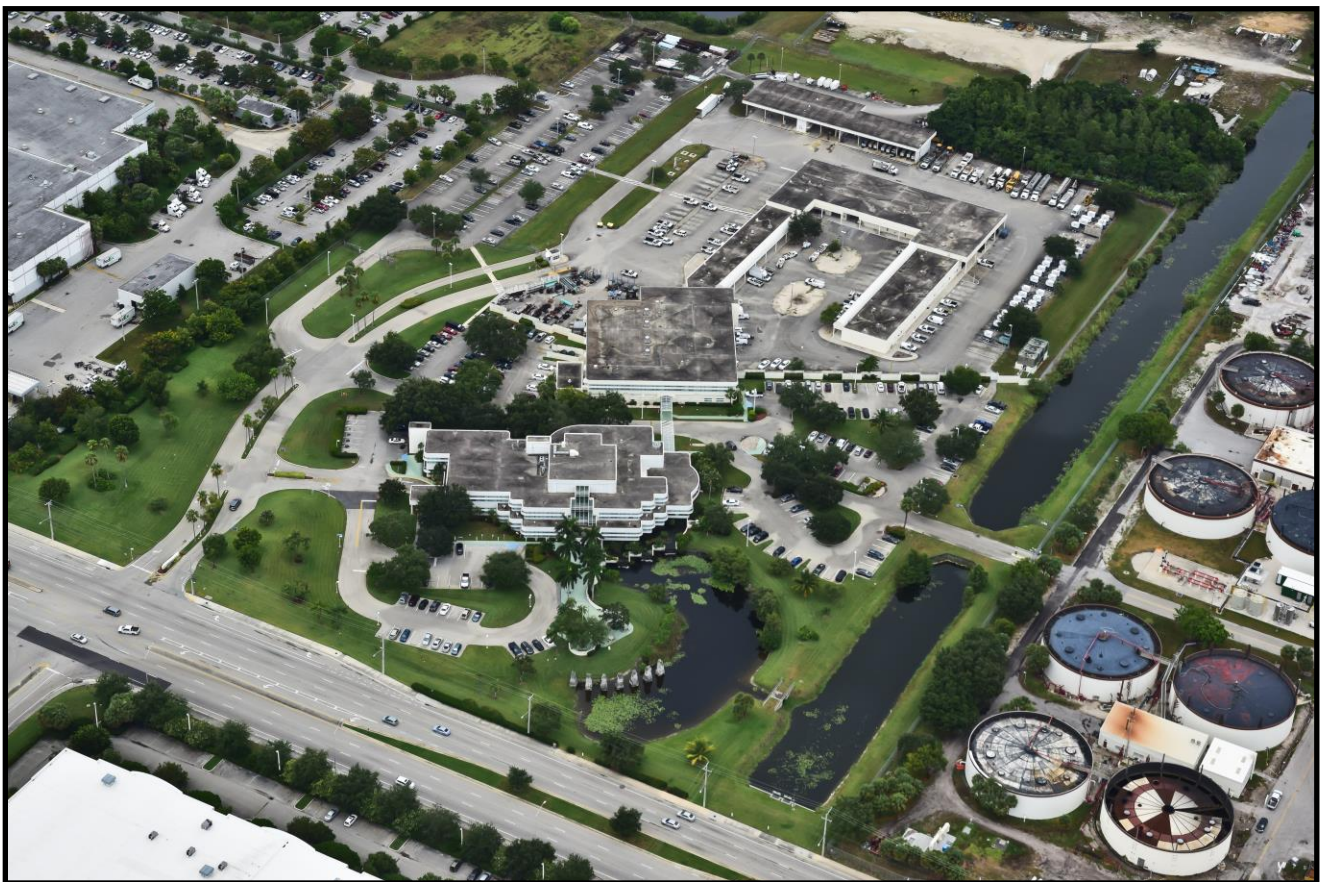


BROWARD COUNTY WATER AND WASTEWATER SERVICES ANNUAL REPORT

FISCAL YEAR 2016

"Our Best in Every Drop"



Final Report Prepared July 2017 by
Brown and Caldwell, Inc.



Table of Contents

Section 1	Introduction	1-1
	1.1 Purpose of the Report.....	1-1
Section 2	Administration and Management.....	2-1
	2.1 History and Organization of Water and Wastewater Services	2-1
	2.2 Mission	2-2
	Water and Wastewater Services Administration.....	2-2
	Water and Wastewater Operations Division	2-3
	Water and Wastewater Engineering Division	2-4
	Water Management Division	2-5
	Business Operations Division	2-6
	Water and Wastewater Information Technology Division	2-7
Section 3	Retail Water and Wastewater Utilities System.....	3-1
	3.1 General Description	3-1
	Service Area and Customer Base	3-2
	3.2 Water System Regulatory Requirements.....	3-8
	Current Water Quality Regulations.....	3-8
	3.3 Water Supply.....	3-11
	3.4 Water Supply Regulatory Requirements.....	3-12
	3.5 Overview of the Water System Facilities	3-14
	District 1	3-14
	District 2	3-14
	District 3	3-15
	3.6 Overview of the Retail Wastewater System Facilities	3-15
	District 1	3-15
	District 2	3-15
	District 3	3-15
	3.7 Visual Inspection and Review.....	3-16
	Water Treatment Plant 1A.....	3-16
	Water Treatment Plant 2A.....	3-21

Table of Contents

	Water Distribution System 3A	3-25
	Water Distribution System 3BC	3-27
	3B Storage and Pumping Facility.....	3-27
	3C Storage and Pumping Facility.....	3-27
	Retail Lift Stations	3-28
Section 4	Regional Wastewater System	4-1
4.1	General Description	4-1
	Service Area and Customer Base	4-2
4.2	Wastewater System Regulatory Requirements	4-5
4.3	Wastewater Effluent Management	4-5
4.4	Biosolids Management.....	4-6
4.5	Wastewater Large User Agreements	4-7
4.6	Visual Inspection and Review.....	4-10
	Master Lift Stations	4-10
	North Regional Wastewater Treatment Plant	4-11
	Septage Receiving Facility	4-16
	WWS Administrative Complex.....	4-17
Section 5	Regional Raw Water Supply	5-1
5.1	General Description	5-1
5.2	North Regional Wellfield.....	5-4
5.3	South Regional Wellfield.....	5-4
5.4	Contractual Agreements	5-5
5.5	Large Users.....	5-5
5.6	Regional Raw Water Supply Regulations	5-5
5.7	Visual Inspection and Review.....	5-6
	North Regional and South Regional Wellfields	5-6
	North Regional Wellfield.....	5-6
	South Regional Wellfield.....	5-8
Section 6	Capital Improvement Program	6-1
6.1	Description of the Capital Improvement Program.....	6-1

Table of Contents

- 6.2 Retail Water and Wastewater System Improvements6-4
- 6.3 Water Treatment6-4
- 6.4 Neighborhood Program6-4
- 6.5 Local Utility Program (LUP)6-4
- 6.6 Other Including Mains, Lift Station Improvements and Potable Storage6-4
- 6.7 Regional Wastewater Treatment6-5
- 6.8 Regional Wastewater Transmission6-5
- Section 7 Financial Conditions7-1**
- 7.1 Overview of Financial Operations7-1
- 7.2 Water and Wastewater Rates and Charges7-4
- 7.3 Revenue Projections7-7
- 7.4 Comparison of Utilities Service Costs for Municipalities and the Unincorporated Area in Broward County7-9
- 7.5 Insurance Coverage7-11

Table of Contents

List of Tables

Table 3-1 Summary of Retail Water System and Retail Wastewater System	3-2
Table 3-2 Summary of Water System Facilities and Capabilities as of September 30, 2016	3-4
Table 3-3 Summary of Treated Water Sold as of September 30, 2016	3-5
Table 3-4 Retail Wastewater System Characteristics as of September 30, 2016	3-7
Table 3-5 Summary of Billed Wastewater – Retail as of September 30, 2016	3-7
Table 3-6 Water Usage – Five Year History (1,000 gallons) Through September 2016	3-8
Table 3-7 Summary of SFWMD Wellfield Permits as of September 30, 2016	3-13
Table 4-1 Summary of Historical Large User Wastewater Average Monthly Flow for Treatment and Disposal (1,000 Gallons)	4-3
Table 4-2 North Regional Wastewater System Reserve Capacity as of September 30, 2016 (MGD) ...	4-4
Table 4-3 Summary of Large User Wastewater Treatment Annual Flows Five-Year History as of September 2016 (1,000 Gallons)	4-5
Table 5-1 NRW Physical Descriptions	5-2
Table 5-2 SRW Physical Descriptions	5-4
Table 5-3 Large User Actual Flow North Regional Raw Water Flow Distribution	5-5
Table 5-4 Large User Actual Flow South Regional Raw Water Flow Distribution (1,000 Gallons)	5-6
Table 6-1 Capital Improvement Program as of September 30, 2016	6-2
Table 6-2 Capital Projects Budgets by Type through Fiscal Year 2021	6-3
Table 7-1 Broward County Water and Sewer Monthly Service Costs for a Residential Customer Using 5,000 Gallons per Month	7-2
Table 7-2 Broward County Schedule of Retail Rates Minimum Monthly Charges by Customer Class and Meter Size Effective October 1, 2016	7-3
Table 7-3 Broward County Schedule of Retail Rates Volume Charge (1,000 Gallons) by Customer Class and Meter Size Effective October 1, 2016	7-4
Table 7-4 Retail Water and Wastewater Billing Volumes as of September 30, 2016 (1,000 Gallons)	7-6
Table 7-5 Automatic Rate Adjustments for Periods of Mandated Water Restrictions	7-7
Table 7-6 Historical and Projected Ratios of Large Users’ Revenues and Wastewater Revenues (in 1,000s)	7-9

Table of Contents

Table 7-7 Schedule of Historical and Projected Net Revenues, Debt Service and Debt Service Coverage (\$1,000) 7-10

Table 7-8 Comparative Rate Survey as of 12/31/2016 (Based on Usage of 5,000 Gallons Per Month for a 5/8-inch Meter 7-11

Table 7-9 Estimated Value of Aboveground Water and Wastewater Facilities 7-13

Table of Contents

List of Figures

Figure 2-1 Water and Wastewater Services Organizational Chart.....2-1

Figure 3-1 WWS Retail Water Service Areas3-3

Figure 3-2 WWS Retail Wastewater Service Areas3-6

Figure 4-1 WWS Wastewater Large User Service Areas.....4-2

Figure 5-1 Regional Raw Water Service Areas5-2

Figure 7-1 Broward County Insurance Towers7-11

Table of Contents

Appendix A

Table A-1 Water Production, Wastewater Treatment, And Regional Raw Water (Million Gallons) ...	A-1
Table A-2 Average Number of Accounts as of September 30, 2016	A-2
Table A-3 Retail Water and Wastewater Customer Average Monthly Demand & Revenues, September 30, 2016	A-3
Table A-4 Activity Based Costing Report for the Twelve Months Ended September 30, 2016	A-4
Table A-5 Disaggregation of Operating & Maintenance Expenses for The Twelve Months Ended September 30, 2016	A-16
Table A-6 Operating and Maintenance Expense for Large User Rate Fiscal Year 2016 and 2017 \$ per 1,000 gallons	A-17
Table A-7 Historical and Budgeted Large Users Operating & Maintenance Rates	A-17
Table A-8 Water and Wastewater Fund Statement of Net Position September 30, 2012 – 2016 (in Thousands)	A-18
Table A-9 Water and Wastewater Fund Statement of Revenue, Expense, and Changes in Net Position September 30, 2012 – 2016 (in Thousands)	A-19
Table A-10 Water and Wastewater Fund Statement of Cash Flows September 30, 2012 – 2016 (in Thousands)	A-20
Table A-11 Water and Wastewater Retail Statistics (1,000's Gallons) September 30, 2016	A-21
Table A-12 Capital Improvement Program Budget History and Projections	A-22
Table A-13 Historical Capital Recovery Fees Collected	A-23
Table A-14 History of Large User Wastewater Rates	A-24

Table of Contents

Appendix B

Map B-1 Visual Inspection Overview Map B-1

Map B-2 North Regional Wellfield B-2

Map B-3 South Regional Wellfield B-3

Map B-4 District 1 B-4

Map B-5 District 2 B-5

Section 1 Introduction

1.1 Purpose of the Report

The purpose of this Annual Report from Consulting Engineers for Water and Wastewater Services (WWS) of Broward County, Florida (County) is to provide the following:

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

This report provides descriptions and observations of the Utility; the primary operating activities including the retail water and wastewater system, which provides water and/or sewer service to approximately 59,455 customers and sewer only to approximately 2,798 customers, the North Regional Wastewater System, which provides transmission, treatment and disposal services to other utilities on a wholesale basis, and 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

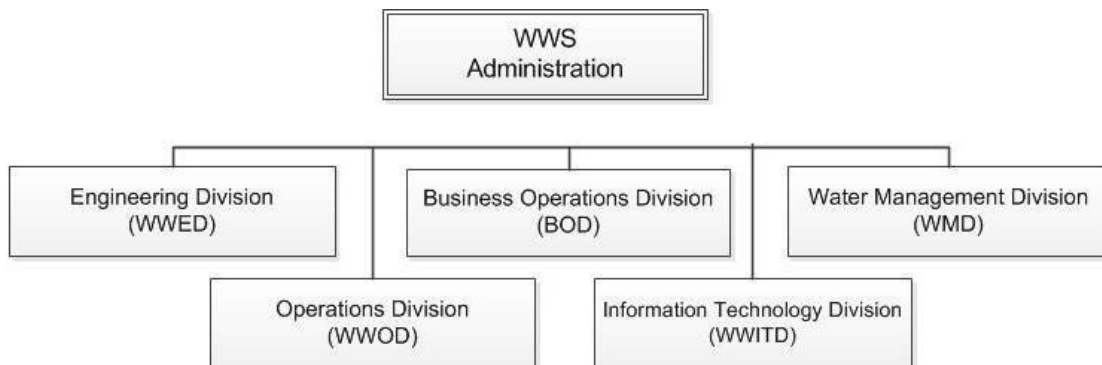
Section 2 Administration and Management

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 414 people, including 22 certified water operators, 26 certified wastewater operators, 18 registered professional engineers, and 1 certified public accountant. 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

Section 2 - Administration and Management

regulation by any other political subdivision of the State (provided that environmental impacts are regulated as described herein).

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, Business Operations, Information Technology, Operations, 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— "Aa2", "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 2016.
- Palm Beach County Water Utilities Department (PBCWUD) and Broward County Water and Wastewater Services (BCWWS) on May of 2016 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 the Florida 'Ocean Outfall Rule' that requires increased beneficial reuse water capacity and distribution. The project will provide up to 15 million gallons per day of new reuse water to Palm Beach County to meet increasing demands throughout its reclaimed water service area. Through the utilization of 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 retail operations, as well as operates two retail wellfields that supply water to the County's 1A and 2A water treatment plants.

Section 2 - Administration and Management

WWOD is also responsible for providing wastewater transmission, treatment and disposal services to eleven Large Users and to Broward County through the operation and maintenance of a regional wastewater treatment facility and related regional pumping stations. The division operates a reclaimed water facility, which provides reclaimed water to both industrial and retail customers. In addition, WWOD operates a state-certified laboratory, 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) 2016 highlights included:

- North Regional Wastewater Treatment Plant (NRWWTP) effluent ocean outfall nutrient reduction goals continued to exceed those established by the State of Florida in response to the ocean outfall legislation.
- Broward County's NRWWTP was the First Place Winner of the Florida Water Environment Association 2016 Earle B. Phelps Award for "Outstanding Water and Wastewater Treatment Plant Performance" for consistently providing the highest removal of pollution prior to discharge of treated effluent and having an exemplary compliance record.
- The Fats Oils and Grease receiving facility was placed in service in FY16. This facility bolsters methane gas production.
- The Cogeneration Facility, which uses methane gas to create electricity, was placed in service in FY16. The electricity created reduces the amount of purchased electricity.
- The NRWWTP converted from chlorine gas to sodium hypochlorite and rehabilitated the chlorine building for emergency use in FY16.
- Broward County received an award from the Florida Section of the AWWA for Outstanding Water Distribution System of the year.
- New 1.0 MG Storage Tank was placed in service at the 1A Water Treatment Plant.

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 the 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, the maintenance of record information on potable water and wastewater facilities, administration of potable water and sewer easements, and administration

Section 2 - Administration and Management

of permits to connect to the potable water and wastewater plants operated by WWS. WWED also provides general potable 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).
- North Regional Wastewater Treatment Plant (NRWWTP) effluent disposal and treatment enhancements to comply with outfall legislation and proposed facilities operational modifications are estimated at \$174 million over the next five years.
- Initial steps for the Septic Tank Elimination Program have begun, which will address the removal of all septic tanks within Water and Wastewater Services service areas. The program is initially estimated at \$60 million and will be implemented over the next five years.
- WWS established a Guaranteed Energy Savings contract for the construction of the energy conservation measures (ECMs) for the agency's wastewater treatment facilities. The goal of this project is to reduce the carbon footprint through the implementation of the ECMs, thus resulting in reduced operational costs and improved environmental efficiencies. This project was completed and placed into service in August 2016.
- North Regional Wastewater Treatment Plant 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 is expected to begin construction in 2017. The estimated cost of this project is \$105 million.

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 flood protection, surface and ground water recharge, saltwater intrusion abatement and urban water supply. Water supply planning, well site

Section 2 - Administration and Management

assessments, and permitting services are provided to apply for, obtain and assure compliance with public water supply and diversion and impoundment water use permits.

WMD highlights included:

- Providing support to water supply and water resource development programs, including the Broward County Water Supply 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, submittal of information to the Water Supply Project Database (WaSUP) and Consumptive Use Permit modifications, and submittal of monthly Consumptive Use Permit compliance information.
- Collection, analyses and tracking of wellfield withdrawals and surface water pumpages, 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 in the development of models to evaluate the impacts of predicted sea level rise on the 2A wellfield, the potential benefit of the C-51 Storage Reservoir and the Floridan Aquifer System's potential 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, the division performs grounds and building maintenance services for over 200 locations owned and operated by WWS throughout

Section 2 - Administration and Management

the County. The division also coordinates the budgeting activities of all divisions of WWS, supports the development of fiscal plans and rates, fees and charges for the services provided by WWS and publishes an award-winning WWS employee newsletter.

BOD highlights included:

- Continuing to implement the “Toilet Credit” Program for WWS water customers to replace old high flow toilets with WaterSense high efficiency low flow toilets.
- Enhancing customer payment systems and customer service procedures at the WWS Customer Payment Centers and Call Center.
- Continuing to fill critical vacant managerial/supervisory positions within the Business Operations Division.
- Preparing complete WWS financial statements using Comprehensive Annual Financial Report (CAFR) online, and implementing new PeopleSoft Financial and Accounting Modules.
- Continuing to coordinate with Water and Wastewater Information Technology Division to upgrade the “Energy” System, which is the Utility Management and Customer Information Software.
- Continuing to implement preventive maintenance schedules for WWS physical facilities and to complete major capital improvements at WWS Admin 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 providing 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 critical infrastructure by Homeland Security.

WWITD highlights included:

- Completed Total SCADA network separation.
- Completed a Proof of concept solution to allow access to the County Admin Network from workstations on the WWS Utility Network. This was presented to the County’s Chief Information Officer (CIO) and received his approval.

Section 2 - Administration and Management

- Negotiated contract with Hansen Corporation PTY Ltd for the continuing support and upgrade of the Energy/Utility Billing Customer Information System. Contract term is 10 years plus 5-year renewals.
- Completed the WWITD Security System Upgrade (Regional) Capital Project No. 8990, which was intended to provide additional safety and security hardening to District 4.
- 95% completion of the negotiation of the Enterprise Agreement with LabLynx, Inc. for the continuing support of the LabLynx application. Contract term will be for three years plus 2-year renewals. This contract was passed by the Board on April 4, 2017.
- Upgraded core data communications on Utility Network.
- Upgraded the virtual infrastructure.
- Implemented the PA system at the Main Campus.
- Implemented ACH payments and eStatements on Utility Billing System.
- Upgraded bill printing capability for Utility Billing System.
- Developed Advantage PeopleSoft Cross walk utility that is being utilized by several agencies County-wide.
- Implemented IV Telstart software module for PCI compliance for credit card payments at the call center.

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 ten years, the County's retail water system has grown from 55,596 customers (accounts) to its present retail base of 56,695. Broward County's total population is approximately 1.8 million. Of this amount, WWS's customer base represents a population of approximately 181,243. The City of Coconut Creek, a sale for resale customer, has approximately 56,287 residents. Including the City of Coconut Creek, the retail water system serves approximately 13% of Broward County's total population.

The retail wastewater customer base has grown from 38,559 customers (connections) to its present base of 49,643 customers in the past ten years, representing an increase of 29%. 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.

Notably, finished water production has decreased in recent years. This may be attributable to slowdown in population growth and 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 2007	Fiscal Year 2016	Change	Percent Change
Water System					
Customer Base	Customers	55,596	56,695	1,099	1.98%
Water Service Area	Square Miles	41.18	41.00	-0.08	-0.19%
Water Lines	Miles	683.17	717.00	26.83	3.93%
Water Plant Capacity:					
Plant Capacity	MGD ¹	46.00	56.00	0	0%
Avg. Daily Production ²	MGD ¹	21.91	20.07	-2.81	-12.82%
Max. Daily Production ²	MGD ¹	23.76	24.49	-1.09	-4.59%
Purchased Water	MGD ¹	7.145	6.8	-0.26	-3.57%
Wastewater System					
Customer Base	Customers	41,297	49,643	8,702	21.07%
Wastewater Service Area	Square Miles	40.9	40.2	-0.2	-0.49%
<p>¹ MGD = Million Gallons Per Day.</p> <p>² Droughts which began in April 2007 have resulted in reduced water use due to demand management efforts comprising water conservation initiatives, including year round lawn irrigation restrictions. Reduced water use translates to reduced billed wastewater.</p> <p>Source: Broward County Water and Wastewater Services</p>					

Service Area and Customer Base

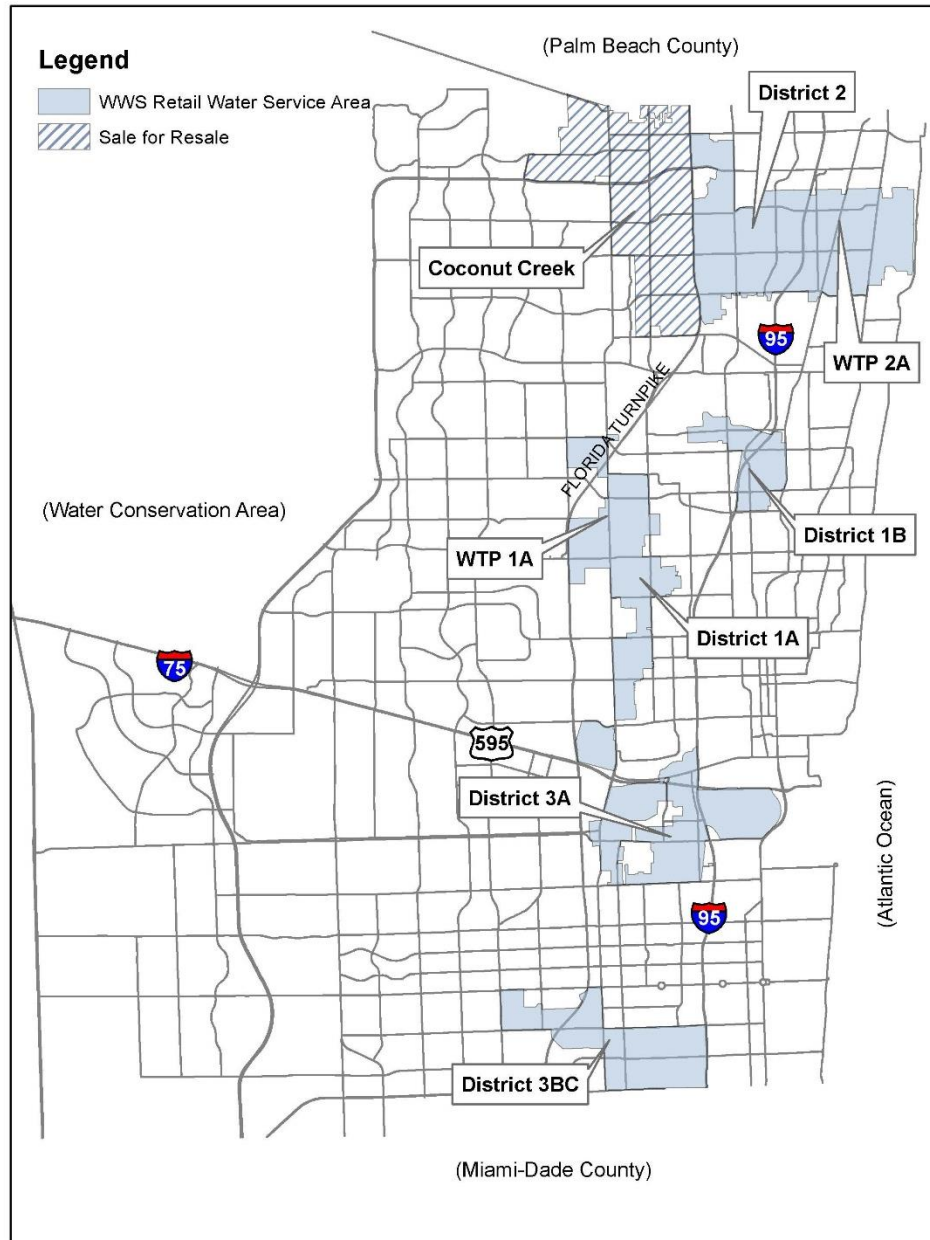
The retail water system is divided into three service areas - Districts 1, 2 and 3, which collectively cover approximately 41 square miles. Additionally, District 2 sells water to the City of Coconut Creek, which re-sells it to its customers. Two (2) Water Treatment Plants (WTPs), one each in District 1 and District 2, have a combined permitted water treatment capacity of 56 MGD (million gallons per day). However, potable water production is constrained by 20-year term consumptive use permits from the South Florida Water Management District (SFWMD). Based on the current 20-year permit, Biscayne Aquifer annual average allocation is 27.54 MGD through March 2028 and includes the North Regional Wellfield. Starting March 2013, a Floridan Aquifer average day allocation of 8.4 MGD is included in the 20-year consumptive use permitted withdrawal. The Utility's five-year Capital Improvement Program (CIP) is predicated upon these allocations. Water for District 3 is provided by the City of Hollywood through a water for resale agreement.

The distribution systems in the three Districts contain approximately 712 miles of water distribution and transmission mains with 2-inch to 54-inch diameters. Figure 3-1 shows the geographic location of each service district as well as the Large User (the City of Coconut

Section 3 - Retail Water and Wastewater Utilities System

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, 2016				
	District 1	District 2	District 3	Total
Production Wells	9	7	0	16
Wellfield Firm Capacity, (MGD) ^{1,2}	19.6	21.3	0	40.9
Treatment Plants ³	1	1	0	2
Permitted Plant Capacity (MGD) ^{2,4}	16	40	0	56
Current Permitted Allocation (MGD) ^{2,4}	10.04	17.5 ⁵	0	27.54
Storage Capacity (Million Gallons) ³	6.2	8.5	6	20.7
Distribution Mains (Miles)	246.0	251	220	717
Service Area (Square Miles)	11.9	14.8	14.3	41.0
Purchased Water (MGD) ²	0	0	6.79	6.79
Produced Water (MGD) ²	7.504	12.569	0	20.073
<p><i>1 Firm Capacity refers to the available flow with the largest well in each district out of service.</i></p> <p><i>2 MGD = Million Gallons Per Day</i></p> <p><i>3 Includes clearwells, on site and distribution storage facilities.</i></p> <p><i>4 Permit allocations are less than permitted treatment plant capacity.</i></p> <p><i>5 Combined permit with North Regional Wellfield and includes finished water sold to Coconut Creek.</i></p> <p><i>Source: Broward County Water and Wastewater Services</i></p>				

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 cannot charge rates to Coconut Creek greater than those charged to other customers in the same class. Billing based upon water meter readings is provided monthly.

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

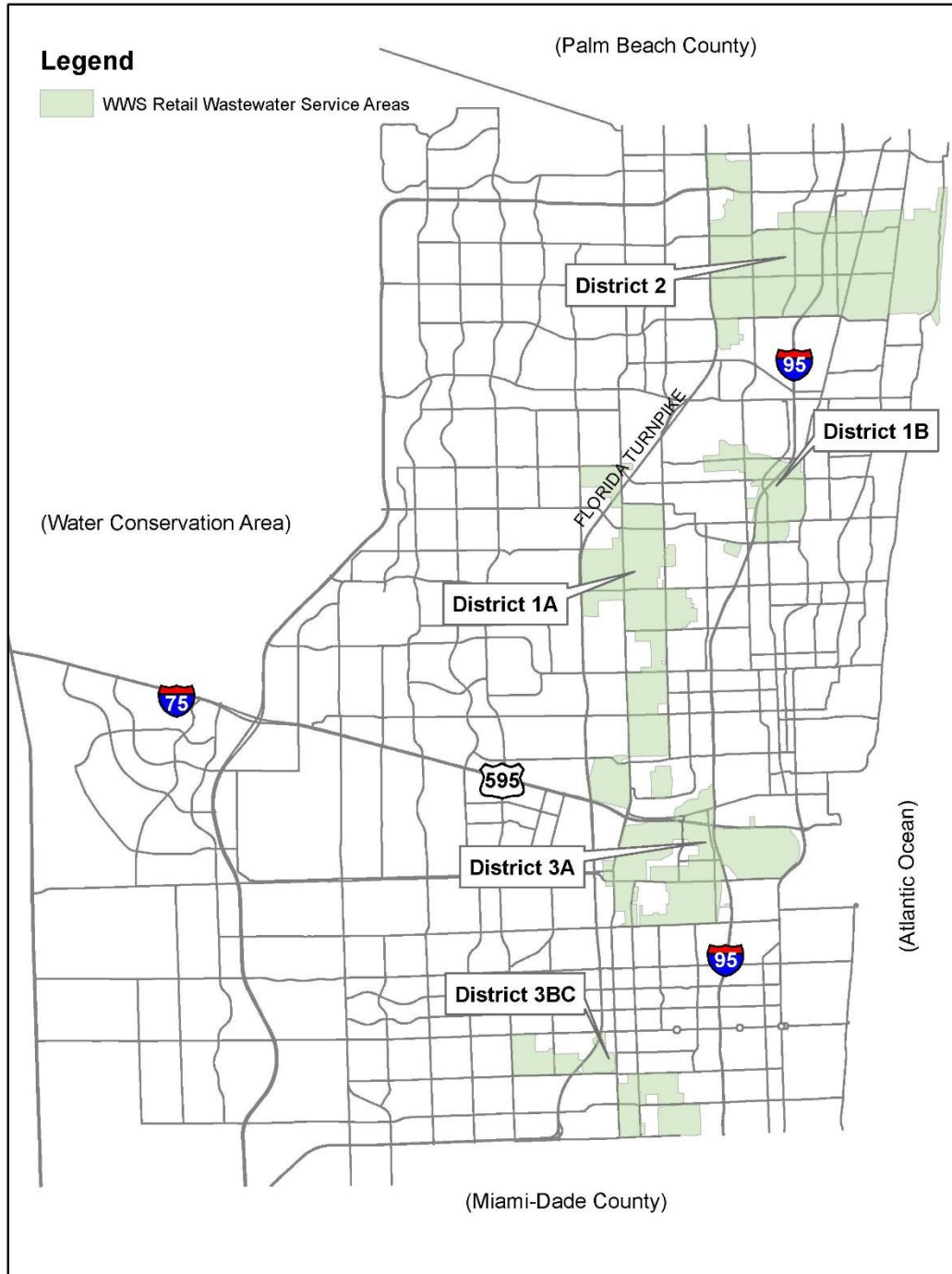
Section 3 - Retail Water and Wastewater Utilities System

Table 3-3 Summary of Treated Water Sold as of September 30, 2016					
Fiscal Year	Average Number of Units ¹	Average Number of Metered Customers	Total Billed Treated Water (1,000 GAL)	Total Billed Water for Resale (1,000 GAL) ²	Annual Average Daily Consumption (MGD)
2007 ^{3,4}	87,539	55,596	9,725,151	1,958,720	26.64
2008 ^{3,4}	89,452	57,003	9,063,644	1,868,562	24.83
2009 ^{3,4}	92,870	58,287	9,001,466	1,872,821	24.66
2010 ^{3,4}	93,183	58,323	8,628,876	1,754,856	23.64
2011 ^{3,4}	92,208	58,773	8,616,736	1,731,297	23.61
2012 ³	88,344	56,503	8,339,560	1,643,812	22.85
2013 ³	87,928	56,529	8,279,722	1,699,799	22.67
2014 ³	88,305	56,538	8,449,062	1,754,927	23.15
2015 ³	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
<p><i>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.</i></p> <p><i>2 Included in the total water billed; most represents service to the City of Coconut Creek.</i></p> <p><i>3 Droughts conditions have resulted in reduced water use due to demand management efforts comprising water conservation initiatives, including year round lawn irrigation restrictions. Reduced water use translates to reduced billed wastewater.</i></p> <p><i>4 Included in Average Number of Metered Customers are sewer only customers.</i></p>					
<p><i>Source: Broward County Water and Wastewater Services</i></p>					

The retail wastewater system service area covers approximately 40 square miles with approximately 444 miles of gravity sewers, 239 lift stations, 8 retail master pump stations and 112 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.

Section 3 - Retail Water and Wastewater Utilities System

Figure 3-2 WWS Retail Wastewater Service Areas



Source: Broward County Water and Wastewater Services

Section 3 - Retail Water and Wastewater Utilities System

**Table 3-4 Retail Wastewater System Characteristics
as of September 30, 2016**

	District 1	District 2	District 3	Total
Service Area (Square Miles)	12.9	15.5	11.8	40.2
Gravity Sewer (Miles)	186.5	171.5	86.2	444.2
Lift Stations	75	99	65	239
Force Mains (Miles)	43.3	34.9	34.5	112.7
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, 2016**

Fiscal Year	Average Number of Units ¹	Average Number of Metered Customers	Total Billed Treated Wastewater ² (1,000 GAL)	Annual Average Daily Flow (MGD)
2007	70,361	41,297	4,915,383 ²	13.47
2008	71,718	42,163	4,830,155 ²	13.23
2009	74,146	43,591	4,828,210 ²	13.23
2010	74,547	44,953	4,744,985 ²	13.00
2011	74,691	44,856	4,891,742 ²	13.40
2012	77,247	46,911	4,872,721 ²	13.35
2013	78,020	47,799	4,996,843 ²	13.69
2014	79,466	48,873	5,165,058 ²	14.15
2015	80,995	49,643	5,372,243 ²	14.72
2016	81,144	49,999	5,339,240 ²	14.63

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

2 Billed wastewater is primarily based upon water sold.

Source: Broward County Water and Wastewater Services

Section 3 - Retail Water and Wastewater Utilities System

**Table 3-6 Water Usage – Five-Year History (1,000 gallons)
Through September 2016**

Customer Class	Fiscal Year				
	2012	2013	2014	2015	2016
Residential	4,534,199	4,462,407	4,463,289	4,587,014	4,457,935
Commercial	1,756,142	1,740,148	1,868,525	1,961,350	1,922,866
Irrigation	405,407	377,368	362,321	401,151	385,410
Sale for Resale	1,643,812	1,699,799	1,754,927	1,789,374	1,736,453
Total¹	8,339,560	8,279,722	8,449,062	8,738,889	8,502,167

1 Droughts which began in April 2007 have resulted in reduced water use due to demand management efforts comprising water conservation initiatives, including year-round lawn irrigation restrictions. Reduced water use 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. In Broward County, the authority to enforce drinking water regulations is delegated by FDEP to the Broward County Health Department, which is an Approved County Health Department (ACHD) as defined under the Memorandum of Understanding between FDEP and the Florida Department of Health.

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 2016. 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>

Section 3 - Retail Water and Wastewater Utilities System

The Disinfectants and Disinfection Byproducts Rule (D/DBPR) requires all water treatment plants to comply with MCLs for byproducts of a number of common disinfectants. For WWS water treatment plants, byproducts of chlorine and chloramines, specifically total trihalomethanes (TTHMs) and 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 8, 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 design phase. In FY 2016, 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 8, 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.

Section 3 - Retail Water and Wastewater Utilities System

- If the system has a total coliform-positive repeat sample following an *E. coli*-positive routine sample.
- 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.

Section 3 - Retail Water and Wastewater Utilities System

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 1A and 2A Water Treatment Plants, with firm capacities of 19.6 and 21.3 MGD, respectively. Additional water is provided to District 2 by 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. Water for District 3 is provided 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. 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.

Section 3.2 of the Source Specific Criteria of the South Florida Water Management District (SFWMD) Applicant’s Handbook for Water Use Permit Applications, which current version went into effect on September 7, 2015, limits raw water usage from the Biscayne Aquifer for public water supply to the maximum quantity of water withdrawn over a consecutive 12-month period during the five years preceding April 1, 2006. Water supplies necessary to satisfy any demand which exceeds the maximum allowable withdrawal must come from an alternative water supply source, such as captured/stored water, the Upper Floridan Aquifer, harvested stormwater or reclaimed wastewater to offset withdrawal impacts to the Everglades Water Bodies.

Due to the “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 is available from the brackish Upper Floridan Aquifer. The County CIP for the Utility includes provisions to construct reverse osmosis facilities to desalinate water from the Upper Floridan Aquifer to meet projected future potable water demands, should that become necessary. The County, Palm Beach County, several municipalities, and the SFWMD are moving forward with an option for a regional water storage reservoir project located in Palm Beach County known as the C-51 Reservoir Project. This project will expand the availability of Biscayne Aquifer raw water 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.

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 in order to receive long-term raw water permit allocations from the South Florida Water Management District. The proposed C-51 Reservoir in western Palm Beach County has the potential to deliver a significant amount of water for future public water supply in Broward and Palm Beach 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. These projections are subject to change as the C-51 project continues to develop.

Section 3 - Retail Water and Wastewater Utilities System

3.4 Water Supply Regulatory Requirements

The volume of raw water withdrawal from the Utility's wellfields is regulated by the SFWMD. Each wellfield is governed by a 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 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 15.2 billion gallons of groundwater from their combined Biscayne aquifer wellfields, including the Regional Raw Water Wellfields. The Utility holds three permits from the SFWMD for the wellfields 1A, 2A/North Regional Wellfield (NRW), and the South Regional Wellfield (SRW). The permit for the combined 2A/NRW wellfields was issued for a 20-year duration in March 2008 and the permit for the District 1A wellfield was issued for a 20-year permit duration in April 2008.

An application to renew the SRW permit was submitted in October 2007 prior to permit expiration. The County and the SFWMD are actively reviewing available information and the permit has been administratively extended while the review process continues. The SRW permit governs the withdrawal of raw water from the Biscayne aquifer for sale to coastal raw water Large Users (Dania Beach, Hallandale Beach, Hollywood and FPL) and the permit allocation is based on the projection of raw water demands for each Large User. The County is actively working with the SFWMD and Large Users to complete the renewal effort, which will include an allocation from the C-51 reservoir.

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.

Section 3 - Retail Water and Wastewater Utilities System

Table 3-7 Summary of SFWMD Wellfield Permits as of September 30, 2016

Description	Wellfield		
	1A	2A/NRW	SRW
Permit Period:			
Issuance	4/10/2008	3/13/2008	10/10/2002
Expiration	4/10/2028	3/13/2028	10/10/2007 ¹
Total Allocations:			
Annual Average Daily (MGD)	13.9	22.1	14.2
Maximum Monthly (MGD)	15.2	24.3	-
Maximum Day (MG)	-	-	22.4
Biscayne Aquifer Withdrawals			
Annual Average Daily (MGD)	10.0	17.5	1
Maximum Monthly (MGM)	10.9	19.2	1
Floridan aquifer wells			
Annual Average Daily (MGD)	3.9	4.6	1
Maximum Monthly (MGM)	4.2	5	1
Number of Wells – proposed	4 ²	4	-
Diameter (Inches)	16	16	-
Depth (Feet)	1,200	1,200	-
<i>Proposed Implementation Date Modification</i> ³	2019	2022	-
<p><i>1. Permit for SRW expired October 2007 and an application is under review with the SFWMD. It is expected that the SRW permit will be renewed in the ordinary course of events.</i></p> <p><i>2 Construction of two test wells was completed in 2014.</i></p> <p><i>3. Due to demand management efforts and lower growth, the implementation dates for alternative water supply were extended.</i></p> <p><i>Source: Broward County Water and Wastewater Services</i></p>			

Long-term water supply in South Florida may also be affected by the Comprehensive Everglades Restoration Plan (CERP) undertaken by the U.S. Army Corps of Engineers (ACOE) in coordination with the SFWMD and by regional water supply planning undertaken by the SFWMD and the FDEP. The intent of CERP is to provide multiple benefits to the South Florida ecosystem. While restoration of the Everglades is a primary objective of the plan, it also includes a provision for ensuring a reliable, adequate supply of fresh water for use by the environment, public water supply and agriculture while maintaining flood protection. The effect of CERP will be to reserve water resources for restoration of the Everglades without impacting existing legal users. Implementation through the Lower East Coast Water Supply Plan (LECWSP), and CERP account for future needs of water utilities by utilization of new surface water reservoirs and by implementation of Aquifer Storage and Recovery (ASR) wells. A decision by the State to endeavor to acquire the property owned and farmed by US Sugar as part of the CERP may limit the option of utilities to store and use excess stormwater as an alternative to water supply.

Section 3 - Retail Water and Wastewater Utilities System

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 LECWSP, 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 (IWRP) in order to maximize the utilization of available water. Current projects include the design of interconnects 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 engaged with the SFWMD and Palm Beach Aggregates to fully develop the C-51 Storage Reservoir Project as a water source to offset 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 246 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.

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 251 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.

Section 3 - Retail Water and Wastewater Utilities System

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 220 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 186.4 miles of gravity collection sewers and 75 lift stations. There are 43.3 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 15.5 square miles. The collection system consists of 171.5 miles of gravity sewer, 99 lift stations, 5 retail master pump stations, and 34.7 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 86.2 miles of gravity sewer, 65 lift stations and 2 retail master pump station. The force main network contains 34.5 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

Section 3 - Retail Water and Wastewater Utilities System

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 a number of 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 of the District 1 and 2 water treatment plants was performed on April 6, 2017. The former District 3 water treatment plant (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), were inspected on April 5, 2017. These inspections were performed by Brown and Caldwell accompanied by WWS staff. Appendix B contains a compilation of maps showing the locations of the inspected facilities.

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 April 6, 2017:

- District 1 Raw Water Wells – Biscayne Aquifer
 - Well 1 was in good condition. The wellhead and associated piping and valves appeared to be in good condition. Light corrosion was noted around the pump shaft. Electrical equipment was in good condition. The concrete slab was in good condition.
 - Well 2 was out of service since it was going through bacteriological testing. Once testing results clear it will be put back into operation. The pump and shaft need to be replaced. The wellhead and associated piping and valves appeared to be in good condition. Light corrosion was noted around the pump shaft and piping. Electrical equipment was in good condition. The concrete slab was in good condition.

Section 3 - Retail Water and Wastewater Utilities System

- Well 3 was in good condition. The wellhead and associated piping and valves appeared to be in good condition. Light 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 in good condition. The wellhead and associated piping and valves appeared to be in good condition. Corrosion was noted around the pump shaft; pump and shaft need to be replaced. Electrical equipment was in good condition. The concrete slab was in good condition.
- Well 5 was in good condition. The wellhead and associated piping and valves appeared to be in good condition. Corrosion was noted around the pump shaft and piping. Electrical equipment was in excellent condition. The concrete slab was in good condition.
- Well 6 was in good condition. The wellhead and associated piping and valves appeared to be in good condition. Corrosion was noted around the pump shaft and piping. Electrical equipment was in good condition. The concrete slab was in good condition.
- Well 7 was in good condition. The wellhead and associated piping and valves appeared to be in good condition. Pump has been replaced recently. 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. Light corrosion was noted around the pump shaft and piping. Electrical equipment was in good condition. The concrete slab was in good condition.
- Well 9 was in good 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.

Section 3 - Retail Water and Wastewater Utilities System

- District 1 Floridan Wells
 - Floridan Well 1 is a new 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 a new off-site; 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) gear and electrical conduit are being replaced. The interior, including the cone, mixer and launders were rebuilt and are in good condition. The drive was removed from the unit and was rebuilt. Electrical equipment and instruments appeared to be in good condition. Auxiliary pumps and associated piping, valves, and equipment were generally in good condition. Sludge cycling pumps will soon need replacement.
- Treatment Unit 2 is in good condition. The interior, including the visible parts of the cone and mixer were in good condition. Effluent launders showed moderate corrosion in several locations; rehabilitation will address corrosion in a project identified in the future project list on page 3-21. 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 generally in good condition. Sludge cycling pumps will soon need replacement.
- 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

Section 3 - Retail Water and Wastewater Utilities System

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

- Filter 5 was in very good condition since rehabilitation work was completed recently. Filter media appeared level and uniform. 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 since rehabilitation work was completed recently. Filter media appeared level and uniform. 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 since rehabilitation work was completed recently. Filter media appeared level and uniform. Piping and valves were in very good condition. Effluent launders were in very good condition. The control panel on the filter deck appeared to be in good condition. The overall structure appeared to be in very good condition.
- Filter 8 was in 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 good condition. Corrosion was observed on the baseplate of both backwash pumps that should be addressed during routine maintenance. Valve actuators and turbidity meters are becoming outdated and will soon need to be replaced.
- Four clearwell transfer pumps and all piping, valves, gauges, appurtenances, and associated structures appear to be in excellent condition.
- High Service Pumping
 - High service pumps 1, 3, and 5 appeared to be in good condition. Pumps, piping, valves, gauges, appurtenances, and associated structures appeared to be in good condition. Pumps will soon need to be replaced due to normal wear and tear.
 - High service pumps 2, 4, and 6 appeared to be in good condition. Pumps, piping, valves, gauges, appurtenances, and associated structures appeared to be in

Section 3 - Retail Water and Wastewater Utilities System

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 in service on an as-needed basis.
 - Vacuum filter 1 was in good condition. Vacuum filter 2 was out of service and is currently being rehabilitated. Belt and electrical equipment generally 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. These systems were installed as part of the 4-log project.
 - The ferric chloride system and pumps are currently operational and slated to be replaced in the near future. Bulk and day storage tanks are functional.
 - The dry polymer makedown and feed systems were in good condition. Makedown and dilution units appeared generally intact and functional. Metering pumps are functional.
 - The lime slaking and feed systems appeared to be in good condition. The lime silo, vibrator, rotary valve, and dosing unit appeared to be in good condition. Slakers and pumps, and slurry pumps are currently operational and slated to be replaced in the near future; manifolds are also slated to be redone in the near future redone. Corrosion was present on equipment.
 - The fluoride (HFS) pump and tank are currently operational and slated to be replaced in the near future. Bulk and day storage tanks appeared generally intact and functional. Metering pumps are functional. Electrical and mechanical equipment was extensively corroded inside the day tank/metering room.
 - The sodium hypochlorite feed and storage system was in good condition. Storage tanks are generally in good condition. Containment area flooring is in good condition. Metering pumps are in very good condition. Metering pump piping is in good condition.

Section 3 - Retail Water and Wastewater Utilities System

- The Chlorine system overall is in good condition, but pumps and gaskets need rehabilitation.
- 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.
- Operations building air conditioning system will soon need to be replaced due to aging.

Plant modifications performed through FY 2016:

- Construction of new 1.0 MG water storage tank (complete)
- Design of new electrical switchgear (complete)

The plant modifications to be initiated for FY 2017 & FY 2018:

- Demolition of 1B-2 elevated tank
- Construction of new electrical switchgear (ongoing)
- Demolition of on-site 0.3 MG ground storage tank (ongoing)
- Treatment Unit 2 Rehabilitation project (in design)
- Chemical Feed System Modifications

Water Treatment Plant 2A

The 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.

A summary of the inspection observations performed for major subsystems is presented below, District 2 raw water wells were inspected between April and June 2017:

- District 2 Raw Water Wells – Biscayne Aquifer
 - Well 4 was in good condition. The security fencing was intact. The wellhead and associated pump shaft, piping and valves appeared to be in good condition. Electrical equipment was in good condition. The concrete slab was in good condition.

Section 3 - Retail Water and Wastewater Utilities System

- Well 6 was in fair condition. The well building was intact and generally in fair condition. The wellhead and associated pump shaft, piping and valves appeared to be in fair condition. Electrical equipment was in fair condition. The building enclosure was in fair condition.
- Well 7 was in good condition. The security fencing was generally in good condition. The wellhead and associated 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 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 good condition.
- Well 9 was out of service. The motor was being replaced. The security fencing was intact. 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 light corrosion noted on the motor base. Electrical equipment was in good condition. The concrete slab was in good condition.
- Treatment Unit 1 was out of service at the time of the visual inspection; it is on stand-by. Effluent launders showed light corrosion in several locations. Electrical equipment and instruments also appeared to be in good condition. The gearbox is in the process of being replaced. 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 were in good condition. Effluent launders showed light 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.
- Filters: All six filters have recently been rebuilt and media has been replaced. All filters were in the same general good condition. Filter media appeared level and uniform, piping and valves in the filter gallery were in good condition. Effluent launders were in

Section 3 - Retail Water and Wastewater Utilities System

good condition. The overall structure appeared to be in good condition. No issues were identified with instrumentation.

- Filter backwash pumps 1, 3 and 4 along with associated motor, piping, valves, gauges, and appurtenances appeared to be in fair to good condition.
- Filter backwash pump 2 will soon be replaced in-house.
- 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. Transfer pump 3 was recently repaired.
- 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
 - Gravity thickener 1: the structure, rake and drive, and auxiliary pumps appeared to be in good condition. Pumps will soon be replaced.
 - Gravity thickener 2: the structure, rake and drive, and auxiliary pumps appeared to be in good condition. Two of the three thickener pumps for this unit have recently been replaced.
 - Vacuum filters and associated vacuum pumps and electrical equipment generally appeared to be in fair to poor condition. Pump 2 will soon be replaced. These units should be repaired/rehabilitated as needed.
- 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 fair to good condition. The bulk storage tank appeared generally intact and functional. Metering pumps were functional.
 - The dry polymer makedown and feed systems were in good condition. Makedown and dilution units appeared generally 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 good condition. Slakers were functional.

Section 3 - Retail Water and Wastewater Utilities System

- 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 are generally in good condition, except for Day Tank No. 1's bottom flange, valve and elbow that showed evidence of a previous leak (dry liquid was present). Containment area flooring is generally in good condition. Metering pumps are in good condition. Light 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 in 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 are in very good condition. Ammoniators are in very good condition.
- The diesel fuel storage system is in excellent condition. Bulk storage tanks are in very good condition.
- Backup generators and associated equipment appeared to be in good condition.
- The 0.5, 1 and 5 MG ground storage tanks, including their exterior coating, appeared to be in good condition.
- The backwash tank was generally in good condition.

Plant modifications performed through FY 2016:

- Installation of lighting improvements for the plant (ongoing)
- Installation of new chlorine analyzers (complete)
- Connection of North High Service Pump building drains to new public sewer system (complete)
- Repair of the roof on the lime silo tower and replace bag house (ongoing)
- Rehabilitation of chemical feed systems (ongoing)
- Rehabilitation of switchgear at high service pump room at building No.1 (ongoing)
- Resealing, media replacement, and repainting of Filter 6 (complete)

Section 3 - Retail Water and Wastewater Utilities System

Plant modifications to be initiated for FY 2017 & FY 2018:

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

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 April 5, 2017. In general, the 3A facility appeared to be in fair condition. Observations from the site visit are provided below.

- High service pump 1 appeared to be in good condition. The pump appeared to be in good condition, with light 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. The VFD was wired to an emergency generator located outside the building, and portions of the wires serving this generator were not in a conduit. If WWS desires to maintain the ability to serve this VFD with a backup generator, it is recommended that a permanent, hard-wired generator connection receptacle be installed.
- High service pump 3 appeared to be in good condition. The discharge isolation valves, check valves, and piping are 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.

Section 3 - Retail Water and Wastewater Utilities System

- 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 good condition. The chlorinator unit was in good condition. County staff anticipates replacing this system with a permanent system in the near term to support 4-log virus treatment.
- The ammonia storage and feed system appear to be in good to fair condition. Moderate corrosion was observed on a short section of piping within the ammonia storage building.
- The diesel fuel storage system appeared to be in fair condition and containment appeared to be in good condition.
- The main diesel generator appears to be in fair condition. The generator building is scheduled to be demolished.

Planned modifications to be initiated for FY 2017 & FY 2018:

- Demolition of the existing treatment plant and adjacent plant building, which includes:
 - Upflow treatment units
 - Greenleaf filter
 - Backwash recovery pond
 - Permuted treatment unit
- Construction of 4-log disinfection improvements, including an upgraded temporary hypochlorite system
- Construction of a new building to house a new generator
- Construction of a new by-pass system
- Implementation of new site lighting system

Section 3 - Retail Water and Wastewater Utilities System

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). Another 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 April 5, 2017.

3B Storage and Pumping Facility

Overall, the four distribution high service pumps and their associated piping and valving appeared to be in good condition. It was reported that pumps 2 and 4 appear to have insufficient head capacity to pump into the system. HSPs 2 and 3 name plates are illegible and HSP 4's name plate is missing. The 2.5 MG ground storage tank appeared to be in good condition, with minor spalling noted in certain locations and the exterior paint was chalking. It is recommended that those spots be repaired/recoated. The backup generator and associated equipment appeared to be in good condition. The temporary hypochlorite system installed previously appeared to be in good condition, and is slated to be replaced with a permanent system in the future. The pump building exterior was in good condition.

3C Storage and Pumping Facility

The 3C storage and pumping facility currently consists of a 2.0 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 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-in 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. Pump 3 has some light corrosion on the top half of the casing. Check valves for pump 2 were replaced. The water storage tank appeared to be in good condition. Sodium hypochlorite storage tank 1 was generally in good conditions, and tank 2 was out of service and a patched leak was present at the bottom of the tank. It is in the process of being replaced to provide redundant hypochlorite storage capacity at this facility. The sodium hypochlorite transfer/tank mixing pumps were not functional at the time of the site visit, but 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 was in good condition; ammoniator 1 was operational while ammoniator 2 was out of service due to missing tubing, gasket and o-ring that was in the process of being replaced. The chlorine analyzers were generally in good condition.

Section 3 - Retail Water and Wastewater Utilities System

The backup generator appeared to be in good condition. The pump building exterior was in good condition.

Retail Lift Stations

There is a total of 232 lift stations operated by the County. A representative set of 20 lift stations were inspected by Brown and Caldwell; RMPS 10R, 30C1, 31A1, 32C, 50E and 50H were inspected on April 11, 2017 while the remaining lift stations were inspected on April 13, 2017. 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 summary of the observations made during the visual inspection of the lift stations:

- RMPS 10R This submersible pump-type lift station was in very good condition. No pump issues were reported. The wetwell and valve vault hatches were in good condition. Piping and valving were in good condition, with light corrosion noted. The valve vault was flooded with about two feet of water at the time of site visit and consideration should be made to have a sump pump or drain installed. The wetwell was in good condition, with the liner mainly intact, but a piece of the liner had fallen off. The electrical panel was in good condition and generator appeared to be functional. The chain link fence and gate were in good condition.
- LS 30C1 This submersible pump-type lift station was in good condition. No pump issues were reported. The wetwell and valve vault and hatches were in good condition. Piping and valving were in good condition, the pipe and valves in the valve vault had light corrosion noted. The valve vault floor was wet and long wires were around a valve nut. The wetwell was in good condition, with the wetwell liner also in good condition. The electrical panel was in good condition.
- LS 31A1 This submersible pump-type 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 generally in good condition, with light corrosion noted. The wetwell was in good condition, with the liner in general good condition. The electrical panel was in good condition.
- LS 32C This submersible pump-type 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 generally in good condition, with light corrosion noted. The wetwell was in good condition. The electrical panel was in good condition.

Section 3 - Retail Water and Wastewater Utilities System

- LS 50E This submersible pump-type lift station was in good condition. No pump issues were reported. The wetwell and valve vault hatches were in poor condition. The visible piping and valving appeared to be in good condition with minor corrosion noted; bottom part of the piping and valving were covered with gravel. The wetwell, electrical panel, fence and gate were in good condition.
- LS 50H This submersible pump-type lift station was in good condition. No pump issues were observed or reported, but pumps were below the wetwell water surface and could not be directly observed. The wetwell and valve vault hatches were in good condition. Piping and valving were generally in good condition, with light corrosion noted. The valve vault had about seven inches of water at the time of the site visit and consideration should be made to have a sump pump or drain installed. The wetwell, electrical panel, chain link fence and gate were in good condition.
- LS 20D This submersible pump-type 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 generally in good condition, with moderate corrosion noted and peeling of the pipe exterior coating. The wetwell and electrical panel were in good condition.
- LS 20E This submersible pump-type 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 generally in fair condition, with some corrosion and coat peeling noted mainly at the pipe ends. One of the valves had been replaced and a dresser was installed with it. The wetwell was in good condition. The electrical panel was in good condition.
- LS 21D5-1 This submersible pump-type lift station was in good condition. No pump issues were reported. The wetwell hatch was in good condition while the valve vault hatch hinges were rusted making it hard to open the vault. Piping and valving in the valve vault were under gravel, only the valve handwheels were visible. The wetwell was in good condition. The electrical panel was in good condition.
- LS 211 This submersible pump-type lift station was in very good condition. No pump issues were reported. The wetwell and valve vault hatches were in very good condition. Piping and valving were generally in good condition, with light corrosion noted. The wetwell and electrical panel were in good condition. This lift station has a connection for a portable generator.

Section 3 - Retail Water and Wastewater Utilities System

- LS 22A This submersible pump-type 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 generally in fair condition, with moderate corrosion and pipe coating peel off noted. The wetwell was in good condition, but the liner showed extensive peeling. The electrical panel was in good condition.
- LS 22B This submersible pump-type 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 generally in good condition, with moderate corrosion noted. One of the valves inside the valve vault has been replaced. The wetwell, electrical panel, wood fence and chain link gate were in good condition. Sections of the barb wire on top of the fence are bent.
- LS 23C This submersible pump-type 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 generally in good condition. The wetwell and electrical panel were in good condition.
- LS 24D1-111 This submersible pump-type lift station was in good condition. No pump was observed since wetwell hatch requires the removal of bolts and machinery to lift cover, but no reason was given to suspect the pump is not functional. The wetwell and valve vault hatches were in excellent condition. Piping and valving were in good condition. The electrical panel was in good condition.
- LS 24E2-2 This submersible pump-type lift station was in excellent condition. No pump was observed since wetwell hatch requires the removal of bolts and machinery to lift cover. The wetwell and valve vault hatches were in good condition. The valve vault floor contained less than an inch of water. Piping and valving were generally in fair condition, with moderate corrosion noted. One of the valves has been replaced. The electrical panel was in good condition.
- LS 26A This submersible pump-type 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 light corrosion noted and sand present at the bottom of the valve vault. The wetwell was in good condition. The electrical panel was in good condition.
- LS 28C1 This submersible pump-type 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, with light corrosion noted. The wetwell

Section 3 - Retail Water and Wastewater Utilities System

was in good condition. The electrical panel was in good condition and has a power connection for a portable generator. The concrete slab was cracked. Chain link fence and gate were in good condition.

- LS 28D1 This submersible pump-type lift station was in good condition. Wetwell could not be observed since the door lock could not be opened. The wetwell door lock needs to be repaired. No reason was given to suspect that the pump was not functional since lift station work had recently been done. The wetwell and valve vault hatches were in good condition. Piping and valving were in good condition. Piping and valving had recently been repainted inside valve vault. The electrical panel was in good condition.
- LS 51D1 This submersible pump-type lift station was in fair condition. No pump issues were reported. The wetwell and valve vault hatches were in good condition. The wetwell was in good condition. Piping and valving were generally in fair to good condition, with light to moderate corrosion noted. Wood rack and a layer of dirt were present at the bottom of the valve vault. The electrical panel was in good condition.
- LS 61A This submersible pump-type 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, with light to moderate corrosion noted. A valve along with a dresser had been installed. The wetwell, electrical panel, chain link fence and gate 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, Lauderhill, 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 miles of force mains. All of 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 2016, the annual average daily flow rate at the NRWWTP was approximately 70.7 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. On a monthly basis, 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

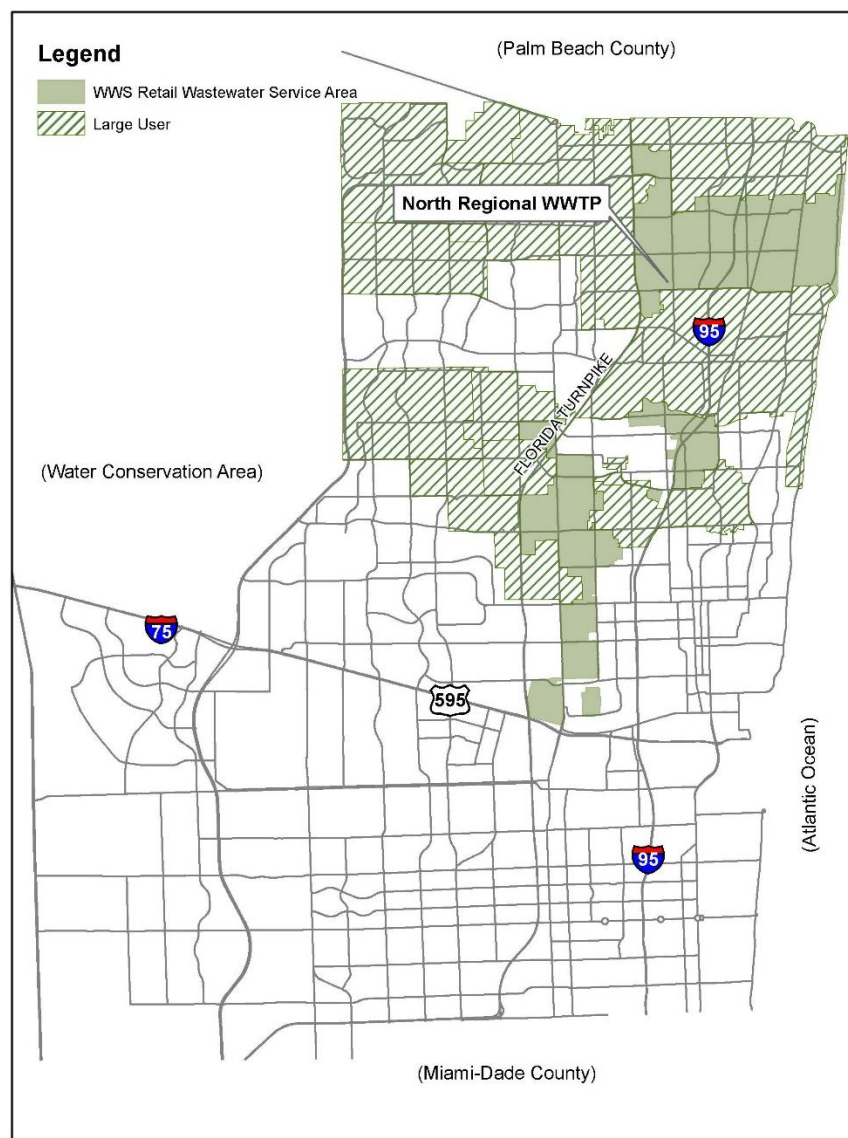
Section 4 - Regional Wastewater System

chlorinated and filtered 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 NRWWT 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 NRWWT 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 2014	FY 2015	FY 2016¹	Change From Prior Year	% of Change
Coconut Creek	122,466	123,283	126,018	2,735	2.22%
Coral Springs	220,419	216,483	271,306	54,823	25.32%
Deerfield Beach	170,908	168,645	198,350	29,705	17.61%
Lauderhill	189,115	180,403	189,169	8,766	4.86%
North Lauderdale	126,269	113,280	107,148	(6,132)	-5.41%
NSID	84,236	85,888	91,755	5,867	6.83%
Oakland Park	44,711	42,816	42,934	118	0.27%
Parkland Utilities	6,339	6,457	5,906	(551)	-8.53%
Pompano Beach	435,906	383,692	408,733	25,042	6.53%
Royal Utilities	8,712	7,920	9,451	1,531	19.33%
Tamarac	250,546	222,589	228,988	6,399	2.87%
Subtotal	1,659,627	1,551,456	1,679,758	128,303	8.27%
Broward County	446,743	403,257	427,628	24,372	6.04%
Total	2,106,370	1,954,713	2,107,387	152,674	7.81%
¹ Higher flows in FY 2016 compared to FY 2015 are believed to be related to infiltration and inflow associated with high rainfall in 2016					
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, 2016 (MGD)		
Large User	Capacity	
	Treatment	Transmission
Broward County	19.420	19.42
Coconut Creek ¹	6.540	4.41
Coral Springs	9.790	9.79
Deerfield Beach	8.500	8.50
Lauderhill	7.100	7.10
North Lauderdale	4.400	4.40
N S I D	3.530	3.53
Oakland Park	1.520	1.52
Parkland Utilities	0.265	0.27
Pompano Beach ¹	17.000	N/A
Royal Utilities	0.450	0.45
Tamarac	8.500	8.50
Total	87.015	67.89
<i>¹ All of Pompano Beach and portions of Coconut Creek do not use the North Regional Wastewater System transmission facilities.</i>		
<i>Source: Broward County Water and Wastewater Services</i>		

Table 4-3 Summary of Large User Wastewater Treatment Annual Flows Five-Year History as of September 2016 (1,000 Gallons)					
Large User (LU)	Fiscal Year 2012	Fiscal Year 2013	Fiscal Year 2014	Fiscal Year 2015	Fiscal Year 2016
Coconut Creek	1,447,199	1,491,870	1,469,596	1,479,397	1,512,213
Coral Springs	3,128,012	2,932,561	2,645,025	2,597,792	3,255,671
Deerfield Beach	2,190,729	2,128,498	2,050,891	2,023,739	2,380,200
Lauderhill	2,403,809	2,263,122	2,269,385	2,164,841	2,270,030
North Lauderdale	1,427,346	1,292,221	1,515,225	1,359,362	1,285,778
NSID	1,115,514	992,712	1,010,832	1,030,656	1,101,064
Oakland Park	638,795	550,088	536,527	513,792	515,203
Parkland	76,984	74,607	76,065	77,485	70,875
Pompano Beach	5,009,080	4,913,176	5,230,870	4,604,300	4,904,800
Royal Utilities	90,382	105,492	104,544	95,037	113,410
Tamarac	3,529,445	3,055,706	3,006,553	2,671,066	2,747,855
Total LU	21,057,295	19,800,053	19,915,513	18,617,467	20,157,099
Broward County	4,931,347	4,976,657	5,360,913	4,839,080	5,131,540
Total LU and County	25,988,642	24,776,710	25,276,426	23,456,547	25,288,639
<i>Source: Broward County Water and Wastewater Services</i>					

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 2016, 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 January 25, 2013 and became fully enforceable in March 2013.

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 Legislature 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. Requires FDEP, SFWMD and the outfall utilities to consider the above information for the purpose of adjusting, as needed, the reuse requirements, and requires FDEP to report to the Legislature any changes that may be necessary in the reuse requirements by February 15, 2015.

In order to meet the advanced wastewater treatment requirements of the rule, 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.

Section 4 - Regional Wastewater System

In addition to the ocean outfall, the effluent management system also includes six Class I deep injection wells. The Operation Permit 0051336-502-UO for Injection Wells 1 through 6 was issued on July 2, 2010 and is valid for five (5) years. A Conditional Permit was recently issued.

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 is currently in discussions with Palm Beach County for the creation of a regional reclaimed water system 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-

Section 4 - Regional Wastewater System

spreading for wastewater residuals disposal. The County has a current contract to dispose of biosolids by land application.

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

In August 2010, revisions to the state regulations governing the treatment and disposal of biosolids, Chapter 62-640 F.A.C., went into effect. The NRWWTP became subject to the new regulations upon renewal of the facility's operating permit in January, 2013. New land application sites were permitted under these new regulations. While land application continues to be an option, permitting of sites will likely be at greater distances, potentially making hauling to new disposal sites more costly. 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 NRWWTP and associated transmission and disposal facilities, or any part thereof, are retired or satisfied. The current Large User reserved capacity in the NRWWTP is set forth in Table 4-2.

The Agreements are substantially alike in form and a brief 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

Section 4 - Regional Wastewater System

periods of no flow. Each of the users must list estimates of its future flows in the Agreement and the user must submit annual updates of these estimates to the County. The County is required to use these estimates to plan future treatment capacity and to determine whether facilities should be extended or modified. The County's obligation to provide service is limited to the capacities reserved by users, which may be increased or decreased by amendment or modification to the Agreements. The Agreements allow users to lease or sell excess capacity to other users, subject to the County's approval. The County is required to install and maintain a meter at each point of connection to determine the volume and rates of flow and to inspect the meters at least annually to determine the accuracy thereof. The Agreements provide for credits or additional charges in the event of the inaccuracy of the meters. If the meters are inoperative, the users are required to pay an amount based on the average flow of the prior month.

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

Section 4 - Regional Wastewater System

The debt service charge included in monthly rates charged to the Large Users include principal, interest and coverage requirements on debt obligations issued at any time for the NRWWS and is computed by determining the ratio of the amount of capacity reserved by the user to the amount reserved by all users. The debt service charge for the NRWWS transmission facilities is computed by reference to transmission reserved capacity in the same manner. A user's contribution to the Improvement, Repair and Replacement Surcharge, which is part of the monthly rate charged to users, may not exceed 10% of that user's monthly bill. In addition, the Agreements provide for additional charges in the event that a customer requests additional transmission or treatment capacity or in the event that 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

Section 4 - Regional Wastewater System

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 4, 2017 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. All five lift stations appeared to be in good condition and operating satisfactorily. A summary of the findings at each station is presented below.

- MLS 410 The inline booster-type station in general was in good condition. Pumps, motors, and interior station piping were in good condition, with some corrosion present at pump bases. Pump control valves and actuators appeared to be in good condition, other valves were generally in good condition. Check valves for pumps 3 and 4 have been replaced. The backup power diesel generator was out of service for repairs at the time of the visual inspection. Electrical control panels appeared to be in in good working condition. The building interior and exterior was in good condition.
- MLS 450 The station was being prepared to become an inline booster-type station. All three pumps and associated piping and valving will be replaced with three primary pumps, and three jockey pumps will be added above where the existing wet well is located; the wet well will no longer be operational as part of the improvements. The existing pumps, motors, and interior station piping and valving were operational. Electrical control panels appeared to be in good working condition. The building interior and exterior were in good condition.
- MLS 455 The inline booster-type station was in good condition. Pumps, motors, and interior station piping were in good condition, with some corrosion present at pump bases. Pump 2's motor had been replaced. Moderate corrosion was noted at pump base plates, and on exterior visible portions of the pumps 2 and 4 shafts had blue coloring. Pump bases should be sanded and recoated. Valves in general were in good condition. Station electrical gear also appeared to be in good condition. The backup power generator appeared to be in good condition. The flow meter pit appeared to be in good condition. Electrical control panels appeared to be in in good condition. The building interior and exterior were in in good condition, except that the exterior of the building had hairline cracks.

Section 4 - Regional Wastewater System

- MLS 458 The inline booster-type station in general was in good condition. Pumps, motors, and interior station piping appeared to be in good condition. Pump 2's motor had been removed, and pumps 1 and 3 motors were making an unusual sound; motors should be inspected to determine the cause of the sound. Pump 1's impeller has been replaced. Pump bases had some corrosion present, bases should be sanded and recoated. Pump control valves appeared to be in good condition. Other valves in general in were good condition. Air release valves for all three pumps have been replaced. The backup power generator appeared to be in good condition. Electrical control panels appeared to be in good condition. The building interior and exterior were in good condition.
- MLS 460 The inline booster-type station wetwell refurbishment work was being performed at the time of the inspection; the rest of the station was in good condition. At the time of the inspection, pump 1 was operational while the other two were on standby. Pumps, motors, and interior station piping were in good condition. Valves were generally in good condition; all 3 pumps' ARVs and valve actuator have been replaced. The backup power generator appeared to be in good condition; two tanks inside the generator room have been removed and the battery housing exterior was corroded at the bottom. Electrical control panels and station electrical gear appeared to be in good condition. The building interior and exterior were in good condition.

North Regional Wastewater Treatment Plant

The visual inspection of the NRWTP was performed on April 19, 2017 for the headworks and aeration tanks for Treatment Module C, the rest of the inspection was performed on May 2, 2017. 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 be able to perform its intended function. 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 is not utilized and can be removed/demolished. The bar screens will soon be replaced, and gate work was ongoing (concrete below gate handwheel was chipped). First floor interior and exterior walls have cracks, coating has started to peel off and signs of water infiltrating the wall coatings were observed. Overall, the headworks building needs a structural inspection by a qualified professional to evaluate, and thereafter perform appropriate rehabilitation work.

Section 4 - Regional Wastewater System

- Treatment Module A
 - Aeration basin structures and piping appeared to be in fair to 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 fair condition, with all showing moderate corrosion in the area of the drive mechanisms. Clarifier A-3 was back in service from rehabilitation work.
 - Return Activated Sludge (RAS) pumping station appeared to be in fair to good condition. Pumps, piping and valving showed light to moderate corrosion.

- Treatment Module B
 - Aeration basin structures and piping appeared to be sound. 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 fair condition, with all showing moderate corrosion in the area of the drive mechanisms. Clarifier B2 was out service during inspection due to recent drive failure.
 - RAS pumping station appeared to be in fair to good condition. Pumps, piping and valving showed light to moderate corrosion.

- Treatment Module C
 - Aeration basin structures, piping, and equipment appeared to be in fair condition. Cracks and spalls in concrete walkway were observed. Air valve seats are not seating properly.
 - Clarifiers were in fair condition, with all showing moderate corrosion in the area of the drive mechanisms. Clarifier C4 was out service during inspection; motor drive needs replacement due to aging.
 - RAS pumping station appeared to be in fair to good condition. Pumps, piping and valving showed light to moderate corrosion.

Section 4 - Regional Wastewater System

- Treatment Module D
 - Aeration basins were out of service due to scheduled repainting.
 - Clarifiers were in fair condition, with all showing moderate corrosion in the area of the drive mechanisms.
 - RAS pumping station appeared to be in fair to good condition. Pumps, piping and valving showed light to moderate corrosion.

- Treatment Module E
 - Aeration basin structures, piping, and equipment appeared to be in fair to good condition.
 - Clarifiers were in fair to good condition, with all showing light to moderate corrosion in the area of the drive mechanisms.
 - RAS pumping station in general appeared to be in fair to good condition. Pumps, piping and valving showed slight to moderate corrosion.

- Ocean outfall pump station
 - Gravity valve was out of service during the time of the inspection.
 - Outfall pumps: five of the six vertical turbine ocean outfall pumps were functional at the time of the inspection. In general, all five pumps appeared to be in fair to good condition. Pump 6 was out of service due to motor failure. Light corrosion was observed around the motor bases, which should be addressed by sanding and recoating. In addition, light spalling of the concrete support bases was evident on a few of the motors.
 - 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 deep injection well pumps, motors, and supporting electrical equipment appeared to be in fair to good condition.
 - Injection well 1 was out of service during the inspection due to a pump leaking.

Section 4 - Regional Wastewater System

- Construction of injection wells 7 and 8 is now complete, but booster pumps and their modern controls need to be installed before wells 7 and 8 go online.
- Plant staff indicated periodic packing issues with the strainers, which produce leaks.
- Water reuse system
 - The reuse system feed pumping station appeared to be in good condition.
 - The self-backwashing sand filters were in fair to good condition but are now due for sand replacement.
 - 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 seven digesters appeared to be functional and in fair to good condition. Digester P-3 rehabilitation has been completed and is now back online for testing. Rehabilitation of secondary digester will start soon.
 - Sludge Pumping – WWS has been replacing old piston-style pumps with new progressive cavity (Moyno) pumps. The new pumps were generally in good condition, while the other pumps appeared to be fair condition.
 - Boilers serving digesters 1-3 appear to be in fair to good condition. Boiler 7 was out of service during the time of the inspection. The five boilers serving digesters 4-7 appeared to be in fair to good condition. The digester cluster electrical gear appeared to be generally in fair condition, with a light to moderate amount of surface rust present on cabinet and panel.
- Biosolids processing
 - Dissolved Air Floatation (DAF) thickeners appeared to be functioning adequately, except for unit 1 and 6, which both had issues with the skimmer. A skimmer on Unit 6 came out of the chain. Skimmers coming off the chains is a periodic issue. The associated pressure tanks appeared to be fair condition and are scheduled for replacement. It was reported that the polymer feed system serving the DAF building was not being used.
 - Belt filter presses and associated equipment were in good condition, with the exception of significant amounts of corrosion observed on some drive motors, especially on the fan shrouds. Presses 1-4 and 8 had mild to moderate corrosion on motors and shrouds. The supporting polymer feed system

Section 4 - Regional Wastewater System

components, including pumps, tanks, piping, and electrical gear, appeared to be in good condition.

- Backup generators:
 - The backup generators and associated equipment appeared to be in good condition and operational, except for generators 6, which was out of service. A leak was fixed on Generator 5, but it was still operational. Generator 4 replacement is ongoing.
 - The diesel fuel storage system is generally in good condition. Bulk storage tanks are in fair to good condition. Plant staff indicated that the underground bulk storage tanks are scheduled for replacement with above ground tanks.
- Cogeneration System
 - Construction is now complete and system is online. It appeared to be functional and in excellent condition.
- Fats, Oils, and Grease (FOG) Facility
 - Construction of this facility to receive and process FOG is now complete and operational. It appeared to be in excellent condition.

Plant modifications for FY 2016:

- Eliminate evaporators at the chlorine facility; change piping and add two scales (complete)
- Installation of FOG unit in partnership with OpTerra (complete)
- Repair of E1 Clarifier mechanism (complete)
- Replacement of 20 underground reuse valves throughout the plant (ongoing)
- New Injection well booster pump stations (ongoing)
- 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)
- Modules A, B & D diffused air (ongoing)

Section 4 - Regional Wastewater System

Plant modifications to be initiated in FY 2017 & FY 2018:

- Replacement of generator No.4 (ongoing)
- Replacement of grit capture system (five units) and Modules A, B, and C influent piping
- Replacement of cover at Digester P3
- Boilers 1 – 8 replacement
- Automatic bar screen rehabilitation (five units)
- Demolition of Crom sludge holding tank
- Demolition of old dewatering building
- Demolition of existing grit removal System
- Reuse Expansion (ongoing)
- Dewatering project to include new belt presses and centrifuges

Septage Receiving Facility

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

The Septage Receiving Facility was inspected on April 25, 2017. The facility inclusive of liquid pumps, solids discharges area, liquids discharge area, and office building appears to be in good working condition. Major upgrades to this facility were completed in 2016 and listed below.

Facility modifications included:

- Demolition of existing equipment, fencing and access ways required (ongoing)
- Installation of aerator grid chamber (ongoing)
- Repair of existing septage receiving station, including rehabilitating the wet well, replacement of cover and removal of non-working equipment (ongoing)
- Installation of new biofilter odor control system (ongoing)
- Implementation of landscaping and irrigation system improvements

Section 4 - Regional Wastewater System

- Design of new administrative building (ongoing)
- Installation of Raptor Septage Complete Treatment Plant (ongoing)

WWS Administrative Complex

A visual inspection of the WWS Administrative Complex needs to be performed outside of the Annual Report. The inspection should consist of a visual observation and assessment of the administrative building (Building 1), and operations building (Building 2) and equipment to establish the condition, functionality, and needed improvements. A facility condition study is anticipated to be performed in Fiscal Year 2018.

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

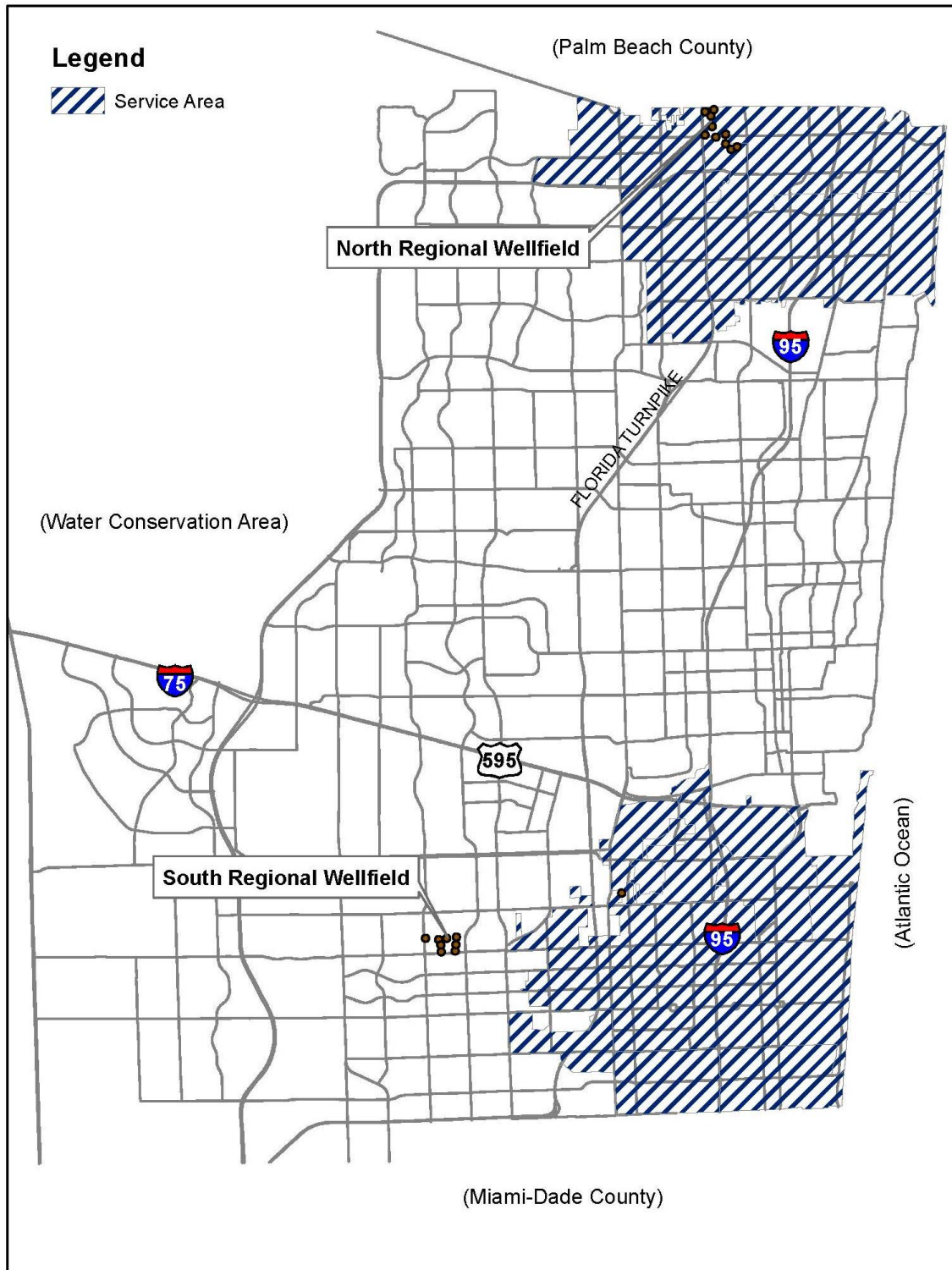
The Biscayne Aquifer, currently the County's primary source of drinking water, is subject to saltwater intrusion. In 1986, the County adopted the Regional Raw Water Supply (RRWS) Program, which called for centralized wellfields located further inland to ensure a long-term water supply for Broward County 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

Section 5 - Regional Raw Water Supply

Figure 5-1 Regional Raw Water Service Areas



Source: Broward County Water and Wastewater Services

Section 5 - Regional Raw Water Supply

Table 5-2 SRW Physical Descriptions							
Well No.	Size (in)	Depth (ft.)	Casing Depth (ft.)	Type of Casing	Normal Yield (GPM)	Capacity (GPM)	Service Status
5	20	110	75	PVC	2083	1400	ABANDONED*
6	20	110	75	PVC	2083	1400	ABANDONED*
17	12	115	81	PVC	2800	2800	ONLINE
18	12	140	80	PVC	2800	2800	ONLINE
19	12	140	80	PVC	2800	2800	ONLINE
20	12	140	80	PVC	2800	2800	ONLINE
21	12	140	80	PVC	2800	2800	ONLINE
22	12	140	80	PVC	2800	2800	ONLINE
23	12	140	80	PVC	2800	2800	ONLINE
24	12	140	80	PVC	2800	2800	**DISCONNECTED
*Abandoned due to saltwater intrusion.							
**Disconnected from the SRWF system due to past issue							
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.

Table 5-3 Large User Actual Flow North Regional Raw Water Flow Distribution (1,000 Gallons)

Fiscal Year	Deerfield	Broward County	NRW
FY 2012	200,980	2,567,130	2,768,110
FY 2013	204,231	2,295,427	2,499,658
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

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 permitted capacity of the SRW is 22.4 MGD on a maximum month basis and 14.2 MGD on an annual average basis. The consumptive use permit expired in October 2007 (and is currently being administratively extended until permit renewal is completed). Permit reissuance is expected in the normal course of events. Wells 5 and 6 were formerly associated with WTP 3A and were abandoned in 2015. The well casings at the SRW are set in the Biscayne Aquifer at a depth of approximately 100 feet below land surface. Usage data for the SRW are presented in Table 5-4. All wells in the SRW have PVC casings.

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	SRW
FY 2012	1,338,773	1,379,070	677,090	506,214	3,901,147
FY 2013	1,270,864	1,449,876	651,827	582,357	3,954,924
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

Source: Broward County Water and Wastewater Services

5.4 Contractual Agreements

The contractual agreements with each of the Large Users are substantially similar. All, except for Hollywood's, do not have an expiration date. The City of Hollywood agreement 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 application for the renewal of the SRW permit has been filed. The Utility has responded to permit application review comments from the SFWMD and is coordinating with the SFWMD to establish raw water demands based on the Cities of Hollywood, Hallandale Beach and Dania Beach consumptive use permits and the Regional Water Availability Rule base condition water use for the SRW. The SFWMD has requested additional groundwater modeling information before resolving the outstanding issues. The SRW permit renewal is anticipated to be complete in Fiscal Year 2018.

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

Section 5 - Regional Raw Water Supply

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 and South Regional Wellfields

Visual inspections of the County's regional wellfields were performed on by Brown and Caldwell on April 26 and April 27, 2016. The findings of these inspections are summarized below.

North Regional Wellfield

Overall, the NRW appeared to be in good operating condition and in good to very good physical condition. Most wells appeared to have been recently painted, and the vaults and surrounding concrete areas pressure washed as part of annual maintenance. A summary of the observed condition of each well is presented below. One well was offline at the time of the site visit.

- 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 interior and exterior were in very good condition.
- Well 2 Well 2 was in good 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. The vault had some minor concrete spalling on the exterior.
- Well 27 Well 27 was in very good condition. The well is currently offline. 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 very 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.

Section 5 - Regional Raw Water Supply

- Well 30 Security fencing and locked vaults were intact. The wellhead was generally in excellent condition, and associated piping and valves appeared to be in fair to good condition with minimal corrosion. A small leak was noted on the CARV which should be repaired during routine maintenance. 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 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 fair to good condition. A small leak was noted on the CARV which should be repaired during routine maintenance. 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 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; however, the interior of the building could not be inspected due to access issues.
- 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 showed no obvious evidence of flooding.
- 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 showed no obvious evidence of flooding.

Section 5 - Regional Raw Water Supply

South Regional Wellfield

The SRW was generally in good condition; however, issues were identified that warrant attention. Well 21 had cracks and fractures in the concrete around the vault door, which should be addressed within a reasonable amount of time. In addition, Well 22 had some grout missing around the door that needs replacement, an approximately 1/16-inch crack along the bottom, and evidence of ants tunneling through the vault walls. A summary of the observed condition of each well is presented below. One well was offline at the time of the site visits.

- 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 some minor corrosion present. Electrical equipment was in good condition. The sump pumps appeared to be in operational condition – the well vault showed no obvious evidence of flooding. One of the ladder extension arms was missing and needs to be replaced.
- Well 18 Well 18 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, including the backup generator serving this well and two adjacent wells. The sump pumps appeared to be in operational condition – the well vault showed no obvious evidence of flooding. Minor grout repair may be needed in the vicinity of the vault hatch. 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. Both of the ladder extension arms were missing and need to be replaced.
- 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. Minor grout repair may be needed in the vicinity of the vault hatch.
- Well 21 Well 21 was in good condition, with an issue at the top of the concrete vault that needs to be addressed. Security fencing and locked vaults were intact. The wellhead and associated piping and valves appeared to be in good condition.

Section 5 - Regional Raw Water Supply

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 vault had cracks and fractures in the concrete around the lid – these should be repaired to limit the potential for water intrusion into the vault.

Well 22 Well 22 was in good to fair condition. Security fencing and locked vaults were intact. The wellhead and associated piping and valves appeared to be in good condition, with light corrosion in places. 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 vault had some grout missing around the door that needs replacement.

Well 23 Well 23 was in good condition. Security fencing and locked vaults were intact. Associated piping and valves appeared to be in good condition, with light corrosion in places. Electrical equipment was in very good condition. The sump pumps appear to be in operational condition – the well vault showed no obvious evidence of flooding. The vault had some grout missing at the corners near the hatch that needs replacement.

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. The well had a spool piece removed and was configured to allow sampling. Electrical equipment was in very good condition. The sump pumps appear to be in operational condition – the well vault showed no obvious evidence of flooding. The grading around the vault does not appear to slope away from the vault and areas of severe erosion from well flushing were observed. This should be further investigated.

Section 6 - Capital Improvement Program

Section 6 Capital Improvement Program

This section includes descriptions of the five-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 the Water and Wastewater Services retail service areas.

As noted, the Utility develops a five-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 2017 through 2021 in September 2016. The five-year CIP reflects the total estimated project costs for each project, which is expected to be initiated within the five-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 2021 are presented in Table 6-2.

Section 6 - Capital Improvement Program

Table 6-1 Capital Improvement Program as of September 30, 2016

Capital Budgets	Water Treatment	Water and Sewer Mains	Wastewater Treatment	Regional Transmission	Engineering Services & Misc.	Total
Unspent Prior Budget	\$13,849,324	\$52,242,899	\$199,596,043	\$12,659,307	\$9,419,918	\$287,767,491
2017	3,684,620	88,776,990	56,063,460	10,936,120	9,219,750	168,680,940
2018	3,450,000	43,190,730	30,823,610	5,975,000	250,000	83,689,340
2019	500,000	52,112,450	58,800,000	500,000	-	111,912,450
2020	300,000	19,253,980	800,000	500,000	-	20,853,980
2021	3,386,000	3,350,000	800,000	500,000	-	8,036,000
Totals	\$25,169,944	\$258,927,049	\$346,883,113	\$31,070,427	\$18,889,668	\$680,940,201
Five Year CIP Funding:						
Bonds FY 2017-2021	15,000,000	35,000,000	110,000,000	20,000,000	-	180,000,000
Cash FY 2017-2021 ¹	5,000,000	55,000,000	43,000,000	4,000,000	18,889,668	125,889,668
Beyond 2021 ²	5,169,944	168,927,049	193,883,113	7,070,427	-	375,050,533
Totals	25,169,944	\$258,927,049	\$346,883,113	\$31,070,427	\$18,889,668	\$680,940,201
¹ Cash reflects net revenues, capital recovery charges, Large User contributions, and grants ² Reflects effects of construction period. It is currently expected that \$306M of the \$681M program will be spent by 2018. Since the construction period extends beyond 2021, the remaining \$375M 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 2021	
	Budget
Water Treatment	
Water Treatment Plant Expansion	\$3,003,014
Water Treatment Plant IRR ¹ & Misc. Projects	\$22,166,930
Water Treatment Subtotal	\$25,169,944
Water Distribution and Sewer Collection	
Neighborhood & Local Utility Projects (NP & LUP)	\$149,606,983
Misc. Main Improvements	\$41,502,135
Potable Water Storage Improvements	\$43,075,402
Lift Station Improvements	\$24,742,529
Water Distribution and Sewer Collection Subtotal	\$258,927,049
Wastewater Treatment	
NRWWTP Effluent Disposal /Treatment Enhancements	\$174,103,708
Wastewater Plant IRR ¹ & Misc. Projects	\$172,779,405
Wastewater Treatment Subtotal	\$346,883,113
Regional Transmission	
Master Pump Station Improvements	\$22,637,579
Force Main Extensions/Improvements	\$8,432,848
Regional Transmission Subtotal	\$31,070,427
Engineering/Misc. Services	\$18,889,668
GRAND TOTAL	\$686,309,352
<i>1 IRR = Improvement, Repair and Replacement</i>	
<i>Source: Broward County Water and Wastewater Services</i>	

The estimated funding requirements for this five-year period ending Fiscal Year 2021 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 40% 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 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 action taken at the September budget hearings. Current projections anticipate level rate increases of approximately three percent annually through Fiscal Year 2019. The

Section 6 - Capital Improvement Program

County estimates it will issue approximately \$150 million in bonds in 2019 (the “Series 2019A Bonds”).

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

6.3 Water Treatment

The five-year CIP includes \$25 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

The Neighborhood Program (NP) was initiated by the County in 1993 to upgrade 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 is anticipated to be completed in Fiscal Year 2017.

6.5 Local Utility Program (LUP)

WWS began implementing local utility improvement projects by Utility Analysis Zones (UAZ) in mid-2009. Where the NP included drainage, landscaping and sidewalk improvements, which were paid for from County general funds, the LUP projects focus solely on water and sanitary sewer improvements. The total cost estimate for these improvements is nearly \$275 million dollars over the next 20 plus years. The five-year CIP includes \$146 million dollar for UAZ projects.

6.6 Other Including Mains, Lift Station Improvements and Potable Storage

The CIP includes \$41 million for water and wastewater main improvement projects to address aging water and wastewater lines; increase transmission and distribution capacities, and to extend service to new customers. \$43 million of potable water storage improvements are included for the purpose of replacing existing aging systems and enhancing water storage capacities to meet current and future demands. The CIP also includes \$25 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 \$4.5 million budgeted for repairs to be the wastewater collection system.

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 amendment to the Ocean Outfall legislation in 2013, and the potential of sending reclaimed water to PBC, estimated costs are expected to be substantially reduced to approximately \$170 million. The Utility has negotiated a long-term agreement with Palm Beach County (PBC) to supply bulk reclaimed water to customers in PBC. The agreement was fully executed in April 2016. The County has included approximately \$173 million in the current 5-year CIP to start addressing these improvements to meet the future requirements. Various other system Utility Improvement Repair and Replacement (IRR) projects are budgeted at approximately \$185 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 \$23 million in improvements to the master pumping stations.

Section 7 - Financial Conditions

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 2016 and became effective October 1, 2016. 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 Charge¹	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
2013	14.89	9.01	23.90	1.4%	17.44	17.15	34.59	1.6%	58.49	1.5%
2014	14.89	9.01	23.90	0.0%	17.44	17.15	34.59	0.0%	58.49	0.0%
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 ²	16.01	9.81	25.82	3.0%	18.69	19.30	37.99	3.2%	63.81	3.1%

¹ Includes customer charge.

² Based on rates adopted by the Board effective October 1, 2016.

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, 2016				
Customer Class	Meter Size (inches)	Water (\$)	Wastewater (\$)	
Residential	5/8" Residential	11.60	18.69	
	1" Residential	33.14	43.74	
	Commercial, Municipal and Institutional	5/8	17.17	25.27
		1	40.53	66.89
		1 1/2	92.93	139.97
		2	232.56	389.76
		3	511.13	1,156.45
		4	4,305.56	2,238.20
		6	8,806.10	13,754.48
		8	10,572.13	14,908.40
10	58,645.02			
Sale for Resale	4 or less	4,305.56	-	
	6	8,806.10	-	
	8	10,572.13	-	
	10+	58,645.02	-	
Multi-Family and Mobile Home (per unit)	All sizes	9.56	14.79	
Hotels and Motels (per unit)	All sizes	5.60	11.09	
Recreational Vehicles (per unit)	All sizes	6.52	11.38	
Private Fire Protection	All Sizes	117.48	-	
Irrigation	5/8	14.77	-	
	1	29.51	-	
	1 1/2	79.64	-	
	2	185.16	-	
	3	444.37	-	
	4	1,966.15	-	
Reclaimed Water (based on 1,000 GPD demand and 20% discount on capital)	5/8	11.6	-	
	1	11.6	-	
	1 1/2	72.78	-	
	2	232.56	-	
	3	511.13	-	
	4	4,305.56	-	
	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, 2016

Customer Class (all Meter sizes unless noted)	Water		Wastewater	
	Volume (per 1,000 Gals)	Charge (\$)	Volume (per 1,000 Gals)	Charge (\$)
Residential	0-3	1.51	0 - 15	3.86
	4-6	2.64	Over 15	No Charge
	7-12	6.24		
	Over 12	7.57		
Commercial, Municipal and Institutional	0 - 75% of Avg. Consumption	3.78	All Volumes	3.86
	Over 75% of Avg. Consumption	7.57		
Sale for Resale	Water Treatment Charge	2.46	N/A	-
	Water Transmission Charge	0.10	N/A	-
Multi-Family and Mobile Homes (per unit)	0-2	1.51		
	3-4	2.64	0-8	3.86
	5-6	6.24		
	Over 6	7.57	Over 8	No Charge
Hotels and Motels (per unit)	0 - 75% of Avg. Consumption	3.78	All Volumes	3.86
	Over 75% of Avg. Consumption	7.57		
Recreational Vehicles (per unit)	0 - 75% of Avg. Consumption	3.78	All Volumes	3.86
	Over 75% of Avg. Consumption	7.57		
Private Fire Protection	All Volumes	6.24	N/A	-
Irrigation				
5/8" meter	0-8	6.24	N/A	-
	Over 8	7.57	N/A	-
1" meter	0-22	6.24	N/A	-
	Over 22	7.57	N/A	-
1 1/2" meter	0-55	6.24	N/A	-
	Over 55	7.57	N/A	-
2 to 3" meter	0-142	6.24	N/A	-
	Over 142	7.57	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 2016, 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 on the basis of flows, debt service costs assessed on the basis of 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 2016 to Fiscal Year 2017. 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, 2016. A five-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, 2016 (1,000 Gallons)				
Fiscal Year Ended 9/30	Billed Retail Water	Coconut Creek	Billed Water Total ¹	Billed Retailed Wastewater ¹
2012	6,695,748	1,643,812	8,339,560	4,872,721
2013	6,579,923	1,699,799	8,279,722	4,496,843
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
¹ Reduced water use due to demand management efforts comprising water conservation initiatives, including year round lawn irrigation restrictions. Reduced water use translates to reduced billed wastewater.				
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 way 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 2016 revenues are approximately \$6.6 million. Based on the financial statement for the Fiscal Year ended September 30, 2016, the 2016 total revenues were \$132,838,000. The current balance in the Renewal, Replacement and Improvement Fund is \$6.6 million. The Consultant recommends that the balance in this fund be increased to at least \$6,641,900 for Fiscal Year 2017, consistent with the requirement of the Bond Resolution.

7.3 Revenue Projections

Annual water and wastewater revenues and expenditures for Fiscal Year 2014 are based on actual values from financial statements prepared as of September 30, 2016. Fiscal year 2017 revenues and expenditures have been projected based upon the rates approved by the County, which were implemented October 1, 2016 in conjunction with estimated expenses through Fiscal Year 2017. Revenues for Fiscal Years 2017 through 2021 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 2017 have been estimated at 1% annually for water and 2% annually for wastewater. Operation and Maintenance costs are forecast at budgeted levels for Fiscal Year 2017 and assumed to increase by an average of 2% annually for both water and wastewater beginning in Fiscal Year 2018. Retail rate increases from Fiscal Years 2017 through 2021 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 Series 2019AA debt service assumes a 5% interest rate per annum and maturities over a 25 year period, back-loaded to support levelized total debt service payments. In Fiscal Year 2016, 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, 2016 present the computation of debt service coverage on all outstanding revenue bonds as 1.74 for Fiscal Year 2016. In addition, a Balance Available for Renewal, Replacement and Capital Expenditures of approximately \$26.6 million was generated during Fiscal Year 2016. 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 2017 through Fiscal Year 2021. 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				
	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Total Revenues ¹	118,221	122,344	123,983	132,139	132,838	133,941	137,959	142,098	146,361	150,752
Large User Revenues (Excluding Broward County)	31,228	32,957	32,413	34,417	33,868	36,221	36,819	38,108	40,101	40,903
Percentage Large User to Total Revenues	26.4%	26.9%	26.1%	26.0%	25.5%	27.0%	26.7%	26.8%	27.4%	27.1%
Regional Raw Water Revenues	701	876	945	849	857	860	877	894	903	912
Percentage Regional Raw Water Total Revenues	0.6%	0.7%	0.8%	0.6%	0.6%	0.6%	0.6%	0.6%	0.6%	0.6%
Sale for Resale/Water ²	5,520	5,740	5,938	6,053	6,247	6,309	6,372	6,435	6,499	6,564
Percentage Sale for Resale Revenues to Total Revenues	4.7%	4.7%	4.8%	4.6%	4.7%	4.7%	4.6%	4.5%	4.4%	4.4%

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				
	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Revenues:										
Water	\$43,458	\$43,990	\$45,453	\$47,796	\$48,106	\$47,352	\$47,774	\$49,949	\$52,215	\$54,522
Wastewater	66,249	69,419	70,385	76,159	76,890	75,259	77,683	80,176	85,114	88,616
Other ¹	8,030	8,735	7,869	7,893	7,417	9,517	9,669	10,008	10,264	10,534
Interest Income	793	200	276	291	425	499	499	499	499	499
Total Revenues	\$118,530	\$122,344	\$123,983	\$132,139	\$132,838	\$132,627	\$135,625	\$140,632	\$148,092	\$154,171
Current Expenses:										
Water Transmission & Distribution	\$8,811	\$9,043	\$10,024	\$11,258	\$11,441	\$11,784	\$11,076	\$11,297	\$11,523	\$11,754
Water Source of Supply, Treatment & Pumping	8,702	8,713	9,060	7,317	9,817	10,112	9,504	9,694	9,887	10,085
Wastewater Collection & Transmission	11,169	11,141	9,200	11,004	11,262	11,600	10,902	11,120	11,343	11,570
Wastewater Treatment	15,324	14,936	15,373	17,321	17,724	18,256	17,158	17,501	17,851	18,208
Customer Service	5,499	4,729	4,765	4,782	4,953	5,102	4,795	4,891	4,989	5,088
Administrative/General	14,568	14,813	14,041	15,203	14,920	15,368	14,444	14,732	15,027	15,328
Total Current Expenses	\$64,073	\$63,375	\$62,463	\$66,885	\$70,117	\$72,221	\$67,878	\$69,236	\$70,620	\$72,033
Net Revenues	\$54,457	\$58,969	\$61,520	\$65,254	\$62,721	\$60,406	\$67,747	\$71,396	\$77,472	\$82,138
Debt Service:										
Senior Lien Debt:										
Series 2003 Bonds	\$3,459	\$1,048								
Series 2003-B Bonds	9,079	8,188								
Series 2005-A Bonds	3,147	2,456	\$2,457	\$1,979						
Series 2009-A Bonds	10,322	10,325	10,326	8,773	\$2,367	\$2,363	\$2,363	\$1,985	\$1,984	\$1,700
Series 2012-A Bonds	3,219	8,251	8,252	8,252	8,251	8,253	9,037	8,723	8,725	8,810
Series 2012-B Bonds	2,623	5,522	5,523	5,523	5,523	5,523	11,058	16,371	16,370	14,271
Series 2012-C Bonds	283	1,706	10,941	10,945	10,940	10,943	4,622	-	-	-
Series 2015-A Bonds				411	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
Series 2019-A Bonds							7,965	8,095	9,500	
Total Debt Service	\$32,132	\$37,496	\$37,499	\$37,222	\$36,079	\$36,080	\$36,078	\$44,042	\$44,172	\$45,909
Debt Coverage Senior Lien	1.69	1.57	1.64	1.75	1.74	1.67	1.88	1.62	1.75	1.79

¹ Commencing in fiscal year 2012, other revenues include the customer service charge previously reflected as water revenues.
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.

Section 7 – Financial Conditions

Table 7-8 Comparative Rate Survey as of 12/31/2016 (Based on Usage of 5,000 Gallons Per Month for a 5/8-inch meter)			
Utility	Water	Sewer	Total
Wilton Manors	59.03	48.47	107.50
Sunrise (outside City)	48.29	58.98	107.27
Davie	37.35	69.62	106.97
Dania Beach ¹	35.00	58.82	93.82
Oakland Park	47.09	44.27	91.36
Sunrise (inside City)	38.61	47.19	85.80
Hollywood ¹	26.93	54.27	81.20
North Lauderdale	32.30	47.25	79.55
Parkland	24.64	51.84	76.48
Margate (outside City)	36.07	36.75	72.82
Coconut Creek	41.04	31.50	72.54
Cooper City	26.75	40.59	67.34
NSID ¹	36.09	30.28	66.37
Miramar ¹	29.03	37.02	66.05
Tamarac ¹	21.80	42.75	64.55
Broward County (WWS)	25.82	37.99	63.81
Pompano Beach (outside City) ¹	30.10	32.18	62.28
Coral Springs	21.29	40.53	61.82
Plantation	22.14	39.53	61.67
Fort Lauderdale	22.46	37.63	60.09
Hallandale Beach ¹	24.36	34.76	59.12
Royal Utility	26.93	31.41	58.34
Margate (inside City)	28.88	29.40	58.28
Lauderhill	20.37	35.69	56.06
Deerfield Beach ¹	28.25	24.53	52.78
Pembroke Pines	24.13	27.93	52.06
CSID ¹	25.01	25.01	50.02
Pompano Beach (inside City) ¹	24.08	25.76	49.84
Average Water & Sewer for Broward	30.85	40.07	70.92
Water Only			
Hillsboro ¹	34.20		34.20
Sewer Only			
Pembroke Park		56.38	56.38
Lauderdale by the Sea		39.37	39.37
Tri-County Utilities			
Palm Beach County	22.26	27.22	49.48
Miami Dade County ¹	10.74	21.23	31.97
¹ The rates did not change from 2015 to 2016			
Source: Broward County Water and Wastewater Services			

7.5 Insurance Coverage

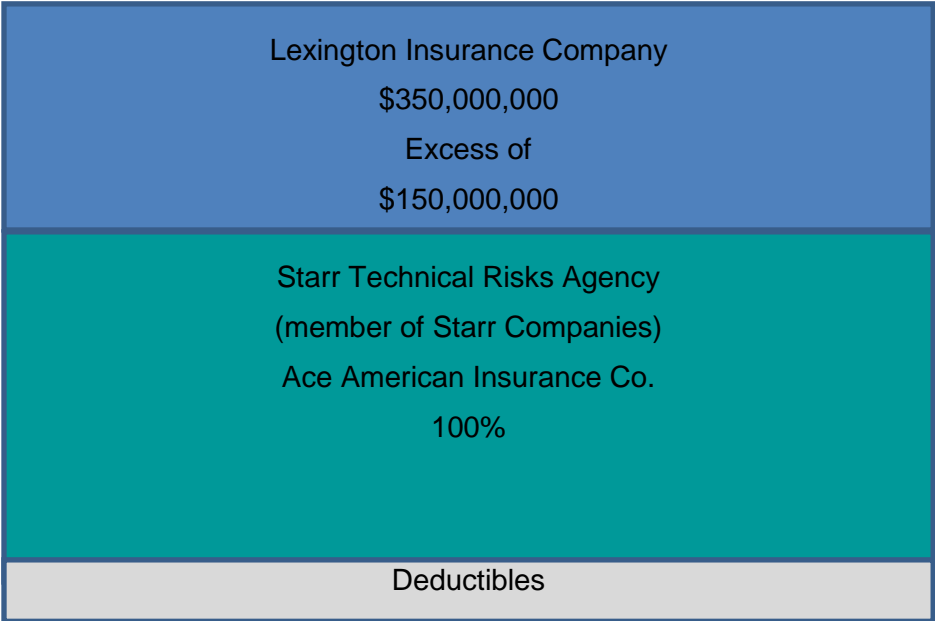
Broward County Water and Wastewater Services (WWS) bond covenants require that customary insurance be carried on the physical assets of the system and coordinates coverage through the County’s Master Property program. The term of the present policy is from February 1, 2017 to February 1, 2018.

Broward County has a fairly large portion of property values located in Special Flood Hazard Areas. The County and Water and Wastewater Services 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 Water and Wastewater Services locations that provide comprehensive protection for its physical assets valued over \$487 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, Water and Wastewater Services has an independent tower, separate from Aviation (BCAD) and the County (including Port Everglades).

Figure 7-1 WWS Insurance Tower



Section 7 – Financial Conditions

in Fiscal Year 2016, Broward County saved an additional \$1.2 Million, or 6.66% in premium in comparison to the prior year on their Master Property program. Water and Wastewater Services' insured physical assets comprise 9.6% of Broward County's assets. Water and Wastewater Services recognized a premium savings of 14.89% on their dedicated property renewal.

This is in line with Council of Insurance Agents and Brokers¹ first quarter report released April 2016 that showed just over 51.85% experienced reductions between 1-10% and just under 20% experienced flat renewals in the Southeastern United States.

The four major above-ground water and wastewater facilities and their estimated values, as provided by Broward County Water and Wastewater Services, as of June 2016 are as follows:

Table 7-9 Estimated Value of Aboveground Water and Wastewater Facilities	
Facility	FY 2016 Estimated Bldg. Value (\$1,000s)¹
NRWWTP Complex	\$901,765
Water Treatment Plant 2 A	\$106,090
Water Treatment Plant 1 A	\$68,959
3 A Repump Station	\$15,914
<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. In order to aid in determining insurance coverage needs, 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 (Million Gallons)

	FY-2007	FY-2008	FY-2009	FY-2010	FY-2011	FY-2012	FY-2013	FY-2014	FY-2015	FY-2016
Water Production										
Plant 1A	2,977	3,059	2,835	2,865	2,635	2,672	2,613	2,608	2,739	2,670
Plant 1B	-	-	-	-	-	-	-	-	-	-
Plant 2A	5,179	4,599	4,571	4,555	4,572	4,259	4,444	4,364	4,588	4,498
Plant 3A	-	-	-	-	-	-	-	-	-	-
Plant 3B	-	-	-	-	-	-	-	-	-	-
Plant 3C	-	-	-	-	-	-	-	-	-	-
Broadview	-	-	-	-	-	-	-	-	-	-
Purchased Water from Municipality	2,608	2,486	2,597	2,203	2,204	2,187	2,390	2,515	2,293	2,402
Total Water Production	10,764	10,143	10,003	9,623	9,411	9,118	9,447	9,487	9,620	9,570
Wastewater Treatment										
North Regional WWTP	24,257	25,156	23,793	23,852	21,762	25,989	24,777	25,276	23,457	25,289
WW Flows to Hlwd. Regional Treatment	967	1,053	1,162	1,069	958	1,158	1,142	1,308	1,248	1,284
Total Wastewater Treatment	25,224	26,209	24,955	24,921	22,720	27,147	25,919	26,584	24,705	26,573
Regional Raw Water										
	6,795	7,023	6,438	6,374	7,196	6,669	6,455	6,462	6,105	6,047
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, 2016**

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"	46,348	46,313	231,384	41,427	41,388	213,411
1"	1,819	1,786	25,425	2,744	2,711	32,440
1 1/2"	136	69	1,682	192	176	4,825
2"	2	2	612	30	30	2,406
TPK Residential Single Family						
5/8"	35	18	70	32	15	64
1 1/2"	69	2	138	36	1	24
2"	146	2	219	275	1	1,210
Residential Multi-Family, Hotel & RVs	33,111	2,031	126,684	32,500	1,870	123,584
Commercial						
5/8"	2,723	2,722	13,288	1,945	1,945	10,272
1"	1,592	1,440	16,388	805	805	13,426
1 1/2"	701	699	26,222	565	563	19,313
2"	846	625	54,624	465	465	47,746
3"	279	81	7,336	118	19	4,585
4"	10	10	20,066	8	8	5,969
6"	7	7	7,753	1	1	428
Irrigation						
5/8"	284	284	2,570	1	1	0
1"	273	273	5,336	-	-	-
1 1/2"	202	202	9,733	-	-	-
2"	123	123	14,281	-	-	-
Sale for Resale						
10"	6	6	144,704	-	-	-
Total	88,712	56,695	708,514	81,144	49,999	479,702

Source: Broward County Water and Wastewater Services

**Table A - 3
Water and Wastewater Services
Retail Water & Wastewater
Customer Average Monthly Demand & Revenues
as of September 30, 2016**

Revenue Class	Water			Wastewater		
	Demand	Revenue		Demand	Revenue	
	Total 1,000 Gal	\$ Total	\$ Per 1,000 Gal	Total 1,000 Gal	\$ Total	\$ Per 1,000 Gal
Residential Single Family	259,102	1,386,487	5.35	224,824	1,680,704	7.48
Residential Multi Family	111,956	599,606	5.36	104,974	794,171	7.57
Commercial	160,406	1,236,087	7.71	125,609	869,148	6.92
Sale for Resale	144,704	528,870	3.65	N/A	N/A	N/A
Irrigation	31,919	260,268	8.15	N/A	N/A	N/A
Total	708,087	4,011,318	5.67	455,407	3,344,022	7.34

Source: Broward County Water and Wastewater Services

Table A - 4.0
Water and Wastewater Services
Activity Based Costing Report for the Twelve Months Ended September 30, 2016
Retail Water

Retail Water	Activities				Total Water
	Wellfields	Treatment	Purchased Water	Distribution	
Personal Services	\$ 38,172	\$ 3,165,062	\$ -	\$ 1,569,065	\$ 4,772,299
Operating Material	27,507	542,885	2,164	313,240	885,796
Other Material	-	7,435	-	787	8,222
Utilities-Other	-	17,981	-	33,244	51,225
Electric	116,791	703,258	-	325,017	1,145,065
Treat/Trans	-	-	-	-	-
Purchased Water	-	-	6,270,091	-	6,270,091
Rental/Leases	-	-	-	6,447	6,447
Motor Pool	-	189,993	-	70,795	260,788
Contract Service	9,492	369,223	-	822,395	1,201,110
Other	198,785	-171,708	-	387,007	414,084
Educational Courses	-	7,209	-	1,295	8,503
Computer Maintenance	-	-	-	-	-
Travel	-	-	-	-	-
Other Chlorine	-	898,535	-	45,867	944,402
Lime	-	480	-	8,590	9,070
Subtotal	-	1,132,854	-	-	1,132,854
	390,746	6,863,206	6,272,255	3,583,749	17,109,956
<u>Operating Cost Reclass:</u>					
One Call					
Paint Shop	-	-	-	124,596	124,596
Heavy equipment	-	61,601	-	-	61,601
Subtotal	-	-	-	218,168	218,168
<u>Allocate:</u>		61,601	-	342,764	404,365
Section Admin.					
Division Administration	-	-	-	-	-
Subtotal Direct Overhead	32,018	562,379	513,956	293,656	1,402,009
Total	32,018	562,379	513,956	293,656	1,402,009
	\$ 422,764	\$ 7,487,185	\$ 6,786,211	\$ 4,220,169	\$ 18,916,330

Source: Broward County Water and Wastewater Services

Table A - 4.1
Water and Wastewater Services
Activity Based Costing Report for the Twelve Months Ended September 30, 2016
Retail Water - Wellfields Detail

Activity - Retail Wellfields	District One			District Two			Total		
	Operations	Maintenance	Total O&M	Operations	Maintenance	Total O&M	Operations	Maintenance	Total O&M
Personal Services	\$ -	\$ 21,040	\$ 21,040	\$ -	\$ 17,132	\$ 17,132	\$ -	\$ 38,172	\$ 38,172
Operating Material	-	23,506	23,506	-	4,001	4,001	-	27,507	27,507
Other Material	-	-	-	-	-	-	-	-	-
Utilities-Other	-	-	-	-	-	-	-	-	-
Electric	-	-	-	116,791	-	116,791	116,791	-	116,791
Treat/Trans	-	-	-	-	-	-	-	-	-
Purchased Water	-	-	-	-	-	-	-	-	-
Rental/Leases	-	-	-	-	-	-	-	-	-
Motor Pool	-	-	-	-	-	-	-	-	-
Contract Service	-	-	-	-	9,492	9,492	-	9,492	9,492
Other	105,882	9,691	115,574	82,353	858	83,211	188,235	10,549	198,785
Educational Courses	-	-	-	-	-	-	-	-	-
Travel	-	-	-	-	-	-	-	-	-
Other	-	-	-	-	-	-	-	-	-
Chlorine	-	-	-	-	-	-	-	-	-
Lime	-	-	-	-	-	-	-	-	-
Subtotal	105,882	54,237	160,119	199,144	31,483	230,627	305,026	85,720	390,746
<u>Operating Cost Reclass:</u>									
One Call	-	-	-	-	-	-	-	-	-
Paint Shop	-	-	-	-	-	-	-	-	-
Heavy Equipment	-	-	-	-	-	-	-	-	-
Subtotal	-	-	-	-	-	-	-	-	-
<u>Allocate:</u>									
Section Admin.	-	-	-	-	-	-	-	-	-
Division Administration	8,676	4,444	13,120	16,318	2,580	18,898	24,994	7,024	32,018
Subtotal Direct Overhead	8,676	4,444	13,120	16,318	2,580	18,898	24,994	7,024	32,018
Total	\$ 114,558	\$ 58,681	\$ 173,240	\$ 215,462	\$ 34,063	\$ 249,525	\$ 330,020	\$ 92,744	\$ 422,764

Source: Broward County Water and Wastewater Services

Table A - 4.2
Water and Wastewater Services
Activity Based Costing Report for the Twelve Months Ended September 30, 2016
Retail Water - Water Treatment Detail

	Activity - Retail Water Treatment									Activity - Purchased Water
	WTP 1-A			WTP 2-A			Total Treatment			
	Operations	Maintenance	Total O&M	Operations	Maintenance	Total O&M	Operations	Maintenance	Total O&M	
Personal Services	\$ 1,088,755	\$ 684,635	\$ 1,773,391	\$ 795,640	\$ 596,031	\$ 1,391,671	\$ 1,884,396	\$ 1,280,666	\$ 3,165,062	\$ -
Operating Material	9,033	250,364	259,397	24,827	258,661	283,488	33,860	509,026	542,885	2,164
Other Material	3,879	709	4,588	2,055	792	2,847	5,934	1,501	7,435	-
Utilities-Other	17,981	-	17,981	-	-	-	17,981	-	17,981	-
Electric	353,417	-	353,417	349,841	-	349,841	703,258	-	703,258	-
Treat/Trans	-	-	-	-	-	-	-	-	-	-
Purchased Water	-	-	-	-	-	-	-	-	-	6,270,091
Rental/Leases	-	-	-	-	-	-	-	-	-	-
Motor Pool	55,500	49,580	105,080	63,004	21,908	84,913	118,504	71,488	189,993	-
Contract Service	26,190	135,369	161,558	120,514	87,150	207,664	146,704	222,519	369,223	-
Other	11,695	(80,382)	(68,687)	8,775	(111,796)	(103,021)	20,470	(192,178)	(171,708)	-
Educational Courses	1,040	1,130	2,170	1,397	3,641	5,038	2,437	4,772	7,209	-
Computer Maintenance	-	-	-	-	-	-	-	-	-	-
Travel	-	-	-	-	-	-	-	-	-	-
Other Chemicals	403,662	-	403,662	494,873	-	494,873	898,535	-	898,535	-
Chlorine	-	-	-	-	480	480	-	480	480	-
Lime	396,445	-	396,445	736,409	-	736,409	1,132,854	-	1,132,854	-
Subtotal	2,367,597	1,041,405	3,409,002	2,597,336	856,868	3,454,204	4,964,933	1,898,273	6,863,206	6,272,255
Operating Cost Reclass:										
One Call	-	-	-	-	-	-	-	-	-	-
Paint Shop	-	21,489	21,489	-	40,112	40,112	-	61,601	61,601	-
Heavy Equipment	-	-	-	-	-	-	-	-	-	-
Subtotal	-	21,489	21,489	-	40,112	40,112	-	61,601	61,601	-
Allocate:										
Section Admin.	-	-	-	-	-	-	-	-	-	-
Division Administration	194,003	85,334	279,337	212,829	70,213	283,041	406,832	155,547	562,379	513,956
Subtotal Direct Overhead	194,003	85,334	279,337	212,829	70,213	283,041	406,832	155,547	562,379	513,956
Total	\$ 2,561,600	\$ 1,148,228	\$ 3,709,828	\$ 2,810,165	\$ 967,193	\$ 3,777,357	\$ 5,371,765	\$ 2,115,420	\$ 7,487,185	\$ 6,786,211

Source: Broward County Water and Wastewater Services

**Table A - 4.3
Water and Wastewater Services
Activity Based Costing Report for the Twelve Months Ended September 30, 2016
Retail Water - Distribution Detail**

Activity-Distribution	District One			District Two			District Three			Total Distribution		
	Operations	Maintenance	Total O&M	Operations	Maintenance	Total O&M	Operations*	Maintenance	Total O&M	Operations	Maintenance	Total O&M
Personal Services	\$ -	\$ 268,153	\$ 268,153	\$ -	\$ 215,312	\$ 215,312	\$ 622,339	\$ 463,261	\$ 1,085,600	\$ 622,339	\$ 946,726	\$ 1,569,065
Operating Material	-	64,059	64,059	-	30,860	30,860	145,278	73,043	218,321	145,278	167,962	313,240
Other Material	-	-	-	-	-	-	787	-	787	787	-	787
Utilities-Other	-	-	-	-	-	-	33,244	-	33,244	33,244	-	33,244
Electric	125,358	-	125,358	-	-	-	199,658	-	199,658	325,017	-	325,017
Treat/Trans	-	-	-	-	-	-	-	-	-	-	-	-
Purchased Water	-	-	-	-	-	-	-	-	-	-	-	-
Rental/Leases	-	-	-	-	-	-	6,447	-	6,447	6,447	-	6,447
Motor Pool	-	-	-	-	-	-	70,795	-	70,795	70,795	-	70,795
Contract Service	-	50,536	50,536	-	102,268	102,268	595,665	73,926	669,591	595,665	226,730	822,395
Other	-	180,793	180,793	-	158,524	158,524	(240,476)	288,165	47,689	(240,476)	627,483	387,007
Educational Courses	-	-	-	-	-	-	1,295	-	1,295	1,295	-	1,295
Computer Maintenance	-	-	-	-	-	-	-	-	-	-	-	-
Travel	-	-	-	-	-	-	-	-	-	-	-	-
Other Chemicals	-	-	-	-	-	-	45,867	-	45,867	45,867	-	45,867
Chlorine	-	-	-	-	-	-	8,590	-	8,590	8,590	-	8,590
Lime	-	-	-	-	-	-	-	-	-	-	-	-
Subtotal	125,358	563,542	688,900	-	506,964	506,964	1,489,490	898,394	2,387,884	1,614,849	1,968,900	3,583,749
Operating Cost Reclass:												
One Call	43,048	-	43,048	43,573	-	43,573	37,974	-	37,974	124,596	-	124,596
Paint Shop	-	-	-	-	-	-	-	-	-	-	-	-
Heavy Equipment	-	108,566	108,566	-	62,588	62,588	-	47,015	47,015	-	218,168	218,168
Subtotal	43,048	108,566	151,614	43,573	62,588	106,161	37,974	47,015	84,989	124,596	218,168	342,764
Allocate:												
Section Admin.	-	-	-	-	-	-	-	-	-	-	-	-
Division Administration	10,272	46,177	56,449	-	41,541	41,541	122,050	73,615	195,666	132,322	161,334	293,656
Subtotal Direct Overhead	10,272	46,177	56,449	-	41,541	41,541	122,050	73,615	195,666	132,322	161,334	293,656
Total	\$ 178,679	\$ 718,285	\$ 896,964	\$ 43,573	\$ 611,093	\$ 654,667	\$ 1,649,514	\$ 1,019,024	\$ 2,668,539	\$ 1,871,767	\$ 2,348,403	\$ 4,220,169

Note:
*includes Underground

Source: Broward County Water and Wastewater Services

Table A - 4.4
Water and Wastewater Services
Activity Based Costing Report for the Twelve Months Ended September 30, 2016
Retail Wastewater

Retail Wastewater	Activities		
	Collection	Lift Stations	Total Wastewater
Personal Services	\$ 685,031	\$ 1,485,145	\$ 2,170,176
Operating Material	817,709	388,275	1,205,983
Other Material	290	-	290
Utilities-Other	3,538,937	17,432	3,556,368
Electric	2,852	990,472	993,323
Treat/Trans	-	-	-
Purchased Water	-	-	-
Rental/Leases	6,616	6,754	13,370
Motor Pool	60,321	136,240	196,561
Contract Service	101,209	95,600	196,809
Other	11,406	66,162	77,568
Educational Courses	-	-	-
Computer Maintenance	4,522	782	5,304
Travel	-	-	-
Other Chemicals	-	-	-
Chlorine	-	-	-
Lime	-	-	-
Subtotal	5,228,892	3,186,862	8,415,754
<u>Operating Cost Reclass:</u>			
One Call	96,422	-	96,422
Paint Shop	-	60,168	60,168
Heavy Equipment	-	114,848	114,848
Generators	-	126,458	126,458
Subtotal	96,422	301,474	397,896
<u>Allocate:</u>			
Section Admin.	-	-	-
Division Administration	428,461	261,135	689,596
Subtotal Direct Overhead	428,461	261,135	689,596
Total	\$ 5,753,774	\$ 3,749,471	\$ 9,503,246

Source: Broward County Water and Wastewater Services

Table A - 4.5
Water and Wastewater Services
Activity Based Costing Report for the Twelve Months Ended September 30, 2016
Retail Wastewater - Collection Detail

Activity - Collection	District One			District Two			District Three			Total Collection		
	Operations	Maintenance	Total O&M	Operations	Maintenance	Total O&M	Operations*	Maintenance	Total O&M	Operations	Maintenance	Total O&M
Personal Services	\$ -	\$ 114,293	\$ 114,293	\$ -	\$ 127,412	\$ 127,412	\$ 381,599	\$ 61,727	\$ 443,326	\$ 381,599	\$ 303,432	\$ 685,031
Operating Material	-	13,241	13,241	-	7,650	7,650	796,066	752	796,817	796,066	21,643	817,709
Other Material	-	-	-	-	-	-	290	-	290	290	-	290
Utilities-Other	-	-	-	-	-	-	3,538,937	-	3,538,937	3,538,937	-	3,538,937
Electric	-	-	-	2,852	-	2,852	-	-	-	2,852	-	2,852
Treat/Trans	-	-	-	-	-	-	-	-	-	-	-	-
Purchased Water	-	-	-	-	-	-	-	-	-	-	-	-
Rental/Leases	-	-	-	-	-	-	6,616	-	6,616	6,616	-	6,616
Motor Pool	-	-	-	-	-	-	60,321	-	60,321	60,321	-	60,321
Contract Service	-	9,269	9,269	-	19,449	19,449	70,901	1,590	72,491	70,901	30,308	101,209
Other	-	69,427	69,427	-	114,198	114,198	(212,144)	39,925	(172,219)	(212,144)	223,550	11,406
Educational Courses	-	-	-	-	-	-	-	-	-	-	-	-
Computer Maintenance	-	-	-	-	-	-	4,522	-	4,522	4,522	-	4,522
Travel	-	-	-	-	-	-	-	-	-	-	-	-
Other Chemicals	-	-	-	-	-	-	-	-	-	-	-	-
Chlorine	-	-	-	-	-	-	-	-	-	-	-	-
Lime	-	-	-	-	-	-	-	-	-	-	-	-
Subtotal	-	206,230	206,230	2,852	268,709	271,560	4,647,108	103,994	4,751,102	4,649,959	578,933	5,228,892
Allocate:												
Section Admin.	-	-	-	-	-	-	-	-	-	-	-	-
Division Administration	-	16,899	16,899	234	22,018	22,252	380,789	8,521	389,311	381,023	47,438	428,461
One Call	40,074	-	40,074	35,524	-	35,524	20,824	-	20,824	96,422	-	96,422
Paint Shop												
Heavy Equipment												
Subtotal Direct Overhead	40,074	16,899	56,972	35,757	22,018	57,776	401,613	8,521	410,135	477,444	47,438	524,883
Total	\$ 40,074	\$ 223,128	\$ 263,202	\$ 38,609	\$ 290,727	\$ 329,336	\$ 5,048,721	\$ 112,515	\$ 5,161,236	\$ 5,127,403	\$ 626,371	\$ 5,753,774

Note:
* includes Underground
Source: Broward County Water and Wastewater Services

Table A - 4.6
Water and Wastewater Services
Activity Based Costing Report for the Twelve Months Ended September 30, 2016
Retail Wastewater - Lift Stations Detail

Retail Wastewater Activity - Lift Stations	District One			District Two			District Three			Field Support	Total Lift Stations		
	Operations	Maintenance	Total O&M	Operations	Maintenance	Total O&M	Operations	Maintenance	Total O&M		Operations	Maintenance	Total O&M
Personal Services	\$ -	\$ 208,853	\$ 208,853	\$ -	\$ 383,052	\$ 383,052	\$ -	\$ 243,314	\$ 243,314	\$ 649,927	\$ 649,927	\$ 835,218	\$ 1,485,145
Operating Material	-	102,703	102,703	-	150,336	150,336	-	79,403	79,403	55,833	55,833	332,442	388,275
Other Material	-	-	-	-	-	-	-	-	-	-	-	-	-
Utilities-Other	2,606	-	2,606	14,825	-	14,825	-	-	-	-	17,432	-	17,432
Electric	219,464	-	219,464	179,810	-	179,810	590,966	-	590,966	232	990,472	-	990,472
Treat/Trans	-	-	-	-	-	-	-	-	-	-	-	-	-
Purchased Water	-	-	-	-	-	-	-	-	-	-	-	-	-
Rental/Leases	-	-	-	-	-	-	-	-	-	6,754	6,754	-	6,754
Motor Pool	-	-	-	-	-	-	-	-	-	136,240	136,240	-	136,240
Contract Service	-	15,525	15,525	-	58,519	58,519	-	18,382	18,382	3,174	3,174	92,426	95,600
Other	-	135,280	135,280	-	195,777	195,777	-	136,998	136,998	(401,893)	(401,893)	468,055	66,162
Educational Courses	-	-	-	-	-	-	-	-	-	-	-	-	-
Computer Maintenance	-	-	-	-	-	-	-	-	-	782	782	-	782
Travel	-	-	-	-	-	-	-	-	-	-	-	-	-
Other Chemicals	-	-	-	-	-	-	-	-	-	-	-	-	-
Chlorine	-	-	-	-	-	-	-	-	-	-	-	-	-
Lime	-	-	-	-	-	-	-	-	-	-	-	-	-
Subtotal	222,070	462,361	684,431	194,635	787,685	982,320	590,966	478,096	1,069,062	451,049	1,458,721	1,728,141	3,186,862
Allocate:													
Section Admin.	-	-	-	-	-	-	-	-	-	-	-	-	-
Division Administration	18,197	37,886	56,083	15,949	64,544	80,492	48,424	39,176	87,600	36,959	119,529	141,606	261,135
One Call	-	-	-	-	-	-	-	-	-	-	-	-	-
Paint Shop	-	20,056	20,056	-	20,056	20,056	-	20,056	20,056	-	-	60,168	60,168
Heavy Equipment	-	47,457	47,457	-	38,563	38,563	-	28,828	28,828	-	-	114,848	114,848
Generators	38,780	-	38,780	54,517	-	54,517	33,160	-	33,160	-	126,458	-	126,458
Subtotal Direct Overhead	18,197	105,399	123,596	15,949	123,163	139,112	48,424	88,060	136,484	36,959	119,529	316,622	436,151
Total	\$ 240,267	\$ 567,760	\$ 808,027	\$ 210,584	\$ 910,848	\$ 1,121,431	\$ 639,390	\$ 566,156	\$ 1,205,546	\$ 488,009	\$ 1,578,250	\$ 2,044,763	\$ 3,623,013

Source: Broward County Water and Wastewater Services

Table A - 4.7
Water and Wastewater Services
Activity Based Costing Report for the Twelve Months Ended September 30, 2016
Wholesale Raw Water

Wholesale Raw Water	North System			South System			Total		
	Operations	Maintenance	Total O&M	Operations	Maintenance	Total O&M	Operations	Maintenance	Total O&M
Personal Services	\$ -	\$ 41,020	\$ 41,020	\$ -	\$ 53,430	\$ 53,430	\$ -	\$ 94,451	\$ 94,451
Operating Material	-	6,078	6,078	135,197	124,810	260,007	135,197	130,888	266,085
Other Material	-	-	-	-	-	-	-	-	-
Utilities-Other	-	-	-	-	-	-	-	-	-
Electric	94,835	-	94,835	297,572	-	297,572	392,407	-	392,407
Treat/Trans	-	-	-	-	-	-	-	-	-
Purchased Water	-	-	-	-	-	-	-	-	-
Rental/Leases	-	-	-	-	-	-	-	-	-
Motor Pool	-	-	-	-	-	-	-	-	-
Contract Service	-	3,052	3,052	9,871	6,044	15,915	9,871	9,096	18,966
Other	117,647	640	118,287	94,118	35,587	129,704	211,765	36,227	247,991
Educational Courses	-	-	-	-	-	-	-	-	-
Computer Maintenance	-	-	-	-	-	-	-	-	-
Travel	-	-	-	-	-	-	-	-	-
Other Chemicals	-	-	-	-	-	-	-	-	-
Chlorine	-	-	-	-	-	-	-	-	-
Lime	-	-	-	-	-	-	-	-	-
Subtotal	212,482	50,790	263,272	536,757	219,872	756,628	749,239	270,661	1,019,900
Operating CostReclass:									
One Call	1,837	-	1,837	1,837	-	1,837	3,675	-	3,675
Paint Shop	-	-	-	-	-	-	-	-	-
Heavy Equipment	-	4,036	4,036	-	-	-	-	4,036	4,036
Subtotal	1,837	4,036	5,874	1,837	-	1,837	3,675	4,036	7,711
Allocate:									
Section Admin.	-	-	-	-	-	-	-	-	-
Division Administration	17,411	4,162	21,573	43,982	18,017	61,999	61,393	22,178	83,572
Subtotal Direct Overhead	17,411	4,162	21,573	43,982	18,017	61,999	61,393	22,178	83,572
Total	\$ 231,731	\$ 58,988	\$ 290,719	\$ 582,576	\$ 237,888	\$ 820,465	\$ 814,307	\$ 296,876	\$ 1,111,183

Source: Broward County Water and Wastewater Services

Table A - 4.8
Water and Wastewater Services
Activity Based Costing Report for the Twelve Months Ended September 30, 2016
Wholesale Wastewater Treatment

Wholesale Wastewater Treatment	Solids			Liquids			Reuse			Total Plant			Other*	Total Treatment
	Operations	Maintenance	Total O&M	Operations	Maintenance	Total O&M	Operations	Maintenance	Total O&M	Operations	Maintenance	Total O&M		
Personal Services	\$ 3,461,090	\$ 271,385	\$ 3,732,475	\$ -	\$ 109,749	\$ 109,749	\$ -	\$ 49,969	\$ 49,969	\$ 3,461,090	\$ 431,103	\$ 3,892,193	\$ 1,044,571	\$ 4,936,764
Operating Material	948,192	156,925	1,105,117	-	31,061	31,061	43,382	32,355	75,737	991,574	220,340	1,211,915	17,547	1,229,461
Other Material	26,444	-	26,444	-	-	-	-	-	-	26,444	-	26,444	5,357	31,800
Utilities-Other	171,784	-	171,784	333	-	333	-	-	-	172,117	-	172,117	8,077	180,194
Electric	2,778,333	-	2,778,333	-	-	-	-	-	-	2,778,333	-	2,778,333	-	2,778,333
Treat/Trans	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Purchased Water	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Rental/Leases	13,385	-	13,385	-	-	-	-	-	-	13,385	-	13,385	628	14,012
Motor Pool	192,892	-	192,892	-	-	-	-	-	-	192,892	-	192,892	14,927	207,819
Contract Service	3,646,265	1,024,045	4,670,310	-	210,314	210,314	-	20,265	20,265	3,646,265	1,254,624	4,900,889	34,377	4,935,266
Other	70,354	24,371	94,725	-	8,774	8,774	-	3,354	3,354	70,354	36,499	106,853	33,707	140,560
Educational Courses	6,492	-	6,492	-	-	-	-	-	-	6,492	-	6,492	-	6,492
Computer Maintenance	-	-	-	-	-	-	-	-	-	-	-	-	1,032	1,032
Travel	2,250	-	2,250	-	-	-	-	-	-	2,250	-	2,250	-	2,250
Other Chemicals	1,040,780	-	1,040,780	-	-	-	-	-	-	1,040,780	-	1,040,780	-	1,040,780
Chlorine	57,038	-	57,038	-	-	-	-	-	-	57,038	-	57,038	-	57,038
Lime	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Subtotal	12,415,298	1,476,727	13,892,024	333	359,898	360,231	43,382	105,942	149,324	12,459,013	1,942,567	14,401,580	1,160,223	15,561,803
Operating Cost Reclass:														
One Call	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Paint Shop	-	21,489	21,489	-	-	-	-	-	-	-	21,489	21,489	-	21,489
Heavy Equipment	-	-	-	-	-	-	-	-	-	-	-	-	60,454	60,454
Subtotal	-	21,489	21,489	-	-	-	-	-	-	-	21,489	21,489	60,454	81,943
Allocate:														
Section Admin.	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Division Administration	1,017,323	121,005	1,138,328	27	29,490	29,518	3,555	8,681	12,236	1,020,905	159,176	1,180,081	95,070	1,275,151
Subtotal Direct Overhead	1,017,323	121,005	1,138,328	27	29,490	29,518	3,555	8,681	12,236	1,020,905	159,176	1,180,081	95,070	1,275,151
Total	\$ 13,432,621	\$ 1,619,220	\$ 15,051,841	\$ 361	\$ 389,389	\$ 389,749	\$ 46,937	\$ 114,623	\$ 161,560	\$ 13,479,918	\$ 2,123,232	\$ 15,603,150	\$ 1,315,747	\$ 16,918,897

Note: *Other - details provided in Table A-4.9
Source: Broward County Water and Wastewater Services

Table A - 4.9
Water and Wastewater Services
Activity Based Costing Report for the Twelve Months Ended September 30, 2016
Wholesale Wastewater Treatment - Other Detail

Wholesale Wastewater Treatment - Other	Reuse Distribution			Compliance and Monitoring &	Total Other
	Operations	Maintenance	Total O&M		
Personal Services	\$ -	\$ 1,654	\$ 1,654	\$ 1,042,918	\$ 1,044,571
Operating Material	-	-	-	17,547	17,547
Other Material	-	-	-	5,357	5,357
Utilities-Other	-	-	-	8,077	8,077
Electric	-	-	-	-	-
Treat/Trans	-	-	-	-	-
Purchased Water	-	-	-	-	-
Rental/Leases	-	-	-	628	628
Motor Pool	-	-	-	14,927	14,927
Contract Service	-	-	-	34,377	34,377
Other	-	205	205	33,503	33,707
Educational Courses	-	-	-	-	-
Computer Maintenance	-	-	-	1,032	1,032
Travel	-	-	-	-	-
Other Chemicals	-	-	-	-	-
Chlorine	-	-	-	-	-
Lime	-	-	-	-	-
Subtotal	-	1,858	1,858	1,158,365	1,160,223
Operating Cost Reclass:					
One Call	-	-	-	-	-
Paint Shop	-	-	-	-	-
Heavy Equipment	-	60,454	60,454	-	60,454
Subtotal	-	60,454	60,454	-	60,454
Allocate:					
Section Admin.	-	-	-	-	-
Division Administration	-	152	152	94,918	95,070
Subtotal Direct Overhead	-	152	152	94,918	95,070
Total	\$ -	\$ 62,465	\$ 62,465	\$ 1,253,283	\$ 1,315,747

Source: Broward County Water and Wastewater Services

Table A - 4.10
Water and Wastewater Services
Activity Based Costing Report for the Twelve Months Ended September 30, 2016
Wholesale Regional Transmission (Master Lift Stations)

Wholesale Regional Transmission (Master Lift Stations)	District Four		
	Operations	Maintenance	Total O&M
Personal Services	\$ 334,135	\$ 367,478	\$ 701,613
Operating Material	91,676	58,166	149,842
Other Material	524	-	524
Utilities-Other	170,263	-	170,263
Electric	519,454	-	519,454
Treat/Trans	-	-	-
Purchased Water	-	-	-
Rental/Leases	-	-	-
Motor Pool	-	43,621	43,621
Contract Service	1,158	101,033	102,191
Other	751	(92,241)	(91,490)
Educational Courses	-	-	-
Computer Maintenance	842	-	842
Travel	-	-	-
Other Chemicals	-	-	-
Chlorine	-	-	-
Lime	-	-	-
Subtotal	1,118,803	478,056	1,596,859
<u>Operating Cost Reclass:</u>			
One Call	11,725	-	11,725
Subtotal	11,725	-	11,725
<u>Allocate:</u>			
Section Admin.	-	-	-
Division Administration	91,676	39,172	130,848
Subtotal Direct Overhead	91,676	39,172	130,848
Total	\$ 1,222,204	\$ 517,228	\$ 1,739,432

Source: Broward County Water and Wastewater Services

**Table A - 4.11
Water and Wastewater Services
Activity Based Costing Report for the Twelve Months Ended September 30, 2016
General & Administrative**

	WWS Administration		Engineering Division (WWED)	Information Technology Division (WWITD)				Business Operations Division (BOD)				Total
	Administration	Project & Community Coordinator		Infrastructure Support	Application Development	Desktop Support	SCADA	Customer Service	Grounds & Warehouse Buildings	Warehouse Costs	Other Costs	
Personal Services	\$ 892,074	\$ -	\$ 1,646,886	\$ 916,135	\$ 901,893	\$ -	\$ -	\$ 2,275,560	\$ 348,424	\$ 299,002	\$ 943,551	\$ 8,223,526
Operating Material	575	-	22,963	248	-	-	-	429,259	58,066	19,082	378	530,570
Other Material	16,427	-	30,071	535,671	516	-	-	401,454	612	12,648	7,024	1,004,424
Utilities-Other	877	-	1,493	261,637	-	-	-	338	126,756	-	-	391,102
Electric	-	-	-	-	-	-	-	-	221,631	-	-	221,631
Treat/Trans	-	-	-	-	-	-	-	-	-	-	-	-
Purchased Water	-	-	-	-	-	-	-	-	-	-	-	-
Rental/Leases	127	-	2,937	-	-	-	-	27,130	1,840	-	4,500	36,533
Motor Pool	-	-	46,548	3,517	-	-	-	58,701	16,235	-	-	125,001
Contract Service	2,490	-	164,954	383,022	337,223	-	-	987,693	273,356	10,211	87,647	2,246,596
Other	(33,066)	-	(68,882)	364	30	-	-	528,141	9,011	28,293	1,217	465,109
County Services	4,027,350	-	-	-	-	-	-	-	-	-	-	4,027,350
Educational Courses	1,001	-	17,696	34,542	29,410	-	-	3,128	-	-	949	86,726
Computer Maintenance	-	-	-	67,671	-	-	-	-	-	-	-	67,671
Purchased Insurance	1,391,397	-	-	-	-	-	-	-	-	-	-	1,391,397
Travel	2,703	-	5,443	805	203	-	-	-	-	-	19	9,172
Operating Costs Reclass	428	-	-	-	-	-	-	-	-	-	-	428
Chlorine	-	-	-	-	-	-	-	-	-	-	-	-
Lime	-	-	-	-	-	-	-	-	-	-	-	-
Subtotal	6,302,383	-	1,870,109	2,203,612	1,269,275	-	-	4,711,404	1,055,932	369,237	1,045,285	18,827,238
Allocate:												
Division Administration				429,662	247,484	-	-	241,949	54,226	18,962	53,679	1,045,963
Total	6,302,383	-	1,870,109	2,633,275	1,516,759	-	-	4,953,353	1,110,158	388,199	1,098,965	19,873,201
Total to be Allocated	6,302,383	-	1,870,109	2,633,275	1,516,759	-	-	4,953,353	1,110,158	388,199	1,098,965	19,873,201
	(6,302,383)	-	(1,870,109)	(2,633,275)	(1,516,759)	-	-	(4,953,353)	(1,110,158)	(388,199)	(1,098,965)	(19,873,201)
Balance After Allocation	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -

Source: Broward County Water and Wastewater Services

Table A - 5
Water and Wastewater Services
Activity Based Costing for the Twelve Months Ended September 30, 2016
Disaggregation of Operating & Maintenance Expenses

Operation and Maintenance Expenses:	Retail Water	Retail Wastewater	Wholesale Raw Water	Wholesale Treatment	Wholesale Transmission	WWS Admin, WWITD & BOD	Engineering	Total
Personal Services	\$ 4,772,299	\$ 2,170,176	\$ 94,451	\$ 4,936,764	\$ 701,613	\$ 6,576,640	\$ 1,646,886	\$ 20,898,829
Utility Services	1,196,290	4,549,692	392,407	2,958,527	689,717	611,240	1,493	10,399,367
Material & Supplies	894,018	1,206,274	266,085	1,261,262	150,366	1,481,960	53,035	5,312,999
Chemicals	2,086,325	-	-	1,097,818	-	-	-	3,184,143
Motor Pool	260,788	196,561	-	207,819	43,621	78,453	46,548	833,789
Contractual Services	1,201,110	196,809	18,966	4,935,266	102,191	2,081,642	164,954	8,700,939
Purchased Insurance	-	-	-	-	-	1,391,397	-	1,391,397
County Administrative Service	-	-	-	-	-	4,027,350	-	4,027,350
Purchased Water	6,270,091	-	-	-	-	-	-	6,270,091
Rental & Leases	6,447	13,370	-	14,012	-	33,596	2,937	70,362
Travel	-	-	-	2,250	-	3,729	5,443	11,422
Other	414,084	77,568	247,991	140,560	(91,490)	534,419	(68,882)	1,254,251
Educational Courses	8,503	-	-	6,492	-	69,030	17,696	101,721
Computer Maintenance	-	5,304	-	1,032	842	67,671	-	74,849
IRR & Expensed Projects	-	-	-	-	-	-	-	-
Subtotal O&M Expenses	17,109,956	8,415,754	1,019,900	15,561,803	1,596,859	16,957,129	1,870,109	62,531,511
Operating Overhead:								
Section Administration	-	-	-	-	-	-	-	-
Division Administration	1,402,009	689,596	83,572	1,275,151	130,848	1,045,963	-	4,627,140
One Call	124,596	96,422	3,675	-	11,725	-	-	236,417
Paint Shop	61,601	60,168	-	21,489	-	-	-	143,257
Heavy Equipment	218,168	114,848	4,036	60,454	-	-	-	397,507
Generators	-	126,458	-	-	-	-	-	126,458
Lab	527,532	2,748	21,980	805,035	16,485	-	-	1,373,781
Subtotal Operating O/H	2,333,905	1,090,240	113,264	2,162,130	159,058	1,045,963	-	6,904,560
Total Expenses Before Allocation	19,443,862	9,505,993	1,133,164	17,723,933	1,755,918	18,003,092	1,870,109	69,436,070
Allocation:								
Customer Service	2,295,633	2,013,785	49,534	495,335	99,067	(4,953,353)	-	-
WWS Administration	5,853,161	2,861,577	341,115	5,335,413	528,582	(13,049,739)	(1,870,109)	-
Subtotal Allocation	8,148,794	4,875,362	390,648	5,830,749	627,649	(18,003,092)	(1,870,109)	-
Total Operating Expenses	27,592,656	14,381,355	1,523,812	23,554,681	2,383,566	-	-	69,436,070
Retail Share of Regional Cost	440,231	6,254,640	-	-	-	-	-	6,694,871
Total Cost	\$ 28,032,887	\$ 20,635,995	\$ 1,523,812	\$ 23,554,681	\$ 2,383,566	\$ -	\$ -	\$ 76,130,941

Source: Broward County Water and Wastewater Services

**Table A - 6
Water and Wastewater Services
Operating and Maintenance Expense for Large User Rate
Fiscal Year 2016 and 2017
\$ per 1000 Gallons**

	Fiscal 2016		Fiscal 2017	
	Treatment & Disposal	Transmission	Treatment & Disposal	Transmission
Total Direct Operating Costs	18,450,240	2,257,870	19,294,570	2,556,389
Allocated A & G Costs	7,466,520	882,540	6,442,190	825,530
Projected Annual Average Daily Flow (MGD)	69.3	53.4	69.3	53.4
Operating and Maintenance Rate Per 1,000 Gallons	0.861	0.151	0.855	0.162

NOTE: (1) This charge does not include costs of debt service which are fixed monthly charges to Large Users or IRR.

Source: Broward County Water and Wastewater Services

**Table A - 7
Water and Wastewater Services
Historical and Budgeted Large Users Operating & Maintenance Rates**

Period Large User Charge in Effect	Treatment & Disposal Rate Per 1,000 Gallons	Transmission Rate Per 1,000 Gallons	Combined Rate Per 1,000 Gallons
Fiscal 2008	\$0.70	\$0.14	\$0.84
Fiscal 2009	\$0.68	\$0.14	\$0.81
Fiscal 2010	\$0.80	\$0.18	\$0.97
Fiscal 2011	\$0.89	\$0.21	\$1.10
Fiscal 2012	\$0.84	\$0.19	\$1.03
Fiscal 2013	\$0.78	\$0.20	\$0.98
Fiscal 2014	\$0.75	\$0.16	\$0.91
Fiscal 2015	\$0.84	\$0.16	\$1.00
Fiscal 2016	\$0.86	\$0.15	\$1.01
Fiscal 2017	\$0.86	\$0.16	\$1.02

Source: Broward County Water and Wastewater Services

Table A - 8
Water and Wastewater Services
Water & Wastewater Fund
Statement of Net Position
September 30, 2012 - 2016 (in Thousands)

	FY 2016	FY 2015	FY 2014	FY 2013	FY 2012
Assets					
Current Assets:					
Unrestricted Assets:					
Cash & Cash Equivalents	\$ 7,627	\$ 13,305	\$ 27,881	\$ 14,441	\$ 4,531
Investments	80,498	85,915	56,591	39,703	32,234
Receivable (Net)	16,698	18,235	14,873	13,460	12,867
Due from Other Government	-	18	-	-	-
Inventory	8,845	8,694	8,511	8,070	7,557
Prepaid Items	427	1,337	1,568	2,051	1,391
Total Current Unrestricted Assets	114,095	127,504	109,424	77,725	58,580
Restricted Assets:					
Current Restricted Assets	34,254	40,717	45,757	39,144	39,280
Total Current Assets	148,349	168,221	155,181	116,869	97,860
Noncurrent Assets:					
Noncurrent Restricted Assets	43,359	42,952	81,043	122,932	148,407
Capital Assets:					
Utility Plant in Service	1,194,686	1,143,447	1,124,870	1,102,690	1,035,917
Land	4,936	4,936	4,936	4,904	4,904
Equipment	31,401	28,688	27,270	26,710	24,509
Construction in Progress	111,473	101,079	63,231	40,268	70,212
Total Capital Assets	1,342,496	1,278,150	1,220,307	1,174,572	1,135,542
Less Accumulated Depreciation	(553,472)	(520,093)	(485,842)	(452,215)	(418,484)
Total Capital Assets, Net	789,024	758,057	734,465	722,357	717,058
Total Noncurrent Assets	832,383	801,009	815,508	845,289	865,465
Total Assets	980,732	969,230	970,689	962,158	963,325
Deferred Outflows of Resources	34,002	31,639	13,445	13,311	14,798
LIABILITIES					
Current Liabilities:					
Payable from Unrestricted Assets:					
Accounts Payable and Accrued Liabilities	13,991	6,827	3,547	3,216	4,485
Due to Other County Funds	404	-	-	-	-
Due to Other Governments	5,571	4,032	3,091	3,258	2,425
Compensated Absences	1,685	1,744	1,759	1,763	1,781
Total Current Liabilities Payable from Unrestricted Assets	21,651	12,603	8,397	8,237	8,691
Payable from Restricted Assets					
Accounts Payable and Accrued Liabilities	22	9,442	11,257	5,013	8,436
Accrued Interest Payable	10,999	8,352	11,897	12,068	11,914
Revenue Bonds Payable	14,080	13,875	13,705	13,360	10,440
Customer Deposits	9,153	9,048	8,898	8,703	8,490
Total Current Liabilities Payable from Restricted Assets	34,254	40,717	45,757	39,144	39,280
Total Current Liabilities	55,905	53,320	54,154	47,381	47,971
Noncurrent Liabilities:					
Revenue Bonds Payable, Net of Discount & Premiums	521,843	539,373	535,928	551,826	567,379
Compensated Absences	1,914	1,815	1,865	1,822	2,220
Other Post Employment Benefits	830	762	690	617	538
Net Pension Liabilities	21,315	14,067	9,798	-	-
Total Noncurrent Liabilities	545,902	556,017	548,281	554,265	570,137
Total Liabilities	601,807	609,337	602,435	601,646	618,108
Deferred Inflows of Resources	528	1,988	5,898	-	-
Net Position					
Net Investment in Capital Assets	316,526	270,706	271,569	287,484	259,115
Restricted For:					
Debt Service Reserve	14,080	13,875	13,705	13,360	47,939
Renewal, Replacement, and Improvement	6,607	6,200	6,130	5,930	5,830
Unrestricted	75,186	98,763	84,397	67,049	47,131
Total Net Position	\$ 412,399	\$ 389,544	\$ 375,801	\$ 373,823	\$ 360,015

Table A - 9
Water and Wastewater Services
Water & Wastewater Fund
Statement of Revenue, Expense, and Changes in Net Position
September 30, 2012 - 2016 (in Thousands)

	FY 2016	FY 2015	FY 2014	FY 2013	FY 2012
Operating Revenue:					
Retail Services:					
Water	\$ 47,249	\$ 46,947	\$ 44,508	\$ 43,114	\$ 45,642
Wastewater	39,968	38,999	35,740	34,485	33,476
Septic Charges	3,054	2,743	2,232	1,977	1,545
Other Services	6,953	7,473	6,932	6,807	4,070
	97,224	96,162	89,412	86,383	84,733
Wholesale Services:					
Water	857	849	945	876	701
Wastewater	33,868	34,417	32,413	32,957	31,228
Total Operating Revenue	131,949	131,428	122,770	120,216	116,662
Operating Expenses:					
Personal Services	27,066	24,405	23,081	23,208	23,108
Utilities Services	16,424	15,712	14,927	15,338	15,400
Chemicals	3,184	3,225	3,281	3,086	2,784
County Services	3,827	4,052	3,339	3,236	3,334
Material and Supplies	5,773	5,628	4,923	5,635	4,432
Motor Pool	1,161	1,322	1,245	1,449	1,520
Contractual Services	9,933	10,294	8,423	8,203	8,420
Other	2,749	2,247	2,583	3,220	5,075
Total Operating Expense Before Depreciation	70,117	66,885	61,802	63,375	64,073
Operating Income Before Depreciation	61,832	64,543	60,968	56,841	52,589
Depreciation Expense	34,328	34,962	34,730	33,947	31,039
Operating Income	27,504	29,581	26,238	22,894	21,550
Non-Operating Revenue (Expense):					
Grants	-	18	11	20	-
Interest Income	444	351	394	353	793
Interest Expense, Net of Capitalized Interest	(14,052)	(16,385)	(16,964)	(17,235)	(18,557)
Other Income	505	469	941	1,938	1,053
Bond Issuance Costs	-	(1,506)	-	-	(2,306)
Discontinued Project Costs	(185)	(1,344)	(499)	(179)	-
Other Expense	(23)	(36)	(32)	(24)	(11)
Gain/(Loss) on Disposal of Assets	93	71	25	4	22
Total Non-Operating (Expense)	(13,218)	(18,362)	(16,124)	(15,123)	(19,006)
Income before Capital Contributions and Transfers	14,286	11,219	10,114	7,771	2,544
Capital Contributions	8,569	8,046	6,600	6,037	4,768
Transfer Out	-	(5,522)	-	-	-
Change in Net Position	22,855	13,743	16,714	13,808	7,312
Total Net Position - Beginning, as Restated (1)	389,544	375,801	359,087	360,015	352,703
Total Net Position - Ending	\$ 412,399	\$ 389,544	\$ 375,801	\$ 373,823	\$ 360,015

(1) The FY 2014 beginning net position in the table above was restated due to the implementation of GASB Statement No. 68, *Accounting and Financial Reporting for Pensions - 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*.

The FY 2013 beginning net position in the table above was restated due to the implementation of GASB Statement No. 65, *Items Previously Reported as Assets and Liabilities*.

Table A - 10
Water and Wastewater Services
Water & Wastewater Fund
Statement of Cash Flows
September 30, 2012 - 2016 (in Thousands)

	FY 2016	FY 2015	FY 2014	FY 2013	FY 2012
Cash Flows from Operating Activities:					
Cash Received from Customers	\$ 133,830	\$ 128,787	\$ 121,370	\$ 120,655	\$ 117,325
Cash Payments to Suppliers for Goods and Services	(40,726)	(43,305)	(38,988)	(42,004)	(41,486)
Cash Payments to Employees for Services	(26,662)	(24,838)	(23,439)	(23,503)	(23,410)
Other Cash Received (Paid)	505	469	941	980	1,053
Net Cash Provided by Operating Activities	66,947	61,113	59,884	56,128	53,482
Cash Flows from Noncapital Financing Activities:					
Transfers Out	-	(5,522)	-	-	-
Cash from Noncapital Grants	16	-	11	20	-
Net Cash Provided by Noncapital Financing Activities	16	(5,522)	11	20	-
Cash Flows from Capital and Related Financing Activities:					
Proceeds from Revenue Bonds	-	653	-	-	157,651
Payment of Refunded Bond Escrow Agent	-	(748)	-	-	-
Payment of Bond Issuance Costs	(85)	(546)	-	-	(110)
Acquisition and Construction of Capital Assets	(55,540)	(48,355)	(33,708)	(35,632)	(43,827)
Proceeds from Internal Loan	-	-	-	-	3,513
Payments on Internal Loan	-	-	-	-	(24,869)
Interest Paid on Internal Loan	-	-	-	-	(175)
Proceeds from Sale of Capital Assets	94	71	69	12	22
Capital Recovery Fees	2,394	3,120	4,093	3,680	636
Capital Surcharges Contributed from Other Governments	1,874	1,743	1,662	1,633	1,709
Principal Paid on Revenue Bonds	(13,875)	(13,705)	(13,360)	(10,440)	(10,110)
Interest Paid on Revenue Bonds	(19,352)	(26,892)	(23,965)	(23,982)	(19,724)
Other Costs Paid	(23)	(36)	(43)	(18)	(11)
Net Cash Provided by (Used for) Capital and Related Financing Activities	(84,513)	(84,695)	(65,252)	(64,747)	64,705
Cash Flows from Investing Activities:					
Purchase of Investment Securities	(225,562)	(235,835)	(166,287)	(130,683)	(70,241)
Proceeds from Sale and Maturities of Investment Securities	239,984	232,437	150,090	123,945	49,500
Interest on Investments	399	721	409	367	793
Net Cash Provided by (Used for) Investing Activities	14,821	(2,677)	(15,788)	(6,371)	(19,948)
Net Increase (Decrease) In Cash & Cash Equivalents	(2,729)	(31,781)	(21,145)	(14,970)	98,239
Cash & Cash Equivalents, Beginning	81,751	113,532	134,677	149,647	51,408
Cash & Cash Equivalents, Ending	\$ 79,022	\$ 81,751	\$ 113,532	\$ 134,677	\$ 149,647
Cash and Cash Equivalents - Unrestricted Assets	\$ 7,627	\$ 13,305	\$ 27,881	\$ 14,441	\$ 4,531
Cash and Cash Equivalents - Restricted Assets	71,395	68,446	85,651	120,236	145,116
Total Cash & Cash Equivalents	\$ 79,022	\$ 81,751	\$ 113,532	\$ 134,677	\$ 149,647
Reconciliation of Operating Income to Net Cash Provided by Operating Activities:					
Operating Income	\$ 27,504	\$ 29,581	\$ 26,238	\$ 22,894	\$ 21,550
Adjustments to Reconcile Operating Income to Net Cash Provided by (Used For) Operating Activities:					
Depreciation	34,328	34,962	34,730	33,947	31,039
Miscellaneous Non-Operating Income (Expense)	505	469	941	1,030	1,053
Decrease (Increase) in Assets and Deferred Outflows of Resources:					
Accounts Receivable	1,590	(3,732)	(1,428)	(607)	304
Inventory	(151)	(183)	(441)	(513)	(436)
Prepaid	14	(223)	197	131	(687)
Items	(4,835)	(873)	(1,312)	-	-
Deferred Outflows on Pensions					
Increase (Decrease) in Liabilities and Deferred Inflows of Resources:					
Accounts Payable	1,121	(419)	(23)	(1,455)	601
Accrued Liabilities	(659)	74	191	(8)	(87)
Due to Other Governments	1,529	941	(167)	833	248
Customer Deposits	105	150	195	213	111
Compensated Absences	40	(65)	39	(416)	(282)
Other Post Employment	68	72	73	79	68
Benefits Net Pension Liability	7,248	4,269	(5,247)	-	-
Deferred Inflows on Pensions	(1,460)	(3,910)	5,898	-	-
Total Adjustments	39,443	31,532	33,646	33,234	31,932
Net Cash Provided by Operating Activities	\$ 66,947	\$ 61,113	\$ 59,884	\$ 56,128	\$ 53,482

**Table A-11
Water and Wastewater Services
Water and Wastewater Retail Statistics (1,000's gallons)
As of September 30, 2016**

Water	Produced	Purchased	Billed	System Uses & Losses
District 1	2,670,347	6,000	2,440,646	235,701
District 2	4,497,983	-	2,320,665	-
District 2 - Resale	-	-	1,736,453	440,865
District 3A	-	1,152,773	948,856	203,917
District 3BC	-	1,243,147	1,055,556	187,591
Total	7,168,330	2,401,920	8,502,176	1,068,074

Wastewater	Billed	Wastewater Transmission to Plant LU Adj
District 1	2,309,152	2,533,517
District 2	2,057,563	2,598,023
District 3A	650,921	666,833
District 3BC	323,446	338,112
Total	5,341,083	6,136,485

* Based upon water billed to wastewater customers. Residential billing capped at 15,000 gallons.

Source: Broward County Water and Wastewater Services

Table A-12			
Water and Wastewater Services			
WWS Capital Improvement Program Budget History and Projections			
FY	Capital Budget	Debt Financed	Cash Financed
2005	88,852,571	22,792,255	40,999,372
2006	76,378,590	34,207,745	24,427,103
2007	78,678,510	38,775,056	13,951,976
2008	84,191,260	34,080,229	14,277,285
2009	70,447,060	34,136,740	9,585,084
2010	39,665,540	44,291,612	12,341,221
2011	81,438,970	51,020,406	11,397,849
2012	34,695,650	28,718,290	18,825,564
2013	85,366,450	26,486,078	3,291,213
2014	74,726,900	31,501,547	2,718,458
2015	142,412,090	29,226,894	19,108,000
2016	86,315,190	18,035,392	55,540,000
2017	168,680,940	139,351,870	29,329,070
2018	86,902,920	54,800,000	32,102,920
2019	115,126,030	77,000,000	38,126,030
2020	24,067,560	9,000,000	15,067,560
2021	11,249,580	-	11,249,580

Source: Broward County Water and Wastewater Services

**Table A-13
Water and Wastewater Services
Historical Capital Recovery Fees Collected**

Fiscal Year Ended 9/30	Water	Wastewater	Total
2007	2,825,876	1,068,021	3,893,897
2008	914,606	942,749	1,857,355
2009	-220,999	-83,229	-304,228
2010	75,862	198,779	274,641
2011	287,404	374,258	661,661
2012	35,454	600,408	635,862
2013	2,014,861	1,665,189	3,680,050
2014	1,838,187	2,255,302	4,093,489
2015	1,498,657	1,621,728	3,120,385
2016	1,440,573	953,212	2,393,785

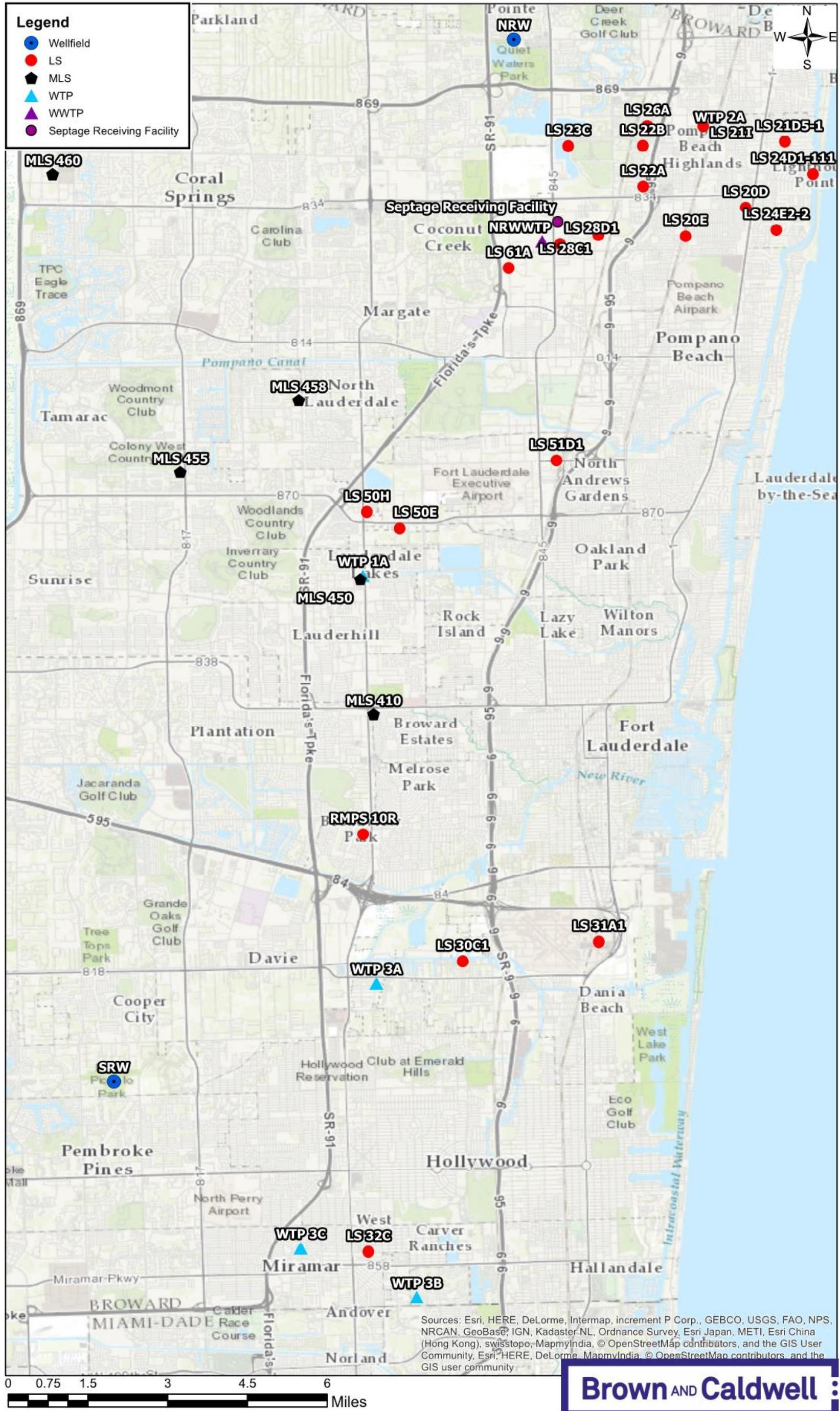
Source: Broward County Water and Wastewater Services

Table A-14					
Water and Wastewater Services					
History of Large User Wastewater Rates					
Fiscal Year Ended 9/30	O&M (Per 1,000 gallons)		Debt Service (Per MGD)		IR&R Surcharge
	Treatment	Transmission	Treatment	Transmission	
2017	0.86	0.16	15,924.67	5,301.99	5.0%
2016	0.86	0.15	15,922.79	5,302.12	5.0%
2015	0.84	0.16	16,155.30	5,475.88	5.0%
2014	0.75	0.16	16,153.27	5,476.00	5.0%
2013	0.78	0.20	16,165.78	5,439.64	5.0%
2012	0.84	0.19	12,562.44	5,155.32	5.0%
2011	0.89	0.21	12,849.17	5,278.69	5.0%
2010	0.80	0.18	14,251.52	6,139.48	5.0%
2009	0.68	0.14	11,253.00	3,840.90	5.0%
2008	0.69	0.14	10,096.74	3,641.36	5.0%
2007	0.69	0.14	10,119.20	3,641.27	2.5%

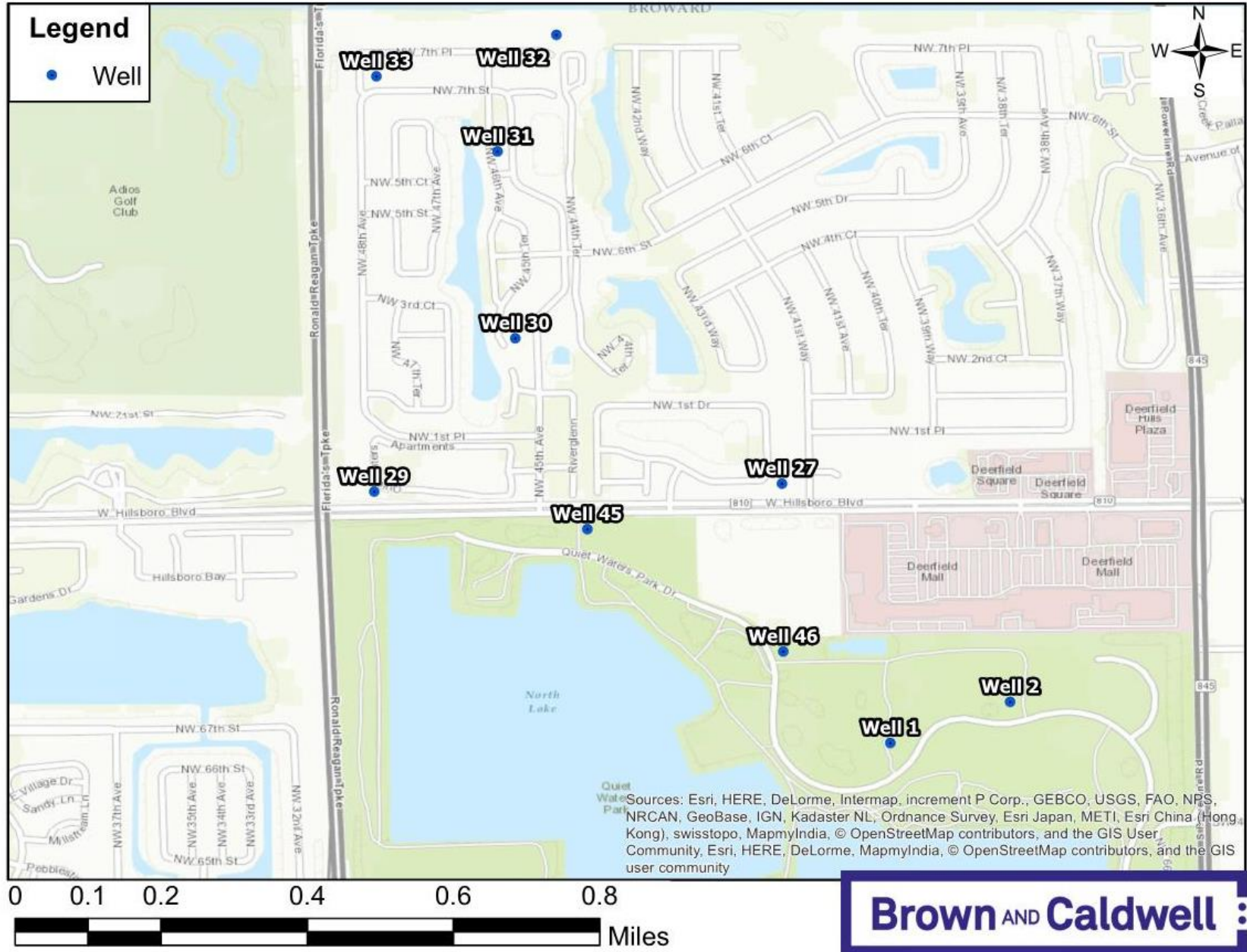
Source: Broward County Water and Wastewater Services

Appendix B

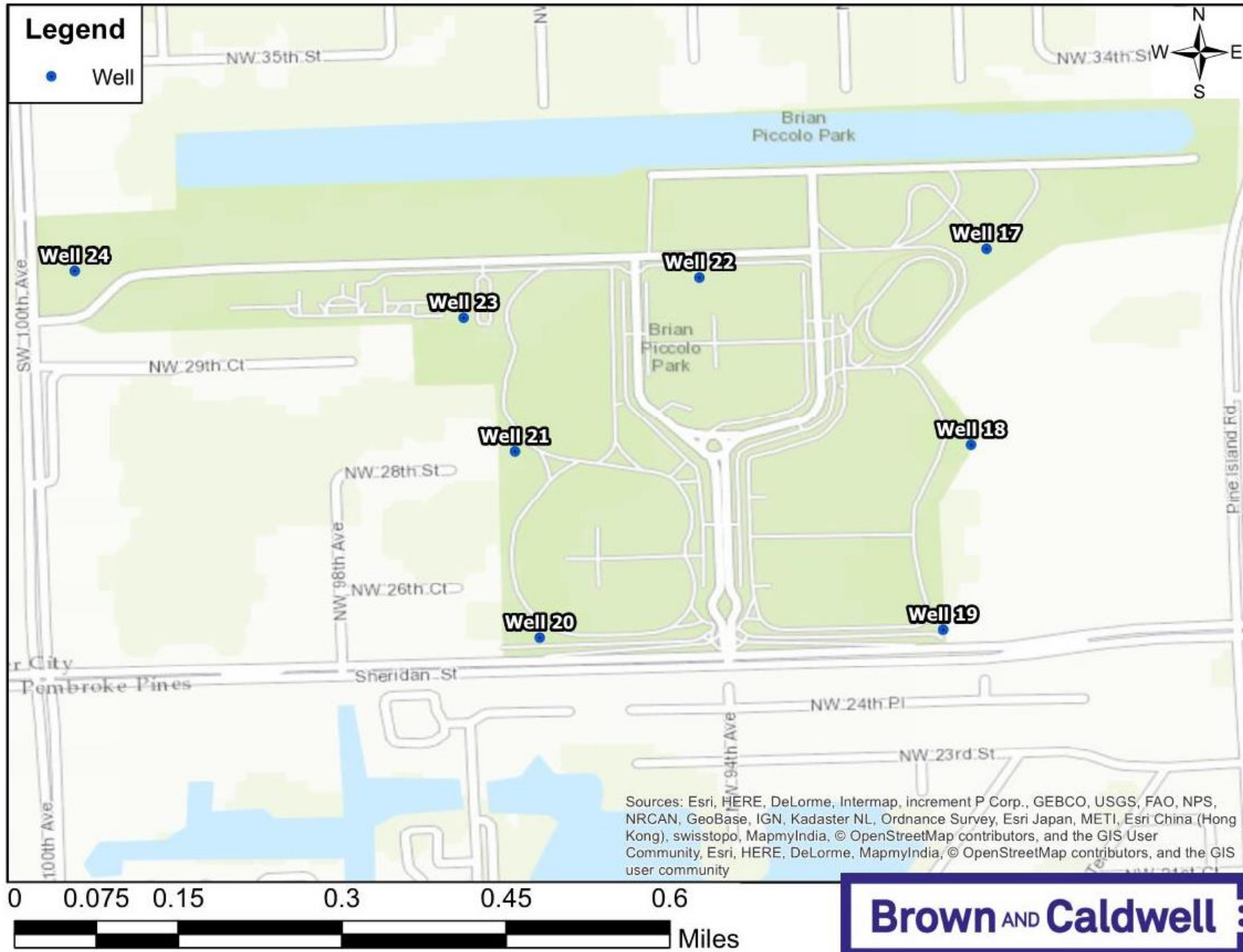
Visual Inspection Overview Map



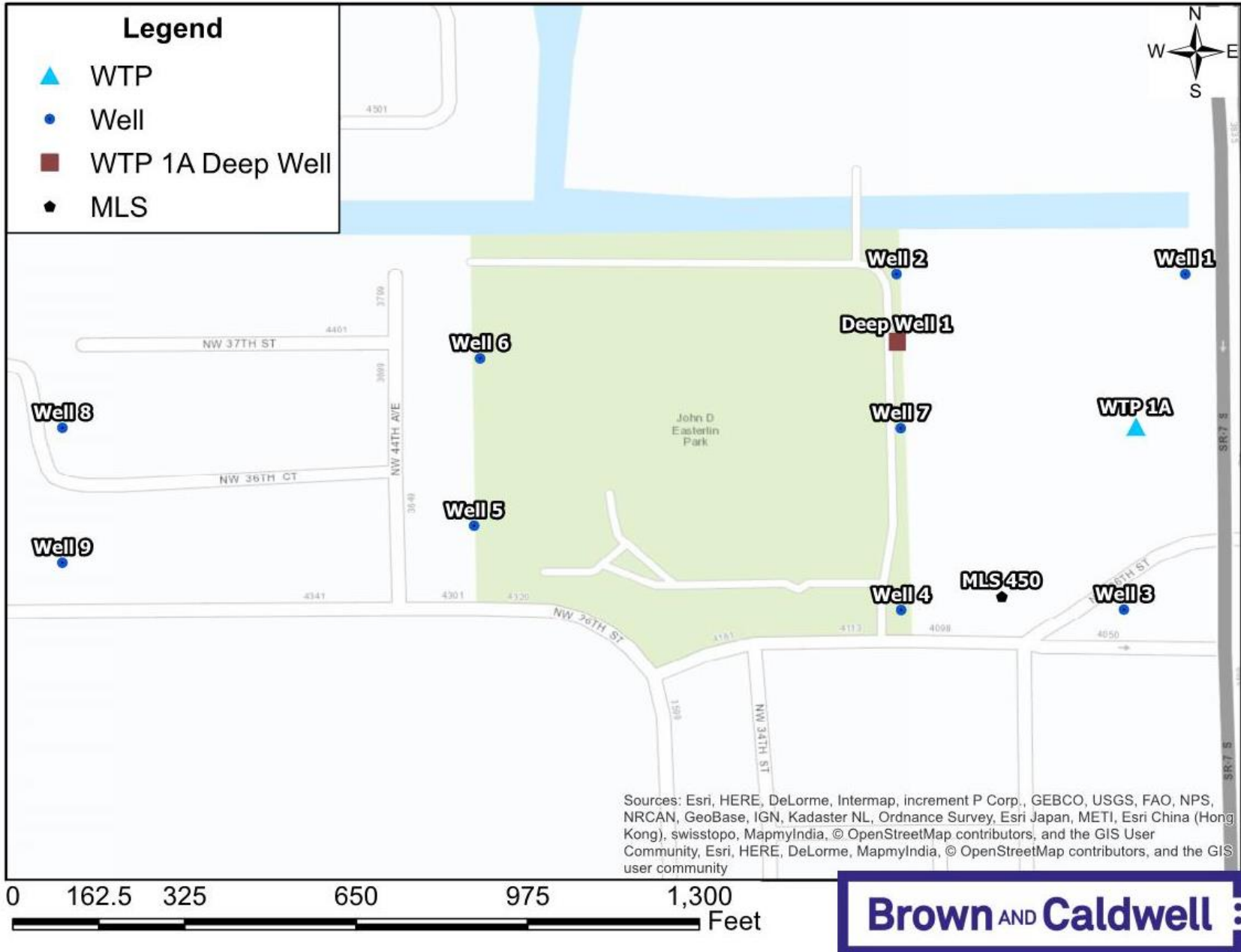
North Regional Wellfield



South Regional Wellfield



District 1



District 2

