2022

Roswell Water Utility Master Plan

City of Roswell Water Utility Division

January 2022

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Patti Weathersbee
Administrative Assistant

Andy Hamby
Assistant Water Plant Operations Manager

Brian Watson, PE
Support Services Manager

Rahel Turner
Financial Services Manager

Jessie Cash
Water Plant Operations Manager

Lacy Smith-Castillo
Accounts Payable/Revenue Manager

Lynn Williams
Interim-Budget Manager

Chris Boyd
Roswell Water Utility Manager

Sharon Izzo, PE
Deputy Director of Environmental/Public Works

Hill Baughman
Internal Consultant

Erica Koh, PE
Sr. Environmental Engineer

Dan Skalsky, PE
Director of Environmental/Public Works

Nancy Velez
GIS Analyst

Finance Department

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ACRONYMS/ABBREVIATIONS

%	Percent
“	Inches
AC	Asbestos Concrete
AMI	Automated Metering Infrastructure
ARC	Atlanta Regional Commission
AWIA	America’s Water Infrastructure Act
AWWA	American Water Works Association
CCR	Consumer Confidence Report
CEU	Continuing Education Unit
CFS	Cubic Feet Per Second
CI	Cast Iron
CIP	Capital Improvement Plan
CM	Corrective Maintenance
CMMS	Computerized Maintenance Management System
CPI	Consumer Price Index
CPR	Cardiopulmonary Resuscitation
DI	Ductile Iron
FEMA	Federal Emergency Management Agency
FY	Fiscal Year
GA EPD	Georgia Environmental Protection Division
GAWP	Georgia Association of Water Professionals
GAWWA	Georgia American Water Works Association
GEFA	Georgia Environmental Finance Authority
GIS	Geographic Information System
GPCPD	Gallons per Capita per Day
GRWA	Georgia Rural Waters Association
GS	Galvanized Steel
GWSA	Georgia Water Stewardship Act
HAA	Haloacetic Acid
HDPE	High Density Polyethylene
KPI	Key Performance Indicators
MCL	Maximum Contaminant Level
MCLG	Maximum Contaminant Level Goal
MG	Million Gallons
MGD	Million Gallons per Day

MNGWPD	Metropolitan North Georgia Water Planning District
MRDL	Maximum Residual Disinfectant Level
MRDLG	Maximum Residual Disinfectant Level Goal
NIMS	National Incident Management System
PAC	Powdered Activated Carbon
PFAS	Polyfluoroalkyl Substances
PM	Preventative Maintenance
Ppb	Parts per Billion
PSI	Pounds per Square Inch
PVC	Polyvinyl Chloride
RDOT	Roswell Department of Transportation
SCADA	Supervisory Control and Data Acquisition System
SDWA	Safe Drinking Water Act
THM	Trihalomethane
TOC	Total Organic Carbon
UCMR	Unregulated Contaminant Monitoring Rule
US EPA	United States Environmental Protection Agency
USGS	United States Geological Survey
VFD	Variable Frequency Drive
VSAT	Vulnerability Self-Assessment Tool
WTP	Water Treatment Plant

1.0 INTRODUCTION

Water has been a central focus for the City of Roswell (City) dating back to 1838, when Roswell King began work on the first cotton mill. Roswell's proximity to Big Creek, also known as Vickery Creek, and the Chattahoochee River has shaped the City and its progress. The City places a very high emphasis on water conservation and was designated as a WaterFirst community in 2009 for excellence in water stewardship. WaterFirst is a voluntary partnership between local governments, state agencies, and other organizations working together to enhance quality of life through the wise management and protection of water resources. It is vital that the City continues to plan for the future of its water supply to achieve the City's mission – To provide our citizens with an exceptional quality of life by delivering responsive high-quality service in a fiscally sound manner to ensure Roswell continues to be an evolving family-friendly and vibrant community. Implementation of the Roswell Water Utility Master Plan (Master Plan) is a key objective to the City's Strategic Plan's goal for Outstanding City Services and indirectly helps the City meet the following Strategic Plan goals: i) Outstanding Collaboration, Community Engagement, and Customer Service; ii) Economic Vitality and Sustainability; and iii) Exceptional Quality of Life.

The objective of a water utility master plan is to provide a roadmap, with recommendations, that will guide staff and decision-makers in maintaining and enhancing the system to meet future needs. The first Master Plan was completed in 2006 and has since been updated in 2010 and 2016. Since the 2016 Master Plan, the Roswell Water Utility has been internally preparing and managing the Master Plan process. Over the past five years, the Roswell Water Utility completed 14 of the 19 2016 Master Plan recommendations and 3 of the recommendations are currently in the process of being completed. **Table 1** provides a summary of the 2016 Master Plan recommendations and the actions taken to complete each recommendation. Additional information on the actions taken can be found within the text of this Master Plan.

The goals of this Master Plan are to: i) provide Roswell's growing community with high quality water to meet current and future water demands; ii) enhance self-sufficiency and limit dependence on adjacent water systems; iii) maintain financial stability; and iv) provide outstanding customer service.

This Master Plan is organized into eight sections that include:

I. Introduction
II. System Overview
III. Water Production
IV. Water Distribution
V. Regulatory Requirements
VI. Climate Resiliency
VII. Financial Analysis
VIII. Recommendations

Table 1. Summary and Status of 2016 Master Plan Recommendations

			Plant Production		
1. Optimize Water Production	FY17/Ongoing	Met goal of updating operations to optimize production	FY19: $24,840 FY20: $24,586 FY20: $27,564 (Design & Construction) FY21: $8,254	FY19: Energy Optimization FY20: Chemical Optimization FY20: Fluoride Room Upgrade FY21: Variable Frequency Drive Assessment	Section 3.3.1.1 Section 3.3.1.2 Section 3.4.1 Section 3.4.2
2. Maintain Asset Management Program	FY18	Yes	FY18: $31,050	FY18: HiperWeb CMMS is utilized for plant and distribution asset management	Section 3.9.2 Section 8.1.2
3. Investigate Groundwater System Expansion	On Hold	Yes		FY18: Had discussions with Chattahoochee Nature Center regarding installing test wells. City will not be pursuing groundwater system expansion within the next five years	Section 3.5.2
4. Replace Elevated Water Tank	FY27	No		Proposed schedule indicated this recommendation would not be completed until FY27.	Section 3.2.3 Section 8.1.3
			Distribution		
5. Replace Water Lines	Ongoing	Met goal of completing projects utilizing $400,000 annually	$400,000 annually FY18: $1,231,498.32 FY19: $393,956.00 FY20: $305,437.59 FY21: $326,451.00	FY18: Completed 14 projects FY19: Completed 11 projects FY20: Completed 4 projects FY21: Completed 4 projects	Section 4.2 Section 8.2.1 Appendix D
6. Test and Replace Meters	Ongoing	Met goal of testing up to 500 meters with annual budget of $75,000	Budgeted $75,000 annually starting in FY18	• FY18: Meter replacement program restarted to replace up to 500 meters annually • 2018: Purchased a new meter Test Bench • 2020: Contracted with Reed and Shows to test all commercial large meters • 2021: Expanded Reed & Shows contract to test 10% of 1.5“ through 2” meters	Section 5.2.2.3 Section 8.2.2
7. Detect and Fix Leaks	Ongoing	Met goal of surveying 1/3 of system each year		• Surveyed entire system in a 3-year span • 2018: 3rd party contractor surveyed entire system and found seven leaks • 2020: Installed eight M&H i-Hydrants	Section 5.2.2.2

				• 2021: Installed an additional 92 i-Hydrants	
8. Evaluate Unidirectional Hydrant Flushing	FY19	In progress	Being conducted internally	Staff is in the process of updating hydraulic model. The updated model will be used to evaluate unidirectional flushing and develop an internal program.	Section 4.3.4 Section 8.2.4
9. Maintain Hydraulic Model	Ongoing	In progress	Being conducted internally	Staff is in the process of completing a major update to the hydraulic model to include all pipe updates completed since 2016	Section 4.3 Section 8.2.5
10. Evaluate Future Water System Growth	Ongoing	In progress	Being conducted internally	Updated hydraulic model will be utilized to calculate pressures and fire flow demands to evaluate potential to transfer Fulton County customers located within the Roswell Water District to Roswell water	Section 2.6 Section 4.3 Section 8.2.6
11. Acquire CMMS	FY17/18	Yes	FY18: $31,050	FY18: Use HiperWeb CMMS for work orders, asset management, and inventory control; previously using excel spreadsheets	Section 4.5.1
12. Initiate Hydrant Security	FY18	No		This will be completed in conjunction with Fulton County. Roswell is waiting on Fulton County to install the security caps on their hydrants so Roswell could supply fire department with the necessary tool. Roswell has installed M&H i-Hydrant to alert staff to drops in pressure when hydrants are in use.	Section 5.2.3.2 Section 8.2.7
			Operations/Administration		
13. Establish Financial Sustainability **Adjust Base Charge** **Adjust Rates**	FY17 FY19	Yes	Conducted internally	Rates were increased by 4% in FY19 for the next four years	Section 7.0 Section 8.3.3
14. Maintain High Level of Customer Service	FY18	Yes	Conducted internally	See Click Fix was replaced with HiperWeb 311 in 2020	Section 2.7 Section 8.3.5
15. Secure Critical Data	Ongoing	Yes	FY19: Increased to $18,000 annually; Annual increase of 3% per year	FY18: New contract with Sensus to include storage and maintenance of three years of AMI data hosted on their network	Section 7.7.2
16. Monitor Future Regulations	Ongoing	Yes			

			FY18:$23,190 FY18 &19: $21,400	UCMR-4 Completed GA EPD Monitoring Fees	Section 5.1.1 Section 5.1.3
17. Update Yield Analysis & Modify Withdrawal Permit	FY18	Yes	Conducted internally	Roswell renewed the water withdrawal permit with the removal of the 50% safety factor on minimum streamflows for May - October	Section 3.1 Section 8.3.7
18. Anticipate Staffing Needs & Certify Laboratory	FY17/Ongoing	Yes	Annually operating cost of lab: $25,000	Lab was certified in 2019	Section 2.8
19. Participate in Industry Organizations	Ongoing	Yes	$4,000 annually for professional dues	Roswell Water Utility staff participated in GRWA, AWWA, GAWWA, and GAWP. Staff attended training at GWWI. Staff had one presentation at the Spring Conference of GAWP in 2017; participate on Distribution, Water Treatment, Water Loss, and Chair of Awards GAWP/GAWWA Committees; and won GAWP/GAWWA WTP Gold (2013-2019), Plant of the Year Award (2020), and Distribution Award (2018-2020)	Section 3.9 Section 4.5 Section 8.3.10

2.0 SYSTEM OVERVIEW

2.1 WATER SUPPLY

The City obtains its water supply from three sources: Big Creek, Chattahoochee River, and groundwater. The primary source is Big Creek, where the City has had a water withdrawal permit from the Georgia Environmental Protection Division (GA EPD) for over 80 years. The GA EPD water withdrawal permit allows the utility to withdraw water from Big Creek to supply water to the water treatment plant (WTP). The raw water is pumped from the intake in Big Creek to a 10 million gallon (MG) raw water storage tank. Alternatively, the system has the ability to bypass the raw water storage tank and send raw water directly to the WTP. The location of the raw water intake, raw water storage tank, and WTP are shown in **Figure 1**.

Photo of Intake Station on Big Creek

For redundancy, the Roswell Water Utility maintains six interconnections with Fulton County's water system for which the Roswell Water Utility can purchase water from Fulton County during emergencies. Fulton County draws water from the Chattahoochee River through the Atlanta-Fulton County Water Resources Commission System. The Roswell Water Utility primarily utilizes two interconnections located at 10489 Alpharetta Highway and 800 Pine Grove Road as shown in **Figure 1**. The Roswell Water Utility's four additional interconnections serve as emergency backup water supply. A summary of the six interconnections is provided in **Table 2**. Fulton County also provides water to the portions of the City located outside the City's WTP service area.

Finally, the Roswell Water Utility installed a groundwater well system that began operating in 2012 to improve system reliability.

Table 2. Summary of Six Interconnections with Fulton County Water Distribution System

1	10489 Alpharetta Highway	8"
2	800 Pine Grove Road	6"
3	Intersection of Warsaw Road and Holcomb Bridge Road	8"
4	Intersection of Riverside Road and Atlanta Street	6"
5	Intersection of Willeo Road and Old Willeo Road	8"
6	685 Grimes Bridge Road	8"

2.2 WTP OVERVIEW

The current WTP began production in March 2016, replacing the WTP that was originally built in 1936. The current WTP has a design production capacity of 3.3 million gallons per day (MGD) (Permit Number #1210009, effective date March 8, 2016, expiration date March 7, 2026); however, the GA EPD water withdrawal permit (Permit Number #060- 1209-01; effective date October 28, 2021; expiration date October 28, 2031) limits withdrawal from Big Creek to a monthly average of 2.8 MGD. All water production permits are in **Appendix A**.

The water plant is a conventional WTP that includes a 10 MG raw water storage tank, chemical addition, rapid mixing, four-stage flocculation, sedimentation, dual media filtration, disinfection, treated water storage and pumping into the distribution system. Water used for backwashing and rewashing of filters is recycled back to the head of the plant into the raw water storage tank. Under a Fulton County Industrial Permit (Permit Number #B-24941-101;

effective date March 1, 2019; expiration date February 28, 2024), the solids removed during the treatment processes are discharged directly to the Fulton County sanitary sewer system for treatment.

The Roswell Water Utility also operates a groundwater well system that is permitted to withdraw a monthly average rate of 0.167 MGD from a well located at 9400 Willeo Road (Permit Number #060-0007; effective date July 7, 2021; expiration date July 7, 2031). The groundwater is pumped from the well to the Michael J. Leonard Groundwater Treatment Plant (Permit Number #1210009, effective date March 8, 2016, expiration date March 7, 2026) located at 485 Willeo Road.

Aerial Photo of WTP

The groundwater treatment plant consists of chemical addition and two green sand filters rated at 250 gallons per minute. The treated water is then blended into the distribution system via a connection at Willeo Road and Highway 120.

2.3 DISTRIBUTION SYSTEM OVERVIEW

The Roswell Water Utility's distribution system consists of multiple components including pipes, valves, meters, fire hydrants, fittings, structures, meter vaults, and elevated storage tanks. The Roswell Water Utility uses a geographic information system (GIS)-based system to keep the water distribution system inventory current (e.g., geographic boundary of the system; the size, material type and length of water distribution pipes, installation dates of pipes, valves, and meters; and manufacturer of fire hydrants). The data is continually updated as new pipes, valves and meters are installed and/or repaired. In 2016, the Roswell Water Utility launched its GIS Mobile App for field crews to view, update, and add water line appurtenances in the field.

Figure 1. Roswell Water Utility WTP and Distribution System Map

As of November 1, 2021, the total length of water pipe in the distribution system was 469,225 feet or approximately 88.9 miles. The current pipes in the distribution system consist of copper, ductile iron (DI), cast iron (CI), galvanized steel (GS), high density polyethylene (HDPE), Municipex, polyvinyl chloride (PVC), and asbestos concrete (AC) and range in size from less than 2.5 inches (“) to 24” as shown in **Table 3**.

Table 3. Pipe Size and Length throughout System

2.5” or less Copper	1,474
2.5” or less DI	412
2.5” or less Galvanized Pipe	15,114
2.5” or less HDPE	387
2.5” or less Municipex	9,646
2.5” or less PVC	226
4” CI	179
4” DI	2,977
6” AC	21,088
6” CI	110,375
6” DI	34,789
8” CI	41,595
8” DI	190,941
10” CI	95
10” DI	2,649
12” DI	35,954
16” DI (Raw Water)	1,260
24” DI (Raw Water)	65
Total	469,225 ft. (88.9 miles)

2.4 POPULATION PROJECTIONS

Population projections are utilized to estimate the population served by the Roswell WTP and forecast water demand so the Roswell Water Utility can prepare to meet future needs and maintain self-sufficiency. Population projections for this Master Plan were evaluated using four different sources: 1) Atlanta Regional Commission’s (ARC’s) population projections utilizing 2010 Census data (used in 2016 Master Plan); 2) Roswell’s 2040 Comprehensive Plan; 3) ARC population projections updated in 2020; and 4) 2020 Census data. The population projections were similar amongst the four different sources with a range of about 1,800 customers in 2040. The 2020 Census data had the lowest projected population in 2040. Since the 2020 Census data is not final and is currently being challenged by multiple North Fulton municipalities due to population declines over projected 2019 numbers, the 2020 Census data was not utilized in this Master Plan. Since population projections are used for water demand projections, the Roswell Water Utility was conservative and used the highest projected populations which was calculated using the ARC population projections updated in 2020.

This Master Plan utilized the same methodology to estimate population projections as the 2016 Master Plan. In the 2016 Master Plan, the population served by the Roswell Water System was estimated based on the ARC census tract level population projections published in 2010. The Roswell Water System serves customers in census tracts 114.05, 114.18, 114.19, 114.22, and 144.23 as shown in **Figure 2**. The percentage of each tract block served by the Roswell Water System in 2010 was estimated as shown in **Table 4**.

Table 4. ARC 2010 Census Block Data Served by Roswell's WTP

11405	1	1,869	43.39%	811	
11405	2	994	94.22%	937	3,921
11405	3	1,794	93.02%	1,669	
11405	4	2,234	22.61%	505	
11418	1	1,030	0.0%	0	
11418	2	756	0.0%	0	1,953
11418	3	1,436	15.18%	218	
11418	4	2,631	65.94%	1,735	
11419	1	1,413	71.78%	1,014	
11419	2	1,891	40.02%	757	1,771
11419	3	1,995	0%	0	
11422	1	2,561	100.0%	2,561	3,666
11422	2	1,105	100.0%	1,105	
11423	1	1,036	100.00%	1,036	
11423	2	1,620	73.11%	1,184	4,416
11423	3	1,304	100.00%	1,304	
11423	4	892	100.00%	892	
		Total Population Served by Roswell's WTP in 2010			15,727

In 2020, ARC published updated population estimates and projections by tract and block ID starting with 2015. The updated projections for 2020 are approximately 9 percent (%) higher than previously estimated by ARC based on 2010 census data, indicating the City of Roswell is growing at a higher rate than previously expected. A summary comparison of estimated population projections for 2015 through 2060 based upon 2010 census data (used in 2016 Master Plan) and ARC's 2020 updated data are presented in **Table 5**. It was estimated that the Roswell's WTP served approximately 18,525 people in 2020.

In estimating population projections beyond 2020, a 2% increase per decade was used, which is consistent with previous population growth rates used by ARC. However, this is likely a conservative growth rate based on observed increases in the past 10 years.

Table 5. Population Projections based on 2010 Census Data and 2020 ARC Estimates

2015	16,678	18,162
2020	17,028	18,525
2030	17,452	18,896
2040	17,792	19,274
2050	18,139	19,659
2060	18,492	20,052

Figure 2. Water Distribution System Census Tracts & Block Groups

2.5 DEMAND PROJECTIONS

As seen through the updated population projections presented above, the City is growing at a higher rate than previously projected. The Roswell Water Utility needs to verify that the WTP and distribution system are capable of supporting the increased growth and future projections to maintain self-sufficiency. **Table 6** shows the projected water demand based on historical data and predicted demand reduction due to anticipated water conservation measures. Based on these demand projections, the peak monthly system demand exceeds the current permitted monthly average Big Creek withdrawal rate of 2.8 MGD by 2030. Therefore, the City needs to prepare to increase its current permitted withdrawal limits prior to 2030 or be prepared to purchase water from Fulton County to meet future peak demands. Additionally, **Table 6** illustrates that the peak monthly system demand will exceed the current WTP design capacity of 3.3 MGD between 2030 and 2040. The City needs to prepare a plan addressing how future needs will be met prior to 2030 to maintain self-sufficiency and limit dependence on interconnects with Fulton County.

Table 6. Historical and Projected Water Demand for Roswell Water System

2017	1.47	1.63		0.01	1.48	98.6%	1.46	-
2018	1.53	1.70		0.01	1.54	98.7%	1.52	-
2019	1.73	2.18		0.04	1.74	97.1%	1.69	-
2020	1.79	2.07	0.1%	0.03	1.79	98.1%	1.76	-
2030	2.37	2.85	0.5%	0.02	2.40	98.1%	2.35	As Needed
2040	3.14	3.77	0.5%	0.23	2.80[6]	98.1%	2.75	0.167
2050	4.16	4.99	0.5%	1.24	2.80[6]	98.1%	2.75	0.167
2060	5.51	6.61	0.5%	2.59	2.80[6]	98.1%	2.75	0.167
2070	7.29	8.75		4.38	2.80[6]	98.1%	2.75	0.167

Notes:

1. Start at year 2017, since the plant came online in March 2016, the City had to buy water from Fulton County from Jan 2016 - Apr 2016. Years 2017 - 2020 include actual demand, WTP production, and purchase from Fulton County data.
2. Demand includes water produced by WTP, well, and purchased from Fulton County. Projected 3% average annual increase (lowest of previous 4 years and consistent with MNGWPD Utility Climate Resiliency Study).
3. Used a peaking factor of 1.2 (Average of previous 4 years); consistent with Water Resource Management Plan.
4. Monthly average daily purchase from Fulton County jumps in Year 2040 due to demand exceeding permitted capacity of WTP and well withdrawals. Water must be purchased from Fulton County to meet average daily demand. Even more water will need to be purchased to meet monthly peak demands.
5. The well is permitted to withdraw 0.167 MGD per month; however, the well will not consistently produce every day to meet demand due to the need for recharge; therefore, the well was not included in the calculations until the projected water produced by the WTP could not meet demand.
6. The WTP has a design production capacity of 3.3 MGD; however, the City is currently only permitted to withdraw a monthly average of 2.8 MGD from Big Creek.

The Roswell Water Utility's demand and production projections are based on yearly billed water and is influenced by weather, climate, and economic conditions. As shown in **Table 6**, the anticipated demand reduction due to water conservation declines due to the current use of highly efficient appliances (e.g., washer machine, dishwasher, etc.) and anticipated plateau of per capita water use as shown in **Table 7**. This time period has included droughts, wet periods, and a global pandemic.

Table 7. Total Yearly and Average Annual Indoor Residential Per Capita per Day Water Use

2015	497.185	1.362	18,162	75.0
2016	396.567	1.086	18,235	59.6
2017	356.129	0.976	18,307	53.3
2018	368.666	1.010	18,380	55.0
2019	374.043	1.025	18,453	55.5
2020	375.965	1.030	18,525	55.6

Prior to 2015, the Roswell Water Utility implemented an aggressive water conservation rate structure and continues to implement other incentives to encourage customers to conserve water, thus reducing per capita water use. Average annual indoor residential per capita water consumption declined from 75 gallons per capita per day (GPCPD) in 2015 to 55 GPCPD in 2020, significantly less than the Metro Atlanta average of 100 GPCPD. Future water conservation would be achieved through reduction in water losses within the distribution lines.

2.6 POTENTIAL WATER SYSTEM GROWTH

There are several customers within the City's water system boundary that are being served by Fulton County due to low pressures in the City's system, leading to lost revenue for the City. In addition to verifying the WTP can meet future demand projections, the Roswell Water Utility should analyze the cost of distribution system upgrades required to tie these customers into the City's water system (See Section 8.2.6). A few areas being evaluated include:

- Swaybranch Drive – An 8" DI water line along Swaybranch Drive, between Market Place and Warsaw Road, was installed in 2009 to provide a loop in the City's water system. Residents along Swaybranch Drive, within the City's water boundary, are still served by Fulton County. Potential system growth could include tying residents within the City's water boundary onto the City's 8" DI water line.
- Wavetree Drive – Residents along Wavetree Drive, within the City's water boundary, are served by Fulton County. Potential system growth could include tying residents within the City's water boundary onto the City's 8" DI water line.
- Woodstock Road – Current water infrastructure along Woodstock Road has limited the City's ability to meet fireflow demand; therefore, new developments are served by Fulton County's system. These new developments include:
    - Amberly Place
    - Legacy Oaks
    - Oak Lane
    - New Fulton County School
    - Park Bridge Lane
    - Broadmeadow Cove
    - Kiveton Park area
- Park East - Roswell has not been able to provide adequate fire flow along Crabapple Road for new developments, thus these new developments have connected to Fulton County's system.

The Roswell Water Utility will also consider conversion of private water systems to the Roswell distribution system on an individual basis. The Roswell Water Utility adopted a Private to Public Water System Policy in June 2016 which is included in **Appendix B**. In 2018, the Roswell Water Utility accepted the Ashley Manor Subdivision. Currently, two private communities have submitted letters requesting for the Roswell Water Utility to annex their systems, Garrison Hills Subdivision and St. Charles Square Condominium Association. As of October 2021, an

agreement between the City and St. Charles Square Condominium Association has been signed allowing the City to adopt their water system once it has been updated to meet current design requirements.

2.7 CUSTOMER SERVICE, AUTOMATION, AND TECHNOLOGY

The Roswell Water Utility continuously explores upgrading technology to provide customers with better customer experience. In 2020, the City migrated to one computerized maintenance management system (CMMS) program, HiperWeb 311, allowing customers to send questions, complaints, and observed deficiencies (e.g., pipe leaks) directly to the Roswell Water Utility division. This allows Roswell Water Utility staff to respond quickly to customer notifications; the Roswell Water Utility currently has a goal of 2-hour response time to reported leaks.

Additionally, the Roswell Water Utility provides customers with a means to track their monthly bill during a billing cycle through a water conservation and budgeting portal. In 2011, the Roswell Water Utility implemented the Automated Metering Infrastructure (AMI) network providing a means to read water meters remotely utilizing two towers. In 2015, the Roswell Water Utility launched a water conservation and budgeting portal for customers. The AquaHawk Alerting! Customer Portal provides a link between the FlexNet AMI Network and billing database so customers can track usage, establish a threshold, estimate their bill any time during the billing cycle, and receive notification alerts for potential leaks. **Figure 3** below provides an example of the type of data that customers can see. In this figure, the customer can see the amount of water consumed over a 365-day time frame (1 year). It also provides the customer with the estimated cost of the water during the current billing period. In 2016, the AMI network afforded the City the opportunity to convert from bi-monthly billing to monthly billing.

Figure 3. AquaHawk Alerting! Program

2.8 STAFFING

Figure 4 shows the current organizational chart for the Roswell Water Utility division and the Support Services division (assists Roswell Water Utility division as needed). Since the 2016 Master Plan, the Roswell Water Utility has added one new position, Water Construction/Backflow Specialist.

Figure 4. Roswell Water Utility and Support Services Organization Chart

2.9 REGULATORY REQUIREMENTS

The Roswell Water Utility maintains compliance with federal, state, and location regulations. The regulatory laws that govern municipal drinking water systems were enacted by Congress in 1974 under the Federal Safe Drinking Water Act (SDWA). The State of Georgia is the primary agency for enforcing the rules and regulations under this Act and must enact state laws in compliance with the Federal Act. The Roswell Water Utility is regulated by the GA EPD and is required to meet all aspects of the Georgia SDWA (GA SDWA).

The Roswell Water Utility is also governed by the Metropolitan North Georgia Water Planning District (MNGWPD). The MNGWPD is a planning agency that is responsible for water supply planning in the Metropolitan Atlanta Region. The MNGWPD publishes plans outlining requirements for municipalities to follow. These plans are updated every five years. In 2017, the Water Conservation and Supply Plan, Wastewater Plan, and Watershed Protection Plan were combined into one plan, The Water Resources Management Plan. The Water Resources Management Plan creates action items for utilities to implement and compliance is reviewed when requesting a loan from Georgia Environmental Finance Authority (GEFA) and conducting GA EPD sanitary surveys. The MNGWPD is currently in the process of updating the Water Resources Management Plan which is expected to be completed in 2022.

2.9.1 Sanitary Surveys

Every three years, GA EPD is required to conduct a sanitary survey on the WTP and distribution system. The survey is very thorough and consists of: i) reviewing water plant records, sampling data, distribution operations and procedures, maintenance records, and system map(s), and ii) inspecting operating equipment, each treatment element, and water tanks. GA EPD scores the system and issues a final report summarizing deficiencies found during the survey. Systems that score below 70% receive a list of improvements with mandatory completion dates. Upon improving deficient items, a re-inspection is conducted. **Table 8** shows the Roswell Water Utility's continued improvement over the past 15 years. Starting with the 2019 audit, GA EPD no longer provides a numerical score. Instead, scores are given simply as a pass or fail.

Table 8. Current GA EPD Sanitary Survey Results 2004 - 2019

2004	76.0%
2007	77.1%
2010	93.9%
2013	95.6%
2016	94.9%
2019	Pass

2.9.2 Record Keeping

The GA SDWA also requires utilities to retain certain documents for mandated periods of time. **Table 9** describes the required regulatory compliance for sampling and reporting and the requirements for retention of water system records. Retention of documents is verified during the GA EPD sanitary survey.

Table 9. Water System Record Retention Schedule

Disinfection and Benchmarking	Indefinitely
Lead and Copper Analyses	12 years
Monitoring Plans	10 to 12 years
Tank Inspection Records	Minimum of 10 years
Chemical Analysis Records	10 years
Sanitary Surveys	10 years
Variance or Exemptions Granted	10 years
Work Orders	10 years
Microbiological Records	5 years
Records of action by the system to correct violations	3 years
Results of Individual Filter Monitoring	3 years
Backflow Records	3 years

3.0 WATER PRODUCTION

The City's WTP is a 3.3 MGD conventional surface WTP. The treatment processes consist of pre- and post-chemical treatment systems, raw water intake, raw water storage, coagulation, flocculation, sedimentation, treated water storage and filtration and high service pumping. The chemical treatment consists of sodium hypochlorite for disinfection and oxidation of iron and manganese, polyaluminum chloride for removal of particulate matter, poly-orthophosphate for corrosion control, and fluoride for dental health. The WTP has the option to use sodium permanganate for oxidation of iron and manganese and powdered activated carbon (PAC) for taste and odor control as needed.

Photo of WTP Control Room and SCADA System

The Roswell Water Utility also operates a groundwater system comprised of one well (located at 9400 Willeo Road) and a groundwater filtration system (Michael J. Leonard Groundwater Treatment Plant located at 485 Willeo Road). The groundwater filtration system utilizes two pressure green sand filtration units to treat raw water for iron and manganese. The chemical treatment system utilizes sodium hypochlorite for disinfection and poly-orthophosphate for corrosion control. Water from the groundwater system is blended into the WTP distribution system.

The WTP utilizes a Supervisory Control and Data Acquisition (SCADA) System which monitors processes for the surface water plant and groundwater plant. Data and information from these processes are retained in a historical database.

Both water treatment systems are operated by a staff of seven Georgia certified WTP operational personnel, including: Water Operations Manager, Assistant Water Operations Manager, and five plant operators. The operational staff performs hourly testing on the finished water to confirm the finished water meets GA EPD standards under the GA SDWA.

3.1 WITHDRAWALS

The Roswell WTP has a GA EPD issued water withdrawal permit (Permit Number 060-1209-01) to withdraw water from Big Creek. The permit allows a 24-hour maximum withdrawal of 4.5 MGD, not to exceed a monthly average of 2.8 MGD. The streamflows in Big Creek control the rate water can be withdrawn as shown in **Table 10**. When Big Creek streamflow is equal to or less than 8.4 cubic feet per second (cfs), water withdrawal is not permitted. If the streamflow is between 8.4 cfs and the minimum listed in the table for a given month, the maximum withdrawal will be 1.2 MGD. When streamflow is greater than or equal to the monthly minimum listed in the table below, withdrawal can be as great as 4.5 MGD as long as the monthly average does not exceed 2.8 MGD. The monthly minimum streamflows were updated in 2021 during the water withdrawal permit renewal process to remove a 50% safety factor that was previously applied to the streamflows during May through October. The updated minimum monthly streamflows allows the WTP to withdraw water from Big Creek during lower flows, reducing the dependence of purchasing water from Fulton County to supply Roswell customers during periods of low flow.

Table 10. Big Creek Withdrawal Schedule

Annual	8.4	0-1.2
January	≥58	Between 1.2 - 2.8
February	≥73	Between 1.2 - 2.8
March	≥75	Between 1.2 - 2.8
April	≥67	Between 1.2 - 2.8
May	≥39	Between 1.2 - 2.8
June	≥25	Between 1.2 - 2.8
July	≥18	Between 1.2 - 2.8
August	≥13	Between 1.2 - 2.8
September	≥13	Between 1.2 - 2.8
October	≥17	Between 1.2 - 2.8
November	≥29	Between 1.2 - 2.8
December	≥45	Between 1.2 - 2.8

Note: The WTP may withdraw up to 4.5 MGD as long as the monthly average withdrawal rate does not exceed 2.8 MGD

The Roswell Water Utility completed an updated surface water yield analysis in 2021 to evaluate whether a closer United States Geological Survey (USGS) stream gage could be utilized to develop the monthly minimum streamflows. The City is still in communication with GA EPD regarding utilizing the USGS stream gage located 500 feet downstream from the WTP intake (USGS 02335757) opposed to the USGS stream gage located in Alpharetta, approximately 7.5 miles from the WTP intake (USGS 02335700). Utilizing the closer gage would better mimic practices currently used by the Roswell Water Utility staff; the staff uses the closer gage to determine the flow rate to withdraw from Big Creek.

3.2 STORAGE CAPACITY

3.2.1 Raw Water Storage Tank

The WTP has a 10 MG raw water storage tank. This allows the WTP to have three days of storage during times when the WTP intake is down for maintenance or water cannot be withdrawn from Big Creek due to minimum streamflow requirements not being met or high flows that result in untreatable water quality.

Photo of 10 MG Raw Water Storage Tank

3.2.2 Finished Water - Clearwell Storage

The WTP has a clearwell on-site which can store up to 375,000 gallons of finished water. The stored finished water is pumped into the distribution system and is also utilized for backwashing of the filtration systems.

3.2.3 Finished Water - Elevated Storage

The Roswell Water Utility currently has three elevated finished storage tanks providing a total storage of 1.075 MG of potable water. The three elevated storage tanks are:

Community Circle	75,000 gallons
Woodstock	500,000 gallons
Hightower	500,000 gallons

The locations of these tanks are shown on **Figure 1**. The water levels in these tanks are remotely monitored through the WTP's SCADA system to ensure that proper tank level parameters are maintained. When levels are outside established thresholds, the Water Operators are notified by SCADA to adjust operations.

These tanks help the Roswell Water Utility meet daily water demands, provide capacity for fire protection, and stabilize pressures within the water distribution system. The Roswell Water Utility recommends replacing the 75,000 gallon tank, located on Community Circle, with a third 500,000 gallon tank within the system. A new tank will increase finished water storage (potentially provide one days' worth of daily demand) and increase pressures within the system to meet fire flow requirements. Increasing finished water storage would enhance Roswell Water Utility's self-sufficiency and limit need to purchase water from Fulton County during periods of low or high flows in Big Creek or when the WTP is down for maintenance.

Photo of Elevated Storage Tank

3.3 WTP OPERATING COSTS

3.3.1 Production Costs

A goal of the Roswell Water Utility is to provide customers high quality water while maintaining financial stability. The cost per 1,000 gallons treated has decreased over the past five years as shown in **Table 11**. The WTP production costs are currently $1.92 per 1,000 gallons of water produced. The Roswell Water Utility staff has decreased unit costs mainly by reducing the cost of power and chemicals. Generally, labor costs did not fluctuate over the past several years; however, the labor cost significantly decreased in fiscal year (FY) 20 due to the COVID-19 pandemic and the labor shortage. There were multiple job vacancies within the Roswell Water Utility during the pandemic.

Table 11. Summary of Costs for WTP to Produce Water

Power	$0.27	$0.27	$0.25	$0.19	$0.21
Chemicals	$0.28	$0.22	$0.14	$0.12	$0.13
Labor	$1.01	$1.01	$1.00	$0.83	$0.97
Other Operating Costs	$0.67	$0.80	$0.72	$0.62	$0.61
TOTAL	**$2.23**	**$2.30**	**$2.11**	**$1.76**	**$1.92**

Note: Other operating costs include plant maintenance, GEFA loan repayment, material/supplies, and technical and construction services.

3.3.1.1 Power

The Roswell Water Utility developed a log to track peak power demands and analyze electricity costs to identify operational optimization strategies to reduce power expenditures. In FY19, the City's WTP was costing $0.25 per 1,000 gallons of water produced for power. Based on FY19 demand, this accounted for approximately $140,708 annually for electricity. In FY20, the WTP contracted with Georgia Power to implement real-time pricing. Real-time

pricing reduces costs by taking advantage of off-peak rates. During periods of low electricity demands within the Georgia Power system, the price per kilowatt hour is low; consequently, during peak demand periods, the cost per kilowatt hour is high. Using real-time electricity pricing, the Roswell Water Utility saved approximately $59,687 in electricity costs in 2020 (calendar year). The real-time pricing structure altered some plant operations including, running the raw water pumps between 11:00 pm and 11:00 am when electricity costs are low and shutting the pump off during peak times if possible. **Figure 5** illustrates the monthly electricity cost prior to implementing real-time pricing and after implementation. The WTP personnel are looking into other alternative equipment operation schedules to further reduce electricity costs.

Figure 5. Monthly Electricity Costs for WTP Prior To and After Implementation of Real-Time Pricing

3.3.1.2 Chemicals

The WTP utilizes polyaluminum chloride for coagulation, hydrofluorosilicic acid for dental health, ortho-polyphosphate for corrosion inhibition, and sodium hypochlorite for disinfection and oxidation of iron and manganese. The WTP has the option to use sodium permanganate for oxidation of iron and manganese and PAC for taste and odor control as needed. As the costs of these chemicals have direct impact on the cost to produce finished water, changing chemical suppliers requires testing for performance to ensure that the water chemistry is compatible. The Roswell Water Utility plans to periodically invite suppliers to perform these tests onsite to improve cost effectiveness. The current cost for chemicals is approximately $0.13 per 1,000 gallons of water produced. Based on FY21 demand, the total chemical cost was approximately $84,337. The Roswell Water Utility did not see an increase in chemical costs due to COVID-19; however, the lead time to receive chemicals was dramatically increased due to labor shortage and lack of drivers at the chemical companies. There is a possibility that the Roswell Water Utility could see additional cost pressure for chemicals going into 2022.

Photo of Sodium Hypochlorite System

Increased temperatures may also cause the WTP to alter chemical application strategies. Currently, the sodium hypochlorite feed rate is increased during summer months to allow for higher residuals throughout the system. The Roswell Water Utility also has seven flushing stations located at the end of its distribution lines which run weekly to ensure that water is continually moving in the system, thus reducing the potential for water quality issues. New water is pumped through the system, removing water that has been sitting in the system for excessive periods of time.

In August 2019, the Roswell Water Utility retained the services of a consultant to perform a chemical optimization review of chemical usage at the WTP. The review found several areas where the Roswell Water Utility could reduce chemical costs which included, but were not limited to, restricting sodium permanganate dosage to an as needed basis, optimizing sodium hypochlorite dosage, optimizing the polyaluminum chloride dosage, and optimizing the filter backwash. The Roswell Water Utility has implemented some of these recommendations including removing sodium permanganate dosing and saved $8,711 in chemicals for FY21.

3.4 CONDITION ASSESSMENT

The WTP staff places a high priority on preventative maintenance (PM) to prevent the WTP from unexpectedly being shut down due to equipment malfunctioning and/or failure and therefore reducing the need to purchase water from Fulton County. PM also helps reduce maintenance and expensive emergency equipment replacement costs; allowing the WTP to utilize budget towards other operational needs.

In September 2019, the WTP began using Fluke 3561 sensors to monitor the vibration of motors used in the water production process. This predictive maintenance technique uses historical and real-time data to anticipate problems within the motor before it happens. The Fluke sensors help staff identify the most common type of machine faults which include: imbalance, misalignment, looseness, and bearing damage. Once identified, the equipment is repaired before the fault causes damage to the equipment. This helps WTP staff extend equipment operating performance, effectively use internal maintenance resources, and increase life expectancy from the equipment.

Photo of High Service Pumps

Around the same time, the WTP began utilizing other predictive maintenance technologies such as nonintrusive testing to check for equipment "hotspots" using infrared thermography. This allows maintenance staff to quickly identify the "hotspots" and avoid equipment replacement or downtime. Additionally, the maintenance staff began conducting oil analyses on the high service and backwash pumps where a sample of the oil is analyzed to evaluate if contaminants are present. This allows maintenance staff to check whether pump internals are wearing down and need replacement long before the equipment starts to make a noise or develop major problems.

3.4.1 Fluoride Room Upgrade

Starting in 2019, WTP staff noticed that the fluoride pumping and containment room was exhibiting a high level of corrosion and deteriorating at an alarming rate. The Roswell Water Utility utilized one of its consultants to inspect the area and provide recommendations for renovating the room. During the first assessment, the consultant discovered the bulk chemical storage tank and the day tank were not properly vented. This issue was corrected immediately, but a long term solution was required. In July 2020, the consultant provided a renovation plan for the fluoride room.

The plan required the current day tank and the piping from the day tank to the pumps be demolished, a new 55-gallon day tank with new piping to the pumps be installed, a new ultrasonic level transmitter and controller be installed, and a new calibration column and vent lines be tied in to the new piping. The work started in January 2021 and was completed within three months. An outside contractor was utilized to complete the demolition work and plumbing. WTP staff employed appropriate safety measures during demolition and installation, and the new system has been performing well since startup. The new system will be more sustainable, providing reliable and safe operations and maintenance.

3.4.2 Variable Frequency Drive Assessment

In October 2020, the WTP experienced a power outage due to Hurricane Zeta. When power to the WTP was restored, it caused damage to the high service pumps variable frequency drives (VFDs). The damage was repaired; however, staff decided to have the VFDs inspected and assessed by a qualified engineer. In November 2020, a consultant completed a site assessment which included inspecting VFDs on major equipment (raw water pumps, transfer pumps, and high service pimps) for proper installation and potential recommendations.

The consultant provided several recommendations on proper VFD operations that would extend the life of the VFDs and the pumps. Immediate recommendations were:

- High Service Pump VFDs - replace temperature switches in each drive.
- Raw Water Pump VFD #2 - vacuum and clean the VFD and its components.

- Raw Water Pumps (3) - add filtered supply and exhaust vents.
- Vent openings on the side of the enclosure or cover.
- Transfer Pump VFDs (3) - securely fasten the VFD cable ground wire terminals.
- Procure a disconnect handle for the surge suppressor located on switchboard SB-5.

The Roswell Water Utility received the VFD assessment report in December 2020 and retained Electronic Maintenance Associates (EMA) to address the items listed above. The Roswell Water Utility placed EMA under contract to complete a yearly inspection of the VFDs at the WTP. The implemented recommendations provide additional protection for the pumps and VFDs and will prolong the life of these critical pieces of equipment.

3.5 GROUNDWATER SUPPLY

3.5.1 Well Operations

The groundwater well is operated by a remote SCADA system located at the WTP. Although the filtration plant has a design capacity of 0.325 MGD, the groundwater plant is permitted to produce 0.167 MGD (Permit # 060-0007) due to the unknown recharge rate of the well. Well operation is dependent on the demand for water but normal operation of the well was from 1:00 a.m. to 1:00 p.m., Monday through Friday, allowing for well to recharge over the weekend.

Photo of the Groundwater Well

The groundwater well has not been operational since 2018 due to electrical issues (e.g., lightning strike and moisture damage) and tree damage. In 2021, the VFD was replaced, well head building structure was replaced, surge protectors were updated and repaired, new flow meter and level transmitter were installed, and the communication system was upgraded. Also in 2021, a chlorine and pH analyzer was installed at the well filtration plant building and staff is in the process of replacing the hypochlorite and fluoride chemical feed pumps. The Roswell Water Utility staff aims to have the well and filtration system running by the end of 2021.

In 2018, it cost about $1.88 per 1,000 gallons produced to operate the well where $0.95 was spent on power, $0.20 was spent on chemicals, and $0.73 was spent on labor and maintenance. An additional safe yield analysis should be completed to evaluate if an increased withdrawal rate would be permitted. Due to economies of scale, the cost per 1,000 gallons would decrease if another groundwater source were developed near the current filtration plant or if GA EPD permitted an increased withdrawal rate for the current well.

In 2019, the Roswell Water Utility contracted with Georgia Power to provide real-time pricing for the WTP, effectively reducing costs by taking advantage of off-peak pricing (see Section 3.3.1.1 for additional information on real-time pricing). Real-time pricing for power currently does not apply to the well; however, once the well is operational and the Roswell Water Utility obtains at least two years of electrical data usage, real-time pricing will be evaluated. Real-time pricing could reduce power costs by operating the groundwater plant during non-peak rate hours.

3.5.2 Future Deep Well Development

The Roswell Water Utility continues to be proactive at evaluating alternatives to increase water supply, enhancing its self-sufficiency and limiting dependence on neighboring systems. Two alternatives the Roswell Water Utility has evaluated include additional production wells and flow augmentation.

In 2007, the City retained the services of Emery & Garrett Groundwater, Inc. to perform a groundwater exploration and development program. Phase II of the Emery & Garrett Report identified other well sites within the City that could serve as production wells. Exploratory test wells need to be installed to evaluate potential productivity of these well sites. The locations of these additional deep well sites are shown in **Figure 6**. Some of these sites are far from the distribution system; therefore, transmission lines would have to be installed to connect the wells to the City's system which would increase the cost of installing these wells. The Roswell Water Utility would need to conduct a cost analysis to evaluate the feasibility of pursuing the sites for additional groundwater production. One potential

site was located on land owned by the Chattahoochee Nature Center. In 2018, the Roswell Water Utility discussed the potential of digging a test well at the Chattahoochee Nature Center and they declined the opportunity. The Roswell Water Utility does not plan on investigating additional deep well sites within this Master Plan.

Figure 6. Locations for Potential Additional Groundwater Wells

However, the Roswell Water Utility would like to further investigate the potential to use its well to supplement flow within Big Creek during drought conditions or periods of low flow. Flow augmentation is when water stored in a reservoir or other impoundment is used to increase the natural flow of a stream. Water would be discharged directly into Big Creek, augmenting the flow of the creek during extreme drought conditions. By using the groundwater from the well, the City would be able to keep the flow rate within the stream at a rate where water for the WTP could still be withdrawn.

3.6 WHOLESALE WATER PURCHASES

Prior to the opening of the new WTP in March 2016, the Roswell Water Utility was highly dependent on Fulton County for water supply. The Roswell Water Utility frequently had to purchase water from Fulton County to meet daily demands. The average annual cost for water purchased from Fulton County between 2011 and 2014 was $369,000. The cost of purchased water in 2015 was $617,000. The old water plant was shut down from October 2015 through March of 2016 to construct the new water plant; therefore, the Roswell Water Utility had to purchase all of its water from Fulton County during this period. As shown in **Table 12**, the Roswell Water Utility has become less dependent on Fulton County for water supply due to the construction of the new WTP. The last full year before construction of the new WTP commenced, 2014, the City purchased 137 MG from Fulton County costing the

Roswell Water Utility $293,000. The first full year of the new WTP in operation, 2017, the Roswell Water Utility purchased a total of 3 MG from Fulton County for $13,000.

Table 12. Water Purchased Annually from Fulton County

2011	212	$407,000
2012	196	$429,000
2013	157	$347,000
2014	137	$293,000
2015	277	$617,000
2016	132	$327,000
2017	3	$13,000
2018	5	$15,000
2019	19	$47,000
2020	10	$35,008

Between 2017 and 2020, the average annual volume of water purchased from Fulton County was 9.25 MG for $27,502; an average savings of approximately $341,498 per year. The volume purchased in 2019 increased from 2017 and 2018 due to heavy rains towards the end of the year. When the flowrates are high in Big Creek, water cannot be withdrawn due to increased turbidity. Water purchased was also higher in 2020 than 2017 and 2018 because the Roswell Water Utility had to purchase 4.5 MG of water due to a power outage in October, shutting the WTP down for one day. The reinstating of the power at the WTP also damaged two of the high surface pump VFDs, causing the WTP to be operational at limited capacity for an additional two days. The Roswell Water Utility has applied for several grants to purchase a generator to power the WTP equipment during power outages. This generator would increase WTP reliability and decrease dependence on Fulton County in emergency situations. This item is discussed further in Section 8.1.4.

It costs the Roswell Water Utility $1.92 per 1,000 gallons to produce finished water in FY21. It costs $3.71 per 1,000 gallons to purchase water from Fulton County in 2021.

3.7 STAFFING AND TRAINING

The WTP staff includes: Water Operations Manager (with Class I license), Assistant Water Plant Manager (with Class I license), two Water Plant Operators (with Class III licenses), one Water Plant Operator (with Class II license), and two Water Plant Operators (with Class I licenses). This staffing plan allows for 24 hour, seven day per week staffing in the most cost effective and economical approach. The Roswell Water Utility updated the WTP operator schedule in August 2021 from a fixed rotation to a four day on, four day off, 12-hour rotation. This scheduling approach is more in line with industry standards and should make it easier to recruit staff when openings occur. The previous fixed rotation had employees working the same days each week.

The motivation for an updated schedule was to prevent having the same two operators always covering the weekend shift. Previously, operators that worked the weekend shift rarely interacted with plant management, City management, customers, and other staff members. The updated operator schedule prevents dedicated weekend shifts, does not change operator salaries, allows for additional training opportunities between management and operators, and allows for all operators to cross-train with the distribution department.

3.7.1 Training Requirements

Georgia requires anyone involved in the operation of a municipal WTP to hold a State Water Operator License. The Operator in Charge must have a license level based on the complexity of the WTP. The City's WTP is classified as a Class I facility; therefore the Operator in Charge must have a Class I license. As of July 1, 2021, the City's WTP currently has seven staff members operating the plant, of which four hold a Class I license. The Roswell Water Utility has consistently met the staffing and certification requirements of its permit.

The training requirements established by the State of Georgia require each operator to renew their license every two years through continuing education units (CEU's). The CEUs required are based on the level of the license: Class I – 24 CEU's, Class II – 18 CEU's and Class III – 12 CEU's. The CEUs can be obtained by:

- Attending water professional conferences offered through the Georgia Rural Water Association (GRWA), Georgia Association of Water Professionals (GAWP) and the American Water Works Association (AWWA);
- Taking on-line courses provided by the Georgia Certification Board; or
- Attending courses at the Georgia Water and Wastewater Institute (GWWI).

The last renewal period was June 2021 and the next renewal period is June 2023. In addition to holding a Water Operator License, water operations personnel may also hold the following:

- Flagging Certification – renewed every two years
- Confined Space Certification – renewed every two years
- First Aid/CPR – renewed every two years

3.8 WATER QUALITY

3.8.1 Taste and Odor

The Roswell Water Utility monitors water quality and strives to provide high quality water to its customers. Within the past five years, the Roswell Water Utility had two occurrences of taste and odor complaints. On August 27, 2016 the Roswell Water Utility experienced a taste and odor event. Customers called the WTP stating that their water tasted like dirt and/or had an earthy smell. WTP staff immediately altered raw water operation procedures by discontinuing sodium hypochlorite and increasing sodium permanganate dosing. Distribution staff was notified of the event and began flushing the system. By September 1, 2016 the entire system was flushed.

Between August 27 and September 1, the WTP staff had the raw water tank tested for the presence of the algae Geosmin and Methylisoborneol. The tests confirmed the presence of both compounds and aerial drone shots confirmed an algal bloom had occurred inside the tank.

As a result of this taste and odor event, the WTP generally does not withdraw from Big Creek when turbidity levels are above 100 nephelometric turbidity units and alkalinity is above 20 milligrams per liter. PAC was applied to the filters after every backwash for the next year. Additionally, the WTP staff installed a mechanical mixer, GridBee GF5000, in the raw water tank. The GridBee GF5000 continuously mixes the stored water, preventing stagnation, thermal stratification, and short-circuiting and providing uniform water age and equal distribution of disinfectant residual to prevent algae from growing.

On October 21, 2020, Fulton County contacted the Roswell Water Utility to warn them of a taste and odor event occurring in the north section of Fulton County. During this same time period, a storm caused damage to electrical equipment at the WTP, forcing the WTP to shut down for one day, October 30, 2020. Water was purchased from Fulton County for 24 hours resulting in a few taste and odor complaints. Distribution staff were notified of the complaints and the lines were flushed to remove the Fulton County water before it became a system-wide issue. This event highlights the importance for Roswell Water Utility to continue to enhance its self-sufficiency and limit dependence on purchasing water from Fulton County to meet demand.

Taste and odor events are a widespread issue throughout Georgia. Roswell WTP staff participate in a taste and odor group formed by GAWP. The group holds workshops where predictive modeling, monitoring technologies, best practices, oxygenation, and PAC applications are discussed. This allows the Roswell Water Utility to be

proactive and informed of potential taste and odor issues that may occur in the future. The WTP staff regularly conduct basic odor screening on Big Creek water, raw water in the storage tank, and finished water to monitor for any changes and potential early detection of potential problems.

3.9 WATER TREATMENT PLANT PERFORMANCE METRICS

3.9.1 Consumer Confidence Report

The Roswell Water Utility is required by the United States Environmental Protection Agency (US EPA) to provide a Consumer Confidence Report (CCR) to consumers twice a year, six months apart. The purpose of the CCR is to provide the public with important information regarding the quality of their drinking water. The CCR summarizes the source of the potable water, water quality and detected contaminants, and compliance with regulations.

The CCR has eight content requirements that must be met:

- Item 1: Water System Information – Name/phone number of a contact person; information on public participation opportunities.
- Item 2: Source(s) of Water.
- Item 3: Definitions – Maximum Contaminant Level (MCL); MCL Goal (MCLG); Treatment Technique; Action Level; Maximum Residual Disinfectant Level (MRDL); MRDL Goal (MRDLG).
- Item 4: Detected Contaminants – A table summarizing reported concentrations and relevant MCLs and MCLGs or MRDLs and MRDLGs; known source of detected contaminants; health effects language.
- Item 5: Information on Monitoring for Cryptosporidium, Radon, and Other Contaminants (if detected).
- Item 6: Compliance with Other Drinking Water Regulations (any violations and Ground Water Rule special notices).
- Item 7: Variances and Exemptions (if applicable).
- Item 8: Required Educational Information – Explanation of contaminants in drinking water and bottled water; information to vulnerable populations about Cryptosporidium; statements on nitrate, arsenic, and lead.

The current Roswell Water Utility's CCR can be found on the City of Roswell website and in **Appendix C**.

3.9.2 Key Performance Indicators

The Roswell Water Utility staff utilizes a CMMS program, HiperWeb CMMS, to store and organize maintenance information and facilitate prioritization of maintenance operations. HiperWeb CMMS also organizes WTP data (e.g., maintenance operations, power consumption, etc.) which allows the WTP staff to measure key performance indicators (KPI's). Currently, KPI's have not been assigned to the WTP and are still in the planning stages; however, several potential indicators are identified below. These will be finalized by FY23 after continuing discussions with staff and assessed annually.

Photo of Example PM vs. CM Report Produced by HiperWeb CMMS

- Preventative Maintenance (PM) vs. Corrective Maintenance (CM) – This will allow management to observe previous PM and CM activities performed on a certain asset to evaluate if the asset is at the end of its useful life cycle.
- WTP Power Consumption – This indicator quantifies the total amount of power consumed to operate the WTP and supply potable water.
- Training Hours Per Employee – This will give a historical trend for the number of annual training hours an employee receives to meet certification requirements.
- Asset Life Cycle – This will help organize and optimize the performance of the asset throughout its useful life.

- Asset Failure Rate – This will give management a look at how many times an asset fails over a given period of time. This will be used when evaluating if the asset should be repaired or replaced.
- Missed PM's – This will provide a quick trend of PM's that may have been missed by maintenance personnel.

3.9.3 GAWWA/GAWP Gold/Platinum Designation

The Roswell WTP is an award winning treatment plant. GAWP/Georgia American Water Works Association (GAWWA) presents Gold/Platinum Awards to WTPs based on overall operations of the facility and meeting US EPA/GA EPD drinking water standards within a calendar year. The award evaluates the WTP across multiple categories such as security, documentation, storage and handling of chemicals, safety around large equipment (e.g., raw pumps, finished pumps, etc.), maintenance, and monitoring. A treatment plant must receive the Gold Award for four consecutive years before it can receive the Platinum Award on the fifth year. The Roswell WTP won the Gold Award 2006-2009, the Platinum Award in 2010, and the Gold Award 2013-2019.

3.9.4 GAWWA/GAWP Plant of the Year

The Roswell WTP received the GAWWA/GAWP Plant of the Year Award in 2020 for the best plant operating with a design capacity between 1 MGD and 4.99 MGD. To receive the award, the plant is inspected by representatives of the GAWP Water Plant of the Year Committee. This inspection consists of a site visit by industry peers scoring the following categories: documentation practices, plant security, plant pumping systems, chemical feed systems, plant cleanliness, system monitoring, and laboratory practices. The award cannot be won by the same plant in consecutive years, therefore the Water Utility will be submitting for the award again in 2022.

4.0 WATER DISTRIBUTION

The Roswell Water Utility's distribution system consists of multiple components including pipes, valves, meters, fire hydrants, fittings, structures, meter vaults, and elevated storage tanks. These components convey water from the WTP to the customer. Pressure is maintained within the distribution system through the three WTP high service pumps, three water storage tanks, and the topography of the service area. It is important to maintain pressures within the distribution system to greater than 20 pounds per square inch (psi) to reduce the risk of cross-contamination, prevent boil water advisories, and maintain regulatory compliance. The average operating pressure in the system is 90 psi and ranges between 45 psi to 155 psi depending on the location in the system.

The water distribution programs can be described using five components: metering, water line replacement optimization, hydraulic water model, regulatory programs, and performance metrics. The goals of these programs are to provide high quality water to customers and prevent water loss or unaccounted for water; therefore increasing revenue and reducing costs to produce lost water.

4.1 METERING

The Roswell Water Utility has approximately 5,700 metered service connections on the current 88.9 miles of water lines. The Roswell Water Utility customers are 84% residential (classified as residential and multi-family in **Figure 7** below) and 9% commercial. The City, irrigation, and other institutional users account for 7% as shown in **Figure 7** below.

Figure 7. 2020 Water Consumption by Type of User

Table 13 shows the billed consumption in 2020 (calendar year) by water customer type (residential, commercial, etc.). Even though commercial customers are only 9% of the metered service connections, they use 16% of the produced water.

Table 13. 2020 Billed Consumption Water by Service Type

Residential	375,965,168	78.5%
Commercial	76,960,866	16.1%
Fire Line	761,044	0.2%
Irrigation	13,046,442	2.7%
Hydrant Meters	1,655	0.00%
Pool	406,219	0.1%
City	12,017,289	2.5%
Total	**479,158,683**	

As meters age, they don't account for all the water that flows through them, resulting in lost revenue. The Roswell Water Utility has a Meter Replacement Program focused on replacing meters older than 15 years of age to prevent the loss of revenue (see Section 5.2.2.3 for additional information on the Meter Replacement Program). In 2020, the Roswell Water Utility found seven multi-family meters less than 98.5% accurate, resulting in approximately $5,544 in lost revenue.

4.2 WATER LINE REPLACEMENT OPTIMIZATION

The City's water distribution system has 469,225 linear feet of water lines, which equates to 88.9 miles. Approximately 57.1% of these lines are DI pipe; 32.4% are CI pipe; 4.5% are AC; and 3.5% are GS. The remaining 2.5% of the water lines consist primarily of Municipex, PVC, copper, and HDPE. A report published by the AWWA on the nation's water infrastructure, State of the Water Industry Report (2019), indicates that the nation's aging infrastructure is reaching the end of its life cycle and is in need of replacement. The Roswell Water Utility has lines that have been in the ground since the late 1930's and have exceeded their recommended life span. It is important for the Roswell Water Utility to prioritize water line replacement projects to reduce occurrences of unexpected pipe breaks and ensure customers continue to receive high quality water. The Roswell Water Utility has prioritized the replacement of AC pipe and GS pipe.

Photo of Distribution Crew Member Installing 8" Water Line

The Roswell Water Utility focuses on removing AC pipe from the system and replacing it with DI pipe due to reliability and health concerns. AC lines tend to fail due to previous installation methods and weakening of the concrete when in contact with air. Health and safety of staff are also concerns when conducting emergency repairs on AC pipes. Staff must cut the AC line causing friable asbestos particles to be released into the air and possibly breathed into the lungs of the work crew. Planning the replacement of the AC lines allows staff to work under controlled circumstances easing health and safety concerns. Since 2016, the Roswell Water Utility has replaced approximately 745 linear feet (3.5%) of AC pipes. The Roswell Water Utility anticipates replacing 1,500 to 2,000 feet of AC pipe annually for the next five years. Eight of the top ten prioritized water line replacement projects are identified as AC replacement projects (see **Table 14**).

In 2016, the Roswell Water Utility had approximately 26,322 linear feet of GS pipes within the water distribution system. Since 2016, 11,208 (43%) linear feet of GS pipes have been removed leaving approximately 16,562 linear feet of GS pipes within the distribution system. The utility has identified 32 additional GS loops throughout the water system (see **Figure 8**).

Since 2018, the Roswell Water Utility has prioritized replacing 2" GS pipes due to water quality and pressure concerns. The GS pipes in cul-de-sacs are replaced with new Municipex or HDPE to provide looping which improves water quality, pressure, and flow issues. A majority of the pipe leaks over the past 14 years have occurred on small GS pipes.

- In 2015, the Roswell Water Utility replaced two GS lines in the Shadowbrook Subdivision due to customers complaining of water color; GS lines can turn water a yellowish to brownish color as a result of manganese and iron oxide in the water lines.
- In 2017, a 2" GS line that supplied five homes on Maple Street required replacement due to low pressures. The customers on this line only had 20 psi at their meter boxes due to tuberculation causing the 2" inner diameter pipe to have less than a 2" diameter. The buildup in the line is due to its contact with the treated water.

It is important for the Roswell Water Utility to set aside funds each FY dedicated to water line replacement projects to prevent emergency main breaks, decrease potential for water quality issues, and prevent impacting future development (e.g., cannot meet fire flow demands). The Roswell Water Utility currently dedicates $400,000 per FY towards water line replacement projects. Additionally, it is important for the Roswell Water Utility to have a standard methodology to prioritize line replacement projects so the most vulnerable pipes are replaced first. The Roswell Water Utility maintains a Water Line Capital Improvement Plan (CIP) Matrix (**Appendix D**) that scores and prioritizes water line replacement projects. The matrix consists of the following seven scoring criteria:

- Safety: evaluates if the system meets existing and future fire flow demands;
- Community Improvement: evaluates the probability of future development or re-development in the area. The City's Planning and Zoning Department provides the Roswell Water Utility information on proposed or anticipated re-development for future planning purposes;

- Pipe Age/Condition: focuses on the age and condition of the infrastructure in the ground;
- Water Quality/Breaks/Service Calls: includes number/frequency of water quality complaints, location of water main breaks, and the number of service calls to an area;
- System Upgrade: evaluates improving pressures and flows to an area by creating loops in the system;
- Roswell Department of Transportation (RDOT) Road Projects: coordinates water line projects with RDOT's road projects (paving) saving the City and citizens' disruption time and cost; and
- Pipe Material: evaluates suitability of existing water line material type (CI, GS, AC or DI pipe)

The CIP Matrix is a dynamic tool that allows projects to move up or down the list based on a change in one of the criterion's scores. This could be due to line breaks, water quality issues, future RDOT projects, or future development. **Table 14** is a list of the current top 10 water line projects (as of July 1, 2021), but is subject to change. **Appendix D** provides a summary of water line replacement projects conducted over the past four FYs.

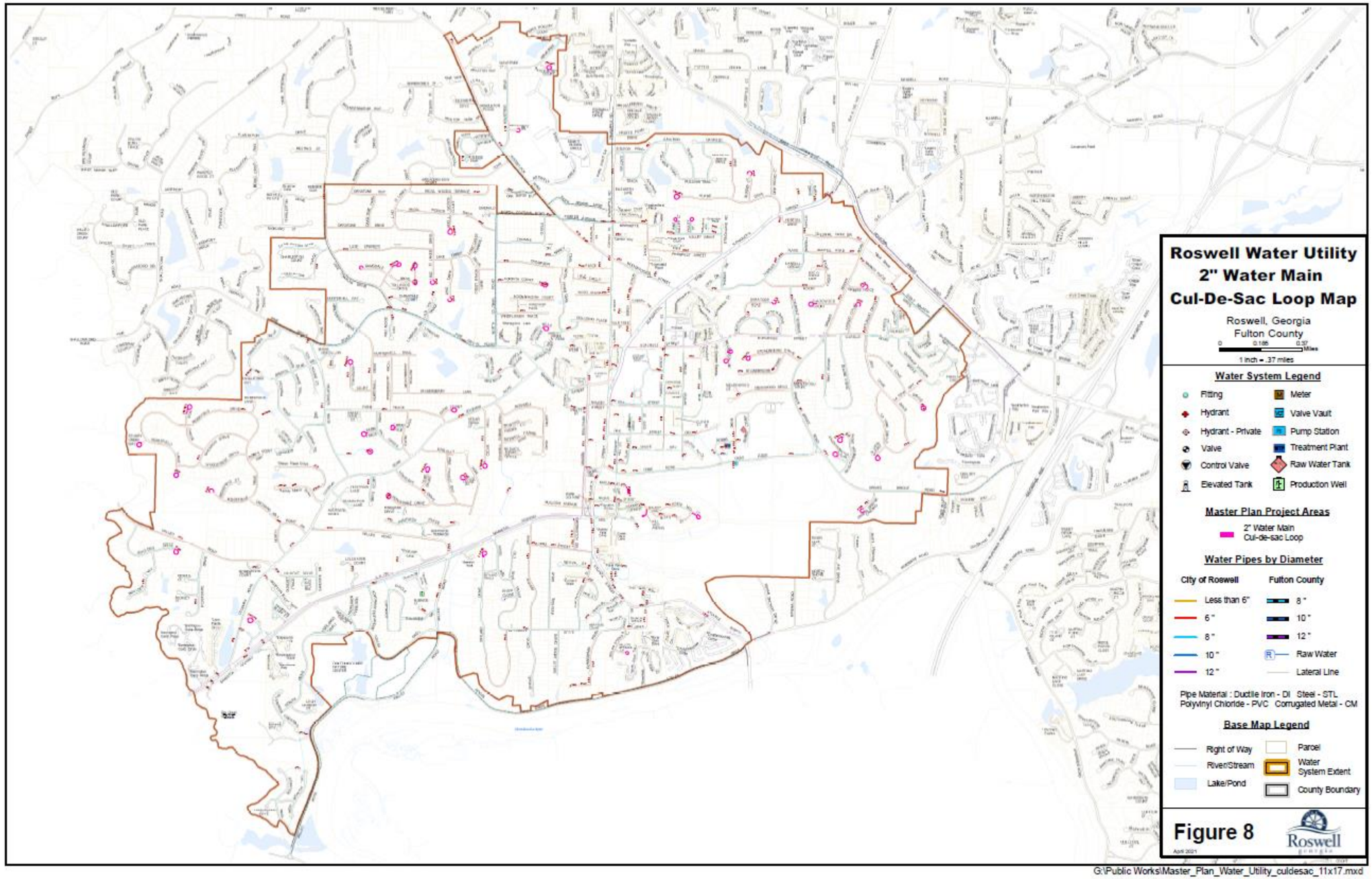


Figure 8. Locations of Remaining 2" GS Pipe within Cul-De-Sacs

Table 14. Top Ten Water Line Replacement CIP Projects (as of July 1, 2021)

Street address	Total Score	Pipe Size & Material	Age of Pipe (years)	Length Linear Feet	Project Type	Estimated Construction Cost
Atlanta Street (Maple Street to Sloan Street)	135	2" GS	-	550	GS Pipe Elimination	$ 192,500
Thompson Place	115	6" AC	53	1,174	AC Pipe Elimination	$ 234,800
Prospect Street	105	6" AC	34	1,735	AC Pipe Elimination	$ 347,000
Connemara Road	105	6" AC	57	2,330	AC Pipe Elimination	$ 466,000
Longleaf Drive	105	6" CI	48	2,140	Improve System Performance	$ 535,000
Maxwell Road	95	6" AC	64	1,076	Improve System Performance & AC Pipe Elimination	$ 215,200
Rocky Creek Lane	95	6" AC	58	340	Improve System Performance & AC Pipe Elimination	$ 68,000
Tuxedo Court	95	6" AC	55	653	Improve System Performance & AC Pipe Elimination	$ 130,600
Tuxedo Drive	95	6" AC	55	950	Improve System Performance & AC Pipe Elimination	$ 190,000
La View Circle	90	6" AC	57	2,240	Improve System Performance & AC Pipe Elimination	$ 448,000
					Total	**$ 2,827,100**

When the new WTP began construction in 2015, the Water Line Replacement Program budget was reduced to $300,000, and in FY16 the program was suspended. The program was reinstituted in 2018 at $400,000 per year. Based on the current Roswell Water Utility's CIP Matrix, there are approximately $21.2 million dollars (as of July 1, 2021) in water line replacement projects. If budgeted spending for these replacements remains at $400,000 annually, there is a 53-year backlog of water line replacements.

4.3 HYDRAULIC WATER MODEL

The Roswell Water Utility maintains a GIS-based water distribution numerical model. The model enables users to simulate the existing water distribution system, prioritize projects, evaluate alternatives, and assist in troubleshooting. The water network model is comprised of a series of nodes and pipes. Nodes represent individual physical assets such as a tank, pump or valve, or a group of assets such as flowmeters.

4.3.1 2016 Model Updates

A major update to the model was completed in November 2016. This update included the addition of the new WTP and development of new demand data. The inclusion of the WTP was completed by coding the high service pump characteristics, pump production and efficiency curves, system production pressures, clearwell water levels, and included operational parameters to mimic actual water plant operations. The development of the new demand data was completed using data from all the AMI meters to create updated diurnal demand curves for water users by class of user. Diurnal demand curves chart the variation in water consumption throughout a day. The AMI data also allowed development of peak day and peak week analyses based on the actual peak data which occurred in June 2016 and July 2016, respectively.

4.3.2 2016 Model Evaluations

In 2016, an enhanced fire flow evaluation of the full system was completed utilizing the 2016 calibrated model. Areas warranting additional model refinement and accompanying field evaluation were identified. Evaluation of field fire flow tests were also completed in 2016 to aid in model calibration and distribution system troubleshooting of the 2016 model.

4.3.3 2021 Model Evaluations

In 2020, the 2016 model was used to evaluate pressures throughout the distribution system to identify specific locations to install i-Hydrants (see Section 5.2.2.2 for background information on i-Hydrants). These i-Hydrants will provide real-time pressure readings to eventually be used to recalibrate the water model.

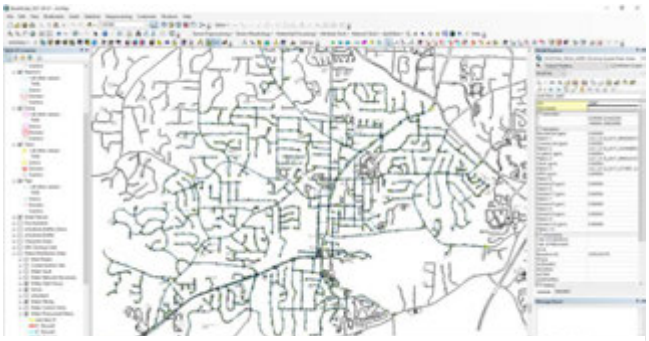


Photo of GIS-Based Water Distribution Model

In 2021, the 2016 model was updated to include pipe replacements (upsizing of pipe) and new pipe that had been installed since the 2016 model update (e.g., new subdivisions and 2" loops at end of residential streets). Additionally, the 2021 updated model went through a quality assurance/quality control process where model-predicted pressures where compared to pressures recorded by i-Hydrants and static pressures recorded during field flow and fire flow tests.

The 2021 updated model was then utilized to conduct a system-wide fireflow analysis to evaluate the ability of each hydrant within the Roswell distribution system to meet specific fireflow demands while maintaining a minimum pressure of 20 psi. The 2021 updated model identified 39 hydrants (5%) that could not meet current fireflow demands. The Roswell Water Utility distribution staff will be conducting field fireflow tests at these hydrants to field-verify the model results.

4.3.4 Future Uses

The 2021 model is in the process of being used to analyze the six interconnections with Fulton County and evaluate which interconnections best serve the Roswell system. This analysis will help evaluate whether all six connections are required or whether one or more of them can be abandoned.

Additionally, the model will undergo another large update to update demand data. Demand data has not been updated since 2016 and the City has experienced an increase in population and development. The model will be recalibrated, similar to the calibration process completed in 2016, with the addition of utilizing the i-Hydrants installed throughout the distribution system.

Future uses of the numerical model could include:

- Evaluation of unidirectional hydrant flushing or implementation of other water quality evaluation tools;
- Evaluation of water age scenarios;
- Utilizing pressure monitoring devices to better calibrate the model with real-time pressure data from the system;
- Update demand data;
- Providing additional hydraulic data for consideration for the water line replacement matrix evaluation;
- Evaluation of other types of system upgrades such as additional finished water storage scenarios (location and size) and distribution growth; and
- Conducting an additional system-wide fire flow analysis to evaluate potential future development impacts on distribution system.

4.4 STAFFING AND TRAINING

The distribution staff includes: Water Distribution Supervisor, two Crew Leaders, two Water Distribution Operator 1s, Meter Technician, and a Water Construction/Backflow Specialist (Figure 4).

4.4.1 Training Requirements

Georgia requires anyone involved in the operation of a municipal water distribution system to hold a State Water Distribution License. The Crew Leaders must have a Water Distribution License. As of July 1, 2021, the Roswell Water Utility's distribution team has eight staff members operating the water distribution system of which six have Water Distribution Licenses. The Stormwater Division also has two personnel with Water Distribution Licenses and can be utilized to help the distribution team if needed. Additionally, the seven WTP operators holding at least a Class III Water Operator License may help the distribution team as needed.

The training requirements established by the State of Georgia require each personnel holding a Water Distribution License to renew their license every two years and have at least 12 CEU's. The CEUs can be obtained similarly to WTP Operator License. The last renewal period ended June 2021 and the next renewal period runs through June 2023.

In addition to holding a Water Distribution License, water distribution personnel must also hold the licenses/certifications listed in **Table 15**. A backflow license is required for Backflow Specialist position and NIMS (FEMA Emergency Management Training) is required for supervisors and management personnel.

Table 15. Required Licenses and Certifications for Water Distribution Operators

License/Certification	Renewal Requirement
Flagging Certification	Every 2 years with renewal class
Confined Space Certification	Every 2 years with renewal class
Work Zone Safety Certification	Every 2 years with renewal class
Competent Person-Trenching and Shoring Certification	Every 2 years with renewal class
Erosion and Sediment Control Level 1A Certification	Every 3 years with renewal class

4.5 PERFORMANCE METRICS

4.5.1 Key Performance Indicators

The AWWA sets standard benchmarking KPI's for utilities to track. The Roswell Water Utility utilizes HiperWeb CMMS to track distribution KPI's and evaluate how well Roswell compares nationally to other utilities of similar size. HiperWeb CMMS organizes the distribution data (e.g., CM, PM, asset management, customer requests, etc.) and quickly generates reports to evaluate progress towards achieving the AWWA benchmarking KPIs. Examples of AWWA benchmarking include:

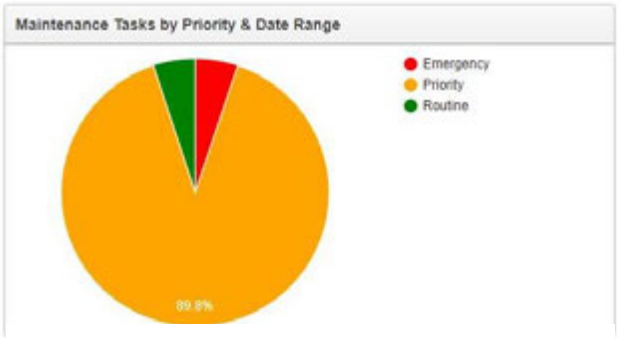


Photo of Example PM vs. CM Report Produced by HiperWeb CMMS

- Average Response time for Emergencies: This tracks the time it takes a staff member to respond to after-hour emergencies. The goal is to respond to all after hour calls within 2 hours. The average response time for Roswell in 2020 was 1.75 hours.
- Number of main breaks per 100 miles of pipe: This tracks the number and location of main breaks. The goal is to reduce this number each year and to be less than a total of ten breaks per year. In 2020, Roswell Water Utility had a total of 36 main breaks of which 12 were caused by contractors.

- Number of Hydrants Inspected and Flushed: This verifies that hydrants are inspected annually and dead-ends are flushed at least twice a year as required. In 2020, the Roswell Fire Department inspected 794 hydrants and Roswell Water Utility had 190 hydrants serviced and flushed.
- Number of Valves Inspected and Exercised: This verifies that 1/3 of the system's valves are inspected and exercised each year as required. In 2020, Roswell Water Utility inspected and exercised 30 of the approximate 1,930 valves (Note: The peak of the COVID pandemic occurred in 2020 and the distribution team had multiple vacancies and employees on sick leave at some point during the year.)
- Number of Meters Replaced: This tracks the meters that are replaced as part of the Meter Replacement Program and verify if the Roswell Water Utility is meeting the goal to test 500 meters annually. In 2020, the Roswell Water Utility replaced 500 meters.
- Water Quality Complaints: This tracks where complaints occur and type of complaint (discolored water or taste and odor). In 2020, the Roswell Water Utility had two taste and odor complaints (purchased water from Fulton County due to WTP being shut-down) and two discolored water complaints.

4.5.2 GAWWA Gold/Platinum Designation

The Roswell Water Utility's distribution system is an award winning system. The Distribution system has won the GAWP/GAWWA Distribution System Operations Excellence award for Small Systems in 2006, 2009, and 2014. In 2015, the GAWP/GAWWA Distribution System Operations Excellence award was revised to a Gold/Platinum designation. In this way, utilities were not competing with each other, but were being scored based on how well the system is being operated and meeting the requirements of GA EPD's Sanitary Survey (see Section 2.9.1). The Roswell Water Utility won the Gold Award for the following years: 2018, 2019, 2020, and 2021. In 2022, the Roswell Water Utility should receive the Platinum award. Once the distribution system achieves platinum status, the Roswell Water Utility will go through the audit process every other year and solely submit documentation in the non-audit year.

5.0 REGULATORY REQUIREMENTS

The City's WTP and distribution system are governed by a multitude of Federal and State regulations and requirements. A significant portion of each WTP operator's work day consists of sampling and analytic activities to stay compliant with the Federal and State Regulations. Additionally, many of the proposed projects within the Recommendations (Section 8) are connected to Federal and State regulatory compliance. **Table 16** summarizes the main Federal and State Regulations for the WTP and distribution system, the actions the Roswell Water Utility currently takes to meet the required regulation, and the associated recommendation/action the Roswell Water Utility plans on taking to meet the regulation in the next five years. Refer to the sections listed in the "Additional Information" column for an in-depth discussion and analysis of each regulatory requirement and historical compliance.

Table 16. Summary of Production and Distribution Regulatory Requirements

Federal / State Regulation	Summary of Regulatory Requirements	Summary of Current Program / Process to Meet Requirement	Additional Information	2022 Master Plan Recommendation
PLANT PRODUCTION				
US EPA's SDWA / GA SDWA	• SDWA passed by Congress in 1974 to protect public health by regulating public drinking water supply • US EPA set national health-based standards to protect public against man-made contaminants • GA passed GA SDWA in 1977 to establish policies, procedures, requirements, and standards to implement US EPA's SDWA	• Roswell Water Utility publishes the Consumer Confidence Report twice a year (available on City's website) • CCR details water quality requirements and sampling results for the Roswell Water Utility	Section 5.1.1 Appendix C	Section 8.1.7 Section 8.1.10 Section 8.1.12 Section 8.2.1 Section 8.2.4
GA EPD Monitoring and Analyses	Not a regulatory requirement to utilize the EPD lab; however, Roswell Water Utility utilizes the GA EPD laboratory for analysis of certain regulated chemicals	Roswell Water Utility utilizes the GA EPD laboratory for: TOC (monthly); THM/HAA (quarterly); nitrates, nitrites, volatile organic compounds (annually); and lead and copper (every 3 years)	Section 5.1.2	
National Primary Drinking Water Regulations	Specifies MCLs for specific contaminants found in drinking water	• Contaminants monitored using WTP laboratory include: total coliforms, turbidity, iron, and manganese. • Contaminants monitored using GA EPD laboratory include: THM/HAA, inorganic chemicals, organic chemicals, radionuclides	Section 5.1.3	Section 8.1.7 Section 8.1.10 Section 8.1.12 Section 8.2.4
Bacteriological (Bac-T) Sampling	• Required as part of Total Coliform Rule • Tests for bacteria, parasites, and viruses (pathogens) that can potentially cause health problems if ingested	• Roswell Water Utility takes 15 bacteriological samples a month • Samples collected at various locations throughout distribution system	Section 5.1.4	Section 8.1.10 Section 8.2.4 Section 8.3.9
Other Sampling Requirements	WTP Operators required to take multiple samples at the WTP throughout the day	• Grab sampling: test of water collected at one time • Composite sampling: combining numerous individual samples taken at regular intervals over a period of time • Continuous monitoring: conducted utilizing on-line instrumentation	Section 5.1.5	Section 8.3.9
Unregulated Contaminant Monitoring Rule 4 (UCMR 4)	• Requires monitoring of high priority unregulated contaminants	• Occurred 2017 – 2021 with sampling between 20018 and 2020	Section 5.1.6	

Federal / State Regulation	Summary of Regulatory Requirements	Summary of Current Program / Process to Meet Requirement	Additional Information	2022 Master Plan Recommendation
	• Used by US EPA to establish future regulatory drinking water requirements • US EPA established new list of high priority contaminants every 5 years	• Sampled for 30 chemical contaminants: 10 cyanotoxins and 20 additional contaminants		
UCMR 5	• Requires monitoring of high priority unregulated contaminants • Used by US EPA to establish future regulatory drinking water requirements • US EPA established new list of high priority contaminants every 5 years	• Will occur 2022 through 2026 with sampling period between 2023 and 2025 • Roswell Water Utility will be required to sample for 30 contaminants, 29 specific PFAS and lithium.	Section 5.1.7	Section 8.3.6 Section 8.3.10
Polyfluoroalkyl Substances (PFAS) Regulations	• US EPA in process of updating regulations for PFAS • PFAS tend to break down very slowly and have been linked to harmful health effects • PFAS regulations will be established once UCMR 5 has been completed	Roswell WTP will be required to comply with updated PFAS regulations and update current chemical treatment processes if needed.	Section 5.1.8	Section 8.3.6 Section 8.3.10
Lead and Copper Rule	• US EPA updated Lead and Copper Rule in December 2020 to better protect public from risks of lead exposure • Updated rule emphasizes protecting children at schools and child care facilities, removing lead from public and private infrastructure, and increasing public education	Roswell WTP currently uses corrosion inhibitors to reduce potential for lead and copper contamination within distribution pipes.	Section 5.1.9	Section 8.3.6 Section 8.3.10
DISTRIBUTION				
Cross Connection Control Program	• Required by the US EPA SDWA and GA EPD • Goal is to protect public and private water systems from backflow contamination	• Roswell Water Utility staff identifies customer connections that may pose a risk to public water system • Backflow protection must be installed; type of protection based on potential contamination type • Roswell Water Utility maintains database of medium and high hazard backflow devices; these devices required to be tested annually	Section 5.2.1	Section 8.1.12
Water Loss Control Program Water Audit Leak Detection/Repair	• GA EPD requires utilities to develop Water Loss Control Programs to investigate, assess, and implement	• Roswell Water Utility developed a Water Loss Control Program in 2016 and updates the program annually	Section 5.2.2	Section 8.2.1 Section 8.2.2 Section 8.2.3

Federal / State Regulation	Summary of Regulatory Requirements	Summary of Current Program / Process to Meet Requirement	Additional Information	2022 Master Plan Recommendation
Meter Testing/Replacement	efforts to improve water supply efficiency • Water Audit: The GWSA requires water utilities to conduct an annual water audit and submit results to GA EPD • Leak Detection Program: Part of Water Loss Control Program to identify leaks within the system and reduce non-revenue water. • Meter Testing/Replacement: AWWA accuracy standard requires meters to be between 98.5% and 101.5% accurate. As meters age, they don't account for all water that flows through them, resulting in lost revenue.	• Water Audit: Roswell Water Utility has conducted and submitted water audits for the past 15 years. The 2020 water audit identified 3 areas for improvement: volume from own sources; customer retail until charge; and unauthorized consumption. • Leak Detection Program: Roswell Water Utility surveys the entire water system over a three-year period and leaks are repaired within 24 hours of identification. • Meter Testing/Replacement: Roswell Water Utility has a Meter Replacement Program with goal of testing up to 500 meters per year with an annual budget of $75,000 to replace meters not meeting AWWA accuracy standard or meters greater than 15 years old		
Hydrant Maintenance and Flushing	• Hydrants are required to be inspected annually • Hydrants are to be used to flush dead-end distribution lines	• Roswell Water Utility and Roswell Fire Department inspect each hydrant at least once a year • Roswell Water Utility flushes dead-end lines once in spring and in fall	Section 5.2.3	Section 8.2.4
Valve Exercising	Water utilities are required to have a valve exercising program; Roswell's program has a goal to exercise at least one-third of the valves each year.	Valves that are 2" or smaller are turned by hand, larger valves turned by Vermeer Vac trailer with valve exerciser.	Section 5.2.4	
Water Conservation	The MNGWPD has a water conservation plan for metro district utilities requiring municipalities to develop water conservation programs.	The Roswell Water Utility developed a Water Conservation and Drought Management Plan that is updated annually.	Section 5.2.5 Appendix F	Section 8.2.3
Lead and Copper Rule	• US EPA updated Lead and Copper Rule in December 2020 to better protect public from risks of lead exposure • Updated rule emphasizes protecting children at schools and child care facilities, removing lead from public and private infrastructure, and increasing public education	• Roswell Water Utility started the lead and copper service line inventory due 12/22/2024 • Waiting on GA EPD to set deadlines for remaining requirements	Section 5.2.6	Section 8.3.6 Section 8.3.10

5.1 PRODUCTION REGULATORY PROGRAMS

The City's WTP operation is governed by a multitude of Federal and State regulations and requirements. The Roswell Water Utility and WTP staff must stay current with updated regulations and testing procedures and testing of contaminants as required for compliance with US EPA, GA EPD, and MNGWPD requirements. There are a number of significant programs of note. The following programs are either ongoing or were completed during the last five year period:

- US EPA's SDWA / GA SDWA – Ongoing
- GA EPD Monitoring and Analyses – Ongoing
- National Primary Drinking Water Regulations - Ongoing
- Bacteriological (Bac-T) Sampling – Ongoing
- Other Sampling Requirements - Ongoing

In addition to the items identified above, there are other requirements that will affect the Roswell Water Utility and WTP during the next planning horizon. These include:

- Unregulated Contaminant Monitoring Rule 4 (UCMR 4) – Completed
- UCMR 5 – Required in next five years
- Update to Polyfluoroalkyl Substances (PFAS) Regulations - Expected from US EPA in late 2023
- Update to Lead and Copper Rule – Implementation during next five years

5.1.1 US EPA's Safe Drinking Water Act / GA Safe Drinking Water Act / GA Water Supply Act

The SDWA was passed by Congress in 1974 to protect public health by regulating public drinking water supply. The SDWA authorizes the US EPA to set national health-based standards that each public water utility must follow to protect the public against both naturally-occurring and man-made contaminants that may be found in drinking water. GA EPD then passed the GA SDWA of 1977 to establish the policies, procedures, requirements, and standards to implement the US EPA's SDWA. The rules and regulations of both the US EPA SDWA and the GA SDWA are detailed in the Georgia Water Supply Act. The GA SDWA specifies approved water treatment techniques, operation procedures, required chlorine residuals within the distribution system, and establishes primary and secondary MCLs for drinking water.

Appendix C contains the latest CCR for the Roswell Water Utility. This document is published twice a year and posted on the City of Roswell website. The report details water quality requirements and the sampling results for the Roswell Water Utility. See Section 3.9.1 for additional information on CCRs.

5.1.2 GA EPD Monitoring and Analyses

The Roswell Water Utility uses the GA EPD laboratory for monitoring and analysis of certain chemicals: total organic carbon (TOC) is analyzed monthly; trihalomethanes (THM) and HAA are analyzed quarterly; and nitrates, nitrites, volatile organic compounds, and inorganic compounds are analyzed annually. Every three years the GA EPD laboratory tests the lead and copper samples taken from the Roswell Water Utility system.

5.1.3 National Primary Drinking Water Regulations

Along with the previously mentioned regulations under the US EPA SDWA / GA SDWA / and the Georgia Water Supply Act, the Roswell Water Utility is required to comply with the National Primary Drinking Water Regulations that specifies MCLs for specific contaminants found in drinking water and the common sources of the contaminant. The contaminants that are monitored using the laboratory at the WTP include:

- Total Coliforms (including *E.coli* – MCL of 0
- Turbidity – MCL of 0.3 nephelometric turbidity units
- Iron – MCL of 0.3 milligrams per liter (mg/L)
- Manganese – MCL of 0.5 mg/L

The contaminants that are monitored at the WTP using the GA EPD laboratory include:

- Disinfection Byproducts (THM/HAA) – MCL of 0.06 mg/L and 0.08 mg/L, respectively
- Inorganic Chemicals – Various MCLs
- Organic Chemicals – Various MCLs
- Radionuclides – Various MCLs

5.1.4 Bacteriological (Bac-T) Sampling

The National Primary Drinking Water Regulations sets the MCL for contaminants in the drinking water but certain contaminants have their own set of rules and regulations. The Total Coliform Rule became effective in 1990 in Georgia and was revised in 2016. The rule states:

Total coliforms are a group of related bacteria that are (with few exceptions) not harmful to humans. A variety of bacteria, parasites, and viruses, known as pathogens, can potentially cause health problems if humans ingest them. US EPA considers total coliforms a useful indicator of other pathogens for drinking water. Total coliforms are used to determine the adequacy of water treatment and the integrity of the distribution system.

Photo of Certified Laboratory Located at WTP

The Roswell Water Utility is required to take 15 bacteriological samples a month to evaluate the integrity of the distribution system. The number of routine samples collected per month or quarter is based on the population served. These samples are collected at various locations throughout the water distribution system.

5.1.5 Other Sampling Requirements

A significant portion of each WTP operator's work day consists of sampling and analytic activities. Water samples at the WTP are collected by two different methods, grab sampling and composite sampling. A grab sample is a test of water that is collected at one time. Operators collect grab sample at various intervals throughout the day, based on the parameter being analyzed. A composite sample consists of combining numerous individual samples taken at regular intervals over a given period of time. The composite sampling at the WTP is typically conducted over a 24 hour time period.

In addition to the individual grab and composite sampling, a number of analytical parameters are monitored continuously through the use of on-line instrumentation. Parameters such as pH and turbidity are monitored continuously, and grab and composite samples are analyzed periodically by WTP staff to verify accuracy of the on-line instruments.

5.1.6 UCMR 4

The UCMR is a rule that requires monitoring of high priority unregulated contaminants in drinking water at public water systems across the country. The data collected as part of the UCMR is then used by the US EPA to establish future regulatory drinking water requirements. The US EPA establishes a new list of high priority unregulated contaminants every five years and the fourth UCMR was 2017 through 2021 with a sampling collection period between 2018 and 2020. UCMR 4 required sampling of 30 chemical contaminants: 10 cyanotoxins and 20 additional contaminants (metals, pesticides, brominated haloacetic acid (HAA) disinfection byproducts, alcohols, and semi-volatile organic chemicals). The Roswell Water Utility fully complied with the requirements of UCMR 4.

5.1.7 UCMR 5

The fifth UCMR will apply to the calendar years 2022 through 2026 with a sampling collection period between 2023 and 2025. UCMR 5 will place a very high emphasis on PFAS by sampling for 30 total contaminants, 29 specific PFAS and lithium. PFAS are part of a group of manufactured chemicals that have been used in industry and

consumer products since the 1940s. They are still widely used, long lasting chemicals, containing components that break down very slowly in the natural environment. Scientific studies have shown that exposure to some PFAS in the environment may be linked to harmful health effects in humans and animals. The Roswell Water Utility will be required to start sampling for the 30 contaminants starting in 2022.

5.1.8 Update to PFAS Regulations

The US EPA is in the process of updating regulations for PFAS in drinking water since they tend to break down very slowly in waterways and have been linked to harmful health effects. Once nationwide monitoring is completed through UCMR 5, the US EPA will establish national primary drinking water regulations for PFAS that would set enforceable limits and require public water supplies to conduct continued monitoring of the substances. The Roswell WTP will be required to comply with the updated PFAS regulations and update current chemical treatment processes or add additional treatment processes (e.g., ozone, etc.) if needed. Based on the location of the watershed that Roswell utilizes for it drinking water source, the Utility is not expecting issues with these upcoming regulations, but will have to monitor these developments in the next several years.

5.1.9 Update to Lead and Copper Rule

On December 22, 2020, the US EPA published updates to the Lead and Copper Rule to better protect the public from the risks of lead exposure. The updated rule places an emphasis on protecting children at schools and child care facilities, removing lead from both public and private drinking water infrastructure, and increasing distribution of educational material around lead in drinking water. The Roswell Water Utility currently utilizes corrosion inhibitors (poly orthophosphate) at the WTP to reduce the potential for lead and copper contamination within distribution pipes. See Section 5.2.6 for additional information on the Updated Lead and Copper Rule and required implementation schedule.

5.2 DISTRIBUTION REGULATORY PROGRAMS

The Roswell Water Utility **must** have the following programs in place to remain compliant with the US EPA, GA EPD, and MNGWPD:

- Cross Connection Control (Backflow Prevention)
- Water Loss Control Program
    - Water Audit
    - Leak Detection and Repair
    - Meter Testing and Replacement
- Hydrant Maintenance and Flushing
- Valve Exercising
- Water Conservation
- Update to Lead and Copper Rule

5.2.1 Cross Connection Control Program

In accordance with the Federal SDWA and the requirements of GA EPD, the Roswell Water Utility has had a Cross Connection Control Program in place since 1990. The program is reviewed annually and updates are made as needed. The last update to the program was made in 2007.

The purpose of the program is to protect the Roswell Water Utility's public system and the customer's private water systems against backflow. The backflow can contain contamination or pollutants that may have entered the customer's potable water system through an uncontrolled cross-connection within the customer's premises. The most common example of a cross connection is a garden hose in a swimming pool.

As part of the City's Cross Connection Control Program, Roswell Water Utility staff identify customer connections that can pose a risk to the City's public water system. The type of backflow protection required is based on the potential contamination type, hazardous contaminants (high hazard) or non-hazardous pollutants (medium hazard).

Residential customers who consume water for indoor and minimal outdoor use without permanently installed irrigation systems are deemed to present minimal or no potential hazard (low hazard). The Roswell Water Utility staff installs dual check backflow devices at the water meter for low hazard customers.

The Roswell Water Utility maintains a database of installed medium and high hazard backflow devices. These devices are required to be tested on an annual basis to ensure the device is working properly. The Roswell Water Utility mails annual notices to customers with these devices, along with a list of Roswell Water Utility-approved testers, to remind the customers that their device is due to be tested. Routine inspections by Roswell Water Utility staff ensure the device is installed properly and has been tested. The Roswell Water Utility currently has three staff members who are certified to test these devices.

To protect testing integrity, the Roswell Water Utility has a policy in place that a tester must agree and adhere to in order to remain on the Roswell Water Utility's approved testers list. As part of the policy, the tester must take a before and after picture of the device and install a test tag on the device so that Roswell Water Utility personnel know who last tested the device and on what date.

5.2.2 Water Loss Control Program

In 2010, the Georgia Senate approved the Georgia Water Stewardship Act (GWSA), requiring water utilities to submit annual water loss audits and illustrate improvement in efficiencies through water loss abatement programs. As a result of the Water Stewardship Act, in 2015 the GA EPD approved GA Rules and Regulation 391-3-33, "Rules for Public Water Systems to Improve Water Supply Efficiency", requiring the Roswell Water Utility to develop a Water Loss Control Program by July 1, 2016. Under the developed Water Loss Control Program, the Roswell Water Utility is required to investigate, assess, and implement efforts to improve water supply efficiency. A copy of the Roswell Water Utility's current Water Loss Control Program is located **in Appendix E**. Water Loss Control programs are to be updated annually and may include, but are not limited to, the following:

- Water loss abatement (including distribution system water leakage detection and repairs);
- Finished water meter flow verification;
- Customer water meter testing and calibration;
- Resource allocation (including planned preventive maintenance); and
- Revenue recovery activities.

The Water Loss Control Program discussed here includes: water audit, water loss abatement through leak detection and leak repair, and meter testing and repair/replacement.

5.2.2.1 Water Audit

As part of the Water Loss program, the 2010 GWSA requires water systems to conduct an annual water audit according to the International Water Association/AWWA methods and submit audit results to GA EPD. The Roswell Water Utility has conducted and submitted water audits for the past 15 years and strives to improve audit numbers annually. The 2020 Water Audit (**Appendix E**) identified three areas for the Roswell Water Utility to improve the validity of its data as follows:

1. Volume from Own Sources - This is a measurement of the treated water pumped into the system through the "master meter". The master meter is tested annually for accuracy. The audit recommends repair or replace meters outside of +/- 3% accuracy and to investigate new meter technology.
2. Customer Retail Unit Charge – This represents the charge that customers pay for water service. Due to the limitations of the City's billing software, the Roswell Water Utility is not able to calculate a weighted average of individual costs and number of customer accounts in each water consumption tier.
3. Unauthorized Consumption – This is a measurement of water illegally withdrawn from fire hydrants, illegal connections, bypasses to customer consumption meters, or tampering with metering or meter reading equipment. To address this, in 2020 and 2021 the Roswell Water Utility installed a total of 100 i-Hydrants (see Section 5.2.2.2 for background information on i-Hydrants) throughout the system to alert staff in pressure drops, potentially due to theft.

5.2.2.2 Leak Detection Program

Photo of a Water Main Leak

The Roswell Water Utility implemented a Leak Detection Program in 2006 which utilizes leak detection loggers to listen to the water lines and evaluate if there are leaks in the system. In 2006, the Roswell Water Utility purchased four Itron ZCORR loggers to help find leaks. If leaks are found, the leaks are repaired. This is a proactive approach to help reduce the potential for emergency water main breaks, water loss, and property damage. The City's entire water system is surveyed over a three-year period and leaks are periodically found. In 2010, the Roswell Water Utility purchased 10 Aclara ZoneScan loggers to accelerate the process of surveying the system. With the additional equipment, the entire system is surveyed in 2.5 years.

In 2018, the entire system was surveyed by an outside vendor who found seven leaks. These leaks were repaired within 24 hours of identification. In 2019, the leak detection loggers failed, preventing the Roswell Water Utility from surveying 1/3 of its system. The leak detection loggers were sent for repair/replacement immediately upon identification of failure.

The Roswell Water Utility is always looking for new technologies to detect and repair leaks more efficiently. In 2020, the Roswell Water Utility installed eight M&H i-Hydrant Technology on hydrants as a means to continuously detect leaks and monitor pressure and temperature within the distribution system. The data is uploaded to a web-based dashboard in real-time. In 2021, the Roswell Water Utility installed 92 additional i-Hydrants to effectively monitoring pressure and temperature throughout the entire distribution system. In 2022, the Roswell Water Utility is contracted to install 400 leak detection devices throughout the distribution system. The M&H i-Hydrant and leak detection technology will alert staff to drops in pressure due to main breaks or theft of water, temperature changes in the water which can affect water quality, and monitor for small leaks at night and provide a snap shot of the system the next day. This will aid in the reduction of water loss due to leaks and theft and improve the efficiency of staff to find and repair leaks.

5.2.2.2.1 Leak Repairs

Photo of GS Line Being Replaced in a Cul-De-Sac

The Roswell Water Utility's goal is to repair leaks within 24 hours. The Water Distribution staff verifies the leak within 2-hours of customer identification to assess the extent of the leak and dispatch others, as needed, to make repairs. Many of the leaks that staff respond to are related to blown gaskets at fittings, aging infrastructure, or contractor damages. For calls received after 5 PM (Monday through Friday) or on the weekends, the Roswell Police Department dispatches the call to all Water Distribution staff. Currently, one staff person responds to these after-hour calls to evaluate if the leak is on the City's or the customer's side of the meter. If it is on the City's side of the meter, the on-call person will make repairs or call in others to assist. On-call responsibilities are rotated on a weekly basis among Water Distribution staff.

5.2.2.2.2 Historic Leak Summary Data

The Roswell Water Utility tracks main breaks/leaks by pipe size and material as shown in **Figure 9** and has seen a reduction in main breaks/leaks over time since the Leak Detection Program was implemented. Many of the leaks/breaks that occur are due to changing seasons (fall to winter, winter to spring) and contractor damages. Through replacing aging water lines and improved water line locating, the Roswell Water Utility has seen a decrease in main breaks/leaks and contractor-related damages.

Over the past 14 years, most of the main breaks have occurred on small GS pipes. Since 2018, the Roswell Water Utility has been actively replacing these lines with new Municipex or HDPE pipe. In 2016, the Roswell Water Utility had approximately 26,322 linear feet of GS pipes within the water distribution system. Since 2016, 11,208 (43%)

linear feet within cul-de-sacs have been replaced. Depending on approved capital budgets, the Roswell Water Utility plans to replace all GS lines within the next four years. In 2020, the Roswell Water Utility saw the highest number of breaks on GS and CI mains since the implementation of the Leak Detection Program in 2006 at 23 and 13 breaks, respectively.

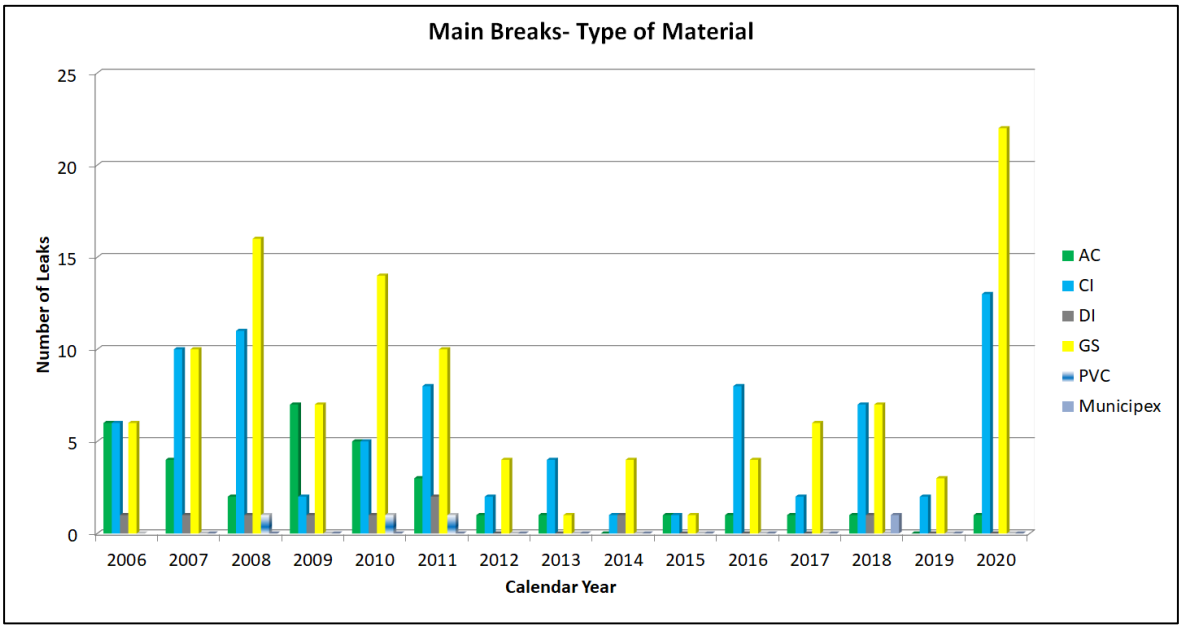


Figure 9. Water Main Leaks/Breaks by Material Type

The Roswell Water Utility also tracks service line breaks by pipe size and material. Most of the service line breaks/leaks are on blue poly pipe. As blue poly and GS lines are discovered, they are immediately scheduled for replacement. As depicted in **Figure 10**, there were 59 blue poly pipe breaks in 2019, about 3.7 times more than in 2018. In 2020, the number increased to 64. The total number of breaks/leaks on service lines continues to increase. In 2018, the total number of breaks/leaks was 37, in 2019 it was 93, and in 2020 it was 151. The Roswell Water Utility also saw an increase in breaks/leaks on service lines that were "not recorded" (up from 16 in 2019 to 47 in 2020) which indicates the leaks were at the meter box or due to blown gaskets.

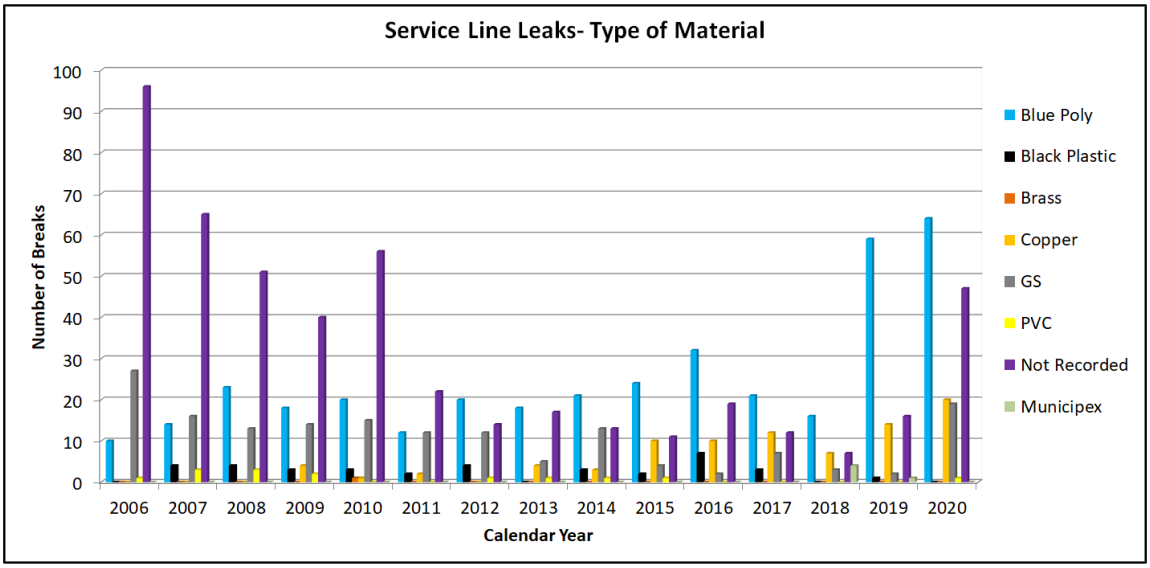


Figure 10. Service Lines Leaks/Breaks by Material

5.2.2.3 Meter Testing and Replacement

The Roswell Water Utility has a Meter Replacement Program with a goal of testing up to 500 meters per year (ranging in size from ¾" to 8") with an annual budget of $75,000. The Meter Replacement Program was initiated in the 1990s, suspended in 2011, and then re-instituted in 2018. As meters age, they don't account for all the water that flows through them, resulting in lost revenue. The AWWA indicates that a meter's useful life is approximately 10 years, however, the Roswell Water Utility has found through testing that many of the meters still meet AWWA accuracy standards beyond the 10-year time frame. The AWWA accuracy standard requires meter to be between 98.5% and 101.5% accurate. Meters that fail to meet the AWWA Meter Accuracy Standards are repaired or replaced.

Table 17 summarizes the number of meters by meter size the distribution team strives to annually test. Actual number of meters tests varies by year due to distribution staff availability and priorities.

Table 17. Summary of Water Meters Planned for Annual Testing

Meter Size	Number of Meters Tested Annually
3/4" thru 1"	373
1.5" thru 2"	56
3" thru 8"	58
Fire Line	13
Total	**500**

Note: The City's WTP's master meter is also tested annually for accuracy.

In 2011, the Roswell Water Utility replaced a total of 4,100 meters (3,500 small meters [3/4" to 1"] as part of the AMI Implementation project, 500 meters as part of the Meter Replacement Program, and 100 new installs). In 2016, the Roswell Water Utility participated in the GEFA Technical Assistance Program to test large meters 1.5" up to 8". The Roswell Water Utility had 53 large meters tested as part of this grant and found 23% of the meters failed to meet the AWWA Meter Accuracy Standards. The meters were 15 years of age or older and were replaced. In 2020, the Roswell Water Utility replaced seven multi-family meters that had resulted in approximately $5,544 in lost revenue (in 2020).

Additionally, as of March 1, 2020 the City's Finance Department produces a monthly report of meters registering no usage. The Roswell Water Utility staff utilizes this report to create work orders to investigate and possibly replace non-working, damaged, or outdated meters.

5.2.3 Hydrant Maintenance

The Roswell Water Utility has approximately 796 public fire hydrants. Of the 796 hydrants, there are three different barrel sizes as listed below in **Table 18**.

Table 18. Roswell Water Utility Fire Hydrants

Barrel Size	Number of Fire Hydrants
4 ¼"	28
4 ½"	494
5 ¼"	274

The Roswell Water Utility is replacing the 4 ¼" barrel sized hydrants with new 5 ¼" barrel sized hydrants each budget year or as new or replacement water lines are installed. The distribution system currently has several different manufacturers' hydrants installed as shown in **Table 19**. In 2012, the Roswell Water Utility updated its

Standard Construction Specifications to allow only three manufacturer's models to be installed: M&H 129 hydrant, Mueller Super Centurion 250 Hydrant, and US Pipe M94 Hydrant. This was done to ensure an adequate parts inventory for repair of these hydrants. The Roswell Water Utility prefers the M&H 129 hydrant because all of its parts are backwards compatible with earlier versions of this model. As hydrants are replaced with one of the three approved hydrants, an isolation valve is installed (if not already present) to isolate water lines during main breaks and/or maintenance. In 2020, the Roswell Water Utility updated its Standard Construction Specifications to require at least one i-Hydrant technology to be installed every two to three new hydrants within residential subdivisions.

Table 19. Water System Hydrant Manufacturers

Name of Manufacturer	Number of Hydrants
American Darling	35
AP Smith	1
AWWA	7
Clow	1
Kennedy	4
M&H	426
Mueller	256
US Pipe	66

The Roswell Water Utility is responsible for repairing public fire hydrants. The maintenance of the hydrants is shared between the Roswell Water Utility Division and the Roswell Fire Department. If during inspection or operation, a hydrant is found to be inoperable, or in need of major repairs, the hydrant is reported to the Roswell Water Utility Division and tagged as out of service or bagged.

5.2.3.1 Hydrant Flushing

The Roswell Water Utility utilizes fire hydrants to flush distribution lines due to their ease of operation and high flow capability. The Roswell Water Utility flushes dead-end lines twice a year, once in the spring and in the fall, to reduce the potential for water quality issues from occurring within the area. The Roswell Fire Department assists the Roswell Water Utility with this program during routine hydrant maintenance. The Roswell Water Utility also has seven Hydro-Guard automatic flushing units located at the end of distribution lines which run weekly to ensure that water is continually moving in the system.

Photo of Hydrant Flushing

5.2.3.2 Hydrant Security

The Roswell Water Utility is identifying ways to protect the water system from potential contamination, as well as from theft of water. The US Department of Homeland Security has identified the fire hydrant as a means of access for someone to contaminate a water system. Over the years, the Roswell Water Utility has worked to identify cost effective means to prevent this from taking place as well as respecting the Roswell Fire Department's need to access the fire hydrant for life safety purposes. The most cost effective measure would be to place a locking device on the hydrant to prevent unauthorized access to it while at the same time not hindering the Roswell Fire Department's need to access it quickly in the time of an emergency. This involves placing a Captivator Cap on the hydrant nozzle that could only be removed by a special wrench.

The cost of the cap is:

- 2.5" Captivator Cap = $170

- 4.5” Captivator Cap (Pumper Nozzle) = $305
- Captivator Wrench = $185

Of the 796 hydrants in the system, there are 101 two-hole hydrants (two 2.5” nozzles) and 695 three-hole hydrants (two 2.5” nozzles and one 4.5” pumper nozzle). The cost to retrofit all of the hydrants would be approximately $500,000. In conjunction with Fulton County, the Roswell Water Utility plans to accomplish this as a phased-in approach, retrofitting about 10% of hydrants per year. As water mains are replaced, the captivator cap would be specified to be included. The Roswell Water Utility plans to add it to the Standard Construction Specifications for new developments.

The 100 M&H i-Hydrant technology installed on fire hydrants will also help the Roswell Water Utility identify instances of theft. Since installation, the i-Hydrant technology has alerted Roswell Water Utility staff of three drops in pressure where others were illegally using water from hydrants. Upon receiving the pressure drop alert, staff were dispatched to the site where they were able to observe the illegal use of hydrant water.

5.2.4 Valve Exercising

The Roswell Water Utility is required to have a valve exercising program. Roswell’s valve exercising program has a goal to exercise at least one-third of the distribution system’s valves each year. Valve exercising is conducted by distribution staff and is conducted to assure reliable operation of the valve and maintain water quality within the system. Each valve is rotated through a full cycle and returned to its normal position. Valves that are 2” or smaller are turned by hand while the 6”, 8”, and 12” valves are turned using a Vermeer Vac trailer with valve exerciser.

Photo of Crew Exercising a Valve

5.2.5 Water Conservation

Water conservation measures are extremely important in Georgia due to the tristate water wars and the cyclical occurrence of droughts. The requirements for water conservation measures are outlined in the Water Contingency Planning Task Force – Findings and Recommendations Report (Task Force Report) dated December 2009. The Roswell Water Conservation Plan meets the requirements outlined in the Task Force Report and identifies ongoing and future measures to reduce per capita water use.

The MNGWPD creates a water conservation plan for metro district utilities. The GA EPD reviews Roswell Water Utility’s programs periodically to verify that the Roswell Water Utility meets the MNGWPD requirements for conservation. The City’s Water Conservation Plan provides the following conservation measures (**Appendix F**):

- An increasing three-tiered water rate structure;
- A toilet rebate program for single-family residential, multi-family residential, and commercial communities;
- Public education;
- Residential and commercial water audits;
- Drought restrictions for outdoor watering (set by GA EPD);
- Use of captured rainwater or water reuse for irrigation at government facilities;
- Rain sensor shut-off mechanisms at City Parks and Recreation irrigation systems; and
- Ordinances for the following:
    - Wasting water
    - Plumbing fixtures
    - Car wash recycling
    - Landscaping/Irrigation

In keeping with the outlined conservation measures, the City installed high efficiency toilets and urinals in its government buildings in 2018. The City also participated in ARC’s Toilet Rebate Program until 2015. In 2015, the City took over the management of the Toilet Rebate Program and expanded it to include multi-family customers. In 2021, the toilet rebate program was expanded again to include commercial customers. As of November 2019, the

City has replaced 992 units, with an estimated daily water savings of 17,400 gallons. The City still reports provided rebates to ARC.

5.2.6 Update to Lead and Copper Rule

On December 22, 2020, the US EPA published updates to the Lead and Copper Rule to better protect the public from the risks of lead exposure. The updated rule places an emphasis on protecting children at schools and child care facilities, removing lead from both public and private drinking water infrastructure, and increasing distribution of educational material around lead in drinking water. Some of the main components of the updated Lead and Copper Rule that the Roswell Water Utility will need to comply with include:

- Complete inventory of lead and copper service lines on both the private and public side within three years (by December 22, 2024);
- 20% of all schools and child care facilities served by the City's WTP must be sampled annually and notified of sampling results;
- 3% of lead service lines (public and private) must be replaced annually (replacement program required to be started by 2024);
- Rapid implementation of corrosion control treatment must be completed for locations where sampling results exceed 10 parts per billion (ppb [new trigger level]);
- Additional water quality monitoring must be conducted where sampling results exceed 15 ppb; and
- The public must be notified within 3 days if sampling results from a home exceed 15 ppb and they must be notified within 30 days if sampling results are less than 15 ppb.

In 2021, the Roswell Water Utility started working on the lead service line inventory and will be working on the lead service line sampling and lead service line replacement to remove lead from the system.

6.0 CLIMATE RESILIENCY

As weather patterns change and become more extreme and demand increases due to increases in population, the Roswell Water Utility will need to plan to provide high quality water to customers during periods of drought as well as during larger, high intensity storm events. During periods of drought, flows in Big Creek may be below permitted levels of withdrawal, preventing the WTP from withdrawing water. Conversely, flows and turbidity in Big Creek may be too high during high intense storm events, preventing the WTP from withdrawing water. During periods when the WTP cannot withdraw water, the Roswell Water Utility can utilize water stored in the 10 MG raw water storage tank and/or three finished storage tanks to meet demand. Operational procedures require the raw water tank to be kept full as much as practical. If the period of drought or high flows exceed the storage capacity of the raw water and finished storage tanks, the Roswell Water Utility can purchase water from Fulton County through the six interconnects.

As population within Roswell has increased (as shown in **Table 4**), water demand has also been steadily increasing as shown in **Table 20.** Maximum day demand reached 2.97 MGD in 2020. Historically, the highest demand is typically during the summer months when the probability for drought is also the highest.

Table 20. Water Demand Trends

Parameter (MGD)	2017	2018	2019	2020
Average Daily Demand	1.45	1.51	1.69	1.76
Maximum Month Demand	1.63	1.70	2.18	2.07
Maximum Day Demand	1.98	2.15	2.47	2.97
Peak Weekly Demand	1.77	1.90	2.16	2.30

The WTP is currently permitted to withdraw a monthly average of 2.8 MGD from Big Creek which is below the plant's designed capacity of 3.3 MGD. If the demand is projected to be greater than 2.8 MGD, the Roswell Water

Utility can request to modify its current permit to increase withdrawal to a monthly average of 3.3 MGD. Additionally, to help combat the projected increasing demand, the Roswell Water Utility has implemented a Water Conservation Plan required by MNGWPD. The plans goal is to reduce the City's overall per capita water consumption through conservation programs and initiatives designed for residential and commercial customers.

Finally, as climate changes and storms produce more rainfall, additional nonpoint source pollutants such as nitrogen and phosphorus may also increase. The Roswell Water Utility, in conjunction with the MNGWPD, developed a Source Water Assessment Plan identifying potential point source and nonpoint source pollutants and evaluated the WTP's susceptibility to those pollutants. If an increase in nonpoint source pollutants does occur, the WTP can adapt to the changes by altering the chemicals in the water treatment process. Sufficient chemicals are always safely stored on site for reacting to water quality changes. If the chemicals cannot be altered to provide safe drinking water due to the increase in nonpoint source pollutants, the WTP will not withdraw from Big Creek and will either use raw water stored in the on-site raw water tank or purchase water from Fulton County until pollutant levels return to normal.

6.1 RISK AND RESILIENCY REPORT

On March 17, 2021, a risk and resiliency assessment was performed in conjunction with a third party consultant on the Roswell Water Utility using the US EPA Vulnerability Self-Assessment Tool (VSAT) Web Version 2.0. The US EPA developed and maintains VSAT Web to serve as a hazard assessment tool for water and wastewater utilities to meet America's Water Infrastructure Act of 2018 (AWIA) requirements. VSAT is used to assess hazards from malicious events as well as from weather and climate related events. The AWIA requires water utilities to conduct risk and resiliency assessments of specified assets such as raw water tank, finished water tanks, etc. The methodology is based on assessing the risk from a specific threat or hazard for a specific asset, where risk is defined as:

Risk (R) = Threat (T) X Vulnerability (V) X Consequences (C)

- T = Likelihood that the threat will be perpetrated or occur against the asset;
- V = Likelihood that the threat will damage the asset, considering the effectiveness of countermeasures; and
- C = Economic (cost to the utility and region) and public health (injuries and deaths) impacts resulting from damage to the asset.

A monetary value of illness and life are assigned to injuries and deaths, respectively, so that risk can be evaluated as a single monetized value. Results from VSAT Web Version 2.0 helps water utility owners and operators prioritize threats with the highest risks and evaluates the cost-effectiveness of countermeasures to reduce the identified risk.

Three risks identified in the report included the items listed below. The City will address these items as several are discussed in Section 8 of this Master Plan.

- Lack of an alternate power supply (generator) – See Section 8.1.4
- Lack of participation in Georgia Water/Wastewater Agency Response Network (WARN) - See Section 8.3.11
- Off-site security monitoring – See Section 8.1.11

The Roswell Water Utility certified completion of the Risk & Resiliency Assessment on June 20, 2021.

6.2 EMERGENCY RESPONSE PLAN

Based on the results of the Risk and Resiliency Assessment, the Roswell Water Utility updated their Emergency Response Plan describing actionable items to help mitigate the identified risks. The Emergency Response Plan was completed and certified to the US EPA by December 20, 2021 to meet the requirements of the AWIA. The updated Emergency Response Plan addresses standard operating procedures and actions to take should emergency events occur. It defines such items as required safety equipment, emergency contact lists (internal and external to the Roswell Water Utility) and training requirements for staff. The Emergency Response plan is a "living document" and the Roswell Water Utility staff will update and refine the plan on a regular basis (at least annually) as well as conduct staff training exercises.

7.0 FINANCIAL ANALYSIS

A primary objective of this Master Plan Update is to maintain financial sustainability for the Roswell Water Utility Enterprise Fund. The availability of reserve funds has been limited for the past several years due to: debt service payments associated with the new WTP, capital investments, and operational modifications. This section presents a summary of the water fund status through the end of FY26, together with forecasts to assess potential policy options to enhance financial sustainability.

Following a critical review of available data, Roswell Water Utility staff prepared a pro forma model to forecast future fund status based on the current fund status and policies together with forecasted revenue and expenses. The key assumptions and methodology used in the forecasting model and staff's assessment of financial sustainability options are summarized in the remainder of this section.

7.1 RECENT EVENTS AFFECTING WATER FUND STATUS

Notable events that have occurred since the 2016 Master Plan that are included in this analysis are:

- In 2019, the City revised and adopted the current rate structure which is an increasing block rate with 3 tiers and a monthly base rate service charge based on meter size.
- In 2019, City Council passed a 4-year annual rate increase that includes 4% annual increases effective July 2020, 2021, 2022, and 2023.
- In 2019, the Roswell Water Utility optimized chemical dosing at the WTP based on results from a Chemical Optimizing Study and saved $8,711 in FY21.
- In 2020, the Roswell Water Utility implemented real-time pricing rate with Georgia Power to decrease electrical bills associated with WTP power consumption.
- In 2020, the Roswell Water Utility replaced seven large meters (3" through 8") that were under-registering flow as recommended through AWWA standards.
- In 2021, a 9% salary increase for all employees was instituted based upon results from a compensation study conducted by the City.
- Utility billing reminders were updated to help reduce the number and dollar value of delinquent accounts.
- The Roswell Water Utility continued its ongoing review of Water Fund fees and charges, including:
    - Updated multi-family conservation rate tiers to accurately reflect the number of units and mirror the residential tier structure.
    - Implemented a capacity fee for additional and/or larger water meter purchases to recover the portion of the cost of the new WTP that is available to future growth.

7.2 CURRENT RATES AND FEE SCHEDULE

The current rates and fees are included in their entirety in **Appendix G**. **Table 21** below summarizes the current monthly billing structure (as of July 1, 2021) for a typical residential customer, which promotes water conservation by increasing the unit price of water over three tiers of consumption.

Table 21. Roswell Water Utility Residential Consumption Tiers as of July 1, 2021

Residential Water Rates By Service Size	Base Service Charge	0 – 5,000 gallons	5,001 - 10,000 gallons	Greater than 10,000 gallons
5/8-3/4"	$5.72	$4.70	$9.40	$14.10
1"	$10.80	$4.70	$9.40	$14.10

One notable concern with the current rate structure is its high dependence on consumption. **Figure 11** shows that approximately 80.2% of fund revenue is due to metered water consumption, 15.3% is from the monthly base service charge, and 4.5% is from new service fees. The high percentage of revenue from water sales may leave the Roswell

Water Utility vulnerable during emergency conditions such as droughts. The Roswell Water Utility must sell water to fund base operating expenses for operations, maintenance, and replacement of existing infrastructure.

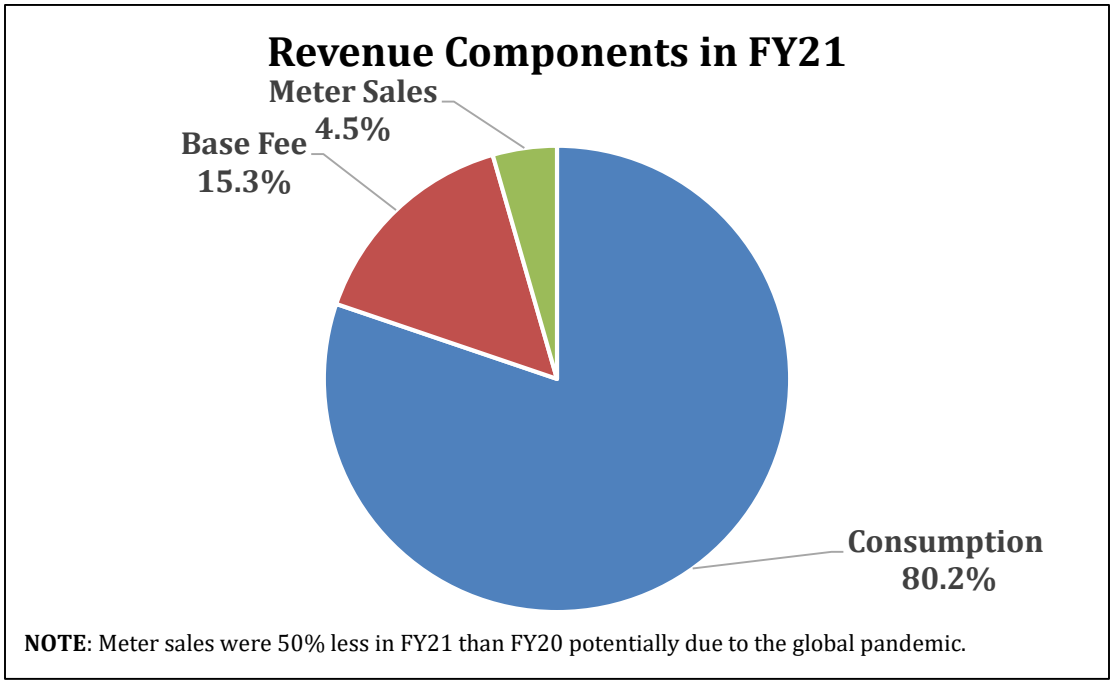


Figure 11. Revenue Components in FY21

Figure 12 shows revenue of water sales by month and illustrates the highly variable monthly revenue pattern. Consumption based revenues during the highest revenue month were about 1.5 times the consumption based revenue during the lowest consumption month. Steps that would level revenues would be advantageous from a business operations perspective.

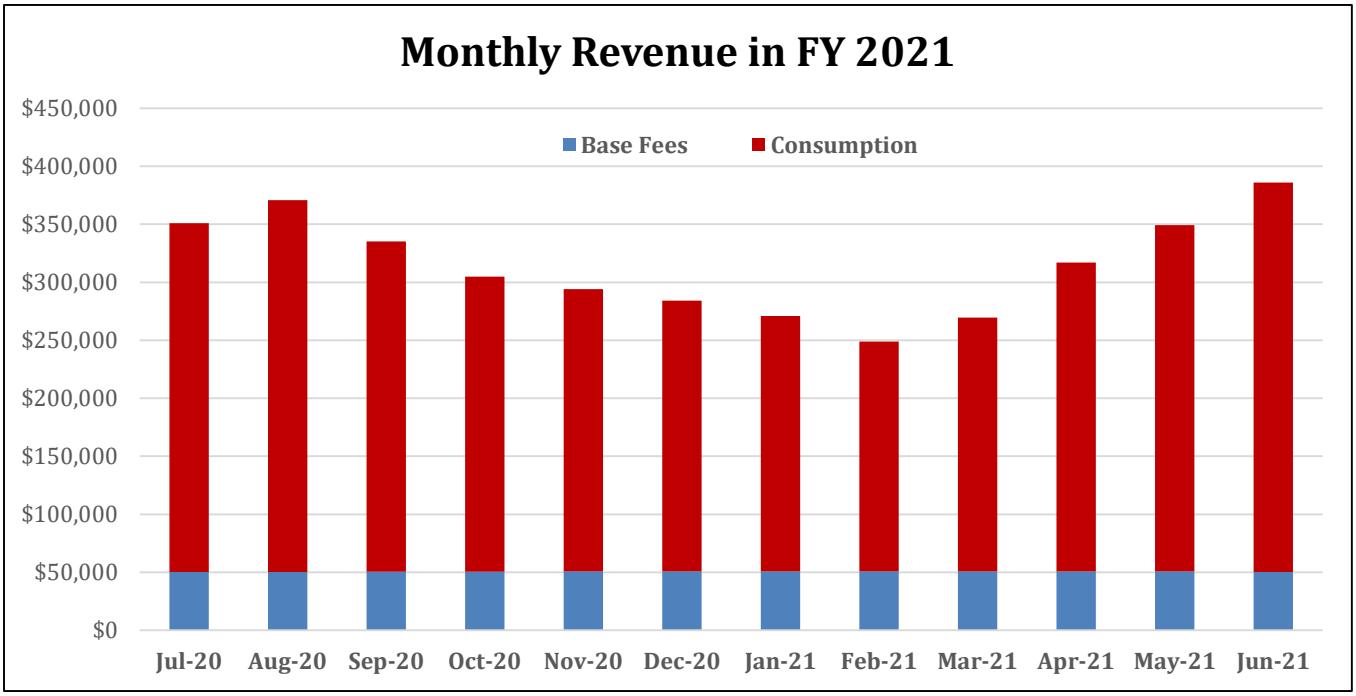


Figure 12. Breakdown of Monthly Revenue in FY21

7.3 CAPACITY FEE SCHEDULE

On June 29, 2016, Mayor and Council approved Resolution Number 2016-06-40 (**Appendix H**) establishing a schedule of rates, service charges, consumption levels and deposits for water service. **Table 22** provides the adopted Capacity Rates for new customers connecting to the existing water distribution lines or existing customers asking for additional density. The proposed fee does not apply to existing customers replacing their home with comparable density and water system demand. The proposed fee will recover the cost of investment paid from the fund as future growth buys a share of the available capacity in the system. The Capacity Rates have not been updated since approved by Mayor and Council in 2016. The Roswell Water Utility will evaluate whether an update to Capacity Rates are necessary for FY25, concurrent with evaluation of rate increases. Since 2016, there have been approximately 318 additional customers added to the Roswell water distribution system.

Table 22. Capacity Rates

Meter Size	ERU Equivalent	Rate
5/8" and ¾"	1.00	$ 1,500
1"	1.78	$2,700
1.5"	7.50	$11,200
2"	10.66	$16,000
3"	11.52	$17,300
4"	39.81	$59,700
6"	46.00	$69,000
8"	51.47	$77,200

NOTE: An ERU equals one Equivalent Residential Unit; each unit in a multi-family development is one (1) ERU; the Capacity Rate is the number of units times $1,500.

7.4 RESIDENTIAL CONSUMPTION AND REVENUE BY CONSERVATION TIERS

Consumption and revenue generated within each consumption tier in FY21 for residential properties was evaluated. Due to the varying tier levels and number/type of meter for multi-family and commercial based consumption, a comparative analysis was not conducted. **Table 23** below summarizes the FY21 consumption and revenue for each conservation tier for residential customers. Most of residential consumption, 59.9%, falls within Tier 1, while Tier 3 has the lowest residential consumption, 14.3%. This is a change from the 2016 Master Plan where 37.8% of residential customers were in Tier 1 and 36.4% of residential customers were in Tier 3. The decrease in Tier 3 consumption and increase in Tier 1 consumption indicates residential customers are conserving water usage.

Table 23. FY21 Residential Consumption and Revenue by Conservation Tier

Description	Tier 1 0 to 5,000 gallons	Tier 2 5,001 to 10,000 gallons	Tier 3 Above 10,001 gallons
Gallons	194,227,254	41,759,247	15,427,029
Revenue in dollars	$878,149	$377,511	$209,195
Percentage	59.9%	25.8%	14.3%

7.5 COMPARISON WITH OTHER LOCAL UTILITY RATES

Roswell is a small system in a large metropolitan area and remains competitive with similar utilities. Comparable utilities water rates (as of December 2020) are shown in **Figure 13**, based on the most recent water rate survey completed by GEFA and the Environmental Finance Center at the University of North Carolina. The Environmental

Finance Center and GEFA conduct annual water and wastewater rates surveys of nearly all local government and many non-profit utilities in the State of Georgia.

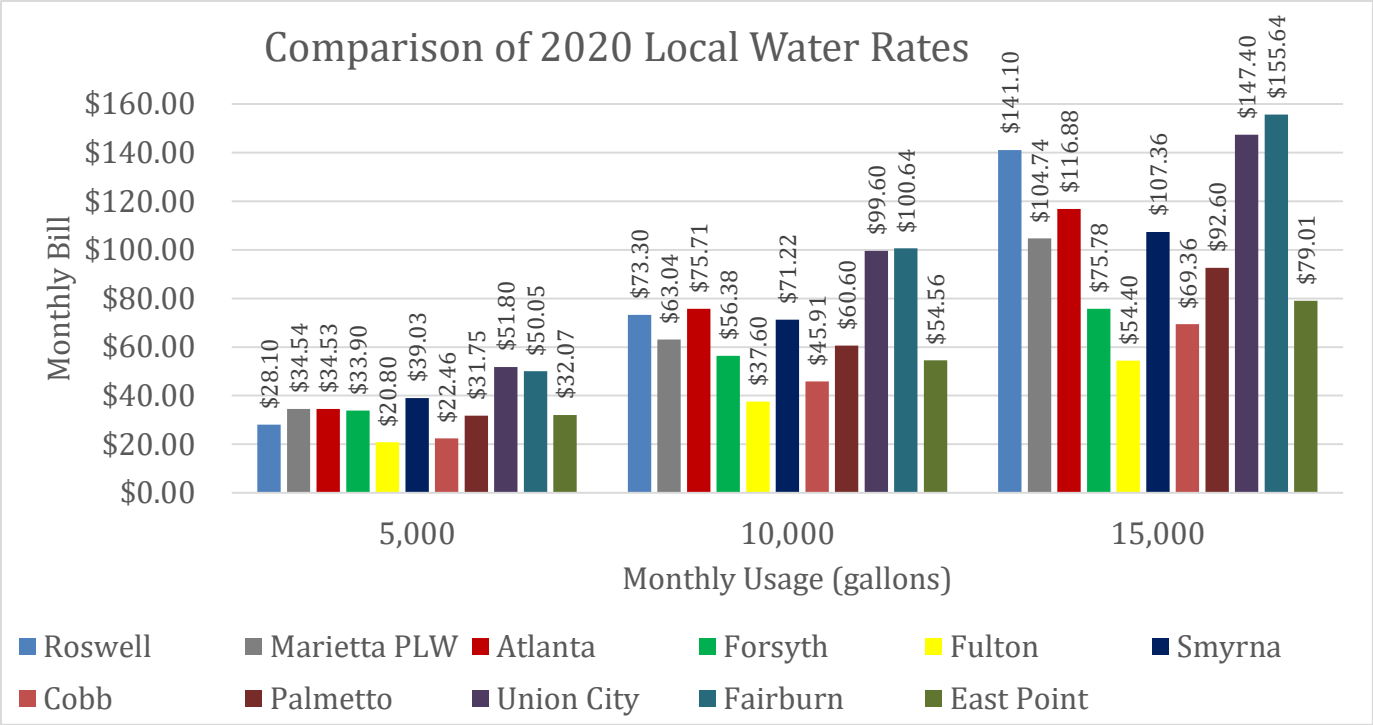


Figure 13. Comparison of Water Rates amongst Local Municipalities

7.6 2021 ANNUAL RATE ADJUSTMENT AND INFLATION

As a general business practice, staff recommends the Roswell Water Utility maintain its current rate policy that includes an annual percentage increase that is reasonably close to inflation. A policy of modest regular increases to keep pace with inflation is a best practice, and is recommended by the Environmental Finance Center at the University of North Carolina, GAWP, AWWA, and GEFA. Due to an increase in capital and maintenance costs, the Roswell Water Utility increased the annual percentage rate increase above inflation to complete required projects while maintaining a sustainable reserve fund for emergencies.

Historical inflation data can be summarized in terms of the year over year increase in the Consumer Price Index (CPI), as computed and published by the United States Bureau of Labor Statistics. **Figure 14** shows this data as presented by the Bureau of Labor Statistics. The past 4 years (July 2017 – July 2021) has been below average for historical inflation at 2.05% compared to the past 30-year average inflation rate is 2.28%.

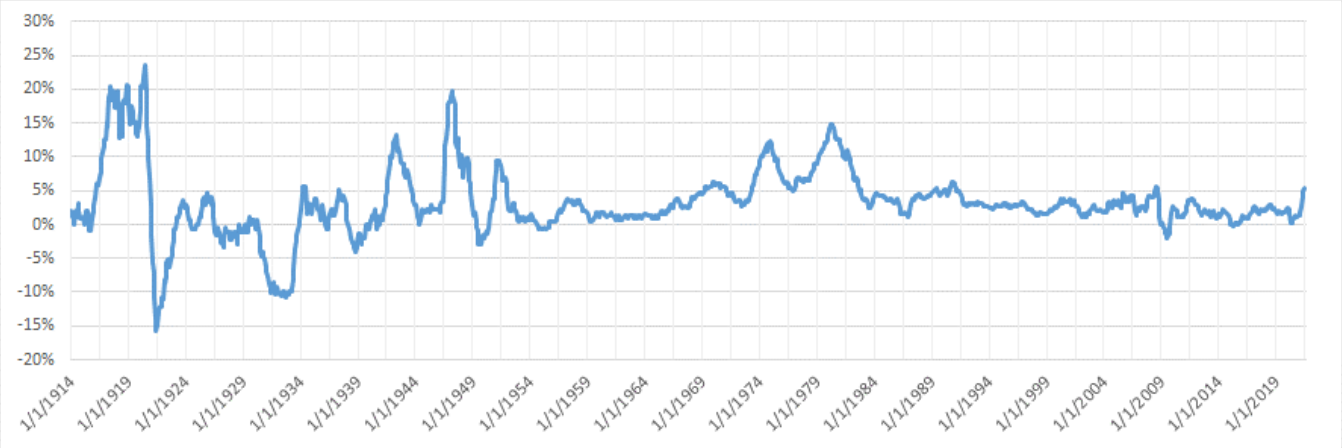


Figure 14. Historical Inflation between 1/1/1914 and 7/1/2021

7.7 OPERATING EXPENSES

Roswell Water Utility staff review and annually update the operating program expenses based on best available data. The most significant shift in program expenses was due to upgrading and/or replacing WTP equipment, replacing old distribution water lines, replacing GS water lines, adding loops within the distribution system that previously dead ended, and maintaining/replacing vehicles. The Roswell Water Utility did not see a large impact on expenses from COVID-19. Chemical and operating costs remained consistent with years prior to COVID. The main financial impact of COVID on the Roswell Water Utility was the purchase of protective supplies (e.g., masks, gloves, disinfectant, etc.).

7.7.1 Variable Water Production Costs

Since the opening of the new WTP in April 2016, the Roswell Water Utility has slowly continued to increase production due to an increase in population and demand. In 2016, the plant averaged 1.66 MGD production during its first seven months of operation and in 2020, the plant averaged 1.76 MGD production. The plant is designed to produce up to 3.3 MGD; however, the current GA EPD issued water withdrawal permit (Permit Number 060-1209-01) limits monthly average withdrawal from Big Creek to 2.8 MGD. The increase in capacity has reduced the Utility's reliance on purchased water from Fulton County to meet increasing demands.

The Roswell Water Utility saved $184,853.24 in purchased water from Fulton County in the first seven months of operation. The dollar amount purchased from Fulton County in the past 10 years is shown in **Figure 15**. Once the new WTP opened in April 2016, the Roswell Water Utility's reliability on purchased water from Fulton County to meet water demand significantly decreased. A slight increase in water purchased from Fulton County occurred in 2019 because of the plant's inability to withdraw water from Big Creek during high streamflows. The Roswell Water Utility saw an increase in water purchased from Fulton County in 2020 when compared to 2018 due to the plant being shut-down for maintenance and due to a power outage.

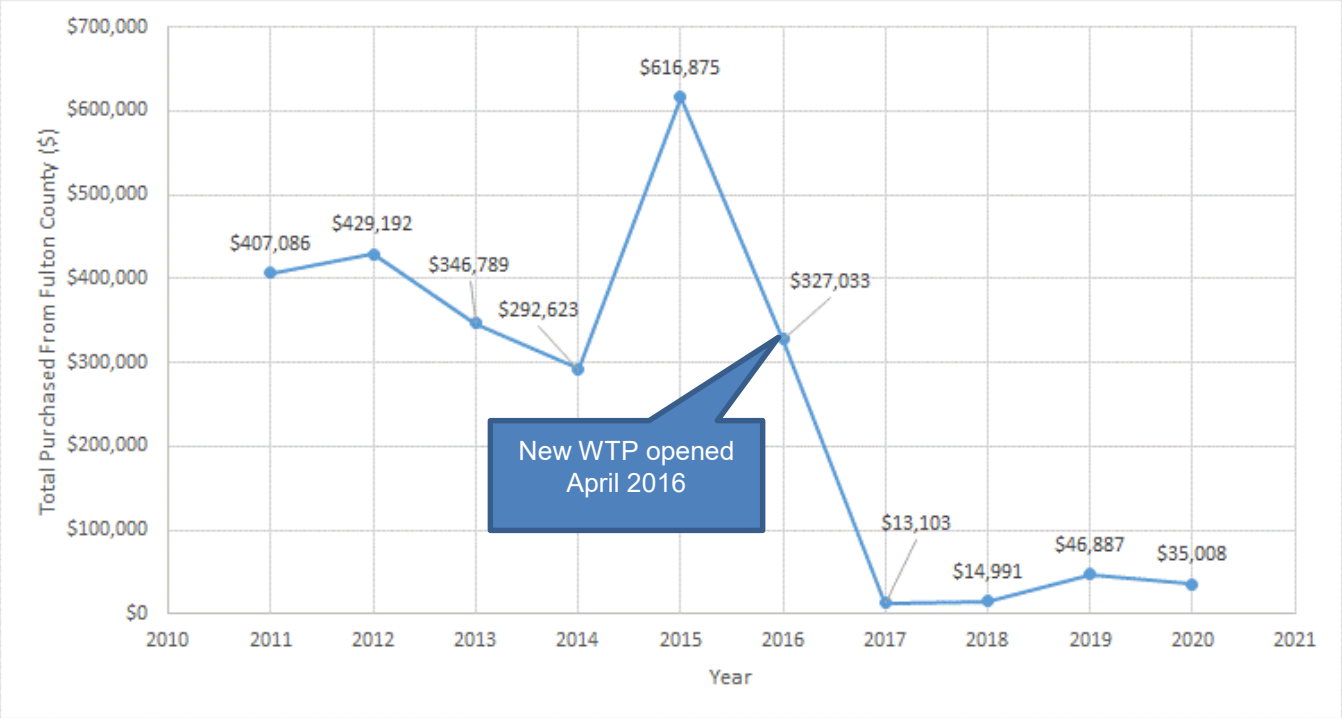


Figure 15. Total Dollars of Water Purchased from Fulton County (2011 - 2020)

Additionally, the annual electricity budget was reduced from $140,000 to $100,000 for FY22 due to real-time electricity pricing. A real-time pricing rate with Georgia Power was implemented in 2020 to help reduce electrical costs associated with WTP power consumption. The real-time pricing structure altered some plant operations including, running the raw water pumps between 11:00 pm and 11:00 am when electricity costs are low and shutting the pump off during peak times if possible. Using real-time electric pricing, the Roswell Water Utility saved approximately $59,687 in 2020 as shown in Section 3.3.1.1. The annual chemical budget has remained steady at $138,000 based on chemical consumption figures and current market pricing.

7.7.2 Water Distribution Operations

The Roswell Water Utility has a Meter Replacement Program with a goal of testing up to 500 meters with an annual budget of $75,000 (see Section 5.2.2.3 for additional information on the Meter Replacement program). It is important for the Roswell Water Utility to continue to budget $75,000 each FY to test and replace meters.

In FY17, the Roswell Water Utility increased the support and services for the Sensus AMI network; therefore, the Roswell Water Utility increased the budget in FY18 to $18,000 annually. The increased support and services included storage and maintenance of three years of AMI data hosted on their network. Sensus would be responsible for maintaining the server and the site to host the data.

The Roswell Water Utility also plans to implement a Hydrant Security Program in conjunction with Fulton County to meet a Homeland Security requirement to protect the potable water system from the introduction of a hazard, whether accidental or intentional, into the public water supply. Under this program, the Roswell Water Utility staff will retrofit hydrants with security devices to prevent unauthorized access to a hydrant. A secondary benefit of this program is preventing theft of water. The Roswell Water Utility will need to set aside about $50,000 each FY for about ten years to protect all public hydrants within the distribution system.

7.8 CAPITAL COST ESTIMATES

Capital costs depends upon adequate repair and replacement of the physical facilities that produce and distribute drinking water. The City's WTP was an example of a necessary facility replacement needed to sustain the system.

Since, the replacement of the WTP in 2016, the water system capital investments shifted from production expenses to distribution related programs and investments, to the extent permitted by fund balance. Now with the plant being over five years old, it is important to budget for potential replacement of WTP equipment.

The Roswell Water Utility has many capital needs in both infrastructure and equipment based on the life cycle of the asset. These have been divided into two categories: production and distribution. **Table 24** illustrates the capital needs for the WTP and distribution system over the next 8 FYs. Over the next 8 FYs, most capital will be designated for replacement of old water lines and GS piping, increasing the efficiency and reliability of the system. A detailed CIP for both the water distribution and the WTP is located in **Appendix I**.

Table 24. Water Fund Capital Project Summary

	FY2022	FY2023	FY2024	FY2025	FY2026	FY2027	FY28-29
Production							
Equipment Replacement	$78,000	$240,000	$365,000	$1,730,000	$65,000	$670,000	$160,000
Replacement Vehicles	-	-	$10,000	-	-	-	-
Replace Elevated Tank	-	-	-	-	-	$250,000	$1,750,000
Production Subtotal	**$78,000**	**$240,000**	**$375,000**	**$1,730,000**	**$65,000**	**$920,000**	**$1,910,000**
Distribution							
Water Line Replacement	$400,000	$320,000	$400,000	$400,000	$300,000	$200,000	$450,000
Equipment Replacement	-	$80,000	-	-	-	-	-
Replacement Vehicles	-	-	-	-	-	-	-
Distribution Subtotal	**$400,000**	**$400,000**	**$400,000**	**$400,000**	**$300,000**	**$200,000**	**$450,000**
Total Capital	**$478,000**	**$640,000**	**$775,000**	**$2,130,000**	**$365,000**	**$1,120,000**	**$2,360,000**

7.9 PRELIMINARY REVENUE, EXPENSE AND RATE ANALYSIS

The Priority Based Budget system and FY20 actual costs provide the basis for the current pro forma analysis. The Roswell Finance Department ran a 5-Year pro forma to look at projected revenues and expenses (operational and capital). Financial forecasts for: salary increases, health care costs, general inflation as tracked by the CPI, and debt service were provided by the Finance Department and are consistent with all current City financial forecasting methodologies.

The current pro forma analysis shown in **Figure 16** summarizes the Roswell Water Utility's projected operating and capital expenses in relation to revenues, affecting the ending unrestricting fund balance. A 4% water utility rate increase was approved by Mayor and Council through July 1, 2023 (FY24). Historically, the approved annual increase was 1.5%, except for a 2.5% increase on July 1st of 2019. Due to increases in capital and operating expenses and payment of debt service from the new WTP, the Water Fund's projected expenses exceeded projected revenues and the remaining fund balance was projected to decline. The forecast shown below assumes

the annual rate increase will decrease to 3% starting in FY25, close to the projected inflation rate. This appears to be a sustainable financial forecast for the next projected five years.

Starting in FY26, a large capital project is projected to commence: design and installation of a new water tank. The Roswell Water Utility will need to consider obtaining a new GEFA loan to financially prepare for the large capital expenditure. It is also important to note that the Roswell Water Utility evaluates rate increases annually to verify projected operating and capital expenses and projected revenues are sustainable.

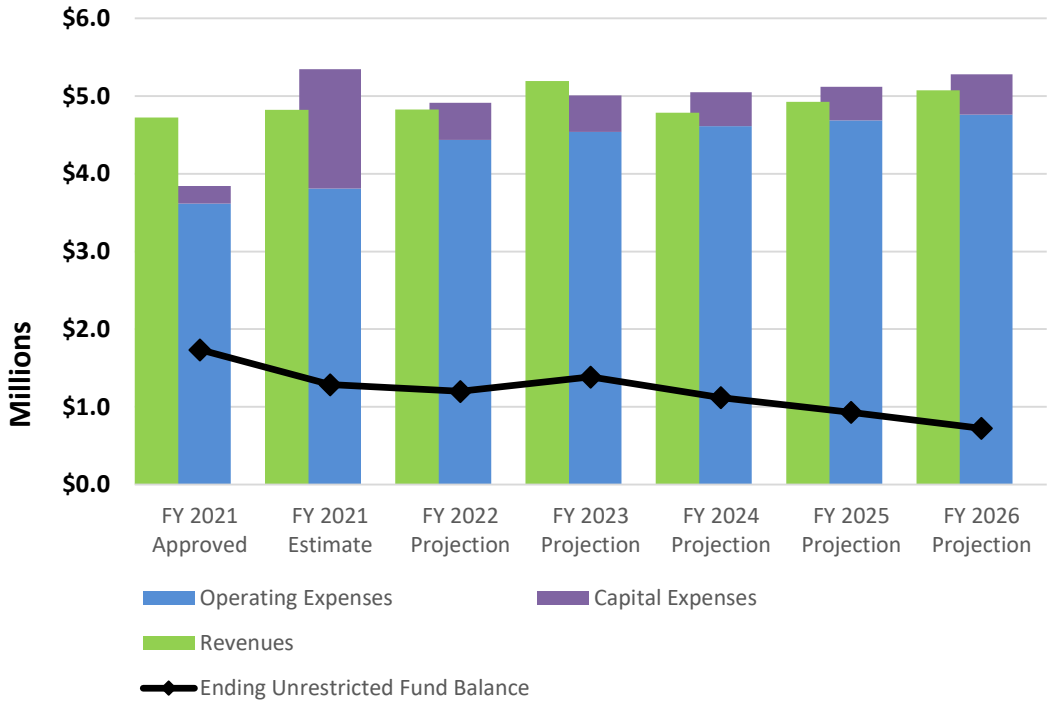


Figure 16. Revenue and Expense Forecast Based on Current Rate and Fee Schedule

7.10 MAINTAIN FINANCIAL SUSTAINABILITY

7.10.1 Adjust Base Account Fees to Reduce Revenue Variability

As indicated in Section 7.2, the Roswell Water Utility's current rate structure is highly dependent on consumption. Instead, staff recommends increasing the portion of revenues recovered through the fixed monthly base fee to stabilize monthly revenues and recover a greater portion of the fixed costs of account maintenance, metering, and billing systems. Section 8.3.2 describes a potential alternative to the current rate structure.

7.10.2 Adjust Rates to Continue Financial Sustainability

The 2016 Master Plan indicated that steps to increase fund revenues were needed to keep pace with inflation. As a result, starting on July 1, 2020 (FY21), the annual rate was increased from 2.5% to 4%, increasing revenue to match projected expenses. It is recommended that the Roswell Water Utility continue to adopt a policy of annual rate adjustments that mirror the forecast inflation of fund expenses. See Section 8.3.3 for recommended future rate adjustments.

8.0 RECOMMENDATIONS

Recommendations for the Roswell Water Utility for the next five years (FY23 - FY27) are presented in this section. The recommendations are based on the goal of maintaining a sustainable, independent water system, in alignment

with the City's Strategic Plan. The recommendations presented are divided into three major areas: plant production, distribution, and operations/administration.

Tracking the progress and success of Master Plan initiatives is an important part of building a strong and resilient utility. **Table 1** presents the recommendations from the 2016 Master Plan and their status. **Table 28** at the end of this section, summarizes the recommendations for this Master Plan, containing both new items and continuing items from the 2016 Master Plan.

8.1 PLANT PRODUCTION RECOMMENDATIONS

8.1.1 Optimize Production Electricity and Chemical Use

As indicated in Section 3.3.1, the WTP spends approximately $1.92 to produce 1,000 gallons. The WTP staff is continuously working to lower production cost through optimization of power and chemical use. Staff instituted the real-time power program with Georgia Power in 2020 and has seen significant reductions ($59,687) in the first twelve months. Staff will continue to optimize run time on major equipment, primarily the large pumping stations, to further reduce power costs. For example, staff changed the operation time of the raw water pumps to occur at night, during off peak hours to leverage lower rates. Additionally, staff plans to evaluate using real-time electricity pricing at the groundwater well once the well becomes operational and sufficient electricity data is collected.

In 2018, WTP staff in conjunction with a consultant, conducted a chemical optimization study. Chemical feed rates and application points were evaluated and the individual chemicals previously utilized were adjusted. As a result of the optimization study, chemical costs have declined by approximately 33%, even as plant flows have increased. Staff will continue to evaluate other operation procedures with a goal of optimizing power and chemical use.

8.1.2 Maintain/Optimize Facility Asset Management Program

The current WTP was placed into service in 2016 and has been operating for over five years. As discussed in Section 3.4, the WTP staff have utilized a number of industry best practices to evaluate, maintain, and optimize the life of the equipment at the facility. These approaches are focused on the most critical and costly equipment, and have included:

- Vibration Analysis and Monitoring
- Infrared thermography
- Oil analysis

The WTP staff utilizes the data from these technologies, along with industry standard metrics, to assist in the development of the WTP's capital rehabilitation and replacement program. Several of the recommendations included within this section (blower and pump replacement, piping coatings, etc.) are tied directly to the asset management program.

The Roswell Water Utility currently uses HiperWeb CMMS for many plant activities including asset management. This software provides a system for data management, scheduling, and work order generation and other modules for maintenance of assets and financial planning. The WTP staff has been working over the past year to input cost and condition assessment data into HiperWeb CMMS and is currently finalizing KPIs for major equipment. This software also forecasts the WTP equipment repair and/or replacement costs, assisting the Roswell Water Utility staff in developing capital budgets. The costs are currently generated through 2029 so staff can better understand and prepare for future expenditures. Over the coming years the staff will continue to fine tune the asset management program to more effectively manage current maintenance and plan for future repair and replacement.

8.1.3 Replace/Add Elevated Water Tank

The Roswell Water Utility has three elevated storage tanks for potable water in the distribution system. These tanks help meet daily water demands, provide capacity for fire protection, and control pressures within the water distribution system. There are currently two 500,000 gallon tanks and one 75,000 gallon tank, providing the system with 1.075 MG of water storage.

In alignment with the City's Strategic Plan, particularly the goals of "Safe and Secure Community" and "Exceptional Quality of Life", the Roswell Water Utility will begin the process of replacing the 75,000 gallon tank (located at Community Circle) with a larger tank (500,000 gallon tank). Potential sites for a new tank will be developed during the next several years. The additional capacity provided by replacing the Community Circle tank with a 500,000 gallon tank would bring the Roswell Water Utility closer to providing a day's worth of water storage which is an industry best practice. A new tank increases the Roswell Water Utility's ability to meet future demands, provide additional fire flow, and better manage pressures in the distribution system.

8.1.4 Procure Emergency Generator for Water Treatment Plant

A key to the independence and sustainability of the Roswell Water Utility is a safe and consistent supply of power for the WTP. During late October 2020, Hurricane Zeta swept through the Metro Atlanta region, causing wide-spread damage and power outages. The Roswell WTP completely lost power for one day and was operating under limited capacity for two additional days due to damage to the high service pump station as a result of the outage. The Roswell Water Utility purchased water (3,681,500 gallons) from Fulton County over the three day period.

As seen during the recent events in Texas in February 2021, widespread power outages are possible due to un-anticipated inclement weather, or other adverse conditions. By securing a stand-alone emergency power backup, which is an industry best practice, the City will reduce impact of power outages on WTP operations, reducing the need to rely on outside support for operational continuity.

During design of the current WTP, an emergency generator was excluded due to cost considerations. The staff has been exploring grant options to procure an emergency generator through GEMA/FEMA, federal and state COVID recovery funding and State and Federal agency programs. The Roswell Water Utility may investigate a GEFA loan as an alternative financing option.

8.1.5 Provide Awning/Cover over Flocculation and Sedimentation Basins

Shortly after the start-up of the new WTP in 2016, staff completed a project to cover the WTP filter gallery with an awning. This cover has protected the equipment and instrumentation from weather elements including direct sunlight. It would be beneficial to the operation and maintenance of the WTP to install covers over the flocculation and sedimentation basins. The cover will help limit exposure of the equipment and instrumentation to weather elements, prolonging their useful life. The cover will also help limit the growth of algae on the sedimentation basin weirs and make it more practical for staff to calibrate and maintain equipment during inclement weather.

8.1.6 Provide Additional Storage for Filter Backwash

The WTP currently does not have enough storage to effectively manage more than two consecutive filter backwashes. This situation will get worse as WTP production increases due to increase in demand. Additional tank storage would allow for increased flexibility of operation. It would also allow for storage when tanks (sedimentation basins, flocculation tanks, etc.) are taken out of service for cleaning. Two options that staff are considering include:

- Conversion of existing tankage at the old treatment plant adjacent to the new WTP. This approach has the advantage of utilizing already constructed tankage. Approximately 140,000 gallons of storage could be achieved through this approach. A hydraulic evaluation would need to be performed to evaluate viability of this approach.
- Construction of a new storage tank. This would allow the flexibility to design a tank with larger capacity to accommodate future higher flows.

8.1.7 Transfer Station Flow Meter and Chlorine Analyzer

To control the WTP flow rate more effectively, staff is considering the addition of a flow meter between the transfer pump wet well and the clearwell. The meter would help pace the flow through the WTP and assist in matching transfer pump operation to influent flow. Staff is also considering the addition of an on-line chlorine analyzer in the same location. The analyzer will assist plant operators in detecting problems with the finished water chemical feed.

The analyzer would also allow for real-time reaction to water quality concerns in the clearwells, prior to pumping to the distribution system

8.1.8 Outdoor Pipe and Valve Painting

As discussed in Section 8.1.2 above, a key to the sustainability of the WTP is on-going equipment condition assessment and asset management. Maintenance of effective paint coatings is essential to prolonging the life of the WTP infrastructure. Piping, valves and other appurtenances exposed to the weather normally need repainting every eight to ten years. Staff plans to begin a recoating program in the next three years.

8.1.9 Demolition of Old Water Treatment Plant

The old WTP has been idle and unused since the new WTP came online in 2016. Staff is evaluating whether some of the tankage at the old plant could be repurposed for backwash storage. Other structures at the old plant are not salvageable and staff will evaluate the demolition of these structures in this planning period. Demolition of the old WTP would free up space on the Roswell Water Utility lot. The space could be used for additional tank storage for backwash (if using old WTP tankage is not cost effective) or for additional lay down/storage area for the water plant and water distribution staff.

8.1.10 Add Chlorine Analyzers at Elevated Storage Tanks

Staff is evaluating the addition of on-line chlorine analyzers at the three above ground storage tanks in the distribution system. Increased flows, elevated temperatures, and other conditions can negatively affect chlorine residuals in the distribution system. These analyzers would assist the plant operators in monitoring chlorine levels in the system and in optimizing chemical dosages at the WTP.

8.1.11 Off-Site Security Monitoring

The Risk and Resiliency report discussed in Section 6.1 had several recommendations to improve the sustainability and security of the Roswell Water Utility. One recommendation is to install security cameras at off-site facilities, particularly the groundwater well site and the groundwater treatment plant. These cameras would allow plant staff to monitor activity around both facilities from the WTP control room. The security systems would allow the operators the ability to respond quickly to malevolent acts.

8.1.12 Install Event Detection Systems in Distribution System

The AWWA and the US Department of Homeland Security have recognized that water production and distribution systems are critical infrastructure and could potentially be targets for malicious attacks. In order to monitor for unusual occurrences in the distribution system, or the introduction of harmful materials, staff has investigated installation of Event Detection Systems. These systems would be placed at strategic locations throughout the distribution system (potentially at storage tanks) and used to monitor for water quality and unusual events. These devices can identify public health and security issues in the distribution system and alert Roswell Water Utility staff in a timely manner.

8.1.13 Schedule Replacement of Major Equipment

The WTP has multiple major pieces of rotating equipment. Several of these operate at high speeds or at high pressures. Specific equipment that falls into this category include the filter backwash pump and the plant blower. Both of these are single source of failure equipment, meaning there is no spare, and due to their operating conditions, normally have a life span of 10 to 15 years. The Water Utility recommends planning and budgeting for replacement of these two pieces of equipment beginning in FY27.

8.1.14 Implement KPIs for the WTP

As discussed in Section 3.9.2, the WTP staff is in the process of developing KPIs for the facility. These KPIs will be used to continually evaluate and monitor the performance of the WTP across financial, operations, maintenance and regulatory parameters. Utilizing the HiperWeb CMMS system, the KPIs will be presented in a dashboard manner for review by staff and management. Implementing and monitoring these KPIs facilitates a continuous improvement process for the WTP. The data generated will also allow for benchmarking of the Roswell WTP performance with other utilities.

8.1.15 Optimize Raw Water Pumps Capacity

The Roswell Water Utility is in the process of assessing potential methods to increase raw water pump capacity at the intake structure in Big Creek to meet the permitted maximum daily withdrawal rate of 4.5 MGD. Currently, there are three raw water pumps rated at 1.6 MGD each that can withdraw a total of 4.3 MGD if all three pumps operate simultaneously. Industry best practice is to operate two pumps with the third pump acting as a standby backup. Staff is evaluating whether the existing raw water pumps can be updated with alternative parts to increase flow rate capacity or whether the raw water pumps would need to be replaced. The evaluation of the pumping system will also include verifying compatibility of the existing VFDs with new pumps and ensuring the upgraded system meets the power saving goals of the WTP's real-time power pricing. Additionally, staff is verifying that the currently installed 16" transmission line from the raw water intake pump station to the raw water tank can convey 4.5 MGD.

8.1.16 Raw Water Tank Maintenance Schedule

The 10 MG raw water tank has not been cleaned since the start-up of the WTP in 2016 and sediment has accumulated on the bottom of the tank, reducing storage capacity. The Roswell Water Utility is in the process of obtaining quotes to remove sediment from the raw water tank. The cost to remove the sediment is highly dependent upon the ability to dry the sediment on-site prior to hauling to an off-site facility versus disposing of the sediment as a liquid slurry. Staff is in the process of creating a raw water tank maintenance plan, identifying potential sediment drying locations, and developing a maintenance schedule to clean the tank over time. Staff will evaluate procedures to potentially reduce the use of outside contractors and provide for a sustainable approach moving forward.

8.2 DISTRIBUTION RECOMMENDATIONS

8.2.1 Replace Water Lines

As indicated in Section 4.2, the Roswell Water Utility budgets $400,000 annually for water line replacement projects and maintains a Water Line CIP Matrix to prioritize replacement projects. The Roswell Water Utility places a high priority on replacing 2" GS water lines in cul-de-sacs to provide looping for these areas which helps improve water quality and pressures. The Roswell Water Utility has identified 32 GS lines and plans to dedicate approximately $100,000 (of the $400,000) to complete two to three of these line replacements per FY. **Table 25** summarizes the cost of water line replacement projects over the past several FYs. A detailed list of water line replacement projects completed over the past four FYs can be found in **Appendix D**.

Table 25. Summary of Water Line Replacement Project Costs by FY

FY	Water Line Replacement Cost ($)
FY15	$106,996
FY16	$614,481
FY17	$23,869
FY18	$1,231,498
FY19	$393,956
FY20	$305,438
FY21	$326,451

8.2.2 Test and Replace Meters

As indicated in Section 5.2.2.3, the Roswell Water Utility has a Meter Replacement Program that tests up to 500 meters with an annual budget of $75,000. Any meter 15 years of age or older is scheduled for replacement. Annual operating funds will be used to continue the Meter Replacement Program over the next five years. The meter replacement program is an essential component of the Roswell Water Utility's maintenance program as well as for financial stability, by ensuring accurate meter readings and customer billings.

8.2.3 Implement and Maintain i-Hydrant Technology

With the implementation of the AMI network, the Roswell Water Utility has investigated new technologies that could be permanently installed in the distribution system to provide a daily snapshot of its operation. This would help identify where crews need to be dispatched and make repairs more efficiently. The Roswell Water Utility identified M&H's i-Hydrant Technology as a means to detect leaks, as well as, monitor pressure and temperature within the water distribution system. The Roswell Water Utility installed 100 I-Hydrants for pressure and temperature monitoring (in 2020 and 2021) and will install approximately 400 leak detection devices (in 2022).

The i-Hydrant technology will alert staff to drops in pressure due to main breaks or theft of water, temperature changes in the water which can affect water quality, and monitor for small leaks at night and provide a snap shot of the system the next day. This will aid in the reduction of water loss and improve the efficiency of staff to find and repair leaks.

The i-Hydrant technology is able to generate real-time data for use in the Roswell Water Utility's hydraulic model. The Roswell Water Utility plans to use the hydraulic model to perform predictive analyses to help evaluate where pressure fluctuations are occurring and possible future line replacements. The information generated by the i-Hydrant technology will also be used to optimize the Water Line CIP Matrix for prioritizing line replacement projects.

8.2.4 Evaluate Unidirectional Hydrant Flushing

The Roswell Water Utility is evaluating a unidirectional flushing program to promote better cleaning of lines. Unidirectional flushing is a means to scour/clean water lines to remove sediment and manganese from the inner walls of the pipes. It can also help increase the chlorine residuals within the system, without having to flush as much water, thus improving water quality and reducing water loss. The Roswell Water Utility will conduct a cost analysis to evaluate the feasibility of implementing the program and its elements: valve replacements, cost of flow equipment, identifying which valves to open/close to maximize the cleaning effect, etc.

8.2.5 Maintain Hydraulic Model

The Roswell Water Utility's hydraulic model is a valuable tool for managing the system and identifying issues. Several significant model updates were completed over the past five years including: i) addition of the new WTP; ii)

development of new demand data; iii) enhanced system-wide fire flow evaluation in 2016; iii) update of pipe replacements projects and addition of new pipe; and iv) updated system-wide fire flow analysis in 2021. See Section 4.3 for a full list of hydraulic model updates since the 2016 Master Plan.

Since 2016, the model was maintained by one of the Roswell Water Utility's consultants. In 2021, the Roswell Water Utility transferred the responsibility of the model from the consultant to Environmental / Public Works Support Services staff. The model will undergo another large update to update demand data. The model will need to be recalibrated similarly to the recalibration that occurred in 2016.

As indicated in Section 4.3.4, the 2021 updated hydraulic model will be used to evaluate scenarios pertinent to prioritizing future water distribution system updates. Important upcoming evaluations include:

- Interconnects: The model will be used to evaluate which interconnections with Fulton County best serve the Roswell system.
- Water Quality: Water age evaluations will be conducted to estimate chlorine residuals in the water distribution system and compare this to the location of existing flushing stations.
- Water Line Replacement and System Upgrades– The hydraulic model has been used to identify areas where fire flow is expected to be lower than the flow required for new development. As new development and redevelopment is considered, the model can be used to evaluate the existing system to serve additional customers and to target system improvements to attract new customers.
- Additional Pressure Zones: The water distribution system current operates as one pressure zone. The model can be used to evaluate optimizing the system by adding a second or third pressure zones.

8.2.6 Evaluate Future Growth and Service Boundary

As described in Section 2.6, the Roswell Water Utility has identified several areas within, or just outside, its current water system boundaries that are served by Fulton County's Water System. These are the same areas that were identified in the 2016 Master Plan. The utility is analyzing the cost of tying these customers into the City's water system, should these customers wish to be served by the Roswell Water Utility. Current water line pipe size and pressures have impacted the ability for some of these locations to be converted to the City's water system.

Roswell will also continue to consider conversion of private water systems to the Roswell Water Utility system on an individual basis. The Roswell Water Utility adopted a Private to Public Water System Policy in June 2016 which is included in **Appendix B**. The GA EPD strongly encourages municipal water systems to convert private systems to help ensure effective maintenance and management.

The following activities related to private systems have occurred:

- Ashley Manor Subdivision: The Roswell Water Utility adopted the private water system in 2018.
- Saint Charles Square: The Mayor and City Council approved adoption of this private line on October 12, 2021. Annexation of the system should be complete in 2022.
- Garrison Hills Subdivision: Submitted letter to the Roswell Water Utility in 2021, requesting annexation of water system.

8.2.7 Initiate Hydrant Security Program

As indicated in Section 5.2.3.2, the Roswell Water Utility has identified Captivator Caps as a cost effective means to prevent contamination of the water system through hydrants. The cost to retrofit all of the hydrants with the caps is approximately $500,000. In conjunction with Fulton County, the Roswell Water Utility plans to accomplish this in a phased-in approach, retro-fitting approximately 10% of the hydrants per year starting in FY23. The Roswell Water Utility also plans to require security caps for new hydrants by modifying the Standard Construction Specifications for new developments.

8.2.8 Implement and Annually Assess KPIs for the Distribution System

The importance of the distribution system KPIs was discussed in Section 4.5.1. The Roswell Water Utility began implementing the KPIs and is scheduled to have them fully implemented by the end of this FY (FY22).

Implementation of the KPIs allows for continuous monitoring of system performance and also allows for benchmarking against other similar sized utilities. The KPIs allow the Roswell Water Utility to monitor performance of many of its customer service parameters, such as response time and water quality issues.

8.2.9 Procure Kobus Pipe Puller

The Roswell Water Utility investigated new equipment that could quickly and efficiently replace service lines located under roads. The Kobus Pipe Puller installs new service lines (3/4" up to 2") in the same location as the old service line without the need to bore under the road. This eliminates the need to repair the pavement once installation is complete, saving the Roswell Water Utility construction costs. The Kobus Pipe Puller costs approximate $80,000; however, it would pay for itself after about eight long side service line replacements.

8.3 OPERATIONS/ADMINISTRATION

8.3.1 Enhance Financial Sustainability

Section 7 of this Master Plan provided a financial analyses of the Roswell Water Utility. Following are recommendations for enhancing financial stability in the next five years.

8.3.2 Adjust Base Account Fees to Reduce Revenue Variability

As indicated in Sections 7.2 and 7.10.1, the Roswell Water Utility's current rate structure is highly dependent on consumption. Instead, staff recommends increasing the portion of revenues recovered through the fixed monthly base fee to stabilize monthly revenues and recover a greater portion of the fixed costs of account maintenance, metering, and billing systems. In order to expedite this transition, staff recommends a revenue neutral approach. A portion of consumption each month would be provided at no cost to customers and the base fee would be increased by an equivalent amount. Base account fees would be adjusted for each size meter and include the same portion of Tier 1 consumption. **Table 26** below illustrates how this recommendation would work if the first 2,000 gallons of consumption for a typical single family residential account were included in the modified base account fee. Staff estimates that this recommendation would increase the portion of fund revenues recovered through the base fee from 15.3% to 40.4%, which is a significant step to stabilize monthly revenues.

Table 26. Example of Recommended Base Fee Adjustment

Portion of Bill	Current	Proposed
Base fee	$5.72	$15.12
Consumption, gallons	3,000	3,000
Gallons included in base fee	0	2,000
Consumption fee	$14.10	$4.70
Total monthly bill	$19.82	$19.82

A credit program could be developed for residential customers who've demonstrated at least 6 months of consumption less than 2,000 gallons per month. An example credit program is shown in **Table 27**. The credit would be applied to the base fee.

Table 27. Example Credit Program for Customers Consuming Less than 2,000 Gallons per Month

Tier	Credit
500 gallons – 999 gallons	35% off
1,000 gallons – 1,499 gallons	20% off
1,500 gallons – 1,999 gallons	10% off

8.3.3 Adjust Rates to Continue Financial Sustainability

Staff analysis indicates that steps to increase fund revenues are required to keep pace with inflation. It is recommended that the Roswell Water Utility continue its policy of annual rate adjustments that mirror the forecast inflation of fund expenses. The Roswell Water Utility has projected decreasing the annual rate increase from 4% to 3% for FY25 and FY26 to be closer to typical inflation rate. This policy should be reviewed and adopted by the Roswell Water Utility prior to the last annual rate adjustment previously approved by Mayor and Council and would become effective for FY25. Additionally, the Roswell Water Utility will evaluate whether an update to Capacity Rates are necessary for FY25, concurrent with evaluation of rate increases.

8.3.4 Consider a GEFA Loan

The Roswell Water Utility currently has a GEFA loan from construction of the new WTP. Several major capital items have been discussed in the Recommendations Section of this Master Plan. Staff will consider securing another GEFA loan, while rates are at historically low levels, to allow for financing capital projects, potentially including an emergency generator and a new elevated storage tank. Utilizing a low interest GEFA loan can also free up capital for other needed water system projects.

8.3.5 Maintain High Level of Customer Service

Several key components of the City's Strategic Plan address providing the highest level of service to the City's residents. These include "Outstanding City Services", "Outstanding Collaboration, Community Engagement and Customer Service", and "Exceptional Quality of Life". The Roswell Water Utility considers customer service a top priority in order to fulfill these goals. The Roswell Water Utility has embraced technology for delivering top level customer service to customers such as launching the AquaHawk Alerting! Customer Portal. The leak notification process of AquaHawk is a critical tool to alert customers to leaks. This saves the customer money and decreases water loss from the system. Optimizing and marketing AquaHawk is a necessary focus for high value customer service. Currently approximately 43% of the City's metered customers participate in the AquaHawk program. The Roswell Water Utility's goal is to increase this participation rate to 65% within the next five years. The Roswell Water Utility will work with the Environment/Public Works Education Coordinator to continue to publicize AquaHawk and educate customers on the importance of utilizing the AquaHawk program.

Additional priorities for the next five years include:

- Provide on-going staff training to maintain high quality service
- Provide cross-training for staff to ensure that there are multiple people capable of performing critical duties. The Roswell Water Utility is currently implementing cross-training between distribution and WTP staff. This program will be evaluated for expansion in the future.

8.3.6 Monitor Future Regulations

The Roswell Water Utility needs to comply with all regulatory agencies as new rules are adopted. These agencies include the US EPA, GA EPD, and MNGWPD. The MNGWPD is releasing an update to the Water Supply and Conservation Plan in 2022. Anticipated changes to the MNGWPD Plan will affect the Roswell Water Utility, particularly related to drought planning.

Of significant importance for the Roswell Water Utility in coming years will be the requirements of US EPA's new Lead and Copper Rule and upcoming UCMR 5 monitoring. The Roswell Water Utility will need to budget for these activities. Specifically, these rules will include the following:

- Lead and Copper Rule: The updated rule imposes new requirements, including developing an inventory of service lines, increased sampling for schools and day care centers, and increased public involvement and communication.
- UCMR 5 – The next round of UCMR sampling in 2022 will focus on sampling 30 contaminants, 29 PFAS and lithium. Although it is anticipated that these substances will not be detected in concentrations affecting WTP operations, development of these regulations could be a future concern.

8.3.7 Update Yield Analysis and Modify Withdrawal Permit

As discussed in Section 3.1, the Roswell Water Utility's withdrawal permit limits withdrawal from Big Creek based upon streamflows. The Roswell Water Utility completed an updated surface water yield analysis in 2021 to evaluate if water can be withdrawn from Big Creek at lower stream flows. GA EPD approved the removal of a 50% safety factor that was previously applied to the minimum streamflow requirements for May through October. The new streamflow requirements were incorporated into the WTP's permit renewal issued in November 2021.

The City is also in communication with GA EPD regarding utilizing the USGS stream gage located 500 feet downstream from the WTP intake (USGS 02335757) opposed to the USGS stream gage located in Alpharetta, approximately 7.5 miles from the WTP intake (USGS 02335700). Staff will continue to update and use the safe yield analysis model to continue discussions with GA EPD. Additionally, staff will update the groundwater well safe yield analysis once the well is operational and sufficient recharge data is collected.

8.3.8 Anticipate Staffing Needs

The Roswell Water Utility will continue to develop a targeted recruiting approach in high schools and trade schools to develop new water treatment professionals. The Water Utility Manager, Water Plant Manager, and the Environment/Public Works Education Coordinator will work together to implement this program. The Roswell Water Utility has also started a cross-training program to cross-train distribution and water plant staff to create redundancy for critical positions. Due to the economy in recent years, labor has been difficult to identify, train, and retain. As the water industry changes, it is imperative that the Roswell Water Utility continue to anticipate future staffing needs.

Another alternative that the Roswell Water Utility will investigate is a partnership with The Water Tower, a non-profit foundation in Gwinnett County that is focused on technological innovation and workforce development in the water industry. The Water Tower is currently constructing a training facility for operations and maintenance staff on its campus in Lawrenceville, Georgia.

8.3.9 Maintain Laboratory Certification

The WTP staff achieved certification for the laboratory at the WTP in 2019. It is recommended that the Roswell Water Utility maintain the laboratory certification to allow in- house analyses for required sampling and monitoring. This provides more timely data for process control and regulatory compliance.

8.3.10 Participate in Industry Organizations

It is important for the Roswell Water Utility to stay active in water industry organizations such as GAWP, GRWA, AWWA, American Public Works Association, etc. These organizations provide the Roswell Water Utility with great networking opportunities and learning from peer organizations. Conferences and training provided by these organizations allows staff to stay current in industry practices, regulations and other pertinent information. These organizations also serve as a conduit for information important to the Roswell Water Utility from MNGWPD, the ARC, and US EPA/GA EPD.

Membership in some of these organizations provide a means for the Roswell Water Utility's staff to stay current with their CEUs necessary for maintaining their water treatment and distribution licenses.

The Roswell Water Utility staff participate as members of several GAWP committees, including Water Distribution, Water Treatment, and Small Systems Committees. The Roswell Water Utility's staff currently hold leadership positions on GAWP committees and the goal of staff is to continue to progress into these position in the future.

8.3.11 Participate in GAWARN

Georgia Water/Wastewater Agency Response Network (WARN) is a mutual aid agreement between utilities to help each other during times of need. The network provides:

- A standard mutual aid agreement for sharing emergency resources among members statewide;
- Organized emergency response according to established requirements; and

- Shared personnel and other resources statewide under previously arranged agreements.

Joining GAWARN will allow the Roswell Water Utility to be more resilient and sustainable should future emergencies require short-term assistance. This item was also a recommendation in the Risk and Resiliency Report discussed in Section 6.1.

8.3.12 Summary of Recommendations

Table 28 summarizes the recommendations, estimated costs, and proposed schedule of the Roswell Water Utility Master Plan.

Table 28. Summary of Recommendations

Recommendation (Old/New)	Estimated Cost	Proposed Schedule	Comments
Plant Production			
Optimize Production Electricity & Chemical Use (Old / Ongoing)	Potential Savings	Ongoing	Instituted real-time pricing with GA Power in 2020 resulting in a 42% reduction in costs over the first year. Staff will evaluate use of real-time pricing at the groundwater well once well becomes operational and sufficient electricity data has been obtained. Conducted chemical optimization program – costs have declined even as plant flows have increased.
Maintain Asset Management Program (Old / Ongoing)	Operating Budget	Ongoing	Currently implementing and optimizing the use of HiperWeb CMMS software across the entire Water Utility.
Replace/Add Elevated Water Tank (Old)	$2,000,000 (Capital Budget)	FY27-29	Replace the current 75,000 gallon Community Circle tank with a new 500,000 gallon tank within distribution system. Needed to meet water future demands, provide adequate fire flow and better manage pressures in the distribution system.
Procure Emergency Generator (New)	$1,000,000 (Capital Budget)	FY24/25	Generator would allow WTP to operate all equipment during a power failure, reducing the need to buy water from Fulton County.
Cover Flocculation and Sedimentation Basins (New)	$100,000 (Capital Budget)	FY24	Cover would prolong the life of the equipment exposed to the weather elements and to excessive heat during the summer months. Will also allow staff to more effectively work in the area during inclement weather.
Additional Backwash and Wash-Down Storage (New)	$250,000 to $500,000 (Capital Budget)	FY27	Help the WTP manage multiple, consecutive, backwashes. Options being considered include conversion of existing tankage at old WTP or construction of a new storage tank.
Transfer Pump Station Flow Meter and Chlorine Analyzer (New)	$15,000 (Operating Budget)	FY23	Evaluate the addition of these items to optimize plant flow rate, particularly as demand increases over the coming years.
Outdoor Pipe and Valve Painting (New)	$25,000 - $50,000 (Operating Budget)	FY24	As the plant ages, maintenance of coatings is essential to prolong the life of piping, valves and other equipment in the water plant.
Demolition of Old Water Treatment Plant (New)	$500,000 (Capital Budget)	FY25	Evaluate the demolition of all or part of the old, idle, WTP to free up space for other uses by the Water Utility.
Add Chlorine Analyzers at Elevated Tanks (New)	$20,000 (Operating Budget)	FY23	Allow plant staff to monitor, in real time, chlorine levels in the distribution system. These analyzers would also assist in the overall approach to chemical optimization for the water system.

Recommendation (Old/New)	Estimated Cost	Proposed Schedule	Comments
Add Off-Site Security Monitoring (New)	$40,000 (Capital Budget)	FY24	Allow plant staff to remotely monitor the groundwater well and groundwater treatment plant for malevolent events and respond promptly.
Install Event Detection System(s) in Distribution System (New)	$50,000 each (Capital Budget)	FY27	Investigate these systems to monitor for distribution system water quality, water security, event detection and other operational issues. These systems could enhance identification of issues that could impact public health and safety
Backwash Pump Replacement (New)	$70,000 (Capital Budget)	FY27	Useful life for high speed rotating equipment, especially equipment operating at high pressures, can be from 10 to 20 years based on operating conditions.
Blower Replacement (New)	$50,000 (Capital Budget)	FY27	Useful life for high speed rotating equipment can be from 10 to 20 years based on operating conditions.
Implement Key Performance Indicators (New)	Operating Budget	FY23	Develop and monitor key information for continuous improvement of operations, maintenance and regulatory activities.
Optimize Raw Water Pumps Capacity (New)	$200,000 (Capital Budget) $200,000 (Capital Budget) $200,000 (Capital Budget)	FY23 FY24 FY25	The Roswell Water Utility is in the process of assessing potential methods to increase raw water pump capacity at the intake structure to meet the permitted maximum daily withdrawal rate of 4.5 MGD. Staff is evaluating whether the existing three raw water pumps can be updated with alternative parts to increase flow rate capacity or whether the raw water pumps would need to be replaced. Staff is also verifying whether the existing 16” transmission line from the raw water intake pump station to the raw water tank can convey 4.5 MGD.
Raw Water Tank Maintenance Schedule	$100,000	FY23	The Roswell Water Utility is in the process of obtaining quotes to remove sediment from the raw water tank. Staff is in the process of creating a raw water tank maintenance plan, identifying potential sediment drying locations, and developing a maintenance schedule to clean the tank over time.
Distribution			
Replace Water Lines (Old / Ongoing)	Maximum of $300,000 annually (Capital Budget)	Ongoing	Continue the City’s program for replacement of water lines, utilizing the Water Line CIP Matrix.
Test and Replace Meters (Old / Ongoing)	$75,000 annually (Operating Budget)	Ongoing	The Roswell Water Utility tests and replaces up to 500 meters annually. Meters 15 years or older are replaced.
Implement and Maintain i-Hydrant Technology (New)	$100,000 annually (Capital Budget), plus $30,000	FY22 - FY26	Technology that monitors distribution system status, detects leaks in real time, and monitors system pressure and temperature. Helps identify where crews need to be dispatched

Recommendation (Old/New)	Estimated Cost	Proposed Schedule	Comments
	annually service cost (Operating Budget)		more quickly. Data from the system helps prioritize line replacement projects.
Evaluate Unidirectional Hydrant Flushing (Old / Ongoing)	$50,000 (Operating Budget)	FY23	Evaluate and perform a cost analysis to determine feasibility of program for better cleaning of lines in the distribution system.
Maintain Hydraulic Model (Old / Ongoing)	Operating Budget	Ongoing	Consultant developed original model. Internal staff now maintain and use model for multiple tasks including evaluation of water quality, need for system upgrades, and water line replacement
Evaluate Future Water System Growth (Old / Ongoing)	$50,000 (Operating Budget)	Ongoing	Evaluate the feasibility of adding customers served by Fulton County that are in, or just outside, the Roswell water system boundary
Initiate Hydrant Security (Old)	$50,000 annually for ten years (Operating Budget)	FY23	Ten year program to enhance hydrant security throughout the distribution system based on Homeland Security guidance. This program would be completed in conjunction with Fulton County.
Implement and Annually Assess Key Performance Indicators (New)	Operating Budget	Ongoing	Fully implement KPIs to enhance system performance monitoring, allow for continuous improvement provide the ability to effectively benchmark with similar systems.
Procure Kobus Pipe Puller (New)	$80,000 (Capital Budget)	FY23	The Kobus Pipe Puller installs new service lines (3/4" up to 2") in the same location as the old service line without the need to bore under the road. This eliminates the need to repair the pavement once installation is complete, saving the Roswell Water Utility construction costs.
Operations/Administration			
Establish Financial Sustainability (Old / Ongoing) **Adjust Base Charge** **Adjust Rates**	Review annually Review annually Review annually	Ongoing FY24 FY24	Staff, working with Finance Department, regularly review revenues and expenditures for the Water Utility. Staff is also reviewing need for rate increases and adjustments to maintain the financial stability of the Utility. Additionally, staff will evaluate whether an update to Capacity Rates are necessary for FY25, concurrent with evaluation of rate increases.
Consider a GEFA Loan (New)	Conducted Internally	FY25	Consider securing another GEFA loan, while interest rates are at historically low levels, to allow for financing of upcoming capital projects.
Maintain High Level of Customer Service (Old / Ongoing)	$30,000 annually for Sensus AMI and AquaHawk Customer Portal (Operating Budget)	Ongoing	Customer service is a top priority so the Roswell Water Utility has implemented several technology platforms to enhance service.
Monitor Future Regulations (Old / Ongoing)	Operating and Capital Budgets	Ongoing	Meeting regulatory requirements is a key element of water system performance. Over the next several years the Roswell

Recommendation (Old/New)	Estimated Cost	Proposed Schedule	Comments
Lead and Copper Rule (New)	Inventory (Operating Budget) Replacement (Capital Budget)	FY22 - FY24 FY23 - FY27	Water Utility will need to meet the requirements of several new, or updated, regulatory rules.
UCMR-5 (New)	$15,000 (Operating Budget)	FY23 – FY26	
Update Yield Analysis & Modify Withdrawal Permit (Old)	$40,000 (Operating Budget)	FY22 – FY24	Staff recently updated the Big Creek Safe Yield Analysis to remove a 50% safety factor previously applied during May - October. Staff will continue to update and use the model for future permit modifications. Staff will also evaluate potential to withdraw more water from groundwater well once well it is operational and sufficient recharge data has been recorded.
Anticipate Staffing Needs (Old / Ongoing)	Operating Budget	Ongoing	Roswell Water Utility management regularly evaluates staffing needs and capabilities. The WTP adopted a new shift schedule in August 2021 that utilizes staff more effectively, promotes management interaction, and is consistent with schedules used by other utilities. The Roswell Water Utility will continue the cross-training program to cross-train distribution and water plant staff to create redundancy for critical positions.
Maintain Laboratory Certification (Old / Ongoing)	$25,000 (Operating Budget)	Ongoing	Maintaining laboratory certification allows for in-house testing, reducing costs and providing more timely data over using outside laboratories
Participate in Industry Organizations (Old / Ongoing)	$12,500 (Operating Budget)	Ongoing	Roswell Water Utility division staff are active in many industry organizations. Staff members have key committee and leadership roles in GAWP
Participate in Georgia WARN (New)	Operating Budget	FY23	Participation in this mutual aid program allows the Roswell Water Utility to be better prepared to deal with emergencies and unusual circumstances.

APPENDIX A WATER PRODUCTION PERMITS

A.1 GA EPD WATER WITHDRAWAL PERMIT

A.2 GA EPD GROUNDWATER WITHDRAWAL PERMIT

A.3 GA EPD PERMIT TO OPERATE A PUBLIC WATER SYSTEM

A.4 FULTON COUNTY INDUSTRIAL WASTEWATER DISCHARGE PERMIT

PERMIT NO. 060-1209-01
ISSUANCE DATE: Oct 28, 2021

GEORGIA
DEPARTMENT OF NATURAL RESOURCES
ENVIRONMENTAL PROTECTION DIVISION

PERMIT TO WITHDRAW, DIVERT OR IMPOUND SURFACE WATER

PERMIT HOLDER'S NAME **City of Roswell**
PERMIT HOLDER'S ADDRESS **38 Hill Street, Roswell, Georgia 30075**
COUNTY: **Fulton**

In accordance with the provisions of the Georgia Water Quality Control Act, (O.C.G.A. § 12-5-20 et seq.) as amended, and the Rules and Regulations for Water Quality Control, Chapter 391-3-6, promulgated pursuant thereto, this permit is issued to **withdraw** surface water from **Big Creek** in the **Chattahoochee River Basin** for the purpose of **municipal water supply**.

The City of Roswell (Permittee) must comply with the following limitations:

(1) Maximum 24 hour: Withdrawal **4.5** MGD; Impoundment ____ MGD; Diversion ____ MGD

(2) Not to exceed a monthly average of **2.8** MGD

This Permit is conditioned upon the permit holder complying with the attached **Standard Conditions** (1 through 5) and the additional **Special Conditions** (9 through 17) which are hereby made a part of this Permit.

In accordance with the application dated **04/14/2021** and in conformity with the statements and supporting data entered therein or attached thereto, all of which are filed with the Environmental Protection Division of the Department of Natural Resources and are hereby made part of this Permit.

This Permit is effective from the date first above written and is subject to revocation pursuant to the Georgia Water Quality Control Act, as amended, O.C.G.A. § 12-5-31 (k).

Absent prior revocation in accordance with the above language, this Permit will expire **ten (10) years** from the issuance date on this permit.

STATE OF GEORGIA
CONSTITUTION
WISDOM JUSTICE MODERATION
1776

Richard E. Dunn, Director
Environmental Protection Division

This permit is conditioned upon the permittee complying with the provisions of the Water Quality Control Act, as amended, or any of the Rules and Regulations promulgated thereto;

STANDARD CONDITIONS

1) GENERAL PERMIT CHARACTERISTICS

a) The use of surface water is limited to the quantities and purposes as specified herein;

b) Water associated with this Permit must not be withdrawn by, released for, or otherwise utilized by any other entity or for any purpose without first modifying this Permit.

c) This permit must not be transferred except with the approval of the Division;

d) This permit supersedes any and all previous permits of the same permit number.

2) PERMIT RENEWAL

All permittees desiring to renew a permit shall submit an application for renewal to the Director within six (6) months prior to its expiration.

3) PERMIT MODIFICATION

a) The permittee may seek modification of any of the terms of an unexpired permit upon written request to the Director.

b) The Georgia EPD has the authority to modify any surface water withdrawal permit at any time.

4) MONITORING AND REPORTING

a) The permittee must submit annually to the Division, within 30 days of completion of the calendar year, a report listing for each month of the previous year:

1. The gallons per day withdrawn, based on an average of the daily withdrawals for the month;

2. The maximum 24 hour withdrawal;

b) In addition to Condition 4a, the permittee must submit to the Environmental Protection Division (EPD) within 10 days of completion of the calendar month, a monthly Surface Water Withdrawal Report for the previous month showing daily raw water withdrawals associated with this Permit.

5) WATER PLANNING REQUIREMENTS

a) The permittee must abide by all applicable water conservation requirements, which may include but are not limited to submission of a Water Conservation Plan for EPD approval and submission of a five-year Water Conservation Progress Report in accordance with 391-3-6-.07. The Progress Report must include all actions and improvements made to conserve water and reduce water loss and shall be submitted for EPD review no later than November 1, 2026.

b) The permittee must abide by all applicable drought response requirements, which include but are not limited to the Georgia Drought Management Rule (391-3-30) and the permittee's Drought Contingency Plan.

c) The permittee must maintain ongoing compliance with applicable "Chattahoochee River Basin Water Plan" requirements.

SYSTEM INFORMATION

6) The permittee obtains its water supply from three sources: Big Creek, groundwater, and the Chattahoochee River. The primary source is Big Creek on the Chattahoochee River. This water withdrawal permit (#060-1209-01) allows the utility to withdraw water from Big Creek to supply water to the water treatment plant (WTP) (WSID #1210009). The raw water is pumped from the intake in Big Creek to a 10 million gallon (MG) raw water storage tank. Alternatively, the system could bypass the raw water storage tank and send raw water directly to the WTP. The permittee also has a groundwater source (#060-0007) located near the treatment plant. A system location map is included as Figure 1.

7) The third source is the Chattahoochee River. The permittee maintains six interconnections with Fulton County's water system for which the utility can purchase water from Fulton County during emergencies. Fulton County draws water from the Chattahoochee River through the Atlanta Fulton County Water Resources Commission System.

8) The water plant is a conventional WTP that includes a 10 MG raw water storage tank, chemical addition, rapid mixing, four-stage flocculation, sedimentation, dual media filtration, disinfection, and pumping into the distribution system.

SPECIAL CONDITIONS

9) The permittee's withdrawal intake structure is located downstream of the U.S Geological Survey (USGS) Alpharetta gage (USGS 02335700) on Big Creek in Fulton County. All water withdrawn must be metered at or immediately upon leaving the intake structure.

10) The permittee's maximum withdrawal is equal to 4.5 million gallons per day (mgd) 24-hour maximum day and 2.8 mgd monthly average.

11) The permittee will use the Hog Wallow Creek gage (USGS 02335757) for monitoring flows in Big Creek. The minimum required stream flows as shown in the table below represent minimum stream flows not to be depleted by the withdrawal amount.

Big Creek Water Withdrawal Schedule

Period	Minimum Streamflow Requirement at USGS Big Creek Below Hog Wallow Creek Gage (0233575) cubic feet per second (cfs)	Allowable Monthly Withdrawal million gallons per day (MGD)
Annual	> 8.4*	0 – 1.2
January	≥ 58	Between 1.2 and 2.8
February	≥ 73	Between 1.2 and 2.8
March	≥ 75	Between 1.2 and 2.8
April	≥ 67	Between 1.2 and 2.8
May	≥ 39	Between 1.2 and 2.8
June	≥ 25	Between 1.2 and 2.8
July	≥ 18	Between 1.2 and 2.8
August	≥ 13	Between 1.2 and 2.8
September	≥ 13	Between 1.2 and 2.8
October	≥ 17	Between 1.2 and 2.8
November	≥ 29	Between 1.2 and 2.8
December	≥ 45	Between 1.2 and 2.8

Notes: *When the natural streamflow is equal to or less than 8.4 cfs there will be no withdrawals.

The symbol ≥ means greater than or equal to

12) The permittee must record daily streamflow from Big Creek and these records will be submitted annually to the Surface Water Withdrawal Permitting Unit (SWWPU) of the EPD by March 1 of each calendar year.

13) The permittee will adhere to the conditions of the Metropolitan North Georgia Water Planning District Water Supply and Water Conservation Management Plan.

14) The permittee must operate in accordance with all criteria for Water Supply Watersheds as outlined in 391-3-16-.01, including the applicable Water Supply Watershed Protection Plan.

15) In accordance with 391-3-33-.05, any future renewal or modification of this permit is conditioned upon the demonstration of progress towards improved water efficiency. The permittee must submit

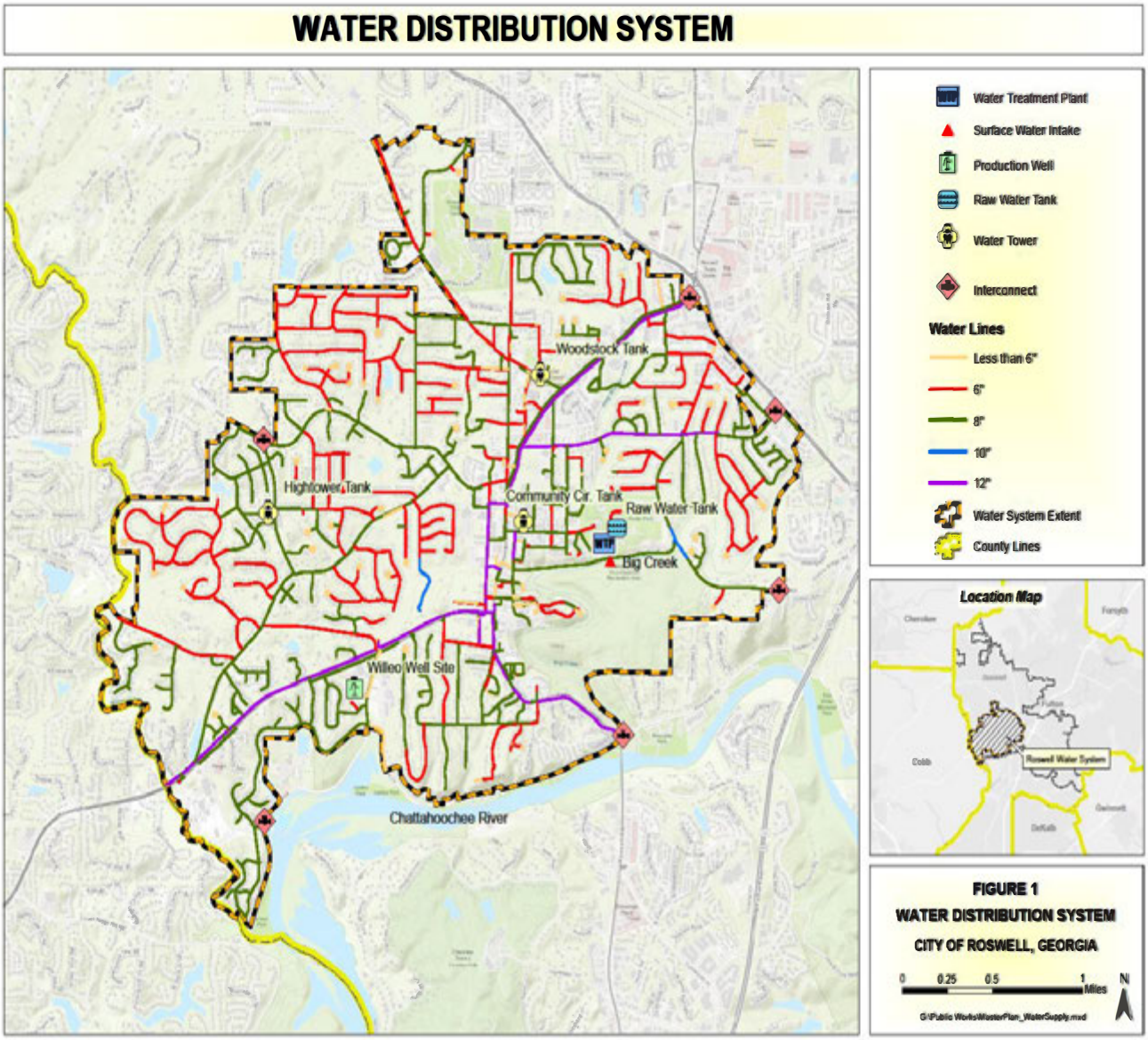
an annual Water Audit by March 1 of each year and maintain ongoing compliance with the following:

a) Establishment of a Water Loss Control Program and associated goals to set measures of water supply efficiency.

b) Demonstration of progress toward improved water efficiency using the measures established.

16) The permit holder must not transfer any water withdrawn via this permit to any entity operating outside the Chattahoochee River basin without EPD approval of such a transfer.

17) To ensure progress toward improved water supply efficiency, the permittee must provide a progress report every year starting one (1) year from this permit issuance date, based on the permittee's Water Loss Control Plan, on efforts made to reduce Water Loss within the permittee's system. The progress report must provide a description of implemented measures and how the implemented measures have reduced the system's NRW. This annual report must continue to be submitted every year to ensure increasing water efficiency.


WATER DISTRIBUTION SYSTEM
Water Treatment Plant
Surface Water Intake
Production Well
Raw Water Tank
Water Tower
Interconnect
Water Lines
Less than 6"
6"
8"
10"
12"
Water System Extent
County Lines
Woodstock Tank
Hightower Tank
Community Cir. Tank
Raw Water Tank
WTP
Big Creek
Willeo Well Site
Chattahoochee River
Location Map
Roswell Water System
Cobb
DeKalb
FIGURE 1
WATER DISTRIBUTION SYSTEM
CITY OF ROSWELL, GEORGIA
0
0.25
0.5
1
Miles
N

GEORGIA
DEPARTMENT OF NATURAL RESOURCES
ENVIRONMENTAL PROTECTION DIVISION

Richard E. Dunn, Director

Watershed Protection Branch
2 Martin Luther King, Jr. Drive
Suite 1152, East Tower
Atlanta, Georgia 30334
404-463-1511

Oct 28, 2021

Mr. Dan Skalsky
Environmental Public Works Department
City of Roswell
38 Hill Street, Suite 235
Roswell, GA 30075

RE: Surface Water Withdrawal Permit Application (Renewal)
Permit # 060-1209-01, Fulton County in the Chattahoochee River Basin
Source: Big Creek
Current Permit Limits: 4.5 mgd max 24-hr day/ 2.8 mgd monthly average

Dear Mr. Skalsky:

In accordance with the Georgia Water Quality Control Act, as amended, the above referenced permit to withdraw surface water from Big Creek has been issued by the Division and is hereby enclosed. The conditions of compliance are provided on pages 2 and 3 of this permit. Standard Condition number (4b) requires the permit holder to submit to the Division within the first 10 days of the calendar month, a monthly Surface Water Withdrawal Report for the previous month, showing daily raw water withdrawals associated with this permit. A copy of this reporting form is included.

Exceeding the maximum 24-hour or monthly average withdrawal limitations is a Permit violation and must be reported to the Water Protection Branch by telephone (404) 463-1511 within 48 hours and confirmed in writing within 10 days. Failure to comply with any of the provisions of the Permit may make the permit holder liable for civil penalties as provided by the Act.

If you have any questions, please do not hesitate to contact me or write me at (470) 251-4897 or wei.zeng@dnr.ga.gov.

Sincerely,

Wei Zeng

Wei Zeng, Ph.D., Professional Hydrologist
Manager, Water Supply Program
Watershed Protection Branch

PERMIT NO. **060-0007**
ISSUANCE DATE: Jul 07, 2021

GEORGIA
DEPARTMENT OF NATURAL RESOURCES
ENVIRONMENTAL PROTECTION DIVISION

PERMIT TO USE GROUNDWATER

PERMIT HOLDER'S NAME: **City of Roswell**
PERMIT HOLDER'S ADDRESS: 38 Hill Street, Roswell, GA 30075
COUNTY: **Fulton County**

In accordance with the Provisions of the Groundwater Use Act, (O.C.G.A § 12-5-90 et seq.) as amended, and the Rules and Regulations for Groundwater Use, Chapter 391-3-2, promulgated pursuant thereto, this Permit is issued to withdraw, obtain, or utilize a maximum system wide total of groundwater in the amount of:

0.167 million gallons per day monthly average and **0.167** million gallons per day annual average;

from **one** well(s) located near/at **Roswell, Georgia – Fulton County** for the purpose of a consumptive use for **a central water supply**.

This Permit is conditioned upon the permit holder complying with all of the terms, conditions, and schedules of compliance specified on the attached pages, which are hereby made a part of this Permit.

In accordance with the application dated **April 14, 2021** and in conformity with the statements and supporting data entered therein or attached thereto, all of which are filed with the Environmental Protection Division (EPD) and are hereby made part of this Permit.

This permit is effective from the date first above written and is subject to revocation on evidence of noncompliance with any of the provisions of the Groundwater Use Act, as amended, or any of the Rules and Regulations promulgated pursuant thereto; or with any representation made in the above mentioned application or the statements and supporting data entered therein or attached thereto; or with any condition of this permit.

Absent prior revocation in accordance with the above language, this Permit will expire **ten (10) years from the issuance date on this permit.**

STATE OF GEORGIA
CONSTITUTION
WISDOM JUSTICE MODERATION
1776

Richard E. Dunn, Director
Environmental Protection Division

This Permit is conditioned upon the permit holder complying with the provisions of the Groundwater Use Act, as amended, or any of the Rules and Regulations promulgated pursuant thereto;

1) GENERAL REQUIREMENTS

a) This Permit is valid for ground water withdrawal from the **Crystalline Rock** Aquifer(s). No other aquifer(s) can be used without the approval of the EPD.

b) The withdrawal of groundwater is limited to the quantities and purpose of the water herein specified.

c) Water associated with this Permit must not be withdrawn by, released for, or otherwise utilized by any other entity or for any other purpose, without first modifying this Permit.

d) This Permit must not be transferred except with the approval of the EPD.

e) The replacement of any permitted well must receive prior approval from the EPD.

f) This permit supersedes any and all previous permits of the same permit number.

2) PERMIT RENEWAL

All permit holders desiring to renew a permit shall submit an application for renewal to the EPD Director within six (6) months of the permit's expiration.

3) PERMIT MODIFICATION

a) The permit holder may seek modification of any of the terms of an unexpired permit upon written request to the EPD Director.

b) The Georgia EPD has the authority to modify any groundwater withdrawal permit at any time.

4) MONITORING AND REPORTING

a) If multiple aquifers are designated in Condition (1a) above, groundwater withdrawal from each aquifer must be reported separately, in addition to the total amount withdrawn from all wells. Each aquifer must be identified on the Groundwater Withdrawal Report, in addition to listing the well or wells that are producing from each aquifer. If a well is producing in more than one aquifer, it is to be noted.

b) The Groundwater Withdrawal Report must be submitted MONTHLY in accordance with the following schedule:

- Production between the first day of the month and the last day of the month will be submitted to EPD by the 10th day of the following month (ex. January 1st through January 31st groundwater withdrawal data will be reported to the EPD by February 10th).

4) MONITORING AND REPORTING (Continued)

c) In accordance with the Groundwater Use Rules, 391-3-2-.08(2), a permit holder will analyze a raw groundwater sample for specific conductance on an annual basis. Analysis for specific conductance must be conducted in accordance with 40 Code of Federal Regulations, Part 141.89. A raw groundwater sample must be collected for every five permitted wells (i.e., if you have between one and five permitted wells, collect one raw groundwater sample for analysis; if you have between six and ten permitted wells, collect a raw groundwater sample from two of the permitted wells, etc.). The groundwater samples will be collected from the highest yielding wells. The results must be submitted to EPD attached to a corporate letterhead and will include the date sampled, well number, temperature of water sample at time of testing, the specific conductance result, and the units of measurement.

5) WATER PLANNING REQUIREMENTS

a) This groundwater withdrawal permit and any future modifications or re-issuances of such, is conditioned upon implementation of the permit holder's Water Conservation Plan developed in accordance with the Rules and Regulations for Groundwater Use, Chapter 391-3-2, and the Georgia Water Stewardship Act. It should be regularly updated to be consistent with current EPD guidelines.

b) The permit holder must submit a Water Conservation Progress Report to the Division five years after permit issuance, and every five years thereafter.

c) In accordance with the Rules for Public Water Systems to Improve Water Supply Efficiency (391-3-33), Public Water Systems that regularly serve 3,300 or more individuals must submit an annual Water Audit to EPD by March 1 of each year. Any future permit action is conditional upon the demonstration of progress toward increased water efficiency. The permit holder must maintain ongoing compliance with the following:

1. Establishment of a Water Loss Control Program and associated goals to set measures of water supply efficiency.
2. Demonstration of progress toward increased water efficiency using the measures established.

d) The permit holder must abide by all applicable drought response requirements, which include but are not limited to the Georgia Drought Management Rule (391-3-30), the Georgia Water Stewardship Act, and the permit holder's Drought Contingency Plan.

e) The permit holder must maintain ongoing compliance with applicable **Metro North GA Water** Planning District Regional Water Plan requirements.

6) SPECIAL CONDITIONS

a) The permit holder will cooperate with the Georgia EPD in the coordination of its water withdrawal requirements associated with this Groundwater Withdrawal Permit and the following additional Water Withdrawal Permit(s):

- **060-1209-01**

GEORGIA
DEPARTMENT OF NATURAL RESOURCES
ENVIRONMENTAL PROTECTION DIVISION

Richard E. Dunn, Director

Watershed Protection Branch
2 Martin Luther King, Jr. Drive
Suite 1152, East Tower
Atlanta, Georgia 30334
404-463-1511

Jul 07, 2021

Mr. Chris Boyd
City of Roswell
38 Hill Street
Roswell, GA 30075

Re: Groundwater Withdrawal Permit No. 060-0007

Dear Mr. Boyd:

In accordance with the Georgia Groundwater Use Act, as amended, a Renewed permit to withdraw groundwater has been issued by the Division and is hereby enclosed. Please read your permit and note that your total system groundwater production limits are:

0.167 million gallons per day (mgd) monthly average and 0.167 mgd annual average,

from **one** well(s) in the **Crystalline Rock** aquifer(s). Also, please read the Standard Conditions and Special Conditions contained within the permit. This permit will expire **ten (10) years from the issuance date on the attached permit** and must be renewed prior to the expiration date. Any change in the withdrawal limits or conditions under which your permit was issued will require a permit modification, see Chapter 391-3-2-.06, paragraph 6 of the Rules for specifics.

Please be aware that you are required to submit Groundwater Use Reports (GWURs) on a monthly basis, which must be sent to EPD by the 10th day of the following month. The current "Monthly Groundwater Use Reporting Form" is available from the EPD website at: (https://epd.georgia.gov/water-withdrawal-permitting-forms). Please send each completed GWUR to:

ground.water@dnr.ga.gov Or

Georgia Environmental Protection Division
Water Supply Program
Groundwater Withdrawal Unit
2 Martin Luther King Jr. Dr., S.E.
East Floyd Towers, Suite 1362
Atlanta, Georgia 30334

If you have any further questions, please call me at 470-524-0567, or email me at bill.frechette@dnr.ga.gov.

Sincerely,

William Frechette

STATE OF GEORGIA
DEPARTMENT OF NATURAL RESOURCES
ENVIRONMENTAL PROTECTION DIVISION

PERMIT NO.: CS1210009

COUNTY: Fulton

ISSUE DATE OF PERMIT: March 8, 2016

MODIFICATION DATE:

PERMIT TO OPERATE A PUBLIC WATER SYSTEM

In compliance with the provisions of the **GEORGIA SAFE DRINKING WATER ACT of 1977, O.C.G.A. 12-5-170 et. seq.**, and the **RULES, CHAPTER 391-3-5**, adopted pursuant to the **ACT**

City of Roswell

is issued a **PERMIT TO OPERATE A PUBLIC COMMUNITY WATER SYSTEM** named

Roswell Water System

and located at

Roswell, Georgia

THIS PERMIT to operate the above public water system shall become effective on the date shown above and shall expire, absent any prior revocation or modification, at midnight

March 7, 2026

THIS PERMIT is issued subject to the terms, conditions and schedules of compliance as follows:

1. **THE PERMITTEE** shall at all times operate the public water system in full compliance with the **GEORGIA SAFE DRINKING WATER ACT of 1977**, and the **RULES, CHAPTER 391-3-5**, adopted under the **ACT**. **THE DIRECTOR** may modify, suspend or revoke this permit as provided therein.

2. **THIS PERMIT** is transferable only with a change of ownership. **THE PERMITTEE** shall notify the succeeding owner by letter of the existing permit and surrender the original permit to the Director. The succeeding owner shall apply to the Director for a permit transfer within 30 days of receiving title to the property.

3. **THIS PERMIT** is further subject to the terms, conditions and schedules of compliance specified on the attached pages.

Judson H. Turner
Director

STATE OF GEORGIA
DEPARTMENT OF NATURAL RESOURCES
ENVIRONMENTAL PROTECTION DIVISION

OWNER: **City of Roswell** ISSUE DATE: **March 8, 2016**

SYSTEM: **Roswell Water System** PERMIT NO.: **CS1210009**

PERMIT CONDITIONS

4. **This permit is for the operation of a public water system using surface water as the principal source of supply, supplemented by one (1) well and one (1) purchased surface water as sources of water supply** as indicated on your application. Any additional sources must have written approval from the Director before use. The approved production rates for the surface water treatment plant and other approved sources of water are:

Big Creek, Source #101
Roswell Water Plant: 2,292 GPM (3.30 MGD) w/4 Filters @ 4.0 GPM/SQFT
Atlanta-Fulton County Water Resources Commission Water System, WSID#1210038, Source #102
Well #1, Source #103

Operation of the water plant(s) in excess of the approved production rate(s) in a twenty-four (24) hour period (starting at 0000 to midnight 2400 hours) is a violation of this permit. Violations must be reported to the Drinking Water Program by telephone within forty-eight (48) hours and confirmed in writing within ten (10) days. **The total amount of water produced must not exceed the limits imposed by your surface water withdrawal permit, #060-1209-01, and your groundwater withdrawal permit, #060-0007.**

5. The permittee must provide continuous disinfection by chlorinating all water distributed by the system to maintain a detectable residual of free chlorine in the recommended amount of 0.2 milligrams per liter in all parts of the distribution system, or as specified in Section 391-3-5-.14, as amended, of the Rules for Safe Drinking Water.

6. **The permittee shall analyze or have analyzed all microbiological and chemical samples required by the Rules for Safe Drinking Water, Chapter 391-3-5. Monitoring for each contaminant must be performed as scheduled by the Georgia Environmental Protection Division's (EPD) Watershed Compliance Program (WCP). The supplier must provide all test results to the WCP within the time frames established in the schedules.** The permittee may use the laboratory services of the EPD's certified laboratory or any other laboratory certified by the WCP to perform the specific analysis. If a laboratory other than the EPD's certified laboratory is used, the laboratory results must be submitted to the following address as specified in Section 391-3-5-.30:

Environmental Protection Division
Watershed Protection Branch Compliance Program
Drinking Water Compliance Unit
2 Martin Luther King, Jr. Drive, SE, Suite 1152 East
Atlanta, Georgia 30334

The format used to report results must be approved by the WCP and must identify the system by the water system identification number, WSID# 1210009, and the laboratory performing the analysis. The laboratory's certification number must be included on the report. Results requiring immediate notification should be reported to the WCP by telephone at (404) 463-1511 or fax at (404) 651-9590.

STATE OF GEORGIA
DEPARTMENT OF NATURAL RESOURCES
ENVIRONMENTAL PROTECTION DIVISION

OWNER: **City of Roswell** ISSUE DATE: **March 8, 2016**

SYSTEM: **Roswell Water System** PERMIT NO.: **CS1210009**

PERMIT CONDITIONS

7. Reports must be maintained by the permittee on the premises of the water system and be available for inspection. **A true and correct copy of the operation records and other reports must be sent to the following address, by the tenth day of the month following the month being reported,** unless otherwise stated in Section 391-3-5-.30 or elsewhere in the Rules:

Environmental Protection Division
Drinking Water Permitting & Engineering Program
Suite 1362, Floyd Towers East
2 Martin Luther King, Jr. Drive, SE
Atlanta, Georgia 30334
Phone: (404) 656-2750
Fax: (404) 651-9590

8. **The permittee shall ensure that this public water system is operated in compliance with the Georgia Certification of Water and Wastewater Treatment Plant Operators and Laboratory Analysts Act,** as amended, and the Rules adopted thereunder. The certification classification must be consistent with the public water system classification specified in Section 391-3-5-.39 of the Rules for Safe Drinking Water.

9. Drinking water distributed by the permittee should not contain any impurity which will cause offense to the sense of sight, taste or smell and should not be excessively corrosive as to cause degradation of the water quality or deterioration of the distribution system, as specified in Section 391-3-5-.19 and .26 of the Rules for Safe Drinking Water.

10. The permittee is required to have a water conservation and cross-connection control plan on file with the Division.

11. **The permittee is required to provide continuous fluoridation to all water distributed by the system,** as specified in Section 391-3-5-.16 of the Rules for Safe Drinking Water.

12. The permittee shall comply with Section 391-3-5-.40, Wellhead Protection and the approved Wellhead Protection Plan, which is incorporated herein by reference as a condition of this permit.

13. The permittee shall meter all existing water sources connected to the public water supply system and shall report the system's water usage to the EPD's Drinking Water Permitting & Engineering Program.

14. The permittee shall provide sanitary protection for each source of water supply, as specified in Section 391-3-5-.07 of the Rules for Safe Drinking Water.

15. The permittee must meter any new water sources and new services connected to the public water supply system.

16. This permit replaces all Permits to Operate a Public Water System previously issued for the operation of this public water system.

Georgia Department of Natural Resources
Environmental Protection Division
2 Martin Luther King Jr. Dr., SE., Suite 1456 East, Atlanta, Georgia 30334
Judson H. Turner, Director
(404) 656-4713

March 8, 2016

Honorable Jere Wood
City of Roswell
38 Hill Street
Roswell, GA 30075

Re: **Roswell Water System**
WSID# 1210009
Fulton County

Dear Mayor Wood:

In accordance with the Georgia Safe Drinking Water Act of 1977, as passed by the Georgia General Assembly, and the Rules for Safe Drinking Water, Chapter 391-3-5, a permit to operate the Roswell Water System, a public water system located in Fulton County, Georgia has been issued by the Environmental Protection Division (EPD) and is hereby enclosed. The specific conditions for operation of the water system are outlined in the pages attached to the permit. **Please provide a copy of this permit to anyone directly involved in the operation or sample collection for this water system.**

The Rules for Safe Drinking Water, Chapter 391-3-5, specify the number and frequency of chemical and microbiological samples that must be analyzed for your water system. The microbiological and chemical water samples must be analyzed by EPD's Laboratory or any other commercial laboratory certified by EPD. If you participate in EPD's "Drinking Water Fee System", the Watershed Compliance Program will schedule the chemical monitoring. Sample bottles with instructions for sample collection and shipping will be mailed to you as sampling is required. If you did not contract with the EPD for these laboratory services, you are responsible for complying with all applicable monitoring schedules in the Rules for Safe Drinking Water. Monitoring schedules and other water system information can be found online at http://gadrinkingwater.net .

You are urged to become familiar with all applicable sections of the Rules for Safe Drinking Water, especially Section 391-3-5-.15 (Record Maintenance) and Section 391-3-5-.32 (Public Notification). **Remember that all bacteriological and chemical samples, information, and correspondence for this system that are submitted to EPD should be identified by the water system identification number, WSID# 1210009.**

Sincerely,

Kirk A. Chase

Kirk A. Chase
Drinking Water Manager
Phone: (404) 656-2750

Enclosure

cc: Drinking Water Permitting & Engineering Program, EPD
Fulton County Health Department

FULTON COUNTY
DEPARTMENT OF PUBLIC WORKS
INDUSTRIAL MONITORING

INDUSTRIAL WASTEWATER DISCHARGE PERMIT

Pursuant to the Fulton County Pretreatment Sewer Use Ordinance, Article IV, Chapters 82:231-256

ROSWELL WATER TREATMENT PLANT
(City of Roswell)
100 Dobbs Drive,
Roswell, GA 30075

Is authorized to discharge industrial wastewater from the above identified facility and through the outfalls identified therein into the Fulton County sewer system in accordance with the conditions set forth in this permit. Compliance with this permit does not relieve the permittee of its obligation to comply with any or all applicable pretreatment regulations, standards or requirements under local, State, and Federal laws, including any such regulations, standards, requirements, or laws that may become effective during the term of this permit.

Noncompliance with any term or condition of this permit shall constitute a violation of the Fulton County Sewer Use Ordinance.

This permit shall become effective on March 1, 2019 and shall expire at midnight on February 28, 2024.

If the permittee wishes to continue to discharge after the expiration date of this permit, an application must be filled for renewal permit in accordance with the requirements of Fulton County Sewer Use Ordinance Sec. 82-240(8).

Issued this 27th day of February 2019

By: Ngozi Dacosta
Manager, Industrial Monitoring

PURPOSE (Fulton County Sewer Use Ordinance 82-233):

Fulton County enacts this article in order to implement and enforce the rules and requirements of the Georgia Clean Water Act of 1964, as amended; to set forth uniform requirements for users of the Publicly Owned Treatment Works for the County; to enable the County to comply with all applicable State and Federal laws, including the Clean Water Act (33 United s Code §1251 et seq.) and the General Pretreatment Regulations (40 Code of Federal Regulations Part 403); to prevent the introduction of pollutants into the Publicly Owned Treatment Works that will interfere with its operation; to prevent the introduction of pollutants into the Publicly Owned Treatment Works that will pass through the Publicly Owned Treatment Works ; to protect both Publicly Owned Treatment Works personnel who may be affected by wastewater and sludge in the course of their employment and the general public; to promote reuse and recycling of industrial wastewater and sludge from the Publicly Owned Treatment Works; to provide for fees for the equitable distribution of the cost of operation, maintenance, and improvement of the Publicly Owned Treatment Works; and to enable the County to comply with its National Pollutant Discharge Elimination System permit conditions, sludge use and disposal requirements, and any other Federal or state laws to which the Publicly Owned Treatment Works is subject.

PART 1 EFFLUENT LIMITATIONS (Ordinance section 82-240)

A. From March 1, 2019 permittee is authorized to discharge process wastewater into the Fulton County collection system from the outfall listed below.

Description of outfalls:

Outfall	Descriptions
001	The sampling point is a gray fabricated manhole that has an 8" flume located at the bottom of the hill before a gate.

B. All Sewer Use Ordinance limits and permit rationale are found in **Appendix A, page 17** of this permit. From the effective date to February 28, 2024 the discharge from outfall 001 shall not exceed the following effluent limitations:

Parameter	Daily Maximum	Range
COD	350mg/l	
TSS	25mg/l	
TKN	200mg/l	
Total Phosphorus	5mg/l	
Oil & Grease	100mg/l	
pH		6.0-9.0

PART 2 - MONITORING REQUIREMENTS (Ordinance Section 82-242)

A. From the effective date of the permit to February 28, 2024 Fulton County Government will sample outfall 001 as follows and may split samples with the permittee. The permittee will be responsible for sampling and running the analyses (self-monitoring).

	Daily Maximum	Monthly Average	Collection Frequency	Sample Type
Flow	39,000gpd	25,000gpd	Daily	Continuous Recording
pH	6.0-9.0		Daily	Grab
COD	350mg/l	350mg/l	Monthly	24 hr. composite
TSS	200mg/l	200mg/l	Monthly	24 hr. composite
TKN	25mg/l	25mg/l	Monthly	24 hr. composite
Total Phosphorus	5mg/l	5mg/l	Monthly	24 hr. composite
Oil & Grease	100mg/l	100mg/l	Monthly	Grab

B. All handling and preservation of collected samples and laboratory analyses of samples shall be performed in accordance with 40 CFR Part 136 and amendments thereto unless specified otherwise in the monitoring conditions of this permit.

C. All discharges shall comply with all other applicable laws, regulations, standards, and requirements contained in section 82-237 of the ordinance.

The Discharge Limitations outlined above are subject to revision if dictated by Title 40, Code of Federal Regulations, Part 403, (40 CFR 403). The permittee will be notified in writing of any changes in applicable discharge limitations.

PART 3 - REPORTING REQUIREMENTS (Ordinance section 82-241)

A. Compliance Monitoring Reports

1. The monitoring results shall be received at this office postmarked no later than the 15th of the month following the monitoring period. The monitoring data must be submitted on the Self-Monitoring Report (SMR) form supplied by the County. All monitoring and analytical procedures must comply with the current Fulton County Pretreatment Ordinance. The report shall indicate the nature and concentration of all pollutants in the effluent for which sampling and analyses were performed.

Failure to submit reports is a major violation. Reports more than 30 days late are considered a significant violation.

B. Additional Monitoring

If the permittee monitors any pollutant more frequently than required by this permit, using test procedures prescribed in 40 CFR part 136 or amendments thereto, or otherwise approved by EPA

or as specified in this permit, the results of such monitoring shall be included in any calculations of actual daily maximum or monthly average pollutant discharge and results shall be reported in the monthly report submitted to the Fulton County Government.

C. Automatic Resampling Reports

If the results of the permittee's wastewater analysis indicate that a violation of this permit has occurred, the permittee must:

1. Inform the Fulton County Government of the violation within 24 hours; and
2. Repeat the sampling and pollutant analysis and submit, in writing, the results of this second analysis within 30 days of the first violation.
3. The user is not required to resample if Fulton County Government monitors at the user's facility at least once a month, or if a sample was collected between the user's initial sampling and when the user receives the results of this sampling.

D. Accidental Discharge, Potential Problem, and Operating Upset Reports

1. The Permittee shall notify the Fulton County Government immediately upon the occurrence of an operating upset or accidental discharge of substances prohibited by Fulton County Government Sewer Use Ordinance section 82-237, or any slug loads or spills that may enter the public sewer. During normal business hours Fulton County Government should be notified by phone at 404-612-0212 or 404-734-5190 after 4 p.m. Monday-Friday, weekends, or holidays. The notification shall include location of discharge, date and time thereof, type of waste, concentration and volume, and corrective actions taken. The permittee's notification of accidental releases in accordance with this section do not relieve it of other reporting requirements that arise under local, State, or Federal laws. **See Appendix B on page 18.**

2. Within five days following an operating upset or accidental discharge, the permittee shall submit to the Fulton County Government a detailed written report. The report

Shall specify:

a. Description and cause of the upset, slug load or accidental discharge and the impact on the permittee's compliance status. The description should also include location of discharge, type, concentration and volume of waste.

b. Duration of noncompliance, including exact dates and times of noncompliance and, if the noncompliance is continuing, the time by which compliance is reasonably expected to occur.

c. All steps taken or to be taken to reduce, eliminate, and/or prevent recurrence of such an upset, slug load, accidental discharge, or other conditions of noncompliance.

The report must also demonstrate that the treatment facility was being operated in a prudent and workmanlike manner. A documented and verified operating upset shall be an affirmative defense to any enforcement action brought against the permittee for violations attributable to the upset event.

E. Changed Conditions Reports
The permittee shall give notice to Fulton County Government thirty (30) days prior to any facility expansion, production increase, or process modifications which results in a new or substantially increased discharges or change in the nature of the discharge.

F. Duty to Provide Information
The permittee shall furnish to Fulton County Government, within ten (10) days any information which Fulton County Government may request to determine whether cause exists for modifying, revoking, reissuing, or terminating this permit, or to determine compliance with this permit. The permittee shall also, upon request, provide within ten (10) days, copies of any records required to be kept by this permit.

G. Notification of Discharge of Hazardous Waste
Any user who commences the discharge of hazardous waste shall notify Fulton County Government, in writing, of any discharge into the sewer system of a substance which, if otherwise disposed of, would be a hazardous waste under 40 CFR Part 261. Such notification must include the name of the hazardous waste as set forth in 40 CFR Part 261, the EPA hazardous waste number, and the type of discharge (continuous, batch, or other). Consult Fulton County Government Sewer Use Ordinance section 82-241(9) for reportable quantities and exemptions.

H. Signatory Requirements (Ordinance section 82-239 (6))
All user reports must be signed by an authorized representative of the user and contain the following statement: "I certify under penalty of law that this document and all attachments

were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my

inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

I. All reports required by this permit shall be submitted to the Fulton County Government, Industrial Monitoring at the following address:

Industrial Monitoring Manager
Industrial Monitoring
SFMOC
7472 Cochran Road,
College Park, GA 30349

PART 4 - GENERAL SEWER USE REQUIREMENTS (Ordinance section 82-237)

A. Prohibited Discharge Standards

A. General prohibitions. No user shall introduce or cause to be introduced into the POTW any pollutant or wastewater which causes pass through or interference. These general prohibitions apply to all users of the POTW whether or not they are subject to categorical pretreatment standards or any other national or local pretreatment standards or requirements.

B. Specific prohibitions. No user shall introduce or cause to be introduced into the POTW the following pollutants, substances, or wastewater:

1. Pollutants which create a fire or explosive hazard in the POTW, including, but not limited to, waste streams with a closed-cup flashpoint of less than 140° (60°) using the test methods specified in 40 CFR 261.21. Wastewater causing two readings on an explosion hazard meter at the point of discharge into the POTW, or at any point in the POTW, of more than five (5) percent or any single reading over ten percent of the lower explosive limit of the meter. Prohibited materials include, but are not limited to, gasoline, kerosene, naphtha, benzene, toluene, xylene, ethers, alcohols, ketones, aldehydes, peroxides, chlorates, per chlorates, bromates, carbides, hydrides and sulfides and any other substances which the county, EPD or EPA has identified as a hazard to the system.
2. Wastewater having a pH less than 6.0 or more than 12.0, or otherwise causing corrosive structural damage to the collection system, POTW or equipment;
3. Solid or viscous substances in amounts which will cause obstruction of the flow in the POTW resulting in interference but in no case solids greater than one inch (1.0") or 2.54 centimeters (2.54 cm) in any dimension;
4. Pollutants, including oxygen-demanding pollutants (BOD, etc.), released in a discharge at a flow rate and/or pollutant concentration which, either singly or by interaction with other pollutants, will cause interference with the POTW;
5. Wastewater having a temperature greater than 150° (65.5°), or which will inhibit biological activity in the treatment plant resulting in interference, but in no case wastewater which causes the temperature at the introduction into the treatment plant to exceed 104° (40°);
6. Petroleum oil, non-biodegradable cutting oil, or products of mineral oil origin, in amounts that will cause interference or pass through;
7. Pollutants which result in the presence of toxic gases, vapors, or fumes within the POTW in a quantity that may cause acute worker health and safety problems;
8. Trucked or hauled pollutants, except at discharge points designated by the director in accordance with section 82-237.C of this article;
9. Noxious or malodorous liquids, gases, solids, or other wastewater which, either singly or by interaction with other wastes, are sufficient to create a public nuisance or a hazard to life, or to prevent entry into the sewers for maintenance or repair;
10. Wastewater which imparts color which cannot be removed by the treatment process, such as, but not limited to, dye wastes and vegetable tanning solutions, which consequently

imparts color to the treatment plant's effluent, thereby violating the county's NPDES permit;

11. Wastewater containing any radioactive wastes or isotopes except in compliance with applicable or federal regulations;
12. Storm water, surface water, ground water, discharge from groundwater remediation, artesian well water, roof runoff, subsurface drainage, swimming pool drainage, condensate, deionized water, non-contact cooling water, and unpolluted wastewater, unless specifically authorized by the director;
13. Sludge's, screenings, or other residues from the pretreatment of industrial wastes;
14. Medical wastes, except as specifically authorized by the director in a wastewater discharge permit;
15. Wastewater causing, alone or in conjunction with other sources, the treatment plant's effluent to fail a toxicity test. In no case shall an industry's discharge exceed a total toxic organics (TTO) concentration of 2.13 mg/L;
16. Detergents, surface-active agents, or other substances which may cause excessive foaming in the POTW;
17. Fats, oils, or greases (FOG) of animal or vegetable origin in concentrations greater than 100 mg/L.

B. Dilution

The permittee shall not increase the use of potable or process water or, in any way, attempt to dilute an effluent as a partial or complete substitute for adequate treatment to achieve compliance with the limitations contained in this permit.

C. Compliance with Applicable Pretreatment Standards and Requirements

Compliance with this permit does not relieve the permittee from its obligations regarding compliance with any and all applicable local, State and Federal pretreatment standards and requirements including any such standards or requirements that may become effective during the term of this permit.

PART 5 - MONITORING AND RECORDS (Ordinance section 82-242)

A. Representative Sampling

Samples and measurements taken as required herein shall be representative of the volume and nature of the monitored discharge. All samples shall be taken at the monitoring points specified in this permit and unless otherwise specified, before the effluent joins or is diluted by any other wastestream, body of water or substance. All equipment used for sampling and analysis must be routinely calibrated, inspected and maintained to ensure their accuracy. Monitoring points shall not be changed without notification to and the approval of Fulton County Government.

B. Flow Measurements

If flow measurement is required by this permit, the appropriate flow measurement devices and methods consistent with approved scientific practices shall be selected and used to ensure the accuracy and reliability of measurements of the volume of monitored discharges. The devices shall be installed, calibrated, and maintained to ensure that accuracy of the measurements is consistent with the accepted capability of that type of instrument. Certified annual recalibration of flow measurement device and submittal of documentation is required by Fulton County.

C. Inspection and Entry

The permittee shall allow the Fulton County Government or an authorized representative, upon the presentation of credentials and other documents as may be required by law, to:

1. Enter upon the permittee's premises where a regulated facility or activity is located or conducted, or where records must be kept under the conditions of this permit;
2. Have access to and copy, at reasonable times, any records that must be kept under the conditions of this permit;
3. Inspect at reasonable times any facilities, equipment (including monitoring and control equipment), practices, or operations regulated and required under this permit;
4. Sample or monitor, for the purposes of assuring permit compliance, any substances or parameters at any location; and
5. Inspect any production, manufacturing, fabricating, or storage area where pollutants, regulated under the permit, could originate, be stored, or be discharged to the sewer system.

D. Retention of Records

1. The permittee shall retain records of all monitoring information, including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation, copies of all reports required by this permit, and records of all data used to complete the application for this permit, for a period of at least three years from the date of the sample, measurement, report or application.
2. All records that pertain to matters that are the subject of special orders or any other endorsement or litigation activities brought by the Fulton County Government shall

be retained and preserved by the permittee until all enforcement activities have concluded and all periods of limitation with respect to any and all appeals have expired. These periods may be extended by request of the Fulton County Government.

E. Record Contents

Records of sampling and analyses shall include:

1. The date, exact place, time, and methods of sampling or measurements, and sample preservation techniques or procedures;
2. Who performed the sampling or measurements;
3. The date(s) analyses were performed;
4. Who performed the analyses;
5. The analytical techniques or methods used; and
6. The results of such analyses.

F. Additional / Special Monitoring Requirements
None

PART 6 - OPERATION AND MAINTENANCE OF POLLUTION CONTROLS

A. Proper Operation and Maintenance
The permittee shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed or used by the permittee to achieve compliance with the conditions of this permit. Proper operation and maintenance includes but is not limited to: effective performance, adequate funding, adequate operator staffing and training, and adequate laboratory and process controls, including appropriate quality assurance procedures. This provision requires the operation of back-up or auxiliary facilities or similar systems only when necessary to achieve compliance with the conditions of the permit.

B. Requirement for Certified Operator / Lab Analyst or Laboratory
Permittee must comply with State regulations stated below:

1. Section 43-51-6(b) of the State of Georgia Water and Wastewater Treatment Plant Operators and Laboratory Analysts Act states: "Certification by the State Board of Examiners for Certification of Water and Wastewater Treatment Plant Operators and Laboratory Analysts is required of the person who is responsible for wastewater pretreatment facility process control decisions. Responsibility shall not be delegated to non-certified personnel but a "decision tree" or similar formal, written process control decision method may be developed by the certified operator."

   Excluded from certification requirements are those pretreatment processes that consist solely of screening, pH adjustment, sedimentation processes without mechanical solids removal, septic tanks, grease traps or oil-water separators; unless specifically required in this permit.
2. Section 43-51-2(c) of the State of Georgia Water and Wastewater Treatment Plant Operators

   and Laboratory Analysts Act states: "Any laboratory analyst who conducts certain tests, as defined by the State Board, of water or wastewater samples in conjunction with the operation of public water supply systems or wastewater treatment plants shall obtain a certificate from the State Board."

3. Section 12-2-9 requires any person submitting data prepared by a commercial environmental laboratory to the Environmental Protection Division for regulatory purposes shall stipulate that the lab is approved or accredited as specified in EPD rules and regulations.

C. Duty to Halt or Reduce Activity
Upon reduction of efficiency of operation, loss, or failure of all or part of the treatment facility, the permittee shall, to the extent necessary to maintain compliance with its permit, control its production or discharges (or both) until operation of the treatment facility is restored or an alternative method of treatment is provided. This requirement applies, for example, when the primary source of power of the treatment facility fails or is reduced. It shall not be an affirmative defense for a permittee in an enforcement action that it would have been necessary to halt or

reduce the permittee activity in order to maintain compliance with the conditions of this permit.

D. Bypass of Treatment Facilities

1. Bypass is prohibited unless it is unavoidable to prevent loss of life, personal injury, or severe property damage or no feasible alternatives exist.
2. The permittee may allow bypass to occur which does not cause effluent limitations to be exceeded, but only if it is also for essential maintenance to assure efficient operation.
3. Notification of bypass:
   a. Anticipated bypass - If the permittee knows in advance of the need for a bypass, it shall submit prior written notice, at least ten days before the date of the bypass, to the Fulton County Government.
   b. Unanticipated bypass - The permittee shall immediately notify Fulton County Government and submit a written notice within 5 days. This report shall specify:
      (i) A description of the bypass, and its cause, including its duration;
      (ii) Whether the bypass has been corrected; and
      (iii) The steps being taken or to be taken to reduce, eliminate and prevent a reoccurrence of the bypass.

E. Removed Substances

Solids, sludges, filter backwash, or other pollutants removed in the course of treatment or control of wastewater shall be disposed of in accordance with section 405 of the Clean Water Act and Subtitles C and D of the Resource Conservation and Recovery Act.

PART 7 - INDUSTRIAL WASTE SURCHARGE (Ordinance section 82-250)

A. All persons discharging industrial waste into the public sewers shall be charged and assessed a surcharge, in addition to any sewer service charges, if these waste have a concentration greater than the following "normal" concentrations:

1. Chemical oxygen demand (COD) of 350 mg/l;
2. A total suspended solids (TSS) of 200 mg/l; or
3. A Total Kjehdahl Nitrogen (TKN) of 25 mg/l;
4. A Total Phosphorus of 5 mg/l.

The amount of such surcharge shall reflect the total cost incurred by Fulton County Government in handling these excess pollutants. Surcharge determination shall be in accordance with Fulton County Government Sewer Use Ordinance section 82-250(2)(J).

PART 8 - WASTEWATER DISCHARGE PERMITS (Ordinance section 82-239)

A. Permit Modification

This permit may be modified for good causes including, but not limited to, the following:

1. To incorporate any new or revised federal, State, or local pretreatment standards or requirements;
2. Material or substantial alterations or additions to the discharger's operation processes, or discharge volume or character which were not considered in drafting the effective permit;

3. A change in any condition in either the industrial user or the POTW that requires either a temporary or permanent reduction or elimination of the authorized discharge;
4. Information indicating that the permittee discharge poses a threat to Fulton County Government's collection and treatment systems, Fulton County Government personnel or the receiving waters;
5. Violation of any terms or conditions of the permit;
6. Misrepresentation or failure to disclose fully all relevant facts in the permit application or in any required reporting;
7. Revision of or a grant of variance from such categorical standards pursuant to 40 CFR 403.13;
8. To correct typographical or other errors in the permit;
9. To reflect transfer of the facility ownership and/or operation to a new owner/operator; or
10. Upon request of the permittee, provided such request does not create a violation of any applicable requirements, standards, laws, or rules and regulations.

The filling of a request by the permittee for a permit modification, revocation and reissuance, or termination, or a notification of planned changes or anticipated noncompliance, does not stay any permit condition.

B. Permit Revocation

This permit may be revoked for good cause, including, but not limited to, the following reasons:

1. Failure to notify Fulton County Government of significant changes or changed conditions prior to changed discharge;
2. Misrepresentation or failures to fully disclose all relevant facts in the wastewater discharge permit application;
3. Falsifying or failure to submit self-monitoring reports;
4. Tampering with monitoring equipment;
5. Refusing to allow timely access to the facility premises and records;
6. Failure to meet effluent limitations;
7. Failure to pay fines;
8. Failure to pay sewer charges;
9. Failure to meet compliance schedules;
10. Failures to complete a wastewater survey or the wastewater discharge permit application;
11. Failure to provide advance notice of the transfer of business ownership of a permittee facility;
12. Violation of any pretreatment requirement, or any terms of the wastewater discharge permit or Fulton County Government Sewer Use Ordinance.

C. Permit Appeals

The permittee may petition to appeal the terms of this permit within thirty (30) days of the notice. This petition must be in writing; failure to submit a petition for review shall be deemed to be a waiver of the appeal. In its petition, the permittee must indicate the permit provisions objected to,

the reasons for this objection, and the alternative condition, if any, it seeks to be placed in the permit.

Fulton County Government shall not stay the effectiveness of this permit pending reconsideration. If, after considering the petition and any arguments put forth by the pretreatment coordinator, Fulton County Government determines that reconsideration is proper, it shall remand the permit back to the Industrial Monitoring Manager for reissuance. Those permit provisions being reconsidered by the Industrial Monitoring Manager shall be stayed pending reissuance.

A Fulton County Government decision not to reconsider a final permit shall be considered final administrative action for purposes of judicial review. The permittee seeking judicial review of the Board's final action must do so by filing a complaint with the Fulton County Superior Court.

D. Limitation on Permit Transfer

Permits may be reassigned or transferred to a new owner and/or operator with prior approval of the Pretreatment coordinator under these conditions:

1. The permittee must give at least thirty (30) days advance notice to the Industrial Monitoring Manager; and
2. The notice must include a written certification by the new owner which:

    a. States that the new owner has no immediate intent to change the facility's operations and processes;
    b. Identifies the specific date on which the transfer is to occur; and
    c. Acknowledges full responsibility for complying with the existing permit.

E. Duty to Reapply

If the permittee wishes to continue an activity regulated by this permit after the expiration date of this permit, the permittee must submit an application for a new permit at least ninety (90) days before the expiration date of this permit.

F. Continuation of Expired Permits

An expired permit will continue to be effective and enforceable until the permit is reissued if:

1. The permittee has submitted a complete permit application at least ninety (90) days prior to the expiration date of the user's existing permit.
2. The failure to reissue the permit, prior to expiration of the previous permit, is not due to any act or failure to act on the part of the permittee.

PART 9 - PRETREATMENT OF WASTEWATER (Ordinance section 82-238)

A. Flow Regulation

Fulton County Government reserves the right to place limits on the average and/or maximum rate of discharge, time of discharge, and/or requirements for flow regulation and equalization. At least once every two (2) years, Fulton County Government shall evaluate whether each significant

industrial user needs an accidental discharge/slug control plan. Fulton County Government may require any user to develop, submit for approval, and implement such a plan. An accidental discharge/slug control plan shall address, at a minimum, the following:

1. Description of discharge practices, including nonroutine batch discharges;
2. Description of stored chemicals;
3. Procedures for immediately notifying Fulton County Government of any accidental or slug discharge, as required by section 82-241 (6) of the ordinance; and
4. Procedures to prevent adverse impact from any accidental or slug discharge. Such procedures include, but are not limited to, inspection and maintenance of storage areas, handling and transfer of materials, loading and unloading operations, control of plant site runoff, worker training, building of containment structures or equipment, measures for containing toxic organic pollutants, including solvents, and/or measures and equipment for emergency response.

B. Installation of Necessary Equipment

Fulton County Government may require the permittee to install and maintain inspection, flow monitoring, and sampling equipment. Fulton County Government may also require the installation of pretreatment technology, pollution control, or construction of appropriate containment devices, designed to reduce, eliminate, or prevent the introduction of pollutants into the sewer system.

PART 10 - STANDARD CONDITIONS

A. Severability

The provisions of this permit are severable, and if any provision of this permit, or the application of any provision of this permit to any circumstance, is held invalid, the application of such provision to other circumstances, and the remainder of this permit, shall not be affected thereby.

B. Duty to Comply

The permittee must comply with all conditions of this permit. Failure to comply with the requirements of this permit may be grounds for administrative action, or enforcement proceedings including civil or criminal penalties, injunctive relief, and summary abatements.

C. Duty to Mitigate

The permittee shall take all reasonable steps to minimize or correct any adverse impact to the public treatment plant or the environment resulting from noncompliance with this permit, including such accelerated or additional monitoring as necessary to determine the nature and impact of the noncomplying discharge.

D. Property Rights

The issuance of this permit does not convey any property rights of any sort, or any exclusive privileges, nor does it authorize any injury to private property or any invasion of personal rights, nor any violation of Federal, State, or local laws or regulations.

E. Annual Publication of Significant Noncompliance

A list of all industrial users that were subject to enforcement proceedings during the twelve (12) previous months shall be annually published by the Fulton County Government in the largest daily newspaper within its service area. Accordingly, the permittee is appraised that noncompliance with this permit may lead to an enforcement action and may result in publication of its name in an appropriate newspaper in accordance with Fulton County Government Sewer Use Ordinance section 82-244.

PART 11 - ENFORCEMENT REMEDIES (Ordinance section 82:245-246)

Any person(s) violating any the provisions of this permit or provisions of the Fulton County Government Sewer Use Ordinance shall be subject to any of the enforcement remedies listed in the Fulton County Government Sewer Use Ordinance section 82-245-246.

A. Civil and Criminal Liability

Nothing in this permit shall be construed to relieve the permittee from civil and/or criminal penalties for noncompliance under the Fulton County Government Sewer Use Ordinance section 82-246.

B. Penalties for Violations of Permit Conditions

The Fulton County Government Sewer Use Ordinance section 82: 246 provides that any person who violates a permit condition is subject to a civil penalty of at least $1,000 per day of such violation. Any person who willfully or negligently violates permit conditions is subject to criminal penalties of a fine of up to $1,000 per day of violation, or by imprisonment for 12 months, or both. The permittee may also be subject to sanctions under State and/or Federal law.

C. Administrative enforcement remedies

In accordance with the Sewer Use Ordinance, any of the following remedies may be implemented to effect compliance: notice of violation, consent orders, show-cause hearings, compliance orders, cease-and-desist orders, administrative fines, emergency suspensions, and termination of discharge.

D. Recovery of Costs Incurred

In addition to civil and criminal liability, the permittee violating any of the provisions of this permit or Fulton County Government Sewer Use Ordinance or causing damage to or otherwise inhibiting the Fulton County Government wastewater disposal system shall be liable to Fulton County Government for any expense, loss, or damage caused by such violation or discharge. Fulton County Government shall bill the pennittee for the costs incurred by Fulton County Government for any cleaning, repair, or replacement work caused by the violation or discharge.

E. Falsifying Information

Knowingly making any false statement on any report or other document required by this permit or knowingly rendering any monitoring device or method inaccurate is a crime and may result in the imposition of criminal penalties.

F. Commercial Laboratory Testing

Commercial laboratories used to supply permit compliance data must be approved or accredited as required by OCGA section 12-2-9 (DNR Regulations at 391-3-26 Rules for Commercial Environmental Laboratories).

G. Compliance of Schedule

No increments of progress referred to in this section shall exceed 9 months. And not later than 14 14 days following each date in the schedule and the final date for compliance, the industrial user shall submit a progress report to the County including, as a minimum, whether or not it complied with the increment of progress to be met on such date and, if not, the date on which it expect to comply with its increment of progress, the reason for the delay, and steps being taken by the industrial user to return the construction to the schedule established. In no event shall more than 9 months elapse between such progress reports to the County.

FULTON COUNTY
DEPARTMENT OF PUBLIC WORKS

PART XVIII. AGREEMENT:

I, _____, of

ROSWELL WATER TREATMENT PLANT

being duly authorized to sign this document, and in consideration for the granting of this permit, do hereby agree to allow duly authorized employees of the FULTON COUNTY PUBLIC WORKS, INDUSTRIAL MONITORING DIVISION the right to enter upon said company properties without prior notification, for the purposes of inspection, observation, measurement, sampling, copying of records, photographing or testing.

Additionally, I agree to abide by all applicable provisions of the Fulton County Sewer Use and Pretreatment Ordinance, the State of Georgia Water Quality Rules and Regulations, any applicable Federal Regulations including 40 CFR 403-699.

I understand that failure to abide by the terms of this permit may be cause for disconnection of sewer service to the property authorized to discharge by this permit.

Signed this _____ day of _____, _____.

_____
(Signature)

_____
(Name & Title)

_____
(Address)

APPENDIX A

Fulton County Govt. Sewer Use Ordinance Limits			Surcharge Limits	ROSWELL WATER TREATMENT PLANT Permit Limits		
Parameter	**Daily Maximum**	**Monthly Average**		**Parameter**	**Daily Maximum**	**Monthly Average**
COD	591mg/l	443mg/l	1500mg/l	COD	350mg/l	350mg/l
TSS	286mg/l	215mg/l	1000mg/l	TSS	200mg/l	200mg/l
TKN	50mg/l	25mg/l	50mg/l	TKN	25mg/l	25mg/l
Total Phosphorus	7mg/l	5mg/l	7mg/l	Total Phosphorus	5mg/l	5mg/l
O&G	100mg/l	100mg/l		O&G	100mg/l	100mg/l
pH	6.0-9.0			pH	6.0-9.0	

APPENDIX B

A. SPILL NOTIFICATION PROCEDURES, SLUG LOADING:

Section 82-241. Reporting Requirements for the Permittee (6)

Reporting Potential Problems, Including Slug Loadings:

(1) The industrial user shall notify the Director within one (1) hour of becoming aware of any spill, dump, or discharge that could cause problems in the water pollution control facility; including, but not limited to, any slug loading as defined in section 82-235.

(2) Additionally, within five (5) days of becoming aware of a discharge described in subparagraph (6) (B) of this section, the industrial user must submit a written report to the Director. This report shall include the date, time, duration, cause of discharge and, in accordance with section 82-238, provisions of protection against such discharges.

(See Section 82-238 of the Fulton County Ordinance)

Spill to the Sewer System:

In the event of a spill, dump, or unavoidable discharge to the sanitary sewer system of any deleterious material, immediately notify the **Division of Industrial Pretreatment** at 404-612-0212 or 404-734-5190. If this number cannot be reached, notify the water pollution control facility underlined below: (See Section 82-238 and Section 82-241 (6) (B) of the ordinance)

Camp Creek Water Reclamation Facility - 7520 Cochran Rd., College Park	(470) 488-1928
Big Creek Water Pollution Control Plant - 1030 Marietta Hwy, Roswell	**(770) 642-0455**
Utoy Creek Water Pollution Control Plant - 800 Selig Dr. SW, Atlanta	(404) 215-5649
Johns Creek Environmental Campus- 8100 Holcomb Bridge Rd, Alpharetta	(404) 613-3006

Spill to Stream or Strom Sewer System:

In the event of a spill, dump or unavoidable discharge of any substance to any stream, creek, ditch or storm sewer within Fulton County, immediately notify the following:

1.	**Fulton County, Public Works**	**(404) 612-7400**
2.	**Fulton County Industrial Monitoring**	**(404) 612-0212, 404-734-5190**
3.	Georgia Environmental Protection Division	(404) 656-4300
4.	Atlanta-Fulton County Emergency Management	(404) 730-5600

Other Emergency Telephone Numbers

Fulton County Police Department	(404) 613-5700
Fulton County Fire Department	(404) 612-5700

OFFICE OF INSURANCE AND SAFETY FIRE

John F. King, Commissioner
Safety Fire Division-Safety Engineering
2 Martin Luther King Jr. Drive
West Tower, Suite 920
Atlanta, GA 30334

OPERATING PERMIT

Mailing Name and Address

CITY OF ROSWELL - WATER TREATMENT PLANT
38 HILL ST
SUITE # 130
ROSWELL GA 30075-4537

JURISDICTION: P 109271

INSPECTION DATE: 08/22/2019

EXPIRATION DATE: 12/01/2019

INSPECTOR: HECTOR A GONZALEZ

Owner Name and Address

CITY OF ROSWELL
38 HILL ST
SUITE # 130
ROSWELL GA 30075-4537

Location of Equipment

CITY OF ROSWELL - WATER TREATMENT PLANT
100 DOBBS DR
WATER TREATMENT PLANT
ROSWELL GA 30075-4567

Equipment Information

SPECIFIC LOCATION:	PLANT
TYPE:	AIR
MANUFACTURER:	MANCHESTER
NATIONAL BOARD NUMBER:	483792
SERIAL NUMBER:	

This is to certify that the equipment herein described may be operated at the location as specified and for the period as shown. A sixty (60) day period is allowed after the Operating Permit's expiration date for inspection and reissue of the certificate.

This Operating Permit must be posted on or near the above mentioned equipment.

This Operating Permit may be revoked for failure to keep equipment in safe condition.

In the event of accident or injury:

Daytime Contact: (404) 679-0687

Night & Weekend (404) 473-1301

JOHN F. KING
INSURANCE AND SAFETY FIRE COMMISSIONER

Please follow reporting requirements at www.oci.ga.gov.

GID-305-SF JUL 2019 (same as DOL-4219)

APPENDIX B TRANSFER OF PRIVATE WATER UTILITIES TO PUBLIC WATER UTILITIES

Policy and Procedure on Transfer of Private Water Utilities to Public Water Utilities

Purpose

This policy provides a checklist and referenced standards for homeowners associations, Condominium, Town Homes, or other similar entities that want to convert a private water system to a public water system.

This policy will not apply to Apartment Complexes.

Plats

Subdivisions designed, constructed and platted as private shall forever remain private.

Standard Construction Specifications and Subdivision Regulations

The current condition of the water infrastructure under consideration must conform to each of the City standards described in the Standard Construction Specifications & Subdivision Regulations, current edition, and requirements in the Unified Development Code (UDC). City staff must be able to accurately verify conformance. It is the responsibility of the applicant to provide all data including engineering test results to prove conformity.

The applicant will usually be the homeowners association (HOA), who will not typically have the expertise to use the City standards. The applicant shall hire a professional engineer, knowledgeable of this type of civil engineering, who shall act as the applicant's Certified Agent.

Permanent Water Line Easement

The Private community will be required to dedicate a minimum 20-foot waterline easement, with at least 10 feet of the easement extending behind the curb. The water main shall be in the center of the permanent easement.

Access to Private Community

The Roswell Water Utility shall be granted access to the subject property at all times for purposes including, but not limited to, inspecting the water system, maintaining the water system, and reading meters. Any gated roads or drives shall be equipped with an emergency access system. Access codes shall be provided to the Roswell Water Utility and updated when changed.

Water Infrastructure and Appurtenances

It will be the responsibility of the applicant to show proof that all piping installation meets and conforms to Roswell's Standard Construction Specifications. This will include pipe material, services, hydrants, verification that proper blocking is installed and that all fittings are properly installed. The applicant shall provide as-built drawings and be prepared to uncover the infrastructure for inspections to verify that everything meets Roswell's specifications.

The applicant is also responsible for purchasing meters for each residence (domestic/irrigation) and the removal of the existing meter, meter box, and backflow prevention device(s). Meters with appropriate shutoff valves, meter box, backflow prevention, etc. and service contracts will be required for each property/unit.

Procedure for Conversion of Private Water Systems to Public Systems

1. A "Letter of Interest" shall be submitted to the Environmental/Public Works Director from the authorized homeowners association (HOA) representative requesting conversion of a private water system to a public water system. The letter should indicate the means by which the HOA owns the property (fee simple, ground lease, etc.), and that it has the authority to transfer ownership of the

water system to the City of Roswell. The letter should also confirm that the majority of HOA members, as defined in the HOA Bylaws, are in favor of the conversion and HOA documents should be supplied to show what is required for full HOA approval.

2. Upon receipt of the "Letter of Interest", the Roswell Water Utility will perform a cursory inspection and investigation to attempt to find the standards to which the waterlines and appurtenances were built and the amount of easement that is available. The Roswell Water Utility shall distribute the "Letter of Interest" to appropriate departments for coordination.

3. City Departments will evaluate submitted information for compliance with the Roswell Comprehensive Plan, UDC, Water System Master Plan, Water Resources map and corresponding standards.

4. Depending on what is found in the initial inspection and investigation, the City may require the applicant (at his expense) to provide a signed and sealed engineering study, conducted and submitted to the Roswell Water Utility by a registered engineer, licensed in the State of Georgia, to determine if the water system has been constructed to meet the current City of Roswell standards.

5. If all standards are not met, the applicant must make whatever improvements are necessary to bring the facilities up to current standards at the applicant's cost. The upgrades will be confirmed in a follow-up engineering report, signed and sealed by the same engineer.

6. The Environmental/Public Works Director shall make a determination about the level of compliance of the proposed Water System with City standards as one of the following: Non-Compliance, Substantial Compliance, or Full Compliance. The Environmental/Public Works Director shall report his recommendation to the next available Public Safety and Public Works Committee meeting (such Committee consists of the Mayor, members of City Council and the City Administrator). The Public Safety and Public Works Committee may vote to move the matter to a meeting of Mayor and Council for formal action or may seek additional information.

   The City shall forward a copy of the Environmental/Public Works Director's report regarding the application to the applicant at least five days before the Public Safety and Public Works Committee meeting at which the application is to be discussed.

   The applicant and any other interested party may appear and speak to the Committee. The decision of Mayor and Council regarding the application is final.

7. Once all standards/criteria, including easements and access, are met, the request to make the water system public shall be formalized by the applicant and submitted to the City Attorney to begin the legal process to make the water system public and obtain and document the new permanent water utility easement. An agreement with terms of the acceptance of the water system shall be contracted and brought before Mayor and City Council for approval/acceptance of the agreement. In the agreement a minimum of a 2 year warranty on the system will be given by the applicant on the waterlines and all of its appurtenances. Any latent defects will also be warrantied against.

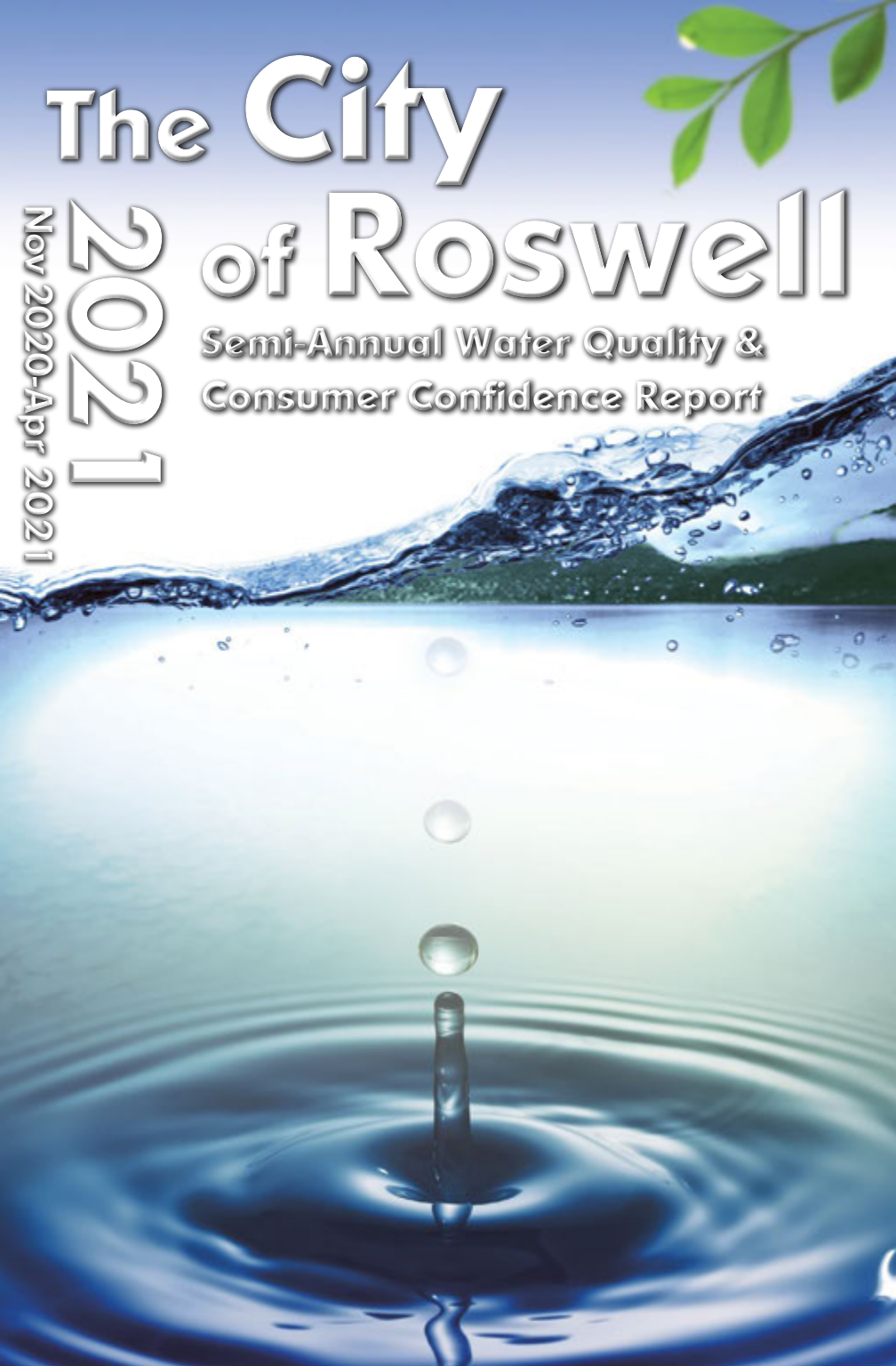
APPENDIX C RECENT CONSUMER CONFIDENCE REPORT

The City of Roswell

2021

Nov 2020-Apr 2021

Semi-Annual Water Quality & Consumer Confidence Report



The City of RoswellWater Utility Division is proud to present the City's November 2020-April 2021 Water Quality and Consumer Confidence Report. This report provides valuable information about the City's drinking water.

Included in this report is information about where the City's water comes from, what it contains, and how it compares to standards set by regulatory agencies.

The City of Roswell Water Utility Division in conjunction with the Georgia Environmental Protection Division conducted laboratory tests for drinking water parameters in November 2020 through April 2021. All tests came back well within accepted ranges with no violations reported. Data from these tests are included in this report.

In order to ensure that tap water is safe to drink, EPA prescribes regulations that limit the amount of certain contaminants in water provided by public water systems. Food and Drug Administration regulations establish limits for contaminants in bottled water which must provide the same protection for public health.

Other Reference Sites for Drinking Water Information

United States Environmental Protection Agency Drinking Water Hot Line: 1-800-426-4791 or www.epa.gov/safewater.

American Water Works Association: www.awwa.org

EPD Monitoring Waivers for 28 Synthetic Organic Compounds and Inorganic Compounds (Asbestos, Cyanide)

As authorized by Georgia EPD, the City of Roswell water system has reduced monitoring requirements for certain contaminants to less often than once per year because the concentration of these contaminants are not expected to vary significantly from year to year.

For information on the water produced by Fulton County, contact Fulton County Water at 404-612-7400.

Basic Watershed Principles

The sources of drinking water (both tap water and bottled water) include rivers, lakes, streams, ponds, reservoirs, springs, and wells. As water travels over the surface of the land or through the ground, it dissolves naturally-occurring minerals and, in some cases, radioactive material, and can pick up substances resulting from the presence of animals or from human activity.

Contaminants that may be present in source water include the following:

Microbial contaminants, such as viruses and bacteria that may come from sewage treatment plants, septic systems, agricultural livestock operations, and wildlife.

Inorganic contaminants, such as salts and metals, which can be naturally occurring or result from urban stormwater runoff, industrial or domestic wastewater discharges, oil and gas production, mining, or farming.

Pesticides and herbicides, which may come from a variety of sources such as agriculture, urban stormwater runoff, and residential uses.

Organic chemical contaminants, including synthetic and volatile organic chemicals, which are by-products of industrial processes and petroleum production, and can also come from gas stations, urban stormwater runoff, and septic systems.

Radioactive contaminants, which can be naturally occurring or be the result of oil and gas production and mining activities.

Your Water is Safe to Drink!!

Definitions and Abbreviations:

AL - Action Level
The concentration of a contaminant which, if exceeded, triggers a treatment or other requirement that a water system must follow.

MCL - Maximum Contaminant Level
The highest level of a contaminant that is allowed in drinking water. The MCLs are set as close to the MCLGs as feasible using the best available treatment technology.

MCLG - Maximum Contaminant Level Goal
The level of a contaminant in drinking water below which there is no known or expected risk to health. MCLGs allow for a margin of safety.

NTU – Nephelometric Turbidity Units
A measure of turbidity or cloudiness of water.

PPB – Parts per billion
(same as micrograms per liter)
One part per billion is equivalent to one minute in 2,000 years or one penny in $10 million.

PPM – Parts per million
(same as milligrams per liter)
One part per million is equivalent to one minute in 2 years or one penny in $10,000.

THHA – Total Haloacetic Acids
A by-product of disinfection by chlorination.

TT - Treatment Technique
A required process intended to reduce the level of a contaminant in drinking water.

TTHM – Total Trihalomethanes
A by-product of disinfection by chlorination.

Table of Detected Contaminants

Data within this table represents Nov 2020–Apr 2021

REGULATED SUBSTANCES						
Substance (units)	MCLG (ideal level)	MCL (highest allowed)	Roswell System Average	Range of Levels Detected	Violation	Probable Sources
Total Coliform Bacteria	0.0	Presence of bacteria in <5% of monthly samples	0	<5%	No	Naturally present in the environment
Fluoride (ppm)	4.0	4.0	0.81	0.78 - 0.87	No	Erosion of natural deposits; water additive which promotes strong teeth
Nitrate (ppm)	10.0	10.0	0.9	0.9	No	Runoff from fertilizer use; leaching from natural deposits
Total Organic Carbon (ppm)	N/A	TT $\geq$ 1.0 (1.0 in the minimum removal ratio)	1.62	1.2 - 1.5	No	Naturally present in the environment
Chlorine (ppm)	4.0	4.0	1.68	0.82 - 1.97	No	Added to water as a disinfectant
Turbidity	N/A	TT - 0.3 NTU	0.02	0.00 - 0.15	No	Soil runoff and erosion
Total Trihalomethanes (TTHms) (ppb)	N/A	80	28.2	15.5 - 48.1	No	By-product of disinfection by chlorination
Total Haloacetic Acids (THAAs) (ppb)	N/A	60	29.7	19.5 - 50	No	By-product of disinfection by chlorination

LEAD AND COPPER						
Substance (units)	MCLG (ideal level)	MCL (highest allowed)	Roswell System Average	Range of Levels Detected	Violation	Probable Sources
Lead (ppb)	0.0	AL - 15	0.0025	0.0 - 0.016	No	Corrosion of household plumbing systems; erosion of natural deposits
Copper (ppb)	1.3	AL - 1.3	0.38	0.0 - 0.58	No	Corrosion of household plumbing systems; erosion of natural deposits; leaching from wood preservations

Where does Roswell's water come from?

The City of Roswell's water comes from two sources. The primary source is the Roswell Water Treatment Plant in Roswell. Water for this facility is withdrawn from the Big Creek Watershed.

Supplemental water is purchased by the City from the North Fulton/Atlanta Treatment Plant in Alpharetta. The source for this plant is the Chattahoochee River. Since the City has two sources, Roswell's system is classified as a "blended water source."

Source Water Assessment
Watershed Susceptibility Rankings

Watershed	Potential Point Source Rank	Potential Non-Point Source Rank	Overall Watershed Ranking
Big Creek	Medium	High	Medium - High

Point Source Pollution involves actual facilities, which have contaminants on site and can pose a potential health risk if humans consume those contaminants.

Non-Point Source Pollution is caused by development and everyday activities that take place in residential, commercial, and rural areas and is carried by rainfall to streams and lakes. The non-point source analysis used land use categories and their corresponding impervious surface area to determine the possible impact on the water supply intakes. Land use categories vary from forested areas to urban or commercial areas. Impervious surfaces are mainly constructed surfaces covered by impenetrable materials. These materials seal surfaces, repel water and prevent precipitation from infiltrating the soil. These paved or impervious surfaces collect pollution from many possible sources including dust, dirt, leaks from vehicles, animal wastes, yard pesticides and fertilizers, leaky sewer lines, construction, and barren soil areas. These sources become pollution problems when rain events cause the accumulated pollutants to be washed into nearby streams.

The Source Water Assessment can help communities understand the potential for contamination of their drinking water supplies and can be used to prioritize the need for protecting drinking water sources.

What is a Watershed?

A watershed is the land area that drains to a particular stream, lake, or river. The quality of the streams, lakes and rivers in the watershed is affected by activities on both the water and land.

What is Water Pollution?

Water pollution is caused when substances such as chemicals, pathogens, sediment, and metals are dumped into the water. There are two types of water pollution, point source and non-point source pollution.

What is a Source Water Assessment?

A source water assessment is a study and report, unique to each water system that provides basic information about the water used to provide drinking water.

What will the Assessment tell?

The assessments will:

- identify the area of land that contributes the raw water used for drinking water,
- identify potential sources of contamination to drinking water supplies, and
- provide an understanding of the drinking water supply's susceptibility to contamination.

If present, elevated levels of lead can cause serious health problems, especially for pregnant women and young children. Lead in drinking water is primarily from materials and components associated with service lines and home plumbing. The City of Roswell is responsible for providing high quality drinking water, but cannot control the variety of materials used in plumbing components. When your water has been sitting for several hours, you can minimize the potential for lead exposure by flushing your tap for 30 seconds to 2 minutes before using water for drinking or cooking. If you are concerned about lead in your water, you may wish to have your water tested. Information on lead in drinking water, testing methods, and steps you can take to minimize exposure is available from the Safe Drinking Water Hotline or at www.epa.gov/safewater/lead.

The City of Roswell's Source Water Assessment is available to the public. To obtain a copy, please contact the City of Roswell Public Works/Environmental Department at 770-641-3707 or at www.RoswellGov.com/WaterUtility.

Roswell's Water Utility Division is proud to serve the citizens of Roswell and provide the best possible services related to water resources. Whether we are producing and distributing the highest quality of drinking water to our customers, ensuring that the drainage system is working properly or completing waterline and stormwater pipe improvement projects, the employees of the Water Utility Division are committed to excellence and striving to protect and enhance our community.

Customer Service

For billing questions or new service connection / disconnection, call the Finance Department at 770-641-3759.

City of Roswell Water Emergencies

Call 770-641-3707, Monday - Friday, 8:00 a.m. to 5:00 p.m.
Call 770-640-4100 after hours and weekends

Website

Visit our website at www.roswellgov.com for comprehensive utility, water conservation and customer service information, as well as online bill payment. Download the Aquahawk water usage and monitoring app at www.RoswellGov.com/Aquahawk. To report problems, visit www.RoswellGov.com/App.

City of Roswell Organizational Committee

The City of Roswell Public Safety/Public Works Committee meets on the second Tuesday of the month at 5 p.m. in Room 220 of Roswell City Hall, 38 Hill Street. These meetings are open to the public.

Questions about this report?

Please call Jessie Cash, Water Operations Manager, Roswell Water Treatment Plant, 770-641-3816, Monday - Friday, 8:00 a.m. to 5:00 p.m.

Additional copies of this report may be obtained at 38 Hill Street, City Hall. A PDF image of this report may also be downloaded from our website, www.roswellgov.com/CCR.

Produced by the City of Roswell Community Relations Division, June 2021.

Vulnerable Populations

Some people may be more vulnerable to contaminants in drinking water than the general population. Immuno-compromised persons such as persons with cancer undergoing chemotherapy, persons who have undergone organ transplants, people with HIV/AIDS or other immune system disorders, some elderly, and infants can be particularly at risk from infections. These people should seek advice about drinking water from their health care providers. EPA/CDC guidelines on appropriate means to lessen the risk of infection by Cryptosporidium and other microbial contaminants are available from the Safe Drinking Water Hotline (1-800-426-4791).

Cryptosporidium is a microscopic organism that is common in surface water. The organism comes from animal wastes in the watershed and are removed by a well-maintained water treatment process.

Awards

- GAWP Public Education Award 2000
- GAWP Water Distribution System Award 2006, 2011, 2014, 2018, 2019, 2020
- GAWP Gold Award 2006-2009, 2013-2019
- GAWP Platinum Award 2010
- Consumer Confidence Award 2006, 2008, 2011
- ASCE Award for Water Plant Project 2015-2016
- Fox McCarthy Award 2016
- GAWP Public Education Committee Print Media Award (for Drippy Dropperson: Water Ambassador story) 2018
- GAWP Water Treatment Plant of the Year 2020

Georgia Association of Water Professionals
1932

City of Roswell
Water Utility Division
105 Frank Lewis Drive
Roswell, GA 30075

Lori Henry | Mayor

City Council
Marcelo Zapata | Post 1
Mike Palermo | Post 2
Christine Hall | Post 3
Marie Willsey | Post 4
Mathew Tyser | Post 5
Matt Judy | Post 6

Michael Fisher | City Administrator (Interim)

Dan Skalsky | Director of Environmental, Public Works

APPENDIX D WATER LINE CAPITAL IMPROVEMENT PLAN MATRIX AND PREVIOUS WATER LINE PROJECT SUMMARY

Previous Water Line Project Summary

The following water line replacement projects were completed between FY18 and FY 21:

FY18: Total Spent – $1,231,498

- Alpine Drive ($60,131)
- Blackberry Court ($68,244)
- Bushy Run ($36,914)
- Cone Court ($25,455)
- Ellis Street ($197,246)
- Farm Court ($26,725)
- Grove Way-Bush Street Phase 1 (CDBG) ($173,192)
- Kings Mill Court ($50,018)
- La View Circle ($76,034)
- Mill Village Service Line Tie Over ($15,000)
- Millbrook Circle (CDBG) ($185,338)
- Stonebridge Drive ($55,520)
- Tollwood Drive ($31,707)
- Walnut Lane ($164,133)

FY19: Total Spent – $393,956

- Ashley Manor ($17,250)
- Cedar Trace ($30,050)
- Crestbrook Lane ($28,804)
- Driftwood Court ($187,10)
- Farm Dale ($37,000)
- Jade Cove Circle ($46,075)
- Knoll Woods Court ($33,762)
- Mill View Avenue ($29,650)
- Roswell Hills Place ($50,130)
- Shadowood Court ($37,575)
- Design for Relocation of Water Line for Gateway Project ($64,950)

FY20: Total Spent – $305,438

- Clara Drive (CDBG) ($118,030)
- Hunterhill Court ($39,400)
- Ramsdale Drive ($36,100)
- Willow Springs Lane ($111,908)

FY21: Total Spent – $326,451

- Corinth Court ($44,250)
- Farm Trace ($38,400)
- Groveway/Bush Street Phase 2 (CDBG) ($229,276)
- Ridgefield Court ($14,525)

Safety	Community Improvement	Pipe Age	Water Quality/Breaks/ Service Calls	System Upgrade	RDOT Projects	Pipe Material
15 = meets fireflow; too few hydrants	10 = moderate probability for redevelopment	10 = pipe age 26-40 years	10 = 1-5 waterline breaks and/or 1-5 water quality calls	10 = improved/ proposed line improves flows in limited area	30 = funded road project	10 = cast iron
20 = Meets demands for fireflow but main too small for hydrants	20 = high probability for redevelopment	15 = pipe age 41-75 years	30 = 6 or more waterline breaks within 5 years and/or 6 or more water quality issues	25 = improved/ proposed waterline improves looping and flows for large area		25 = galvanized steel; municipex
30 = does not meet fireflow		20 = pipe age greater than 75 years				35 = asbestos concrete

Street address	Total Score	Location tag	Pipe Size	Pipe Material	Date Installed	Current Calendar Year	Age of Pipe	Linear Feet	Estimated Cost for Construction	Projected Construction Year	Problem	Comments	Replacement Pipe Size	Replacement Pipe Material	Funding
Millbrook Circle	130	G	2"	GS	1970	2016	46	1,100	$220,000.00	FY18	2" line has had many breaks on it during its lifetime. No hydrants are installed on this street.	Replace 2" GS line with new 8" DI line. May consider repalcing with a new 12" line for new proposed Water	8"	DI	
Grove Way (Bush Street to Myrtle Street)-Phase 1	125	G	6"	CI	1958	2016	58	250	$50,000.00	FY17 (Phase 1)		Phase 1 replaces 241 linear feet of the 6" line.	8"	DI	Partially funded by CDBG in amount of $100,000
Bush Street (Oak Street to Pleasant Hill Street)- Phase 1	115	G	6"	CI	1974	2016	42	583	$116,600.00	FY17 (Phase 1)			8"	DI	
Thompson Place	115	D	6"	AC	1966	2016	50	1,174	$234,800.00		Replace 6" AC main (from Canton Street to Windy Pines Trail) with 8" DI main.	Improve System Performance for better flows/ looping	8"	DI	
Prospect Street	105	A	6"	AC	1985	2016	31	1,735	$347,000.00	FY25	Transite main	Need to replace 6" AC main with 8" DI main	8"	DI	
Bush Street (Oak Street to Pleasant Hill Street)- Phase 1	105	G	2"	GS	1974	2016	42	583		FY17 (Phase 1)		Abandon 2" line and tie services to 6" CI main or to new main that replaces 6" CI main.			
Clara Drive	100	A	6"	AC	1963	2016	53	463	$92,600.00	FY23	Transite main	Need to replace 6" AC main with 8" DI main	8"	DI	
Grove Way (Bush Street to Myrtle Street)- Phase 2	95	G	6"	CI	1958	2016	58	733	$146,600.00						
Maxwell Road	95	B	6"	AC	1956	2016	60	1,076	$215,200.00		Replace 6" AC/ CI main with 8" DI	Improve System Performance for better flows/ looping, remove AC main.	8"	DI	Possibly funded by CDBG
Rocky Creek Drive	95	B	6"	AC	1962	2016	54	2,220	$444,000.00		Transite main	Need to replace 6" AC main with 8" DI main	8"	DI	Possibly funded by CDBG
Strickland Road	90	A	6"	AC	1958	2016	58	480	$96,000.00	FY24	Transite main	Need to replace 6" AC main with 8" DI main	8"	DI	
Thompson Place	90	D	6"	CI	1966	2016	50	1,571	$314,200.00						
Grove Way (Bush Street to Myrtle Street)	90	G	1.5"	GS	1958	2016	58	462				Abandon 1.5" line and tie services to 6" CI main or to new main that repalces 6" CI main.			
La View Circle	90	B	6"	AC	1963	2016	53	2,240	$448,000.00		Transite main	Need to replace 6" AC main with 8" DI main	8"	DI	
La View Court	85	B	2"	GS	1963	2016	53	664	$132,800.00				8"	DI	
Oak Street (Park Sign to Dobbs	85	G	6"	CI	1960	2016	56	1,207	$422,450.00		End of Line so we have complaints of dirty water. Also look to wards looping to Dobbs and new proposed water plant		12"	DI	
Atlanta Street (Hill Street to Oak Street)	85	A	6"	CI	1980	2016	36	740	$259,000.00	FY21	Extend 12" main from Hill Street to Marietta Highway	Replace 6" CI line with new 12" DI line	12"	DI	
Connemara Road	85	A	6"	AC	1962	2016	54	2,275	$455,000.00		Transite main	Need to replace 6" AC main with 8" DI main	8"	DI	
Rocky Creek Lane	85	B	6"	AC	1962	2016	54	340	$68,000.00		Transite main	Need to replace 6" AC main with 8" DI main	8"	DI	Possibly funded by CDBG
Skyland Drive	85	C	6"	AC	1959	2016	57	2,667	$533,400.00				8"	DI	
Forrest Street (From Hill Street to	80	G	6"	CI	1989	2016	27	1,322	$264,400.00	FY20			8"	DI	
Oak Street (Park Sign to Atlanta	80	A	8"	CI	1960	2016	56	2,618	$916,300.00		Replace 8" CI with 12" DI line		12"	DI	
Oxbo Road (Pleasant Hill to	80	G	2"	GS	1960	2016	56	365	$73,000.00	FY23	Extend 8" DI main from Pleasant Hill to Atlanta Street, tieing into new 12" main on Atlanta Street, replacing 2" GS main	System Improvement to provide better fflow/ looping and provide for	8"	DI	
Jade Cove Drive	80	B	6"	AC	1960	2016	56	2,920	$584,000.00		Transite main	Need to replace 6" AC main with 8" DI main	8"	DI	
Bush Street (Oak Street to Pleasant	75	G	2"	GS	1974	2016	42	964							
Alpine Drive	75	A	6"	CI	1960	2016	56	2,470	$494,000.00		Replace 6" main with 8" DI main	Improve System Performance for better flows/ looping	8"	DI	
Spring Drive (Hillcrest Drive	75	C	6"	CI	1964	2016	52	4,230	$846,000.00		Transite main	Need to replace 6" AC main with 8" DI main	8"	DI	
Magnolia Street	75	A	6"	CI	1940	2016	76	3,195	$639,000.00				8"	DI	
Knollwoods Terrace	75	D	6"	AC	1964	2016	52	2,050	$410,000.00		Transite main	Need to replace 6" AC main with 8" DI main	8"	DI	
Long Circle	75	D	6"	AC	1966	2016	50	1,165	$233,000.00				8"	DI	
Atlanta Street (Oak Street to Marietta Highway)	70	A	N/A	No Main	N/A	2016	N/A	2,200	$770,000.00			Extend 12" DI line to Marietta Highway and tie into existing 12" DI line	12"	DI	
Clara Drive	70	A	2"	GS	1963	2016	53	400	$32,000.00	FY23	Transite main	Need to replace 6" AC main with 8" DI main	8"	DI	
Alpine Drive	70	A	2"	GS	1960	2016	56	400	$32,000.00		Replace 6" main with 8" DI main	Improve System Performance for better flows/ looping	8"	DI	
Thompson Place	70	D	2"	GS	1966	2016	50	896				Abandon 2" line and tie services to 6" CI main or to new main that repalces 6" CI main.			
Maple Street	70	A	2"	GS	1965	2016	51	486	$38,880.00						
Maxwell Road	70	B	6"	CI	1956	2016	60	257	$51,400.00		Replace 6" AC/ CI main with 8" DI	Improve System Performance for better flows/ looping, remove AC	8"	DI	Possibly funded by CDBG
Webb Street	70	D	6"	CI	1964	2016	52	1,215	$243,000.00		Replace 6" CI main with 8" DI main to improve system flow/ looping	Improve system performance for better flows/ looping	8"	DI	
Maple Street	70	A	6"	CI	1965	2016	51	692	$138,400.00	FY22			8"	DI	

Pine Grove Road (Coleman Road to	70	E	8"	CI	1965	2016	51	5,043	$1,765,050.00				12"	DI	
Woodstock Road	70	D	8"	CI	1950	2016	66	1,102	$220,400.00				8"	DI	
Woodstock Road	70	D	6"	CI	1950	2016	66	5,659	$1,131,800.00				8"	DI	
Woodstock Street	70	D	6"	CI	1960	2016	56	1,690	$338,000.00				8"	DI	
Knollwoods Court	70	D	6"	AC	1968	2016	48	871	$174,200.00				8"	DI	
Ellis Street (from Hill Street to Oak	70	G	2"	GS	1979	2016	37	710	$142,000.00	FY19			8"	DI	
South Atlanta Street (Mill Street to	70	A	No Main	No Main	N/A	2016	N/A	3,145				Tie onto 8" main at Mill Street and extend new 8" DI main to Riverside	8"	DI	
Green Street	65	A	2"	GS	1985	2016	31	1,701				Abandon 2" line and tie services to 6" CI main or to new main that repalces			
Jones Drive (from Connemara to	65	A	2"	GS	1975	2016	41	480	$96,000.00			Abandon 2" line and tie services to 6" CI main or to new main that repalces			
Zion Circle (from Zion Church vault to	65	G	6"	CI	1966	2016	50	1,157	$231,400.00			Replace 6" CI line with new 8" DI line	8"	DI	
Green Street	65	A	6"	CI	1985	2016	31	2,043	$408,600.00						
Jones Drive (from Connemara to south side of Jones	65	A	6"	CI	1975	2016	41	1,140	$120,000.00			Tie Services and laterals over to 8" DI Line and extend 8" line to South Atlanta Street (476 feet)	8"	DI	
Green Street	65	A	8"	DI	1985	2016	31	220	$44,000.00				8"	DI	
Grove Place	65	G	6"	CI	1958	2016	58	337	$67,400.00				8"	DI	
Back Street	60	B	No Main	No Main	N/A	2016	N/A	1,100				Need to install 8" main. This will provide better looping which will help	8"	DI	Possibly funded by CDBG
Marietta Highway (Between	60	C	No Main	No Main	N/A	2016	N/A	1,020				Need to install 8" DI main on this side of the road with copper services.	8"	DI	
Marietta Highway (Between Big Creek	60	C	No Main	No Main	N/A	2016	N/A	6,500				Extend 8" DI main from Big Creek WTP to Spring Drive, eliminating	8"	DI	
Mill Street (Atlanta Street to Elm/ Mill	60	A	No Main	No Main	N/A	2016	N/A	565					8"	DI	
Oxbo Drive	60	A	No Main	No Main	N/A	2016	N/A	463				Tie onto 12" main on Mimosa Blvd and new 12" main on Atlanta St.. System Improvement to provide	8"	DI	
King Street (from Spring Drive to	60	A	6"	CI	1964	2016	52	1,058	$211,600.00				8"	DI	
Goulding Place	60	D	6"	CI	1982	2016	34	885					8"	DI	
Lake Charles Way	60	E	6"	CI	1965	2016	51	2,420					8"	DI	
Willeo Road (Boulder Drive to Coleman Road)	60	F	6"	CI	1964	2016	52	4,555			Replace 6-inch CI main with 12-inch DI to improve system flow because of possible well installation	Replace 6-inch CI main with 12-inch DI to improve system flow because of possible well installation	8"	DI	
Mimosa Boulevard (Marietta Highway to Pratt Street)	60	C	6"	CI	1936	2016	80	5,180	$100,000.00			Could tie all services and line conncetions to 12" DI line and abandon 6" CI line for less.	8"	DI	
Community Circle	60	A	8"	CI	1960	2016	56	389	$77,800.00				8"	DI	
Blackberry Court	60	D	2"	GS	1964	2016	52	614	$122,800.00	FY22			8"	DI	
Market Place	60	B	6"	CI	1977	2016	39	1,270	$254,000.00		Need to install 8" main with copper services. This will provide better pressue and flows for future growth.	System improvement to provide better flow/looping	8"	DI	Possibly funded by CDBG
Jade Cove Circle	60	B	6"	AC	1966	2016	50	1,861	$372,200.00		Transite main	Need to replace 6" AC main with 8" DI main	8"	DI	
La View Way	60	B	6"	AC	1963	2016	53	486	$97,200.00		Transite main	Need to replace 6" AC main with 8" DI main	8"	DI	
Saratoga Drive	60	B	6"	AC	1965	2016	51	956	$191,200.00		Transite main	Need to replace 6" AC main with 8" DI main	8"	DI	Possibly funded by CDBG
Tuxedo Court	60	B	6"	AC	1965	2016	51	653	$130,600.00		Transite main	Need to replace 6" AC main with 8" DI main	8"	DI	Possibly funded by CDBG
Tuxedo Drive	60	B	6	AC	1965	2016	51	950	$190,000.00		Transite main	Need to replace 6" AC main with 8" DI main	8"	DI	Possibly funded by CDBG
Pine Street	55	A	1"	GS	1960	2016	56	379	$75,800.00				8"	DI	
Minhinette Drive	55	D	6"	CI	1978	2016	38	2,196					8"	DI	
Moonshadow Court	55	D	6"	CI	1972	2016	44	1,060					8"	DI	
Cherry Street	55	A	6"	CI	1935	2016	81	554					8"	DI	
Grimes Bridge Road (From	55	B	8"	CI	1982	2016	34	4,036					8"	DI	
Land O Lakes Drive	55	D	6"	CI	1965	2016	51	400					8"	DI	
Park Square	55	A	6"	CI	1960	2016	56	420			Replace 6" CI main with 12" main connecting 12" main on Mimosa Blvd with 8" DI main on Sloan Street	System Improvement for better flow/ looping	8"	DI	
Cone Court	55	H	2"	GS	1970	2016	46	400	$32,000.00				8"	DI	
Stonebridge Drive	55	B	2"	GS	1968	2016	48	400	$32,000.00						
Walnut Lane	50	A	2"	GS	1956	2016	60	824	$164,800.00				8"	DI	
Tollwood Drive	50	E	2"	GS	1974	2016	42	290	$23,200.00						
Farm Court	50	E	2"	GS	1980	2016	36	342	$27,360.00						
Shadowood Court	50	B	2"	GS	1967	2016	49	400	$32,000.00		Replace 6" CI main with 8' DI main adding another hydrant to street to improve fire protection and increase flows to area	System improvement to provide better flow/looping	8"	DI	Possibly funded by CDBG
Ramsdale Drive	50	E	2"	GS	1974	2016	42	648							
Jones Drive (from Connemara to	50	A	8"	DI	1996	2016	20	618				Tie Services and laterals over to 8" DI Line	8"	DI	

Cedar Trace	50	H	6"	CI	1977	2016	39	1,475					8"	DI	
Ramsdale Drive	50	E	6"	CI	1974	2016	42	2,201					8"	DI	
Tollwood Drive	50	E	6"	CI	1974	2016	42	979					8"	DI	
Wickerberry Lane	50	H	6"	CI	1972	2016	44	2,620					8"	DI	
Farm Court	50	E	6"	DI	1980	2016	36	672					8"	DI	
Horton Drive	50	A	6"	CI	1983	2016	33	737					8"	DI	
Bulloch Avenue	50	C	6"	CI	1935	2016	81	1,861					8"	DI	
Lake Crest Drive	50	D	6"	CI	1965	2016	51	1,680					8"	DI	
Land O Lakes Drive	50	D	6"	CI	1965	2016	51	3,320					8"	DI	
North Point Way	50	H	6"	CI	1967	2016	49	520					8"	DI	
North Pointe Drive	50	H	6"	CI	1967	2016	49	1,500					8"	DI	
Oakstone Drive	50	D	6"	CI	1971	2016	45	1,650					8"	DI	
Oakstone Trail	50	D	6"	CI	1971	2016	45	810					8"	DI	
Oakstone Way	50	D	6"	CI	1971	2016	45	860					8"	DI	
Orchard Way	50	H	6"	CI	1967	2016	49	990					8"	DI	
Ridgefield Drive	50	H	6"	CI	1969	2016	47	7,775					8"	DI	
Shadowood Court	50	B	6"	CI	1967	2016	49	536			Replace 6" CI main with 8' DI main adding another hydrant to street to improve fire protection and increase flows to area	System improvement to provide better flow/looping	8"	DI	Possibly funded by CDBG
Woodcrest Drive	50	H	6"	CI	1971	2016	45	1,265					8"	DI	
Wordsworth Drive	50	E	6"	CI	1971	2016	45	950					8"	DI	
Bushy Run	50	H	2.5"	GS	1972	2016	44	400					8"	DI	
Kings Mill Court	50	A	2"	GS	1977	2016	39	800					8"	DI	
Roswell Hills Place	50	E	2"	GS	1983	2016	33	400					8"	DI	
Mimosa Boulevard (Pratt Street to	50	D	No Main	No Main	1936	2016	80	600				Extend 12" main from Ramsey Street to Webb Street with 8" DI main and	8"	DI	
Crabapple Road (From Woodstock	50	D	6"	CI	1982	2016	34	2,620			Replace 6" CI main with 8" DI main	Improve system performance for better flows/ looping	8"	DI	
Grimes Bridge Road (From	50	B	6"	CI	1978	2016	38	2,380			Need to install 12" main with copper services. This will provide better pressue and flows for future growth.	System improvement to provide better flow/looping	8"	DI	Possibly funded by CDBG
Jade Cove Circle	50	B	2"	GS	1966	2016	50	400	$32,000.00		Transite main	Need to replace 6" AC main with 8" DI main	8"	DI	
La View Way	50	B	2"	GS	1963	2016	53	400	$32,000.00		Transite main	Need to replace 6" AC main with 8" DI main	8"	DI	
Saratoga Drive	50	B	2"	GS	1965	2016	51	400	$32,000.00		Transite main	Need to replace 6" AC main with 8" DI main	8"	DI	Possibly funded by CDBG
Tuxedo Court	50	B	2"	GS	1965	2016	51	400	$32,000.00		Transite main	Need to replace 6" AC main with 8" DI main	8"	DI	Possibly funded by CDBG
Birchmead Drive	50	D	6"	AC	1984	2016	32	172	$34,400.00		Transite main	Improve system performance for better flows/ looping	8"	DI	
Knollwoods Drive	50	D	6"	AC	1976	2016	40	1,200	$240,000.00				8"	DI	
Willow Springs Lane	45	A	2"	GS	1964	2016	52	352	$70,400.00				8"	DI	
Crest Brook Lane	45	D	2"	GS	1965	2016	51	400	$32,000.00				8"	DI	
Driftwood Court	45	A	2"	GS	1964	2016	52	400	$32,000.00				8"	DI	
Knollwoods Court	45	D	2"	GS	1968	2016	48	400	$32,000.00				8"	DI	
Lake Drive	45	D	2"	GS	1965	2016	51	400	$32,000.00				8"	DI	
Ridgefield Court	45	H	2"	GS	1971	2016	45	400	$32,000.00				8"	DI	
Ridgefield Drive (culdesacs)	45	H	2"	GS	1969	2016	47	800	$64,000.00				8"	DI	

Periwinkle Drive	45	H	2"	GS	1972	2016	44	400	$32,000.00				8"	DI	
Grimes Place	45	B	2"	GS	1978	2016	38	400	$32,000.00		Replace 6" CI main with 8' DI main adding another hydrant to street to improve fire protection and increase flows to area	System improvement to provide better flow/looping	8"	DI	Possibly funded by CDBG
Crest Brook Lane	45	D	6"	CI	1965	2016	51	400					8"	DI	
Driftwood Court	45	A	6"	CI	1964	2016	52	821					8"	DI	
Lake Crest Terrace	45	D	6"	CI	1965	2016	51	630					8"	DI	
Lake Drive	45	D	6"	CI	1965	2016	51	900					8"	DI	
Plum Street	45	D	6"	CI	1960	2016	56	469					8"	DI	
Pratt Street	45	E	6"	CI	1956	2016	60	459					8"	DI	
Ridgefield Court	45	H	6"	CI	1971	2016	45	555					8"	DI	
Robinwood Lane	45	H	6"	CI	1967	2016	49	300					8"	DI	
Stone Bridge Drive	45	B	6"	CI	1968	2016	48	1,568					8"	DI	
Stoney Creek Way	45	H	6"	CI	1967	2016	49	200					8"	DI	
Willow Springs Drive	45	A	6"	CI	1964	2016	52	759					8"	DI	
Wood Place	45	D	6"	CI	1951	2016	65	835					8"	DI	
Grimes Bridge Road (from Oxbo	45	B	8"	CI	1982	2016	34	2,597					8"	DI	
Grimes Place	45	B	6"	CI	1978	2016	38	371			Replace 6" CI main with 8' DI main adding another hydrant to street to improve fire protection and increase flows to area	System improvement to provide better flow/looping	8"	DI	Possibly funded by CDBG
Loblolly Lane	45	H	6"	CI	1977	2016	39	2,660					8"	DI	
Longleaf Drive	45	H	6"	CI	1972	2016	44	2,140					8"	DI	
Oakwood Drive	45	H	6"	CI	1979	2016	37	2,200					8"	DI	
Periwinkle Drive	45	H	6"	CI	1972	2016	44	1,050					8"	DI	
Pine Thicket Way	45	H	6"	CI	1972	2016	44	1,230					8"	DI	
Windflower Trace	45	D	6"	CI	1973	2016	43	1,235					8"	DI	
Windwisp Pass	45	D	6"	CI	1973	2016	43	340					8"	DI	
Meadowood Court	40	B	2"	GS	1972	2016	44	400					8"	DI	
Meadowood Drive	40	B	2"	GS	1972	2016	44	400					8"	DI	
Sunset Court	40	A	2"	GS	1977	2016	39	400					8"	DI	
Shadowbrook Court	40	B	6"	CI	1983	2016	33	242					8"	DI	
Shadowbrook Drive	40	B	8"	CI	1983	2016	33	1,146					8"	DI	
Brentwood Court	40	B	6"	CI	1972	2016	44	394					8"	DI	
Grimes Bridge Landing	40	B	6"	CI	1982	2016	34	592					8"	DI	
Meadowood Court	40	B	6"	CI	1972	2016	44	120					8"	DI	
Meadowood Drive	40	B	6"	CI	1972	2016	44	1,436					8"	DI	
Pleasant Avenue	40	A	8"	CI	1983	2016	33	531					8"	DI	
Roswell Farms Circle	40	H	6"	CI	1980	2016	36	480					8"	DI	
Roswell Farms Court	40	H	6"	CI	1980	2016	36	750					8"	DI	
Roswell Farms Drive	40	H	6"	CI	1980	2016	36	1,475					8"	DI	
Roswell Farms Lane	40	H	6"	CI	1980	2016	36	1,025					8"	DI	
Roswell Farms Road	40	H	6"	CI	1980	2016	36	2,350					8"	DI	
Sunset Court	40	A	6"	CI	1977	2016	39	661					8"	DI	
Windy Pine Trail	40	D	6"	CI	1977	2016	39	650					8"	DI	
Cone Court	40	H	6"	CI	1970	2016	46	454					8"	DI	
Corinth Court	40	D	6"	CI	1965	2016	51	1,200					8"	DI	
Stonebridge Drive	40	B	6"	CI	1968	2016	48	1,362					8"		
Stonebridge Trail	40	B	6"	CI	1968	2016	48	1,254					8"		
Willeo Road (Marietta Hwy to	40	F	6"	CI	1965	2016	51	3,595			Replace 6-inch CI main with 12-inch DI to improve system flow looping from Marietta Hwy to Coleman Rd. Possible tank		8"	DI	
Warsaw Road (From Jade Cove	40	B	6"	CI	1978	2016	38	1,081					8"	DI	
Birchmead Drive	40	D	2"	GS	1984	2016	32	400			Transite main	Improve system performance for better flows/ looping	8"	DI	
Boulder Drive	40	F	2"	GS	1984	2016	32	400					8"	DI	
Farm Cove Court	40	H	2"	GS	1979	2016	37	400					8"	DI	

Hunterhill Court	40	E	2"	GS	1972	2016	44	400					8"		
Farm Dale	40	H	2"	GS	1979	2016	37	400							
Farm Trace	40	H	2"	GS	1979	2016	37	395							
Maple Street	35	A	2"	MP	2016	2016	0	266							
Willow SpringsLane	35	A	2"	GS	1964	2016	52	686							
Grimes Bridge Road (from Oxbo	35	B	8"	DI	1982	2016	34	950					8"	DI	
Willow Springs Drive	35	A	6"	CI	1964	2016	52	691							
Willow Springs Drive	35	A	6"	CI	1964	2016	52	300							
Bushy Run	35	H	6"	CI	1972	2016	44	1,200					8"	DI	
Roswell Hills Place	35	E	8"	CI	1983	2016	33	623					8"	DI	
Oakfield Lane	35	D	6"	CI	1971	2016	45	2,220	$444,000.00		Replace 6" main with 8" DI main	Improve System Performance for better flows/ looping	8"	DI	
Knollwoods Drive	35	D	6"	CI	1976	2016	40	1,297					8"	DI	
Barrington Drive	35	C	2"	GS	1986	2016	30	712				Tie services and laterals over to 12" DI line	8"	DI	
Cedar Cove	35	H	2"	GS	2007	2016	9	400					8"	DI	
Skyland Drive	35	C	2"	GS	1984	2016	32	400					8"	DI	
Pleasant Hill Street	30	A	8"	DI	1983	2016	33	700					8"	DI	
Ramsey Street	30	A	12"	DI	1983	2016	33	513					8"	DI	
Skyland Trace	30	C	8"	DI	1983	2016	33	348					8"	DI	
Canton Street	30	D	8"	DI	1996	2016	20	4,030					8"	DI	
Coleman Road	30	H	8"	CI	1973	2016	43	11,055					8"	DI	
Frazier Street	30	A	8"	CI	1993	2016	23	1,116					8"	DI	
Dobbs Drive	30	B	6"	CI	1984	2016	32	859					8"	DI	
Kings Mill Court	25	A	8"	CI	1977	2016	39	802					8"	DI	
Willeo Road (between Hwy 120	25	F	8"	CI	1974	2016	42	1,815					8"	DI	
Mimosa Boulevard (Marietta Highway	25	C	12"	DI	1980	2016	36	5,180							
Charles Place (From Bridge to	25	A	8"	DI	2010	2016	6	630						DI	Possibly funded by CDBG
Warsaw Road (From Grimes	25	B	12"	DI	2010	2016	6	1,050					8"	DI	Possibly funded by CDBG
Hunterhill Court	25	E	6"	CI	1972	2016	44	1,035					8"	DI	
Hunterhill Drive	25	E	6"	CI	1972	2016	44	2,040					8"	DI	
Hunterhill Trail	25	E	6"	CI	1972	2016	44	1,060					8"	DI	
Roswell Hills Court	25	E	8"	CI	1983	2016	33	590					8"	DI	
Wickerberry Hollow	25	H	6"	CI	1977	2016	39	910					8"	DI	
Wickerberry Knoll	25	H	6"	CI	1977	2016	39	1,340					8"	DI	
Lake Charles Road	20	D	No Main	No Main	N/A	2016	N/A	6,993				Extend 6" main on Lake Charles Road with 8" DI main, and run down Jones Road to tie onto end of 6" main on Woodstock Road. Improve	8"	DI	
Land O Lakes Drive	20	D	No Main	No Main	N/A	2016	N/A	3,170				Extend 6" main on Land O Lakes Drive with 8" DI main, down Broad	8"	DI	
Pine Grove Road (Connect	20	E	No Main	No Main	N/A	2016	N/A	560				Loop System and provide better flow. needs to be designed and budgeted	8"	DI	
Mimosa Boulevard (hydrant (Wachovia)	20	D	8"	DI	2008	2016	8							DI	
Dobbs Drive	20	B	6"	DI	2015	2016	1	787					8"	DI	
Thomas Street	20	E	8"	DI	2015	2016	1	374							
Canton Street (from 1270 Canton Street	20	D	8"	CI	2016	2016	0	104					8"	DI	
Cedar Cove	20	H	6"	CI	2007	2016	9	240					8"	DI	
Chattahoochee Street	20	A	6"	CI	1986	2016	30	859				Tie services and laterals over to 8" DI line	8"	DI	
Huntwick Court	20	F	8"	CI	1987	2016	29	240					8"	DI	
Huntwick Lane	20	F	8"	CI	1987	2016	29	320					8"	DI	
McBride Court	20	C	6"	CI	1989	2016	27	280					8"	DI	
Plantation Lane	20	B	8"	CI	1987	2016	29	640					8"	DI	
Dove Court	20	H	8"	DI	2004	2016	12	735						DI	
Hightower Road	15	E	8"	CI	1972	2016	44	3,430					8"	DI	

Hunterhill Drive (N)	15	E	8"	CI	1974	2016	42	965					8"	DI	
Hunterhill Way	15	E	8"	CI	1974	2016	42	920					8"	DI	
Alpharetta Street (west side)	15	A	8"	DI	1980	2016	36	7,474					8"	DI	
Alpharetta Street(East Side	15	A	12"	DI	1980	2016	36	7,959					8"	DI	
Azalea Drive	15	C	8"	DI	1983	2016	33	7,390					8"	DI	
Boulder Drive	15	F	8"	DI	1984	2016	32	1,870					8"	DI	
Brandon Ridge Drive	15	D	8"	DI	1983	2016	33	1,057					8"	DI	
Bristol Oaks Drive	15	E	8"	DI	1985	2016	31	1,205					8"	DI	
Carriage Station Circle	15	B	8"	DI	1979	2016	37	1,744					8"	DI	
Coleman Street	15	D	6"	DI	1980	2016	36	540					8"	DI	
Farm Cove Court	15	H	6"	DI	1979	2016	37	150					8"	DI	
Farm Dale	15	H	6"	DI	1979	2016	37	603					8"	DI	
Farm Hill Circle	15	H	8"	DI	1979	2016	37	1,330					8"	DI	
Farm Path	15	H	6"	DI	1979	2016	37	1,250					8"	DI	
Farm Trace	15	H	8"	DI	1979	2016	37	600					8"	DI	
Farm Track	15	H	8"	DI	1979	2016	37	1,221					8"	DI	
Farm Track	15	H	6"	DI	1979	2016	37	1,789					8"		
Highlands Court	15	C	8"	DI	1984	2016	32	295					8"	DI	
Highlands Overlook	15	C	8"	DI	1984	2016	32	385					8"	DI	
Highlands Trace	15	C	8"	DI	1984	2016	32	700					8"	DI	
Inverness Approach	15	C	8"	DI	1983	2016	33	1,180					8"	DI	
Junction Point	15	D	8"	DI	1980	2016	36	504					8"	DI	
Junction Track	15	D	8"	DI	1980	2016	36	3,517					8"	DI	
Leather Hinge Trail	15	E	8"	DI	1985	2016	31	1,315					8"	DI	
Loch Harbor Court	15	C	8"	DI	1984	2016	32	680					8"	DI	
Log House Court	15	E	8"	DI	1985	2016	31	1,350					8"	DI	
Old Tree Trace	15	C	8"	DI	1983	2016	33	2,668					8"	DI	
Pullman Trail	15	D	8"	DI	1983	2016	33	1,931					8"	DI	
Ridgefield to Federal Connection	15	E	8"	DI	1985	2016	31	600					8"	DI	
River Close	15	C	8"	DI	1983	2016	33	525					8"	DI	
River Run	15	C	8"	DI	1983	2016	33	1,160					8"	DI	
Station Parkway	15	D	8"	DI	1983	2016	33	664					8"	DI	
Wingfield Boulevard	15	D	8"	DI	1997	2016	19	455					8"	DI	
Cedar Creek Court	15	E	8"	DI	2010	2016	6	260					8"	DI	
Valley Ridge Drive	15	C	8"	DI	2013	2016	3	1,080					8"	DI	
Shadowbrook Drive	10	B	2"	MP	2016	2016	0	400					8"	DI	
Pine Valley Court	10	A	2"	Cu	2015	2016	1	250					8"	DI	
Valley Court	10	A	2"	Cu	2015	2016	1	250					8"		
Valley Drive	10	A	2"	Cu	2015	2016	1	281							
Afton Drive	10	B	8"	DI	2003	2016	13	857					8"	DI	
Ashurst Drive	10	H	8"	DI	1997	2016	19	1,190					8"	DI	
Bannister Drive	10	A	8"	DI	2004	2016	12	498					8"	DI	
Barrington Drive	10	C	12"	DI	1986	2016	30	742					8"	DI	
Beloit Place	10	H	8"	DI	1997	2016	19	190					8"	DI	
Bexhill Court	10	F	8"	DI	2004	2016	12	330					8"	DI	
Bloxley Court	10	F	8"	DI	2004	2016	12	500					8"	DI	
Bonnie Way	10	C	8"	DI	1988	2016	28	299					8"	DI	
Boulder Way	10	F	8"	DI	1998	2016	18	1,920					8"	DI	
Bywater Trail	10	F	8"	DI	1992	2016	24	1,700					8"	DI	
Carmichle Court	10	F	8"	DI	2004	2016	12	520					8"	DI	

Charles Place (From Bridge to	10	B	8"	DI	2007	2016	9	2,429					8"	DI	
Charleston Court	10	E	8"	DI	1988	2016	28	207					8"	DI	
Charleston Lane	10	E	8"	DI	1988	2016	28	1,222					8"	DI	
Charleston Trace	10	E	8"	DI	1988	2016	28	1,705					8"	DI	
Chattahoochee Street	10	A	8"	DI	1986	2016	30	1,862					8"	DI	
Chipley Court	10	E	8"	DI	1995	2016	21	565					8"	DI	
Colonial Park Drive	10	B	8"	DI	1985	2016	31	1,509					8"	DI	
Courage Court	10	D	8"	DI	1998	2016	18	228					8"	DI	
Cresta Court	10	B	8"	DI	1991	2016	25	357					8"	DI	
Crestview Circle	10	B	8"	DI	2002	2016	14	1,119					8"	DI	
Delmont Terrace	10	B	8"	DI	2002	2016	14	1,170					8"	DI	
Dumont Trace	10	H	8"	DI	1997	2016	19	245					8"	DI	
Elaine Drive	10	B	8"	DI	2010	2016	6	2,145					8"	DI	
Elm Street	10	A	8"	DI	1987	2016	29	399					8"	DI	
Emerald Lane	10	D	8"	DI	2000	2016	16	310					8"	DI	
Farnworth Lane	10	B	8"	DI	1987	2016	29	431					8"	DI	
Federal Road	10	E	8"	DI	1987	2016	29	2,041					8"	DI	
Fenwood Trail	10	E	8"	DI	1987	2016	29	1,390					8"	DI	
Fowler Avenue	10	D	8"	DI	2010	2016	6	1,227					8"	DI	
Hampton Bluff Court	10	C	8"	DI	1994	2016	22	1,355					8"	DI	
Hampton Bluff Way	10	C	8"	DI	1994	2016	22	1,105					8"	DI	
Heritage Court	10	A	8"	DI	1999	2016	17	344					8"	DI	
Heritage Trail	10	A	8"	DI	1999	2016	17	1,171					8"	DI	
High Branch Way	10	F	8"	DI	1992	2016	24	1,450					8"	DI	
High Branch Way to Inverness Crosssing	10	F	8"	DI	1992	2016	24	1,470					8"	DI	
Hill Street	10	A	8"	DI	1989	2016	27	1,288					8"	DI	
Hillcrest Drive (Westside Drive to	10	C	8"	DI	2013	2016	3	770					8"	DI	
Hillcrest Drive (Westside Drive to	10	C	8"	DI	2014	2016	2	997					8"	DI	
Huntwick Place	10	F	8"	DI	1987	2016	29	1,777					8"	DI	
Huntwick Terrace	10	F	8"	DI	1987	2016	29	363					8"	DI	
Inverness Crossing	10	C	8"	DI	1988	2016	28	1,400					8"	DI	
Jones Drive (at Church)	10	A	8"	DI	2011	2016	5	1,740					8"	DI	
Lauren Court	10	B	8"	DI	1994	2016	22	462					8"	DI	
Leasingworth Lane	10	B	8"	DI	1994	2016	22	461					8"	DI	
Lisa Drive	10	D	8"	DI	2012	2016	4	315					8"	DI	
Lochland Circle	10	C	8"	DI	1989	2016	27	2,550					8"	DI	
Longwater Cove	10	C	8"	DI	1992	2016	24	830					8"	DI	
Lullwater Court	10	C	8"	DI	2001	2016	15	865					8"	DI	
Lynwood Court	10	E	8"	DI	1999	2016	17	365					8"	DI	
Lynwood Drive	10	E	8"	DI	1999	2016	17	545					8"	DI	
Magnolia Place	10	H	8"	DI	1996	2016	20	320					8"	DI	
Magnolia Walk	10	H	8"	DI	1996	2016	20	1,300					8"	DI	
Magnolia Way	10	H	8"	DI	1996	2016	20	770					8"	DI	
Mansell Circle	10	B	8"	DI	2004	2016	12	1,743					8"	DI	
Marietta Highway	10	C	12"	DI	1989	2016	27	10,700					8"	DI	
Melody Lane	10	B	8"	DI	2011	2016	5	1,425					8"	DI	
Mill Street	10	A	8"	DI	2002	2016	14	990					8"	DI	
Mosspointe Drive	10	F	8"	DI	2004	2016	12	1,790					8"	DI	
Myrtle Street (Zion Circle to dead end	10	G	8"	DI	2016	2016	0	917					8"	DI	CDBG

Myrtle Street (Zion Circle to Norcross	10	G	8"	DI	2002	2016	14	1,651					8"	DI	
Nancy Trail	10	D	8"	DI	2011	2016	5	965						DI	
Norcross Street	10	B	12"	DI	2002	2016	14	5,782					8"	DI	
North Coleman Road	10	D	8"	DI	2009	2016	7	4,580					8"	DI	
North Point Way to Fenwood Connection	10	E	8"	DI	1987	2016	29	300					8"	DI	
Old Oak Trace	10	C	8"	DI	1995	2016	21	780					8"	DI	
Opal Drive	10	A	8"	DI	2010	2016	6	766					8"	DI	
Oxbo Road (Pleasnt Hill to Grimes	10	A	8"	DI	2000	2016	16	365					8"	DI	
Parnham Circle	10	B	8"	DI	1994	2016	22	127					8"	DI	
Pattingham Drive	10	D	8"	DI	1987	2016	29	1,886					8"	DI	
Pine Ridge Way	10	E	8"	DI	2005	2016	11	740					8"	DI	
Pine Valley Court	10	A	8"	DI	2015	2016	1	275					8"	DI	
Pinebark Drive	10	H	8"	DI	1987	2016	29	426					8"	DI	
Revival Street	10	A	8"	DI	1995	2016	21	742					8"	DI	
Robinwood Court	10	F	8"	DI	2004	2016	12	530					8"	DI	
Sandorn Drive	10	H	8"	DI	1997	2016	19	880					8"	DI	
Shoal Creek Drive	10	E	8"	DI	2004	2016	12	725					8"	DI	
Skyland Drive	10	C	8"	DI	1984	2016	32						8"	DI	
Slaton Circle	10	D	8"	DI	1997	2016	19	1,700					8"	DI	
Sloan Street	10	A	8"	DI	2001	2016	15	3,401					8"	DI	
South Atlanta Street (From King Street to Riverside Road)	10	A	12"	DI	2011	2016	5	4,529					12"	DI	GEFA Loan
Spring Drive (Hillcrest Drive to	10	C	8"	DI	2014	2016	2	1,635					8"	DI	
Stonebridge Trail	10	B	8"	DI	2009	2016	7	143					8"	DI	
Swaybranch Drive (From Market Place	10	B	8"	DI	2010	2016	6	1,400					8"	DI	Possibly funded by CDBG
Tangle Tree Drive	10	E	8"	DI	1998	2016	18	1,880					8"	DI	
Tangle Tree Way	10	E	8"	DI	1998	2016	18	190					8"	DI	
Thomas Circle	10	D	8"	DI	2012	2016	4	1,741						DI	
Thomas Drive	10	A	8"	DI	2010	2016	6	766					8"	DI	
Tullmore Drive	10	C	8"	DI	1990	2016	26	885					8"	DI	
Valley Court	10	A	8"	DI	2015	2016	1	307					8"	DI	
Valley Drive	10	A	8"	DI	2015	2016	1	1,245					8"	DI	
Vickery Street	10	A	8"	DI	1997	2016	19	689					8"	DI	
Victory Ridge Lane	10	D	8"	DI	1994	2016	22	502					8"	DI	
Wavetree Drive	10	D	8"	DI	2008	2016	8	2,250					8"	DI	
Westside Drive	10	C	8"	DI	2006	2016	10	1,990					8"	DI	
Windflower Trace (Cul-De-Sac)	10	D	8"	DI	2011	2016	5	435					8"	DI	
Shadowbrook Court	5	B	2"	MP	2016	2016	0	400							
								Total	**$18,439,240.00**						
					If Budget $300,000/ year, years to complete equals:				**61**						
					If Budget $500,000/ year, years to complete equals:				**37**						
					If Budget $750,000/ year, years to complete equals:				**25**						
					If Budget $900,000/ year, years to complete equals:				**20**						

APPENDIX E WATER LOSS CONTROL PROGRAM AND 2020 WATER AUDIT

CITY OF ROSWELL WATER LOSS CONTROL PROGRAM

Prepared by City of Roswell Water Utility Division
August 2021

Executive Summary

In compliance with the Water Stewardship Act and the "Rule for Public Water Systems to Improve Water Efficiency" regulations, and as part of the Roswell Water Treatment Plant's water withdrawal permit renewal application, the City of Roswell (City) developed and is now updating their Water Loss Control Program. This document summarizes the City's progress toward water supply efficiency and results from the 2020 Water Loss Audit. The 2020 Water Loss Audit illustrated that the City's greatest area for improvement is to reduce Real Losses, which in turn would reduce Non-Revenue Water and the Infrastructure Leakage Index.

The City of Roswell saw a slight increase in Real Losses in 2018 and a large increase in Real Losses in 2019 and again in 2020 when compared to previous years. In 2019, it was due to failure of the leak detection loggers, preventing the City from surveying 1/3 of its system for leaks. The leak detection loggers were immediately sent for repair/replacement upon identification of failure. In 2020, the increase in real losses were due to a surge in main and service line breaks. There were 36 total main breaks in 2020, approximately 7.2 times more than 2019. Of the 36 main breaks, 22 were on galvanized steel (GS) lines, 13 were on cast iron (CI) lines, and one was an asbestos concrete (AC) line. The City estimates that approximately three million gallons (MG) were lost due to these main breaks. There was also a surge in service line breaks. In 2019, there were a total of 78 service line breaks, up 2.6 times from 2018. In 2020 there were a total of 151 service line breaks, approximately 5.0 times more than 2018, effecting the large increase in Real Losses. Of the 151 service line breaks in 2020, 64 were blue poly pipe. As blue poly and GS lines are discovered, they are immediately scheduled for replacement. The City saw a slight decrease in Apparent Losses in 2020.

The City continues to maintain reduction in Real Losses and Apparent Losses, subsequently affecting Non-Revenue Water, a very high priority. To reduce Real Losses, the City continues to replace mains and service lines. A majority of the water pipe leaks over the past 14 years have occurred on small GS pipes. Since 2018, the City has been actively replacing these lines (usually in cul-de-sac loops) with new HDPE pipe. In 2016, the City had approximately 26,322 linear feet of GS pipes within the water distribution system. Since 2016, 9,416 (36%) linear feet of GS pipes, within cul-de-sacs, have been replaced leaving approximately 16,906 linear feet for replacement. Depending on approved capital budgets, the City plans to replace all GS lines within the next four years. To reduce Real Losses within the system, the City replaced a total of 244 service lines (approximately 2,175 linear feet), and completed a total of 33 projects (approximately 15,766 linear feet) between 2017 and 2021.

To reduce Apparent Losses, the City re-instituted the Meter Replacement program in 2018 to test and replace approximately 500 meters annually with an annual budget of $75,000. This budget includes replacement of under-performing large meters. Additionally, as of March 1, 2020 the city's Finance Department will produce a monthly report of meters registering no usage. The Water Utility staff utilizes this report to create work orders for the investigation and possible replacement

of non-working, damaged, or outdated meters. In 2020, the City contracted with Reed & Shows to test all large meters (greater than or equal to three inches) and found that seven out of the fifty-six tested meters fell below AWWA meter accuracy standards. These seven meters were replaced with new meters. It was estimated approximately 29 MG were lost due to meter inaccuracies in 2020, equating to about $125,000 in Non-Revenue Water. The City will retest all large meters (greater than or equal to three inches) and about seventy small meters in 2021.

In 2020, the City installed pressure monitoring devices on eight M&H hydrants. This new technology, M&H i-Hydrant, provides real-time monitoring of system pressure and temperature and sends real-time alerts when pressure drops, potentially indicating a water leak or water theft from a hydrant. In 2021, the City partnered with M&H Valve Co. to install 92 more i-Hydrants throughout the system and 400 permanent leak detection loggers with the intent of reducing Real Losses. This will provide the City with a snapshot each morning of potential leaks within the system and send alerts for any pressure deviations. Lastly, the City also plans to begin installation of security caps on hydrants preventing access by unauthorized persons to reduce and prevent water theft.

Results of the 2020 Water Audit illustrated that Real and Apparent Losses equated to a loss of approximately $203,410 which is similar to the loss calculated for 2019 of $201,319. The programs and projects outlined above are expected to reduce the amount of lost revenue experienced each year due to losses within the system.

Background

The City of Roswell (City) is classified as a medium-size water system that has been treating and distributing water to customers since 1936, when the Cecil B. Wood Water Treatment Plant began pumping water from Big Creek. Over the years, the City's population has grown; therefore, so has the demand for water service. In 2012, the City started utilizing a groundwater well in addition to the water treatment plant to supplement demand within the system. The well is permitted to produce 0.167 million gallons per day (MGD). In 2016, a new Roswell Water Treatment Plant, replacing the Cecil B. Wood Water Treatment Plant, was constructed and permitted to produce up to 3.3 MGD. In addition to the water treatment plant, the City has six interconnections with the Fulton County Water and Sewer system. The City subsidizes its water demand by purchasing water from Fulton County when needed. The City's water system currently contains approximately 89 miles of piping, serves an estimated 16% of the City's population (approximately 18,525 people) with about 5,700 meters while the remaining 84% of the population are served by the Fulton County Water and Sewer system.

The City's water withdrawal permit for the water treatment plant and groundwater well permit both were to expire on November 1, 2021. In 2021, the City renewed both permits. The groundwater well permit now expires on July 7, 2031 and the water withdrawal permit expires on October 28, 2031. This document summarizes the City's Water Loss Control Program and progress

toward water supply efficiency as required by Georgia Department of Natural Resources (GA DNR) and Georgia Environmental Protection Division (EPD) for renewal of a water withdrawal permit.

Water Supply Efficiency Rule

In 2010, the Georgia Senate approved the Water Stewardship Act, requiring water utilities to submit annual water loss audits and illustrate improvement in efficiencies through water loss abatement programs. As a result of the Water Stewardship Act, in 2015 the GA DNR approved GA Rules and Regulation (R&R) 391-3-33, "Rules for Public Water Systems to Improve Water Supply Efficiency", requiring the City to develop a Water Loss Control Program by July 1, 2016. Under the developed Water Loss Control Program, the City is required to investigate, assess, and implement efforts to improve water supply efficiency. Water Loss Control programs shall be updated periodically as needed and may include, but are not limited to, the following:

1) Leakage management (including distribution system water leak detection and repairs);
2) Finished water meter flow verification;
3) Customer water meter testing and calibration;
4) Resource allocation (including planned preventive maintenance); and
5) Revenue recovery activities.

Review and Permitting

R&R 391-3-33 requires the City to demonstrate progress toward water supply efficiency and submit documentation of progress to either GA EPD or GA DNR upon submitting an application to renew or modify an existing water withdrawal permit.

Section R&R 391-3-33.05 states that "demonstration of progress shall be documented by public water systems upon application to the Division [GA Environmental Protection Division or GA DNR] for a water withdrawal permit or increase in permitted drinking water service connections and may be evaluated by the Division as part of the following:

1) An application to renew a water withdrawal permit;
2) An application to modify an existing water withdrawal permit; or
3) An application to increase the number of permitted service connections issued to a public water system."

The rule further states "Public Water systems shall make progress toward improving water supply efficiency. Progress may be demonstrated through process and performance measures:

1) Improvement in data validity score to the extent of practical for a specific utility as a process of data reliability;

2) The development and implementation of the water loss control program;
3) Improvement in performance measures once a reliable level of validity score has been achieved:
    a. Operational Real Losses;
    b. Operational Apparent Losses; and
4) Economic Level of Leakage has been achieved and maintained."

The Water Audit

History

The City has implemented multiple programs and projects over the past 15 years to reduce water losses and improve data management including:

1) Active leak detection;
2) Water line replacement projects;
3) Meter testing and replacement programs;
4) Master meter calibration (production meter); and
5) Implementation of automated metering infrastructure.

In 2006, the City of Roswell began utilizing the AWWA/IWWA Water Loss Audit software. Since 2011, the City has been compliant in submitting formal water loss audit documentation to the GA EPD as required under the Water Stewardship Act. The audit is conducted on an annual basis and data is collected on a monthly basis. The final version of the audit is reviewed and certified by an outside Qualified Water Loss Auditor (QWLA) and submitted to EPD by March 1st each year. The City has contracted with Engineering Strategies to perform the QWLA verification and validation. Although the City has a QWLA on staff, the City chose to utilize the services of a third-party reviewer.

The City implemented a Water Loss Committee that meets annually to discuss the Water Audit and provide necessary information to complete the water audit. The committee is comprised of the following:

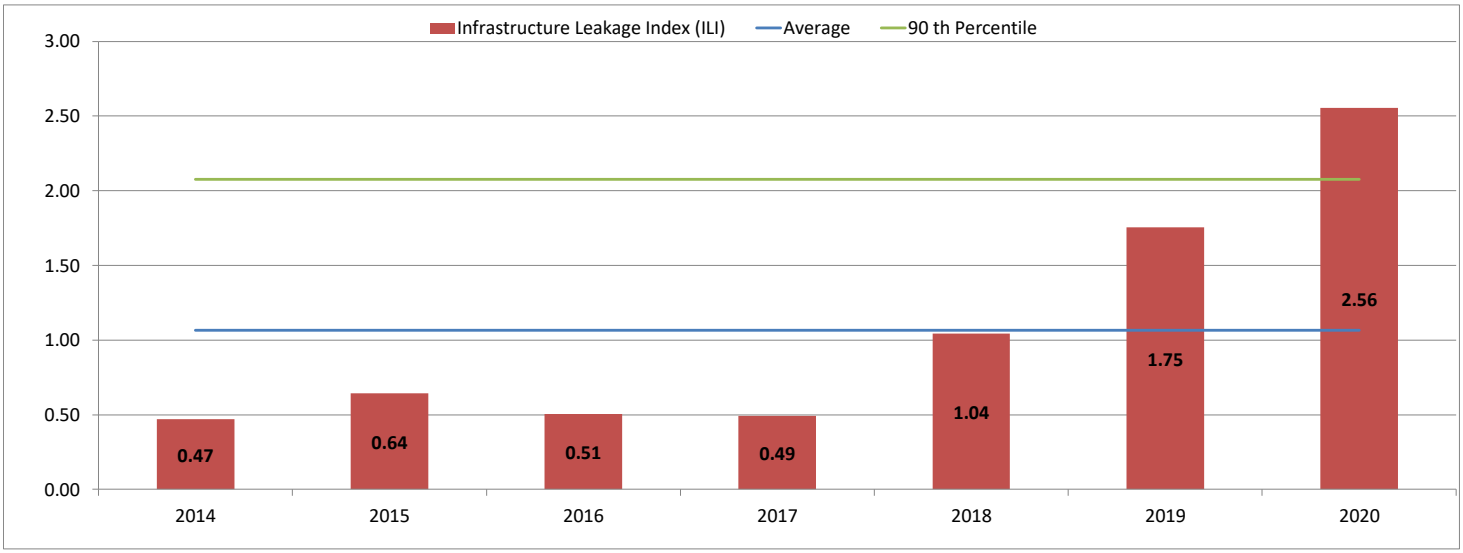
Department/Name	Title
Water Utility Division	
Chris Boyd (QWLA)	Water Utility Manager
Jessie Cash	Water Operations Manager
Andy Hamby	Assistant Water Operations Manager
Jason Downs	Water Distribution Supervisor
John Campbell	Field Services Representative
Nancy Velez	GIS Analyst

Erica Koh	Senior Environmental Engineer
Finance	
Rahel Turner	Financial Services Manager
Amanda Ellison	Financial Services Representative II
Jennifer Stewart	Accounting Manager
Fire	
Robert Rogers	Deputy Fire Chief

Infrastructure Leakage Index (ILI)

In 2005, the ILI score was 2.66. Over the years, the City has maintained an ILI below 1 due to implemented water loss abatement programs which has included, but are not limited to, the following:

1. Passive leak detection
2. Meter testing & calibration
3. Meter replacement
4. Main and service line replacements



Since 2018, the ILI score has been above 1 due to an increase in Real Losses (e.g., service line leaks and main breaks), affecting the overall ILI score. Between 2017 and 2021, the City replaced a total of 244 leaking service lines (approximately 2,175 linear feet) and completed a total of 33 projects (approximately 15,766 linear feet). In 2019, the ILI score increased above the 50th percentile because the leak detection loggers failed and there were 59 blue poly service line breaks, about 3.7 times more than in 2018 (see Real Loss section below). Upon notification of the failed

leak detection loggers, they were immediately returned to the manufacturer for repair or replacement. The City was also not able to survey one-third of the water system in 2019. With limited staffing, it takes approximately three years to survey the entire system. The entire system was surveyed in 2018 by MatchPoint. MatchPoint identified seven leaks within the water system and the City repaired the leaks within 24 hours upon notification.

In 2020 the ILI score increased above the 95th percentile, because of the large increase in service line and main breaks (see Real Loss section below). There were 36 main breaks, about 7.2 times more than in 2019, and there were 151 service line breaks, about 5.0 times more than 2018. The City's goal is to keep the ILI score at or below a 1.

2020 Audit Results

The Water Audit helps the City calculate revenue and non-revenue water. The water balance (shown below) generated from the water audit helps the City identify areas for improvement within the City's water distribution network.

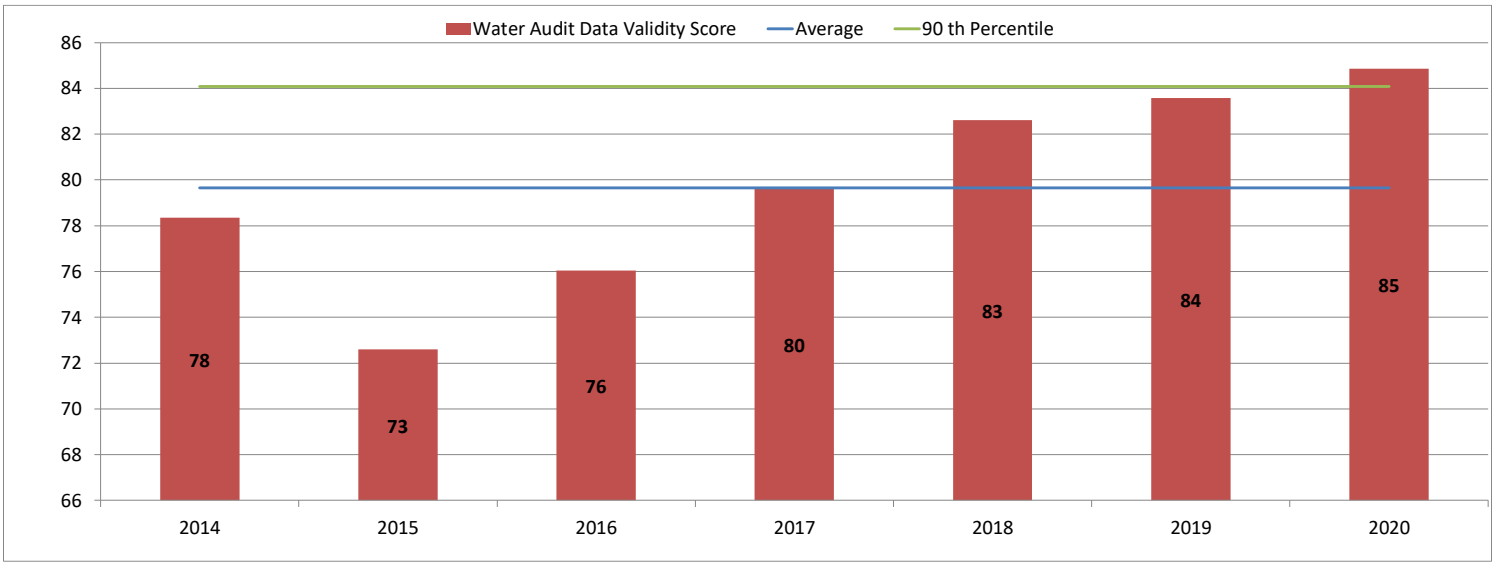
AWWA Free Water Audit Software: Water Balance — WAS v5.0 — American Water Works Association.

Water Audit Report for:	City of Roswell (1210009)
Reporting Year:	2020 (1/2020 - 12/2020)
Data Validity Score:	85

		Water Exported 0.000	Billed Water Exported			Revenue Water 0.000
Own Sources (Adjusted for known errors) 628.690	System Input 640.798	Water Supplied 640.798	Authorized Consumption 510.283	Billed Authorized Consumption 479.159	Billed Metered Consumption (water exported is removed) 479.159	Revenue Water 479.159
					Billed Unmetered Consumption 0.000	
				Unbilled Authorized Consumption 31.124	Unbilled Metered Consumption 27.173	Non-Revenue Water (NRW) 161.639
					Unbilled Unmetered Consumption 3.951	
			Water Losses 130.515	Apparent Losses 18.030	Unauthorized Consumption 1.602	
					Customer Metering Inaccuracies 15.230	
					Systematic Data Handling Errors 1.198	
Water Imported 12.108				Real Losses 112.485	Leakage on Transmission and/or Distribution Mains Not broken down	
					Leakage and Overflows at Utility's Storage Tanks Not broken down	
					Leakage on Service Connections Not broken down	

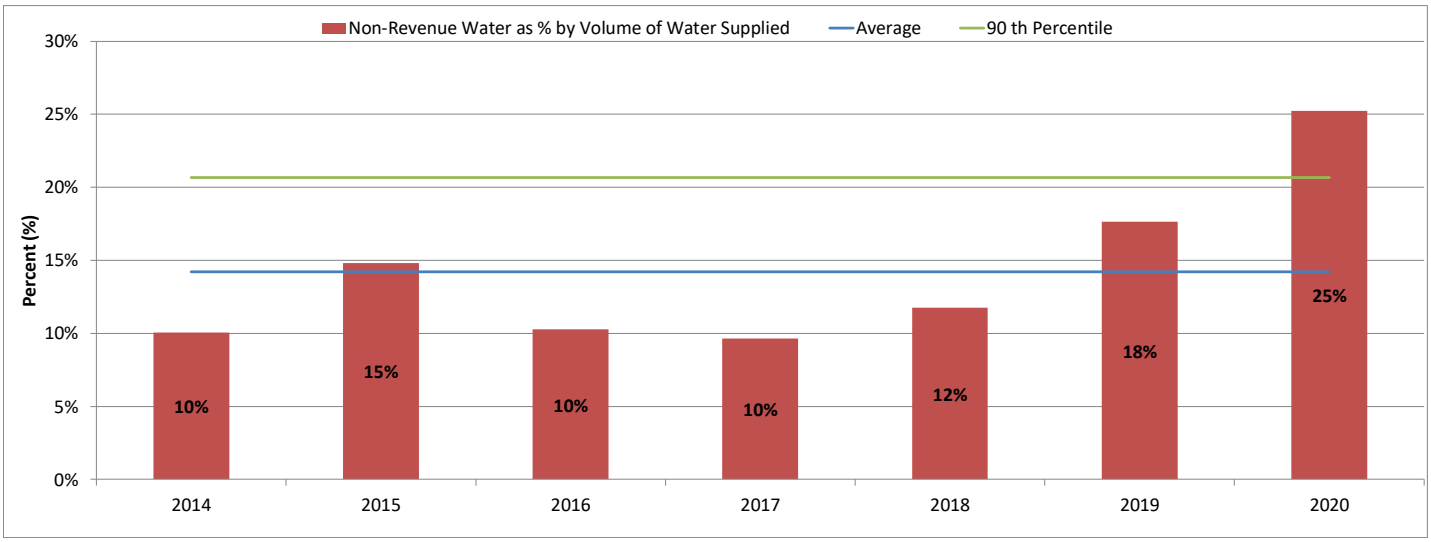
The City's Data Validity Score has improved over the last seven years (2014 thru 2020). The validity score dropped in 2015 due to the availability of more precise data analysis and management tools for the audit. Since 2015, the score has continuously increased, with the highest

score of 85 occurring in 2020. The City's validity score goal is to be above an 85. The score can be increased through improving grading scores on unauthorized consumption, systematic data handling errors, volume from own sources, and imported water.



Non-Revenue Water

In 2006, the City's non-revenue water was 26%. Over the years, the percent has gone down through the implementation of multiple water loss programs previously identified. The City's goal is to maintain non-revenue water at, or under 10%. Since 2018, the non-revenue water has been increasing due to the increase in Real Losses (see "Real Loss" section below).

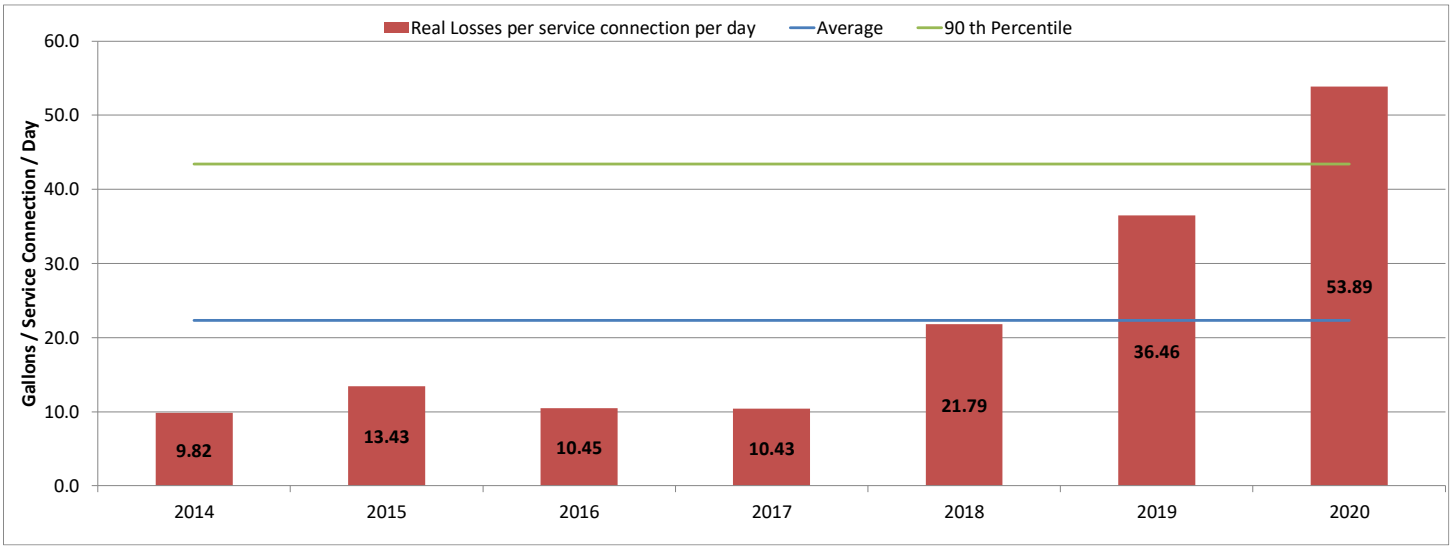


The Non-Revenue Water calculated by the 2020 Water Audit includes accounted for and unaccounted for lost water (approximately 161 MG). The City maintains records and estimates water loss from multiple sources including: i) leaks, once they are located and repaired utilizing Greeley's Water Lost to Leaks formula; ii) meter inaccuracies through meter testing; iii) new water line project flushing; and iv) water flushing of system (e.g., flush valves, fire department, water department, etc.). After including estimated water losses from known sources, the City's unaccounted revenue water in 2020 is approximately 10% (64 MG). The City maintains records of estimated water loss from known sources using Microsoft Excel Workbook and the City's Computerized Maintenance Management System (CMMS) HiperWeb.

The City can lower non-revenue water through decreasing Real and Apparent Losses, through meter replacement, increasing testing of large commercial meters, continued water line (mains and service line) replacement projects, and contract leak detection services to an outside company every two to three years to survey the entire system. To help prevent future main leaks and/or breaks, the City tracks all of the main breaks by pipe size and material. The City discovered that a majority of the water main leaks occur on small galvanized steel pipes. Since 2018, the City has been actively replacing these lines (usually in cul-de-sac loops) with new HDPE pipe. Additionally, the City had three main breaks on 6" CI water lines in 2020. In one of the breaks, a one-foot section of the pipe blew out. This line has been schedule for replacement in 2021. Additionally, the City will have installed real-time continuous leak detection monitoring devices on 400 hydrants throughout the distribution system. This will help the City detect leaks on a daily basis.

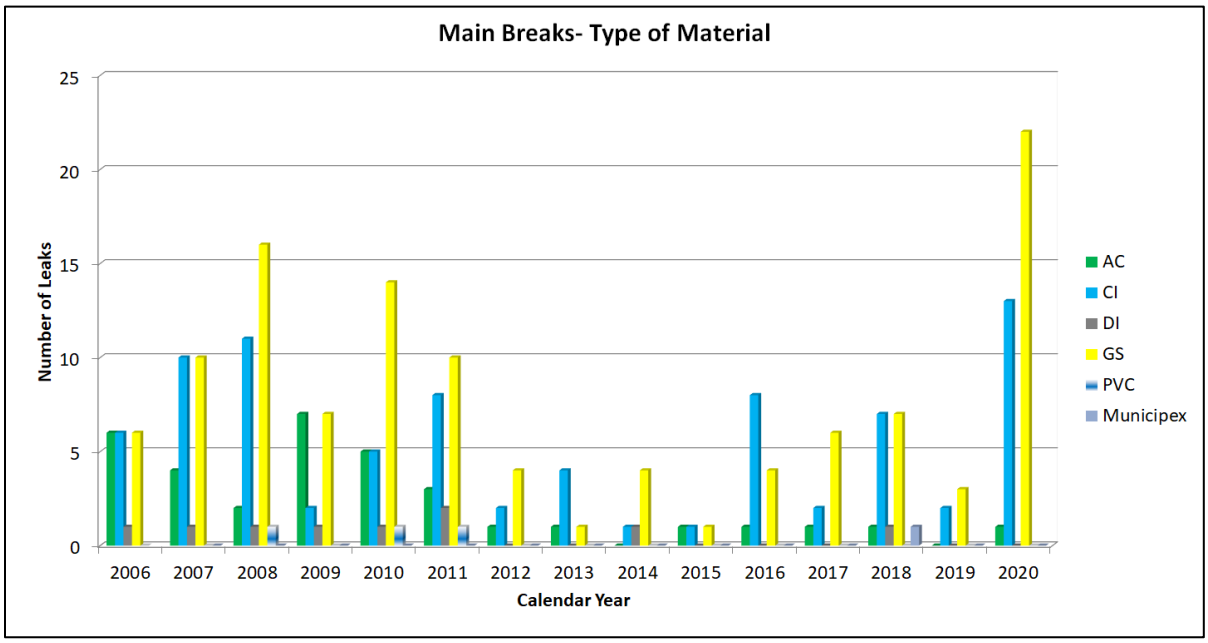
Real Losses vs. Apparent Losses
Real Loss

Real Losses have been increasing since the 2018 Water Loss Audit when compared to previous years. In 2019, the City's real loss exceeded the 50th percentile and in 2020 the real loss exceeded the 90th percentile. As previously stated, the leak detection loggers installed on water mains failed in 2019. The failure of these systems left leaks undetected, increasing Real Losses. The equipment has since been replaced. Additionally, the City saw a large increase in service line breaks and main breaks in 2020. The City will be working to decrease Real Losses below the average through real-time leak detection, meter replacements, real-time pressure monitoring, and line replacements. Between 2017 and 2021, the City replaced a total of 244 service lines (approximately 2,175 linear feet), and completed a total of 33 projects (approximately 15,766 linear feet) replacing mainly GS and AC mains. Service line and main replacements remains a high priority for the City to help reduce Real Losses. The City's goal is for the Real Loss per service connection per day to be below 20. This will be achieved through the real-time leak detection, real-time pressure monitoring, meter replacement, and main and service line replacement.

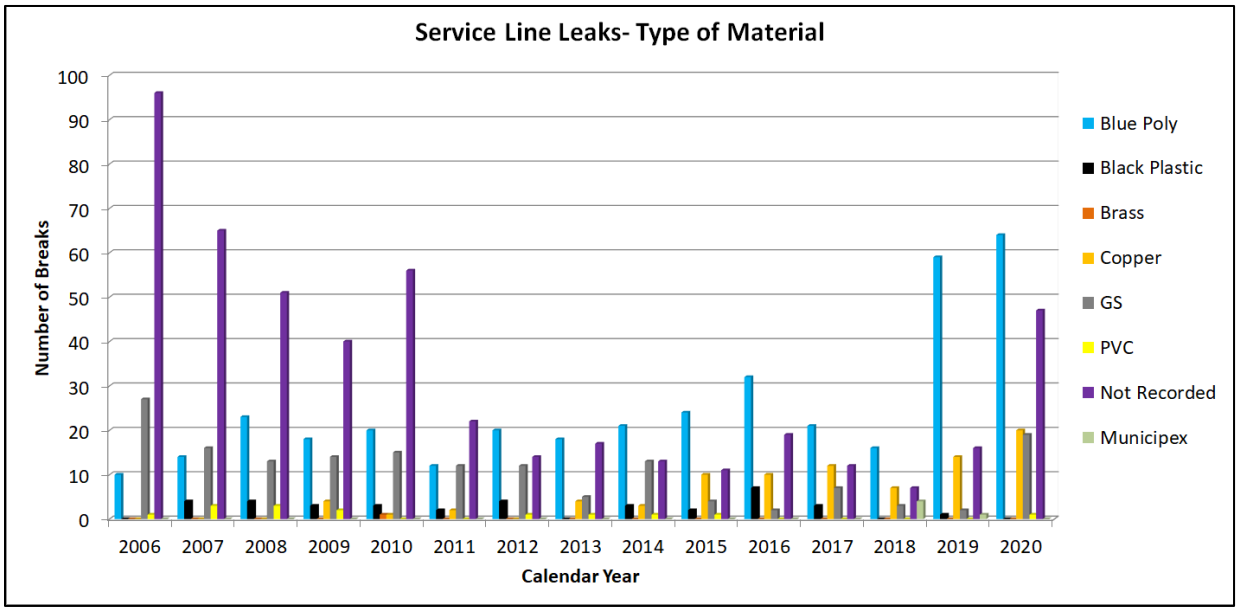


***Leak detection loggers failed in 2019. The failed equipment was sent back to the manufacturer to be repaired/replaced. The City received the repaired equipment approximately 6 months after failure**
****The City experienced 36 main breaks and 151 service line breaks in 2020, a large increase from any previous year**

The City tracks main breaks by pipe size and material as shown in the figure below. A majority of the water pipe leaks over the past 14 years have occurred on small GS pipes. Since 2018, the City has been actively replacing these lines (usually in cul-de-sac loops) with new HDPE pipe. In 2016, the City had approximately 26,322 linear feet of GS pipes within the water distribution system. Since 2016, 9,416 (36%) linear feet within cul-de-sacs have been replaced. There is approximately 16,906 linear feet (within cul-de-sacs) of GS pipe remaining. Depending on approved capital budgets, the City plans to replace all GS lines within the next four years. Additionally, the City has replaced approximately 745 linear feet of AC pipes since 2016. The City experienced 36 main breaks in 2020, the most breaks in the past 15 years. Of the 36 main breaks, 22 were on GS pipes and 13 were on CI pipes. A lot of these service lines and main breaks occurred due to contractor damages. In 2020, contractors damaged 12 main line and 35 service lines resulting in breaks. The average total number of contractor breaks on both service line and mains for the past eight years (excluding 2020) was three.

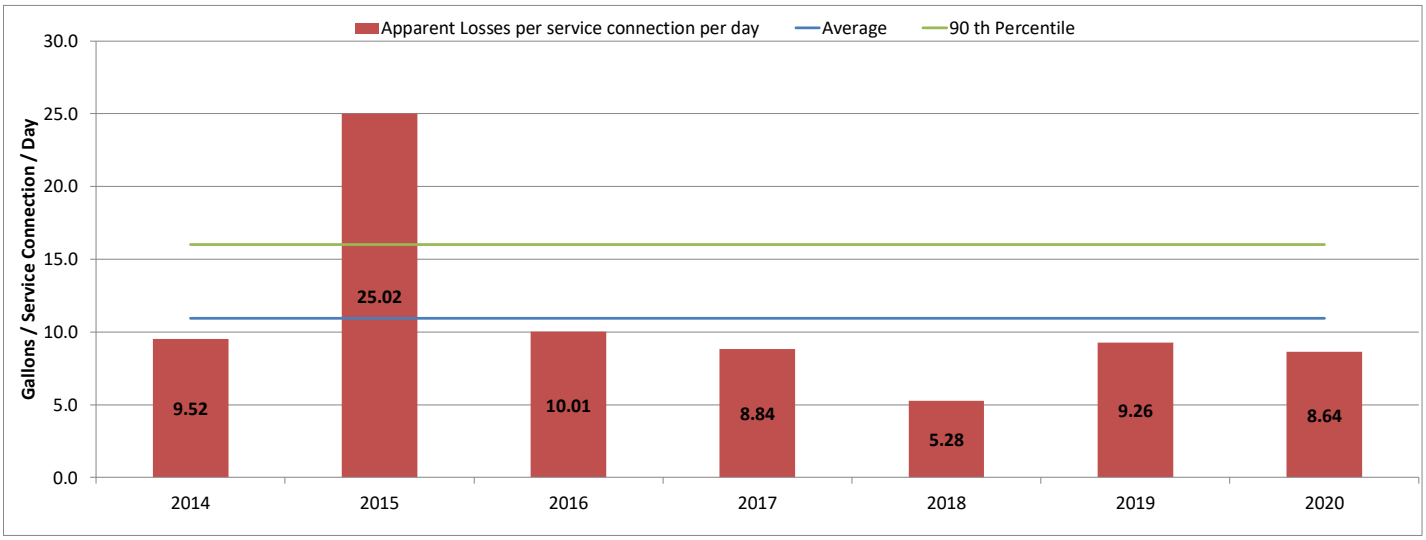


The City also tracks service line breaks by pipe size and material. The majority of service line leaks are from blue poly pipe. As blue poly and GS lines are discovered, they are immediately scheduled for replacement. As depicted in the figure below, there were 59 blue poly pipe breaks in 2019, about 3.7 times more than in 2018. Additionally, there were 64 blue poly pipe breaks in 2020, up from 2019, highly impacting the large increase in Real Losses observed in 2020. In 2020, the City experienced the most service line leaks (151 leaks) in the past 15 years.



Apparent Losses

The City has shown improvement in reducing apparent losses over the years. This has been achieved primarily through testing, replacing meters, and better oversight of authorized consumption. The City provides hydrant meters to all departments that would require water from a hydrant and hydrant consumption is recorded on a monthly basis. The City also utilizes meters at every flush station and City facility. These are not billed; however, the consumption is recorded on a monthly basis and included within the water audit for the calendar year. The City's goal is for the Apparent Loss per service connection per day to be below 10.



In 2011, the City implemented an automated metering infrastructure (AMI) system to help migrate towards monthly billing and increase customer notification of potential leaks through hourly meter readings. In 2018, the AMI system was updated to an improved analytics platform. An area for improvement is notification of meters no longer registering usage. The City has the software to produce reports that include this information; however, the City lacks dedicated staff to run and review the report. As of March 1, 2020, the City's Finance Department will create the report on the 10th of each month and generate work orders for the Water Utility staff to investigate and possibly replace meters. The Water Utility staff utilizes this report to create work orders for the investigation and possible replacement of non-working, damaged, or outdated meters.

Additionally, the City re-instituted the Meter Replacement program in 2018 to test and replace approximately 500 meters annually with an annual budget of $75,000. This budget includes

replacement of under-performing large meters. Meters are typically replaced every 12 years. The table shown below summarizes the number of meters tested each year by meter size. In 2020, the City contracted with Reed & Shows to test all large meters (greater than or equal to three inches) and found that seven out of the fifty-six tested meters fell below AWWA meter accuracy standards. These seven meters were replaced with new meters. It was estimated approximately 29 MG were lost due to meter inaccuracies in 2020, equating to about $125,000 in Non-Revenue Water. The City will retest all large meters (greater than or equal to three inches) and about seventy small meters in 2021.

Meter Size	Number of Meters Tested Annually
3/4" thru 1"	373
1.5" thru 2"	56
3" thru 8"	58
Fire Line	13
Total	**500**

*** NOTE: The City's Water Treatment Plant's master meter is also tested annually for accuracy.**

Areas for Improvement

The three areas for improvement identified in the 2020 water audit are:

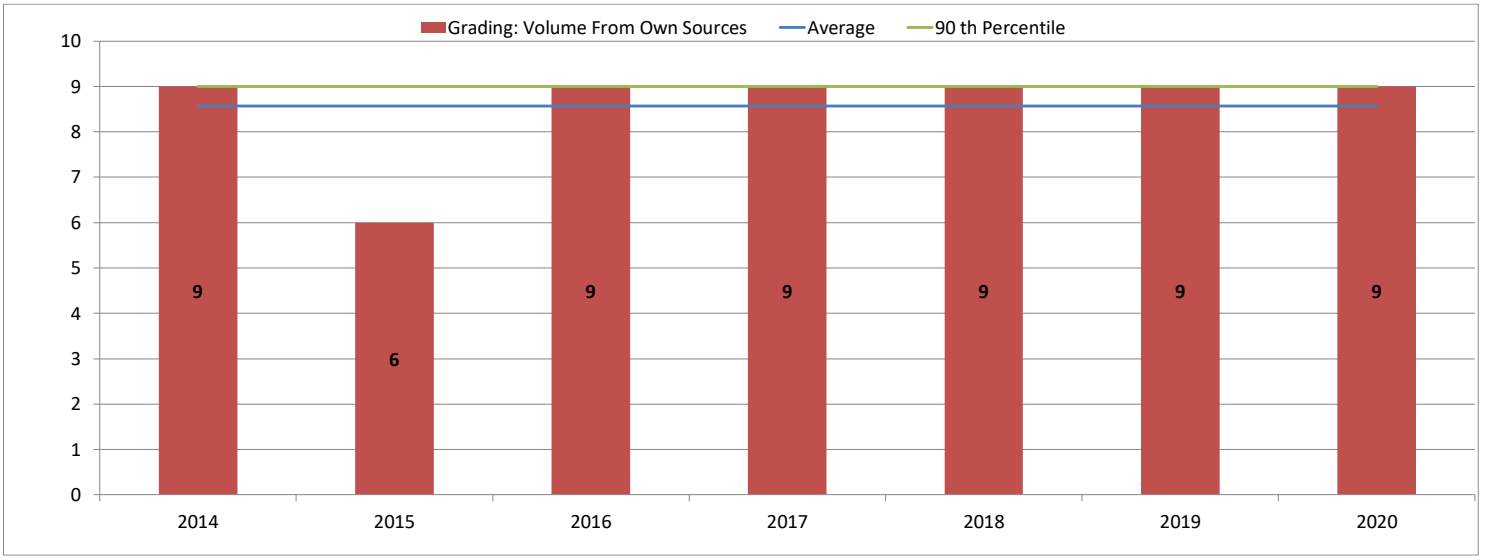
1. Customer retail until cost (applied to Apparent Losses)
2. Volume from own sources
3. Unauthorized consumption

Additional areas that the City plans to focus on include:

1. Customer metering inaccuracies
2. Water imported

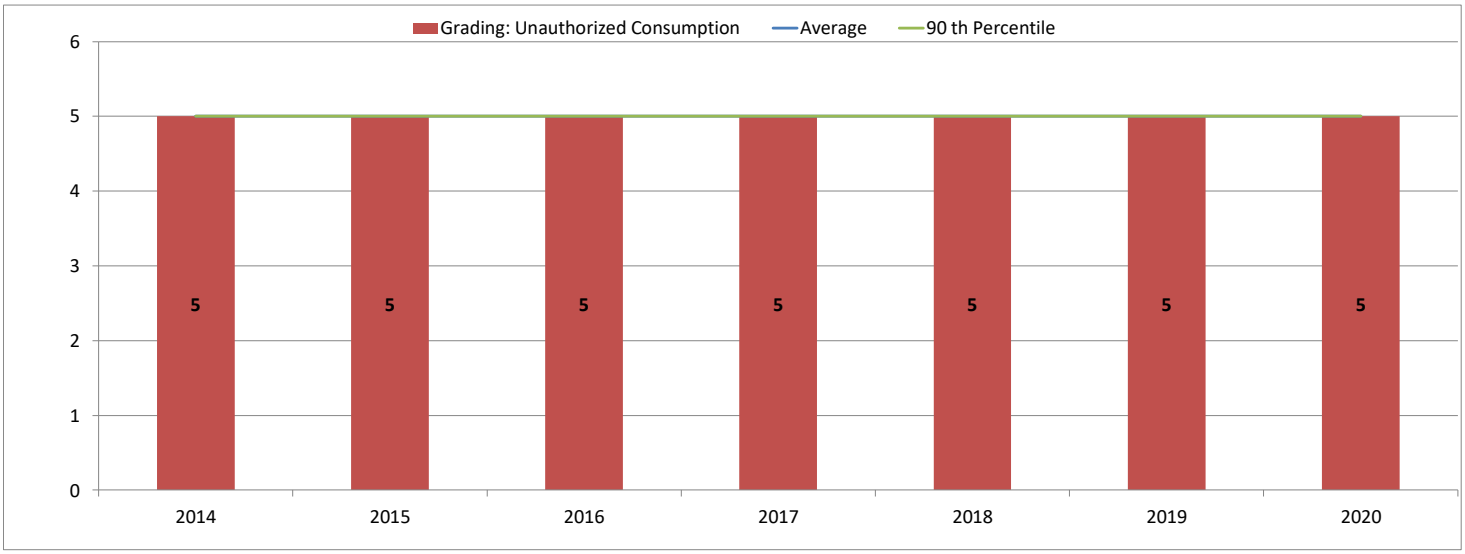
Improvement Strategies - Volume from Own Sources

The 2020 water audit indicated that the City had a validity score of 9 for volume from own sources and a validity Score of 8 for the master meter error and supply adjustment categories. The City's goal is to maintain a score of 9. The City plans to install a flow meter downstream of the master meter for further verification of the master meter's accuracy. This will provide a third verification tool next to SCADA and drawdown of the clear well. The City will also investigate the necessity of testing the master meter for accuracy on a semi-annual basis if the budget can support this cost and it is deemed feasible. The master meter is currently tested on an annual basis.



Improvement Strategies - Unauthorized Consumption

The City used the default for this category, and thus was given a validity score of 5. The City's goal is to improve this validity score to 7. The City has ordinances with prescribed penalties for water theft (24.5.7- Illegal Use of Water; 24.5.19- Meddling with Waterworks System) and other illegal acts. If a person is caught in violation of these ordinances, they will receive a citation to appear in court and any equipment attached to the hydrant or any other water appurtenance will be seized by the City.



In 2020, the City installed pressure monitoring devices on eight M&H hydrants. This new technology, M&H i-Hydrant, provides real-time monitoring of system pressure and temperature and sends real-time alerts when pressure drops, potentially indicating a water leak or water theft from a hydrant. The City detected several unauthorized uses utilizing the i-Hydrant technology. In 2021, The City will be installing an additional 92 pressure and temperature monitoring devices (for a total of 100) and 400 leak detection monitoring devices throughout the distribution system. Installing i-Hydrants throughout the distribution system will provide a better picture of the entire system on a daily basis.

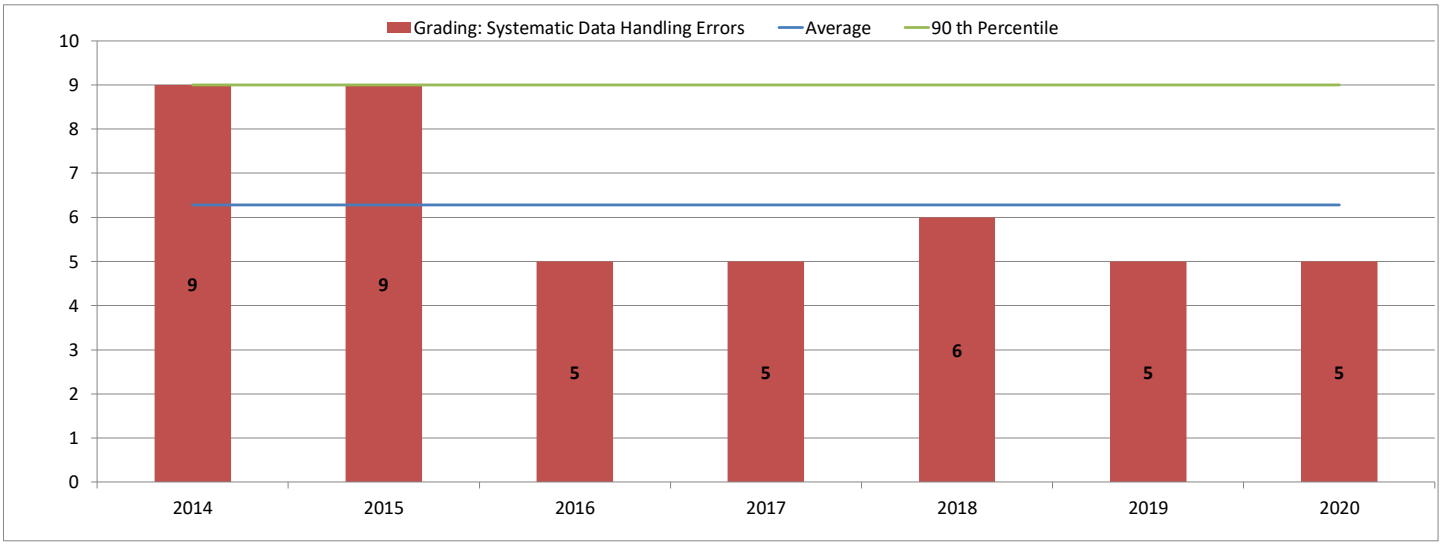
The City plans to begin installation of security caps on hydrants to prevent access to the hydrant by unauthorized persons and therefore help prevent water theft. The City will budget approximately $5,000 per year to retrofit hydrants with the new security caps. The initial cost will include supplying the fire department and authorized personnel with a "key" to unlock the hydrant cap. As the City catches people "stealing" water from a hydrant or service, the City will improve documentation of the volume of water thefts from the system.

Improvement Strategies – Customer Retail Unit Cost (applied to Apparent Losses)

To increase the City's score within this category, the City would need to change its billing operations and the City currently does not have the software capable of the required changes.

Systematic Data Handling Errors

The City had a validity score of 5 in the 2020 audit. The City's goal is to improve this score to 9, which can be accomplished through additional data management procedures.



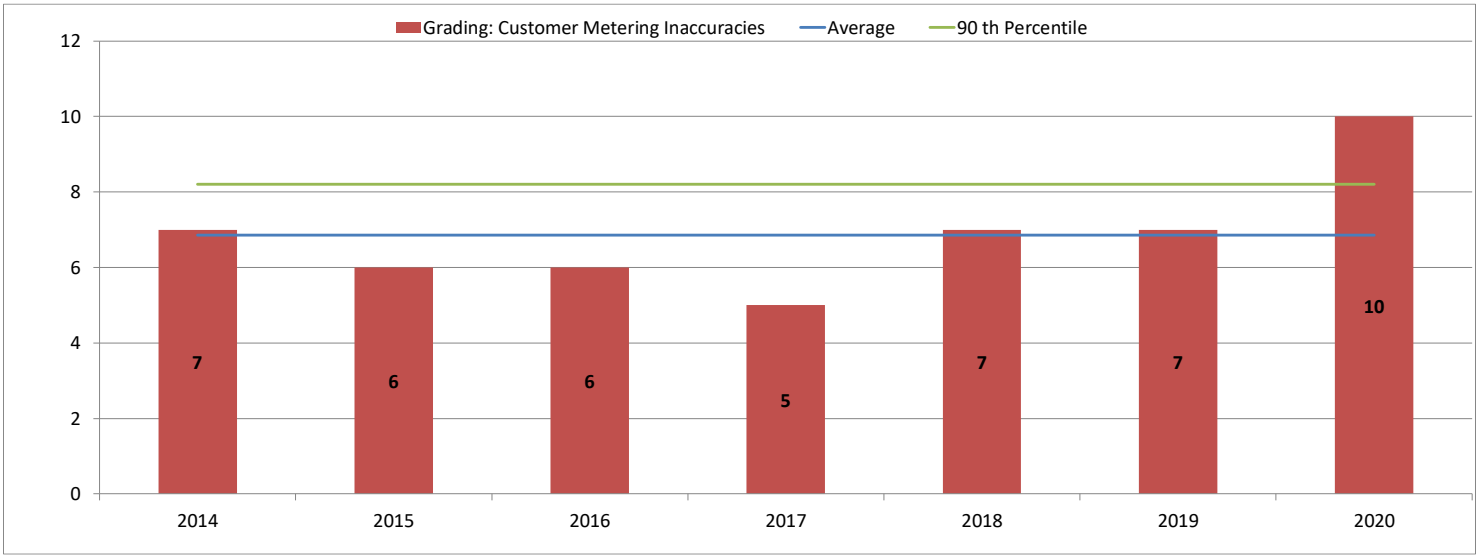
In 2011, the City implemented a new AMI to provide hourly meter readings and improve accuracy within billing. The City has discovered instances where the wrong multiplier has been applied to the meter, therefore, the billing is incorrect. Policies will be developed and utilized to verify that the correct multiplier is assigned to the installed meter. As part of this policy, all meters three inches and smaller will be read at one-gallon increments with a multiplier of one and all meters four inches and larger will be read in ten gallon increments with a multiplier of ten. As meters are installed, the Meter Tech will verify that the meter is reading properly and the information on the meter form is correct prior to sending the information to the Utility Billing department to update the customer account.

The City uses the AMI system to produce monthly reports for zero consumption meters. Using this approach, the City schedules testing and replacement of these meters. The Utility Billing department creates the report around the 10th of each month giving staff time to replace the meters prior to the next billing cycle. Staff also utilizes the AMI system to estimate water loss through the meter based on past use. The City of Roswell has contracted with Water Revenue Resources (WRR) to review the City's metering and billing systems to identify areas of lost revenue. The City was able to identify 98 instances where the meter stopped recording usage and 95 instances of less than prior (meter rolling backwards) in 2020. The meters were immediately replaced.

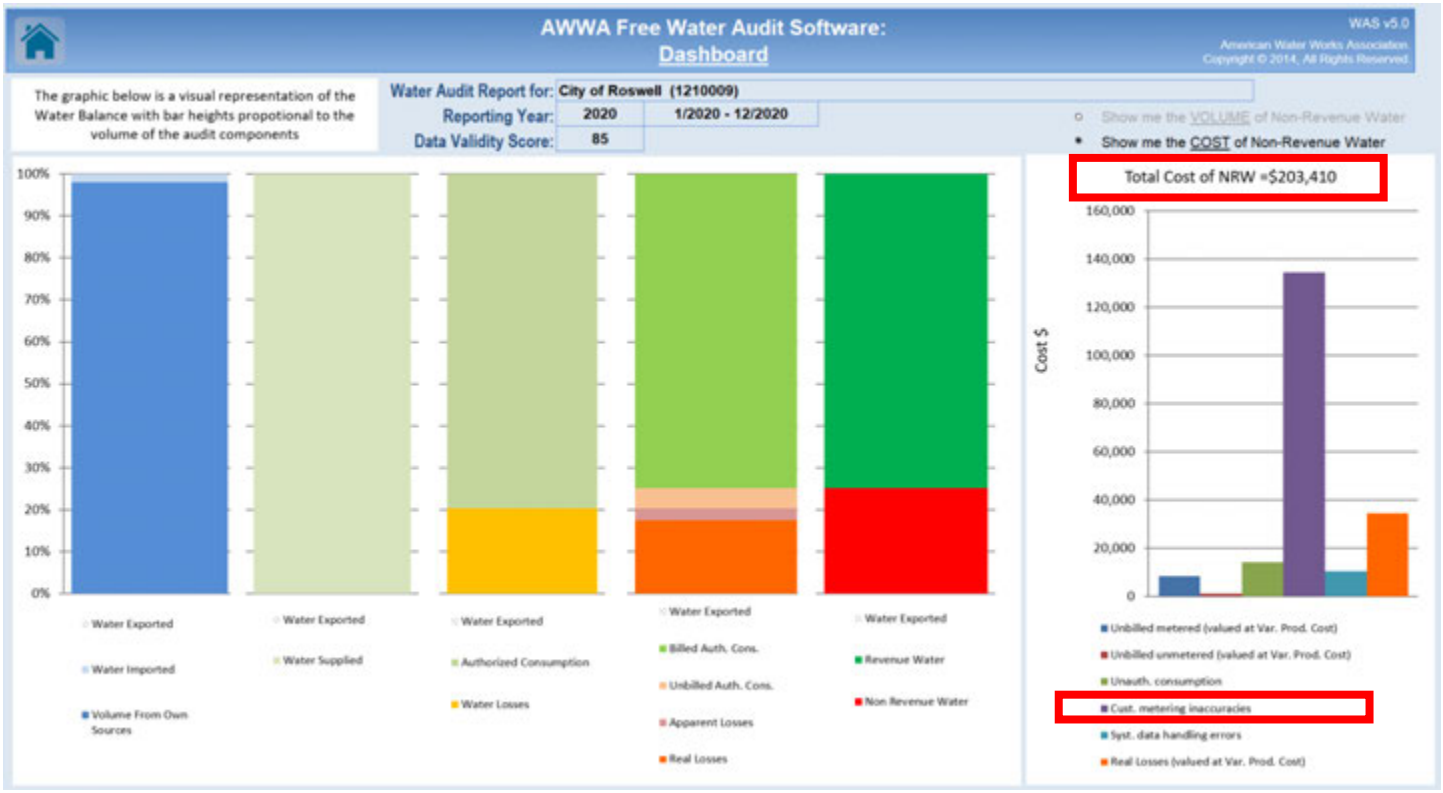
The City's Financial Billing system is audited on an annual basis for the City's Comprehensive Annual Financial Report (CAFR).

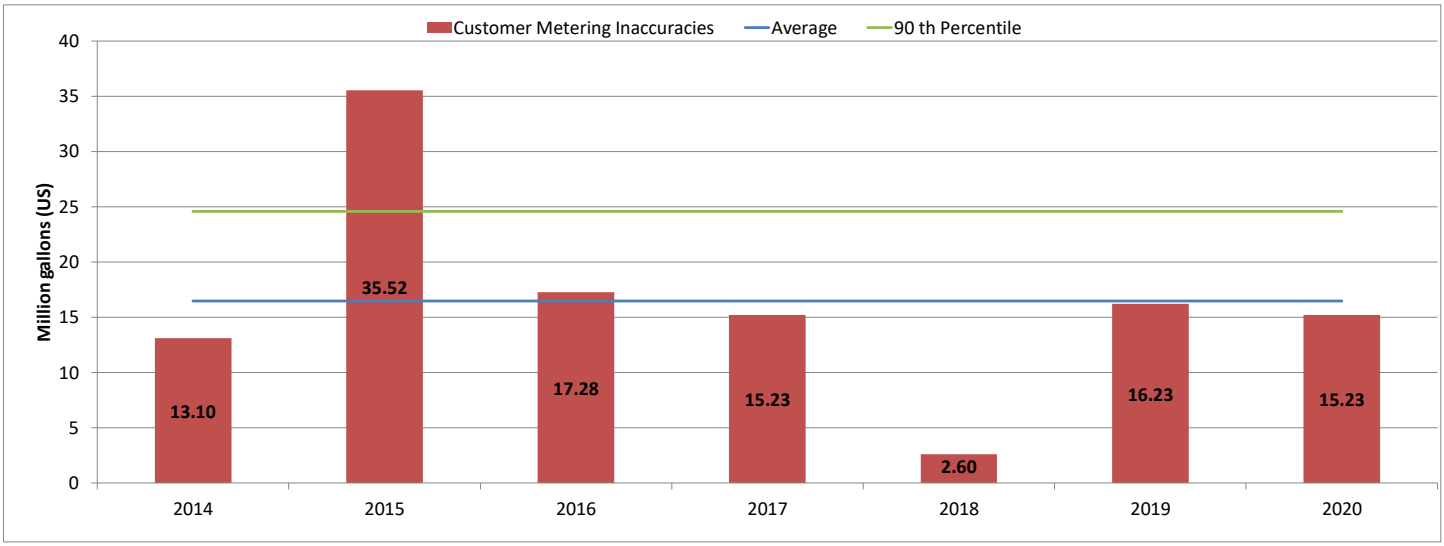
Customer Metering Inaccuracies

In the 2020 Water Audit, the City had a validity score of 10 for customer metering inaccuracies, meeting the City's goal of 9.



The validity score from the 2020 Audit was highly impacted by the high cost of non-revenue water due to customer metering inaccuracies (shown by purple bar in figure below).





The City plans to reduce this cost within the next two years through annual meter testing and replacement and review of monthly reports for zero consumption meters. The City re-instituted the Meter Replacement program in 2018 to test and replace approximately 500 meters annually

with an annual budget of $75,000. This budget includes replacement of under-performing large meters. In 2020, the City contracted with an outside vendor (Reed & Shows) to test and calibrate large meters (3 inches and larger).

In 2018, the City updated the Sensus AMI to an Analytics platform to better analyze meter performance. The City will continue to randomly test approximately 10% of the meter population to verify that the meters are properly recording usage and meet AWWA Meter Accuracy Standards. Meters that fail to meet this standard will be replaced.

In 2019, the City implemented its first district metered area (DMA) when it took control of a private water system for the Ashley Manor subdivision. The DMA meter is an 8-inch acoustic meter which has proven to record water usage not registered by the 35 individual meters located downgradient of it. This could be in part to the inaccuracy of the positive displacement meters, leaks, or water theft from a hydrant. In 2020, the City installed a second DMA meter at 21 Oak Street. A leak was detected on the new DMA and it was estimated that this leak resulted in the loss of about 1.6 MG.

In 2020, the City contracted with Reed & Shows to test all large meters (greater than or equal to three inches) and found that seven out of the fifty-six tested meters fell below AWWA meter accuracy standards. These seven meters were replaced with new meters. It was estimated approximately 29 MG were lost due to meter inaccuracies in 2020, equating to about $125,000 in Non-Revenue Water. The City will retest all large meters (greater than or equal to three inches) and about seventy small meters in 2021.

Water Imported

In the 2020 Water Audit, the City's validity score was 4 for Water Imported, down from a five in 2019. The City's goal is to improve this score to 8 over the next two years. The City currently has six interconnections with Fulton County to purchase water during emergencies or drought conditions. The City would prefer the validity score in the Water Imported category to improve; however, the City has little control over Fulton County's testing program for the interconnect meters. Fulton County currently tests the interconnect meters once every three years. In 2021, The City contracted with Brown & Caldwell to evaluate the six interconnections to determine which one(s) are required to supply water to customers. This study will be completed by the end of 2021. Based on the study outcomes, the City will install a new McCrometer magnetic flow meter and actuator valve downstream of Fulton County's meter, on Roswell's waterline, and connect it to the Roswell Water Plant's SCADA system to verify Fulton County monthly water meter readings. Following installation, the new meters will be tested and calibrated on an annual basis.

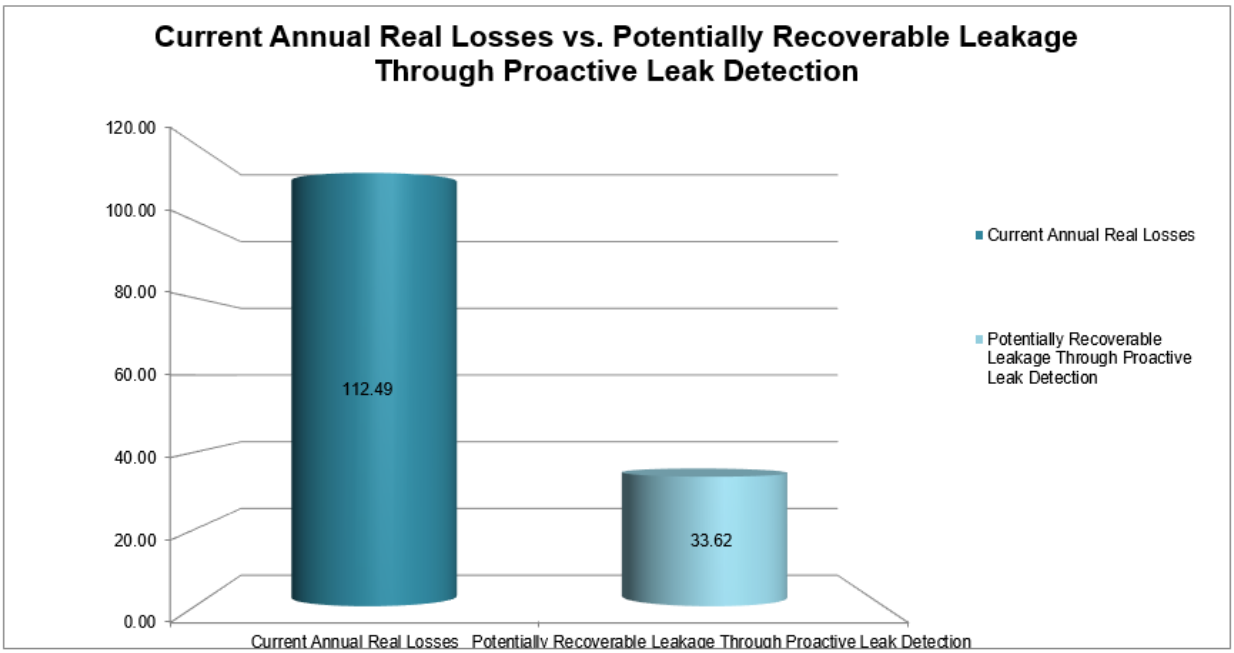
Economic Analysis and Demonstration of Progress

An economic analysis on the water system was conducted as part of the 2020 Water Audit to evaluate the components of the system that lead to the City's largest lost revenue and prioritize projects to minimize the lost revenue. Results of the 2020 Water Audit illustrated the combination of Real Losses and Apparent Losses resulted in a loss of approximately $203,410.

WATER AUDIT PERFORMANCE INDICATORS	
Financial	
Non-revenue water as percent by volume of water supplied:	25.2%
Non-revenue water as percent by cost of operating system:	4.4%
Annual cost of Apparent Losses:	$159,205
Annual cost of Real Losses:	$34,625

To reduce the lost revenue associated with Apparent Losses, the City will continue to implement the Meter Replacement Program, replacing 500 meters annually. As shown above, a large contributor to Apparent Losses results from meter inaccuracies. Since 2018, the City has replaced approximately 500 meters annually. The City has budgeted for an additional 500 meters to be tested and replaced in 2021. Additionally, the City implemented new procedures within the Utility Billing department to check for meters that do not record water usage and to verify meters are assigned to the correct base rate. In 2020, the City contracted with Reed & Shows to test all large meters (greater than or equal to three inches) and found that seven out of the fifty-six tested meters fell below AWWA meter accuracy standards. These seven meters were replaced with new meters. It was estimated approximately 29 MG were lost due to meter inaccuracies in 2020, equating to about $125,000 in Non-Revenue Water. The City will retest all large meters (greater than or equal to three inches) and about seventy small meters in 2021.

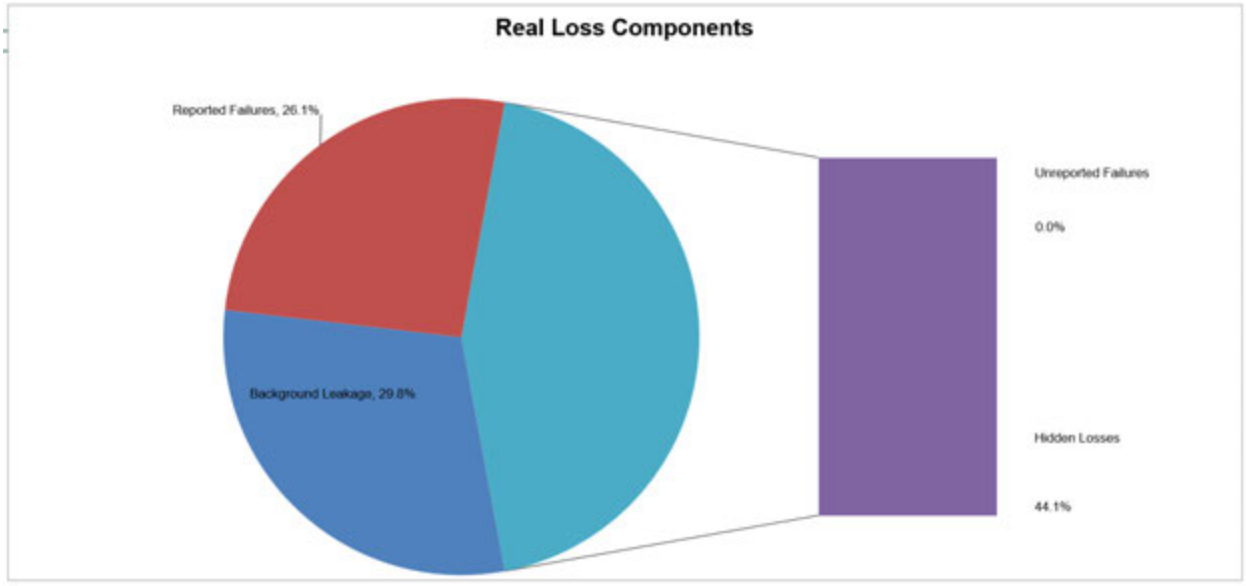
To reduce the lost revenue associated with Real Losses, the City continues to replace water mains and service lines and conduct leak detection. Approximately one-third of the system is surveyed annually for leaks, with the entire system being surveyed by an outside vendor approximately once every two to three years. The whole system was last surveyed in 2018 and seven leaks were detected and immediately repaired. About 30% of the Real Losses could be recovered through proactive leak detection programs and equipment. By 2022, the City will have installed 400 permanent leak detection monitoring devices throughout the system with the intent of reducing Real Losses. This will provide the City with a snapshot each morning of potential leaks within the system. The leak detection devices will give the City the ability to survey the entire system on a daily basis.



The economic analysis further broke out Real Losses between mains and service lines. As shown below, the majority of the Real Losses are from service line leaks and hidden losses versus actual breaks.

SUMMARY: REAL LOSS COMPONENT ANALYSIS

System Component	Background Leakage (MG)	Reported Failures (MG)	Unreported Failures (MG)	Total (MG)
Reservoirs	-	-	-	-
Mains and Appurtenances	9.55	24.61	-	**34.17**
Service Connections	23.92	4.74	0.04	**28.70**
Total Annual Real Loss	**33.48**	**29.35**	**0.04**	**62.87**
Real Losses as Calculated by Water Audit				**112.49**
Hidden Losses/Unreported Leakage Currently Running Undetected				**49.62**



Replacement of leaking mains and service lines continues to be a priority for the City with an approximate total of 244 service line (2,175 linear feet) and 33 main replacement projects (15,766 linear feet) between 2017 and 2021. The City plans to complete an additional 29 GS main replacement projects within the next three fiscal years.

The economic analysis also provides methods to calculate potential savings through pressure management. In 2020, the City installed pressure monitoring devices on eight M&H hydrants. This new technology, M&H i-Hydrant, provides real-time monitoring of system pressure and temperature and sends real-time alerts when pressure drops, potentially indicating a water leak or water theft from a hydrant. In 2021, the City installed 92 more i-Hydrants throughout the system and 400 permanent leak detection loggers with the intent of reducing Real Losses. This will provide the City with a snapshot each morning of potential leaks within the system and send alerts for any pressure deviations.

AWWA Free Water Audit Software v6.0

FWAS v6.0

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This spreadsheet-based water audit tool is designed to help quantify and track water losses associated with water distribution systems and identify areas for improved efficiency and cost recovery. It provides a "top-down" summary water audit format and is not meant to take the place of a full-scale, comprehensive water audit format. Auditors are strongly encouraged to refer to the most current edition of AWWA M36 Manual for Water Audits for detailed guidance on the water auditing process and targeting loss reduction levels. This tool contains several separate worksheets. Sheets can be accessed using the tabs at the bottom of the screen, or by clicking the TOC links below.

Table of Contents (TOC)

AWWA Web Resources for Water Loss Control

https://www.awwa.org/Resources-Tools/Resource-Topics/Water-Loss-Control

Items referenced in the Free Water Audit Software v6.0 on the web:

- Data Grading Matrix v6.0
- Example Water Audit v6.0
- Water Audit Compiler v6.0
- AWWA Reports on Performance Indicators
- M36 Manual

Enter Basic Information

Name of Utility:	City of Roswell
Name of Contact Person:	Chris Boyd
Email:	cboyd@roswellgov.com
Telephone | Ext.:	770-817-6750
City/Town/Municipality:	City of Roswell
State / Province:	Georgia (GA)
Country:	United States
Audit Preparation Date:	Feb 01 2021
Audit Year:	2020
Audit Year Label:	Calendar (Fiscal, Calendar, etc)
Audit Period Start Date:	Jan 01 2020
Audit Period End Date:	Dec 31 2020
Volume Reporting Units:	Million gallons (US)
Water System Structure:	Retail
Water Type:	Potable Water
System ID Number:	1210009
Validator Name/ID:	
Validator Email:	
Estimated Total Population Served by Water Utility:	18,300

Key of Input Acronyms

In order of appearance in the Worksheet

VOS	Volume from Own Sources
VOSEA	VOS Error Adjustment
WI	Water Imported
WIEA	WI Error Adjustment
WE	Water Exported
WEEA	WE Error Adjustment
BMAC	Billed Metered Authorized Consumption
BUAC	Billed Unmetered Authorized Consumption
UMAC	Unbilled Metered Authorized Consumption
UUAC	Unbilled Unmetered Authorized Consumption
SDHE	Systematic Data Handling Errors
CMI	Customer Metering Inaccuracies
UC	Unauthorized Consumption
Lm	Length of mains
Nc	Number of service connections
Lp	Average length of (private) customer service line
AOP	Average Operating Pressure
CRUC	Customer Retail Unit Charge
VPC	Variable Production Cost

Color Key User input | Calculated | Optional default

Guidance for the Worksheet

Choosing to enter unit of **percent** or **volume** (applies to VOSEA, WIEA, WEEA, CMI) choose entry option:

1.00%	percent	*or*
	volume	25.000

Choosing to enter **default** or **custom input** (applies to UUAC, SDHE, UC) choose entry option:

0.25%	default	*or*
	custom	75.000

Guidance for the Interactive Data Grading

Use acronym buttons in IDG header to navigate among inputs. Acronym Key above. White = needs answers, orange = complete, clear = not required. Example below.

VOS	VOSEA	WI	WIEA	WE	WEEA	BMAC	BUAC	UMAC	UUAC
SDHE	CMI	UC	Lm	Nc	Lp	AOP	CRUC	VPC	

After clicking an acronym button, answer all visible questions in the order they're presented, choosing best-fit answer

Grade will populate when all visible questions are complete for an input: **7**

The limiting criteria will be labeled along the right. If only 1 limiting criterion is shown, improving on that criterion will achieve a higher data grade. If multiple limiting criteria are shown, improving on *each* limiting criterion is necessary to achieve a higher data grade. A complete inventory of data grading criteria is available in the Data Grading Matrix v6.0 (see web resources)

Limiting

If you have questions or comments regarding this software please contact us at: wlc@awwa.org

AWWA Free Water Audit Software: Worksheet

IWAS v6.0
American Water Works Association.
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Water Audit Report for: City of Roswell
Audit Year: 2020 | Jan 01 2020 - Dec 31 2020 | Calendar

Click 'n' to add notes
Click 'g' to determine data validity grade

To edit water system info: go to start page

To access definitions, click the input name

All volumes to be entered as: MILLION GALLONS (US) PER YEAR

WATER SUPPLIED

Water Supplied Error Adjustments
choose entry option:

VOS	Volume from Own Sources:	n	g	9	628.690	MG/Yr	n	g	10	0.00% percent	
WI	Water Imported:	n	g	4	10.4411	MG/Yr	n	g	6	13.77% percent	under-registration
WE	Water Exported:	n	g	n/a	0.000	MG/Yr					
	WATER SUPPLIED:				640.798	MG/Yr					

WOSEA
WEA
WEEA

AUTHORIZED CONSUMPTION

BMAC	Billed Metered:	n	g	9	479.195	MG/Yr	
BUAC	Billed Unmetered:	n	g	n/a	0.000	MG/Yr	
UMAC	Unbilled Metered:	n	g	10	29.953	MG/Yr	choose entry option:
UUAC	Unbilled Unmetered:	n	g	6	3.951	MG/Yr	custom 3.951 MG/Yr
	AUTHORIZED CONSUMPTION:				513.099	MG/Yr	

WATER LOSSES

127.699 MG/Yr

Apparent Losses

Default option selected for Systematic Data Handling Errors, with automatic data grading of 3

choose entry option:

SDHE	Systematic Data Handling Errors:	n	g	3	1.158	MG/Yr	0.25% default	
CMI	Customer Metering Inaccuracies:	n	g	10	31.349	MG/Yr	5.00% percent	under-registration
UC	Unauthorized Consumption:	n	g	3	1.158	MG/Yr	0.25% default	

Default option selected for Unauthorized Consumption, with automatic data grading of 3

Apparent Losses: 33.745 MG/Yr

Real Losses

Real Losses: 93.955 MG/Yr

WATER LOSSES: 127.699 MG/Yr

NON-REVENUE WATER

NON-REVENUE WATER: 161.603 MG/Yr

SYSTEM DATA

Lm	Length of mains:	n	g	10	89.1	miles	(including fire hydrant lead lengths)
Nc	Number of service connections:	n	g	10	5,719		(active and inactive)
	Service connection density:				64	conn./mile main	
	Are customer meters typically located at the curbstop or property				Yes		
Lp		n	g	10			

Average length of customer service line has been set to zero and a data grading of 10 has been applied

AOP	Average Operating Pressure:	n	g	9	90.0	psi

COST DATA

CRUC	Customer Retail Unit Charge:	n	g	55	$3.63	$/1000 gallons (US)	Total Annual Operating Cost
VPC	Variable Production Cost:	n	g	9	$3.086.33	$/Million gallons	$4,577,758 $/Yr (optional input)

WATER AUDIT DATA VALIDITY TIER:

*** The Water Audit Data Validity Score is in Tier IV (71-90). See Dashboard tab for additional outputs. ***

go to dashboard

A weighted scale for the components of supply, consumption and water loss is included in the calculation of the Water Audit Data Validity Score

PRIORITY AREAS FOR ATTENTION TO IMPROVE DATA VALIDITY:

Based on the information provided, audit reliability can be most improved by addressing the following components:

1: Volume from Own Sources (VOS)
2: Customer Retail Unit Charge (CRUC)
3: Unauthorized Consumption (UC)

KEY PERFORMANCE INDICATOR TARGETS:

OPTIONAL: If targets exist for the operational performance indicators, they can be input below:

Unit Total Losses:		gal/conn/day
Unit Apparent Losses:		gal/conn/day
Unit Real Losses*:		gal/conn/day
Unit Real Losses*:		gal/mile/day

If entered above by user, targets will display on KPI gauges (see Dashboard)

City of Roswell
2020

White = incomplete
Orange = complete
Use acronyms for navigation

AWWA Free Water Audit Software: Interactive Data Grading

FWAS v6.0 American Water Works Association. Copyright © 2020, All Rights Reserved.

acronym key

Limiting criteria (see Start Page for details)

go to input

Volume from Own Sources (VOS) - Data Grading Criteria

go to notes

vos	Criteria Question	Select Best-Fit Answers to All Visible Questions	
vos.0	Did the water utility supply any water from its own sources during the audit year?	Yes	
vos.1	What percent of own supply volume is metered?	>99%	

For questions 2-10 below: Choose the answer that applies for those meters that measure >90% of the finished water volume.
In-situ flow accuracy testing = a test process that confirms the flow measuring accuracy of the primary device (the flowmeter), in its installed location, using an independent reference volume.
Electronic calibration = a process that checks for error in the metering secondary device(s) and/or the tertiary device(s).
Secondary device can include conversion to mA, meter transmitter or similar instrumentation.
Tertiary device can include SCADA, historian or other computerized archival system.

vos.2	What is the frequency of electronic calibration?	Annually	Limiting
vos.3	What level of data transfer errors are checked as part of the electronic calibration process?	Data transfer errors are checked at secondary device(s) AND tertiary device(s)	
vos.4	Is the most recent electronic calibration documentation available for review?	Yes	
vos.5	What is the frequency of in-situ flow accuracy testing?	Annually	Limiting
vos.6	Is the most recent in-situ flow accuracy testing documentation available for review?	Yes	
vos.7	What are the total volume-weighted average results of in-situ flow accuracy testing (during or closest to audit year)?	Between ±3% to ±6%	Limiting
vos.8	Have testing and calibration procedures been closely scrutinized for compliance with procedures described in the AWWA M36 and/or M33 Manual(s)?	Yes	
vos.9	Which best describes the frequency of finished water meter readings?	Continuous	
vos.10	Which best describes the frequency of data review for anomalies/errors? These can include numbers that are outside of typical patterns, and zero or 'null' values that may reflect a gap in data recording.	Daily	
	FINAL DATA GRADE FOR THIS AUDIT INPUT:	**9**	

go to input

Volume from Own Sources Error Adjustment (VOSEA) - Data Grading Criteria

go to notes

vosea	Criteria Question	Select Best-Fit Answers to All Visible Questions
vosea.1	Are tank levels monitored automatically & recorded daily?	Yes
vosea.2	Are daily changes of stored water volumes in distribution system tanks included in the tabulation of the daily "Volume from Own Sources" quantity?	Yes
vosea.3	Is the annual net distribution storage change included in either the VOS input or the VOSEA input?	Yes
vosea.4	Are the flow accuracy test and/or electronic calibration results included in the VOSEA input in the water audit?	Yes, results are analyzed and incorporated
	FINAL DATA GRADE FOR THIS AUDIT INPUT:	**10**

go to input

Water Imported (WI) - Data Grading Criteria

go to notes

wi	Criteria Question	Select Best-Fit Answers to All Visible Questions	
wi.0	Did the water utility import any water during the audit year?	Yes	
wi.1	What percent of water imported is metered?	>99%	
	For questions 2-10 below: Choose the answer that applies for those meters that measure >90% of the water imported volume. **In-situ flow accuracy testing** = a test process that confirms the flow measuring accuracy of the primary device (the flowmeter), in its installed location, using an independent reference volume. **Electronic calibration** = a process that checks for error in the metering secondary device(s) and/or the tertiary device(s). **Secondary device** can include conversion to mA, meter transmitter or similar instrumentation. **Tertiary device** can include SCADA, historian or other computerized archival system.		
wi.2	What is the frequency of electronic calibration?	Less than annual but within last 5 years	
wi.3	What level of data transfer errors are checked as part of the electronic calibration process?	Data transfer errors are not checked, or not sure	Limiting
wi.4	Is the most recent electronic calibration documentation available?	No	
wi.5	What is the frequency of in-situ flow accuracy testing?	Less than annual but within last 5 years	
wi.6	Is the most recent in-situ flow accuracy testing documentation available?	Yes	
wi.7	What are the total volume-weighted average results of in-situ flow accuracy testing (during or closest to audit year)?	At ±6% or greater	
wi.8	Have testing and calibration procedures been closely scrutinized for compliance with procedures described in the AWWA M36 and/or M33 Manual(s)?	No	
wi.9	Which best describes the frequency of meter readings (data collection frequency as opposed to billing frequency)?	Once per month	
wi.10	What is the frequency of data review & correction by Exporting or Importing Utility for data gaps and/or anomalies? These can include numbers that are outside of typical patterns, and zero or 'null' values that may reflect a gap in data recording.	Once per month	
	FINAL DATA GRADE FOR THIS AUDIT INPUT:	**4**	

go to input

Water Imported Error Adjustment (WIEA) - Data Grading Criteria

go to notes

wiea	Criteria Question	Select Best-Fit Answers to All Visible Questions	
wiea.1	Is an agreement in place between Exporting and Importing Utility for the purchase of water?	Yes, written	
wiea.2	Are meter accuracy testing or electronic calibration requirements stipulated in the water purchase agreement?	Yes, and stipulated as less frequent than annual	Limiting
wiea.3	Are flow accuracy test and/or electronic calibration results used to inform the error adjustment input in the water audit?	Yes, results are analyzed and incorporated	
wiea.4	Who has access to the import meter readings including current and archived data?	Exporting Utility only	
	FINAL DATA GRADE FOR THIS AUDIT INPUT:	**6**	

go to input

Water Exported (WE) - Data Grading Criteria

go to notes

we	Criteria Question	Select Best-Fit Answers to All Visible Questions
we.0	Did the water utility export any water during the audit year?	No
we.1		

For questions 2-10 below: Choose the answer that applies for those meters that measure >90% of the water exported volume.
In-situ flow accuracy testing = a test process that confirms the flow measuring accuracy of the primary device (the flowmeter), in its installed location, using an independent reference volume.
Electronic calibration = a process that checks for error in the metering secondary device(s) and/or the tertiary device(s).
Secondary device can include conversion to mA, meter transmitter or similar instrumentation.
Tertiary device can include SCADA, historian or other computerized archival system.

we.2		
we.3		
we.4		
we.5		
we.6		
we.7		
we.8		
we.9		
we.10		
	FINAL DATA GRADE FOR THIS AUDIT INPUT:	**n/a**

go to input

Water Exported Error Adjustment (WEEA) - Data Grading Criteria

go to notes

weea	Criteria Question	Select Best-Fit Answers to All Visible Questions
weea.1		
weea.2		
weea.3		
weea.4		
	FINAL DATA GRADE FOR THIS AUDIT INPUT:	**n/a**

go to input

Billed Metered Authorized Consumption (BMAC) - Data Grading Criteria

go to notes

bmac	Criteria Question	Select Best-Fit Answers to All Visible Questions	
bmac.0	Were any customers metered in the audit year?	Yes	
bmac.1	For billed metered accounts, what % of bills are estimated in a typical billing cycle?	5% or less	
bmac.2	How often does the utility read its customer meters? For systems with multiple read frequencies, select the reading frequency that describes the majority of your customers.	More frequently than monthly	
bmac.3	Is the BMAC volume pro-rated to represent consumption occuring exactly during the audit period?	Yes	
bmac.4	How frequently does internal review by utility staff of the BMAC volumes occur?	Every billing cycle	
bmac.5	What level of detail is examined in the internal review of BMAC volumes?	Totals grouped by use type or customer class and specific accounts flagged for anomalous consumption	
bmac.6	When was the most recent billing data review by someone who is independent of the utility billing process?	Within last 3 years	
bmac.7	What level of detail was examined in the review by someone who is independent of the utility billing process?	Third party review includes a check on a sample of accounts	Limiting
	FINAL DATA GRADE FOR THIS AUDIT INPUT:	**9**	

go to input

Billed Unmetered Authorized Consumption (BUAC) - Data Grading Criteria

go to notes

buac	Criteria Question	Select Best-Fit Answers to All Visible Questions
buac.0	Was there any billed consumption on unmetered accounts in the audit year?	No
buac.1		
buac.2		
buac.3		
	FINAL DATA GRADE FOR THIS AUDIT INPUT:	**n/a**

go to input

Unbilled Metered Authorized Consumption (UMAC) - Data Grading Criteria

go to notes

umac	Criteria Question	Select Best-Fit Answers to All Visible Questions
umac.0	Did the water utility have any unbilled-metered consumption in the audit year?	Yes
umac.1	Does the water utility policy articulate which accounts are exempt from billing?	Policy includes specific exemptions
umac.2	How many unbilled metered accounts exist?	Monitored, count available
umac.3	How often is each unbilled customer meter read? For systems with multiple read frequencies, select the reading frequency that describes the majority of your customers.	Monthly or more frequently
umac.4	How often are unbilled metered volumes reviewed for error?	Each billing cycle
	FINAL DATA GRADE FOR THIS AUDIT INPUT:	**10**

go to input

Unbilled Unmetered Authorized Consumption (UUAC) - Data Grading Criteria

go to notes

uuac	Criteria Question	Select Best-Fit Answers to All Visible Questions	
uuac.0	On the Worksheet, the status of the default option is:	A system specific volume has been entered	
uuac.1	How well-understood is the extent of unbilled unmetered use?	Majority identified and tracked	
uuac.2	Which best describes the records that are kept for events of unbilled unmetered use?	Documentation exists, but not specific to each event	Limiting
uuac.3	How is the majority of unbilled unmetered use estimated?	Entirely from event-specific estimates	
	FINAL DATA GRADE FOR THIS AUDIT INPUT:	6	

go to input

Systematic Data Handling Error (SDHE) - Data Grading Criteria

go to notes

This Data Grading Criteria is hiddem when the 'default' input is used on the Worksheet

FINAL DATA GRADE FOR THIS AUDIT INPUT:	3

go to input

Customer Metering Inaccuracies (CMI) - Data Grading Criteria

go to notes

cmi	Criteria Question	Select Best-Fit Answers to All Visible Questions
cmi.0	Was there any metered customer usage during the audit period?	Yes
cmi.1	Do you test meters reactively (when triggered by customer complaint or billing/consumption flag)?	Reactive testing conducted
cmi.2	For small size customer meters, which best describes the frequency of proactive testing (effort beyond when triggered by customer complaint or billing/consumption flags)?	Ongoing, conducted annually
cmi.3	Which best describes what meters are included in the proactive small size customer meter testing activities?	Proactive - representative sample (for small meters)
cmi.4	For mid and large size customer meters, which best describes the frequency of the proactive testing program?	Ongoing, conducted annually
cmi.5	Which best describes what meters are included in the proactive mid- and large customer meter testing activities?	Proactive - all large meters are on a testing schedule
cmi.6	Which best describes how the input was derived?	Calculated based on most recent meter accuracy tests, comprehensive of all meter performance
cmi.7	Has the input derivation been reviewed by someone with expert knowledge in the M36 methodology?	Yes
cmi.8	To what extent does meter replacement occur and for which meters?	Annual proactive replacement of subset of meters (i.e. by age or throughput)
cmi.9	Which best describes the reliability of meter installation records?	Records are kept for meter installations, but data is missing for installation date, type, size, or manufacturer
	FINAL DATA GRADE FOR THIS AUDIT INPUT:	**10**

go to input

Unauthorized Consumption (UC) - Data Grading Criteria

go to notes

This Data Grading Criteria is hidden when the 'default' input is used on the Worksheet

FINAL DATA GRADE FOR THIS AUDIT INPUT:	**3**

go to input

Length of Mains (Lm) - Data Grading Criteria

go to notes

Lm	Criteria Question	Select Best-Fit Answers to All Visible Questions
Lm.1	How was the input derived?	Derived directly from Mains inventory (GIS, ledger, etc)
Lm.2	Are hydrant laterals included in the input derivation?	Yes
Lm.3	Which best describes how the Mains inventory (GIS, ledger, etc) is kept up to date?	Additions or subtractions are updated in the mains inventory (GIS, ledger, etc), at least annually
Lm.4	Which best describes how the Mains inventory (GIS, ledger, etc) is field validated to confirm field conditions match the inventory?	Field validation is accomplished (i.e. in daily operations or specific validation projects)
	FINAL DATA GRADE FOR THIS AUDIT INPUT:	**10**

go to input

Number of Service Connections (Nc) - Data Grading Criteria

go to notes

Nc	Criteria Question	Select Best-Fit Answers to All Visible Questions
Nc.1	How was the input derived?	Extracted from Services inventory (GIS, billing system, etc)
Nc.2	What is the count of services based on?	Premise based, i.e. service connection count, location ID count
Nc.3	Are inactive (but still pressurized) service lines included in the input? These may be metered or unmetered.	Yes
Nc.4	Which best describes how the inventory of service connections (GIS, billing system, etc) is kept up to date?	Additions or subtractions are updated in the service line inventory (GIS, billing system, etc), at least annually
Nc.5	Which best describes how the inventory of service connections (GIS, billing system, etc) is field validated to confirm field conditions match the inventory?	Field validation is accomplished for the entire system (i.e. in daily operations or specific validation projects)
	FINAL DATA GRADE FOR THIS AUDIT INPUT:	**10**

go to input

Average Length of (Private) Customer Service Line (Lp) - Data Grading Criteria

go to notes

Lp	Criteria Question	Select Best-Fit Answers to All Visible Questions
Lp.0	Are customer meters typically located at the curbstop or property line?	Yes
Lp.1		
Lp.2		
Lp.3		
Lp.4		
	FINAL DATA GRADE FOR THIS AUDIT INPUT:	10

go to input

Average Operating Pressure (AOP) - Data Grading Criteria

go to notes

aop	Criteria Question	Select Best-Fit Answers to All Visible Questions	
aop.1	Which best describes checks on the boundary integrity for the system's pressure zone(s)?	Not applicable, the system operates as a single pressure zone	
aop.2	Which best describes how one-time pressure readings (i.e. from hydrants) are collected?	Collected annually during routine system flushing and/or hydrant testing	
aop.3	Which best describes where continuous pressure data (via temporary data loggers or permanent telemetry) is collected?	At zone boundary conditions, plus some locations inside the zone(s) but not representing the full pressure profile	Limiting
aop.4	Which best describes how continuous pressure data is collected?	Year-round data collection via permanent monitoring	
aop.5	How was the input derived?	Derived from hydraulic model, where model has been field calibrated in the last 5 years	
	FINAL DATA GRADE FOR THIS AUDIT INPUT:	9	

go to input

Customer Retail Unit Charge (CRUC) - Data Grading Criteria

go to notes

cruc	Criteria Question	Select Best-Fit Answers to All Visible Questions	
cruc.0	Was any metered consumption billed on a volumetric basis in the audit period?	Yes	
cruc.1	Which best describes the use and reliability of the current rate structure?	Customer bill calculations have been checked to confirm the rate structure is correctly implemented	
cruc.2	Choose the option that best describes how the input was derived	A non-weighted average of multiple rates was calculated	Limiting
cruc.3	Is there any additional volumetric revenue the utility receives that depends on water meter readings, such as sewer?	Yes, and this has been incorporated into the volume-weighted average calculation	
cruc.4	Has the input derivation been reviewed by someone with expert knowledge in the M36 methodology?	Yes	
	FINAL DATA GRADE FOR THIS AUDIT INPUT:	**5**	

go to input

Variable Production Cost (VPC) - Data Grading Criteria

go to notes

vpc	Criteria Question	Select Best-Fit Answers to All Visible Questions	
vpc.1	Choose the option that best describes how the input was derived	Only one source of water exists, which was the basis for the input derivation	
vpc.2	Choose the option that best describes which short-run marginal costs have been included in the input, using the definitions below for reference. Short-run marginal costs can include the following: - chemicals + power for treatment, typically applicable if the utility is producing/treating water - power for distribution, typically applicable if pumps exist in the distribution network - water acquisition costs, typically applicable if the utility is purchasing water or incurs any extraction costs for withdrawing from a source Some short-run marginal costs may not be applicable. The auditor should analyze the system characteristics to determine which costs are applicable for inclusion in the VPC input derivation. See also the latest AWWA M36 Manual for further guidance.	All applicable short-run marginal costs are included	
vpc.3	Choose the option that best describes which long-run marginal costs have been included in the input, using the definitions below for reference. Long-run marginal costs can include the following: - water treatment residuals management, typically applicable if solids are produced from water treatment process - accelerated wear & tear on dynamic equipment, typically applicable if pumps exist for treatment and/or distribution, or any other equipment exists that wears out as a function of use instead of time (i.e. filter media, chemical dosing pumps, uv disinfection bulbs, etc) - payouts for damage claims from main and service line breaks, typically applicable if damage claims are paid by the utility - accelerated expansion of supply capacity, typically applicable if the utility is at or nearing supply capacity, or scarecity costs in water scarce areas - full cost pricing that includes all lifecycle costs and externalities (internalized or not) Some long-run marginal costs may not be applicable. The auditor should analyze the system characteristics to determine which costs are applicable for inclusion in the VPC input derivation. See also the latest AWWA M36 Manual for further guidance.	Long-run marginal costs have been evaluated for applicability, and some but not all applicable costs are included	Limiting
vpc.4	Has the input derivation been reviewed by someone with expert knowledge in the M36 methodology?	Yes	
	FINAL DATA GRADE FOR THIS AUDIT INPUT:	**9**	

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AWWA Free Water Audit Software: Dashboard

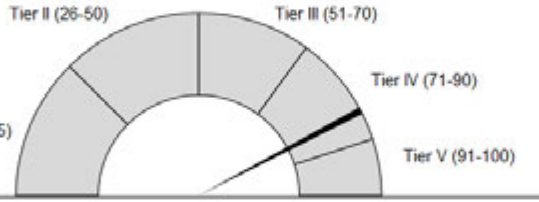
go to worksheet | go to grading | go to references

Water Audit Report for: City of Roswell | **Audit Year: 2020 Calendar** | **Jan 01 2020 - Dec 31 2020**

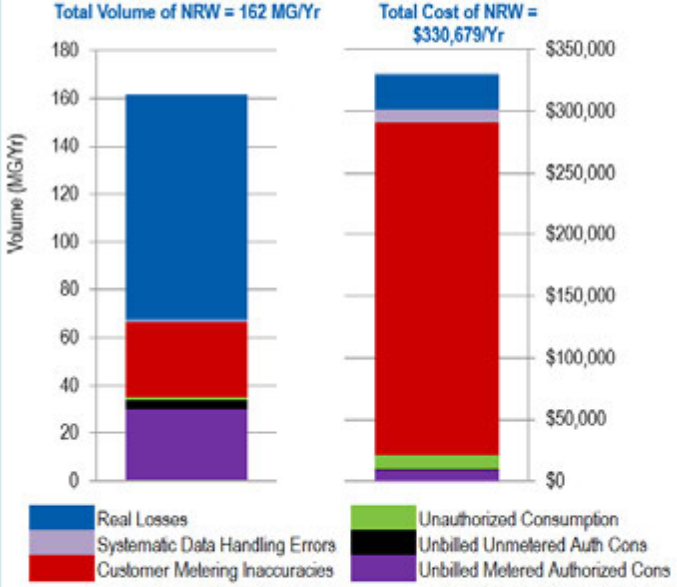
Data Validity

Data Validity Score: 84 **Data Validity Tier:** Tier IV (71-90)

See Loss Control Planning for Tier Details



NRW Components Summary

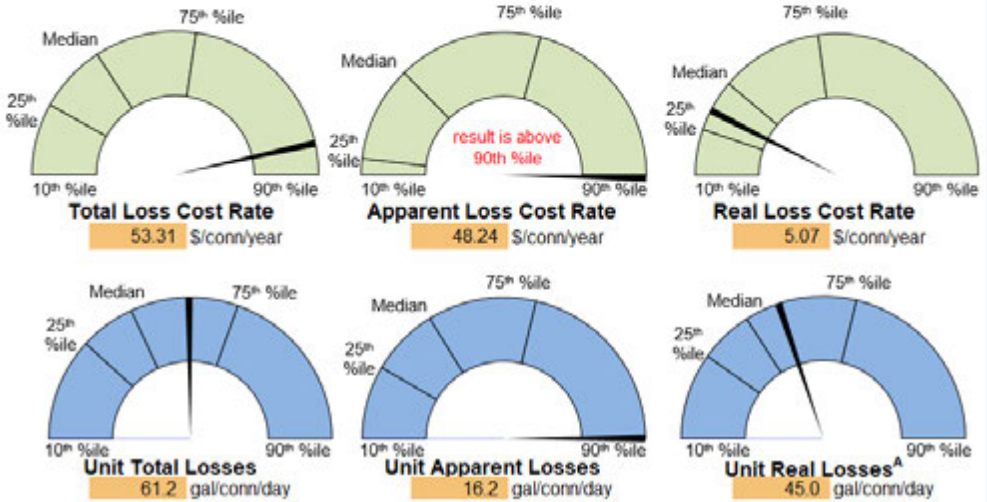


	Volume MG/Yr	Value $/Yr	Basis of Valuation
Apparent Losses	33.7	$275,871	CRUC
Real Losses	94.0	$28,997	VPC
Unbilled Authorized Cons	33.9	$10,464	VPC
Non-Revenue Water	161.6	$315,332	Blended

Key Performance Indicators

Actual KPI result | Target (see Worksheet)

gauge %iles per validated industry ranges[2]



Average Operating Pressure
90 psi

See UARL definition for additional guidance on the ILI

(UARL) Unavoidable Annual Real Losses	44.0 MG/Yr	21.1 gal/conn/day

Guidance Information for Key Performance Indicators

- The eight indicators shown are the recommended suite per the AWWA Water Loss Control Committee 2020 Position on KPIs[1].
- A suite of KPIs is necessary, as no single KPI can holistically communicate water loss performance for a given water system.
- See Table 1 below for Uses and Limitations for each KPI, excerpted from the AWWA Water Loss Control Committee Report (2020)[1], with naming conventions updated.
- Percentiles (%iles) shown on KPI gauges come from Level 1 validated data in the AWWA WLCC Reference Water Audit Dataset (2020)[2].
- KPI %iles shown above are not segregated by cohorts. Limited KPI data by cohorts may be found in WRF 4695 Guidance Manual, Appendix B (2019)[3].
- Actual KPI results that fall below 10th %ile or above 90th %ile do not necessarily imply error, but should be viewed with scrutiny.
- Percentiles not intended to imply targets. Targets may be input by user for operational KPIs, if desired, on Worksheet.
- See UARL and ILI in Definitions tab for discussion of size and pressure limitations.
- Systems that fall on the extreme ends of size or connection density should use caution when interpreting Unit Losses KPIs.

Table 1

Source: AWWA Water Loss Control Committee Report (2020)[1], with naming conventions updated

2020 AWWA Water Audit Method – Water Audit Outputs and Key Performance Indicators: Uses and Limitations

Type	Indicator	Description	Suitable Purposes					Uses and Limitations	Principal Users
			Assessment	Bench-Marking	Target-Setting	Planning	Tracking		
Attribute	Apparent Loss Volume	Calculated by Free Water Audit Software	✓				✓	Assess loss level	Utility, Regulators
	Apparent Loss Cost	Calculated by Free Water Audit Software	✓				✓	Assess cost loss level	Utility, Regulators
	Real Loss Volume	Calculated by Free Water Audit Software	✓				✓	Assess loss level	Utility, Regulators
	Real Loss Cost	Calculated by Free Water Audit Software	✓				✓	Assess loss cost level	Utility, Regulators
	Unavoidable Annual Real Loss (UARL)	Calculated by Free Water Audit Software	✓				✓	Reveal theoretical technical low level of leakage	Utility, Regulators
Volume	Unit Apparent Losses (vol/conn/day)	Strong and understandable indicator for multiple users.	✓	✓	✓	✓	✓	Used for performance tracking and target setting	Utility, Regulators
	Unit Real Losses[A] (vol/conn/day)	Strong and understandable indicator for multiple users.	✓	✓	✓	✓	✓	Used for performance tracking and target setting	Utility, Regulators, Policy Makers
	Unit Real Losses[B] (vol/pipeline length/day)	Strong and understandable indicator for use by utilities with low connection density.	✓	✓	✓	✓	✓	Data collection and assessment of systems with "low" connection density	Utility, Regulators, Policy Makers
	Unit Total Losses (vol/conn/day) **New KPI**	Strong and understandable indicator, suitable for high-level performance measurement.	✓				✓	High level indicator for trending analysis. Not appropriate for target setting or benchmarking	Utilities, Customers
	Infrastructure Leakage Index (ILI)	Robust, specialized ratio KPI; can be influenced by pressure and connection density.	✓	✓			✓	Benchmarking after pressure management is implemented	Utilities
Value	Apparent Loss Cost Rate (value/conn/year) **New KPI**	Indicators with sufficient technical rigor. Provide the unit financial value of each type of loss, which is useful for planning and assessment of cost efficiency of water loss reduction and control interventions and programs.	✓			✓	✓	Data collection and assessment on AWWA indicators or contextual parameters to use in conjunction with Loss Cost Rates	Utilities, Regulators, Customers
	Real Loss Cost Rate (value/conn/year) **New KPI**		✓			✓	✓		Utilities, Regulators, Customers
Validity	Data Validity Tier (DVT)	Strong indicator of water loss audit data quality, if data has been validated. Tier provides guidance on priority areas of activity.	✓	✓		✓	✓	Assess caliber of data inputs of the water audit	Regulators, Utilities

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Water Balance

Water Audit Report for: City of Roswell
Audit Year: 2020 Jan 01 2020 - Dec 31 2020
Data Validity Tier: Tier IV (71-90)

Volume from Own Sources (VOS) (corrected for known errors) 628.690	System Input Volume 640.798	Water Exported (WE) (corrected for known errors) 0.000	Billed Water Exported			Revenue Water (Exported) 0.000
		Water Supplied 640.798	Authorized Consumption 513.099	Billed Authorized Consumption 479.195	Billed Metered Consumption (BMAC) (water exported is removed) 479.195	Revenue Water 479.195
					Billed Unmetered Consumption (BUAC) 0.000	
				Unbilled Authorized Consumption 33.904	Unbilled Metered Consumption (UMAC) 29.953	Non-Revenue Water (NRW) 161.603
					Unbilled Unmetered Consumption (UUAC) 3.951	
			Water Losses 127.699	Apparent Losses 33.745	Systematic Data Handling Errors (SDHE) 1.198	
					Customer Metering Inaccuracies (CMI) 31.349	
					Unauthorized Consumption (UC) 1.198	
Water Imported (WI) (corrected for known errors) 12.108				Real Losses 93.955	Leakage on Transmission and/or Distribution Mains Not broken down	
					Leakage and Overflows at Utility's Storage Tanks Not broken down	
					Leakage on Service Connections Not broken down	

AWWA Free Water Audit Software:
Determining Water Loss Standing

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Water Audit Report for: City of Roswell
Audit Year: 2020 Jan 01 2020 - Dec 31 2020
Data Validity Tier: Tier IV (71-90)

Water Loss Control Planning Guide

	Water Audit Data Validity Tier (Score Range)				
Functional Focus Area	**Tier I (1-25)**	**Tier II (26-50)**	**Tier III (51-70)**	**Tier IV (71-90)**	**Tier V (91-100)**
Audit Data Collection	Launch auditing and loss control team; address supply metering deficiencies	Analyze business process for customer metering and billing functions and water supply operations; Identify data gaps; improve supply metering	Establish/revise policies and procedures for data collection	Refine data collection practices and establish as routine business process	Annual water audit is a reliable gauge of year-to-year water efficiency standing
Short-term loss control	Research information on leak detection programs; Begin flowcharting analysis of customer billing system	Conduct loss assessment investigations on a sample portion of the system: customer meter testing, leak survey, unauthorized consumption, etc	Establish ongoing mechanisms for customer meter accuracy testing, active leakage control and infrastructure monitoring	Refine, enhance or expand ongoing programs based upon economic justification	Stay abreast of improvements in metering, meter reading, billing, leakage management and infrastructure rehabilitation
Long-term loss control		Begin to assess long-term needs requiring large expenditure: customer meter replacement, water main replacement program, new customer billing system or AMR/AMI system	Begin to assemble economic business case for long-term needs based upon improved data becoming available through the water audit process	Conduct detailed planning, budgeting and launch of comprehensive improvements for metering, billing or infrastructure management	Continue incremental improvements in short-term and long-term loss control interventions
Target-setting			Establish long-term apparent and real loss reduction goals (+10 year horizon)	Establish mid-range (5 year horizon) apparent and real loss reduction goals	Evaluate and refine loss control goals on a yearly basis
Benchmarking			Preliminary Comparisons - can begin to rely upon with PIs for performance comparisons for real losses	Performance Benchmarking with PIs is meaningful in comparing real loss standing	Identify Best Practices/ Best in class; PIs are very reliable as real loss performance indicators for best in class service

For validity scores of 50 or below, the shaded blocks should not be focus areas until better data validity is achieved.

APPENDIX F WATER CONSERVATION PLAN

Executive Summary

The Atlanta Regional Commission (ARC) and the Metropolitan North Georgia Water Planning District (MNGWPD), in an effort to address water service needs and balance the uses of water resources, created a *Water Supply and Water Conservation Management Plan.* This plan has charged each of the sixteen counties and municipal water utilities in the metropolitan area with the task of creating and managing a water conservation program.

In response to this requirement, the City of Roswell has developed a multi-faceted, ongoing water efficiency plan and conservation program aimed at both educating the citizens of Roswell about the need for and means of achieving water efficiency now and in the future as well as reducing the City's overall water consumption through conservation programs and initiatives designed for residential and business customers. The City has also developed a drought contingency plan which addresses drought condition indicators, potable water use priorities, low flow protection, and the availability of water supplies in drought conditions.

The Water Conservation Plan outlines in detail what activities are currently underway as well as what activities will be initiated in the upcoming months. All of this is part of the City of Roswell's Water Conservation Plan. The purpose of this plan is to:

- Ensure an adequate clean drinking water supply for our present and future customers.
- Enhance the City of Roswell's commitment to responsible environmental stewardship.
- Help our customers identify water as a finite resource and ways to foster (encourage) water conservation.
- Contribute to the District's target goal of reducing per capita water use by 11 percent by 2030, in compliance with the *Metro North Georgia Water Planning District Water Supply and Conservation Plan.*
- Decrease peak demand periods through efficient water use; thereby reducing capital expenditures for meeting increased capacity needs.

I. Background

In 2001, the Georgia General Assembly enacted Senate Bill 130, which established the Metropolitan North Georgia Water Planning District and charged it with addressing comprehensive water resource management planning in the 16-county area of metropolitan north Georgia.

The sources of drinking water for Roswell residents are Big Creek and the Chattahoochee River (Fulton County Water System), both of which are part of the Apalachicola-Chattahoochee-Flint drainage system which provides water resources for Alabama, Georgia, and Florida. Since the Chattahoochee River is a shared resource amongst multiple jurisdictions and water supply to many counties and cities in Georgia are experiencing rapid population growth, it becomes increasingly

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important that the City of Roswell implement water conservation measures to ensure future availability of potable water resources to meet projected District water demands.

II. System Management

The City of Roswell Water System uses several primary programs of system management to reduce water losses. These include the leak detection program, GIS system mapping, and meter testing/replacement program. These programs help the City better manage its water system and reduce water losses. The City's leak detection program resulted in an estimated 8 MG savings in 2007 and 19.4MG in 2008. The meter testing/replacement and leak detection programs have contributed significantly to the reduction of water losses in the system. Additionally, the City had the distribution system surveyed for leaks in 2018 by a third party contractor. Through the survey, seven (7) distribution leaks and four (4) suspected customer leaks were found amounting to a loss of approximately 31,680 gallons per day or $20,815 lost each year. Once detected, the 7 distribution leaks have been fixed. In 2020, one leak was detected in a service line through passive leak detection.

A. Water Audits

The City of Roswell performs annual water audits using the AWWA Water Audit Software to assess the management of its water system. The results of the 2013 -2020 AWWA Water Audits are summarized in **Table 1**.

Table 1 Summary of 2013 - 2020 AWWA Water Audits for Roswell Water System

	Volume of Water in Million Gallons (MG)							
	2013	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**
Water Produced by City of Roswell	371.3	400.3	306.6	456.9	530.0	556.3	611.4	628.7
Water Imported	157.0	137.2	276.5	131.7	2.6	4.8	18.5	12.1
Total Water Supplied	**528.3**	**537.5**	**583.1**	**588.6**	**532.6**	**561.1**	**629.9**	**640.8**
Total Billed Authorized Consumption	450.5	483.5	496.7	528.1	481.3	495.1	518.7	479.2
Un-Billed Metered Consumption	4.7	9.4	6.0	12.0	11.2	10.3	15.1	30.0
Billed UnMetered Consumption	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Unbilled Authorized Consumption	11.3	16.1	9.9					33.9
Total Authorized Consumption	**461.8**	**499.6**	**506.6**	**547.5**	**493.9**	**505.7**	**533.8**	**513.1**
Total Apparent Losses	15.2	18.6	49.8	20.1	17.8	10.8	40.6	33.7
Unauthorized Consumption	1.3	1.3	1.5	1.5	1.3	1.4	1.6	1.2
Customer Metering Inaccuracies	13.6	13.1	35.5	17.3	15.2	2.6	37.7	31.3
Data Handling Errors	0.3	4.2	12.8	1.3	1.2	6.8	1.3	1.2
Total Real Losses	51.3	19.2	26.7	21.0	21.0	44.6	55.0	94.0
Total Water Losses	**66.5**	**37.9**	**76.5**	**41.0**	**38.7**	**55.4**	**96.6**	**127.7**
Total Revenue Water	**450.5**	**483.5**	**496.7**	**528.1**	**481.3**	**495.1**	**518.7**	**479.2**
Total Non-Revenue Water	**77.8**	**54.0**	**86.4**	**60.4**	**51.4**	**66.0**	**111.2**	**161.6**

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B. Current and Planned Programs to Address Water Losses

1. Leak Detection Program

This program is in place to help minimize the City of Roswell's water losses by locating and repairing leaks as quickly as possible. The goal of the program is to distribute all of the water from the water treatment plant to the customers' taps.

Currently the City of Roswell: 1) Monitors the water lines at night to detect if any leaks are present, 2) Repairs all leaks that are found, and 3) Estimates amount of water lost through leaks utilizing Greeley's Water Loss Formula to account for water lost. This program helps to reduce the amount of water losses, ensures that water is safely delivered to the customers tap, and reduces the amount of lost revenues.

In 2020, eight pressure monitoring systems were installed within the distribution system to monitor leaks as well as theft from fire hydrants. Since installation, instances of theft have been observed through temperature and system pressure differentials. In 2021, the City of Roswell is planning on installing additional 92 pressure monitoring systems and 400 leak detection systems throughout the water distribution system.

2. Water System Map

The City of Roswell Public Works/ Environmental Department uses a GIS-based system to maintain and update the water distribution system maps. The GIS data maintained by the City includes the size, material, and length of water distribution pipes, valves, fire hydrants, fittings, meters, structures, and vaults. The data is continually updated with new information regarding details of pipe, valve and meter location and installation/repair dates of facilities. The pipe network of the Roswell Water System is shown in **Figure 1**.

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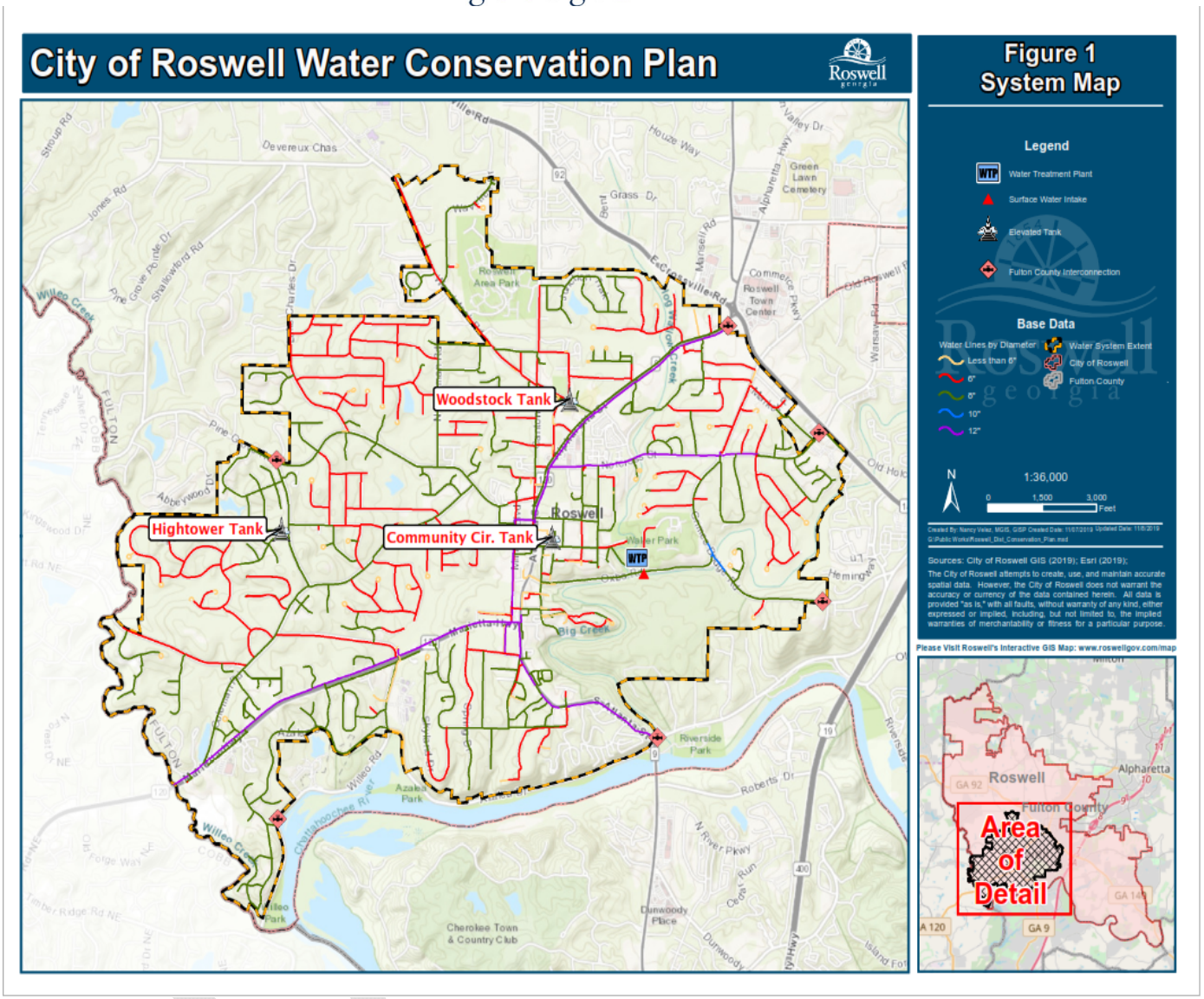

Figure 1 Map of City of Roswell Water Distribution System

As of February 17, 2021, the total length of pipeline in the distribution system was 469,654 feet or approximately 88.9 miles. The pipes range in size from 1" to 12" (see **Table 2** below).

Table 2 Pipe Size and Length throughout System

Pipe Sizes	Pipe Length (Linear Feet)
2.5” or less Copper	918
2.5” or less Ductile Iron	451
2.5” or less Galvanized Pipe	16,906
2.5” or less HDP	387
2.5” or less Municipex	9,209
2.5” or less PVC	596
4” Cast Iron	179
4” Ductile Iron	2,956
4” Municipex	31
6” Asbestos Concrete	21,104
6” Cast Iron	109,787
6” Ductile Iron	31,788
6” PVC	3,997
6” Other	48
8” Cast Iron	41,633
8” Ductile Iron	188,175
8” Other	2,992
10” Cast Iron	95
10” Ductile Iron	1,123
12” Ductile Iron	35,885
12” PVC	9
12” Other	60
16” Ductile Iron (Raw Water)	1,260
24” Ductile Iron (Raw Water)	65
Total	**469,654 ft. (88.9 miles)**

3. Meter Testing and Replacement Program

This program is in place to ensure that meters are registering customer water consumption accurately under AWWA standards. Meters that fail to meet the criteria for accuracy standards are replaced with new meters. The City of Roswell Water Department staffs a dedicated crew to replace meters, should it be necessary, after following up on a customer complaint or an internally generated work order.

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In 2008, the City tested 2 large water meters (6" and 8" fire line meters). Both meters failed the calibration test and were replaced. The City lost an estimated $30,000 per year in revenues on the 8-inch meter. The City had to stop the periodic testing of large meters due to the 2008 drought. Testing of large meters can use up to 1,000,000 gallons of water. The City resumed testing of large meters in 2020. In 2020, the City tested 50 large commercial meters (3" and larger) and 7 were under-registering water usage and replaced. An additional 2 large commercial meters were replaced even though they were accurate. The 9 meters were replaced with new Acoustic meters. In 2020, the City tested approximately 100 small meters for accuracy and replaced 500 meters as part of the meter replacement program.

The City has tested several of the smaller meters for accuracy, based on age or customer complaints. Several of these meters have failed to meet AWWA Accuracy standards, to the customer's advantage (lost revenues for the City of Roswell). The City of Roswell has since replaced these meters with new, more accurate meters.

In 2011, the City implemented the Sensus FlexNet Automated Metering Infrastructure (AMI). Through AMI, the City is able to automatically read meters monthly, improve leak detection, provide customers with up-to-the hour information when necessary, and meet the District's criteria for conservation measures. As part of this implementation, the City replaced 4,100 meters with new Sensus IPERL smart meters. In 2015, the City launched the AquaHawk customer portal for its customers to sign up and monitor their own usage, see estimated bill, and set up thresholds to receive alerts for potential leaks. As of 2019, approximately 34% of the City's water customers are registered under the portal.

In March 2019, the City created its first District Metered Area (DMA) in response to taking responsibility for a private system, Ashley Manor Subdivision. As part of this project, the City installed individual meters for residents so they could be billed separately for their consumption. Each month reports are generated to compare total usage of the residential meters to the usage that flowed through the DMA. The City is able to better account for this area's water usage including identifying periods of leaks, flushing, and theft from hydrants.

Planned Improvements to this Program include:

- Replace small meters (3/4" through 1") that are 15 years or older (meter life span with desired accuracy is between 10 to 15 years). Replace large meters (1.5" through 8") that are 10 years or older. In 2011, the City replaced 4,100 meters as part of its upgrade to an Automated Metering Infrastructure (AMI). In 2018, the City resumed its Meter Replacement program replacing 500 meters annually.
- Continue to include meter replacement within annual budget since many meters are approaching the 15 year age criteria.
- Purchase laptop/tablet computers to enhance efficiency of data collection, provide

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field personnel with calibration report to show customer, and to analyze data in the field.

- Test large commercial meters (3" and larger) annually and test 1.5-inch through 2-inch meters every three (3) years.
- Implement a Hydrant Security Program in conjunction with Fulton County to protect the potable water system from introduction of a hazard, whether accidental or intentional, into the public water supply, and theft.
- Install 92 additional pressure monitoring systems and 400 leak detection systems throughout the water distribution system.

4. Prevention of Tank Overflows

The Roswell Water System has three elevated finished water storage tanks:

1. Community Circle -75,000 gallons
2. Woodstock -500,000 gallons
3. Hightower -500,000 gallons

The locations of these tanks are shown in Figure 1. The water levels within these tanks are monitored through the City's SCADA system. The SCADA system notifies the Roswell Water Treatment Plant (Roswell WTP) operators when the tank water levels are too high so that the operators can make adjustments to prevent tank overflows.

5. Line-Flushing Program

The City of Roswell operates metered flush stations at the end of their system which run once per week for a predetermined amount of time. The City has been monitoring chlorine levels in their system and chlorine residuals have stabilized. The Roswell Fire Department aids in the flushing program by flushing the City's hydrants. The Fire Department is provided with a hydrant meter to monitor water usage which they provide to the Water System operator on a monthly basis.

6. Prevention of Unauthorized Water Use

The City has hydrant meters equipped with RPZ back flow preventers that are rented out to contractors. Anyone illegally hooked up to a City hydrant will have all their hoses confiscated, receive a ticket, be charged for their estimated water use, and appear in court.

7. List of Unmetered Service Connections

All of the City of Roswell's service connections are metered.

C. Interconnections with Other Water Systems

When needed, the Roswell Water System purchases additional water from the Fulton County Water System to meet demand. In 2018, the City purchased a total of 4.8 MG, in 2019 the City purchased 18.5 MG, and in 2020 the City purchased 12.1 MG from Fulton County. The City uses

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two main interconnections with the Fulton County System which are located at 10489 Alpharetta Highway and 800 Pine Grove Road and the City maintains four (4) additional interconnections with the Fulton County Water System to provide an emergency back-up supply of water as shown in **Table 3**. The locations of the interconnections are shown in Figure 1.

Table 3. Summary of Six Interconnections with Fulton County Water Distribution System

Valve	Location	Pipe Size
1	10489 Alpharetta Highway	8"/2"
2	800 Pine Grove Road	6"/1.5"
3	Intersection of Warsaw Road and Holcomb Bridge Road	8"/2"
4	Intersection of Riverside Road and Atlanta Street	6"/1.5"
5	Intersection of Willeo Road and Iverness Crossing	8"/2"
6	290 Grimes Bridge Road	8"/2"

III. Treatment Plant Management

The Roswell WTP is part of the Water Resources Division (WRD) of the Public Works/Environmental Department. The Roswell WTP has seven (7) employees directly involved in daily plant operations: a Water Operations Manager, Assistant Water Operations Manager and five (5) plant operators. The Roswell WTP is required to have one (1) Class I State Water Certified Operator. The Roswell WTP exceeds this requirement. There are currently six (6) Class I operators and one (1) Class III operator.

A. Plant Water Metering

The raw water flow into the raw water storage tank is metered by a Rosemount Integral Mount meter. This meter was installed in 2016 and is in good condition. The raw water meter undergoes complete calibration once per year by MR Systems. Additionally, meter readings are reviewed on a regular basis by WTP operators, and meter calibration is performed on an as-needed basis following Highway Addressable Remote Transducer (HART) protocols.

The raw water flow from the storage tank to the flocculation and sedimentation basins is metered by another Rosemount Integral Mount meter. This meter was installed in 2016 and is in good condition. The raw water meter undergoes complete calibration once per year by MR Systems. Additionally, meter readings are reviewed on a regular basis by WTP operators, and meter calibration is performed on an as-needed basis following HART protocols.

The finished water is metered by a Rosemont Integral Mount that provides flow data to the WTP SCADA system. This meter was installed in 2016 and is in good condition. The finished water meter is in good condition and is calibrated once per year by MR systems. Additionally, meter readings are reviewed on a regular basis by WTP operators, and meter calibration is performed on an as-needed basis following HART protocols.

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B. In-Plant Water Use

Most of the water used at the plant is for backwashing filters. The WTP operators monitor the number of filter backwash hours on a daily basis. Other in-plant water uses include laboratory use and lavatory.

C. Filter Backwash Water Reuse or Recycling

The Roswell WTP currently recycles 100% its filter backwash water. The water is returned to the raw water storage tanks through the use of two decant basins.

D. Roswell WTP Improvements

Since the completion of the Roswell WTP upgrade in 2016, multiple improvements have been conducted at the plant to ensure equipment is working properly. A summary of WTP improvements between fiscal year (FY) 2017 and FY 2021 is shown in **Table 4**.

Table 4 FY 2017- FY 2021 WTP Improvements

FY 2017 - 2021 WTP Improvements	
	Cost
Chemical Feed Pump Replacement Program	$11,457.10
Install mixing/aeration unit in raw water storage tank	$92,883.00
Video surveillance upgrades	$49,119.56
SCADA upgrades	$27,000.00
VFD upgrades to raw water pumps	$33,203.60
Fluoride room renovation	$39,432.00
Replace altitude valve with butterfly valve at Community Circle	$3,482.50
Replace well VFD	$12,344.39
Telemetry upgrades	$29,763.00
Install card readers at water treatment plant	$39,432.00
Total	**$338,117.15**

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IV. Rate Making Policies

The City of Roswell has adopted the MNGWPD recommendation for conservation pricing to be used by water supply utilities. The City is in compliance with the MNGWPD requirement for local governments/utilities to adopt a conservation pricing structure by 2006. Roswell enacted a compliant pricing structure in 2001. The goal of the tiered rate structure is to reduce excessive water use, especially outdoor irrigation, by making water increasingly more expensive for discretionary uses.

The City of Roswell maintains a monthly billing schedule. The City revised and adopted its current rate structure in May 2019. It is an increasing block rate with 3 tiers. Additionally, there is a base rate service charge for each billing period based on the meter size. The current rate structure is shown in **Table 5**. The first tier for residential-size meters is based on 5,000 gallons per billing period. The first tier rate will remain at $4.52 per thousand gallons. The second tier rate will be two times that or $9.04 per thousand gallons. The third tier rate for highest consumption will be three times the initial rate or $13.56 per thousand gallons.

In previous rate determinations, general groups of users were established based on meter sizes and tiers and were set for small commercial rates, large commercial rates, and specialty rates for fire lines and irrigation meters. Because of the high variability of flow rates and meter sizes for multifamily complexes, each complex has been assigned a consumption tier based on the number of units in the complex; these tiers are on file in the Utility Billing Division of the Finance Department.

There is not a set schedule or time that the City of Roswell evaluates and updates their rate schedule; however, revenues and expenditures from the Water Fund are compared every year as part of the budget development process. The rate review and a potential rate increase would be evaluated based on tracking utility revenues and costs. There was a 4% rate increase for each year starting in FY 2020 through FY 2023 based on predicted expenses and future projects.

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Table 5 City of Roswell Water Rate Structure

City of Roswell Water Utility Rate Changes

Effective July 1, 2020, residential and commercial water rates will be increased as follows:

Monthly Base Rates		
Meter Size	**Current Rate**	**July 1, 2020 Rate (4% Increase)**
5/8" - 3/4"	$5.29	$5.50
1"	$9.98	$10.38
1.5"	$16.45	$17.11
2"	$27.61	$28.71
3"	$39.94	$41.54
4"	$59.69	$62.08
6"	$122.43	$127.33
8"	$190.11	$197.71

Residential Water Rates			
Meter Size	**Gallons**	**Current Rate**	**July 1, 2020 Rate (4% Increase)**
5/8" - 1"	0 - 5,000	$4.35	$4.52
5/8" - 1"	5,001 - 10,000	$8.69	$9.04
5/8" - 1"	> 10,000	$13.04	$13.56

Small Commercial Water Rates			
Meter Size	**Gallons**	**Current Rate**	**July 1, 2020 Rate (4% Increase)**
5/8" - 3"	0 - 50,000	$4.35	$4.52
5/8" - 3"	50,001 - 75,000	$8.69	$9.04
5/8" - 3"	> 75,000	$13.04	$13.56

Large Commercial Water Rates			
Meter Size	**Gallons**	**Current Rate**	**July 1, 2020 Rate (4% Increase)**
2" - 8"	0 - 122,500	$4.35	$4.52
2" - 8"	122,501 - 300,000	$8.69	$9.04
2" - 8"	> 300,000	$13.04	$13.56

Fire Lines Water Rates			
Meter Size	**Gallons**	**Current Rate**	**July 1, 2020 Rate (4% Increase)**
5/8" - 8"	Per 1,000	$13.04	$13.56

Irrigatiom Water Rates			
Meter Size	**Gallons**	**Current Rate**	**July 1, 2020 Rate (4% Increase)**
5/8" - 4"	Per 1,000	$13.04	$13.56

Rates will increase by 4% each July 1st starting in 2020 through 2023.

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V. Plumbing Ordinances and/or Codes

The Roswell City Code includes a variety of provisions that promote water conservation and improve water system management. These are summarized below:

Article 24.5; Section 24.5.22 Conservation Measures Relating to Lawn and Landscape Irrigation

Summary: It is a violation of the City Code of Roswell to water a lawn or landscape in a manner that wastes water or causes runoff including causing water to fall on sidewalks, driveways, or other areas not lawns or landscapes. It is recommend that the customer have their irrigation system inspected annually, by a certified inspector, to ensure that the irrigation system is working properly, as well as, maintain their irrigation system to prevent waste by repairing broken, missing, or misdirected sprinkler heads. Rain sensors are required on all automatic sprinkler systems.

Article 24.5; Section 24.5.21 Water Waste

Summary: It is a violation of the City Code of Roswell for any person in the city limits to intentionally, knowingly, recklessly, or criminally negligently allow or cause water waste, to allow or cause landscape watering outside the prescribed hours for landscape watering.

Article 24.5; Section 24.5.9.1 Use of sub-meters for multi-tenant properties

Owners of property that is used by multiple tenants, whether commercial or residential, shall be required to install sub-meters for water use for each such tenant. The cost of such sub-meter shall be borne by the property owner.

Article 24.5; Section 24.5.20 Plumbing and Water Conservation

(a) Purpose. It is the purpose of this section to require the use of ultra-low-flow plumbing fixtures in all new construction or when replacing plumbing fixtures during renovation or remodeling of existing buildings, and to require the labeling of plumbing fixtures with information regarding flow rates for the purpose of conserving water to maintain the integrity of drinking water supplies and reduce wastewater flows.

(c) Standards. No plumbing fixture shall be installed which does not meet the standards listed in subsection (c)(1). This includes all plumbing fixtures installed in newly constructed buildings or when replacing plumbing fixtures during remodeling or renovation of existing buildings, except as noted in subsection (e). The effective date of this requirement for residential buildings shall be July 1, 1991, and for commercial buildings shall be July 1, 1992, and for government/municipality buildings shall be July 1, 2009.

(1) All plumbing fixtures installed as referred to above should not exceed the following maximum water use rates: Fixture Gallons per Flush/Minute Toilets 1.6 Urinals 1.0 Showerheads 2.5 Kitchen Faucets 2.5 Bathroom and lavatory faucets 2.0

(2) The flow restriction device in a showerhead must be a permanent and an integral part of the showerhead and must not be removable to allow flow rates in excess of that stated in subsection (c)(1) above.

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(3) Lavatory faucets located in restrooms intended for use by the general public shall be of the metering or self-closing type, in addition to the flow requirement listed in subsection (c)(1).
(4) All plumbing fixtures installed in government/ municipality buildings shall not exceed the following maximum water use rates: Fixture Gallons per Flush/ Minute Toilets 1.28 Urinals 0.5 Showerheads 1.6 Kitchen Faucets 2.5 Bathroom and Lavatory Faucets 1.5 Fixtures and equipment labeled WaterSense® shall be the standard whenever possible. Future changes approved for WaterSense products that exceed the performance specifications above shall supersede these specifications.

VI. Recycle-Reuse

The City of Roswell does not operate a wastewater treatment facility. The wastewater generated by the Roswell Water System customers is treated at the Fulton County Big Creek Treatment Plant.

VII. Water Conservation Education

The City of Roswell is committed to protect its valuable water resources. The City has developed multiple programs aimed at educating the citizens of Roswell about the need for water efficiency now and in the future. The water conservation education efforts currently ongoing in the City are described below.

- Low-Flow Pre-Rinse Spray-Valve Education Program-Water Resource Department distributes educational brochures to local businesses that conduct dishwashing. The City's Environmental Enforcement Officer also carries these brochures to hand out when appropriate.
- Distribute Low-Flow Retrofit Kits to Residential Users - Indoor and outdoor water conservation kits are available to any Roswell Water Utility customer at the Water Utility Division and at various outreach events. Kits are given to customers who complain of a high bill in pre-1992 homes. Low-flow sink aerators are given out at outreach events. Low-flow showerheads and shower timers are also given out at various events.
- Water conservation information provided on City website
- Water education included in water utility bills
- School Programs on water conservation - In the 2008-2009 school year over 80 programs were taught about water conservation and environmental protection.
- EverGreen Schools Program - Roswell teachers are given information on water conservation as well as lesson plans and resources related to water programs.
- Workshops held by the City for residents on rain barrels, Adopt-A-Stream, composting, xeriscaping, Fix-it-Yourself, and rain gardens
- Outreach at community events including Annual Drinking Water Festival, Rivers Alive, Alive After Five, Youth Day Parade, and Big Creek Work Day
- Water conservation videos shown on RCTV
- Drippy Dropperson (City's water conservation mascot) Coloring Book Contest engages approximately 400 Roswell students each year.

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- Rain barrels used at historic home and Adult Recreation Center
- Xeriscape landscaping in City parks and buildings
- Tours of water treatment plant for scouts, civic groups, and schools
- City staff serve as a member of GA Water Wise Council, MNGWPD Public Education Sub-Committee, GAWP Education Committee, American Backflow Prevention Association, and the Environmental Education Alliance of Georgia.
- Distribution of educational brochures from Clean Water Campaign.
- Roswell City Hall was retrofitted with low-flow sink aerators and flush valve diaphragms as well as infrared sensor sinks in 2006. The remaining City facilities had toilets and fixtures upgraded in 2018. Toilets were retrofitted to High Efficiency Toilets (HETs) and High Efficiency Urinals (HEUs).

VIII. Water Use Data

The City of Roswell has a Georgia Environmental Protection Department (EPD) approved permit to withdraw raw water from Big Creek (Permit number #060-1209-01, effective date December 15, 2011; expiration date November 1, 2021). This permit allows monthly average withdrawals from Big Creek for municipal water supply purposes of 2.8 million gallons per day (MGD), not to exceed 4.5 MGD in a 24-hour period.

Water system records for 2017 through 2019 were evaluated for the Roswell Water System to calculate the System's average water demand. A summary of the System's water demand is provided in **Table 6**.

Table 6 Summary of 2017 -2020 Water Use

	2017	2018	2019	2020
Daily Average City of Roswell Water Production (MGD).	1.45	1.52	1.71	1.76
Yearly Amount Purchased from Fulton County (MG)	2.65	4.8	18.5	12.1
Total Daily Average System Use (MGD)	1.45	1.51	1.68	1.76
Peak Month Produced (MG)	1.82	1.86	2.17	2.07

In 2020, the Roswell Water System served approximately 18,525 customers (approximately 5,700 meters). The indoor residential per capita water use has remained steady for the past three years (2018 – 2020) at 56 gallons per day. Figure 2 illustrates the percentages of water consumption by different types of users for 2019.

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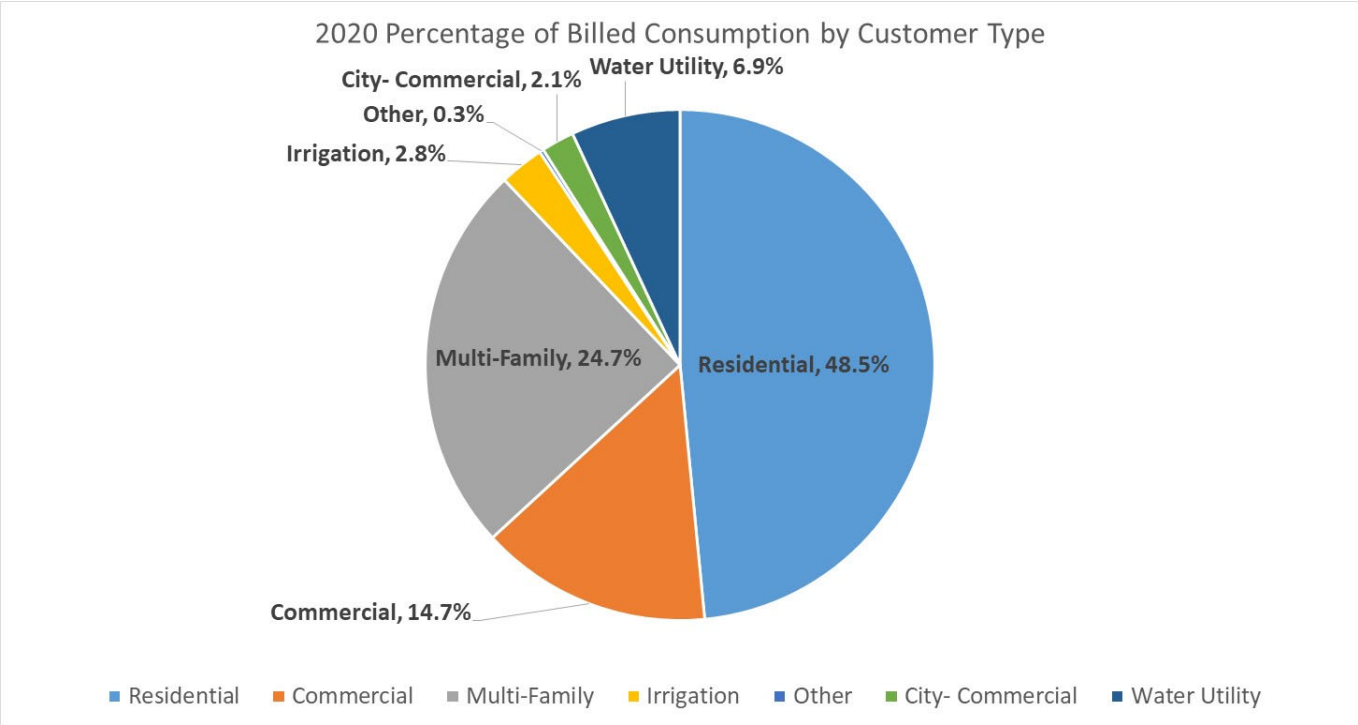

Figure 2: 2020 Water Consumption

IX. Long Range Planning

Population and water demand forecasts through 2070 for the City of Roswell Water System have been developed utilizing ARC population projections approved in January 2020 and are shown in **Table 7** and **Table 8**. The ARC 2015 Roswell Water District population is assumed to increase at 2% every five (5) years, consistent with ARC project population increases. The City has incorporated a percentage reduction in per capita water use resulting from water conservation measures.

Table 7: ARC Population Projections Approved in 2020

Census Tract	ARC 2015 Population (from report approved January 2020)	2015 Roswell Water District Population based on ARC 2015 Population
11405	7,880	5,245
11418	6,141	2,049
11419	6,363	2,127
11422	3,844	3,844
11423	5,381	4,897
TOTAL		**18,162**

Table 8: Roswell Water System Demand Projections

	DEMAND PROJECTIONS			PRODUCTION PROJECTIONS				
Year*	Monthly Average Daily Demand (MGD)**	Monthly System Peak Demand (MGD)***	Demand Reduction Due to Water Conservation	Monthly Average Daily Purchase from Fulton County (MGD)****	Monthly Average Daily Finished Water Production from WTP (MGD)	WTP Production Efficiency	Monthly Average Daily Withdrawal from Big Creek (MGD)	Monthly Average Daily Well Production (MGD)*****
2017	**1.47**	**1.63**		**0.01**	**1.46**	**98.6%**	**1.48**	-
2018	**1.53**	**1.70**		**0.01**	**1.52**	**98.7%**	**1.54**	-
2019	**1.73**	**2.18**		**0.04**	**1.69**	**97.1%**	**1.74**	-
2020	**1.79**	**2.07**	**0.1%**	**0.03**	**1.76**	**98.1%**	**1.79**	-
2021	1.84	2.21	0.1%	0.02	1.82	98.1%	1.86	As Needed
2022	1.90	2.27	0.1%	0.02	1.88	98.1%	1.91	As Needed
2023	1.95	2.34	0.1%	0.02	1.93	98.1%	1.97	As Needed
2024	2.01	2.41	0.1%	0.02	1.99	98.1%	2.02	As Needed
2025	2.07	2.48	0.1%	0.02	2.05	98.1%	2.08	As Needed
2026	2.12	2.55	0.1%	0.02	2.10	98.1%	2.14	As Needed
2027	2.19	2.62	0.1%	0.02	2.17	98.1%	2.21	As Needed
2028	2.25	2.70	0.1%	0.02	2.23	98.1%	2.27	As Needed
2029	2.32	2.78	0.1%	0.02	2.30	98.1%	2.34	As Needed
2030	**2.37**	**2.85**	**0.5%**	**0.02**	**2.35**	**98.1%**	**2.40**	**As Needed**
2040	**3.14**	**3.77**	**0.5%**	**0.23**	**2.75**	**98.1%**	**2.80**	**0.167**
2050	**4.16**	**4.99**	**0.5%**	**1.24**	**2.75**	**98.1%**	**2.80**	**0.167**
2060	**5.51**	**6.61**	**0.5%**	**2.59**	**2.75**	**98.1%**	**2.80**	**0.167**
2070	**7.29**	**8.75**		**4.38**	**2.75**	**98.1%**	**2.80**	**0.167**

Notes:

*Start at year 2017 because plant came online in March 2016 and City of Roswell had to purchase water from Fulton County for January 2016 – April 2016. Years 2017 through 2020 include real demand, WTP production, and purchase from Fulton County data.

**Demand includes water produced by WTP, well, and purchased from Fulton County. Projected 3% average annual increase (lowest of previous 4 years and consistent with MNGWPD Utility Climate Resiliency Study.

***Monthly average daily purchase from Fulton County jumps in Year 2040 due to demand exceeding permitted capacity of WTP and well withdrawals. Water must be purchased from Fulton County to meet average daily demand. Even more water will need to be purchased to meet monthly peak demands.

****The well is permitted to withdraw 0.167 MGD per month; however, the well will not consistently produce every day to meet demand due to the need for recharge; therefore, the well was not included in the calculations until the projected water produced by the WTP could not meet demand.

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A. Additional Water Sources

1. Groundwater Well

The City of Roswell operates one groundwater well (Permit # 060-0007 issued February 25, 2011 and will expire November 1, 2021) located on Willeo Road. The facility is capable of producing 0.167 MG a day monthly average and 0.167 MG annual average. The City has submitted a groundwater permit renewal application for the well in 2021.

X. Additional Water Conservation Activities

A. Atlanta Regional Commission (ARC) Green Communities Certification

The City of Roswell's Sustainability Task Force partnered with the Green Ribbon Committee to apply for the ARC Green Communities Program. This is a voluntary certification program for jurisdictions in the 10-county Atlanta Region to encourage local governments to become more sustainable. Local governments earn points in ten categories by implementing specific policies and practices that contribute to overall sustainability. These ten categories are listed below:

- Green Building
- Energy Efficiency
- Green Power
- Water Use Reduction and Efficiency
- Trees and Greenspace
- Transportation
- Recycling and Waste Reduction
- Land Use
- Education
- Innovation

As part of this initiative, the City of Roswell submitted the following measures to receive points:

- Conduct water audits (indoor and outdoor) of existing local government facilities and implement recommendations *or* Engage in performance contracting for water use in government buildings.
- Require WaterSense certified high efficiency toilets (1.28gpf or less), urinals (0.5gpf or less), and faucets (1.5gpm or less) in all new government buildings.
- Use captured rainwater or reuse water to irrigate landscapes at government facilities.
- Become a DCA Water First Community.
- Comply with Metro Water District Water Supply and Water Conservation Management Plan.
- Comply with Metro Water District Stormwater Management Plan.

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In December 2009, the City of Roswell was awarded the Silver Level Certification for its efforts. Roswell was the first city in the metro Atlanta area to receive the Silver Level certification. Since 2009, the City of Roswell has been awarded the Gold Level Certification. There are currently 20 cities in metro Atlanta that are certified through ARC. Currently there are 5 bronze certified, 4 silver certified, 8 gold certified and 3 platinum certified cities.

B. City Water Conservation Designations

The City of Roswell prides itself on being a leader in local conservation initiatives and as such, has been a **WaterFirst** Community since 2009, as named by the Department of Community Affairs. The City is also an **EPA WaterSense** partner. These designations demonstrate the commitment by the City to protect its valuable water resources.

C. Toilet Rebate Program

The City of Roswell participated in the ARC toilet rebate program until 2015. In 2015, the City took over management of its Toilet Rebate Program and expanded it to include Multi-Family customers. As of January 2021, the City has replaced 981 units, with an estimated daily water savings of 17,232.83 gallons as shown in **Table 9**. The City still reports all rebates provided to the ARC. In 2021, ARC updated their toilet rebate program to require 1.1 gallon per flush (gpf) or less toilets instead of the current, less efficient 1.28 gpf toilets. This change would apply to both the single and multi-family programs.

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Table 9 Summary of City of Rowell's Toilet Rebate Program and Approximate Associated Water Savings as of January 2021

Metropolitan North Georgia Water Planning District

Water Utility Summary Report

Prepared for City of Roswell on 4/22/2021 1:28:07 PM

Program Totals

Single-Family Program Totals	**930**
HET 1.28 gpf [Roswell Program as of 7/1/15]	*259*
HET 1.28 gpf [MNGWPD Program until 6/30/15]	*478*
Low-Flow 1.6 gpf [MNGWPD Program until 6/30/15]	*193*
Multi-Family Program Totals	**51**
HET 1.28 gpf	*51*
Low-Flow 1.6 gpf	*0*
Commercial Program Totals	**0**
HET 1.28 gpf	*0*
Low-Flow 1.6 gpf	*0*
Total Rebated Toilets	**981**
Total Estimated Daily Water Savings (gallons)	**17,232.83**
Single-Family Program [Roswell Program as of 7/1/15]	*4,510.49*
Single-Family Program [MNGWPD until 6/30/15]	*11256.14*
Multi-Family Program	*1,466.20*
Commercial Program	*0.00*

Funding History

Total Expenditures	**$88,550.00**
Single-Family Rebate Credits [Roswell Program as of 7/1/15]	*$26,000.00*
Single-Family Rebate Credits [MNGWPD Program until 6/30/15]	*$57,450.00*
Multi-Family Rebate Credits	*$5,100.00*
Commercial Rebate Credits	*$0.00*

D. Residential Water Audits

The Water Resource Division offers residential water audits to any Roswell Water Utility customer. Any customer who complains of a high water bill will be visited by staff and also offered a water audit. Household water audit forms are handed out at events, available for pickup at City Hall, and available on the City's website. The in-person residential water audits were suspended in 2020 due to COVID-19. The City provided residents with do-it-yourself audit flyers and dye tabs to check for toilet leaks.

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E. Commercial Water Audits

The 25 highest commercial water users are offered commercial water audits. In 2018, the City partnered with the Atlanta Regional Commission to conduct the Commercial Water Audits. The commercial entity simply completes a form available on the City's website requesting an audit. Upon receipt of the form, the City will schedule and conduct the audit. The ARC suspended the commercial water audit program in 2020 due to COVID-19 business impacts and public health considerations associated with in-person audits. It is uncertain when the commercial water audit program will resume.

F. Rain sensor shut-off switches on irrigation systems

All City Parks and Recreation irrigation systems have rain sensor shut-off mechanisms.

G. Installation of High Efficiency Toilets and High Efficiency Urinals in Government Buildings

Roswell City Hall was retrofitted with low-flow sink aerators and flush valve diaphragms as well as infrared sensor sinks in 2006. The remaining City facilities had toilets and fixtures upgraded in 2018. Toilets were retrofitted to High Efficiency Toilets (HETs) and High Efficiency Urinals (HEUs).

H. Require New Car Washes to Recycle Water

Section 24.5.23 - Commercial Car Wash.

(a) *General provisions.*

(1) *Purpose and intent.* The purpose of this section is to reduce water consumption from commercial car wash facilities by requiring all new conveyor car washes to install operational recycled water systems.

(2) *Applicability.*

a. This section applies to all new conveyor car washes permitted and constructed after January 1, 2011, regardless of the water source.

b. The provisions of this section do not apply to conveyor commercial car washes that were permitted or constructed before January 1, 2011.

c. The provisions of this section do not apply to self-service car washes or in-bay car washes.

(b) *Definitions.* The following words and phrases, whenever used in this section, have the meaning defined in this section:

In-bay automatic car wash means a commercial car wash where the driver pulls into the bay and parks the car. The vehicle remains stationary while a machine moves back and forth over the vehicle to clean it, instead of the vehicle moving through the tunnel.

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Conveyor car wash means a commercial car wash where the car moves on a conveyor belt during the wash. The driver of the vehicle can remain in the vehicle or wait outside of the vehicle.

Recycled water system means a water system that captures and reuses water previously used in wash or rinse cycles.

Self-service car wash means a commercial car wash where the customers wash their cars themselves with spray wands and brushes.

(c) *Commercial car wash water recycling requirement.* All new commercial conveyor car washes permitted and constructed after January 1, 2011 must install operational recycled water systems. A minimum of fifty (50) percent of water used will be recycled.

(Ord. No. 2017-07-08 , § 1, Amended 7/10/2017; 2011-01-01, § 2, Added, 01/18/2011)

XI. Drought Contingency Plan

A. Drought Condition Indicators

The City of Roswell has adopted the Georgia Department of Natural Resources Drought Management Plan (GA Drought Plan). The City shall implement the restrictions specified in the GA Drought Plan in response to the officially declared Drought Response Level. The City of Roswell is located in Georgia Climate Division (CD) 2. The drought indicators for CD 2 are Standardized Precipitation Index (SPI) 3, 6, and 12, reservoir levels of Lake Lanier and Lake Allatoona, and stream flows of the Etowah River at Canton and the Chestatee River near Dahlonega.

B. Potable Water Use Priorities Program

The City of Roswell's potable water use priorities are as follows:

1. Emergency facilities for essential life support measures
2. Domestic and personal uses, including drinking, cooking, washing, sanitary and health related
3. Farm uses
4. Industrial uses (including those industries on public water systems
5. Other uses such as lawn sprinkling, non-commercial car washing, and garden watering
6. Outdoor recreational water uses

The GA Drought Plan outlines the roles for emergency water supplies and highlights specific conservation program initiatives during drought situations. The plan includes progressively stringent steps, ranging from voluntary to mandatory restrictions, but, by law, cannot have more stringent requirements than the State Plan. The City of Roswell will continue to comply with state restrictions and declarations as well as promote year round conservations efforts.

These rules apply to any entity, and its customers, permitted by the Georgia Environmental Protection Division (EPD) for water withdrawal or for operation of a drinking water

system. The City of Roswell can request written approval from the Environmental Protection Division to enforce more stringent restrictions, depending on its water supply needs. The City of Roswell has adopted the following rules for its water system.

391-3-30-.03 Outdoor Water Use Schedule during Non-Drought Periods

(1) Outdoor water use other than exempted activities shall occur only as follows:

(a) Odd-numbered addresses: outdoor water use is allowed on Tuesdays, Thursdays and Sundays.

(b) Even-numbered addresses: outdoor water use is allowed on Mondays, Wednesdays and Saturdays.

391-3-30-.04 Outdoor Water Use Schedule during Declared Drought Response Levels

(1) The Director of the Environmental Protection Division is authorized to make drought declarations.

(2) During declared drought conditions, outdoor water use other than activities exempted in 391-3-30-.05, shall occur only during scheduled hours on the scheduled days.

(3) Declared Drought Response Level One – Outdoor water use may occur on scheduled days within the hours of 12:00 midnight to 10:00 a.m. and 4:00 p.m. to 12:00 midnight.

(a) Scheduled days for odd-numbered addresses are Tuesdays, Thursdays and Sundays.

(b) Scheduled days for even-numbered addresses are Mondays, Wednesdays and Saturdays.

(c) Use of hydrants for any purpose other than firefighting, public health, safety or flushing is prohibited.

(4) Declared Drought Response Level Two – Outdoor water use may occur on scheduled days within the hours of 12:00 midnight to 10:00 a.m.

(a) Scheduled days for odd-numbered addresses are Tuesdays, Thursdays and Sundays.

(b) Scheduled days for even-numbered addresses and golf course fairways are Mondays, Wednesdays and Saturdays.

(c) The following uses are prohibited:

1) Using hydrants for any purpose other than firefighting, public health, safety or flushing.

2) Washing hard surfaces, such as streets, gutters, sidewalks and driveways except when necessary for public health and safety.

(5) Declared Drought Response Level Three – Outdoor water use may occur on the scheduled day within the hours of 12:00 midnight to 10:00 a.m.

(a) The scheduled day for odd-numbered addresses is Sunday.

(b) The scheduled day for even-numbered addresses and golf course fairways is Saturday.

(c) The following uses are prohibited:

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1) Using hydrants for any purpose other than firefighting, public health, safety or flushing.

2) Washing hard surfaces, such as streets, gutters, sidewalks, driveways, except when necessary for public health and safety

3) Filling installed swimming pools except when necessary for health care or structural integrity.

4) Washing vehicles, such as cars, boats, trailers, motorbikes, airplanes, golf carts.

5) Washing buildings or structures except for immediate fire protection.

6) Non-commercial fund-raisers, such as car washes.

7) Using water for ornamental purposes, such as fountains, reflecting pools, and waterfalls except when necessary to support aquatic life.

(6) Declared Drought Response Level Four – No outdoor water use is allowed, other than for activities exempted in 391-3-30-.05, or as the EPD Director may order.

391-3-30-.05 Exemptions

(1) This rule shall not apply to the following outdoor water uses:

(a) Capture and re-use of cooling system condensate or storm water in compliance with applicable local ordinances

(b) Re-use of gray water in compliance with applicable local ordinances

(2) The following established landscape water uses are exempt from the outdoor water use schedules of this rule.

(a) Use of reclaimed wastewater by a designated user from a system permitted by EPD to provide reclaimed wastewater.

(b) Irrigation of personal food gardens.

(3) Newly (in place less than thirty days) installed landscapes are subject to the following:

(a) Irrigation of newly installed landscapes is allowed any day of the week, but only during allowed hours for the drought response level in effect, for a period of 30 days following installation. No watering is allowed during Drought Response Level Four.

(b) For new landscapes installed by certified or licensed professionals, commercial exemptions apply.

(4) The following golf course outdoor water uses are exempt from the outdoor water use schedules of this rule.

(a) Use of reclaimed wastewater by a designated user from a system permitted by EPD to provide reclaimed wastewater.

(b) Irrigation of fairways during times of non-drought and Declared Drought Response Level One.

(c) Irrigation of tees during times of non-drought and Declared Drought

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Response Levels One, Two and Three.

(d) Irrigation of greens.

(5) The following commercial outdoor water uses are exempt from the outdoor water use schedules of this rule.

(a) Professionally certified or licensed landscapers, golf course contractors, and sports turf landscapers: during installation and 30 days following installation only. Professional landscapers must be certified or licensed for commercial exemptions to apply.

(b) Irrigation contractors: during installation and as needed for proper maintenance and adjustments only.

(c) Sod producers.

(d) Ornamental growers.

(e) Fruit and vegetable growers.

(f) Retail garden centers.

(g) Hydro-seeding.

(h) Power-washing.

(i) Construction sites.

(j) Producers of food and fiber.

(k) Car washes.

(l) Other activities essential to daily business.

(m) Watering-in of pesticides and herbicides on turf.

391-3-30-.06 Local and Regional Options

(1) Local and regional water providers are authorized to implement additional outdoor water use restrictions within their jurisdictions. Action items to consider at the local/regional level include, but are not limited to, the following: developing system integration and interconnection to reduce drought vulnerability, placing additional water use restrictions on specific commercial uses, putting water conservation based rates in place (increasing block/summer surcharge) and placing additional restrictions on outdoor water use.

(2) Local and regional water providers may request approval of alternative days for outdoor water use for purposes of enforcement, peak water usage, timing of recovery days, and other valid reasons. Approval shall be contingent upon:

(a) Written notification to, and approval by, EPD of the alternate watering schedule; and

(b) Enactment of a local ordinance allowing no more than 3 days a week outdoor watering during time(s) of day consistent with the level of drought as set forth in sections 391-3-30-.03 and -.04 of this rule.

(c) Regional consistency.

C. Low Flow Protection

As part of the City of Roswell's water withdrawal permit, the flow in Big Creek as monitored by USGS 02335757 stream gage is not reduced below the 7Q10 (8.4 cfs/5.4

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MGD). The flow rate at the USGS gage is accessed via the internet and is used to determine when adjustments to the operation of the Roswell WTP are needed. The City will continue to comply with this requirement. When the Big Creek streamflow drops below the 7Q10, the City allows all upstream flow in Big Creek to pass its intake. The City maintains water system connections with the Fulton County Water System in order to purchase additional water during times of restricted withdrawal from Big Creek.

D. Available Water Storage

The Roswell Water System has three elevated finished water storage tanks:

1. Community Circle -75,000 gallons
2. Woodstock -500,000 gallons
3. Hightower -500,000 gallons

The locations of these tanks are shown in Figure 1. The City of Roswell also maintains interconnections with the Fulton County Water System which maintains multiple finished water storage tanks.

E. Big Creek Safe Yield Analysis

In 2007, Integrated Science & Engineering, Inc. (ISE) performed a safe yield analysis of Big Creek and ISE concluded that during a 20-year simulation period, raw water withdrawal of 3 MGD would be available 94.4 percent of the time assuming a low flow protection criteria of 30% Mean Annual Flow, 90.7 percent of the time when the Monthly 7Q10 flow is assumed, and 97.3 percent of the time using the current 7Q10 flow of 8.4 cfs. The simulation above did not include a storage reservoir for raw water.

An updated analysis was conducted by Gresham Smith and Partners (GSP) in 2012 in response to Georgia EPD's modification to the monthly minimum streamflow requirements within Big Creek. As a result, GSP concluded that during a 21.5-year simulation period, raw water withdrawal of 2.8 MGD would be available 86.7% when the Monthly 7Q10 flow is assumed.

The safe yield analysis was updated again in 2020 to utilize the USGS streamflow gage located approximately 500 feet downstream of the WTP instead of the previously used USGS stream flow gage located approximately 7.5 miles upstream of the WTP. As of 2020, the streamflow gage located adjacent to the WTP had 16 years of data and the Georgia EPD spreadsheet utilized to calculate the monthly minimum streamflows requires at least 11 years of data.

Based on the 20-year simulated flow for the intake location, it was concluded that there could be times in which raw water could not be withdrawn during severe droughts due to in-stream flow protection requirements. The City's interconnection with Fulton County Water System is able to supply additional water to the City of Roswell during these times

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of severe drought. Additionally, the City explored alternative sources of water such as the construction of an off-line raw water storage and groundwater wells near the Chattahoochee River. A groundwater study conducted by Emery and Garrett Groundwater, Inc. in 2010 explored nine (9) potential locations for groundwater wells near the Chattahoochee River; however, due to their potential hydraulic connection with a surface waterbody (Chattahoochee River or Big Creek) and the need for additional permitting, the groundwater wells were not explored further. Additionally, they would be drawing from the same source as the Roswell WTP.

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APPENDIX G ROSWELL WATER RATES AND FEES

ROSWELL WATER UTILITY RATES

Monthly Base Rates	
Meter Size	**Monthly Rate as of July 1, 2021**
5/8" – 3/4"	$5.72
1"	$10.80
1.5"	$17.79
2"	$29.86
3"	$43.20
4"	$64.56
6"	$132.42
8"	$205.62

Residential Water Rates		
Meter Size	**Gallons**	**Monthly Rate as of July 1, 2021**
5/8" – 1"	0 – 5,000	$4.70
5/8" – 1"	5,001 – 10,000	$9.40
5/8" – 1"	> 10,000	$14.10

Small Commercial Water Rates		
Meter Size	**Gallons**	**Monthly Rate as of July 1, 2021**
5/8" – 3"	0 – 50,000	$4.70
5/8" – 3"	50,001 – 75,000	$9.40
5/8" – 3"	> 75,000	$14.10

Large Commercial Water Rates		
Meter Size	**Gallons**	**Monthly Rate as of July 1, 2021**
2" – 8"	0 – 122,500	$4.70
2" – 8"	122,501 – 300,000	$9.40
2" –8"	> 300,000	$14.10

Fire Lines Water Rates		
Meter Size	**Gallons**	**Monthly Rate as of July 1, 2020**
5/8" – 8"	Per 1,000	$14.10

Irrigation Water Rates		
Meter Size	**Gallons**	**Monthly Rate as of July 1, 2020**
5/8" – 4"	Per 1,000	$14.10

APPENDIX H RESOLUTION NUMBER 2016-06-40

Resolution No. 2016-06-40

STATE OF GEORGIA
COUNTY OF FULTON

June 29, 2016

RESOLUTION ESTABLISHING WATER RATES FOR CAPACITY RATES

WHEREAS, the City of Roswell provides water services for owners of certain properties with the City; and

WHEREAS, the Code of Ordinances of the City of Roswell § 24.4.4 provides that a schedule of rates, service charges, consumption levels and deposits for water shall be subject to adjustments from time to time by Resolution of the Mayor and Council; and

WHEREAS, the Mayor and Council have determined that it is in the public interest to create such capacity rates for water services:

NOW, THEREFORE, BE IT RESOLVED by the Mayor and Council of the City of Roswell, that Capacity Rates shall be established for the Roswell Water Service Area. Such rates imposed hereby shall become effective as of October 1, 2016 and collected with meter fees:

IT IS FURTHER RESOLVED by the Mayor and Council of the City of Roswell, Georgia, and it is hereby resolved by authority of same, that capacity rates for water service are set in accordance with the fee schedule in Attachment A and shall become effective October 1, 2016.

Jere Wood, Mayor

Attest:

Marlee Press, City Clerk
(Seal)

Councilmember Jerry Orlans

Councilmember Nancy Diamond

Councilmember Donald J. Horton

Councilmember Michael Palermo

Councilmember Kent Igleheart

Councilmember Marcelo Zapata

ATTACHMENT A
Capacity Rates

Meter size	ERU Equivalent	Rate
5/8 & 3/4-inch	1.00	$ 1,500
1-inch	1.78	$ 2,700
1.5-inch	7.50	$ 11,200
2-inch	10.66	$ 16,000
3-inch	11.52	$ 17,300
4-inch	39.81	$ 59,700
6-inch	46.00	$ 69,000
8-inch	51.47	$ 77,200

An ERU equals one Equivalent Residential Unit.

Each unit in a Multi-family development is one (1) ERU, and the Capacity Rate is the number of units times $1,500.

APPENDIX I DETAILED CAPITAL IMPROVEMENT PLAN

Capital Projects

		FY 2022	FY 2023	FY 2024	FY 2025	FY 2026	FY 2027	FY 2028	FY 2029
Water Line Replacement		$ 400,000	$ 300,000	$ 300,000	$ 300,000	$ 300,000	$ 200,000	$ 225,000	$ 225,000
Trailer Replacement		$ -	$ -	$ 10,000	$ -	$ -	$ -	$ -	$ -
Replace Chemcial Metering Pumps for Surface Water System		$ -	$	$ -	$ -	$ 30,000	$ -	$ -	$ -
Replace Chemical Metering Pumps for Groundwater System		$ -	$ 12,000	$ -	$ -	$ -	$ -	$ -	$ -
Replace Filter Media in Groundwater Filters System		$ -	$ 15,000	$ -	$ -	$ -	$ 40,000	$ -	$ -
Flocculators		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 80,000
Transfer Pumps		$ -	$ 15,000	$ -	$ -	$ -	$ -	$ 80,000	$ -
Backwash EQ Pumps		$ -	$ -	$ -	$ 30,000	$ -	$ -	$ -	$ -
Backwash Pump Replacement		$ -	$ -	$ -	$ -	$ -	$ 70,000	$ -	$ -
Raw Water Pumps		$ -	$ -	$ -	$ -	$ 154,637	$ -	$ -	$ -
Online TOC Analyzer		$ -	$ -	$ -	$ -	$ 35,000	$ -	$ -	$ -
Blower Replacement		$ -	$ -	$ -	$ -	$ -	$ 50,000	$ -	$ -
Plant Cameras		$ 22,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Plant Duress System		$ 21,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Automatic Actuator on Fulton County Interconnects		$ -	$ 25,000	$ 25,000	$ -	$ -	$ -	$ -	$ -
Replacement Water Tank - 500k gal		$ -	$ -	$ -	$ -	$ -	$ 250,000	$ 250,000	$ 1,500,000
Replace SCADA Communication System for sites		$ 15,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Card Readers on Plant Doors		$ -	$ 15,000	$ -	$ -	$ -	$ -	$ -	$ -
Relocate AMI Antennae on Hightower Tank		$ 20,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Procure Emergency Generator		$ -	$ -	$ -	$ 1,000,000	$ -	$ -	$ -	$ -
Cover Flocculation/Sedimentation Basins		$ -	$ -	$ 100,000	$ -	$ -	$ -	$ -	$ -
Install Event Detection Systems		$ -	$ -	$ -	$ -	$ -	$ 50,000	$ -	$ -
Add Off-Site Security Monitoring		$ -	$ -	$ 40,000	$ -	$ -	$ -	$ -	$ -
Implement and Maintain i-Hydrant		$ -	$ 100,000	$ 100,000	$ 100,000	$ 100,000	$ -	$ -	$ -
Procure Kobus Pipe Puller		$ -	$ 80,000	$ -	$ -	$ -	$ -	$ -	$ -
Optimize Raw Water Pumps Capacity		$ -	$ 200,000	$ 200,000	$ 200,000	$ -	$ -	$ -	$ -
Additional Backwash and Wash-Down Storage		$ -	$ -	$ -	$ -	$ -	$ 500,000	$ -	$ -
Demolition of old WTP		$ -	$ -	$ -	$ 500,000	$ -	$ -	$ -	$ -
Total Capital		**$ 478,000**	**$ 762,000**	**$ 775,000**	**$ 2,130,000**	**$ 619,637**	**$ 1,160,000**	**$ 555,000**	**$ 1,805,000**