City of Saskatoon
Saskatoon Water

WATER AND WASTEWATER UTILITIES

2023 Annual Report

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MESSAGE FROM THE DIRECTORS

The Water and Wastewater Utilities fund a complex urban water ecosystem that starts at the Water Treatment Plant Raw Water Intake on the South Saskatchewan River and ends at the Wastewater Treatment Plant outfall, where treated effluent is discharged into the river. Responsibility for the planning and design, treatment, operations, maintenance, certified laboratory services, quality assurance, asset preservation, programming, and construction engineering falls within the following three departments:

- Saskatoon Water
- Water and Waste Operations – Water and Sewer Section
- Technical Services – Asset Preservation Section

Management and staff from these departments are committed to providing exceptional quality water and wastewater services in the most reliable and cost-efficient way for utility customers and citizens of Saskatoon. We are pleased to present our results in the Water and Wastewater Utilities 2023 Annual Report on behalf of our departments.

We take great pride in receiving one of the highest citizen satisfaction ratings of City of Saskatoon (City) service for the quality of our water. Several initiatives have been completed and more are underway to further enhance service to customers, increase efficiencies, reduce costs, and strengthen our environmental leadership. The departments have been focused on addressing growing demands, regulatory improvements, and aging infrastructure for water-related services.

Our financial statements show responsible stewardship of the resources that Saskatoon citizens and regional partners have entrusted to us. We continue to provide excellent value to our customers as we undertake capital and Continuous Improvement projects that ensure asset and financial sustainability. Our utility rates are designed to fund the needed capital and operating costs for current and future water and wastewater services.

We are proud to work with a dedicated group of professionals who demonstrate an ongoing commitment to not only making quality of life great in Saskatoon, but to continue to ensure the water and wastewater infrastructure is sustainable. Their work is greatly appreciated.

Russ Munro – Director of Saskatoon Water
Brendan Lemke – Director of Water and Waste Operations
Dan Willems – Director of Technical Services

EXECUTIVE SUMMARY

The Water and Wastewater Utilities (Utilities) fund essential services that contribute to our customers' quality of life by providing safe, reliable, high-quality drinking water, and wastewater collection and treatment that meet health and environmental regulatory standards. The Utilities provide water services to approximately 78,251 residential and commercial water meters (in-service meters). The Water Treatment Plant (WTP) supplies water to approximately 328,800 Saskatchewan residents, including about 290,800 in Saskatoon and approximately 38,000 customers outside of Saskatoon through SaskWater. Wastewater is collected and treated for customers within the city. The approximately 4,500 commercial customers account for 51% of the Utilities' revenues.

Water services are performed by the Saskatoon Water Department, the Water and Sewer Section of the Water and Waste Operations Department, and some staff in the Technical Services Department. Between 351 and 371 staff, depending on the season, were employed through these three departments to:

- Operate and maintain the WTP, three reservoirs and pump stations, the Wastewater Treatment Plant, 29 lift stations, the Meter Shop, and underground water and wastewater infrastructure.
- Provide professional water and environmental laboratory services.
- Provide engineering, planning, and project management services.
- Provide asset management and preservation services for the Utilities.

In 2023, treated water volumes were higher than 2021 and 2022, and approximately 2% more than the previous ten-year annual average. During 2023, there was higher than average temperatures and lower than average rainfall. Customers are increasingly switching to low-flow appliances and reducing irrigation due to the water block pricing structure and conservation awareness. Some of these factors also influence the fact that wastewater treatment volumes are at much lower levels in the past five years compared to the years before 2017. Wastewater volumes in 2023 were approximately the same as volumes in 2022.

Average monthly residential water-related utility bills of $153.59 in 2023 remain below average when compared to other major prairie cities. In 2023, the Water and Wastewater Utilities collected $192.46 million in revenues and incurred $184.25 million in expenses, resulting in a $8.21 million surplus. Compared to 2022, total revenues in 2023 increased by 6.3% due to higher than forecast metered revenues. Expenses increased by 1.5% due to increased contributions to Grants-in-Lieu of Taxes and Return on Investment, as well as capital investment; materials and supplies; security costs, which were partially offset by decreased maintenance work; and savings in salaries, training, utilities, and special services expenses. The Utilities contributed $25.1 million to the City for Return on Investment and Grants-in-Lieu of Taxes.

In 2023, 47.4% of total revenues, or $91.3 million, was allocated to capital to fund longer-term, water-related infrastructure projects. In 2023, the Utilities funded 77 active capital

projects valued at $652.6 million. Significant 2023 capital project highlights include the following:

- McOrmond Drive Reservoir and Pump Station: Construction continued with final completion in 2024.
- Water Treatment Plant Transfer Pumping and Electrical Upgrades: The project reached substantial completion (i.e., in-service) in December 2023. Completion is expected in 2024.
- New Spadina Wastewater Lift Station and Force Main: Construction continued with completion in 2024.
- Hampton Village Business Park Lift Station and Force Main: Detailed design was completed and construction was initiated.
- 7.7 km of sanitary sewer main lined.
- 11.7 km of water main replacement.

In 2023, over 5,700 Advanced Metering Infrastructure (AMI) communication modules were installed to offer real-time, water-usage readings for customers, bringing the total to approximately 98% of all water meters updated since the program started in 2016. AMI module installations will continue in 2024.

The Utilities continue to leverage the SAP system launched in 2021. 2023 areas of improvement included improved inventory and warehouse functions, increased planning and reliability engineering work, and financial optimization to meet budget directives.

The Long-term Capital Development Strategy for the WTP was completed in 2022, outlining a thirty-year capital expenditure schedule, aligning with expected capacity, redundancy, and regulatory treatment objectives. This plan will help ensure that the long-term planning for the Water Utility is well positioned to provide high-quality, reliable, and cost-effective water services in the future. Due to the magnitude, level of complexity, and strategic decisions evaluated in this iteration, a Decision Quality Review of the long-term strategy was undertaken, utilizing internal resources to determine the best approach to increase the City's water treatment capacity. A summary of the strategy and Decision Quality Review was brought forward to City Council outlining the findings and next steps for execution. This has now evolved into the creation of the WTP Capital Program, which will focus on regulatory and reliability upgrades at the existing WTP and will result in the construction of a second WTP near the existing Raw Water Intake. The WTP Capital Program is nearing completion of the planning stage and will move into design in 2025 and project delivery in 2026 and beyond.

1.0 OVERVIEW

1.1 Introduction

The Water and Wastewater Utilities (Utilities) fund the Saskatoon Water Department, Water and Sewer section of the Water and Waste Operations (WWO) Department, and portions of the Technical Services Department, which are collectively responsible for the planning, design, operation, maintenance, and capital project delivery for all water and wastewater services for existing and future customers. The Utilities also fund a portion of Corporate Revenue for customer billing, meter reading, and collection services.

Abbreviations are listed in Appendix One and a Glossary of key definitions for the report can be found in Appendix Two.

1.1.1 Saskatoon Water Department

Saskatoon Water consists of the following seven sub-departments or sections.

The Water Treatment Plant (WTP) supplies all consumers with safe and reliable, high-quality drinking water that meet provincial and federal regulatory standards. Core functions include operating, maintaining, and monitoring the South Saskatchewan River Raw Water Intake, the WTP, and three potable water storage reservoirs with a capacity of 114 million litres.

Figure 1: Aerial Photograph of the WTP

The Wastewater Treatment Plant (WWTP) ensures that wastewater is treated to meet provincial and federal regulatory standards before being returned to the South Saskatchewan River. Core functions include operating, maintaining, and monitoring the WWTP, 29 lift stations, Marquis Liquid Waste Hauler Facility, Heavy Grit Facility, and Biosolids Facility where solids from the treatment process are handled and applied to agricultural land. Sales of the plant's slow-release fertilizer from its nutrient recovery system create additional revenues.

Figure 2: Aerial Photograph of the WWTP

The Meter Shop is responsible for the purchase, installation, testing, repair, and replacement of water meters; the activation and termination of water services; as well as the installation and commissioning of Advanced Metering Infrastructure (AMI). The Meter Shop also operates the Cross-Connection Control Program to ensure that proper backflow prevention devices on multi-unit residential, commercial, industrial, and institutional service connections protect the city's potable water.

Figure 3: Photograph of the Meter Shop

Figure 4: Aerial Photograph of New Land Development

Engineering and Planning is responsible for the planning and design of water and sewer servicing for new land development, as well as capacity analysis and improvement within existing neighbourhoods. A city-wide network of water, sewer, and rain gauge monitors are operated and maintained by the system modeling group to assist with water-related planning and design activities. Engineering and Planning also manages the Storm Water Utility and provides storm water engineering expertise. The Section monitors and mitigates damage to public property from riverbank settlement and instability due to high ground-water levels. The Storm Water Utility Annual Report provides more information on storm water operations.

Engineering Services is a professional and diverse section that provides project management and technical advisory services to support Saskatoon Water and stakeholder departments for the development of capital programs and delivery of capital projects to maintain infrastructure life and capacity required to meet the demands of a growing city and region.

Figure 5: Photograph of Lift Station Infrastructure Construction

Quality Assurance and Training was formed in 2021 from existing City staff. This small team of employees exists to support the achievement of the department's vision. They do so by bridging organizational boundaries, administering training, providing support for work planning and project execution, and delivering a growing portfolio in quality assurance.

Regional Services was also formed in 2021 as part of a re-organization through an employee transfer from the Technical Services Department. This section exists to support the supply of potable water and removal of wastewater from Saskatoon's regional partners in an efficient, fair, and sustainable way.

1.1.2 Water and Waste Operations Department

Although WWO is composed of three distinct sections, only the Water and Sewer section provides water and wastewater utility services.

Water and Sewer is responsible for the operation, maintenance, and inspection of the water distribution, sanitary sewer collection, and storm water collection systems. The water distribution and sanitary sewer collection system has a replacement value in excess of $8.2 billion. Lined up end-to-end, the underground pipes (not including service connections) that make up Saskatoon's water distribution and sanitary sewer collection systems total over 2,280 km.

Figure 6: Photograph of Sewer Inspection Activities

Water and Sewer material handling sites are separated into three locations: The Nicholson Yards, West Saskatoon Yards, and Downtown Yards. Each location houses resources for the Water and Sewer crews to maintain and repair the City infrastructure. The Nicholson Yards and West Saskatoon Yards both store backfill material, as well as incoming wet fill, which is processed so it can be repurposed and utilized. Having these two remote locations enables crews to provide faster service by accessing the nearest site to the work zone. The Downtown Yards is the reporting grounds for all employees to receive their daily assignments and tasks, as well as storing material, equipment, and parts.

The Clearance and Records workgroup provides communication to the public through the delivery of maintenance notices. The group sees that all records and data for work done to the underground infrastructure are managed and maintained, as well as providing infrastructure locates for internal and external contractors. Providing location to a work group enables crews to work safely and effectively, with the reassurance that when digging, there will be no obstructions or concerns for their safety or safety of those around.

1.1.3 Technical Services Department

Technical Services consist of three sections, with **Asset Preservation** responsible for managing asset preservation for underground water distribution and sewer collection systems. The condition of the distribution and collection assets is continually evaluated, and a long-term asset management plan is in place outlining levels of service and funding for annual maintenance and rehabilitation programs. The Construction and Design Department provides construction engineering services to deliver the required capital projects to upgrade the water and sewer assets.

Figure 7: Photograph of Work in an Excavated Trench

Municipal Engineering Services supports Water and Sewer through program design, contract management, and Continuous Improvement initiatives.

1.2 Strategic Linkages

The City's 2018-2021 Strategic Plan provided direction that guided the activities of the Utilities. On January 31, 2022, the 2022-2025 Strategic Plan was approved by City Council. The following section outlines our Saskatoon Water Vision and Mission, the Corporate Purpose and Values, and our linkages to the Corporate Strategic Goals.

1.2.1 Our Vision

Saskatoon citizens have exceptionally high-quality water and dependable wastewater handling services that sustain people, property, and the environment.

1.2.2 Our Mission

The Utilities deliver safe, reliable, and cost-effective water and wastewater services that meet and exceed health and environmental regulatory standards.

1.2.3 Our Corporate Purpose

The Utilities are aligned with the City's Corporate Purpose statement, which describes the reasons we come to work every day.

Our Purpose

Our Purpose describes the reasons we come to work every day.

- **We are making** Saskatoon a great place to live, work, learn and play every day.
- **We are creating** a welcoming workplace where each of us are encouraged to realize our full potential.
- **We are building** a sustainable future upon our predecessors' legacy and history of success.
- **We are exceptional** in delivering public services.
- **We are innovative** and unleash creative solutions and investments that contribute to a great city.
- **We adopt and support** behaviours that reduce the environmental footprint of the city.

City of Saskatoon

1.2.4 Our Corporate Values

The Utilities adhere to the City's Corporate Values. They are part of who we are, what we stand for, and how we behave towards each other.

1.2.5 Our Strategic Goals

Quality of Life: Provide citizens with affordable, reliable, and high-quality water and wastewater treatment services.

Culture of Continuous Improvement: Increase workplace efficiencies and improve services through implementing innovative approaches that maximize value.

Asset and Financial Sustainability: Adopt and maintain Asset Management Plans which optimize the value of the services which the Utilities provide.

Environmental Leadership: Implement leading-edge innovations for environmentally responsible water-related infrastructure and services, and take action to mitigate the impacts of climate change on this infrastructure and these services.

Sustainable Growth: Work closely with other departments to provide efficient and resilient designs for water and wastewater infrastructure for new developments. Explore collaborative servicing strategies with regional partners, driven by business case development.

Moving Around: Collaborate with all stakeholders to minimize water-related transportation disruptions.

Economic Diversity and Prosperity: Provide competitively priced and reliable water-related services, and cost-effective water and sewer designs for new developments.

2.0 OUR PEOPLE

2.1 Organizational Charts

The following organizational charts provide an overview of how the management teams are structured within Saskatoon Water, WWO, and Technical Services.

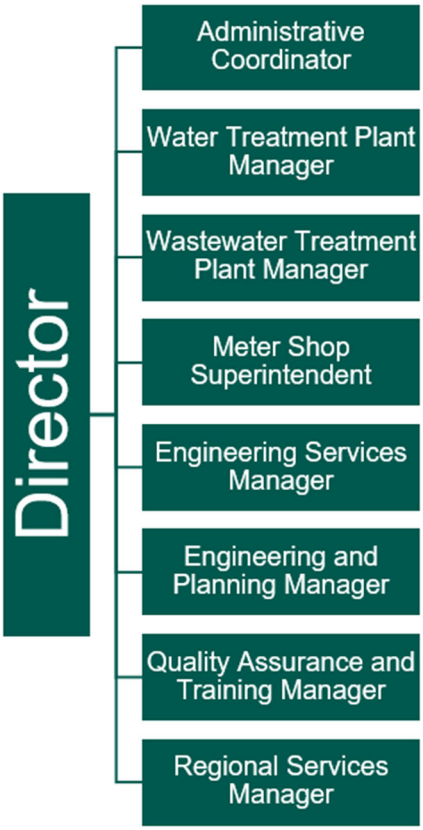

Figure 9: Saskatoon Water Management

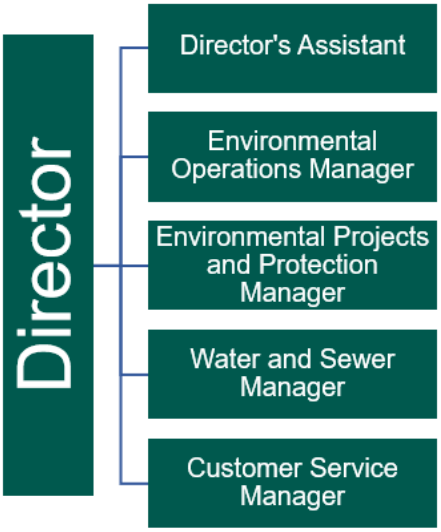

Figure 8: Water and Waste Operations Management

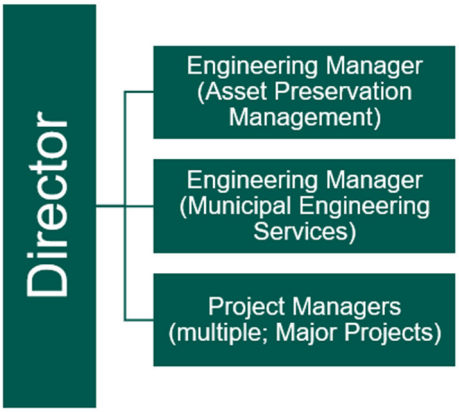

Figure 10: Technical Services Management

2.2 Number of Employees

Saskatoon Water had 176 employees as of December 2023. The graph below shows the distribution within each section. Director and support staff are included in Water Treatment.

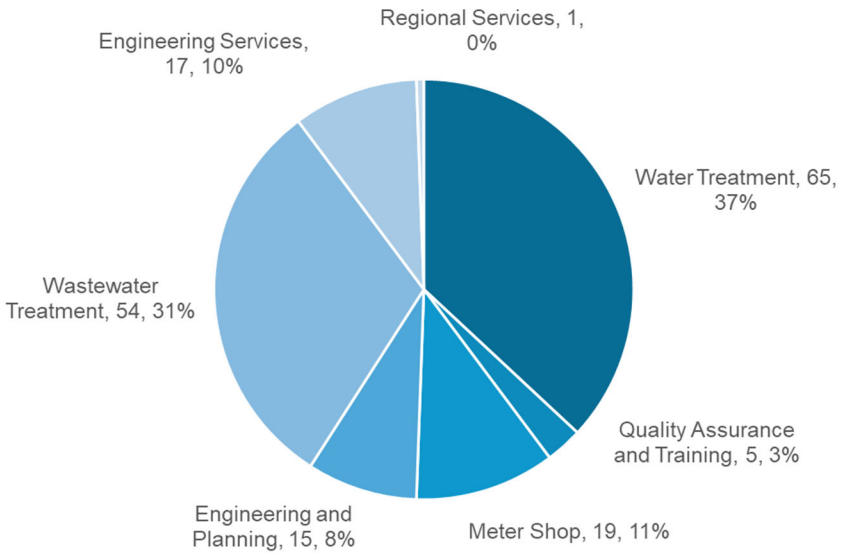

Figure 11: Employee Distribution within Saskatoon Water

At its peak in the fall, Water and Sewer had 170 employees, and as of December 31, 2023, had 150. Technical Services had 44 employees throughout the Department, with approximately 25 performing some utility-related activities.

2.3 Representative Workforce

The Utilities continue to participate in diversity, equity, and inclusion programs with Human Resources and other City departments to increase awareness among under-represented groups of career opportunities within the department.

Relative to 2024 recommended employment equity targets from the Saskatchewan Human Rights Commission (SHRC)[1], Saskatoon Water had a lower proportion of self-declared visible minority employees and lower proportions of employees who self-declared as Indigenous, female, or with a disability. WWO had a higher proportion of employees self-declared as Indigenous and lower proportions of employees who self-declared as female, a visible minority, or with a disability.

Figure 12: Photograph of Employees Showing Support for International Women's Day

Table 1: Percent Employees Self-Declared an Equity Group Member

Equity Group	Saskatoon Water (2023)	Water and Waste Operations (2023)	SHRC Target (2024)
Self-Declared as Indigenous Ancestry	5.6%	19.8%	15.2
Self-Declared as Visible Minority	15.6%	8.2%	16.8%
Self-Declared as Person with Disability	2.2%	3.1%	27.7%
Self-Declared as Female	17.3%	12.5%	47.5%

2.4 Employee Safety

Safety is a core value at the City and is integrated into the work performed by Utility staff through a Health and Safety Management System (HSMS). The eight elements that make up the HSMS are:

- Leadership
- Hazard identification, assessment, and control
- Incident investigation
- Inspection program
- Education and communication
- Emergency response

[1] Employment Equity Targets, Saskatchewan Human Rights Commission, June 2024, https://saskatchewanhumanrights.ca/employment-equity-targets/

- Health and wellness
- Program administration

Management and staff place a strong emphasis on safety in the workplace and strive to meet goals for leading and lagging indicators. The HSMS is continuously improved through the establishment and completion of annual projects and initiatives.

Within Saskatoon Water, several safety audits and inspections were conducted highlighting areas of improvement regarding the safety equipment, training, and revisions to safety documentation. This resulted in the commencement of:

- Fall Protection Program project.
- Detailed in-house training specific to our processes and needs.
- Adjustments and maintenance to our safety equipment, use/operations, and locations.
- Update/review of Critical Task Inventories.
- Updated safety signage (i.e. chemical signage, decibel readings, first aid/eyewash locations).

In 2023, Saskatoon Water experienced zero lost-time incidents, which is less than the one reported in 2022. The number of lost-time hours in 2023, due to injury, was approximately zero, down from 29 in 2022. In both 2023 and 2022, Water and Sewer experienced seven lost-time incidents. The number of lost-time hours was 894 in 2023, down from 1,062 in 2022. Technical Services had zero lost-time incidents in 2023.

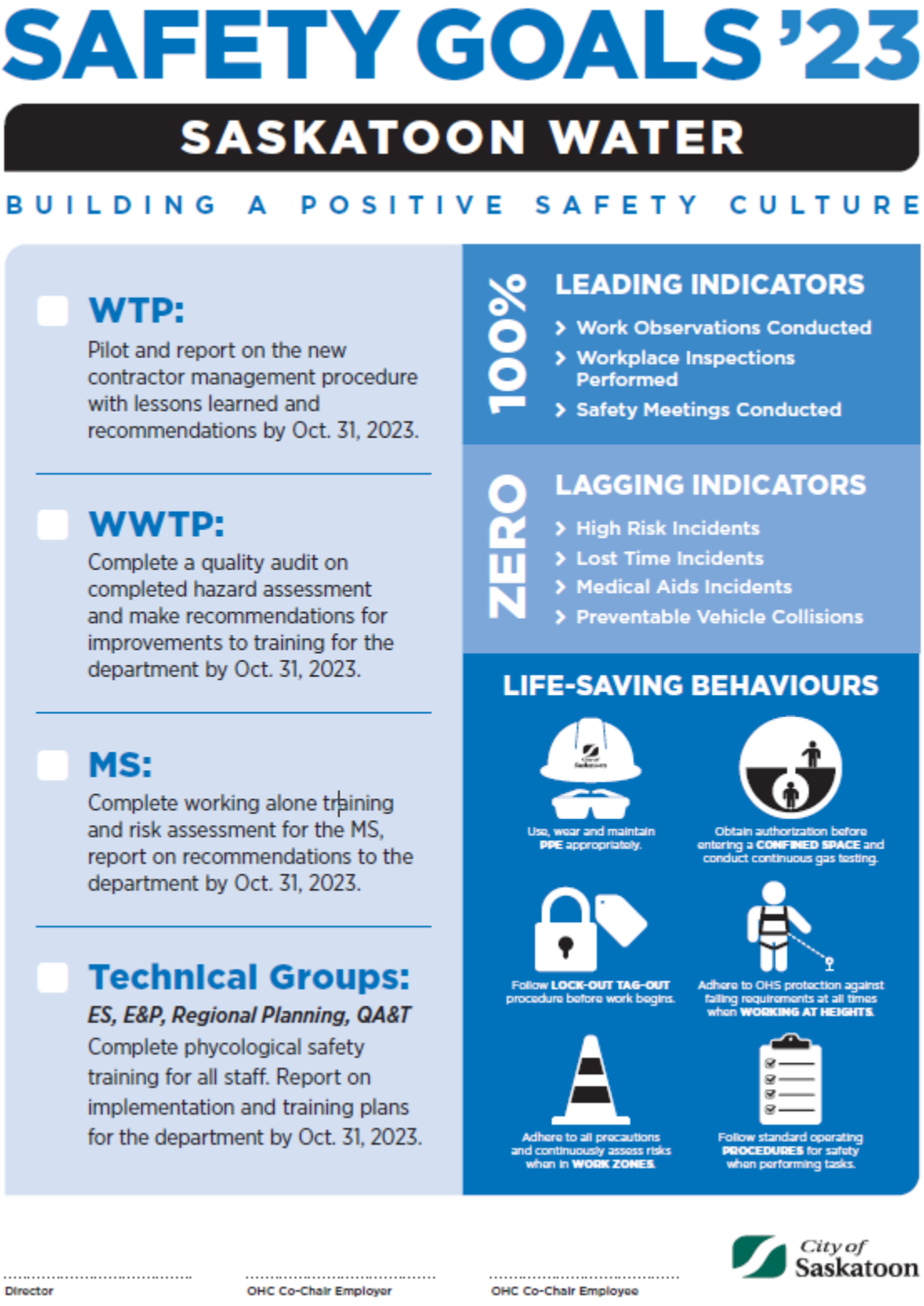

Figure 13: Saskatoon Water's 2023 Safety Goal Poster

3.0 OUR CUSTOMERS

3.1 Number of Customers

In 2023, water treatment and distribution, and wastewater collection and treatment services were provided to approximately 290,800 Saskatoon residents. There are approximately 78,251 in-service water meters, and of those, 4,563 are industrial, commercial, and institutional (based on water meters) customers in Saskatoon. Some water meters, such as many of those servicing multi-residential apartments and condos, may provide water services for more than one household or business. Some businesses may have more than one water meter.

The Water Utility also sells treated water to SaskWater, which receives this water at eight supply points around the city's perimeter and redistributes it to approximately 38,000 customers outside of Saskatoon.

3.2 Water Treatment Plant Volumes

Based on customer meter readings, 35.6 million cubic meters of water was sold in 2023. Although the population has grown by approximately 15% since 2013, demand has not increased in a similar manner over this time. This is influenced by a generally declining trend in consumption per capita due to more low-flow faucets, toilets, and washing machines; along with the water rate (pricing) structure and an increased water conservation awareness.

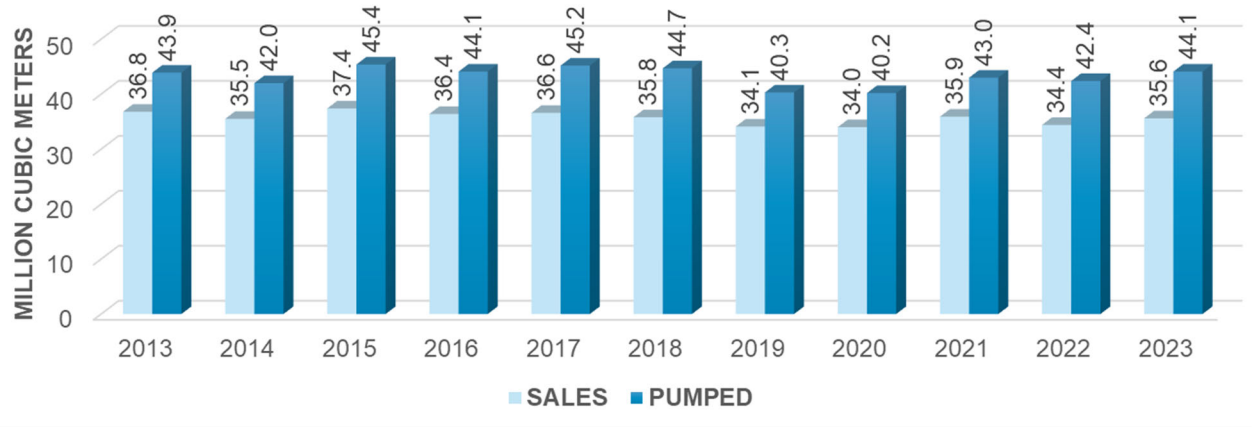

Figure 14: WTP Water Pumped and Sales Volume (million cubic meters)

The previous figure compares the annual volume of treated water pumped from the WTP into the distribution system and the volume of water sold (pumpage was estimated in 2013). In 2023, unmetered water was 19.3% of total water pumpage (44.1 million cubic meters), which was slightly higher than 2022. The difference between the volume of treated water pumped and sold was due to the following:

- Water loss through leaks
- Water main breaks
- Unauthorized water use
- Authorized but unmetered consumption (e.g., flushing water mains and fire flow)
- Estimated consumption and year-end, unbilled volumes
- Water meter accuracy

Summer rainfall and temperatures can help explain some variation in annual water demand. In particular, weather has a significant impact on the water demand for irrigation. In 2023, Saskatoon recorded 213 mm of rainfall, which is lower than the last ten-year average of 245 mm, and approximately 5% higher than the 203 mm of rainfall received in 2022. This was the thirty-third lowest seasonal rainfall total since 1900.

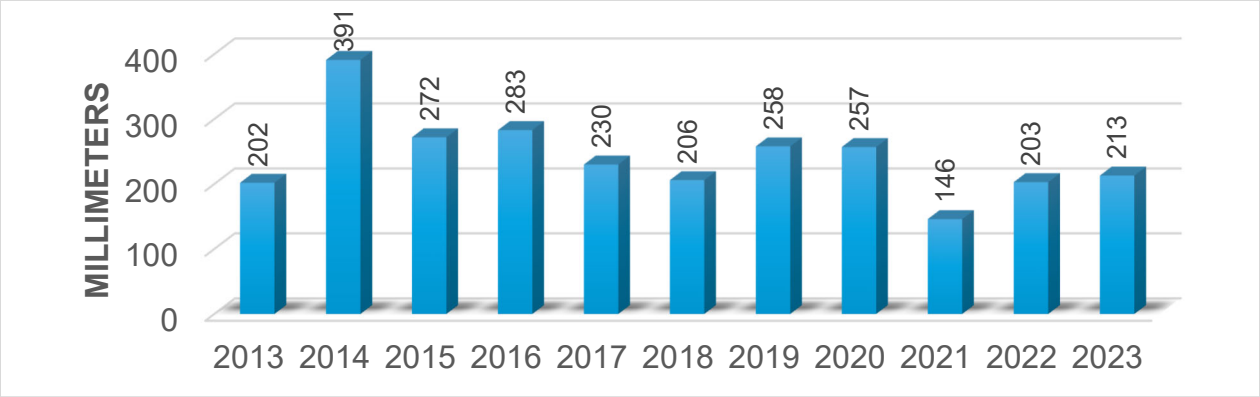

Figure 15: Saskatoon Annual Rainfall, millimeters (April to September)
Source: City of Saskatoon 2023 Annual Rainfall Report

Summer (May to August) temperatures in 2023 averaged 17.6˚C, which was higher than the last ten-year average of approximately 16.1˚C and higher than the average summer temperature of 16.4˚C in 2022. Temperature and rainfall are driving factors for consumption and water usage.

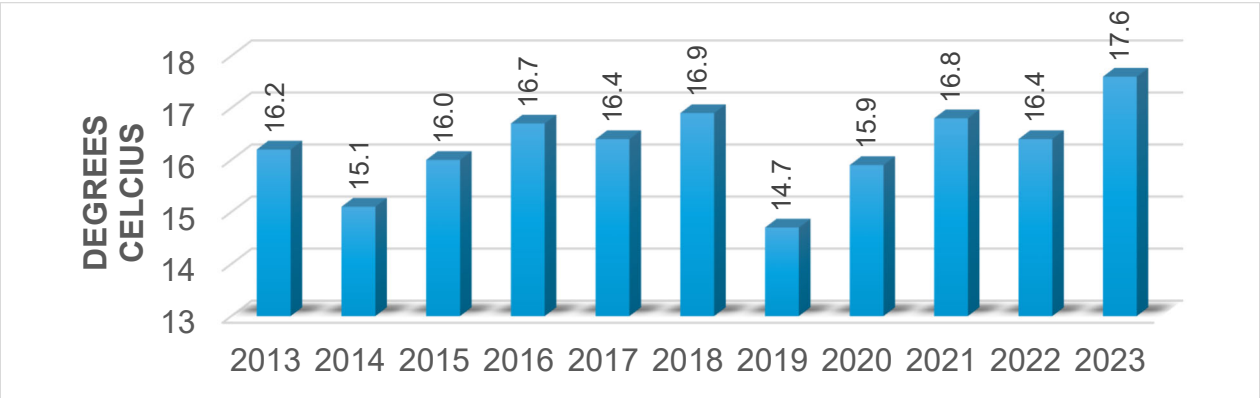

Figure 16: Saskatoon Seasonal Mean Temperature, Deg. Celsius (May to August)
Source: Environment Canada

The current level of service is for the WTP's capacity to meet or exceed the maximum daily water demand, which is the average of four consecutive days of highest demand each year. Large volatility in the maximum daily demand is mostly due to weather conditions. The following figure reflects the extra capacity required for the maximum daily volume of water consumption at the height of summer irrigation relative to average daily water consumption throughout the entire year. In 2023, the maximum day pumpage to average day pumpage ratio of 1.78 was lower than the ten-year average of 1.83.and slightly higher than 2022. The maximum day pumpage ratio is used for long-term demand forecasting; however, due to its volatility, it is difficult to provide accurate forecasts. As demand approaches Plant capacity, the level of service to always meet maximum daily demand will be evaluated along with conservation strategies and capital expansion plans.

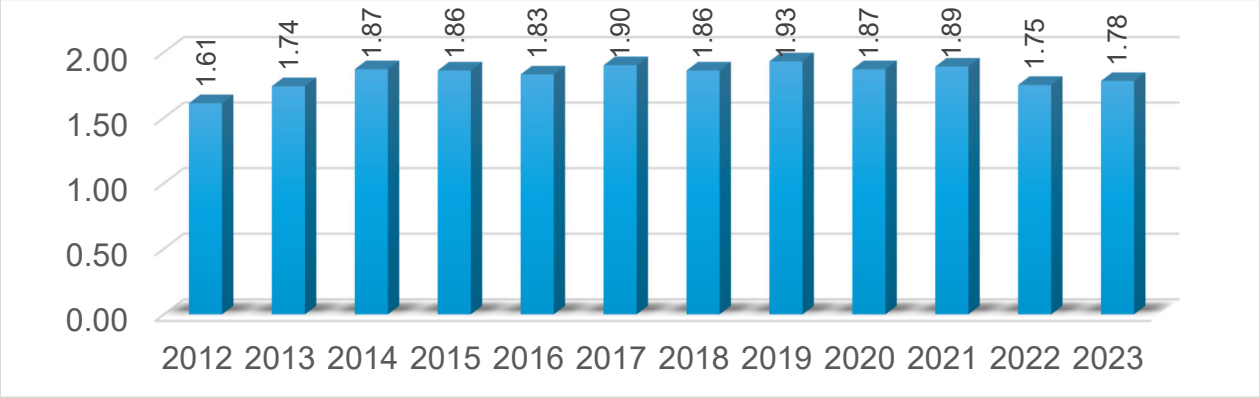

Figure 17: Ratio of treated water maximum day pumpage to average day pumpage

In 2023, at 29.2 million cubic meters, the WWTP effluent continued to be a lower volume than the years prior to 2017. The year 2021 was the lowest level in the last decade at 28.3 million cubic meters.

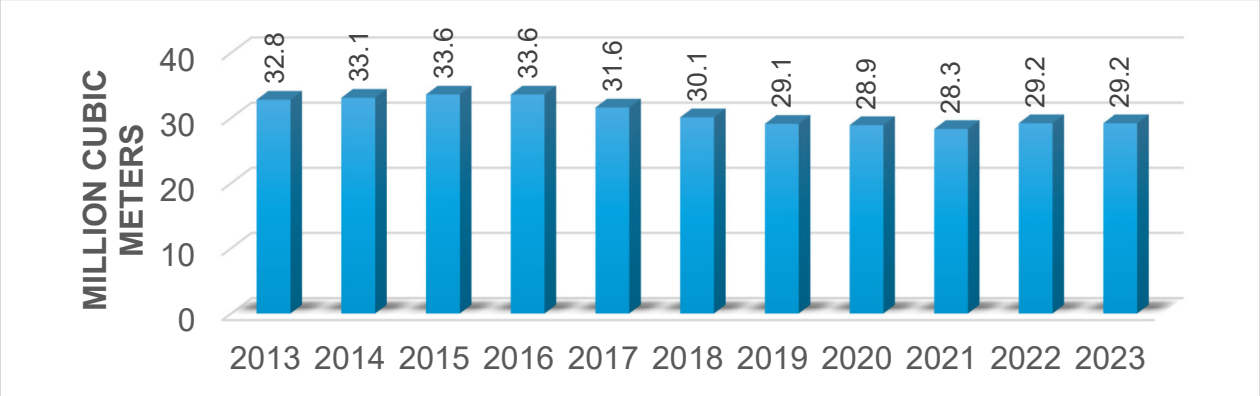

Figure 18: Volume of Wastewater Treatment Plant Effluent Flow (million cubic meters)

Volumes have decreased significantly since 2016 but began to increase slightly in the last two years. WWTP effluent flow increases as the population grows and decreases when households install water-saving appliances, such as low-flush toilets. Large commercial

and industrial operations can significantly impact effluent volume. Wet weather or intense storm conditions also influence effluent flow due to inflow (e.g. weeping tiles) and infiltration (e.g. leaky pipe joints and manholes) into the wastewater collection system; therefore, less effluent is expected in dry years. The work on lining sewer mains also reduces infiltration into the collection system, thereby reducing the demand on WWTP equipment.

3.4 Meter Shop Customers

In 2023, the Meter Shop attended to over 11,450 total jobs, reflecting approximately an 8% decrease from 2022. The following figure provides a breakdown of the total jobs, which result from work orders generated by Corporate Revenue to check malfunctioning meters or for cut-offs and reconnects. For job definitions, see Meter Shop Service Calls in Appendix Two: Glossary.

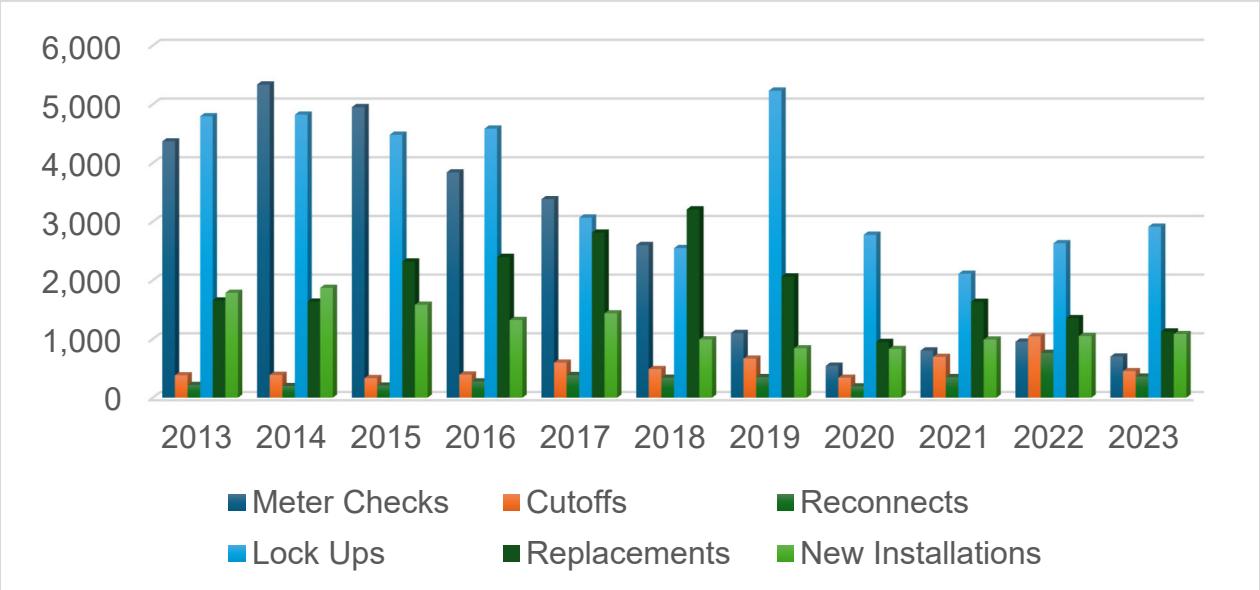

Figure 19: Quantity of Meter Shop Service Calls

In 2023, 5,700 AMI communication modules were installed, totaling 76,990 since the program started in 2016. This represents approximately 98% of the nearly 78,500 total physical water meters within Saskatoon (physical meters include in-service and out-of-service meters). Most AMI installations require that installers enter homes or businesses to access water meters. Total installations in 2023 was lower than 2022 and approximately 44% lower than the average for the previous five years.

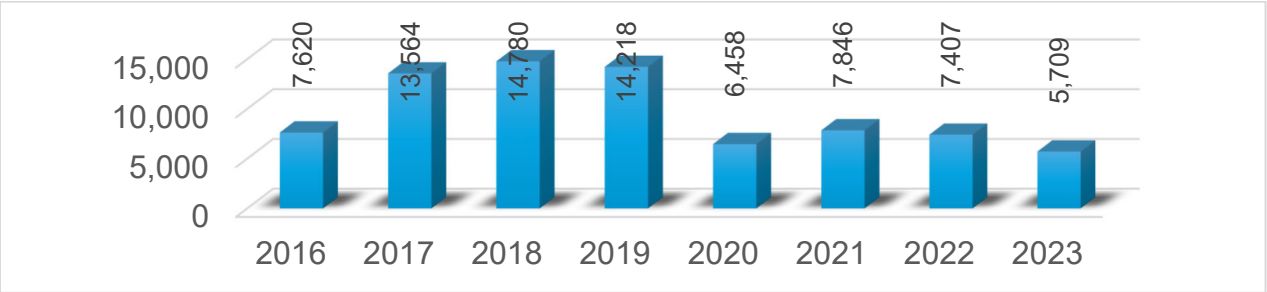

Figure 20: Quantity of AMI Communication Modules Installed

Backflow prevention devices are important in reducing the risk of contaminants from entering the City's drinking water system. In 2023, 324 new backflow prevention devices were installed, with a total of 10,879 devices being active as of December 31, 2023. Saskatoon Water's Cross Connection Control Inspectors work with commercial and industrial water users to ensure proper backflow prevention devices are installed and tested annually. In 2023, 520 cross connection control survey/inspections were performed, and 9,819 notices were processed.

3.5 Customer Satisfaction

The City conducted two civic services surveys in 2023: the **Satisfaction & Performance Survey** and the **Performance, Priorities and Preferences Survey**. Each survey was conducted through an online panel (a telephone option was not used in 2023), and by having a survey link available on the City's website (referred to as "self-selected").

The **Performance, Priorities and Preferences Survey's** primary objectives were to gauge the following:

- Perceptions of quality of services provided by the City
- Priorities of services
- Preferences on level of civic services for 12 categories

Saskatoon citizens were asked to rate services provided by the City on a ten-point scale where a score of ten means "excellent" and one means "poor". The charts below summarize the results. Like 2021, **quality of drinking water** and **speed of water main break repairs** ranked in the top three highest rated services in the 2023 survey.

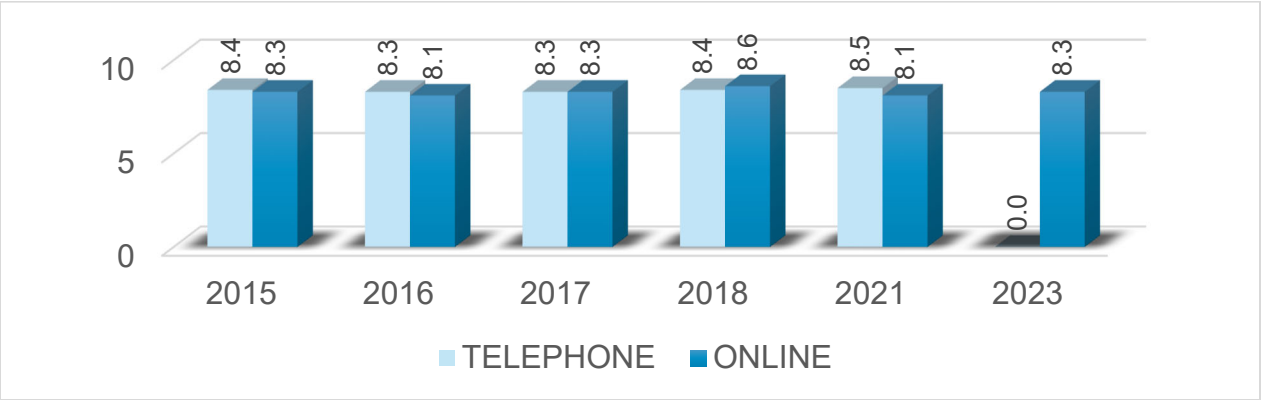

Figure 21: Citizen Satisfaction with Water Quality (rating out of 10)

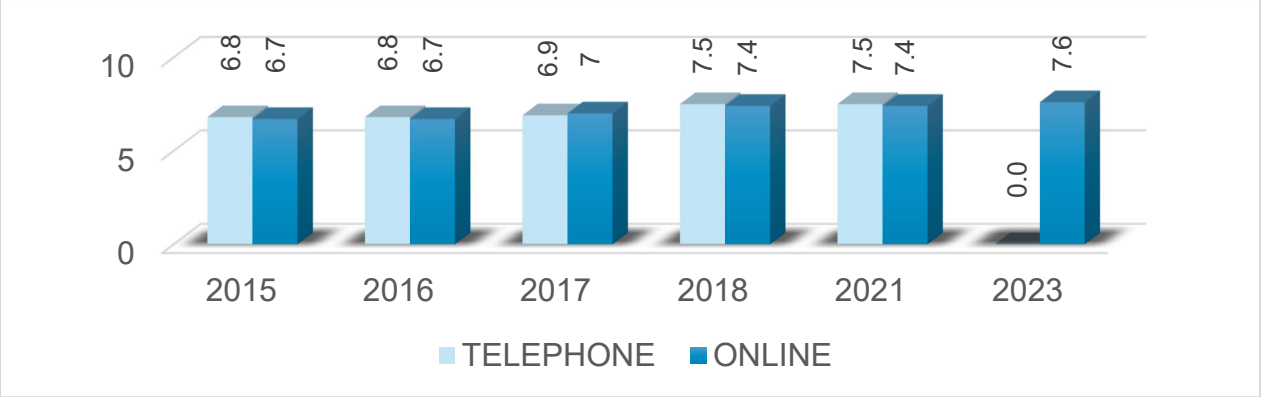

Figure 22: Citizen Satisfaction with Speed of Water Main Break Repairs (rating out of 10)

3.6 Customer Enquiries

Phone calls to the Customer Care Centre are received and resolved by the Water Laboratory through discussion and education.

One call regarding WWTP odour was received in 2023. The Customer Care Centre received approximately 62 complaints related to odours from various sanitary sewer mains across the city, and approximately 201 reports of sanitary sewer mains surcharging, blocked, or running high at various locations.

4.0 OUR INFRASTRUCTURE

The replacement value of all water and wastewater infrastructure was estimated at over $9.8 billion. A detailed review of the valuation of the WTP, water intakes, and reservoirs, along with the WWTP and lift stations is planned in the near future.

The WTP and assets associated with water distribution have an estimated value of $4.9 billion.

The WWTP and assets associated with the sanitary sewer collection system have an estimated replacement value of $4.9 billion.

Table 2: Estimated Water Utility Asset Replacement Values

Asset	2023 Inventory	Replacement Value ($M)
Water Treatment Plant, water intakes and three reservoirs*		$858
Water Pipes	1,228 km	$3,046
Valves	15,774 ea	$257
Hydrants	7,399 ea	$72
Service Connections	72,436 ea	$703
Total		**$4,936**

* Value equals the 2022 annual report plus 10% inflation.

Table 3: Estimated Wastewater Utility Asset Replacement Values

Asset	2023 Inventory	Replacement Value ($M)
Wastewater Treatment Plant*		$715
Lift Stations*	26 ea	$189
Wastewater Pipes	1,052 km	$3,073
Manholes	12,849 ea	$182
Force main	46 km	$99
Service Connections	72,725 ea	$615
Total		**$4,873**

* Value equals the 2022 annual report plus 10% inflation.

The condition of distribution and collection assets is continually evaluated, and a long-term asset management plan is in place outlining levels of service and funding for annual maintenance and rehabilitation programs.

5.0 OUR WORK

5.1 Community Awareness and Engagement

A major priority for the Utilities is ensuring residents are informed about our services, significant projects, initiatives, and campaigns. In 2023, we reached the public through reports, news releases about major projects, signage, flyers, social media, and through the City's website.

General information on water quality, water and wastewater treatment processes, major capital projects, and water conservation is available at saskatoon.ca/water and saskatoon.ca/wastewater.

Water Quality Reporting: Saskatoon Water produced the annual Drinking Water Quality and Compliance Report to comply with Water Security Agency (WSA) requirements to notify consumers about water quality, and the performance of the waterworks in submitting samples required by a Minister's Order or Permit to Operate a Waterworks. Quarterly Water Quality reports are published on the City of Saskatoon website, providing easily accessible key water quality data to citizens and businesses.

Water Treatment and Wastewater Treatment Plant Outreach: Guided tours are available to the public, ages 16 and older, to increase awareness of how the Utilities operate in providing safe, reliable water and in returning quality effluent to the South Saskatchewan River.

Advanced Metering Infrastructure (AMI) System: Through letters and phone calls, Saskatoon Water continued to reach out to residents who had not yet signed up to receive AMI infrastructure. The meters have a communication module to improve billing by utilizing remote meter reading and monthly billing based on current usage instead of estimates.

Figure 23: Billboard Communicating AMI Program Information

SmartUTIL: The SmartUTIL online tool, launched in July 2022, uses AMI data to help utility customers view water and electricity usage and trends, keep on budget, and take steps to conserve and reduce the impact on the environment.

5.2 Water Quality

The City's water treatment and distribution systems are regulated by a "Permit to Operate a Waterworks" issued by the WSA. Our drinking water quality is further regulated by Health Canada's *Guidelines for Canadian Drinking Water Quality* and Saskatchewan Environment's *The Waterworks and Sewage Works Regulations, 2015.* Water quality is closely monitored 24 hours a day, 365 days a year.

The WTP Laboratory's comprehensive inspection program meets the highest standard in North America. In 2023, a total of 22,557 water treatment quality tests and 15,268 distribution water quality tests were conducted by our WTP Laboratory, accredited by the Canadian Association for Laboratory Accreditation Inc. (CALA) to meet ISO/IEC 17025:2017 standards for the parameters listed on the scope of accreditation.

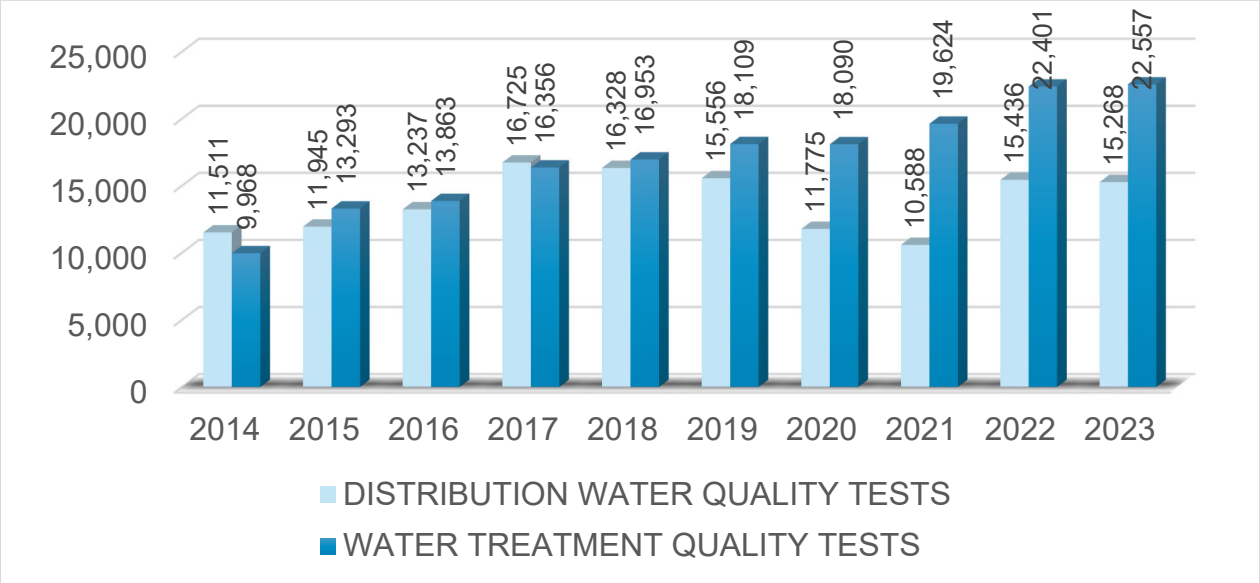

Figure 24: Quantity of Treated Water Quality Tests Performed by the WTP Lab

The following table shows the results of some of the many types of testing completed by the WTP, which are well within acceptable limits under the Permit to Operate a Waterworks.

Table 4: Summarized Results of Select Water Quality Tests from Distribution System

	2014	2015	2016	2017	2018	2018	2020	2021	2022	2023	Allowable Values
Yearly Total Chlorine Median (mg/L)	1.78	1.83	2.00	1.93	1.99	2.0	1.95	1.90	1.90	1.85	0.5-3.0
Yearly Turbidity Median (NTU)[2]	0.14	0.18	0.13	0.11	0.09	0.10	0.10	0.10	0.09	0.09	< 1.0
Total Coliforms >0 (CFU / 100mL)[3]	0	0	0	0	0	0	0	0	0	0	0

[2] Nephelometric Turbidity Units (NTU) is a measure of scattered light. A high turbidity level is caused by organic matter which can promote the growth of pathogens as well as being aesthetically unappealing.

[3] Colony Forming Unit (CFU) is a measure of viable bacterial cells.

Wastewater Quality and Environmental Monitoring Program: The City's wastewater collection and treatment systems are regulated by a "Permit to Operate a Sewage Works" issued by the WSA. Our final effluent water quality and spillage of untreated raw sewage are further regulated by Saskatchewan Environment's *The Waterworks and Sewage Works Regulations, 2015,* the Saskatchewan Environmental Code, and the Federal *Wastewater System Effluent Regulations, 2012*. The water quality of raw sewage coming to the WWTP and the final effluent discharged into the South Saskatchewan River is closely monitored 365 days a year.

Analytical tests to monitor required parameters are performed by the Saskatoon Water's Environmental Laboratory. The Laboratory demonstrated technical competence for a defined scope and the operation of a laboratory Quality Management System to ISO/IEC 17025:2017 as recognized by the CALA. In 2023, there were 51 laboratory non-conformances identified and corrective actions were put in place. There was one internal audit completed to assess the Lab's compliance to the Quality Management System. In 2023, Environmental Laboratory added Enterococcus bacteriological testing in its scope of accredited analysis. The Enterococcus test was included in the WWTP Permit to Operate a Sewage Works in 2022.

In 2023, the Environmental Laboratory collected a total of 1,869 samples and performed 14,177 tests for the WWTP Permit to Operate a Sewage Works and 33,934 tests for the WWTP process control.

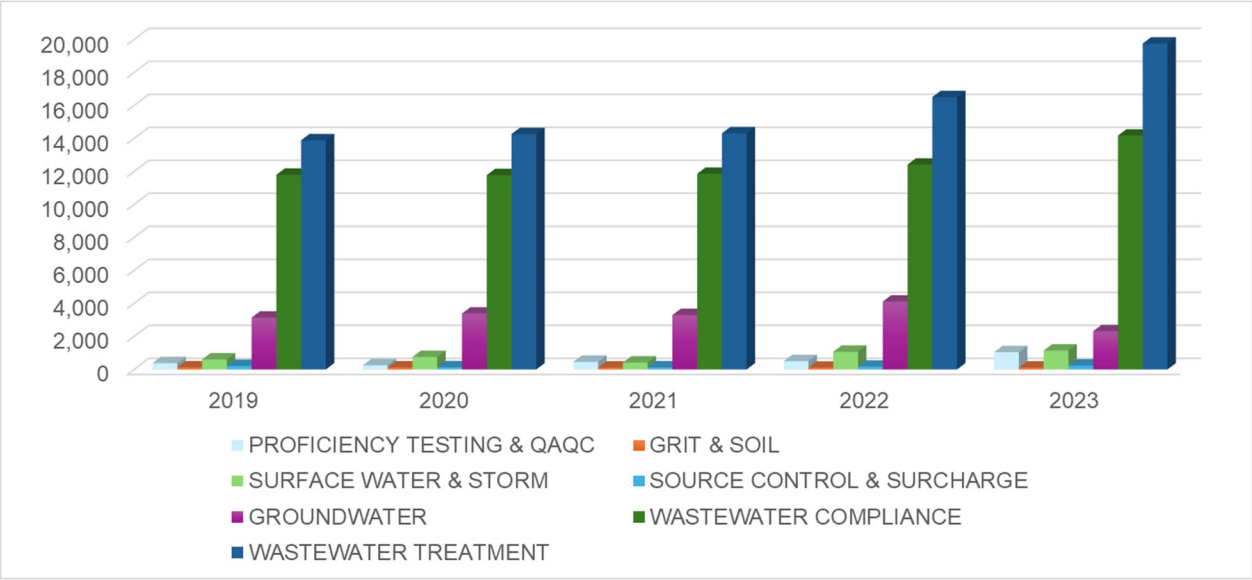

Figure 25: Quantity of Water Quality Tests Performed by Environmental Lab

The Environmental Laboratory also collected over 580 samples and performed 3,823 water quality tests to support other divisions and departments of the City. The other sampling and monitoring programs are groundwater, ponds, stormwater outfalls, bylaw compliance, industrial sewer surcharge, and the South Saskatchewan River water quality. The Environmental Laboratory performed 19,704 additional tests through third-party labs for the tests that were not in the scope of the Environmental Laboratory's activities.

The following table shows the results of some of the many types of wastewater testing completed by Saskatoon Water's Environmental Laboratory, which are well below the acceptable limit under the Permit to Operate a Sewage Works.

Table 5: Summarized Results of Select Wastewater Quality Tests

	2017	2018	2019	2020	2021	2022	2023	Wastewater Effluent Standard
Yearly Median cBOD[4]	3.5	4.0	3.0	2.0	3.6	3.0	1.5	<25 mg/L
Yearly Median BOD	14.9	16.7	9.8	8.2	13.0	13.0	10.0	<30 mg/L
Yearly Median TSS[5]	7.3	10	7.8	6.2	7.3	5.0	6.4	<25 mg/L
Yearly Median Total Phosphorous (TP)	0.31	0.425	0.364	0.287	0.323	0.331	0.303	<0.75 mg/L
Yearly Median E.coli[6]	<10	<10	<10	<10	<10	<10	20	<200 mpn/100mL
Yearly Median unionized ammonia	0.179	0.203	0.089	0.074	0.248	0.245	0.125	<1.25

[4] Carbonaceous Biochemical Oxygen Demand (CBOD) Measures the oxidation of carbons in water
[5] Total Suspended Solids
[6] E.coli is a common indicator of fecal contamination and is quantified using the Most Probable Number (MPN) method. MPN is a probabilistic test which assumes coliform bacteria meet certain criteria.

5.3 Water Main Operations

A high-level of service has been established for maintaining utility services for residents. Water main breaks are to be repaired within 48 hours. Maintenance crews repaired 1,595 water and sewer locations in 2023, of which, only 187 (12%) were water main breaks. In 2023, approximately 63% of water main breaks were repaired and water restored within 24 hours, the average repair time was 25 hours per break, and the service level time was exceeded on 49 occasions.

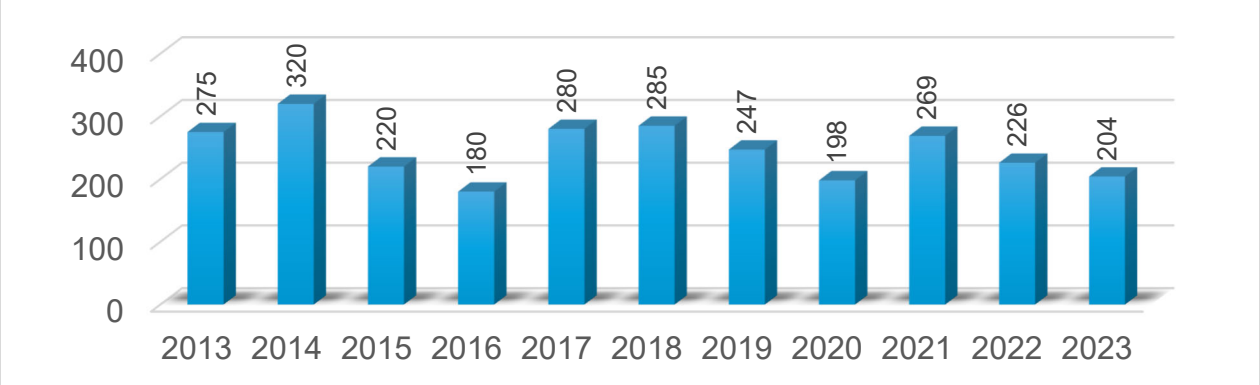

Figure 26: Quantity of Water Main Breaks per Year

The previous figure shows the number of water main breaks in previous years. The number of breaks in 2023, 204, was lower than the ten-year average of 250. The number of breaks varies every year due to weather and frost depth; however, the trend of the average number is going down over the past thirty years. While there are spikes in water main breaks, the Planned Maintenance Program and the Capital Rehabilitation Program, supported by Technical Services and Construction and Design, are having an overall positive impact on the reliability of the distribution system.

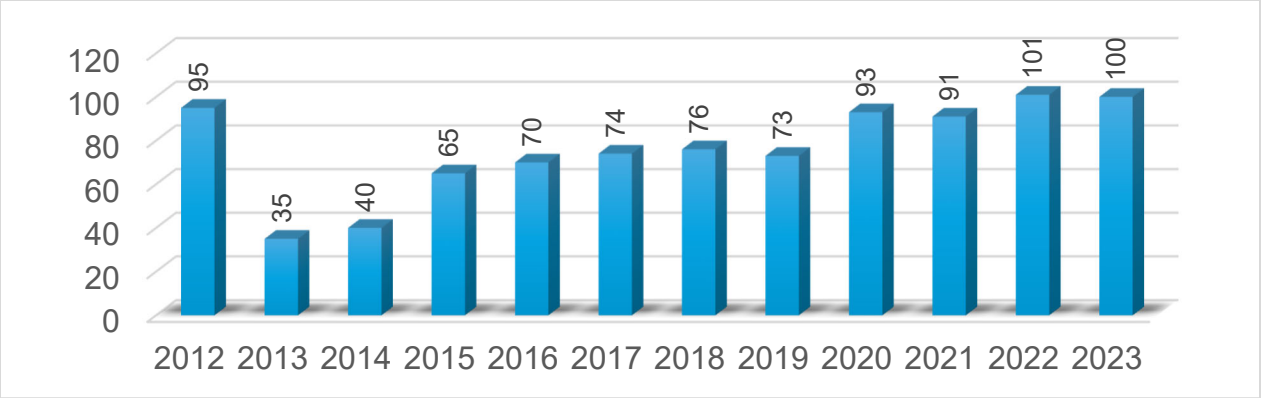

Figure 27: Quantity of Water Main Valve Repairs and Replacements

The previous figure shows the number of completed water main valve repairs and replacements throughout the system. These repairs are part of the approximately 1,600 locations maintained by Water and Sewer staff in 2023.

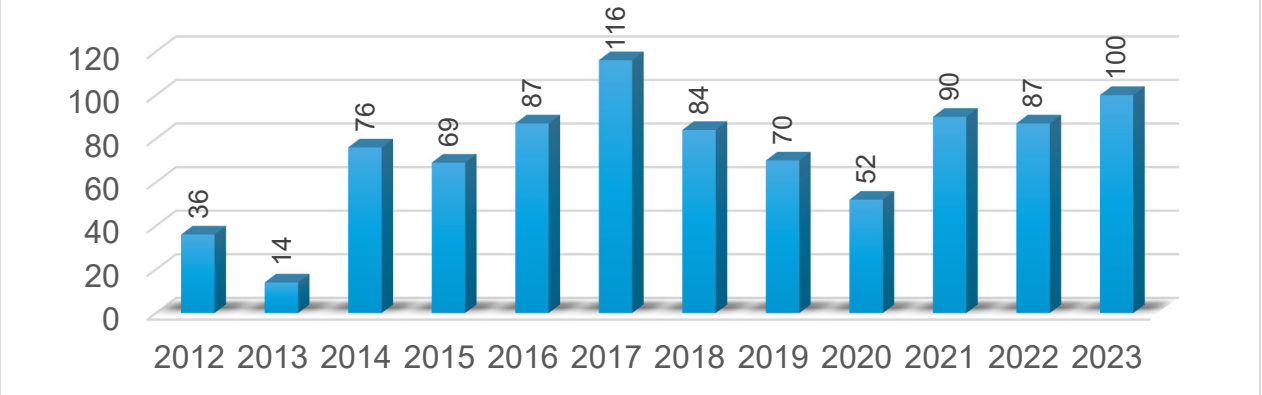

Figure 28: Quantity of Valve Casings or Spindles Repaired Using Hydro-Excavation

The previous figure shows the number of locations in each year where valve casings or spindles were repaired using hydro-excavation. This method is less damaging to the road infrastructure and is used wherever possible.

Figure 29: Photographs of Water Main Break Repair Work

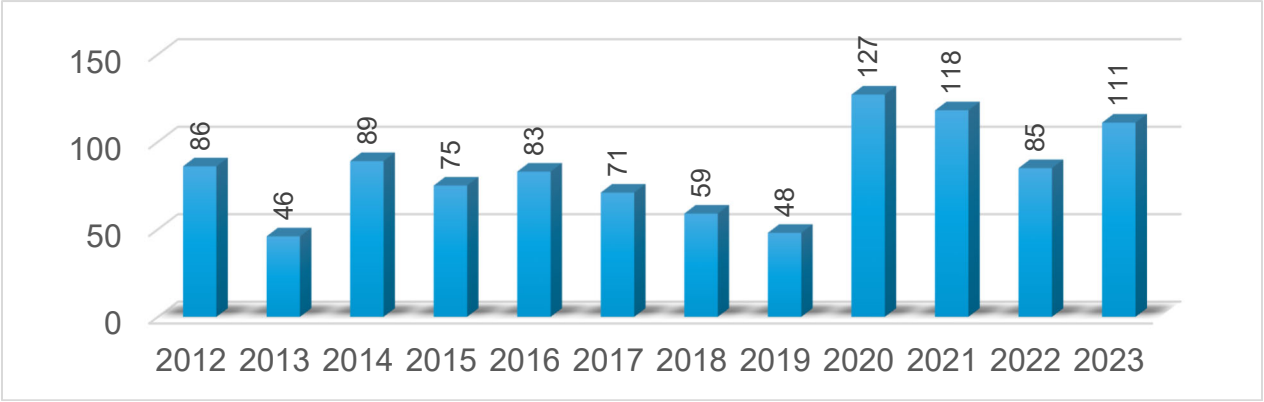

Figure 30: Quantity of Fire Hydrant Repairs

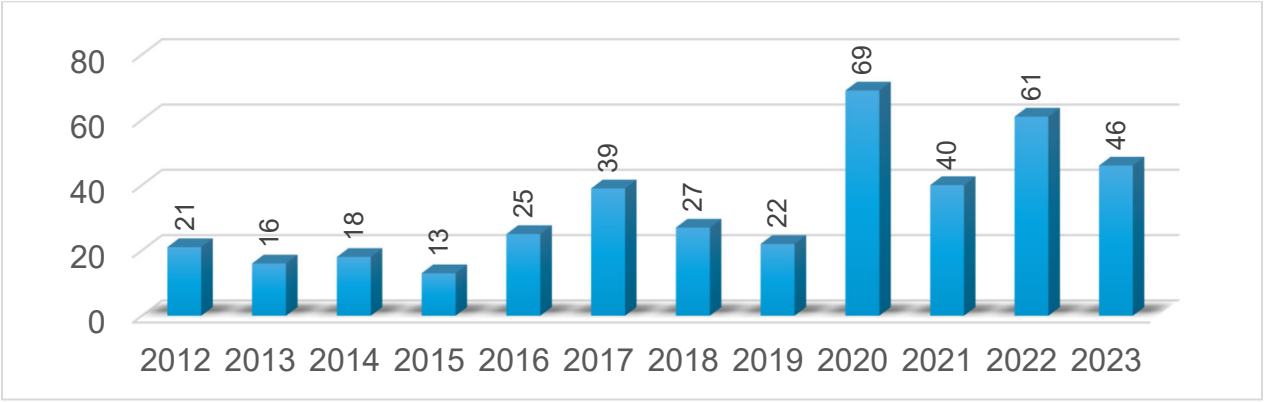

Figure 31: Quantity of Fire Hydrant Replacements

The previous two figures show the number of fire hydrants repaired and replaced by WWO each year. The decision to replace or repair a non-functional or damaged hydrant is made based on the most cost-effective option. Each hydrant is also inspected and tested annually to ensure high reliability for firefighting.

5.4 Sanitary Sewer Operations

The Sewer Operations workgroup is responsible for maintaining over 12,526 sanitary manholes. Two types of sewer maintenance activities are performed. The first technique utilizes high-pressure water jetting called “flushing”. The second technique is called “brushing” and involves pulling stiff brushes through sewer mains. Approximately 379 km of sanitary sewer mains were cleaned using flushing and 40 km were brushed. Closed-Circuit Television (CCTV) crews inspected 21 km of pipe.

Figure 32: Photographs of Closed-Circuit Television Inspection Work

5.5 Capital Projects

The Water and Wastewater Utilities funded 77 capital projects in 2023, budgeted at $652.6 million, of which, $193.3 million was unspent. The following table summarizes the active capital projects by three areas.

Table 6: Active Capital Projects Summary by Work Group, as of December 31, 2023

Section	# of Active Projects	Approved Funding	Unspent Funding
Water Treatment	43	$216,606,000	$93,233,030
Wastewater Treatment	30	$194,931,200	$73,559,265
Water Distribution and Wastewater Collection	4	$241,088,500	$26,497,750
Total	**77**	**$652,625,700**	**$193,290,045**

The following section describes some of the Utilities' major capital projects.

Water Treatment Plant

Water Treatment Plant Program: In the most recent Long Term Capital Development Plan update, the City has significantly broadened the scope of the planning effort, to not only rationalize how best to maintain the existing plant, but to identify the preferred approach to sustaining a reliable long-term supply of safe drinking water. This requires a significant increase in capacity from the existing 250 million litres per day (MLD) to 450 MLD, approximately twice the capacity of the existing plant, which is planned to meet projected demands for the next 50 years.

A long-term strategy was created to identify future needs of a preferred long-term staged approach to upgrading and expansions required to keep pace with growing demands. Key factors influencing the strategy included climate change, regulations, and growth and condition of existing facilities.

The chosen strategy focuses on sustaining capital at the existing WTP and staged development of a new WTP, as growth requires, to bring the city's total treatment capacity between the two WTPs to 450 MLD. The resulting development of a second WTP on the east side of the South Saskatchewan River would deliver a staged capacity of 150 MLD with plans to increase capacity to 250 MLD, as dictated by demand. The strategy was reported to City Council throughout 2022. Following approval to proceed with strategy planning, a Program Manager was hired in December 2022. In 2023, the WTP Capital Program was formalized, and a team was created to deliver the mandate. The Capital Program team is currently using the long-term planning work that has been completed and refining it with greater detail. Additional scope definition, estimated project costs, proposed project sequencing, and schedules will be summarized into a Program Definition Report. Another important area of focus is the evaluation of the most suitable procurement strategy and project delivery method. A decision on the project delivery model is part of the program definition phase. Program definition work will conclude in 2024. A detailed funding strategy will be prepared with the Finance team and brought forward for City Council approval in early 2025. Preliminary design is expected to commence in 2025 and project delivery will occur in 2026 and beyond.

McOrmond Drive Reservoir and Pump Station: This project includes the design and construction of a new 43 million litre reservoir system and pump station in the Evergreen neighborhood. Construction is being completed by PCL Construction Management Inc. for approximately $41.5 million with completion in summer 2024.

Water Treatment Plant Transfer Pumping and Electrical Upgrades: This project replaced the short-term transfer pumping system, increased efficiency, and addressed single points of failure while replacing much of the electrical systems on site. Construction (completed by Westridge Construction Ltd. for $40.7 million) reached substantial completion in December 2023 with completion expected in 2024.

Water Treatment Asset Condition Assessment: The WTP and remote sites include several structural, mechanical, electrical, and instrumentation and control assets. The purpose of this project is to complete a condition assessment of the WTP assets to ensure the assets are in good condition and the plant can continue to run reliably. A consulting contract for the equipment assessment is expected to be complete in 2024 by MPE Engineering Ltd.

Meter Shop

Advanced Metering Infrastructure: AMI is used to transmit electrical and water consumption data directly from individual meters to the utilities. The data will assist in obtaining more accurate revenue projections throughout the year. Consumers benefit from having their monthly bill based on actual consumption rather than estimates. AMI continues to be implemented throughout the city to provide accurate utility readings. Saskatoon Water is installing communication modules on all water meters and are approximately 98% complete. A final wave through the City is being completed using the opt-out policy to assist with installations. City Council determined that fees would apply to those who will not accept AMI, and this policy will facilitate project completion. Letters are issued and phone calls are made to residents providing information about AMI. Completion is dependent on several factors, including resident response rates to the letters. Once installations are finished, the project will move into maintenance mode and the data can be utilized to help optimize operations. In 2023, 2,995 customers were contacted by the Corporate Revenue Department about abnormal high water or continuous water consumption based off their AMI data.

Wastewater Treatment Plant

Wastewater Treatment Plant Primary Effluent Pump 6: This project was completed in 2023 and included the installation of a sixth primary effluent pump and related ancillary works. The design was completed by MPE Engineering Ltd. with Graham Construction and Engineering LP responsible for project construction.

Wastewater Treatment New Spadina Lift Station and Force Main: This project includes the construction of a new lift station and piping to replace the existing Spadina Lift Station to maintain conveyance of more than 60% of the City's collected wastewater. Jacobs Solutions completed detailed design and Graham Construction and Engineering LP is responsible for project construction ($19.7 million) with the lift station in service in 2024.

Figure 33: Spadina Lift Station

Jasper Sanitary Lift Station Pilot Project: Due to odour in the Nutana neighbourhood, an aeration system will be installed in the Jasper Sanitary Lift Station force main after a pilot study proved that the system was able to decrease odour. Construction of the aeration system was completed in 2023 with commissioning in 2024.

Wastewater Treatment Lift Station PLC Upgrade Strategy: The PLC Upgrade Strategy Project identified and prioritized lift stations throughout the city at-risk due to outdated controls system and dial-up internet connections. Aim Electric Ltd. was procured in 2022 to address stations at-risk as identified in the strategy on a prioritized basis within the allowable budget. The current contract is expected to be complete in 2024.

Wastewater Treatment Biosolids Handling Facility Force Main Twinning: Two 12 km long pipelines transfer digestate from the WWTP to the Biosolids Handling Facility, which is located north of Saskatoon require replacement. The existing pipes were constructed in 1984 and 2005 and have accumulated a large amount of struvite – a rock-like precipitate that forms along the inside walls of the pipes. The limited number of manholes and removeable couplings located at various locations along the pipes creates maintenance challenges and results in a lack of redundancy. Conceptual design services were awarded to AECOM Canada Ltd. and the report was received in the fall of 2023. Future contracts to support detailed design and construction services have followed in 2024.

Hampton Village Business Park Lift Station & Forcemain: The detailed design was completed in 2023 by CIMA+ for a new lift station to support development in the neighbourhood. Construction services awarded to Con-Tech General Contractors Ltd for approximately $13.6 million, with construction starting in the fall of 2023 and will continue to 2025.

Wastewater Treatment Digester Tank C Refurbishment: The replacement and improvements of piping systems, upgraded roof system, and structure improvement design was completed by Jacobs Solutions in 2023. The contract procurement and construction phases of the project will occur in 2024.

Distribution and Collection System Monitoring and Modelling

Water and Sewer Monitoring Program: The Monitoring Group of Engineering and Planning develops, implements, maintains, and reports on environmental and hydraulic monitoring programs in the following categories:

- Sanitary and Storm System Hydraulics
- Precipitation
- Water Distribution Hydraulics
- Water Quality
- H_2S Monitoring
- Storm Pond Bathymetry and Mapping
- Monitoring Equipment Testing and Calibration.

Table 7: Engineering and Planning Monitoring Program in 2023

Program	Number of Monitoring Locations
Sanitary System	51
Storm System	13
Sanitary Tank	5
Rain Gauge	11
Hydrant Pressure	93
Hydrant Flow	7
PWM Pressure and Flow	6
Water Quality	3
H_2S Monitoring	3
Storm Pond Bathymetry	1
Total	**193**

***Northeast Swale Hydrology, Hydraulics and Water Quality Monitoring Report*:** Water quality and quantity monitoring and reporting of the Aspen Ridge neighbourhood development impact on the Northeast Swale continued in 2023.

***Annual and Monthly Rainfall Reports*:** Reporting continued on major rain event classification, daily rainfall totals and accumulation, moisture condition in each neighbourhood based on the previous 30 days of rainfall, and historical comparison since 1900.

Figure 34: Photograph of Flow Bench for Equipment Testing and Calibration

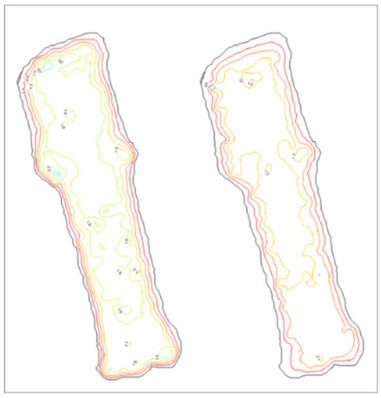

Figure 35: Aspen Ridge Forebay Bathymetric Map Comparison, 2017 (left) 2022 (right)

Figure 36: Photograph of Rainfall and Wind Measurement Equipment

Figure 37: Fire Flow Testing

***Water and Sewer Modeling*:** The water and sewer modeling group of Engineering and Planning is responsible to develop, maintain, and update city-wide water and sewer models using the best accepted modeling software packages in the industry. The current software packages include WaterCAD for the water distribution system, PCSWMM for sanitary collection, and XPSWMM for storm water collection. The models are the basis for the City's and regional water and sewer systems short and long-term planning, design, system capacity assessment for infill and greenfield developments, operational impact analysis and improvement, flood analysis and mitigation, flood mapping, etc.

Infill and Redevelopment Water and Sewer Capacity Improvement

The City's growth plan to half a million aims to accommodate 35% of total growth in infill and redevelopment areas. Most of these areas are in older parts of the city with water and sanitary capacity constraints. Engineering and Planning has initiated a program to address system capacity deficiencies related to infill and densification along key corridors and in the downtown. The water and sewer systems were modeled, and maps were prepared showing the potential water and sewer upgrades. In collaboration with the Asset Preservation section, projects have been defined and added to the three-year plan to address the capacity deficiencies in prioritized locations. This will be an ongoing, long-term program.

Distribution and Collection System Planning

Long Term Capital Development and Expansion Planning: Functional water and sewer planning and updates progressed in 2023 as part of the Riel and Blairmore Sector Plan Amendments. On completion and acceptance of servicing strategies for these two growth areas, the master planning document will be updated with the latest design and costing information.

Saskatoon Freeway Planning Study: Collaboration continued throughout 2023 with internal and external stakeholders, including the Saskatchewan Ministry of Highways through Technical Services. Information was provided about regional drainage and utility easements required for future servicing near the proposed freeway.

The Willows Concept Plan Amendment: A developer's proposed amendment to the Willows Concept Plan triggered a substantial review of water and sewer models and design calculations, system capacity investigation, surveys, hydraulic analysis, and assessment of servicing options for the area. Analysis showed that the existing Willows sanitary connection is insufficient to support expansion. A new sanitary connection is required along Cartwright Street and across the CN rail tracks to connect to the Melville sanitary trunk close to the Jasper Avenue and Melville Street intersection.

Distribution and Collection System Servicing Designs

Engineering and Planning completes water, sanitary, and storm water system design work for Saskatoon Land and for other major City capital projects. Highlights of their 2023 work include the following:

Figure 38: Brighton Storm Trunk Installation

- ***Brighton Phase D2B:*** Completed design of local water distribution, sanitary, and storm sewer collection systems.

- **Acadia Drive PWM**: Completed design of the Acadia Drive primary water main (1050 mm). Stakeholder consultation was completed for expected 2024 tender and construction.

- ***Aspen Ridge Phase D2:*** Initiated detailed design of area grading, local water distribution, sanitary, and storm sewer collection systems.

- ***Water Mains Rehabilitation (Multiple Locations):*** Completed designs for water mains that needed to be replaced and/or upsized as part of the Capacity Upgrade Program.

- ***Hampton Village Business Park (HVBP) Concept Plan Amendment:*** Kahkewistahaw First Nation initiated the HVBP Concept Plan amendment, which resulted in substantial review of water and sewer and area grading design. The Concept Plan amendment has been accepted by City Council.

- ***Hampton Village Business Park Sanitary Trunk****:* Completed design and tendering of the 525 mm sanitary trunk sewer extension along Markham Avenue south to the planned HVBP lift station.

- ***Hampton Village Business Park Storm Pond and Outlet Trunk***: Initiated preliminary planning and design of the HVBP stormwater dry pond and 1050 mm storm outlet trunk.

- ***Brevoort Park Storm Pond****:* Completed detailed design of the Flood Control Project, including storm sewer collection system and inlet structure.

- ***Private Development Applications:*** Reviewed 97 applications and advised on water or sewer servicing considerations for proposed re-zonings, subdivisions, condo developments, discretionary uses, utility installations, concept plan amendments, etc.

- ***Building Permit Applications:*** Reviewed 83 commercial building permit applications for design standards and bylaw compliance.

Distribution and Collection System Preservation

Water Distribution and Sewer Collection Assets: Water and Sewer preservation programs are selected annually based on the condition of assets (water and sewer mains and service lines), as well as approved levels of service and funding plans. Funding for the water and sanitary programs comes from the Water and Wastewater Infrastructure

Levies. The City has the following annual programs for preservation of water and sewer assets:

- Water Main Replacement: 11.7 km in 2023.
  - Capacity Program: Focuses on areas where water main capacity needs to be improved and there is a high density of lead service lines. Replacement of the water main is done via open trench excavation. Water main diameters are increased to improve flow capacity, typically from 150 mm diameter to 200 mm diameter; and lead service lines, if present, are replaced at the same time as the water main.
  - Preservation Program: Targets water mains that have had high numbers of water main breaks, prioritizing locations that have been breaking frequently in recent years. Since this program relies on water main break rates that are constantly changing and being updated, locations are prioritized and selected each year.

- Sewer Main Lining: 7.7 km in 2023.
  - Sanitary and storm sewer mains are inspected using remote video cameras and assigned condition ratings. Based on these ratings and other risk factors, a long-term rehabilitation strategy has been developed. Lining for sewer mains uses the same method as water mains, except excavation is typically not required. Sanitary and storm mains have access points (manholes) approximately every 150 m to 200 m that allow for liner installation. This method of rehabilitation for sanitary and storm mains has been used in Saskatoon since the 1990s and has been so effective that open trench replacement of sewer mains has been phased out, except for very limited circumstances where a liner cannot be installed.

- Water and Sewer Service Line Replacements: 577 service lines replaced in 2023. Water Service Lines and Tar Fiber Sewer Service Lines are replaced:
  - In conjunction with open trench water main replacement.
  - Prior to certain roadway preservation treatments.
  - On an emergency basis.

Table 8: 2024-2025 Projected Budgets – Technical Services

Program	2024 Budget ($M)	2025 Budget ($M)
Water Preservation	$25.32	$24.29
Sewer Preservation	$7.40	$7.12
TOTAL	**$32.72**	**$31.41**

5.6 Continuous Improvement Initiatives

Saskatoon Water, WWO, and Technical Services are committed to Continuous Improvement through improved customer service and continually implementing innovations to improve efficiencies and reduce costs. In addition to the operating and capital projects described above, the departments have undertaken the following Continuous Improvements initiatives:

Fusion (SAP): With SAP allowing integration of supply chain, work management, finance, and HR systems, the three departments are leveraging the new data available to make improvements. Operator Certification (required by WSA) is also tracked automatically in the system, alongside other corporate training. The WWTP has also been able to directly track the natural gas savings from the digester and heating upgrades to help better budget for natural gas consumption.

Improved Sewer Operations and Procedures: The Planning and Scheduling Group was established in 2018 to support the WWO and Roadways, Fleet and Support departments in planning, scheduling, and coordination of jobs. The group continues to contribute to more efficient and organized operations and maintenance workflow by designing planned maintenance programs, distributing work, and providing regular progress tracking reports with Key Performance Indicators for improved accountability. Supervisors and superintendents are able to spend less time in the office and more time in the field.

Water and Sewer Repairs for Roadway Restoration Locations: The Planning and Scheduling Group lead a coordination effort to streamline scheduling and communications for Water and Sewer inspection and repair work performed in advance of roadway restoration projects. This effort was successful in creating a proactive approach rather than the largely reactive model previously in place.

Water and Sewer Maintenance Backlog Restructure: In an effort to prepare for the transition to Enterprise Asset Management (EAM) software, the Planning and Scheduling Group restructured the Water and Sewer maintenance backlog. The backlog now matches the processes that have been developed in EAM and the various Microsoft Planners, meaning less administrative work is required when defects are identified or repaired, minimizing the opportunity for mistakes.

The Valve App Project: The valve application, in use since 2018, has been used to record the on/off status of 62% of water valves (9,567 out of 15,410 total valves). Using this app reduces miscommunication and saves time for staff and contractors completing important repair and installation work in the field. Valve status also is used to interpret water pressure monitoring and modelling results, contributing to data-driven decisions about water flow.

New West Side Handling Site: Water and Sewer uses handling sites to store operating equipment and process materials such as gravel. In late 2020, a new handling site west of Highway 7 came into full service to replace the Dundonald handling site, which had been re-allocated for the Recovery Park expansion. The new west side handling site has augmented the Nicholson Yards handling site on 8th Street and is expected to significantly increase operating efficiency.

Primary Water Main Valve Inspection and Isolation Assessment: In 2023, the Planning and Scheduling Group continued supporting WWO, with an assessment into the primary water main valve inspections and isolation procedures. The objective of this work is to increase the number of valve inspections to ensure all primary water main valves meet the two-year inspection goal, and to update the current inventory database and isolation procedures for primary water main valves. Once completed, this information will

help ensure that Water and Sewer has all relevant, up-to-date information necessary to successfully manage emergencies.

Digital Application Reviews: In 2023, digital applications continued to be received and reviewed from developers for proposed re-zonings, subdivisions, condominiums, discretionary uses, etc., saving time and costs compared to the previous paper-based process. Engineering and Planning tracks all applications and summarizes review responses in a single accessible digital file.

Microsoft Teams Communication: Online Teams' meetings continued to replace many in-person meetings in 2023, saving travel time and costs.

Saskatoon Water Energy Management: In 2023, Saskatoon Water continued work in energy management by completing the following activities:

- Performed measurement and verification of energy savings from using biogas for heating, process operation changes at the WWTP, and changing pumping operations at the reservoirs and Raw Water Intake.
- Applied for grant funding from Natural Resources Canada to conduct an ISO 50001 Gap Analysis on the Energy Management System at the WTP and reservoirs.
- Applied to the Federation of Canadian Municipalities for grant funding for the nitrification pilot at the WWTP.
- Proceeded with the construction phase for the lighting upgrades at both plants.
- Initiated a Conceptual Design Report from a consultant on improvements to the Building Management System at the WTP and WWTP.
- Assisted SaskPower with an emergency load shed request by utilizing diesel generators at the WTP and WWTP to shed approximately three megawatts of load from the grid.

Motion Sensors and LED Lighting: Motion Sensors and LED lighting replaced conventional lighting systems at the WTP and WWTP, reducing power consumption and maintenance requirements.

Water Treatment Plant Filter Plant Upgrades: The WTP is upgrading the 1964 filter plant actuators to allow for enhanced control and feedback. The 1964 plant filters are also receiving upgraded turbidity meters. A trial run of new media in one filter was initiated at the beginning of 2020 and is completed. The assessment indicates that there is potential for increased filter capacity when new media is installed. Installation plans will align with long-term capital development plans for the WTP.

Employee Onboarding and Training: Saskatoon Water completed a project aimed at enhancing employee onboarding, along with training processes and resources. Deliverables included an employee orientation and welcome video, an updated employee handbook, a formalized training procedure, and a comprehensive training matrix that outlines minimum training requirements for each position within the department.

Cross Connection Control Program: Saskatoon Water has two cross connection inspectors who manage a program to protect the city's potable water supply from contamination. In 2021, Saskatoon Water initiated a project to identify Continuous Improvements for the Cross Connection Control Program. The goal is to recommend ways to optimize efficiency and effectiveness of service delivery, and reduce the risk associated with water backflow from private properties into the potable water distribution system. Work will continue through 2024 and beyond to implement recommendations.

Quality Decision Making: Quality decision making is vital to not only achieve the City's Strategic Goals, but also to support our Purpose, live our Values, and realize our workplace transformation vision. In 2021, Saskatoon Water initiated a project to support employees in their efforts to make quality decisions. A combined decision-making process and framework was introduced, which has been proven to capture the art, the science, and the practice of achieving optimum value in decisions. Additional training and resources have been made available to support employees as they apply this collaborative philosophy.

Continuous Quality Management System*:* Technical Services began developing written Administrative Procedures for all its essential services in 2020. In 2022, Technical Services continued to advance work on an Administrative Procedure for emergency water main break response with contractor forces. When completed, this will mark the completion of Administration Procedures for all essential services in the department's portfolio. In 2022, Saskatoon Water began implementing the revised Document Control and Management Procedure and worked on ensuring Policy and Procedural documents were reviewed on a set schedule.

6.0 OUR ENVIRONMENT

6.1 Stewardship

Protecting the river and its surrounding watershed is vital to the long-term sustainability of our water supply. The City is committed to responsible watershed management and stewardship that meet citizens' expectations. The City is represented on the advisory committee of the Northwest District of the Saskatchewan Association of Watersheds. The WWTP consistently meets or exceeds all regulatory limits for effluent discharged to the river under the WSA's Permit to Operate a Sewage Works.

Saskatoon Water and the Water and Sewer section of Water and Waste Operations support the Provincial Operator Certification Program for both the Water and Wastewater Treatment Plants, and the water distribution and collection systems, which help protect both the public and the environment.

6.2 Energy Management

Water and wastewater activities accounted for almost a quarter of total municipal government greenhouse gas (GHG) emissions in 2021, a 7% increase from the 2014 baseline. Data was only available for 2021 as a greenhouse gas inventory is only completed every second year; the next one will be completed in 2024 using 2023 data.

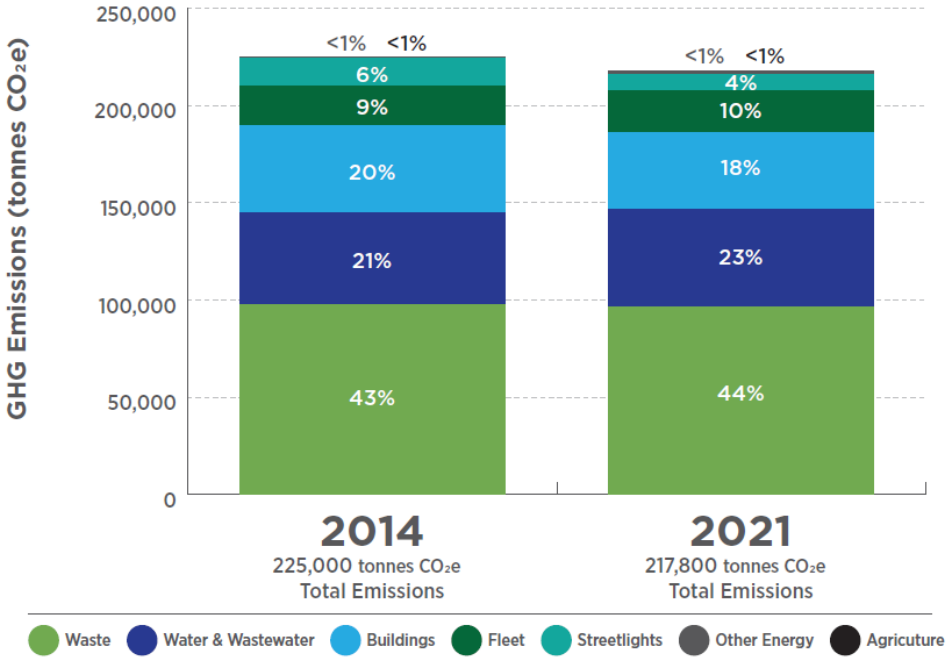

Figure 39: Municipal Government GHG Inventory Chart, Climate Action Plant Progress Report 2021

Achieving a balance between efficiency, renewable energy, and water conservation is part of an integrated approach to reducing emissions in the water system.

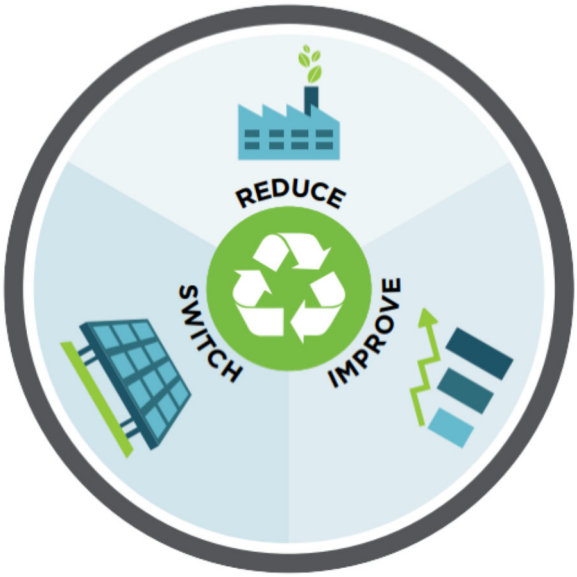

Figure 40: A Three-Pronged Approach to Reducing Water-Related Emissions: Reduce, Improve, Switch

The WWTP and WTP have committed to managing energy-use through the development of a Department Energy Policy and plant specific strategies. Energy teams have been created at both plants to conduct energy studies, capital projects, and process optimizations. Results, achievements, and external collaborations from energy management will be communicated through annual reports.

In 2023, the WWTP continued to utilize biogas for heating and was able to meet approximately 77% of their heating load using biogas. The WWTP is planning to continue to use biogas for heating in 2024 but is also planning to explore other energy options. In addition, the WWTP and WTP proceeded to the construction phase of a lighting retrofit, which is slated to be completed in the first quarter of 2024.

In addition to the Energy Management Program and the Water Conservation Strategy, *Alternative Currents: A Renewable and Low-Emissions Energy Implementation Plan* was approved, in principle, by City Council in November 2022. The plan to switch to low carbon energy sources includes two water utility related actions and initiatives:

- "Action 34.1: install ~1MW generation capacity of ground-mount solar PV at the Wastewater Treatment Plant
  a. Pursue external grant funding and internal funding for the installation of ~1MW generation capacity of ground-mount solar PV at the Wastewater Treatment Plant
  b. If funding is secured, install ~1MW generation capacity of ground mount solar PV at the Wastewater Treatment Plan
  c. Operations of the solar PV system"
- "40.1 Wastewater Treatment Plant biogas use opportunities
  a. Explore opportunities to further use biogas and biomass generated from the City's Water and Wastewater Treatment Plants, including power generation and use in civic operations outside of the facility.

b. Implement viable opportunities for biogas use from the wastewater treatment facility.
c. Operations for viable usage of biogas."

6.3 Conservation

Providing the community with safe, high-quality drinking water is a top priority for the City. Water conservation can help ensure that we can meet the community's water needs in the long term, even with a growing population and economy. The Water Conservation Strategy is a road map of actions to reduce peak summer use, to ease demands on capacity-limited infrastructure, and to meet the community's many goals, including water conservation, emission reduction, water affordability, and capital-cost management. There are many reasons to conserve water in Saskatoon, including:

1. Fostering equality by helping households and business moderate their water use.
2. Reducing GHG emissions.
3. Increasing water system resiliency and prepare for a changing climate.
4. Managing water demand to ease the strain on the City's water system.

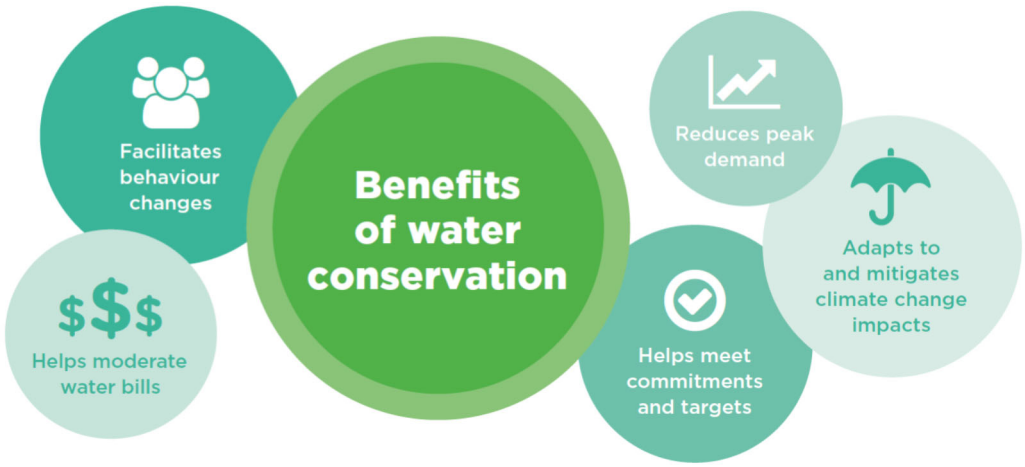

Figure 41: Infographic Outlining the Benefits of Water Conservation

Water conservation initiatives in the strategy are prioritized based on overall water and GHG reduced with specific focus on peak summer demand reductions, as well as the costs and savings associated with the measures and community feedback.

There was a strong public preference for the City to lead by example and make civic water conservation a priority. Two thirds of the City's own water use in facilities and operations is used outdoors in the summer, the majority for park irrigation.

Targets

The Water Conservation Strategy is based on the water conservation targets set in the *Low Emissions Community Plan.* Action 25 is a 5% reduction in absolute water demand

by 2026 through efficiency, monitoring, and leak reduction. Action 26 is a 20% outdoor and 30% indoor water-use reduction by 2050 through residential and commercial education and water efficiency incentive programs.

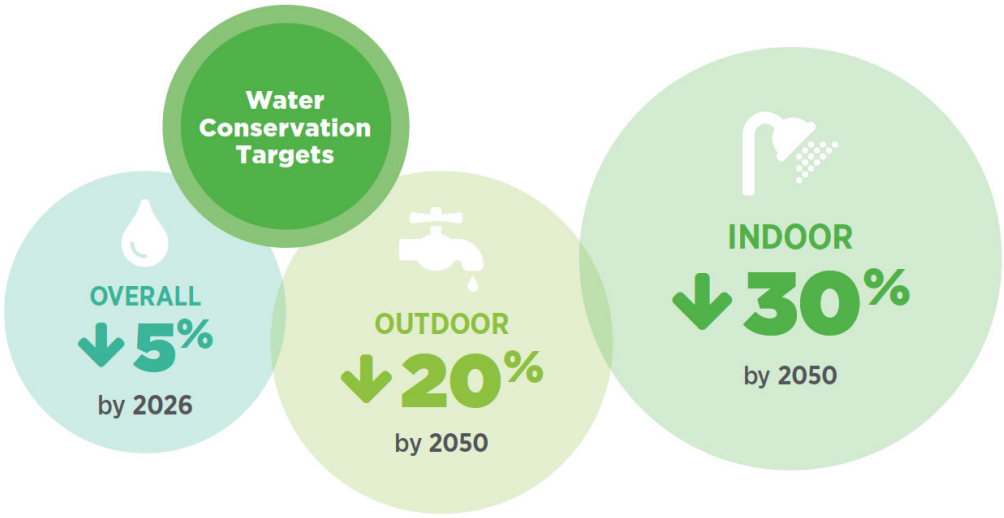

Figure 42: Infographic Outlining Water Conservation Targets from the Low Emissions Community Plan

From the baseline year of 2016, overall and indoor water-use was progressing towards the targets, but outdoor summer water-use has been constantly high due to extreme heat and extended drought events in recent years.

In 2023, overall and indoor water-use increased, in large part due to hot, dry summer weather and population growth (there was an increase of 14,400 people). However, per capita residential water use in 2023 was at an all-time low of 187.8 liters/day/person.

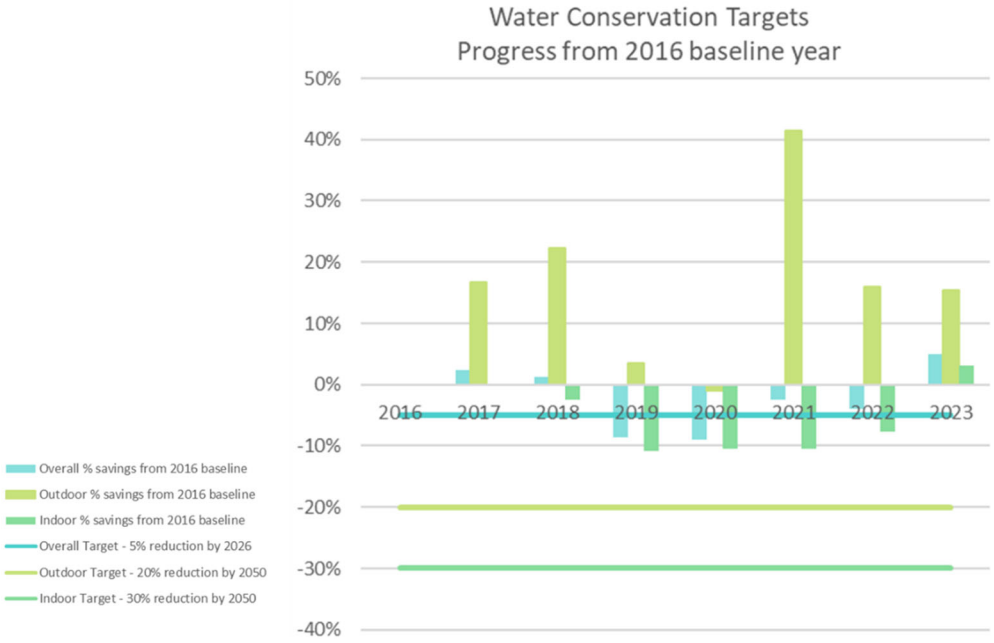

Figure 43: Water Conservation Targets Progress from 2016 Baseline Year

6.4 Work Completed in 2023

Civic Water Conservation: The City uses over 1.5 billion litres of water each year in its facilities and operations. Two thirds of civic water use (excluding community use) is outdoors during summer, 51% for green space irrigation. An irrigation pilot in the summer of 2022 used software and weather information to reduce the amount of water used in irrigating municipal parks. The system considers rainfall, temperature, and wind to determine the amount of irrigation needed to maintain turf quality. Building on a 2021 pilot of 10 parks, the 2022 project involved 46 test sites. The pilot surpassed expectations, reducing water use by approximately 39 million litres and emissions by about 16.8 tCO2, and realizing cost savings of $98,000.

Irrigation: Over the past three years, irrigation pilot projects, which use software and weather information to reduce the amount of water used in irrigating parks, have been conducted. In 2023, the irrigation project was conducted to improve irrigation of sports fields that have higher maintenance and turf quality standards compared to other irrigated turf in parks. Six of the seven pilot sports fields showed water savings, while one showed a slight increase in water use. Overall, the pilot sports fields reduced water use by 29-40% compared to the control group. This amounted to savings of 17 million litres of water, $65,000, and 8 tonnes CO2e. Based on the irrigation pilot projects, plans to do a network-wide irrigation upgrade project from 2025-2028, funded with a green loan, are underway.

Figure 44: Park Irrigation

Spray Pads: In 2023, a spray pad efficiency project was completed at two spray pads – Pleasant Hill and Wallace Parks. The project saved 6.4 million liters of water, $24,000 and 2.7 tonnes CO2e, by replacing nozzles and did not reduce the fun at these sites. This work will be expanded in 2024 by testing other equipment upgrades and, based on this testing phase, full efficiency upgrades will be planned at all 23 spray pads from 2025-2028, funded with a green loan.

Figure 45: Pleasant Hill Spray Pad

Park Upgrades: In 2023, 21 Parks were audited for potential irrigation and naturalization improvements and a Non-Potable Water for Irrigation Study was started. This work will help develop plans for future park improvements to reduce reliance on drinking water to maintain the City's natural infrastructure. These studies are being funded by the Natural Infrastructure Fund Grant. As part of the grant funding, Boughton and Leif Erickson Parks will be the first park upgrades to try some of these new approaches and will be upgraded in 2024. For more information visit https://www.saskatoon.ca/engage/boughton-park-upgrade and https://www.saskatoon.ca/engage/leif-erickson-park-upgrade.

Building Operator Training: Training was held in the Fall 2023 for 65 civic staff from Facilities. This training included a water conservation module as part of the 1-day session.

Healthy Yards: The Healthy Yards Program is a partnership that creates free and regionally specific materials designed to educate the public on how to create a healthy yard and garden. The programming focuses on practices, such as home composting, outdoor water conservation, pesticide reduction, and food production. As part of the program, the Saskatchewan Waste Reduction Council administered and gave out $20 compost bin and rain barrel rebates for the City. In 2023, the rain barrel rebate was increased from $20 to $40 per barrel, and a $100 rebate for income-qualified residents who are part of the Leisure Access or Transit Subsidy programs was added. In 2022 and 2023, 68 compost bins and 291 rain barrel rebates were issued, as well as five rain barrel rebates to income-qualified residents. We estimate these rebates will, cumulatively from 2017-2023, save 1.9 million litres of water per year.

Figure 46: Program Communication

Environmental Grant: Funding is available to non-profit organizations implementing initiatives that support the City's strategic goal of Environmental Leadership. Initiatives prioritized for funding in 2023 include those that increase awareness and protection of our water resources. In addition to many projects with broad sustainability benefits that included water conservation, organizations, and projects funded in 2023 with a focus on water included:

- Saskatchewan Environmental Society: Within the Smarter Science Better Buildings Program, content for materials will be updated and displayed at the Western Development Museum. This program serves to educate residents on how to conserve energy and water in building systems.
- Buena Vista Community Association: In partnership with the Public-School Division, Buena Vista Boulevard Garden Group will install a permanent water source for the expansion of their garden. Expansion items include native plant beds and prairie-friendly food plans, a little library, welcoming signs, rain barrels, and communal tools for garden volunteers.
- Greater Saskatoon Catholic School Foundation: At Bethlehem Catholic High School, a garden tower machine will be purchased to grow food for cooking class, Indigenous plants/herbs, and grow plants for all classes to green the school. This project will increase the green space in every classroom, use 2% of the water that traditional gardening takes, increase yields of produce by 30%, and students will use this resource to learn about how to grow and use their own food.

- Saskatchewan Association of Watersheds: This project will procure additional loanable, educational, curriculum-linked kits for schools in Saskatoon that educate students about everything watershed related, including environmental protection and conservation.
- Native Plant Society of Saskatchewan: Expanding Wild About Saskatoon's Pollinator Paradise YXE to increase Saskatoon's biodiversity and green network by developing a Saskatoon-specific business case for replacing "conventional" landscaping with native plants.

Energy Assistance Program: In partnership with SaskPower, this program provides energy and water efficiency education and free installation of energy and water saving measures to residents (both renters and owners) who have not traditionally been able to access other efficiency programs.

Saskatoon Home Energy Loan Program (HELP): HELP provides Property Assesses Clean Energy (PACE) loans to single-family residential homeowners to improve the energy and water efficiency of their home and install renewable energy. In 2022, 73 households participated in the program. Seven low-flow faucets, four low-flow toilets, and one permanently affixed rainwater catchments were installed reducing an estimated total 122,500 litres of water per year. In 2023, 44 households participated in the program. Three low-flow faucets, nine low-flow toilets, and two permanently affixed rainwater catchments were installed reducing an estimated total 234,600 litres of water per year.

7.0 OUR FINANCES

7.1 Utility Bills

Residential water-related utility charges were $153.59 per month in 2023, based on a standard 3/4-inch meter connection and a monthly water volume of 25.5 m^3 (900 ft^3). Saskatoon residents with smaller 5/8-inch water meters, which are common in core neighbourhoods, pay $13.02 less per month on the fixed portion of their utility bill. In 2022, 50% of meters for single residential homes were 5/8 inch and 50% were 3/4 inch. All new homes are fitted with 3/4-inch meters, which meet customers expectations for water demand for watering lawns, etc.

Infrastructure Levies include the Roadway Levy and the Redevelopment Levy, which were phased in between 2014 and 2016. See Appendix Three for more information about utility bill charges. Saskatoon's total water, wastewater, and storm water[2] utility bill remains low at average residential water volumes compared to other cities in Alberta, Manitoba, and Saskatchewan. Based on the standard water meter size and monthly water volume of 25.5 m^3, the utility bill in Saskatoon was 14.2% higher than in Calgary, which has the lowest utility bill; and 16.7% lower than in Edmonton, which has the highest bill. Under Saskatoon's inclining block rate system, water and wastewater rates increase at volumes of 17 m^3 (600 ft^3) and 34 m^3 (1,200 ft^3).

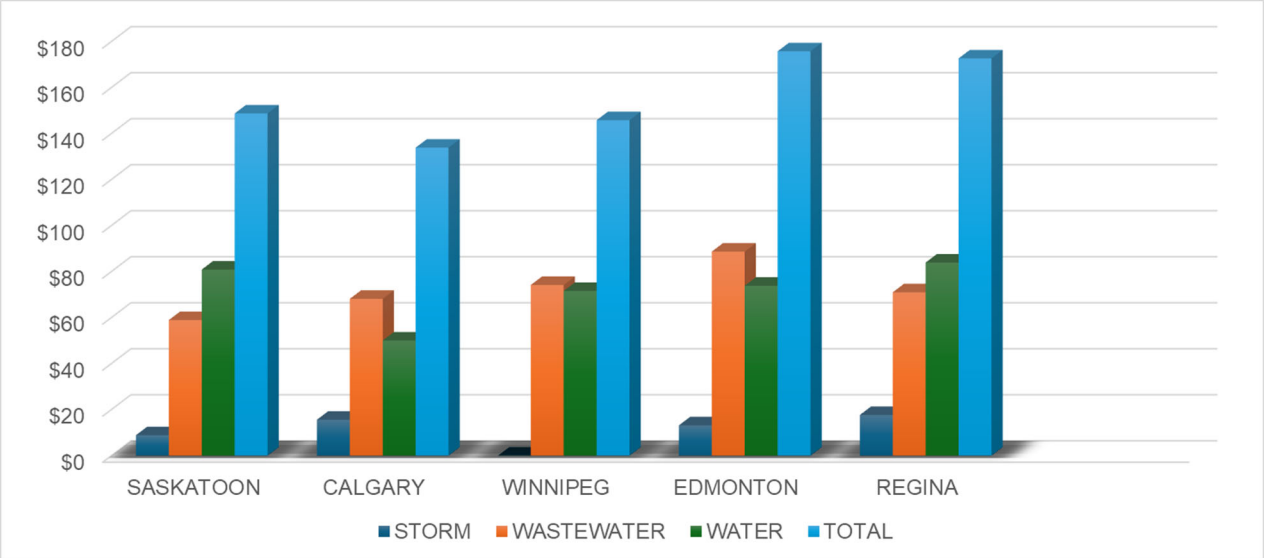

Figure 47: Residential Water, Wastewater, and Storm Water Monthly Charges by Utility [3/4 inch meter and volume of 25.5 m^3 (900 ft^3)]

7.2 Financial Summary

The Water and Wastewater Utilities are based on a user-pay principal and are fully funded through their rates. In 2023, the two utilities collected $192.5 million in total revenues and had $184.2 million in total expenses for a positive variance of $8.214 million.

[2] The 2022 Storm Water Utility Annual Report documents Saskatoon's storm water financial information and other highlights.

Table 9: Water and Wastewater Revenues and Expenditures ($1000s).

Water and Wastewater Statement of Revenues and Expenditures ($1000s)				
	Water Utility 2023	Wastewater Utility 2023	Consolidated 2023	Consolidated 2022
Total Revenues	**106,459**	**86,004**	**192,462**	**181,007**
Expenditures				
Utility Operations	17,136	12,775	29,910	31,314
Public Works Operations	16,780	11,357	28,137	28,872
Administration & General	2,981	1,249	4,231	3,406
Corporate Services & Billing	3,247	2,386	5,633	5,425
Capital Charges	28,847	19,339	48,186	48,088
Infrastructure Services Capital Reserve	18,100	24,996	43,096	40,365
Grants-in-lieu of Taxes	7,640	5,082	12,761	12,343
Return on Investment	7,144	5,150	12,294	11,698
Total Expenditures	**101,915**	**82,334**	**184,249**	**181,512**
Revenues less Expenditures	**4,544**	**3,670**	**8,214**	**505**
(To)/From Stabilization/ Capital Reserves	**(4,544)**	**(3,670)**	**(8,214)**	**(505)**

Positive Water and Wastewater variances fund the Water and Wastewater Revenue Stabilization Reserve which is utilized in years when there is an operating deficit (negative variance). The Stabilization Reserve has a maximum allowable balance of 5% of the current year's budgeted metered revenue and Infrastructure Levy. Any amount that exceeds the maximum is transferred to the Waterworks Capital Projects Reserve, the Sewage Treatment Capital Reserve, or the Infrastructure Replacement Reserve.

Total Utility revenues increased by 6.33% in 2023 as a result of higher metered revenues.

The Water Utility accounts for 60% and Wastewater for 40% of revenues.

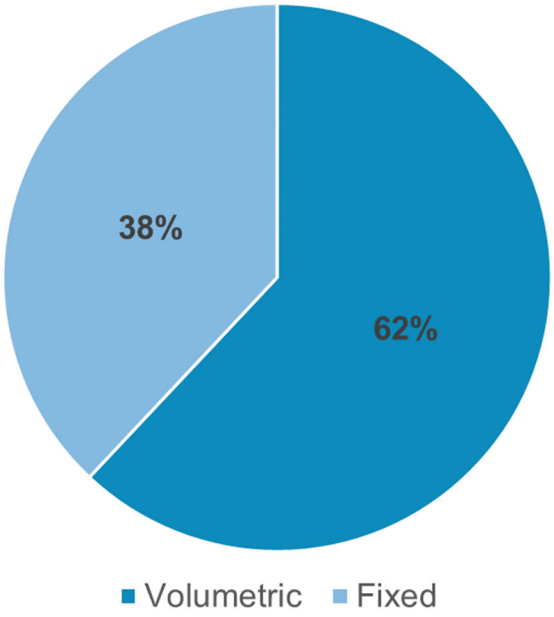

Figure 49: Water and Wastewater Revenue Chart, by Customer Class

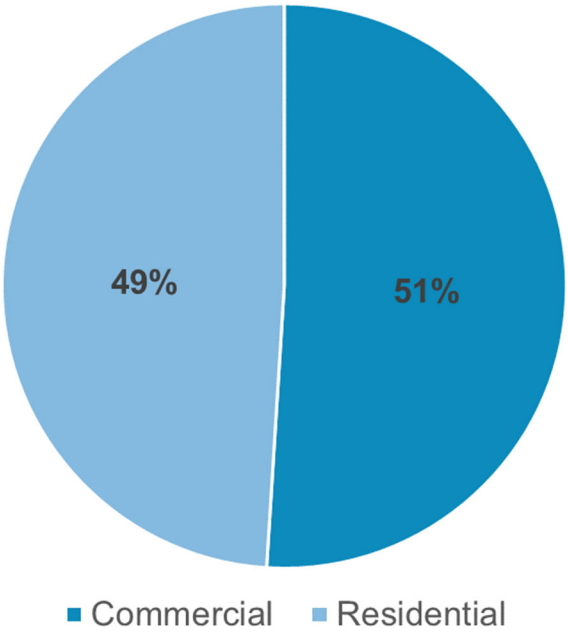

Figure 50: Water and Wastewater Revenue Chart, by Rate Type

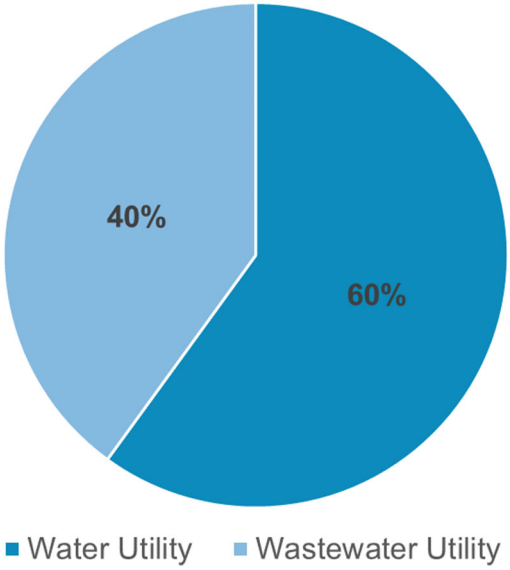

Figure 48: Percentage of Revenue by Utility (Water or Wastewater)

Commercial customers account for 51% of Water and Wastewater's total revenues. About 62% of revenues are based on volumetric charges and 38% are from fixed charges.

In 2023, total expenditures were 1.5% higher than 2022 as a result of increased contributions to Grants-in-Lieu of Taxes and Return on Investment; as well as capital investment; materials and supplies; security costs, which were partially offset by decreased maintenance work; and savings in salaries, training, utilities, and special services expenses resulting in actual expenses 0.68% less than budgeted. Total 2023 revenue was 3.75% more than budgeted. Overall, the results were a positive balance of $8.214 million, which was transferred to the Water and Wastewater Revenue Stabilization Reserve.

Funding to the Roadways, Fleet and Support, and WWO departments to deliver the day-to-day operation and maintenance of the water distribution, collection, and drainage systems accounted for 15.3% of total expenditures. Funding for the Infrastructure Services Capital Reserve accounted for another 23.4% of expenditures.

An original Infrastructure Levy was implemented to fund the Infrastructure Services Capital Reserve for water distribution and wastewater collection system rehabilitation and replacement projects needed to address aging infrastructure and eliminate the water main replacement backlog to meet service levels. A Redevelopment Levy was added in 2013 and a Roadway Levy was added in 2014, which now generate $3.8 million and $6.0 million, respectively, annually for a total of $9.8 million in 2023.

In 2023, the Water and Wastewater Utilities paid $12.3 million (planned to be 10.0% of metered budgeted revenue) Return on Investment (ROI). The year 2020 was the final year of a five-year, phase-in plan for the ROI, which after that was to be 10% of budgeted metered revenues. The Utilities also paid $12.8 million in 2023 to the City as Grants-in-Lieu of Taxes.

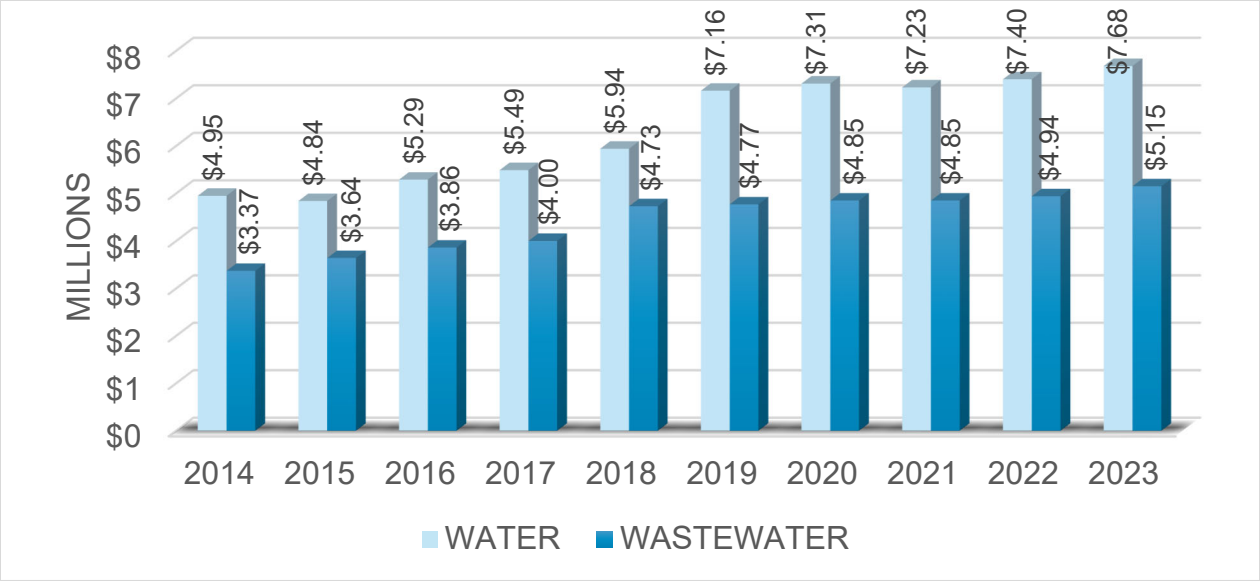

Figure 51: Water and Wastewater Utility Grant-in-Lieu of Taxes ($ Millions)

7.3 Water Utility

Revenues

The Water Utility's 2023 total revenues of $106.5 million were $3.2 million or 3.10% more than budgeted. Total revenues increased by 6.4% from 2022.

Other revenues included late payment penalties and some miscellaneous revenue.

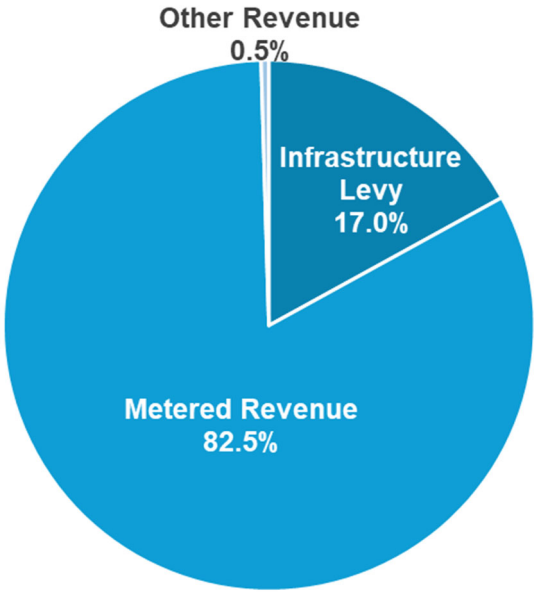

Figure 52: Water Utility Revenue

Expenses

The Water Utility's 2023 expenses of $101.9 million included the following:

- Saskatoon Water Water Utility Operating expenses, of $20.1 million, include water treatment, pumping, storage, Meter Shop, administration, and general expenses incurred by Saskatoon Water.

- WWO operating expenses, of $16.8 million, include funding to the department to operate and maintain the water distribution system.
- Saskatoon Water Capital, of $28.8 million, funds all capital work related to the WTP and reservoirs, including debt servicing costs.
- Infrastructure Replacement Reserve – Water and Wastewater, of $18.1 million (funded by the Infrastructure Levy), includes capital replacement of the water distribution systems, roadway damage associated with the utility, and water upgrades for core area developments.
- Corporate Charges, of $10.9 million, include the Grants-in-Lieu of taxes, cross-charges for customer billing and collections, and corporate administration.
- ROI of $7.1 million.

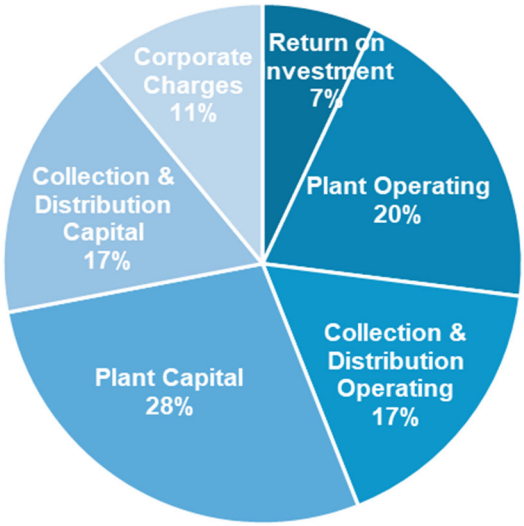

Figure 53: Water Utility Operating Expenses

The Water Utility's 2023 total expenses were 1.3% under budget due to savings in distribution costs, chemicals, special services, contractor costs, equipment maintenance and training, offset by increases in utilities, security costs, material and supplies and increased transfers to Capital Reserves. Expenses were 0.2% more than in 2022 due to inflation, Grants-in-Lieu of Taxes and Return on Investment increases, and an increased

contribution to the Capital Reserves, offset by various savings, such as for training, and construction and maintenance costs.

Financial Statement

Table 10: Water Utility Statement of Operating Revenues and Expenses ($1000s)

Water Utility Statement of Operating Revenues and Expenses ($1000s)	2023 Budget	2023 Actual	2022 Actual
Revenues			
Metered revenue	85,328	87,853	82,647
Infrastructure Levy	17,419	18,100	16,953
Other revenue	515	505	495
Total Revenue	103,262	106,459	100,095
Expenses			
Water Treatment, Pumping, Storage	16,410	15,081	16,321
Water Meters	2,397	2,055	2,168
Water Administration & General	2,557	2,981	1,586
Corporate Services	3,513	3,247	3,078
Distribution (Public Works)	17,456	16,780	17,982
Capital Charges	28,688	28,847	29,415
Provision to Infrastructure Services Capital	17,419	18,100	16,953
Grants-in-lieu of Taxes	7,680	7,680	7,400
Return on Investment	7,144	7,144	6,778
Total Expenses	103,262	101,915	101,682
Revenues less Expenses	-	4,544	(1,857)
(To)/From Stabilization/Capital Reserves	-	(4,544)	1,857

The positive balance of $4.544 million was transferred to the Water and Wastewater Revenue Stabilization Reserve.

7.4 Wastewater Utility

Revenues

The Wastewater Utility's Revenues increased by 6.3% from 2022 due to greater than anticipated metered revenues.

Expenses

The Wastewater Utility's 2023 expenses, of $82.3 million, included the following:

- Saskatoon Water Wastewater Utility Operating expenses, of $14.0 million, include wastewater treatment, pumping, sludge handling and disposal, administration, and general expenses incurred by Saskatoon Water.
- WWO operating expenses, of $11.4 million, include funding to WWO to operate and maintain the wastewater collection system.
- Saskatoon Water Capital, of $19.3 million, funds capital work related to the WWTP.
- Infrastructure Replacement Reserve – Water and Wastewater, of $25.0 million, funds capital replacement of the wastewater collection systems, roadway damage associated with the utility, and wastewater upgrades for core areas.
- Corporate Charges, of $7.5 million, include the Grants-in-Lieu of Taxes, cross-charges for customer billing and collections, and corporate administration.
- ROI, of $5.2 million, is provided to the City for general operations.

The Wastewater Utility's 2023 expenses were 0.11% more than budgeted due to contributions to reserves, collection maintenance costs offset by savings in training, overtime, contract support costs, special services, utilities, chemicals. Expenses were about 3.1% more than in 2022 due to increases in ROI, Grants-in-lieu, contributions to Capital reserves and capital charges, and collection maintenance costs.

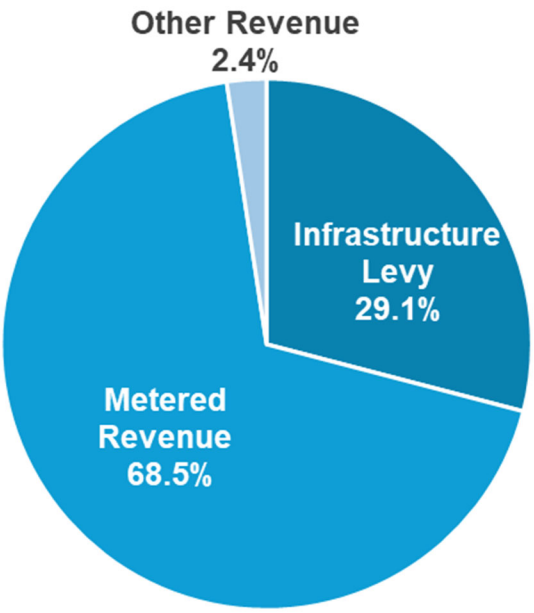

Figure 54: Wastewater Utility Revenue

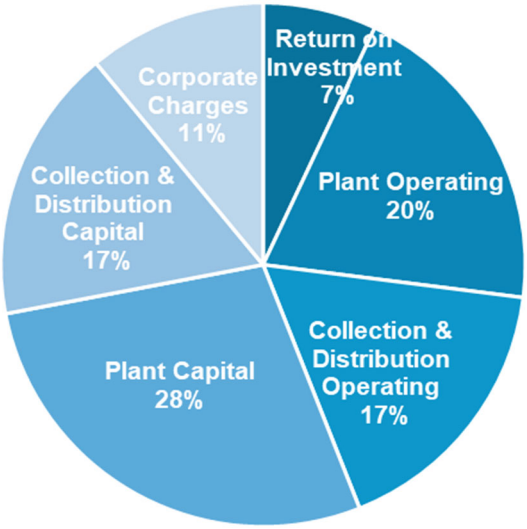

Figure 55: Wastewater Utility Operating Expenses

Financial Statement

Table 11: Wastewater Utility Operating Revenues and Expenses ($1000s)

Wastewater Utility Statement of Operating Revenues and Expenses ($1000s)	2023 Budget	2023 Actual	2022 Actual
Revenues			
Metered revenue	56,464	58,932	55,877
Infrastructure Levy	23,731	24,996	23,412
Other revenue	2,051	2,076	1,623
Total Revenues	82,246	86,004	80,912
Expenses			
Wastewater Treatment	11,042	8,952	9,031
Wastewater Lift Stations	2,299	2,312	2,295
Wastewater Sludge Handling & Disposal	2,072	1,510	1,498
Wastewater Administration & General	2,105	1,249	1,820
Corporate Services	2,451	2,386	2,348
Collection (Public Works)	9,503	11,357	10,890
Capital Charges	18,810	19,339	18,673
Provision to Infrastructure Services Capital	23,731	24,996	23,412
Grants-in-lieu of Taxes	5,082	5,082	4,943
Return on Investment	5,150	5,150	4,920
Total Expenses	82,246	82,334	79,830
Revenues less Expenses	-	3,670	1,082
(To)/From Stabilization/Capital Reserves	-	3,670	1082

The positive balance of $3.67 million was transferred to the Water and Wastewater Revenue Stabilization Reserve.

7.5 Water and Wastewater Reserves

Maintaining balances in reserves is essential for the Utilities to have the capacity to pay for revenue shortfalls or unexpected operating expenses that are higher than budgeted and for large long-term capital projects, such as plant improvements and expansions.

As of December 31, 2023, balances for Water and Wastewater Utility reserves were $39.8 million. The Water and Wastewater Revenue Stabilization Reserve balance is $9.1 million. This reserve is funded from operating surpluses, up to a maximum balance of 5% of revenues, and is used to fund annual operating deficits. Other reserves fund longer-term capital asset replacements, expansions, and enhancements needed to meet water and wastewater service levels that customers expect and regulatory requirements. End-of-year Capital and Replacement Reserve balances total $15.71 million for Water, $13.44 million for Wastewater, and $1.49 million for Water and Sewer infrastructure (e.g. manholes, pipes). See the table below for reserve details.

Table 12: Operating Stabilization and Capital Reserves Balances, Dec 31, 2023 ($1000s)

Operating Stabilization and Capital Reserves Balances as of December 31, 2023 ($1,000s)	
W/WW Revenue Stabilization Reserve	$9,147
Waterworks Capital Projects Reserve	$15,493
Water Replacement Reserve	$216
Wastewater Capital Projects Reserve	$10,615
Wastewater Replacement Reserve	$2,825
Water and Sewer Infrastructure Replacement Reserve	$1,494
Total	**$39,790**

2023 Waterworks Financial Overview

- Total waterworks revenues (R) 192,463,159.36
- Total waterworks expenditures (E) 179,926,451.58
- Total debt payments on waterworks infrastructure loans (D) 12,536,707.78
- Comparison of waterworks revenues to (waterworks expenditures plus waterworks debt payments), expressed as a ratio:

$$R = (1192,463,159.36) /(1179,926,451.58+12,536,707.78) = 1.00$$

8.0 OUR CHALLENGES

Saskatoon Water, Water and Sewer, and Technical Services have been proactive in anticipating and managing the following ongoing challenges:

Keeping Up with Growth: Saskatoon's growth in population and development has required additions to water infrastructure with large up-front capital expenditures. Construction costs fluctuate depending on competing demands for contractor services. Saskatoon Water is continually coordinating multiple capital projects to respond to growth and has identified ways to defer some capital capacity expenditures. Long-term capital development plans are continually updated for the Water and Wastewater Treatment Plants and for the water distribution and collection systems.

Infill Development: Cumulative impacts of infill development are placing higher demands on the carrying capacity of existing water and sewer infrastructure. Expanding water and sewer underground linear infrastructure in developed areas is more expensive, technically challenging, and disruptive, than constructing infrastructure in new greenfield areas.

Brown Field Construction: Similar to the challenges of infill development, construction at the WTP and WWTP requires extensive planning to work around existing infrastructure and maintain service while upgrades continue.

Condition and Capacity of Existing Infrastructure: Some infrastructure has entered into a "replacement era" where asset sustainability and reliability will be at risk if not properly managed. Some of the infrastructure is over 100 years old and does not meet modern design standards for new development areas. Monitoring and assessing the physical condition and capacity of the infrastructure has been initiated as a foundation for an asset management program to better maintain our assets, prolong life, and increase resiliency.

Climate Change: Changing temperature and rainfall patterns impact demand for water, with high-peak demands during dry stretches. Wet weather conditions and extreme rain events can cause storm water infiltration to the sanitary system, resulting in sewer back-ups and flooding. Extremely cold weather and freeze/thaw cycles can increase water main breaks, creating challenges to meet repair service levels.

Reducing Greenhouse Gases and Our Environmental Footprint: Steps are being taken to reduce GHG and optimize energy usage through the Energy Management Program. Measures are also being undertaken to reduce water leakages and conserve water through the Water Conservation Strategy. Saskatoon Water is updating long-term capital development plans to include the energy optimization goals, while working towards better water efficiency.

Regulatory Requirements: The provincial Permit to Operate impacts the required processes and standards for the WTP and WWTP. Further evolving federal and provincial regulations have the potential to impact discharges to the river. Saskatoon Water and

Water and Sewer will continue to monitor regulatory trends and opportunities to be a leader in protecting our watershed.

Inflow and Infiltration: Identifying and removing the amount of inflow and infiltration entering the sanitary sewer system will help to protect the environment, reduce sewer back-ups, and reduce costs for collection and treatment. Partial treatment of high flows, which are mostly rain or groundwater, will be considered as the WWTP reaches capacity.

Inadequate Space for Personnel, Materials, and Equipment: WWO's current facilities are not optimal for accommodating current and expected future staff, material, and equipment necessary to meet the needs of a growing city. The department has been improving communications with remote work sites and adapting existing spaces to meet requirements. The department will continue to make creative short-term adjustments and work towards suitable long-term replacement space.

Employee Retention: As a section, the majority of Water and Sewer's employees are unionized by CUPE Local No. 859, which provides opportunity for movement and growth within the corporation. Management turnover also has been relatively high. Employee turnover can cause stress to individual groups because of the change in work group dynamics and the time and expenditures to train employees in new roles.

Meeting Approved Level of Service: Water and Sewer aims to reach their level of service of no more than 48 hours of water outage after a main break. This goal, combined with the new planned work program, is harder to reach with current resources.

Incomplete Integrated Asset Management Approach: Water and Sewer lacks an integrated asset management strategy to maintain and replace assets based on lowest life-cycle cost. Work will continue on the development of an Asset Management Strategy and Policy for linear water and sewer infrastructure, with an annual maintenance workplan, including labour, materials, equipment, and schedules that are integrated with the other sections. Benchmarking data for Key Performance Indicators are expected to be defined to measure success. A funding plan will be identified to meet levels of service. A service area asset management strategy for all water utilities is targeted for December of 2023.

Non-standard Equipment: WWO has a range of non-standard equipment that has created maintenance and training challenges. The Department will continue to identify equipment needs, specifications and participate in procurement activities, with the objective of standardizing equipment where possible.

Incomplete Integrated Equipment Life Cycle Management Plan: WWO does not have a plan for managing equipment maintenance and replacement for lowest life-cycle costs. The department will continue efforts to develop a life cycle management plan, including expansion, proactive maintenance, and optimized replacement plan. The Department will also continue to enhance equipment training and maintenance programs and develop service agreements with service providers, where appropriate. This will be integrated into the service area asset management strategy.

9.0 CONCLUSION

The year 2023 continued to be transformational for the Water and Wastewater Utilities. Workplace policies and procedures were revised to maintain reliable, high-quality essential water services. Significant progress was made on capital projects and long-term planning, which will be vital for reliable water services, both now and in the future.

The Utilities' employees look forward to the challenges and the opportunities that the future presents, including the following areas of focus:

- Enhancing employee engagement and striving to meet all safety goals.
- Continuously improving operations to minimize our environmental impact through energy reduction initiatives and water conservation work, including process efficiency and water reuse.
- Executing long-term strategies and funding plans to keep up with growth and to maintain and replace aging infrastructure based on lowest life-cycle costs.
- Adapting to climate change impacts through mitigation of impacts and by reducing our overall environmental impact, such as with the quality of water returned to the river.

The delivery of essential water and wastewater services is dependent on the dedication and skills of our employees. Our competent team of plant operators, tradespersons, maintenance staff, engineers, technologists, technicians, and administrators play a crucial role. The continued guidance and support of our General Managers, City Manager, and City Council is appreciated.

10.0 APPENDICES

Appendix One: Abbreviations

AMI: Advanced Metering Infrastructure

CALA: Canadian Association for Laboratory Accreditation Inc.

CBOD: Carbonaceous Biochemical Oxygen Demand

CFU: Colony Forming Unit

City: City of Saskatoon

GHG: Greenhouse Gases

IEC: The International Electrotechnical Commission

ISO: The International Organization for Standardization

MLD: Million litres per day

MPN: Most Probable Number

NTU: Nephelometric Turbidity Units

PLC: Programmable logic controls

ROI: Return on Investment

TP: Total Phosphorous

WSA: Water Security Agency

WWO: Water and Waste Operations

WTP: Water Treatment Plant

WWTP: Wastewater Treatment Plant

Appendix Two: Glossary

Backflow Prevention Device: A device installed to prevent liquids or solids from mixing with drinking water, whereby one or both of them becomes or may become contaminated or polluted. A backwater valve is a device that prevents sewage from backing up into basements.

Biosolids: Organic matter recycled from sewage.

Capital Reserve: Funding that is reserved for long-term infrastructure projects to be undertaken in the future.

Colony Forming Unit (CFU): A measure of viable bacterial cells.

Commercial customers: For this report, refers to all non-residential customers and includes retail, wholesale, industrial, and institutional customers.

Cross Connection Control Program: A cross connection is any link between the water supply and potentially contaminated sources. The Cross Connection Control Program ensures that proper backflow prevention devices are installed and tested to prevent foreign substances from entering the water distribution system.

Digester: One step of the wastewater treatment process used to decrease the amount of organic matter present.

Effluent: Treated water discharged back into the river.

Ferric: Iron-containing materials or compounds.

Grants-In-Lieu of Taxes: Money paid by the Water and Wastewater Utilities in place of taxes.

Infill (Development): Development of land within already developed areas.

Infiltration: Groundwater seeping into sanitary sewers through cracks and crevices, such as defective pipe joints and broken pipes.

Inflow: Water flowing into the sanitary sewer through large openings, such as cross connections and weeping tile.

Irrigation: Applying water to support plants growth and green spaces health, typically due to low amounts of rainfall.

Lift Station: Facility designed to move wastewater or storm water from lower to higher elevations with pumps.

Low-Flow Fixture: Fixtures that use water efficiently to reduce overall water usage.

Meter Shop Service Calls:

- Meter Checks: Meter verifications completed when meter recording information is deemed likely to be inaccurate (i.e. not recording or low or change in consumption).

- Cut-offs: Water service is turned off because of arrears, seasonal (irrigation), demolitions, renovations, etc.

- Reconnects: Water service is turned on seasonally, after payment is made on an arrears account, demolition or renovations are completed, etc.

- Repairs/Other: Work is completed to fix module wiring or modules, test meters, etc.

- Lock ups: Visits to sites where access to meters is not possible (homeowner away or not allowing access). A card is left instructing the homeowner to contact the Meter Shop for information and to arrange an appointment.

- Replacements: Old meters that are no longer working, are leaking, or require replacement due to updates in technology are replaced with new meters.

- New installations: Meters are installed in new buildings in order to complete the water service connection.

Nephelometric Turbidity Units (NTU): A measure of the amount of light that is passed through a sample. A high turbidity level may result from a variety of sources and can indicate the potential for pathogens and lower clarity.

PCSWMM: Computer software for wastewater, watershed, and storm water management modeling.

Potable: Safe to drink.

Procurement: The process of obtaining or purchasing.

Stabilization Reserve: Water utility revenues fluctuate due to rainfall and demand for irrigation. Annual operating surpluses, which are more likely during drier years, are allocated to the Stabilization Reserve that can be used in years with an operating deficit. The Stabilization Reserve is capped at 5% of the current year's budgeted metered revenue, and any additional surplus is allocated to the Capital Reserve(s).

Turbidity: The cloudiness or haziness of a fluid caused by a large number of individual particles that are generally invisible to the naked eye.

WaterCAD: Computer software to analyze, design, and optimize water distribution systems.

XPSWMM: Computer software for storm water modeling, including hydrology, hydraulics, water quality, and surface flooding.

Appendix Three: Understanding Your Residential Water-Based Utility Bill

The bill was simplified in 2019, and the details can be viewed on the City's website. The 2023 rate structure remained the same except for the elimination of the Temporary Flood Protection Charge.

WATER, SEWER & INFRASTRUCTURE **Billing Period** May 18, 2021 - Jun 18, 2021

Meter No. 123456789

Current Billing Read	Previous Billed Read	Multiplier	Usage
Jun 18 Actual 1236.33	May 18 Actual 1222.28	35.315	496.18 ft3

	Amount
Water	$23.32
Water Service Charge for 31 days	$19.23
Sewer	$12.08
Sewer Service Charge for 31 days	$19.23
Infrastructure	$17.48
	$91.34
TEMPORARY FLOOD PROTECTION CHARGE	**$1.15**
STORM WATER MANAGEMENT CHARGE	**$7.92**
RECYCLING CHARGE	**$7.61**

Figure 56: Sample Residential Water-Based Utility Bill (2021)

Water Service Charge: The fixed monthly charge for a 5/8-inch water meter is $13.02, and $19.53 for a 3/4-inch meter. The fee is prorated by the number of days in the month. A second water service charge is based on water usage (volumetric): $5.068 per 100 ft^3 for the first 600 ft^3, $5.713 per 100 ft^3 for the second 600 ft^3, and $7.521 per 100 ft^3 for over 1,200 ft^3. The water service charges are used to fund water utility operations and capital projects.

Sewer Service Charge: The fixed monthly sewer service charge is based on the size of the water meter and is the same amount as the fixed water service charge. The sewer volumetric charge is 50.5% of the water volumetric charge. Rates are set on a cost recovery basis and recognize that not all water returns to the sanitary sewer: $2.559 per 100 ft^3 for the first 600 ft^3, $2.885 per 100 ft^3 for the second 600 ft^3 and $3.798 per 100 ft^3 for over 1,200 ft^3. Sewer service charges fund wastewater operations and capital projects.

Residential Infrastructure: The fee is $3.786 per 100 ft^3 of water usage. This fee is used for the capital replacement and upgrade of the water distribution and wastewater collection systems. The Redevelopment Levy to increase capacity of existing infrastructure to accommodate infill developments and the Roadways Levy that funds remediation of roadway damage associated with the utilities are included in the charge.

Storm Water Management Charge: The monthly charge for residential properties is a fixed amount of $8.90 prorated by the number of days in the month. This fee is used to fund operations and capital projects for storm water and for stabilizing riverbank slumping.