



WATER AND WASTEWATER UTILITIES

2022 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 2022 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 77,400 residential and commercial water meters. The Water Treatment Plant 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 Water and Wastewater 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 353 and 362 staff, depending on the season, were employed through these three departments to:

- Operate and maintain the Water Treatment Plant, three reservoirs and pump stations, the Wastewater Treatment Plant, 26 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 2022, treated water volumes were higher than 2020, lower than 2021, and approximately 2% less than the previous ten-year annual average. During 2022, 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 six years compared to the years before 2017. Volumes in 2022 were slightly higher than volumes in 2019.

Average monthly residential water-related utility bills of \$148.76 in 2022 remain below average when compared to other major prairie cities. In 2022, the Water and Wastewater Utilities collected \$181.0 million in revenues and incurred \$181.5 million in expenses, resulting in a \$0.5 million deficit. Compared to 2021, total revenues in 2022 decreased by 0.8% due to lower than forecasted miscellaneous revenues. Expenses increased by 6.1% due to increased contributions to Grants-in-Lieu of Taxes; as well as staff compensation, contractor costs, capital investment, electrical, gas, maintenance, and security costs; which were partially offset by decreased maintenance work due to capital investment, savings in training, and reduced special services. The Utilities contributed \$24.0 million to the City for Return on Investment and Grants-in-Lieu of Taxes.

In 2022, 48.9% of total revenues, or \$88.5 million, was allocated to capital to fund longer-term, water-related infrastructure projects. In 2022, the Utilities funded 95 active capital

projects valued at \$669.9 million. Significant 2022 capital project highlights include the following:

- McOrmond Drive Reservoir and Pump Station: Construction contract awarded.
- Water Treatment Plant Transfer Pumping and Electrical Upgrades: Construction continued to progress with completion estimated in 2024.
- Wastewater Treatment Plant Nitrification Expansion Conceptual Design: Completed in 2022.
- New Spadina Wastewater Lift Station and Force Main: Construction contract awarded.
- Hampton Village Business Park Lift Station and Force main: Design contract awarded.
- Wastewater Treatment Plant Digester Tank C Refurbishment: Construction contract awarded.
- 13.1 km of sanitary sewer main lined.
- 8.8 km of water main replacement.

In 2022, over 7,846 Advanced Metering Infrastructure (AMI) communication modules were installed to offer real-time, water-usage readings for customers, bringing the total to approximately 94% of all water meters updated since the program started in 2016. AMI module installations will continue in 2023.

The Utilities optimized exposure control plans for the COVID-19 pandemic in accordance with public health measures and *The Occupational Health & Safety Regulations* of Saskatchewan. The Wastewater Treatment Plant continued its partnership with the University of Saskatchewan and the Saskatchewan Health Authority to test for the COVID-19 virus in wastewater samples. The wastewater test results provided an early warning of trends in positive cases identified at COVID-19 testing centers and were provided to health officials for consideration in their planning decisions.

In January 2021, the City launched SAP as its Enterprise Resource Planning software, replacing roughly 280 systems, which were previously in place across the organization. Software modules for Finance, Supply Chain Management, and select areas of Human Capital Management were made available to the entire corporation, while Saskatoon Water also piloted the Enterprise Asset Management module. SAP continues to allow the City to fuse its many diverse processes and integrate them, creating a new energy and a unified approach to managing resources.

The Long-term Capital Development Strategy for the Water Treatment Plant 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.

1.0 OVERVIEW

1.1 Introduction

The Utilities fund the Saskatoon Water Department, Water and Sewer Section of the Water and Waste Operations (WVO) 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.



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, 26 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.

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 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 is a relatively new section, 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 \$8.1 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 2,351 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.

Municipal Engineering Services supports the Water and Sewer section of the WWO Department through program design, contract management, and Continuous Improvement initiatives.



Figure 7: Photograph of Work in an Excavated Trench

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.



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.



Our Values

Our values are part of who we are, what we stand for and how we behave towards each other.

PEOPLE MATTER

We work together as one team, seek input when it matters, support each other to grow and be our best selves, and foster a culture where we use our voices to drive change.

RESPECT ONE ANOTHER

We value the diversity each of us brings, celebrate our successes – big or small, and take the time to listen, understand and appreciate each other.

ACT AND COMMUNICATE WITH INTEGRITY

We are honest and take ownership of our actions, transparent in our decision-making, and question actions inconsistent with our values.

SAFETY IN ALL WE DO

We never compromise on the safety, health and well-being of ourselves and those around us, we put safety at the forefront of all decisions, and take responsibility to act on unsafe or unhealthy behaviours.

TRUST MAKES US STRONGER

We depend on each other and know we will do what we say, we assume the best of others, and support, inspire and empower each other every day.

COURAGE TO MOVE FORWARD

We lead and embrace change, think outside the box, and ask the tough questions.



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.

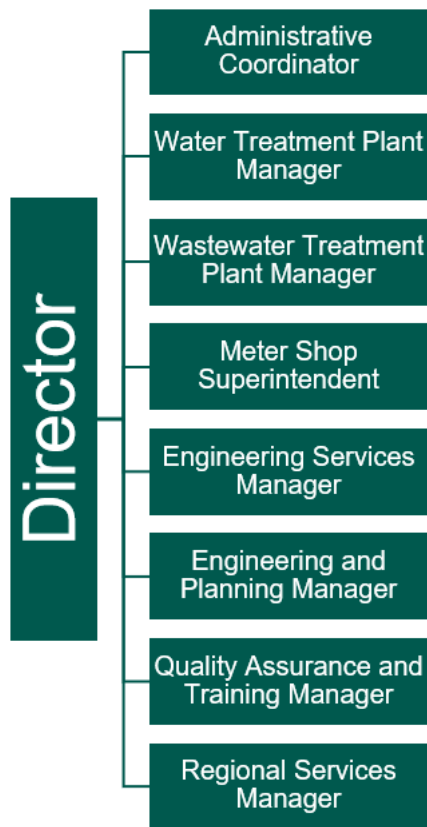


Figure 9: Saskatoon Water Management

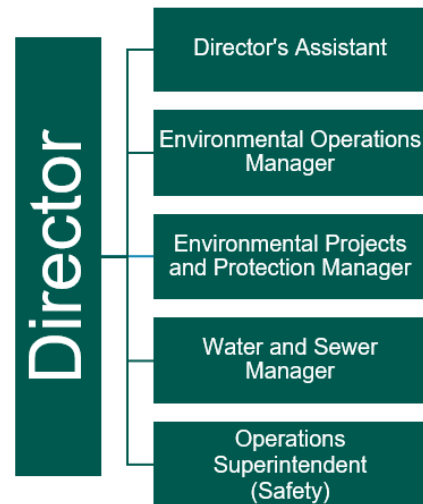


Figure 8: Water and Waste Operations Management

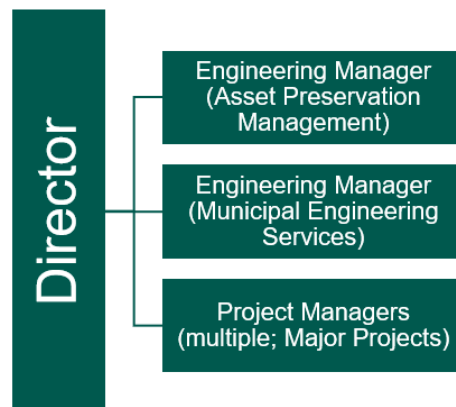


Figure 10: Technical Services Management

2.2 Number of Employees

Saskatoon Water had 183 employees as of December 2022. The graph below shows the distribution within each section. Director and support staff are included in Water Treatment.

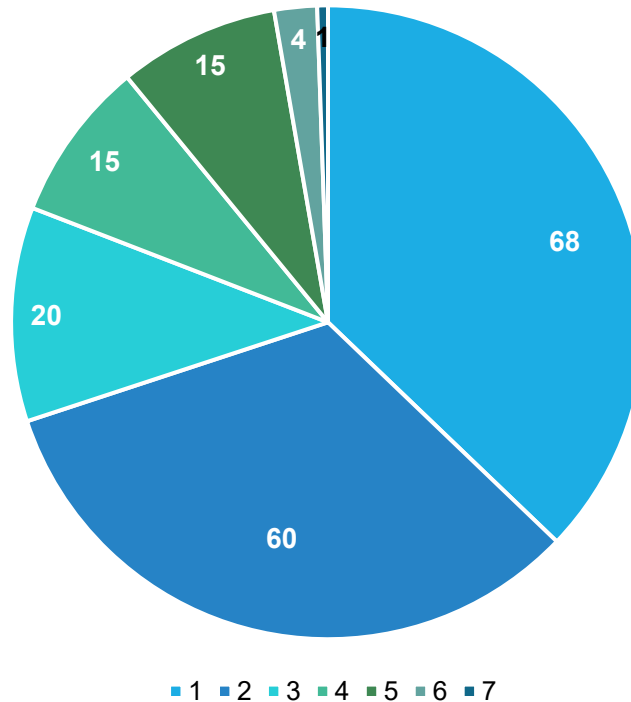


Figure 11: Employee Distribution within Saskatoon Water

At its peak in the fall, the Water and Sewer section of the WWO Department had 170 employees, and as of December 31, 2022, had 154. 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 2019 employment equity targets from the Saskatchewan Human Rights Commission (SHRC), Saskatoon Water had a higher 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, Dec 2022

Equity Group	Saskatoon Water	Water and Waste Operations	SHRC Target (2019)
Self-Declared as Indigenous Ancestry	5.46%	19.42%	14.0%
Self-Declared as Visible Minority	18.03%	8.26%	16.8%
Self-Declared as Person with Disability	2.73%	3.72%	22.2%
Self-Declared as Female	17.49%	11.98%	47.0%

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
- 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, a comprehensive audit was performed on health and safety policies and procedures. The audit recommendations resulted in improved document organization and accessibility, and a sustainable process through which health and safety documentation is regularly reviewed to ensure it is relevant and reliable.

In 2022, Saskatoon Water experienced one lost-time incident, less than the three reported in 2021. The number of lost-time days in 2022, due to injury, was just under four, down from 30 in 2021. In 2022, Water and Sewer experienced three lost-time incidents, compared to five in 2021. The number of lost-time hours was 397 in 2022, up from 224 in 2021. Technical Services had zero lost-time incidents in 2022.

SAFETY GOALS '22

SASKATOON WATER

BUILDING A POSITIVE SAFETY CULTURE

- ❑ Improve safety engagement through increased quality of work observations

- ❑ Increase the quality of JSAs through quarterly field level verification

- ❑ Increased visibility of Safety KPIs

- ❑ ICS 100 training completed for required staff and introduction to ICS for all staff

- ❑ Develop Risk-Based Contractor Safety Management Policy

100%

LEADING INDICATORS

- > Work Observations Conducted
- > Workplace Inspections Performed
- > Safety Meetings Conducted

ZERO

LAGGING INDICATORS

- > High Risk Incidents
- > Lost Time Incidents
- > Medical Aids Incidents
- > Preventable Vehicle Collisions

LIFE-SAVING BEHAVIOURS



Use, wear and maintain PPE appropriately.



Obtain authorization before entering a **CONFINED SPACE** and conduct continuous gas testing.



Follow **LOCK-OUT TAG-OUT** procedure before work begins.



Adhere to OHS protection against falling requirements at all times when **WORKING AT HEIGHTS**.



Adhere to all precautions and continuously assess risks when in **WORK ZONES**.



Follow standard operating **PROCEDURES** for safety when performing tasks.

.....
Director

.....
OHC Co-Chair Employer

.....
OHC Co-Chair Employee



Figure 13: Saskatoon Water's 2022 Safety Goal Poster

3.0 OUR CUSTOMERS

3.1 Number of Customers

In 2022, water treatment and distribution, and wastewater collection and treatment services were provided to approximately 290,800 Saskatoon residents. There are approximately 77,436 water meters, and of those, 4,538 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 seven 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, 34.4 million cubic meters of water was sold in 2022. Although the population has grown by approximately 15% since 2013, demand has not increased in a similar manner over the past ten years. 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, an increased water conservation awareness, and more recently the COVID-19 impact on commercial consumption.

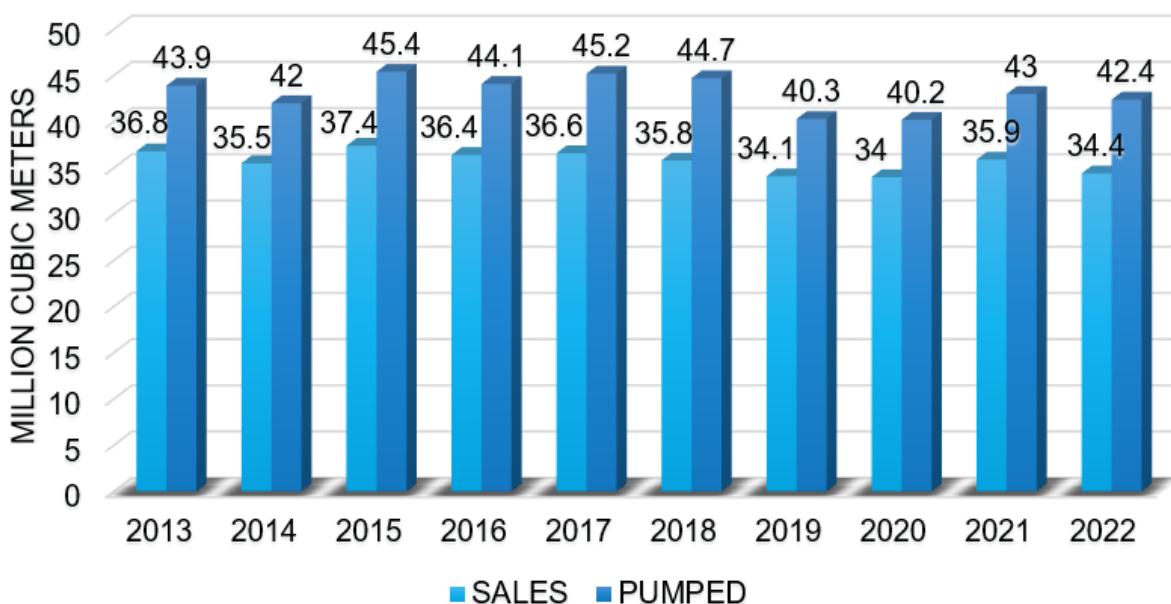


Figure 14: WTP Water Pumped and Sales Volume (million cubic meters)

The chart above 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 2022, unmetered water was 18.8% of total water pumpage (42.4 million cubic meters), which was slightly lower than 2021. 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 2022, Saskatoon recorded 203 mm of rainfall, which is lower than the last ten-year average of 265 mm, and approximately 40% higher than the 146 mm of rainfall received in 2021. This was the twenty-fifth lowest seasonal rainfall total since 1900.

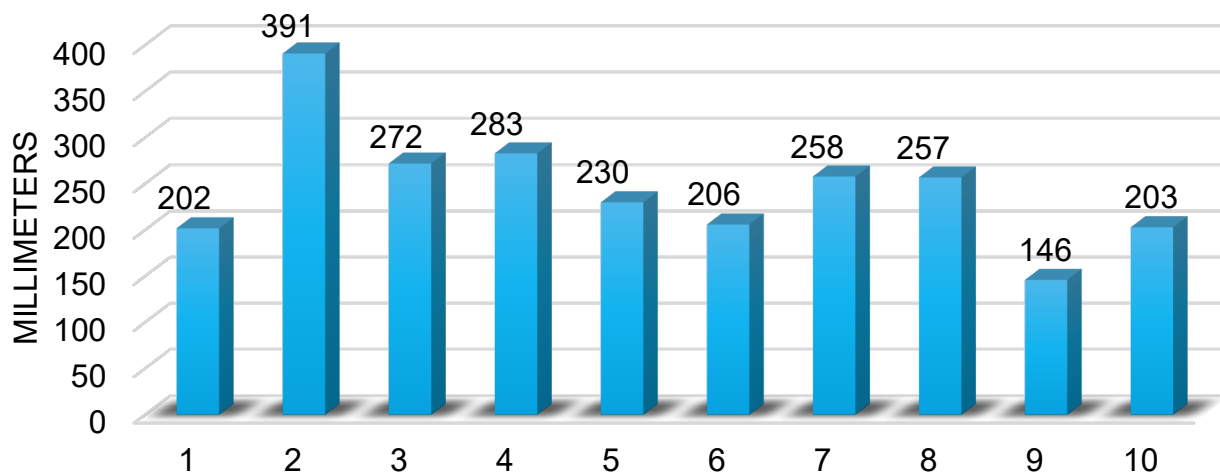


Figure 15: Saskatoon Annual Rainfall, millimeters (April to September)

Source: City of Saskatoon 2022 Annual Rainfall Report

Summer (May to August) temperatures in 2022 averaged 16.4°C, which was higher than the last ten-year average of approximately 16°C. The summer of 2022 received more rainfall than 2021, but less than the ten-year average. It was warmer than average but not as warm as the average temperature of 16.8°C in 2021. These are driving factors for consumption and water usage, which was similar to the previous year.

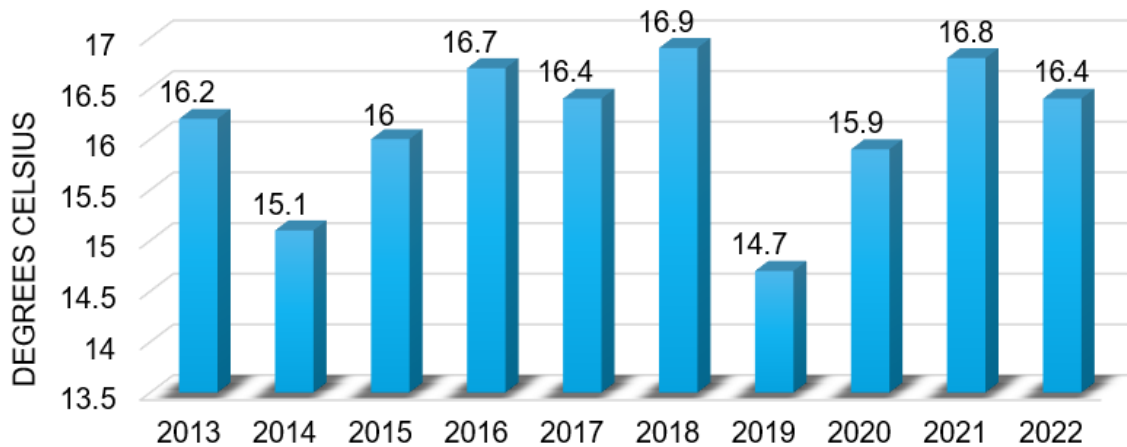


Figure 16: Saskatoon Seasonal Mean Temperature, Deg. Celsius (May to August)

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 chart below 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 2022, the maximum day pumpage to average day pumpage ratio of 1.75 was lower than the ten-year average of 1.84 and the lowest since 2013. 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.

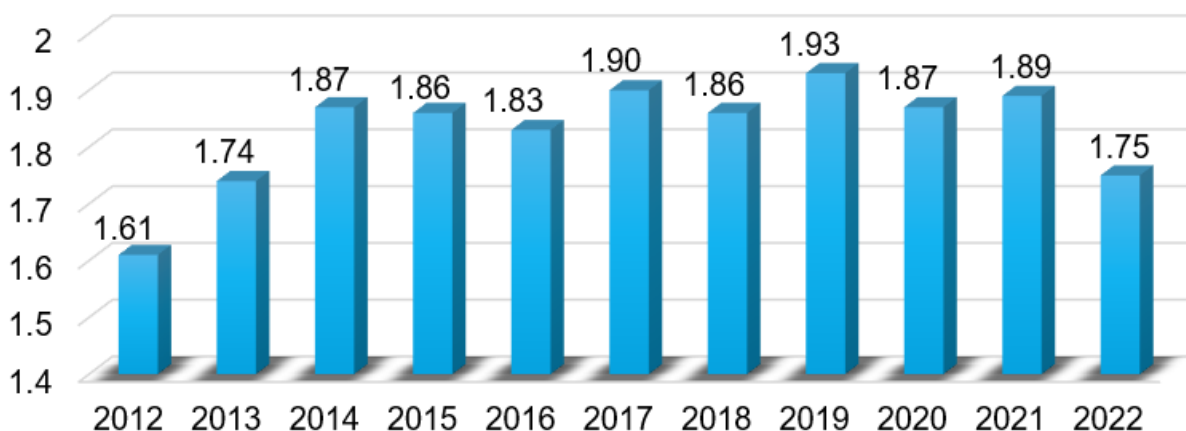


Figure 17: Ratio of treated water maximum day pumpage to average day pumpage

3.3 Wastewater Treatment Plant Volumes

In 2022, at 29.2 million cubic meters, the WWTP effluent continued to be a lower volume than the years prior to 2017, but has increased compared to 2021, which was the lowest level in the last decade at 28.3 million cubic meters.

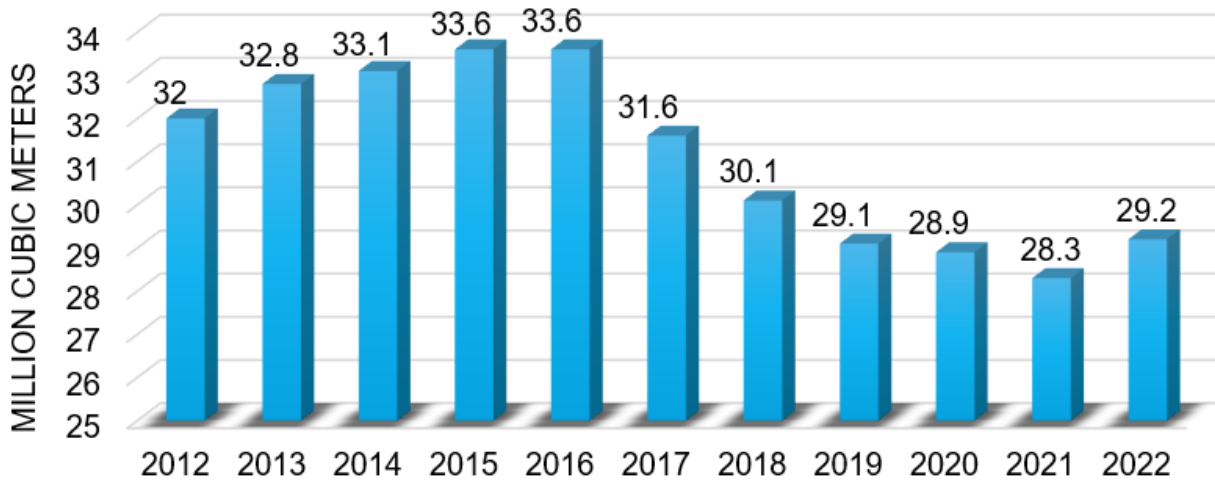


Figure 18: Volume of Wastewater Treatment Plant Effluent Flow (million cubic meters)

Volumes have decreased significantly over the last five 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 2022, the Meter Shop attended to over 12,900 total jobs, reflecting approximately a 16% increase over 2021. 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.

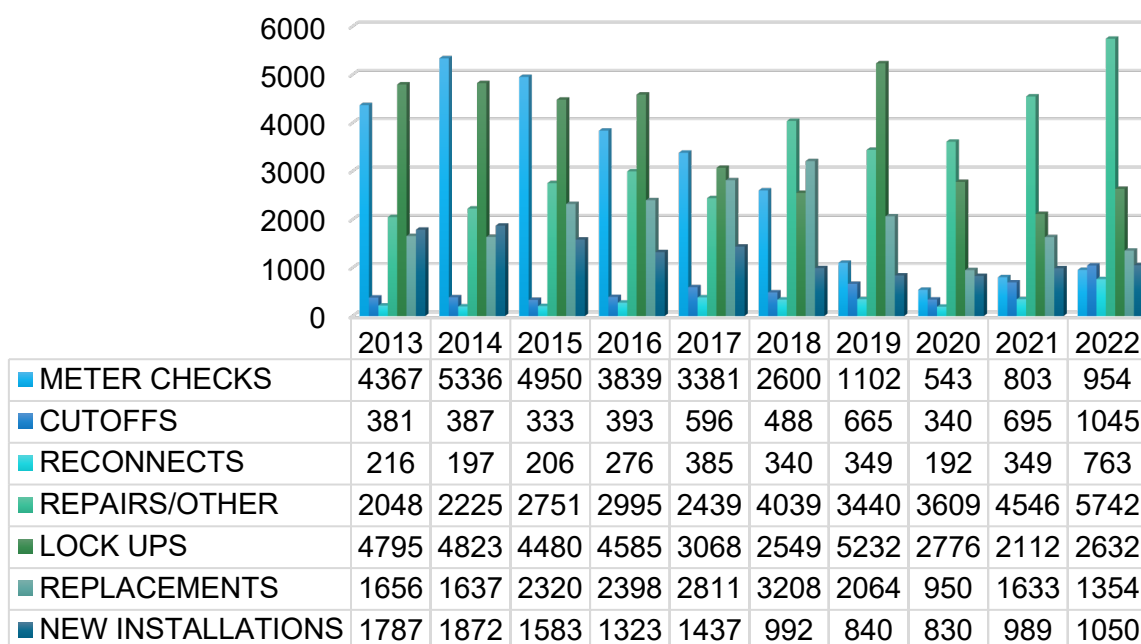


Figure 19: Quantity of Meter Shop Service Calls

In 2022, 7,407 AMI communication modules were installed, totaling 71,893 since the program started in 2016. This represents approximately 94% of the nearly 77,436 total water meters within Saskatoon. Supply chain issues led to a brief reduction in appointment bookings until orders were received. These issues have now been resolved. Most AMI installations require that installers enter homes or businesses to access water meters. Total installations in 2022 was lower than 2021 and approximately 35% lower than the average for the previous five years.

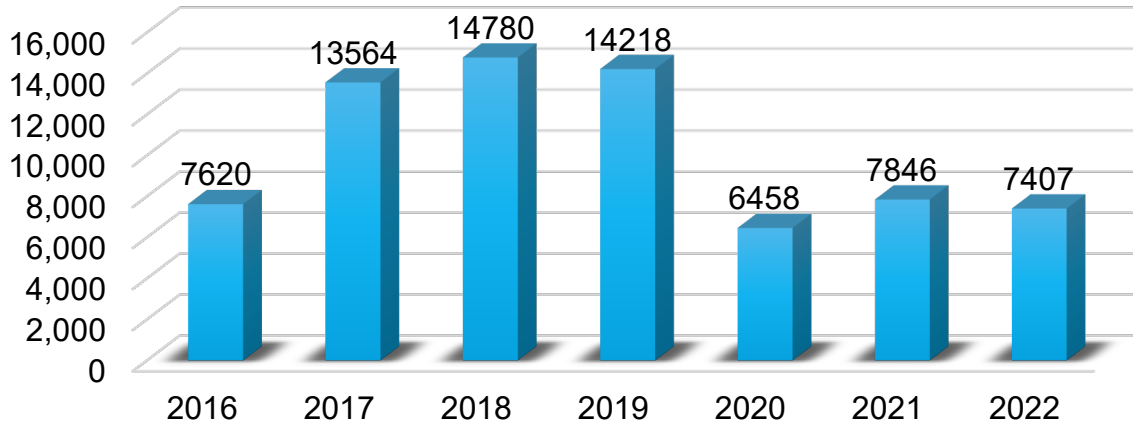


Figure 20: Quantity of AMI Communication Modules Installed

Backflow prevention devices are important in reducing the risk of contaminants from entering the City’s drinking water system. In 2022, 342 new backflow prevention devices were installed, with a total of 10,555 devices being active as of December 31, 2022. In 2022, 89% of the devices were tested, and of those tested, 85% passed. 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 2022, 666 cross connection control survey/inspections were performed, and 9,495 notices were processed.

3.5 Customer Satisfaction

The City conducted two civic services surveys in 2021: the **Satisfaction & Performance Survey** and the **Performance, Priorities and Preferences Survey**. Each survey was conducted by telephone, through an online panel, and by having a survey link available on the City’s website (referred to as “self-selected”). Similar surveys were last performed in 2018. A survey was not conducted in 2022.

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 2018, **quality of drinking water** and **speed of water main break repairs** ranked in the top three highest rated services in the 2021 survey.

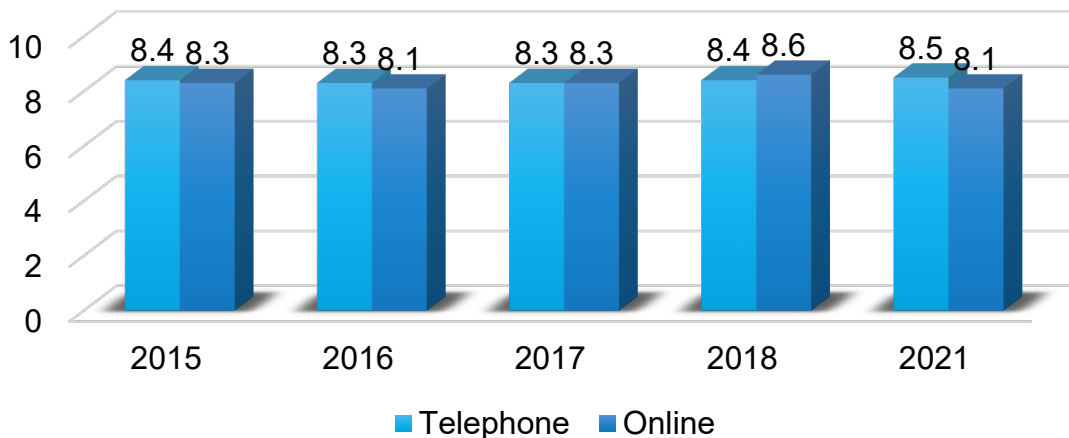


Figure 21: Citizen Satisfaction with Water Quality (rating out of 10)

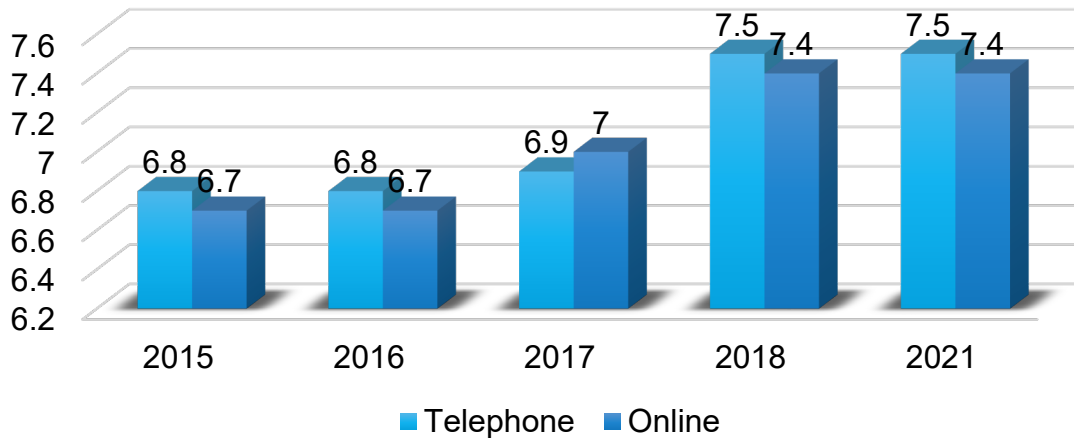


Figure 22: Citizen Satisfaction with Speed of Water Main Break Repairs (rating out of 10)

3.6 Customer Enquiries

Numerous phone calls to the Customer Care Centre were received and resolved by the Water Laboratory through discussion and education. In 2022, laboratory personnel did not attend any in-person water quality investigations as this work has been transferred to WWO. Going forward, this metric will not be included in this report.

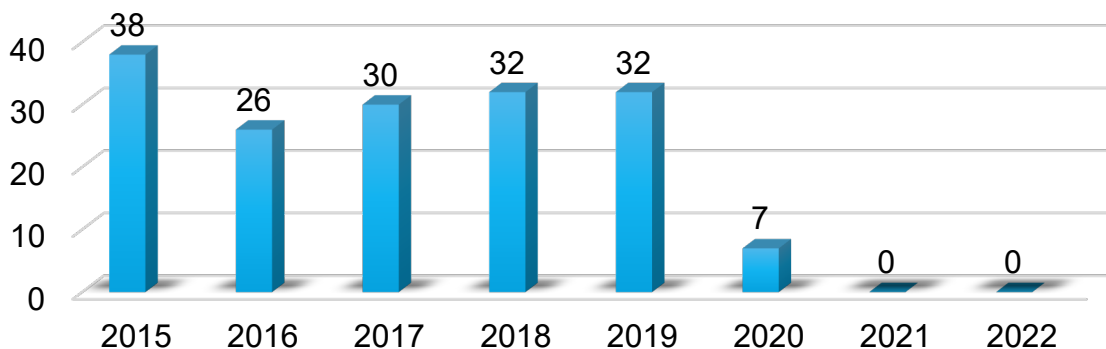


Figure 23: Quantity of Complaints about Water Quality that Require In-Person Action

Two calls regarding WWTP odour were received in 2022. The Customer Care Centre received approximately 103 complaints related to odours from various sanitary sewer mains across the city, and approximately 180 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 \$9.3 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 \$4.4 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	2022 Inventory	Replacement Value (\$M)
Water Treatment Plant, water intakes and three reservoirs*		\$ 780
Water Pipes	1,211 km	\$ 2,622
Valves	15,322	\$ 254
Hydrants	7,553	\$ 74
Service Connections	71,311	\$ 692
Total		\$ 4,422

* Value equals the 2020 annual report plus 30% inflation.

Table 3: Estimated Wastewater Utility Asset Replacement Values

Asset	2022 Inventory	Replacement Value (\$M)
Wastewater Treatment Plant*		\$ 650
Lift Stations*	26	\$ 172
Wastewater Pipes	1,088 km	\$ 3,168
Manholes	12,302	\$ 175
Force main	52 km	\$ 112
Service Connections	70,944	\$ 600
Total		\$ 4,877

* Value equals the 2020 annual report plus 30% inflation.

The **Water Distribution System** is used to deliver potable water from the WTP to the customers. The system is composed of approximately 1,211 km of water mains, 15,322 valves, 7,553 hydrants, and 71,311 service lines.

The **Wastewater Collection System** is used to collect wastewater from customers and deliver it to the WWTP. The system is composed of approximately 1,088 km of gravity sewer mains, 52 km of pressurized force mains, 12,302 manholes, and 70,944 service lines.

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 2022, 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.

Water Treatment and Wastewater Treatment Plant Outreach: Guided tours are normally 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. Tours became available again in 2022 once COVID-19 restrictions were removed.



Figure 24: Billboard Communicating AMI Program Information

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.

Prevent Irritable Sewer Syndrome:

Significant problems can occur in the sewer system when individuals put harmful things down their drain. To shift behaviors, the City developed an education campaign, [Prevent Irritable Sewer Syndrome](#), in partnership with Partners For the Saskatchewan River Basin. The program’s goal is to reduce the number of blockages experienced throughout the community by building awareness of what is and is not to be flushed down toilets and rinsed down sinks. As part of the program, Partners for the Saskatchewan River Basin purchased an “Enviroscape Drinking Water and Wastewater Treatment Model” to support slide and video presentations.



Figure 25: Enviroscape Drinking Water and Wastewater Treatment Model

In 2022, the program was delivered through a combination of online and in-person presentations to comply with COVID-19 requirements. The program reached 231 students and teachers from eight schools.



Figure 26: Educational Content for the Prevent Irritable Sewer Syndrome Campaign

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 2022, a total of 22,401 water treatment quality tests and 15,436 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.

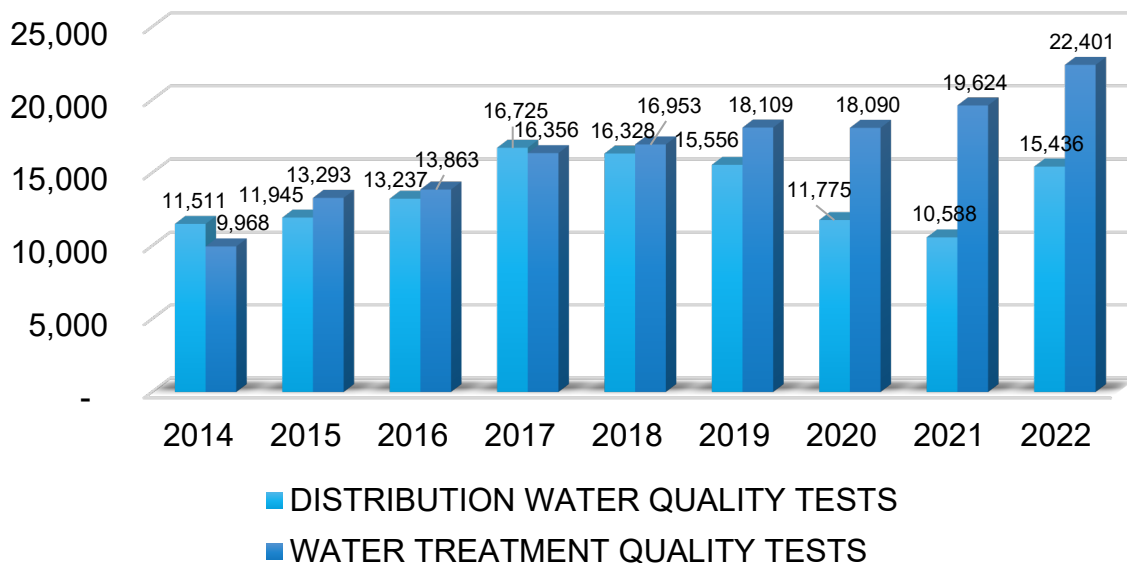


Figure 27: Quantity of Treated Water Quality Tests Performed by the WTP Lab

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	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	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	< 1.0
Total Coliforms >0 (CFU/100mL) ³	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 2022, there were 58 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 2022, the Environmental Laboratory collected a total of 1,903 samples and performed 12,420 tests for the WWTP Permit to Operate a Sewage Works and over 28,000 tests for the WWTP process control.

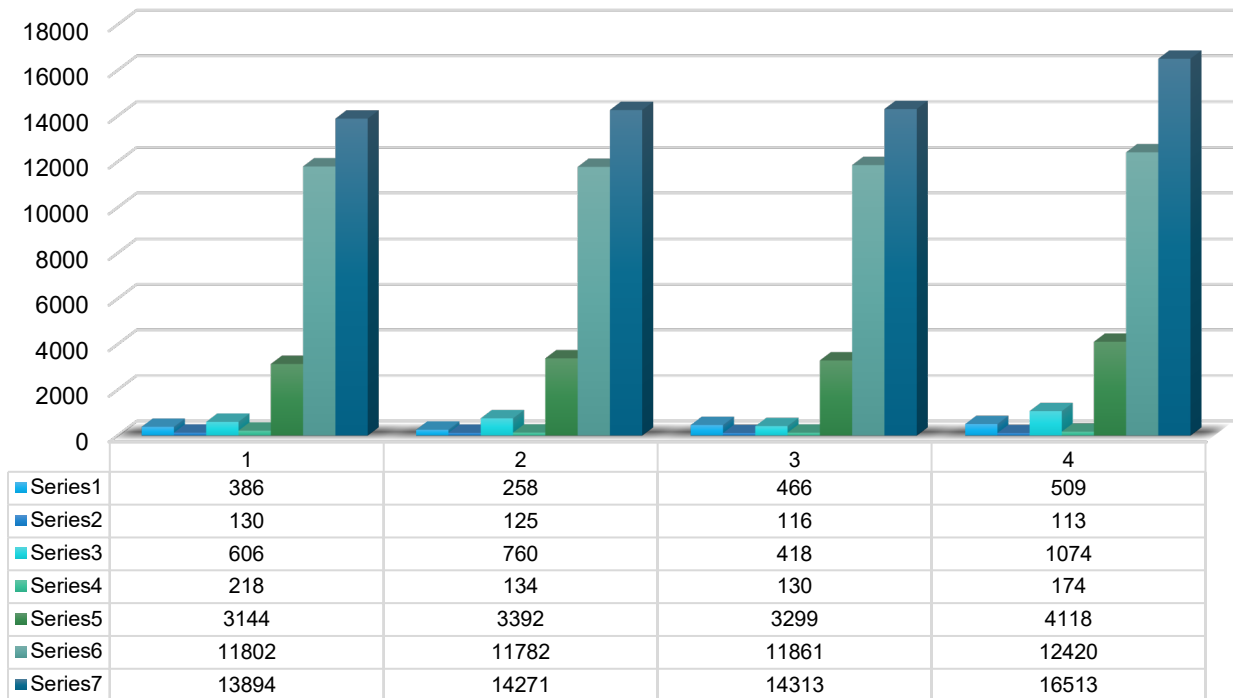


Figure 28: Quantity of Water Quality Tests Performed by Environmental Lab

The Environmental Laboratory also collected over 550 samples and performed 5,000 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 7,120 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	Wastewater Effluent Standard
Yearly Median cBOD ⁴	3.5	4.0	3.0	2.0	3.6	3.0	<25 mg/L
Yearly Median BOD	14.9	16.7	9.8	8.2	13.0	13.0	<30 mg/L
Yearly Median TSS ⁵	7.3	10	7.8	6.2	7.3	5.0	<25 mg/L
Yearly Median Total Phosphorous (TP)	0.31	0.425	0.364	0.287	0.323	0.331	<0.75 mg/L
Yearly Median E.coli ⁶	<10	<10	<10	<10	<10	<10	<200 mpn/100mL
Yearly Median unionized ammonia	0.179	0.203	0.089	0.074	0.248	0.245	<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 Wastewater COVID-19 Testing

In 2022, the WWTP continued its collaboration with University of Saskatchewan and the Saskatchewan Health Authority in a pilot project to test sewage samples for the virus that causes COVID-19. Infected people shed virus traces through their feces, often even before COVID-19 symptoms appear. The wastewater test results provided an early warning of trends in positive cases identified at COVID-19 testing centers and were provided to health officials for consideration in resource allocation planning and decision making.

The chart below plots the sewage testing results for the overall viral RNA load of COVID-19 in the community. Results have shown that sewage results provide an accurate two-week prediction of new cases in Saskatoon.

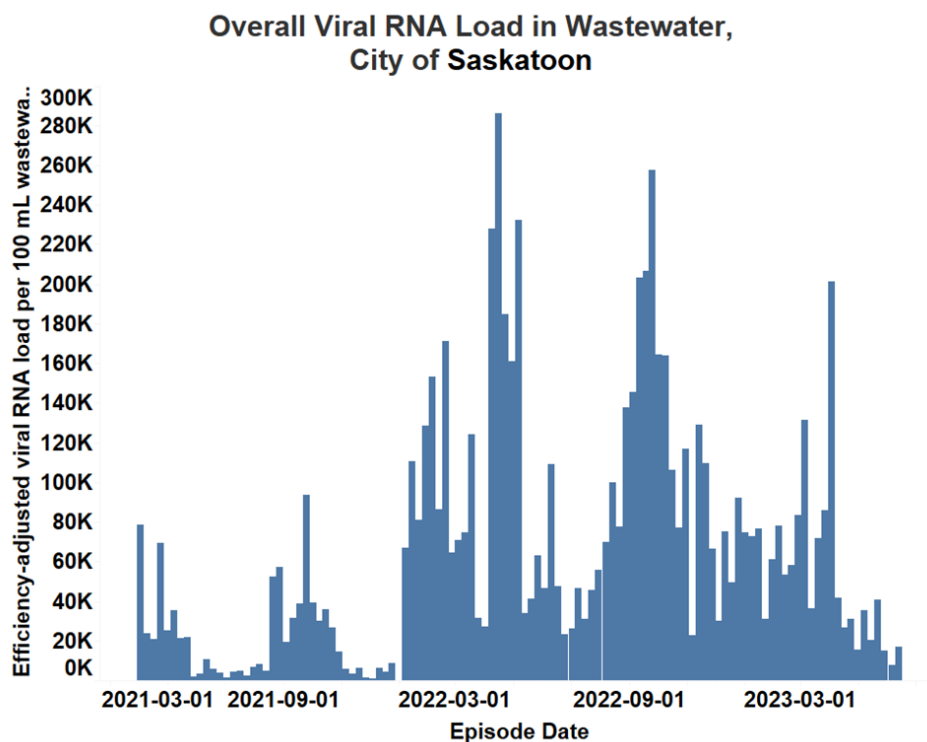


Figure 29: SARS-CoV-2 Viral RNA Load in Wastewater, City of Saskatoon

5.4 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 1,602 locations in 2022, of which only 226 (14%) were water main breaks. In 2022, approximately 45% of water main breaks were repaired and water restored within 24 hours, the average repair time was 36.9 hours per break, and the service level time was exceeded on 19 occasions.

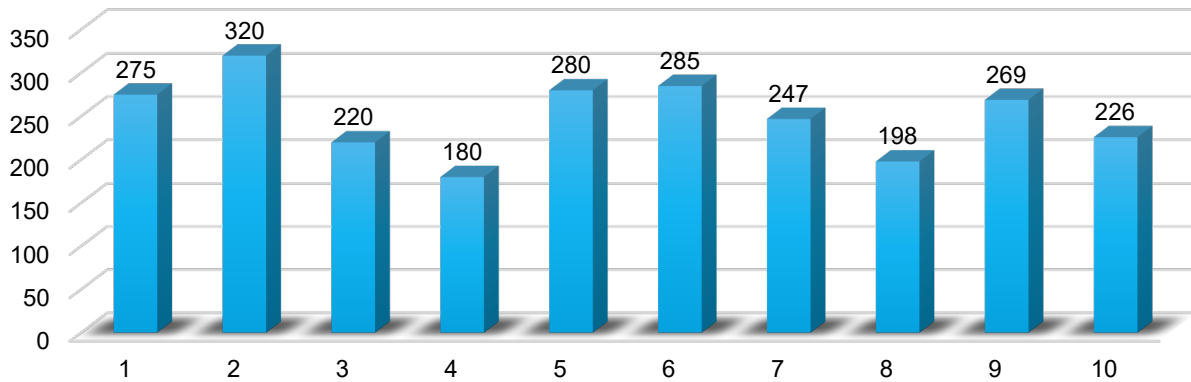


Figure 30: Quantity of Water Main Breaks per Year

The previous figure shows the number of water main breaks in each of the last ten years. The number of breaks in 2022, 226, was lower than the ten-year average of 246. 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.

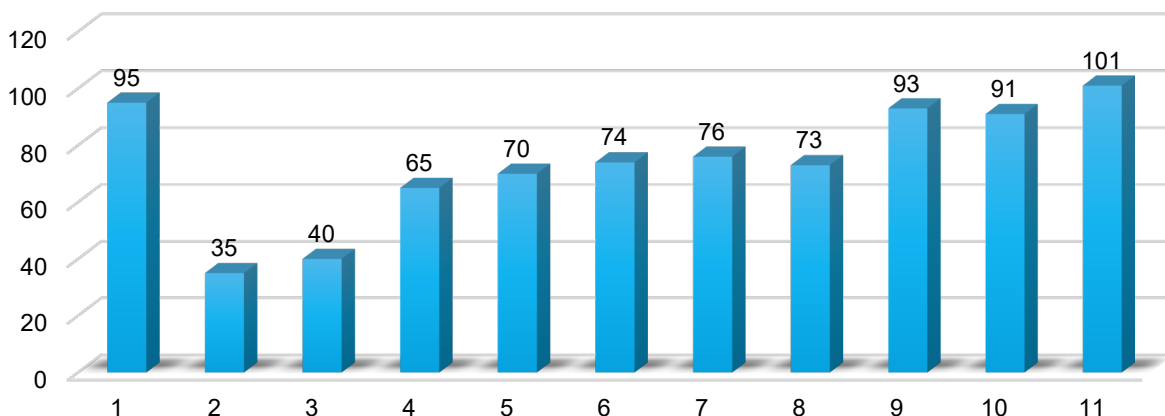


Figure 31: Quantity of Water Main Valve Repairs and Replacements

The previous figure shows the number of completed water main valve repairs and replacements throughout the system. These repairs are part of the over 1,500 locations maintained by Water and Sewer staff in 2022.

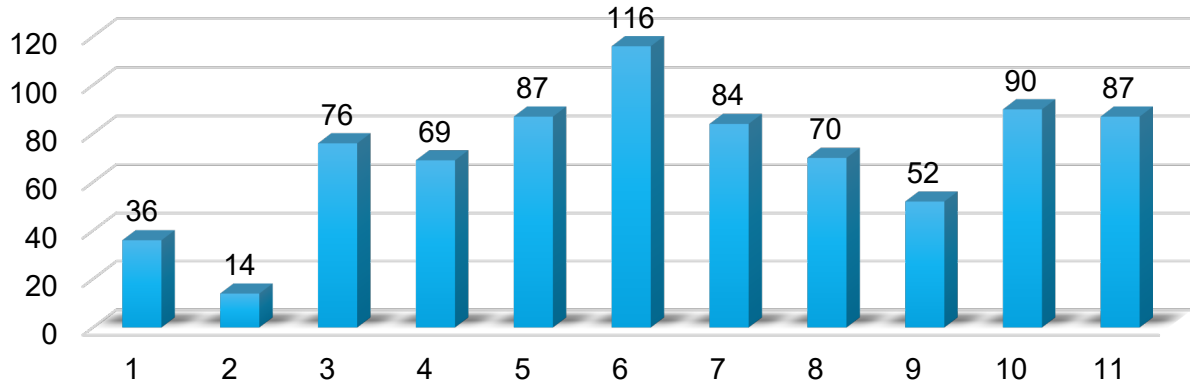


Figure 32: Quantity of Valve Casings or Spindles Repaired Using Hydro-Excavation

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



Figure 33: Photographs of Water Main Break Repair Work

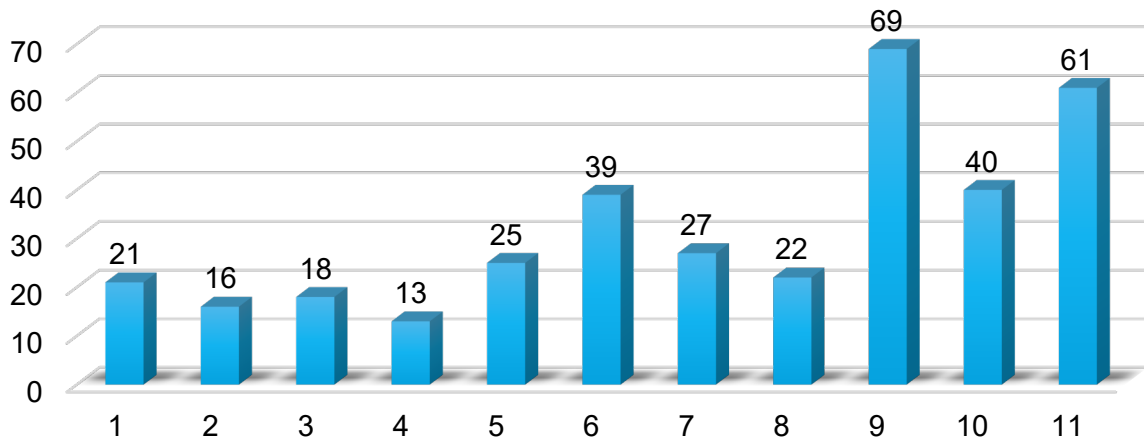


Figure 35: Quantity of Fire Hydrant Replacements

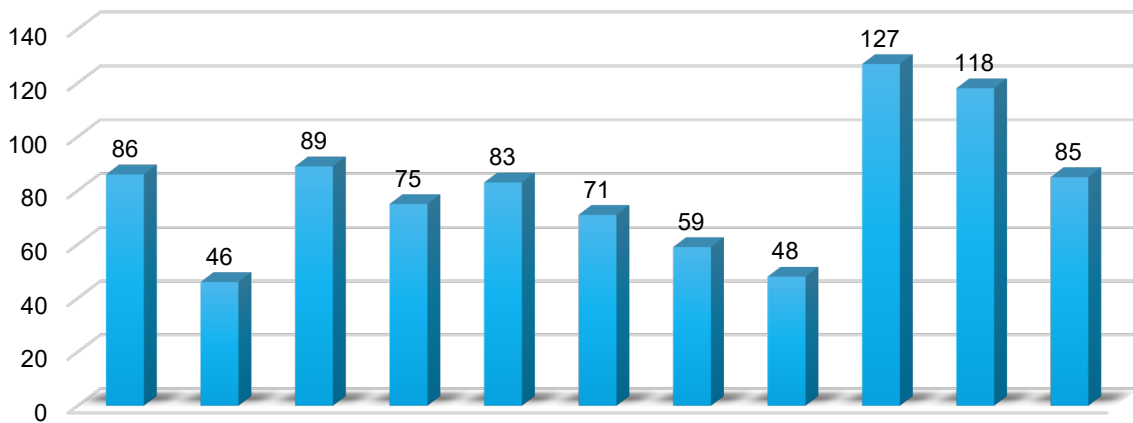


Figure 34: Quantity of Fire Hydrant Repairs

The two charts above 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.

5.5 Sanitary Sewer Operations

The Sewer Operations workgroup is responsible for maintaining over 12,302 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 453 km of sanitary sewer mains were cleaned using flushing and 25 km were brushed. Closed-Circuit Television (CCTV) crews inspected 15.0 km of pipe.



Figure 36: Photographs of Closed-Circuit Television Inspection Work

5.6 Capital Projects

The Water and Wastewater Utilities funded 95 capital projects in 2022, budgeted at \$669.9 million, of which, \$122.7 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, 2022

Section	# of Active Projects	Approved Funding	Unspent Funding
Water Treatment	57	\$267,203,000	\$85,342,190
Wastewater Treatment	43	\$192,988,000	\$9,563,123
Water Distribution and Wastewater Collection	4	\$209,694,500	\$25,808,997
Total	95	\$669,885,500	\$122,663,542

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 eventual development of second WTP on the east side of the South Saskatchewan River would require a capacity of 125 – 250 MLD. The strategy was reported to Council throughout 2022. Following approval to proceed with strategy planning a Program Team Manager was hired in December 2022. In 2023, there are plans to buildout team support and begin initial and concept project work to identify near-term requirements of the program.

McOrmond Drive Reservoir and Pump Station: This project includes the design and construction of a new 43 million litre reservoir system complete, with pump station in the Evergreen neighborhood. Construction was awarded PCL Construction Management Inc. for \$40.5 million in July 2021. Completion is expected in spring 2024.

Water Treatment Plant Transfer Pumping and Electrical Upgrades: This project will replace the short-term transfer pumping system, increase efficiency, and address single points of failure while replacing much of the electrical systems on site. Construction was awarded to Westridge Construction Ltd. for \$40.7 million in March 2019. Completion is expected in 2024.

Water Treatment Long Term Capital Strategy: A comprehensive long-term capital planning process was introduced for the City's WTP in 1980 and updated in 2009. The process identifies a strategy for WTP development and modernization to meet city demands and the Drinking Water Quality Standards. The plan is being reviewed and evaluated to determine how to increase the City's water treatment capacity to provide safe and reliable drinking water for approximately 500,000 people. Engineering services were awarded to AECOM Canada Ltd. for \$329,000, and they provided their recommendations in August 2021. Due to the magnitude, level of complexity, and strategic nature of the decisions evaluated, a Decision Quality review of the strategy will be undertaken utilizing internal resources. The Decision Quality report was completed in January 2022, and will be brought forward to City Council in 2023, along with the proposed capital funding strategy.

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 was awarded to WSP Global Inc. in 2022 and was completed in 2022. A consulting contract for the equipment assessment was awarded the MPE Engineering Ltd. in 2022 and is expected to be completed in 2023.

Water Treatment Plant Permit to Operate Study: This project is a follow-up study to the recently completed Saskatoon Water River Impact Study and was mandated by the WSA as part of the WTP's updated Permit to Operate issued on May 30, 2020. This project will further study the effect that the WTP discharge has on the South Saskatchewan River. Engineering services were awarded to Hutchinson Environmental Sciences Ltd. for \$143,000. Completion of the study occurred in the winter of 2022.

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 94% complete. A second 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 don't accept AMI, and this policy will facilitate project completion. Letters are issued 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 2022, over 2,000 customers were contacted by the Corporate Revenue department about potential leaks based off their AMI data.

Wastewater Treatment Plant

Wastewater Treatment Plant Nitrification Expansion Conceptual Design: The purpose of this project is to complete a conceptual design for the expansion of the bioreactors to achieve year-round nitrification and determine the aeration requirements of the third bioreactor train to form a strategy to meet current and future treatment requirements. Engineering services were awarded to Jacobs Solutions Inc. in 2020 with completion reached in September 2022.

Wastewater Treatment Plant Primary Effluent Pump 6: This project includes the installation of a sixth primary effluent pump and related ancillary works. Engineering services were awarded to MPE Engineering Ltd. in 2020, with the construction contract awarded in 2022. Completion is expected in 2023.

Marquis Liquid Waste Haulers Station: Commissioning work continued in 2022 on this \$8.5 million project. The work includes construction of a waste hauler receiving facility containing liquid and solids receiving bays; programmable logic controls (PLC); infrastructure; and Heating, Ventilation, and Air Conditioning equipment. This project will be integrated with the existing Marquis Odour Control Facility. This facility was opened to waste haulers in 2022.

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. Construction was awarded to Graham Construction and Engineering LP for \$18.5 million in August 2021. Completion is expected at the end of 2023.



Figure 37: 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. The engineering design contract was awarded to MPE Engineering Ltd. in 2021. The equipment supply contract was awarded in 2022 to Anue Water Technologies, and the construction installation contract will be awarded in 2023, with a completion date expected in 2023.

Wastewater Treatment Plant Bioreactor Gate Replacement: The existing bioreactor cell slide gates that are used for level control, isolation of cells, and bypassing effluent through channels have reached their end of life. In 2021, half of the slide gates were demolished and replaced. The remainder of the slide gates were demolished and replaced in summer 2022.

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. An initial contract with Delco Automation Inc. was retained in 2021 to provide design-build services to upgrade the Jasper Sanitary Lift Station with instrumentation to provide real-time control and monitoring. Construction was completed in the fall of 2022. A further contract with 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 completed 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. 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. These pipes are now reaching the end of their life and require replacement, as well as an evaluation to determine the optimal corridor for the new pipes. Conceptual design services were awarded to AECOM Canada Ltd. and the report is expected to be complete by fall 2023. Future contracts to support detailed design and construction services will follow.

Wastewater Treatment Plant Digester Tank A Refurbishment: The WWTP utilizes anaerobic sludge digestion to breakdown organic sludge into Biosolids that can be applied as a Class B fertilizer on agricultural land. Two digester tanks were originally constructed

in 1969 (Digester Tank A and C), with additional tanks constructed in 1989 (Digester Tank B) and 2020 (Digester Tank D). Digester Tank A was taken out of service in Spring 2022 to be cleaned and to complete the replacement of the roof membrane, gas handling equipment, and internal piping. Construction was completed in quarter four of 2022.

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
- H₂S Monitoring
- Storm Pond Bathymetry and Mapping
- Monitoring Equipment Testing and Calibration.

Table 7: Engineering and Planning Monitoring Program in 2022

Program	Number of Monitoring Locations
Sanitary System	47
Storm System	13
Sanitary Tank	5
Rain Gauge	11
Hydrant Pressure	37
Hydrant Flow	30
PWM Pressure and Flow	6
Water Quality	3
H ₂ S Monitoring	4
Storm Pond Bathymetry	5

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 2022.

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.

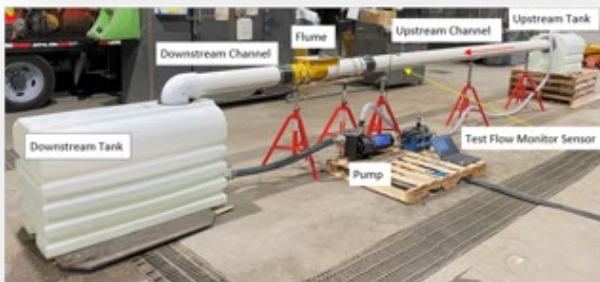


Figure 38: Photograph of Flow Bench for Equipment Testing and Calibration

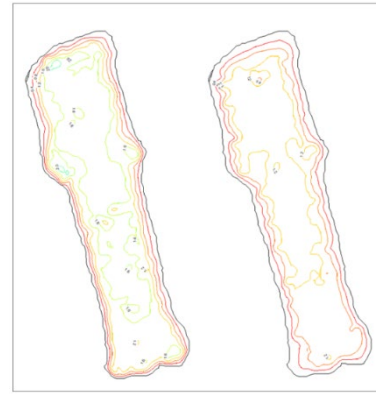


Figure 39: Aspen Ridge Forebay Bathymetric Map Comparison, 2017 (left) 2022 (right)



Figure 40: Photograph of Rainfall and Wind Measurement Equipment



Figure 41: Fire Flow Testing

Water and Sewer Modeling: The water and sewer modeling group of Engineering and Planning is responsible to develop, maintain, and update citywide 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. The business case for this program was approved with further program development to happen in 2023.

Distribution and Collection System Planning

Long Term Capital Development and Expansion Planning: Functional water and sewer planning and updates progressed in 2022 as part of the Blairmore Sector Plan Amendment. A functional servicing plan has also been developed for the Southeast Concept Plan regional growth area. 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 2022 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. Phase 2 Functional Design Draft Report review comments were provided.

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.

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 2022 work include the following:



Figure 42: Brighton Storm Trunk Installation

- **Brighton Phase D2B:** Initiated designs for local water distribution, sanitary, and storm sewer collection systems.
- **Acadia Drive PWM:** Initiated stakeholder consultation and preliminary design of the Acadia Drive primary water main (1050 mm).

- **Faithfull Avenue Trunk Extension:** Completed designs of a primary water main (750 mm), sanitary trunk (900 mm), and storm sewers (1,500 mm to 1,800 mm) for future service extensions into the Riel Sector.
- **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:** Completed review of detailed design of the Kahkewistahaw First Nation Phase 1 area grading, temporary storm water management ditches, storm water retention area, and water

and sewer design. The Kahkewistahaw First Nation initiated the HVBP Concept Plan amendment, which has resulted in substantial review of water and sewer and area grading design.

- **Hampton Village Business Park Sanitary Trunk:** Initiated design of 525 mm sanitary trunk sewer extension along Markham Ave south to the planned HVBP lift station.
- **Prairieland Park Concept Plan Amendment:** Prairieland Park has proposed a Concept Plan amendment, which needed an assessment of servicing options, system capacity investigation, and review of water and sewer models and designs.
- **Yarrow Storm Water Pond:** Completed detailed design of the Yarrow Storm Water Management Pond in Kensington, including outstanding inlets/outlet structures.
- **Neault Road PWM:** Completed detailed design of the Neault Road primary water main (600 mm) extension south of Kensington Gate West.
- **Neault Road Storm Sewer:** Completed area grading and storm sewer design for the Neault Road project between new 33rd Street and 22nd Street.
- **Marquis Phase 9:** Completed design of local water distribution, and sanitary and storm sewer collection systems.
- **Weaver Park Storm Pond:** Completed detailed design of the storm water detention pond, including storm sewer collection system and inlet structures.
- **Private Development Applications:** Reviewed 108 applications and advised on water or sewer servicing considerations for proposed re-zonings, subdivisions, condo developments, discretionary uses, utility installations, commercial building permits, concept plan amendments, etc.

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: 8.8 km in 2022
 - 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: 13.1 km in 2022
 - 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: 771 service lines replaced in 2022. 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: 2020-2024 Projected Budgets – Technical Services

Program	2020 Budget (\$M)	2021 Budget (\$M)	2022 Budget (\$M)	2023 Budget (\$M)	2023 Budget (\$M)
Water Preservation	\$6.64	\$7.07	\$7.53	\$8.02	\$8.26
Water Capacity	\$5.96	\$7.64	\$6.26	\$6.42	\$6.61
Sewer Preservation	\$3.47	\$3.07	\$3.56	\$3.64	\$3.75
LSL Replacements	\$4.92	\$3.90	\$4.57	\$4.60	\$4.80
Sewer Service Lines	\$1.29	\$1.33	\$1.36	\$2.09	\$2.16
TOTALS	\$22.28	\$23.01	\$23.28	\$24.85	\$25.58

5.7 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. For example, in 2022, Saskatoon Water was able to reallocate two FTEs instead of asking for additional staff due to efficiencies found. 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 50% of water valves (8,467 out of 17,059 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 Audit: In 2022, the Planning and Scheduling Group began supporting WWO, with an audit into the primary water main valve inspections and isolation procedures. The objective of this audit 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 2022, 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 2022, saving travel time and costs.

Saskatoon Water Energy Management: In 2022, Saskatoon Water continued work in energy management by completing the following activities:

- Completed the Energy Management Project with Natural Resources Canada and received \$180,000 in grant funding for work conducted on the project.
- Created an Energy Strategy for the WTP, providing timelines for energy reduction initiatives that involve pumping optimization.
- Performed measurement and verification of energy savings from using biogas for heating and changing pumping operations at the Reservoirs and Raw Water Intake.
- Applied for grant funding from Natural Resources Canada to implement an Energy Management System at the WTP and reservoirs that would comply with the ISO 50001 Energy Management Standard.
- Proceeded with the design phase for the lighting upgrades at both plants to solidify scope and costs.
- Implemented energy saving operation change for the Ultraviolet Disinfection System at the WWTP based on recommendations from 2021 assessment.

Motion Sensors and LED Lighting: Motion Sensors and LED lighting is replacing 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: 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. Saskatoon Water has two cross connection inspectors. There are

77 certified cross connection testing companies and 211 certified cross connection control specialists (testers) in Saskatoon. Work will continue through 2023 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 a member of the South Saskatchewan River Watershed Stewards Incorporated, a community-based organization that was formed to implement the South Saskatchewan River Watershed Source Water Protection Plan. 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 Water and Sewer 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 2014 and 2021.

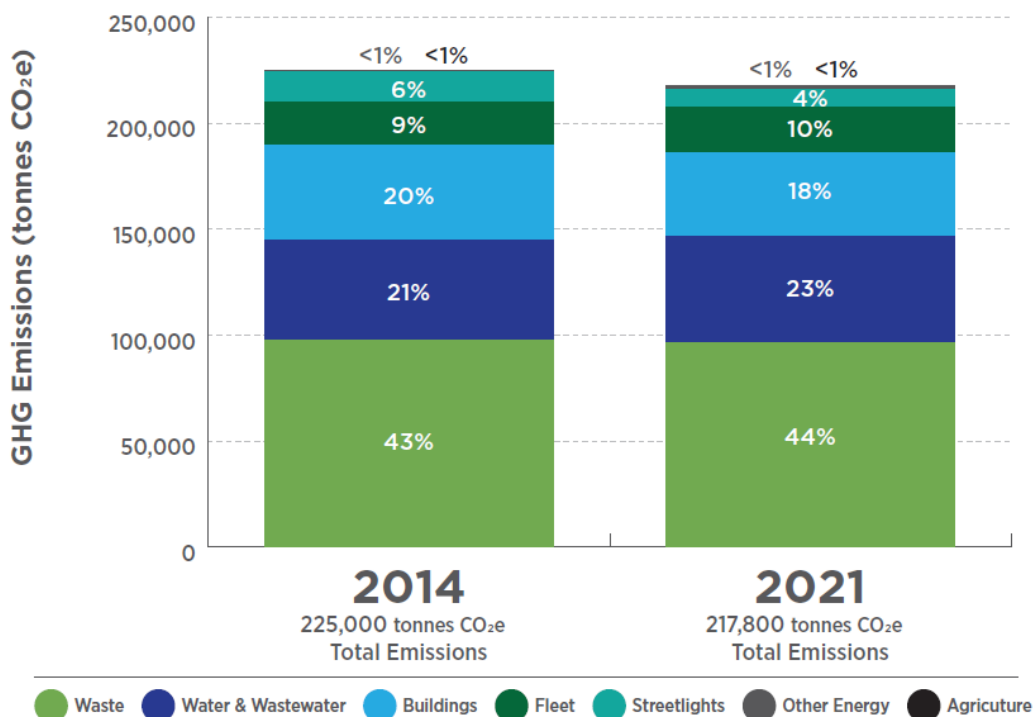


Figure 43: Municipal Government GHG Inventory Chart, Climate Action Plan Progress Report 2021

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

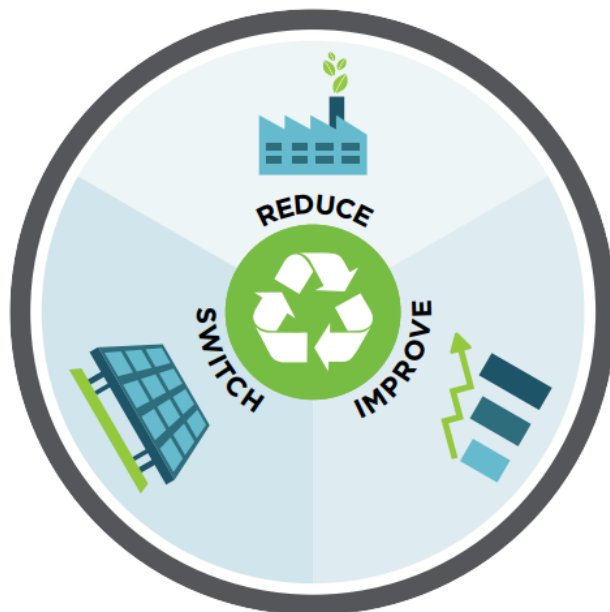


Figure 44: A Three-Pronged Approach to Reducing Water-Related Emissions: Reduce, Improve, Switch

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 2022, the WWTP continued to utilize biogas for heating and was able to meet approximately 50% of their heating load using biogas. The WWTP is planning on increasing the amount of biogas used for heating in 2022 to meet 75% of their heating demand. In addition, the WWTP and WTP have proceeded to the design phase of a lighting retrofit to establish a scope and costs for the proposed energy conservation measure.

In addition to the Energy Management Project and the Water Conservation Strategy, the *Alternative Currents: A Renewable and Low-Emissions Energy Implementation Plan* was approved, in principle, by City Council in November 2022, during consideration of the Renewable and Low-emissions Energy Implementation Plan report. 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 Plant
- 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.

In May 2022, City Council approved, in principle, a Water Conservation Strategy. The 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.

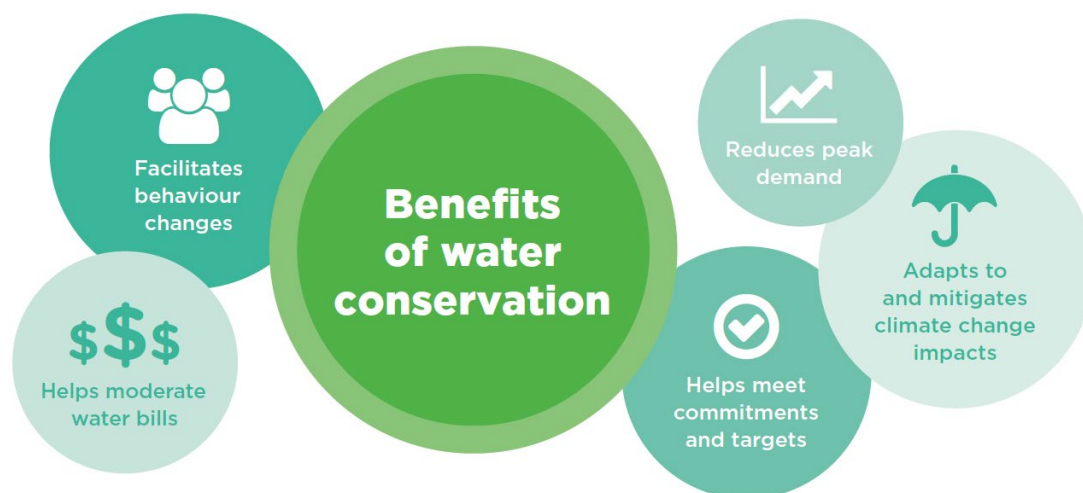


Figure 45: Infographic Outlining the Benefits of Water Conservation

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.

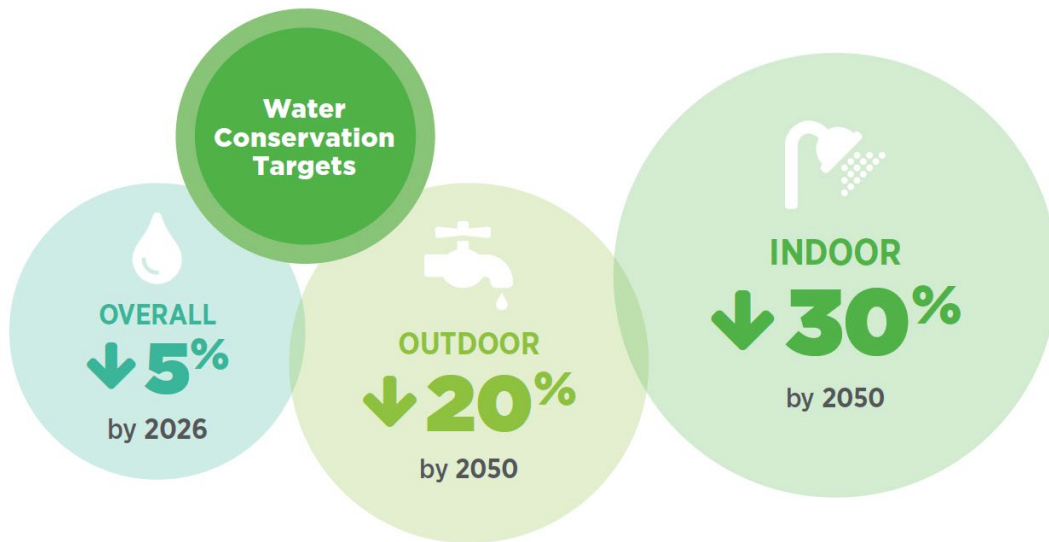


Figure 46: Infographic Outlining Water Conservation Targets from the Low Emissions Community Plan

Overall and indoor water use is progressing towards the targets, but outdoor summer water use is substantially increasing due to extreme heat and extended drought events in recent years. Climate projections indicate that these weather extremes will occur more often.



Figure 47: Water Conservation Targets Progress from 2016 Baseline Year

6.4 Work Completed in 2022

Water Conservation Strategy: The Water Conservation Strategy was completed in 2022.

Water Conservation in Parks: 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.



Figure 48: Park Irrigation

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. Through the program, 45 compost bin and 121 rain barrel rebates were issued.

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 2022 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 2022 with a focus on water included:

- Safe Drinking Water Foundation – To collect pH, total dissolved solids, and temperature data; and shipment of Operation Water Pollution kits to schools and individuals in South Saskatchewan River.
- South Saskatchewan River Watershed Stewards – Track plastics in the Saskatoon area of the South Saskatchewan River by utilizing the #OpenLitterMap¹. Final report will be completed in 2023.

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. In 2022, 112 households participated in the program. 58 low-flow faucet aerators and 13 low-flow shower heads were installed reducing an estimated total 226,600 litres of water per year.

¹ <https://openlittermap.com/global>

7.0 OUR FINANCES

7.1 Utility Bills

Residential water-related utility charges were \$148.76 per month in 2022, based on a standard 3/4-inch meter connection and a monthly water volume of 25.5 m³ (900 ft³). Saskatoon residents with smaller 5/8-inch water meters, which are common in core neighbourhoods, pay \$12.82 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 water² 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 m³, the utility bill in Saskatoon was 11.1% higher than in Calgary, which has the lowest utility bill. Saskatoon Flood Protection charge is included with Storm in the following graph. Under Saskatoon's inclining block rate system, water and wastewater rates increase at volumes of 17 m³ (600 ft³) and 34 m³ (1,200 ft³).

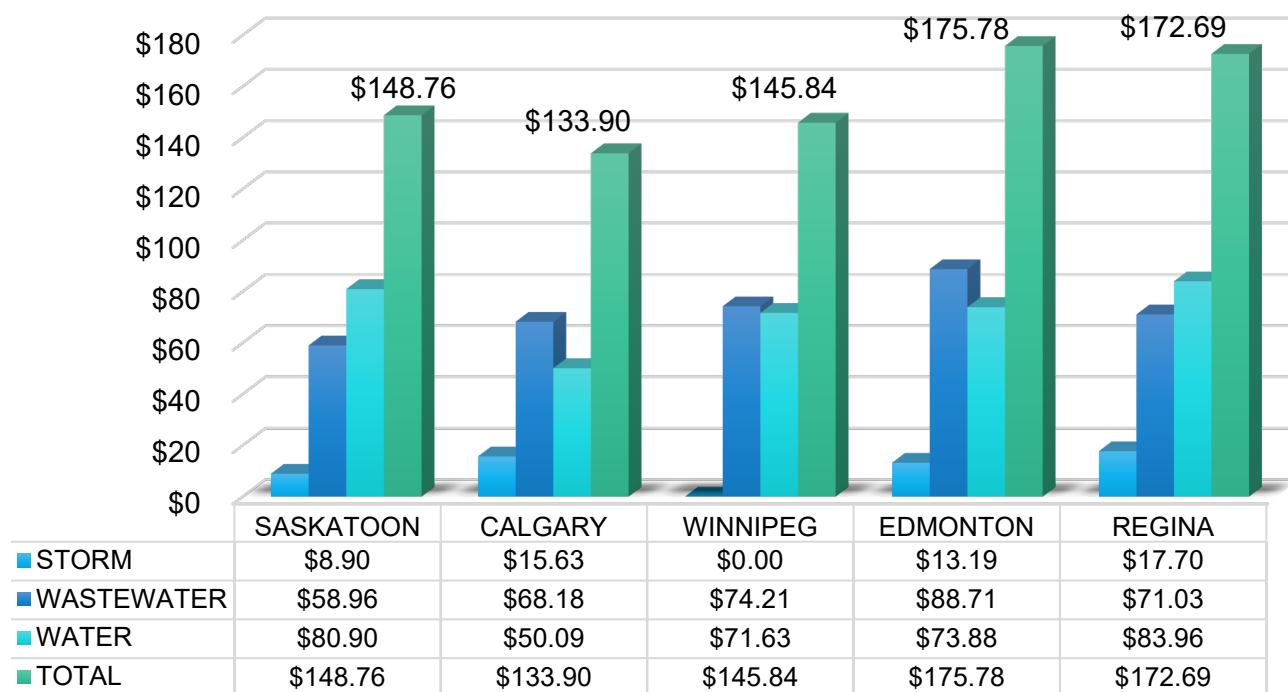


Figure 49: Residential Water, Wastewater, and Storm Water Monthly Charges by Utility [3/4 inch meter and volume of 25.5 m³ (900 ft³)]

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

7.2 Financial Summary

The Water and Wastewater Utilities are based on a user-pay principal and are fully funded through their rates. In 2022, the two utilities collected \$181.0 million in total revenues and had \$171.0 million in total expenses for a negative variance of \$0.505 million.

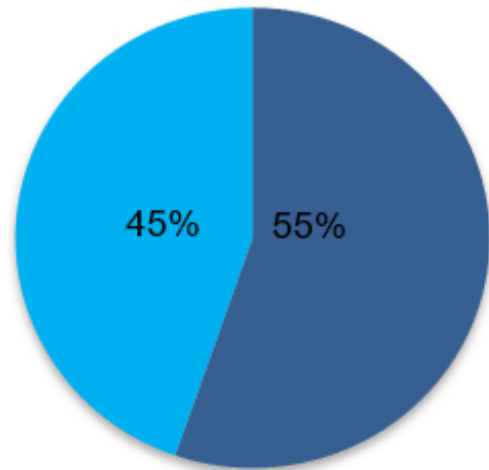
Table 9: Water and Wastewater Revenues and Expenditures (\$1000s).

Water and Wastewater Statement of Revenues and Expenditures (\$1000s)				
	Water Utility 2022	Wastewater Utility 2022	Consolidated 2022	Consolidated 2021
Total Revenues	100,095	80,912	181,007	182,413
Expenditures				
Utility Operations	18,490	12,825	31,314	28,011
Public Works Operations	17,982	10,890	28,872	26,213
Administration & General	1,586	1,820	3,406	2,234
Corporate Services & Billing	3,078	2,348	5,425	5,283
Capital Charges	29,415	18,673	48,088	50,945
Infrastructure Services			40,365	
Capital Reserve	16,953	23,412		40,075
Grants-in-lieu of Taxes	7,400	4,943	12,082	12,082
Return on Investment	6,778	4,920	12,923	12,923
Total Expenditures	101,682	79,830	181,512	171,018
Revenues less Expenditures	(1,587)	1,082	(505)	11,396
(To)/From Stabilization/ Capital Reserves	1,587	(1,082)	505	(11,396)

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.

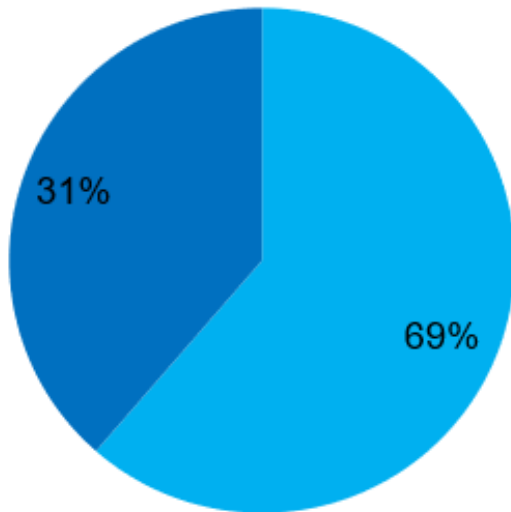
Total Utility revenues decreased by 0.80% in 2022 as a result of lower miscellaneous revenues.

The Water Utility accounts for 55% and Wastewater for 45% of revenues.



■ Water Utility ■ Wastewater Utility

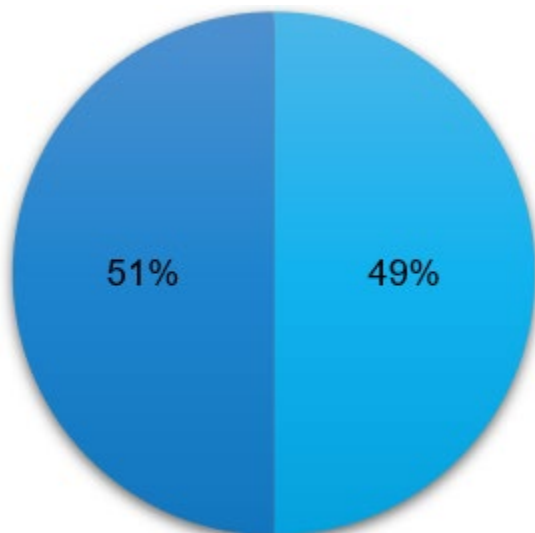
Figure 50. Percentage of Revenue by Utility (Water or Wastewater)



■ Volumetric ■ Fixed

Figure 51: Water and Wastewater Revenue Chart, by Customer Class

Commercial customers account for 51% of Water and Wastewater’s total revenues. About 69% of revenues are based on volumetric charges and 31% are from fixed charges.



■ Commercial ■ Residential

Figure 52: Water and Wastewater Revenue Chart, by Rate Type

In 2022, total expenditures were 6.1% higher than 2021 as a result of increased contributions to Grants-in-Lieu of Taxes; as well as staff compensation; contractor costs and capital investment; electrical; gas; materials and supplies; security costs, which were partially offset by decreased maintenance work due to capital investment; and savings in training and special services expenses resulting in actual expenses 1.1% more than budgeted. Total 2022 revenue was 0.85% less than budgeted, resulting in a negative balance of \$0.505 million, which was transferred from 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 15.9% of total expenditures. Funding for the Infrastructure Services Capital Reserve accounted for another 20.55% 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 \$3.9 million and \$6.0 million, respectively, annually for a total of \$9.9 million in 2022.

In 2022, the Water and Wastewater Utilities paid \$11.7 million (10.0%) 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 \$12.3 million in 2022 to the City as Grants-in-Lieu of Taxes.

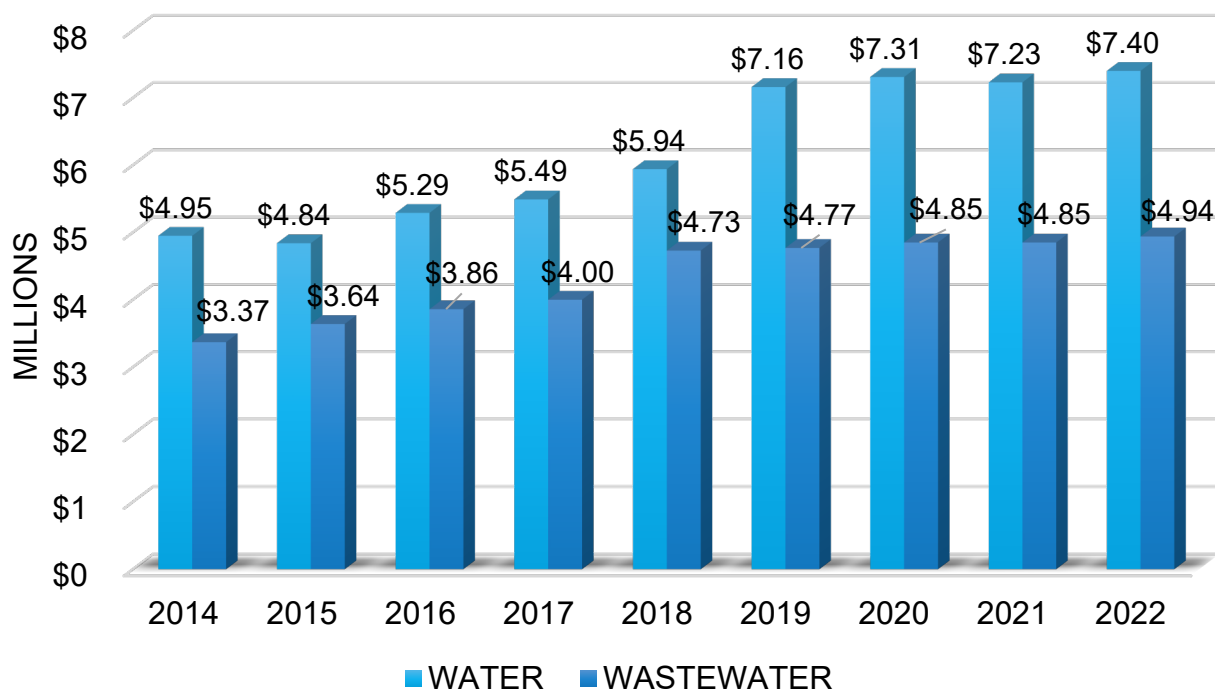


Figure 53: Water and Wastewater Utility Grant-in-Lieu of Taxes (\$ Millions)

7.3 Water Utility

Revenues

The Water Utility's 2022 total revenues of \$101.1 million were \$0.5 million or 0.5% more than budgeted. Total revenues decreased by 1.6% from 2021.

Other revenues included late payment penalties and some miscellaneous revenue.

Expenses

The Water Utility's 2022 expenses of \$101.7 million included the following:

- Saskatoon Water 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 \$17.9 million, include funding to the department to operate and maintain the water distribution system.
- Saskatoon Water Capital, of \$29.4 million, funds all capital work related to the WTP and reservoirs, including debt servicing costs.
- Infrastructure Replacement Reserve – Water and Wastewater, of \$16.9 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 \$10.4 million, include the Grants-in-Lieu of taxes, cross-charges for customer billing and collections, and corporate administration.
- ROI of \$6.7 million.

The Water Utility's 2022 total expenses were 2.1% over budget due to increased distribution costs, security costs, material and supplies, equipment maintenance, and increased transfers to Capital Reserves. Expenses were 2.0% more than in 2021 due to inflation, Grants-in-Lieu of Taxes increases, and an increased contribution to the Capital Reserves, offset by various savings, such as for training and construction and maintenance costs.

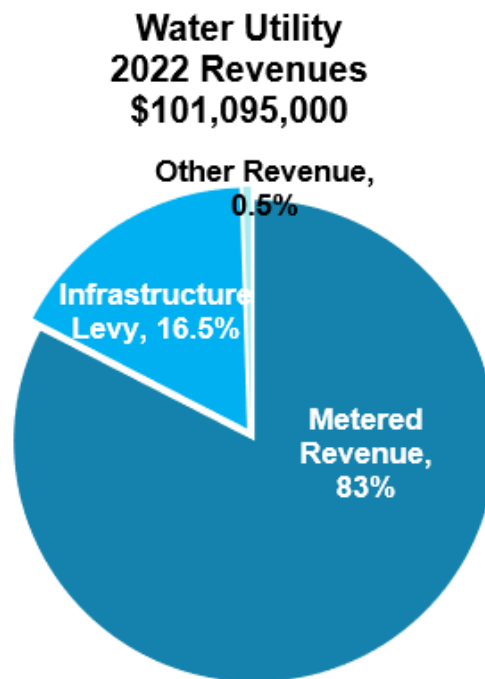


Figure 54: Water Utility Revenue

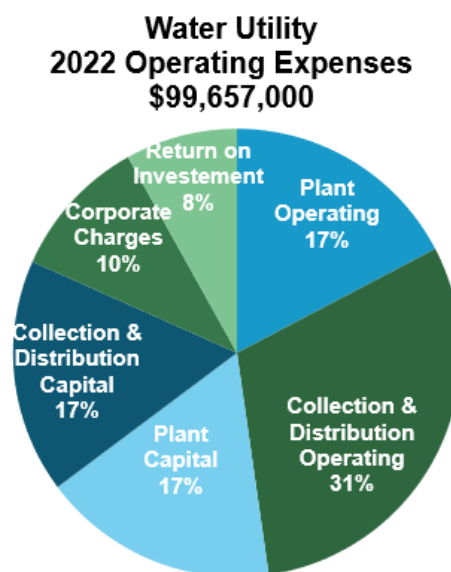


Figure 55: Water Utility Operating Expenses

Financial Statement

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

Water Utility Statement of Operating Revenues and Expenses (\$1000s)			
	2022 Budget	2022 Actual	2021 Actual
Revenues			
Metered revenue	82,223	82,647	84,376
Infrastructure Levy	16,865	16,953	16,832
Other revenue	510	495	507
Total Revenue	99,597	100,095	101,714
Expenses			
Water Treatment, Pumping, Storage	15,739	16,321	13,747
Water Meters	2,322	2,168	2,142
Water Administration & General	1,403	1,586	1,366
Corporate Services	3,274	3,078	2,972
Distribution (Public Works)	16,485	17,982	16,997
Capital Charges	29,332	29,415	30,309
Provision to Infrastructure Services Capital	16,865	16,953	16,832
Grants-in-lieu of Taxes	7,400	7,400	7,231
Return on Investment	6,778	6,778	8,063
Total Expenses	99,597	101,682	99,657
Revenues less Expenses	-	(1,587)	2,057
(To)/From Stabilization/Capital Reserves	-	1,587	(2,057)

The positive balance of \$1.587 million was transferred from the Water and Wastewater Revenue Stabilization Reserve.

7.4 Wastewater Utility

Revenues

The Wastewater Utility's Revenues increased by 0.3% from 2021 due to greater than anticipated metered revenues.

Expenses

The Wastewater Utility's 2022 expenses, of \$79.8 million, included the following:

- Saskatoon Water Operating expenses, of \$13.0 million, include wastewater treatment, pumping, sludge handling and disposal, administration, and general expenses incurred by Saskatoon Water.
- WWO operating expenses, of \$10.9 million, include funding to WWO to operate and maintain the wastewater collection system.
- Saskatoon Water Capital, of \$18.7 million, funds capital work related to the WWTP.
- Infrastructure Replacement Reserve – Water and Wastewater, of \$23.4 million, funds capital replacement of the wastewater collection systems, roadway damage associated with the utility, and wastewater upgrades for core areas.
- Corporate Charges, of \$7.3 million, include the Grants-in-Lieu of Taxes, cross-charges for customer billing and collections, and corporate administration.
- ROI, of \$4.9 million, is provided to the City for general operations.

Wastewater Utility 2022 Revenues
\$80.9 M

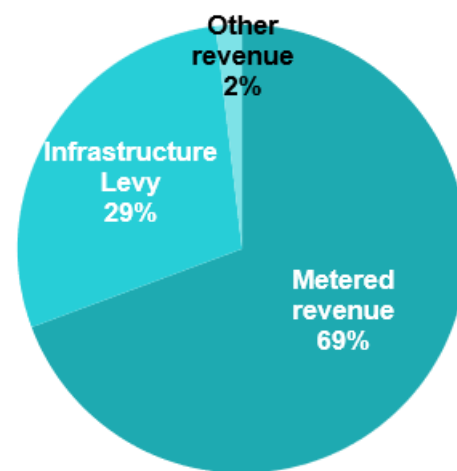


Figure 56: Wastewater Utility Revenue

Wastewater Utility 2022 Operating Expenses
\$79.8 M

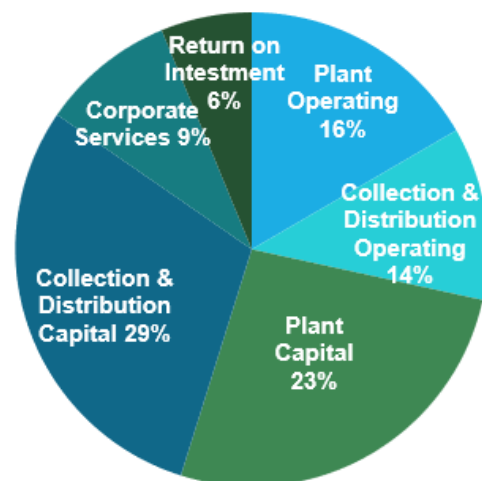


Figure 57: Wastewater Utility Operating Expenses

The Wastewater Utility's 2022 expenses were 0.1% less than budgeted and about 2.2% greater than in 2021. This is due to increases in ROI, treatment and lift stations costs.

Financial Statement

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

Wastewater Utility Statement of Operating Revenues and Expenses (\$1000s)			
	2022 Budget	2022 Actual	2021 Actual
Revenues			
Metered revenue	54,923	55,877	55,939
Infrastructure Levy	22,966	23,412	23,244
Other revenue	1,996	1,623	1,517
Total Revenues	79,885	80,912	80,699
Expenses			
Wastewater Treatment	10,639	9,031	8,815
Wastewater Lift Stations	2,302	2,295	1,862
Wastewater Sludge Handling & Disposal	2,063	1,498	1,445
Wastewater Administration & General	1,767	1,820	869
Corporate Services	2,447	2,348	2,311
Collection (Public Works)	9,102	10,890	9,216
Capital Charges	16,750	18,673	20,636
Provision to Infrastructure Services Capital			
Grants-in-lieu of Taxes	24,953	23,412	23,244
Return on Investment	4,943	4,943	4,851
Total Expenses	4,920	4,920	4,860
	79,885	79,830	78,109
Revenues less Expenses			
	-	1,082	2,590
(To)/From Stabilization/Capital Reserves			

The positive balance of \$1.082 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, 2022, balances for Water and Wastewater Utility reserves were \$20.1 million. The Water and Wastewater Revenue Stabilization Reserve balance is \$8.1 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 \$5.2 million for Water, \$6.6 million for Wastewater, and \$0.82 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, 2022 (\$1000s)

Operating Stabilization and Capital Reserves Balances as of December 31, 2022 (\$1,000s)	
W/WW Revenue Stabilization Reserve	\$3,676
Waterworks Capital Projects Reserve	\$390
Water Replacement Reserve	\$8,147
Wastewater Capital Projects Reserve	\$6,169
Wastewater Replacement Reserve	\$1,605
Water and Sewer Infrastructure Replacement Reserve	\$82
Total	\$20,069

7.6 2022 Waterworks Financial Overview

- Total waterworks revenues (R) 181,006,931.09
- Total waterworks expenditures (E) 170,987,035.56
- Total debt payments on waterworks infrastructure loans (D) 10,019,895.53
- Comparison of waterworks revenues to (waterworks expenditures plus waterworks debt payments), expressed as a ratio:

$$R = (181,006,931.09) / (170,987,035.56 + 10,019,895.53) = 1.00$$

8.0 OUR CHALLENGES

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

COVID-19 Pandemic: Through early 2022, the City, and those departments supporting the Water Utilities, continued to optimize exposure control plans for the COVID-19 pandemic in accordance with public health measures and *The Occupational Health & Safety Regulations* of Saskatchewan. Some highlights include:

- Implemented a risk mitigation framework to keep staff safe and services going, and to ensure transparency and predictability for all.
- A heavy emphasis on education and communication for employees through email updates, safety meetings, and signage.
- Deploying rapid on-site COVID-19 testing in key workplaces.
- Coordinating vaccination clinics and launching a mandatory employee COVID-19 proof of vaccination or proof of negative test program.
- Regular workplace inspections to ensure the effectiveness of exposure control plans.
- Maintaining the extensive list of controls outlined in the 2020 Annual Report.

Despite the challenges, Water and Wastewater Utility employees continued to adapt to the ever-changing conditions of the pandemic.

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. Adding water and sewer underground linear infrastructure in developed areas is more expensive, technically challenging, and disruptive, than adding 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 Project initiated in 2020. 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 2022 continued to be transformational for the Water and Wastewater Utilities. Workplace policies and procedures were revised to maintain reliable high quality essential water services during the wind down of the pandemic. The launch of SAP for WWO and Technical Services is starting to create opportunities for efficiency by creating a unified approach to managing our resources. 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 for 2022:

- Enhancing employee engagement and striving to meet all safety goals.
- Continuously improving operations to utilize resources as efficiently and effectively as possible to deliver the quality water and wastewater services that customers expect.
- Refining 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 and optimizing energy usage to reduce GHG.

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: Artificial application of water 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 2022 rate structure remained the same.

WATER, SEWER & INFRASTRUCTURE			Billing Period
Meter No. 123456789			May 18, 2021 - Jun 18, 2021
Current Billing Read	Previous Billed Read	Multiplier	Usage
Jun 18	May 18		
Actual 1236.33	Actual 1222.28	35.315	496.18 ft ³
			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 58: Sample Residential Water-Based Utility Bill (2021)

Water Service Charge: The fixed monthly charge for a 5/8-inch water meter is \$12.81, and \$19.22 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): \$4.836 per 100 ft³ for the first 600 ft³, \$5.451 per 100 ft³ for the second 600 ft³, and \$7.177 per 100 ft³ for over 1,200 ft³. 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 51.8% of the water volumetric charge. Rates are set on a cost recovery basis and recognize that not all water returns to the sanitary sewer: \$2.499 per 100 ft³ for the first 600 ft³, \$2.817 per 100 ft³ for the second 600 ft³ and \$3.708 per 100 ft³ for over 1,200 ft³. Sewer service charges fund wastewater operations and capital projects.

Residential Infrastructure: The fee is \$3.623 per 100 ft³ 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.