City of Saskatoon
Saskatoon Water

SERVICE LEVEL FOR WATER UILITY

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Scope: What is This About

Service Level (SL) documents are prepared to allow customers of the City of Saskatoon (City) to review and understand the services currently provided. Water, as a service, is provided through activities in multiple departments – Water Treatment by the Saskatoon Water Department and Water Distribution by the Water and Waste Operations Department. Activities executed by the City's Construction and Design department as well as Technical Services through design, construction, monitoring, and replacements provide a comprehensive lifecycle approach to the management of these facilities.

This document focuses on activities completed in the treatment, distribution, and monitoring of water to continuously guarantee the availability and reliability of safe drinking water for our customers as well as meeting regulator requirements.

Service Overview: What We Do

Saskatoon has one of the safest water supplies in North America. The Water Utility takes pride in the quality of the water produced and distributed and is committed to ensuring all precautions are taken to keep citizens safe with minimal disruptions in the provision of treated water.

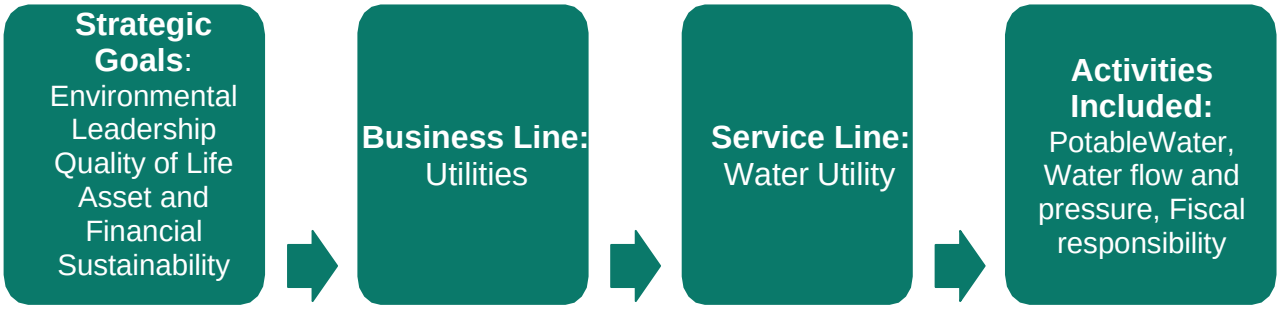
The treatment process involves taking raw water directly from the South Saskatchewan River through the Raw Water Intake facility located upstream of the Water Treatment Plant (WTP). The water is screened and treated before distribution to over 300,000 Saskatchewan residents via a network of water mains and three potable water storage reservoirs with capacity of 114 million litres. The stored water allows the WTP to be more efficient by running at a constant rate. The City's water treatment and distribution systems are regulated by a "Permit to Operate a Waterworks" issued by the Water Security Agency. Drinking water quality is further regulated by Health Canada's *Guidelines for Canadian Drinking Water Quality* and Saskatchewan Environment's *The Water Regulations, 2002, The Environmental Management and Protection Act, 2010 (EMPA)* and *The Waterworks and Sewage Works Regulations*.

The Saskatoon Water Department operates the WTP and reservoirs. The Water and Waste Operations Department (Water and Sewer section) operates the distribution system from the treatment plant and reservoirs to homes and businesses. Water quality is monitored 24 hours a day, 365 days a year which is in part why Saskatoon's water has consistently ranked amongst the highest in the Saskatoon citizen satisfaction rating of all civic services.

Purpose: Why We Do It

Safe drinking water is key to life. The World Health Organization identifies safe and readily available water as an important requirement for public health, whether it is used for drinking, domestic use, food production or recreational purposes. Consequently, in Saskatoon, treated water is provided to give residents and businesses a clean and safe potable water supply.

Furthermore, the recent Civic Services Performance, Priorities and Preferences Survey indicates high quality drinking water as one of the top service priorities of the citizens of Saskatoon.



Asset Management: How We Do It

The City's Water Treatment Plant continues to produce high quality drinking water through the effective management of its assets – physical, human, information, etc.

The main physical water treatment assets include the Raw Water Intake, WTP, and water storage reservoirs at three locations as well as auxiliary support assets such as vehicles and other machinery. The treatment process involves screening, coagulation, flocculation, softening, clarification, filtration, and disinfection. The physical assets have a combined asset replacement value of over $600 million.

The distribution system's physical assets consist of a network of water mains (about 1,192 km in total), valves, and hydrants with an estimated asset replacement value of approximately $3.18 billion.

These physical assets are operated, maintained, and managed by about 170 professional and dedicated employees (permanent and temporary) in order to deliver the following service items:

1. Provide potable water for consumption;
2. Provide water to the Saskatoon Fire Department for fire suppression purposes;
3. Provide sufficient pressure and flow for residential and commercial use;
4. Protect the environment; and
5. Ensure fiscal responsibility.

The assets are managed by following appropriate standards and employing strategic maintenance approaches to individual assets throughout their lifecycle. Typically applied standards are produced by Canadian Standards Association (CSA), American Society for Testing and Materials (ASTM), American Water Works Association (AWWA), Institute of Electrical and Electronics Engineers (IEEE), International Organization for Standardization (ISO), etc.

Customer Levels of Service: What Are Our Customer Targets

Customer Levels of Service (CLOS) outlines what the customer will receive. This section describes what is being provided to customers. Targets and current performance are highlighted to determine trends and identify the gaps.

CLOS (what are we measuring) Program in Service Line	Service Attributes or Values	Service Level Outcomes	Target Performance	Current Performance
Provide Potable Water for Consumption	Health and Safety, Quality, Aesthetic, Customer Service	1. Treated and distributed water is • safe to drink • cool and odorless • aesthetically pleasing 2. Meet requirement of "Permit to Operate a Waterworks" issued by Water Security Agency. 3. Lead service lines in the system will be replaced to meet immediate priorities for clean water and a healthier city. 4. Maintain high level of confidence in water quality by completing all monitoring and reporting requirements of provincial and federal regulatory programs.	Meet or exceed provincial and federal water standards.	Meeting goal greater than 99.5% of the time (one incident in 2021 with readings below 0.5 mg/l total in distribution system).
			Meet disinfection requirements (5 Log Inactivation of Cryptosporidium and Gardia as well as 6 Log Inactivation of virus) 99.99967% of the time.	
			All lead service lines in water distribution system will be replaced by 2027.	On track to achieve target.
			80% of water quality enquiries are addressed over the phone. The Water Lab will work with the customer to establish the cause of the issue and provide awareness on ways to prevent reoccurrence.	Meeting target: Over 90% of water quality enquiries are addressed over the phone.
			If an enquiry is not resolved over the phone, a home visit will be arranged to test the water within 48 hours. A sample is collected and tested within 48 hours to ensure water is safe for consumption.	Meeting target 100% of the time.
			Provide reporting results to customers annually in the Drinking Water Quality and Compliance report.	Meeting target 100% of the time.
Provide Water to the Saskatoon Fire Department for Fire Suppression Purposes	Reliability	1. The pressure in the Water Distribution System is operated to maintain adequate pressure in the system for fire	Minimum water pressure (20 psi) recommended by the American Water Works Association is maintained when the hydrants are in operation.	Mostly meeting goal (>99% of the time). When goal is not met Drinking Water Advisories (DWA's) are issued.

		suppression purposes. 2. Water Hydrants are inspected to ensure they are operating at capacity, highly visible, and accessible in the case of an emergency.	Inspect 80% to 100% of over 7,100 Hydrants in the system on an annual basis. • Winter Inspections: 100% of Hydrant. • Summer Inspections: 50% of Hydrants.	Mostly meeting goal. Improved resource planning to enhance achievement of goal.
Provide sufficient pressure and flow for residential and commercial use	Reliability, Customer satisfaction	1. Saskatoon's home and business water demands will be met at a sustained normal operating pressure. 2. Provision of high and reliable water pressure at all parts in the Water Distribution System is generally achieved by meeting Fire Flow requirements for those areas.	Normal water operating pressure range shall be maintained in the distribution system between 280 kPa (40 psi) to 550 kPa (80 psi).	Mostly meeting goal (>99% of the time). When goal is not met Drinking Water Advisories (DWA's) are issued.
			Minimum water pressure (20 psi) recommended by the American Water Works Association is maintained when the hydrants are in operation.	Mostly meeting goal (>99% of the time). When goal is not met Drinking Water Advisories (DWA's) are issued.
			Following an interruption in service that can affect water flow and pressure: • A Drinking Water Advisory will be provided to all homes and businesses affected. • Alternate water supply is provided to those affected within eight hours if the issue remains unresolved. • Water will be restored in one to two days except for extenuating cases	Mostly meeting goal (>99% of the time). Systems (e.g. documents) and processes are continuously updated to improve representation of the physical system in order to ensure DWA's are appropriately issued.
Protect the Environment	Environmental Leadership	1. Proactively protect and preserve the City's primary source of raw water. The South Saskatchewan River and its surrounding watershed (drainage	Reduced (as far as reasonably practicable) effluent discharge from the Water Treatment Plant to the South Saskatchewan River.	Not meeting goal – reddish brown discharge around the Water Treatment Plant resulting in poor aesthetic of the area.

		area) is protected to ensure Saskatoon's water supply is sustainable and impact to the environment is reduced. 2. The City is a partner in the South Saskatchewan River Watershed Stewards Inc. This organization works within the watershed to implement programs and initiatives that will protect the water resource.	Systems are operated, inspected, and maintained so that no Permit to Operate violations occur.	Treatment processes are being optimized to reduce flow by 40% y/y over the next three years.

Asset Management and Fiscal Responsibility	Asset management, reliability, responsible	1. Asset Management principles are used to maintain defined levels of service at the lowest life cycle costs. The Asset Management Plan will be reviewed and updated on a bi-annual basis. 2. Appropriate water rate is determined based on long term financial plan.	Utilization of preventive maintenance programs in a cost-effective manner to ensure asset integrity and reliability of the following assets - Water Treatment Plant, Water Mains, Valves, and Hydrants.	With current approved funding levels for water main replacement, the number of water mains in poor condition is getting smaller over time. Based upon the observed life cycle of water mains in Saskatoon, a water main is considered in poor condition when it meets certain criteria: • It has had six or more breaks in the last 25 years. • It does not meet current capacity standards. Water main replacement is prioritized based on capacity (volume of water), the number of people serviced and the number of historic breaks (last 25 years), the number of recent breaks (last five years), as well as optimizing the use of our resources by working with Roadways and Operations and other service areas.
			Develop and utilize long term capital development plans to guide the determination of water rate.	Mostly meeting goals.
			Appropriate water rate is determined based on long term financial plan.	Mostly meeting goals.

Resource Allocation: What Does it Cost

Service Line	Customer Levels of Service	2021 Budgeted Costs	2021 Actual Costs	Variance
Water Utility	5	$90,946,200	$91,594,348.38	$(648,148.38)

Service Line	Customer Levels of Service	2021 Actual Revenue	2021 Actual Costs	Variance
Water Utility	5	$101,715,353.64	$91,594,348.38	$10,121,005.26 The positive balance is transferred to the stabilization and capital reserve.

*Includes $3,630,505.26 transfer to stabilization reserve and $8,063,250 ROI transfer to City's general fund.

Some of the cost to provide these service levels broken down by activity in 2021 are:

Service Activity	Total Cubic Meters of Water Produced in 2021	Budgeted Cost Per Activity	Actual Cost Per Activity	Variance
Water treatment, pumping and Storage	43.1 million cubic meters in 2021	1.7	1.67	0.03
Water Distribution to homes and businesses (includes metering services)	43.1 million cubic meters in 2021	0.41	0.46	(0.05)

Financial Assumptions

- Water Treatment, Pumping, and Storage unit costs include Water Administration, General, and Corporate Service charges as well as Grant in Lieu.
- In 2021, the Water Utility Service Line paid a Return on Investment of $6,490,500 which was transferred to the City's general fund as well as $7,230,804 grant in lieu of taxes.
- The table below provides service level options and associated costs should there be a need or desire to adjust the service level.

No.	Service Level Option	Description of Change in Service Level Outcome	Estimated Annual Cost 2022	Annual Budget Allocation 2022	Overall Funding Result
1	Introduce 'Peak Shaving' initiative (odd/even watering of lawns).	Represents the offset to Operating expenditures which in turn will impact rate structure.	$92,801,000	$92,819,000	Savings of $18,000 annually.
2	Change guidelines for water main replacement from six breaks in 25 years to nine breaks in 25 years. The average number of breaks in a year would increase from 240 to 275.	Annual capital funding for replacement would reduce in the short-term. Over the long-term, replacement costs would increase because of a built-up backlog of failed water mains requiring replacement. Short-term and long-term maintenance costs would increase because of increased water main breaks.	$92,177,000	$92,819,000	Savings of $642,000 annually.
3	Change Watermain break response time from 48 hours to 72 hours.	Reduced reliance on contractor repairs will result in an estimated reduction in contractor calls to 12 calls per year at $3,000 per repair.	$92,777,000	$92,819,000	Savings of $42,000 annually.

Supporting Information

The revenue from the Water Utility, funds the Infrastructure Services Capital Reserve for water distribution and wastewater collection system rehabilitation and replacement projects needed to address aging infrastructure. In addition, there is a Redevelopment Levy as well as a Roadway Levy which is funded by the Water Utility.

Constraints

- Ageing infrastructure (some greater than 100 years old) with increased risk of failure if not managed effectively. Asset condition assessment project initiated at the WTP to determine current state of assets and recommend repair and replacement plan.
- Cumulative impacts of infill development is placing higher demands on the carrying capacity of existing water and sewer infrastructure.

Supporting References

Benchmarking: How We Compare

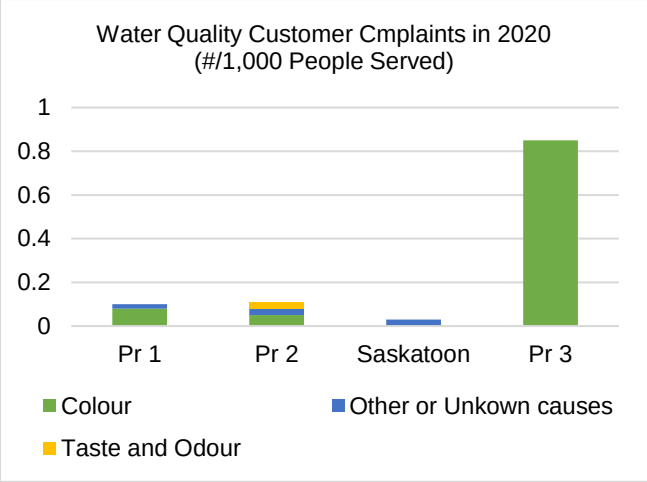


Figure 1: Water Quality Customer Complaints in selected Prairie Cities

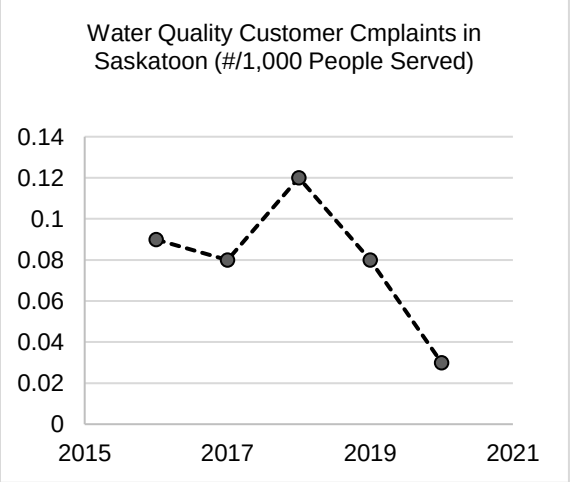


Figure 2: Water Quality Customer Complaints in Saskatoon

Saskatoon's performance with regards to the quality of water produced (public health and safety) and the reliability of the service was measured and compared to three other cities in the Prairies. Figure 1 above show that Saskatoon performs very well when compared to other cities in the Prairies with regards to the quality of water supplied as measured by the number of citizen complaints received. Furthermore, Figure 2 shows a decreasing trend of water quality complaints in Saskatoon since 2018.

The number of water main breaks is a good indicator of service performance with regards to reliable supply of safe drinking water. Unplanned service interruptions can be caused by water main breaks, leaking joints, damaged valves, cracks, etc. Typically, causes of the water main breaks include pipe age and material, pressure changes, water and ground temperature, as well as ground settling and corrosive soil conditions. Depth of pipe installation as well as weather also impact the possibilities of water main breaks.

Saskatoon continues to perform well compared to similar cities. Although compared to the same three cities in the Prairies, Saskatoon doesn't perform as strongly, but the number of water main breaks have been trending downwards in recent years. This is because of improved monitoring, inspections, maintenance, and replacements.

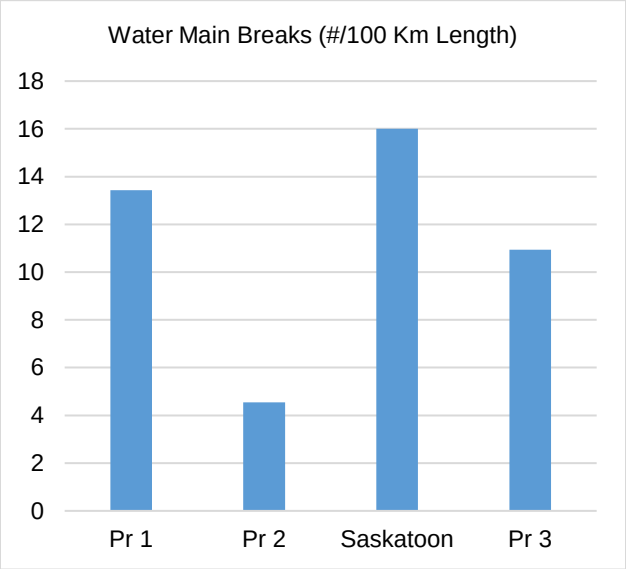


Figure 3: Water Main Breaks in selected Prairie Cities

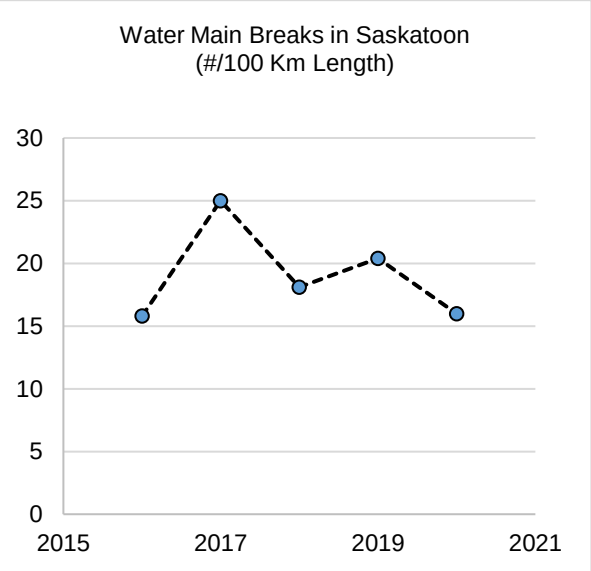


Figure 4: Water Main Breaks in Saskatoon

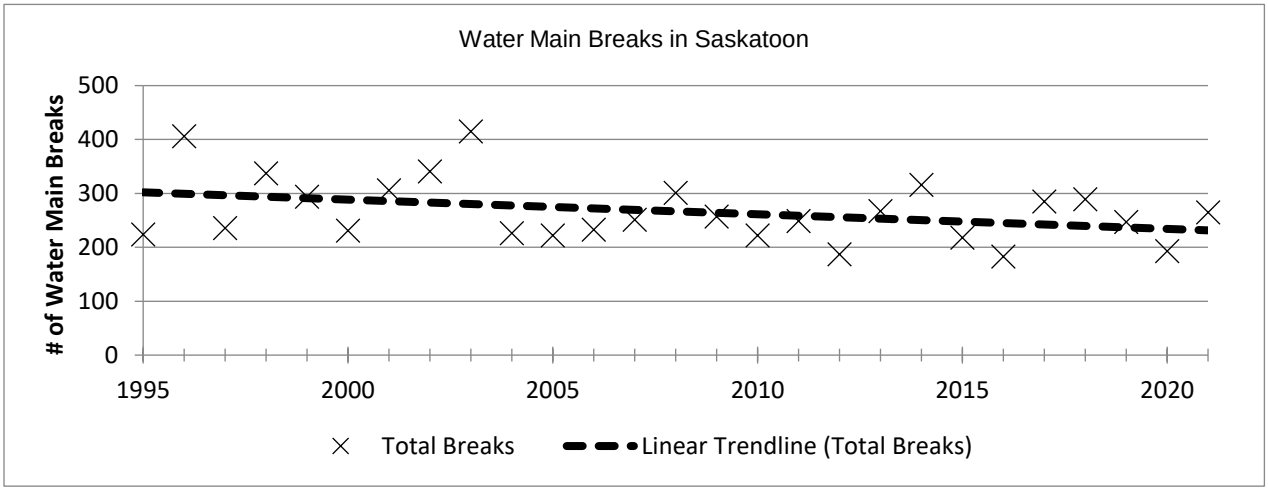


Figure 5: Total Water Main Breaks in Saskatoon

The City's current Council approved Asset Management Plan (AMP) defines the funding level for the preservation (replacement) of water mains as sufficient to decrease the back log of failed water mains in the city over time. To date the inventory of water mains meeting the criteria to be replaced has been reduced from 22.5km in 2011 to 16km in 2020. This backlog inventory is updated annually and monitored to make sure that the replacement program is reducing the backlog.