Saskatoon Water

2016 Annual Report

City of Saskatoon
Transportation & Utilities Department

Saskatoon Water 2016 Annual Report

1.0 OVERVIEW 3
1.1 Introduction 3
Water Treatment Plant 3
Wastewater Treatment Plant 3
Meter Shop 4
Engineering & Planning 4
Engineering Services 4
1.2 Strategic Linkages 4
Our Mission 4
Our Vision 4
Our Strategic Goals 5
Our Leadership Commitments 5
Our Corporate Values 5

2.0 OUR CUSTOMERS 6
2.1 Number of Customers 6
2.2 Rainfall and Temperature 6
2.3 Water Treatment Plant Volumes 8
2.4 Wastewater Treatment Plant Volumes 10
2.5 Meter Shop Customers 11
2.6 Customer Satisfaction 12
2.7 Citizen Calls 12

3.0 OUR FINANCES 13
3.1 Utility Bills 13
3.2 Financial Summary 15
3.3 Water Utility 18
3.4 Wastewater Utility 20
3.5 Storm Water Utility 22

4.0 OUR PEOPLE 24
4.1 Number of Employees 24
4.2 Representative Workforce 24
4.3 Organizational Chart 25
4.4 Employee Safety 26

5.0 OUR WORK 27
5.1 Community Awareness and Engagement 27
5.2 Operating Highlights 28
5.3 Capital Projects 30
5.4 Continuous Improvement Initiatives 32

6.0 OUR ENVIRONMENT 34
6.1 Stewardship 34
6.2 Conservation 35

7.0 OUR CHALLENGES 36

8.0 CONCLUSION 37

9.0 APPENDICES 37

Appendix One: Water, Wastewater and Storm Water Infrastructure 38
Appendix Two: Understanding Your 2016 Residential Water-Based Utility Bill 39
Appendix Three: Abbreviations 40
Appendix Four: Glossary 41

MESSAGE FROM THE DIRECTOR

Saskatoon Water's management and staff are committed to providing exceptional quality water, wastewater, and storm water management services in the most reliable and cost-efficient way for the citizens of Saskatoon. I am pleased to present our results in the *Saskatoon Water 2016 Annual Report* on behalf of our division.

The report describes our contributions to achieving the City of Saskatoon's Strategic Plan. We take great pride in receiving the highest citizen satisfaction rating of any City service for the quality of our water. Several initiatives have been completed and more are underway that will further enhance service to citizens, increase efficiencies, reduce costs, and strengthen our environmental leadership.

Our financial statements show responsible stewardship of the resources that Saskatoon citizens have entrusted to us. We continue to provide excellent value to our citizens as we maintain the lowest average water, wastewater, and storm water Utility Bill among major Western Canadian cities. Our utility rates are designed to fund the needed capital and operating costs for current and future water and wastewater services.

Management and staff place a strong emphasis on safety. Our Lost Time Frequency Rate was lower than the City of Saskatoon's corporate average.

Saskatoon Water has been focused on addressing growing demands, changing expectations, regulatory changes, and aging infrastructure for water-related services. In 2016, Saskatoon Water had 93 active capital projects valued at $212.5 million. Saskatoon Water will continue to plan for the future and make needed infrastructure investments.

Reid Corbett

Director

SASKATOON WATER

Executive Summary

Saskatoon Water contributes to our city's quality of life by providing safe and reliable, high-quality drinking water, wastewater treatment that meets health and environmental regulatory standards, and storm water management to minimize flooding.

The division oversees three self-funded public utilities: Water, Wastewater, and Storm Water. The utilities fund all aspects of water services performed by Saskatoon Water and other divisions. Saskatoon Water's 163 employees operate the Water Treatment Plant, the Wastewater Treatment Plant, 28 lift stations, the Meter Shop, and provide engineering and planning services. The utilities also fund other divisions to deliver day-to-day operation and maintenance of the water distribution, wastewater collection, storm drainage systems, asset preservation and construction, and billing services.

Saskatoon Water provides water services to approximately 73,000 residential and commercial customers. The Water Treatment Plant supplies water to approximately 300,000 Saskatchewan residents. Average monthly residential water-related Utility Bills of $105.28 was the lowest among Western Canadian cities in 2016.

In 2016, the utilities collected $139.1 million in revenues, incurred $135.5 million in expenses, and contributed $3.6 million to stabilization and capital reserves. Compared to 2015, total revenues in 2016 increased by 7% as a result of growth and development, rate increases; and the phase-in of roadways, redevelopment levies, and a Return on Investment. A 9.5% annual increase in water and wastewater rates was approved for 2014 through 2016 to ensure that the utilities can meet needs of current and future citizens.

In 2016, almost half of Saskatoon Water's revenues, or $68.7 million, was allocated to capital to fund longer-term, water-related infrastructure projects. Significant capital projects in 2016 include Acadia Drive Reservoir capacity improvements, Advanced Metering Infrastructure, Water Treatment Plant filter upgrades, Spadina Lift Station expansion, Wastewater Treatment Plant odour abatement, 16th Street Slope remediation, upsized Fletcher Road force main, condition assessments of storm water collection system, and long-term master planning of water and sewer servicing to a population of one million.

SASKATOON WATER

1.0 OVERVIEW

1.1 Introduction

Saskatoon Water is a division that oversees three self-funded utilities: Water, Wastewater, and Storm Water that fund the planning, designing, operating, maintenance, and capital for all water, wastewater, and storm water services for existing and future citizens and businesses. The utilities have assets with a replacement value estimated at over $9.5 billion (2014 dollars) – see Appendix 1 for details.

The utilities also fund Roadways & Operations and Water & Waste Stream (formerly Public Works), which delivers the day-to-day operation and maintenance of the water distribution, collection, and drainage systems. Major Projects & Preservation and Construction & Design manage infrastructure assessment and construction projects. Corporate Revenue provides customer billing, meter reading, and collection services. The following summarizes the responsibilities of Saskatoon Water's five sections.

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

The **Wastewater Treatment Plant** (WWTP) ensures that wastewater is treated to meet high provincial and federal regulatory standards before being returned to the South Saskatchewan River. The wastewater's system includes the WWTP, 28 lift stations, and the Biosolids Facility where solids from the treatment process are handled and disposed. Sales of the plant's slow-release fertilizer create additional revenues.

The **Meter Shop** is responsible for the purchase, installation, testing, repair, and replacement of water meters; the installation 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 of Saskatoon's (City) potable water.

Engineering & 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 sewer and rain gauge monitors are operated and maintained by the system modeling group to assist with water-related planning and design activities.

Engineering & Planning manages the Storm Water Utility and provides storm water engineering expertise. The section also monitors and mitigates damage to public property from riverbank settlement and instability due to high ground water levels.

Engineering Services provides capital planning and feasibility studies, and project management services for Saskatoon Water's capital expansions and asset replacements.

1.2 Strategic Linkages

The City's Strategic Plan 2013-2023 provides the direction that guides Saskatoon Water's activities. The following section outlines our Mission, Vision, and linkages to the Corporate Strategic Goals, Leadership Commitments, and Values.

Our Mission

Saskatoon Water delivers safe, reliable, and cost-effective water, wastewater, and storm water services that meet and exceed health and environmental regulatory standards.

Our Vision

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

Our Strategic Goals

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

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

Asset and Financial Sustainability: Implement capital preservation and expansion plans that provide the most cost-effective, water-related infrastructure for current and future citizens and businesses.

Environmental Leadership: Implement leading-edge innovations for environmentally responsible water-related infrastructure and services.

Sustainable Growth: Work closely with other divisions to provide efficient and resilient designs for water, wastewater, and storm water infrastructure for new developments.

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.

Our Leadership Commitments

Our employees support leadership commitments in our day-to-day work:

- Reliable and Responsible Service
- Strong Management and Fiscal Responsibility
- Effective Communication, Openness, and Accountability
- Innovation and Creativity

Our Corporate Values

Trust: We build trust with citizens and colleagues by providing accurate technical information, analysis, and responses in a timely manner.

Integrity: We lead by example, making the best decisions and striving to work beyond the scope of the position.

Respect: We build on each other's strengths; respectfully acknowledging individual beliefs.

Honesty: We are honest to each other, and encourage frank, honest discussions while being sincere, admitting mistakes, and learning from them.

Courage: We take smart risks, thinking through challenges, suggesting new approaches, and embracing change to enhance our level of service.

2.0 OUR CUSTOMERS
2.1 Number of Customers

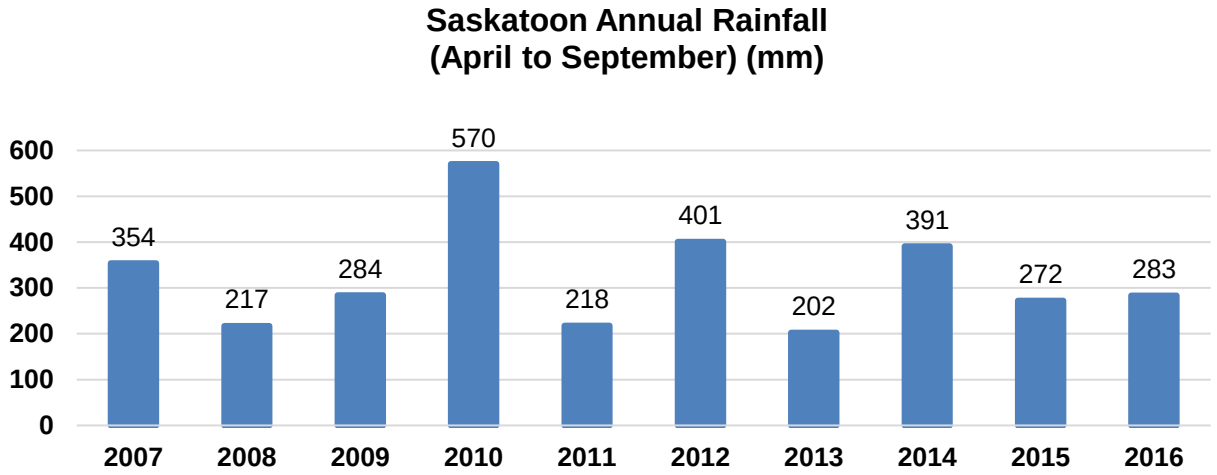
Water treatment and distribution, wastewater collection and treatment, and storm water management services are provided to Saskatoon's 262,900 citizens and to commercial, industrial, and institutional customers. Saskatoon Water also sells treated water to SaskWater, which receives this water at seven supply points around the city's perimeter and re-distributes it to 37,900 customers outside of Saskatoon.

In 2016, Saskatoon Water provided water services to approximately 73,000 residential and commercial water meters.

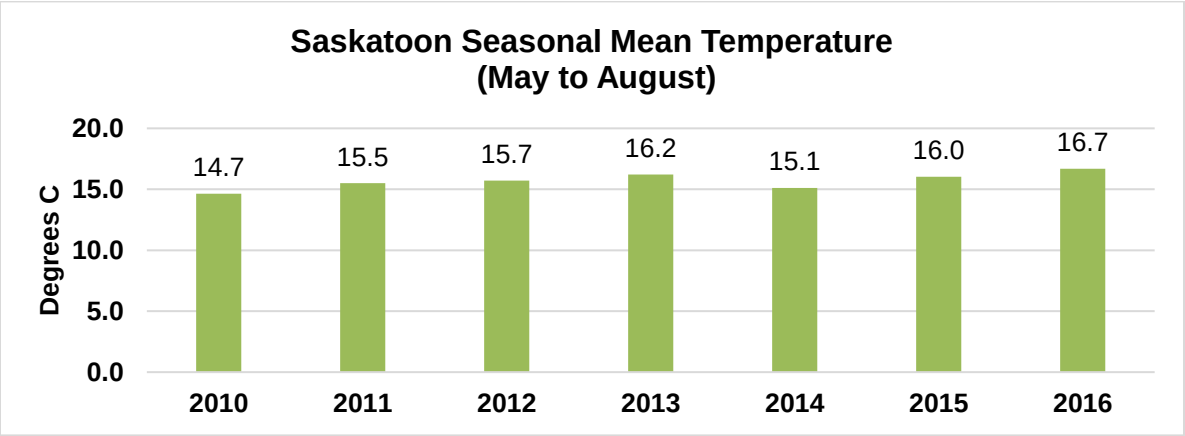
Storm water customers include residential properties with water meters and commercial, industrial, and institutional properties that generate storm water run-off. In 2016, storm water management charges were applied to over 70,000 total properties in the city. Agriculture-zoned property, roads, right-of-ways, and City-owned parks were exempted from storm water charges.

2.2 Rainfall and Temperature

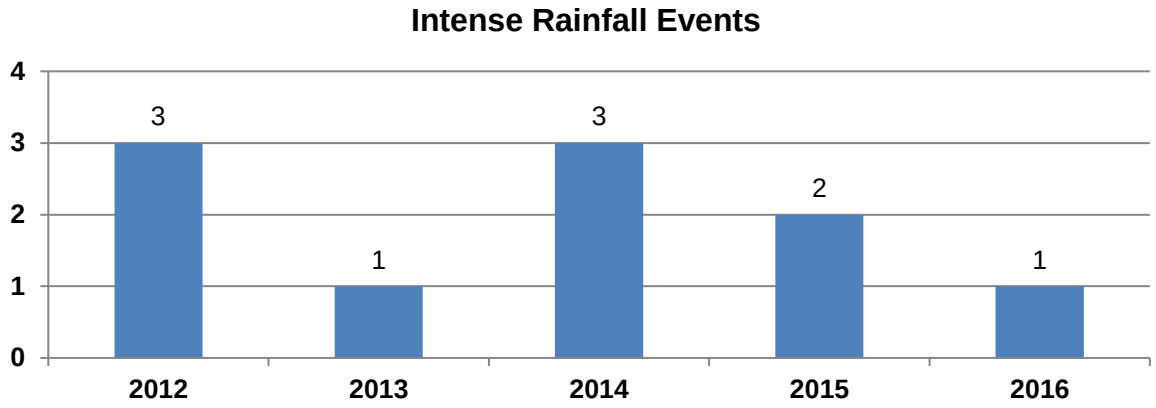
Variations in annual water sales correlate closely with summer rainfall and temperatures, which show irrigation is a significant portion of total sales volume. In 2016, Saskatoon registered 283 mm of rainfall, which is slightly lower than the 10-year average rainfall of 319 mm.



Average summer (May to August) temperatures in 2016 were 0.7º C warmer than historical summer averages. In 2015, summer monthly temperatures were an average 0.1 º C warmer than normal.

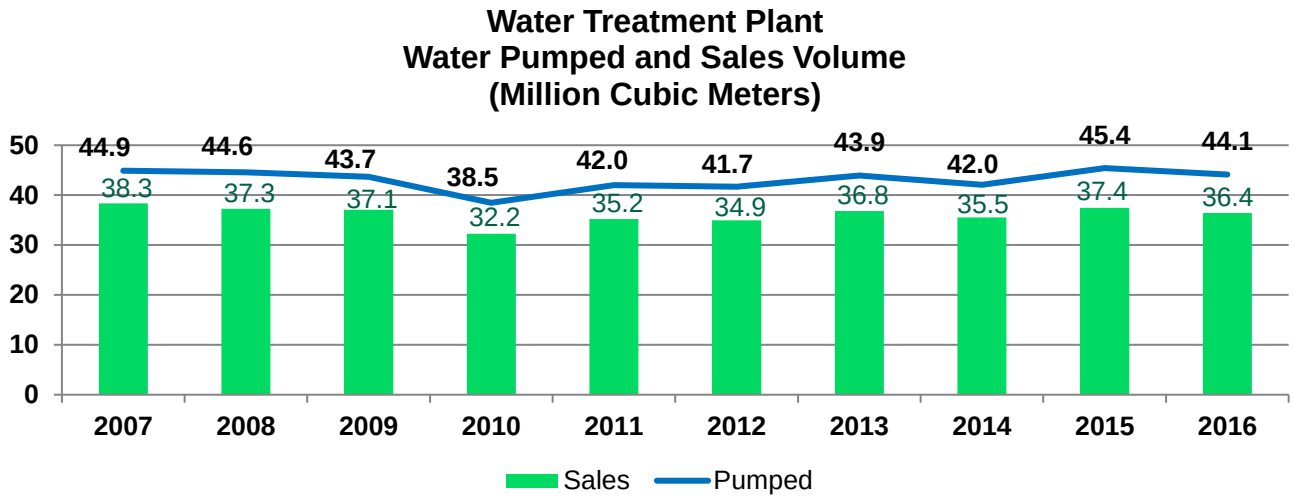


Intense rainfalls place demands on the storm water infrastructure. Since 2012, Saskatoon has operated eight rain gauges. In 2016, an average of one rain event (minimum two-year return period) per gauge was recorded. Saskatoon had a maximum 24-hour rainfall of 24 mm on August 3, 2016. In seven of the last ten years, Saskatoon experienced maximum 24-hour rainfall levels that were higher than the historical 116-year average (37 mm).



2.3 Water Treatment Plant Volumes

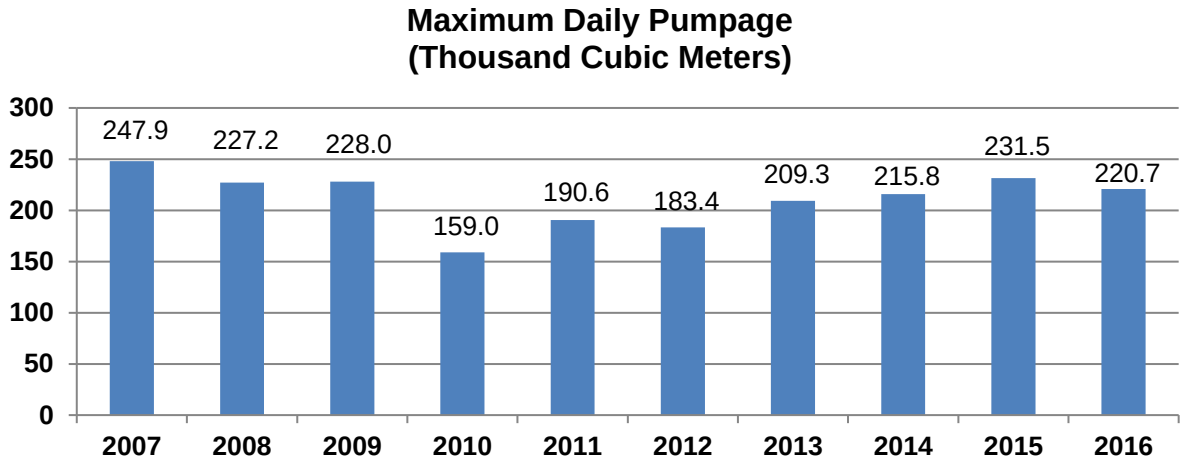
Based on customer meter readings, 36.4 million cubic meters of water were sold in 2016. The wet spring in 2016 resulted in a lower demand for irrigation, resulting in lower sales than 2015. Even with population growth, the volume of water sold in 2016 was lower than the volume sold in 2007. This can be attributed to lower consumption per capita due to low-flow faucets, toilets, and washing machines, and an increased water conservation awareness.



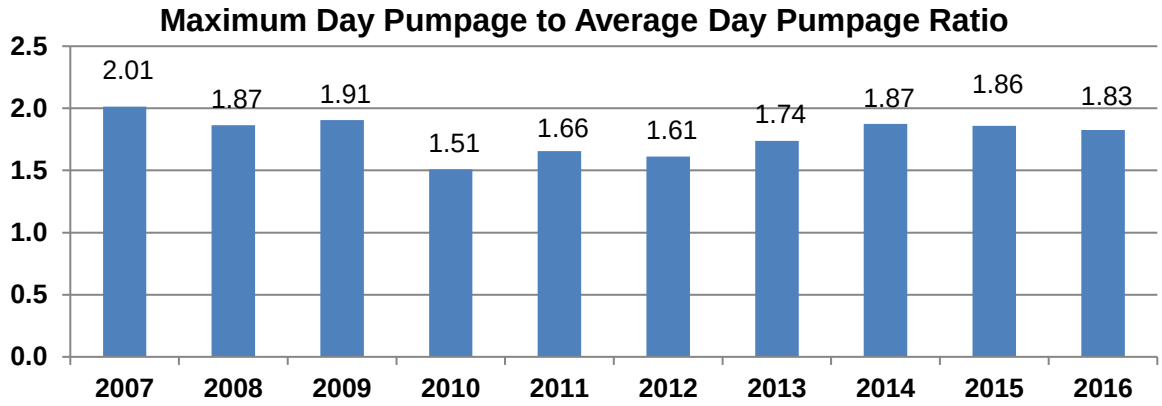
The above chart compares the annual volume of treated water pumped from the WTP into the distribution system and the volume of water sold. Due to a water meter failure, the pumpage was estimated from 2010 to 2013 based on an assumed water leakage rate of 16.2%. In 2016, unmetered water was 17.5% of total water pumpage. 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

Maintenance and investment in the water distribution system will reduce water loss and lower water treatment operating costs.



The WTP's capacity must be able to meet the maximum daily water demand, which is the average of four consecutive days of highest demand each year. Maximum daily pumpage has increased over three years from 2013 to 2015, with a maximum of 231,465 m^3 in June 2015. In June 2016, the maximum daily demand was 220,705 m^3. The City's population growth and weather conditions impact the maximum daily pumpage. Conservation initiatives have helped to reduce maximum daily pumpage from the levels seen in 2007, even with population growth.

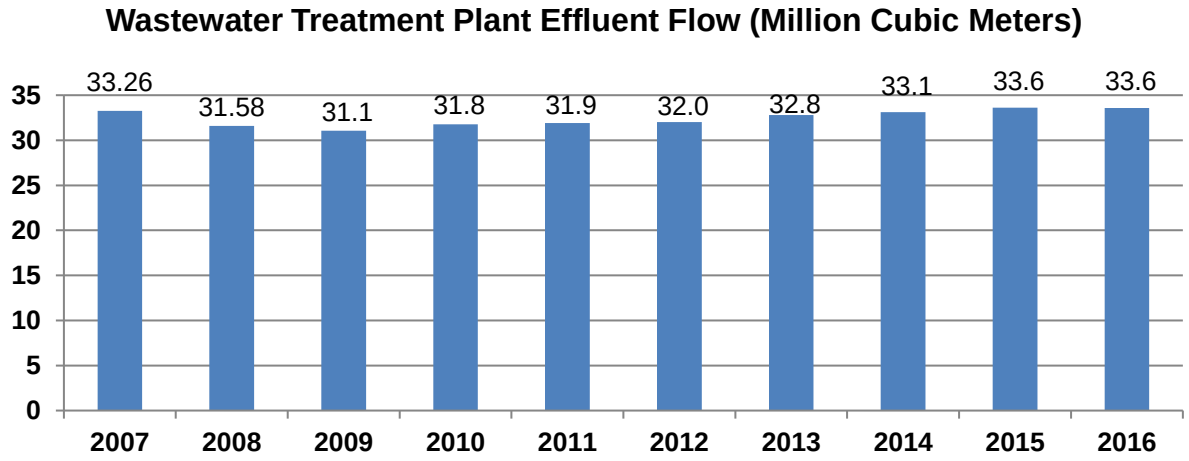


"Maximum Day Pumpage to Average Day Pumpage Ratio" reflects the extra capacity required for the maximum daily volume of water consumption at the height of summer irrigation relative to average daily water consumption throughout the entire year.

The 2016 "Maximum Day to Average Day Pumpage Ratio" of 1.83 was slightly lower than the ratio in 2015. This ratio is highly volatile as it is largely dependent upon weather in the summer. Hot, dry weather yields high ratios, while cool, wet weather yields low ratios.

Over the next decade, as demand approaches plant capacity, construction of a new WTP can be deferred by reducing the peaking caused by irrigation during periods of hot, dry weather. The ratio can be significantly reduced through peak demand management initiatives, such as implementing watering schedules.

2.4 Wastewater Treatment Plant Volumes



*2011 was estimated due to missing flow data. The monitoring instrumentation was replaced.

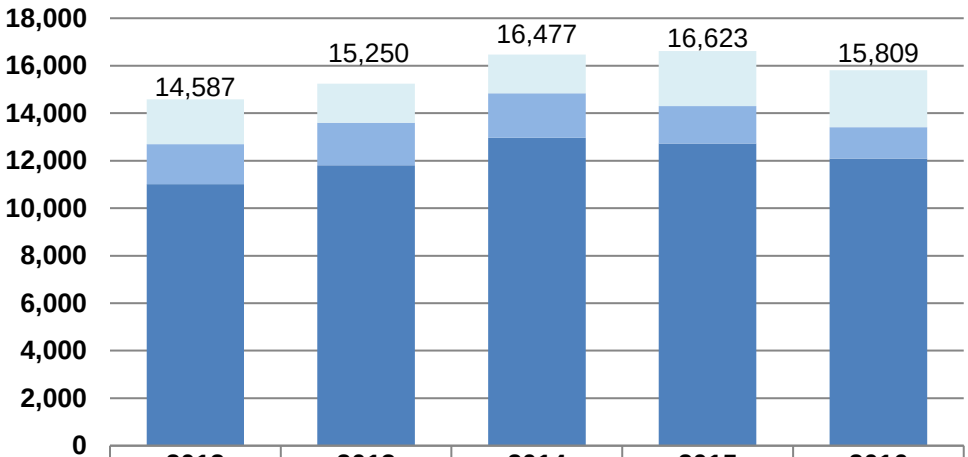
In 2016, WWTP effluent was the same as in 2015, which is the maximum over the last 10 years. WWTP effluent flow increases as the population grows and decreases when households install water-saving appliances, such as low-flush toilets. Wet weather or intense storm conditions also influence effluent flow 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.

Waste Activated Sludge Stripping to Remove Internal Phosphorous (WASSTRIP) Tank with cover to reduce odour

2.5 Meter Shop Customers

In 2016, the Meter Shop undertook 15,809 total jobs, an increase of about 8.4% since 2012, with the same number of employees. Jobs included 2,398 meter replacements, 1,323 new meter installations, and 12,088 service calls, which result from work orders generated by Corporate Revenue to check malfunctioning meters or for cut-offs and reconnects. New meter installations were down due to decrease in growth, while the number of meter replacements increased by 3.4%.

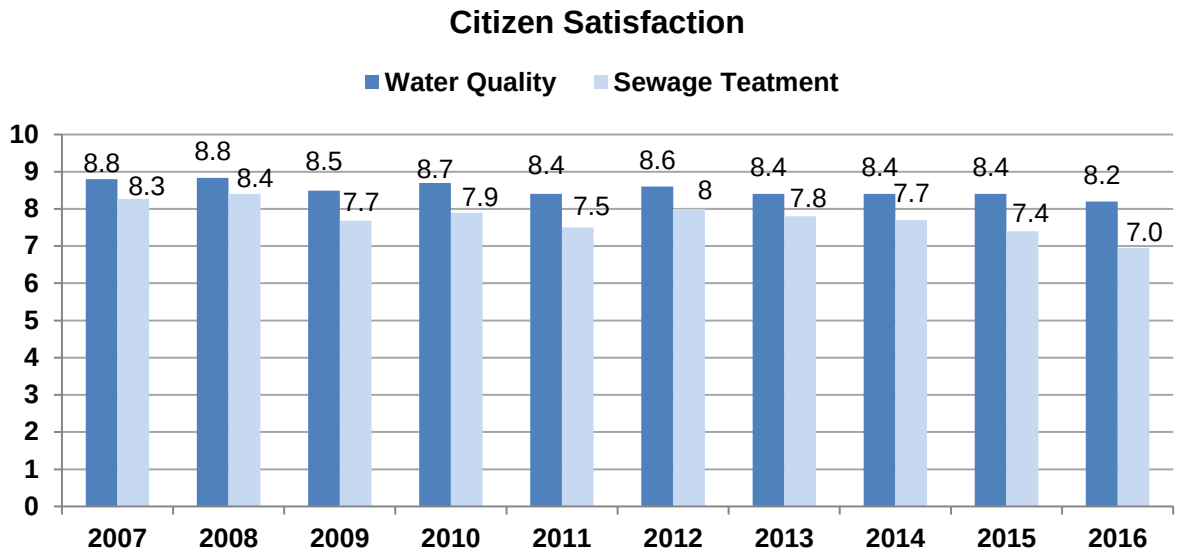
Meter Shop
Service Calls, New Meter Installations and Replacements



	2012	2013	2014	2015	2016
Replacements	1,888	1,656	1,637	2,320	2,398
New Installations	1,689	1,787	1,872	1,583	1,323
Service Calls	11,010	11,807	12,968	12,720	12,088

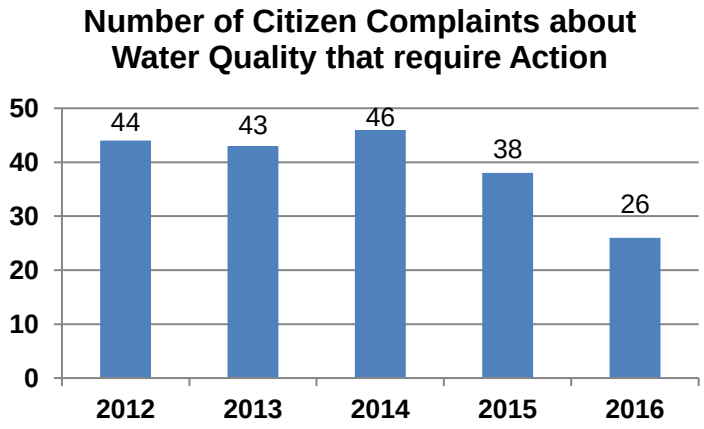
Presently, there are 7,835 active backflow prevention devices. In 2016, 991 new devices were installed and 95.1% of all devices were tested. Almost all of the 4.9% of devices not tested were inactive due to construction or City parks not completed on time.

2.6 Customer Satisfaction



Saskatoon citizens ranked water treatment and wastewater treatment as two of the most important civic services, with drinking water quality being the most important service in the annual 2016 Civic Services Satisfaction Study. A score of ten means "excellent" and five means "average". In 2016, the average citizen satisfaction for water quality was 8.2 and sewage treatment was 7.0 out of 10. **Water quality has consistently received the highest Saskatoon citizen satisfaction rating of all civic services**.

2.7 Citizen Calls



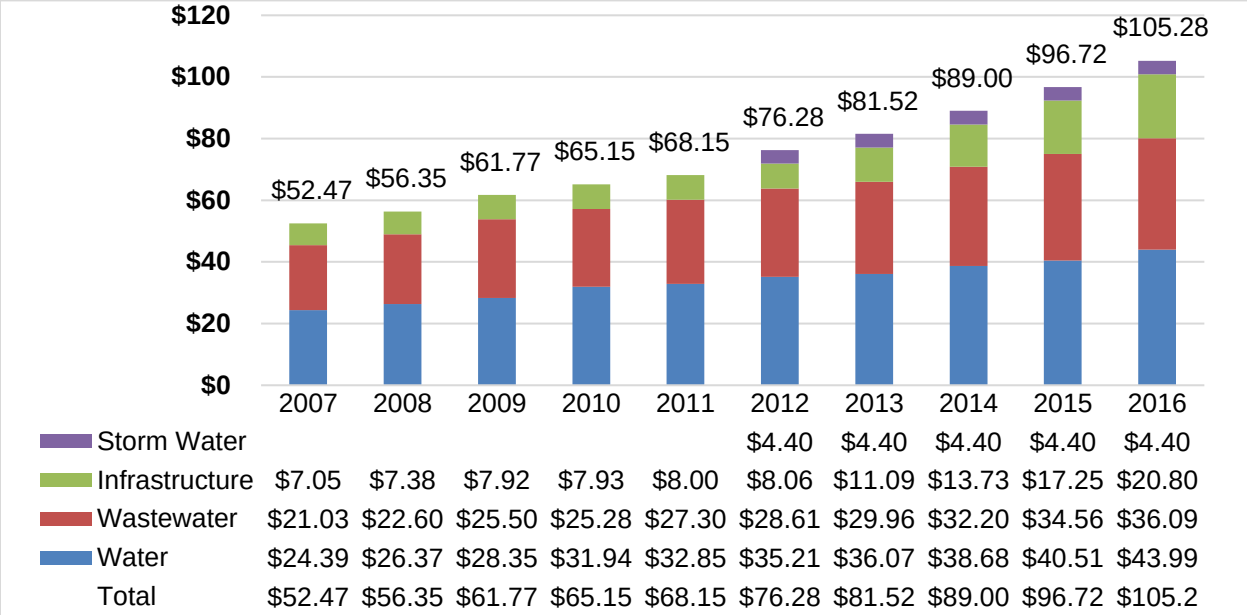
In 2016, citizen calls resulted in lab personnel making 26 on-site visits to conduct water quality testing for bacteria and inorganic material to ensure safe, high-quality water is maintained.

Three calls about WWTP odour were received in 2016, and all occurred during the commissioning of a capital project. No odour complaints were received during normal operations.

3.0 OUR FINANCES

3.1 Utility Bills

Average Residential Monthly Water-Related Utility Charges
3/4 inch meter and Volume of 900 ft3 / 25.5 m3)



	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Storm Water						$4.40	$4.40	$4.40	$4.40	$4.40
Infrastructure	$7.05	$7.38	$7.92	$7.93	$8.00	$8.06	$11.09	$13.73	$17.25	$20.80
Wastewater	$21.03	$22.60	$25.50	$25.28	$27.30	$28.61	$29.96	$32.20	$34.56	$36.09
Water	$24.39	$26.37	$28.35	$31.94	$32.85	$35.21	$36.07	$38.68	$40.51	$43.99
Total	$52.47	$56.35	$61.77	$65.15	$68.15	$76.28	$81.52	$89.00	$96.72	$105.2

Total residential water-related utility charges were $105.28 per month in 2016 based on a standard 3/4 inch meter connection and a monthly water volume of 900 ft^3. Saskatoon residents with smaller 5/8 inch water meters, which are common in core neighbourhoods, pay $4.68 less per month on the fixed portion of their Utility Bill. In 2016, 55% of meters for single residential homes were 5/8 inch and 45% were 3/4 inch. All new homes are fitted with 3/4 inch meters, which meet citizen expectations for higher water demand, for example, watering larger lawns.

Infrastructure Levies include the Roadways Levy and Redevelopment Levy, which were phased in between 2014 and 2016, and its funding is split between the Water and Wastewater Utilities. See *Appendix 2: Understanding Your 2016 Water-Based Utility Bill* for more information about Utility Bill charges.

Saskatoon's total water, wastewater, and storm water Utility Bills remain significantly less than in other cities in Alberta, Manitoba, and Saskatchewan at average water volumes. Based on the standard water meter size and monthly water volume of 900 ft^3, water bills in Saskatoon were 8.0% less than in Regina, the second lowest utility.

2016 Water, Wastewater & Storm Water Monthly Charges by Utility (3/4 inch meter and Volume of 900 ft³ / 25.5 m³)

	Saskatoon	Winnipeg	Calgary	Edmonton	Regina
Storm	$4.40	$-	$13.05	$11.76	$15.21
Wastewater	$46.49	$60.00	$56.29	$62.71	$57.86
Water	$54.39	$53.65	$60.61	$60.08	$67.57
Total	$105.28	$113.65	$129.95	$134.55	$140.64

Under Saskatoon's inclining block rate system, water and wastewater rates increase at volumes of 600 ft³ (17 m³) and 1,200 ft³ (34 m³). Of the western benchmark cities, only Winnipeg has lower charges for water volume, less than 600 ft³ (17 m³) per month.

The 2014 *Storm Water Utility Program Comparison* report compared the City's storm water rates with 12 other cities for different property types on the basis of costs and "user-pay". Saskatoon residential properties paid the third lowest storm water utility rate and commercial properties paid the fourth highest rate.

The "user-pay" assessment considered the degree to which properties were charged proportionally for the amount of storm water run-off they generated, ranging from charges based on area size and imperviousness for all types of properties (most "user-pay") to a flat rate for all properties (least "user-pay"). Saskatoon is among the leading "user-pay" cities, ranking fourth among the 13 cities.

3.2 Financial Summary

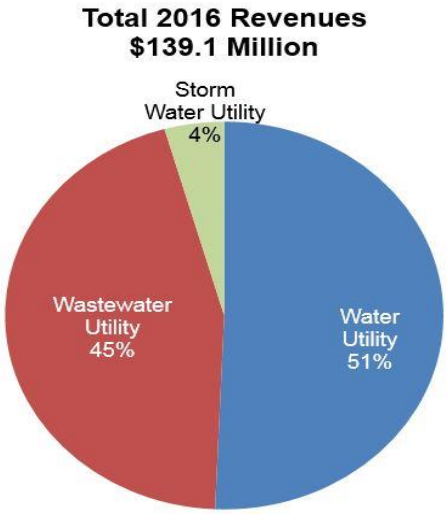
The Water, Wastewater and Storm Water Utilities are based on a user-pay principal and are fully funded through their rates. In 2016, the three utilities collected $139.1 million in total revenues and had $135.5 million in total expenses for a positive variance of $3.6 million.[1]

Water, Wastewater and Storm Water Utilities
Statement of Revenues and Expenditures
($1,000s)

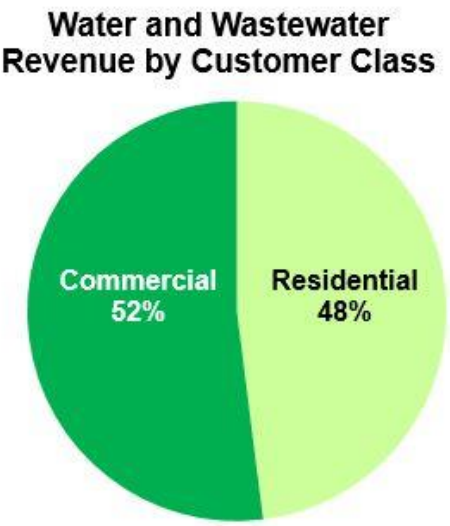
	Water Utility	Wastewater Utility	Storm Water Utility	Consolidated	Consolidated
	2016	2016	2016	2016	2015
Total Revenues	**$ 70,504**	**$ 62,518**	**$ 6,120**	**$ 139,142**	**$ 130,005**
Expenditures					
Utility Operations	$ 12,088	$ 10,573	$ 376	$ 23,037	$ 23,636
Public Works Operations	11,598	7,351	2,619	21,568	19,597
Administration & General	2,377	1,454	16	3,847	4,961
Corporate Services & Billing	3,638	2,345	179	6,163	4,766
Capital Charges	21,040	15,160	2,667	38,866	37,750
Flood Protection Charges		3,899		3,899	3,841
Infrastructure Services Capital Reserve	10,910	15,066		25,976	22,302
Grants-in-lieu of Taxes	5,291	3,862		9,153	8,479
Return on Investment	1,740	1,260		3,000	
Total Expenditures	**$ 68,682**	**$ 60,971**	**$ 5,856**	**$ 135,509**	**$ 125,332**
Revenues less Expenditures	**$ 1,823**	**$ 1,548**	**$ 263**	**$ 3,634**	**$ 4,672**
(To)/From Stabilization/Capital reserves	**$ (1,823)**	**$ (1,548)**	**$ (263)**	**$ (3,634)**	**$ (4,672)**

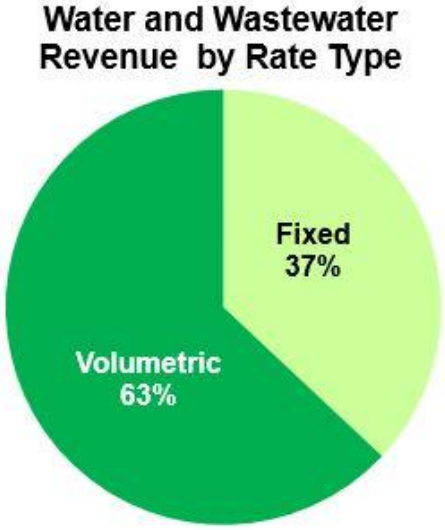
Total utility revenues increased by 7% in 2016 as a result of the infrastructure levy phase-in, rate increases, population growth, and increased other revenue, which offset the decrease in volumetric and fixed revenue.

The Water Utility accounts for 51%, Wastewater for 45%, and Storm Water for 4% of revenues.



[1] Positive Water and Wastewater variances fund the Water & Wastewater Revenue Stabilization Reserve which is utilized in years when there is an operating deficit. The Stabilization Reserve has a maximum 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. The positive Storm Water Utility variance will be transferred to the Storm Water Stabilization Reserve.



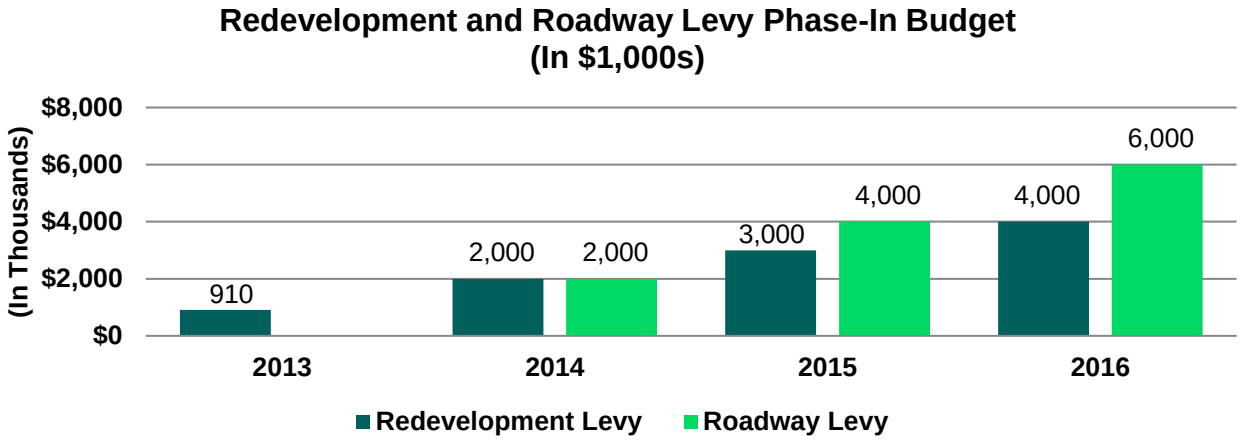


Commercial customers account for just over half of Water and Wastewater's total revenues.

About 63% of revenues are based on volumetric charges and 37% are from fixed charges.

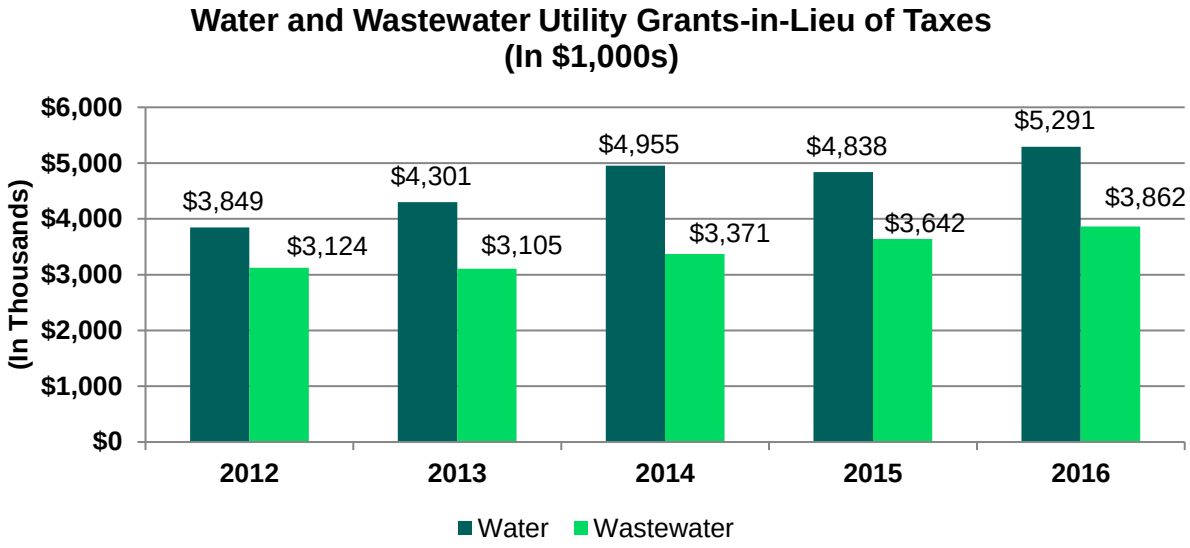
In 2016, total expenditures increased by 8.1% due to growth, inflation, additional water treatment processes to meet higher standards, and increased contributions to the Infrastructure Services Capital Reserve. Despite below budget revenues in 2016 due to cool, wet weather, the overall expenditures were below budget resulting in the positive balance of $3.6 million, which was allocated to the Water & Wastewater Revenue Stabilization Reserve and to Capital Reserves.

Funding to Roadways & Operations and Water & Waste Stream to deliver the day-to-day operation and maintenance of the water distribution, collection, and drainage systems accounted for 16% of total expenditures. Funding for the Infrastructure Services Capital Reserve accounted for another 19% of expenditures, and in 2016, Saskatoon Water paid $3 million (2%) Return on Investment (ROI). 2016 is the first year of a five-year phase-in plan to establish an ROI from Saskatoon Water on 10% of metered and fixed revenue.



The Infrastructure Levy was originally implemented to fund the Infrastructure Services Capital Reserve for water distribution and wastewater collection system rehabilitation and replacement projects needed to address aging infrastructure (e.g. eliminate the water main replacement backlog to meet current service levels). In 2013, a Redevelopment Levy was added to the Infrastructure Levy, with a four-year phase-in period to generate $4.0 million annually by 2016. In 2014, a Roadway Levy was added to the Infrastructure Levy with a three-year phase-in period to generate $6.0 million annually by 2016. The new levies accounted for $10.0 million in 2016, representing 82% of the 2016 increase in Infrastructure Levy revenue.

The Water and Wastewater Utilities paid $9.15 million in 2016 to the City as a Grant-in-lieu of Taxes.



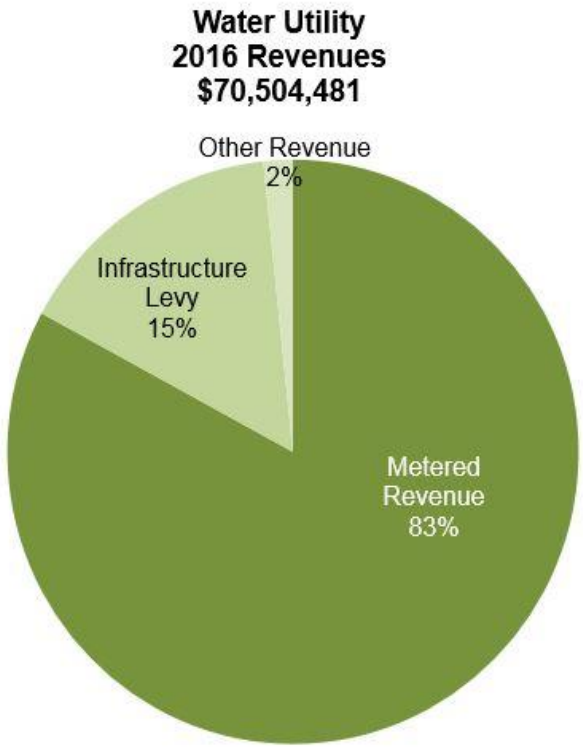
The Water and Wastewater Utilities had a positive variance of $3.6 million, of which, $791,158 was allocated to maximize the allowable balance in the Water and Wastewater Revenue Stabilization Reserve and the remainder was transferred to capital reserves to support capital projects and reduce debt requirements.

3.3 Water Utility

Revenues

The Water Utility's 2016 total revenues of $70.5 million were $153,000 or 0.2% less than budgeted. Total revenues were $5.3 million or 8.1% more in 2016 than in 2015. Infrastructure Levy revenues, a volumetric charge, increased by 16.5% in 2016.

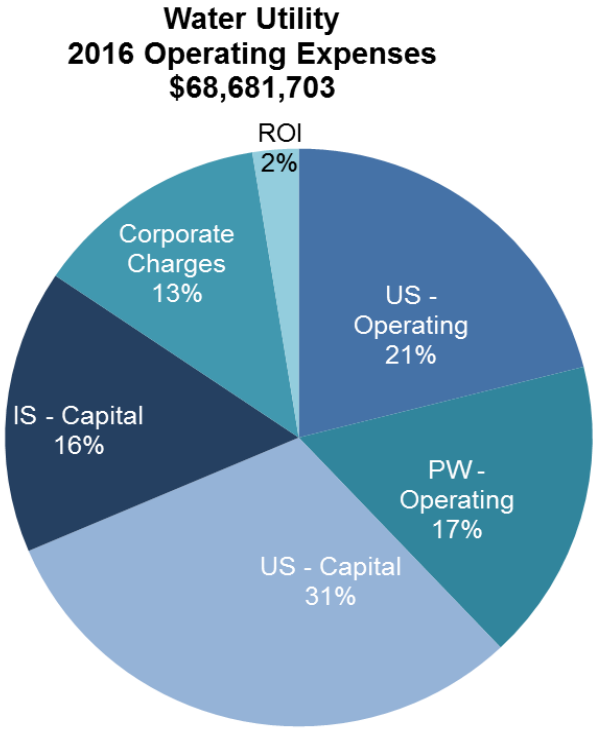
Other revenues included the fire protection charge, late payment penalties, and some miscellaneous revenue.



Expenses

The Water Utility's $68.6 million expenses in 2016 included the following:

- Utility Services (US) Operating expenses, of $14.4 million, include water treatment, pumping, storage, Meter Shop, administration, and general expenses incurred by Saskatoon Water.
- Public Works (PW) Operating expenses, of $11.6 million, include funding to Water & Waste Stream to operate and maintain the water distribution system.
- Utility Services (US) Capital, of $20 million, funds all capital work related to the WTP and reservoirs, including debt servicing costs.
- Infrastructure Services (IS) Capital, of $10.9 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 $8.9 million, include the Grant-in-Lieu of taxes, cross-charges for customer billing and collections, and corporate administration.



- Return on Investment (ROI), of $1.7 million. 2016 is the first year of a five-year phase-in plan to establish an ROI from Water Utility based on 10% of metered and fixed revenue.

The Water Utility's 2016 total expenses were approximately as budgeted and were 8.0% more than in 2015, reflecting the 2015 discretionary spending order, inflation, higher costs for additional new treatments, increase in the volume of treated water, increased maintenance, and increased contribution to the Infrastructure Services Capital Reserve. The 2016 expenses, under the control of Saskatoon Water, were under budget by $1.8 million and were $1.1 million (7.3 %) less than in 2015.

Financial Statement

Water Utility
Operating Revenues and Expenses
($1000s)

	2016 Budget	2016 Actual	2015 Actual
Revenues			
Metered revenue	$ 58,786	$ 58,426	$ 54,676
Infrastructure Levy	10,863	10,910	9,367
Other revenue	1,009	1,168	1,156
Total Revenue	**$ 70,658**	**$ 70,504**	**$ 65,198**
Expenses			
Water Treatment, Pumping, Storage	$ 12,019	$ 10,481	$ 10,736
Water Meters	1,669	1,606	1,603
Water Administration & General	2,590	2,377	3,259
Corporate Services	3,599	3,638	2,752
Distribution (Public Works)	11,859	11,598	11,108
Capital Charges	21,029	21,040	19,927
Provision to Infrastructure Services Capital	10,863	10,910	9,367
Grants-in-lieu of Taxes	5,291	5,291	4,838
Return on Investment	1,740	1,740	
Total Expenses	**$ 70,658**	**$ 68,682**	**$ 63,589**
Revenues less Expenses	**$ -**	**$ (1,823)**	**$ (1,609)**
(To)/From Stabilization/Capital Reserves	**$ -**	**$ 1,823**	**$ 1,609**

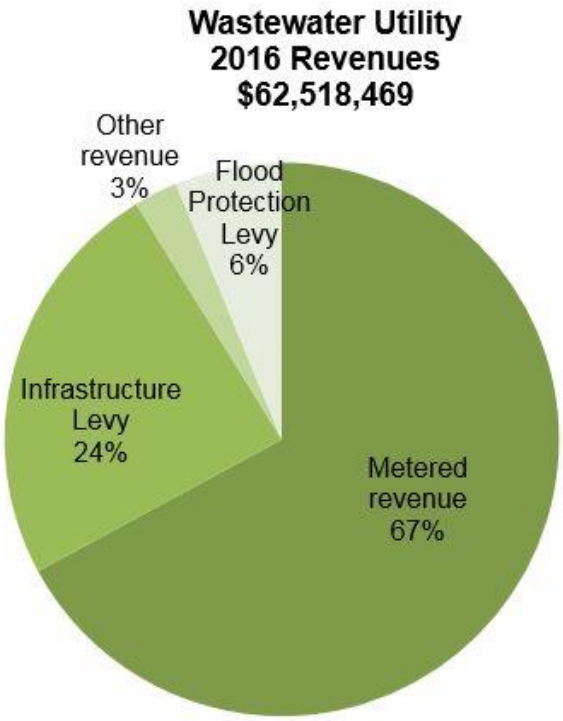
The positive balance of $1.8 million was allocated to the Water & Wastewater Revenue Stabilization Reserve and to Capital Reserves.

3.4 Wastewater Utility

Revenues

The Wastewater Utility's 2016 revenues, of $62.5 million, were about 0.5% less than budgeted.

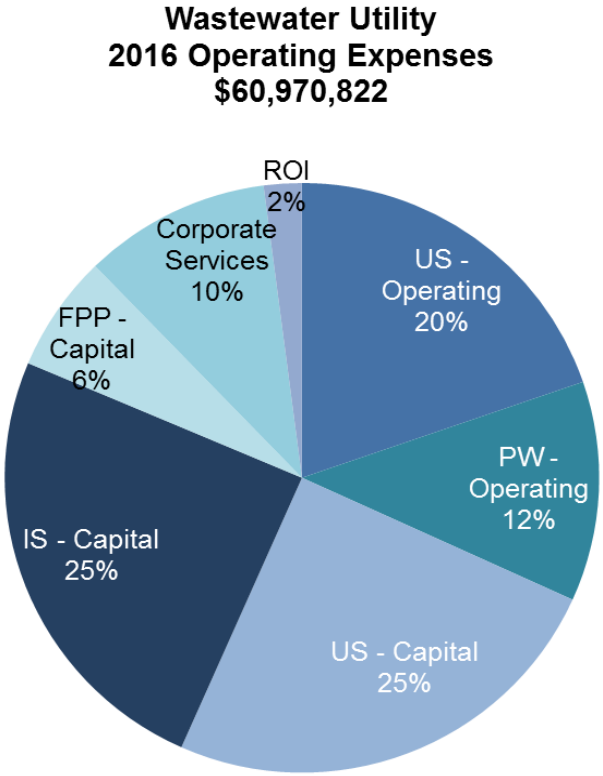
Revenues increased by 5.8% from 2015 due to rate increases including the Roadways and Redevelopment Levies, and the higher demand. The plant also received more revenues from liquid waste haulers, which are increasingly bringing septic waste to the plant in anticipation of provincial regulatory changes restricting land spreading of septic tank waste after 2017.



Expenses

The Wastewater Utility's 2016 expenses of $60.9 million included the following:

- Utility Services (US) Operating expenses, of $12 million, include wastewater treatment, pumping, sludge handling and disposal, administration, and general expenses incurred by Saskatoon Water.
- Public Works (PW) Operating expenses, of $7.3 million, include funding to Water & Waste Stream to operate and maintain the wastewater collection system.
- Utility Services (US) Capital, of $15.1 million, funds capital work related to the WWTP.
- Flood Protection Program (FPP) Capital, of $3.9 million, funds projects that reduce sewer back-ups during major storms.
- Infrastructure Services (IS) Capital Reserve, of $15 million, funds capital replacement of the wastewater collection systems, roadway damage associated with the utility, and wastewater upgrades for core areas.
- Corporate Charges, of $6.2 million, include the Grant-in-lieu of Taxes, cross-charges for customer billing and collections, and corporate administration.



- Return on investment (ROI), of $1.2 million. 2016 is the first year of a five-year phase-in plan to establish an ROI from Wastewater Utility based on 10% of metered and fixed revenue.

The Wastewater Utility's 2016 expenses were 3.0% less than budgeted and about 9.0% more than in 2015, which reflected the 2015 discretionary spending order, the increase to the Infrastructure Services Capital Reserve, inflation, and increased volume. The 2016 expenses, under control of Saskatoon Water, were under budget by $0.9 million and were $0.5 million (4.3%) less than in 2015.

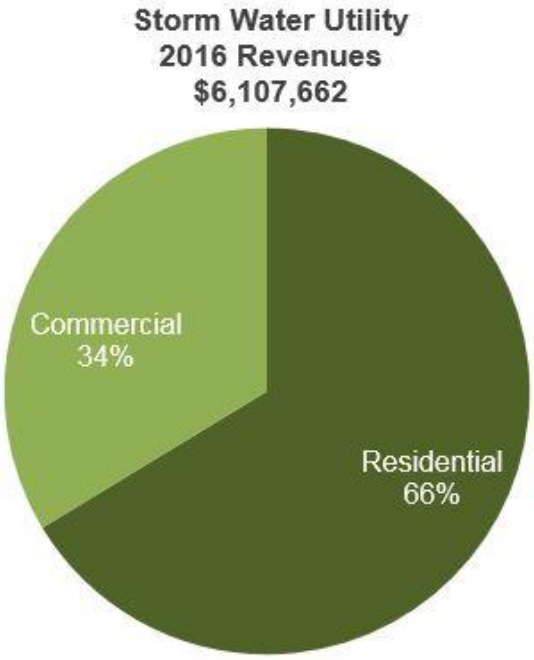
Financial Statement

Wastewater Utility
Operating Revenues and Expenses
($1000s)

	2016 Budget	2016 Actual	2015 Actual
Revenues			
Metered revenue	$ 42,911	$ 41,948	$ 40,566
Infrastructure Levy	15,001	15,066	12,935
Other revenue	1,008	1,605	1,723
Flood Protection Levy	3,921	3,899	3,841
Total Revenues	**$ 62,840**	**$ 62,518**	**$ 59,065**
Expenses			
Wastewater Treatment	$ 7,595	$ 7,262	$ 7,418
Wastewater Lift Stations	1,742	1,522	1,750
Wastewater Sludge Handling & Disposal	1,960	1,789	1,710
Wastewater Administration & General	1,655	1,454	1,688
Corporate Services	2,321	2,345	1,843
Collection (Public Works)	8,377	7,351	6,370
Capital Charges	15,148	15,160	14,902
Flood Protection Program	3,921	3,899	3,841
Provision to Infrastructure Services Capital	15,001	15,066	12,935
Grants-in-lieu of Taxes	3,862	3,862	3,642
Return on Investment	1,260	1,260	-
Total Expenses	**$ 62,840**	**$ 60,971**	**$ 56,099**
Revenues less Expenses	**$ -**	**$ 1,548**	**$ 2,967**
(To)/From Stabilization/Capital Reserves	**$ -**	**$ (1,548)**	**$ (2,967)**

The positive balance of $1.55 million was allocated to the Water & Wastewater Revenue Stabilization Reserve and to Capital Reserves.

3.5 Storm Water Utility



Revenues

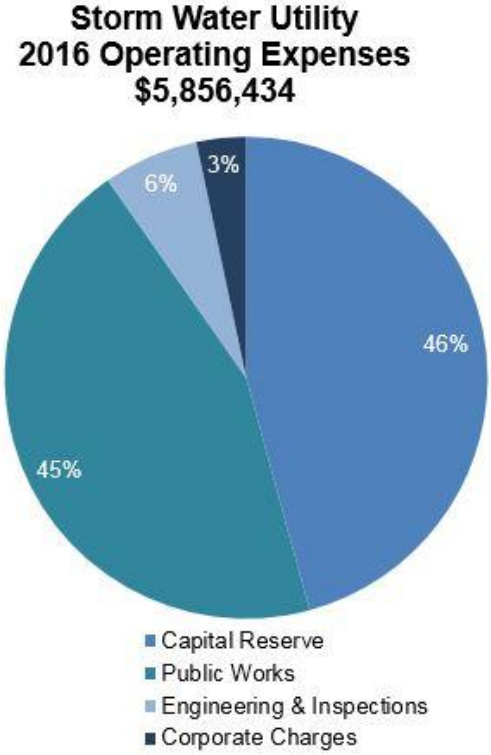
The Storm Water Utility's revenues include single-family residential charges ($52.80 per year), multi-residential, commercial, industrial, and institutional charges, which are proportional to the storm water generated based on property size and surface imperviousness. A seven-year phase-in of commercial rates started in 2012, with a maximum annual charge of $3,696 per property in 2016.

The Storm Water Utility's revenues in 2016 were $6.11 million, an increase of 6.60% from 2015. Residential customers accounted for about two thirds of revenues while commercial customers accounted for one third of revenues.

The Storm Water Utility's revenues were higher by 1.79% than the budgeted amount of $6.0 million. This increase is mainly due to re-assessment of run-off charges for commercial and multi-residential properties in order to capture all new developments.

Expenses

The Storm Water Utility's 2016 operating expenditures were $5.8 million, which was higher by 3.75% than 2015 expenses of $5.64 million. Operating expenditures in 2016 were 2.57% lower than budgeted because of no major storm events and staff vacancies.



- Engineering and inspections, of $0.38 million, included drainage inspections and overall utility management by Saskatoon Water.
- Provisions to Capital expenditures, of $2.69 million, are related to annual funding allocation to capital investments. In 2016, almost half of total expenditures was allocated to Storm Capital Reserve to fund storm water infrastructure rehabilitation.
- Public Works Operating expenses, of $2.62 million, include funding to Roadways & Operations and Water & Waste Stream to operate and maintain the storm water collection system including surface drainage.
- Corporate Charges, of $0.17 million, included billing services by Corporate Revenue and financial and administration services from Business Administration, Transportation & Utilities Department.

The Storm Water Utility's positive variance of $.026 million was allocated to the Stabilization Reserve, which the utility can draw on in years when there is a negative annual operating balance. The Stabilization Reserve balance was $1.46 million at the end of 2016.

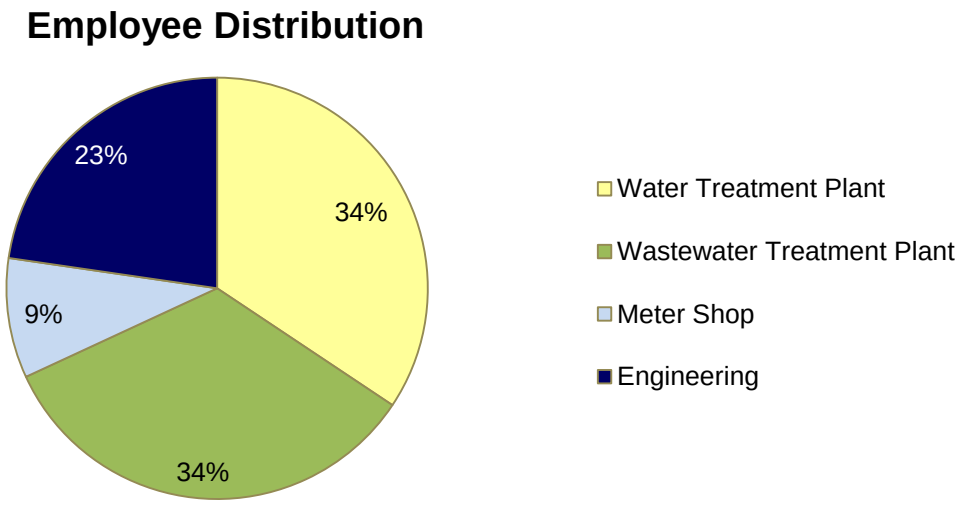
Financial Statement

Storm Water Utility Operating Revenues and Expenses ($1000s)	2016 Budget	2016 Actual	2015 Actual
Revenues			
Storm Water Charges	$ 6,000	$ 6,108	$ 5,729
Late Charges	11	12	12
Total Revenues	**$ 6,011**	**$ 6,120**	**$ 5,741**
Expenses			
Engineering & Inspections Operations	$ 417	$ 376	$ 418
Maintenance (Public Works)	1,858	1,805	1,449
Drainage (Public Works)	879	814	671
Customer Billing	123	127	122
Corporate Services	52	52	50
Licenses & Insurance	16	16	14
Interest Expense/(Revenue)	(25)	(25)	(35)
Provision to Capital Reserve	2,691	2,691	2,957
Total Operating Expenses	**$ 6,011**	**$ 5,856**	**$ 5,644**
Revenues Less Expenses	**$ -**	**$ 263**	**$ 97**
(To)/From Stabilization/Capital Reserves	**$ -**	**$ (263)**	**$ (97)**

4.0 OUR PEOPLE

4.1 Number of Employees

Saskatoon Water had 163 employees as of December 2016. The graph shows the distribution in major areas. (Engineering includes Engineering Services and Engineering & Planning sections.)



4.2 Representative Workforce

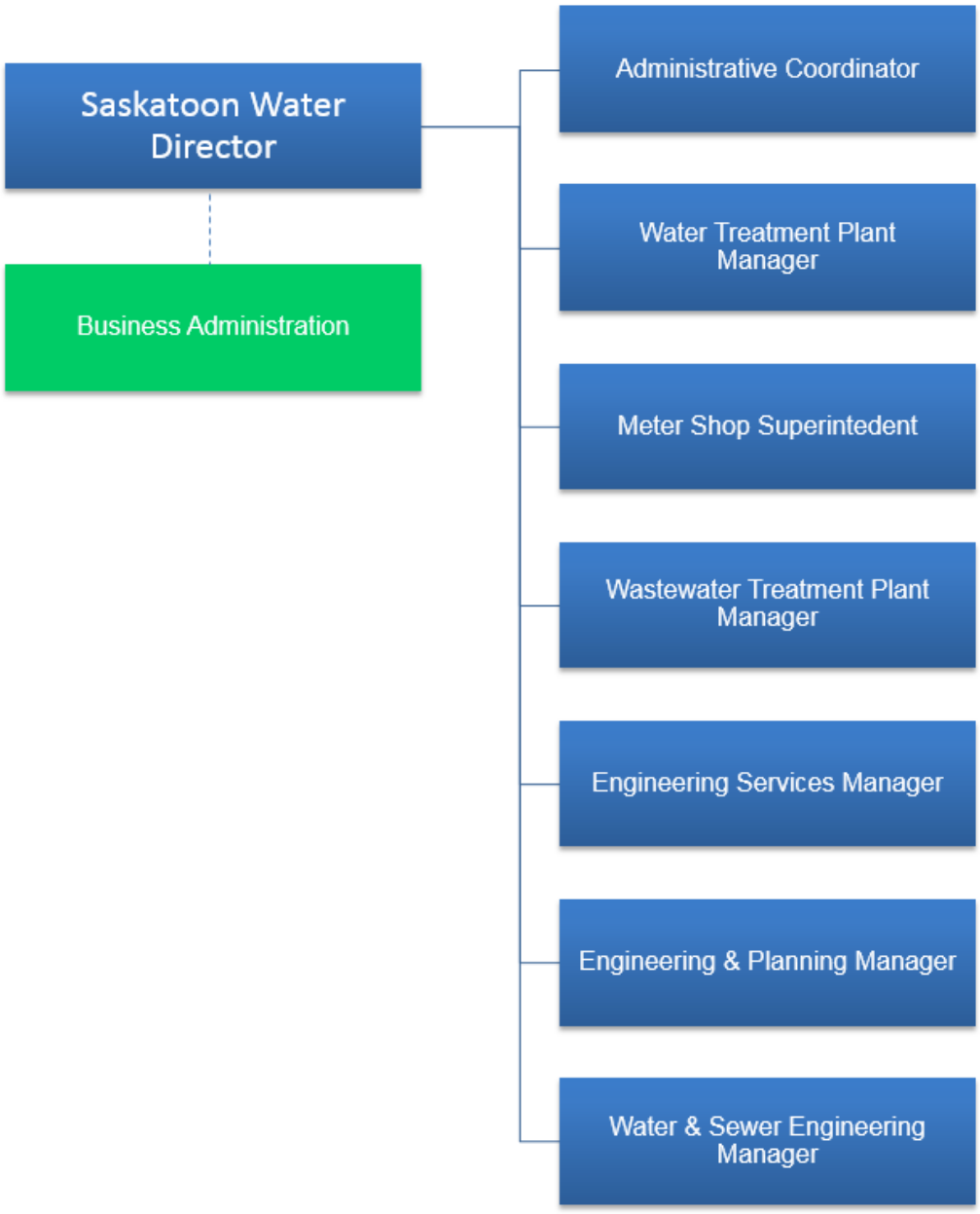
Saskatoon Water participated in diversity programs with Human Resources and other organizations to increase awareness among under-represented groups of career opportunities with Saskatoon Water. Examples of programs include Gabriel Dumont Institute Work Experience for Aboriginal People, Women in Trades - Grade XII Girls, and Open House for New Canadians.

Relative to goals set in 2014 by the Saskatchewan Human Rights Commission (SHRC) and adopted as corporate targets by the City, Saskatoon Water had a higher proportion of self-declared visibility minority employees and lower proportions of employees who self-declared as Aboriginal, female, or with a disability as of December 2016.

Percentage of Employees Self-Declared as an Equity Group Member December, 2016			
Equity Group	**Saskatoon Water**	**City of Saskatoon**	**SHRC Goal**
Self-Declared as Aboriginal Ancestry	5.0%	7.2%	14.0%
Self-Declared as Visible Minority	15.6%	10.6%	11.0%
Self-Declared as Person with Disability	1.9%	3.8%	12.4%
Self-Declared as Female	20.6%	38.0%	46.0%

4.3 Organizational Chart

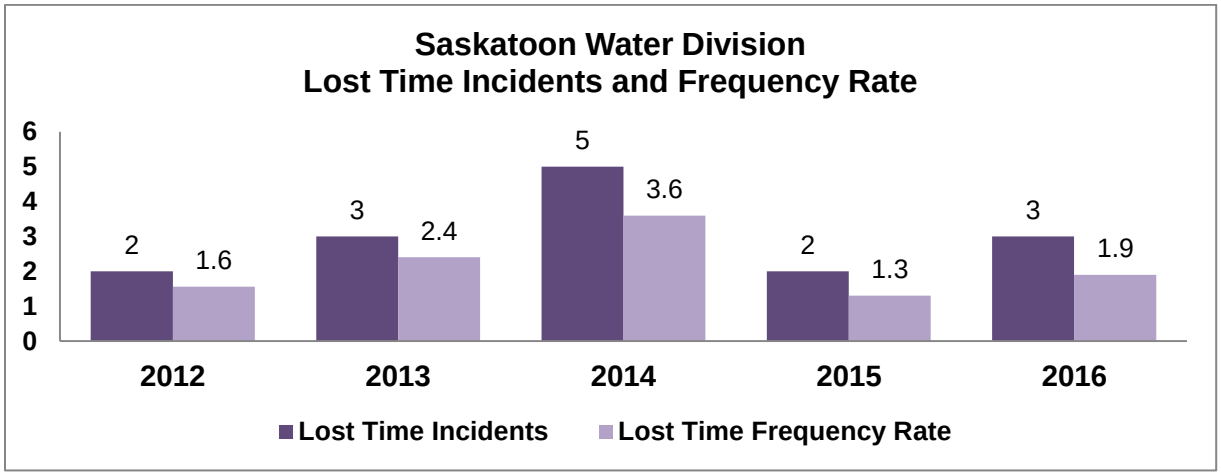
The organizational chart provides a high level overview of how Saskatoon Water is organized and key positions in 2016.

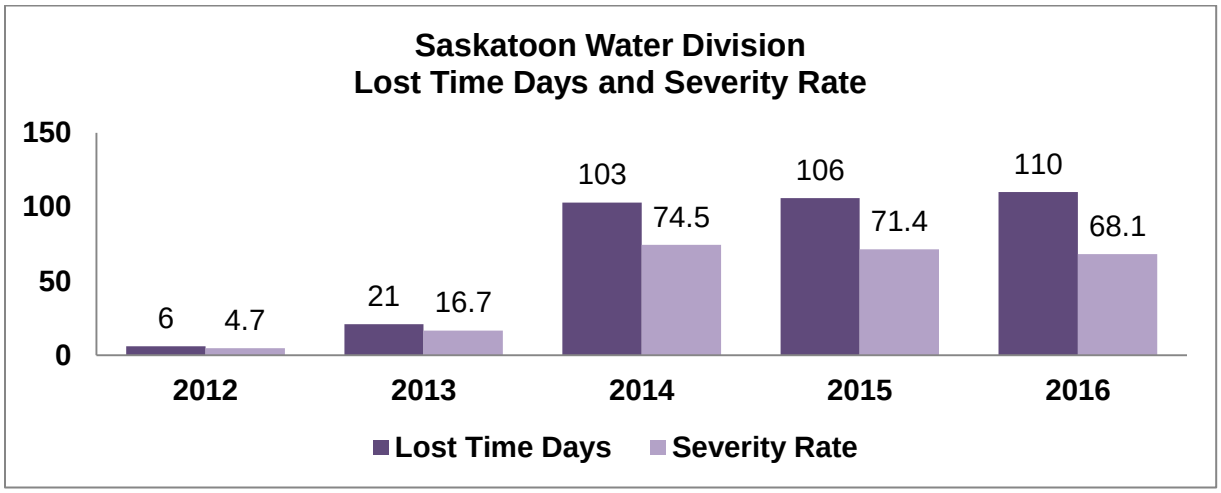


4.4 Employee Safety

Management and staff place a strong emphasis on safety in the workplace to strive to meet the corporate target of zero lost-time injuries. Saskatoon Water is currently implementing recommendations from a 2014 safety audit through engagement from management and staff, with the goal of eliminating work-place incidents/injuries.

Saskatoon Water employees' Lost Time Frequency Rate of 1.9 in 2016 was lower than the 2.7 average for all City employees. Our employees had three lost-time incidents in 2016, compared to two incidents in 2015. Saskatoon Water will continue to follow the Health Management Program and Disability Assistance Program to support employees from the first day of injury or illness to their pre-injury job or an accommodation.





5.0 OUR WORK

5.1 Community Awareness and Engagement

Water Quality Reporting: The Water Security Agency (WSA) requires that at least once each year, Saskatoon Water provide notification to consumers of the quality of water produced and supplied, as well as information on the performance of the waterworks in submitting samples as required by a Minister's Order or Permit to Operate a Waterworks. In compliance with this order, Saskatoon Water produces the Drinking Water Quality and Compliance report annually.

For general information on water quality, water and wastewater treatment processes, environment, major capital projects, and water conservation, Saskatoon Water posts Saskatoon Water's Annual Water Quality Report on the City's website.

Guided Tours of Water Treatment and Wastewater Treatment Plants: Guided tours are available to the public, ages 16 and older, to increase awareness of how the utilities operate in providing safe, reliable water and in returning quality effluent to the South Saskatchewan River. In 2016, the WTP had 315 people booked on 23 tours and the WWTP recorded 227 participants on 19 tours.

Water Week: Saskatoon's Water Week, March 21 to 27, 2016, was themed "Freshwater Leadership". Communication and engagement activities to increase water awareness included a Water Week website, Facebook Water Week Question of the Day, Twitter, YouTube videos about the WTP and the WWTP, and media interviews.

Drinking Water Quality – Lead Pipes: Each year, Saskatoon Water mails drinking water safety information to all homes known to have lead water service pipes. A new brochure was developed with instructions for reducing exposure to lead in drinking water and an outline of the City's new accelerated lead pipe replacement program. Beginning in 2017, the City is committed to replace all 4,900 remaining lead water service pipes within 10 years. This is made possible by the Federal Clean Water and Wastewater Fund; details can be found on the City's website.

Launch of Advanced Metering Infrastructure System: Water meters will have a communication module added to improve billing for customers with remote meter reading and monthly billing based on current usage, not estimates. About 62,000 water meters, newer than 1994, will have the black circular scan pad on the outside of the home replaced with a communication module. Once the communication module is in place, the wiring system that currently links the scan pad to the water meter will be attached to the new communication module. Installations are occurring by neighbourhood and citizens can book an appointment online once they receive a notification letter.

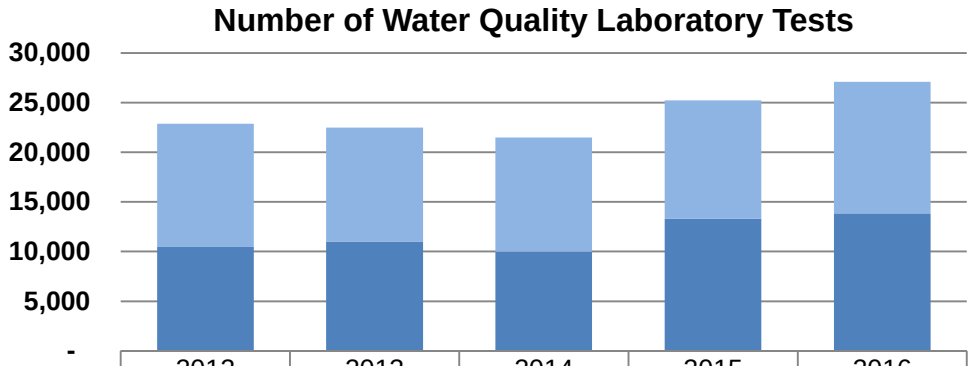
16th Street Slope Remediation Project: Engineering & Planning had an open house, six flyers, and created a website page to keep local citizens updated about the 16th Street Slope Remediation Project.

The Yellow Fish Road Program: This program communicates that water entering storm drains goes directly into the river untreated so materials like used oil, pesticides, fertilizer, and soap should not enter catch basins. The program targeted Saskatoon Public and Catholic School students. Each teacher received a double-sided poster containing information about the program and all students received a two-sided bookmark. Main Yellow Fish Road™ activities included volunteer groups painting storm drains with "yellow fish" symbols and the words "rainwater only" beside storm drains, and distributing door hangers to local residents.

5.2 Operating Highlights

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 Water Regulations, 2002.* Water quality is closely monitored 24 hours a day, 365 days a year.

The WTP's comprehensive Maintenance and Equipment Inspection Program meets the highest standard in North America. In 2016, a total of 13,863 water treatment quality tests and 13,237 distribution water quality tests were conducted by our WTP Laboratory accredited by the Canadian Association for Laboratory Accreditation Inc. (CALA). Additional quality tests were conducted at every step of the treatment process for a total of over 50,000 tests.



	2012	2013	2014	2015	2016
Distribution Water Quality Tests	12,389	11,473	11,511	11,945	13,237
Water Treatment Quality Tests	10,476	11,017	9,968	13,293	13,863

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.

Water Distribution System Values						
	2012	**2013**	**2014**	**2015**	**2016**	**Allowable Values**
Yearly Total Chlorine Median (mg/L)	1.83	1.8	1.78	1.83	2.00	> 0.5
Yearly Turbidity Median (NTU)[2]	0.16	0.12	0.14	0.18	0.13	< 1.0
Total Coliforms >0 (CFU/100mL)[3]	0	0	0	0	0	0

In addition to the *Drinking Water Quality and Compliance* report, the *2016 Waterworks System Assessment* was completed to meet the WSA's requirements for a thorough five-year reporting of the WTP and distribution system.

Wastewater Quality: 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 is further regulated by Saskatchewan Environment's *Sewage Works Regulations, 2010, Saskatchewan Environmental Code, 2015*, and the *Federal Wastewater System Effluent Regulation, 2012*. Final effluent water quality is closely monitored 365 days a year.

The WWTP's comprehensive Maintenance and Equipment Inspection Program meets the highest standard in North America. In 2016, a total of 6,370 final effluent quality tests and over 20,000 water quality tests of other samples, including groundwater, ponds, storm water outfalls, industries, and the river were conducted by the WWTP CALA-accredited Environmental Laboratory. Over 40,000 tests were conducted throughout the treatment process.

The following table shows the results of some of the many types of testing completed by Saskatoon Water, which are well below the maximum allowable values under the Permit to Operate.

Wastewater Distribution System Values						
	2012	**2013**	**2014**	**2015**	**2016**	**Wastewater Effluent Standard**
Yearly Median CBOD[4]	4.9	4.6	4.3	3.9	3.4	<25 mg/L
Yearly Median TSS[5]	10.7	8.8	10	8	7.2	<25 mg/L
Yearly Median Total Phosphorous (TP)	0.15	0.26	0.24	0.2	0.247	<0.75 mg/L
Yearly Median E.coli[6]	<10	<10	<10	<10	<10	<200 mpn/100mL

[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.
[4] 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.

Drainage Inspections: The Storm Water Utility helps developers and citizens ensure that drainage is meeting Saskatoon's Drainage Bylaw. The drainage inspector responded to over 400 citizen drainage issues in 2016.

Rainfall Reporting: Eight rainfall gauges were regularly monitored and protocol for reporting was implemented that informed the City of flood potential and assessed past storms. The 2016 Annual Rainfall Report provides a summary of Saskatoon's 2016 rainfall season.

City of Saskatoon Intensity-Duration-Frequency Curves Variations under Different Climate Change Scenarios: Engineering & Planning is working to integrate climate change patterns into the City design standards. Climate change impact on the City's existing storm system will also be investigated.

5.3 Capital Projects

Saskatoon Water had 93 active capital projects as of December 31, 2016, budgeted at $212.5 million, of which, $80.5 million is unspent. The following table summarizes the active capital projects by section:

Saskatoon Water Active Capital Projects as of December 31, 2016			
Section	**# of Active Projects**	**Approved Funding**	**Unspent Funding**
Water Treatment	32	$132,597,000	$36,189,708
Wastewater Treatment	42	$ 71,760,000	$40,948,264
Storm Water	19	$ 8,099,000	$ 3,350,665
Total	93	$212,456,000	$80,488,637

The following section describes some of the major capital projects funded by the water-related utilities.

Clarifier Upgrades: The upgrades to Clarifier #2 and Clarifier #4 were completed in 2014 and 2015, respectively. The planned upgrade to Clarifier #3 in 2016 was delayed as a structural analysis determined the clarifier mechanism could not support the addition of tube settlers. Funding of $9.0 million is in the Capital Plan for 2019 for the structural upgrades and tube settlers for Clarifier #3.

Water Treatment Plant Transfer Pumping and Electrical Upgrades: A Request for Proposal to procure engineering design and construction services was issued in December 2016. Design work on the $26.5 million project is scheduled to commence in May 2017 with design and construction scheduled to take three years.

Water Treatment Plant Filer Plant Upgrade: Procurement of design services and construction contract was completed in 2016. The $2.7 million project will replace corroded material and include aesthetic upgrades to the plant filter banks.

Acadia Drive Capacity Improvements: Work to enable pumping capacity improvements at the Acadia Drive Reservoir and Pumphouse was completed in May 2016 at a capital cost of $2.3 million. The work included installation of a new draw line and upgrades to the process piping. This lays the groundwork for replacement of the existing pumps in 2018.

Construction on Acadia Drive Reservoir and Pumphouse

Advanced Metering Infrastructure: AMI is used to transmit electrical and water consumption data directly from individual meters to the utilities. The most immediate benefit to consumers is their monthly bill is based on actual consumption as opposed to estimates. The water portion of the project is currently funded at $11.7 million and is 6.25% complete as of 2016 year-end.

Wastewater Odour Abatement Project: Work on the $8.8 million construction phase continued in 2016, with work 90% complete by year-end. The project will reduce approximately 76% of all odour emissions during normal operations.

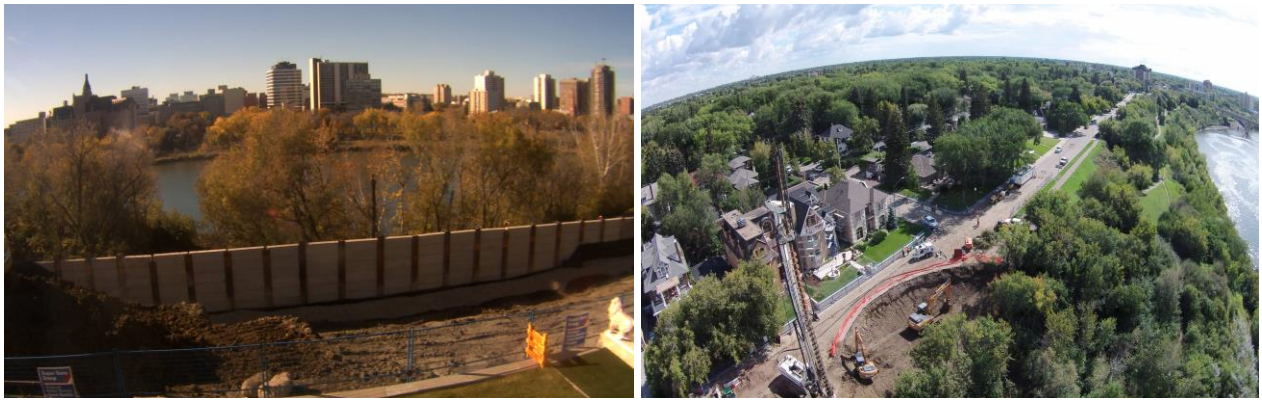
Wastewater Treatment Plant Digester: An analysis of options identified a conventional digester as the preferred technology for a fourth WWTP digester required to meet demands of growth and increase treatment reliability. The new digester is expected to be operational by 2018.

Sanitary Lift Station Upgrades: This is an ongoing project for the upgrades and refurbishment of the 28 lift stations in the city. In 2016, the Spadina Lift Station Permanent Bypass was completed. This will allow 2017 work to take place at the original station to correct structural deficiencies and upgrade pumps.

Spadina Lift Station

Fletcher Road Force Main Design: Capacity constraints were identified within the existing sanitary system on Fletcher Road. Design was completed to twin the sanitary sewer and upsize the sanitary force main on Fletcher Road. The design included a new 300 mm sanitary sewer and 300 mm shallow bury force main with insulation.

16th Street Slope Remediation: The east riverbank slope was stabilized with regrading, new sub-drainage, and construction of an H-pile and concrete lagging retaining wall at 16th Street. The lower Meewasin Trail and Saskatchewan Crescent were restored and re-opened in fall 2016.



Construction of the retaining wall for 16th Street Slope Remediation

Long Term Capital Development and Expansion Planning: Master planning work for the water distribution system, fill mains, and reservoirs within city limits, as well as for the region was completed in 2016. Sanitary and storm planning for regional growth continued in 2016.

Nodes and Corridors Capacity Study (Growth Plan): A water and sewer capacity analysis was completed for the major nodes and corridors within the Growth Plan. The locations with potential risks due to land use intensification have been identified and plans have been made to install flow monitors at strategic locations for further investigation and conceptual design.

Camera Inspection of storm water pipe showing partial blockage

Storm Sewer Closed Circuit Television and Cleaning Contract: In 2016, flushing/cleaning and Closed Circuit Television (CCTV) inspections and assessments were completed for 12.5 km of storm sewers. The inspections identified issues such as pipe separations and offset joint repairs, as well as high levels of sediment, concrete and rocks, and other debris built up in the pipes.

5.4 Continuous Improvement Initiatives

Saskatoon Water is committed to Continuous Improvement (CI) through improved customer service and continually implementing innovations to improve efficiencies and reduce costs. In addition to the operating and capital projects described above, Saskatoon Water has undertaken the following CI initiatives:

Odour Abatement Project – First Fermenter Upgrade: The sludge density was thickened from 1% to 3%, which improved the process in the digesters.

Heavy Grit Facility Operation: The WWTP staff assumed operation of the Heavy Grit Facility from the Landfill and made improvements to the prcess. This improved Customer Service by providing a one-stop facility for liquid and solid wastes. It reduced the impact on the Landfill by consistently providing dewatered solids that can be used for Landfill cover.

Digester Gas Exercise: A procedure was developed and drilled for a Digester Gas Leak Exercise. This enhanced emergency response planning, creating a positive safety culture.

Lighting Motion Sensors: To reduce energy use, the WTP staff replaced light switches with motion sensors and low power LEDs in five major plant areas.

Filter Runtime Increases: The WTP increased filter runs to reduce wasted water from backwashing and reduce energy usage. This reduced Operator time to backwash filters and had an approximate 50% reduction of water consumption for backwashing.

Paper Use Reduction: The Meter Shop has equipped six Small Meter Installers with laptops so work orders and maps are available digitally. The installers now have access to Map Guide for locating curb stops and process work orders on site, leaving more time for the Customer Service Coordinator to schedule appointments. Cross Connection Control pictures and filing are now all done electronically, saving paper and time.

Advanced Metering Infrastructure Saturday Shift: A Wednesday to Saturday shift was added to gain more access to customers by giving more options. On average, they are completing 35 appointments on a Saturday.

Stage 1 of Primary Basin Electrical Replacement: The electrical was upgraded in one of the oldest areas in the WWTP. This improved safety standards by installing electrical to modern-day code.

Odour Abatement – Installed Air Blower: The air blower draws foul air off the first fermenter and sends it to the bioreactors for processing, rather than emitting into atmosphere.

Aspen Ridge Lift Station Commissioned: The new sewage lift station will help the City grow into the northeast by providing reliable wastewater conveyance

Storm Water Utility: Storm Water Charges for Commercial Property Development: The process was completed to identify accurate Equivalent Runoff Unit (ERU) ratings associated with changes to commercial properties. The process resulted in a more up-to-date database of commercial property footprints. Annual bills in 2016 more accurately reflected ERUs and Storm Water Management charges. The new process resulted in approximately $200,000 in utility revenue that would not otherwise have been collected.

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 public expects, and Saskatoon Water is committed to, responsible watershed management and stewardship. Saskatoon Water is a member of the South Saskatchewan 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 WSA's "Permit to Operate a Sewage Works". Phosphorous is the key nutrient the WWTP removes because of its negative impacts on the South Saskatchewan River. The implementation of the Ultraviolet Disinfection Facility, to replace chlorine disinfection, has improved the quality of the final effluent being discharged to the South Saskatchewan River.

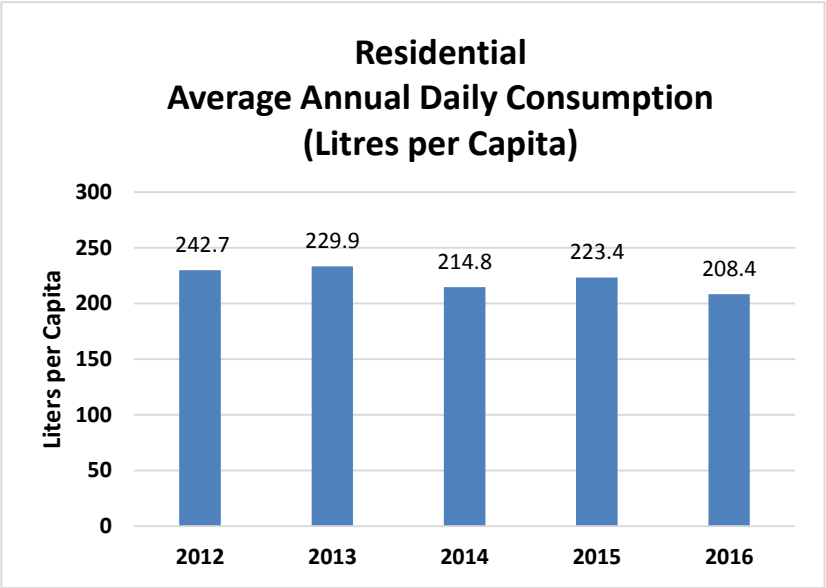
ISO/IEC 17025:2005 accreditation from CALA was maintained at both the WWTP Environmental Laboratory and the WTP Laboratory.

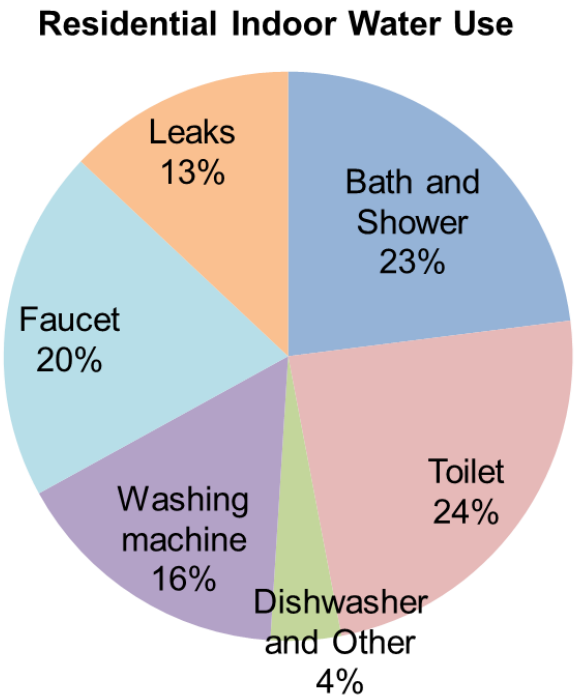
Saskatoon Water supports the Provincial Operator Certification Program, for both the Water and Wastewater Treatment Plants, which helps protect both the public and the environment.

6.2 Conservation

Saskatoon water rates are designed to encourage water conservation in order to defer the need for high capital intensive capacity projects. Customer education to reduce the summer maximum day volume (peak demand management) can also assist in deferring some capital expenditures.

Due to fluctuating seasonal irrigation demands, Saskatoon's total average annual daily consumption varies significantly from year to year.





Source: Water Research Foundation, April 2016

A recent study conducted by the Water Research Foundation shows that indoor household water use in a single family home has decreased by 22% from 1999 to 2016. The City of Saskatoon has experienced a similar downward trend as citizens implement low-flow fixtures.

The chart provides an indication of how indoor water is consumed in average residential homes in Canada and the United States.

7.0 OUR CHALLENGES

Saskatoon Water has been proactive in anticipating and managing the following ongoing challenges it faces:

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 have been higher because of the strong competing demands for contractor services. The division coordinated multiple capital projects, trained staff for new facilities, and identified ways to defer capital expenditures.

Infill Development: Cumulative impacts of infill development are placing higher demands on the carrying capacity of existing water and sewer infrastructure. More infill reduces greenspace and increases surface runoff so appropriate policies are needed to minimize surface flooding.

Age and Condition of Existing Infrastructure: Aging 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 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 and Rainfall: Changing rainfall patterns impact demand for water, with high peak demands during dry stretches. Wet weather conditions also have created drainage issues throughout the city. High groundwater levels have impacted neighbourhood drainage and resulted in east riverbank slumping and slope failure that damaged infrastructure.

Drainage Bylaw Enforcement: Neighbourhood storm water drainage is impacted by properties, which are developed contrary to approved design standards or drainage paths that are not maintained, resulting in flooding for homeowners and their neighbours. Appropriate tools and resources are necessary for inspections when development occurs to minimize future problems.

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

Inflow & 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.

Growth Pays for Growth: As Saskatoon continues to grow, Saskatoon Water continues to explore alternate sources of funding. One such initiative, is "Growth Pays for Growth" in response to the Financial Growth Study. This initiative assigns capital costs that can be directly attributed to the off-site levies paid by developers. Obtaining appropriate funding for infill development, where off-site levies do not apply, will be a challenge for future nodes and corridor growth.

8.0 CONCLUSION

The WTP and the WWTP have long-term strategic capital development and expansion plans. Through its approved 2016 Operating Budget and the approved five-year Capital Plan, Saskatoon Water was able to maintain operations and fund capital projects related to treated water and wastewater quality, city growth, and regulatory matters.

The success of Saskatoon Water is dependent on the dedication and skills of our employees, and their efforts are greatly appreciated. Our competent team of plant operators, tradespersons, maintenance staff, engineers, technologists, technicians, chemists, and administrators play a crucial role. The guidance and support of the General Manager, City Manager, and City Council is appreciated.

The staff of Saskatoon Water look forward to the challenges and the opportunities that the future will provide.

9.0 APPENDICES

Appendix One: Water, Wastewater and Storm Water Infrastructure

In 2014, the replacement value of all water, wastewater, and storm water infrastructure was estimated at over $9.5 billion.

The Water Treatment Plant (WTP) and assets associated with water distribution have an estimated value of $3.4 billion. An update to the valuation of the WTP, water intakes, and reservoirs is planned for 2016.

The Wastewater Treatment Plant and assets associated with the sanitary sewer collection system has an estimated replacement value of $4.0 billion.

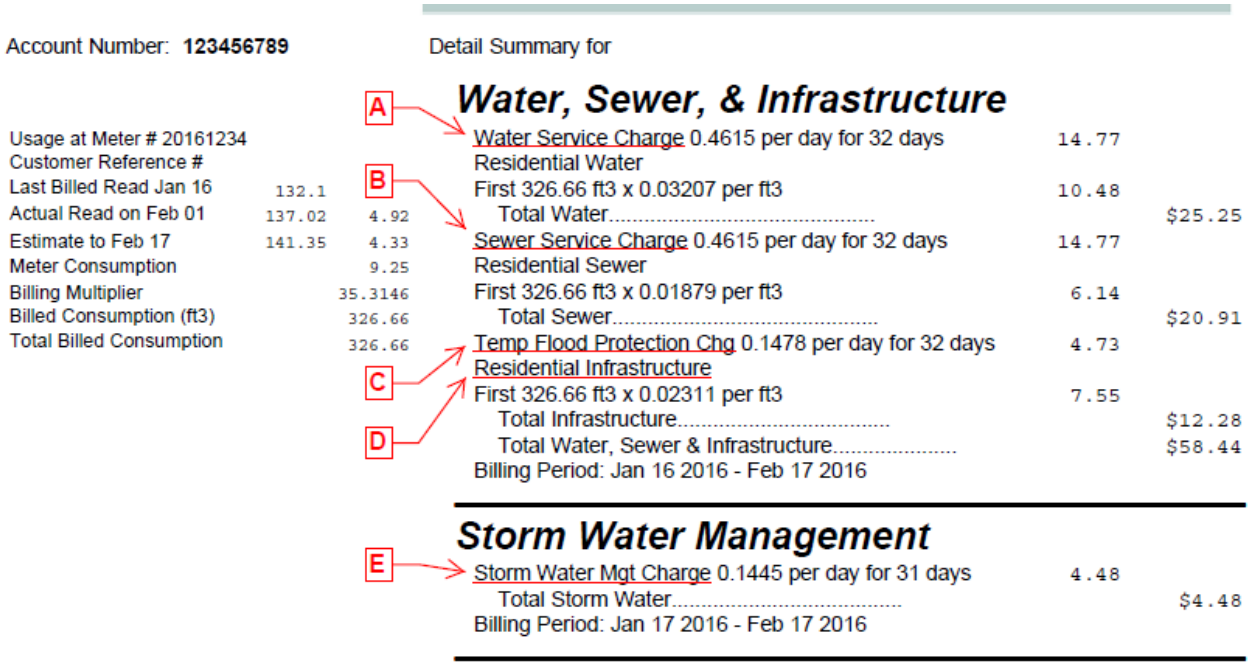
Saskatoon's storm water infrastructure has a replacement value of over $2.0 billion.

Water Utility Assets		
Asset	**2014 Inventory**	**Replacement Value ($M)**
Water Treatment Plant, Water Intakes and three Reservoirs		$ 600
Water Pipes	1,132 km	2,073
Valves	13,964	175
Hydrants	7,063	76
Service Connections	71,096	519
Total		**$ 3,443**

Wastewater Utility Assets		
Asset	**2014 Inventory**	**Replacement Value ($M)**
Wastewater Treatment Plant		$ 500
Lift Stations	28	154
Wastewater Pipes	1,030 km	2,686
Manholes	11,298	208
Forcemains	44 km	98
Service Connections	69,635	393
Total		**$ 4,039**

Storm Water Utility Assets		
Asset	**2014 Inventory**	**Replacement Value ($M)**
Storm Water Pipes	702 km	$ 1,797
Manholes	8,710	136
Catch Basins	11,758	44
Leads	136 km	34
Service Connections	2,971	17
Wet Ponds	20	16
Dry Ponds	8	2
Culverts	5 km	2
Water Outfalls	92	6
Total		**$ 2,053**

Appendix Two: Understanding Your 2016 Residential Water-Based Utility



Account Number: **123456789**

Detail Summary for

Usage at Meter # 20161234		
Customer Reference #		
Last Billed Read Jan 16	132.1	
Actual Read on Feb 01	137.02	4.92
Estimate to Feb 17	141.35	4.33
Meter Consumption		9.25
Billing Multiplier		35.3146
Billed Consumption (ft3)		326.66
Total Billed Consumption		326.66

Water, Sewer, & Infrastructure

A — Water Service Charge 0.4615 per day for 32 days	14.77	
Residential Water		
B — First 326.66 ft3 x 0.03207 per ft3	10.48	
Total Water		$25.25
Sewer Service Charge 0.4615 per day for 32 days	14.77	
Residential Sewer		
First 326.66 ft3 x 0.01879 per ft3	6.14	
Total Sewer		$20.91
C — Temp Flood Protection Chg 0.1478 per day for 32 days	4.73	
Residential Infrastructure		
First 326.66 ft3 x 0.02311 per ft3	7.55	
Total Infrastructure		$12.28
D — Total Water, Sewer & Infrastructure		$58.44

Billing Period: Jan 16 2016 - Feb 17 2016

Storm Water Management

E — Storm Water Mgt Charge 0.1445 per day for 31 days	4.48	
Total Storm Water		$4.48

Billing Period: Jan 17 2016 - Feb 17 2016

Bill

A. Water Service Charge: The fixed monthly charge for a 5/8 inch water meter is $9.36, and for a 3/4 inch meter is $14.04. The fee is prorated by the number of days in the month

A second water service charge is based on water usage (volumetric): $3.207 per 100 ft^3 for the first 600 ft^3, $3.57 per 100 ft^3 for the second 600 ft^3 and $4.70 per 100 ft^3 for over 1,200 ft^3. The water service charges are used to fund water utility operations and capital projects.

B. 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 58.6% of the water volumetric charge. Rates are set on a cost recovery basis and recognize that not all water returns to the sanitary sewer: $1.879 per 100 ft^3 for the first 600 ft^3, $2.092 per 100 ft^3 for the second 600 ft^3 and $2.754 per 100 ft^3 for over 1,200 ft^3. Sewer service charges fund wastewater operations and capital projects.

C. Temporary Flood Protection Charge: The charge is a fixed fee of $4.50 per month, prorated by the number of days in the month. The fee is charged on each water meter until December 2018. The charge is used to upgrade the sanitary sewer system to reduce the risk of sewer back-ups during severe rain events.

D. Residential Infrastructure: The fee is $2.311 per 100 ft^3 of water usage. This fee is used for the capital replacement and upgrade of the water distribution and wastewater collection systems. The Redevelopment Levy to increase capacity of existing infrastructure to accommodate infill developments and the Roadways Levy that funds remediation of roadway damage associated with the utilities are included in the charge.

E. Storm Water Management Charge: The monthly charge for residential properties is a fixed amount of $4.40 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.

Appendix Three: Abbreviations

AMI – Advanced Metering Infrastructure

CALA – Canadian Association for Laboratory Accreditation Inc.

CBOD - Carbonaceous Biochemical Oxygen Demand

CCTV – Closed Circuit Television

CFU – Colony Forming Unit

CI – Continuous Improvement

City – City of Saskatoon

ERU – Equivalent Runoff Unit

IEC – the International Electrotechnical Commission

IS – Infrastructure Services

ISO – the International Organization for Standardization

MPN – Most Probable Number

NTU - Nephelometric Turbidity Units

PW – Public Works

TP - Total Phosphorous

US – Utility Services

WSA – Water Security Agency

WTP – Water Treatment Plant

WWTP – Wastewater Treatment Plant

Appendix Four: Glossary

Abatement: To reduce the amount or lessen the effect of.

Backflow Prevention Device: 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.

Clarifier: A settling tank used to remove solids in the water treatment process.

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 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.

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

Imperviousness: Ability of a material (e.g. soil, concrete) to not allow fluid to pass through.

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.

Nephelometric Turbidity Units (NTU): A measure of scattered light. A high turbidity level is caused by organic matter that can promote the growth of pathogens, as well as being aesthetically unappealing.

Potable: Safe to drink.

Procurement: The process of obtaining or purchasing.

Residual Handling Facility: Removes chlorine and solids, mostly consisting of sand and inert ferric material, from the Water Treatment Plant effluent that is discharged to the South Saskatchewan River.

Return Period: The estimate of the likelihood of a rainfall event. A two-year rain event would have a 50% likelihood of occurring in any given year. A five-year rain event would have a 20% likelihood of occurring in any year.

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.

Sub-drainage System: Typically perforated pipe used to drain groundwater and seepage.

Surface Runoff: Rainfall flowing overland and into the storm sewer without being absorbed into the ground.

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