

# Wastewater Collection & Treatment

Led by: Director of Water Services

## Description

We're a big, growing city on a small river. This is a highly regulated, essential and public health focused service that ensures over 1.3M Calgarians and regional customers can trust that their wastewater is removed and treated to protect the health of the river. The Wastewater Collection & Treatment service collects wastewater from toilets, sinks and drains, treats it, and returns it to the river. We ensure necessary investments are made in treatment plants, pipes and people to keep pace with the needs of a growing population and so that service is available 24/7, 365 days a year during evenings, weekends, and emergencies.

## Value and benefits

Our wastewater service reliably removes and treats wastewater from Calgary homes and businesses before returning it to river; it ensures public health, reduces risk to property and is essential to the health of the river and economy. Downstream communities depend on us to manage the quality of water returned to the river as it passes through the city and it is our responsibility to do exactly that. A healthy river is equally important to fish and wildlife. Three wastewater treatment plants treat over 300 thousand litres of wastewater every minute and the treated water that goes back into the Bow River consistently meets or exceeds all environmental and regulatory requirements. As the city grows and our climate changes, pressure on treatment processes will increase and we must continually optimize our plants to ensure we can serve future generations and protect the river.

## Customers

Our customers include residential customers, commercial customers (e.g. hotels and septage haulers), institutional customers (e.g. hospitals and schools) and industrial customers (e.g. food producers). They may be longtime Calgarians or newcomers to the region, speaking many languages and having varied experiences with wastewater service.

## What we deliver

Wastewater from toilets, sinks and drains is collected and removed from homes and businesses, treated and then returned to the river. We work to ensure system reliability through investment and proactive maintenance. If there is a disruption, we work to have service restored quickly. Customers can trust that we are protecting the health of the watershed and responsibly managing biosolids.

## Partners

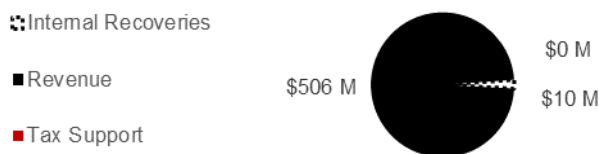
Education partners (RiverWatch, Advancing Canadian Wastewater Assets); Research partners (Universities, Alberta Innovates); Government agencies (Fisheries and Oceans Canada, Alberta Environment and Parks); Upstream and downstream municipalities City services (Waste & Recycling Services, Planning); Biosolids recipients Developers; Regional municipalities and Calgary Metropolitan Regional Board

341,807	# of customer service connections
7,300	# of calls we respond to per year
300,000 litres	of wastewater treated every minute
125,000	tests to ensure environmental safety

## Key assets

Wastewater Treatment & Collection is a growing network of three treatment facilities, 2 pump stations, 43 lift stations and over 5,000 km of underground pipes throughout our city. Paired with technology to capture energy and nutrients from wastewater, this critical infrastructure makes up the system customers count on to remove wastewater before treating and safely returning it back to the river.

**Wastewater Collection and Treatment**  
2022 Budgeted Gross Operating Expenditures Funding Breakdown (\$ Millions)\*



\* Gross operating budget may include internal recoveries that are also included in other services' gross operating cost.

Note: Internal recoveries is how The City accounts for the costs of goods or services between services

# What we have heard & what we are watching

## What we have heard

We prioritize understanding our customers' values, priorities and service expectations to develop levels of service, guide continuous improvement, and inform long-term planning. Our customers' top priorities are treating wastewater to protect the health of the river, reliable service, and responsiveness to service issues. Based on our research so far, over half of customers expect us to maintain the current level of river water quality. Three-quarters of customers expect a low risk of experiencing a wastewater backup, and over half expect that we respond to a wastewater backup within six hours. Customers expect us to deliver this and more at a fair price, with predictable and accurate billing. Current service levels are generally in line with customer expectations. To be future-ready, we must listen to citizens, businesses and customers. Many innovations come from these conversations.

## What Council has directed

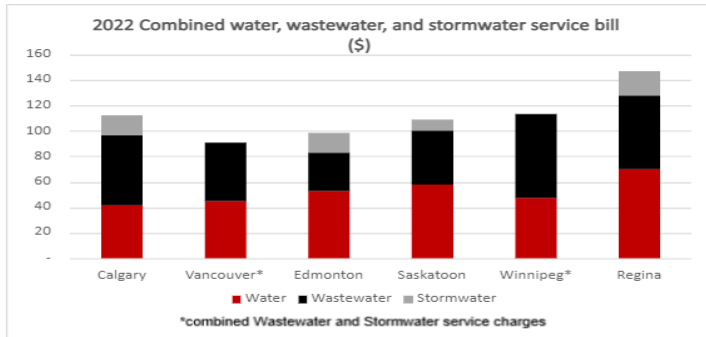
To maintain highly reliable wastewater systems, meet regulatory requirements and protect the environment, service resiliency is vital. We focus on finding process improvements within the plants and collection system. This includes exploring practices to reduce risk of sewer back-ups, mitigate safety risks, and ensure proactive and timely capital investments to keep wastewater bills lower for customers. Aligning with Council priorities, we are committed to climate change mitigation by improving energy management measures and reducing greenhouse gas emissions. Innovation in resource recovery helps ensure we reach 2050 climate mitigation and adaptation outcomes. As The City grows, pressure on treatment processes increases. To maintain wastewater rates at affordable levels, the service identified cost reduction methods to operate infrastructure, manage debt, and respond to inflationary pressures in chemicals, energy, and fuel.

## What we are watching

Our customers' priorities are our priorities. We are future focused and closely monitor how climate change can impact our ability to ensure river health and thrive as a service. At the same time, a growing and aging infrastructure base requires additional tools, dollars, and people to be maintained and ensure service is reliable for our customers. We are monitoring our critical assets and their condition to ensure we operate and maintain a resilient system.

We continue to watch economic indicators of our residential and business customers to find opportunities to ensure costs are allocated based on usage, equity and system impacts. We are fostering partnerships to reduce hydrogen sulphide by-products that can harm our customers and employees. We are exploring opportunities to offset greenhouse gas emissions through wastewater energy capture as well as the beneficial uses of biosolids removed at our plants. Underpinning everything, our services must remain affordable for everyone.

Combined water, wastewater and stormwater service bill



Posted rates on municipality websites

## Comparing our service

Calgary's water, wastewater and stormwater rates are at the median compared with other cities on small rivers that have similar regulatory requirements, environmental conditions, capital obligations and complexity of systems to operate. Comparisons are challenging since growth costs are calculated differently and many utilities do not pay return on equity to municipalities.

In this cycle, wastewater bills increase slightly to \$55/month on average. With higher investment in infrastructure replacement and maintenance, our customers can expect improved service reliability versus other cities.

# Measuring performance & where we want to go

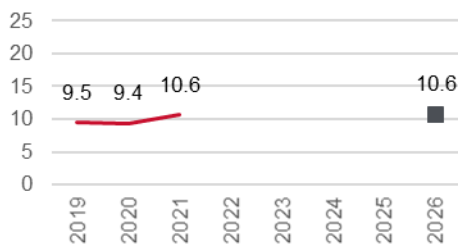
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— Actuals      ■ Expected Future Performance

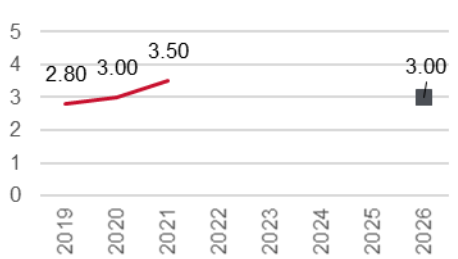
PM1: Years remaining of installed treatment plant capacity



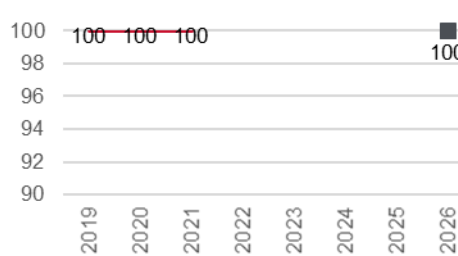
PM2: Properties impacted by interruption to wastewater service (per 1,000)



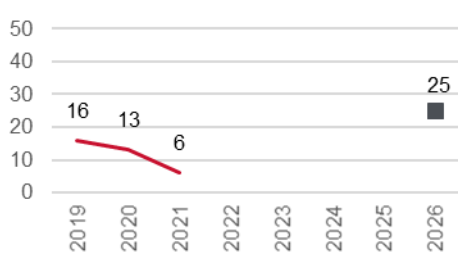
PM3: Time it takes to respond to wastewater service interruption (hours)



PM4: Regulations met for treated wastewater returned to the river (per cent)



PM5: Electricity and heating powered by wastewater biogas (per cent)



## Story behind the curve

Customers in Calgary and the region expect assured wastewater treatment capacity now and into the future. Given the duration and complexity of wastewater system investments, a 5-year target buffer helps ensure that treatment capacity meets projected population growth. Since 2016, substantial upgrades have been made to expand the Bonnybrook facility to accommodate population growth into the 2030s. Calgary's installed capacity is re-set to 9 years as of 2022 and significant wastewater treatment investments at other facilities will be on the horizon to stay ahead of the curve.

Customers can experience a wastewater backup due to factors such as tree roots, collapsed pipes or clogs from wipes, hair, grease and other unflushable items. In recent years, ~10 out of 1000 properties had their service interrupted. Customers expect their risk of a wastewater backup to be low, so if one happens it often impacts service value perceptions and trust. In order to maintain service levels over the next four years, a key focus will be to build understanding of the most effective risk reduction levers and invest in condition assessments to inform targeted infrastructure upgrades.

This measure reflects the time it takes the Water Utility to respond to a customer that is experiencing a wastewater backup. Response times have averaged between 2.5-3.5 hours in recent years and have seen some fluctuations due to seasonality and COVID-19 protocols. To maintain this service level, operating budget for fuel and overtime are needed as well as improved monitoring technology and resourcing plans to build resilience and operate infrastructure.

Wastewater is a highly regulated, essential, and public health focused service. The service is greatly valued by customers, and they expect their wastewater is cleaned to protect the health of the river. Calgary's three treatment plants continue treating wastewater better than the quality specified by Alberta Environment & Parks, 100% of the time. In order to maintain this high standard, a key focus will be to prioritize significant wastewater plant and collection system upgrades and work with high-strength customers to reduce their impact to the wastewater system and, ultimately, the river.

Wastewater is a valuable, nutrient rich product that can be harnessed to reduce greenhouse gas emissions and offset rising energy costs that would otherwise pass onto customers. Innovative biogas technologies are projected to generate 27% of energy needs at the Bonnybrook Wastewater Treatment Plant. A focus for this service will be to explore and maximize the benefits at this and Calgary's two other wastewater treatment facilities to build towards an overall biogas energy generated quantity of 25%.

## What we plan to do

### Result for 2023-2026

The service will focus on process improvements within its plants and collection system. We will improve service reliability, mitigate safety concerns, and optimize costly system upgrades to keep customer bills affordable. We are committed to climate change mitigation and greenhouse gas reduction.

### How we are going to get there

Reduce risk of wastewater backups for customers by building understanding of the most effective risk reduction levers and investing in condition assessments to inform targeted upgrades and replacements for critical infrastructure.

Establish clear levels of service for customers who experience wastewater backups by reviewing options with a lens of sustainability, customer expectations and industry best practices.

Explore opportunities to improve system monitoring and enable proactive response to issues such as choked wastewater mains and system risks that emerge.

Maintain service resilience through ensuring appropriate resources including competent and certified operators to maintain regulatory compliance and operate a growing wastewater collection and treatment network (three treatment facilities, 43 lift stations and over 5,000 km of underground pipes).

Protect the river and reduce impacts to the system by working together with high-strength wastewater customers to ensure rate equity and bylaw compliance.

Meet growth demands and reduce risks of customer backups, releases to the environment and regulatory non-compliance by evaluating and prioritizing significant upgrades at Bonnybrook Wastewater Treatment Plant, Fish Creek Wastewater Treatment Plant and the wastewater collection system.

Improve energy efficiency and reduce Greenhouse Gas (GHG) emissions from wastewater operations.

Reduce the exposure and vulnerability of the wastewater service to changes in influent strength, shifting seasonality, extreme weather events and higher temperatures related to climate change by supporting, prioritizing and enabling mitigation actions.

Establish levels of service, optimize value, and deliver service equity by leveraging innovation, data, technology, and customer insights.

Reduce safety risk for employees and Calgarians caused by Hydrogen Sulfide (H<sub>2</sub>S) gases through improved modeling, monitoring and mitigation initiatives.

## Operating budget needed to achieve results

For Council Approval

### Breakdown of net operating budget (\$000s)

	2023		2024		2025		2026	
	Base	One-time	Base	One-time	Base	One-time	Base	One-time
Previous Year's Net Budget	-	-	-	-	-	-	-	-
Previously approved One-time budget	-	-	-	-	-	-	-	-
2022 One-time carry forward	-	-	-	-	-	-	-	-
Revenue Changes	276	-	7,071	-	(9,815)	-	(9,804)	-
Internal Recoveries Changes	(503)	-	(254)	-	(243)	-	(248)	-
Inflation	1,741	-	1,371	-	1,689	-	1,461	-
Operating Impact of Previously Approved Capital	5,733	-	(2,892)	-	(2,953)	-	(2,980)	-
Operating Impact of New Capital (Incremental)	11,960	-	8,868	-	7,852	-	10,558	-
Service Reductions	-	-	-	-	-	-	-	-
Service Increases	-	-	1,734	-	1,578	-	1,613	-
Transfers to/(from) reserves	(19,207)	-	(15,898)	-	1,892	-	(600)	-
Total net budget	-	-	-	-	-	-	-	-

### Total Operating Budget (\$000s) for Approval

	2022 Budget	2023			2024			2025			2026		
	At April 30	Base	One-Time	Total	Base	One-Time	Total	Base	One-Time	Total	Base	One-Time	Total
Expenditures	516,458	516,685	-	516,685	509,868	-	509,868	519,926	-	519,926	529,978	-	529,978
Recoveries	(10,057)	(10,560)	-	(10,560)	(10,814)	-	(10,814)	(11,057)	-	(11,057)	(11,305)	-	(11,305)
Revenue	(506,401)	(506,125)	-	(506,125)	(499,054)	-	(499,054)	(508,869)	-	(508,869)	(518,673)	-	(518,673)
Net	-	-	-	-	-	-	-	-	-	-	-	-	-

Note: Figures may not add up due to rounding.

# Capital budget needed to deliver service

For Council Approval

Activity	Investment Name	2023 Request (\$000s)	2024 Request (\$000s)	2025 Request (\$000s)	2026 Request (\$000s)	2027+ Request (\$000s)	Total Request (\$000s)
<b>Annual Investment Program(s)</b>							
		-	-	-	-	-	-
<b>Program(s)</b>							
455739	Wastewater Treatment Plant	43,987	91,525	97,728	145,440	-	378,680
456129	Wastewater Collection Network	108,291	63,160	63,160	63,160	-	297,771
<b>Projects(s)</b>							
		-	-	-	-	-	-
Sub-Total (New Budget Requests)		152,278	154,685	160,888	208,600	-	676,451
Previously Approved Budget Remaining		39,441	11,203	5,000	-	-	55,644
Total Capital Investment		191,719	165,888	165,888	208,600	-	732,095

## Explanation of capital budget requests

### Program(s)

#### Activity 455739: Wastewater Treatment Plant

Treatment capacity expansion to accommodate population growth, and investment to address capital maintenance needs to meet regulatory requirements.

Funding From: Capital Reserves (\$154,078 thousand) Self-supported Debt (\$224,602 thousand)

Contributing Services: None

Operating Impact: This request requires \$3,455 thousand base funding of operating costs starting in 2023, \$5,247 thousand base funding of operating costs starting in 2024, \$4,770 thousand base funding of operating costs starting in 2025, and \$7,361 thousand base funding of operating costs starting in 2026.

#### Activity 456129: Wastewater Collection Network

Maintain the delivery of wastewater services in existing communities, and extend services to new communities, and address capital maintenance needs.

Funding From: Capital Reserves (\$129,359 thousand) Self-supported Debt (\$168,412 thousand)

Contributing Services: None

Operating Impact: This request requires \$8,505 thousand base funding of operating costs starting in 2023, \$3,621 thousand base funding of operating costs starting in 2024, \$3,082 thousand base funding of operating costs starting in 2025, and \$3,197 thousand base funding of operating costs starting in 2026.