

# 2025

## State of SASKATOON WASTEWATER INFRASTRUCTURE

# Contents

- Introduction ..... 1**
- Infrastructure Service Statement..... 1**
- Stewards ..... 2**
- Current Inventory and Value ..... 5**
- Asset Performance with Data Confidence ..... 8**
  - Current Condition of Infrastructure and Service Life ..... 9
  - Condition Assessment Methodology and Programs ..... 11
- The Service Levels ..... 12**
  - Customer Levels of Service ..... 12
  - Technical Levels of Service and Current Performance ..... 12
- Asset Criticality and Risk ..... 15**
  - Key Risks ..... 15
  - Mitigation Strategies ..... 16
  - Resilience Planning ..... 17
  - Climate Change-Related Risk..... 18
  - WWTP Energy Costs and GHGs ..... 19
  - Anticipated Funding and Path to Net Zero ..... 19
  - Infrastructure Climate Resilience Approach ..... 20
- Investment Strategies and Needs ..... 20**
  - Lifecycle Programs & Analysis ..... 20
  - Funding Requirements and Investment Strategies ..... 21
  - Long-Term Financial Plan ..... 22
  - Asset Management Principles for Addressing Infrastructure Gaps ..... 25
- List of Recommendations and Action Plans ..... 26**
- Forecasted State of Infrastructure..... 27**
- Appendix A: Levels of Service ..... 28**
- Appendix B: Risk Management Plan ..... 29**
- Appendix C: Financial Plan (30-Year Capital Plan) ..... 31**
- Appendix D: Asset Register ..... 34**

*The State of Report is a standardized Corporate Asset Management tool designed to give City Council and Executive Leadership a strategic overview of each infrastructure portfolio. It outlines the current condition, performance, risk levels, service level achievement and asset management capacity, promoting transparent, evidence-based decision-making across the organization. A Corporate Asset Management Consolidated Report consolidates findings from all asset portfolio State of Reports into one overall executive summary report.*

## Introduction

The City of Saskatoon's Wastewater Utility continues to provide safe, reliable, and environmentally responsible wastewater services, supported by a complex network of critical infrastructure. This State of the Asset report provides a high-level summary of the current condition, capacity, and key risks identified in the Wastewater Utility Asset Management Plan (AMP).

The Utility manages over 1,054 kilometers of sewer mains, 11,538 manholes, and 2,098 assets at the Wastewater Treatment Plant (WWTP), along with several lift stations and supporting operational facilities. More than half of these assets are currently rated in good to very good condition, and all have sufficient capacity to meet existing and near-term service demands.

The Wastewater AMP supports the City's Strategic Goals of Financial Sustainability and Environmental Stewardship. Notably, energy use at WWTP has decreased over the past four years due to ongoing operational improvements and efficiency initiatives.

### Key Highlights:

- The 2025 Wastewater Utility Capital Budget exceeds \$40 million, reflecting investments in critical maintenance, renewal, and capacity growth.
- While asset conditions are generally positive, proactive lifecycle management remains essential to maintaining service levels, particularly in the face of infrastructure deterioration and evolving regulatory requirements.
- Climate resilience, risk mitigation, and continuous improvement are embedded in the long-term strategy.

The AMP outlines balanced lifecycle strategies that prioritize maintenance, renewal, and replacement to preserve asset value and optimize long-term costs. Funding strategies are in place to close remaining gaps and ensure infrastructure continues to meet service expectations and risk thresholds.

## Infrastructure Service Statement

The Wastewater Utility provides essential services that protect public health, support development, and safeguard the environment by collecting, conveying, and treating wastewater. This is achieved through a complex system of underground infrastructure and treatment facilities that must be maintained, renewed, and operated to meet regulations, growth, and community expectations.

## The Stewards

**Asset Owner:** The wastewater system—including the collection network, lift stations, and treatment facilities—has no single owner. Multiple stakeholders are involved throughout the asset lifecycle. Overall accountability for asset management rests jointly with the General Manager of the Utilities and Environment Division and the General Manager of the Transportation and Construction Division.

**Asset Custodian(s):** Custodians are responsible for managing and maintaining assets on a day-to-day basis. While the asset owner retains ultimate accountability, custodians ensure assets are properly operated, maintained, and utilized, in line with the City’s asset management objectives.

Multiple Departments within the Utilities and Environment and Transportation and Construction Divisions serve as custodians of the wastewater system. This includes responsibility for the collection system, lift stations, WWTP, and associated operational infrastructure. The table below outlines the key stakeholders and the programs or activities they oversee.

**Table 1: Responsibilities and Responsible Parties**

Responsibility	Description	Responsible Party
<b>Overall Accountability</b>	Implement and continuously improve the processes governing wastewater asset management planning, design, construction, maintenance and preservation.	General Manager of Utilities and Environment  General Manager of Transportation and Construction
<b>Resources and Budget Allocation</b>	Approve the proposed budget, allocate resources, and make strategic decisions related to wastewater management.	Director of Saskatoon Water  Director of Technical Services  Director of Water and Waste Operations  Director of Construction and Design
<b>Risk Management</b>	Identify, assess, and prioritize risks related to wastewater infrastructure.	Asset Preservation Manager – Water & Sewer – Technical Services  Water & Sewer Manager – Water and Waste Operations  Engineering Manager – Land Development, Surveying, and Drafting – Construction and Design

Responsibility	Description	Responsible Party
		<p>Engineering Manager – Preservation and Connections – Construction and Design</p> <p>Land Development Manager – Construction and Design</p> <p>Engineering Manager (MES) - Technical Services</p> <p>Engineering and Planning Manager – Saskatoon Water</p> <p>Water Operations Manager (Wastewater Treatment Plant)</p> <p>Maintenance Manager (Wastewater Treatment Plant)</p>
<p><b>Regulatory Compliance</b></p>	<p>Ensure Wastewater Collection and Treatment Infrastructure Service Delivery and Programs meet all local, provincial, and federal regulations, including safety, environmental, and operational standards.</p>	<p>Asset Preservation Manager – Water &amp; Sewer – Technical Services</p> <p>Water &amp; Sewer Manager – Water and Waste Operations</p> <p>Engineering Manager – Land Development, Surveying, and Drafting – Construction and Design</p> <p>Engineering Manager – Preservation and Connections – Construction and Design</p> <p>Land Development Manager – Construction and Design</p> <p>Engineering Manager (MES) - Technical Services</p> <p>Engineering and Planning Manager – Saskatoon Water</p> <p>Wastewater Treatment Plant Manager</p>

Responsibility	Description	Responsible Party
<b>Asset Inspection and Condition Monitoring</b>	Assess the Condition of Wastewater Collection and Treatment Infrastructure assets and report on performance.	<p>Asset Preservation Manager – Water &amp; Sewer – Technical Services</p> <p>Water &amp; Sewer Manager – Water and Waste Operations</p> <p>Maintenance Manager – Wastewater Treatment Plant</p>
<b>Data Management</b>	Collect and validate data on asset inventory, condition, and performance.	<p>Asset Preservation Manager – Water &amp; Sewer – Technical Services</p> <p>Water &amp; Sewer Manager – Water and Waste Operations</p> <p>Engineering Manager – Land Development, Surveying, and Drafting – Construction and Design</p> <p>Engineering Manager – Preservation and Connections – Construction and Design</p> <p>Land Development Manager – Construction and Design</p> <p>Governance and Strategy Manager – Information Technology</p> <p>Electrical, Instrumentation and Controls Engineer - Saskatoon Water</p> <p>Water Operations Manager – Wastewater Treatment Plant</p>
<b>Asset Design and Construction</b>	Implement and continuously improve standards and specifications governing the design and construction of both new wastewater collection and treatment assets as well as preservation and rehabilitation in accordance with current industry best management practices.	<p>Asset Preservation Manager – Water &amp; Sewer – Technical Services</p> <p>Engineering Manager – Land Development, Surveying, and Drafting – Construction and Design</p>

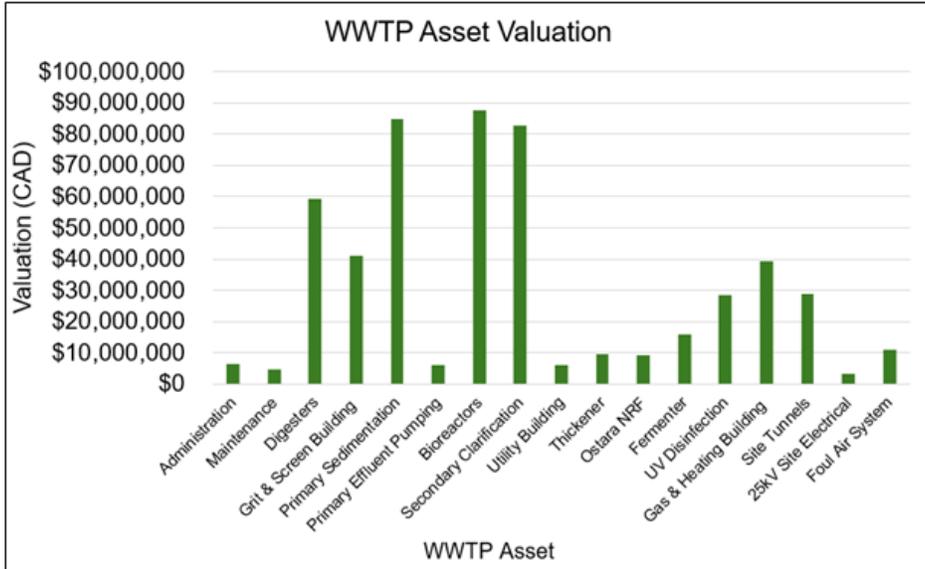
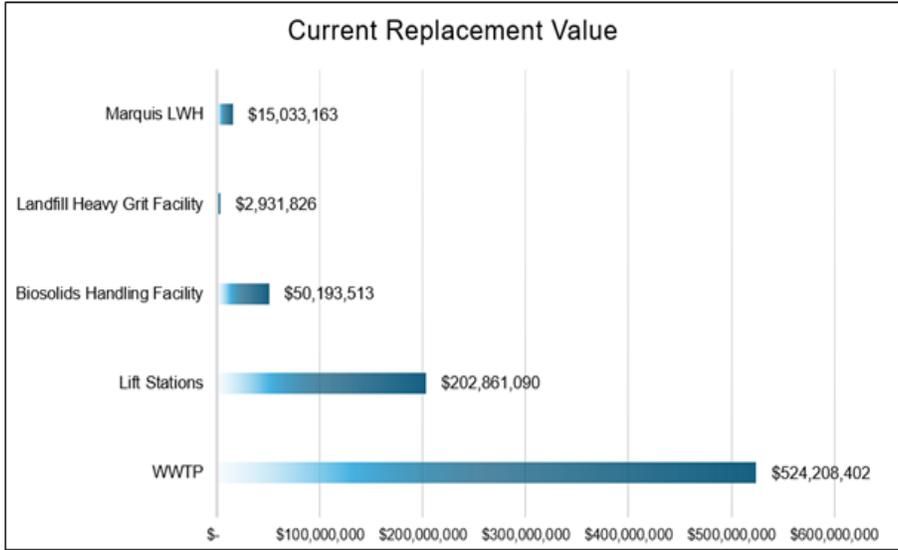
Responsibility	Description	Responsible Party
		Engineering Manager – Preservation and Connections – Construction and Design  Land Development Manager – Construction and Design  Engineering and Planning Manager – Saskatoon Water  Engineering Services Manager – Saskatoon Water  Wastewater Treatment Plant Manager
<b>Routine Maintenance</b>	Implement maintenance activities, including preventative and corrective maintenance.	Asset Preservation Manager – Water & Sewer – Technical Services  Water & Sewer Manager – Water and Waste Operations  Maintenance Manager – Wastewater Treatment Plant

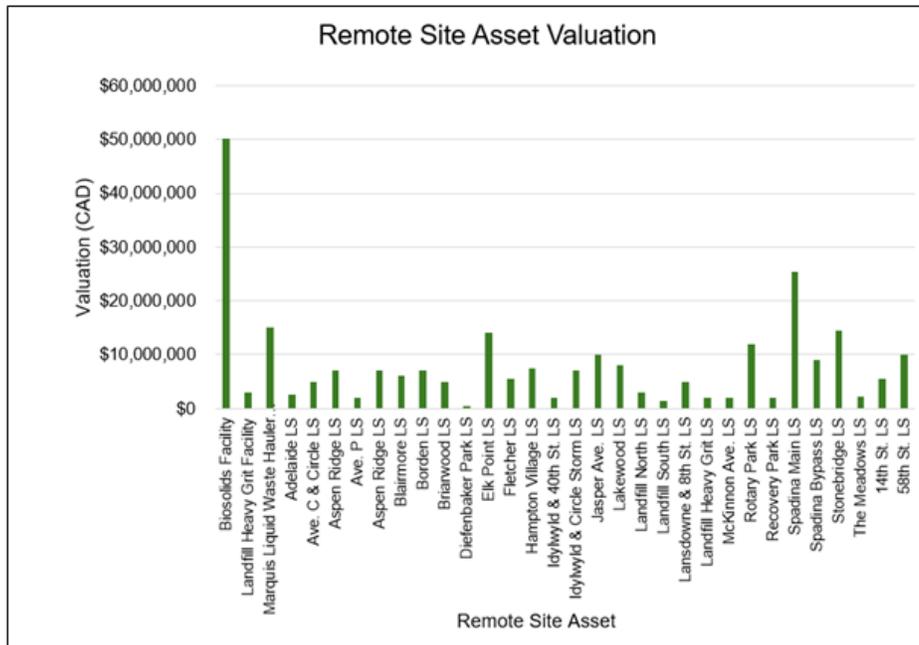
## Current Inventory and Value

### Wastewater Treatment – Non-Linear

The estimated replacement value of wastewater treatment and support facility assets is based on Current Replacement Value (CRV), reflecting today’s market costs. These figures are derived from historical project data and the 2020 Long-Term Capital Plan adjusted to 2025 values.

CRV provides a more accurate picture of the financial needs to sustain and renew infrastructure than accounting-based asset values. No deferred maintenance has been identified to date. Asset values are categorized by major process areas at the main treatment plant and by individual lift stations and remote sites to support planning, budgeting, and risk management.





### Wastewater Collection - Linear

The method used to value assets is to calculate the replacement value. This is an estimated cost of:

- Replacing an asset by physical excavation
- Replacing with new approved materials
- Restoring the surface area disturbed by the work

Past replacement contracts and new development contracts were analyzed to determine an average estimated value of replacement in 2023 dollars. Sewer main replacement value is based on a standard trench width (three meters), and average construction cost based on the diameter and depth of the pipe. Manholes use a single unit replacement value. Force main replacement value is based on a standard trench width (three meters) and average construction cost based on diameter. Service connections use a single unit replacement value. All costs include a 10% contingency.

Table 2 summarizes the estimated replacement value for the water system network.

**Table 2: Replacement Value Summary**

Asset	Type	Inventory	Replacement Value (\$M)	% of Total
Sanitary Mains	Collectors	924 km	2,302	56%
	Trunks	130 km	601	15%
Manholes	Collectors	10,317 ea.	289	7%
	Trunks	1,221 ea.	34	1%
Force Mains		46 km	160	4%
Service Connections		72,730 ea.	694	17%
<b>Total</b>			<b>4,080</b>	<b>100%</b>

## Asset Performance with Data Confidence

The data contained in this report was compiled or derived from a variety of sources, including the observations of WWTP staff, a collection of formal asset assessments, and long-term capital development plans with supporting documentation. These sources may have a wide range of accuracy from auditable to estimated, as specified in the tables below.

**Table 3: Accuracy Range**

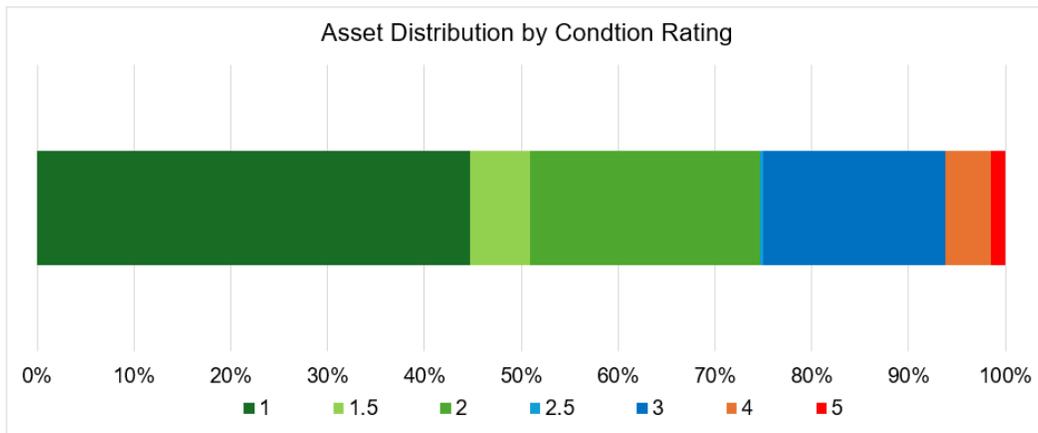
Measure	Description	High	Moderate	Low
<b>Reliability</b>	Can be trusted to be accurate or to provide a correct result	Based on sound records, procedures, or analyses that have been acceptably documented, and are recognized as the best method of assessment	Based upon known reasonable procedures, or analyses that have been acceptably documented	Based upon expert verbal opinion or cursory inspections/ observations
<b>Accuracy</b>	Probable difference between a recorded parameter and its true value	+/- 1%	+/- 25%	+/- 50%
Data Type	Data Source	Reliability	Accuracy	
<b>Replacement Valuations</b>	Previous Capital Project Documentation	High	High	
	Long-term Capital Development Plans	Moderate	Moderate	
	Estimation Based on Capital Project Documentation or Long-term Capital Development Plans	Moderate	Moderate	
	Estimation Based on Condition Assessments and Capital Project Documentation	Moderate	Moderate	
	Collection system past replacement and development contracts analyzed; unit values based on diameter, depth, and trench width with 10% contingency	High	Moderate	
<b>Asset Condition Ratings</b>	Plant Engineer and Maintenance Manager Review	Low	Moderate	
	Collection system inspection by personnel or CCTV	Moderate	Moderate	

The Enterprise Asset Management (EAM) software included in SAP has been in use since 2021, albeit with data entry inconsistent to the intended processes. Improving the SAP EAM data quality and workflow at the WWTP is an ongoing process which will result in more organized and effective use of inspection and maintenance data. This data will be useful in the future to better evaluate the present reliability and condition of wastewater plant assets.

## Current Condition of Infrastructure and Service Life

### Asset Condition and Performance Wastewater Treatment – Non-Linear

The majority of assets are in strong condition, with 45% rated as *Very Good* and an additional 6% falling between *Good* and *Very Good*. Another 24% are rated as *Good*, while only 0.25% fall between *Good* and *Fair*. About 19% of assets are in *Fair* condition. Assets in concerning condition are limited, with 5% rated as *Poor* and just 1% classified as *Critical*.



A total of 1% of assets are rated as *Critical*, indicating they require attention. These include equipment at both remote sites and the WWTP. At remote sites, issues include non-functional or ineffective components such as the live-bottom hopper and inclined screw conveyor at the Marquis Liquid Waste Hauler Station (new but not serving their intended function), the inoperable odour control system at the 14th Street Lift Station, and a failed HVAC blower at the Landfill North Lift Station. At the WWTP, the Grit Building’s isolation gates leak when operated, and the fermenter’s odour control blowers suffer from vibration issues, possibly due to improper pad installation.

While these assets are in critical condition, none currently have an immediate impact on service levels or overall operational efficiency. Plans are in place to address and remedy all these issues within the next five years.

### Wastewater Collection – Linear Assets Sewer Mains

The physical condition of sewer collection and trunk mains are assessed using CCTV inspection. CCTV inspection refers to a remote camera recording live video or digital

scanning along the length of the pipe. These video and scans are then assessed by identifying defects Pipeline Assessment Certification Program (PACP). The PACP system then uses a defect severity and quantity scoring system to assign an overall defect score to the pipe.

The Asset Preservation section has developed a condition rating system that uses this defect score to assign an overall condition to each inspected sewer main, as outlined in Table 4.

**Table 4: Physical Condition Grades**

Grade	Implication	Defect Specific	Action
A	No structural problems evident	N/A	Ongoing monitoring and maintenance only.
B	Some structural deficiencies noted	Where scoring results in a condition less than "C" but max defect score is 3, as shown in lookup code	Ongoing monitoring and maintenance only. Rehabilitation likely necessary in five years or greater.
C	Physical condition is showing deterioration	When overall rating is greater than 100	Some rehabilitation may be recommended for highly critical mains. Rehabilitation likely necessary in three to five years. Less critical mains should be flagged for increased monitoring.
D	Physical condition is near failure	Where scoring results in a condition less than "F" but max defect score is 5, as shown in lookup code	Rehabilitation likely necessary in one to two years and should be taken into account for long-term budgeting.
F	Physical condition has failed	Where defect = XP or Where defect =FH4	Rehabilitation or replacement is immediately necessary. Mains should be prioritized for annual rehab programs based on defect severity, main criticality, and budget availability.

Establishing an accurate physical condition model of the collection system requires collecting and maintaining a database of up-to-date CCTV inspection data by:

- Inspecting aging sewer mains through an annual CCTV inspection
- Updating the condition assessment of the network
- Identifying and prioritizing preservation activities.

The information in Table 5 and Table 6 below show the breakdown of known condition rating for collection and trunk sewer mains for each pipe material.

**Table 5: Collectors – Known Conditions Ratings – Length (km)**

Collectors – Known Condition Rating – Length (km)								
Material	Total Inventory (km)	A	B	C	D	F	Total Rated	% of Inventory Rated
Vitrified Clay	369	126	29	55	12	13	236	64%
Concrete	10	3	0	2	0	3	8	86%
PVC	337	15	2	2	2	1	21	6%
Lined Vitrified Clay	154	154	0	0	0	0	154	100%
Lined Concrete	52	51	1	0	0	0	52	100%
Other	2	0	0	0	0	0	0	6%
Unknown	1	0	0	0	0	0	0	0%
<b>Total</b>	<b>924</b>	<b>343</b>	<b>34</b>	<b>61</b>	<b>14</b>	<b>18</b>	<b>470</b>	<b>51%</b>

**Table 6: Trunks – Known Condition Ratings – Length (km)**

Trunk – Known Condition Rating – Length (km)								
Material	Total Inventory (km)	A	B	C	D	F	Total Rated	% of Inventory Rated
Vitrified Clay	25	10	3	3	1	2	19	75%
Concrete	51	15	4	3	1	5	29	57%
PVC	23	1	0	0	0	1	2	8%
Lined Vitrified Clay	12	12	0	0	0	0	12	100%
Lined Concrete	13	8	3	2	0	0	13	100%
Other	6	0	0	0	0	0	0	6%
Unknown	1	0	0	0	0	0	0	0%
<b>Total</b>	<b>130</b>	<b>46</b>	<b>10</b>	<b>8</b>	<b>2</b>	<b>8</b>	<b>74</b>	<b>57%</b>

## Condition Assessment Methodology and Programs

Condition data is currently available for approximately 32% of the wastewater collection system. In 2023, a review of the CCTV inspection program evaluated multiple service level scenarios to assess unlined concrete, clay tile, metallic, and unknown-material pipes. These scenarios range from maintaining the current internal-only approach to accelerated inspection timelines using both internal and contracted crews.

Advancing beyond the current approach would require significant increases in annual funding. The ongoing work is focused on defining performance targets, improving cost tracking, and evaluating the cost-benefit of expanded inspections. Future improvements aim to optimize inspection productivity, support evidence-based investment decisions, and identify opportunities to reduce long-term maintenance costs.

At the WWTP, asset condition assessments are made through a combination of consultant-led evaluations and operational insight from experienced Plant staff. While formal third-party assessments provide structured data for major systems, day-to-day monitoring and preventative maintenance conducted by staff remain critical to identifying emerging risks and prioritizing renewal needs.

## The Service Levels

### Customer Levels of Service

Service levels are categorized into customer levels of service and technical levels of service, with municipal performance measures supplementing both.

Customer levels of service define how residents experience and benefit from wastewater infrastructure, measuring whether services meet expectations in quality, function, and capacity.

**Quality** – refers to the condition and reliability of wastewater assets, ensuring safe and efficient service delivery

**Function** – assesses whether the service meets the intended requirements, ensuring proper wastewater collection, treatment, and environmental sustainability.

**Capacity and Use** – evaluates whether wastewater infrastructure meets demand, assessing usage trends and future needs to determine necessary expansions or optimizations.

Expected service levels, based on long-term financial planning, are detailed in the table below. These data-driven measures provide objective insight into wastewater system reliability, contrasting customer perception with performance-based benchmarks such as downtime incidents and infrastructure condition assessments

### Technical Levels of Service and Current Performance

Technical levels of service define the operational and financial activities required to support desired customer outcomes. These measures guide how resources are allocated to sustain performance and demonstrate service effectiveness.

They are categorized into four key areas:

**Operations** – Day-to-day activities that keep services running (e.g., inspections, energy use, cleaning).

**Maintenance** – Work to preserve asset condition and functionality over its service life (e.g., equipment repairs, structural upkeep).

**Renewal** – Activities that restore asset performance to its original standard (e.g., pipe replacements, component upgrades).

**Upgrades/New** – Investments that improve or expand service capacity (e.g., upsizing infrastructure, adding new facilities).

Service and asset managers oversee the planning and delivery of these activities to meet performance targets. The AMP outlines the current and desired technical service levels to ensure alignment with long-term service objectives.

### Wastewater Treatment – Non-Linear

**Table 7: Technical Levels of Service Expected**

Service Attribute	Service Activity Objective	Activity Measure Process	Current Performance	Desired for Optimum Lifecycle Cost
<b>TECHNICAL LEVELS OF SERVICE</b>				
<b>Routine Operations</b>	Lift Station monitoring and operational clean cycles	Monitoring Reports	Monitored 24/7	Maintain current performance
	WWTP process monitoring and inspections	Daily monitoring and field inspection reports	Monitored 24/7 and inspections completed twice per day	Maintain current performance
<b>Maintenance</b>	Planned and reactive maintenance on lift stations and WWTP	Percentage of planned work vs reactive	80% planned	>85% planned
<b>Customer Service Activities</b>	Responding to odour, or flood complaints	Notification frequency	~three per year	<two per year
	Emergency and homeowner requested replacement of service connections	Number replaced per year	~110 per year (90 emergency, 20 requests)	Maintain at current funding level (\$615K/year)
<b>Asset Renewals</b>	Timely renewal of aging critical infrastructure	Percentage of assets in good condition or higher	>90% of assets	Maintain current performance
<b>New Upgrades</b>	Capacity or compliance driven upgrades	Permit Compliance	Zero non-compliances with the permit to operate	Maintain current performance

## Wastewater Collection – Linear

Table 8 is a summary of the level of service defined for the wastewater collection system in the 2024-2025 Approved Detailed Operating and Capital Budget.

**Table 8: Service Levels for the State of Wastewater Collection**

Service	Sub-Service	Service Levels		
		2023	2024	2025
Asset Management	Sanitary Sewer Mains	To provide regular cleaning and repairs to the sanitary sewage collection system to maintain it in a free-flowing condition for the protection of community health and property.		
		At current funding levels the backlog of Poor and very Poor mains will decrease over time. The overall condition of sanitary mains is increasing slowly over time. Based on planned expenditure service level, there is no funding gap.		
	Sanitary Sewer Connections	To provide repairs to the sanitary sewer service connections to maintain free-flowing sewage drainage from all properties.		

Table 9 is a summary of existing programs and service levels.

**Table 9: Existing Program Service Levels for the Wastewater Collection System**

Asset	Program	Capital Project	Service Levels Target	Service Level KPI
Sewer Mains	Collection Main Preservation	P.10060	Asset condition is improving slowly over time	Replace or line 15 km of sewer main per year
Sewer Mains	Trunk Main Preservation	P.10060	Rehabilitate or replace trunk sewer based on recommendations from trunk sewer inspections	As needed, no KPI
Sewer Mains	Corridor Capacity	TBD	Upsize sewer mains in designated corridor growth areas as identified by Saskatoon Water.	TBD
Sewer Mains	Collection Sewer Inspection Program	P.10060 and Operating funding	Minimize backups and unscheduled sewer repairs by inspecting all mains ahead of roadway preservation program and selected mains by Technical Services.	Currently approximately 30km per year. Analysis being Done on optimal inspection cycle.
Sewer Mains	Trunk Sewer Inspection Program	P.10060	Inspect critical trunk sewers based on risk assessment.	No KPI Medium term plan in place

Asset	Program	Capital Project	Service Levels Target	Service Level KPI
Manholes	Manhole rehabilitation	P.10060	Replace or rehabilitate failed manholes as identified by WWO.	As needed, no KPI
Service Connections	Emergency Replacement Program	P.10060	Replace sewer connection as they fail	Approximately 100 per year
Service Connections	Owner Request Replacement Program	P.10060	Replace sewer connections by owner request	Approximately 20 per year
Service Connections	Roadways Fibre Sewer Connection Replacement Program	P.10060	Replace fiber sewer connections in conflict with either resurfacing or full reconstruction paving treatments	Variable, as needed
Force mains	Force main Inspections	P.10060	Inspect critical force mains based on risk assessment.	No KPI and no plans in place
Force mains	Force main Preservation	P.10060	Rehab or replace force mains based on recommendations from trunk sewer inspections	No KPI and no plans in place

## Asset Criticality and Risk

### Key Risks

Critical assets are those whose failure would have a significant impact on safety, environmental protection, regulatory compliance, financial performance, or the City's reputation. Saskatoon Water uses a Criticality Matrix to assess asset risks based on both the severity and likelihood of failure, helping prioritize investment and risk management.

A criticality review of all 2,098 WWTP assets showed that:

- Low impact assets make up 74% (target: ≥70%)
- Medium impact assets account for 24% (target: 20–25%)
- High impact assets represent 2% (target: 1–5%)
- Extreme impact: only two assets fall in this category (target: 0–1%)

These results indicate that most assets present low to moderate risk. While the wastewater system plays a vital role in protecting public health and the environment, most asset failures are manageable through established operational procedures and do not pose immediate or widespread threats. The assessment confirms that the current asset portfolio maintains a low overall critical risk exposure.

Wastewater mains are assigned a Pipe Class to reflect their relative importance and the consequences of failure. Criticality is based on factors such as the type of roadway above the pipe, proximity to private property or other critical infrastructure, flow volume, and pipe

depth. Each segment is assessed across these categories, and the highest-rated factor determines its overall Pipe Class—from Class 1 (highest criticality) to Class 4 (lowest).

Collection System Breakdown (924 km total):

- Class 1: 2%
- Class 2: 25%
- Class 3: 43%
- Class 4: 30%

Trunk System Breakdown (130 km total):

- Class 1: 44%
- Class 2: 42%
- Class 3: 12%
- Class 4: 3%

These classifications are used with condition data to assess asset risk. Risk is calculated by combining the likelihood of failure with the consequence of failure, helping prioritize locations for future inspection, maintenance, or replacement. This approach ensures limited resources are directed at where they can deliver the most value and reduce service risks.

## **Mitigation Strategies**

The Wastewater Utility uses a structured, risk-based approach to proactively manage asset-related risks and maintain reliable, compliant service delivery. Risks are identified through condition assessments, operational insight, and criticality evaluations, with targeted actions taken to reduce both the likelihood and impact of failure.

High and critical risk assets are addressed through:

- Preventive maintenance and inspections to detect and resolve issues early
- Planned renewals or upgrades based on risk and condition
- Strategic spare parts planning and system redundancy to minimize downtime
- Operational response procedures to contain and manage incidents effectively

Risk mitigation is embedded within the Utility's capital planning, maintenance, and renewal programs. This ensures resources are directed toward assets where failure would have the most significant consequences—supporting long-term service continuity, regulatory compliance, and environmental protection.

**Table 10: WWTP Non-Linear Critical/High Impact Assets**

Critical Asset(s)	Impact	Consequence	Likelihood	Rating	Mitigation Strategies
10 Inch Biosolids Pipeline	<ul style="list-style-type: none"> <li>Biosolids spill</li> <li>Environmental impact/regulatory reporting</li> <li>Digester tank capacity limited</li> </ul>	2	1	Extreme	<ul style="list-style-type: none"> <li>Annual pipeline cleaning</li> <li>Flow and pressure monitoring</li> <li>Overland pipeline in inventory</li> <li>Project in design phase to replace</li> </ul>
8 Inch Biosolids Supernatant Pipeline	<ul style="list-style-type: none"> <li>Supernatant spill</li> <li>Environmental impact/regulatory reporting</li> <li>Biosolids lagoon storage limited</li> </ul>	2	1	Extreme	<ul style="list-style-type: none"> <li>Annual pipeline cleaning</li> <li>Flow and pressure monitoring</li> <li>Overland pipeline in inventory</li> <li>Project in design phase to replace</li> </ul>
WWTP Fire Alarm System	<ul style="list-style-type: none"> <li>Fire note detected</li> <li>Safety risk</li> <li>Asset risk</li> </ul>	1	3	High	<ul style="list-style-type: none"> <li>Contractor inspections and maintenance program</li> </ul>
Digester Explosion Relief Valve	<ul style="list-style-type: none"> <li>Digester overpressure</li> <li>Explosion risk</li> <li>Structural damage and safety risk</li> </ul>	2	3	High	<ul style="list-style-type: none"> <li>Preventative inspections and exercising</li> </ul>

## Resilience Planning

The resilience of our critical infrastructure is vital to our customers and the services we provide. To adapt to changing conditions and grow over time, we need to understand our capacity to respond to possible disruptions, be positioned to absorb disturbance and act effectively in a crisis to ensure continuity of service.

Resilience is built on response and recovery planning, financial capacity, and crisis leadership.

Our current measure of resilience includes the type of threats and hazards, adaptation strategy, resilience assessment and identified improvements and/or interventions.

**Table 11: WWTP Resilience Planning**

Threat / Hazard	Adaptation	Resilience	Improvements / Interventions
Pipeline failure – biosolids or supernatant	Annual pipeline cleaning; flow and pressure monitoring; overland bypass pipeline in inventory	Moderate – preventative measures in place, but aging infrastructure remains a risk	Replace pipeline  Optimize nutrient recovery system
Electrical failure – MCCs (Bioreactor, Primary Effluent, UV, etc.)	Equipment inspections; standby generator backup	Moderate to High – standby power and inspections mitigate outage risk	Enhance MCC condition monitoring (e.g., IR scans)
Digester overpressure / explosion risk	Preventative inspections: relief valves exercised regularly	Moderate – safeguards exist but incident severity is high	Evaluate valve replacement frequency.
Fire not detected – WWTP Fire Alarm System	Contractor inspections and maintenance	Low to Moderate – limited fire detection coverage in some areas	Expand coverage; implement system self-testing alerts.
Safety equipment failure (showers, SCBAs, gas detectors)	Routine inspections and calibrations	High – regular checks ensure equipment readiness	Refresher training for emergency response
Inaccurate effluent flow measurement	Monthly inspection and calibration; redundant flow meter installed	High – redundancy ensures regulatory compliance	Replace aging sensors on a lifecycle basis; assess long-term performance trends
Lift station or generator failure (e.g., Rotary Park, Station)	Quarterly inspections and load tests	Moderate – testing in place but aging assets can fail under load	Consider mobile backup generators.
Flooding from storm events	Generator protection for storm lift station	Low to Moderate – asset protected, but high-impact risk	Explore capacity upgrade or bypass pumping strategy.

## Climate Change-Related Risk

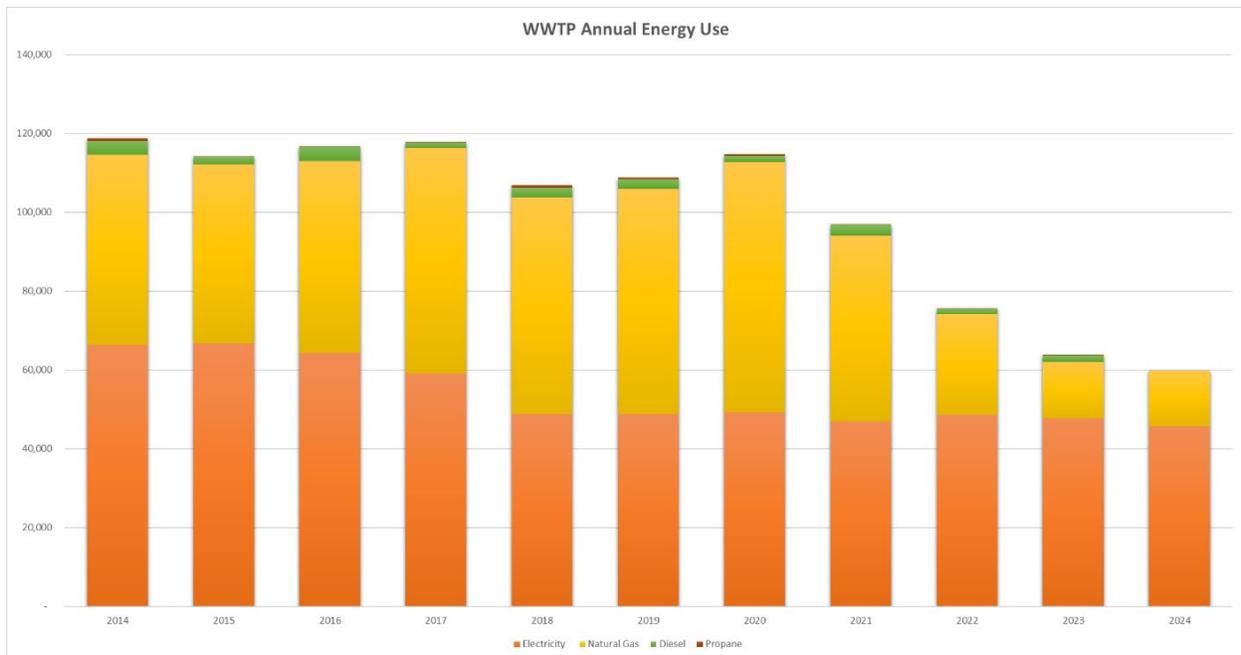
Saskatoon Water is committed to supporting the City’s broader climate objectives, including the updated target from the 2021 Climate Action Plan to achieve net zero emissions by 2050. The WWTP plays a key role in meeting these goals by integrating energy management directly into its asset management and operational planning.

To meet its commitments, Saskatoon Water has adopted an Energy Management Policy, which is reviewed and updated every three years. This policy outlines how the WWTP will pursue energy efficiency, cost control, and emissions reduction. Using 2019 as a baseline year, the WWTP has set both short and long-term targets to reduce energy consumption and ultimately reach net zero GHG emissions, aligning with the City’s Low Emissions Community (LEC) Plan.

## WWTP Energy Costs and GHGs

The WWTP consumes electricity, natural gas, diesel, and propane. Total annual consumption was benchmarked from 2014–2020, with 2019 selected as the baseline for tracking energy and GHG performance. The short-term target for the 2022–23 budget cycle was a reduction of approximately 51,000 GJ, largely through the increased use of biogas generated on-site.

A dedicated energy team—including Operations, Engineering, Maintenance, and Management staff—oversees implementation of strategies, capital projects, and process optimization to support GHG reductions. The team also participates in AECOM’s National Water & Wastewater Benchmarking Initiative (NWWBI) to track energy and GHG performance against peer utilities. The chart below demonstrates the improvements and reduction in energy use at the WWTP over recent years.



## Anticipated Funding and Path to Net Zero

The WWTP recognizes that reaching net zero will require sustained investment and careful project selection. Current funding sources used to support energy initiatives include several internal capital projects and external grant opportunities, such as the Low Carbon Economy Fund and FCM’s Green Municipal Fund.

While a fixed date for reaching net zero at the WWTP has not yet been set, the Plant is pursuing a multi-year strategy that is updated with each budget cycle. The approach ensures that targets are realistic, do not compromise treatment performance, and remain financially feasible. Funding decisions will be guided by marginal abatement cost principles outlined in the LEC Plan.

## Infrastructure Climate Resilience Approach

The WWTP Energy Strategy is a key part of Saskatoon Water's climate adaptation efforts, following a cyclical process aligned with the City's two-year budget to identify opportunities, implement projects, and monitor progress.

Key initiatives include using biogas to reduce grid reliance, exploring combined heat and power and biomethane, assessing solar and heat recovery options, and enhancing energy monitoring to guide investments. These actions boost resilience to energy price fluctuations and lower the Plant's carbon footprint while maintaining reliable service. Long-term strategies like biogas optimization and carbon credit sales are also under review.

Sanitary sewers can see increased flows during heavy rain due to inflow and infiltration from elevated water tables. To manage this, regular cleaning, maintenance, and rehabilitation of pipes and manholes help maintain capacity and reduce infiltration risks.

Progress on climate and energy goals is shared through team meetings, recognition programs, and partnerships, embedding resilience in both infrastructure and workplace culture.

## Investment Strategies and Needs

### Lifecycle Programs & Analysis

The lifecycle cost approach includes comprehensive consideration of all stages: business planning, acquisition, O&M, asset renewal, and end-of-life disposal.

- **Business Planning:** Costs related to asset management planning and budgeting are incorporated within administrative budgets.
- **Acquisition:** Capital expenditures for new assets and system expansions are identified and included in the capital improvement plan.
- **Operation & Maintenance:** Water rates are established to fully fund ongoing O&M expenses, ensuring reliable daily operation of the collection system, Lift Stations, treatment plant, and solids handling processes.
- **Renewal & Replacement:** Renewal and asset replacement projects are identified through condition assessments and integrated into the capital budget, ensuring assets are replaced prior to failure.
- **Disposal:** End-of-life asset disposal or decommissioning costs are planned on an as-needed basis and funded through capital reserves or specific project budgets.

The wastewater collection system requires ongoing investment throughout its lifecycle to maintain service levels, address asset deterioration, and mitigate the risk of failures. Lifecycle costs include preventive maintenance, condition assessments, repairs, rehabilitation, and eventual replacement. A key strategy in managing lifecycle costs is prioritizing rehabilitation techniques—such as Cured-in-Place Pipe (CIPP) lining—that

extend asset life at a lower cost than full replacement. This approach reduces disruption, minimizes excavation, and preserves infrastructure value efficiently.

Ongoing maintenance also plays a critical role in reducing total lifecycle costs by extending asset life and deferring more expensive capital interventions. Programs are targeted to minimize inflow and infiltration, ensure hydraulic capacity, and address structural deterioration before failures occur.

The following table outlines lifecycle programs and the responsible departments.

**Table 12: Lifecycle Programs and Responsible Departments**

<b>Lifecycle Activity</b>	<b>Responsible Department</b>	<b>Programs</b>
<b>Asset Planning and Acquisition</b>	Saskatoon Water	
	Construction and Design	
<b>Operations and Maintenance</b>	Water and Waste Operations	
	Saskatoon Water	
<b>Preservation and Renewal</b>	Technical Services	Collection Main Preservation
	Water and Waste Operations	Corridor Growth Program
	Construction and Design	Trunk Main Preservation
	Saskatoon Water – WWTP	Collection Main Inspection
	Saskatoon Water – Engineering Services	Trunk Water Main Inspection Program
		Service Connection Replacement Program WWTP Capital Maintenance Plan

## **Funding Requirements and Investment Strategies**

Funding is primarily rate-based with additional borrowing utilized to finance capital projects as needed. Debt incurred is repaid from the operating budget with rates set to cover the full cost of current O&M and planned capital projects, including renewals and necessary expansions to maintain levels of service.

- **Funding Sources:**

- Water user rates serve as the principal funding source for O&M, capital investment and debt repayment.
- Borrowing is used for capital investments when required, with debt service costs integrated into the annual operating budget and funded by rates.
- Occasional grants may supplement funding for large capital projects when available but are not relied upon for core funding.

- **Investment Needs:**
  - **Total Funding Gap/Investment Needs:** The current rate structure and capital plans maintain a balanced budget, with no significant funding gaps anticipated in the foreseeable future.
  - **Capital Growth Funding:** Growth-related capital projects are planned and funded through development charges or rate adjustments as required.
  - **Capital & O&M Funding:** Current capital renewal and O&M expenses are fully funded through rates. Budgeting processes incorporate asset condition data to ensure funding aligns with infrastructure needs.

The wastewater collection system currently receives \$7.4 million annually for capital preservation and \$8.9 million for operations and maintenance. This funding supports key programs, including collection and trunk main rehabilitation, manhole and service connection replacement, and system inspections.

At current funding levels, the City is able to maintain the network and make incremental progress in reducing the backlog of assets rated in “Poor” condition. There are currently no funding gaps in the capital preservation programs based on existing service level targets. However, continued investment will be required to prevent the growth of that backlog and avoid deterioration in overall network condition.

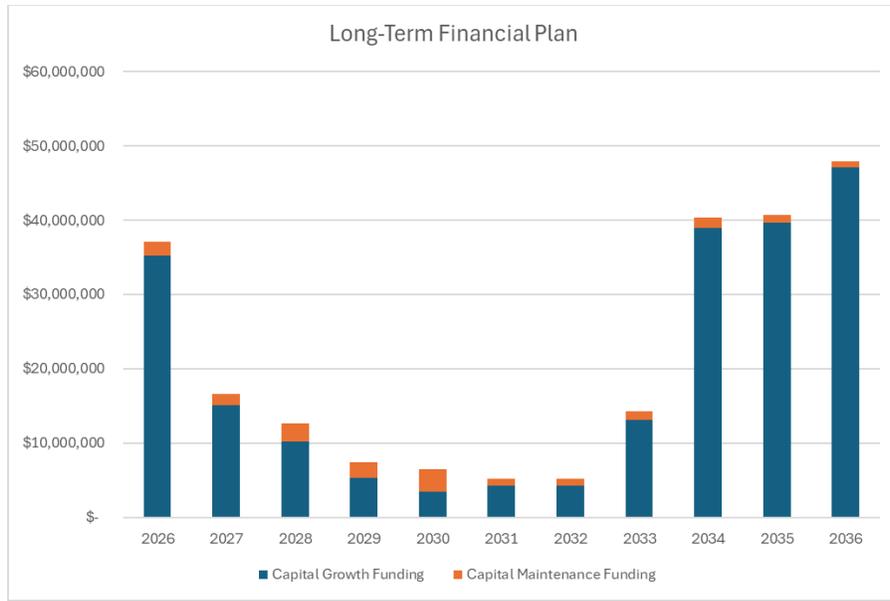
The primary funding sources for the wastewater collection system include utility rates, which support both operating and capital expenditures. Multi-year tendering is used to stabilize pricing and enable cost-effective delivery of rehabilitation work.

## **Long-Term Financial Plan**

### **Wastewater Treatment – Non-Linear**

The Capital Plan forecasts investment needs through 2036, with peaks in 2026 and again from 2034 to 2036. The initial spike reflects required bioreactor expansions to meet anticipated ammonia limits from the Water Security Agency, ensuring year-round nitrification. The later increase aligns with projected population growth and the next major WWTP expansion.

Capital growth funding also incorporates support for biogas optimization, combined heat and power, and other sustainability initiatives tied to the utility’s energy strategy. These investments reduce reliance on external energy sources and enhance climate resilience. The plan is reviewed and updated in coordination with the City’s two-year budget cycle to ensure long-term alignment with service goals and regulatory drivers. The utility does not typically experience funding gaps, as water rates are structured to recover both operating costs and long-term capital needs, including debt repayment.



### Wastewater Collection – Linear

A sustainable long-term financial plan is essential to ensure that the wastewater collection system can meet current and future service needs. While current funding levels are sufficient to meet existing program targets, the ability to sustain this position over time depends on maintaining annual increases that match inflation and construction cost escalation.

Failure to account for growth and inflationary pressures may result in declining asset conditions, increased risk of failures, and a growing funding gap. To mitigate this risk, the financial strategy includes:

- Annual review of construction cost indices and adjustment of funding targets accordingly.
- Regular condition assessments to refine asset needs and adjust investment priorities.
- Continued use of cost-efficient rehabilitation methods when feasible.
- Long-range forecasting of capital and operating needs based on asset performance trends.

By aligning funding levels with lifecycle demands and long-term growth, the City can continue to deliver reliable wastewater services while minimizing the financial burden on future ratepayers.

The tables below depict current asset performance, funding summaries and funding gaps.

**Table 13: Current Asset Performance and Funding Gaps**

<b>Asset Program</b>	<b>Current Performance</b>	<b>Desired Performance</b>	<b>Approved Expenditure Level</b>	<b>Required Annual Funding</b>	<b>Existing Annual Funding</b>	<b>2025 Funding Gap</b>
Sanitary Mains Collections –	<i>Known Condition of 46% of Collection System</i>  81% Very Good  13% Fair  1% Poor  4% Very Poor	Fair	B	\$4.1 M	\$4.1 M	\$0.0 M
Sanitary Mains Trunks –	<i>Known Condition of 47% of Trunk System</i>  80% Very Good  1% Good  12% Fair  1% Poor  6% Very Poor	Good	C	\$0.9 M	\$0.9 M	\$0.0 M
Service Connections	93% Very Good  7% Very Poor	Good	B	\$2.4 M	\$2.4	\$0.0
Sanitary Operations and Maintenance	Good	Good	C	\$10.0 M	\$8.9 M	\$1.1 M

**Table 14: Funding Summary and Gaps**

<b>Asset</b>	<b>Program</b>	<b>Service Level KPI</b>	<b>Required Annual Funding</b>	<b>2025 Funding</b>	<b>2025 Funding Gap</b>
Wastewater Mains	Wastewater Collection Main Preservation	Replace or line approximately 15,000 m per year	\$4,668,300	\$4,668,300	-
Wastewater Service Connections	Service Line Replacement	Relace approximately 225 sewer service lines per year	\$2,693,250	\$1,936,700	\$756,550
Wastewater Manholes	Manhole Preservation	No KPI	-	-	-
Wastewater Mains	Wastewater Trunk Preservation	No KPI	\$1,000,000	\$1,000,000	-
Wastewater Mains	Wastewater Trunk Inspection	No KPI	-	-	-
<b>Total</b>			<b>\$8,361,550</b>	<b>\$7,605,000</b>	<b>\$756,550</b>

The two 2025 funding gaps noted in the above tables are addressed in the 2026 & 2027 multi-year business plan and budget rate request for the water and wastewater utilities.

### **Asset Management Principles for Addressing Infrastructure Gaps**

Based on historical rates of water main replacement per year, network wide water main condition has been improving as shown in the Figure below. Reduced funding for annual water main replacement may result in worsening water main conditions over time.

The 2026 budget submission eliminates the funding gaps observed in 2025. The table below shows 2026 budget submissions for wastewater collection preservation.

**Table 15: 2026 Budget Submissions – Wastewater Collection Preservation**

Asset	Program	Service Level KPI	Required Annual Funding	2026 Funding	Funding Gap
Wastewater Mains	Wastewater Collection Main Preservation	Replace or line approximately 15,000 m per year	\$4,668,300	\$4,668,300	-
Wastewater Service Connections	Service Line Replacement	Relace approximately 225 sewer service lines per year	\$2,693,250	\$2,693,250	
Wastewater Manholes	Manhole Preservation	No KPI	-	-	-
Wastewater Mains	Wastewater Trunk Preservation	No KPI	\$1,000,000	\$1,000,000	-
Wastewater Mains	Wastewater Trunk Inspection	No KPI	-	-	-
<b>Total</b>			<b>\$8,361,550</b>	<b>\$8,361,550</b>	

## List of Recommendations and Action Plans

### Action Plan

*Immediate Actions* will focus on maintenance and renewals targeting assets identified in critical condition or at risk, addressing urgent needs to preserve service reliability and safety.

*Mid-Term Priorities* involve enhancing asset condition ratings by conducting more detailed assessments, affirming the adequacy of current asset budgets, and refining capital plans to better support sustainable asset management.

*Long-Term Roadmap* aims to improve data storage and asset monitoring capabilities while continuing to evolve and enhance the AMP. This will support improved decision-making and ensure the plan remains aligned with the City’s strategic goals over time.

The following table displays the asset management improvement plan going forward.

**Table 16: Asset Management Improvement Plan**

<b>Gap or Task</b>	<b>Action Plan</b>	<b>Responsibility</b>	<b>Resources</b>	<b>Timeline</b>
Asset valuations lack accuracy (based on historic project costs adjusted for inflation)	Develop updated asset valuation methods using more refined methods or consultants	Engineering	Internal staff, consultant support	2028-2030
Condition ratings rely heavily on staff knowledge and lack consistency	Develop formal condition assessments with internal staff	Engineering and Operations	Internal staff, industry references	2026-2028
Limited structural condition data for buildings and tanks	Engage specialists to assess structural components not covered by internal expertise	Asset Management	Capital budget allocation	2026–2029
Stronger focus on wastewater processes than on buildings and support spaces	Broaden asset inventory and condition efforts to include facility and workspace elements	Asset Management and Facilities	Internal coordination	2028 onward

## Forecasted State of Infrastructure

Based on current funding levels and planned activities, the overall condition of wastewater assets, including both the collection system and treatment plant, is expected to remain in good condition. While predictive modelling is not yet in place, condition trends will be monitored to support this expectation.

At the WWTP, continued investment in maintenance, renewal, and energy efficiency helps sustain asset performance and regulatory compliance. For the collection system, Technical Services and Water and Waste Operations are improving data capture in SAP to support better planning for rehabilitation and replacement.

Work is also underway to reduce duplication in reporting systems and improve access to operational and maintenance data. New performance targets for the CCTV inspection program will be developed and evaluated annually to improve inspection coverage using existing funding.

## Appendix A: Levels of Service

Service Objective	Customer LOS	Targets	2020	2021	2022	2023	2024	Trend
Wastewater Reliability	Quality	>90% of Assets Condition Rating 4 or 5						
Wastewater Treatment Compliance	Function	Zero permit exceedances	1	1	1	1	0	Improving
Septage Receiving	Function	Facilities or Closures per year <2	3	3	6	5	4	Improving
Wastewater Collection Capacity	Capacity & Use	Percent of sewers at or exceeding capacity	<1%	<1%	<1%	<1%	<1%	Meets Target
	Capacity & Use	Number of Lift Stations operating above design capacity	0	0	0	0	0	Meets Target
Wastewater Treatment Plant Capacity	Capacity & Use	Number of treatment processes operating above design loading <1	0	0	0	0	0	Meets Target

## Appendix B: Risk Management Plan

Critical Asset(s)	Impact	Consequence	Likelihood	Rating	Mitigation Strategies
Digester Pressure Relief Valves	<ul style="list-style-type: none"> <li>Digester overpressure</li> <li>Explosion risk</li> <li>Structural damage and safety risk</li> </ul>	2	3	High	<ul style="list-style-type: none"> <li>Preventative inspections and exercising</li> </ul>
Primary Effluent Pumping MCC	<ul style="list-style-type: none"> <li>Environmental risk</li> <li>Primary effluent spill to river</li> <li>Regulatory contravention</li> </ul>	1	4	High	<ul style="list-style-type: none"> <li>Equipment Inspections</li> <li>Standby generator</li> </ul>
Bioreactor MCC	<ul style="list-style-type: none"> <li>Environmental risk</li> <li>Mixers unable to suspend biomass</li> <li>Untreated effluent released to river</li> <li>Regulatory contravention</li> </ul>	1	4	High	<ul style="list-style-type: none"> <li>Equipment Inspections</li> <li>Standby generator</li> </ul>
Utility MCC	<ul style="list-style-type: none"> <li>Environmental risk</li> <li>Aeration loss to biomass</li> <li>Untreated effluent released to river</li> <li>Regulatory contravention</li> </ul>	1	4	High	<ul style="list-style-type: none"> <li>Equipment Inspections</li> <li>Standby generator</li> </ul>
Secondary Clarifiers MCC	<ul style="list-style-type: none"> <li>Environmental risk</li> <li>Clarifier blanket build-up</li> <li>Loss of biomass in Bioreactors</li> <li>Untreated effluent released to river</li> <li>Regulatory contravention</li> </ul>	1	4	High	<ul style="list-style-type: none"> <li>Equipment Inspections</li> <li>Standby generator</li> </ul>
UV Disinfection MCC	<ul style="list-style-type: none"> <li>Environmental risk</li> <li>UV bulbs powered off</li> <li>Untreated effluent released to river</li> <li>Regulatory contravention</li> </ul>	1	4	High	<ul style="list-style-type: none"> <li>Equipment Inspections</li> <li>Standby generator</li> </ul>
Safety Shower and Eyewashes	<ul style="list-style-type: none"> <li>Inoperable safety equipment</li> </ul>	1	4	High	<ul style="list-style-type: none"> <li>Monthly inspections</li> </ul>

Critical Asset(s)	Impact	Consequence	Likelihood	Rating	Mitigation Strategies
	<ul style="list-style-type: none"> <li>OHS non-compliance</li> </ul>				
SCBA Equipment	<ul style="list-style-type: none"> <li>Unable to respond to emergency gas leak</li> </ul>	1	4	High	<ul style="list-style-type: none"> <li>Daily inspections</li> </ul>
H2S Gas Detectors	<ul style="list-style-type: none"> <li>Staff exposure risk</li> </ul>	1	4	High	<ul style="list-style-type: none"> <li>Monthly Inspections and calibrations</li> </ul>
Final Effluent Flow Meter	<ul style="list-style-type: none"> <li>Inaccurate flow and release data</li> <li>Regulatory contravention</li> </ul>	2	3	High	<ul style="list-style-type: none"> <li>Monthly inspection and calibration</li> <li>Redundant meter installed</li> </ul>
Rotary Park Lift Station Generator	<ul style="list-style-type: none"> <li>Sewer release to river</li> <li>Regulatory contravention</li> </ul>	2	3	High	<ul style="list-style-type: none"> <li>Quarterly inspections and load tests</li> </ul>
Primary Effluent Pumping Transfer Switch	<ul style="list-style-type: none"> <li>Environmental risk</li> <li>Primary effluent spill to river</li> <li>Regulatory contravention</li> </ul>	2	3	High	<ul style="list-style-type: none"> <li>Monthly load tests</li> </ul>

## Appendix C: Financial Plan (30-Year Capital Plan)

Year/Project	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
AADF (ML/d)	94	97	99	101	103	105	108	110	112	115	117
Digester Transfer Lines	\$12,000,000	\$14,000,000	\$5,000,000								
Nitrification Expansion (Including WWFM)	\$135,000	\$14,799,670	\$14,799,670	\$14,799,670							
Biogas Utilization Expansion	\$200,000	\$9,150,000									
River Study						\$100,000					\$100,000
Second BTF				\$100,000	\$1,000,000						
Secondary Clarifiers Train #3									\$2,935,497	\$14,075,332	\$14,075,332
Bioreactors Train #3									\$5,197,620	\$20,596,625	\$20,596,625
Nutrient Recovery Expansion											\$561,164
Administration Upgrade									\$715,370		
UV Expansion											
PEP Expansion											
Primary Influent Channel											
Fermenter Expansion											
Headworks Expansion											
Primary Basin #5											
Outfall Ports											
Tertiary Treatment Expansion											
Secondary Clarifiers Train #4											
Bioreactors Train #4											
Digester #5											
<b>Total</b>	<b>\$12,335,000</b>	<b>\$37,949,670</b>	<b>\$19,799,670</b>	<b>\$14,899,670</b>	<b>\$1,000,000</b>	<b>\$100,000</b>	<b>\$0</b>	<b>\$0</b>	<b>\$8,848,487</b>	<b>\$34,671,957</b>	<b>\$35,333,121</b>

Year/Project	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046
AADF (ML/d)	120	123	125	128	131	134	137	140	143	146	149
Digester Transfer Lines											
Nitrification Expansion (Including WWFM)											
Biogas Utilization Expansion											
River Study					\$100,000					\$100,000	
Second BTF											
Secondary Clarifiers Train #3	\$14,075,332										
Bioreactors Train #3	\$20,596,625										
Nutrient Recovery Expansion	\$8,072,130										
Administration Upgrade											
UV Expansion		\$857,372	\$12,332,967								
PEP Expansion		\$682,000	\$9,810,361								
Primary Influent Channel			\$1,214,071	\$17,463,952							
Fermenter Expansion						\$480,844	\$6,916,754				
Headworks Expansion									\$2,489,713	\$17,906,777	\$17,906,777
Primary Basin #5									\$1,036,620	\$7,455,688	\$7,455,688
Outfall Ports											
Tertiary Treatment Expansion											
Secondary Clarifiers Train #4											
Bioreactors Train #4											
Digester #5											
<b>Total</b>	<b>\$42,744,087</b>	<b>\$1,539,372</b>	<b>\$23,357,399</b>	<b>\$17,463,952</b>	<b>\$100,000</b>	<b>\$480,844</b>	<b>\$6,916,754</b>	<b>\$0</b>	<b>\$3,526,333</b>	<b>\$25,462,465</b>	<b>\$25,362,465</b>

Year/Project	2047	2048	2049	2050	2051	2052	2053	2054	2055
AADF (ML/d)	152	156	159	163	166	170	174	178	181
Digester Transfer Lines									
Nitrification Expansion (Including WWFM)									
Biogas Utilization Expansion									
River Study				\$100,000					\$100,000
Second BTF									
Secondary Clarifiers Train #3									
Bioreactors Train #3									
Nutrient Recovery Expansion									
Administration Upgrade									
UV Expansion									
PEP Expansion									
Primary Influent Channel									
Fermenter Expansion									
Headworks Expansion									
Primary Basin #5									
Outfall Ports			\$41,030						
Tertiary Treatment Expansion						\$1,652,384	\$11,884,457	\$11,884,457	
Secondary Clarifiers Train #4						\$2,072,521	\$9,937,473	\$9,937,473	\$9,937,473
Bioreactors Train #4						\$3,583,591	\$17,182,860	\$17,182,860	\$17,182,860
Digester #5									\$23,476,018
<b>Total</b>	<b>\$0</b>	<b>\$0</b>	<b>\$41,030</b>	<b>\$100,000</b>	<b>\$0</b>	<b>\$7,308,496</b>	<b>\$39,004,790</b>	<b>\$39,004,790</b>	<b>\$50,696,351</b>

## Appendix D: Asset Register

