

Presented To:	Audit Committee
Presented:	Tuesday, Dec 08, 2020
Report Date	Tuesday, Nov 24, 2020
Type:	Managers' Reports

Request for Decision

Performance Audit of Wastewater Services Section

Resolution

THAT the City of Greater Sudbury approves the recommendations as outlined in the report entitled "Performance Audit of Wastewater Services Section", from the Auditor General, presented at the Audit Committee meeting on December 8, 2020.

Signed By

Auditor General
Ron Foster
Auditor General
Digitally Signed Nov 24, 20

Relationship to the Strategic Plan / Health Impact Assessment

This report supports the strategic goal of asset management and service excellence as well as the supporting initiative of demonstrating innovation and cost-effective service delivery.

Report Summary

While staff have managed the wastewater treatment plants and lift stations efficiently, work has been delayed on a number of upgrades to treatment plants and lift stations that were recommended in the 2017 water and wastewater master plan. Management should update the water and wastewater long-range financial plan in 2024 to ensure it incorporates sound asset management and risk management practices and recommends sufficient funding to maintain and, where necessary, expand the capacity of the wastewater assets.

Financial Implications

No immediate financial implications.

Performance Audit of
Wastewater Services

November 24, 2020

Final Report



OBJECTIVE

To assess the extent of regard for economy, efficiency and effectiveness within Wastewater Services.

BACKGROUND

Wastewater Services is a section of the Water/Wastewater Division of the Growth and Infrastructure Department with 38 staff who are responsible for the operation and maintenance of 12 wastewater treatment plants, 69 sewage lift stations and 4 lagoons. The financial results for the Section are shown below.

Revenues and Expenses (000s)	Dec 31 2017		Dec 31 2018		Dec 31 2019		Sept 30 2020	
	Budget	Actual	Budget	Actual	Budget	Actual	Budget	Actual
User Fees	23,290	22,275	26,361	25,799	27,304	26,103	20,022	20,000
Other Revenues	407	839	705	862	705	803	529	538
Total Revenues	23,697	23,114	27,066	26,661	28,009	26,906	20,551	20,538
Salaries & Benefits	1,721	1,758	1,743	1,762	1,785	1,790	1,319	1,433
Materials	1,697	2,227	1,706	1,942	1,797	2,213	1,379	2,071
Energy Costs	2,145	2,395	2,485	2,195	2,535	2,338	1,719	1,284
Purchased Services	1,273	1,695	1,338	1,909	1,363	1,994	979	1,460
Indirect Costs	2,600	2,409	4,084	3,085	3,407	2,990	2,207	2,224
Labour Fringes	904	1,025	929	1,122	936	1,080	704	764
Engineering Costs	791	728	768	745	837	816	655	651
Biosolids Costs	6,420	5,971	6,479	6,120	6,540	6,422	4,931	4,462
Finance & Capital	5,855	5,854	7,208	7,207	8,441	8,450	6,384	6,376
Internal Recoveries	291	313	326	326	368	432	274	292
Total Expenses	23,697	24,375	27,066	26,413	28,009	28,525	20,551	21,017
Net Expenses	0	-1,261	0	248	0	-1,619	0	-479

METHODOLOGY & SCOPE

This audit included interviews of staff, analysis of policies, procedures, and reports and tests of controls for the period January 1, 2017 to September 30, 2020 but excluded the collection network within Linear Infrastructure Services.

EXECUTIVE SUMMARY

While staff have managed the wastewater treatment plants and lift stations efficiently, work has been delayed on a number of upgrades to treatment plants and lift stations that were recommended in the 2017 water and wastewater master plan. Management should update the water and wastewater long-range financial plan in 2024 to ensure it incorporates sound asset management and risk management practices and recommends sufficient funding to maintain and, where necessary, expand the capacity of the wastewater assets.

AUDIT STANDARDS

We conducted our audit in accordance with Generally Accepted Government Auditing Standards which require that we adequately plan audits; properly supervise staff; obtain sufficient, appropriate evidence to provide a reasonable basis for audit findings and conclusions; and document audits. For further information regarding this report, please contact Ron Foster at the City of Greater Sudbury at 705-674-4455 extension 4402 or via email at ron.foster@greatersudbury.ca

OBSERVATIONS AND ACTION PLANS

A. Master Plan and Long-Range Financial Plan

In 2010, a ten-year financial plan was prepared for the City's water and wastewater services. To achieve financial sustainability over the next ten years, that plan recommended an annual increase to water and wastewater rates of 7.4 percent. These recommended increases were approved in 2016, 2017, 2018 and 2019. The annual increases approved between 2011 and 2015 averaged just 3.5 percent. As a result, a significant maintenance backlog on the wastewater assets had developed by 2017 when the last water and wastewater master plan was completed. The objectives of this plan were:

- To plan for safe, robust servicing systems;
- To accommodate planned growth within the community,
- To ensure system performance and efficiency within the servicing systems is maintained, and
- To comply with existing legal and regulatory requirements.

In 2019, the City engaged external consultants to develop a new water and wastewater long-range financial plan. The goal of this plan was to provide the City with a realistic and informed view of the water and wastewater operating and capital expenditures needed over time to maintain the integrity and health of its physical infrastructure and to accommodate growth and new environmental standards. To ensure affordability, the consultants recommended a phase-in strategy of 20 years for capital contributions to move toward the recommended annual replacement funding requirements. Annual rate increases of 4.6 percent for wastewater that were introduced in the 2020 budget flowed from this strategy.

Observations

This audit determined that the 20-year phase in strategy that was recommended within the 2019 water and wastewater long-range financial plan places insufficient emphasis on the risks of asset failure and ignores significant capacity limitations within some of the City's treatment plants. As a result, a number of upgrades to treatment plants and lift stations that have higher risks of failure and were recommended in the 2017 master plan have been deferred.

Recommendation

Update the water and wastewater long-range financial plan in 2024 to ensure it incorporates sound asset management and risk management practices and recommends sufficient funding to maintain and, where necessary, expand the capacity of the wastewater assets.

Management Response and Action Plan

The Long-Range Financial Plan is scheduled to be updated in 2024. Even though the current plan is following a 20-year timeframe, by Ontario Regulation the plan has to be updated no less frequently than every 5 years as part of the drinking water license renewal process. This 5-year renewal period may see a change in forecasted rates and, if necessary, an appropriate recommendation for a rate change to Council will be made at that time. Two factors that will have a major impact on the financial plan will be the implementation of the Advanced Meter Infrastructure (AMI) and the work of the Inflow and Infiltration (I&I) Task Force.

The AMI portion is significant and as of mid-2022, we will have a more accurate value of water consumption and available funding. The Infiltration and Inflow (I&I) task force is now gaining momentum and have started formulating design plans and producing recommendations which will assist in Council's intent of minimizing the impact of peak weather flow on our Wastewater systems. The data collected between now and 2024 will provide an update to our risk assessments and have an impact on capital allocation that may differ from recommendations in the 2017 Master Plan (MP) by directing funds towards maximizing reduction of I&I thereby minimizing the more costly option of expanding facilities.

B. Asset Management

Regulation 588/17 requires municipalities to develop Asset Management Plans (AMPs) for their infrastructure assets, to manage their life cycle costs and to communicate the service levels for these assets to residents. In April 2018, staff presented an Enterprise Asset Management Policy to, among other things:

- Establish full life-cycle costing principles aligned with asset management strategies that minimize ownership costs over the asset's service life;
- Maintain assets in order to deliver defined levels of service that meet legislative requirements and customer expectations;
- Establish risk management strategies to support service delivery at expected levels of service;
- Maintain a system of performance monitoring and reporting on asset level of service and the impacts of potential changes in policy, levels of service or risk;
- Maintain assets to protect the safety of the public and health & safety of our employees; and
- Establish clear and continuous connections to the long-term financial plan and related financial policies.

Observations:

In 2016, an infrastructure backlog of \$882 million was identified in the Water/Wastewater division that needed to be addressed by 2026. Since then, the City has spent less than 5% of that amount on capital upgrades to the wastewater treatment plants and lift stations to improve their reliability and efficiency. Table 3 summarizes the status of the upgrades to wastewater assets with higher risks of failure that were identified within the 2017 water and wastewater master plan.

Recommendations

1. In the short-run, introduce or expand cost effective infiltration and inflow control programs within communities where insufficient capacity exists to treat peak flows; and
2. Update the water and wastewater long-range financial plan in 2024 to address the updated condition assessments and any significant risks of failure identified within the asset management plans for the wastewater assets.

Management Response and Action Plan:

The expansion of the I&I program with the deliberate attempt of focusing capital funding on minimizing system leaks into the collection system will require constant adjustment and updates of any risk assessments conducted, including those identified in the 2017 Master Plan (MP) that have not yet had capital funding allocated. Our intent is to use this process to ensure capital is allocated to areas determined critical through the ongoing updates to the condition and risk assessments completed during the asset management planning process rather than relying on old data from the 2017 MP.

C. Overall Management

Management currently monitors and reports on the following performance measures within the annual budget package:

- Cost per Megalitre Treated in 2019: \$ 259.47
- Cost of Energy in 2019: \$2 million/annually
- Cost of Chemicals in 2019: \$600,000/annually
- Number of Wastewater Regulatory Non-Compliance events in 2019: zero

Management also participates within annual benchmarking exercises such as the BMA municipal study and the National Benchmarking Index study for Water/Wastewater but does not disclose relevant performance measures from these studies in the annual budget package.

Recommendation

To provide more insights on wastewater services operations, provide additional performance measures in the annual budget package from the BMA and National Benchmarking studies.

Management Response and Action Plan:

Staff will expand annual reporting to include the recommended performance measures. In addition to the BMA performance measures that provide municipal averages, staff will make an effort to compare the City to municipalities with similar processes and magnitude of infrastructure. The number of facilities over the broad square area of coverage continues to create a disproportionate factor when comparing to other municipal benchmarks. Additionally some of our costs also include the treatment of a Class A Biosolids facility, which may not be the case with a number of the municipalities in the BMA study.

D. Operational Improvements

During the audit, we noted that management has made significant strides in recent years to improve the operational efficiency of the wastewater treatment plants and reliability of the sewage lift stations. Management has achieved approximately \$1 million of cost avoidance since 2017 by participating in the Independent Electricity System Operator of Ontario Industrial Conservation Initiative. Annual energy savings of over \$200,000 have also been achieved by implementing an aeration tank cleaning program at the Sudbury and Walden treatment plants. The reliability of lift stations has also been improved by implementing a preventative maintenance program and replacing outdated equipment. Finally, by increasing employee engagement and enhancing safety training and equipment, management has achieved zero lost time injuries in the last two years.

Management Response

The improvements listed above are all due to active engagement in benchmarking groups and conferences where staff can learn new ideas and implement what works in Sudbury. Additionally the implementation of a reasonably solid planned maintenance program has paid dividends in Wastewater Treatment as our corrective maintenance has been minimized and the longevity of equipment has been maximized.

E. Risk Management

Risks are uncertain events which can be measured by calculating the product of the likelihood and impact of these events. Risks can be mitigated by applying controls related to the acquisition and application of human and contract resources; implementation of formal procedures; acquisition and utilization of plant, equipment and tools; collection and utilization of relevant information or the acquisition of insurance. Tables 1 and 2 on the next page identify the significant risks associated with the City's Wastewater Services Section.

Observations:

Management has taken steps to mitigate significant risks within the Wastewater Services Section.

Recommendation:

Management should take steps to further mitigate residual risks that are above 10.

Management Responses on Significant Risks:

F1/O1 are being addressed by continuing to complete the facility assessments in order to be compliant with the provincial mandate of recognizing assets as part of the overall asset management plan. This will give us a clear picture of the state of the assets and allow us to develop a plan to prioritize capital spending over a 5-year period (subject to updates as per management responses as noted above).

F3 will be considered at least every 5 years and an appropriate adjustment will be recommended to Council if required.

O3 is mitigated by our upgrade of high-risk facilities from a capital perspective but also by maintaining a robust emergency response by our crews during periods of asset failures/peak flow during weather events.

F2/O2 are addressed by Wastewater Treatments continuous improvement program where analysis of data is conducted and any recommendations for an increase in efficiency is implemented. It should be noted that the funding allocated to O and M has minimally increased over the past 5 years despite disproportionate cost increases in labour, energy, chemicals and materials.

O4 has been designated a high inherent risk, but field data indicates this risk can be effectively mitigated. Wastewater Treatment has seen "0" Loss Time Injuries over the last 2 years due in large part to the serious manner in which we administer both our employee engagement as well as the robustness of our health and safety program.

L1 is mitigated by our Compliance section which oversees and proactively recommends solutions regarding all legal and regulatory parameters for wastewater.

R1 takes into account the process of our Standard Operating Procedures for which all staff are regularly trained. These SOP's serve to minimize situations that may damage the City's reputation.

F4 indicates that all purchases, tenders and RFPs made by wastewater staff adhered to the Purchasing By-law.

Table 1 – Summary of Significant Risks

Risk	Total No. of Risks	Risks (Before Controls)			Residual Risks (After Controls)		
		High (15 to 25)	Med (9 to 14.99)	Low (1 to 8.99)	High (15 to 25)	Med (9 to 14.99)	Low (1 to 8.99)
Reputation (R)	1	1	0	0	0	0	1
Operational (O)	4	4	0	0	0	4	0
Financial (F)	4	4	0	0	0	3	1
Legal (L)	1	1	0	0	0	0	1
TOTAL	10	10	0	0	0	7	3

Table 2 – Significant Risks

Type of Risk	Description of Risk	Risk Before Controls	Residual Risk*
F3	User fees may be insufficient to maintain and, where necessary, expand the capacity of the wastewater assets.	20	13.5
F1/O1	Wastewater assets may not be maintained in accordance with the City's enterprise asset management policy and enterprise risk management policy.	20	13.5
O3	Asset failures may cause damages to private properties.	17.5	11
F2/O2	Wastewater assets may not be operated with due regard for efficiency.	17.5	10
O4	Injuries may arise from failure to follow health and safety practices.	17.5	10
L1	Legal and regulatory obligations may not be managed effectively.	20	8
R1	Issues may arise which could damage the City's reputation.	16	8
F4	Purchases may not be made in accordance with the City's Purchasing By-law.	16	8

* Eliminating residual risks (risks after controls) is not cost-effective.

Table 3 - Status of the Higher-Risk Wastewater Assets Identified in 2017 Master Plan

Lift Station (LS) or Plant (WWTP)	Capital Upgrades Recommended and Status Comments	Upgrade Complete	Upgrade In Progress	Plan In Progress	Study Under Way
Nickel LS	This was a capital project that was completed successfully. We have increased pumping capacity by upgrading pumps. In addition, we have upgraded electrical and mechanical systems and built a new forcemain from Copper Cliff to Sudbury WWTP.	X			
Valley East WWTP	Implement I&I program. As part of the capital needs study and through capital program, we have addressed risks related to sludge handling by building a sludge handling unit operation. We are in the process of upgrading the aeration system. The design is complete and ready for tender.		X	X	
St. Charles LS	Construct new LS. We have completed the first phase of moving the museum buildings from the existing lift stations site to O'Conner park. The detail design for the lift station is complete and ready for tender. We are waiting for property acquisition to proceed with construction.			X	
Jacob LS	Upgrade then expand. We have completed the first phase of upgrades that included new larger pumps and a new standby power unit with electrical upgrades. The lift station has enough capacity to handle existing flows and we will be looking at adding additional pumping capacity as Walden WWWWTP is upgraded and ready to receive additional flows. We are taking a phased approach for infrastructure upgrades in Lively/Walden.	Phase 1 X			
Sudbury WWTP	Minor upgrades. As part of capital program, we are in the process of upgrading the electrical system by building a new generator capable of providing enough power to run the plant during periods of peak flow and also meet the environmental requirements for running a standby power unit for continued involvement in our peak power program/energy savings. We have recently completed the upgrades to the aeration system by installing a new blower (2 now) and we have completed electrical upgrades for our large lift station pumps. We have also completed concrete work on the deck of the main structure to prevent continued rain and melt water from leaking inside the building process structure area. Future phases of upgrades will be assessed on a regular basis.	X	X	X	
Chelmsford WWTP	Minor upgrades. UV disinfection units, new blowers and new aeration diffusers were installed. We will be reevaluating the needs for upgrades in the future as the flows changes over time.	X			
Lively WWTP	Decommission once EA process for Walden/Lively is complete and work at Walden WWWWTP commences.			X	
Lagace LS	Assess condition. This lift station requires assessment due to the manner in which the discharge is connected to the existing force main from St. Charles. Once St. Charles is reconfigured, a solution for Lagace will have to be determined. The station itself is in good working condition.			X	

Lift Station (LS) or Plant (WWTP)	Capital Upgrades Recommended and Status Comments	Upgrade Complete	Upgrade In Progress	Plan In Progress	Study Under Way
Capreol Lagoon	Upgrade for compliance. To comply with regulations, we have completed detail design and are in the procurement process for construction. The work should be completed by end of next year.			X	
Jeanne D'Arc LS	Implement I&I program; new pumps installed in 2015	X		X	
Anderson LS	Decommission if Walden plant upgraded.			X	
Riverside LS	Upgrade pumps & Implement I&I program.			X	
Walden WWTP	Expand treatment capacity following Environmental Assessment				X
Azilda WWTP	Upgrade LS, implement I&I program and re-evaluate the need for storage tanks for peak flows. We have completed process upgrades in recent years and we have planned a second phase of upgrades to the electrical system and the building. The detail design is already complete and ready for tender once additional funding is approved for 2021.	X		X	
Coniston WWTP	Assess condition. We are doing condition assessment and process performance for the plant. We will be engaging in implementing the recommendations once the work is complete.			X	
Levack WWTP	Assess condition. Completed condition assessment this year and will be implementing recommendations for the first phase of capital needs once additional funding is approved.			X	
Dowling WWTP	Assess condition. Completed condition assessment this year and will be implementing recommendations for the first phase of capital needs once additional funding is approved.			X	
Levesque LS	Upgrade LS. Design complete, RFP awarded and the lift station upgrades are currently underway.		X		
Walford LS	Upgrade LS. Upgrade complete including new pumps, standby power and electrical upgrades.	X			

Appendix 1 – Risk Assessment Criteria

Impact	Services	Technology	People	Strategic	Legal/Reputational	Financial
Very Minor (1)	<ul style="list-style-type: none"> Less than 90% of service objectives achieved. 	<ul style="list-style-type: none"> Minor disruptions of secondary systems or data loss or corruption. 	<ul style="list-style-type: none"> Minor reportable employee injury. Increase in number of union grievances. 	<ul style="list-style-type: none"> Minor instances of actions that are at odds with strategic priorities. 	<ul style="list-style-type: none"> Small amount of negative media coverage or complaints to City. Non-lasting damage or no reputational damage Theft or Fraud under \$1,000. 	<ul style="list-style-type: none"> Uninsured loss, cost overruns or fines < \$10K Insured loss < \$100K Loss of replaceable asset.
Minor (2)	<ul style="list-style-type: none"> Less than 75% of service objectives achieved. Unable to perform non-essential service. 	<ul style="list-style-type: none"> Disruptions of systems or data loss or corruption Disclosure of non-confidential but embarrassing information. 	<ul style="list-style-type: none"> Reportable employee injury. Loss of key staff but able to recruit competent replacements Significant increase (>10%) in number of union grievances. 	<ul style="list-style-type: none"> Instances of actions at odds with strategic priorities. 	<ul style="list-style-type: none"> Complaints elevated to the Director level. Short-term repairable damage to City's reputation Public outcry for discipline of employee. Moderate amount of negative media coverage Theft or Fraud of \$1,000 to \$10,000. 	<ul style="list-style-type: none"> Uninsured loss, cost overruns or fines of \$10K to \$100K Insured loss < \$100K - \$1M Inefficient processes City's actions result in reduced economic development.
Moderate (3)	<ul style="list-style-type: none"> Less than 60% of service objectives achieved. Unable to perform essential service but alternatives exist. 	<ul style="list-style-type: none"> Disruptions of significant systems or data loss or corruption Recoverable loss from important system. 	<ul style="list-style-type: none"> Multiple employee injuries or long-term disability from one incident. Inability to retain or attract competent staff. Increase in stress leave, sick leave or WCB claims. Work-to-rule union disagreement or short-term strike. 	<ul style="list-style-type: none"> Numerous actions are at odds with strategic priorities. 	<ul style="list-style-type: none"> Public/media outcry for removal of management Long-term damage to City's reputation Citizen satisfaction survey indicates unacceptable performance. Complaints elevated to Council level. Results inconsistent with commitments made to citizens Theft or Fraud under \$100,000. 	<ul style="list-style-type: none"> Uninsured loss, cost overruns or fines of >\$100K to \$1M Insured loss >\$1M to \$10M Having to delay payments to contractors/suppliers. >20% current demands cannot be services with existing and approved infrastructure. City's actions results in lost revenue for significant number of City businesses.

Impact	Services	Technology	People	Strategic	Legal/Reputational	Financial
Major (4)	<ul style="list-style-type: none"> Less than 45% of service objectives achieved. Unable to perform an essential service where no alternative exists. 	<ul style="list-style-type: none"> Unrecoverable loss of information from important system. External exposure of important information Unavailability of significant systems or data loss or corruption. 	<ul style="list-style-type: none"> Serious injury of one or more employees Legal judgment against the City in workplace matter. Turnover of key employees Sustained strike of services. 	<ul style="list-style-type: none"> Numerous actions are significantly at odds with the strategic priorities. 	<ul style="list-style-type: none"> Public/media outcry for change in CAO or Council Public or senior officials charged or convicted Legal judgment against the City in a workplace matter Integrity breach resulting in decreased trust in City Council or Administration. Theft or Fraud >\$100,000 	<ul style="list-style-type: none"> Uninsured loss, cost overruns or fines of >\$1M - \$10M Insured loss of >\$10M - \$100M Unable to pay employees and contractors on a time. Failure to maintain financial capacity to support current demands. City's actions impair local economic conditions.
Extreme (5)	<ul style="list-style-type: none"> Less than 30% of service objectives achieved. Unable to perform several essential services where no alternatives exist. 	<ul style="list-style-type: none"> Unrecoverable loss of information from critical system. External exposure of confidential information Unavailability of critical systems or data loss or corruption. 	<ul style="list-style-type: none"> Death of an employee Major legal judgment against the City in workplace matter. Significant turnover of key employees with ELT Sustained strike of key services 	<ul style="list-style-type: none"> Many actions are significantly at odds with the strategic priorities. 	<ul style="list-style-type: none"> Public/media outcry for change in CAO or Council Senior officials criminally charged or convicted Severe legal judgment against the City in a workplace matter Major integrity breach resulting in complete loss of trust in City Council or Administration. Theft/Fraud >\$1,000,000 	<ul style="list-style-type: none"> Uninsured loss, cost overruns or fines >\$10M Insured loss > \$100M File for bankruptcy Failure to maintain financial capacity to support current demands. City's actions significantly impair local economic conditions.

Likelihood	Unlikely (1)	Possible (2)	Probable (3)	Likely (4)	Very Likely (5)
	Less than 20%	>20% but < 40%	>40% but < 60%	>60% but < 80%	80% or more
	Less frequent than every 10 years	May occur in the next 2 years	Will occur this year or next year at least once	May occur regularly this year	Will occur within months may reoccur often