



**Utilities Kingston
Report to Council
Report Number 24-080**

To: Mayor and Members of Council
From: David Fell, President & CEO, Utilities Kingston
Resource Staff: Heather Roberts, Director, Water & Wastewater Services
Date of Meeting: February 20, 2024
Subject: 2023 Water System Annual Summary Reports and 2023
Wastewater Annual Reports

Council Strategic Plan Alignment:

Theme: Regulatory & compliance

Executive Summary:

This report provides Council with copies of the Annual Water Summary Reports and Annual Wastewater Reports for the following Water and Wastewater Treatment Facilities and Systems owned by the City of Kingston, and managed, operated, and maintained by Utilities Kingston:

- King Street Water Treatment Plant
- Point Pleasant Water Treatment Plant
- Cana Water Treatment Plant
- Ravensview Wastewater Treatment Plant
- Cataraqui Bay Wastewater Treatment Plant
- Cana Wastewater Treatment Plant
- Kingston Wastewater Collection System

It is a requirement of the [Safe Drinking Water Act, 2002](#) that Council formally receive the Annual Summary Reports for each of the Water Treatment Facilities. The Annual Reports for the Wastewater Treatment Facilities and System are provided for information purposes to Council and require no action. All reports are provided to the Ministry of the Environment, Conservation and Parks.

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Recommendation:

That Council receive the 2023 Annual Water Summary Reports for the King Street Water Treatment Plant, the Point Pleasant Water Treatment Plant and the Cana Water Treatment Plant as required by the terms and conditions outlined in Schedule 22 of Ontario Regulation 170/03 for Drinking Water Systems.

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Authorizing Signatures:

ORIGINAL SIGNED BY PRESIDENT

& CEO, UTILITIES KINGSTON

**David Fell, President & CEO,
Utilities Kingston**

ORIGINAL SIGNED BY CHIEF

ADMINISTRATIVE OFFICER

**Lanie Hurdle, Chief
Administrative Officer**

Consultation with the following Members of the Corporate Management Team:

| | |
|--|--------------|
| Paige Agnew, Commissioner, Growth & Development Services | Not required |
| Jennifer Campbell, Commissioner, Community Services | Not required |
| Neil Carbone, Commissioner, Corporate Services | Not required |
| Peter Huigenbos, Commissioner, Major Projects & Strategic Initiatives | Not required |
| Brad Joyce, Commissioner, Infrastructure, Transportation & Emergency Services | Not required |
| Desirée Kennedy, Chief Financial Officer & City Treasurer | Not required |

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Options/Discussion:**Annual Water Summary Reports**

The Annual Water Summary Reports are a statement to satisfy compliance with the terms and conditions of Schedule 22 of [Ontario Regulation 170/03 for Drinking Water Systems](#). There is a compliance report for each water treatment plant. The purpose of this covering report is to provide details related to compliance with the Drinking Water Works Permit (DWWP) and the Municipal Drinking Water License (MDWL). These reports are Exhibits A, B and C, attached to this covering report.

The terms and conditions of the DWWP and MDWL are located under the “Compliance” section of the annual summary reports. The compliance section in each report summarizes the activities of the licensed water system operations as they relate to the water quality parameters outlined within the drinking water regulations.

The reports also summarize specific instances of non-compliance and adverse water quality during the 2023 reporting period which are summarized below.

King Street Water Treatment Plant

There were no instances of non-compliance with the terms and conditions of the Drinking Water Works Permit (DWWP) or the Municipal Drinking Water Licenses (MDWL) during the 2023 reporting year.

There were two (2) notifications of adverse water quality reported to the Spills Action Centre and to the Environmental Health Division of the local Ministry of Health during the 2023 reporting period.

1. **June 15, 2023:** Notification for total coliform bacteria with a count of 1 cfu/100mL. Free chlorine residuals at the time of sampling were 2.16 mg/L. Subsequent resampling and testing was undertaken from the same location, upstream and downstream and sent to the lab for analysis. No adverse conditions/results were detected in these samples. With the free chlorine residual present in the original sample and the subsequent resamples not indicating any adverse conditions, a contaminated sample bottle or sampling error is suspected.
2. **July 14, 2023:** Notification for total coliform bacteria with a count of 1 cfu/100mL. Free chlorine residuals at the time of sampling were 1.31 mg/L. Subsequent resampling and testing was undertaken from the same location, upstream and downstream and sent to the lab for analysis. No adverse conditions/results were detected in these samples. With the free chlorine residual present in the original sample and the subsequent resamples not indicating any adverse conditions, a contaminated sample bottle or sampling error is suspected. A free chlorine level lower than 0.05 mg/L must be reported and corrective action taken.

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For context and comparison with the free chlorine residuals noted at the time of the events listed above, a free chlorine level lower than 0.05 mg/L must be reported and corrective action taken.

Point Pleasant Water Treatment Plant

There were no instances of non-compliance with the terms and conditions of the DWWP or the MDWL during the 2023 reporting period, or any adverse sampling results.

Cana Water Treatment and Supply System

There were no instances of non-compliance with the terms and conditions of the DWWP or the MDWL during the 2023 reporting period, or any adverse sampling results.

However, it should be noted that the groundwater supply for the Cana Water Treatment Plant contains a sodium concentration greater than 20 mg/L which requires a notification to the Medical Officer of Health and to the Spills Action Center if a report under subsection 18 (1) of the Safe Drinking Water Act has not been made in respect of sodium in the preceding 57 months. This notification was last completed in July of 2022.

Wastewater Annual Reports

Annual reports for the wastewater facilities and system are a requirement identified in the terms and conditions of the environmental approvals for each treatment facility and the wastewater collection system. The annual reports are required to be submitted to the Ministry of the Environment, Conservation and Parks (MECP) by March 31, 2024. Although the regulation does not compel the Operating Authority to provide the reports to Council to be formally received, Utilities Kingston provides them annually for information purposes. The reports provide a summary of the operations for the previous year at Ravensview, Cataraqui Bay and Cana Wastewater Treatment Plants, and for the Kingston Wastewater Collection System.

As identified last year to Council in the [2022 Water System Annual Summary Reports and 2022 Wastewater Annual Reports report](#), a new Consolidated Linear Infrastructure Environmental Compliance Approval (ECA) for the City's wastewater collection system was approved by the MECP in 2022. As a result, the previous annual report titled River Street Pumping Station and Orchard Street and Collingwood Street Combined Sewer Overflows is now consolidated into a single report for the entire Kingston Wastewater Collection System. Also, to note, in previous years overflows in the wastewater collection system were reported in the Annual Reports for facilities. Those details are also now provided in the Kingston Wastewater Collection System Annual Report.

Information for this annual report is still being compiled but will be finalized to meet the regulatory due date of March 31, 2024. A draft version of the report is attached as Exhibit G.

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Ravensview Wastewater Treatment Plant

In 2023, the Ravensview WWTP was in compliance with all of the conditions outlined in Condition 7 of the Certificate of Approval issued for the plant.

Average flows through the plant were recorded at 61,303 m³/day, lower than the 2022 flows recorded at 68,505 m³/day.

There were three (3) secondary bypass events during 2023, causing 3,043 m³ of sewage to be released to the environment.

In the 2023 reporting year, the Ravensview WWTP received one (1) complaint regarding odours from the facility. Staff investigated and no odours were observed at the time of the complaint, however, efforts were made to change some maintenance procedures to reduce the potential for odours. There were no additional odour complaints.

Cataraqui Bay Wastewater Treatment Plant

In October 2023, there was one non-compliant condition reported. The average monthly concentration of Total Phosphorus was 1.07 mg/L, exceeding the limit of 1.00 mg/L as per the ECA. This non-compliant result was reported to the MECP. No actions or directives were provided by the MECP.

No other parameters exceeded the compliance limit as outlined in the Certificate of Approval issued for the plant. However, the following parameters were above the objective concentrations:

- In July 2023, the E.Coli concentration in the final effluent was 109 cfu/100mL, exceeding the objective concentration of 100 cfu/100mL but remained below the compliance limit of 200 cfu/100mL.
- The annual average monthly concentration of Total Suspended Solids (TSS) in the final effluent was 18.88 mg/L, exceeding the objective concentration of 15.00 mg/L, but remained below the compliance limit of 25.00 mg/L.

No other parameters were above objective limits as outlined in the Certificate of Approval issued for the plant.

The non-compliant and elevated concentrations are indicative of the new treatment processes, and the challenges to synchronize processes to achieve optimal operations. Advancements to optimize processes and correct deficiencies have already been made, and a consultant has been retained to assist to improve the quality of the effluent from the plant.

Average flows through the plant were recorded at 28,740 m³/day, lower than the 2022 flows recorded at 29,381 m³/day.

There were no bypasses at the Cataraqui Bay WWTP in 2023.

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In the 2023 reporting year, the Cataraqui Bay WWTP received no official complaints regarding the facility or treatment process.

Cana Wastewater Treatment Plant

In February 2023, there was one non-compliant condition reported. The average monthly concentration of Total Phosphorus was 0.22 mg/L, exceeding the limit of 0.20 mg/L as per the ECA. This non-compliant result was reported to the MECP. No actions or directives were provided by the MECP.

In addition, there were several months where the Total Suspended Solids, and Total Phosphorous exceeded the monthly objectives, but were below the compliance limit. Staff were able to reduce the effluent concentrations of Total Suspended Solids and Total Phosphorous and have confidence that improvements will be sustained in 2024.

No other parameters were above compliance or objective limits as outlined in the Certificate of Approval issued for the plant.

Average flows through the plant were recorded at 62.7 m³/day, the same as the 2022 flows.

There were no bypasses at the Cana WWTP in 2023.

In the 2023 reporting year, the Cana WWTP received no official complaints regarding the facility or treatment process.

Kingston Wastewater Collection System

Certain information to complete the Annual Report for the Kingston Wastewater Collection System is still being compiled. The draft report is attached as Exhibit G to provide the information that is currently available. A complete final Annual Report will be submitted to the MECP by March 31, 2024, and a final version will be available on Utilities Kingston's website.

In 2023, the west collection system collected and conveyed 10,478,205 m³ of wastewater to the Cataraqui Bay WWTP. The Central and East Collection system collected and conveyed 22,375,448 m³ of wastewater to the Ravensview WWTP. The Cana Collection system received and moved 22,841 m³ of wastewater to the Cana WWTP.

The collection system had several wet weather overflow events which released a total of 6,134.82 m³ of sewage to the environment. The collection system had four spills to the environment from pumping stations due to equipment malfunctions totaling 904.4 m³. The overflow and spill locations are provided in Exhibit G. The number of wet weather overflow events and volume of diluted sewage released to the environment in 2023 was less than the number of events and volume reported in 2022. This is due to less severe wet weather events, one combined sewer separation project on Gore Street that also saw the removal of a pollution control point, and past efforts of separation projects. There are two large separation projects planned for 2024 and 2025.

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In the 2023 reporting year, several complaints were received, investigated, and resolved.

There were nine (9) odour complaints connected to the new construction of the Days Road pumping station. These complaints spanned from June to October. Operations staff investigated the complaints and inspected the odour control unit at the facility regularly to ensure it was functioning and being properly maintained. Additional filters are readily available for the odour control unit, and staff continue to monitor the system.

There were seven (7) odour complaints associated with sanitary sewer maintenance holes. Staff responded and investigated all of these complaints. Response and resolution to these complaints included, inspecting infrastructure upstream and downstream of the complaint, installing certain equipment in the maintenance holes to reduce the chance of sewer gasses being released, jetting and cleaning pipes, and inspecting lines with a camera.

Staff responded to fifty-one (51) complaints about lateral and main collection system backups. Operations staff worked with property owners and/or tenants at each site to locate and confirm the source of the backup. Obstructions from materials that should not have been flushed or present into the system, impacted tree roots on pipes, and deformed/degraded pipes were the typical causes. Seventeen (17) of the fifty-one (51) complaints were related to private infrastructure, meaning the portion of the pipe and/or issue was located on private property and the responsible of the home or business owner. Staff responded to relieve backups using different methods, such as rodding lines, camera work to identify locations and used jet trucks to flush materials and blockages.

Public Engagement

In accordance with Schedule 22 of Ontario Regulation 170/03 for Drinking Water Systems, the 2023 annual drinking water quality reports will be available and posted to the Utilities Kingston website. For example, and reference, the 2022 annual reports can be viewed [here](#). Appropriate public notice will be provided in the form of a public news release and on social media. Reports are also available in hard copy at the request of a member of the public.

The Annual Wastewater Reports will be available and posted to the Utilities Kingston website. For example, and reference, the 2022 annual reports can be viewed [here](#).

Existing Policy/By-Law

The Annual Water Summary Reports are a statement to satisfy compliance with the terms and conditions of Schedule 22 of [Ontario Regulation 170/03 for Drinking Water Systems](#), a regulation under the [Safe Drinking Water Act, 2002](#).

As per the Environmental Compliance Approvals, the Annual Reports for the Wastewater Facilities and System are required to be submitted to the MECP by March 31 of each year.

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Notice Provisions

Notice to the public on the completion and availability of the annual drinking water reports is required and will be provided by the end of February.

Financial Considerations

None

Contacts:

Heather Roberts, Director, Water and Wastewater Services, 613-546-1181 extension 2400

Other City of Kingston Staff Consulted:

Julie Runions, Manager, Water and Wastewater Treatment Operations

James Patenaude, Supervisor, Water and Wastewater Treatment Operations

Exhibits Attached:

Exhibit A – King Street Water Treatment Plant, Annual Summary Report 2023

Exhibit B – Point Pleasant Water Treatment Plant, Annual Summary Report 2023

Exhibit C – Cana Water Treatment Plant, Annual Summary Report 2023

Exhibit D – Ravensview Wastewater Treatment Plant, Annual Report 2023

Exhibit E – Cataraqui Bay Wastewater Treatment Plant, Annual Report 2023

Exhibit F – Cana Wastewater Treatment Plant, Annual Report 2023

Exhibit G – Draft Kingston Wastewater Collection System, Annual Report 2023



KING STREET WATER TREATMENT PLANT 2023 ANNUAL SUMMARY REPORT

Drinking Water System Number: 220001860
Drinking Water System Owner: City of Kingston
Drinking Water System Category: Large Municipal Residential

Submitted by:
David Fell
President & C.E.O.

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1 INTRODUCTION

This report has been prepared as required under Ontario Regulation 170/03 of the Safe Drinking Water Act (SDWA) to acknowledge compliance with the terms and conditions of the Drinking Water Works Permit (DWWP) and Municipal Drinking Water License (MDWL) issued for the King Street Water Treatment Plant, comment on any incidents of non-compliance during the reporting period, summarize the quantities of the water supplied, and compare those quantities to the rated capacity and flow rates as set out in the system's permit and MDWL during the reporting period.

This report is specific to the King Street Water Treatment Plant located at 302 King Street West, in the City of Kingston and its associated distribution system, which serves Kingston's municipal water customers in the areas North to Cataraqui Arena, Hwy#2 west to Westbrook, Bath Road to Coronation Blvd, south of Hwy #401, Hwy#2 east to Milton subdivision, and Hwy #15 north to the St. Lawrence Business Park known as the Kingston Drinking Water System.

The Kingston Drinking Water System receives water from both the King Street Water Treatment Plant and the Point Pleasant Water Treatment Plant. The Water Treatment Plants and its associated distribution system are owned by the City of Kingston, with Utilities Kingston acting as the operating authority.

2 NON COMPLIANCE

There were no issues of non-compliance with the terms and conditions of the DWWP or MDWL during this reporting period.

3 COMPLIANCE

The Treatment Operations department of Utilities Kingston, for the City of Kingston, operates and maintains the King Street Water Treatment Plant (WTP) and complies with the terms and conditions of the Drinking Water Works Permit (DWWP) and Municipal Drinking Water License (MDWL) issued for the WTP. The Utilities Kingston Systems Operations department and the Treatment Operations department of Utilities Kingston operate and maintain the associated distribution system and storage and pumping facilities. Staffing is maintained at levels to ensure adequate numbers of trained and licensed personnel are available for proper operations during emergency or upset conditions, vacation/sick relief, or to deal with equipment breakdown.

Quality management systems (QMS), contingency plans, and operations manuals are established and are located in the appropriate facilities and available to appropriate staff.

A QMS for the City of Kingston's drinking water supply systems has been developed and implemented by Utilities Kingston management and staff to ensure the continued safety and security of the community's drinking water by meeting or exceeding the requirements of all relevant legislation and regulations, and the Drinking Water Quality Management Standard (DWQMS).

Operations manuals include information necessary for the day-to-day operations and maintenance of the WTP and distribution system as well as information that may not be regularly used but that might be required to be accessed quickly for various purposes. Contingency plans include information that may be required for proper operation of the WTP or distribution system during emergency or upset conditions and contain items such as emergency plans and contact lists, alternate materials supply sources and notification lists.

The operations strategy of Utilities Kingston includes ensuring that permits, approvals, and licenses are in place, that efficient maintenance and operations ensures the quality of water supplied to its customers meets or exceeds the minimum requirements as set out in the SDWA, and that permissible flow rates are not exceeded. The City of Kingston, as a means of source water protection, considers the impact of decisions made within its authority on the drinking water supply source for the WTP.

Flow measuring devices for measuring the amount of water taken from Lake Ontario, and the amount of water supplied to the distribution system are calibrated annually by a third party. Accuracy in these measurements ensures that treatment chemicals are precisely applied and that flows do not exceed the capacity at which the WTP is designed to be effective. These flows are recorded to provide current and historical information which is used for operational decision making and to allow both the public and the Ministry of the Environment, Conservation and Parks (MECP) the ability to review WTP operations.

Water quality analyzers that monitor parameters such as chlorine residual and turbidity of critical process streams and water directed to the distribution system are alarm equipped and are maintained in accordance with the manufacturer's recommendations as well as the conditions of the DWWP/MDWL.

Water sampling is conducted to a level that exceeds the minimum requirements of schedule 13 of Ontario Regulation 170/03 of the Safe Drinking Water Act, and includes additional sampling as well as sampling recommended in the first Engineers Report for the WTP. Raw water sampling is conducted to give operational staff information required to determine the level of treatment required to make the water potable. In-plant process stream samples provide monitoring of treatment processes. Treated and distribution system sampling provides information regarding the quality of water delivered to customers. All of these samples are analyzed by either licensed staff or by laboratories accredited by the Standards Council of Canada through the Canadian Association for Environmental Analytical Laboratories.

All sampling information, annual reports and all other documentation required by the DWWP, and regulations are available for public viewing at the WTP during normal business hours. Annual Reports are also available on the Utilities Kingston website as well as at the Utilities Kingston and City of Kingston offices. Residents of the City of Kingston are encouraged to review this information, the availability of which is advertised through various local media.

4 NOTIFICATIONS

Under Ontario Regulation 170/03, notifications were required for any instances where a sample result indicated that a parameter used to measure water quality exceeded a Maximum Acceptable Concentration (MAC). Once a notification is received from a laboratory or an observation of any other indicator of adverse water quality is made by operations personnel, corrective action as dictated by the regulations is initiated in an effort to confirm the initial result. If confirmed, further action may be recommended by the Medical Officer of Health (MOH). If not confirmed, sampling will typically return to the normal schedule or depending on the parameter, Utilities Kingston may choose to increase the sampling frequency to monitor the parameter more closely for a period of time. The details of any events requiring notifications are listed below.

4.1 EVENTS REQUIRING NOTIFICATIONS

- Notification of an indicator of adverse water quality was received from Caduceon Environmental Laboratories regarding a sample collected on **June 15th** for Total Coliform (TC) with a count of **1 cfu/100mL**. Free chlorine residual at the time of sampling was **2.16 mg/L**. Notifications were made to the Spills Action Centre and to the Environmental Health Division of the local Ministry of Health. Resamples were collected from the same location, upstream and downstream and sent to the lab for analysis. With the free chlorine residual present in the original sample and the subsequent re-samples not indicating any adverse conditions, a contaminated sample bottle or sampling error is suspected.

DOCUMENT:

King Street Water Treatment Plant Annual Summary Report

- Notification of an indicator of adverse water quality was received from Caduceon Environmental Laboratories regarding a sample collected on **July 14th** for Total Coliform (TC) with a count of **1 cfu/100mL**. Free chlorine residual at the time of sampling was **1.31 mg/L**. Notifications were made to the Spills Action Centre and to the Environmental Health Division of the local Ministry of Health. Resamples were collected from the same location, upstream and downstream and sent to the lab for analysis. With the free chlorine residual present in the original sample and the subsequent re-samples not indicating any adverse conditions, a contaminated sample bottle or sampling error is suspected.

5 QUANTITY OF WATER SUPPLIED

Listed in Tables 3 and 4 following this report are the treated water flows for the King Street Water Treatment Plant. The serviced population for the King Street WTP and Point Pleasant WTP is 132,485 (population from Census data for 2021). The annual average daily use was 22,158 m³/day from the Point Pleasant WTP and 44,427 m³/day from the King Street WTP. Total average per capita use was calculated at 503 litres per person/day. The metered residential use for 2023 is currently pending. The typical Canadian average is 250-350 litres per person/day residential use (source: Environment Canada). The City has imposed limitations or restrictions on water use when necessary. System losses through leakage, mainly due to the age of the distribution system infrastructure, also account for a significant portion of the “unaccounted for” water. Water systems operators perform proactive leak detection throughout the year and perform reactive leak detection based on reports of high water demand.

6 FLOW RATE EXCEEDANCES

There were no instances during this reporting period where flows at the King St WTP exceeded the maximum allowable flow rate of 118,000 m³/day. Listed in Tables 1 and 2 following this report are the raw water flows (water taken from Lake Ontario) for the King Street Water Treatment Plant.

7 TREATMENT CHEMICALS USED

There are two treatment chemicals in use at this treatment plant. Chlorine, in the form of 12% sodium hypochlorite, is used as the disinfectant. Poly Aluminum Chloride (PACl) is used as the coagulant for the WTP.

Chlorine is dosed at the treatment plant at a rate which ensures an adequate residual is maintained at those points in the distribution system that are farthest from the point of entry of treated water to the system and, that an adequate chlorine Contact Time (CT) value is maintained for the rate of flow. Average chlorine dosage for this treatment plant is approximately 2.37 mg/l. Residuals are routinely measured in the distribution system, and the treatment plant chlorine dosage is adjusted as required to ensure the chlorine residual stays above the critical control limit of 0.20 mg/L. The critical control limit is chosen to ensure operators have ample time to respond and correct issues before the chlorine residual reaches the regulatory limit of 0.05 mg/L.

Typical PACl dosages for this treatment plant are in the range of 4.54 – 10.7 mg/l. This dosage is also adjusted to ensure efficiency in the coagulation process as various changes occur in the raw water. Changes are based on things such as pH, temperature, turbidity, and the aluminum residual in the treated water.

Chlorine is also added to the water as it passes through the James St. Booster Station. The booster station is located in Barriefield village, and pumps water from the distribution system at the west of the Cataraqui River into the distribution system located east of the Cataraqui River. Chlorine is added

here to slightly raise the level of chlorine to ensure adequate residual remains in the water in this part of the distribution system.

8 SUMMARY

The King Street Water Treatment Plant supplied water to residents of Kingston at flow rates which allowed adequate treatment while not exceeding permitted flows. Water of good quality which is safe to drink was produced by the treatment plant during this reporting period.

Further information is available for this system and is included in the annual reports which can be accessed from the Utilities Kingston Website at <http://www.utilitieskingston.com> or is available at Kingston City Hall, or the Utilities Kingston offices. For further information about this report or any questions regarding accessibility, contact Robert Cooney at rcooney@utilitieskingston.com, or call 613-546-1181 Ext 2291.

9 FLOWS

Raw, Treated, and Distribution flows are summarized in the following tables.

UTILITIES KINGSTON – WATER TREATMENT – ANNUALSUMMARY REPORT

DOCUMENT:

King Street Water Treatment Plant Annual Summary Report

Table 1 – Raw Water Flow Daily Totals (m3)

| Day | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|---------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| 1 | 45,200 | 54,100 | 53,400 | 54,900 | 51,700 | 52,300 | 46,100 | 45,700 | 47,600 | 47,900 | 52,020 | 54,000 |
| 2 | 45,000 | 51,600 | 54,200 | 54,600 | 52,400 | 47,000 | 46,100 | 45,400 | 47,500 | 47,800 | 50,700 | 54,000 |
| 3 | 44,900 | 48,500 | 54,600 | 51,100 | 46,700 | 51,500 | 46,200 | 49,500 | 50,100 | 48,200 | 51,500 | 53,800 |
| 4 | 45,000 | 53,900 | 54,700 | 51,500 | 45,700 | 47,600 | 49,900 | 45,700 | 55,000 | 48,400 | 48,500 | 53,600 |
| 5 | 45,200 | 54,000 | 54,800 | 51,900 | 45,500 | 48,300 | 51,400 | 45,500 | 54,200 | 49,200 | 50,500 | 49,000 |
| 6 | 45,200 | 54,100 | 54,700 | 53,000 | 45,400 | 50,800 | 52,300 | 45,700 | 54,300 | 53,500 | 48,400 | 49,200 |
| 7 | 45,100 | 54,100 | 54,800 | 52,500 | 45,500 | 49,300 | 52,500 | 45,100 | 54,800 | 49,500 | 48,400 | 50,400 |
| 8 | 45,300 | 53,800 | 51,900 | 52,200 | 45,300 | 47,700 | 52,500 | 45,800 | 51,000 | 47,500 | 47,000 | 53,300 |
| 9 | 45,400 | 53,600 | 52,200 | 52,200 | 46,900 | 48,200 | 52,100 | 45,800 | 46,000 | 47,400 | 44,500 | 53,200 |
| 10 | 52,000 | 53,900 | 52,800 | 48,200 | 47,500 | 46,200 | 52,600 | 45,300 | 46,900 | 40,400 | 44,400 | 52,400 |
| 11 | 51,600 | 54,100 | 52,900 | 47,300 | 47,700 | 45,900 | 48,000 | 45,600 | 52,900 | 32,500 | 44,500 | 44,100 |
| 12 | 53,800 | 53,700 | 51,000 | 49,600 | 48,300 | 46,100 | 45,400 | 45,400 | 53,300 | 44,000 | 44,900 | 44,400 |
| 13 | 48,000 | 54,100 | 52,700 | 53,000 | 48,300 | 46,000 | 46,000 | 45,700 | 52,800 | 45,000 | 44,800 | 47,400 |
| 14 | 47,800 | 54,300 | 52,900 | 53,000 | 51,500 | 45,800 | 46,000 | 45,600 | 46,500 | 41,700 | 44,700 | 53,300 |
| 15 | 47,900 | 54,300 | 53,800 | 46,500 | 45,600 | 47,200 | 47,300 | 45,600 | 45,900 | 43,200 | 44,500 | 48,700 |
| 16 | 47,700 | 54,400 | 54,300 | 52,700 | 45,500 | 47,000 | 52,700 | 45,400 | 46,200 | 41,100 | 44,700 | 45,900 |
| 17 | 47,700 | 54,300 | 54,600 | 52,600 | 45,500 | 47,000 | 54,200 | 46,200 | 46,100 | 44,000 | 47,000 | 45,600 |
| 18 | 50,900 | 54,200 | 54,500 | 46,500 | 45,300 | 47,200 | 47,600 | 46,800 | 48,700 | 47,400 | 52,700 | 45,900 |
| 19 | 53,500 | 54,200 | 54,400 | 48,600 | 45,400 | 47,600 | 47,300 | 47,000 | 54,400 | 48,300 | 52,700 | 46,000 |
| 20 | 52,000 | 54,100 | 53,800 | 51,900 | 45,500 | 50,800 | 47,200 | 46,900 | 54,000 | 50,400 | 45,700 | 45,600 |
| 21 | 48,000 | 54,000 | 54,300 | 48,500 | 45,500 | 55,200 | 44,100 | 47,200 | 52,800 | 49,800 | 45,800 | 45,200 |
| 22 | 47,400 | 53,600 | 40,600 | 47,800 | 45,400 | 49,700 | 45,900 | 47,600 | 52,600 | 42,100 | 48,030 | 45,600 |
| 23 | 47,800 | 49,600 | 54,700 | 48,800 | 45,600 | 45,600 | 46,000 | 47,300 | 47,400 | 49,600 | 50,600 | 45,500 |
| 24 | 51,900 | 49,000 | 54,800 | 48,400 | 45,500 | 45,500 | 47,400 | 47,400 | 45,100 | 47,500 | 52,900 | 45,700 |
| 25 | 54,300 | 54,300 | 54,600 | 46,900 | 45,500 | 43,100 | 52,700 | 47,300 | 44,500 | 53,800 | 52,500 | 45,300 |
| 26 | 54,000 | 50,300 | 54,500 | 51,900 | 45,700 | 44,700 | 52,100 | 47,100 | 44,400 | 53,700 | 52,900 | 45,300 |
| 27 | 54,300 | 51,500 | 54,700 | 51,800 | 45,900 | 45,900 | 52,100 | 47,100 | 51,700 | 54,400 | 53,000 | 44,500 |
| 28 | 54,000 | 54,600 | 54,700 | 45,700 | 45,600 | 46,000 | 52,000 | 47,100 | 54,700 | 48,600 | 49,100 | 45,600 |
| 29 | 49,400 | N/A | 44,500 | 45,600 | 49,400 | 45,300 | 52,100 | 47,400 | 54,300 | 51,700 | 44,100 | 45,600 |
| 30 | 47,200 | N/A | 48,600 | 47,700 | 51,600 | 46,100 | 47,600 | 47,400 | 48,400 | 50,200 | 48,300 | 45,600 |
| 31 | 52,500 | N/A | 55,000 | N/A | 52,330 | N/A | 45,200 | 48,400 | N/A | 48,300 | N/A | 45,700 |
| Total | 1,520,000 | 1,490,200 | 1,644,000 | 1,506,900 | 1,459,230 | 1,426,600 | 1,520,600 | 1,441,000 | 1,504,100 | 1,467,100 | 1,449,350 | 1,489,400 |
| Average | 49,032 | 53,221 | 53,032 | 50,230 | 47,072 | 47,553 | 49,052 | 46,484 | 50,137 | 47,326 | 48,312 | 48,045 |
| Min | 44,900 | 48,500 | 40,600 | 45,600 | 45,300 | 43,100 | 44,100 | 45,100 | 44,400 | 32,500 | 44,100 | 44,100 |
| Max | 54,300 | 54,600 | 55,000 | 54,900 | 52,400 | 55,200 | 54,200 | 49,500 | 55,000 | 54,400 | 53,000 | 54,000 |

| | |
|-------------------------------|---------|
| Permit To Take Water (m3/day) | 118,000 |
| Yearly Average (m3) | 49,125 |
| Yearly Min (m3) | 32,500 |
| Yearly Max (m3) | 55,200 |

UTILITIES KINGSTON – WATER TREATMENT – ANNUAL SUMMARY REPORT

DOCUMENT:
King Street Water Treatment Plant Annual Summary Report

Table 2 – Peak Raw Water Flow Daily Totals (m3)

| Day | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|-------------|--------|--------|---------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 1 | 48,490 | 59,000 | 103,400 | 57,820 | 56,000 | 61,000 | 51,000 | 47,700 | 49,980 | 49,990 | 47,800 | 58,000 |
| 2 | 48,280 | 58,000 | 56,890 | 57,770 | 59,000 | 56,150 | 50,000 | 50,000 | 53,000 | 50,250 | 74,680 | 58,000 |
| 3 | 50,000 | 58,000 | 56,850 | 59,000 | 53,250 | 55,020 | 51,000 | 57,000 | 57,240 | 50,620 | 67,720 | 59,000 |
| 4 | 90,000 | 58,000 | 59,000 | 59,000 | 48,750 | 52,470 | 57,000 | 50,000 | 57,160 | 54,000 | 53,000 | 57,000 |
| 5 | 47,850 | 58,000 | 59,000 | 59,000 | 48,490 | 56,000 | 57,390 | 49,000 | 57,250 | 57,000 | 52,000 | 56,000 |
| 6 | 48,060 | 93,000 | 57,360 | 62,000 | 48,220 | 58,000 | 55,800 | 49,000 | 59,000 | 64,000 | 52,000 | 54,000 |
| 7 | 47,670 | 64,670 | 57,030 | 57,000 | 48,120 | 54,870 | 55,930 | 50,000 | 73,000 | 56,000 | 52,000 | 58,000 |
| 8 | 48,480 | 56,000 | 58,000 | 57,000 | 47,780 | 51,860 | 55,680 | 56,000 | 57,460 | 55,000 | 59,000 | 61,210 |
| 9 | 50,000 | 56,810 | 57,000 | 57,000 | 51,550 | 52,000 | 55,330 | 50,000 | 48,220 | 54,000 | 47,360 | 59,000 |
| 10 | 57,000 | 56,350 | 58,000 | 66,150 | 60,000 | 53,000 | 57,000 | 55,000 | 55,730 | 54,000 | 46,260 | 59,000 |
| 11 | 55,710 | 56,550 | 58,000 | 50,680 | 63,000 | 50,000 | 56,000 | 47,530 | 58,000 | 38,260 | 46,440 | 54,400 |
| 12 | 55,960 | 56,040 | 58,000 | 58,000 | 54,000 | 48,770 | 59,000 | 47,280 | 57,000 | 56,000 | 46,810 | 46,710 |
| 13 | 54,670 | 58,000 | 58,000 | 58,000 | 52,000 | 49,000 | 50,000 | 47,540 | 56,220 | 55,950 | 46,480 | 58,000 |
| 14 | 54,000 | 59,000 | 58,000 | 58,000 | 58,000 | 49,000 | 48,120 | 47,780 | 54,330 | 56,100 | 46,400 | 58,000 |
| 15 | 54,000 | 81,000 | 56,900 | 53,870 | 49,000 | 67,000 | 55,000 | 47,780 | 50,000 | 55,570 | 48,650 | 55,560 |
| 16 | 51,070 | 59,000 | 56,840 | 55,930 | 50,000 | 53,000 | 55,610 | 50,000 | 50,000 | 60,000 | 49,000 | 48,330 |
| 17 | 50,420 | 58,000 | 57,020 | 57,000 | 47,950 | 52,000 | 57,730 | 48,620 | 51,000 | 89,100 | 55,810 | 47,720 |
| 18 | 57,000 | 59,000 | 57,530 | 54,000 | 48,580 | 53,000 | 54,870 | 49,480 | 60,100 | 56,000 | 57,000 | 52,000 |
| 19 | 57,000 | 58,000 | 57,340 | 55,970 | 47,970 | 53,000 | 54,000 | 53,000 | 57,140 | 56,000 | 59,000 | 53,000 |
| 20 | 58,000 | 56,470 | 70,000 | 66,420 | 47,890 | 60,000 | 56,000 | 52,000 | 58,000 | 57,140 | 52,740 | 48,790 |
| 21 | 57,000 | 56,380 | 56,740 | 52,000 | 47,820 | 58,220 | 47,490 | 52,000 | 57,000 | 56,910 | 48,470 | 48,420 |
| 22 | 54,000 | 61,000 | 65,000 | 53,000 | 51,000 | 57,050 | 48,130 | 53,000 | 57,000 | 61,000 | 52,000 | 51,000 |
| 23 | 54,000 | 57,000 | 59,000 | 53,000 | 50,000 | 47,630 | 47,900 | 53,000 | 56,000 | 55,480 | 70,130 | 50,000 |
| 24 | 58,000 | 56,630 | 60,000 | 52,000 | 50,000 | 47,980 | 57,000 | 53,000 | 48,820 | 55,860 | 59,000 | 50,000 |
| 25 | 56,300 | 56,350 | 59,000 | 52,000 | 50,000 | 46,940 | 57,000 | 53,000 | 46,400 | 71,000 | 59,000 | 50,000 |
| 26 | 56,260 | 56,960 | 59,000 | 57,000 | 48,500 | 47,580 | 58,790 | 52,000 | 46,310 | 57,000 | 1,200 | 49,000 |
| 27 | 56,740 | 57,000 | 59,000 | 57,000 | 49,000 | 48,090 | 55,380 | 49,460 | 57,840 | 57,110 | 57,000 | 53,000 |
| 28 | 56,650 | 58,000 | 60,000 | 50,000 | 49,000 | 51,000 | 57,000 | 52,000 | 56,960 | 56,050 | 57,000 | 52,000 |
| 29 | 55,240 | N/A | 47,300 | 50,000 | 54,760 | 58,000 | 57,000 | 53,000 | 56,430 | 60,890 | 46,510 | 51,000 |
| 30 | 50,260 | N/A | 57,060 | 57,000 | 55,130 | 51,000 | 57,000 | 53,000 | 55,240 | 56,000 | 54,960 | 50,000 |
| 31 | 56,480 | N/A | 57,660 | N/A | 61,660 | N/A | 48,440 | 59,000 | N/A | 59,000 | N/A | 50,000 |
| Monthly Max | 90,000 | 93,000 | 103,400 | 66,420 | 63,000 | 67,000 | 59,000 | 59,000 | 73,000 | 89,100 | 74,680 | 61,210 |

| | |
|-------------------------------|---------|
| Permit To Take Water (m3/day) | 118,000 |
| Yearly Max (m3) | 103,400 |

UTILITIES KINGSTON – WATER TREATMENT – ANNUAL SUMMARY REPORT

DOCUMENT:
King Street Water Treatment Plant Annual Summary Report

Table 3 – Treated Water Flow Daily Totals (m3)

| Day | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|---------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| 1 | 41,500 | 48,600 | 47,800 | 48,600 | 47,500 | 48,200 | 41,900 | 41,500 | 41,700 | 41,800 | 41,600 | 48,600 |
| 2 | 41,300 | 45,700 | 48,400 | 48,300 | 48,300 | 42,800 | 41,800 | 41,100 | 41,600 | 41,700 | 42,700 | 48,900 |
| 3 | 41,200 | 43,000 | 49,000 | 44,200 | 43,100 | 47,200 | 41,800 | 45,200 | 44,100 | 42,000 | 44,000 | 48,700 |
| 4 | 41,300 | 48,200 | 49,000 | 45,300 | 41,600 | 43,300 | 45,600 | 41,400 | 48,300 | 42,100 | 44,300 | 48,300 |
| 5 | 41,400 | 48,300 | 49,000 | 46,000 | 41,400 | 44,200 | 47,700 | 41,200 | 47,800 | 45,400 | 46,300 | 42,000 |
| 6 | 41,400 | 48,600 | 48,900 | 47,800 | 41,400 | 46,600 | 48,000 | 41,100 | 48,400 | 48,400 | 44,100 | 42,200 |
| 7 | 41,300 | 48,800 | 49,100 | 48,400 | 41,400 | 45,100 | 48,200 | 41,300 | 48,600 | 43,300 | 44,100 | 45,300 |
| 8 | 41,500 | 48,500 | 49,000 | 48,100 | 41,200 | 43,500 | 48,200 | 41,500 | 45,300 | 41,500 | 43,500 | 49,000 |
| 9 | 41,600 | 48,700 | 48,300 | 48,200 | 42,800 | 44,000 | 47,900 | 41,600 | 41,800 | 41,500 | 41,900 | 48,500 |
| 10 | 48,100 | 48,600 | 48,700 | 43,000 | 44,300 | 42,300 | 48,200 | 41,100 | 42,800 | 35,800 | 41,800 | 48,200 |
| 11 | 46,600 | 48,600 | 48,800 | 41,600 | 43,700 | 41,700 | 43,700 | 41,300 | 48,600 | 29,900 | 41,800 | 41,000 |
| 12 | 48,200 | 48,300 | 47,000 | 44,900 | 44,220 | 41,800 | 41,600 | 41,200 | 48,800 | 40,200 | 42,000 | 41,800 |
| 13 | 42,200 | 48,300 | 48,700 | 48,800 | 44,200 | 41,800 | 41,700 | 41,400 | 48,500 | 41,300 | 41,900 | 44,300 |
| 14 | 42,000 | 48,700 | 48,800 | 48,800 | 47,300 | 41,700 | 41,700 | 41,300 | 42,300 | 38,400 | 42,840 | 48,800 |
| 15 | 42,100 | 48,600 | 48,700 | 42,400 | 41,400 | 42,300 | 43,000 | 41,400 | 41,800 | 39,700 | 42,000 | 44,600 |
| 16 | 41,900 | 48,900 | 48,300 | 48,600 | 41,400 | 41,300 | 48,300 | 41,100 | 42,100 | 37,000 | 51,500 | 41,600 |
| 17 | 41,800 | 48,600 | 48,500 | 48,400 | 41,500 | 41,300 | 48,200 | 41,400 | 41,900 | 40,800 | 45,100 | 41,400 |
| 18 | 45,400 | 48,300 | 48,400 | 42,300 | 41,300 | 41,500 | 41,800 | 41,300 | 44,000 | 43,500 | 48,100 | 41,700 |
| 19 | 48,200 | 48,200 | 48,200 | 44,500 | 41,400 | 41,700 | 41,500 | 41,400 | 49,200 | 44,300 | 46,800 | 41,600 |
| 20 | 46,200 | 48,200 | 47,700 | 47,400 | 41,400 | 44,600 | 42,700 | 41,200 | 48,900 | 45,700 | 41,700 | 41,300 |
| 21 | 42,400 | 48,100 | 48,300 | 44,300 | 41,400 | 48,600 | 40,500 | 41,200 | 48,500 | 44,900 | 32,200 | 41,600 |
| 22 | 41,800 | 48,100 | 44,600 | 44,400 | 41,300 | 44,400 | 41,600 | 41,600 | 48,300 | 44,600 | 43,170 | 41,600 |
| 23 | 41,900 | 43,800 | 48,900 | 44,500 | 41,600 | 41,300 | 41,600 | 41,500 | 43,300 | 45,100 | 45,600 | 41,500 |
| 24 | 46,000 | 43,600 | 48,600 | 44,100 | 41,300 | 41,200 | 43,100 | 41,600 | 45,100 | 43,100 | 48,500 | 41,600 |
| 25 | 48,800 | 48,400 | 48,500 | 42,800 | 41,400 | 39,500 | 48,400 | 41,500 | 41,900 | 49,300 | 48,300 | 41,300 |
| 26 | 48,200 | 44,400 | 48,000 | 47,900 | 41,500 | 41,100 | 47,700 | 41,300 | 41,900 | 49,000 | 48,600 | 41,100 |
| 27 | 48,600 | 45,300 | 48,300 | 47,500 | 41,500 | 41,500 | 47,700 | 41,300 | 47,100 | 48,800 | 48,700 | 41,300 |
| 28 | 48,300 | 48,900 | 48,500 | 41,500 | 41,400 | 41,700 | 47,800 | 41,300 | 48,800 | 43,400 | 45,100 | 41,500 |
| 29 | 43,400 | N/A | 41,500 | 41,400 | 45,200 | 41,400 | 47,800 | 41,600 | 48,700 | 46,000 | 41,500 | 41,500 |
| 30 | 41,400 | N/A | 43,000 | 43,700 | 47,500 | 41,800 | 43,300 | 41,500 | 42,300 | 43,400 | 43,200 | 41,500 |
| 31 | 47,100 | N/A | 48,800 | N/A | 48,000 | N/A | 41,000 | 42,600 | N/A | 41,300 | N/A | 41,600 |
| Total | 1,363,100 | 1,332,300 | 1,487,300 | 1,367,700 | 1,332,920 | 1,289,400 | 1,384,000 | 1,287,000 | 1,362,400 | 1,323,200 | 1,322,910 | 1,353,900 |
| Average | 43,971 | 47,582 | 47,977 | 45,590 | 42,997 | 42,980 | 44,645 | 41,516 | 45,413 | 42,684 | 44,097 | 43,674 |
| Min | 41,200 | 43,000 | 41,500 | 41,400 | 41,200 | 39,500 | 40,500 | 41,100 | 41,600 | 29,900 | 32,200 | 41,000 |
| Max | 48,800 | 48,900 | 49,100 | 48,800 | 48,300 | 48,600 | 48,400 | 45,200 | 49,200 | 49,300 | 51,500 | 49,000 |

| | |
|---|---------|
| Municipal Drinking Water Licence Max (m3/day) | 118,000 |
| Yearly Average (m3) | 44,427 |
| Yearly Min (m3) | 29,900 |
| Yearly Max (m3) | 51,500 |

UTILITIES KINGSTON – WATER TREATMENT – ANNUALSUMMARY REPORT

DOCUMENT:

King Street Water Treatment Plant Annual Summary Report

Table 4 – Peak Treated Water Flow Daily Totals

| Day | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|-------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 1 | 42,680 | 51,230 | 50,690 | 50,110 | 50,040 | 49,800 | 42,930 | 42,290 | 42,530 | 42,870 | 42,640 | 51,260 |
| 2 | 42,430 | 52,100 | 50,740 | 49,800 | 50,410 | 49,700 | 43,040 | 42,680 | 42,730 | 42,920 | 46,300 | 51,080 |
| 3 | 42,560 | 50,040 | 51,000 | 49,990 | 47,490 | 49,100 | 42,870 | 50,380 | 49,970 | 42,940 | 45,620 | 50,740 |
| 4 | 42,690 | 50,150 | 50,790 | 48,800 | 42,650 | 47,820 | 50,400 | 42,640 | 50,340 | 43,340 | 45,590 | 50,900 |
| 5 | 42,510 | 50,550 | 50,930 | 50,820 | 42,540 | 48,380 | 49,670 | 42,700 | 50,360 | 50,460 | 45,640 | 47,970 |
| 6 | 42,510 | 50,850 | 50,720 | 50,620 | 42,670 | 50,180 | 49,170 | 42,570 | 50,640 | 50,840 | 45,130 | 43,020 |
| 7 | 42,430 | 51,050 | 50,820 | 50,330 | 42,360 | 48,820 | 49,830 | 42,610 | 50,740 | 48,280 | 45,480 | 50,830 |
| 8 | 42,320 | 50,330 | 55,690 | 50,940 | 42,590 | 45,040 | 49,330 | 42,740 | 50,510 | 42,640 | 58,360 | 50,650 |
| 9 | 47,680 | 50,420 | 50,820 | 50,150 | 45,200 | 45,510 | 49,940 | 42,760 | 42,870 | 42,900 | 43,230 | 50,920 |
| 10 | 50,490 | 50,370 | 50,710 | 49,390 | 45,380 | 49,970 | 50,790 | 45,680 | 49,920 | 45,430 | 43,230 | 50,970 |
| 11 | 49,580 | 50,230 | 51,030 | 42,480 | 45,820 | 43,020 | 49,850 | 42,300 | 50,940 | 46,003 | 42,930 | 47,430 |
| 12 | 50,680 | 49,860 | 51,050 | 50,930 | 45,870 | 42,760 | 45,490 | 42,440 | 50,900 | 50,480 | 43,160 | 43,090 |
| 13 | 47,220 | 50,660 | 50,920 | 53,160 | 49,640 | 42,570 | 42,920 | 42,420 | 50,400 | 49,990 | 43,200 | 51,220 |
| 14 | 43,050 | 50,930 | 50,980 | 50,810 | 50,170 | 42,770 | 42,640 | 42,390 | 48,660 | 50,020 | 43,090 | 50,600 |
| 15 | 43,200 | 50,990 | 50,180 | 50,310 | 42,720 | 57,230 | 51,110 | 42,300 | 43,060 | 49,870 | 42,870 | 49,560 |
| 16 | 42,860 | 50,550 | 50,170 | 50,460 | 42,740 | 42,230 | 50,740 | 47,980 | 43,110 | 49,890 | 43,120 | 42,780 |
| 17 | 42,620 | 50,750 | 49,850 | 50,830 | 42,640 | 42,490 | 49,600 | 42,660 | 43,120 | 50,900 | 50,450 | 42,550 |
| 18 | 50,430 | 50,150 | 49,940 | 48,570 | 42,510 | 42,600 | 47,040 | 42,670 | 50,480 | 50,700 | 51,170 | 42,940 |
| 19 | 50,820 | 50,540 | 50,750 | 50,080 | 42,510 | 42,520 | 48,810 | 42,610 | 51,200 | 52,500 | 51,220 | 42,750 |
| 20 | 50,080 | 49,740 | 54,890 | 50,080 | 42,330 | 50,680 | 51,030 | 42,360 | 50,860 | 50,900 | 42,860 | 42,670 |
| 21 | 50,390 | 49,420 | 50,490 | 46,010 | 42,330 | 50,200 | 42,460 | 42,460 | 50,760 | 51,020 | 42,570 | 42,690 |
| 22 | 43,080 | 50,740 | 61,770 | 45,740 | 42,480 | 50,100 | 42,690 | 42,780 | 50,480 | 50,970 | 42,720 | 42,740 |
| 23 | 43,170 | 49,130 | 50,890 | 45,650 | 42,660 | 42,460 | 42,460 | 42,750 | 49,890 | 49,660 | 50,950 | 42,510 |
| 24 | 49,770 | 49,610 | 50,890 | 46,310 | 44,910 | 42,300 | 49,960 | 42,660 | 51,000 | 49,900 | 51,150 | 42,650 |
| 25 | 50,520 | 50,360 | 50,770 | 48,830 | 42,790 | 41,740 | 50,720 | 42,750 | 43,040 | 61,610 | 51,200 | 42,470 |
| 26 | 50,370 | 49,890 | 50,220 | 50,015 | 42,500 | 42,400 | 52,480 | 42,500 | 43,290 | 52,980 | 51,080 | 42,310 |
| 27 | 50,290 | 50,610 | 50,840 | 50,260 | 42,500 | 42,800 | 49,510 | 42,230 | 51,690 | 50,070 | 51,040 | 50,110 |
| 28 | 50,390 | 51,160 | 51,260 | 42,700 | 42,900 | 42,970 | 50,230 | 42,560 | 50,940 | 49,650 | 50,940 | 42,800 |
| 29 | 47,770 | N/A | 49,100 | 42,760 | 49,270 | 43,170 | 49,980 | 42,660 | 50,790 | 50,260 | 43,080 | 42,610 |
| 30 | 42,480 | N/A | 49,400 | 56,200 | 48,580 | 43,000 | 48,730 | 42,650 | 49,600 | 49,390 | 49,220 | 42,640 |
| 31 | 50,240 | N/A | 50,310 | N/A | 51,000 | N/A | 42,380 | 49,830 | N/A | 42,860 | N/A | 42,600 |
| Monthly Max | 50,820 | 52,100 | 61,770 | 56,200 | 51,000 | 57,230 | 52,480 | 50,380 | 51,690 | 61,610 | 58,360 | 51,260 |

| | |
|---|---------|
| Municipal Drinking Water Licence Max (m3/day) | 118,000 |
| Yearly Max (m3) | 61,770 |

UTILITIES KINGSTON – WATER TREATMENT – ANNUALSUMMARY REPORT

DOCUMENT:
King Street Water Treatment Plant Annual Summary Report

Table 5 – Net to Distribution System Daily Totals (m3)

| Day | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|---------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| 1 | 40,910 | 47,971 | 46,389 | 45,864 | 41,849 | 46,570 | 39,045 | 40,513 | 43,628 | 43,655 | 43,024 | 46,613 |
| 2 | 41,804 | 45,342 | 47,863 | 48,651 | 47,267 | 47,669 | 44,490 | 41,948 | 43,190 | 41,919 | 43,316 | 48,357 |
| 3 | 41,372 | 46,405 | 48,868 | 46,075 | 43,663 | 44,961 | 43,648 | 45,021 | 43,179 | 42,682 | 44,166 | 48,157 |
| 4 | 43,142 | 48,034 | 49,272 | 45,068 | 43,064 | 45,929 | 45,858 | 41,910 | 48,115 | 43,074 | 45,512 | 48,313 |
| 5 | 40,426 | 50,062 | 49,219 | 48,148 | 43,725 | 45,273 | 44,659 | 41,578 | 46,283 | 44,234 | 48,241 | 45,160 |
| 6 | 41,374 | 47,646 | 49,761 | 46,217 | 41,049 | 43,804 | 48,431 | 41,623 | 46,625 | 45,558 | 40,814 | 44,082 |
| 7 | 43,009 | 48,681 | 49,186 | 48,897 | 43,282 | 45,252 | 46,663 | 42,022 | 48,004 | 43,751 | 42,152 | 44,445 |
| 8 | 42,414 | 47,844 | 49,696 | 47,597 | 41,578 | 44,043 | 48,260 | 41,725 | 48,328 | 41,818 | 44,070 | 49,000 |
| 9 | 43,614 | 48,687 | 47,333 | 46,285 | 44,456 | 43,768 | 47,754 | 41,143 | 43,032 | 42,547 | 42,576 | 47,526 |
| 10 | 47,424 | 47,898 | 49,296 | 44,709 | 40,842 | 40,723 | 49,353 | 41,968 | 42,422 | 40,530 | 42,628 | 48,200 |
| 11 | 44,295 | 49,309 | 48,740 | 45,310 | 44,674 | 43,177 | 44,323 | 40,565 | 48,540 | 37,771 | 42,211 | 45,002 |
| 12 | 46,882 | 48,698 | 46,112 | 45,317 | 44,902 | 43,377 | 44,124 | 42,717 | 46,773 | 41,061 | 43,723 | 43,529 |
| 13 | 43,797 | 49,923 | 48,899 | 48,760 | 43,842 | 41,999 | 41,872 | 40,592 | 48,030 | 41,300 | 42,291 | 45,413 |
| 14 | 44,895 | 48,263 | 48,747 | 46,601 | 44,041 | 42,846 | 43,363 | 40,074 | 44,871 | 38,400 | 43,218 | 44,421 |
| 15 | 43,962 | 46,904 | 49,482 | 44,335 | 43,778 | 42,830 | 41,774 | 42,791 | 43,523 | 39,700 | 41,483 | 46,024 |
| 16 | 41,582 | 48,098 | 49,049 | 48,295 | 40,386 | 41,492 | 45,643 | 43,273 | 42,279 | 37,000 | 53,574 | 43,581 |
| 17 | 41,409 | 49,501 | 49,255 | 46,929 | 40,473 | 40,836 | 48,352 | 40,128 | 43,702 | 40,800 | 44,868 | 47,323 |
| 18 | 44,757 | 49,724 | 48,102 | 45,825 | 43,201 | 42,772 | 43,662 | 40,293 | 42,755 | 43,500 | 45,821 | 42,667 |
| 19 | 44,391 | 48,094 | 49,459 | 45,838 | 43,679 | 44,165 | 43,322 | 43,361 | 46,663 | 44,300 | 44,945 | 41,381 |
| 20 | 45,451 | 48,856 | 46,415 | 44,664 | 40,883 | 41,943 | 42,574 | 40,942 | 49,437 | 45,700 | 44,218 | 42,532 |
| 21 | 45,063 | 45,881 | 48,797 | 44,247 | 42,082 | 46,308 | 41,792 | 41,412 | 48,480 | 44,900 | 33,909 | 42,236 |
| 22 | 44,483 | 47,855 | 47,091 | 42,803 | 41,631 | 44,937 | 40,308 | 43,005 | 47,286 | 44,600 | 44,899 | 39,261 |
| 23 | 42,987 | 46,622 | 46,773 | 44,666 | 43,369 | 41,585 | 42,985 | 40,997 | 44,546 | 45,100 | 44,547 | 42,984 |
| 24 | 45,424 | 44,276 | 49,176 | 45,869 | 41,664 | 42,697 | 45,346 | 41,209 | 46,081 | 41,696 | 46,632 | 40,818 |
| 25 | 48,336 | 47,188 | 47,612 | 44,788 | 41,758 | 39,169 | 46,956 | 42,414 | 43,364 | 43,682 | 49,327 | 42,247 |
| 26 | 46,146 | 47,792 | 49,126 | 45,469 | 40,460 | 39,563 | 49,164 | 42,546 | 44,431 | 43,693 | 48,342 | 42,922 |
| 27 | 48,156 | 46,738 | 46,041 | 46,049 | 43,011 | 42,977 | 44,666 | 42,897 | 46,212 | 42,851 | 47,951 | 41,598 |
| 28 | 48,227 | 48,238 | 48,487 | 44,024 | 41,692 | 42,926 | 47,568 | 40,644 | 46,594 | 43,400 | 46,670 | 41,056 |
| 29 | 45,633 | N/A | 44,581 | 45,627 | 44,511 | 43,480 | 46,515 | 41,911 | 46,236 | 46,000 | 42,792 | 41,361 |
| 30 | 44,077 | N/A | 45,862 | 45,177 | 46,930 | 41,204 | 44,082 | 39,903 | 45,414 | 47,375 | 46,267 | 43,176 |
| 31 | 45,020 | N/A | 46,733 | N/A | 46,523 | N/A | 42,305 | 43,064 | N/A | 44,944 | N/A | 41,501 |
| Total | 1,370,460 | 1,340,528 | 1,491,421 | 1,378,103 | 1,334,265 | 1,298,277 | 1,388,856 | 1,294,188 | 1,368,018 | 1,327,539 | 1,334,186 | 1,370,887 |
| Average | 44,208 | 47,876 | 48,110 | 45,937 | 43,041 | 43,276 | 44,802 | 41,748 | 45,601 | 42,824 | 44,473 | 44,222 |
| Min | 40,426 | 44,276 | 44,581 | 42,803 | 40,386 | 39,169 | 39,045 | 39,903 | 42,279 | 37,000 | 33,909 | 39,261 |
| Max | 48,336 | 50,062 | 49,761 | 48,897 | 47,267 | 47,669 | 49,353 | 45,021 | 49,437 | 47,375 | 53,574 | 49,000 |

| | |
|---------------------|--------|
| Yearly Average (m3) | 44,676 |
| Yearly Min (m3) | 33,909 |
| Yearly Max (m3) | 53,574 |

UTILITIES KINGSTON – WATER TREATMENT – ANNUALSUMMARY REPORT

DOCUMENT:
King Street Water Treatment Plant Annual Summary Report

Table 6 – City East Flow Daily Totals (m3)

| Day | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| 1 | 8,281 | 10,134 | 10,116 | 10,453 | 9,101 | 11,151 | 8,294 | 8,053 | 8,617 | 8,076 | 6,904 | 8,120 |
| 2 | 8,414 | 8,957 | 9,599 | 10,583 | 9,659 | 11,249 | 9,028 | 7,928 | 8,350 | 7,547 | 6,872 | 7,829 |
| 3 | 9,507 | 9,598 | 11,399 | 9,270 | 9,662 | 9,798 | 9,617 | 7,660 | 8,102 | 8,100 | 6,866 | 7,696 |
| 4 | 8,021 | 9,487 | 10,744 | 10,598 | 9,206 | 11,323 | 10,227 | 7,459 | 8,669 | 8,106 | 6,961 | 7,647 |
| 5 | 9,496 | 10,897 | 10,747 | 10,650 | 9,966 | 10,795 | 9,881 | 7,283 | 9,517 | 8,169 | 7,653 | 7,476 |
| 6 | 8,294 | 9,602 | 10,776 | 9,580 | 8,921 | 9,659 | 10,471 | 7,412 | 8,143 | 6,871 | 6,809 | 7,425 |
| 7 | 8,986 | 10,349 | 10,181 | 10,712 | 10,476 | 10,462 | 9,526 | 7,520 | 8,812 | 6,719 | 6,917 | 7,209 |
| 8 | 9,896 | 10,610 | 11,145 | 9,618 | 9,582 | 9,582 | 10,636 | 7,855 | 9,594 | 6,822 | 6,758 | 7,713 |
| 9 | 8,528 | 9,527 | 10,088 | 10,041 | 11,264 | 9,201 | 9,437 | 7,332 | 8,851 | 7,229 | 7,163 | 7,490 |
| 10 | 10,087 | 10,213 | 10,489 | 10,761 | 9,096 | 8,734 | 10,420 | 7,677 | 8,757 | 7,067 | 7,077 | 7,652 |
| 11 | 8,225 | 9,997 | 10,663 | 9,681 | 10,515 | 8,279 | 9,886 | 7,000 | 8,492 | 5,894 | 7,142 | 7,590 |
| 12 | 8,429 | 9,620 | 10,536 | 10,224 | 9,388 | 8,836 | 10,547 | 7,412 | 9,180 | 7,307 | 7,156 | 7,536 |
| 13 | 9,095 | 10,514 | 10,765 | 10,612 | 10,047 | 8,729 | 9,430 | 6,931 | 9,139 | 6,626 | 7,135 | 7,693 |
| 14 | 8,516 | 10,476 | 10,855 | 10,062 | 10,416 | 8,640 | 10,351 | 7,155 | 8,982 | 6,215 | 7,304 | 7,729 |
| 15 | 9,058 | 9,555 | 10,777 | 9,313 | 9,114 | 8,319 | 9,018 | 7,890 | 7,743 | 7,267 | 7,025 | 7,753 |
| 16 | 9,707 | 10,564 | 9,644 | 10,663 | 8,112 | 8,030 | 7,852 | 8,247 | 7,632 | 6,681 | 7,024 | 7,684 |
| 17 | 8,648 | 9,052 | 10,471 | 10,467 | 8,570 | 6,571 | 9,292 | 8,056 | 8,205 | 6,726 | 7,017 | 7,141 |
| 18 | 8,955 | 10,528 | 10,779 | 9,150 | 8,786 | 8,789 | 9,918 | 7,364 | 8,425 | 8,053 | 7,135 | 7,455 |
| 19 | 9,588 | 9,666 | 10,135 | 10,429 | 9,504 | 9,755 | 9,178 | 7,105 | 8,522 | 6,370 | 7,149 | 6,991 |
| 20 | 8,693 | 9,894 | 9,819 | 9,635 | 7,684 | 9,560 | 10,641 | 7,201 | 8,492 | 7,475 | 6,551 | 7,644 |
| 21 | 9,955 | 10,688 | 10,678 | 9,867 | 7,520 | 10,886 | 8,232 | 7,868 | 8,055 | 6,662 | 7,517 | 7,535 |
| 22 | 9,614 | 9,908 | 10,394 | 9,431 | 7,780 | 9,943 | 9,316 | 8,494 | 8,885 | 6,983 | 7,779 | 7,539 |
| 23 | 10,557 | 9,862 | 10,517 | 10,259 | 8,917 | 9,297 | 9,134 | 7,822 | 7,599 | 7,114 | 7,012 | 7,546 |
| 24 | 10,494 | 10,655 | 9,671 | 9,344 | 8,928 | 8,840 | 10,308 | 8,323 | 8,212 | 7,201 | 7,169 | 7,650 |
| 25 | 11,169 | 9,987 | 10,715 | 10,144 | 8,839 | 8,322 | 9,773 | 7,174 | 8,337 | 6,648 | 7,601 | 7,485 |
| 26 | 9,456 | 10,083 | 10,132 | 9,906 | 8,692 | 8,636 | 8,729 | 7,744 | 7,916 | 6,813 | 7,376 | 7,550 |
| 27 | 9,639 | 10,785 | 9,907 | 9,296 | 10,246 | 9,347 | 7,201 | 7,576 | 9,443 | 6,963 | 7,293 | 7,494 |
| 28 | 9,515 | 10,682 | 10,706 | 10,271 | 9,955 | 9,452 | 8,032 | 8,321 | 8,839 | 6,121 | 7,329 | 7,376 |
| 29 | 9,964 | N/A | 10,250 | 8,791 | 10,478 | 8,528 | 7,659 | 8,070 | 8,421 | 7,080 | 6,714 | 7,654 |
| 30 | 10,229 | N/A | 9,721 | 10,737 | 11,128 | 8,599 | 7,214 | 7,828 | 8,572 | 7,671 | 7,689 | 8,165 |
| 31 | 8,517 | N/A | 10,455 | N/A | 11,061 | N/A | 7,740 | 7,887 | N/A | 6,832 | N/A | 8,109 |
| Total | 287,532 | 281,889 | 322,872 | 300,550 | 292,614 | 279,312 | 286,988 | 237,646 | 256,501 | 219,405 | 214,095 | 235,577 |
| Average | 9,275 | 10,067 | 10,415 | 10,018 | 9,439 | 9,310 | 9,258 | 7,666 | 8,550 | 7,078 | 7,136 | 7,599 |
| Min | 8,021 | 8,957 | 9,599 | 8,791 | 7,520 | 6,571 | 7,201 | 6,931 | 7,599 | 5,894 | 6,551 | 6,991 |
| Max | 11,169 | 10,897 | 11,399 | 10,761 | 11,264 | 11,323 | 10,641 | 8,494 | 9,594 | 8,169 | 7,779 | 8,165 |

| | |
|---------------------|--------|
| Yearly Average (m3) | 8,818 |
| Yearly Min (m3) | 5,894 |
| Yearly Max (m3) | 11,399 |



**POINT PLEASANT WATER TREATMENT PLANT
2023 ANNUAL SUMMARY REPORT**

Drinking Water System Number: 220001851
Drinking Water System Owner: City of Kingston
Drinking Water System Category: Large Municipal Residential

Submitted by:
David Fell
President & C.E.O.

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DOCUMENT:

Point Pleasant Water Treatment Plant Annual Summary Report

1 INTRODUCTION

This annual summary report has been prepared as required under Ontario Regulation 170/03 of the Safe Drinking Water Act (SDWA) to acknowledge compliance with the terms and conditions of the Drinking Water Works Permit (DWWP) and Municipal Drinking Water License (MDWL) issued for the Point Pleasant Water Treatment Plant, to comment on any incidents of non-compliance during the reporting period, to summarize the quantities of the water supplied and to compare the summaries to the rated capacity and flow rates approved in the system's permits and approvals during the reporting period.

This report is specific to the Point Pleasant Water Treatment Plant located at 80 Sunny Acres Road in the City of Kingston, the associated distribution system, which serves Kingston's municipal water customers in the areas North to Cataraqui Arena, Hwy #2 west to Westbrook, Bath Road to Coronation Blvd, south of Hwy #401, Hwy #2 east to Milton subdivision, and Hwy #15 north to the St. Lawrence Business Park is known as the Kingston Drinking Water System.

The Kingston Drinking Water System receives water from both the King Street Water Treatment Plant and the Point Pleasant Water Treatment Plant. The Water Treatment Plants and its associated distribution system are owned by the city of Kingston, with Utilities Kingston acting as the operating authority.

2 NON COMPLIANCE

There were no issues of non-compliance with the terms and conditions of the DWWP or MDWL during this reporting period.

3 COMPLIANCE

The Treatment Operations Department of Utilities Kingston, for the City of Kingston, operates and maintains the Point Pleasant Water Treatment Plant (WTP) and complies with the terms and conditions of the Drinking Water Works Permit (DWWP) and Municipal Drinking Water License (MDWL) issued for the WTP. The Utilities Kingston Systems Operations department and the Treatment Operations department of Utilities Kingston operate and maintain the associated distribution system as well as the storage and pumping facilities. Staffing is maintained at levels to ensure adequate numbers of trained and licensed personnel are available for proper operations during emergency or upset conditions, vacation/sick relief, or to deal with equipment breakdown.

Quality management systems (QMS), contingency plans, and operations manuals are established and are located in the appropriate facilities and available to appropriate staff. A QMS for the City of Kingston's drinking water supply systems has been developed and implemented by Utilities Kingston management and staff to ensure the continued safety and security of the community's drinking water by meeting or exceeding the requirements of all relevant legislation and regulations, and the Drinking Water Quality Management Standard (DWQMS).

Operations manuals include information necessary for the day to day operations and maintenance of the WTP and distribution system as well as information that may not be regularly used but that might be required to be accessed quickly for various purposes. Contingency plans include information that may be required for proper operation of the WTP or distribution system during emergency or upset conditions and contain items such as emergency plans and contact lists, alternate materials supply sources and notification lists.

The operations strategy of Utilities Kingston includes ensuring that permits, approvals, and licenses are in place, that efficient maintenance and operations ensures the quality of water supplied to its customers meets or exceeds the minimum requirements as set out in the SDWA, and that permissible

DOCUMENT:

Point Pleasant Water Treatment Plant Annual Summary Report

flow rates are not exceeded. The City of Kingston, as a means of source water protection, considers the impact of decisions made within its authority on the drinking water supply source for the WTP.

Flow measuring devices for measuring the amount of water taken from Lake Ontario, and the amount of water supplied to the distribution system are calibrated annually by a third party. Accuracy in these measurements ensures that treatment chemicals are precisely applied and that flows do not exceed the capacity at which the WTP is designed to be effective. These flows are recorded to provide current and historical information, which is used for operational decision making, and to allow both the public and the Ministry of the Environment, Conservation and Parks (MECP) the ability to review WTP operations.

Water quality analyzers that monitor parameters such as chlorine residual and turbidity of critical process streams and water directed to the distribution system are alarm equipped and are maintained in accordance with the manufacturer's recommendations as well as the conditions of the DWWP/MDWL.

Water sampling is conducted to a level that exceeds the minimum requirements of schedule 13 of Ontario Regulation 170/03 of the Safe Drinking water Act, and includes additional sampling as well as sampling recommended in the first Engineers Report for the WTP. Raw water sampling is conducted to give operational staff information required to determine the level of treatment required to make the water potable. In-plant process stream samples provide monitoring of treatment processes. Treated and distribution system sampling provides information regarding the quality of water delivered to customers. All of these samples are analyzed by either licensed staff or by laboratories accredited by the Standards Council of Canada through the Canadian Association for Environmental Analytical Laboratories.

All sampling information, annual reports, and all other documentation required by the DWWP, and regulations are available for public viewing at the WTP during normal business hours. Annual Reports are also available on the Utilities Kingston website as well as at the Utilities Kingston and City of Kingston offices. Residents of the City of Kingston are encouraged to review this information, the availability of which is advertised through various local media.

4 NOTIFICATIONS

Under Ontario Regulation 170/03, notifications were required for any instances where a sample result indicated that a parameter used to measure water quality exceeded a Maximum Acceptable Concentration (MAC). Once a notification is received from a laboratory or an observation of any other indicator of adverse water quality is made by operations personnel, corrective action as dictated by the regulations is initiated in an effort to confirm the initial result. If confirmed, further action may be recommended by the Medical Officer of Health (MOH). If not confirmed, sampling will typically return to the normal schedule or depending on the parameter, Utilities Kingston may choose to increase the sampling frequency to monitor the parameter more closely for a period of time. The details of any events requiring notifications are listed below.

4.1 EVENTS REQUIRING NOTIFICATIONS

- There were no events within the Point Pleasant Water Treatment Plant that required notification during this reporting period.

5 QUANTITY OF WATER SUPPLIED

Listed in Tables 3 and 4 following this report are the treated water flows for the Point Pleasant Water Treatment Plant. The serviced population for the King Street WTP and Point Pleasant WTP is 132,485 (population from Census data for 2021). The annual average daily use was 22,158 m³/day

DOCUMENT:

Point Pleasant Water Treatment Plant Annual Summary Report

from the Point Pleasant WTP and 44,427 m³/day from the King Street. Total average per capita use was calculated at 503 litres per person/day. The metered residential use for 2023 is currently pending. The typical Canadian average is 250-350 litres per person/day residential use (source: Environment Canada). The city has imposed limitations or restrictions on water use when necessary. System losses through leakage, mainly due to the age of the distribution system infrastructure, also account for a significant portion of the “unaccounted for” water. Water systems operators perform proactive leak detection throughout the year and perform reactive leak detection based on reports of high water demand.

6 FLOW RATE EXCEEDANCES

There were no instances during this reporting period where flows at the Point Pleasant WTP exceeded the daily maximum allowable flow rate of 80,000 m³/day. Listed in Tables 1 and 2 following this report are the raw water flows (water taken from Lake Ontario) for the Point Pleasant Water Treatment Plant.

7 TREATMENT CHEMICALS USED

There are two treatment chemicals in use at this treatment plant. Chlorine is used as the disinfectant, and Poly Aluminum Chloride (PACl) is used as the coagulant for the WTP. A more detailed description of the function of each of these chemicals and where they fit in the treatment processes is contained in the annual reports produced for this treatment plant.

Chlorine is dosed at the treatment plant at a rate which ensures an adequate residual is maintained at those points in the distribution system that are farthest from the point of entry of treated water to the system and, that an adequate chlorine Contact Time (CT) value is maintained for the rate of flow. Average chlorine dosages for this treatment plant are approximately 2.65 mg/L. Residuals are routinely measured in the distribution system, and the treatment plant chlorine dosage is adjusted as required to ensure the chlorine residual stays above the critical control limit of 0.20 mg/L. The critical control limit is chosen to ensure operators have ample time to respond and correct issues before the chlorine residual reaches the regulatory limit of 0.05 mg/L.

Typical PACl dosage for this treatment plant is 6.57 mg/L. This dosage is also adjusted to ensure efficiency in the coagulation process as various changes occur in the raw water. Changes are based on things such as pH, temperature, turbidity, and the aluminum residual in the treated water.

8 SUMMARY

The Point Pleasant Water Treatment Plant supplied water to residents of Kingston at rates which allowed adequate treatment. Water of good quality which is safe to drink was produced by the treatment plant during this reporting period.

Further information is available for this system and is included in the annual reports which can be accessed from the Utilities Kingston Website at <http://www.utilitieskingston.com> or is available at Kingston City Hall, or the Utilities Kingston offices. For further information about this report or any questions regarding accessibility, contact Robert Cooney at rcooney@utilitieskingston.com, or call 613-546-1181 Ext 2291.

9 FLOWS

Raw, Treated, and Distribution Flows are summarized in the following tables.

UTILITIES KINGSTON – WATER TREATMENT – ANNUAL REPORT

DOCUMENT:

Point Pleasant Water Treatment Plant Annual Summary Report

Table 1 – Raw Water Flow Daily Totals (m3)

| Day | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| 1 | 20,896 | 23,706 | 28,423 | 25,957 | 25,321 | 28,292 | 30,988 | 25,686 | 22,320 | 24,331 | 19,443 | 17,357 |
| 2 | 23,586 | 26,201 | 24,964 | 21,313 | 17,083 | 28,886 | 22,154 | 21,287 | 22,168 | 26,668 | 21,148 | 14,524 |
| 3 | 24,435 | 24,131 | 25,375 | 23,471 | 20,868 | 29,438 | 24,322 | 16,680 | 25,527 | 25,885 | 17,575 | 17,098 |
| 4 | 21,187 | 23,747 | 24,024 | 25,012 | 21,678 | 30,225 | 27,934 | 21,259 | 24,876 | 26,420 | 16,432 | 16,018 |
| 5 | 25,988 | 26,538 | 26,412 | 20,465 | 20,716 | 28,886 | 29,790 | 19,566 | 27,045 | 23,046 | 17,536 | 18,818 |
| 6 | 24,916 | 26,512 | 23,665 | 20,625 | 22,424 | 28,254 | 26,754 | 20,368 | 23,471 | 18,099 | 23,729 | 18,455 |
| 7 | 24,709 | 24,992 | 23,703 | 18,892 | 23,529 | 25,502 | 25,636 | 22,510 | 21,623 | 17,933 | 17,183 | 20,247 |
| 8 | 26,756 | 27,719 | 25,220 | 18,013 | 24,682 | 26,832 | 23,082 | 21,116 | 21,303 | 16,942 | 18,957 | 20,314 |
| 9 | 26,229 | 25,772 | 25,890 | 19,908 | 23,399 | 24,491 | 22,024 | 19,732 | 25,723 | 18,001 | 19,828 | 14,408 |
| 10 | 23,061 | 24,725 | 21,522 | 22,669 | 26,354 | 27,402 | 21,309 | 20,229 | 26,465 | 20,858 | 21,722 | 19,296 |
| 11 | 25,351 | 25,675 | 23,438 | 22,644 | 22,479 | 22,347 | 32,026 | 23,054 | 19,183 | 23,129 | 21,852 | 19,451 |
| 12 | 21,882 | 26,208 | 24,193 | 22,001 | 22,866 | 24,370 | 32,112 | 17,853 | 22,546 | 27,480 | 19,712 | 20,235 |
| 13 | 23,924 | 24,323 | 23,591 | 19,340 | 22,195 | 23,804 | 30,385 | 19,971 | 21,876 | 18,141 | 19,243 | 19,037 |
| 14 | 23,578 | 26,809 | 23,982 | 22,268 | 25,171 | 21,957 | 27,699 | 25,591 | 24,137 | 22,180 | 22,555 | 21,218 |
| 15 | 28,279 | 27,176 | 21,875 | 24,890 | 21,881 | 22,472 | 28,480 | 20,987 | 23,617 | 23,270 | 21,513 | 16,720 |
| 16 | 29,599 | 26,303 | 22,497 | 20,545 | 24,445 | 24,103 | 18,841 | 21,718 | 23,307 | 26,248 | 18,312 | 19,061 |
| 17 | 29,609 | 20,457 | 21,319 | 22,033 | 26,675 | 25,370 | 22,519 | 24,520 | 26,849 | 23,553 | 18,962 | 23,264 |
| 18 | 24,481 | 20,805 | 23,331 | 20,153 | 23,205 | 24,406 | 27,625 | 23,424 | 26,681 | 20,014 | 16,613 | 18,488 |
| 19 | 26,218 | 22,132 | 24,235 | 22,791 | 21,505 | 24,423 | 27,494 | 17,197 | 21,095 | 18,357 | 15,942 | 24,332 |
| 20 | 23,617 | 22,014 | 25,813 | 23,031 | 21,865 | 31,614 | 30,325 | 22,186 | 19,013 | 17,743 | 18,942 | 21,345 |
| 21 | 30,436 | 26,999 | 22,648 | 23,489 | 20,716 | 28,528 | 24,476 | 21,370 | 22,418 | 18,095 | 20,314 | 17,796 |
| 22 | 27,066 | 22,726 | 24,398 | 24,920 | 23,733 | 28,731 | 25,606 | 24,515 | 21,233 | 19,373 | 19,110 | 20,624 |
| 23 | 28,075 | 22,388 | 24,467 | 24,681 | 23,777 | 30,128 | 26,439 | 24,038 | 21,951 | 11,746 | 17,688 | 17,495 |
| 24 | 26,312 | 27,829 | 18,605 | 20,337 | 23,490 | 25,997 | 24,476 | 22,015 | 26,542 | 24,092 | 18,150 | 18,869 |
| 25 | 22,939 | 23,052 | 21,995 | 23,375 | 24,757 | 33,009 | 23,715 | 19,511 | 26,007 | 20,371 | 12,735 | 14,929 |
| 26 | 23,000 | 25,490 | 21,688 | 22,403 | 26,746 | 30,671 | 25,374 | 19,724 | 24,835 | 19,429 | 13,563 | 15,826 |
| 27 | 23,987 | 26,330 | 24,051 | 20,481 | 26,878 | 26,963 | 27,025 | 20,006 | 23,520 | 22,546 | 16,034 | 18,118 |
| 28 | 23,100 | 24,986 | 21,642 | 23,148 | 31,854 | 22,641 | 17,208 | 26,113 | 21,591 | 19,022 | 15,458 | 18,503 |
| 29 | 26,133 | N/A | 27,153 | 19,025 | 28,913 | 24,982 | 16,730 | 24,181 | 22,229 | 18,034 | 20,407 | 20,407 |
| 30 | 26,870 | N/A | 22,110 | 21,632 | 28,298 | 27,908 | 18,247 | 25,457 | 22,528 | 17,867 | 20,120 | 17,586 |
| 31 | 25,520 | N/A | 22,964 | N/A | 27,383 | N/A | 23,568 | 21,784 | N/A | 17,245 | N/A | 19,966 |
| Total | 781,739 | 695,745 | 735,193 | 659,512 | 744,886 | 802,632 | 784,363 | 673,648 | 701,679 | 646,118 | 560,778 | 579,805 |
| Average | 25,217 | 24,848 | 23,716 | 21,984 | 24,029 | 26,754 | 25,302 | 21,731 | 23,389 | 20,843 | 18,693 | 18,703 |
| Min | 20,896 | 20,457 | 18,605 | 18,013 | 17,083 | 21,957 | 16,730 | 16,680 | 19,013 | 11,746 | 12,735 | 14,408 |
| Max | 30,436 | 27,829 | 28,423 | 25,957 | 31,854 | 33,009 | 32,112 | 26,113 | 27,045 | 27,480 | 23,729 | 24,332 |

| | |
|-------------------------------|--------|
| Permit To Take Water (m3/day) | 90,000 |
| Yearly Average (m3) | 22,934 |
| Yearly Min (m3) | 11,746 |
| Yearly Max (m3) | 33,009 |

UTILITIES KINGSTON – WATER TREATMENT – ANNUAL REPORT

DOCUMENT:

Point Pleasant Water Treatment Plant Annual Summary Report

Table 2 – Peak Raw Water Flow Daily Totals (m3)

| Day | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|-------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 1 | 38,530 | 46,933 | 43,919 | 48,793 | 45,186 | 43,637 | 43,034 | 40,708 | 46,107 | 39,570 | 46,585 | 39,999 |
| 2 | 38,843 | 47,896 | 43,823 | 43,687 | 32,086 | 47,851 | 47,809 | 29,802 | 37,997 | 41,152 | 45,804 | 26,429 |
| 3 | 47,327 | 48,017 | 43,836 | 41,017 | 36,285 | 43,524 | 38,817 | 26,631 | 38,276 | 44,482 | 29,486 | 35,939 |
| 4 | 38,012 | 45,281 | 39,828 | 44,121 | 39,451 | 46,071 | 45,173 | 37,654 | 44,803 | 45,202 | 28,680 | 28,753 |
| 5 | 39,623 | 47,591 | 39,951 | 44,616 | 43,718 | 44,001 | 44,536 | 31,049 | 45,898 | 40,530 | 29,119 | 28,470 |
| 6 | 35,632 | 44,804 | 39,742 | 38,666 | 47,012 | 43,791 | 39,842 | 37,609 | 42,667 | 31,693 | 28,853 | 28,675 |
| 7 | 39,933 | 43,657 | 35,714 | 38,831 | 39,684 | 43,579 | 39,852 | 43,214 | 37,491 | 44,247 | 28,774 | 28,663 |
| 8 | 41,678 | 46,647 | 38,949 | 31,576 | 36,537 | 44,178 | 35,456 | 43,686 | 36,216 | 30,158 | 28,823 | 37,209 |
| 9 | 37,596 | 46,673 | 46,677 | 29,494 | 43,628 | 35,675 | 31,443 | 27,213 | 44,544 | 31,254 | 28,658 | 25,979 |
| 10 | 43,799 | 38,737 | 39,192 | 41,693 | 43,710 | 43,614 | 35,609 | 38,288 | 44,555 | 31,796 | 26,119 | 38,646 |
| 11 | 46,824 | 38,655 | 39,784 | 38,634 | 44,820 | 39,534 | 48,025 | 44,676 | 44,443 | 43,638 | 38,844 | 35,790 |
| 12 | 33,729 | 39,906 | 40,664 | 39,816 | 37,793 | 39,835 | 43,762 | 40,235 | 36,175 | 43,702 | 38,740 | 47,610 |
| 13 | 47,109 | 40,917 | 39,005 | 31,493 | 44,615 | 39,655 | 49,188 | 36,403 | 30,838 | 31,650 | 37,970 | 46,135 |
| 14 | 38,521 | 42,081 | 38,807 | 31,684 | 38,334 | 38,429 | 46,676 | 44,600 | 35,755 | 39,914 | 38,168 | 38,550 |
| 15 | 44,728 | 43,633 | 37,349 | 44,791 | 39,565 | 30,185 | 46,981 | 36,529 | 41,868 | 35,628 | 44,376 | 36,009 |
| 16 | 45,902 | 39,965 | 31,457 | 36,287 | 43,831 | 39,829 | 29,880 | 44,828 | 39,813 | 39,839 | 35,567 | 35,582 |
| 17 | 43,481 | 39,707 | 35,649 | 36,396 | 43,260 | 40,195 | 36,141 | 39,732 | 39,629 | 39,868 | 34,391 | 45,546 |
| 18 | 39,238 | 31,267 | 44,643 | 36,278 | 42,268 | 48,086 | 45,196 | 35,747 | 37,218 | 31,336 | 35,479 | 40,283 |
| 19 | 39,571 | 35,441 | 45,136 | 36,081 | 43,341 | 44,476 | 45,826 | 35,754 | 35,604 | 38,750 | 42,457 | 35,944 |
| 20 | 39,414 | 35,447 | 35,969 | 43,538 | 35,734 | 40,142 | 45,301 | 39,748 | 35,627 | 26,253 | 35,589 | 39,042 |
| 21 | 44,164 | 39,921 | 35,634 | 39,773 | 31,437 | 46,930 | 43,776 | 35,625 | 34,643 | 47,074 | 35,798 | 35,322 |
| 22 | 43,614 | 39,184 | 43,882 | 40,234 | 39,541 | 47,898 | 39,776 | 39,744 | 40,101 | 40,202 | 35,158 | 35,514 |
| 23 | 44,058 | 35,464 | 40,121 | 40,295 | 35,790 | 43,692 | 39,938 | 37,901 | 40,229 | 25,377 | 31,884 | 31,194 |
| 24 | 44,099 | 43,738 | 31,327 | 36,265 | 39,751 | 38,057 | 39,971 | 45,020 | 41,809 | 39,884 | 26,083 | 31,512 |
| 25 | 38,900 | 43,672 | 35,176 | 31,452 | 35,803 | 46,977 | 40,076 | 39,821 | 37,473 | 35,544 | 23,992 | 31,235 |
| 26 | 43,641 | 44,636 | 43,096 | 40,551 | 40,157 | 43,375 | 35,722 | 29,689 | 41,374 | 27,268 | 31,621 | 31,345 |
| 27 | 38,900 | 44,656 | 39,764 | 34,860 | 40,343 | 39,851 | 40,529 | 39,798 | 41,618 | 45,134 | 26,627 | 35,555 |
| 28 | 47,308 | 44,693 | 40,124 | 45,272 | 46,465 | 37,690 | 29,602 | 46,524 | 36,746 | 40,257 | 29,524 | 34,516 |
| 29 | 46,886 | N/A | 44,902 | 26,974 | 47,794 | 44,220 | 27,094 | 35,066 | 37,123 | 45,734 | 31,449 | 37,979 |
| 30 | 47,361 | N/A | 41,150 | 44,407 | 46,174 | 43,893 | 29,685 | 43,205 | 38,078 | 28,917 | 31,507 | 28,785 |
| 31 | 40,897 | N/A | 44,904 | N/A | 40,199 | N/A | 29,767 | 29,505 | N/A | 28,779 | N/A | 36,806 |
| Monthly Max | 47,361 | 48,017 | 46,677 | 48,793 | 47,794 | 48,086 | 49,188 | 46,524 | 46,107 | 47,074 | 46,585 | 47,610 |

| | |
|-------------------------------|--------|
| Permit To Take Water (m3/day) | 90,000 |
| Yearly Max (m3) | 49,188 |

UTILITIES KINGSTON – WATER TREATMENT – ANNUAL REPORT

DOCUMENT:

Point Pleasant Water Treatment Plant Annual Summary Report

Table 3 – Treated Water Flow Daily Totals (m3)

| Day | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| 1 | 20,018 | 22,747 | 27,565 | 24,888 | 24,214 | 27,253 | 29,954 | 24,768 | 21,821 | 24,195 | 19,470 | 16,339 |
| 2 | 22,763 | 25,329 | 24,564 | 20,942 | 16,662 | 27,950 | 21,252 | 20,758 | 21,595 | 26,340 | 20,244 | 13,714 |
| 3 | 23,748 | 23,643 | 24,264 | 22,810 | 19,698 | 28,819 | 23,684 | 15,743 | 24,484 | 24,810 | 16,775 | 15,480 |
| 4 | 20,533 | 23,099 | 23,450 | 24,506 | 21,013 | 29,202 | 26,842 | 21,286 | 24,319 | 25,607 | 15,702 | 14,782 |
| 5 | 25,050 | 25,478 | 25,646 | 19,360 | 20,298 | 27,991 | 28,584 | 18,968 | 26,017 | 21,886 | 16,874 | 17,710 |
| 6 | 24,090 | 26,061 | 23,198 | 19,650 | 21,692 | 27,327 | 25,479 | 19,254 | 22,830 | 17,068 | 23,506 | 17,195 |
| 7 | 23,964 | 24,080 | 23,473 | 17,612 | 22,880 | 25,199 | 24,599 | 21,723 | 21,106 | 17,640 | 16,423 | 18,625 |
| 8 | 26,370 | 26,920 | 23,998 | 17,834 | 24,071 | 25,954 | 21,880 | 20,395 | 20,299 | 16,671 | 18,237 | 18,559 |
| 9 | 25,450 | 25,131 | 24,806 | 18,690 | 22,803 | 23,593 | 21,009 | 19,517 | 24,780 | 18,068 | 19,005 | 13,509 |
| 10 | 22,245 | 24,141 | 20,863 | 22,501 | 25,325 | 26,731 | 20,265 | 19,133 | 25,709 | 20,175 | 21,030 | 18,141 |
| 11 | 24,603 | 24,623 | 22,534 | 21,473 | 21,455 | 21,812 | 29,091 | 22,518 | 18,546 | 22,531 | 20,961 | 18,674 |
| 12 | 20,856 | 25,449 | 23,323 | 20,650 | 22,026 | 23,351 | 27,386 | 17,257 | 21,559 | 19,305 | 19,004 | 19,325 |
| 13 | 23,462 | 23,309 | 22,129 | 18,701 | 22,693 | 23,125 | 27,638 | 19,365 | 21,361 | 17,766 | 18,949 | 17,892 |
| 14 | 22,685 | 25,807 | 23,287 | 21,100 | 24,655 | 21,026 | 26,164 | 24,494 | 23,301 | 21,702 | 21,523 | 20,203 |
| 15 | 27,680 | 26,269 | 21,363 | 24,404 | 21,290 | 21,782 | 27,022 | 20,322 | 22,873 | 22,703 | 21,145 | 16,657 |
| 16 | 28,459 | 25,197 | 21,805 | 19,752 | 23,543 | 23,790 | 17,508 | 20,610 | 23,220 | 26,306 | 17,512 | 18,549 |
| 17 | 28,590 | 20,152 | 20,906 | 20,651 | 25,833 | 24,524 | 21,471 | 23,779 | 25,915 | 22,592 | 18,233 | 22,602 |
| 18 | 24,352 | 20,198 | 23,404 | 19,799 | 22,703 | 23,411 | 26,415 | 22,098 | 25,649 | 19,147 | 15,985 | 17,863 |
| 19 | 25,536 | 21,755 | 23,769 | 21,911 | 20,847 | 24,361 | 23,467 | 16,694 | 20,500 | 17,606 | 15,401 | 23,379 |
| 20 | 22,927 | 21,841 | 24,807 | 22,464 | 20,992 | 30,468 | 29,130 | 21,722 | 18,725 | 17,409 | 18,195 | 20,344 |
| 21 | 29,708 | 25,999 | 22,518 | 23,078 | 20,327 | 27,425 | 23,200 | 20,943 | 22,008 | 17,268 | 19,747 | 17,818 |
| 22 | 26,416 | 21,940 | 23,569 | 23,427 | 23,156 | 27,594 | 24,444 | 23,439 | 21,454 | 19,345 | 18,479 | 19,811 |
| 23 | 27,452 | 21,447 | 23,896 | 23,597 | 23,056 | 29,377 | 25,729 | 22,797 | 21,261 | 18,812 | 16,917 | 16,584 |
| 24 | 26,023 | 26,987 | 18,202 | 19,369 | 22,660 | 25,162 | 23,447 | 22,001 | 25,569 | 23,339 | 17,458 | 17,808 |
| 25 | 22,165 | 23,033 | 21,993 | 22,596 | 23,664 | 31,978 | 22,440 | 18,406 | 25,759 | 19,359 | 12,002 | 15,160 |
| 26 | 22,234 | 24,676 | 21,066 | 21,695 | 26,567 | 29,629 | 24,272 | 18,890 | 24,082 | 18,724 | 13,355 | 14,949 |
| 27 | 23,019 | 25,260 | 23,127 | 19,748 | 25,950 | 25,700 | 25,816 | 19,846 | 22,739 | 21,700 | 15,764 | 17,651 |
| 28 | 22,990 | 24,237 | 21,515 | 22,460 | 30,818 | 22,127 | 16,048 | 25,084 | 21,592 | 18,353 | 15,252 | 18,101 |
| 29 | 25,674 | N/A | 26,260 | 18,151 | 28,317 | 24,111 | 15,584 | 23,466 | 21,543 | 17,317 | 19,903 | 19,324 |
| 30 | 26,219 | N/A | 21,595 | 20,588 | 27,505 | 26,971 | 18,111 | 24,900 | 21,870 | 17,037 | 19,327 | 17,527 |
| 31 | 24,572 | N/A | 22,059 | N/A | 26,331 | N/A | 22,542 | 20,853 | N/A | 16,514 | N/A | 19,664 |
| Total | 759,853 | 674,808 | 714,954 | 634,407 | 723,044 | 777,743 | 740,473 | 651,029 | 682,486 | 627,295 | 542,378 | 553,939 |
| Average | 24,511 | 24,100 | 23,063 | 21,147 | 23,324 | 25,925 | 23,886 | 21,001 | 22,750 | 20,235 | 18,079 | 17,869 |
| Min | 20,018 | 20,152 | 18,202 | 17,612 | 16,662 | 21,026 | 15,584 | 15,743 | 18,546 | 16,514 | 12,002 | 13,509 |
| Max | 29,708 | 26,987 | 27,565 | 24,888 | 30,818 | 31,978 | 29,954 | 25,084 | 26,017 | 26,340 | 23,506 | 23,379 |

| | |
|---|--------|
| Municipal Drinking Water Licence Max (m3/day) | 80,000 |
| Yearly Average (m3) | 22,158 |
| Yearly Min (m3) | 12,002 |
| Yearly Max (m3) | 31,978 |

UTILITIES KINGSTON – WATER TREATMENT – ANNUAL REPORT

DOCUMENT:

Point Pleasant Water Treatment Plant Annual Summary Report

Table 4 – Peak Treated Water Flow Daily Totals

| Day | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|-------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 1 | 26,477 | 34,510 | 27,359 | 30,872 | 28,550 | 33,301 | 36,809 | 33,304 | 28,567 | 32,962 | 29,589 | 29,863 |
| 2 | 34,388 | 34,553 | 30,340 | 28,439 | 34,485 | 30,242 | 39,377 | 32,802 | 33,904 | 33,382 | 33,978 | 33,788 |
| 3 | 32,424 | 34,260 | 30,937 | 34,774 | 34,301 | 33,325 | 36,914 | 33,479 | 34,014 | 33,652 | 30,736 | 29,948 |
| 4 | 26,707 | 34,442 | 26,748 | 32,505 | 32,848 | 30,662 | 34,135 | 38,006 | 13,941 | 32,614 | 30,205 | 30,192 |
| 5 | 33,891 | 30,074 | 30,606 | 30,889 | 30,448 | 33,129 | 32,463 | 38,998 | 33,861 | 28,735 | 30,855 | 29,339 |
| 6 | 27,029 | 33,627 | 30,950 | 33,957 | 34,503 | 28,289 | 34,344 | 36,757 | 33,554 | 29,631 | 30,064 | 29,972 |
| 7 | 30,537 | 34,907 | 30,802 | 32,569 | 36,556 | 25,592 | 39,052 | 37,012 | 32,734 | 29,481 | 28,978 | 34,245 |
| 8 | 30,649 | 30,560 | 33,038 | 30,238 | 32,543 | 14,261 | 37,513 | 43,825 | 34,145 | 33,847 | 30,207 | 34,523 |
| 9 | 34,506 | 30,666 | 28,533 | 34,293 | 24,545 | 32,536 | 33,680 | 43,986 | 33,898 | 30,399 | 26,226 | 34,167 |
| 10 | 32,541 | 28,658 | 29,762 | 34,194 | 26,185 | 29,266 | 34,012 | 37,501 | 33,938 | 22,674 | 29,422 | 33,749 |
| 11 | 28,721 | 26,446 | 26,529 | 32,596 | 34,239 | 26,886 | 43,498 | 38,250 | 36,735 | 26,966 | 30,233 | 33,844 |
| 12 | 36,816 | 34,272 | 30,186 | 26,594 | 38,124 | 26,745 | 36,931 | 43,569 | 32,586 | 33,764 | 25,818 | 34,013 |
| 13 | 34,412 | 34,083 | 28,545 | 26,723 | 37,079 | 29,717 | 32,982 | 43,028 | 29,987 | 30,149 | 34,742 | 30,081 |
| 14 | 32,517 | 32,579 | 34,314 | 29,738 | 36,856 | 28,286 | 34,289 | 39,814 | 34,159 | 30,479 | 34,077 | 29,395 |
| 15 | 27,060 | 30,663 | 32,584 | 29,359 | 29,575 | 27,027 | 43,728 | 38,079 | 30,399 | 29,395 | 34,074 | 30,520 |
| 16 | 25,467 | 29,617 | 34,075 | 33,201 | 29,763 | 25,744 | 37,593 | 43,688 | 30,385 | 34,171 | 34,525 | 34,516 |
| 17 | 30,645 | 30,322 | 30,669 | 32,044 | 36,589 | 25,492 | 37,753 | 40,770 | 29,526 | 29,830 | 29,974 | 34,588 |
| 18 | 29,368 | 30,637 | 34,244 | 30,546 | 34,632 | 25,793 | 37,238 | 39,114 | 34,201 | 29,953 | 29,293 | 34,828 |
| 19 | 34,912 | 34,142 | 34,583 | 29,035 | 37,545 | 30,155 | 34,373 | 33,043 | 29,688 | 33,895 | 29,840 | 34,090 |
| 20 | 33,559 | 34,134 | 30,545 | 27,019 | 32,569 | 37,534 | 37,438 | 36,881 | 33,059 | 33,610 | 30,136 | 32,640 |
| 21 | 31,050 | 36,494 | 33,740 | 30,636 | 34,699 | 37,542 | 36,728 | 33,178 | 29,603 | 33,340 | 29,887 | 30,397 |
| 22 | 29,563 | 36,616 | 30,810 | 30,103 | 32,478 | 37,524 | 36,628 | 26,243 | 26,214 | 32,589 | 28,576 | 28,349 |
| 23 | 33,610 | 34,090 | 34,368 | 26,441 | 34,362 | 34,532 | 34,291 | 34,391 | 30,143 | 33,927 | 34,074 | 30,136 |
| 24 | 34,827 | 31,236 | 34,764 | 33,694 | 34,995 | 39,500 | 36,887 | 33,862 | 33,375 | 32,630 | 34,453 | 30,880 |
| 25 | 34,720 | 35,191 | 26,756 | 26,982 | 29,298 | 43,778 | 43,785 | 34,375 | 29,204 | 33,847 | 32,525 | 28,490 |
| 26 | 35,058 | 35,361 | 29,842 | 29,999 | 30,921 | 43,443 | 43,432 | 48,052 | 29,975 | 32,972 | 26,652 | 25,863 |
| 27 | 32,544 | 34,353 | 30,887 | 29,878 | 29,232 | 33,449 | 36,527 | 29,902 | 30,518 | 33,947 | 26,347 | 26,393 |
| 28 | 30,765 | 33,509 | 26,804 | 26,843 | 33,318 | 36,841 | 33,849 | 29,020 | 29,568 | 32,603 | 34,630 | 29,188 |
| 29 | 30,402 | N/A | 30,660 | 31,008 | 37,130 | 43,181 | 36,991 | 33,164 | 33,041 | 34,101 | 34,312 | 29,677 |
| 30 | 30,958 | N/A | 30,157 | 31,032 | 36,807 | 38,854 | 32,658 | 34,080 | 31,032 | 13,821 | 32,559 | 33,945 |
| 31 | 30,955 | N/A | 25,705 | N/A | 34,135 | N/A | 33,291 | 32,825 | N/A | 25,607 | N/A | 28,569 |
| Monthly Max | 36,816 | 36,616 | 34,764 | 34,774 | 38,124 | 43,778 | 43,785 | 48,052 | 36,735 | 34,171 | 34,742 | 34,828 |

| | |
|---|--------|
| Municipal Drinking Water Licence Max (m3/day) | 80,000 |
| Yearly Max (m3) | 49,959 |

UTILITIES KINGSTON – WATER TREATMENT – ANNUAL REPORT

DOCUMENT:

Point Pleasant Water Treatment Plant Annual Summary Report

Table 5 – Net to Distribution System Daily Totals (m3)

| Day | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| 1 | 19,383 | 23,067 | 27,262 | 15,435 | 23,383 | 26,845 | 28,926 | 24,141 | 21,391 | 23,551 | 18,987 | 15,586 |
| 2 | 22,705 | 24,294 | 23,512 | 19,974 | 15,906 | 27,372 | 21,100 | 20,158 | 21,259 | 25,546 | 19,455 | 13,079 |
| 3 | 22,618 | 23,142 | 23,462 | 22,633 | 19,853 | 28,415 | 23,173 | 15,115 | 23,656 | 23,906 | 16,738 | 14,661 |
| 4 | 20,653 | 22,459 | 23,357 | 22,290 | 20,396 | 27,937 | 26,198 | 21,508 | 23,672 | 25,489 | 14,610 | 15,306 |
| 5 | 23,576 | 24,967 | 24,757 | 19,825 | 20,336 | 28,224 | 27,655 | 17,637 | 25,823 | 22,221 | 16,493 | 15,784 |
| 6 | 23,453 | 25,575 | 22,686 | 19,473 | 20,764 | 26,163 | 24,959 | 18,337 | 21,670 | 16,048 | 22,810 | 16,963 |
| 7 | 23,063 | 23,636 | 23,285 | 17,262 | 21,878 | 24,259 | 24,362 | 21,560 | 20,563 | 17,307 | 15,589 | 18,721 |
| 8 | 25,980 | 27,116 | 23,267 | 17,062 | 23,490 | 25,004 | 21,187 | 19,231 | 20,117 | 15,334 | 17,767 | 17,641 |
| 9 | 25,100 | 23,598 | 23,854 | 18,177 | 22,042 | 24,003 | 20,400 | 19,730 | 23,954 | 18,285 | 19,182 | 12,669 |
| 10 | 21,294 | 23,355 | 20,297 | 21,599 | 24,713 | 25,282 | 20,080 | 18,507 | 24,689 | 18,506 | 20,223 | 17,934 |
| 11 | 24,384 | 24,426 | 23,000 | 20,757 | 21,165 | 21,181 | 28,054 | 22,220 | 18,509 | 21,275 | 19,921 | 17,570 |
| 12 | 19,924 | 25,066 | 22,234 | 20,158 | 21,035 | 22,900 | 26,791 | 15,980 | 21,548 | 18,505 | 17,567 | 18,830 |
| 13 | 22,601 | 22,790 | 21,571 | 18,369 | 21,647 | 22,762 | 26,574 | 18,507 | 20,692 | 17,006 | 19,867 | 9,556 |
| 14 | 23,217 | 25,060 | 23,351 | 20,577 | 23,308 | 20,135 | 25,868 | 24,304 | 22,957 | 22,262 | 19,545 | 20,709 |
| 15 | 26,815 | 25,669 | 20,077 | 23,485 | 22,429 | 21,490 | 26,314 | 19,118 | 21,285 | 21,660 | 21,184 | 15,734 |
| 16 | 28,250 | 24,002 | 21,916 | 18,852 | 23,594 | 23,034 | 17,189 | 20,370 | 22,576 | 25,875 | 16,942 | 17,315 |
| 17 | 27,653 | 19,741 | 20,161 | 20,610 | 24,925 | 23,444 | 21,013 | 23,237 | 26,333 | 20,906 | 16,970 | 21,853 |
| 18 | 23,692 | 20,188 | 22,469 | 19,451 | 21,911 | 22,799 | 27,374 | 21,343 | 24,562 | 19,121 | 16,143 | 17,767 |
| 19 | 25,418 | 20,828 | 22,758 | 21,278 | 20,452 | 24,064 | 24,294 | 16,666 | 25,189 | 16,225 | 14,866 | 24,629 |
| 20 | 21,693 | 21,337 | 23,385 | 21,509 | 19,966 | 30,704 | 28,471 | 21,427 | 18,804 | 18,409 | 17,395 | 18,034 |
| 21 | 29,118 | 24,876 | 22,988 | 22,298 | 19,842 | 26,910 | 22,538 | 19,850 | 16,138 | 16,490 | 18,808 | 17,189 |
| 22 | 25,720 | 21,635 | 22,885 | 22,794 | 22,648 | 27,184 | 24,343 | 22,126 | 20,792 | 18,672 | 18,092 | 19,198 |
| 23 | 26,892 | 21,244 | 23,032 | 23,288 | 22,371 | 28,056 | 23,528 | 22,678 | 20,338 | 17,865 | 16,487 | 16,240 |
| 24 | 25,211 | 26,272 | 17,070 | 18,926 | 22,383 | 27,957 | 24,003 | 21,800 | 24,901 | 22,708 | 17,542 | 17,507 |
| 25 | 22,145 | 22,518 | 22,628 | 22,577 | 22,789 | 28,897 | 22,169 | 17,593 | 24,911 | 18,195 | 10,590 | 13,123 |
| 26 | 21,524 | 23,831 | 20,033 | 20,713 | 25,778 | 27,630 | 24,012 | 18,751 | 23,571 | 18,755 | 13,581 | 14,423 |
| 27 | 22,845 | 24,457 | 22,676 | 18,924 | 25,563 | 25,284 | 24,649 | 18,879 | 23,263 | 20,965 | 15,523 | 16,993 |
| 28 | 22,201 | 23,840 | 21,412 | 22,142 | 30,821 | 21,798 | 14,638 | 24,264 | 20,647 | 17,718 | 14,059 | 18,019 |
| 29 | 24,620 | N/A | 25,316 | 16,851 | 27,868 | 23,718 | 15,728 | 14,557 | 21,069 | 17,083 | 19,312 | 19,855 |
| 30 | 25,406 | N/A | 20,586 | 20,063 | 26,682 | 26,424 | 18,319 | 23,868 | 21,088 | 13,922 | 18,882 | 16,114 |
| 31 | 23,758 | N/A | 21,786 | N/A | 25,848 | N/A | 21,466 | 19,721 | N/A | 16,666 | N/A | 18,534 |
| Total | 740,910 | 658,991 | 697,072 | 607,352 | 705,785 | 759,874 | 725,374 | 623,181 | 665,969 | 606,475 | 525,131 | 527,538 |
| Average | 23,900 | 23,535 | 22,486 | 20,245 | 22,767 | 25,329 | 23,399 | 20,103 | 22,199 | 19,564 | 17,504 | 17,017 |
| Min | 19,383 | 19,741 | 17,070 | 15,435 | 15,906 | 20,135 | 14,638 | 14,557 | 16,138 | 13,922 | 10,590 | 9,556 |
| Max | 29,118 | 27,116 | 27,262 | 23,485 | 30,821 | 30,704 | 28,926 | 24,304 | 26,333 | 25,875 | 22,810 | 24,629 |

| | |
|---------------------|--------|
| Yearly Average (m3) | 21,504 |
| Yearly Min (m3) | 9,556 |
| Yearly Max (m3) | 30,821 |



**CANA WATER TREATMENT PLANT
2023 ANNUAL SUMMARY REPORT**

Drinking Water System Number: 220006053
Drinking Water System Owner: City of Kingston
Drinking Water System Category: Small Municipal Residential

Submitted by:
David Fell
President & C.E.O.

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1 INTRODUCTION

This annual summary report has been prepared as required under Ontario Regulation 170/03 of the Safe Drinking Water Act (SDWA) to acknowledge compliance with the terms and conditions of the Drinking Water Works Permit (DWWP) and the Municipal Drinking Water License (MDWL) issued for the Cana Drinking Water System, comment on any incidents of non-compliance during the reporting period, summarize the quantities of the water supplied, and compare those quantities to the rated capacity and flow rates approved in the system's permits and MDWL during the reporting period.

This report is specific to the Cana Water Treatment Plant (WTP) located in the Cana Subdivision, and its associated distribution system serving customers on Marian Crescent, Cana Boulevard, and Rochdale Crescent. The groundwater well and its associated distribution system are owned by the City of Kingston, with Utilities Kingston acting as operating authority.

2 NON COMPLIANCE

There were no issues of non-compliance with the terms and conditions of the DWWP or MDWL during this reporting period.

3 COMPLIANCE

The Treatment Operations department of Utilities Kingston, for the City of Kingston, operates and maintains the Cana Well System and complies with the terms and conditions of the Drinking Water Works Permit (DWWP) and Municipal Drinking Water License (MDWL) for the Cana Water Treatment System. The Utilities Kingston Systems Operations department and the Treatment Operations department of Utilities Kingston operate and maintain the associated distribution system. Staffing is maintained at levels to ensure adequate numbers of trained and licensed personnel are available for proper operations during emergency or upset conditions, vacation/sick relief, or to deal with equipment breakdown.

Quality management systems (QMS), contingency plans, and operation manuals are established and are located in the appropriate facilities and available to appropriate staff.

A QMS for the City of Kingston's drinking water supply systems has been developed and implemented by Utilities Kingston management and staff to ensure the continued safety and security of the community's drinking water by meeting or exceeding the requirements of all relevant legislation and regulations, and the Drinking Water Quality Management Standard (DWQMS). Operation manuals include information necessary for the day to day operations and maintenance of the WTP and distribution system as well as information that may not be regularly used but that might be required to be accessed quickly for various purposes. Contingency plans include information that may be required for proper operation of the WTP or distribution system during emergency or upset conditions and contain items such as emergency plans and contact lists, alternate materials supply sources and notification lists.

The operations strategy of Utilities Kingston includes ensuring that permits and approvals are in place, that efficient maintenance and operations ensures the quality of water supplied to its customers meets or exceeds the minimum requirements as set out in the SDWA, and that permissible flow rates are not exceeded. The City of Kingston, as a means of source water protection, considers the impact of decisions made within its authority on the drinking water supply source for the Cana Water Treatment System.

Flow measuring devices for measuring the amount of water taken from the well, and the amount of water supplied to the distribution system, are calibrated annually. Accuracy in these measurements ensures that treatment chemicals are precisely applied and that flows do not exceed the capacity at which the system is designed to be effective. These flows are recorded to provide current and

DOCUMENT:

Cana Water Treatment Plant Annual Summary Report

historical information, which is used for operational decision making, and to allow both the public and the Ministry of the Environment, Conservation and Parks (MECP) the ability to review treatment operations.

Water quality analyzers that monitor chlorine residual, turbidity, and conductivity of the water directed to the distribution system are remotely monitored, alarm equipped, and maintained in accordance with the manufacturer's recommendations as well as the conditions of the DWWP and MDWL.

A water sampling program is conducted to exceed the minimum requirements of schedule 13 of Ontario Regulation 1703/3 under the Safe Drinking Water Act, and includes additional sampling as well as sampling recommended in the first Engineers Report for the Water Treatment System. Raw water sampling is conducted to give operational staff information required to determine the level of treatment required to make the water potable. In-plant process stream samples provide monitoring of treatment processes. Treated and distribution system sampling provides information regarding the quality of water delivered to customers. All of these samples are analyzed by either licensed staff, or by laboratories accredited by the Standards Council of Canada through the Canadian Association for Environmental Analytical Laboratories.

All sampling information, Annual Reports, and all other documentation required by the DWWP/MDWL and regulations in force during this reporting period is available for public viewing through Utilities Kingston during normal business hours. As the treatment building is typically unstaffed and local access to the information is limited, Utilities Kingston has made an effort to ensure residents supplied by this system receive copies of this information. Annual Reports are also available on the Utilities Kingston website as well as at the Utilities Kingston and City of Kingston offices. Residents of the City of Kingston are encouraged to review this information, the availability of which is advertised through various local media.

4 NOTIFICATIONS

Under Ontario Regulation 170/03, notifications were required for any instances where a sample result indicated that a parameter used to measure water quality exceeded a Maximum Acceptable Concentration (MAC). Once a notification is received from a laboratory or an observation of any other indicator of adverse water quality is made by operations personnel, corrective action as dictated by the regulations is initiated in an effort to confirm the initial result. If confirmed, further action may be recommended by the Medical Officer of Health. If not confirmed sampling will typically return to the normal schedule, or depending on the parameter, Utilities Kingston may choose to increase the sampling frequency to monitor the parameter more closely for a period of time.

4.1 EVENTS REQUIRING NOTIFICATIONS

- The groundwater supply for the Cana Water Treatment System contains a sodium concentration greater than 20 mg/l which requires a notification to the Medical Officer of Health and to the Spills Action Center if a report under subsection 18 (1) of the Safe Drinking Water Act has not been made in respect of sodium in the preceding 57 months. This notification was last completed in July of 2022.

5 QUANTITY OF WATER SUPPLIED

Listed in Table 2 following this report are the treated water flows for the Cana Water Treatment System.

With an annual average daily use of 18.38 m³/day, the estimated per capita use is 221 L/day. The typical Canadian average is 250 – 350 litres per person per day (source: Environment Canada). As customer usage is not metered, system losses are typically estimated based on normal day flows.

DOCUMENT:

Cana Water Treatment Plant Annual Summary Report

Known losses include sample flows to water quality analyzers. High flows, occurring typically during summer months, are usually attributed to excessive lawn watering.

6 FLOW RATE EXCEEDANCES

There were no instances during this reporting period where flows exceeded the maximum allowable flow rate of 108 m³/day. Listed in Table 1 following this report are the raw water flows (water taken from the well) and Table 2 are the treated water flows (water entering the distribution system from the pump-house) for the Cana Water Treatment System.

7 TREATMENT CHEMICALS USED

The only treatment chemical in use in this system is Chlorine, in the form of 12% sodium hypochlorite, which disinfects the water. The sodium hypochlorite is diluted to a 2- 3% solution at the well house prior to the point of injection. The average chlorine dosage for this treatment plant is approximately 3.65 mg/L. Chlorine is dosed at the well at a rate which ensures an adequate residual is maintained at those points in the distribution system that are farthest from the point of entry of treated water to the system and that adequate chlorine Contact Time (CT) is maintained for the rate of flow. Residuals are routinely measured in the distribution system, and the treatment plant chlorine dosage is adjusted as required to ensure the chlorine residual stays above the critical control limit of 0.20 mg/L. The critical control limit is chosen to ensure operators have ample time to respond and correct issues before the chlorine residual reaches the regulatory limit of 0.05 mg/L.

8 SUMMARY

The Cana Water Treatment System supplied water to residents of the Cana subdivision at rates which allowed adequate treatment. Water of acceptable quality which is safe to drink was produced by this treatment system during this reporting period.

Further information is available for this system and is included in the annual reports which can be accessed from the Utilities Kingston Website at <http://www.utilitieskingston.com> or is available at Kingston City Hall, or the Utilities Kingston offices. For further information about this report or any questions regarding accessibility, contact Robert Cooney at rcooney@utilitieskingston.com, or call 613-546-1181 Ext 2291.

9 FLOWS

Raw and Treated flows are summarized in the following tables.

UTILITIES KINGSTON – WATER TREATMENT – ANNUAL SUMMARY REPORT

DOCUMENT:

Canal Water Treatment Plant Annual Summary Report

Table 1 – Raw Water Flow Daily Totals (m3)

| Day | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|---------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 1 | 20.00 | 15.50 | 17.00 | 19.00 | 23.00 | 22.50 | 23.67 | 23.00 | 18.00 | 19.33 | 19.00 | 17.33 |
| 2 | 20.00 | 15.50 | 17.00 | 19.00 | 23.00 | 29.33 | 23.67 | 20.50 | 18.00 | 17.00 | 19.00 | 17.33 |
| 3 | 16.00 | 18.33 | 18.67 | 17.50 | 18.50 | 29.33 | 20.00 | 20.50 | 18.00 | 17.00 | 19.67 | 17.33 |
| 4 | 14.50 | 18.33 | 18.67 | 17.50 | 18.50 | 29.33 | 20.00 | 19.33 | 19.50 | 19.00 | 19.67 | 15.50 |
| 5 | 14.50 | 18.33 | 18.67 | 21.00 | 23.33 | 29.50 | 25.00 | 19.33 | 19.50 | 19.00 | 19.67 | 15.50 |
| 6 | 18.67 | 12.00 | 17.00 | 21.00 | 23.33 | 29.50 | 25.00 | 19.33 | 22.50 | 17.33 | 13.00 | 22.00 |
| 7 | 18.67 | 12.00 | 17.00 | 21.00 | 23.33 | 18.00 | 31.00 | 21.50 | 22.50 | 17.33 | 13.00 | 22.00 |
| 8 | 18.67 | 18.00 | 17.50 | 24.50 | 20.00 | 18.00 | 31.00 | 21.50 | 18.00 | 17.33 | 16.50 | 16.00 |
| 9 | 15.75 | 18.00 | 17.50 | 24.50 | 20.00 | 25.00 | 31.00 | 21.50 | 18.00 | 21.00 | 16.50 | 16.00 |
| 10 | 15.75 | 18.00 | 20.33 | 22.00 | 19.00 | 25.00 | 24.00 | 21.50 | 18.00 | 21.00 | 18.00 | 16.00 |
| 11 | 15.75 | 18.00 | 20.33 | 22.00 | 19.00 | 25.00 | 24.00 | 18.67 | 12.00 | 13.00 | 18.00 | 15.50 |
| 12 | 15.75 | 18.00 | 20.33 | 26.00 | 29.00 | 19.25 | 26.00 | 18.67 | 12.00 | 13.00 | 18.00 | 15.50 |
| 13 | 15.67 | 15.50 | 15.00 | 26.00 | 29.00 | 19.25 | 26.00 | 18.67 | 23.00 | 16.67 | 15.00 | 16.00 |
| 14 | 15.67 | 15.50 | 15.00 | 21.33 | 29.00 | 19.25 | 27.00 | 20.00 | 23.00 | 16.67 | 15.00 | 16.00 |
| 15 | 15.67 | 16.00 | 23.00 | 21.33 | 24.00 | 19.25 | 27.00 | 20.00 | 22.33 | 16.67 | 17.50 | 19.67 |
| 16 | 16.00 | 16.00 | 23.00 | 21.33 | 24.00 | 22.33 | 27.00 | 17.00 | 22.33 | 16.50 | 17.50 | 19.67 |
| 17 | 16.00 | 19.67 | 16.33 | 18.00 | 25.50 | 22.33 | 25.50 | 17.00 | 22.33 | 16.50 | 19.67 | 19.67 |
| 18 | 19.50 | 19.67 | 16.33 | 18.00 | 25.50 | 22.33 | 25.50 | 20.00 | 16.00 | 17.00 | 19.67 | 17.50 |
| 19 | 19.50 | 19.67 | 16.33 | 17.00 | 29.00 | 21.50 | 30.60 | 20.00 | 16.00 | 17.00 | 19.67 | 17.50 |
| 20 | 17.00 | 18.00 | 20.00 | 17.00 | 29.00 | 21.50 | 30.60 | 20.00 | 17.50 | 17.00 | 13.50 | 12.50 |
| 21 | 17.00 | 18.00 | 20.00 | 20.00 | 23.67 | 29.50 | 30.60 | 19.50 | 17.50 | 17.00 | 13.50 | 12.50 |
| 22 | 17.00 | 22.00 | 15.50 | 20.00 | 23.67 | 29.50 | 30.60 | 19.50 | 19.00 | 17.00 | 15.00 | 18.80 |
| 23 | 14.00 | 22.00 | 15.50 | 20.00 | 23.67 | 17.33 | 30.60 | 22.00 | 19.00 | 15.50 | 15.00 | 18.80 |
| 24 | 14.00 | 18.33 | 19.67 | 24.00 | 24.50 | 17.33 | 34.50 | 22.00 | 19.00 | 15.50 | 19.67 | 18.80 |
| 25 | 15.50 | 18.33 | 19.67 | 24.00 | 24.50 | 17.33 | 34.50 | 20.33 | 14.00 | 17.50 | 19.67 | 18.80 |
| 26 | 15.50 | 18.33 | 19.67 | 17.50 | 26.67 | 24.00 | 22.00 | 20.33 | 14.00 | 17.50 | 19.67 | 18.80 |
| 27 | 18.33 | 13.00 | 18.50 | 17.50 | 26.67 | 24.00 | 22.00 | 20.33 | 19.00 | 18.33 | 13.00 | 12.50 |
| 28 | 18.33 | 13.00 | 18.50 | 20.00 | 26.67 | 18.00 | 28.67 | 17.00 | 19.00 | 18.33 | 13.00 | 12.50 |
| 29 | 18.33 | N/A | 20.00 | 20.00 | 28.50 | 18.00 | 28.67 | 17.00 | 19.33 | 18.33 | 17.00 | 21.33 |
| 30 | 17.00 | N/A | 20.00 | 20.00 | 28.50 | 23.67 | 28.67 | 22.00 | 19.33 | 14.50 | 17.00 | 21.33 |
| 31 | 17.00 | N/A | 19.00 | N/A | 22.50 | N/A | 23.00 | 22.00 | N/A | 14.50 | N/A | 21.33 |
| Total | 521.01 | 482.99 | 571.00 | 617.99 | 754.51 | 686.14 | 837.35 | 619.99 | 557.65 | 529.32 | 510.00 | 540.00 |
| Average | 16.81 | 17.25 | 18.42 | 20.60 | 24.34 | 22.87 | 27.01 | 20.00 | 18.59 | 17.08 | 17.00 | 17.42 |
| Min | 14.00 | 12.00 | 15.00 | 17.00 | 18.50 | 17.33 | 20.00 | 17.00 | 12.00 | 13.00 | 13.00 | 12.50 |
| Max | 20.00 | 22.00 | 23.00 | 26.00 | 29.00 | 29.50 | 34.50 | 23.00 | 23.00 | 21.00 | 19.67 | 22.00 |

| | |
|-------------------------------|----------|
| Permit To Take Water (m3/day) | 108.00 |
| Yearly Total (m3) | 7,227.95 |
| Yearly Average (m3) | 19.78 |
| Yearly Min (m3) | 12.00 |
| Yearly Max (m3) | 34.50 |

UTILITIES KINGSTON – WATER TREATMENT – ANNUAL SUMMARY REPORT

DOCUMENT:

Caná Water Treatment Plant Annual Summary Report

Table 2 – Treated Water Flow Daily Totals (m3)

| Day | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|----------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|
| 1 | 19.50 | 14.50 | 15.00 | 17.33 | 17.50 | 22.50 | 22.00 | 23.50 | 18.33 | 17.00 | 17.00 | 16.00 |
| 2 | 19.50 | 14.50 | 15.00 | 17.33 | 17.50 | 28.67 | 22.00 | 17.00 | 18.33 | 15.00 | 17.00 | 16.00 |
| 3 | 12.00 | 16.00 | 17.33 | 16.00 | 19.00 | 28.67 | 22.50 | 17.00 | 18.33 | 15.00 | 16.33 | 16.00 |
| 4 | 15.50 | 16.00 | 17.33 | 16.00 | 19.00 | 28.67 | 22.50 | 17.67 | 16.00 | 16.00 | 16.33 | 15.00 |
| 5 | 15.50 | 16.00 | 17.33 | 18.33 | 21.67 | 26.50 | 23.50 | 17.67 | 16.00 | 16.00 | 16.33 | 15.00 |
| 6 | 17.00 | 15.50 | 15.00 | 18.33 | 21.67 | 26.50 | 23.50 | 17.67 | 20.00 | 15.67 | 15.50 | 17.50 |
| 7 | 17.00 | 15.50 | 15.00 | 18.33 | 21.67 | 21.50 | 29.67 | 19.50 | 20.00 | 15.67 | 15.50 | 17.50 |
| 8 | 17.00 | 14.00 | 15.50 | 23.50 | 21.50 | 21.50 | 29.67 | 19.50 | 17.33 | 15.67 | 14.00 | 15.00 |
| 9 | 15.50 | 14.00 | 15.50 | 23.50 | 21.50 | 21.67 | 29.67 | 17.00 | 17.33 | 18.50 | 14.00 | 15.00 |
| 10 | 15.50 | 18.00 | 18.33 | 23.00 | 18.50 | 21.67 | 23.00 | 17.00 | 17.33 | 18.50 | 16.33 | 15.00 |
| 11 | 15.50 | 18.00 | 18.33 | 23.00 | 18.50 | 21.67 | 23.00 | 19.00 | 17.00 | 12.50 | 16.33 | 15.00 |
| 12 | 15.50 | 18.00 | 18.33 | 21.50 | 25.67 | 19.50 | 20.00 | 19.00 | 17.00 | 12.50 | 16.33 | 15.00 |
| 13 | 14.67 | 13.50 | 16.00 | 21.50 | 25.67 | 19.50 | 20.00 | 19.00 | 15.00 | 16.67 | 15.50 | 15.50 |
| 14 | 14.67 | 13.50 | 16.00 | 19.00 | 25.67 | 19.50 | 27.67 | 17.00 | 15.00 | 16.67 | 15.50 | 15.50 |
| 15 | 14.67 | 16.00 | 18.50 | 19.00 | 21.00 | 19.50 | 27.67 | 17.00 | 21.67 | 16.67 | 15.50 | 16.67 |
| 16 | 16.00 | 16.00 | 18.50 | 19.00 | 21.00 | 22.67 | 27.67 | 16.00 | 21.67 | 14.50 | 15.50 | 16.67 |
| 17 | 16.00 | 19.33 | 16.67 | 17.50 | 21.50 | 22.67 | 23.50 | 16.00 | 21.67 | 14.50 | 13.33 | 16.67 |
| 18 | 16.00 | 19.33 | 16.67 | 17.50 | 21.50 | 22.67 | 23.50 | 18.33 | 14.50 | 15.00 | 13.33 | 14.50 |
| 19 | 16.00 | 19.33 | 16.67 | 15.50 | 23.50 | 23.00 | 27.40 | 18.33 | 14.50 | 15.00 | 13.33 | 14.50 |
| 20 | 15.33 | 16.50 | 16.00 | 15.50 | 23.50 | 23.00 | 27.40 | 18.33 | 13.00 | 17.00 | 20.00 | 11.50 |
| 21 | 15.33 | 16.50 | 16.00 | 20.00 | 22.33 | 27.50 | 27.40 | 17.00 | 13.00 | 17.00 | 20.00 | 11.50 |
| 22 | 15.33 | 20.00 | 15.00 | 20.00 | 22.33 | 27.50 | 27.40 | 17.00 | 16.33 | 17.00 | 13.50 | 16.60 |
| 23 | 15.50 | 20.00 | 15.00 | 20.00 | 22.33 | 19.33 | 27.40 | 17.00 | 16.33 | 13.50 | 13.50 | 16.60 |
| 24 | 15.50 | 16.67 | 19.33 | 21.50 | 21.00 | 19.33 | 31.00 | 17.00 | 16.33 | 13.50 | 17.33 | 16.60 |
| 25 | 13.50 | 16.67 | 19.33 | 21.50 | 21.00 | 19.33 | 31.00 | 18.67 | 16.50 | 16.00 | 17.33 | 16.60 |
| 26 | 13.50 | 16.67 | 19.33 | 14.50 | 24.00 | 21.00 | 22.50 | 18.67 | 16.50 | 16.00 | 17.33 | 16.60 |
| 27 | 18.67 | 16.00 | 16.00 | 14.50 | 24.00 | 21.00 | 22.50 | 18.67 | 16.50 | 17.00 | 14.50 | 16.00 |
| 28 | 18.67 | 16.00 | 16.00 | 19.00 | 24.00 | 20.50 | 25.00 | 16.00 | 16.50 | 17.00 | 14.50 | 16.00 |
| 29 | 18.67 | N/A | 17.50 | 19.00 | 28.00 | 20.50 | 25.00 | 16.00 | 17.00 | 17.00 | 14.00 | 18.33 |
| 30 | 16.00 | N/A | 17.50 | 19.00 | 28.00 | 22.00 | 25.00 | 17.50 | 17.00 | 16.00 | 14.00 | 18.33 |
| 31 | 16.00 | N/A | 17.33 | N/A | 22.50 | N/A | 23.50 | 17.50 | N/A | 16.00 | N/A | 18.33 |
| Total | 495.01 | 462.00 | 521.31 | 569.65 | 686.51 | 679.52 | 783.52 | 552.51 | 511.98 | 490.02 | 469.00 | 491.00 |
| Average | 15.97 | 16.50 | 16.82 | 18.99 | 22.15 | 22.65 | 25.27 | 17.82 | 17.07 | 15.81 | 15.63 | 15.84 |
| Min | 12.00 | 13.50 | 15.00 | 14.50 | 17.50 | 19.33 | 20.00 | 16.00 | 13.00 | 12.50 | 13.33 | 11.50 |
| Max | 19.50 | 20.00 | 19.33 | 23.50 | 28.00 | 28.67 | 31.00 | 23.50 | 21.67 | 18.50 | 20.00 | 18.33 |

| | |
|---|----------|
| Municipal Drinking Water License (m3/day) | 118.00 |
| Yearly Total (m3) | 6,712.03 |
| Yearly Average (m3) | 559.34 |
| Yearly Min (m3) | 11.50 |
| Yearly Max (m3) | 31.00 |



**RAVENSVIEW
WASTEWATER TREATMENT PLANT
2023 ANNUAL REPORT**

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1 EXECUTIVE SUMMARY

Ravensview Wastewater Treatment Plant (WWTP) operates under Ministry of the Environment, Conservation and Parks, ECA number 5556-BZFGZL. The facility was compliant with all conditions outlined in condition 7 of the above-mentioned ECA and are briefly described in the following sections of this report.

The average raw influent flow into the plant was 61,303 m³/day.

The facility had three secondary bypass events during the reporting year totaling 3,043 m³.

Operational staff continually improve the operation of Ravensview WWTP taking full advantage of its state-of-the-art technology to protect the environment and maintain the quality of service our residents have come to know.

2 PLANT DESCRIPTION AND TREATMENT PROCESS

The following is a process overview and description of the treatment steps taken at Ravensview Wastewater Treatment Plant

2.1 RAW WASTEWATER RECEIVING

Raw wastewater from the central and east portions of Kingston is conveyed to the influent works. A Parshall flume metering device continuously measures the flow of raw wastewater into the plant. The septage receiving station is located in the northeast corner of the property. The septage receiving station gives approved septic truck haulers a place to discharge the contents of their tanks. The septage receiving station monitors the quantity, and origin, of the contents being unloaded and provides some pre-treatment before the contents enter the treatment plant at the influent works.

2.2 SCREENING

Three large mechanical screens remove larger materials from the incoming wastewater stream. Screened material is conveyed to a screening press where the material is compacted and stored for offsite disposal.

2.3 GRIT REMOVAL

Grit settles out of the sewage as the water flows through the tanks which are covered to keep the odours in. Air is bubbled into the tank to speed up the settling of the sand, gravel, and other heavier, and inorganic materials. In the bottom of the tank, a screw system pushes the settled grit into a hopper at the end of the tank. A pump lifts the grit and a small amount of water up into a separator where the grit is rinsed and then placed into a dumpster where it awaits disposal at a landfill.

2.4 PRIMARY CLARIFIERS

After removing the screenings and grit, the only material left in the wastewater is organic material and dissolved contaminants. The wastewater flows very slowly from one end of the tank to the other. As this happens, the solids, which are high in organic material, settle to the bottom. Large scrapers draw the material to one end of the tank where it is pumped across to the digesters for further processing. At the end of the primary clarifiers, the primary effluent flows into troughs which then direct it to the secondary treatment process. In the primary clarifiers, any grease, fats, or oils that are suspended are skimmed off by rakes and are pumped to the digesters. Any floatable materials that may have slipped through the bars in the screening process will be ground up before entering the digester.

2.5 BIOLOGICAL AERATED FILTERS

The primary effluent flows to a pumping facility which lifts the wastewater up to a channel running along the centre of the Biological Aerated Filters (BAF) facility. In each of the 11 available cells, the wastewater flows from the central channel to the bottom of the filters, and up through the filter. In the filter the wastewater is aerated, this encourages growth of microorganisms which consume carbon dissolved in the wastewater, as well as reducing ammonia and phosphorus. These microscopic organisms, referred to as biomass, stick onto the Bio Styrene media (4 mm diameter polystyrene beads), which also act to filter any suspended materials. The beads are held in place under a concrete floor with nozzles which let the clean water flow out on the surface. Like other filters, these are backwashed periodically to remove excess biomass growth and filtered particles. This helps to restore the filters' ability to process wastewater efficiently.

2.6 DISINFECTION

Disinfection is accomplished by adding sodium hypochlorite to the BAF facility effluent. The effluent flows by gravity to a chlorine contact chamber where ample time is provided for the chlorine to disinfect the BAF effluent. Just prior to exiting the chlorine contact tank, the wastewater is dosed with sodium bisulphite. This process de-chlorinates the water entering the receiving stream.

2.7 OUTFALL

After de-chlorination, the disinfected effluent from the chlorine contact tanks is discharged to the St. Lawrence River through a 1500mm diameter outfall sewer with fourteen 250mm elbow diffusers, approximately 240m offshore.

2.8 BAF BACKWASH RESIDUAL TREATMENT

As wastewater is filtered through the BAF filter beds, the media becomes increasingly clogged and requires backwashing to remove excess contaminants and biomass. After leaving the BAF cell, the backwash residual water follows the backwash channel to 2 backwash residual tanks, each large enough to accommodate the volume of backwash residual from a backwash. The water is pumped back to the head of the plant using one of two submersible backwash residual pumps.

2.9 ANAEROBIC DIGESTERS

The digester facility consists of 3 primary digesters and 1 secondary digester. Inside, the mixture is heated to allow microorganisms to grow and consume carbon, this produces methane gas and carbon dioxide. The first primary digester, digester 3, is heated to 55 degrees Celsius (thermophilic), which further assists in the destruction of harmful bacteria in the solids. After approximately 15 days, the solids are transferred in series to two other primary digesters, digesters 1 and 2, which are heated to 36 degrees Celsius (mesophilic), where they remain for an additional 15 days before being stored in the secondary digester, digester 4, before being sent to the dewatering facility.

Sludge in digesters 1 and 2 is mixed using four mechanical mixers mounted on each of the digester's roofs. The sludge from digesters 1 and 2 is recirculated through two sludge heat exchangers, this helps the digester maintain the correct temperature. Mixing in digester 3 is accomplished using only a mixing pump. The sludge from digester 3 is also recirculated through a heat exchanger to maintain the correct temperature as well. Digester 4 sludge is pumped to holding tanks in the dewatering building where it is recirculated until ready to be dewatered.

The methane gas produced is used as fuel for the boiler system which in turn provides heat for the digestion process through the sludge heat exchangers. If more gas is being generated than can be used in the boiler, the excess gas can be used in a combined heat and power generation system, Co-gen, to help offset the power purchased from the grid, or burned using a flare stack.

2.10 DEWATERING

Liquid biosolids, which are about 2% solid and 98% water, are pumped from the secondary digester into 2 centrifuges. Polymer is added to the biosolids before it enters the centrifuge, this helps the solids stick together, aiding the dewatering process. The centrifuge spins at a high-speed, forcing solids to the outer drum. This separates the solids, referred to as cake, from the liquid, called centrate. The cake, which now has a solids content of about 30%, is conveyed to a hopper. When enough material is in the hopper, a piston pump pushes the solid cake to the biosolids storage building. Alternatively, the cake materials can be loaded directly into a dump truck in a separate loading bay. The centrate, which contains many nutrients and some microorganisms, is returned to the headworks for treatment.

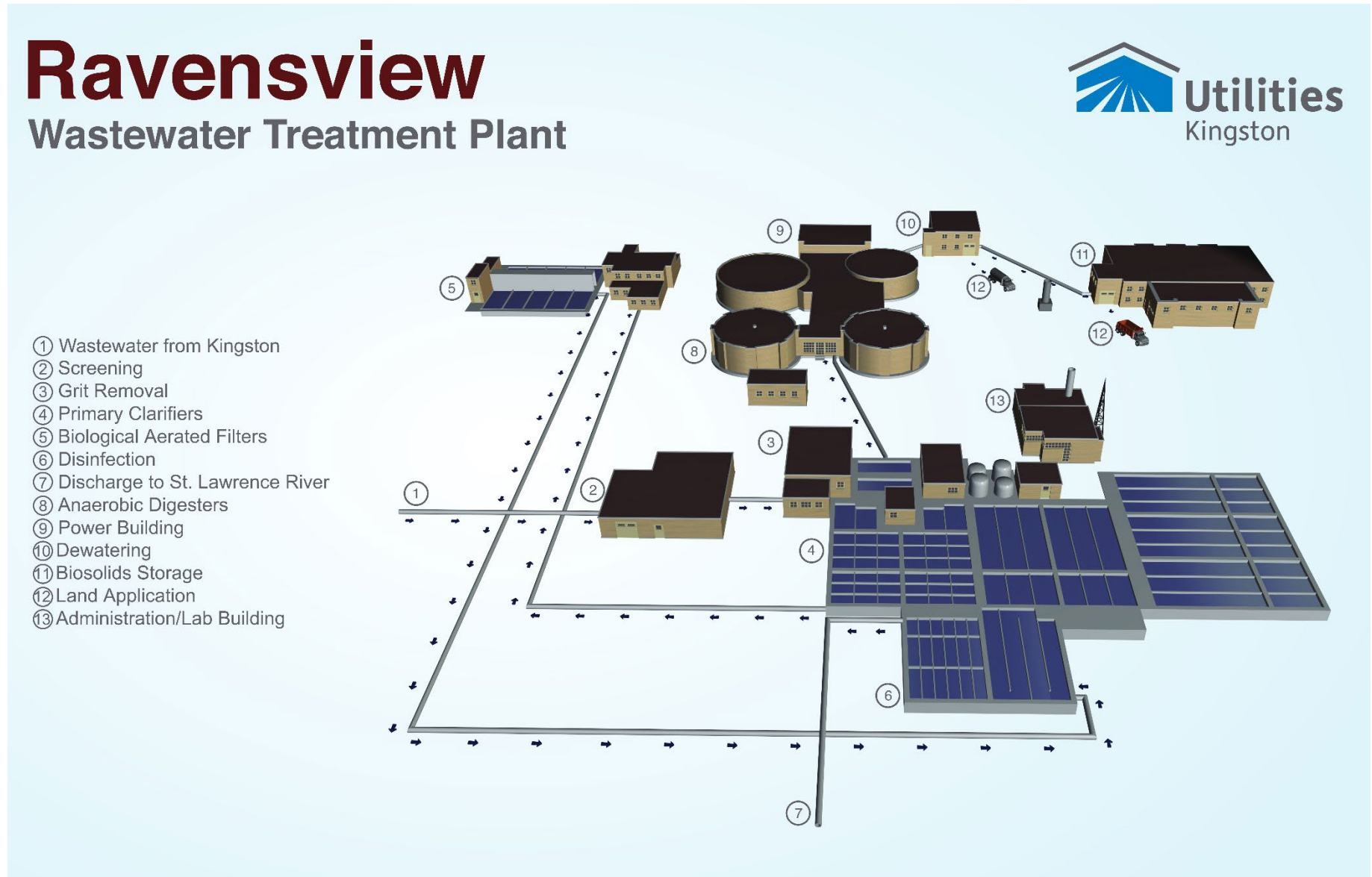
2.11 BIOSOLIDS STORAGE

The dry product, cake, that results from the treatment process is stored on site. The cake is then used on agricultural lands as a nutrient and soil conditioner when weather and crop conditions permit.

2.12 STANDBY EQUIPMENT

The power building houses two 575kW electric back-up generators that are designed to run the water pollution control plant in the event of a power outage. These units are powered by 12-cylinder, low emission natural gas engines that will start automatically in the event of a power failure. The aforementioned Co-gen is a combined heat and power generator. This 8-cylinder engine is designed to work on natural gas, digester gas which has been cleaned and the moisture removed, or a blend of these two fuels. The Co-gen unit is designed to run continuously and produce 375 kW of electric power and 500kW of heat reducing the amount of gas required to heat the digesters.

Figure 1 - Ravensview Wastewater Treatment Plant General Layout



DOCUMENT:
Ravensview Wastewater Treatment Plant Annual Report

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3 OPERATION

Adequate staffing as well as preventative maintenance and regular equipment inspections allowed operational problems to be diagnosed quickly and corrective actions to be taken immediately. Non flushable materials such as wipes, and grease continue to be more prominent in the sewer system resulting in some operational and maintenance challenges. Utilities Kingston continues to implement a public education program to help customers become more aware of what materials should not be flushed down the sewers. This program has included radio and newspaper campaigns, social media campaigns such as Twitter and Facebook, bill stuffers, information on back of parking tickets, and bus information signs. This has been an ongoing campaign for many years with positive results. During the summer of 2023 staff worked to educate owners of grease traps within our system on how to properly maintain their equipment. Pamphlets describing the importance of appropriate grease trap maintenance and how it impacts our system were delivered to many restaurants across the city.

There were several large operational problems that occurred through the year. In September there was a buildup of polystyrene beads from the Biological Aerated Filters (BAF) that were drawn into the backwash tanks. These beads interfered with the level sensors in the backwash tanks, and the primary effluent channels. This level sensor interference led to one of the secondary treatment bypasses at the plant. Staff cleaned out the polystyrene beads and pump them back into the cells. Staff continue to monitor the presence of beads in the backwash tanks to ensure this does not happen again. During the fall the effluent from the plant had increased effluent concentrations, which were related to seasonal flow changes and maintenance being performed on the digester. Staff were able to

4 INFLUENT AND SEPTAGE

Utilities Kingston monitors the raw influent sewage, as well as the imported sewage from our septage receiving station for several parameters throughout the year.

The concentration of the monitored parameters (biochemical oxygen demand (BOD), total kjeldahl nitrogen (TKN), Total Suspended Solids (TSS), and Total Phosphorous (TP)) in the sewage being received at the septage station has been increasing over the past several years. These higher concentrations lead to more frequent operational challenges, including maintenance on the influent screening equipment, and increased costs associated with treating the wastewater. In the next calendar year staff will increase sampling, and verification of septage loads. This will help ensure our treatment system is not impacted by the increasing concentrations of these parameters.

The concentration of the monitored parameters in the raw sewage has also been increasing over the past 5 years. Utilities Kingston has been working to remove stormwater flows into the sanitary sewer system (i.e., separating combined sewers), and it's possible that the reduced stormwater in the sanitary system could have an influence on the increased concentrations of these parameters. The average temperature of the sewage being received at the facility is also increasing and could also be an indicator of the reduced stormwater inputs which are typically much colder than the raw sewage.

The annual average sample results for both Raw Influent and Septage Receiving for the past five years are shown in tables 4 and 5.

5 PLANT PERFORMANCE

The ECA number 5556-BZFGZL lists the limits and objectives for the concentrations of certain effluent parameters, this is shown in Table 3. The effluent objectives listed in this table are the concentrations we are expected to be below. The effluent concentration limits listed in the table are the concentrations we are required to be below. Ravensview WWTP did not exceed any of the limits

set out in the ECA throughout the calendar year. However, the plant did exceed the objective for E. Coli in the month of May. The effluent limits and objectives are shown in Table 3, and the Final Effluent results can be seen in Table 6 and 7. Operational staff had difficulty managing seasonally increased raw influent concentrations. Staff managed the increased concentrations by increasing chemical dosages and taking primary clarifiers offline to increase flow rates through the plant. Final effluent TSS was elevated, however operators were able to maintain a concentration below the objective of 15 mg/L. The average daily influent flow for the year was 64.5% of the rated capacity of the facility, this is below the average influent flow rates from the past 8 years. Raw Influent, Septage, Final Effluent, and Sludge/Biosolids samples were collected and submitted to a third-party laboratory at or above the required frequencies based on the ECA.

6 BIO-SOLIDS MANAGEMENT

Ravensview WWTP processed 64,332.36 m³ of liquid sludge through the centrifuge. Approximately 3,062.4 Metric Tonnes of sludge cake was stored on site until GFL Environmental applied it to land on licensed agricultural fields. A similar amount of sludge cake is expected to be produced next year. The location and date of land application of the Bio-solids produced largely depends on weather, and the crops being grown on the receiving lands. Table 1 contains active spreading locations and their appropriate Non-Agricultural Source Materials Plan (NASM).

7 MAINTENANCE

Staff continue to use our preventative maintenance program in accordance with manufacturer's recommendations.

Additional Maintenance completed this year:

- Infrared scans of high voltage electrical was performed across the plant.
- Equipment and motors had routine vibration monitoring conducted.
- All primary clarifiers were cleaned and inspected.
- The gas Cogen alternator was serviced.
- The media in the septage odour control unit was replaced.
- Both grit tanks were cleaned and inspected.
- Digester 1 and 2 sludge recirculation line had all valves replaced.

8 CAPITAL WORKS

The major highlights for capital works were:

- One of the primary effluent pumps was sent out to be rebuilt.
- The scum pits had repairs completed.
- Concrete in the Bio-solids building was repaired.
- Lighting upgrades have begun throughout the plant.
- Effluent water line supplying water throughout the plant was replaced.
- A blower in the BAF was replaced.
- The gas Cogen had the Human Machine Interface (HMI) replaced.

9 EQUIPMENT CALIBRATION

Third party contractors calibrated all plant flow meters, online analyzers, and lab equipment. As a result, the facility saw limited downtime of major equipment and saw very few mechanical or electrical failures this year. Calibration records are available upon request.

10 COMPLAINTS

In the 2023 reporting year, the Ravensview WWTP received one complaint regarding odours from the facility. Although staff did not notice any increased odours at the facility, efforts were made to change some of the maintenance procedures to reduce any odours. There were no additional odour complaints.

11 BYPASS & OVERFLOW SUMMARY

The facility had three secondary bypass events during the reporting year. These secondary bypass events were due to equipment malfunctions and high flows into the plant. The details of these events are listed in Table 2.

For further information about this report or any questions regarding accessibility, contact Tim Bourne at tbourne@utilitieskingston.com or call 613-546-1181 Ext 2190.

12 BIOSOLIDS RECIPIENTS

Table 1 – Biosolids Recipients

| Non-Agricultural Source Materials Plan (NASM) | Address |
|--|--|
| 24326 | Lot 20 Concession 3 South Town of Greater Napanee |
| 60611 | Lot 13-15 Concession 2 Loyalist Township |
| 24405 | Lot 7-8 Concession 4 Loyalist Township |
| 60884 | Lot 24-27 Concession 5 South Town of Greater Napanee |

13 ANNUAL OVERFLOW SUMMARY

Table 2 – Annual Overflow Summary

| PCP # | Location | Number of Events | Volume (m3) |
|--------------|---------------------------------------|-------------------------|--------------------|
| 1 | Orchard-Emma Martin CSO | 0 | 0.00 |
| 2 | 535 Rideau Belle Park Trunk | 0 | 0.00 |
| 5 | Dalton Ave PS | 0 | 0.00 |
| 14 | Barrack St E of King St | 0 | 0.00 |
| 22 | William St W of Ontario St | 1 | 41.86 |
| 23 | Earl St W of Ontario St | 4 | 186.62 |
| 24 | Gore St W of Ontario St | 0 | 0.00 |
| 25 | Lower Union W of Ontario St | 3 | 396.65 |
| 26 | West St S of King St | 1 | 472.00 |
| 28 | King St (O'Kill) PS | 0 | 0.00 |
| 34 | Helen St at Mack St | 0 | 0.00 |
| 35 | Palace Rd PS | 0 | 0.00 |
| 41 | Morton St PS | 0 | 0.00 |
| 43 | King-Portsmouth PS | 1 | 574.00 |
| 48 | West end of Sherwood Dr | 0 | 0.00 |
| 50 | South end of Parkway | 0 | 0.00 |
| 51 | Clarence St W of King St | 1 | 450.16 |
| 52 | Raglan Rd at Rideau St | 1 | 161.45 |
| 53 | Union St at Division St | 1 | 0.02 |
| 55 | King-George CSO | 1 | 2507.80 |
| 56 | King-Collingwood CSO | 2 | 1166.63 |
| 65 | 535 Rideau Belle Park Local | 2 | 751.64 |
| 68 | Quebec St at Barrie St | 0 | 0.00 |
| 69 | Greenview Dr PS | 0 | 0.00 |
| 70 | Carlisle St at Chestnut St | 0 | 0.00 |
| 74 | Barrett Court | 3 | 88.20 |
| 76 | Ravensview Wastewater Treatment Plant | 3 | 3043.00 |
| 79 | Riverview Way PS | 0 | 0.00 |
| N/A | Total | 24 | 9840.02 |

14 EFFLUENT OBJECTIVES AND LIMITS

Table 3 – Effluent Objectives and Limits

| Effluent Parameter | Objective | Limits |
|---|-------------------------------|------------------------------|
| CBOD5 | 15.00 mg/L (Monthly Average) | 25.00 mg/L (Monthly Average) |
| Total Suspended Solids | 15.00 mg/L (Monthly Average) | 25.00 mg/L (Monthly Average) |
| Total Phosphorus | 0.8 mg/L (Monthly Average) | 1.00 mg/L |
| Total Ammonia Nitrate (Winter) | 12.00 mg/L (October to May) | N/A |
| Total Ammonia Nitrate (Summer) | 7.00 mg/L (June to September) | N/A |
| Total Ammonia Nitrate (Fall) | 5.00 mg/L (July to August) | N/A |
| E. Coli | 100 CFU/100mL | 200 CFU/100mL |
| CBOD5 Monthly Average Daily Effluent Loading | N/A | 2,375 kg/d |
| Total Suspended Solids Monthly Average Daily Effluent Loading | N/A | 2,375 kg/d |
| Total Phosphorous Monthly Average Daily Effluent Loading | N/A | 95 kg/d |

Note: pH maintained between 6.0 to 9.5 at all times

15 SEPTAGE RECEIVING

Table 4 – Septage Receiving

| Parameter | 2019 | 2020 | 2021 | 2022 | 2023 |
|------------------|-------------|-------------|-------------|-------------|-------------|
| BOD5 (mg/L) | 204 | 804 | 565 | 790 | 1476 |
| TP (mg/L) | 360 | 29 | 22 | 53 | 99 |
| TKN (mg/L) | 7 | 548 | 227 | 299 | 564 |
| TSS (mg/L) | 114 | 1975 | 1213 | 995 | 3658 |

16 PLANT PERFORMANCE RESULTS

Table 5 – Raw Influent Results

(Monthly Average)

| Month | BOD5 (mg/L) | Total Suspended Solids (mg/L) | Total Phosphorus (mg/L) | Total Ammonia Nitrogen (mg/L) | Total Kjeldahl Nitrogen (mg/L) | pH | Temp |
|----------------|--------------------|--------------------------------------|--------------------------------|--------------------------------------|---------------------------------------|-----------|-------------|
| January | 39.00 | 48.00 | 2.00 | 15.06 | 19.4 | 7.81 | 13.33 |
| February | 36.00 | 95.00 | 2.40 | 14.53 | 18.43 | 7.8 | 14.03 |
| March | 27.00 | 27.00 | 1.90 | 14.95 | 17.33 | 7.96 | 14.82 |
| April | 41.00 | 39.00 | 1.80 | 13.31 | 15.55 | 7.62 | 15.18 |
| May | 19.00 | 25.00 | 1.00 | 9.33 | 11.15 | 7.63 | 15.18 |
| June | 29.00 | 30.00 | 1.30 | 11.3 | 13.44 | 7.51 | 14.92 |
| July | 29.00 | 55.00 | 1.80 | 12.73 | 15.68 | 7.52 | 17.75 |
| August | 14.00 | 30.00 | 3.90 | 12.95 | 17.3 | 7.59 | 14.28 |
| September | 23.00 | 36.00 | 2.00 | 18.29 | 21.56 | 7.55 | 15.66 |
| October | 70.00 | 183.00 | 3.40 | 27.7 | 31.25 | 7.45 | 12.5 |
| November | 56.00 | 114.00 | 3.70 | 25.56 | 32.42 | 7.22 | 13.45 |
| December | 46.00 | 65.00 | 2.20 | 13.81 | 19.05 | 7.37 | 15.2 |
| Annual Average | 35.75 | 62.25 | 2.28 | 15.79 | 19.38 | 7.59 | 14.69 |

DOCUMENT:
Ravensview Wastewater Treatment Plant Annual Report

Table 6 – Final Effluent Results (Part 1)
(Monthly Average)

| Month | CBOD5 (mg/L) | Total Suspended Solids (mg/L) | Total Phosphorus (mg/L) | Total Ammonia Nitrogen (mg/L) | Un-ionized Ammonia (mg/L) |
|----------------|--------------|-------------------------------|-------------------------|-------------------------------|---------------------------|
| January | 1.90 | 4.70 | 0.36 | 1.62 | 0.01 |
| February | 3.00 | 4.20 | 0.38 | 1.83 | 0.01 |
| March | 3.00 | 3.10 | 0.50 | 1.73 | 0.01 |
| April | 1.80 | 3.50 | 0.56 | 1.68 | 0.02 |
| May | 1.80 | 3.20 | 0.47 | 0.72 | 0.01 |
| June | 1.60 | 3.40 | 0.58 | 1.25 | 0.01 |
| July | 2.10 | 5.40 | 0.73 | 1.47 | 0.01 |
| August | 3.40 | 6.10 | 0.43 | 0.74 | 0.01 |
| September | 2.40 | 12.90 | 0.75 | 1.05 | 0.01 |
| October | 2.70 | 14.20 | 0.71 | 3.55 | 0.01 |
| November | 3.40 | 12.90 | 0.56 | 5.5 | 0.01 |
| December | 2.60 | 9.40 | 0.34 | 1.65 | 0.01 |
| Annual Average | 2.48 | 6.92 | 0.53 | 1.90 | 0.01 |

Table 7 – Final Effluent Results (Part 2)

| Month | pH | E Coli (CFU/100mL) | Acute Lethality (Pass or Fail) | Total Residual Chlorine (mg/L) |
|----------------|------|--------------------|--------------------------------|--------------------------------|
| January | 7.16 | 16 | PASS | 0.00 |
| February | 7.19 | 13 | N/A | 0.01 |
| March | 7.22 | 4 | N/A | 0.00 |
| April | 7.00 | 15 | PASS | 0.01 |
| May | 6.91 | 103 | N/A | 0.01 |
| June | 6.79 | 62 | N/A | 0.01 |
| July | 6.72 | 66 | PASS | 0.01 |
| August | 6.81 | 9 | N/A | 0.00 |
| September | 6.44 | 9 | N/A | 0.00 |
| October | 6.55 | 8 | PASS | 0.01 |
| November | 6.46 | 3 | N/A | 0.00 |
| December | 6.72 | 15 | N/A | 0.01 |
| Annual Average | 6.83 | 26.92 | PASS | 0.01 |

Table 8 – Effluent Loading Limits

| Month | CBOD5 (kg/d) | Total Suspended Solids (kg/d) | Total Phosphorous (kg/d) |
|----------------|--------------|-------------------------------|--------------------------|
| January | 117 | 290 | 22 |
| February | 206 | 289 | 26 |
| March | 225 | 233 | 38 |
| April | 142 | 275 | 44 |
| May | 147 | 262 | 38 |
| June | 101 | 216 | 37 |
| July | 125 | 322 | 44 |
| August | 204 | 367 | 26 |
| September | 110 | 591 | 34 |
| October | 110 | 577 | 29 |
| November | 144 | 548 | 24 |
| December | 150 | 543 | 20 |
| Annual Average | 149 | 376 | 32 |

Table 9 – Annual Plant Influent Flows

| Parameter | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 |
|----------------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| Average (m3/day) | 59,640 | 86,200 | 69,005 | 77,265 | 59,435 | 57,278 | 68,505 | 61,303 |
| Max (m3/day) | 179,987 | 169,266 | 181,067 | 160,459 | 141,016 | 146,486 | 153,434 | 148,549 |
| Design (m3/day) | 95,000 | 95,000 | 95,000 | 95,000 | 95,000 | 95,000 | 95,000 | 95,000 |
| Design Peak (m3/day) | 193,000 | 193,000 | 193,000 | 193,000 | 193,000 | 193,000 | 193,000 | 193,000 |
| Daily/Design (%) | 62.8 | 90.7 | 72.6 | 81.3 | 62.6 | 60.3 | 72.1 | 64.5 |
| Max/Peak (%) | 93.3 | 87.7 | 93.8 | 83.1 | 73.1 | 75.9 | 79.5 | 77.0 |



**CATARAQUI BAY
WASTEWATER TREATMENT PLANT
2023 ANNUAL REPORT**

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1 EXECUTIVE SUMMARY

On December 14th, 2023, the Cataraqui Bay Wastewater Treatment Plant (WWTP) revoked the Ministry of the Environment, Conservation and Parks, ECA number 3714-9YUKZF, and began to operate under ECA number 4163-ACPPRK. An amended ECA, number 2497-CYPPUP was issued on December 22nd, 2023, following a change that was made to the system description, this is the current ECA for the facility.

During 2023 the facility was compliant with all but one of the conditions outlined in condition 7 of ECA number 3714-9YUKZF. The non-compliant month and effluent parameter is described in the following sections of this report.

The average daily flow through the plant was 28,740 m³/day.

There were no bypass events at Cataraqui Bay. There were three spills to the environment of Digester Gas, due to flare stack problems.

Plant staff continue to maintain operations during the facility upgrades. There has been continued planned and reactive maintenance as well as capital works at both the facility and within the collection system. Details regarding these improvements are in the report.

We have continued to provide additional training to staff at the facility to increase their knowledge of the process upgrades currently underway.

2 PLANT DESCRIPTION AND TREATMENT PROCESS

The following is a process overview and description of the treatment steps taken at Cataraqui Bay WWTP. The descriptions contained within this report relate to ECA number 3714-9YUKZF, as the WWTP was required to comply with the regulatory requirements of ECA number 3714-9YUKZF for most of the 2023 reporting year.

A detailed description of the upgraded WWTP described in ECA number 2497-CYPPUP will be provided in the next annual report.

2.1 GRIT REMOVAL

The first step in the treatment process is grit removal. This is accomplished by introducing air into the bottom of the grit channel. The heavier solids in the wastewater settle to the bottom of the tank, while the organics that require treatment stay in suspension and move on to the next step of the treatment process.

2.2 SCREENING

The second operation is the removal of large particles and floating debris such as wood, rags and plastics from the raw wastewater. These items are removed using mechanical screens that rake the debris from the wastewater stream and onto a belt conveyor.

2.3 FLOW SPLITTING

The screened wastewater discharges into a channel where a flow splitter divides the flow into two separate channels that lead to both C and D plants. The channels are equipped with motorized gate valves to control the flow rate to each plant.

2.4 PRIMARY SETTLING

The heavier organics settle by gravity to the bottom of the primary clarifiers. This forms a sludge blanket on the bottom of the tank. The settled sludge is collected by collector flights and scraped into a hopper at the end of the tank. The settled sludge is then pumped to digestion facilities for

further treatment. As wastewater is discharged from the primary clarifiers, it is dosed with aluminum sulfate for phosphorus removal.

2.5 AERATION

Organic matter is broken down by microorganisms in the Aeration tanks. The microorganisms are supplied with air, and food (which is provided by the primary clarifier effluent). Healthy populations of microorganisms are maintained by returning some of the biomass from the final clarifiers. The aeration process effectively removes 95% of the biochemical oxygen demand from the incoming wastewater.

2.6 FINAL SETTLING

After the breakdown of the wastewater is completed, the mixture of microorganisms (mixed liquor) from the aeration tanks flows into the final clarifiers for solid-liquid separation. The biomass formed in the aeration tanks settles to the bottom of the final clarifiers. A portion of this biomass is returned to the head of the aeration tanks. The remainder of the biomass is pumped to sludge thickening facilities.

2.7 DISINFECTION

The supernatant effluent from the final clarifiers is then directed to the disinfection facilities. Chlorine is dosed to the wastewater just prior to entering the chlorine contact tank where disinfection of the final effluent occurs. Just after exiting the chlorine contact tank the wastewater is dosed with calcium thiosulphate for de-chlorination to ensure no chlorine remains in the water entering the receiving stream.

2.8 OUTFALL

After de-chlorination, the disinfected effluent from the chlorine contact tank is discharged back to Lake Ontario through a 1500 mm and a 900 mm outfall sewer. The diffusers at the ends of the sewer lines are located 25 m offshore and 16 m below water surface level.

2.9 SLUDGE THICKENING

The sludge thickening facility consists of two rectangular holding tanks, dual rotating drum thickeners and a polymer system. Sludge is thickened from 0.5% solids to approximately 3.5% solids before being pumped to the digester facilities.

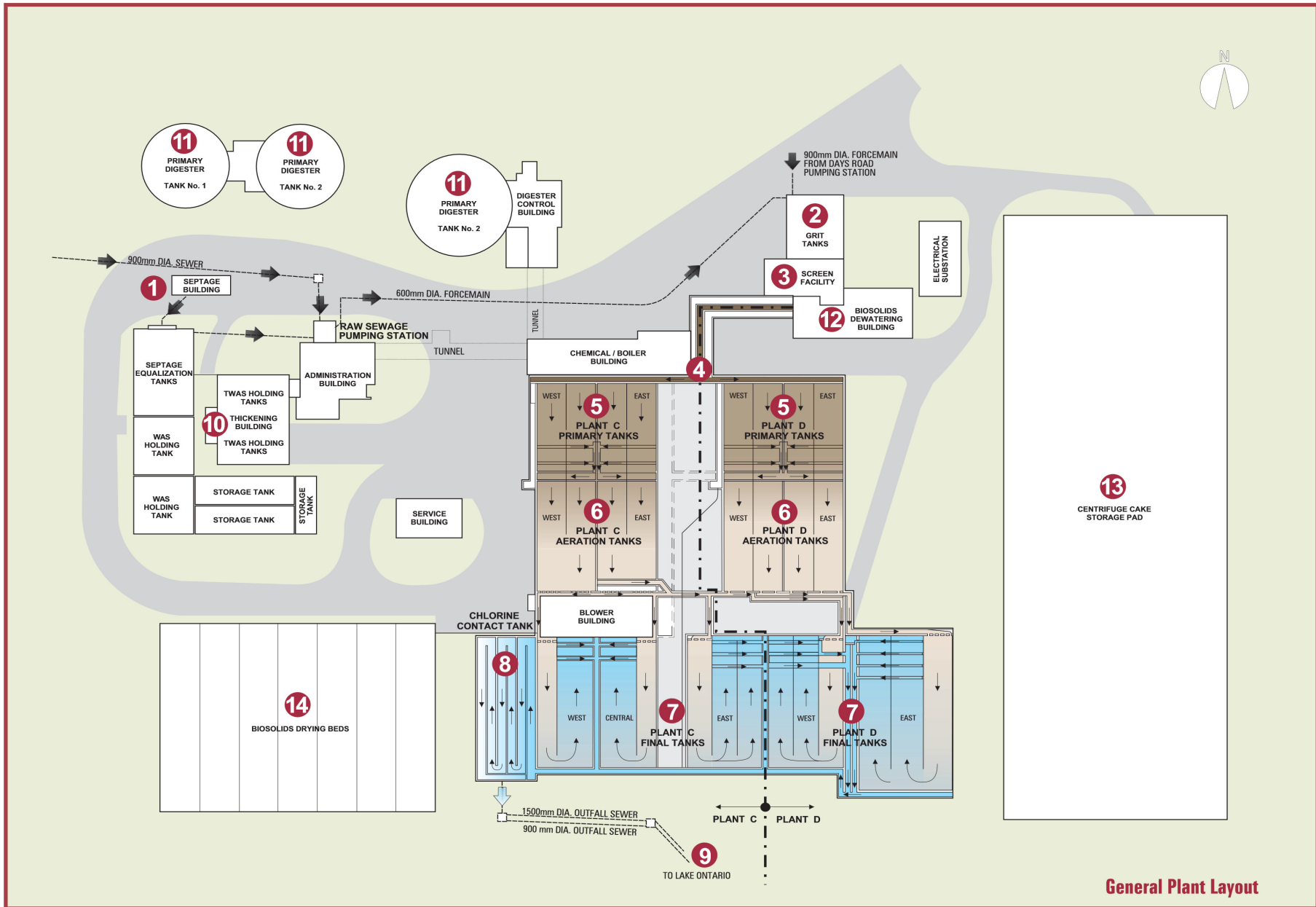
2.10 BIOSOLIDS MANAGEMENT

The sludge from the primary and final clarifiers as well as the sludge from the thickening process is pumped to the digester facilities. The digester facilities consist of one primary digester, one secondary digester and a holding tank. In the primary digester, the sludge is heated, mixed and re-circulated under controlled anaerobic conditions. The anaerobic digestion process produces gas and biosolids. The gas produced is rich in methane which is used as fuel for the boiler system which in turn provides heat for the digestion process. The biosolids produced through sludge digestion are dewatered and used on agricultural lands as a nutrient and soil conditioner when weather and crop conditions permit.

2.11 BIOSOLIDS DEWATERING

The biosolids produced through digestion are dewatered by centrifugation. The centrifuged cake produced is land applied when weather and crops permit.

Figure 1 – Cataraqui Bay Wastewater Treatment Plant General Layout



General Plant Layout

DOCUMENT:

Cataraqui Bay Wastewater Treatment Plant Annual Report

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3 OPERATION

Adequate staffing as well as preventative maintenance, and regular equipment inspections resulted in minimal disruptions to the operation of the plant. Non flushable materials such as wipes, and grease continue to be more prominent in the sewer system resulting in some operational and maintenance challenges. Utilities Kingston continues to implement a public education program to make customers more aware of what materials should not be flushed down the sewers. This program has included radio and newspaper campaigns, social media campaigns such as Twitter and Facebook, bill stuffers, information on back of parking tickets, and bus information signs. This has been an ongoing campaign for many years with positive results. During the summer of 2023 staff worked to educate owners of grease traps within our system on how to properly maintain their equipment. Pamphlets describing the importance of appropriate grease trap maintenance and how it impacts our system were delivered to many restaurants across the city.

Operators encountered several operational difficulties throughout the year. Staff investigated the integrity of the Biological Aerated Filter decks in an effort to locate the source and reason that BAF beads (polystyrene product) were discharging from the BAF cells. Staff found and replaced a broken nozzle that is meant to hold back the beads, while allowing secondary effluent to flow through.

Further, Operators had difficulties maintaining effluent limits and objectives during the summer and fall months, details are below in the Plant Performance section.

The new Calcium Thiosulphate (Captor) line to the final effluent dose location has continued to plug up with deposits. Staff attempted to mitigate this operational issue by flushing the line and have developed a flushing schedule. However, despite these efforts the problem has persisted and as such, a temporary line to ensure continued dosing of Captor has been added, while staff work to find a permanent solution.

4 PLANT PERFORMANCE

Substantial Completion of the plant upgrade was achieved in February 2023. Throughout the reporting year, the remaining construction was completed, and the plant was commissioned by December 31, 2023, with the exception of the chlorination system of which Utilities Kingston received an amended ECA from the MECP. Remaining clean-up type work (i.e., correcting deficiencies noted during commissioning) and the commissioning of the chlorination system, and heating, ventilation and air conditioning systems continues.

The Cataraqui Bay WWTP had one non-compliant monthly average result for Total Phosphorus (TP) of 1.07 mg/L, with the monthly average effluent concentration above the limit of 1.0 mg/L. This occurred in the month of October. This non-compliant result was reported to the MECP, after discussing the efforts made to improve the effluent concentrations (including contacting a consultant) no further actions were required.

In July the E.Coli concentration in the final effluent exceeded the objective but remained well below the limit, the objectives and limits can be seen in Table 2.

The annual average concentration of Total Suspended Solids (TSS) for 2023 was below the limit, but above the objective outlined in the ECA, all Objectives, and Limits are listed in Table 2. All Effluent monitoring results are shown in Table 4 and 5. The elevated TSS concentrations are a direct result of the new treatment process.

No other parameters were above their limit or objective.

Operators experienced operational challenges as plant systems came online and were commissioned. Work has advanced to optimize the processes and correct deficiencies to ensure the safe and compliant operation of the plant. A consultant has been retained to assist the operations group to improve the quality of the effluent from the plant. Staff will continue with mitigation strategies

to reduce concentrations of TP and TSS in the plant effluent. The concentration of raw influent into the plant remains consistent throughout the year, however during the wet seasons concentrations are somewhat reduced, indicating some infiltration of ground water, or potentially illegal sump pump connections to the sanitary collection system. Annual raw influent monitoring results can be seen in Table 3. Raw Influent, and Final Effluent samples were collected and submitted to a third-party laboratory at or above the required frequencies based on the ECA.

5 BIO-SOLIDS MANAGEMENT

Cataraqui Bay WWTP processed 43,489.6 m³ of liquid sludge through the centrifuge. Approximately 2,396.27 Metric Tonnes of sludge cake was stored on site until GFL Environmental applied it to land on licensed agricultural fields.

The location and date of land application of the Bio-solids produced largely depends on weather, and the crops being grown on the receiving lands. Table 1 contains the Non-Agricultural Source Materials Plan (NASM) numbers and addresses of receiving lands for bio-solids produced by the City of Kingston.

6 MAINTENANCE

Staff continue to use our preventative maintenance program in accordance with the manufacturer's recommendations.

Additional Maintenance completed this year:

- Infrared scans of HV electrical were performed across the plant.
- Equipment and motors had routine vibration monitoring conducted.
- The onsite diesel generator was serviced and received routine maintenance.
- Chains and flights in all clarifiers and gravity thickeners were tightened and inspected.
- Rebuild completed on west chlorine gas regulator.
- BAF cell 4 nozzle replacements completed.
- Sludge pump lobes and seals replaced.
- South RDT drum was inspected, and cracks in the drum were welded.

7 CAPITAL WORKS

In October 2016 work began on plant wide upgrades. The original proposed project completion timeline was 4 years (2016-2020). Although the original proposed completion date has passed, the Cataraqui Bay WWTP continues to undergo an extensive process, electrical/instrumentation, and mechanical upgrade.

Additional capital works on the Cataraqui Bay WWTP include:

- Replaced flare stack regulating valve.
- Installed a new grinder on the feed line to Digester 3.
- BAF air compressor wet tank installed.

8 EQUIPMENT CALIBRATIONS

Third party contractors calibrated all plant flow meters, online analyzers, and lab equipment. As a result, the facility saw limited downtime of major equipment and saw very few mechanical or electrical failures this year. Calibration records are available upon request.

9 COMPLAINTS

In the 2023 reporting year, the Catarauqui Bay WWTP received no official complaints regarding the facility or treatment process.

10 BYPASS AND SPILL SUMMARY

There were no bypasses at the Catarauqui Bay WWTP in 2023.

There were three spill events of un-combusted Digester Gas to the environment, totaling 52.25 m³ that were reported to the MECP in the 2023 reporting year. These spills occurred when the pilot light of the flare stack blew out in high winds. When the flare is not lit digester gas not being consumed in the boilers was not burnt at the flare stack, this is considered a spill to the environment.

11 BYPASS RESULT INTERPRETATIONS

As noted above there were no bypasses at the Catarauqui Bay WWTP in 2023. However, it should be noted that bypass discharges have a high bacteria count due to the lack of disinfection. CBOD₅, TP, and TSS results are typical raw sewage influent levels. When bypasses occur, best efforts are made to capture the debris contained in any discharges to the lake. After each bypass event, shoreline inspections near discharge points are done to monitor any debris that may come ashore, and clean-up is done if debris is found.

For further information about this report or any questions regarding accessibility, contact Tim Bourne at tbourne@utilitieskingston.com or call 613-546-1181 Ext 2190.

12 BIOSOLIDS RECIPIENTS

Table 1 – Biosolids Recipients

| Non-Agricultural Source Materials Plan (NASM) | Address |
|---|--|
| 60616 | Lot 11-15 Concession 2 Town of Greater Napanee |
| 24326 | Lot 23-24 Concession 3 South Town of Greater Napanee |
| 24326 | Lot 20 Concession 3 South Town of Greater Napanee |
| 60611 | Lot 13-15 Concession 2 Loyalist Township |
| 60884 | Lot 24-27 Concession 5 South Town of Greater Napanee |

13 EFFLUENT OBJECTIVES AND LIMITS

Table 2 – Effluent Objectives and Limits

| Effluent Parameter | Objective | Limits |
|-------------------------|------------------------------|------------------------------|
| CBOD5 | 15.00 mg/L (Monthly Average) | 25.00 mg/L (Monthly Average) |
| Total Suspended Solids | 15.00 mg/L (Monthly Average) | 25.00 mg/L (Monthly Average) |
| Total Phosphorus | 1 mg/L (Monthly Average) | 1.00 mg/L |
| Total Chlorine Residual | <0.02 mg/L | 0.02 mg/L |
| E. Coli | 100 CFU/100mL | 200 CFU/100mL |

Note: pH maintained between 6.0 to 8.5 at all times

14 PLANT PERFORMANCE RESULTS

Table 3 – Raw Influent Results

(Monthly Average)

| Month | BOD5 (mg/L) | Total Suspended Solids (mg/L) | Total Phosphorus (mg/L) | Total Ammonia Nitrogen (mg/L) | Total Kjeldahl Nitrogen (mg/L) | pH |
|----------------|-------------|-------------------------------|-------------------------|-------------------------------|--------------------------------|------|
| January | 248 | 426 | 5.50 | 23.33 | 41.33 | 7.15 |
| February | 171 | 162 | 3.40 | 18.1 | 37.53 | 7.28 |
| March | 194 | 159 | 4.20 | 17.36 | 35.96 | 7.3 |
| April | 170 | 138 | 2.90 | 18.28 | 32.15 | 7.29 |
| May | 193 | 176 | 2.80 | 22.56 | 28.43 | 7.17 |
| June | 173 | 134 | 3.00 | 22.14 | 34.5 | 6.91 |
| July | 208 | 142 | 3.80 | 23.18 | 36.45 | 7.15 |
| August | 162 | 170 | 4.10 | 19.42 | 35.46 | 7.19 |
| September | 294 | 252 | 4.00 | 25.8 | 40.53 | 6.77 |
| October | 206 | 169 | 4.70 | 26.68 | 43.4 | 6.98 |
| November | 151 | 164 | 3.50 | 23.18 | 35.46 | 6.85 |
| December | 122 | 73 | 2.30 | 15.21 | 26.13 | 7.31 |
| Annual Average | 191 | 180.42 | 3.68 | 21.27 | 35.61 | 7.11 |

DOCUMENT:
 Cataraqui Bay Wastewater Treatment Plant Annual Report

Table 4 – Monthly Effluent Concentrations (Part 1)
 (Monthly Average)

| Month | CBOD5 (mg/L) | Total Suspended Solids (mg/L) | Total Phosphorous (mg/L) | Total Ammonia (mg/L) | Total Kjeldahl Nitrogen (mg/L) |
|----------------|--------------|-------------------------------|--------------------------|----------------------|--------------------------------|
| January | 7.50 | 15.00 | 0.72 | 8.76 | 10.98 |
| February | 8.10 | 23.30 | 0.65 | 11.27 | 14.25 |
| March | 6.60 | 11.20 | 0.46 | 10.55 | 12.76 |
| April | 8.00 | 9.00 | 0.57 | 8.64 | 11.13 |
| May | 6.50 | 14.30 | 0.80 | 0.73 | 2.35 |
| June | 8.60 | 20.00 | 0.86 | 3.70 | 7.48 |
| July | 10.80 | 27.20 | 0.98 | 4.79 | 8.35 |
| August | 5.80 | 22.60 | 0.76 | 1.55 | 3.82 |
| September | 7.80 | 19.00 | 0.94 | 1.27 | 3.45 |
| October | 4.50 | 20.90 | 1.07 | 0.48 | 3.40 |
| November | 6.40 | 29.80 | 0.71 | 0.52 | 3.66 |
| December | 3.90 | 14.30 | 0.39 | 2.56 | 4.45 |
| Annual Average | 7.04 | 18.88 | 0.74 | 4.57 | 7.17 |

Table 5 – Monthly Effluent Concentrations (Part 2)

| Month | Nitrate | Nitrite | E. Coli | pH | Acute Lethality (Pass or Fail) |
|----------------|---------|---------|---------|------|--------------------------------|
| January | 13.73 | 0.34 | 38 | 7.15 | N/A |
| February | 13.23 | 0.68 | 62 | 7.27 | N/A |
| March | 13.49 | 0.32 | 12 | 7.17 | Pass |
| April | 13.38 | 0.70 | 18 | 7.43 | N/A |
| May | 16.88 | 1.50 | 27 | 7.21 | N/A |
| June | 20.16 | 1.06 | 13 | 6.85 | N/A |
| July | 18.58 | 1.59 | 109 | 7.27 | N/A |
| August | 19.34 | 1.06 | 17 | 7.41 | N/A |
| September | 26.60 | 1.48 | 7 | 7.26 | N/A |
| October | 27.90 | 1.29 | 19 | 7.39 | N/A |
| November | 26.18 | 0.59 | 11 | 7.41 | N/A |
| December | 15.88 | 0.18 | 16 | 7.53 | N/A |
| Annual Average | 18.78 | 0.90 | 29 | 7.28 | N/A |

Table 6 – Effluent Loading Limits

| Effluent Parameter | Loading Limit from Effluent | Annual Average |
|------------------------|-----------------------------|----------------|
| CBOD5 | 970 kg/day | 202.4 kg/day |
| Total Suspended Solids | 970 kg/day | 542.7 kg/day |
| Total Phosphorous | 39 kg/day | 21.3 kg/day |

Table 7 – Monthly Flows

| Month | Rated Capacity (m3/day) | Average Flow (m3/day) | Approved Peak Flow (m3/day) | Peak Flow (m3/day) |
|----------------|--------------------------------|------------------------------|------------------------------------|---------------------------|
| January | 38,800 | 35,434 | 134,400 | 65,972 |
| February | 38,800 | 38,221 | 134,400 | 82,315 |
| March | 38,800 | 37,801 | 134,400 | 59,631 |
| April | 38,800 | 33,935 | 134,400 | 62,950 |
| May | 38,800 | 30,553 | 134,400 | 108,514 |
| June | 38,800 | 22,942 | 134,400 | 32,718 |
| July | 38,800 | 22,407 | 134,400 | 45,600 |
| August | 38,800 | 26,112 | 134,400 | 48,849 |
| September | 38,800 | 19,058 | 134,400 | 21,741 |
| October | 38,800 | 20,815 | 134,400 | 25,785 |
| November | 38,800 | 22,305 | 134,400 | 34,205 |
| December | 38,800 | 35,293 | 134,400 | 63,469 |
| Annual Average | N/A | 28,740 | N/A | 54,312 |

Table 8 – Annual Plant Flows

| Parameter | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 |
|----------------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| Average (m3/day) | 59,640 | 30,042 | 28,963 | 29,251 | 27,189 | 27,225 | 29,381 | 28,707 |
| Max (m3/day) | 179,987 | 121,860 | 94,957 | 91,976 | 82,297 | 51,566 | 88,225 | 108,514 |
| Design (m3/day) | 95,000 | 38,800 | 38,800 | 38,800 | 38,800 | 38,800 | 38,800 | 38,800 |
| Design Peak (m3/day) | 193,000 | 134,400 | 134,400 | 134,400 | 134,400 | 134,400 | 134,400 | 134,400 |
| Daily/Design (%) | 62.8 | 77.4 | 74.6 | 75.4 | 70.1 | 70.2 | 75.7 | 74.0 |
| Max/Peak (%) | 93.3 | 90.7 | 70.7 | 68.4 | 61.2 | 38.4 | 65.6 | 80.7 |



**CANA WASTEWATER TREATMENT PLANT
2023 ANNUAL REPORT**

DOCUMENT:

Cana Wastewater Treatment Plant Annual Report

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Cana Wastewater Treatment Plant Annual Report

1 EXECUTIVE SUMMARY

Cana Wastewater Treatment Plant (WWTP) operates under Ministry of the Environment, Conservation and Parks, ECA number 4021-9WUKDE. In the month of February, the facility was out of compliance with one of the effluent limits outlined in condition 7 of the above-mentioned ECA. The facility was compliant during all other months through 2023.

The sewage works has a rated capacity of 125 m³/d, and a maximum day design flow of 200 m³/d. The average flow through the plant was 62.7 m³/d, and the maximum daily flow through the plant was 180 m³/d in 2023.

2 PLANT OVERVIEW

The following is a process overview and description of the treatment steps taken at the Cana WWTP

2.1 RAW SEWAGE PUMPING STATION

A pre-cast concrete wet well accepts sewage flows from the existing sewer system for the Cana Subdivision. The wet well has two pumps which discharge into the preliminary treatment unit.

2.2 PRELIMINARY TREATMENT UNIT

Preliminary treatment involves the removal of large particles and floating debris such as wood, rags, and plastics from the raw sewage. This is accomplished with a manual bar screen installed inside a splitter box.

2.3 SECONDARY TREATMENT UNIT

The sewage flows through the splitter box and bar screen, it then discharges into the two Sequencing Batch Reactors (SBR). Each reactor is essentially an activated sludge process with aeration and settling taking place in the same tank. The decanted effluent from the SBR is then stabilized in a Post Equalization Tank. The sludge that settles out in the SBR is then pumped directly to the Digester.

2.4 POST EQUALIZATION TANK

The Post Equalization Tank collects the decanted water from the Sequencing Batch Reactors and discharges to the tertiary filter system.

2.5 CHEMICAL DOSING SYSTEMS

Phosphorus removal is accomplished using Aluminum Sulfate, which is injected directly into the splitter box during pump cycles.

2.6 TERTIARY FILTRATION UNIT

The discharge of the post equalization tanks goes into a continuous backwash up-flow sand filter to polish the water before going through the ultraviolet disinfection system. Filtrate then passes through one of the two UV disinfection units.

2.7 ULTRAVIOLET (UV) DISINFECTION

The filtrate then passes through one of the two UV disinfection units. Each unit can handle the maximum flow of 200 m³/day.

2.8 OUTFALL

The treated effluent from the plant is discharged into a 27.9-meter-long pipe into an existing creek which flows into Colonel By Lake.

DOCUMENT:

Cana Wastewater Treatment Plant Annual Report

2.9 BUILDING AND CONTROL ROOM

There is one building that houses the tertiary filtration unit, chemical dosing systems, blowers, and all associated electrical equipment.

2.10 DIGESTER UNIT

The waste sludge generated from the SBRs is pumped into the digester for stabilization and storage. The digester supernatant is returned to the influent manhole and the sludge is hauled approximately every 30 days to Ravensview WWTP in the City of Kingston for further treatment.

2.11 STANDBY EQUIPMENT

A diesel generator on the property of the Cana WWTP provides backup electrical supply in case of power outages. This generator is directly connected to both the Cana Water and Cana Wastewater facilities and is capable of fully powering both systems in the event of a power outage.

3 MONITORING DATA

All required samples were collected and sent to a third-party laboratory for testing. The semiannual upstream surface water monitoring sample could not be collected in October due to a lack of flow in the existing water course. The downstream sample was collected in October, and both the upstream and downstream samples were collected in April and the results are shown in Table 5 and 6.

Monthly plant flows can be found in Table 10. The flow into the plant was much higher in the beginning of the year and dropped as the year went on. The concentration of the raw influent (Table 2) increases as the volume of flow decreases. The increased flow during the wet season, as well as the differences in concentrations that correlate to changes in volumes indicates there is likely ground water infiltration or illegal sump connections in the system. Efforts were made to remove illegal connections in 2020, Table 9 shows that the flows have been much more manageable since.

In February 2023, the average monthly concentration of Total Phosphorus was 0.22 mg/L, exceeding the limit of 0.10 mg/L as per the ECA. This exceedance was reported to the MECF, the efforts to reduce the effluent concentrations were detailed (listed below) and no further action was required. Details are shown in Table 1. Additionally, there were several months where the Total Suspended Solids, and Total Phosphorous exceeded the monthly objectives, but were below the compliance limit. The concentration of CBOD5, Total Ammonia Nitrogen, E.Coli and pH have been well below both compliance and objective limits. The final effluent results summary is shown in Table 3 and 4. Operators were able to reduce the effluent concentrations of Total Suspended Solids, and Total Phosphorous, and have confidence that improvements will be sustained in 2024.

4 OPERATION

Staff continue to optimize the plant process to ensure continuous and reliable operations. Cana WWTP exceeded the monthly average limit of Total Phosphorous during the month of February. The raw sewage pumping station was cleaned out to reduce the loading to the plant and improved the effluent quality. Since then, the operations staff continued to clean out the raw sewage pumping station which has improved the effluent of the plant throughout the year. In April the plant saw a peak daily flow of 180 m³/day, the maximum daily flow to the plant approved by the ECA is 200 m³/day. As discussed above, efforts to reduce illegal sump pump connections in 2020 reduced the peak flows dramatically. Staff have begun reviewing CCTV footage and started to complete spot checks to find the source of the increased flows.

DOCUMENT:

Cana Wastewater Treatment Plant Annual Report

Effluent quality began deteriorating again in November and December, staff flushed and rinsed the sand filter, which did not show any immediate impact. Staff noted older biomass in the SBR's and increased wasting to remove the older sludge. A load of sludge from the Ravensview WWTP was used to seed the SBR's in early 2024 with healthy biomass.

5 BIOSOLIDS MANAGEMENT

There were 8 loads, totaling 82.6 m³ in volume, of sludge collected and brought to Ravensview WWTP. The sludge was discharged at the septage facility.

6 MAINTENANCE

Staff continue to use our preventative maintenance program in accordance with manufacturer's recommendations.

Additional Maintenance completed this year:

- Routine equipment maintenance took place throughout the plant.
- EQ tank check valve was replaced.
- Compressor head was replaced.

7 CAPITAL WORKS

- There was no capital work required for the plant this year.

8 EQUIPMENT CALIBRATIONS

All of the treatment facility flow meters are calibrated annually by third party contractors. Calibration records are available upon request.

9 COMPLAINTS

In the 2023 reporting year, the Cana WWTP received no official complaints regarding the facility or treatment process.

10 BYPASS SUMMARY

There were no bypass events in the system this year. However, it should be noted that bypass discharges have a high bacteria count due to the lack of disinfection. CBOD₅, TP, and TSS results are typical raw sewage influent levels. When bypasses occur, best efforts are made to capture the debris contained in any discharges to the lake. After each bypass event, shoreline inspections near discharge points are done to monitor any debris that may come ashore, and clean-up is done if debris is found.

For further information about this report or any questions regarding accessibility, contact Tim Bourne at tbourne@utilitieskingston.com or call 613-546-1181 Ext 2190.

DOCUMENT:

Cana Wastewater Treatment Plant Annual Report

11 EFFLUENT OBJECTIVES AND LIMITS

Table 1 – Effluent Objectives and Limits

| Effluent Parameter | Objective | Limits |
|--------------------------------|--------------------------------|------------------------------|
| CBOD5 | 5.00 mg/L (Monthly Average) | 10.00 mg/L (Monthly Average) |
| Total Suspended Solids | 5.00 mg/L (Monthly Average) | 10.00 mg/L (Monthly Average) |
| Total Phosphorus | 0.10 mg/L (Monthly Average) | 0.20 mg/L |
| Total Ammonia Nitrate (Winter) | 2.00 mg/L (October to March) | 3.00 mg/L |
| Total Ammonia Nitrate (Summer) | 1.00 mg/L (April to September) | 2.00 mg/L |
| E. Coli | 100 CFU/100mL | 200 CFU/100mL |

Note: pH maintained between 6.5 to 8.5 at all times

12 PLANT PERFORMANCE RESULTS

Table 2 – Raw Influent Results

(Monthly Average)

| Month | BOD5 (mg/L) | Total Suspended Solids (mg/L) | Total Phosphorus (mg/L) | Total Ammonia Nitrogen (mg/L) | Total Kjeldahl Nitrogen (mg/L) | pH |
|----------------|-------------|-------------------------------|-------------------------|-------------------------------|--------------------------------|------|
| January | 50 | 63 | 2.10 | 13.45 | 17.50 | 7.64 |
| February | 49 | 81 | 1.80 | 11.81 | 16.73 | 7.51 |
| March | 74 | 89 | 3.20 | 14.96 | 22.70 | 7.79 |
| April | 57 | 89 | 1.70 | 10.05 | 14.55 | 7.30 |
| May | 42 | 72 | 1.60 | 10.04 | 11.80 | 7.33 |
| June | 51 | 78 | 2.30 | 16.50 | 19.60 | 7.87 |
| July | 44 | 96 | 2.30 | 17.21 | 20.43 | 7.21 |
| August | 45 | 62 | 2.60 | 20.50 | 23.72 | 7.43 |
| September | 95 | 125 | 4.10 | 29.00 | 35.53 | 7.38 |
| October | 70 | 162 | 4.40 | 32.20 | 33.63 | 7.15 |
| November | 77 | 124 | 3.50 | 25.68 | 31.06 | 7.17 |
| December | 37 | 68 | 1.60 | 12.32 | 14.20 | 7.10 |
| Annual Average | 58 | 92 | 2.60 | 17.81 | 21.79 | 7.41 |

Table 3 – Final Effluent Results (Part 1)

(Monthly Average)

| Month | CBOD5 (mg/L) | Total Suspended Solids (mg/L) | Total Phosphorous (mg/L) | Total Ammonia (mg/L) |
|----------------|--------------|-------------------------------|--------------------------|----------------------|
| January | 3.00 | 4.10 | 0.10 | 0.37 |
| February | 3.00 | 9.10 | 0.22 | 0.22 |
| March | 3.00 | 8.80 | 0.13 | 0.4 |
| April | 1.90 | 4.30 | 0.11 | 0.62 |
| May | 1.90 | 4.30 | 0.09 | 0.04 |
| June | 3.00 | 9.60 | 0.08 | 0.05 |
| July | 2.40 | 2.80 | 0.08 | 0.08 |
| August | 1.80 | 3.90 | 0.09 | 0.05 |
| September | 3.00 | 4.10 | 0.13 | 0.03 |
| October | 3.00 | 5.30 | 0.14 | 0.05 |
| November | 1.80 | 6.70 | 0.11 | 0.07 |
| December | 3.00 | 6.00 | 0.09 | 0.05 |
| Annual Average | 2.57 | 5.75 | 0.11 | 0.17 |

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Cana Wastewater Treatment Plant Annual Report

Table 4 – Final Effluent Results (Part 2)

| Month | Nitrate (mg/L) | pH | E Coli (CFU/100mL) | Acute Lethality (Pass or Fail) |
|----------------|----------------|------|--------------------|--------------------------------|
| January | 3.23 | 7.73 | 1 | N/A |
| February | 4.2 | 7.86 | 1 | N/A |
| March | 4.22 | 7.79 | 0 | N/A |
| April | 3.74 | 7.89 | 1 | PASS |
| May | 2.98 | 7.77 | 0 | N/A |
| June | 5.66 | 8.04 | 1 | N/A |
| July | 12.37 | 7.42 | 0 | N/A |
| August | 5.59 | 7.7 | 0 | N/A |
| September | 8.19 | 7.6 | 1 | N/A |
| October | 8.58 | 7.49 | 1 | PASS |
| November | 6.07 | 7.43 | 0 | N/A |
| December | 4.63 | 7.56 | 0 | N/A |
| Annual Average | 5.79 | 7.69 | 0.50 | PASS |

Table 5 – Upstream Surface Water Monitoring

| Date | CBOD (mg/L) | Total Suspended Solids (mg/L) | Total Phosphorus (mg/L) | Total Ammonia Nitrate (mg/L) | Nitrate Nitrogen (mg/L) | E. Coli (CFU/100 mL) | pH |
|------------------|-------------|-------------------------------|-------------------------|------------------------------|-------------------------|----------------------|------|
| April 12th 2023 | <3 | 3.00 | 0.09 | <0.05 | 0.18 | 0 | 7.99 |
| October 4th 2023 | N/A | N/A | N/A | N/A | N/A | N/A | N/A |

Table 6 – Downstream Surface Water Monitoring

| Date | CBOD (mg/L) | Total Suspended Solids (mg/L) | Total Phosphorus (mg/L) | Total Ammonia Nitrate (mg/L) | Nitrate Nitrogen (mg/L) | E. Coli (CFU/100 mL) | pH |
|------------------|-------------|-------------------------------|-------------------------|------------------------------|-------------------------|----------------------|------|
| April 12th 2023 | <3 | 6.00 | 0.07 | 0.4 | 1.92 | 0 | 8.03 |
| October 4th 2023 | 6.00 | 12.00 | 0.15 | 0.08 | 6.74 | 7 | 8.19 |

Table 7 – Reportable Bypasses

| Date | Start Time | Duration (hours) | Volume (m3) | Reason | Precipitation (mm) |
|------|------------|------------------|-------------|--------|--------------------|
|------|------------|------------------|-------------|--------|--------------------|

No bypass events to report for 2023

Table 8 – Reportable Bypass Sampling

| Date | Start Time | Duration (hours) | Volume (m3) | Reason | Precipitation (mm) |
|------|------------|------------------|-------------|--------|--------------------|
|------|------------|------------------|-------------|--------|--------------------|

No bypass events to report for 2023

Table 9 – Annual Plant Flows

| Parameter | 2019 | 2020 | 2021 | 2022 | 2023 |
|----------------------|--------|--------|--------|--------|--------|
| Average (m3/day) | 100.05 | 70.10 | 60.00 | 62.70 | 62.70 |
| Max (m3/day) | 243.00 | 110.50 | 97.00 | 160.00 | 180.00 |
| Design (m3/day) | 125.00 | 125.00 | 125.00 | 125.00 | 125.00 |
| Design Peak (m3/day) | 200.00 | 200.00 | 200.00 | 200.00 | 200.00 |
| Daily/Design (%) | 80.04 | 56.08 | 48.00 | 50.16 | 50.16 |
| Max/Peak (%) | 100.05 | 70.10 | 60.00 | 62.70 | 62.70 |

DOCUMENT:

Cana Wastewater Treatment Plant Annual Report

Table 10 – Monthly Flows

| Month | Rated Capacity Flow (m3/day) | Minimum Flow (m3/day) | Maximum Flow (m3/day) | Average Flow (m3/day) | Total Flow (m3/month) |
|----------------|-------------------------------------|------------------------------|------------------------------|------------------------------|------------------------------|
| January | 125 | 50.0 | 140.0 | 75.0 | 2,320 |
| February | 125 | 39.0 | 136.0 | 84.4 | 2,364 |
| March | 125 | 53.0 | 138.0 | 96.0 | 2,978 |
| April | 125 | 61.0 | 180.0 | 93.0 | 2,799 |
| May | 125 | 52.0 | 146.0 | 82.0 | 2,538 |
| June | 125 | 36.0 | 82.0 | 55.0 | 1,664 |
| July | 125 | 29.0 | 87.0 | 49.2 | 1,524 |
| August | 125 | 24.0 | 89.0 | 48.0 | 1,475 |
| September | 125 | 27.0 | 51.0 | 36.0 | 1,069 |
| October | 125 | 15.0 | 58.0 | 27.0 | 824 |
| November | 125 | 19.0 | 115.0 | 36.0 | 1,078 |
| December | 125 | 44.0 | 153.0 | 71.0 | 2,208 |
| Annual Average | 125 | 37.4 | 114.6 | 62.7 | 1,903 |



**City of Kingston Wastewater Collection System
2023 DRAFT ANNUAL REPORT**

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1 EXECUTIVE SUMMARY

The City of Kingston Wastewater Collection System operates under Ministry of the Environment, Conservation and Parks (MECP), Consolidated Linear Infrastructure Environmental Compliance Approval (CLI ECA) number 018-W601.

In October 2022 the above mentioned CLI ECA was approved by the MECP. Utilities Kingston requested an approval for surrogate sampling in March 2023, which was approved. The CLI ECA is a new format for collection system ECAs and is a single approval for all the components of the sewage works in The City of Kingston's sewage collection system. The approval of the CLI ECA included the revocation of all previous ECA's for the collection system infrastructure.

Previously a report was prepared for several Pumping Stations as required by their individual ECAs. This report is the first annual report for the entire City of Kingston Wastewater Collection System.

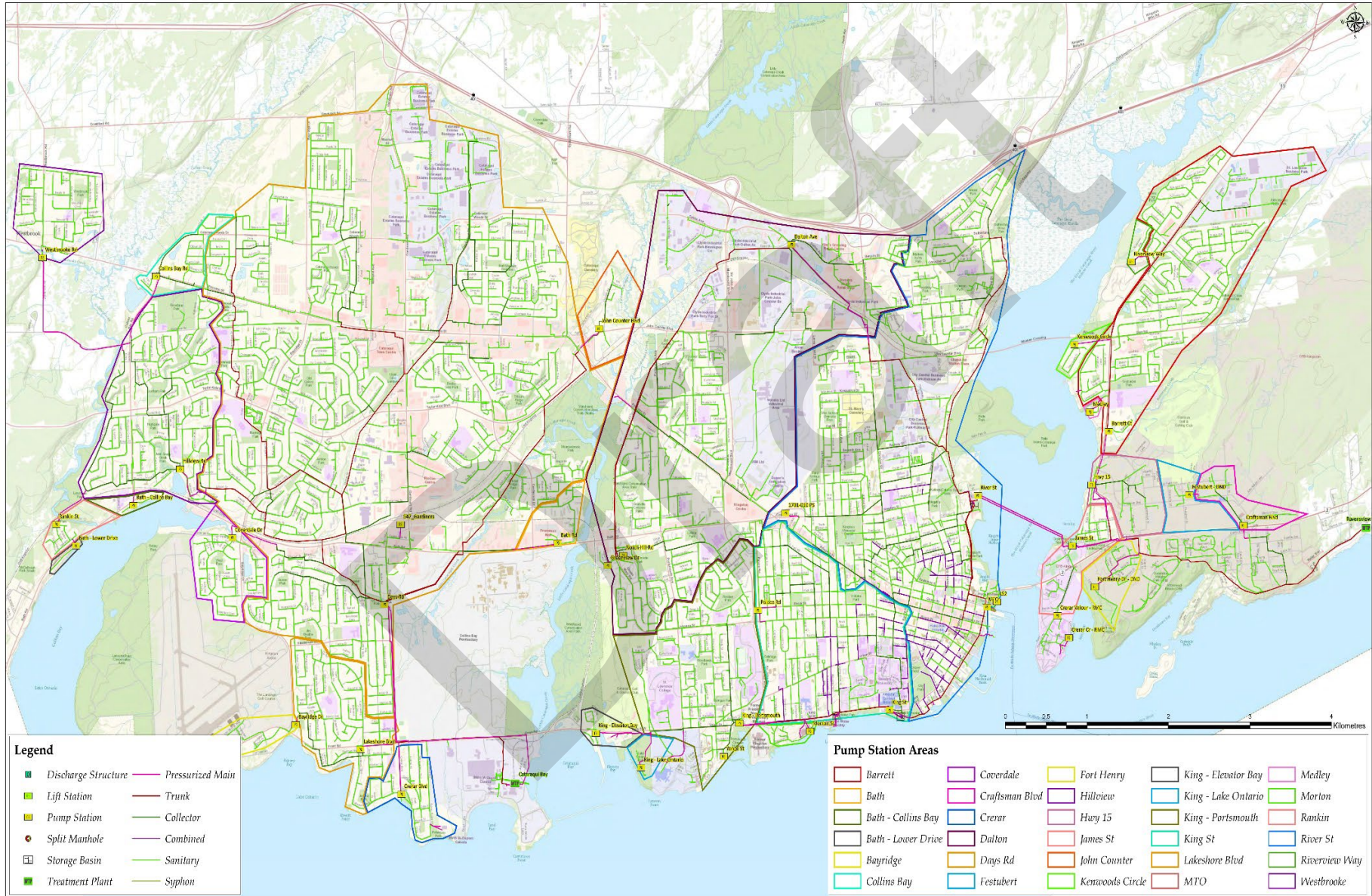
In 2023 the West Collection system received and moved 10,478,205 m³ of wastewater to the Cataraqui Bay Wastewater Treatment Plant (WWTP). The Central and East Collection system received and moved 22,375,448 m³ of wastewater to the Ravensview WWTP. The Cana Collection system received and moved 22,841 m³ of wastewater to the Cana WWTP.

The collection system had several wet weather overflow events which totaled 6,134.82 m³. The collection system had four spills to the environment from pumping stations due to equipment malfunctions totaling 904.4 m³. The overflow and spill locations are listed in Tables 1 and 2 respectively.

2 SYSTEM DESCRIPTION

The City of Kingston Wastewater Collection System collects and transmits sewage to 1 of 3 WWTPs, depending on the pump station area. The collection system consists of 474.0km of gravity sewers (including 42.8km of trunk sewers, 50.7km of collector sewers and 381.0km of local sewers) and includes 18km of combined sewers but excludes the approximately 38,384 active service laterals to the property line. The collection system also contains 29 sewage pumping stations (PS), 3 combined sewer overflow tanks, 6 combined sewage retention tanks, and 29.0km of forcemains, with final discharge into one of 3 wastewater treatment plants including Ravensview, Cataraqui Bay, and Cana.

Figure 1 – City of Kingston Collection System Major Infrastructure



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3 OPERATION

Adequate staffing as well as preventative maintenance and regular equipment inspections allowed operational problems to be diagnosed quickly and corrective actions to be taken immediately. Non flushable materials such as wipes, and grease continue to be more prominent in the sewer system resulting in some operational and maintenance challenges. Utilities Kingston continues to implement a public education program to help customers become more aware of what materials should not be flushed down the sewers. This program has included radio and newspaper campaigns, social media campaigns such as Twitter and Facebook, bill stuffers, information on back of parking tickets, and bus information signs. This has been an ongoing campaign for many years with positive results. During the summer of 2023 staff worked to educate owners of grease traps within our system on how to properly maintain their equipment. Pamphlets describing the importance of appropriate grease trap maintenance and how it impacts our system were delivered to many restaurants across the city.

Staff encountered operational problems at several pumping stations across the system that were a result of grease build up. These problems ranged from instruments becoming plugged to floats being caught up in the grease. Third party contractors were brought in several times throughout the year to clean wet wells and remove the grease and other non-flushable items as required. There were several power related problems at several stations, some of which caused spills to the environment. Staff adjusted alarms and replaced generator testing equipment as a response to these spills. Collins Bay Road Sewage Pump Station has had ongoing issues with infiltration and excessive gravel accumulation in the wet well. Staff are working to collect CCTV footage and complete spot checks to locate the source of the large increase in flow during wet weather events.

4 SYSTEM FLOWS

The City of Kingston wastewater collection system transported 32,853,653 m³ of sewage to the Ravensview and Cataraqui Bay WWTPs. The Cana system collected and transported 22,841 m³ of sewage to the Cana WWTP. The concentration of the raw influent into the three WWTP's increases as the volume of flow decreases. The flow into each plant also increases as the number of wet weather events increase. The increased flow during the wet season, as well as the differences in concentrations that correlate to changes in volumes indicates there is likely ground water infiltration or illegal sump connections in the systems.

5 BYPASS & OVERFLOW SUMMARY

The collection system had several wet weather overflow events which totaled 6,134.82 m³ for 2023. The surrogate loading rates from these overflow events are listed in Table 3. There were 4 spills to the environment from the collection system at Pumping Stations totaling 904.4 m³. The loading rates for the spills are in Table 4. The overflow locations are listed in Table 1. None of the collection system overflows or spills were disinfected, and no adverse impacts were noted. Staff, and third-party contractors checked for, and cleaned up any debris, and garbage after each event. The number of overflows, and the volume of overflows was dramatically reduced in 2023 compared to 2022. This year Utilities Kingston completed the separation of storm and sanitary sewers on Gore St. and removed PCP#24. The rainfall events in 2023 were much less severe than in 2022, and that coupled with the efforts to separate storm and sanitary sewers has led to the reduced overflow volumes. Utilities Kingston released and maintains a real-time overflow map in 2017. This map displays overflow locations and lets you know if an overflow has occurred within the past 48 hours.

6 OVERFLOW REDUCTION EFFORTS

The City of Kingston and Utilities Kingston have been working to reduce the number of combined sewers, both sanitary and storm water in the same pipe, within the collection system. As described above, the Gore St. project was completed in 2023 with a construction cost of \$713,028.62. Another two large, combined sewer separation projects are to be started in 2024 and 2025 respectively. The 2024 project is to include combined sewer separation of: two blocks of Victoria St., one block of Earl St., one block of Collingwood St., one block of Couper St., and two blocks of Union St. The estimated budget forecast for the 2024 construction is \$1.93 million. These projects will lead to reduced overflows of the collection system in wet weather events.

7 POLLUTION PREVENTION CONTROL PROGRAM

The Utilities Kingston Pollution Prevention and Control Plan (PPCP) was developed in 2017 and is set to be updated in 2025. The PPCP focuses on combined sewer separation to reduce the number of overflows from our facilities in the future. As discussed above, the Gore St. project was completed in 2023, which removed an overflow point that historically has been the source of many overflows. There were no specific timelines produced for the 2017 version of the PPCP. The City of Kingston and Utilities Kingston remain dedicated to completing sewer separations within our collection system in preparation for future population growth.

Information for this section of the Annual Report is still being compiled. All required details in accordance with the ECA and to satisfy the MECP will be completed by the March 31, 2024, deadline.

8 CALIBRATIONS

Many of the pumping stations have flow meters installed which helps to investigate inflow and infiltration, as well as any operational problems that may occur. Third party contractors calibrated all facility flow meters. One flow meter in the collection system failed the calibration and will need to be replaced in 2024. Calibration records are available upon request.

9 MAINTENANCE

Staff continue to use our preventative maintenance program in accordance with manufacturer's recommendations.

Additional Maintenance completed this year:

- Infrared scans of high voltage electrical was performed at Pumping Stations throughout the City.
- Equipment and motors had routine vibration monitoring conducted.
- The air relief valve at Bath Rd. PS failed and was rebuilt.
- The Bath-Collins Bay station had all check valves and isolation valves replaced.
- River St. PS had a pump rebuilt by the manufacturer.
- River St. PS bar screen maintenance to track and wheels.
- River St. PS Generator #2 service and maintenance completed.
- Overflow flap valve replaced on Morton St. PS overflow pipe to prevent lake water from entering station.

10 CAPITAL WORKS

The major highlights for capital works were:

- Significant progress was made on the construction of the new Days Rd. PS and decommissioning of the old station has begun.
- Westbrook PS had new level sensors and instrumentation installed.

DOCUMENT:

City of Kingston Wastewater Collection System Annual Report

- Crerar PS had a new flow meter installed.
- Palace Rd. PS had a new flow meter installed.

11 COMPLAINTS

In the 2023 reporting year, there were a number of complaints from residents regarding the system. There were nine (9) odour complaints connected to the new construction of the Days Road pumping station. These complaints spanned from June to October. The station was under the control of the contractor, constructing the new facility. However, Utilities Kingston operations staff investigated the complaints and inspected the odour control unit at the facility regularly to ensure it was functioning and being properly maintained. Additional filters have been purchased for the odour control unit at the facility, and staff continue to monitor the system.

There were seven (7) odour complaints regarding the collection system, these include sewage odours noted in residences and businesses. Staff responded and investigated all of these complaints. Responses to these complaints included, inspecting infrastructure upstream and downstream of the complaint, installing dishes in manholes to reduce the chance of sewer gasses being released, jetting and cleaning pipes, and inspecting lines with a camera.

Staff responded to fifty-one (51) complaints about lateral and main collection system backups. Operations staff worked with property owners and tenants at each site to locate and confirm the source of the backup. The majority of the sewer backups were caused by non-flushable materials, tree root growth, or deformed or degraded pipes. 17 of the 51 complaints were related to private infrastructure (i.e., the homeowner or business owner's sewer lateral on their property). Staff worked to relieve these backups using different methods. Crews rodded lines, performed camera work to identify and locate the issue, used jet trucks to clear blockages and to return the collection system to good working order. Operators also proactively flush known problem sewers, in order to maintain the integrity of the collection system.

For further information about this report or any questions regarding accessibility, contact Tim Bourne at tbourne@utilitieskingston.com or call 613-546-1181 Ext 2190.

12 ANNUAL OVERFLOW SUMMARY

Table 1 – Annual Overflow Summary

| PCP # | Location | Number of Events | Volume (m3) |
|-------|-----------------------------|------------------|-------------|
| 1 | Orchard-Emma Martin CSO | 0 | 0.00 |
| 2 | 535 Rideau Belle Park Trunk | 0 | 0.00 |
| 5 | Dalton Ave PS | 0 | 0.00 |
| 14 | Barrack St E of King St | 0 | 0.00 |
| 22 | William St W of Ontario St | 1 | 41.86 |
| 23 | Earl St W of Ontario St | 4 | 186.62 |
| 24 | Gore St W of Ontario St | 0 | 0.00 |
| 25 | Lower Union W of Ontario St | 3 | 396.65 |
| 26 | West St S of King St | 1 | 472.00 |
| 28 | King St (O'Kill) PS | 0 | 0.00 |
| 34 | Helen St at Mack St | 0 | 0.00 |
| 35 | Palace Rd PS | 0 | 0.00 |
| 41 | Morton St PS | 0 | 0.00 |
| 43 | King-Portsmouth PS | 0 | 0.00 |
| 48 | West end of Sherwood Dr | 0 | 0.00 |
| 50 | South end of Parkway | 0 | 0.00 |
| 51 | Clarence St W of King St | 1 | 450.16 |
| 52 | Raglan Rd at Rideau St | 1 | 161.45 |
| 53 | Union St at Division St | 1 | 0.02 |
| 55 | King-George CSO | 1 | 2507.80 |
| 56 | King-Collingwood CSO | 2 | 1166.63 |
| 57 | Crerar PS | 1 | 0.00 |
| 65 | 535 Rideau Belle Park Local | 2 | 751.64 |
| 68 | Quebec St at Barrie St | 0 | 0.00 |
| 69 | Greenview Dr PS | 0 | 0.00 |
| 70 | Carlisle St at Chestnut St | 0 | 0.00 |
| 74 | Barrett Court | 0 | 0.00 |
| 79 | Riverview Way PS | 0 | 0.00 |
| N/A | Total | 18 | 6134.82 |

13 ANNUAL SPILL SUMMARY

Table 2 – Annual Spill Summary

| PCP # | Location | Number of Events | Volume (m3) |
|-------|---------------------------------------|------------------|-------------|
| 1 | Orchard-Emma Martin CSO | 0 | 0.00 |
| 2 | 535 Rideau Belle Park Trunk | 0 | 0.00 |
| 5 | Dalton Ave PS | 0 | 0.00 |
| 14 | Barrack St E of King St | 0 | 0.00 |
| 22 | William St W of Ontario St | 0 | 0.00 |
| 23 | Earl St W of Ontario St | 0 | 0.00 |
| 24 | Gore St W of Ontario St | 0 | 0.00 |
| 25 | Lower Union W of Ontario St | 0 | 0.00 |
| 26 | West St S of King St | 0 | 0.00 |
| 28 | King St (O'Kill) PS | 0 | 0.00 |
| 34 | Helen St at Mack St | 0 | 0.00 |
| 35 | Palace Rd PS | 0 | 0.00 |
| 41 | Morton St PS | 0 | 0.00 |
| 43 | King-Portsmouth PS | 1 | 574.00 |
| 48 | West end of Sherwood Dr | 0 | 0.00 |
| 50 | South end of Parkway | 0 | 0.00 |
| 51 | Clarence St W of King St | 0 | 0.00 |
| 52 | Raglan Rd at Rideau St | 0 | 0.00 |
| 53 | Union St at Division St | 0 | 0.00 |
| 55 | King-George CSO | 0 | 0.00 |
| 56 | King-Collingwood CSO | 0 | 0.00 |
| 57 | Crerar PS | 1 | 242.20 |
| 65 | 535 Rideau Belle Park Local | 0 | 0.00 |
| 68 | Quebec St at Barrie St | 0 | 0.00 |
| 69 | Greenview Dr PS | 0 | 0.00 |
| 70 | Carlisle St at Chestnut St | 0 | 0.00 |
| 74 | Barrett Court | 3 | 88.20 |
| 76 | Ravensview Wastewater Treatment Plant | 0 | 0.00 |
| 79 | Riverview Way PS | 0 | 0.00 |
| N/A | Total | 5 | 904.40 |

14 OVERFLOW LOADING RATE

Table 3 – Overflow Loading Rate

| Date | Location | Duration | Volume (m3) | BOD (kg) | TP (kg) | TSS (kg) | TKN (kg) | E.Coli |
|----------------|--------------------------|----------|-------------|----------|---------|----------|----------|---------|
| August 10 2023 | PCP 23 Earl St | 0:05 | 0.34 | 0.02 | 0.00 | 0.02 | 0.00 | 189,236 |
| August 7 2023 | PCP 26 West St | 0:30 | 472.00 | 29.74 | 0.36 | 29.26 | 2.50 | 189,236 |
| August 7 2023 | PCP 65 Rideau Belle Park | 0:40 | 685.49 | 43.19 | 0.53 | 42.50 | 3.63 | 189,236 |
| August 7 2023 | PCP 53 Union St | 0:15 | 0.02 | 0.00 | 0.00 | 0.00 | 0.00 | 189,236 |
| August 7 2023 | PCP 52 Raglan Rd | 0:40 | 161.45 | 10.17 | 0.12 | 10.01 | 0.86 | 189,236 |
| August 7 2023 | PCP 51 Clarence St | 0:40 | 450.16 | 28.36 | 0.35 | 27.91 | 2.39 | 189,236 |
| August 7 2023 | PCP 25 Lower Union | 0:55 | 348.74 | 21.97 | 0.27 | 21.62 | 1.85 | 189,236 |
| August 7 2023 | PCP 23 Earl St | 0:40 | 181.46 | 11.43 | 0.14 | 11.25 | 0.96 | 189,236 |
| August 7 2023 | PCP 22 William St | 0:25 | 41.86 | 2.64 | 0.03 | 2.60 | 0.22 | 189,236 |
| August 3 2023 | PCP 65 Rideau Belle Park | 0:15 | 66.15 | 4.17 | 0.05 | 4.10 | 0.35 | 189,236 |
| July 27 2023 | PCP 25 Lower Union | 2:00 | 24.91 | 1.57 | 0.02 | 1.54 | 0.13 | 189,236 |
| July 27 2023 | PCP 23 Earl St | 0:10 | 0.82 | 0.05 | 0.00 | 0.05 | 0.00 | 189,236 |
| April 5 2023 | PCP 25 Lower Union | 0:10 | 23.00 | 1.45 | 0.02 | 1.43 | 0.12 | 189,236 |
| April 5 2023 | PCP 23 Earl St | 0:10 | 4.00 | 0.25 | 0.00 | 0.25 | 0.02 | 189,236 |

15 SPILL LOADING RATES

Table 4 – Spill Loading Rates

| Date | Location | Duration | Volume (m3) | BOD (kg) | TP (kg) | TSS (kg) | TKN (kg) |
|------------------|-----------------------|----------|-------------|----------|---------|----------|----------|
| February 22 2023 | PCP 74 Barrett Ct | 0:25 | 47 | 0.00 | 0.00 | 0.00 | 0.00 |
| June 3 2023 | PCP 74 Barrett Ct | 0:20 | 25.5 | 2.32 | 0.14 | 4.08 | 2.08 |
| April 10 2023 | PCP 43 Portsmouth Ave | 2:30 | 574 | 3.88 | 0.27 | 10.66 | 2.40 |
| April 30 2023 | PCP 57 Crerar Blvd | 15:35 | 242.2 | 1.70 | 1.09 | 6.66 | N/A |
| June 3 2023 | PCP 74 Barrett Ct | 0:20 | 25.5 | 2.32 | 0.14 | 4.08 | 2.08 |
| December 27 2023 | PCP 74 Barrett Ct | 0:15 | 15.7 | 3.08 | 0.13 | 6.44 | 0.99 |

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