



**SYDENHAM
WATER TREATMENT PLANT
2021 ANNUAL REPORT**

Drinking Water System Number: 260069290
Drinking Water System Owner: Township of South Frontenac
Drinking Water System Category: Large Municipal Residential

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1 EXECUTIVE SUMMARY

Utilities Kingston is proud to present this annual report on drinking water quality. This report has been prepared in accordance to Section 11 of Ontario Regulation 170/03. Regulation 170/03 sets requirements for public waterworks with regard to sampling and testing, levels of treatment, licensing of staff, and notification of authorities and the public about water quality. Free copies of this report and the Summary report prepared in accordance to Schedule 22 of Ontario Regulation 170/03, are available by public request at any City of Kingston offices, at our water plant locations, and at <http://www.utilitieskingston.com>. Notices of availability are generally made through the local newspapers and radio. More information on the Drinking Water Regulations can be found on the Ministry of the Environment web site at <http://www.ene.gov.on.ca>. For further information about this report or any questions regarding accessibility, contact Robert Cooney by email at rcooney@utilitieskingston.com, or call 613-546-1181 Ext 2291.

2 PLANT DESCRIPTION AND TREATMENT PROCESS

Raw Water Source

The source of water treated by this plant is Sydenham Lake. The intake is located 128m east of the treatment plant, at approximately 6m of water depth.

Zebra Mussel Control

Pre-chlorination takes place at the mouth of the intake. This protects the intake from becoming encrusted with zebra mussels, which would restrict the flow of water through the intake.

Screening

Two stationary screens located in the low lift pumping well remove any large debris such as weeds, fish, etc.

Low Lift Pumps

These pumps lift the water from lake level to the main treatment building. There are three submersible pumps each with a capacity of 7.8 L/sec which pump the water into the main building for treatment.

Chemical Feed System

XL1900 (Polyaluminum Chloride) is added to the water as it enters the process building just prior to passing through the in-line mixer. The particles in the water will collide with the PACl particles as the water flows in a spiral motion through the mixer, and then join together to form larger particles called floc.

Filters

Three pressure filtration tanks containing a ceramic filtration media remove the floc formed from the addition of PACl and the particles present in the water. Water flows through the filters into two baffled clean water reservoirs called clear wells.

Backwash

Filters are washed to remove the particulates they have collected over the previous 24 hrs. Clean water from the clear well is pumped backwards through the filter, and the filter is agitated by air scouring the filter media to break up any large particles.

Process Waste Management

Effluent water from the backwash process is directed to a backwash storage tank for further settling. The supernatant (the clear water at the top of the tank after settling) is directed back to Sydenham Lake and the settled sludge is mechanically removed and sent for further treatment.

Granular Activated Carbon Contactors

During periods of high dissolved organic content in the source water, filter effluent water is directed to two pressure filtration tanks containing granular activated carbon (GAC). The GAC contactors assist in the removal of dissolved organics which react with chlorine to produce chlorination by-products. The GAC contactors are periodically backwashed to remove the particulates they have collected.

Primary Disinfection

Primary disinfection of the filtered water is achieved via UV light and free chlorine residual. 2 UV reactors (duty/standby) each using 12 low pressure high output lamps, provide the UV light disinfection. Free chlorine disinfection follows the UV process with the use of two chemical metering pumps(duty/standby) which provide sodium hypochlorite to an application point downstream of the UV reactors at the entrance to the detention piping.

Secondary Disinfection

Secondary disinfection is the maintenance of a disinfectant residual throughout the distribution system which is achieved with chloramines. Following the free chlorine disinfection process, ammonium sulphate is added with the use of two chemical metering pumps (duty/standby), at an approximate rate of 3.5:1 ratio (chlorine/ammonia), to react with the free chlorine residual to form chloramines. The application dosages of sodium hypochlorite and ammonium sulphate is adjusted to produce a sufficient in plant combined chlorine residual to ensure that minimum residuals are maintained in the distribution system.

Clear Wells

Two baffled clear wells, each with a volume of 115 m³, provide storage of filtered water and allow for a sufficient amount of chlorine contact time with the water to ensure proper disinfection.

High Lift Pumps

Three high lift pumps move treated water from the clear wells into the distribution system.

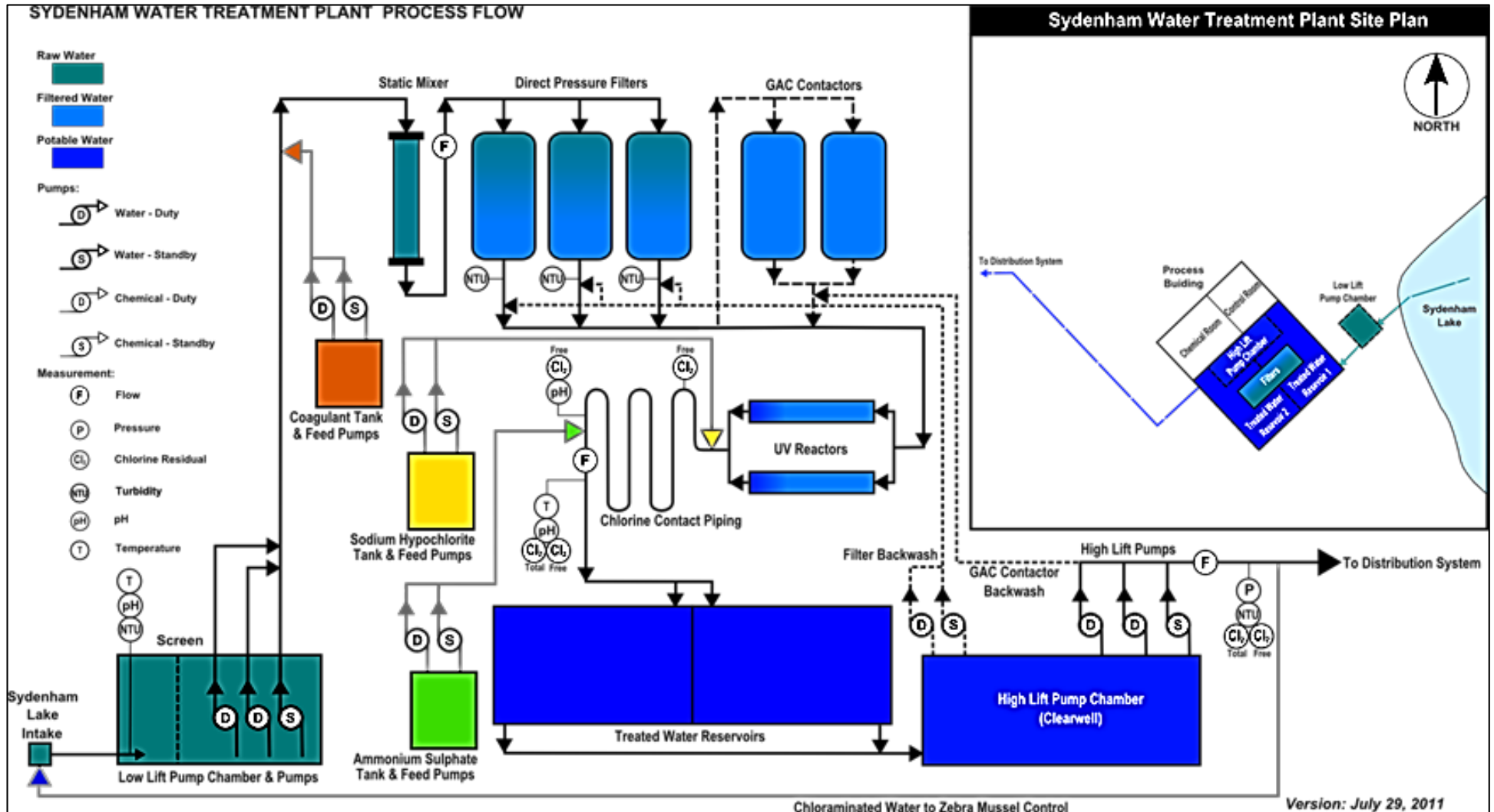
Standby Equipment

A 130 kW standby diesel generator provides electricity to the water plant during power interruptions. The generator and standby equipment are tested regularly to ensure proper operation when required.

Elevated Tank

The elevated tank has a storage capacity of 1019 m³ and provides pressure to the distribution system.

Figure 1 – Sydenham Water Treatment Plant Process Flow Diagram



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3 DISTRIBUTION SYSTEM

There are approximately 6363 meters of water mains, and 47 fire hydrants in the system. Once all connections to the distribution system have been completed, the drinking water system will supply water to 274 customer connections.

4 MONETARY EXPENSES

Under Section 11 of Ontario Regulation 170/03, a description of any major expenses incurred during this reporting period must be included in the annual report.

Major Expenses:

- Sample hydrant replacement
- UV system repairs
- Air compressor replacement and upgrades to provide redundancy and maintain system integrity
- Backflow preventor replacement
- Improvements to the chlorination system

5 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.

Events Requiring Notifications:

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

6 GLOSSARY

TCU – True Colour Units

mg – Milligram

N/A – Not Applicable

N/D – Non-Detectable

NTU – Nephelometric Turbidity Units - A measure of the amount of particles in water.

mg/L – Milligrams per litre. This is a measure of the concentration of a parameter in water, also called parts per million (ppm).

µg/L – Micrograms per litre, also called parts per billion.

ng/L – Nanograms per litre, also called parts per trillion.

Parameter – A substance that we sample and analyze for in the water.

AO – Aesthetic Objective. AOs are not health related, but may affect the taste, odour, colour, or clarity of the water

OG – Operational guideline. Set to ensure efficient treatment and distribution of water.

DOCUMENT:

Sydenham Water Treatment Plant Annual Report

MAC – Maximum Acceptable Concentration. This is a health-related drinking water standard established for contaminants having known or suspected adverse health effects when above a certain concentration. The length of time the MAC can be exceeded without injury to health will depend on the nature and concentration of the parameter

Table 1 - Microbiological Testing (Performed Under Regulation 170/03)

Type	MAC (E. Coli & Total Coloforms)	Number of Samples	Range of E. Coli Results (Min - Max)	Range of Total Coliform Results (Min - Max)	Number of HPC Samples	Range of HPC Results (Min - Max)
Raw	N/A	52	0 - 57	1 - >200	N/A	N/A
Treated	0	52	0	0	52	<10 - 100
Distribution System	0	114	0	0	55	<10 - 430

Note: Total Coliforms are an indicator of adverse water quality if detected

Table 2: Operational Testing (Performed under Schedule 7, 8, or 9 of Regulation 170/03)

Parameter	MAC	Number of Samples	Range of Results (min - max)	Parameter Description
Raw Water Turbidity (NTU)	N/A	Continuous	0.16 - 2.28	Turbidity is a measure of particles in water
Treated Water Turbidity (NTU)	N/A	Continuous	0.052 - 0.382	Turbidity is a measure of particles in water
Treated Combined Chlorine Residual (mg/L)	See Parameter Description	Continuous	1.51 - 2.48	Recommended level of at least 1.00 mg/L in distribution system to maintain microbiological quality. 0.25 mg/L minimum.
Distribution System Chloramines Residual (mg/L)	See Parameter Description	Continuous	1.09 - 2.26	Recommended level of at least 1.00 mg/L combined chlorine in distribution system to maintain microbiological quality. 0.25 mg/L combined chlorine minimum.

Note: Turbidity range determined through in house lab testing

Parameter	MAC	Number of Samples	Rande of Results (min - max)	Results Average
Filter #1 Effluent Turbidity (NTU)	1.0 for >15 minutes	Continuous	0.02 - 2.00	0.1
Filter #2 Effluent Turbidity (NTU)	1.0 for >15 minutes	Continuous	0.03 - 1.76	0.09
Filter #3 Effluent Turbidity (NTU)	1.0 for >15 minutes	Continuous	0.02 - 2.00	0.08

Note: Turbidity range determined through in house lab testing

Table 3: Backwash Wastewater Effluent Testing and Sampling

Parameter	MAC	Number of Samples	Results Average	Parameter Description
Total Suspended Solids (mg/L)	15	12	13	A measure of the particulates collected in the filtration process.

Note: Testing and sampling in accordance with the requirements of the Ministry Drinking Water Licence

Table 4: Raw Water Testing (Analyzed by Accredited Laboratories)

Parameter	MAC	Number of Samples	Results Range (min - max)	MAC Exceedance (Yes or No)	Parameter Description
Microcystin (µg/L)	1.5	22	<0.15 - 0.20	Yes	Naturally occurring (released from blooms of blue-green algae)

Table 5: Treated Water Schedule 23 Inorganic Parameters

Parameter	MAC	Number of Samples	Results Range (min - max)	MAC Exceedance (Yes or No)	Parameter Description
Antimony (mg/L)	0.006	1	0.0001	No	Discharge from petroleum refineries; fire retardants; ceramics; electronics; solder
Arsenic (mg/L)	0.025	1	0.0002	No	Naturally occurring in surface waters / mine drainage
Barium (mg/L)	1	1	0.048	No	Erosion of natural deposits. Discharge from metal refineries, oil drilling wastes.
Boron (mg/L)	5	1	0.024	No	Erosion of natural deposits, industrial waste effluents.
Cadmium (mg/L)	0.005	1	0.000015	No	Industrial discharge
Chromium (mg/L)	0.05	1	<0.002	No	Industrial residues
Mercury (mg/L)	0.001	1	<0.00002	No	Erosion of natural deposits, industrial discharges.
Selenium (mg/L)	0.01	1	< 0.001	No	Discharge from refineries, mines, chemical manufacture
Uranium (mg/L)	0.02	1	<0.000005	No	Erosion of natural deposits.

Table 6: Treated Water Schedule 24 Inorganic Parameters

Parameter	MAC	Number of Samples	Results Range (min - max)	MAC Exceedance (Yes or No)	Parameter Description
Alachlor (µg/L)	5	1	<0.3	No	Agricultural herbicide
Atrazine + N-Dealkylated Metabolites (µg/L)	5	1	<0.5	No	Agricultural herbicide
Azinphos-methyl (µg/L)	20	1	<1	No	Insecticide
Benzene (µg/L)	5	1	<0.5	No	Discharge from plastics manufacturing, leaking fuel tanks
Benzo(a)pyrene (µg/L)	0.01	1	<0.006	No	Formed from the incomplete burning of organic matter.
Bromoxynil (µg/L)	5	1	<0.5	No	Agricultural herbicide
Carbaryl (µg/L)	90	1	<3	No	Agricultural/Forestry/ Household insecticide
Carbofuran (µg/L)	90	1	<1	No	Agricultural insecticide
Carbon Tetrachloride (µg/L)	5	1	<0.2	No	Discharge from chemical and industrial activities
Chlorpyrifos (µg/L)	90	1	<0.5	No	Agricultural/ Household insecticide
Diazinon (µg/L)	20	1	<1	No	Agricultural/ Livestock Operation/ Residential insecticide

Parameter	MAC	Number of Samples	Results Range (min - max)	MAC Exceedance (Yes or No)	Parameter Description
Dicamba ($\mu\text{g/L}$)	120	1	<10	No	Agricultural herbicide
1,2-Dichlorobenzene ($\mu\text{g/L}$)	200	1	<0.5	No	Discharge from industrial chemical factories
1,4-Dichlorobenzene ($\mu\text{g/L}$)	5	1	<0.5	No	Discharge from industrial chemical factories
1,2-Dichloroethane ($\mu\text{g/L}$)	5	1	<0.5	No	Discharge from industrial chemical factories
1,1-Dichloroethylene ($\mu\text{g/L}$)	14	1	<0.5	No	Discharge from industrial chemical factories
Dichloromethane ($\mu\text{g/L}$)	50	1	<5	No	Discharge from pharmaceutical and chemical factories
2,4-Dichlorophenol ($\mu\text{g/L}$)	900	1	< 0.2	No	Industrial contamination/ reaction with chlorine
2,4-Dichlorophenoxy Acetic Acid ($\mu\text{g/L}$)	100	1	<10	No	Agricultural/ Residential herbicide
Diclofop-methyl ($\mu\text{g/L}$)	9	1	<0.9	No	Agricultural herbicide
Dimethoate ($\mu\text{g/L}$)	20	1	<1	No	Agricultural/ Livestock Operation/ Forestry insecticide
Diquat ($\mu\text{g/L}$)	70	1	<5	No	Agricultural/ Aquatic herbicide

Parameter	MAC	Number of Samples	Results Range (min - max)	MAC Exceedance (Yes or No)	Parameter Description
Diuron ($\mu\text{g/L}$)	150	1	<5	No	Agricultural/ Industrial/ herbicide
Glyphosate ($\mu\text{g/L}$)	280	1	<25	No	Agricultural/Forestry/ Household herbicide
Malathion ($\mu\text{g/L}$)	190	1	<5	No	Fruit & Vegetable / pest control insecticide
2-methyl-4-chlorophenoxyacetic Acid ($\mu\text{g/L}$)	0.1	1	< 0.010	No	Leaching and/or runoff from agricultural and other uses
Metolachlor ($\mu\text{g/L}$)	50	1	<3	No	Agricultural herbicide
Metribuzin ($\mu\text{g/L}$)	80	1	<3	No	Agricultural herbicide
Monochlorobenzene ($\mu\text{g/L}$)	80	1	<0.5	No	Discharge from industrial and agricultural chemical factories and dry cleaning facilities
Paraquat ($\mu\text{g/L}$)	10	1	<1	No	Agricultural/ Aquatic herbicide
Pentachlorophenol ($\mu\text{g/L}$)	60	1	<0.2	No	Pesticide/ wood preservative residue
Phorate ($\mu\text{g/L}$)	2	1	<0.3	No	Agricultural insecticide
Picloram ($\mu\text{g/L}$)	190	1	<15	No	Industrial herbicide

Parameter	MAC	Number of Samples	Results Range (min - max)	MAC Exceedance (Yes or No)	Parameter Description
Polychlorinated Biphenyls (µg/L)	3	1	<0.05	No	Residue from various industrial uses
Prometryne (µg/L)	1	1	<0.1	No	Agricultural herbicide
Simazine (µg/L)	10	1	<0.5	No	Agricultural herbicide or its residue
Terbufos (µg/L)	1	1	<0.5	No	Agricultural insecticide
Tetrachloroethylene (µg/L)	30	1	<0.5	No	Leaching from PVC pipes; discharge from factories, dry cleaners and auto shops (metal degreaser)
2,3,4,6-Tetrachlorophenol (µg/L)	100	1	<0.2	No	Wood preservative
Triallate (µg/L)	230	1	<10	No	Agricultural herbicide
Trichloroethylene (µg/L)	5	1	<0.5	No	Discharge from metal degreasing sites and other factories
2,4,6-Trichlorophenol (µg/L)	5	1	<0.2	No	Pesticide manufacturing
Trifluralin (µg/L)	45	1	<0.5	No	Agricultural herbicide
Vinyl Chloride (µg/L)	2	1	<0.2	No	Leaching from PVC pipes; discharge from plastics factories

Table 7: Other Regulatory Treated Water Parameters

Parameter	MAC	Number of Samples	Results Range (min - max)	MAC Exceedance (Yes or No)	Parameter Description
Fluoride (mg/L)	1.5	1	<0.1	No	Naturally occurring.
Nitrite (mg/L)	1	4	<0.1	No	A natural component of water at this level.
Nitrate (mg/L)	10	4	<0.1 - 0.1	No	Runoff from fertilizer use, erosion of natural deposits
Sodium (mg/L)	20	1	10.2	No	Occurs naturally in the earth's crust. Notification is required every 60 months if greater than 20 mg/L

Table 8: Treated Water Testing (Analyzed by Accredited Laboratories)

Parameter	MAC	Number of Samples	Results Range (min - max)	MAC Exceedance (Yes or No)	Parameter Description
Microcystin (µg/L)	1.5	22	<0.15	No	Naturally occurring (released from blooms of blue-green algae)

Table 9: Regulatory Distribution Water Testing (Analyzed by Accredited Laboratories)

Parameter	MAC	Number of Samples	Results Range (min - max)	MAC Exceedance (Yes or No)	Parameter Description
Alkalinity CaCO ₃ (mg/L)	N/A	8	102 - 117	No	A measure of the resistance of the water to the effects of acids. Expressed as calcium carbonate.
Total Haloacetic Acids (mg/L)	0.08 (Annual avg.)	5	0.016 - 0.022	No	By-product of drinking water disinfection with chlorine. Based on a running annual average
pH	6.5–8.5 OG	7	7.17 - 7.72	No	An indicator of the acidity of water.
Total Trihalomethanes (µg/L)	100 (Annual avg.)	4	24 - 28	No	By-product of chlorination. * The MAC for THMs of 100 µg/L is based on a running annual average.
Lead (mg/L)	N/A	7	0.00006 - 0.00084	No	Internal corrosion of household plumbing, erosion of natural deposits.

Table 10: Raw Water Testing (Analyzed by In House Laboratory)

Parameter	MAC	Number of Samples	Average Results	MAC Exceedance (Yes or No)	Parameter Description
UV Transmittance (%)	N/A	114	68.4 - 88.5	No	A measure of the percentage of transmittance of UV light

Table 11: Treated Water Testing (Analyzed by In House Laboratory)

Parameter	MAC	Number of Samples	Average Results	MAC Exceedance (Yes or No)	Parameter Description
Aluminum (mg/L)	0.1	99	0.002 - 0.181	No	May be naturally present or a residual from the coagulation process. There is no MAC for this parameter. It is an Operational Guideline (OG).
Free Ammonia (mg/L)	N/A	113	0.09 - 0.40	No	Residual from the addition of Ammonium Sulphate for the secondary disinfection process
Monochloramines (mg/L)	3	118	1.55 - 2.48	No	Chloramines are produced when ammonia is added to chlorinated water during the disinfection process.
UV Transmittance (%)	N/A	114	81.5 - 96.4	No	UV transmittance is a measure of the percentage of transmittance of UV light



SYDENHAM WATER TREATMENT PLANT 2021 ANNUAL SUMMARY REPORT

Drinking Water System Number: 260069290
Drinking Water System Owner: Township of South Frontenac
Drinking Water System Category: Large Municipal Residential

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

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DOCUMENT:

Sydenham 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 Licence (MDWL) issued for the Sydenham 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 Sydenham Water Treatment Plant (WTP) located at Point Rd. in Sydenham, and its associated distribution system which serves Sydenham's municipal water customers in the village of Sydenham. The WTP and its associated distribution system are owned by the Township of South Frontenac, 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 Group of Utilities Kingston, for the Township of South Frontenac, operates and maintains the Sydenham Water Treatment Plant (WTP) and complies with the terms and conditions of the Drinking Water Works Permit (DWWP) and Municipal Drinking Water Licence (MDWL) issued for the WTP. The Utilities Kingston Systems Operations department and the Treatment Group of Utilities Kingston operate and maintain the associated distribution system and storage 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 Township of South Frontenac'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 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 Township of South Frontenac, 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 Sydenham Lake, 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 of the 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 and MDWL.

Water sampling is conducted to the minimum requirements of schedule 13 of Ontario Regulation 170/03 of the Safe Drinking water Act. Raw water sampling is conducted to give operational staff information required to determine the level of treatment 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, DWML and regulations are available for public viewing on the Utilities Kingston website as well as at the Utilities Kingston and Township of South Frontenac offices. Residents of the village of Sydenham 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.

Events Requiring Notifications

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

5 QUANTITY OF WATER SUPPLIED

Listed in Table 3 following this report are the treated water flows for the Sydenham Water Treatment Plant. The typical Canadian average water usage per person is 220 litres per person per day (source: Stats Canada 2017). Once all services to the water distribution system are completed, an accurate calculation of water usage per person for the village of Sydenham can be calculated.

6 FLOW RATE EXCEEDANCES

There were no instances during this reporting period where daily total flows exceeded the maximum allowable flow rate of 1290 m³/d. Listed in Tables 1 and 2 following this report are the raw water flows (water taken from Sydenham Lake) for the Sydenham Water Treatment Plant.

DOCUMENT:

Sydenham Water Treatment Plant Annual Summary Report

7 TREATMENT CHEMICALS USED

There are three treatment chemicals in use at this treatment plant. Sodium Hypochlorite is used for primary disinfection, XL1900 (Polyaluminum Chloride) used as the coagulant and Ammonium Sulphate combined with Sodium Hypochlorite to form chloramines for secondary chlorination for the WTP.

Sodium Hypochlorite is dosed at the treatment plant at a rate which ensures that an adequate chlorine Contact Time (CT) value is maintained for the rate of flow. Average chlorine dosages for this treatment plant are approximately 4.03 mg/l. Ammonium Sulphate is added at an approximate rate of 3.5:1 ratio (chlorine/ammonia) to react with the free chlorine to form chloramines for secondary chlorination. An adequate chloramines residual is maintained at those points in the distribution system that are farthest from the point of entry of treated water to the system. Residuals are routinely measured in the distribution system and the treatment plant chlorine dosages are adjusted as required to meet the distribution system target residuals and the required CT values.

Typically, XL1900 (Polyaluminum Chloride) dosages for this treatment plant were in the range of 6.56 – 25.85 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 filter head loss, pH, temperature, turbidity, and the aluminum residual in the treated water.

8 SUMMARY

The Sydenham Water Treatment Plant supplied water to residents of Sydenham at 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 www.utilitieskingston.com or is available at the Township of South Frontenac offices, or the Utilities Kingston offices. For further information about this report or any questions regarding accessibility, contact Robert Cooney by email at rcooney@utilitieskingston.com, or call 613-546-1181 Ext 2291.

Sydenham Water Treatment Plant Annual Summary Report



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Table 1: Raw Water Flows (Daily Totals)

Day	m ³											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	138	272		309	400	121		208	230	121		2
2	345					265	282		439	224	310	315
3		267	264	159		364	243		151	354	335	143
4		267	408	362	247	185		251	306	2		218
5	241	1			421		184	386	432	322	319	127
6	426	193			78	232	409	373	114	410	276	
7		280	204	289		331	125		254	407	269	337
8		10	401	489	247	398	218	174	431	183	48	195
9	230	253	201	113	380	155	374	412	69	177	311	
10	482	241			48	224	115	88	193	453	56	347
11			235	298		347	102	198	435	108	319	114
12	6	174	183	323	224	240	441	361	61	294	2	99
13	285	339			410	189	113		255	437		375
14	189		250	236	115	391		166	444	24	288	1
15	17	175	356	433	6	54	305	425	9	294	160	297
16	267	328			243	209	372	149	149	497		125
17	242	1	222	175	365	382	417			96	339	
18			332	364	154	135	16	306		308	114	296
19	219	281			275	145	248	413	247	422		245
20	345	391	118	262	395	350	265	405	455	456	348	
21	119		488	331				64	87	215	99	334
22			102		265	277	131	203	275	323		91
23	138	238		304	403	353	416	375	468	239	292	
24	489	488	329	94	63	255	200	399	28	185	193	323
25		35	432		155	150	291	95	228	478		247
26				257	384	404	424	249	432	156	322	
27	286	218		429	441	122	100	408	62	299	130	283
28	303	790	312	127	82	248	174	236	300	425		184
29			376		96	405	430	149	276		290	1
30			2	253	370	320	14	402	225	200	224	357
31	289		256		396			162		403		73
Total	5,056	5,242	5,471	5,607	6,663	7,251	6,409	7,057	7,055	8,512	5,044	5,129
Avg. Day Production	253	250	274	280	256	259	247	294	252	284	229	205
Average Min	163	187	176	187	215	259	247	275	252	284	229	205
Min						54	14	64	9	2	2	1
Max	489	790	488	489	441	405	441	425	468	497	348	375
							Yearly Average	223				
PTTW Amount		1,290 m³/day					Average Day Production	255	Yearly Total	74,496		
							Yearly Min	790				
							Yearly Max	790				

Sydenham Water Treatment Plant Annual Summary Report



85 Lappan's Lane
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 K7L 4X7
 (613) 546-1181

Table 2: Peak Raw Water Flows (Daily Totals)
 L/min

Day	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	437	408		372	438	416		438	448	372		400
2	411					428	446		446	455	459	456
3		423	430	433		432	438		448	446	454	434
4		427	682	373	438	429		442	451	364		466
5	439	355			427		451	441	449	451	467	397
6	409	428			422	430	448	439	443	448	461	
7		418	429	440		429	443		450	455	470	457
8		417	458	431	430	431	446	446	445	373	395	446
9	433	416	413	417	436	421	443	447	363	439	470	
10	418	4.06			344	442	441	366	446	446	389	460
11			417	437		450	440	451	443	372	467	448
12	415	437	408	413	439	435	435	447	362	437	383	466
13	424	420			430	435	430		449	464		452
14	420		420	420	423	436	4	446	445	446	462	353
15	436	430	416	436	443	435	447	450	358	447	458	459
16	422	429			442	438	460	402	402	448		444
17	409	391	440	433	446	437	437			374	464	
18			416	413	426	437	368	450		439	462	468
19	432	443			431	440	449	443	449	455		409
20	413	426	433	429	432	443	446	446	453	445	473	
21	407		416	477				361	372	374	402	464
22			407		424	443	445	442	453	452		390
23	436	442		400	435	442	451	443	450	454	464	
24	425	421	427	436	347	447	441	442	370	460	455	467
25		421	439		431	439		432	454	454		456
26				425	434	442	446	448	452	418	474	
27	434	430		439	433	443	445	445	421	457	409	464
28	417	419	430	432	422	440	371	444	456	451		457
29			414		428	447	452	437	448		460	376
30			412	451	440	446	444	438	457	460	449	465
31	441		423		429		360	438		456		378
Max	441	443	682	477	446	450	460	451	457	464	474	468

PTTW Amount **1,344 litres/ minute**
 or **1,290 m³/day**

Yearly Average
Average Day Production
Yearly Min
Yearly Max **682**

Sydenham Water Treatment Plant Annual Summary Report



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Table 3: Treated Water Flows (Daily Total)
m³

Day	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	118	182		210	339	27		196	207	131		
2	260					231	278		407	200	306	292
3		237	288	155		295	192		112	305	285	119
4		199	231	276	220	144		213	294			195
5	220				400		108	345	387	238	319	107
6	341	190			12	201	346	304	83	360	232	
7		179	344	229		284	115		223	373	268	347
8			306	400	233	357	150	145	402	150	22	140
9	218	241	137	46	313	90	330	349	36	169	318	
10	380	144				203	71	97	178	408	38	343
11			240	255		312	84	164	381	78	288	109
12		175	96	237	24	176	391	301	50	288		49
13	266	248			321	173	68		239	362		354
14	136		237	277	93	322		166	392	8	286	
15		174	225	281		53	273	384		295	123	297
16	237	217			240	182	299	114	114	461		85
17	149		187	148	329	340	356			62	306	
18			223	239	89	67	10	256		307	88	251
19	197	265			266	121	275	364	234	361		241
20	240	282	117	245	358	316	162	348	422	421	349	
21	46		372	188				33	44	181	55	344
22			42		217	239	118	176	258	317		66
23	98	237		334	368	287	357	325	430	204	317	
24	388	345	297	58		200	143	360		183	124	322
25		5	330		138	110		77	236	432		216
26				189	354	388	278	222	358	152	295	
27	253	200		364	382	75	358	375	46	269	113	283
28	206	351	298	109	18	237	72	173	285	370		155
29			239		81	367	168	141	232		282	
30				204	353	235	363	344	223	187	176	354
31	275		226		365			116		369		62
Total	4,028	3,871	4,435	4,444	5,513	6,032	5,365	6,088	6,273	7,641	4,590	4,731
Avg. Day Production	224	215	233	222	240	215	215	234	285	263	219	215
Average	130	138	143	148	178	215	215	234	239	263	219	215
Min						27	10	33	36	8	22	49
Max	388	351	372	400	400	388	391	384	430	461	349	354
							Yearly Average	195				
							Average Day Production	229		Yearly Total	63,011	
CoA Amount		1,290 m³/day					Yearly Min					
							Yearly Max	461				