TWENTY TWENTY

DRINKING WATER QUALITY REPORT

2020

City of Cornwall, Ontario

Cornwall
ONTARIO CANADA

In accordance with *Section 11* and *Schedule 22* of **Ontario Drinking Water Regulation 170/03** under the *Safe Drinking Water Act*, the Environmental Services Division of the City of Cornwall is pleased to present the *2020 Drinking Water Quality Report*.

We're happy to report that we've continuously delivered ***CLEAN and SAFE*** drinking water to the residents and businesses of Cornwall, and that there were no Corrective Actions for our system from January 1st to December 31st, 2020.

The quality of our drinking water is **continuously monitored** and **tested** by advanced on-line instrumentation and a modern and secure *Supervisory Control and Data Acquisition* (SCADA) system. Additionally, the system is operated and maintained by **highly qualified** City staff members who have successfully completed rigorous training and testing to become certified *Drinking Water Treatment and Distribution System Operators*.

Department of Infrastructure and Municipal Works
Environmental Services Division
861 Second Street West
Cornwall, Ontario, Canada
Phone: 613-932-2235
Fax: 613-932-4506

FEBRUARY 2021

2020

DID YOU KNOW?

Though it may look clean, **untreated** water could contain *microscopic contaminants* that might be **harmful** or possibly even **deadly** if consumed.

Micro-organisms like *viruses, bacteria* and *parasites* can be impossible to see with the naked eye. That's why ***we treat every single drop*** of water in our system and continuously **sample** and **test** it to make sure there's nothing harmful hiding in your taps.

inside

written and prepared by: Daniel G. DROUIN, A.Sc.T.
SCADA and Instrumentation Technologist
Environmental Services Division
Water Purification Plant

photos by: Vitaliy ZHYDKYKH

cover, I, II, 1, 2, 3, 4, 8, 9, 10, 17, 18, 19, 20, 21, 22, 23, 24

message

*It's my pleasure once again to present you with the **Cornwall Drinking Water Quality Report** for the year **2020**.*

*The theme of this year's report centres around the **sustainability** of our drinking water source, the mighty St. Lawrence River and its tributaries. In the following pages you'll notice many striking images which were captured and generously donated by the talented local photographer **Vitaliy Zhydkykh**. These pictures truly reflect the stunning beauty and majesty of the St. Lawrence River and all of the life that depends on it.*

*The river provides us with the water that **we use everyday** for healthcare, cleaning, cooking, and drinking. It's the water that keeps our many local businesses going, the water firefighters use to protect our homes and families, and so much more.*

*I encourage everyone to do their part to help protect our **most precious resource** by being "water wise" and actively learning about and participating in **water conservation** and **protection** activities, and if you're looking for a place to start, keep reading this report!*

Here, we'll be going through all the steps that the water takes to get from the river to your taps, all of the work that goes into making sure that the water we're providing is as safe as we can possibly make it, and all of the steps we take to ensure our water is properly tested and protected.

I hope that the beauty of this report helps to illustrate why we should all do what we can to keep the St. Lawrence River clean and healthy.

Thank you and enjoy!

- Carl GOODWIN, P.Eng. M.Sc.
DIVISION MANAGER of ENVIRONMENTAL SERVICES

Cornwall
ONTARIO CANADA

system

The Corporation of the City of Cornwall owns and operates the ***Cornwall Drinking Water System,*** a *Large Municipal Residential* system.

It's made up of the *Raw Water Intake and Zebra Mussel Control Facilities* located at the base of the R.H. Saunders Power Generating Station Dam; the *Water Purification Plant*, a **class III water treatment facility,** located at 861 Second St. West; the *Boundary Road Reservoir*, the *Elevated Storage Tank* located on Tollgate Rd. and we operate the *City's* ***Distribution System*** which is also classified **class III**.

We take water from the *St. Lawrence River* and treat it according to **standard surface water treatment** methods before it's distributed to your homes and businesses.

"*Our entire water distribution network is a* ***critical piece of infrastructure*** *that we are proud to maintain 24 hours a day, 7 days a week.* ***Providing clean and safe drinking water is our priority***."

-Shawn O'BRIEN
SUPERVISOR of the WATER DISTRIBUTION and WASTE WATER COLLECTION SYSTEMS

"*Although 2020 was a challenging year due to the global pandemic, residents and business can be assured that our staff worked* ***diligently*** *throughout to ensure the* ***quality*** *of drinking water was* ***never compromised***."

-Owen O'KEEFE, C.Tech
SUPERVISOR of the WATER PURIFICATION PLANT

- **LICENSE #: 176-101, issue 2**
- **PERMIT #: 176-201, issue 5**
- **SYSTEM #: 220001049**

The ***Water Purification Plant*** uses chemically assisted *coagulation* and *flocculation* to remove particles suspended in the raw water. The water is then *filtered* and treated with *UV light* and *chlorine* for **disinfection**.

Our system is rigorously inspected annually and in January 2020 earned its **12th CONSECUTIVE 100% COMPLIANCE RATING** from the *Ontario Ministry of the Environment, Conservation and Parks* (MECP).

100%

source quality

RAW WATER

	MIN.	AVG.	MAX.
Turbidity	0.03	0.60	20.00
pH	7.15	7.97	8.46
colour	<2	<2	2

Lake St. Lawrence is a stable and reliable source of water that is part of the *St. Lawrence River* system. The lake was formed on July 1st, 1958 through the intentional flooding of the area known as "*The Lost Villages*".

On June 17, 2013, the Ontario MECP issued us our most recent *Permit to Take Water* (PTTW) from *Lake St. Lawrence*. This permit stipulates that the we are allowed to take a **maximum** of **100,000,000 litres** of water **per day.** We removed an average of 38,331,000 litres per day and reached a maximum of 67,678,000 litres per day.

The *turbidity* (or amount of solids suspended) in Cornwall's raw water averaged 0.60 Nephelometric Turbidity Units (NTU) and reached a maximum of 20.0 NTU on July 27th.

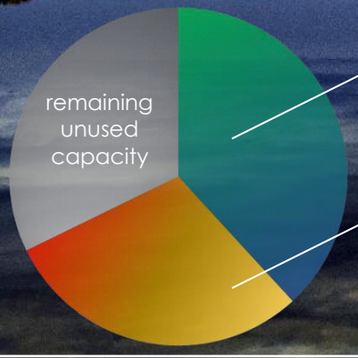
A total of **52** regularly scheduled raw water samples were taken and submitted to an MECP accredited laboratory for *E. coli* and *Total Coliform* testing and analysis, as directed by the *Ontario Drinking Water Regulation 170/03*.

Testing results indicated that an average of 9 *Colony-Forming Units* (CFU) of *E. coli* and 19 CFU of *total coliform* were found per every 100 ml of raw untreated water taken from *Lake St. Lawrence* in 2020.

The raw water enters into the purification system through the Raw Water Intake and Bar Screen that is built into the west side of the *R.H. Saunders Generating Station Dam,* **15 metres below the surface** of *Lake St. Lawrence*.

raw water volume

Our permit to take water stipulates that we can remove up to **100,000,000 litres** of water per day.



average daily volume

In 2020, the City withdrew an average of **38,331,000 litres of water per day**.

maximum daily volume

On June 22nd we withdrew **67,678,000 litres** of water. This was the highest daily volume of water we removed in 2020.

EXAMPLES OF TURBIDITY:

Note how the water becomes "cloudier" as the NTU increases.

0.60ntu

average turbidity before treatment

source protection

As mentioned, our **source water** comes from the *St. Lawrence River System*, and to keep it as **clean as possible** a plan has been put into place through the *Ontario Clean Water Act*. An *Assessment Report* and *Source Water Protection Plan* was developed by the *Raisin - South Nation Source Protection Committee* and implemented in 2015 to keep contaminants away from our raw water intake.

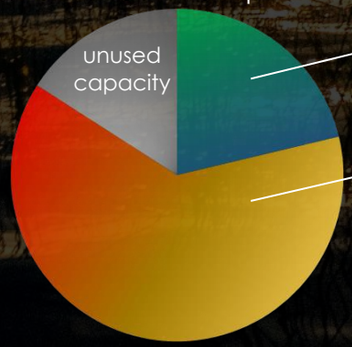
This *Assessment Report* identifies our Source Protection Area and the various activities that could potentially pose a **threat** to either the **quality** or **quantity** of our raw water supply. Our Source Protection Area includes two *Intake Protection Zones* (IPZ #1, IPZ #2 below) that are classified by their **distance** from our raw water intake, and the **time** it would take for contaminated water to travel to it.

We've also developed a *Source Water Protection Implementation Guide* back in 2015, to help us ensure we have the tools we need to meet or exceed all of our obligations under the *Ontario Clean Water Act*.

Protecting our source water is the most important thing we can do to keep our drinking water clean and safe!

raw water flow

Our permit to take water states that we can remove water from the St. Lawrence River up to a maximum flow rate of **125,000 litres per minute**.



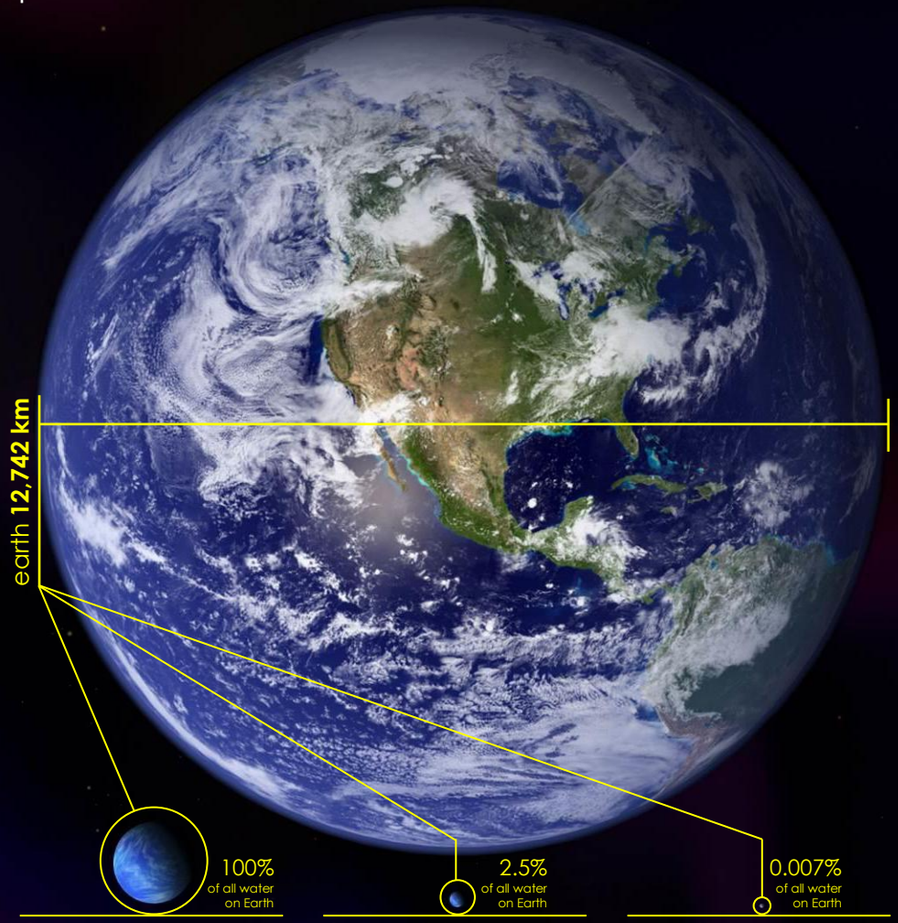
average flow rate

In 2020, we withdrew water at an average rate of **26,613 litres per minute.**

peak flow rate

On November 18th we withdrew water at a rate of **105,120 litres per minute** for approximately **10 minutes**. This was the highest raw water flow rate we experienced in 2020.

conservation



If we created a moon with **all** of Earth's water, it would have a diameter of **1,385 km.**

If we did the same with **all of Earth's FRESH water**, it would have a diameter of **272 km.**

Now, if the moon was only made with **all of Earth's ACCESSIBLE FRESH water**, it would only have a diameter of **56 km.**

While nearly **70%** of the Earth is covered by water, only **2.5%** of it is fresh. The rest is saline and ocean-based. Even then, **less than 1% of our freshwater is easily accessible**, with much of it trapped in glaciers and snowfields. (SOURCE: National Geographic Society)

Water is essential to our daily lives, and there is a potential for water conservation both **inside** and **outside** of your home whenever it's used. Sensible water use can **reduce the amount of stress** that is placed on our **major resources** such as the water and wastewater treatment plants, and the distribution system that delivers water to you.

Here are a few tips that should help you conserve water:

INDOOR WATER CONSERVATION TIPS

- Install aerator attachments on sink faucets.
- Replace or adapt older, less water efficient fixtures or appliances.
- Take short showers. Replace your showerhead with a water saving device such as an ultra-low-flow version.
- When bathing, be careful not to overfill the tub. A ¼ full tub is usually sufficient.
- Don't let water run while shaving, washing your face or brushing your teeth.
- Avoid flushing the toilet unnecessarily. Dispose of tissues and other similar waste in the trash rather than the toilet.
- When replacing a toilet, consider a low-flush toilet that uses a smaller water tank. Or you can install a water saving device in your present toilet to reduce the amount of water used during a flushing cycle.
- Operate automatic dishwashers and washing machines only when they are fully loaded.
- If something requires cleaning fill the sink instead of running a steady stream of water.
- When boiling vegetables use just enough water to cover them or consider steaming, which uses less water and also conserves the natural nutrients.
- Do not use running water to thaw meat or other frozen foods. Instead consider defrosting food overnight in the refrigerator or using the defrost setting on your microwave.

OUTDOOR WATER CONSERVATION TIPS

- Use a broom to clean a driveway or a sidewalk rather than spraying it down with water.
- Watering outdoor greenery in the spring isn't always a good practice. The less it is watered early in the growing season, the deeper the roots will grow. This creates a greater natural reservoir.
- For lawn and garden watering use an appropriate sprinkler with an automatic shut-off nozzle that best suits your needs. Lawns should be watered no more than once every 3 to 5 days. Remember, evaporation rates are lower in the morning or early evening. At times when there are water shortages, lawns should not be watered at all.
- Ask your local gardener about drought resistant plants and ground coverings that will save upkeep time and water.
- Install moisture-holding mulch around trees and shrubs and keep weeds under control. Weeds can prevent much needed water from reaching other plants.
- Rainwater can be collected in large containers and used to water outdoor plants.
- When washing your car use a bucket and sponge, then quickly rinse with a trigger nozzle equipped hose.
- By not overfilling your swimming pool you can prevent water loss due to splashing. Swimming pool covers can also be used to prevent evaporation.

raw water

The raw water enters the purification system through a coated steel **Bar Screen** equipped with 10 cm spacing designed to prevent logs or other large objects from entering the intake pipe and clogging it. The special coating helps to prevent the formation of any *frazil ice* that could potentially clog or jam the bar screen.

Inspections by specially trained and certified SCUBA Divers are completed on the intake system annually. The system was last inspected on **May 20th, 2020** and both the Bar Screen and Raw Water Intake were again found to be in **excellent operating condition**.

Once through the Bar Screen the raw water is **pre-chlorinated** by the Zebra Mussel Control System then passes through a normally open gate valve.

The pre-chlorination of the raw water prevents the formation of **Zebra Mussels** that can grow inside of pipes and equipment, and cause severe clogging or jamming problems with the intake system, bar screen and gate valve.

The Zebra Mussel Control System is enclosed in a small facility located near the east side of *R.H. Saunders Generating Station Dam*.

The Zebra Mussel Control Facility consists of a raw water re-circulation pumping system, a raw water supply line, and gas chlorination equipment which include: chlorine gas cylinders, a weight scale, a chlorine gas feeder, monitoring instrumentation, and an automated chlorine injection control system.

The **chlorine gas** is mixed with the raw water to create a **hypochlorous acid** solution which is effective in reducing the growth of zebra mussels.

After being pre-chlorinated, the raw water is fed by hydraulic pressure through nearly **3.7 kilometres** of reinforced concrete pipe; then finally arrives at the Cornwall Water Purification Plant (WPP) to begin the treatment process.

Just before entering the plant the concrete pipe divides into two separate flow control lines which are individually controlled by motorized valves located in the WPP Flow Control Chamber.

These motorized valves modulate their position to adjust the flow of raw water streaming into the WPP. The valve positions are controlled by the level signal provided by the WPP Settling Tank ultrasonic level sensors. This control is done in order to maintain a constant water level in the Settling Tanks.

Also installed with the valves are magnetic flow meters and indicating transmitters which are used to continuously monitor and record the raw water flows.

One motorized valve and one flow meter is installed on a **600mm diameter flow control line** that is generally used during normal operating conditions.

The other motorized valve and flow meter are installed on a **900mm diameter line** which is used in situations where the City's water demands are significantly higher than usual or during the shut-down and maintenance of the 600mm flow control line.

Once the flow has been **measured and recorded** a chemical coagulant solution is injected against the flowing raw water in order to "flash mix" the coagulant solution with the water and begin the coagulation, flocculation and settling processes.

The water then flows through a new **Motorized Traveling Screen** where weeds, sticks, plastic bags, and other forms of debris which were able to pass through the Raw Water Intake's Bar Screen are removed from the water.

1.00mg/l
average zebra mussel control chlorine dose

0.28mg/l
average pre-treatment free chlorine residual

filtration

Once past the Motorized Traveling Screen the flowing raw water and coagulant mixture enters the Pre-mix Chamber then divides into two separate, yet identical hydraulic flocculation Mixing Chamber systems (North and South) which operate in parallel.

Each Mixing Chamber system consists of three compartments. The **raw water and coagulant mixture** enters a center compartment where additional mixing is achieved. The water is then directed to the two outer compartments for final gentle mixing and to complete the **flocculation process**.

The water then flows from the flocculation compartments to one of two corresponding **Settling Tanks** which also operate in parallel (North and South). The Settling Tanks are equipped with baffles to ensure that the proper **settling** of all **flocculation particles** before filtration.

In 2020, the Cornwall Water Purification Plan used an **aluminum based coagulant solution** to assist in the flocculation process at an average dosage of **12.2 mg/l**.

The effectiveness of the coagulant solutions can vary (sometimes significantly) depending on the **temperature** of the water in which it is injected, particularly in low turbidity waters like those of Lake St. Lawrence. Cornwall's raw water temperature varied between **0.6° and 25.4° Celsius** in 2020.

Each Settling Tank is automatically cleaned every two days by an automated **sludge collection and removal system**. This system is used to remove the flocculation sludge that accumulates at the bottom of the tanks.

During these cleanings the wastewater and accumulated sludge that's created by the settling process is directed to the sanitary sewer system.

After passing through the Settling Tanks the two separate water streams (North and South) re-combine into a single **Settled Water Conduit** which directs the water to the Filter Bed System.

The **Filter Bed System** is comprised of four (4) conventional Filters Beds that have a surface area of **82m²** each, and which operate completely independently from one another.

The settled water enters the Filter Beds through horizontal troughs that run across the filters.

The water then travels down into the filter and through **porous anthracite** to trap and remove any remaining particulate matter that may still be suspended in the water. In 2020, coagulation, settling and filtration reduced the average turbidity in the water from 0.60NTU to 0.04 NTU.

All four of the Filter Beds have been upgraded in recent years and are equipped with anthracite media, improved lateral under-drain systems, and **air-scouring capabilities** which significantly increases the effectiveness of the **backwash cleaning process.**

FILTER EFFECTIVENESS

20.0ntu

maximum raw water turbidity before filtration

0.04ntu

average turbidity after filtration

The individual filters are **cleaned after every 24 hours of operation** by means of air scouring and backwashing with treated water.

DID YOU KNOW?

Ultra Violet light at wavelengths between **200 and 300 nm** (nanometers) and delivered in doses over **40mJ/cm²** (millijoules per square centimeter) are proven to be **extremely effective** at inactivating dangerous waterborne pathogens including viruses, bacteria, and parasites without creating any known harmful by-products. UV light is particularly effective at disinfecting micro-organisms that are resistant to chlorine.

176 mJ/cm²
average UV disinfection dose

disinfection

Once the water has passed through a filter it's discharged into a corresponding **Filter Header** (#1, #2, #3, or #4) located in the Water Purification Plant's Pipe Gallery.

The Filter Headers direct the water to either the Clearwell, the Reservoir, or to waste (the sewer system), and each header is equipped with multiple **sensing devices** designed to **monitor** the **performance** of the filter and the quality and quantity of water (i.e. turbidimeters, differential pressure transmitters, magnetic flow meters, and UV transmittance sensors).

The Filter Headers are also where the water is disinfected with **Ultra Violet (UV) radiation** at an average dose of **176mJ/cm²** in 2020.

In addition to U.V. light, the Water Purification Plant also uses **chlorine** in the form of Sodium Hypochlorite (NaOCl) for **primary chlorination** and to provide **secondary disinfection**.

Primary chlorination and U.V. disinfection ensure the destruction or **inactivation of harmful pathogens** which are too small to be removed by coagulation, settling and filtration.

Secondary chlorine disinfection provides **residual** concentration of free chlorine in the City's Distribution System in order to **prevent bacterial re-growth** and to provide a measurable way to quickly **detect unexpected changes** in the Distribution System's water quality.

Once the water has traveled through the Filter Headers it is (under normal operating conditions) directed to the **Clearwell** where the water is injected with an average dose of approximately **1.07 mg** (milligrams) of chlorine per liter of filtered water.

The Clearwell is a 1,515,000 litre **baffled** water storage chamber which allows the chlorine to come into contact with the filtered water for a period of time.

The chlorine contact time in conjunction with the water's pH, temperature, and free chlorine residual allow plant operators to accurately predict the effectiveness of the chlorine disinfection process in a concept known as CT.

The treated water then moves from the Clearwell to a baffled 3,030,000 litre buried **Reservoir** where additional chlorine contact time is achieved before the water is allowed to be discharged into the Distribution System by the High Lift Pumping System.

Chlorine residual levels at the Water Purification Plant are **continuously monitored and recorded** by five (5) chlorine analyzers which constantly sample and test water from strategic locations within the plant's process stream.

The data collected by the analyzers is securely stored in the plant's *Supervisory Control and Data Acquisition* (SCADA) System and on backup data storage devices.

0.22 min. mg/l

On *November 17th* we recorded a ***minimum*** free chlorine residual of 0.22 milligrams per litre. This brief **dip** was recorded during the **re-calibration** of a component in the chlorine monitoring system.

Harmful Algal Blooms (HABs) occur when *blue-green algae*, grow rapidly in water forming large visible patches. These HABs may produce **biotoxins** like *microcystin* that can be harmful to humans, plants and animals.

Our *monitoring plan* for HABs includes **weekly sampling** and **testing** (June-October) of the raw and treated water for *microcystin*. Average and maximum (<0.15-0.31µg/l) microcystin levels were **well below** concentrations that are believed to cause adverse health effects (1.50 µg/l).

advanced treatment

Cornwall
ONTARIO CANADA

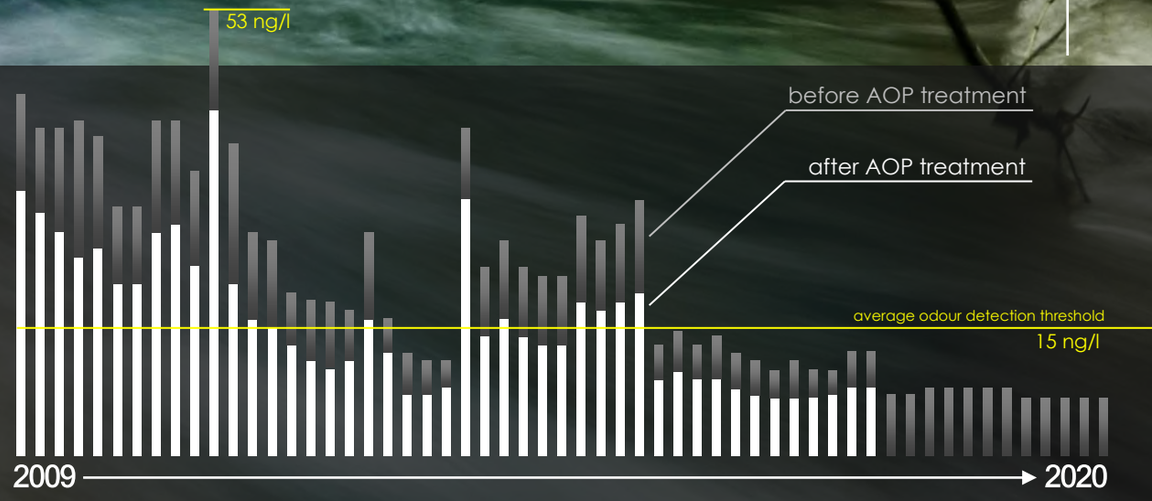
During the late summer, these and other non-harmful algae begin to die off. Their *decomposition* releases compounds that cause even treated drinking water to taste and smell **earthy** or **musty**.

To help control the problem, we inject a small dose of ***Hydrogen Peroxide*** (H_2O_2) into the filtered water and then ramp up the Water Purification Plant's ***UV reactors*** to full power.

This **Advanced Oxidation** treatment process reduced the levels of *Taste and Odour* compounds in the filtered water to below their detectable limits.

0.90 mg/l H_2O_2
AVERAGE DOSE OF HYDROGEN PEROXIDE

590 mJ/cm^2 UVC
AVERAGE DOSE OF ULTRA VIOLET "C" LIGHT



This graph demonstrates the effectiveness of our **advanced oxidation process** (AOP) on *Geosmin* (a taste and odour causing compound). 57 samples were taken at our water purification plant between 2009 and 2020.

The system is typically only activated when *Taste and Odour* events have been detected by sampling activities and/or reported by the public. Despite regular and repeated testing, no events have been detected or reported since 2018 therefore the system has remained offline.

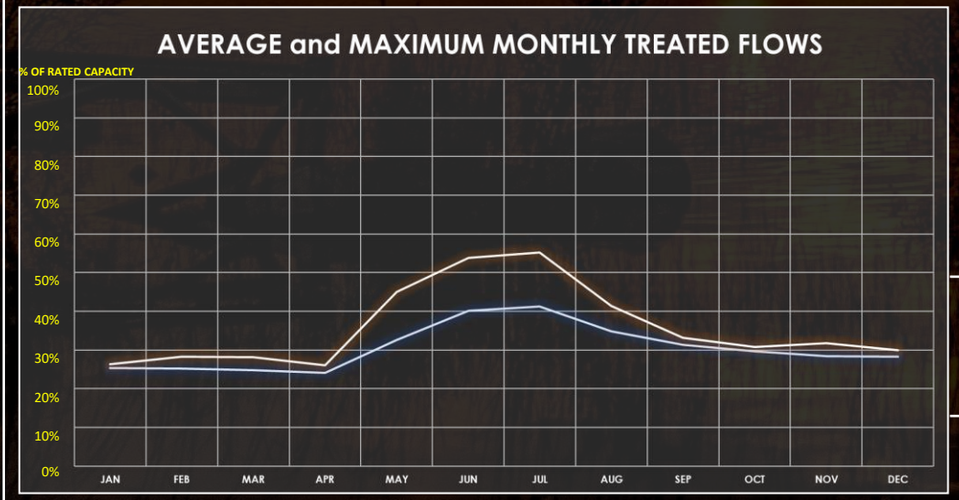
high lift pumping

Once the water's been treated and is ready to be consumed, it's lifted from a water conduit that's fed from the Reservoir and pumped into a common **Discharge Ring Main header** located in the basement of the Water Purification Plant. The conduit can also be fed from the Clearwell when required. This pumping is done by one or more of the Water Purification Plant's five (5) **High Lift Discharge pumps** which can be powered by the plant's **Emergency Stand-By Generator** should there be an interruption in utility power.

From the ring main, the water is directed to the **East** and **South Discharge Lines** where the individual flows are **monitored and recorded** as the water is discharged into the **Distribution System**. Other discharge water quality parameters are continuously monitored and recorded such as:

- the discharge water pressure;
- the discharge turbidity;
- and the post (or secondary) free chlorine residuals.

In 2020 the Water Purification Plant discharged a total of **11,145,303,000 litres of water** at an average rate of **30,429,000 litres of treated water per day**. Average post chlorine residuals of **1.07 mg/l** were also maintained.



Higher **peak flows** in May, June and July can be attributed to the hot and dry weather conditions experienced during those months and an issue that was discovered and subsequently rectified in the City's Water Distribution System.

11.1 BILLION litres pumped in 2020

distribution system

The City's Municipal Works Department has implemented a **Distribution System Flushing Program** which ensures that chlorine residual levels in the Distribution System are being adequately maintained. This is accomplished by allowing distribution water to be discharged from fire hydrants and blow-offs for a specific amount of time then testing the water for free chlorine residual levels.

The **flushing activities** are carried out by Municipal Works staff and automated flushing systems in regularly scheduled intervals at strategic locations throughout the City.

The community of *St. Andrews* is supplied by a connection in an **underground valve chamber** located at the intersection of Cornwall Centre Road and Highway 138 (FCC-02). The flow meter that measures the flow through the connection was replaced with a new unit in 2020.

Rosedale Terrace is supplied by a connection located beneath the intersection of Mack Street and Cornwall Centre Road (FCC-01).

Holy Trinity Catholic School in the Township of South Glengarry is also **connected** to the Cornwall Distribution System.

elevated storage tank

22.7 meters
tank diameter

15.4 meters
tank height

26.3 meters
base height

41.7 meters
total height

4.5 MILLION
litres of storage

The drinking water pumped from the Water Purification Plant enters the Distribution System and flows to **the Elevated Storage Tank** located at 401 Tollgate Road, between McConnell Avenue and Pitt Street in Cornwall.

The Elevated Storage Tank is a composite tower comprised of a 15.4-metre-tall **steel bell** with the capacity to hold **4,545,000 litres** of treated water, secured to the top of a 26.3-metre-tall concrete base.

The City commissioned the Elevated Storage Tank in 1991 to act as an **emergency reservoir**, and to help **maintain and balance the pressure** in all areas of the City's Distribution System. Many safety features were upgraded and its exterior and portions of the interior were recoated in 2015.

The tank's **water level** is monitored and recorded by 2 separate Level Indicating Transmitters. The level varies during the day depending on the City's **demand**; however, a minimum operating level is maintained and additional High Lift Pumps are automatically activated at the Water Purification Plant if the level drops too low.

Pressure Indicating Transmitters monitor and record the Distribution System water **pressure** in the north end of the City.

Free chlorine residual levels are **constantly monitored** by a newly upgraded *Elevated Tank Chlorine Injection and Monitoring System* comprised of a combination of pH and chlorine analyzing probes, a transmitter, and an automated Sodium Hypochlorite injection system which maintains the free chlorine residuals at approximately **1.00 mg/l.**

To maintain uniform free chlorine residuals and prevent freezing in the winter months, the water in the Elevated Storage Tank is in **constant circulation** with the help of a re-circulation pumping and flow monitoring system.

boundary road reservoir

Water from the Distribution System is also stored in the **Boundary Road Reservoir** located at 560 Boundary Road in Cornwall.

The reservoir was commissioned in 1973 to act as an additional **water storage facility** in the event of fire related emergencies and to **augment** the Distribution System's **water pressure** in the eastern portion of the City.

The reservoir has the capacity to store **9,100,000 litres** of water in two separate underground chambers.

It also serves as a water pressure **booster pumping station** equipped with three centrifugal Booster Pumps each capable of transferring approximately **110 litres** of water per second from the reservoir and into the Distribution System.

To maintain **free chlorine residuals**, the water in the reservoir is "**turned-over**" daily.

Turning-over involves **two steps**:

First, is an automated process that occurs at nighttime and which **deactivates the Booster Pumps** and **opens the Inlet Valve** to allow water from the Distribution System to fill the reservoir.

The **second step** occurs during the daytime when the **Inlet Valve** allowing water into the reservoir is **closed** and one or more **Booster Pumps are activated** to reduce the volume of water stored in the Boundary Road Reservoir.

The constant draining and re-filling of the reservoir ensures that the free chlorine residuals are sufficient to **prevent the growth of algae or bacteria**.

Free chlorine residual levels in the Boundary Road Reservoir are also **constantly monitored** by the newly upgraded *Boundary Road Chlorine Injection and Monitoring System*.

The system is comprised of one combination pH and chlorine analyzing transmitter which samples and monitors the free chlorine residuals of the Distribution System water as it enters the reservoir, another combination pH and chlorine analyzing transmitter which samples and monitors the water as it is pumped out of the reservoir, and an automated chlorine injection system which maintains the chlorine residuals of the water discharged from the reservoir at approximately **1.00 mg/l**.

In the event of a utility power failure, the Boundary Road Reservoir is equipped with a **300-kW diesel generator** set which provides emergency power. The generator set was installed in 2010.

Cornwall
ONTARIO CANADA

1973
commissioned

9.1 MILLION
litres of storage

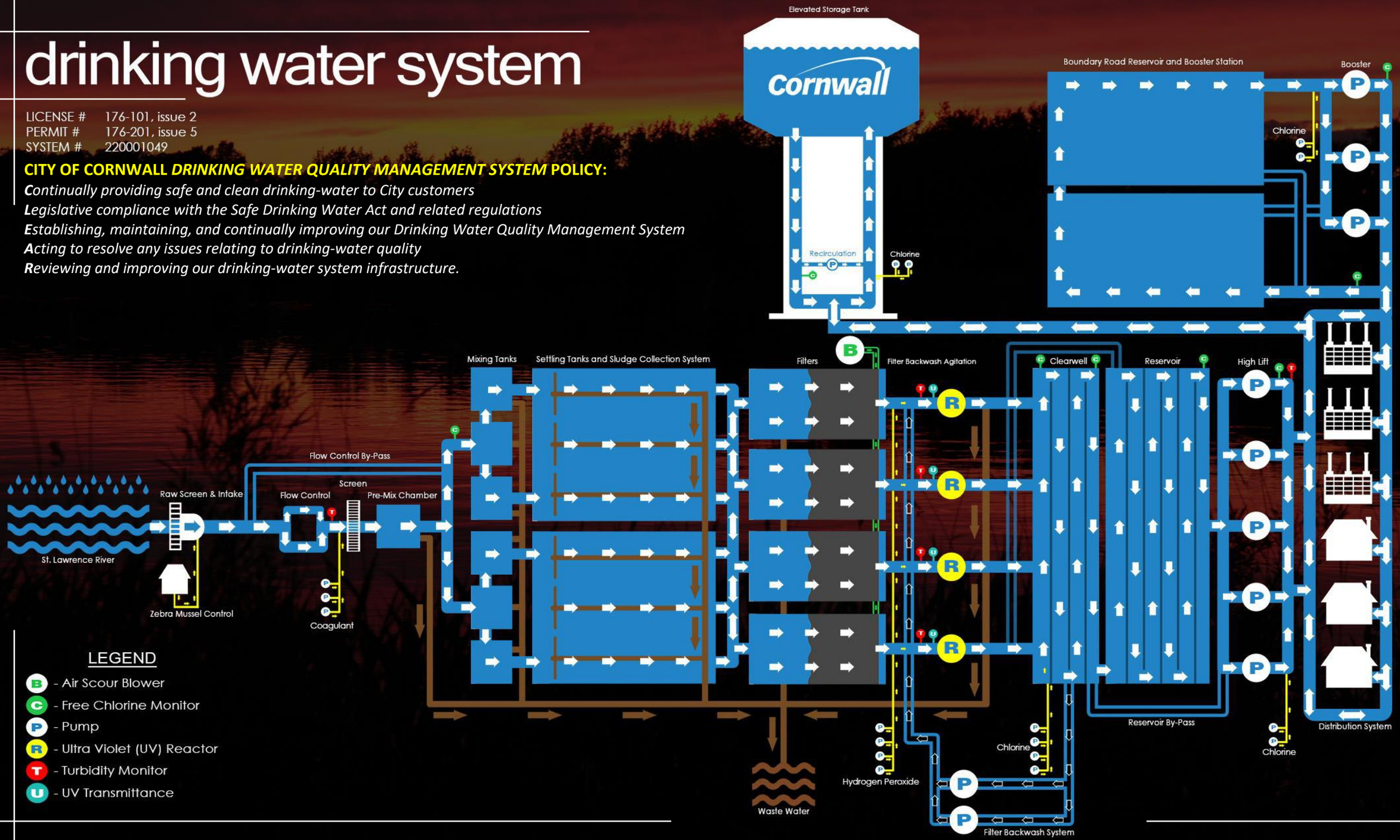
1.00 mg/l avg.
free cl^2 residual

drinking water system

LICENSE # 176-101, issue 2
PERMIT # 176-201, issue 5
SYSTEM # 220001049

CITY OF CORNWALL *DRINKING WATER QUALITY MANAGEMENT SYSTEM* POLICY:

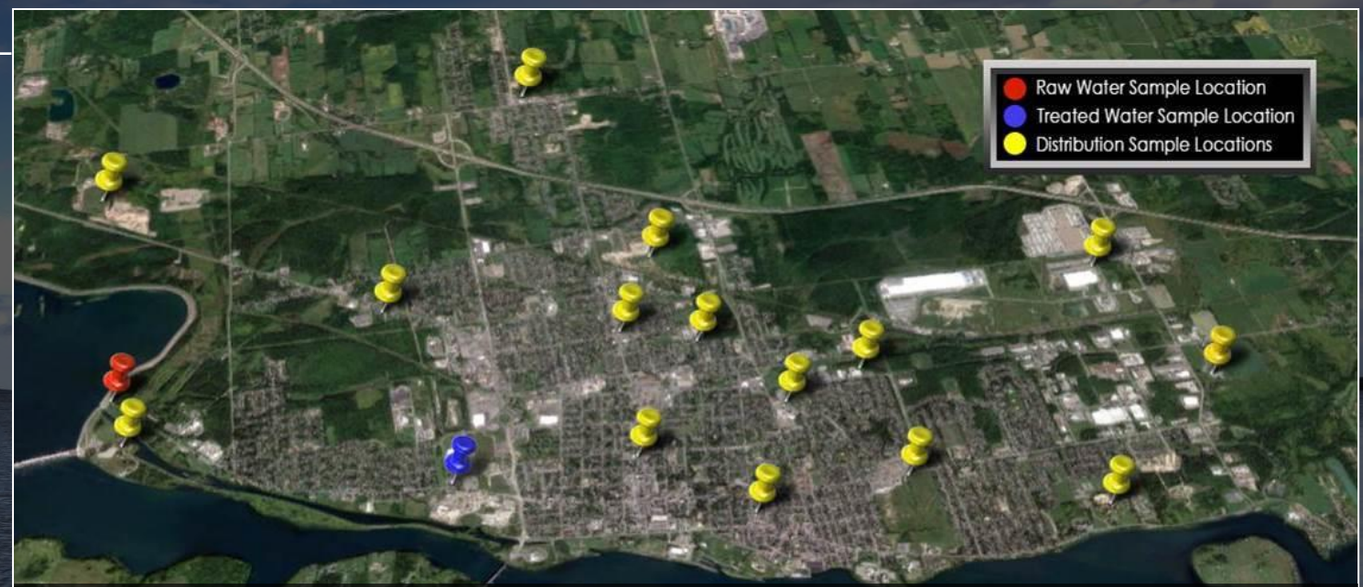
***C**ontinually providing safe and clean drinking-water to City customers*
***L**egislative compliance with the Safe Drinking Water Act and related regulations*
***E**stablishing, maintaining, and continually improving our Drinking Water Quality Management System*
***A**cting to resolve any issues relating to drinking-water quality*
***R**eviewing and improving our drinking-water system infrastructure.*



quality

In order to ensure Cornwall's water is **clean** and **safe**, distribution samples are regularly taken and laboratory tested for various parameters.

The sampling and testing parameters which apply to Cornwall's Drinking Water System are outlined in **Schedules 10, 13, 15, 23,** and **24** of *O.Reg.170/03* under the Safe Drinking Water Act of 2002.



Satellite view of the City of Cornwall with pushpins representing our various sampling locations.

In April, The Cornwall Drinking Water System was granted temporary regulatory relief of Ontario Regulation 170/03 Schedule 10-2 (1) by the Ministry of the Environment, Conservation and Parks (MECP) reducing the number of distribution microbiological samples required each Month by 25% because of facility access limitations put in place due to Covid-19.

The temporary regulatory relief was lowered to a 10% reduction in August and remained in place through December.

Schedule 10 normally requires that one (1) raw water sample and one (1) treated water sample be tested per week for **Escherichia coli** (E. coli) and **total coliforms**, and that a minimum of 55 samples per month be taken from at least 8 different locations in the Distribution System and be tested for the same parameters.

Water Purification Plant staff collected weekly samples from **15 different locations** throughout the City in 2020 and submitted them to an **accredited laboratory** for testing.

The testing results of **52 treated water samples**, and all **664 distribution water samples** collected in 2020 indicated that there was no trace of total coliforms or E. coli in the City's drinking water.

Schedule 10 also requires that the general bacteria population of one treated water sample and 25% of the weekly distribution samples be tested and expressed in **Heterotrophic Plate Count** (HPC).

In 2020, **52 treated water samples** and **265 Distribution System water samples** were submitted to an accredited laboratory for HPC testing.

All HPC testing results indicated that Cornwall's drinking water is of **excellent quality and is safe for consumption.**

Schedule 13 of O.Reg.170/03 requires that the City's drinking water be sampled and tested for **trihalomethane (THM), haloacetic acid (HAA), nitrate and nitrite** levels once every three months, and that sodium levels be sampled and tested annually.

Laboratory results for 2020 indicate that the concentration levels of all parameters listed were below their respective allowable concentration limits.

that the concentration levels of all parameters listed under Schedules 13 were **well below their respective allowable concentration limits**.

Simply put, independent laboratory results confirm that the treated drinking water we produce **exceeds all quality standards, is clean, safe and taste great!**

sampling

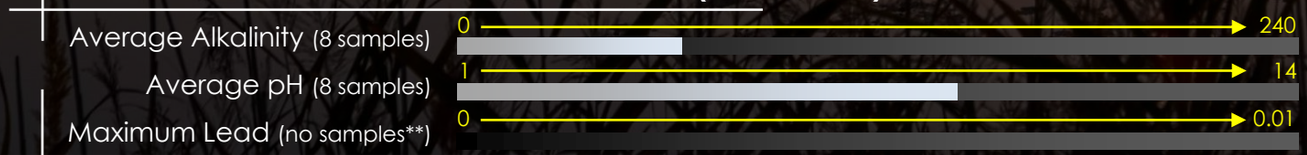
WEEKLY BACTERIOLOGICAL SAMPLING and TESTING (Schedule 10)
Total Coliforms and E. coli *(Escherichia coli)*

Background Heterotrophic Plate Count
52 treated water samples – No Unsafe Samples
265 distribution water samples – No Unsafe Samples

QUARTERLY DISTRIBUTION DISINFECTION BY-PRODUCT and CHEMICALS SAMPLING and TESTING (Schedule 13)

* No Provincial Standards exist for these parameters; therefore, they have been scaled to 100µg/l

BI-ANNUAL DISTRIBUTION LEAD SAMPLING and TESTING (Schedule 15.1)



** The City is entitled to operate a reduced lead sampling program as prescribed under schedule 15.1-5 of Ontario Regulation 170/03.

52 RAW WATER samples

RAW RESULTS
Total Coliforms Monthly Average: 19 cfu/100ml
E. coli Monthly Average: 9cfu/100ml

52 TREATED WATER samples

TREATED RESULTS
No Total Coliforms detected
No E. coli detected

664 DISTRIBUTION samples

DISTRIBUTION RESULTS
No Total Coliforms detected
No E. coli detected

15 locations

ANNUAL TREATED WATER CHEMICAL SAMPLING and TESTING (Schedule 13, 15.2, 23, 24)

Alachlor • Antimony • Aresnic • Atrazine + N-dealkylated metabolites • Azinphos-Methyl • Barium • Benzene • Benzo(a)pyrene • Boron • Bromoxynil • Cadmium • Carbaryl • Carbofuran • Carbon Tetrachloride • Chlorpyrifos • Chromium • Diazinon • Dicamba • 1,2-Dichlorobenzene • 1,4-Dichlorobenzene • 1,2-Dichloroethane • 1,1-Dichloroethylene • Dichloromethane • 2,4-Dichlorophenol • 2,4-Dichlorophenoxy Acetic Acid • Diclofop-methyl • Dimethoate • Diquat • Diuron • Fluoride • Glyphosate • Lead • Malathion • Mercury • 2-Methyl-4-chlorophenoxyacetic Acid • Metolachlor • Metribuzin • Monochlorobenzene • Paraquat • Pentachlorophenol • Phorate • Picloram • Polychlorinated Biphenyls • Prometryne • Selenium • Simazine • Sodium • Terbufos • Tetrachloroethylene • 2,3,4,6-Tetrachlorophenol • Triallate • Trichloroethylene • 2,4,6-Trichlorophenol • Trifluralin • Uranium • Vinyl chloride

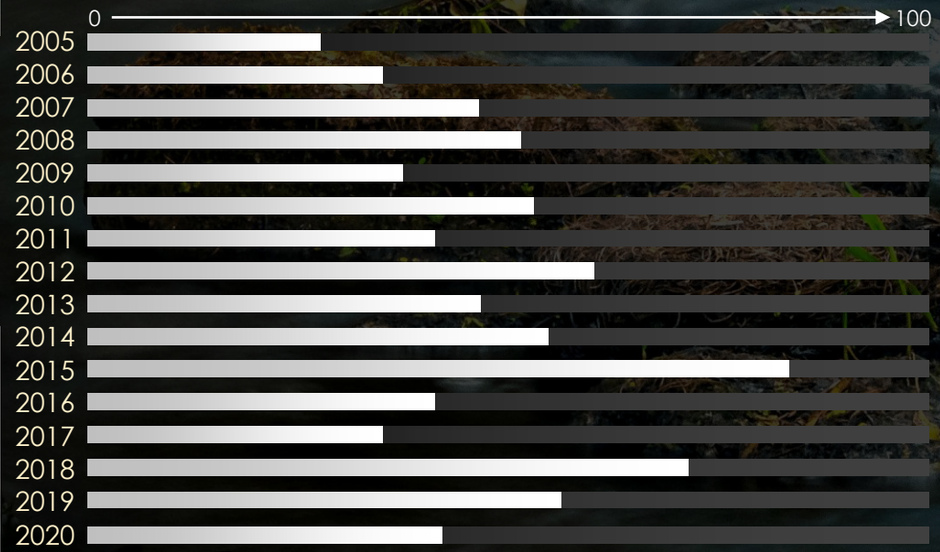
The results of the annual samples indicated that the concentration levels of all of the parameters listed under Schedule 13, 23 and 24 of *O.Reg.170/03* were below one-half of their respective allowable limits set out in the Provincial Standards.

infrastructure

272 km pipe | **1,313 hydrants** | **2,034 valves**

Our water travels to your homes and businesses through a vast network of **underground water mains**. If we connected all the water main pipes end-to-end, it would be long enough to reach from **downtown Cornwall** all the way to **Albany, New York**!

WATER MAIN BREAKS



43 breaks in 2020

$3.75 invested million

We invested over to **$3.75 million** on our distribution infrastructure this year. This consisted of many projects including the ***replacements, repairs,*** and ***rehabilitations*** of pipes throughout various portions of our water distribution network.

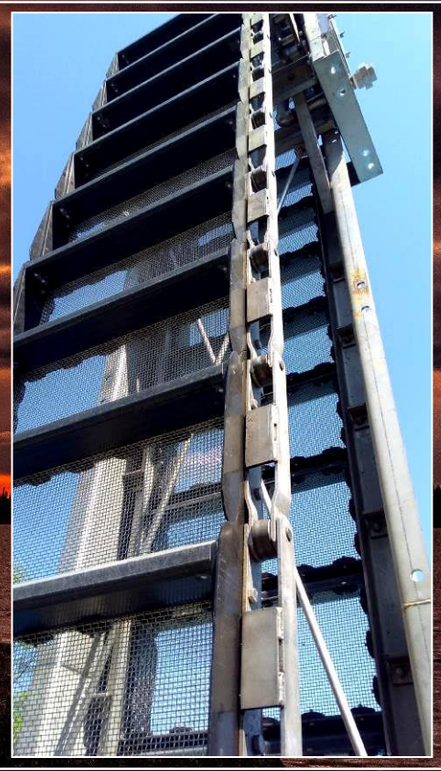
$2,755,390 RELINING

STREET	FROM	TO	DIAMETER/LENGTH
Thirteenth Street	Fatima Street	Chruchill Street	150-300mm/410m
Jane Street	Power Dam Drive	Surgenor Street	150mm/670m
Robertson Avenue	Second Street	Princess Street	150mm/541m
Susan Avenue	Leonard Avenue	Osborne Avenue	150mm/108m
Osborne Avenue	Westmooreland Avenue	Robertson Avenue	150mm/243m
Joyce Street	Dover Road	Surgenor Street	150mm/395m
Queen Street	Riverdale Avenue	Susan Avenue	150mm/660m
Princess Street	Robertson Avenue	Riverdale Avenue	150mm/825m
Pescod Avenue	Dover Road	Queen Street	150mm/224m

$ 997,440 REPLACEMENTS

Louisa Street	Montreal Road	First Street East	150mm/240m
Alice Street	Montreal Road	First Street East	150mm/55m
Baldwin Avenue	First Street East	Second Street East	200mm/160m
Sydney Street	Fourth Street	Fifth Street	150mm/200m
Fifth Street	Amelia Street	Sydney Street	450mm/175m
York Street	Seventh Street	Ninth Street West	150mm/375m

ANNUAL INVESTMENTS IN WATER DISTRIBUTION INFRASTRUCTURE



$900 THOUSAND investments improvements

We invested close to **$900,000** in 5 capital **upgrade** projects related to the ***Water Purification System*** which were completed in 2020, including:

PROJECT #1

We use **Chlorine Injection and Monitoring Systems** at the *Boundary Road Reservoir* and in the *Elevated Storage Tank* to maintain secondary disinfection free chlorine levels in the distribution system. These systems are a critical component of our system and have been replaced with new and upgraded units featuring enhanced monitoring and control capabilities.

$144,000

PROJECT #2

In use since 1958, our **Raw Water Intake Valve** located at the base of the *R.H. Saunders Dam* was inspected and found to require some rehabilitation work and repairs to the external hardware and its fasteners. This project also included the reconditioning of the valve chamber itself, the de-commissioning of a drain valve, and some additional minor repairs.

$ 40,000

PROJECT #3

The **Motor Control Centres** providing electrical control of various portions of the *Water Purification Plant* including the Filter Area, Pipe Gallery, and the SCADA Operations Centre, had reached the end of their respective functional lifecycles and were replaced with new MCCs that provide enhanced power isolation, monitoring and safety features.

$187,000

PROJECT #4

The need for new **Emergency Intake Connections** was Identified as a priority during one of our *Quality Management System Annual Risk Assessments and Emergency Management Exercises*. These Emergency Intake Connections will ensure we have the ability to continue to deliver safe drinking water in the event of a catastrophic failure of our existing intake.

$148,000

PROJECT #5

The old **Raw Water Motorized Traveling Screen** at the *Water Purification Plant* was installed in 1998 and recently underwent a thorough inspection. It was determined that the functional lifecycle of the old screen had been reached and the unit was replaced with a new model featuring upgraded components and enhanced control and monitoring capabilities.

$375,000

Ontario

Safe Drinking Water Act

We operate our *Water Treatment* and *Distribution Systems* under the laws and regulations created under the Province of Ontario's ***Safe Drinking Water Act*** of 2002.

The *Act* clearly recognizes that **people are entitled to expect safe drinking wate**r, and provides for the **protection** of human health from drinking water health hazards through **controls, testing**, and **regulations.**

O.Reg.128/04

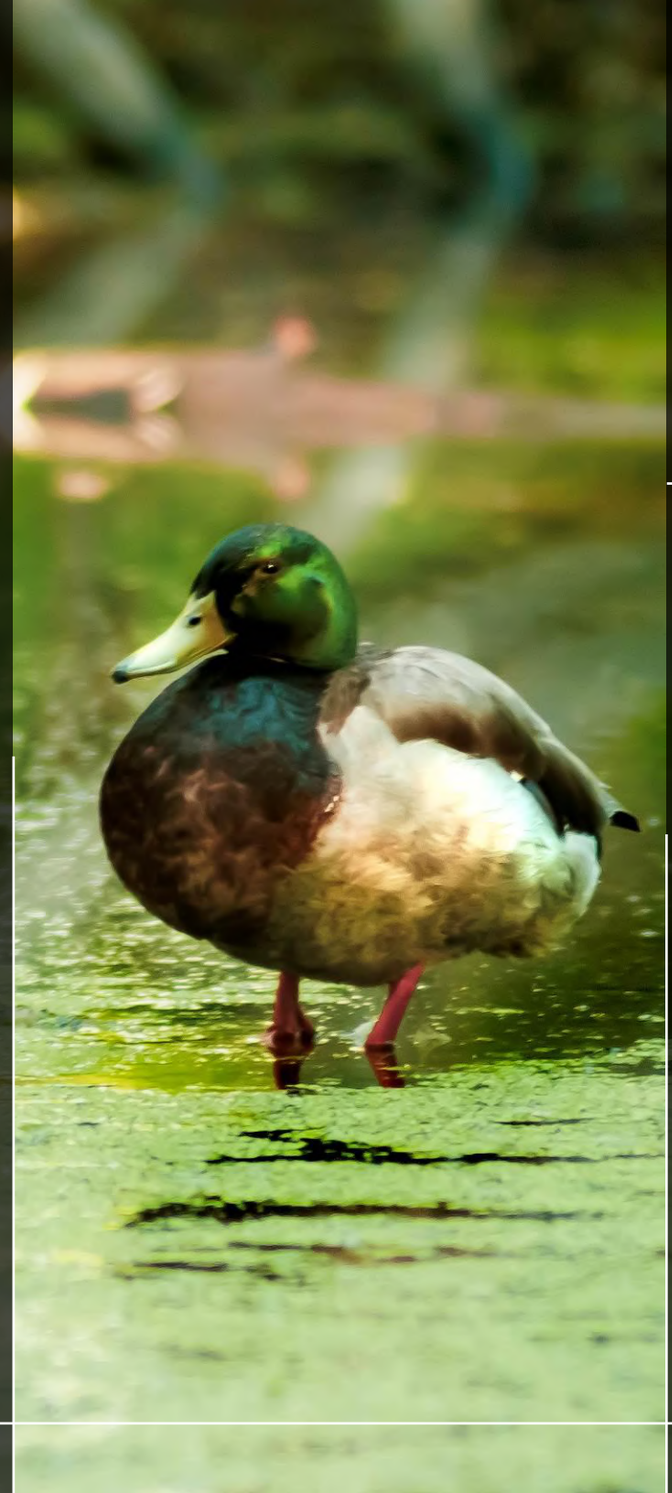
Ensures that the **operators** working on Ontario's drinking water systems are **competent** and **licensed** to perform their duties. It establishes the ongoing training requirements, details the different types of licenses, reissuance and transferability, overall and operator in charge responsibilities, record keeping, and operations and maintenance manual requirements.

O.Reg.169/03

Sets out the **drinking water quality standards** that we operate under, including the testing parameters of the various contaminants and their acceptable concentration limits.

O.Reg.170/03

Applies to **municipal** and private water systems that provide water to residential areas year-round. It stipulates the **treatment methods,** operational checks, chemical and microbiological sampling and testing requirements, corrective actions, and the **reporting requirements**.



KEEPING ONTARIO'S DRINKING WATER SAFE!

O.Reg.287/07

Applies to municipalities within **Source Water Protection Areas** and stipulates the requirements for coordination with Source Water Protection Committees, and the study and creation of specific area protection zones and plans .

O.Reg.435/93

Sets out water treatment, water distribution, and waste water collection and treatment system **Operating Standards**. It defines the various classifications of facilities, operator licensing fees and other general operating standards.

O.Reg.453/07

Stipulates the need to prepare a **Financial Plan** that forecasts our financial requirements for at **least six years into the future**. The plan must be approved by a resolution of *City Council* and is required to be updated regularly before we can apply to renew our Operating License. Our most recent Financial Plan was completed in November of 2020.

sustainability

Under the guidance of *Cornwall City Council*, our administration, in coordination with *Watson and Associates Economists Ltd* and the *St. Lawrence River Institute of Environmental Sciences*, are working on a **Water Conservation and Servicing Master Plan** which will be completed in 2021.

Demand management, **water conservation** and **sustainability** will be key components to our plan, and as part of this effort, we've implemented a volunteer *residential water meter program*.

Although the "*flat rate*" water billing framework hasn't changed, our administration is currently reviewing the policies, consumptions and financial aspects of water metering, as part of the ***Blueprint*** to our *Demand Management* approach.

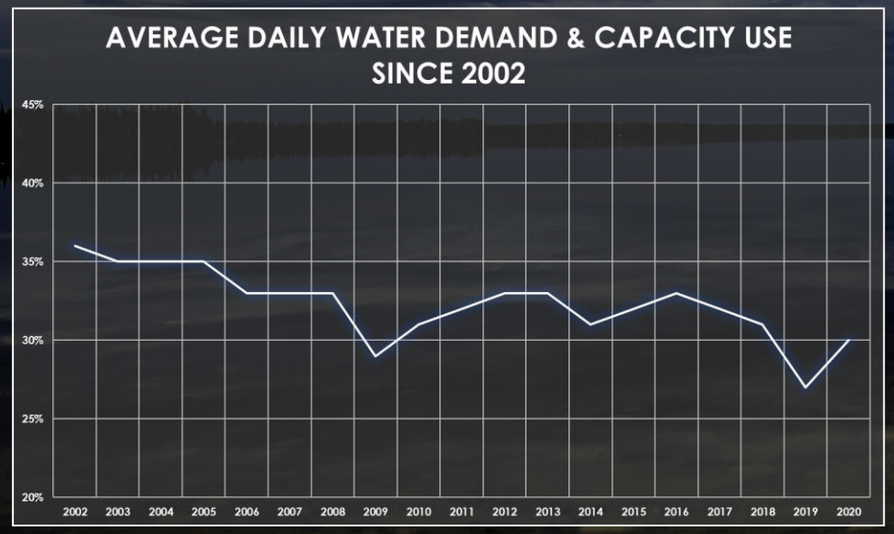
1897

To date, we've installed **1,897** water meters **free-of-charge** in single and multi-residential units. This provides residents with an opportunity to **monitor** and **adapt** to more water conserving habits.

treated summary

	TOTAL VOLUME	MAXIMUM FLOW	MINIMUM FLOW	AVERAGE FLOW	RATED CAPACITY
JANUARY	785,801 m³	18,278 l/m	16,386 l/m	17,603 l/m	25.3 %
FEBRUARY	729,417 m³	19,594 l/m	16,152 l/m	17,467 l/m	25.2 %
MARCH	769,010 m³	19,513 l/m	16,031 l/m	17,227 l/m	24.8 %
APRIL	722,374 m³	18,049 l/m	15,741 l/m	16,721 l/m	24.0 %
MAY	1,012,910 m³	31,227 l/m	16,944 l/m	22,961 l/m	32.6 %
JUNE	1,203,928 m³	37,379 l/m	21,594 l/m	27,869 l/m	40.1 %
JULY	1,278,752 m³	38,309 l/m	23,853 l/m	28,090 l/m	40.3 %
AUGUST	1,078,504 m³	28,716 l/m	19,833 l/m	24,159 l/m	34.8 %
SEPTEMBER	940,375 m³	23,035 l/m	19,885 l/m	21,768 l/m	31.3 %
OCTOBER	918,800 m³	21,375 l/m	19,303 l/m	20,582 l/m	29.6 %
NOVEMBER	851,408 m³	22,036 l/m	18,676 l/m	19,708 l/m	28.4 %
DECEMBER	878,848 m³	20,828 l/m	18,210 l/m	19,688 l/m	28.4 %
TOTAL:	**11,145,303 m²**			**AVERAGE:**	**21,131 l/m** or **30.4%**

The **average daily demand** from our *Water Purification Plant* in 2020 averaged **30.2% of our rated capacity** of 100,000m³ of water per day.



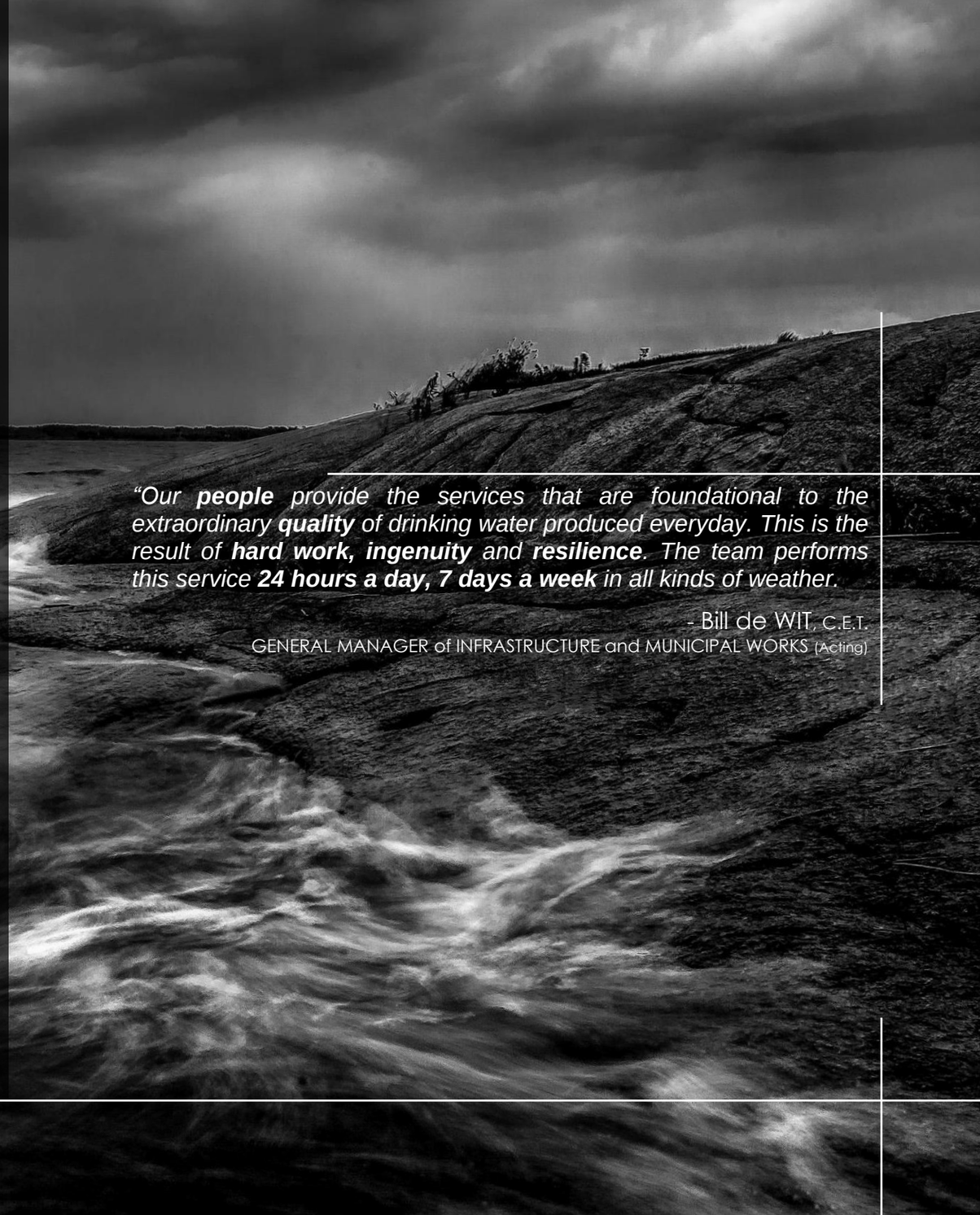
TREATED WATER

	MIN.	AVG.	MAX
Turbidity	0.01	0.04	0.59
pH	7.66	7.86	7.97
colour	<2	<2	2

Our *Water Purification Plant* has the rated capacity to produce and distribute a maximum volume of **100,000 cubic meters per day** (m³) at a maximum flow rate of **70,000 litres per minute** (l/m).

people

GENERAL MANAGER of INFRASTRUCTURE and MUNICIPAL WORKS (Acting)**:**	*Bill de WIT*
DIVISION MANAGER of ENVIRONMENTAL SERVICES:	*Carl GOODWIN*
ASSET MANAGEMENT COORDINATOR:	*Hafiz REHMAN*
SUPERVISOR of WATER PURIFICATION PLANT:	*Owen O'KEEFE*
SUPERVISORY CONTROL, DATA AQUISITION & INSTRUMENTATION TECHNOLOGIST:	*Dan DROUIN*
WATER PURIFICATION PLANT OPERATORS:	*Julien CHARTRAND*
	Steve GIRARD
	Steve JODOIN
WATER PURIFICATION PLANT MAINTENANCE TECHNICIANS:	*Rob LAMARCHE*
	Jean MAINVILLE
WATER METER TECHNICIAN:	*Jason GADBOIS*
DIVISION MANAGER of INFRASTRUCTURE:	*Michael FAWTHROP*
MUNICIPAL ENGINEER:	*Emma VANIER*
PROJECT and ASSET MANAGEMENT SUPERVISOR:	*Jennifer MARJERRISON*
DESIGN TECHNOLOGIST:	*Gordon STIDWILL*
INFRASTRUCTURE TECHNOLOGIST:	*Tracy GORDON*
GEOGRAPHIC INFORMATION SYSTEM TECHNOLOGIST:	*Denis LALONDE*
PLANS and RECORDS CLERK:	*Kevin PILON*
DIVISION MANAGER of MUNICIPAL WORKS (Acting)**:**	*Paul ROCHON*
PUBLIC WORKS DISPATCHER:	*Sharon MILLER*
MUNICIPAL WORKS TECHNOLOGIST:	*Robert RATHBUN*
SAFETY and TRAINING SUPERVISOR:	*Tommy SAUVE*
SUPERVISOR of ROADS:	*Kevin DUCHESNE*
SUPERVISOR of WATER DISTRIBUTION and WASTEWATER COLLECTION:	*Shawn O'BRIEN*
WATER DISTRIBUTION SUB-FOREMAN:	*Scott CAIN*
WATER DISTRIBUTION OPERATORS:	*Bryan DELAGE*
	Jason CROWE
	Pat DECOSTE
	Paul DEJONG
	Kim DELORME
	Kevin DREW
	Shawn HAMEL
	Robert LAUZON
	Jason LIDDLE
	Gary LEDUC
	Duncan MCDONALD
	Tim MORGAN
	Tony PICOTTE



*"Our **people** provide the services that are foundational to the extraordinary **quality** of drinking water produced everyday. This is the result of **hard work, ingenuity** and **resilience**. The team performs this service **24 hours a day, 7 days a week** in all kinds of weather.*

- Bill de WIT, C.E.T.
GENERAL MANAGER of INFRASTRUCTURE and MUNICIPAL WORKS (Acting)

www.cornwall.ca

Corporation of the City of Cornwall
Department of Infrastructure and Municipal Works
Environmental Services Division
861 Second Street West
Cornwall, Ontario, Canada
Phone: 613-932-2235
Fax: 613-932-4506

inquiries

SUPERVISOR of the WATER PURIFICATION PLANT
Owen O'KEEFE, C.Tech
613-930-2787 ext. 2573
ookeefe@cornwall.ca

SUPERVISOR of WATER DISTRIBUTION and WASTEWATER COLLECTION
Shawn O'BRIEN
613-930-2787 ext. 2226
sobrien@cornwall.ca

SOURCE WATER PROTECTION RISK ASSESSMENT OFFICIAL
Tracy GORDON, C.Tech
613-930-2787 ext. 2271
tgordon@cornwall.ca

SCADA & INSTRUMENTATION TECHNOLOGIST and REPORT AUTHOR
Dan DROUIN, A.Sc.T.
613-930-2787 ext. 2518
ddrouin@cornwall.ca

Unless otherwise specifically stated, the information contained herein is made available to the public by the *Environmental Services Department of the City of Cornwall* for use as general information only. The intent of this annual report is to inform the public of the performance of the **City of Cornwall's Drinking Water System** for the year **2020**.

Reference herein to any specific commercial product, process, service by trade name, trademark, manufacturer, or otherwise, does not constitute or imply its endorsement, recommendation, or favoring by the *Corporation of the City of Cornwall* or any entities thereof.

The views and opinions of the originators expressed therein do not necessarily state or reflect those of the *Corporation of the City of Cornwall* or any agency or entities thereof.

Cornwall
ONTARIO CANADA

2020 Drinking Water Quality Report


preserve
reduce
conserve
reuse
save
WATER use wisely

RECYCLE

SEPARATE WASTE MATERIALS
COMPOST
<
<
<
CHOOSE RECYCLABLE!

REUSE

USE THINGS MORE THAN ONCE
REPAIR
>
>
>
REGIFT!

REDUCE

AVOID WASTE!
>
>
>
BUY LESS
CONSERVE WATER

THINK BEFORE YOU PRINT

ENVIRONMENTAL SERVICES DIVISION

TWENTY TWENTY
DRINKING WATER QUALITY SUMMARY REPORT

Corporation of the City of Cornwall
Department of Infrastructure & Municipal Works
Environmental Services Division

Ontario **Drinking-Water Systems Regulation O. Reg. 170/03**

Drinking-Water System Number:	**22001049**
Drinking-Water System Name:	Cornwall Water Treatment Plant
Drinking-Water System Owner:	Corporation Of The City Of Cornwall
Drinking-Water System Category:	Large Municipal Residential
Period being reported:	January 1, 2020 – December 31, 2020

Complete if your Category is Large Municipal Residential or Small Municipal Residential	***Complete for all other Categories.***
Does your Drinking-Water System serve more than 10,000 people? Yes [x] No [ ] **Is your annual report available to the public at no charge on a web site on the Internet?** **Yes [x] No [ ]** **Location where Summary Report required under O. Reg. 170/03 Schedule 22 will be available for inspection.** City of Cornwall Water Purification Plant 861 Second Street West Cornwall, Ontario Telephone: (613) 932-2235	**Number of Designated Facilities served:** **Did you provide a copy of your annual report to all Designated Facilities you serve?** **Yes [ ] No [ ]** **Number of Interested Authorities you report to:** **Did you provide a copy of your annual report to all Interested Authorities you report to for each Designated Facility?** **Yes [ ] No [ ]**

List all Drinking-Water Systems (if any), which receive all of their drinking water from your system:

Drinking Water System Name	Drinking Water System Number
St. Andrews West/Rosedale Distribution System	260001250

Did you provide a copy of your annual report to all Drinking-Water System owners that are connected to you and to whom you provide all of its drinking water?

Yes [X] No [ ]

Indicate how you notified system users that your annual report is available, and is free of charge.

[X] Public access/notice via the web
[ ] Public access/notice via Government Office
[ ] Public access/notice via a newspaper
[X] Public access/notice via Public Request
[ ] Public access/notice via a Public Library
[ ] Public access/notice via other method _____

Describe your Drinking-Water System

Source water is Lake St. Lawrence with pre-chlorination for zebra mussel control. Water Purification Plant is a conventional water treatment plant with chemically assisted filtration, Ultra-Violet disinfection, sodium hypochlorite disinfection, and advanced oxidation with hydrogen peroxide. The Water Purification Plant has a capacity of 100, 000 cubic metres per day, treats and distributes approximately 11 million cubic metres annually of potable water through 275 kilometres of distribution pipes.

List all water treatment chemicals used over this reporting period

Chlorine Liquefied Gas,
Polyaluminum Chloride Coagulant,
Sodium Hypochlorite,

Were any significant expenses incurred to?

[X] Install required equipment
[X] Repair required equipment
[X] Replace required equipment

Please provide a brief description and a breakdown of monetary expenses incurred

- Water Main Relining ($2,750,000)
- Water Main Replacement ($1,000,000)
- Raw Water Traveling Screen Replacement ($375,000)
- Motor Control Centre Replacement ($187,000)
- Raw Water Line Connections ($148,000)
- Chemical Feed System Replacement at Booster Stations ($144,000)
- Raw Water Isolation Valve Room Piping Upgrades ($40,000)

Provide details on the notices submitted in accordance with subsection 18(1) of the Safe Drinking-Water Act or section 16-4 of Schedule 16 of O.Reg.170/03 and reported to Spills Action Centre

Incident Date	Parameter	Result	Unit of Measure	Corrective Action	Corrective Action Date
02/07/2019	Distribution Total Coliform	1	cfu/100ml	Re-sampled	04/07/2019

Microbiological testing done under the Schedule 10, 11 or 12 of Regulation 170/03, during this reporting period.

	Number of Samples	Range of E.Coli Or Fecal Results (min #)-(max #)	Range of Total Coliform Results (min #)-(max #)	Number of HPC Samples	Range of HPC Results (min #)-(max #)
Raw	52	0 - 64	0 – 142	N/A	N/A
Treated	52	0 - 0	0 - 0	52	<2 - 36
Distribution	664	0 - 0	0 - 0	265	<2 – 12

Operational testing done under Schedule 7, 8 or 9 of Regulation 170/03 during the period covered by this Annual Report.

	Number of Grab Samples	Range of Results (min #)-(max #)
Turbidity	8760	0.02 - 0.59 NTU
Chlorine	8760	0.22– 3.59 mg/L
Fluoride (If the DWS provides fluoridation)	N/A	N/A

***NOTE**: For continuous monitors use 8760 as the number of samples.*

Summary of additional testing and sampling carried out in accordance with the requirement of an approval, order or other legal instrument.

Date of legal instrument issued	Parameter	Date Sampled	Result	Unit of Measure
None				

Summary of parameters tested during this reporting period or the most recent sample results

Parameter	Sample Date	Result Value	Unit of Measure	Exceedance
Antimony	13/01/20	0.0001	mg/L	no
Arsenic	13/01/20	0.0003	mg/L	no
Barium	13/01/20	0.023	mg/L	no
Boron	13/01/20	0.017	mg/L	no
Cadmium	13/01/20	<0.000015	mg/L	no
Chromium	13/01/20	<0.002	mg/L	no
Mercury	13/01/20	<0.00002	mg/L	no
Selenium	13/01/20	<0.001	mg/L	no
Sodium	13/01/20	14.5	mg/L	no
Uranium	13/01/20	<0.00005	mg/L	no
Fluoride	20/01/20	<0.1	mg/L	no

Nitrite	20/01/20 14/04/20 13/07/20 19/10/20	<0.1 <0.1 <0.1 <0.1	mg/L mg/L mg/L mg/L	no no no no
Nitrate	20/01/20 14/04/20 13/07/20 19/10/20	0.3 <0.1 0.2 0.2	mg/L mg/L mg/L mg/L	no no no no

Summary of lead testing under Schedule 15.1 during this reporting period
(applicable to the following drinking water systems; large municipal residential systems, small
municipal residential systems, and non-municipal year-round residential systems)

Location Type	Number of Samples	Range of Lead Results (min#) – (max #)	Number of Exceedances
Plumbing	N/A	N/A	0
Distribution	N/A	N/A	0

* On reduced monitoring schedule as per Schedule 15.1 distribution samples collected for pH and alkalinity only in 2019.

Summary of parameters sampled during this reporting period or the most recent sample results

Parameter	Sample Date	Result Value	Unit of Measure	Exceedance
Alachlor	13/01/20	<0.3	µg/L	no
Atrazine + N-dealkylated metobolites	13/01/20	<0.5	µg/L	no
Azinphos-methyl	13/01/20	<1	µg/L	no
Benzene	13/01/20	<0.5	µg/L	no
Benzo(a)pyrene	13/01/20	<0.005	µg/L	no
Bromoxynil	13/01/20	<0.5	µg/L	no
Carbaryl	13/01/20	<3	µg/L	no
Carbofuran	13/01/20	<1	µg/L	no
Carbon Tetrachloride	13/01/20	<0.2	µg/L	no
Chlorpyrifos	13/01/20	<0.5	µg/L	no
Diazinon	13/01/20	<1	µg/L	no
Dicamba	13/01/20	<10	µg/L	no
1,2-Dichlorobenzene	13/01/20	<0.5	µg/L	no
1,4-Dichlorobenzene	13/01/20	<0.5	µg/L	no
1,2-Dichloroethane	13/01/20	<0.5	µg/L	no
1,1-Dichloroethylene (vinylidene chloride)	13/01/20	<0.5	µg/L	no
Dichloromethane	13/01/20	<5	µg/L	no
2-4 Dichlorophenol	13/01/20	<0.1	µg/L	no
2,4-Dichlorophenoxy acetic acid (2,4-D)	13/01/20	<10	µg/L	no
Diclofop-methyl	13/01/20	<0.9	µg/L	no

Dimethoate	13/01/20	<1	µg/L	no
Diquat	13/01/20	<5	µg/L	no
Diuron	13/01/20	<5	µg/L	no
Glyphosate	13/01/20	<25	µg/L	no
Malathion	13/01/20	<5	µg/L	no
2 methyl-4-chlorophenoxyacetic acid (MCPA)	13/01/20	<10	µg/L	no
Metolachlor	13/01/20	<3	µg/L	no
Metribuzin	13/01/20	<3	µg/L	no
Monochlorobenzene	13/01/20	<0.5	µg/L	no
Paraquat	13/01/20	<1	µg/L	no
Pentachlorophenol	13/01/20	<0.1	µg/L	no
Phorate	13/01/20	<0.3	µg/L	no
Picloram	13/01/20	<15	µg/L	no
Polychlorinated Biphenyls(PCB)	13/01/20	<0.05	µg/L	no
Prometryne	13/01/20	<0.1	µg/L	no
Simazine	13/01/20	<0.5	µg/L	no
THM **(NOTE: show latest annual average)**	13/01/20 14/04/20 13/07/20 19/10/20 **2020 Avg**	29.0 42.0 48.0 40.0 39.8	µg/L µg/L µg/L µg/L µg/L	no no no no no
Terbufos	13/01/20	<0.5	µg/L	no
Tetrachloroethylene	13/01/20	<0.5	µg/L	no
2,3,4,6-Tetrachlorophenol	13/01/20	<0.1	µg/L	no
Triallate	13/01/20	<10	µg/L	no
Trichloroethylene	13/01/20	<0.5	µg/L	no
2,4,6-Trichlorophenol	13/01/20	<0.1	µg/L	no
Trifluralin	13/01/20	<0.5	µg/L	no
Vinyl Chloride	13/01/20	<0.2	µg/L	no
Chloroform (Distribution)	13/01/20 14/04/20 13/07/20 19/10/20	17.0 27.0 29.0 24.0	µg/L µg/L µg/L µg/L	no no no no
Bromoform (Distribution)	13/01/20 14/04/20 13/07/20 19/10/20	<5.0 <5.0 <5.0 <5.0	µg/L µg/L µg/L µg/L	no no no no
Dibromochloromethane (Distribution)	13/01/20 14/04/20 13/07/20 19/10/20	4.0 4.0 6.0 5.0	µg/L µg/L µg/L µg/L	no no no no
Bromodichloromethane (Distribution)	13/01/20 14/04/20 13/07/20 19/10/20	9.0 12.0 13.0 11.0	µg/L µg/L µg/L µg/L	no no no no

Total Haloacetic Acids (Distribution)	13/01/20	14.1	µg/L	no
	14/04/20	20.7	µg/L	no
	13/07/20	23.4	µg/L	no
(NOTE: show latest annual average)	19/10/20	17.9	µg/L	no
	2020 Avg	19.0	µg/L	no
Chloroacetic Acids (Distribution)	13/01/20	<4.7	µg/L	no
	14/04/20	<4.7	µg/L	no
	13/07/20	<4.7	µg/L	no
	19/10/20	<4.7	µg/L	no
Bromoacetic Acid (Distribution)	13/01/20	<2.0	µg/L	no
	14/04/20	<2.9	µg/L	no
	13/07/20	<2.9	µg/L	no
	19/10/20	<2.9	µg/L	no
Dichloroacetic Acid (Distribution)	13/01/20	8.1	µg/L	no
	14/04/20	11.3	µg/L	no
	13/07/20	14.3	µg/L	no
	19/10/20	11.1	µg/L	no
Dibromoacetic Acid (Distribution)	13/01/20	<2.0	µg/L	no
	14/04/20	<2.0	µg/L	no
	13/07/20	<2.0	µg/L	no
	19/10/20	<2.0	µg/L	no
Trichloroacetic Acid (Distribution)	13/01/20	6.0	µg/L	no
	14/04/20	9.5	µg/L	no
	13/07/20	9.7	µg/L	no
	19/10/20	6.9	µg/L	no

List any Inorganic or Organic parameter(s) that exceeded half the standard prescribed in Schedule 2 of Ontario Drinking Water Quality Standards.

Parameter	Result Value	Unit of Measure	Date of Sample
None			