TWENTY TWENTY-ONE

DRINKING WATER QUALITY REPORT

City of Cornwall, Ontario

2021

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 *2021 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, 2021.

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 & Distribution System Operators*.

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

FEBRUARY 2022

2021

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.
Supervisor of WATER DISTRIBUTION
and WASTEWATER COLLECTION

photos by: Vitaliy ZHYDKYKH

cover, I, II, 1, 2, 3, 4, 7, 8, 9, 16, 17, 18, 19, 20, 21, 22, 23, 25

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 & 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.

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**.

"The Water Purification Plants' determined team effort throughout another challenging year ensured drinking water quality once again not only met but exceeded all legislative requirements for City residents and business in 2021."

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

- **LICENSE #: 176-101, issue 3**
- **PERMIT #: 176-201, issue 6**
- **SYSTEM #: 220001049**

"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 & safe drinking water is our priority****."*

-Shawn O'BRIEN
MANAGER of MUNICIPAL WORKS

source quality

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 38,560,000 litres per day and reached a maximum of 49,450,000 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 January 2nd.

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 14 *Colony-Forming Units* (CFU) of *E. coli* and 30 CFU of *total coliform* were found per every 100 ml of raw untreated water taken from *Lake St. Lawrence* in 2021.

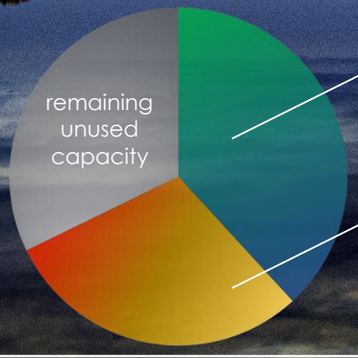
The raw water enters into the purification system through the Raw Water Intake and Bar Screen that is built into the west side of the *R.H. Saunders Generating Station Dam,* **15 metres below the surface** of *Lake St. Lawrence*.

RAW WATER

	MIN.	AVG.	MAX.
Turbidity	0.11	0.57	20.00
pH	7.15	7.97	8.46
colour	<2	<2	4

raw water volume

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



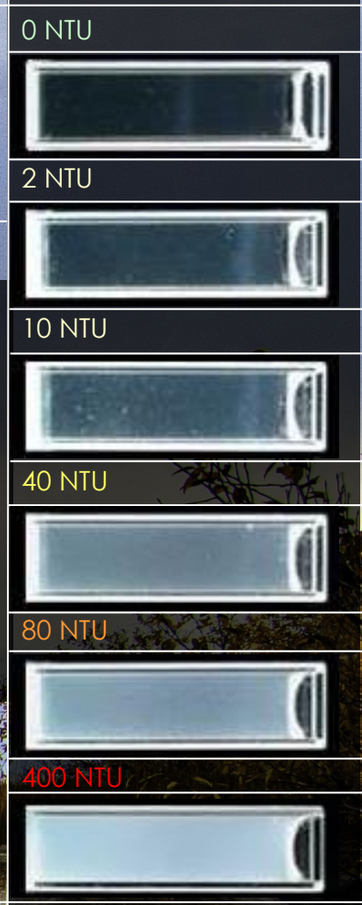
average daily volume

In 2021, the City withdrew an average of **33,560,000 litres of water per day**.

maximum daily volume

On June 22nd we withdrew **49,450,000 litres** of water. This was the highest daily volume of water we removed in 2021.

EXAMPLES OF TURBIDITY:



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

0.57 ntu

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.

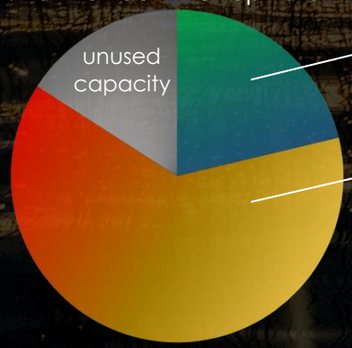
This *Assessment Report* identifies our Source Protection Area and the various activities that could potentially pose a **threat** to either the **quality** or **quantity** of our raw water supply. Our Source Protection Area includes two *Intake Protection Zones* (IPZ #1, IPZ #2 below) that are classified 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**.



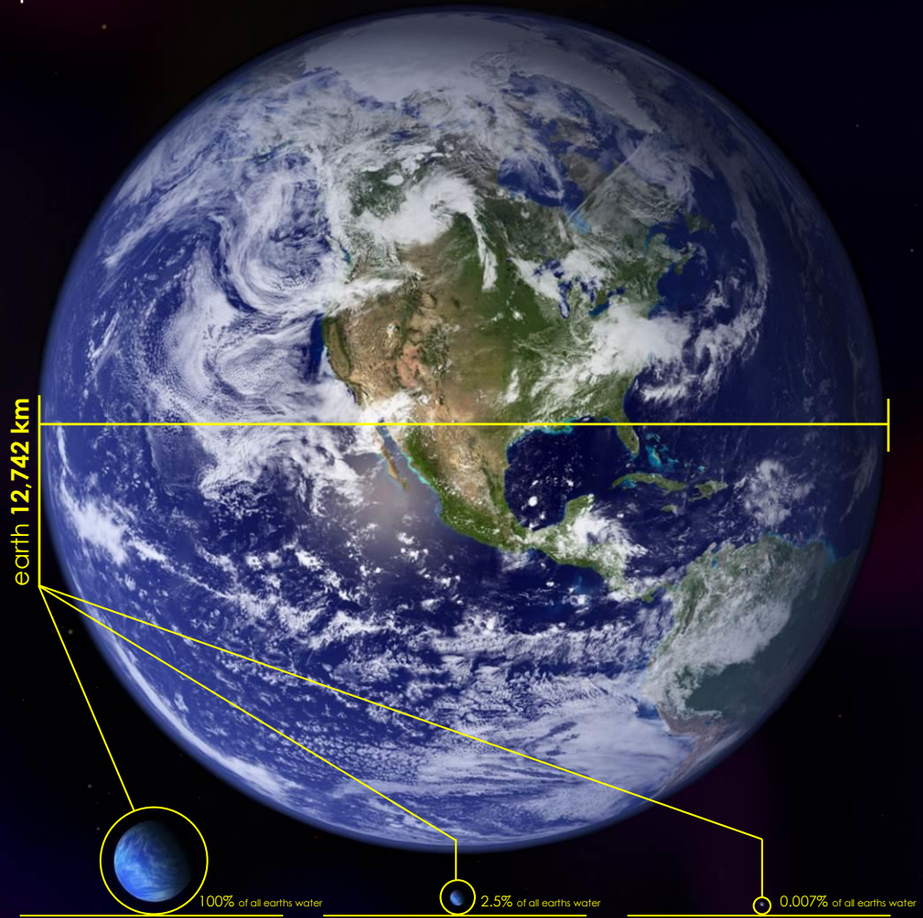
average flow rate

In 2021, we withdrew water at an average rate of **26,613 litres per minute.**

peak flow rate

On April 14th we withdrew water at a rate of **81,300 litres per minute** for approximately **10 minutes**. This was the highest raw water flow rate we experienced in 2021.

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.**

Fresh Water makes up a very small fraction of all water on the planet. 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.

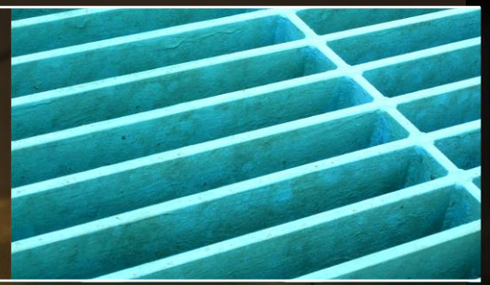
Here are some helpful tips for water conservation:

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 27th, 2021** 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 & 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.

0.98mg/l
average zebra mussel control chlorine dose

0.26mg/l
average pre-treatment free chlorine residual

filtration

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

Each Mixing Chamber system consists of three compartments. The **raw water & 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 & South). The Settling Tanks are equipped with baffles to ensure that the proper **settling** of all **flocculation particles** before filtration.

In 2021, the Cornwall Water Purification Plan used an **aluminum based coagulant solution** to assist in the flocculation process at an average dosage of **11.8 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 **0.9° and 24.3° Celsius** in 2021.

Each Settling Tank is automatically cleaned every two days by an automated **sludge collection & 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 & 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 & remove any remaining particulate matter that may still be suspended in the water. In 2021, coagulation, settling and filtration reduced the average turbidity in the water from 0.57NTU 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 & 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.

167 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 & 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 **167mJ/cm²** in 2021.

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 **1.08 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 & 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.

0.28 min. mg/l

On *November 18th* we recorded a ***minimum*** free chlorine residual of 0.28 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

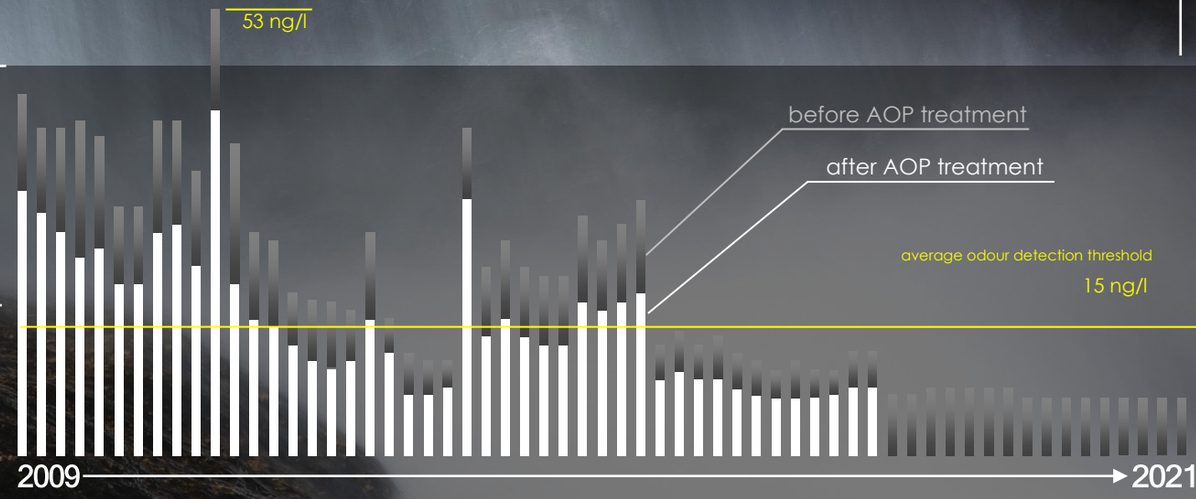
During the late summer, *algae* in the St. Lawrence River begin to die off. Their *decomposition* releases harmless compounds that cause even treated drinking water to taste and smell **earthy** or **musty**.

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*** (which normally operate at only 30% of their capacity) 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). 53 samples were taken at our water purification plant between 2009 and 2021.

The system is typically only activated when *Taste and Odour* events have been detected by sampling activities and/or reported by the public. No events were detected or reported since 2018 therefore the system remained offline.

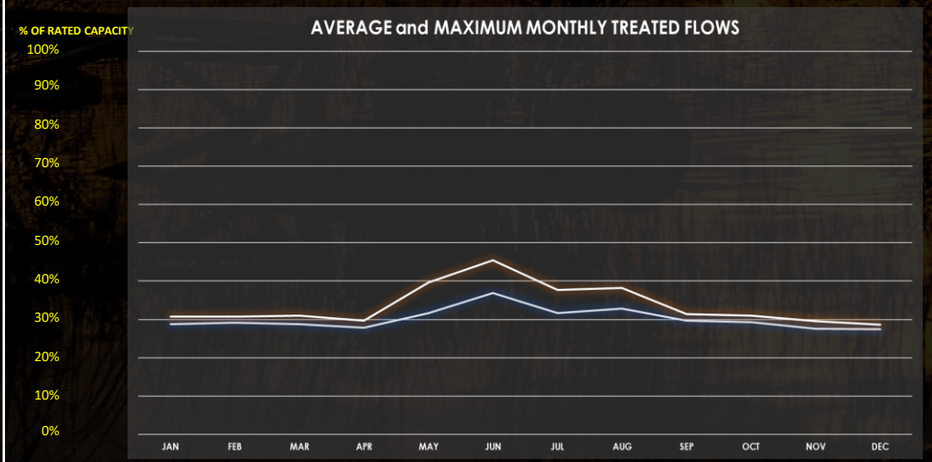
high lift pumping

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**.

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 2021 the Water Purification Plant discharged a total of **11,088,611,000 litres of water** at an average rate of **30,376,000 litres of treated water per day**. Average post chlorine residuals of **1.08 mg/l** were also maintained.



11.1 BILLION litres pumped in 2021

Cornwall
ONTARIO CANADA

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 communities of *St. Andrews* and *Rosedale Terrace* in the Township of South Stormont were **connected** to the City's Distribution System in **1991**.

St. Andrews' water is supplied by a connection in an **underground valve chamber** located at the intersection of Cornwall Centre Road and Highway 138 (FCC-02), and *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.

CITY of CORNWALL, ONTARIO, CANADA

CLASS III WATER TREATMENT & DISTRIBUTION SYSTEM

ONTARIO DRINKING WATER SYSTEM # 220001049

LEGEND

BRR: Boundary Road Reservoir
EST: Elevated Storage Tank
FCC: Flow Control Chamber
RWI: Raw Water Intake
SPS: Sewage Pumping Station
WPP: Water Purification Plant
WWTP: Waste Water Treatment Plant
ZMC: Zebra Mussel Control Facility

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

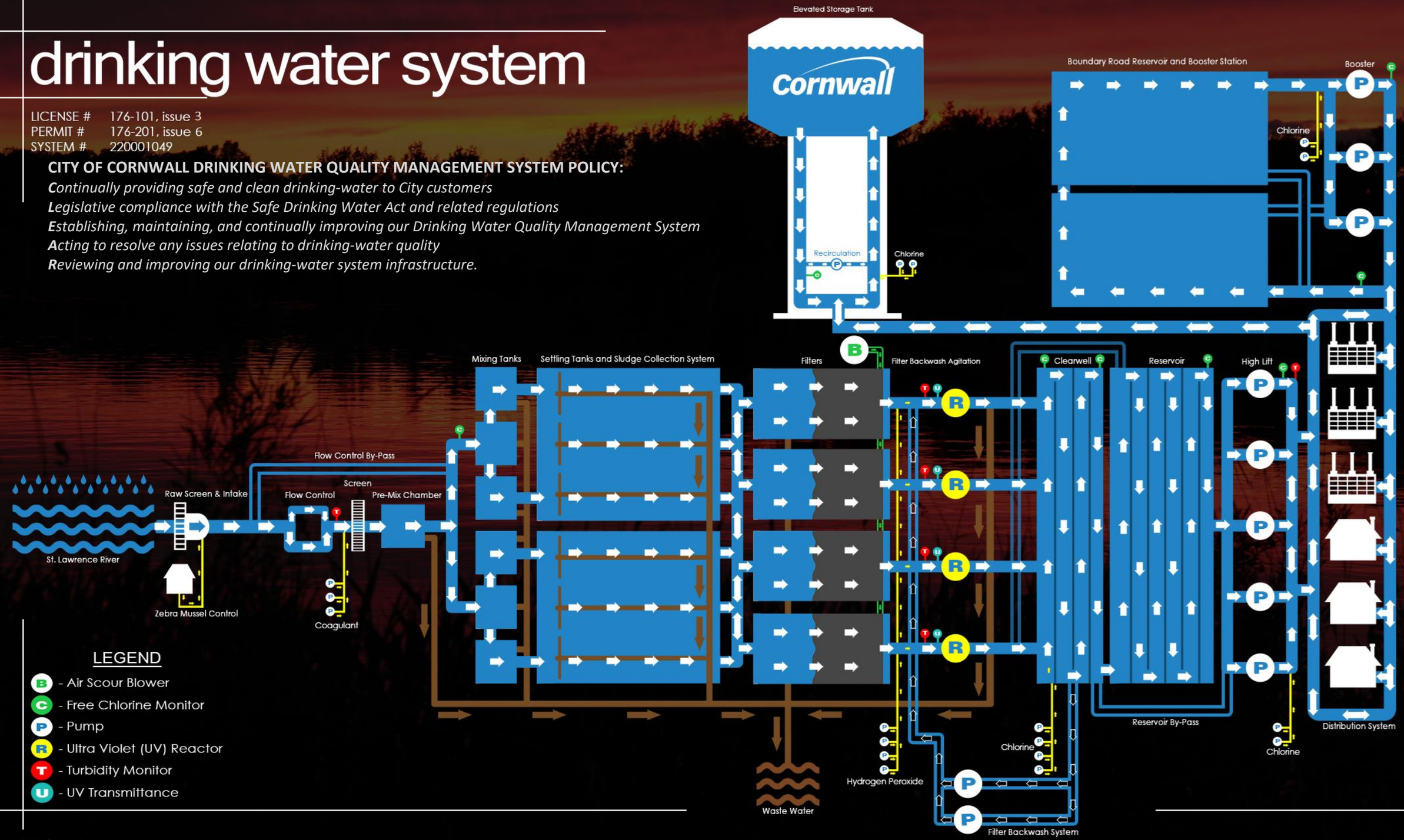
1.00 mg/l avg.
free cl^2 residual

drinking water system

LICENSE # 176-101, issue 3
PERMIT # 176-201, issue 6
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.

The Cornwall Drinking Water System was granted temporary regulatory relief of Ontario Regulation 170/03 Schedule 100-2(1) by the Ministry of the Environment, Conservation and Parks (MECP) reducing the number of distribution microbiological samples required each month by 10% because of facility access limitation put in place due to Covid-19.

This temporary relief was in effect until September 30, 2021. The Drinking Water System resumed 100% normal sampling protocols in October 2021.

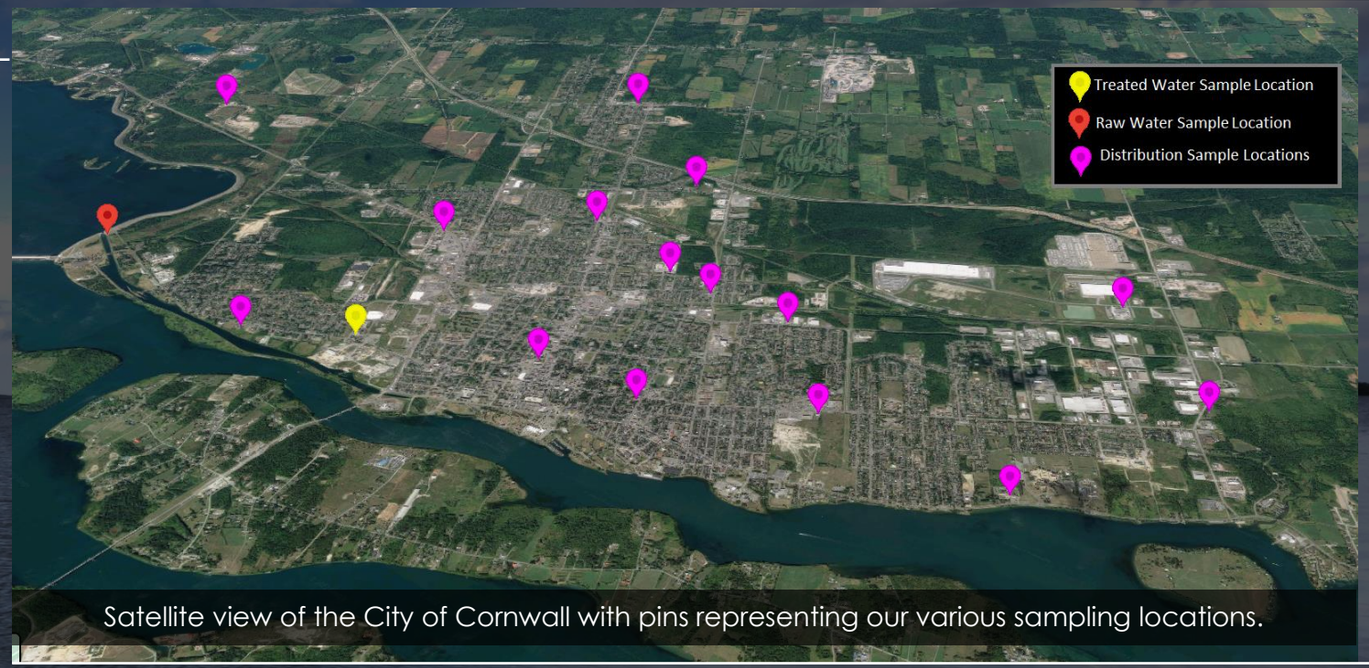
Schedule 10 normally requires that one (1) raw water sample and one (1) treated water sample be tested per week for **Escherichia coli** (E. coli) and **total coliforms**, and that a minimum of 55 samples per month be taken from at least 8 different locations in the Distribution System and be tested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

Water Purification Plant staff collected weekly samples from **15 different locations** throughout the City in 2021 and submitted them to an **accredited laboratory** for testing.

The testing results of **52 treated water samples**, and all **694 distribution water samples** collected in 2021 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 2021, **52 treated water samples** and **259 Distribution System water samples** were submitted to an accredited laboratory for HPC testing.



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

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 & nitrite** levels once every three months, and that sodium levels be sampled and tested annually.

Laboratory results for 2021 indicate 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!**

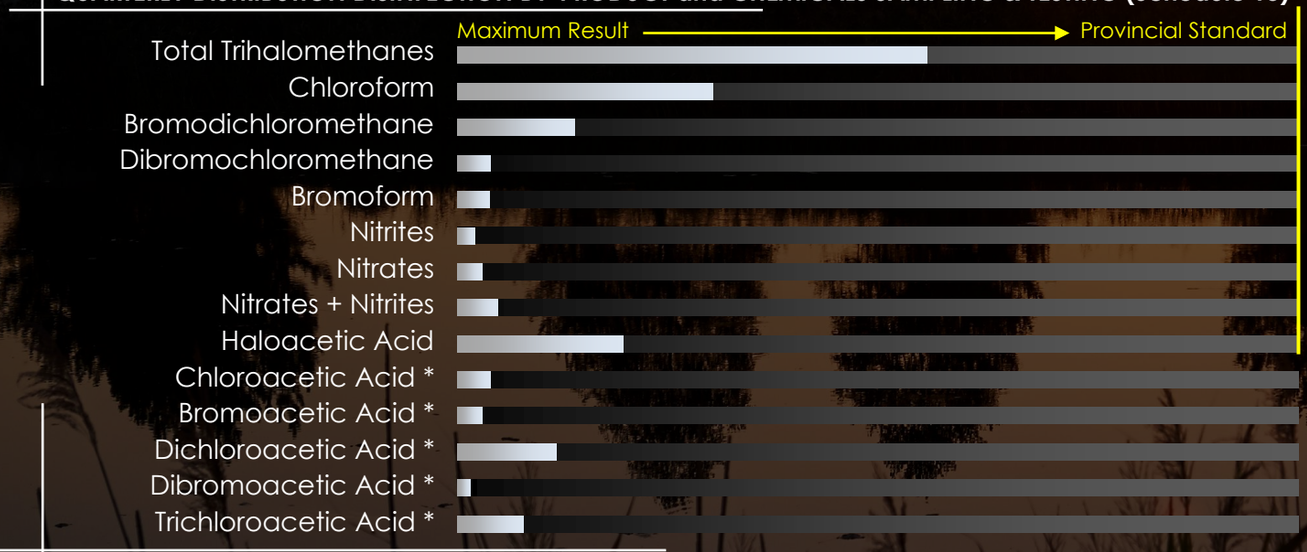
sampling

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

Background Heterotrophic Plate Count

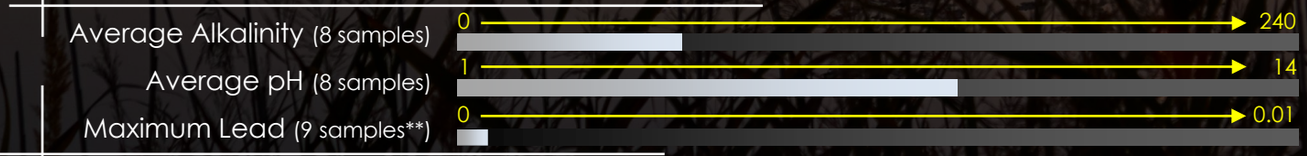
52 treated water samples – No Unsafe Samples
259 distribution water samples – No Unsafe Samples

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



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

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



**March 24, 2021, Lead exceedance was re-sampled, result was .00005 mg/L.

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

694 DISTRIBUTION samples

DISTRIBUTION RESULTS
No Total Coliforms detected
No E. coli detected

15 locations

ANNUAL TREATED WATER CHEMICAL SAMPLING & 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

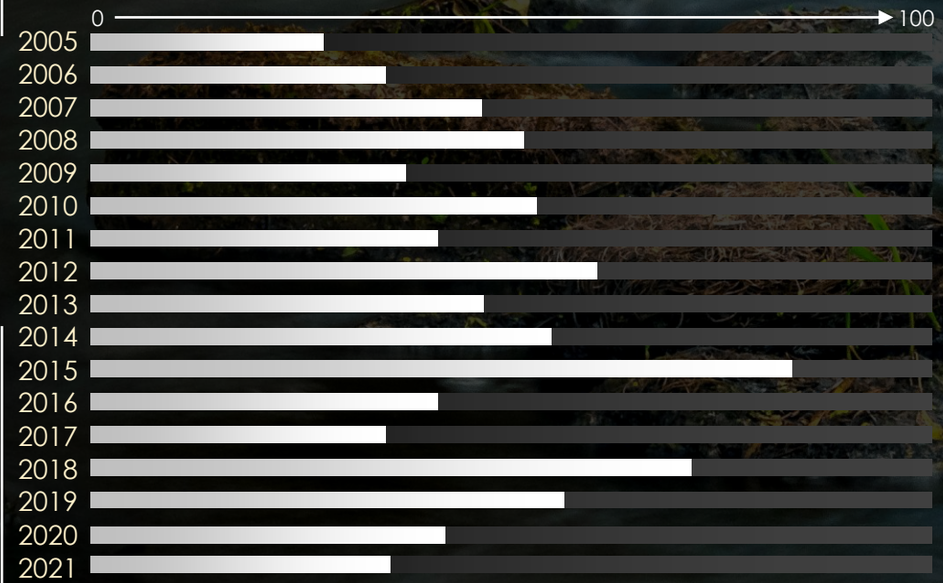
The results of the annual samples indicated that the concentration levels of all of the parameters listed under Schedule 13, 23 & 24 of *O.Reg.170/03* were below one-half of their respective allowable limits set out in the Provincial Standards.

infrastructure

272 km pipe | **1,315 hydrants** | **2,044 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



36 breaks in 2021

$1.33 million invested

We invested over to **$1.33 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.

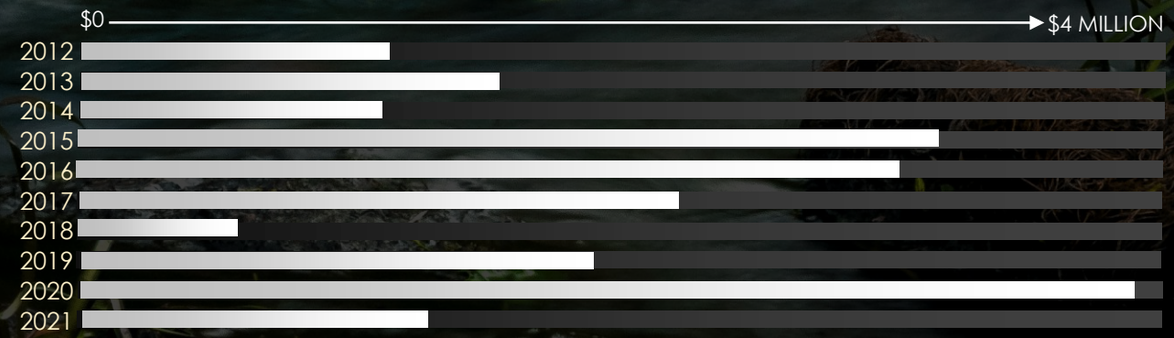
$ 868,507 RELINING

STREET	FROM	TO	DIAMETER/LENGTH
Peter Street	Power Dam Drive	Riverdale Avenue	150mm/359.5m
Peter Street	Pescod Avenue	East Limits	150mm/82.5m
James Street	Jane Street	Queen Street	150mm/421m
Queen Street	Second Street	Riverdale Avenue	150mm/250m
Pescod Avenue	Jane Street	Peter Street	150mm/111.5m

$ 464,987 REPLACEMENTS

Sydney Street	Fifth Street	Seventh Street	150mm/405.9m
First Street East	Marlborough Street	Gloucester Street	150mm/169.8m
Walton Street	Lefebvre Avenue	Danis Avenue	150mm/30m
Benny Avenue	Elsie Avenue	Eva Avenue	150mm/21m

ANNUAL INVESTMENTS IN WATER DISTRIBUTION INFRASTRUCTURE



$600 THOUSAND investments improvements

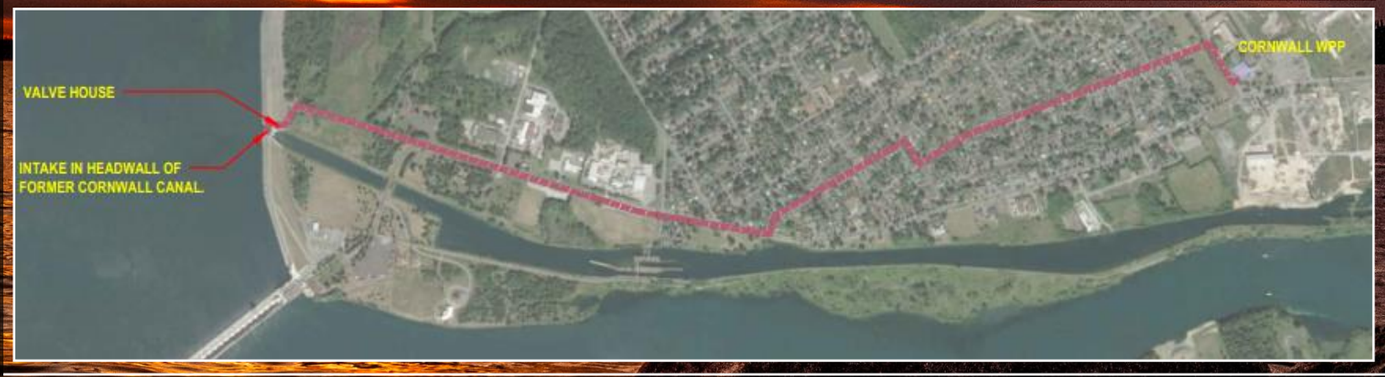
Secondary Intake Environmental Assessment

A Municipal Class Environmental Assessment was initiated to identify a solution to address the risks associated with the single raw water intake and transmission main including, but not limited to:

Existing infrastructure is reaching the end of its design service life. Redundancy of the existing infrastructure was not provided in the original construction making servicing the existing infrastructure difficult and costly. Without redundancy if a catastrophic failure occurred to the intake structure or to the raw water transmission main, there is a potential that the City would be without water.

The Environmental Study process has determined two preferred solutions.
1)"New Intake Near King Street" is estimated at $39.9 million (2021 dollars).
2)"New Intake on Former Domtar Site" is estimated at $40.4 million (2021 dollars).

Supplementary studies (geotechnical, natural environmental inventory, archaeological investigation, etc.) will be completed in 2022 to confirm the selection of one preferred solution.



PROJECT #1
Inlet and Drain Gate Replacement

The filter inlet and drain gates dated back to original construction and have exceeded their operational life expectancy. The replacement gates are zero leakage and will improve the treatment process in water conservation efforts.

PROJECT #2
Chlorine Injection System Replacement

The Water Purification Plants sodium hypochlorite system was installed in 2005. Due to corrosive nature of the product, it had been identified in the asset management plan as reaching the end of its useful lifecycle.

PROJECT #3
Engineering Services for Backwash Pump Replacement

The 1956 backwash pump has reached the end of its operational lifecycle. Engineering consultants are completing the design for a replacement pump which will provide enhanced controls, monitoring capabilities, redundancy, and energy savings.

PROJECT #4

We also invested $50,000 on new equipment and instrumentation for the Water Purification Plant and its ancillary sites.

- Chemical Tank Replacement
- Boundary Generator Controller Replacement
- New Weigh Scale Indicators
- Lab Equipment Upgrades

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

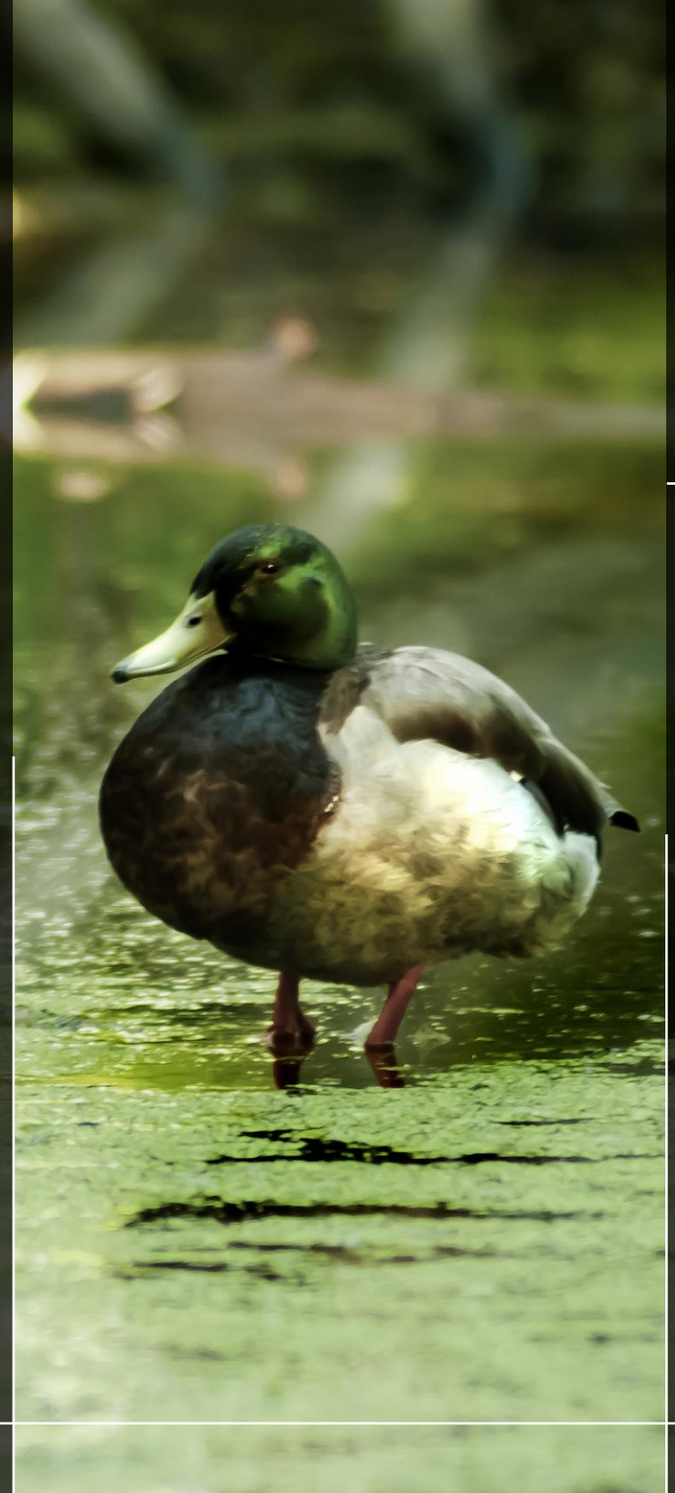
Ensures that the **operators** working on Ontario's drinking water systems are **competent** and **licensed** to perform their duties. It establishes the ongoing training requirements, details the different types of licenses, reissuance and transferability, overall and operator in charge responsibilities,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

Water Conservation and Servicing Master Plan

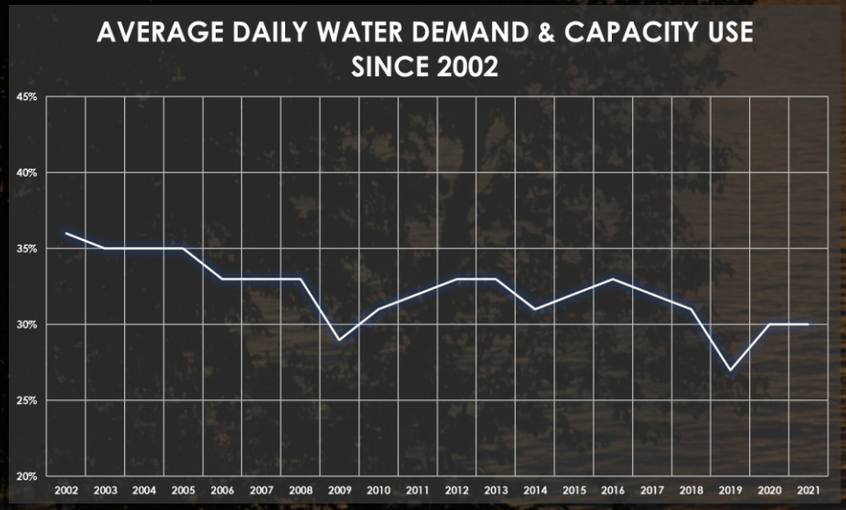
In 2021 City Council endorsed The Water Conservation and Servicing Master Plan which was prepared by Watson and Associates Economists Ltd in coordination with City Administration and the St. Lawrence River Institute of Environmental Sciences. Part of this Plan includes the universal installation of water meters at all water service connections throughout the City of Cornwall. It is anticipated that it will take up to two years to install water meters in all properties within the City and that this process would commence in 2023 with metered water and wastewater rates being imposed for the start of 2025.

Another component of the Water Conservation and Servicing Master Plan is the introduction and implementation of the water conservation program which will commence in 2022. Final details of the water conservation program are yet to be determined but will include financial incentives and rebates for customers to install water efficient appliances or to participate in initiatives to limit water consumption and wastewater flows. Additionally, home water audit programs would be offered to assess the water usage in a home and identify home-specific water efficiency retrofit opportunities as well as providing education regarding other water conservation strategies.

treated summary

	TOTAL VOLUME	MAXIMUM FLOW	MINIMUM FLOW	AVERAGE FLOW	PRODUCTION CAPACITY
JANUARY	900,590 m³	21,519 l/m	18,686 l/m	20,175 l/m	29.0 %
FEBRUARY	823,530 m³	21,479 l/m	19,319 l/m	20,425 l/m	29.4 %
MARCH	879,298 m³	21,731 l/m	19,211 l/m	20,101 l/m	28.9 %
APRIL	842,367m³	20,743 l/m	18,318 l/m	19,499 l/m	28.1 %
MAY	991,144 m³	27,793 l/m	18,864 l/m	22,203 l/m	31.9 %
JUNE	1,114,196 m³	31,793 l/m	21,237 l/m	25,792 l/m	37.1 %
JULY	988,463 m³	26,371 l/m	19,799 l/m	22,143 l/m	31.9 %
AUGUST	1,026,562 m³	26,793 l/m	20,399 l/m	22,996 l/m	33.1 %
SEPTEMBER	897,695 m³	21,939 l/m	19,681 l/m	20,780 l/m	29.9 %
OCTOBER	915,398 m³	21,771 l/m	19,079l/m	20,506 l/m	29.5 %
NOVEMBER	834,431 m³	20,695 l/m	18,103 l/m	19,316 l/m	27.8 %
DECEMBER	856,936 m³	20,069 l/m	17,746 l/m	19,197 l/m	27.6 %
TOTAL:	**11,088,611 m²**			**AVERAGE:**	**21,094 l/m** or **30.3%**

The **average daily demand** from our *Water Purification Plant* in 2021 averaged **30.4% of our rated capacity** of 100,000m³ of water per day.



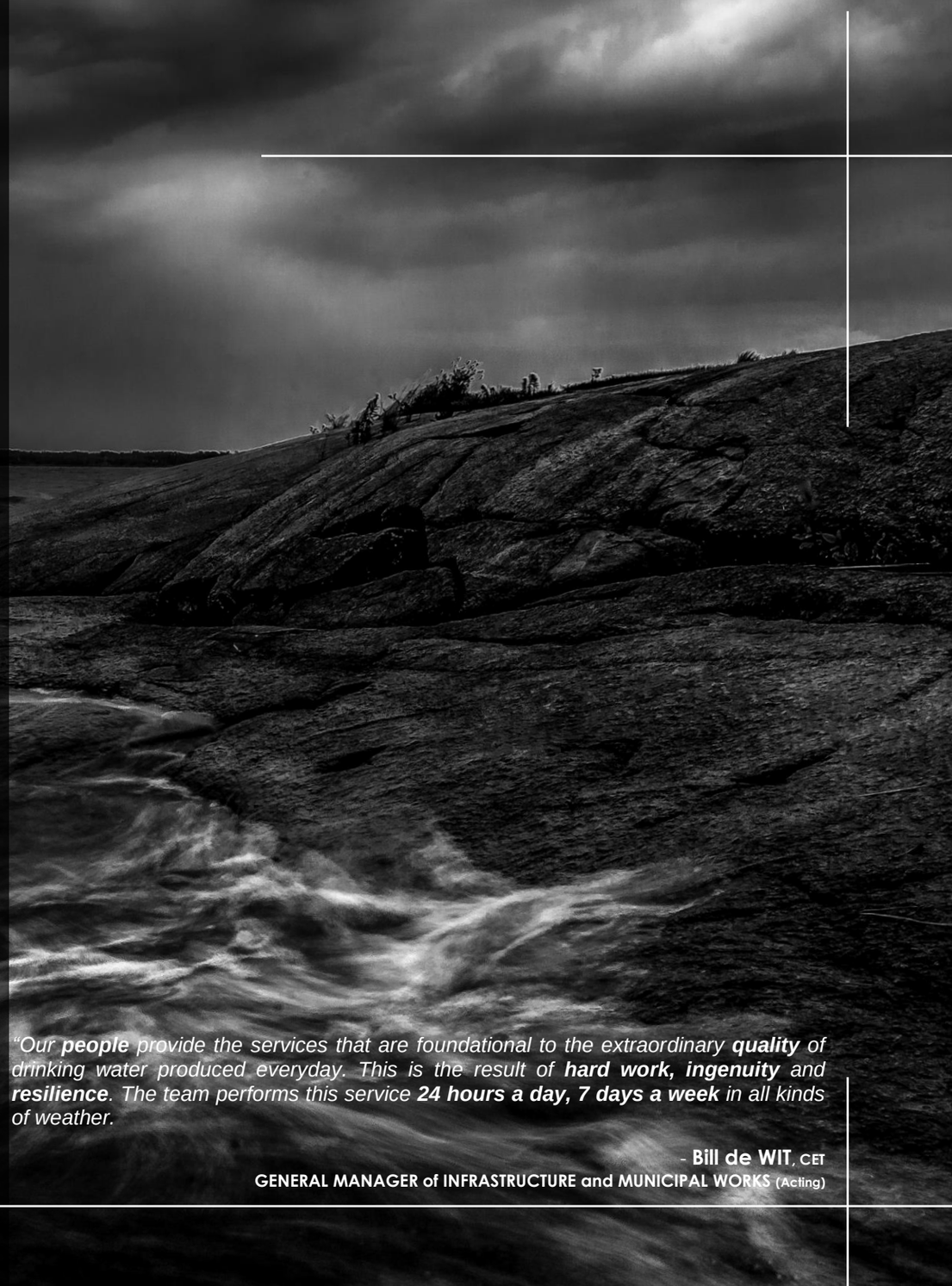
TREATED WATER

	MIN.	AVG.	MAX
Turbidity	0.02	0.04	0.66
pH	7.04	7.68	8.16
colour	<2	<2	5

Our *Water Purification Plant* has the 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*
DWQMS REPRESENTATIVE & ASSET MANAGEMENT COORDINATOR:	*Hafiz REHMAN*
SUPERVISOR of WATER PURIFICATION PLANT:	*Owen O'KEEFE*
SUPERVISORY CONTROL, DATA AQUISITION & INSTRUMENTATION TECHNOLOGIST:	*Charles DRAKICH*
WATER PURIFICATION PLANT OPERATORS:	*Julien CHARTRAND*
	Steve GIRARD
	Steve JODOIN
WATER PURIFICATION PLANT MAINTENANCE TECHNICIANS:	*Rob LAMARCHE*
	Jean MAINVILLE
	Jason GADBOIS
MANAGER, INFRASTRUCTURE and MUNICIPAL WORKS:	*Michael FAWTHROP*
MUNICIPAL ENGINEER:	*Emma VANIER*
PROJECT and ASSET MANAGEMENT SUPERVISOR:	*Jennifer MARJERRISON-BARCIER*
DESIGN TECHNOLOGIST:	*Shafic HAMMOUD*
INFRASTRUCTURE TECHNOLOGIST:	*Robert RATHBUN*
GEOGRAPHIC INFORMATION SYSTEM APPLICATION SPECIALIST:	*Denis LALONDE*
INFRASTRUCTURE COORDINATOR:	*Kevin PILON*
DESIGN and APPROVALS SUPERVISOR (Acting):	*Alexandre BOILEAU*
MANAGER of MUNICIPAL WORKS:	*Shawn O'BRIEN*
PUBLIC WORKS DISPATCHER:	*Sharon MILLER*
MUNICIPAL WORKS TECHNOLOGIST:	*Jesse COLEMAN*
SAFETY and TRAINING SUPERVISOR:	*Tommy SAUVE*
SUPERVISOR of Roads:	*Kevin DUCHESNE*
SUPERVISOR of WATER DISTRIBUTION and WASTEWATER COLLECTION:	*Dan DROUIN*
WATER DISTRIBUTION SUB-FOREMAN:	*Scott CAIN*
WATER DISTRIBUTION OPERATORS:	*Denis BELANGER*
	Justin COLEMAN
	Bryan DELAGE
	Jason CROWE
	Pat DECOSTE
	Kim DELORME
	Kevin DREW
	Shawn HAMEL
	Robert LAUZON
	Jason LIDDLE
	Gary LEDUC
	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**, CET
GENERAL MANAGER of INFRASTRUCTURE and MUNICIPAL WORKS (Acting)

www.cornwall.ca

Corporation of the City of Cornwall
Department of Infrastructure & 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
and REPORT AUTHOR
Dan DROUIN, A.Sc.T.
613-930-2787 ext. 2264
ddrouin@cornwall.ca

SOURCE WATER PROTECTION RISK ASSESSMENT OFFICIAL
Robert RATHBUN, C.E.T.
613-930-2787 ext. 2271
rrathbun@cornwall.ca

SCADA & INSTRUMENTATION TECHNOLOGIST and REPORT EDITOR
Charles DRAKICH
613-930-2787 ext. 2518
cdrakich@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 **2021**.

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

2021 Drinking Water Quality Report

Cornwall
ONTARIO CANADA

Corporation of the City of Cornwall
360 Pitt Street
Cornwall, Ontario, Canada
K6J 3P9
Phone: 613-930-2787
www.cornwall.ca

REUSE

USE THINGS MORE THAN ONCE
REPAIR
>
>
>
REGIFT!

RECYCLE

SEPARATE WASTE MATERIALS
COMPOST
<
<
<
CHOOSE RECYCLABLE!

AVOID WASTE!
>
>
>
BUY LESS
CONSERVE WATER

REDUCE

THINK BEFORE YOU PRINT

ENVIRONMENTAL SERVICES DIVISION

TWENTY TWENTY-ONE

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, 2021 – December 31, 2021

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 272 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 ($870,000)
- : Water Main Replacement ($465,000)
- : Secondary Intake Environmental Assessment ($225,000)
- : Inlet and Drain Gate Replacement ($165,000)
- : Chlorine Injection System Replacement ($100,000)
- : Engineering Services Backwash Pump Replacement ($110,000)
- : Sodium Hypochlorite Tank Replacement ($30,000)

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
March 24, 2021	Lead Hydrant Sample	0.0541	mg/L	Re-sampled	March 26, 2021

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 - 188	0 – 240	N/A	N/A
Treated	52	0 - 0	0 – 0	52	<2 - <2
Distribution	694	0 - 0	0 – 0	259	<2 - 84

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	0.04 - 0.69 NTU
Chlorine	8760	0.25– 2.90 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	18/01/21	0.0001	mg/L	no
Arsenic	18/01/21	0.0004	mg/L	no
Barium	18/01/21	0.023	mg/L	no
Boron	18/01/21	0.023	mg/L	no
Cadmium	18/01/21	<0.000015	mg/L	no
Chromium	18/01/21	<0.002	mg/L	no
Mercury	18/01/21	<0.00002	mg/L	no
Selenium	18/01/21	<0.001	mg/L	no
Sodium	18/01/21	15.8	mg/L	no
Uranium	18/01/21	<0.00005	mg/L	no
Fluoride	18/01/21	<0.1	mg/L	no
Nitrite	18/01/21 12/04/21 12/07/21 13/12/21	<0.1 <0.1 <0.1 <0.1	mg/L mg/L mg/L mg/L	no no no no

Nitrate	18/01/21	0.3	mg/L	no
	12/04/21	0.3	mg/L	no
	12/07/21	0.2	mg/L	no
	13/12/21	0.3	mg/L	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
Distribution	9	0.00005-0.0541*	1

On reduced monitoring schedule as per Schedule 15.1 distribution
* March 24, 2021, lead exceedance was re-sampled, result was 0.00005 mg/L.

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

Parameter	Sample Date	Result Value	Unit of Measure	Exceedance
Alachlor	18/01/21	<0.3	µg/L	no
Atrazine + N-dealkylated Metabolites	18/01/21	<0.5	µg/L	no
Azinphos-methyl	18/01/21	<1	µg/L	no
Benzene	18/01/21	<0.5	µg/L	no
Benzo(a)pyrene	18/01/21	<0.006	µg/L	no
Bromoxynil	18/01/21	<0.5	µg/L	no
Carbaryl	18/01/21	<3	µg/L	no
Carbofuran	18/01/21	<1	µg/L	no
Carbon Tetrachloride	18/01/21	<0.2	µg/L	no
Chlorpyrifos	18/01/21	<0.5	µg/L	no
Diazinon	18/01/21	<1	µg/L	no
Dicamba	18/01/21	<10	µg/L	no
1,2-Dichlorobenzene	18/01/21	<0.5	µg/L	no
1,4-Dichlorobenzene	18/01/21	<0.5	µg/L	no
1,2-Dichloroethane	18/01/21	<0.5	µg/L	no
1,1-Dichloroethylene (vinylidene chloride)	18/01/21	<0.5	µg/L	no
Dichloromethane	18/01/21	<5	µg/L	no
2-4 Dichlorophenol	13/01/21	<0.2	µg/L	no
2,4-Dichlorophenoxy acetic acid (2,4-D)	13/01/21	<10	µg/L	no
Diclofop-methyl	18/01/21	<0.9	µg/L	no
Dimethoate	18/01/21	<1	µg/L	no
Diquat	18/01/21	<5	µg/L	no
Diuron	18/01/21	<5	µg/L	no

Glyphosate	18/01/21	<25	µg/L	no
Malathion	18/01/21	<5	µg/L	no
2 methyl-4-chlorophenoxyacetic acid (MCPA)	18/01/21	<10	µg/L	no
Metolachlor	18/01/21	<3	µg/L	no
Metribuzin	18/01/21	<3	µg/L	no
Monochlorobenzene	18/01/21	<0.5	µg/L	no
Paraquat	18/01/21	<1	µg/L	no
Pentachlorophenol	18/01/21	<0.2	µg/L	no
Phorate	18/01/21	<0.3	µg/L	no
Picloram	18/01/21	<15	µg/L	no
Polychlorinated Biphenyls(PCB)	18/01/21	<0.05	µg/L	no
Prometryne	18/01/21	<0.1	µg/L	no
Simazine	18/01/21	<0.5	µg/L	no
THM **(NOTE: show latest annual average)**	18/01/21 12/04/21 12/07/21 13/12/21 **2021 Avg**	27.0 50.0 42.0 32.0 37.8	µg/L µg/L µg/L µg/L µg/L	no no no no no
Terbufos	18/01/21	<0.5	µg/L	no
Tetrachloroethylene	18/01/21	<0.5	µg/L	no
2,3,4,6-Tetrachlorophenol	18/01/21	<0.2	µg/L	no
Triallate	18/01/21	<10	µg/L	no
Trichloroethylene	18/01/21	<0.5	µg/L	no
2,4,6-Trichlorophenol	18/01/21	<0.2	µg/L	no
Trifluralin	18/01/21	<0.5	µg/L	no
Vinyl Chloride	18/01/21	<0.2	µg/L	no
Chloroform (Distribution)	18/01/21 12/04/21 12/07/21 13/12/21	15.0 31.0 25.0 17.0	µg/L µg/L µg/L µg/L	no no no no
Bromoform (Distribution)	18/01/21 12/04/21 12/07/21 13/12/21	<5.0 <5.0 <5.0 <5.0	µg/L µg/L µg/L µg/L	no no no no
Dibromochloromethane (Distribution)	18/01/21 12/04/21 12/07/21 13/12/21	4.0 5.0 4.0 4.0	µg/L µg/L µg/L µg/L	no no no no
Bromodichloromethane (Distribution)	18/01/21 12/04/21 12/07/21 13/12/21	8.0 14.0 12.0 10.0	µg/L µg/L µg/L µg/L	no no no no

Total Haloacetic Acids (Distribution)	18/01/21	9.1	µg/L	no
	12/04/21	19.5	µg/L	no
	12/07/21	20.5	µg/L	no
	13/12/21	14.8	µg/L	no
(NOTE: show latest annual average)	**2021 Avg**	16.0	µg/L	no
Chloroacetic Acids (Distribution)	18/01/21	<4.7	µg/L	no
	12/04/21	<4.7	µg/L	no
	12/07/21	<4.7	µg/L	no
	13/12/21	<4.7	µg/L	no
Bromoacetic Acid (Distribution)	18/01/21	<2.9	µg/L	no
	12/04/21	<2.9	µg/L	no
	12/07/21	<2.9	µg/L	no
	13/12/21	<2.9	µg/L	no
Dichloroacetic Acid (Distribution)	18/01/21	9.1	µg/L	no
	12/04/21	11.3	µg/L	no
	12/07/21	11.7	µg/L	no
	13/12/21	7.5	µg/L	no
Dibromoacetic Acid (Distribution)	18/01/21	<2.0	µg/L	no
	12/04/21	<2.0	µg/L	no
	12/07/21	<2.0	µg/L	no
	13/12/21	<2.0	µg/L	no
Trichloroacetic Acid (Distribution)	18/01/21	<5.3	µg/L	no
	12/04/21	8.2	µg/L	no
	12/07/21	8.8	µg/L	no
	13/12/21	7.3	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			