2025 Drinking Water Quality Report

Loyalist Township Utilities Division

Contents

Availability of the Annual Summary Report

In light of Section 11 (7) and 11 (10) of Ontario Regulation 170/03, the notice of availability is generally done online through the Township's website and on the customers' bimonthly water bill.

The annual report is available to the public by visiting the Township's website: www.loyalist.ca/living-in-loyalist/water-and-sewer/water-quality/

Copies of the report can also be obtained, at no charge, from Loyalist Township office located at 263 Main Street, Odessa, ON, (613) 386-7351.

Any member of the public can also request to inspect, under Section 12 of Ontario Regulation 170/03, any sample results and reports prepared under Section 11 and Schedule 22 of Ontario Regulation 170/03, free of charge, during Loyalist Township regular office hours.

Loyalist Township strives to provide information in a format accessible to all people. Please contact the Clerk's Division at 613-386-7351 and press 7 or email clerk@loyalist.ca between 8:30 am to 4:30 pm to request an alternative format or complete a request form, available at the Municipal Office, Odessa or online at Request for Documents in Alternate Formats - Loyalist Township.

1. Introduction

This annual summary report is prepared and submitted to our water customers who have their drinking water supplied by the Fairfield Drinking Water System or the Bath Drinking Water System; and to the Council of Loyalist Township, in accordance with Section 11 and Schedule 22 of Ontario Regulation 170/03, as amended.

The report covers the period of January 1 to December 31, 2025.

The quality of Loyalist Township's drinking water is continuously monitored and tested by advanced online instrumentation, supervisory control and data acquisition (SCADA) system, and is supervised, managed, operated and maintained by certified Township staff who have successfully completed rigorous training and testing to become certified Drinking Water treatment and Distribution System Operators.

2. Executive Summary

The water delivered to the customers of the Bath and Fairfield drinking water systems (DWS) continues to meet all water quality standards.

In 2025, 1,001,476 m^3 of potable water were delivered to the Fairfield water distribution system and 536,831 m^3 to the Bath water distribution system. The maximum daily treated water volume was recorded at 53% of the Fairfield Water Treatment Plant's rated capacity and 44% for the Bath Water Treatment Plant.

All sampling required by the applicable acts, regulations, permits and licenses has been conducted in accordance with the legislation.

All reports required by applicable acts, regulations, permits and licenses have been prepared and submitted in accordance with the legislation.

The Ministry of Environment, Conservation and Parks (MECP) inspected both plants in 2025. The inspection rating for both drinking water systems was 100%.

All regulated physical, inorganic, and organic chemical parameters tested in 2025 were well below the limits and/or maximum allowable concentration (MAC).

Both drinking water systems have met the Ontario Drinking Water Quality Standard (ODWQS) for filter effluent turbidity.

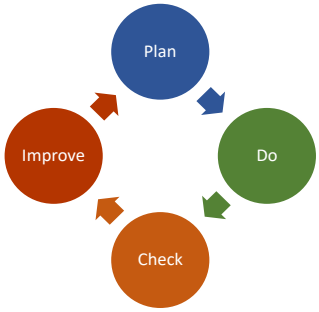
An incident of non-compliance with the MECP watermain disinfection procedure and the Municipal Drinking Water Licence was reported for the Bath drinking water system. This non-compliance occurred when a contractor repaired a temporary water service without supervision of an Operator in Charge. The municipality discovered this incident 4 days

later and immediately acted, flushing the service line, taking bacteriological samples and reporting to both Spills Action Centre and the Medical Officer of Health. The incident was addressed with the contractor both verbally and in writing. Three adverse water quality incidents were reported following distribution samples testing positive for Total Coliforms and/or E. coli. All required notifications and corrective actions were undertaken in accordance with Ontario Regulation 170/03. For further details, refer to Section 11.

To the best of our knowledge, both drinking water systems comply with all regulatory requirements of the Drinking Water Works Permit, Municipal Drinking Water License, Permit to Take Water, Safe Drinking Water Act and its regulations.

3. Quality Management System Policy

Municipal drinking water systems in Ontario must operate under a licensing program. One of the requirements of the Municipal Drinking Water License is to have a quality management system (QMS) in place that meets the minimum requirements of the Ontario Drinking Water Quality Management Standard.



Management systems are preventive and proactive in nature and focus on consistency and continuous improvement. A QMS follows a cycle that includes **planning** what you are going to do, **do** what you planned, **check** what you did, and **improve** where possible.

Loyalist Township QMS Policy: Loyalist Township is committed to comply with all applicable legislative and regulatory requirements, as it relates to drinking water quality, to supply our consumers with safe drinking water and is committed to the maintenance and continual improvement of the QMS.

On May 7 & 8, 2025, a full scope accreditation audit of our Quality Management System was conducted by SAI Global. We received our re-accreditation certificate on October 17, 2025.

4. Description of the Fairfield DWS

Drinking water system number	220009229
Drinking water system name	Fairfield Drinking Water System
Owner & operator	Corporation of Loyalist Township
Operating authority accreditation	0227856
Drinking water system category	Large municipal residential
Drinking water works permit	158-201
Municipal drinking water license	158-101
Design capacity	8,000 m^3 per day
Type of filtration	Ultrafiltration
Commission year	2000
Original design period	2000-2046
Permit to Take Water	P-300-5276401283
Rate of taking	9,000 m^3 per day
Raw water source	Lake Ontario
Population served	11,698

The Fairfield Water Treatment Plant currently serves the communities of Amherstview and Odessa; the Harewood and Brooklands subdivisions; Loyalist East Business Park; and Taylor-Kidd Industrial Park.

The treatment facility consists of a membrane ultrafiltration system followed by chlorination for disinfection. A target (average) free chlorine residual of 1.1 to 1.2 mg/l at the effluent of the chlorine contact chamber is desired to maintain a free chlorine residual of 0.9 mg/l at the effluent of the treatment plant. Granular activated carbon adsorbers are used at certain times of the year to assist in the control of taste and odor as well as a raw water intake chlorination system for Zebra Mussel control.

With the introduction of ultrafiltration technology, the Fairfield Water Treatment Plant is surpassing the Ministry of the Environment and Climate Change's minimum treatment guidelines for waterworks using a surface water source.

The distribution system uses elevated water storage located in Amherstview (1,100 m^3 capacity) and Odessa (900 m^3 capacity). The booster pumping station is on County Road # 6, north of Taylor Kidd Blvd, with a water reservoir (4,225 m^3 capacity) and chlorination booster capability to ensure the maintenance of acceptable chlorine residual in the system. The Odessa water tower, located at the east end of Main Street, Odessa, is also equipped with chlorination booster capability. Chlorine residual in the

water leaving each of the reservoirs is monitored continuously with free chlorine residual analyzers.

Chemicals used within the Fairfield Drinking Water System (DWS) for treatment/disinfection are chlorine gas (disinfection), sodium hypochlorite (disinfection) and sodium bisulphite (treatment of plant residue back to the raw water source). The chlorine gas and sodium hypochlorite used within the Fairfield DWS meet all applicable standards set in the Municipal Drinking Water License, in line with the American Water Works Association (AWWA) and the American National Standards Institute (ANSI) safety criteria standards NSF/60. The plant is operated with automated pre-chlorination for Zebra Mussel control and disinfection.

Emergency power supply equipment is installed at the treatment plant and booster station to ensure safe drinking water is supplied to our customers even during power outages.

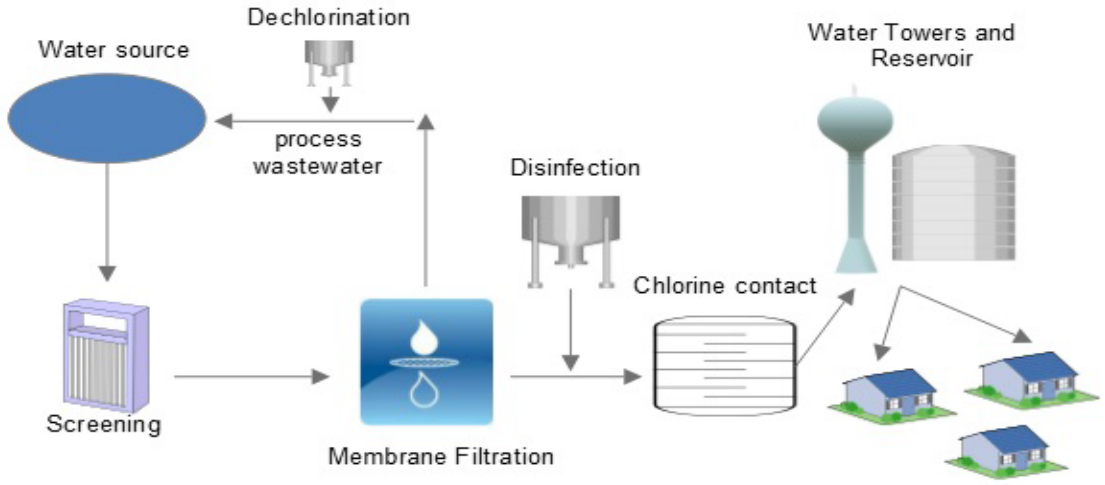


Figure 1 Fairfield Drinking Water System

5. Description of the Bath DWS

Drinking water system number	220002217
Drinking water system name	Bath Drinking Water System
Owner & operator	Corporation of Loyalist Township
Operating authority accreditation	0227856
Drinking water system category	Large municipal residential
Drinking water works permit	158-202
Municipal drinking water license	158-102
Design capacity	6,000 m^3 per day
Type of filtration	Ultrafiltration
Commission year	1997
Original design period	1997-2040
Permit to Take Water	P-300-1276365812
Rate of taking	7,515 m^3 per day
Raw water source	Lake Ontario
Population served	3,664

The Bath Drinking Water System currently serves the community of Bath; and the Bath and Millhaven Correctional Services Canada (CSC) Institutions.

The Bath Water Treatment Plant consists of a membrane gravity filtration system (MGF) to be able to handle sudden and sustained increases in raw water turbidity, followed by chlorination as disinfection. A target (average) free chlorine residual of 1.1 to 1.2 mg/l at the effluent of the chlorine contact chamber is desired to maintain a free chlorine residual of 1.0 mg/l at the effluent of the treatment plant.

The plant is operated with automated pre-chlorination for zebra mussel control and disinfection. Emergency power supply equipment is installed at the treatment plant to ensure safe drinking water is supplied to our customers even during power outages. Turbidity of the filtered water and free chlorine residual in the water leaving the treatment facility are monitored continuously.

The distribution system has an elevated storage reservoir of 1,891 m^3 capacity located adjacent to the west side of the Millhaven Correctional property, in the east end of the village. Chlorine residual in the water leaving the reservoir is monitored continuously with a free chlorine residual analyzer.

The facility far exceeds the Ministry of the Environment's minimum treatment guidelines for waterworks using a surface water source.

Chemicals used for water treatment/disinfection within the Bath Drinking Water System (DWS) are chlorine gas (disinfection), PAX XL54 (coagulation aid), sodium hypochlorite and citric acid (to clean the membranes) and calcium thiosulfate (to treat the plant residue back to the raw water source). They meet all applicable standards set in the Municipal Drinking Water License in line with the American Water Works Association (AWWA) and the American National Standards Institute (ANSI) safety criteria standards NSF/60.

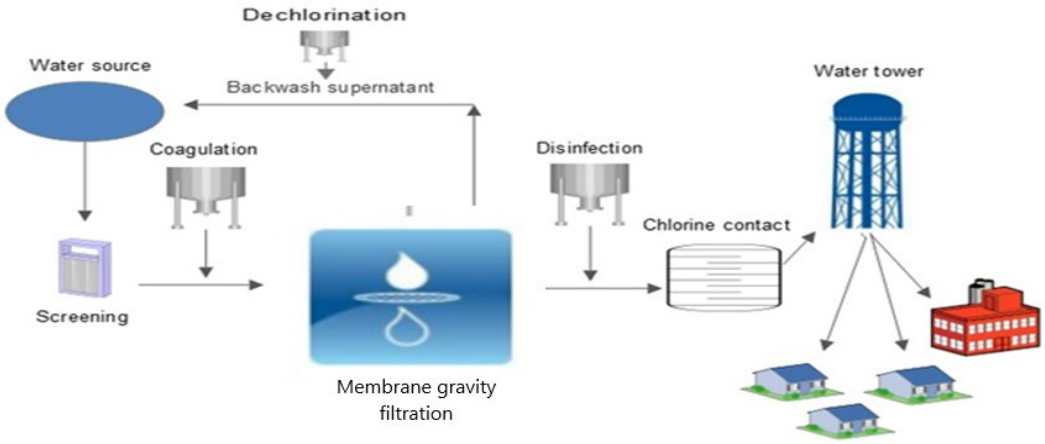


Figure 2 Bath Drinking Water System

6. Flow Summary

The Ministry of the Environment, Conservation and Parks (MECP) issues permits to take water (PTTW), allowing municipal drinking water systems to draw from a water source for water treatment and distribution purposes.

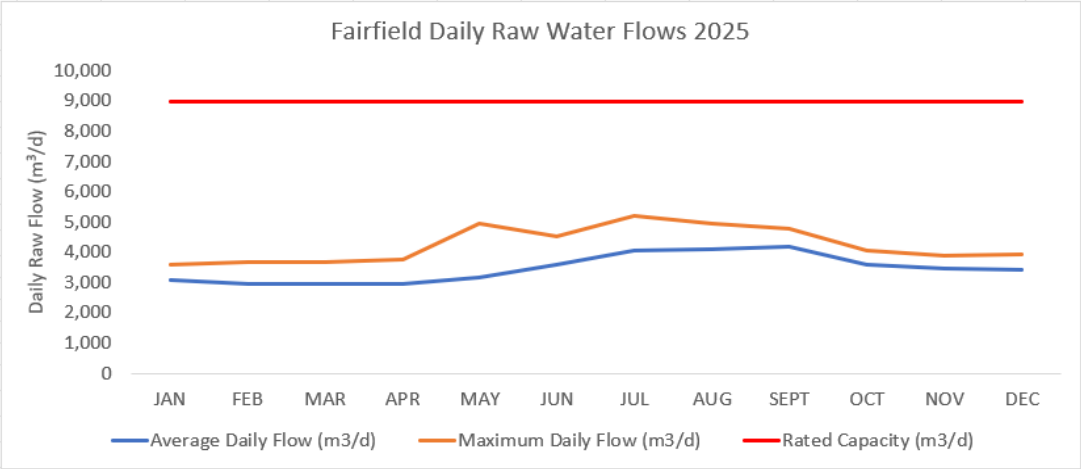
6.1. Fairfield DWS

The MECP issued Loyalist Township its most recent PTTW on May 22, 2024. The permit is valid for 10 years and allows the Township to draw a maximum of 9,000 m^3 per day from Lake Ontario for the Fairfield Water Treatment Plant. The total raw water taken

Total raw water taken in 2025:
1,269,098 m^3

Maximum daily raw water volume taken:
5,190 m^3 (58% of limit)

was 1,269,098 m^3 in 2025. The maximum daily raw water volume in July 2025 was measured to be 5,190 m^3/d and is calculated to be 58% of the limit.



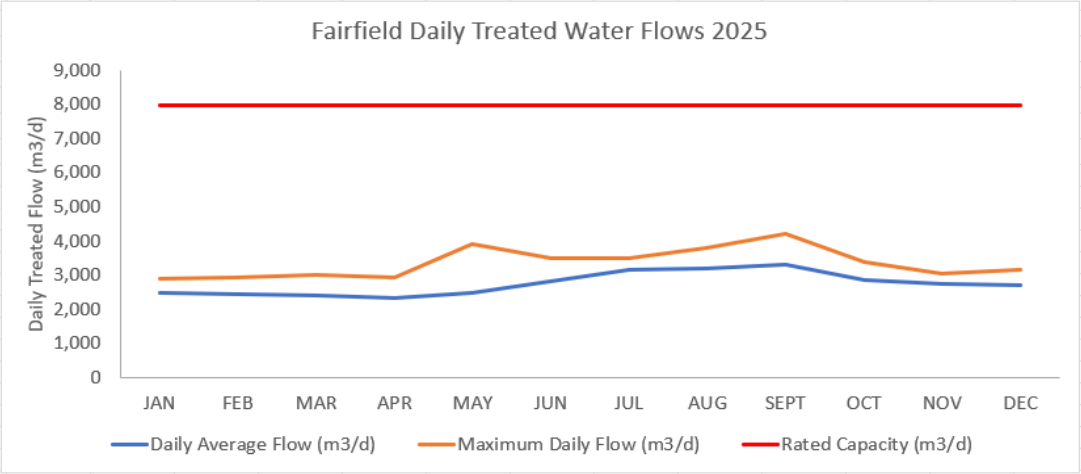
Based on the current Municipal Drinking Water License, the water treatment plant's rated capacity (8,000 m^3 per day) is assessed as being the volume of water that flows from the treatment system to the distribution system or water demand.

In 2025, a total of 1,001,476 m^3 of treated water was distributed to the system.

Total treated water sent to the distribution system in 2025: 1,001,476 m^3

Maximum daily treated water volume: 4,216 m^3 (53% of rated capacity)

The maximum daily flow occurred in September 2025, reaching 53% of the plant's rated capacity.



The uncommitted reserve capacity calculation performed for 2025, combined with the population growth projections for Amherstview and Odessa, places the expansion of the Fairfield Water Treatment Plant in the year 2046. The potable water demand is anticipated to reach 80% of the plant's rated capacity around 2040. When this threshold is hit, activities to expand the plant should be undertaken. This expansion date is subject to change forward or backward based on the size of the development being

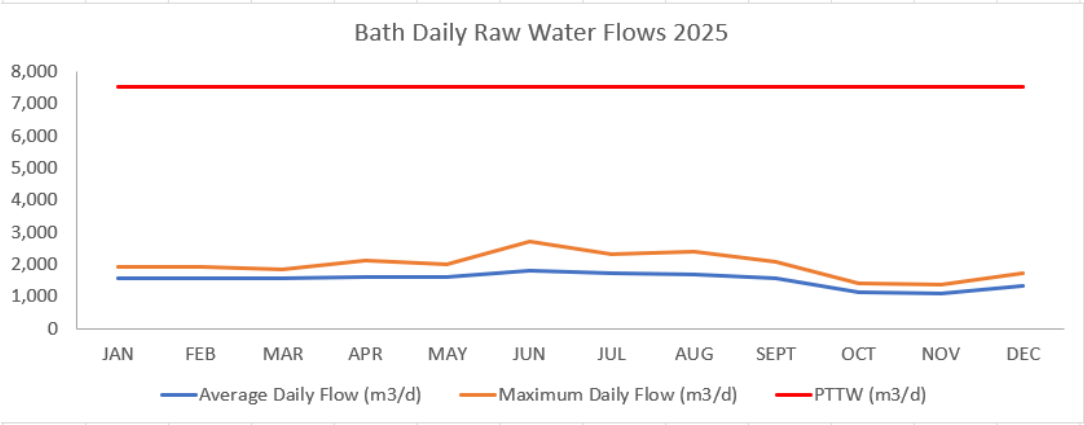
approved, changes in limits of the service area, actual growth rate and water demand. Investing in watermain replacements and repairs, water conservation initiatives and leak reduction programs will enhance the available capacity of the Fairfield water plant. This approach can delay the necessity for a large-scale plant expansion by several years.

6.2. Bath DWS

The most recent PTTW for this system was issued on July 3, 2024. The permit is valid for 10 years and allows the Township to draw a maximum of 7,515 m^3 of water per day from Lake Ontario for the Bath Water Treatment Plant.

Total raw water taken in 2025:
557,278 m^3
Maximum daily raw water volume taken:
2,729 m^3 (36% of limit)

The total raw water taken was 557,278 m^3 in 2025. In June 2025, the maximum daily raw water volume was recorded at 2,729 m^3/d, which is 36% of the allowable limit.

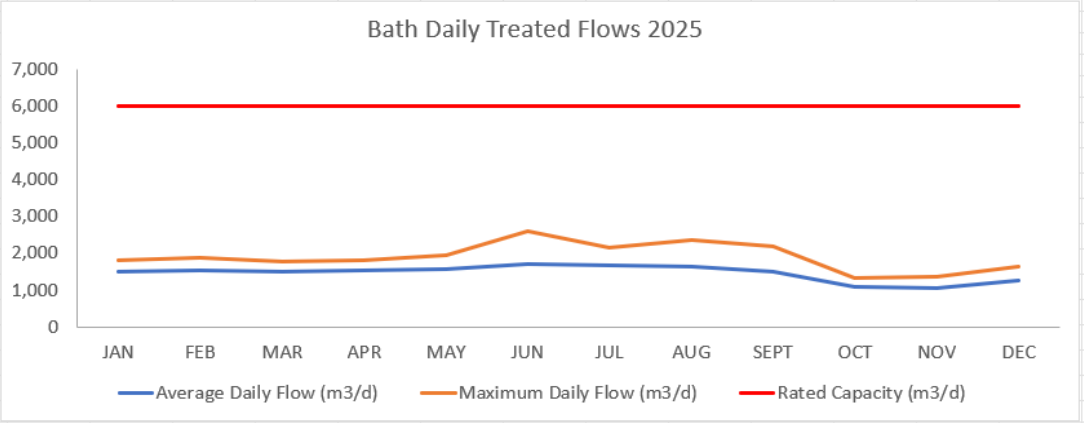


According to the current Municipal Drinking Water License, the rated capacity of the water treatment plant is 6,000 cubic meters per day, which is defined as the volume of water flowing from the treatment system to the distribution system.

In 2025, the total treated water sent to the distribution system was 536,831 m^3. The maximum daily treated water volume recorded in June 2025 was 2,611 m^3, which is 43.5% of the plant-rated capacity.

Total treated water sent to the distribution system in 2025: 536,831 m^3

Maximum daily treated water volume: 2,611 m^3 (43.5% of rated capacity)



It should be noted that most of the existing capacity of the Bath Water System has been allocated through front-end funding agreements to developers and Correctional Services Canada (CSC), leaving little room for further allocation.

The uncommitted reserve capacity calculation performed for 2025, combined with the population growth projections for the Village of Bath, an expansion of the Bath Water Treatment Plant is not expected to be necessary prior to 2038. The potable water demand is expected to reach 80% of the plant's rated capacity around 2032. When this threshold is hit, activities to expand the plant should be undertaken. It should be noted that this projection could be accelerated or delayed based on several factors, such as the rate of construction of new developments or changes to trends in water demand.

6.3. Water Losses

Water Loss or “unaccounted-for water” is the difference between the quantity of water supplied to the distribution system and the metered quantity of water used by the customers. The MECP Design Guideline for Drinking Water Systems refers to “unaccounted-for water” when considering rated capacity. Their policy requires system owners to consider unaccounted-for water to the level of 15% of the average daily demand.

Authorized consumption is water that is used by known customers and the sum of billed authorized consumption and unbilled authorized used.

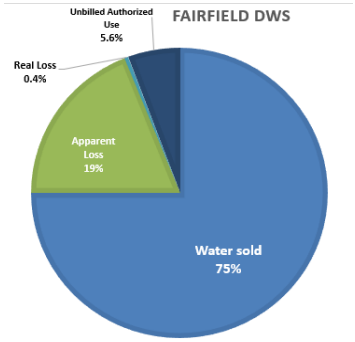
Real losses are actual losses of water from the system and consist of leakage from transmission and distribution mains, leakage and overflows from the water system’s storage tanks, and leakage from service connections up to and including the meter.

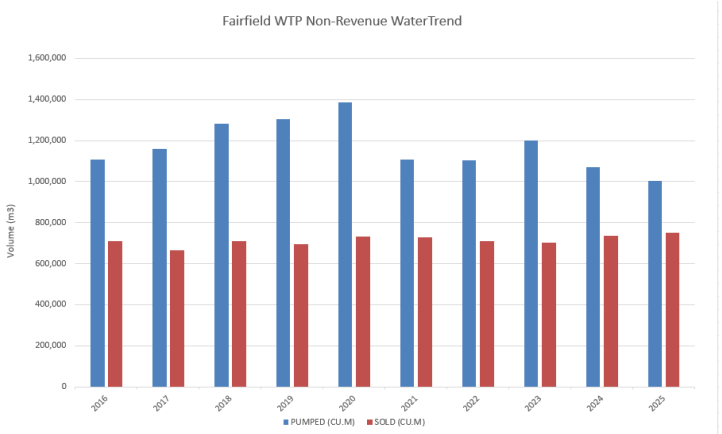
Apparent losses, also referred to as commercial losses, occur when water that should be included as revenue generating water appears as a loss due to unauthorized actions and calculation error. It consists of unauthorized usage, customer meter inaccuracies, and systematic data handling errors in the meter reading and billing processes.

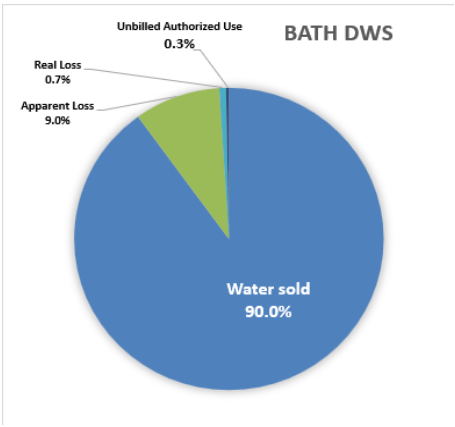
Non-revenue water (NRW) is generally categorized as **unbilled authorized consumption** (water use inside the treatment facilities, distribution system flushing, water used for construction activities, fire training/fire fighting purposes and water used for recreation purposes), **real water losses** (watermain breaks and leaks) and **apparent water losses** (unauthorized consumption/theft, unknown water usage, and metering/data inaccuracies).

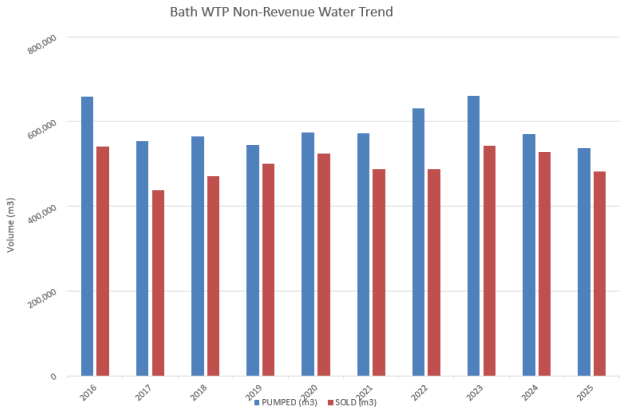
In 2025, 25% of water sent to the Fairfield water distribution system and 10.4% for the Bath water distribution system is water for which no revenue was generated. Here is the breakdown:

- Approximately 19% of the produced water in the Fairfield system is apparent water loss, while 5.6% is attributed to unbilled authorized use, and 0.4% is identified as real water loss.
- 9% of water produced in Bath is considered apparent water loss. The unbilled authorized use was calculated to be 0.6%, while the real water loss due to breaks and leaks is approximately 0.7%.


FAIRFIELD DWS
Unbilled Authorized Use
5.6%
Real Loss
0.4%
Apparent Loss
19%
Water sold
75%

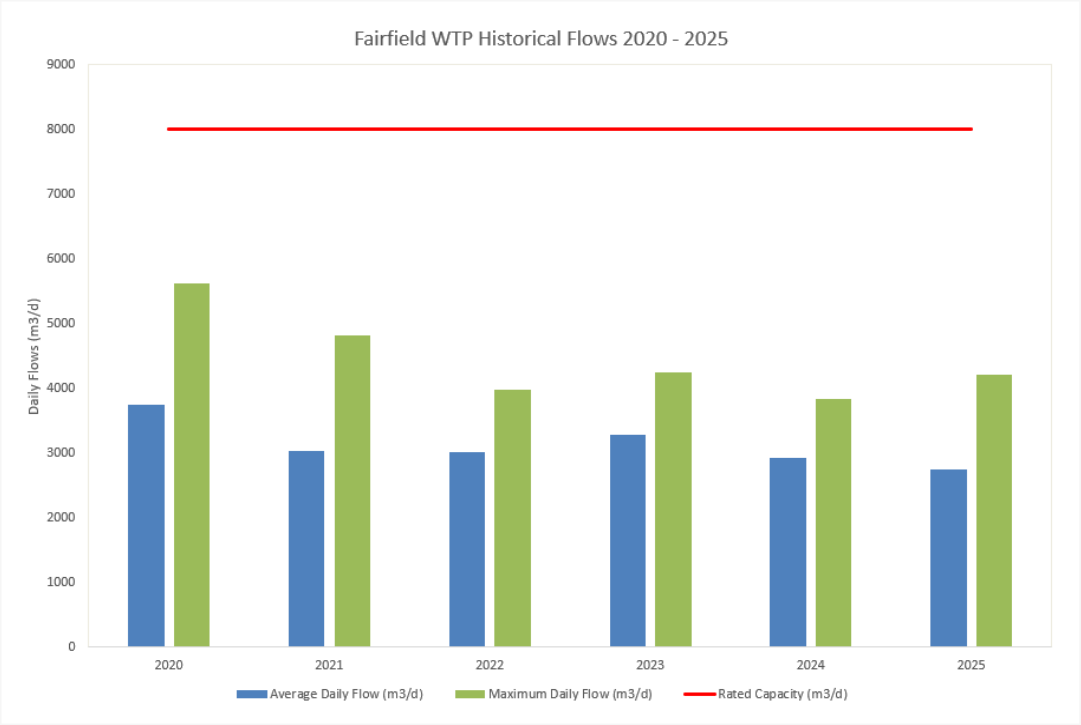

Fairfield WTP Non-Revenue WaterTrend
Volume (m3)
1,600,000
1,400,000
1,200,000
1,000,000
800,000
600,000
400,000
200,000
0
2016
2017
2018
2019
2020
2021
2022
2023
2024
2025
PUMPED (CU.M)
SOLD (CU.M)


BATH DWS
Unbilled Authorized Use
0.3%
Real Loss
0.7%
Apparent Loss
9.0%
Water sold
90.0%


Bath WTP Non-Revenue Water Trend
Volume (m3)
800,000
600,000
400,000
200,000
0
2016
2017
2018
2019
2020
2021
2022
2023
2024
2025
PUMPED (m3)
SOLD (m3)

6.4. Historical Trends

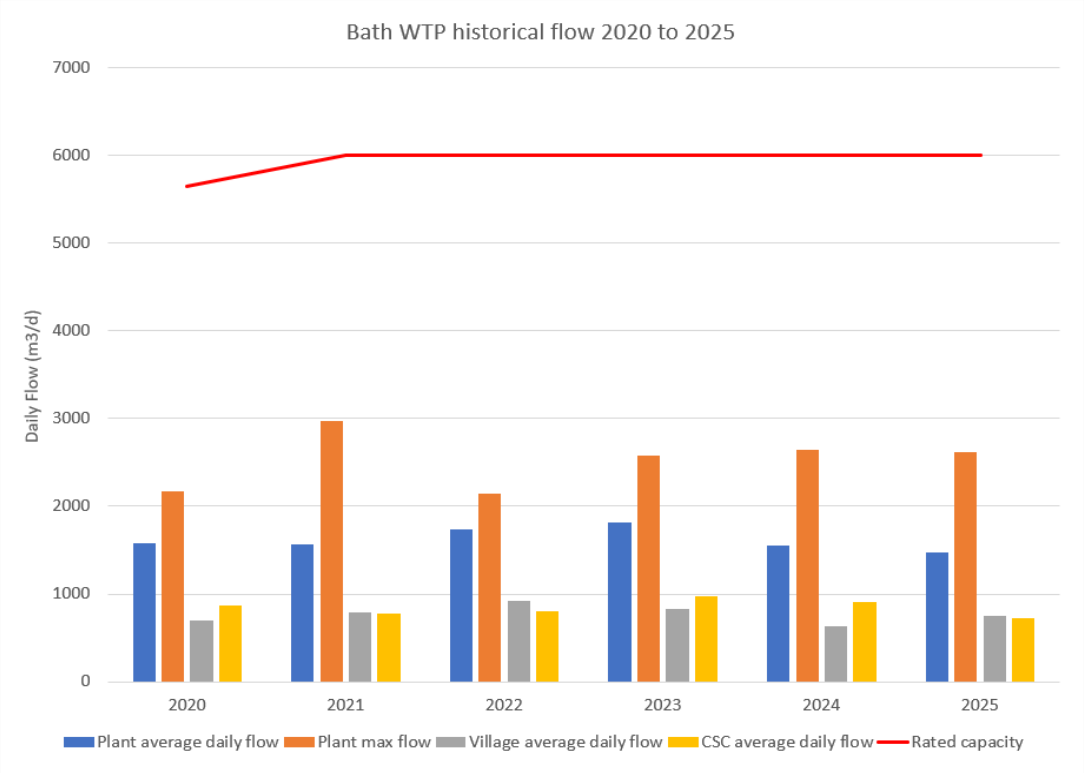
Historical trending indicates that total water consumption (annual average daily flow) has been trending down since 2020 and appears to have stabilized since 2022 for the Fairfield DWS although development and population continue to grow. The increase in flow demand expected with population growth is balanced with household water usage efficiencies and a reduction in water losses achieved by replacing older watermains.



As expected, the fluctuation of the maximum daily flow in the Fairfield system is very much a function of precipitation and major events in the distribution system. In the past years major leaks were repaired by Utilities operators and aging distribution watermains were replaced or relined. Both resulted in a significant reduction in the daily water flows.

Water consumption in Bath has remained relatively stable with the highest flow recorded in 2021 due to the testing of a new filtration system. The consumption is very much influenced by water demand from Correctional Services Canada (CSC).

Flows to Correctional Services Canada (CSC) facilities decreased significantly in October 2025 after repairs in their distribution system were completed.



7. Waterworks Upgrade and Major Maintenance

In 2025 the following major upgrades and maintenance activities took place:

Fairfield DWS:

- Membrane repairs
- Installed new chlorine analyzers on raw, contact chamber and treated water
- Installed new turbidity analyzer on reject water
- Rebuilt HLP 1 & 3 and LLP 1
- Installed small fill station
- Replaced/repaired fire hydrants, multiple curbstops, water services and water meters
- Greased, inspected and flushed all hydrants
- Watermain Odessa – Bridge Street Phase 1 replacement
- Watermain Odessa – Main St reconstruction project
- Watermain Amherstview – Amherstview West development

Bath DWS:

- Inspection and cleaning of raw well and sludge tanks
- MGF repairs
- Installed PLC at water tower
- Replaced backwash pump soft start
- Rebuilt regulator, ejectors and replaced chlorine system tubing and fittings
- Installed new chlorine analyzers on raw, contact chamber and finished water
- Installed ORP probe on decant line
- Greased and flow tested 100 hydrants
- Replaced/repaired multiple curbstops, hydrants and water meters
- Sir John Johnson & Pruyn watermain reconstruction project

8. Regulatory Sampling Requirements

Regulatory samples are analyzed by laboratories that are accredited to conduct these specific analyses. Caduceon Environmental (Kingston/Ottawa) is the contracted accredited laboratory. As regulated, operational checks, testing and sampling are also conducted by certified operators and/or continuous analyzers.

8.1. Sampling Locations

Samples are collected at the following locations on a set schedule, as required by the regulation and more frequently if required operationally:

- Raw water
- Each filter effluent
- Treated water (point where water enters the distribution system)
- Process water discharge to water source
- Distribution system (point with maximum residency time)
- Distribution system (routine microbiological and lead sampling locations)
- Distribution system (water towers and water reservoir)

8.2. Equipment Calibration

All testing instruments are calibrated regularly as per manufacturer's specifications. Although not required to do so, the Township retains a third-party instrumentation service provider to conduct annual servicing on the majority of the laboratory equipment, as a quality control measure.

8.3. Turbidity and Free Chlorine Residual Sampling

Sampling for turbidity and free chlorine residual is required by **Schedule 7** of O.Reg. 170/03. Continuous free chlorine residual and turbidity analyzers are installed throughout the treatment plant and continuous free chlorine analyzers are installed in the water distribution system at the Amherstview, Bath, and Odessa water towers, as well as at the Odessa water booster station, all in accordance with the requirements of the Drinking Water Works Permit.

Readings from these analyzers are trended by the supervisory control and data acquisition (SCADA) system at each water treatment plant and reports of minimum, maximum and average values during a 24-hour period are printed and reviewed by a certified operator on a daily basis.

Turbidity is defined as the cloudiness of the water caused by suspended matter and is an important measure of filter performance. Its measurement is expressed in Nephelometric Turbidity Units (NTU). Water becomes "cloudier" as the NTU increase.

Turbidity in the water interferes greatly with the disinfection process, as the particles causing high turbidity can shield or entrap disease-causing organisms, making it difficult for the disinfectant to reach and destroy them.

Figure 3 Turbidity ranges illustrated in water

The filter performance criteria for membrane filtration (Fairfield and Bath) are ≤ 0.1 NTU in 99% of all turbidity readings taken over the course of one month.

Turbidity higher than 1 NTU at the filter effluent for a duration of 15 minutes is an indicator of “adverse water quality”.

Filter effluent turbidity met the ODWQS criteria at all times at both plants in 2025

Filter Turbidity Results 2025

	Samples	Limit	Unit	Average	min/max
Fairfield					
Train 1	continuous	1*	NTU	0.017	0.01 / 0.141
Train 2	continuous			0.017	0.01 / 0.08
Train 1	continuous	99**	%	100	99/100
Train 2	continuous			100	100
Bath					
MGF 1***	continuous	1*	NTU	0.017	0.011 /1.002
MGF 2***	continuous			0.017	0.011 / 1.002
MGF 1***	continuous	99**	%	100	96.7/100
MGF 2***	continuous			99.9	86.5/100

* max for longer than 15 minutes
** Percentile
***MGF: membrane gravity filtration system

In Bath, starting up the membrane gravity system is causing short turbidity spikes likely due to air in the system. The limits and percentiles were always met at both drinking water plants.

Free chlorine residual is the concentration of residual chlorine that is the most effective at killing or inactivating disease-causing organisms in water. Its measurement is expressed in milligram per liter (mg/l).

Free chlorine residuals were above the legislative minimum criteria.

Proper disinfected water was directed to customers at all times!

The free chlorine residual required in treated water to confirm proper disinfection at Fairfield was above 0.9 mg/L over the course of the calendar year 2025.

The minimum concentration in the distribution system to protect from bacterial re-growth is 0.2 mg/L. The legislative minimum residual of 0.05 mg/L is required to ensure proper

disinfected water is directed to customers. In the Fairfield distribution system, the minimum concentration measured was 0.30 mg/L. In 2025, proper disinfection was always achieved in the Fairfield system.

2025 Free Chlorine Residual Results					
	Samples	Limit	Unit	Average	min
Fairfield					
FCR (treated)	continuous daily grab	0.9*	mg/l	1.60	0.93
FCR (distribution)	continuous daily grab	0.05		1.24	0.30
Bath					
FCR (treated)	continuous daily grab	0.9/0.8**	mg/l	1.62	0.41
FCR (distribution)	continuous daily grab	0.05		1.20	0.36

*limit depending on flows, temperature, and pH – conservative worst-case scenario
**limit is lake temperature dependent (<15 C is 0.9 mg/l and >15 is 0.8 mg/l)

The Bath water treatment plant requires a minimum free chlorine residual of 0.9 mg/L in the treated water when the lake temperature is <15 C and 0.8 mg/L when the lake temperature is >15 C. However, on April 10th and November 4th, 2025, the free chlorine residual required to confirm proper disinfection was recorded below the limit and were caused by failures in the chlorination system. The minimum recorded chlorine residual was 0.41 mg/L and occurred on April 10th. The operator in charge performed Emergency CT calculations for each incident. The calculations confirmed that the water directed to the users was always safe, and proper disinfection was achieved at the Bath facility throughout 2025.

To protect from bacterial re-growth, the minimum free chlorine concentration in the distribution system is 0.2 mg/L. The legislative minimum residual of 0.05 mg/L is required to ensure proper disinfected water is directed to customers. In the Bath distribution system, the minimum concentration measured was 0.36 mg/L in September 2025, and proper disinfection was always achieved throughout the distribution system.

8.4. Microbiological Sampling

Microbiological sampling of raw, treated and distribution water is required by **Schedule 10** of O.Reg. 170/03.

Organisms such as bacteria may come from storm water, sewage plants, livestock operations, septic systems and wildlife. Most present little or no health concerns for humans. The indicator tests include total coliforms, Escherichia coliforms (E. coli), and heterotrophic plate count (HPC).

The presence of any total coliforms or E. coli in water leaving a treatment plant (following the disinfection process) signifies inadequate treatment and an increased risk to public health.

2025 Microbiological Results					
	Number of Samples	E. coli	T. coliforms	Number of Samples	HPC
		CFU/100 mL min – max			counts/mL min - max
Fairfield DWS					
Raw	52	0 – 9	0 – 95	n/a	n/a
Treated	53	0	0	52	<10 - 20
Distribution	424	0-6	0-20	157	<10 - 320
Bath DWS					
Raw	52	0 - 310	0 – 430	n/a	n/a
Treated	52	0	0	52	<10 - 150
Distribution	159	0	0-5	52	<10 - 170

The total coliform counts above 0 occurred in the Fairfield Drinking Water System on two routine samples taken at deadend hydrants on Simurda Crt and Coronation Blvd in October and December 2025. The E. coli counts above 0 occurred in the Coronation sample in December. The total coliforms count above 0 in the Bath Drinking Water System occurred in September 2025 in the Bath Water Tower routine sample. Refer to section 11 for details.

Heterotrophic plate count (HPC) results give an indication of overall water quality in drinking water systems. While a gradual change in results can indicate a change in overall water quality or a problem such as bacterial regrowth in the distribution system, a sudden high result is more an indication of sampling point contamination, issue with sample preparation for analysis or with the analysis itself.

HPC results of 20 counts/ml or less in the treated and distribution water can be expected. Occasional higher results are possible but as a guideline, each result should be less than 500 counts/ml. Slightly elevated HPC results occurred in samples collected at the Odessa firehall (February & June), the Odessa water tower (December) and the Bath water tower (August). The free chlorine residual in these samples was at an acceptable level. No further action required.

8.5. Quarterly Chemical Sampling

Quarterly sampling and testing for nitrates and nitrites in a treated water sample, haloacetic acids and trihalomethanes in distribution samples is required by **Schedule 13,** O.Reg. 170/03.

All samples collected as per Schedule 13 of O.Reg. 170/03
met the standards prescribed in the ODWQS

2025 Nitrate, Nitrite, THM, HAA - Schedule 13				
	Samples	ODWQS	Unit	Average Concentration
Fairfield DWS (distribution)				
Nitrate (N)	4	10	mg/L	0.23
Nitrite (N)	4	1	mg/L	<0.05
THM – 5 Main Street	6**	100	µg/L	39
HAA – 5 Main Street	4	80	µg/L	33
Bath DWS (distribution)				
Nitrate (N)	4	10	mg/L	0.19
Nitrite (N)	4	1	mg/L	<0.05
THM - Main St – Hydrant 534	5**	100	µg/L	44
HAA - Bath STP **extra THM samples were taken on Feb 26/25 on request of MECP	4	80	µg/L	36

Nitrate is present in the water because of decay of plant or animal material, the use of agriculture fertilizer, sewage and treated wastewater contamination or geological formations containing soluble nitrogen compounds. There is a risk for infants to suffer from blood related problems if the nitrate concentration is higher than 50 mg/L in drinking water. Nitrite may occur in groundwater, but with chlorination it's rapidly oxidized to nitrate. All nitrate and nitrite concentrations were well below the established limits in 2025.

Trihalomethanes (THMs) and haloacetic acids (HAAs) are by-products of disinfection (DBP) and are formed when chlorine reacts with organic matter naturally present in water. The level of THMs and HAAs in treated water depends on numerous factors including total organic carbon, temperature, pH, chlorination dose and residency time in the distribution system.

For THMs, the maximum acceptable concentration (MAC) is 100 µg/l. For HAAs, the standard has been established at 80 µg/l, based on a four-quarter moving average.

The running annual averages for THM and HAA are below ½ of their MAC in both the Fairfield and Bath distribution systems.

8.6. Annual Inorganic and Organic Sampling

Yearly sampling of specific inorganic and organic parameters in a treated water sample is required by **Schedules 23 and 24** of O.Reg. 170/03.

If the result for a parameter listed in these schedules exceeds half of the standard prescribed by the ODWQS, then the frequency of testing for that parameter must be increased to quarterly.

All samples collected as per Schedule 23 and Schedule 24 of O.Reg. 170/03 **were well below half of the standard** prescribed in the ODWQS

The results for the inorganic and organic parameters are summarized in the tables below.

All inorganic and organic parameters were well below the limit, and all parameters were far below of the half of the standard prescribed by the ODWQS (see tables below).

2025 Annual Inorganic Results – Schedule 23			
	ODWQS	Fairfield DWS	Bath DWS
Parameter	**µg/L**		
Antimony	6	0.1	0.1
Arsenic	10	0.7	1.0
Barium	1000	20	26
Boron	5000	20	22
Cadmium	5	<0.015	<0.015
Chromium	5	<1	<1
Mercury	1	<0.02	<0.02
Selenium	50	<1	<1
Uranium	20	0.36	0.36

2025 Annual Organic Results - Schedule 24			
	ODWQS	Fairfield DWS	Bath DWS
Parameter		**µg/L**	
Alachlor	5	<0.3	<0.3
Atrazine & Metabolites	5	<0.5	<0.5
Azinphos-methyl	20	<1	<1
Benzene	1	<0.5	<0.5
Benzo(a)pyrene	0.01	<0.006	<0.006
Bromoxynil	5	<0.5	<0.5
Carbaryl	90	<3	<3
Carbofuran	90	<1	<1
Carbon Tetrachloride	2	<0.2	<0.2
Chlorpyrifos	9	<0.5	<0.5
Diazinon	2	<1	<1
Dicamba	120	<1	<1
1,2-Dichlorobenzene	200	<0.5	<0.5
1,4-Dichlorobenzene	5	<0.5	<0.5
1,2-Dichloroethane	5	<0.5	<0.5
1,1-Dichloroethylene	14	<0.5	<0.5
Dichloromethane	50	<5	<5
2,4-Dichlorophenol	900	<0.2	<0.2
2,4-Dichlorophenoxy-aceticacid (2,4-D)	100	<1	<1
Diclofop-methyl	9	<0.9	<0.9
Dimethoate	20	<1	<1
Diquat	70	<5	<5
Diuron	150	<5	<5
Glyphosate	280	<25	<25
Malathion	190	<5	<5
MCPA	100	<10	<10
Metolachlor	50	<3	<3
Metribuzin	80	<3	<3
Monochlorobenzene	80	<0.5	<0.5
Paraquat	10	<1	<1
Pentachlorophenol	60	<0.2	<0.2
Phorate	2	<0.3	<0.3
Picloram	190	<5	<5
PCBs	3	<0.05	<0.05
Prometryne	1	<0.1	<0.1
Simazine	10	<0.5	<0.5
Terbufos	1	<0.5	<0.5
Tetrachloroethylene	10	<0.5	<0.5
2,3,4,6-Tetrachlorophenol	100	<0.2	<0.2
Triallate	230	<10	<10
Trichloroethylene	5	<0.5	<0.5
2,4,6-Trichlorophenol	5	<0.2	<0.2
Triflualin	45	<0.5	<0.5
Vinyl Chloride	1	<0.2	<0.2

8.7. Fluoride and Sodium Sampling

Once every 5 years, sodium and fluoride must be tested in one treated water sample. Sampling occurred on January 9th, 2023. The results are summarized in the table below and treated water in both systems meets the requirements of the ODWQS and the aesthetic objective respectively.

The next samples for fluoride and sodium will be taken in 2028.

2023 Fluoride & Sodium Results			
	Criteria	Fairfield DWS	Bath DWS
Parameter	**mg/L**		
Fluoride	1.5*	<0.1	<0.1
Sodium	200**	13.1	13.4

*: Ontario Drinking Water Quality Standard, **: Aesthetic Objective

8.8. Distribution System Lead Sampling

Semi-annual sampling in the distribution system for pH and alkalinity is a requirement of Schedule 15.1, O.Reg. 170/03.

The Fairfield and Bath Drinking Water Systems have been granted reduced sampling of lead in residential plumbing and the distribution system. This is because previous samples have shown that the levels of lead are not harmful to public health, according to the ODWQS.

All results of lead samples collected were well below the limits prescribed in the ODWQS in 2025

The amount of sampling required is based on the population served. For the year 2025, the number of sampling locations for the Fairfield and Bath Drinking Water System was determined based on population figures from 2024. Four locations in the Fairfield distribution system and three locations in the Bath distribution system were sampled in 2025.

The samples were analyzed for pH and alkalinity, with additional lead sampling required every three years. The most recent lead sampling was done in 2023. In the following table the parameters and the average of the sampling results are listed.

2025 Lead Sampling - Schedule 15.1					
	ODWQS AO/OG	Unit	Dates	Fairfield DWS	Bath DWS
Sample number per date				4	2
Lead	10	µg/L	04/03/2023	0.19	0.035
			10/13/2023	0.06	0.05
pH	6.5-8.5	-	03/20/2025	8.11	7.29
			09/15/2025	7.56	7.91
Alkalinity	30-500	mg/L	03/20/2025	97	104
			09/15/2025	89	91

Lead samples taken in 2023 were well below the criteria of the ODWQS. The pH and alkalinity of the samples taken in 2025 were within the range of the objectives and guidelines.

9. General Water Quality Parameters

Tests for hardness, dissolved organic carbon (DOC), conductivity, total Kjeldahl nitrogen (TKN), ammonia/ammonium, colour, and temperature on raw and finished water are also conducted on a daily or quarterly basis at Bath and Fairfield. The types and frequency of sampling are informed by recommendations from the Engineer's Report, operational experience, and specific treatment needs.

Test results are summarized in the table below for 2025.

The document "Technical Support Document for Ontario Drinking Water Standards, Objectives and Guidelines, June 2006" provides operational guidelines and aesthetic objectives for certain parameters in drinking water. These are provided below for comparison purposes.

2025 General Water Quality Parameter (Annual Average)							
				Fairfield DWS		Bath DWS	
Parameter	Units	**AO**	**OG**	Raw Water	**Treated Water**	Raw Water	**Treated Water**
Hardness	mg/L CaCO3	**-**	**80-100**	126	**125**	128	**128**
Alkalinity	mg/L		**30-500**	-	**95**	97	**93**
DOC	mg/L	**5**	**-**	3.0	**2.7**	3.4	**3.3**
Conductivity	umho/cm	**-**	**-**	-	**-**	309	**311**
TKN	mg/L	**-**	**-**	0.3	**0.2**	0.3	**0.2**
Ammonia/ Ammonium	mg/L	**-**	**-**	0.05	**0.06**	0.03	**0.03**
Colour	TCU	**5**	**-**	3	**0**	7	**0**
Temperature	°C	**<15**	**-**	11.7	**12.5**	11.0	**11.6**

All listed parameters are, except for hardness, below the operational guidelines and aesthetic objectives. Water hardness is defined by the amount of dissolved calcium and magnesium in water. Hard water (121 – 180 mg $CaCO_3$/L) is high in dissolved minerals and tends to form scale deposits. This does not mean that it poses a health risk. It only means that more soap or detergent is needed to clean things. Hard water has benefits as well: humans need minerals to stay healthy and drinking water could contribute to calcium and magnesium in the diet. In Ontario the hardness from surface sources ranges from 3.7 to 296 mg/L.

10. Municipal Drinking Water License Sampling Requirements

According to section C.5.2 of the license for each of the DWS backwash/wastewater, samples of the treatment plant at the point of discharge to Lake Ontario must be taken.

For the Fairfield WTP, free chlorine residual in the discharge must be sampled monthly. The residual must remain below 0.05 mg/l (as an annual average).

For the Bath WTP, suspended solids concentration must be sampled monthly and remain below 25 mg/l (as an annual average).

Residue Management 2025 (January 1st – Dec 31st)							
System	Parameter	Limit	Unit	Required sampling	Samples	Annual Average	min - max
Fairfield	FCR[1]	0.05***	mg/l	1/month	53	0.03	0 – 0.09
Bath	SS[2]	25***	mg/l	1/month	23[3]	6.7	0.1 – 19.1

[1] FCR: Free Chlorine Residual

[2] SS: Suspended Solids

[3] The dechlorination system was taken out of service and the backwash/wastewater was discharged to the Bath sewage treatment plant from Jan 1-19 and June 25-Dec 31, 2025.

Operationally each respective parameter is tested several times each month when the systems are operating. The residues of both plants are well below the limits.

According to section C 6.0 of the license, the owner of a drinking water system shall develop and implement a Harmful Algal Bloom monitoring, reporting and sampling plan for each plant. “Harmful Algal Bloom” is an overgrowth of aquatic algal bacteria that produce or have the potential to produce toxins in the surrounding water. Such bacteria are harmful to people and animals and include microcystins produced by cyanobacterial blooms.

At both treatment plants visual monitoring for harmful algal blooms at/near the source water intake(s) was also conducted 3 times per week from the beginning of May to the end of October 2025.

Raw and finished water for both drinking water systems was sampled monthly during the seasonal warm period (May to October 2025) for Microcystin LR at both treatment plants.

The treatment process at both drinking water plants performed well, and the microcystin LR concentrations determined in treated water were below the limit of quantification.

2025 Microcystin LR Results			
Drinking Water System		Fairfield DWS	Bath DWS
		(µg/L)	
ODWQS		**1.5**	**1.5**
Raw Water	average min/max	<0.15 <0.15	<0.15 <0.15
Finished Water	average min/max	<0.15 <0.15	<0.15 <0.15
Number of Samples		6	6

The ODWQS was always met at both treatment plants.

11. Adverse Water Quality Incident Notifications & Non-Compliance Incidents

In accordance with section 11 (Annual Reports) of Ontario Regulation 170/03, this report must summarize any reports made to the Ministry under subsections 16-3 and 16-4 of Schedule 16 of O.Reg 170/03.

Additionally, this report must describe any corrective actions taken under Schedule 17 of O. Reg 170/03 during the period covered by the report.

Under Schedule 22 of O.Reg. 170/03, any incidents of non-compliance with the SDWA, its regulations, the drinking water works permit (DWWP), municipal drinking water license (MDWL), or any orders applicable to the system have to be reported. Additionally, this report must specify the duration of the failure and the measures that were taken to correct the failure.

Adverse Water Quality Incident Notices & Non-compliance Incidents 2025							
Date sampled	Notice #	System	Schedule O.Reg 170/03	Parameter	Issue	Corrective Action	Completed Action
September 23, 2025	170049	Bath	16-3	Total Coliform	Suspected sample contamination (distribution system)	Flushing lines and sampling at location and downstream location	Sept 25, 2025
October 3, 2025	170207	Bath	16-3	-	Non-compliance with MECPs watermain disinfection procedure & MDWL	Flushed lines, confirmed disinfection and sampling	Oct 6, 2025
October 7, 2025	170260	Fairfield	16-3	Total Coliform	Suspected sample contamination (distribution system)	Flushing lines, sampling at location and upstream location	Oct 9, 2025
December 23, 2025	171142	Fairfield	16-3	Total Coliform & E. coli	Suspected sample contamination (distribution system)	Flushing lines, sampling at location and upstream location	Dec 29, 2025

An AWQI report was filed on September 23, 2025, following a routine sample collected at the Bath Water Tower, which yielded a Total Coliform (TC) count of 5 CFU/100 ml. The free chlorine residual measured on September 22, 2025, was 1.19 mg/l. In response, staff flushed the sample line and collected a second set of samples as requested by the Health Unit. All subsequent samples returned with 0 CFU/100 mL of TC. Properly disinfected water was always directed to customers. Given the acceptable level of chlorine residual in the initial sample, the positive coliform result at the water tower was likely due to contamination during sample collection, preparation for analysis, or an issue with the analysis itself.

On October 3, 2025, the Township submitted an AWQI report to the MECP's Spills Action Centre (SAC) and Southeast Public Health, noting an observation of improperly disinfected water directed to water users in the Bath drinking water system. The incident stemmed from a break in the temporary water service to 100 Pruyn Cres that occurred on September 29, 2025. A contractor, working on behalf of the Township, repaired the temporary watermain without a certified Utilities operator present to ensure proper disinfection procedures were followed. Upon notification of the incident on October 3, 2025, the Utilities division promptly initiated corrective actions in accordance with regulatory requirements. The service was flushed and sampled, with results confirming that the water distributed to residents always remained safe. The Township also addressed the issue with the contractor verbally and in writing.

On October 7, 2025, an AWQI was filed following a routine sample collected at the dead-end hydrant on Simurda Ct, which yielded a Total Coliform (TC) count of 3 CFU/100ml. The free chlorine residual measured on October 6, 2025, was 0.96 mg/l. In response, staff flushed the watermain and collected samples from the dead-end hydrant as well as the first hydrant upstream as requested by the Health Unit. All subsequent samples returned with 0 CFU/100 mL of TC. Properly disinfected water was always directed to customers. Given the acceptable level of chlorine residual in the initial sample, the positive coliform result at the water tower was likely due to contamination during sample collection, preparation for analysis, or an issue with the analysis itself.

On December 23, 2025, an AWQI was filed following a routine sample collected from the dead-end hydrant on Coronation Blvd, which yielded a Total Coliform (TC) count of 20 and an E. coli (EC) count of 6 CFU/100ml. The free chlorine residual measured on December 22, 2025, was 1.16 mg/l. In response, staff flushed the watermain and collected samples from the dead-end hydrant as well as the first hydrant upstream as requested by the Health Unit. All subsequent samples returned with 0 CFU/100 mL of TC. Properly disinfected water was always directed to customers. Given the acceptable level of chlorine residual in the initial sample, the positive coliform and E. coli results were likely due to contamination during sample collection, preparation for analysis, or an issue with the analysis itself.

All adverse water quality incidents (AWQI) and non-compliance incidents were immediately verbally reported and in writing within 24 hours to SAC and the Medical Officer of Health, as required under Ontario Regulation 170/03.

The most recent inspection by the MECP was initiated in July for Fairfield and in October 2025 for Bath respectively. The final inspection rating was 100% for both plants.

Both Drinking Water Systems were operated to the best of our knowledge in compliance with the above-noted legal requirements in 2025, except for the contractor's response to the temporary water service break in Oct 2025 in the Bath distribution system.

12. Definitions and Terms

Adverse Water Quality
Presence of specific parameters in the drinking water identified as indicator of adverse water quality (potential health effects); listed in Schedule 16 of O.Reg. 170/03

Aesthetic Objective (AO)
Aspects of drinking water quality (namely taste, odour, color, clarity, iron, manganese) that are perceivable by the senses

Inorganic parameters
Substances which are naturally occurring or a result of urban storm runoff, industrial or domestic wastewater discharge, mining or agriculture. Examples are salt, metals, carbonates, nitrate, nitrite. Some may be a result of treatment and distribution of water (for example, lead from old solder in pipes)

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

Operational Guidelines (OG)
For parameters, which may affect the treatment, disinfection and distribution of the water, are operational guidelines set. Examples are alkalinity, hardness, and pH.

Organic parameters
Substances which contain a carbon atom are organic compounds, with few exceptions as i.e. carbonates. These includes fats, proteins, sugars, hummin acids, etc. Most of them are present naturally in our environment. Some of them are potentially hazardous for the environment and of concern for the drinking water. These mostly synthetic

produced organics include pesticides and their metabolites, VOCs, THM, HAA, PCBs, etc. They originate from industrial discharges, urban and agricultural storm runoff, air deposition, from treatment of drinking water or other sources.

13. Acts and Regulations

In addition to meeting permits and license requirements issued for the Drinking Water Systems, all acts and regulations made with regards to operating, licensing of facilities, licensing of operators, and quality standards must be met. A summary of pertinent legislation is as follows:

- *Safe Drinking Water Act*, 2002
  - Drinking Water Systems, O.Reg. 170/03
  - Licensing of Municipal Drinking Water Systems, O.Reg. 188/07
  - Certification of Drinking Water Operators, O.Reg. 128/04
  - Ontario Drinking Water Quality Standards, O.Reg. 169/03
  - Drinking Water Testing Services, O.Reg. 248/03
  - Financial Plans, O.Reg. 453/07
  - Procedure for Disinfection of Drinking Water in Ontario
  - Watermain Disinfection Procedure

- *Ontario Water Resources Act*, 1990
  - Water Taking, O.Reg. 387/04
  - Charges for Industrial and Commercial Water Users, O.Reg. 450/07

- *Environmental Protection Act* and its regulations

- *Fisheries Act*, 1985 and its regulations

- Several other MECP, Environment Canada and Health Canada guidelines and protocols

14. References

Technical Support Document for Ontario Drinking Water Standards, Objectives and Guideline, Ministry of Environment, PIBS 4449e01 revised June 2006

Entry level drinking water operator course manual, Ministry of Environment, 3rd Edition (revised 02-2010)

Canadian Association for Laboratory Accreditation (www.cala.ca)

Canadian Water and Wastewater Association (www.cwwa.ca)

e-Laws (https://www.ontario.ca/laws)

Environment Canada (https://www.canada.ca/en/environment-climate-change/services/water-overview.html)

Health Canada (www.hc-sc.gc.ca)

MECP (www.ontario.ca/page/drinking-water

Ontario Municipal Water Association (www.omwa.org)

Ontario Water and Wastewater Certification Office (www.owwco.ca)

Ontario Waterworks Association (https://owwa.ca/)

Walkerton Clean Water Centre (www.wcwc.ca)

15. Key Contacts

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