



RICHARDS LANDING  
DRINKING WATER SYSTEM  
WATERWORKS # 220007212







ANNUAL & SUMMARY  
REPORTS 2023



## Introduction

This Annual and Summary Report has been prepared in accordance with both Schedule 22 and section 11 of Ontario Regulation 170/03. In this manner, the requirements by regulation for each report have been consolidated into a single document. This Report is intended to brief the ownership and consumers of the Richards Landing Drinking Water System on the system's performance over the past calendar year January 1 to December 31, 2023.

This report encompasses all elements as required by O. Reg. 170/03. Each section explains what is required for the category Large Municipal Residential DWS (as it pertains to the Richards Landing DWS) and how limits were met or if shortfalls were revealed. The last section contains a list of tables and definition of terms identified in this report.

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## System Description

The Richards Landing Well Pump house is owned by the Township of St. Joseph.

Richards Landing is located on the northern shore of St. Joseph Island, in the Township of St. Joseph. The Well Pump house was constructed in 1994 on the corner of Highway 548 and Lewellyn Street to replace the private well systems previously used in the community of Richards Landing. The Township of St. Joseph Water Treatment facility is rated as a Class 1 Water Treatment subsystem and is categorized under O. Reg. 170/03 as a Large Municipal Residential system. Approximately 400 of the Township's 1122 residents are provided with potable drinking water from the facility.

The system is comprised of the following equipment:

- Two wells equipped with submersible pumps, one monitoring well, instrumentation and controls
- Disinfection process including two filtration trains each consisting of one 10-micron bag filter system, disinfection facilities (two UV irradiation reactors and a sodium hypochlorite chemical feed system consisting of two chemical feed pumps),
- Corrosion control process including a blended phosphate chemical feed system consisting of two chemical feed pumps
- In-ground storage, four high lift pumps and one fire pump. A diesel generator is located on-site to provide emergency power, and two pressure tanks maintain distribution system pressure during low flow conditions.

The facility design capacity is 912 L/min and the high lift pumps maintain system pressure between 75 and 99 psi (600 to 680 kPa) under normal operating conditions (maximum daily flow)

### Chemicals

Chemicals utilized at the Richards Landing Treatment plant during 20XX include:

- Sodium Hypochlorite for primary and secondary disinfection
- Blended Phosphates - Carus 8500™

### 2023 Expenditures

During the year of 2023, expenses were incurred to maintain treatment and distribution functions:

- ESA services
- 12-month surveillance audit (SAI Global)
- Pressure Tank replacement
- UV Lamps, quartz sleeves and sensors
- Chemical pump repair kits
- Pressure relief valve

### 2023 Drinking Water System Changes

Form 1 – Record of Watermains Authorized as a Future Alteration

- n/a

Form 2 – Record of Minor Modification or Replacements

- Pressure tanks replacement (50% 2023)

Form 3 – Record of addition, modification or replacement of equipment discharging a contaminant of concern to the atmosphere

- n/a



## Water Quality

### Microbiological Sampling and Testing

Sampling is conducted weekly for the DWS at the frequencies and locations identified by Schedule 11 of O. Reg. 170/03 for Large Municipal Residential Systems.

**Table 1: Microbiological sampling requirements**

| Location     | Sample Analysis  | # samples | Frequency |
|--------------|------------------|-----------|-----------|
| Raw          | EC / TC          | 1 sample  | weekly    |
| Treated      | N/A              | 1 sample  | weekly    |
| Distribution | EC / TC/ HPC-25% | 8 samples | monthly   |

Richards Landing raw samples are collected from a sample tap from the raw water header. Treated samples are collected from a sample tap from the treated discharge header prior to distribution. Distribution samples are rotated weekly at the following locations representing areas throughout the village: 1669 Arthur, 1209 Catherine, 1211 Richards, 1250 Marguerite. Other locations may be sampled as required.

**Table 2: Microbiological Sample Results**

| Type         | # samples | EC (range) | TC (range) | # samples | HPC (range) |
|--------------|-----------|------------|------------|-----------|-------------|
| Raw          | 104       | 0 - 1      | 0 - 32     | 0         | n/a         |
| Treated      | 52        | 0          | 0          | 52        | 0 - 430     |
| Distribution | 157       | 0          | 0          | 157       | 0 -20       |

### Operational Checks and Testing

Operational testing is completed as per Schedules 6 & 7 of O. Reg. 170/03 for Large Municipal Residential Systems. These checks and testing are completed on site at the water treatment facility by licensed operators. Continuous monitoring analyzers (collecting at minimum 15-minute readings) are utilized for measurement of filter turbidity and chlorine residuals.

**Table 3: Monthly Filter Turbidity Results**

| Month     | Filter #1     |               | Filter #2     |               |
|-----------|---------------|---------------|---------------|---------------|
|           | Average (NTU) | Range (NTU)   | Average (NTU) | Range (NTU)   |
| January   | 0.460         | 0.049 - 2.002 | 0.298         | 0.126 - 2.002 |
| February  | 0.570         | 0.056 - 2.002 | 0.207         | 0.118 - 2.001 |
| March     | 0.467         | 0.003 - 2.002 | 0.233         | 0.129 - 2.001 |
| April     | 0.389         | 0.001 - 2.002 | 0.183         | 0.001 - 2.001 |
| May       | 0.301         | 0.001 - 2.002 | 0.136         | 0.007 - 2.001 |
| June      | 0.192         | 0.001 - 2.002 | 0.124         | 0.009 - 2.001 |
| July      | 0.261         | 0.017 - 2.003 | 0.146         | 0.001 - 2.001 |
| August    | 0.264         | 0.001 - 2.002 | 0.126         | 0.001 - 2.001 |
| September | 0.326         | 0.001 - 2.002 | 0.130         | 0.008 - 2.001 |
| October   | 0.590         | 0.001 - 2.003 | 0.147         | 0.001 - 2.001 |
| November  | 0.521         | 0.026 - 2.003 | 0.188         | 0.087 - 2.001 |
| December  | 0.709         | 0.022 - 2.003 | 0.162         | 0.001 - 2.001 |



**Table 4: Treated Chlorine Residuals**

| Month     | Average Chlorine Residual (mg/L) | Chlorine Residual Range (mg/L) |
|-----------|----------------------------------|--------------------------------|
| January   | 1.55                             | 0.45 - 2.40                    |
| February  | 1.56                             | 1.07 - 1.84                    |
| March     | 1.56                             | 0.41 - 2.02                    |
| April     | 1.37                             | 0.56 - 2.60                    |
| May       | 1.21                             | 0.50 - 1.52                    |
| June      | 1.23                             | 0.56 - 1.87                    |
| July      | 1.24                             | 0.10 - 1.52                    |
| August    | 1.30                             | 0.68 - 2.82                    |
| September | 1.24                             | 0.73 - 1.63                    |
| October   | 1.41                             | 0.17 - 1.59                    |
| November  | 1.36                             | 0.42 - 1.65                    |
| December  | 1.47                             | 0.49 - 1.72                    |

Chlorine residuals are continuously monitored and data is recorded at a minimum 5-minute intervals.

### Chemical Sampling and Testing

Schedule 13 of O. Reg. 170/03 outlines chemical sampling regiments for Large Municipal Residential systems. Schedules 23 (inorganics) and 24 (organics) are collected every 12 months as well as sodium and fluoride every 60 months. This system requires quarterly sampling for nitrites/nitrates, THMs, and HAAs. Schedule 15.1 outlines the requirements for semi-annual lead testing (2 periods per year). Richards Landing Lead sampling follows the reduced sampling requirements every third year.

**Table 5: Schedule 23 - Inorganics**

| Parameter | Sample Date | Result Value (µg/L) | Units | ODWS |
|-----------|-------------|---------------------|-------|------|
| Antimony  | 12-Jun-23   | <0.5                | µg/L  | 6    |
| Arsenic   | 12-Jun-23   | 1                   | µg/L  | 10   |
| Barium    | 12-Jun-23   | 19                  | µg/L  | 1000 |
| Boron     | 12-Jun-23   | 19                  | µg/L  | 5000 |
| Cadmium   | 12-Jun-23   | <0.1                | µg/L  | 5    |
| Chromium  | 12-Jun-23   | 5                   | µg/L  | 50   |
| Fluoride  | 13-Jun-22   | 0.23                | mg/L  | 1.5  |
| Mercury   | 12-Jun-23   | <0.1                | µg/L  | 1    |
| Selenium  | 12-Jun-23   | 0.6                 | µg/L  | 50   |
| Sodium    | 13-Jun-22   | 66.8                | mg/L  | 20   |
| Uranium   | 12-Jun-23   | <1                  | µg/L  | 20   |

All results for inorganic parameters are within the maximum acceptable concentrations (MAC) of the Ontario Drinking Water Quality Standards as defined in O. Reg. 169/03. No result is above the half MAC with the exception of sodium which has an aesthetic objective (AO) of 200 mg/L but has a limit of 20 mg/L for medical reasons. Notifications are completed to MOH and the residents of the DWS.

**Table 6: Nitrate/ Nitrite Results**

| Date    | ODWS | 03-Jan-23 | 03-Apr-23 | 4-Jul-23 | Q4   |
|---------|------|-----------|-----------|----------|------|
| Unit    | mg/L | mg/L      | mg/L      | mg/L     | mg/L |
| Nitrate | 10   | 1.99      | 1.64      | 1.82     | -    |
| Nitrite | 1.0  | <0.05     | <0.05     | <0.05    | -    |

All quarterly results for Nitrites and Nitrates are well below ODWS.

**Table 7: Disinfection By-products Results (THM/HAA)**

| Date | ODWS | Q1   | Q2   | Q3   | Q4   | RAA  |
|------|------|------|------|------|------|------|
| Unit | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L |
| THM  | 100  | 36.7 | 36   | 33   | -    | 35.2 |
| HAA  | 80   | 37   | 49   | 28   | -    | 38.0 |

ODWS established a MAC of 80 for HAAs effective January 1, 2020.



Table 8: Schedule 24 – Organics

| Parameter                                  | Date      | Result  | Unit | ODWS |
|--|-----------|---------|------|------|
| Alachlor                                   | 12-Jun-23 | <0.233  | µg/L | 5    |
| Atrazine + N-dealkylated metabolites       | 12-Jun-23 | <0.5    | µg/L | 5    |
| Azinphos-methyl                            | 12-Jun-23 | <0.175  | µg/L | 20   |
| Benzene                                    | 12-Jun-23 | <0.2    | µg/L | 5    |
| Benzo(a)pyrene                             | 12-Jun-23 | <0.01   | µg/L | 0.01 |
| Bromoxynil                                 | 12-Jun-23 | <0.0945 | µg/L | 5    |
| Carbaryl                                   | 12-Jun-23 | <1      | µg/L | 90   |
| Carbofuran                                 | 12-Jun-23 | <2      | µg/L | 90   |
| Carbon Tetrachloride                       | 12-Jun-23 | <0.2    | µg/L | 2    |
| Chlorpyrifos                               | 12-Jun-23 | <0.175  | µg/L | 90   |
| Diazinon                                   | 12-Jun-23 | <0.175  | µg/L | 20   |
| Dicamba                                    | 12-Jun-23 | <0.0827 | µg/L | 120  |
| 1,2-Dichlorobenzene                        | 12-Jun-23 | <0.5    | µg/L | 200  |
| 1,4-Dichlorobenzene                        | 12-Jun-23 | <0.5    | µg/L | 5    |
| 1,2-Dichloroethane                         | 12-Jun-23 | <0.5    | µg/L | 5    |
| 1,1-Dichloroethylene (vinylidene chloride) | 12-Jun-23 | <0.5    | µg/L | 14   |
| Dichloromethane                            | 12-Jun-23 | <5      | µg/L | 50   |
| 2,4 Dichlorophenol                         | 12-Jun-23 | <0.2    | µg/L | 900  |
| 2,4-Dichlorophenoxy acetic acid            | 12-Jun-23 | <5      | µg/L | 100  |
| Diclofop-methyl                            | 12-Jun-23 | <0.118  | µg/L | 9    |
| Dimethoate                                 | 12-Jun-23 | <0.175  | µg/L | 20   |
| Diquat                                     | 12-Jun-23 | <0.2    | µg/L | 70   |

| Parameter                                  | Date      | Result  | Unit | ODWS |
|--|-----------|---------|------|------|
| Diuron                                     | 12-Jun-23 | <7      | µg/L | 150  |
| Glyphosate                                 | 12-Jun-23 | <20     | µg/L | 280  |
| Malathion                                  | 12-Jun-23 | <0.175  | µg/L | 190  |
| 2-Methyl-4-Chlorophenoxyacetic Acid (MCPA) | 12-Jun-23 | <5.91   | µg/L | 100  |
| Metolachlor                                | 12-Jun-23 | <0.117  | µg/L | 50   |
| Metribuzin                                 | 12-Jun-23 | <0.117  | µg/L | 80   |
| Monochlorobenzene                          | 12-Jun-23 | <0.5    | µg/L | 80   |
| Paraquat                                   | 12-Jun-23 | <0.2    | µg/L | 10   |
| Pentachlorophenol                          | 12-Jun-23 | <0.3    | µg/L | 60   |
| Picloram                                   | 12-Jun-23 | <0.0827 | µg/L | 190  |
| Polychlorinated Byphenols (PCB)            | 12-Jun-23 | <0.06   | µg/L | 3    |
| Prometryne                                 | 12-Jun-23 | <0.0583 | µg/L | 1    |
| Simazine                                   | 12-Jun-23 | <0.175  | µg/L | 10   |
| Terbufos                                   | 12-Jun-23 | <0.117  | µg/L | 1    |
| Tetrachloroethylene                        | 12-Jun-23 | <0.5    | µg/L | 10   |
| 2,3,4,6-Tetrachlorophenol                  | 12-Jun-23 | <0.3    | µg/L | 100  |
| Triallate                                  | 12-Jun-23 | <0.117  | µg/L | 230  |
| Trichloroethylene                          | 12-Jun-23 | <0.5    | µg/L | 5    |
| 2,4,6-Trichlorophenol                      | 12-Jun-23 | <0.2    | µg/L | 5    |
| Trifluralin                                | 12-Jun-23 | <0.117  | µg/L | 45   |
| Vinyl Chloride                             | 12-Jun-23 | <0.1    | µg/L | 1    |

All results for organic sampling of schedule 24 are below the MAC.



## Compliance

Lead Sampling: The maximum acceptable concentration for lead in drinking water is 10µg/L. This applies to water at the point of consumption since lead is only present as a result of corrosion of lead solder, lead containing brass fittings or lead pipes which are found close to or in domestic plumbing and the service connection to buildings.

Lead samples are collected during the two prescribed periods each year (December 15 – April 15 and June 15 – October 15).

**Table 9: Community Lead Monitoring**

| Location Type | Alkalinity, mg/L | pH   |
|---------------|------------------|------|
| Distribution  | 340              | 7.12 |

*Based on historical results Richards Landing DWS is exempt for the plumbing lead sampling program, however monitoring of distribution alkalinity and pH every winter and summer collection periods and Lead every 3 years is required.*

### Adverse Water Quality Incidents

During 2023, the Richards Landing DWS reported 0 incidents of adverse water quality.

### Annual Drinking Water System Inspection

The last annual DWS inspection took place on July 7, 2023 by MECP Drinking Water inspector Kristy Mitchell. Zero non-conformances and 3 best practice recommendations were identified.

***The DWS received a final inspection rating of 100%***



## Flows

The Permit to Take Water authorizes the municipality to draw water from the wells at a rate not to exceed 1,037 m<sup>3</sup>/d.

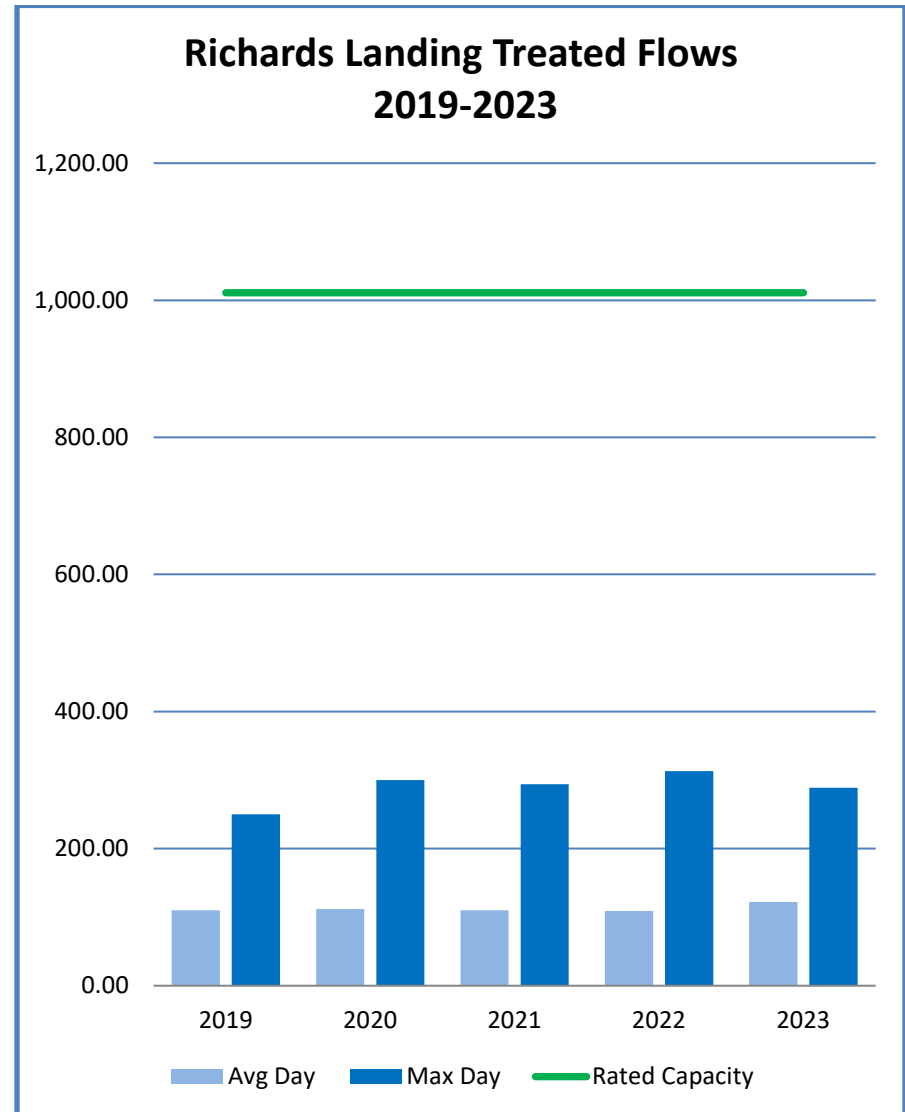
**The maximum daily volume taken was 362 m<sup>3</sup>, 34.9% of the permit limit.**

Municipal Drinking Water Licence: 205-101 specifies a maximum rated flow of 1,011 m<sup>3</sup>/d.

**The max flow rate reported was 289 m<sup>3</sup>/d, 28.6 % of the rated capacity.**

The Richards Landing WTP treated and distributed a total of 43,658 m<sup>3</sup> (44 ML) during the year of 2023. The average day treated flow demand was 122.3 m<sup>3</sup>/d, and maximum day flow was 289 m<sup>3</sup>/d on June 3rd, 2023.

Chart 1: 5-year Production History







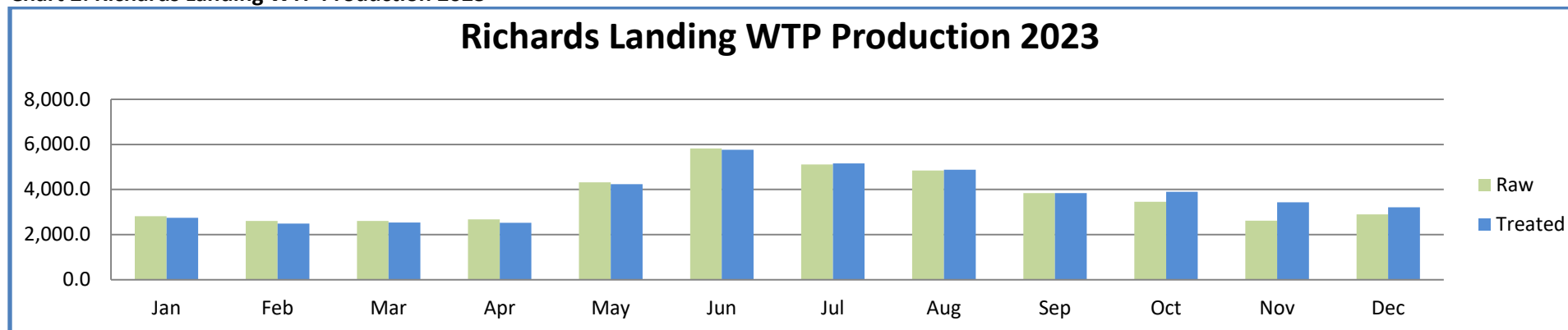
# DWQMS Form 05-12 – Richards Landing DWS Annual & Summary Reports 2023



**Table 10: Raw and Treated Water Flows 2023**

| 2023      | Raw Water Flows             |                                 |                                 |                                 |                         | Treated Water Flows             |                                 |                                 |                                 |                                   |
|-----------|-----------------------------|---------------------------------|---------------------------------|---------------------------------|-------------------------|---------------------------------|---------------------------------|---------------------------------|---------------------------------|-----------------------------------|
| Month     | Raw Water (m <sup>3</sup> ) | Minimum Day (m <sup>3</sup> /d) | Maximum Day (m <sup>3</sup> /d) | Average Day (m <sup>3</sup> /d) | % Max. Flow Day of PTTW | Treated Water (m <sup>3</sup> ) | Minimum Day (m <sup>3</sup> /d) | Maximum Day (m <sup>3</sup> /d) | Average Day (m <sup>3</sup> /d) | % Max. Flow Day of Rated Capacity |
| January   | 2,816.2                     | 0.0                             | 168.3                           | 90.8                            | 16.2                    | 2,749.7                         | 75.0                            | 112.0                           | 88.7                            | 11.1                              |
| February  | 2,605.3                     | 7.8                             | 155.8                           | 93.0                            | 15.0                    | 2,488.4                         | 79.8                            | 104.6                           | 88.9                            | 10.3                              |
| March     | 2,611.3                     | 0.0                             | 150.8                           | 84.2                            | 14.5                    | 2,538.5                         | 70.2                            | 96.0                            | 81.9                            | 9.5                               |
| April     | 2,672.4                     | 0.0                             | 155.2                           | 89.1                            | 15.0                    | 2,521.1                         | 76.8                            | 98.8                            | 84.0                            | 9.8                               |
| May       | 4,319.1                     | 51.3                            | 284.4                           | 139.3                           | 27.4                    | 4,233.4                         | 79.1                            | 207.1                           | 136.6                           | 20.5                              |
| June      | 5,819.0                     | 47.8                            | 362.3                           | 194.0                           | 34.9                    | 5,759.4                         | 107.9                           | 289.0                           | 192.0                           | 28.6                              |
| July      | 5,106.9                     | 89.6                            | 262.6                           | 164.7                           | 25.3                    | 5,159.7                         | 115.7                           | 254.9                           | 166.4                           | 25.2                              |
| August    | 4,839.5                     | 69.1                            | 298.3                           | 157.9                           | 28.8                    | 4,873.9                         | 119.1                           | 281.1                           | 157.2                           | 27.8                              |
| September | 3,840.0                     | 104.3                           | 144.4                           | 128.0                           | 13.9                    | 3,839.9                         | 110.3                           | 171.4                           | 128.0                           | 16.9                              |
| October   | 3,453.0                     | 0.0                             | 148.6                           | 111.4                           | 14.3                    | 3,897.6                         | 101.9                           | 146.9                           | 125.7                           | 14.5                              |
| November  | 2,617.9                     | 0.0                             | 146.3                           | 87.3                            | 14.1                    | 3,435.4                         | 80.9                            | 223.9                           | 114.5                           | 22.1                              |
| December  | 2,903.7                     | 31.2                            | 134.2                           | 93.7                            | 12.9                    | 3,212.6                         | 91.7                            | 127.4                           | 103.6                           | 12.6                              |

**Chart 2: Richards Landing WTP Production 2023**





## Report Availability

### Annual Report

Section 11 of O. Reg. 170/03 defines that this Annual Report must be given, without charge, to every person who requests a copy. Effective steps must also be taken to advise users of water from the system that copies of the report are available, without charge, and of how a copy may be obtained. This Annual Report will be made available for inspection by the public at the Township Office or via their website.

Township of St. Joseph  
P.O. Box 187  
1669 Arthur Street  
Richards Landing, Ontario Canada  
P0R 1J0

### Summary Report

This Summary report for The Richards Landing Drinking Water System for the period of January 1st to December 31<sup>st</sup>, 2023 has been prepared in accordance to Schedule 22 of O. Reg. 170/03.

In accordance with Schedule 22 of O. Reg. 170/03, this Summary Report has been provided to the Township of St. Joseph.



## Tables, Definition of Terms

### Appendix A: List of Tables/ Charts

**Table 1:** Microbiological sampling requirements

**Table 2:** Microbiological Sample Results

**Table 3:** Monthly Filter Turbidity Results

**Table 4:** Treated Chlorine Residuals

**Table 5:** Schedule 23 - Inorganics

**Table 6:** Nitrite/ Nitrate Results

**Table 7:** Disinfection By-products Results (THM/HAA)

**Table 8:** Schedule 24 – Organics

**Table 9:** Community Lead Monitoring

**Table 10:** Raw and Treated Water Flows 2023

**Chart 1:** 5-year Production History

**Chart 2:** Richards Landing WTP Production 2023

### Appendix B: Definition of Terms

| Acronym                | Definition  |
|------------------------|---|
| <b>AWQI</b>            | Adverse water quality incident                      |
| <b>DWS</b>             | Drinking water system                               |
| <b>EC</b>              | E. Coli   |
| <b>GUDI</b>            | Groundwater under direct influence of surface water |
| <b>HAA</b>             | Haloacetic acids                                    |
| <b>HPC</b>             | Heterotrophic plate count                           |
| <b>MAC</b>             | Maximum Acceptable Concentration                    |
| <b>m<sup>3</sup></b>   | Cubic metres  |
| <b>m<sup>3</sup>/d</b> | Cubic metres per day                                |
| <b>mg/L</b>            | Milligram per litre (part per million)              |
| <b>ML</b>              | Megalitre (1,000 m <sup>3</sup> )                   |
| <b>MOH</b>             | Medical Officer of Health                           |
| <b>NTU</b>             | Nephelometric turbidity unit                        |
| <b>ODWS</b>            | Ontario Drinking Water Standards                    |
| <b>O. Reg. 170/03</b>  | Ontario Regulation 170/03                           |
| <b>PTTW</b>            | Permit to take water                                |
| <b>SCADA</b>           | Supervisory control and data acquisition            |
| <b>TC</b>              | Total coliforms                                     |
| <b>THM</b>             | Trihalomethane                                      |
| <b>µg/L</b>            | Microgram per litre (part per billion)              |
| <b>WD</b>              | Water distribution                                  |
| <b>WT</b>              | Water treatment                                     |
| <b>WTP</b>             | Water treatment plant                               |