



STAFF REPORT
City Utilities

Title: 2022 Drinking Water Annual and Summary Reports
Report Number: IPPW2023-003
Author: Natasha Glauser
Council Date: February 27, 2023
File: N/A
Attachments: Appendix A: 2022 Annual Report; Appendix B: 2022 Summary Report
Ward No.: All

Recommendations:

1. That Council receives the 2022 Annual and Summary Reports pursuant to Ontario Regulation 170/03 of the *Safe Drinking Water Act*, 2002.
2. That Council approves IPPW2023-003.

A. Executive Summary

The 2022 Annual and Summary Reports have been prepared in accordance with the Safe Drinking Water Act (2002) and must be received by Council.

The 2022 Annual Report (Appendix A) must be prepared not later than February 28, 2023 and must include a brief description of the drinking water system, a summary of adverse water quality results, a summary of results of required tests, a description of corrective actions taken, a description of major expenses incurred, and the location of the Summary Report.

In addition to the Annual Report, a Summary Report (Appendix B) must also be prepared and provided to the owner of the drinking water system not later than March 31, 2023. The Summary Report includes information regarding applicable legislation, a statement of compliance, including a summary of the latest inspection results, and a summary of water consumption and flow rates.

B. Financial Implications

None

C. Technology Implications

None

D. Link to Strategic Plan

(Strategic Objectives: Equity, Inclusion and a Sense of Belonging; Sustainability and the Environment; Safe, Sustainable Transportation; Healthy Community & Resilient Neighbourhoods; Infrastructure Renewal; Economic Growth & Development)

(Guiding Principles: Equity and Inclusion; Sustainability; Fiscal Responsibility; Healthy and Safe Workplace; Effective Engagement; Personal Leadership; Service Excellence)

The Annual and Summary Reports provide assurance to the City of Waterloo's owner and its customers that safe, high quality drinking water is being provided; this supports the Strategic Objectives and Guiding Principles:

- Infrastructure Renewal
- Service Excellence

E. Previous Reports on this Topic

A report has been sent to Council every year since 2003; the most recent report is IPPW2022-001.



2022 Drinking Water Annual and Summary Reports

IPPW 2023-003

2022 Annual Report

The 2022 Annual Report, attached in Appendix A, has been prepared in accordance with the terms and requirements set out in the Safe Drinking Water Act (2002), Section 11 of Ontario Regulation 170/03. It covers the period from January 1 to December 31, 2022 and the owner (City of Waterloo Mayor and Council) must ensure that the annual report is prepared no later than February 28, 2023. As per Section 11 of the regulation, the report includes:

- a) Brief Description of the Drinking Water System;
- b) Summary of Adverse Water Quality Results;
- c) Summary of Results of Required Tests;
- d) Description of Corrective Actions Taken;
- e) Description of Major Expenses Incurred; and,
- f) Location of Summary Report

Copies of the City of Waterloo's Annual Report are available, free of charge, at the Waterloo Service Centre, 265 Lexington Court, by contacting Customer Service at (519) 886-2310, extension 30239. An electronic copy can also be downloaded from the City of Waterloo website at www.waterloo.ca.

2022 Summary Report

In addition to the Annual Report, Schedule 22 of Ontario Regulation 170/03 requires large municipal residential systems to complete a Summary Report. The Summary Report, attached in Appendix B, covers the same time period as the annual report and must be prepared and given to the owner of the drinking water system not later than March 31, 2023. The report follows the requirements prescribed in Schedule 22 of the regulation for the purpose of enabling the owner of the system to assess the capability of the system to meet existing and planned uses of the system and includes:

- a) Applicable Legislation;
- b) Statement of Compliance;
- c) Summary of Quantities and Flow Rates; and,
- d) Communication.

Drinking Water Inspection Results

The Ministry of the Environment, Conservation and Parks aims to inspect every drinking water system annually. The MECP conducted a remote inspection of the drinking water distribution system from January 11 to February 7, 2022. The primary focus of this inspection was to confirm compliance with MECP legislation as well as evaluating conformance with ministry drinking water policies and guidelines during the inspection period. The ministry utilizes a comprehensive, multi-barrier approach in the inspection of water systems that focuses on the source, treatment, and distribution components as well as management practices. The inspection covered the period of February 1 to December 31, 2021.

There were no non-compliances with regulatory requirements. Three best practice recommendations were noted during the inspection period; all are in the process of being addressed. The City of Waterloo received a final inspection rating of 100%.



Drinking Water Systems Regulation (O. Reg. 170/03)

Appendix 'A' – 2022 Annual Report

Drinking-Water System Number: 260002473
Drinking-Water System Name: City of Waterloo Distribution System
Drinking-Water System Owner: City of Waterloo
Drinking-Water System Category: Large Municipal Residential
Period being reported: January 1, 2022 – December 31, 2022

For Large Municipal Residential Systems:

Does your Drinking-Water System serve more than 10,000 people?

Yes

Is your annual report available to the public at no charge on a web site on the Internet?

Yes

Location where Summary Report required under O. Reg. 170/03 Schedule 22 will be available for inspection:

- Available on the City website at www.waterloo.ca or by calling City Utilities, Customer Service at (519) 886-2310 ext.30239

1. 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 |
|----------------------------|------------------------------|
| None | N/A |

2. 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?

N/A

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

- Public access/notice via the web
- Public access/notice via Government Office
- Public access/notice via a newspaper

4. Describe your Drinking-Water System:

The City of Waterloo owns the water distribution system; City Utilities is responsible for the operation of the Class 1 water distribution system, including pipes, valves, and hydrants. According to the Region of Waterloo 2021 Year End Population Estimates, the City's water distribution system serves a population of 147,520 people, including temporary non-resident students (28,390). The water distribution system consists of the following (2021 data):

- 440.1 kilometres of distribution main
- 31,426 water connections (active accounts)
- 2,571 hydrants (not including private hydrants)
- 5,019 valves (not including curbstop service valves, or control valves)

The City of Waterloo's distribution system dates back to 1899; extensive replacement and extension of the distribution system has occurred since that time. The water distribution system watermains range in size from 25 mm to 450 mm in diameter and are constructed of cast iron, ductile iron, asbestos-cement (AC), high-density-polyethylene (HDPE) or polyvinyl chloride (PVC). Any alteration to the City's distribution system requires completion of the Form 1 - Record of Watermains Authorized as a Future Alteration.

There are 7.9 kilometres of dual mains (owned by both the City of Waterloo and the Regional Municipality of Waterloo) that function as both transmission and distribution. The dual mains are shared with the Regional Municipality of Waterloo (RMOW) but are maintained by City of Waterloo, City Utilities. Any alterations to dual mains require completion of the Form 1 under the Drinking Water Works Permit by the initiating municipality, and the Form 1 is to be signed off by both the City of Waterloo and the RMOW. The role of Overall Responsible Operator for dual mains is the responsibility of the City of Waterloo.

The City of Waterloo's distribution system does not provide treatment to the water; therefore, there is no chlorine boosting, ultraviolet (UV) irradiation, secondary disinfection, and pressure boosting or pressure control within the control of the water distribution system. The Region of Waterloo is responsible for the water supply and water treatment. The City shares responsibility with the Region to regularly test water and ensure that the standards set out by the Ontario Ministry of Environment, Conservation and Parks are being met or exceeded.

The water distribution system also provides source distribution to neighbourhoods in three adjacent municipalities: the City of Kitchener's community of River Ridge; the Township of Woolwich's commercial development at the St. Jacobs Outlets; and, the Community of St. Agatha within the Wilmot Township. The City of Waterloo does not provide treatment to the water, boost pressure or operate the distribution systems in these neighbourhoods.

Drinking Water Systems Regulation (O. Reg. 170/03)
5. List all water treatment chemicals used over this reporting period:

Water treatment is the responsibility of the Region of Waterloo. The Region of Waterloo reports all the treatment chemicals used via their annual Water Quality Reports for the Integrated Urban System.

The City of Waterloo disinfects all parts, material and pipe during new installation and repair work using NSF 60 rated chlorine solution.

6. Were any significant expenses incurred to:

- Install required equipment
- Repair required equipment
- Replace required equipment

7. Please provide a brief description and a breakdown of monetary expenses incurred:

- Repair and maintenance of the distribution system (operating) = \$1,767,079
- Replacement of watermains and valves (capital) = \$3,127,500

8. 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:

| AWQI# | Parameter | Incident Date | Result | Unit of Measure | Corrective Action | Corrective Action Resolution Date |
|--------|---------------------|---------------|----------------------------------|-----------------|---|-----------------------------------|
| 158197 | Lead - Distribution | 2022-04-07 | 11.7 | ug/L | • Flushed and resampled | 2022-04-20 |
| 158707 | TC | 2022-06-14 | P | P/A | • Flushed and resampled adverse site; flushed and sampled upstream (no downstream location) | 2022-06-17 |
| 159317 | TC | 2022-07-27 | P | P/A | • Flushed and resampled adverse site; flushed and sampled downstream, sampled upstream | 2022-07-29 |
| 159506 | TC | 2022-08-10 | P | P/A | • Flushed and resampled adverse site; flushed and sampled downstream, sampled upstream | 2022-08-15 |
| 159520 | TC | 2022-08-10 | P | P/A | • Flushed and resampled adverse site; flushed and sampled downstream, sampled upstream | 2022-08-15 |
| 159601 | Chlorine Residual | 2022-08-18 | TCR=0.11 FCR=0.01 CCR=0.10 | mg/L | • Flushed and resampled adverse site; flushed and sampled upstream (no downstream location) | 2022-08-18 |
| 159702 | Chlorine Residual | 2022-08-25 | TCR=0.18 FCR=0.02 CCR=0.16 | mg/L | • Flushed and resampled adverse site; flushed and sampled upstream (no downstream location) | 2022-08-25 |

Drinking Water Systems Regulation (O. Reg. 170/03)

| AWQI# | Parameter | Incident Date | Result | Unit of Measure | Corrective Action | Corrective Action Resolution Date |
|---------------------|---------------------------|---------------|----------------------------------|-----------------|--|-----------------------------------|
| 159792 | Chlorine Residual | 2022-08-31 | TCR=0.19 FCR=0.02 CCR=0.17 | mg/L | <ul style="list-style-type: none"> Flushed and resampled adverse site Flushed and sampled upstream (no downstream location) | 2022-08-31 |
| 160083 | Chlorine Residual | 2022-09-21 | TCR=0.23 FCR=0.01 CCR=0.22 | mg/L | <ul style="list-style-type: none"> Flushed and resampled adverse site Flushed and sampled upstream (no downstream location) | 2022-09-21 |
| 160088 ¹ | Lead - Private | 2022-09-13 | 10.2 16.4 | ug/L | <ul style="list-style-type: none"> Resampled adverse site, sampled nearby hydrant Resident notified, ROW Lead Fact Sheet provided | 2022-09-30 |
| N/A ¹ | Lead - Private | 2022-09-13 | 349 25.9 | ug/L | <ul style="list-style-type: none"> Resampled adverse site, sampled nearby hydrant Resident notified, ROW Lead Fact Sheet provided PHU notified 2022-09-23 | N/A |
| N/A ² | Lead - Private | 2022-09-14 | 14.6 | ug/L | <ul style="list-style-type: none"> Resampled adverse site, sampled nearby hydrant Resident notified, ROW Lead Fact Sheet provided PHU notified 2022-09-23 | N/A |
| N/A ¹ | Lead - Private (Resample) | 2022-09-23 | 207 13.8 | ug/L | <ul style="list-style-type: none"> Resident notified, ROW Lead Fact Sheet provided; PHU notified 2022-09-30 | N/A |
| N/A ³ | Lead - Private | 2022-09-28 | 11.4 10.7 | ug/L | <ul style="list-style-type: none"> Resampled adverse site, sampled nearby hydrant Resident notified, ROW Lead Fact Sheet provided PHU notified 2022-10-05 | N/A |
| N/A | Lead - Private | 2022-09-28 | 19.5 | ug/L | <ul style="list-style-type: none"> Resampled adverse site, sampled nearby hydrant Resident notified, ROW Lead Fact Sheet provided PHU notified 2022-10-05 | N/A |
| N/A | Lead - Private | 2022-09-29 | 16.2 | ug/L | <ul style="list-style-type: none"> Resident notified, ROW Lead Fact Sheet provided; PHU notified 2022-10-06 | N/A |
| N/A ² | Lead - Private (Resample) | 2022-09-29 | 19.6 30.5 | ug/L | <ul style="list-style-type: none"> Resident notified, ROW Lead Fact Sheet provided; PHU notified 2022-10-06 | N/A |
| N/A ³ | Lead - Private | 2022-10-12 | 12.7 95.1 | ug/L | <ul style="list-style-type: none"> Resident notified, ROW Lead Fact Sheet provided; PHU notified 2022-10-19 | N/A |
| 160343 ³ | Lead - Private | 2022-10-12 | 57.3 18.4 74.1 | ug/L | <ul style="list-style-type: none"> City owned lead service replaced | 2022-10-25 |

A=Absent
P=Present

TCR=Total Chlorine Residual
FCR=Free Chlorine Residual

CCR=Combine Chlorine Residual
PHU = Region of Waterloo Public Health Unit

BWA = Boil Water Advisory
SAC = Spills Action Centre

1 – These three incidents are at the same address and count as one adverse

2 – These two incidents are at the same address and count as one adverse

3 – These three incidents are at the same address and count as one adverse

Drinking Water Systems Regulation (O. Reg. 170/03)
9. Microbiological testing done under the Schedule 10 of Regulation 170/03, during this reporting period:

| Sample Source | 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) |
|---------------|-------------------|--|---|-----------------------|----------------------------------|
| Distribution | 1706 | Absent 0 | Absent - Present 0 | 521 | 0 - 500 CFU/mL |

CFU=Colony forming units

10. Operational testing done under Schedule 7 of Regulation 170/03 during the period covered by this Annual Report:

| Parameter | Number of Grab Samples | Range of Results (min - max) | Unit |
|----------------|------------------------|------------------------------|------|
| Total Chlorine | 3501 | 0.11 – 1.87 | mg/L |
| Free Chlorine | 3501 | 0 – 1.29 | mg/L |

11. 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 |
|---------------------------------|-----------|--------------|--------|-----------------|
| N/A | | | | |

12. Summary of Inorganic parameters tested during this reporting period or the most recent sample results:

| Parameter | Sample Date | Result Value Range (min - max) | Unit of Measure | Number of Exceedances |
|-----------|---|--------------------------------|-----------------|-----------------------|
| Antimony | As a distribution system only testing is not required by the City of Waterloo; see Region of Waterloo Annual Report for source water results. | | | |
| Arsenic | | | | |
| Barium | | | | |
| Cadmium | | | | |
| Fluoride | | | | |
| Lead* | N/A | N/A | N/A | N/A |
| Mercury | As a distribution system only testing is not required by the City of Waterloo; see Region of Waterloo Annual Report for source water results. | | | |
| Nitrate | | | | |
| Nitrite | | | | |
| Selenium | | | | |
| Sodium | | | | |
| Uranium | | | | |

* Lead samples taken outside of mandated timeframe as per Schedule 15.1

13. Summary of lead testing under Schedule 15.1 during this reporting period:**

| Location Type | Number of Samples | Range of Lead Results (min#) - (max #) | Unit of Measure | Number of Exceedances |
|-----------------|-------------------|--|-----------------|-----------------------|
| Plumbing*** | 171 | ND-349 | µg/L | 5 |
| Distribution*** | 66 | ND-11.7 | µg/L | 1 |
| Alkalinity | 66 | 193-361 | mg/L | - |
| pH | 129 | 7.1-7.9 | pH | - |

** Schedule 15.1 samples taken December 15 to April 15 and June 15 to October 15. Lead samples taken outside these mandated timeframes are reported in section 12 above

***Due to the COVID-19 pandemic, regulatory relief from Schedule 15.1 residential sampling requirements was granted by the Ministry of Environment, Conservation and Parks for the December 15 to April 15 round only

14. Summary of Organic parameters sampled during this reporting period or the most recent sample results:

| Parameter | Sample Date | Result Value | Unit of Measure | Number of Exceedances |
|---|--|------------------------------|-----------------|-----------------------|
| HAA (NOTE: year-end running average) | January 24, 2022 May 4, 2022 August 4, 2022 November 9, 2022 | 8.39 | µg/L | 0 |
| THM (NOTE: year-end running average) | January 24, 2022 May 4, 2022 August 4, 2022 November 9, 2022 | 21.2 | µg/L | 0 |
| NDMA | February 14, 2022 May 10, 2022 August 23, 2022 November 8, 2022 | 0.0012 ND 0.0011 ND | µg/L | 0 |

15. 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 |
|--|------------------|-----------------|--------------------|
| Lead – Distribution | 11.7 | µg/L | April 7, 2022 |
| Lead – Private Plumbing | 6.06 | µg/L | September 12, 2022 |
| Lead – Private Plumbing (at same address) | 10.2 | µg/L | September 13, 2022 |
| | 16.4 | | September 13, 2022 |
| | 349 | | September 23, 2022 |
| | 25.9 | | September 23, 2022 |
| | 207 | | September 23, 2022 |
| | 13.8 | | September 23, 2022 |
| Lead – Private Plumbing | 9.16 | µg/L | September 13, 2022 |
| Lead – Private Plumbing | 7.39 | µg/L | September 14, 2022 |
| Lead – Private Plumbing (at same address) | 14.6 | µg/L | September 14, 2022 |
| | 16.2 | | September 29, 2022 |
| Lead – Private Plumbing | 7.48 | µg/L | September 23, 2022 |
| Lead – Private Plumbing (at same address) | 11.4 | µg/L | September 28, 2022 |
| | 10.7 | | September 28, 2022 |
| | 12.7 | | October 12, 2022 |
| | 95.1 | | October 12, 2022 |
| | 57.3 | | October 12, 2022 |
| | 18.4 | | October 12, 2022 |
| 74.1 | October 12, 2022 | | |
| Lead – Private Plumbing | 19.5 | µg/L | September 28, 2022 |
| Lead – Private Plumbing | 5.52 | µg/L | September 28, 2022 |
| Lead – Distribution | 5.33 | µg/L | September 29, 2022 |
| Lead – Private Plumbing | 7.76 | µg/L | September 29, 2022 |
| Lead – Private Plumbing | 19.6 | µg/L | September 29, 2022 |
| | 30.5 | | September 29, 2022 |
| Lead – Private Plumbing | 6.93 | µg/L | September 29, 2022 |
| Lead – Distribution | 7.63 | µg/L | October 12, 2022 |
| Lead – Private Plumbing | 6.75 | µg/L | October 12, 2022 |
| Lead – Private Plumbing | 8.66 | µg/L | October 12, 2022 |

Appendix 'B' – 2022 Summary Report for Drinking Water Systems

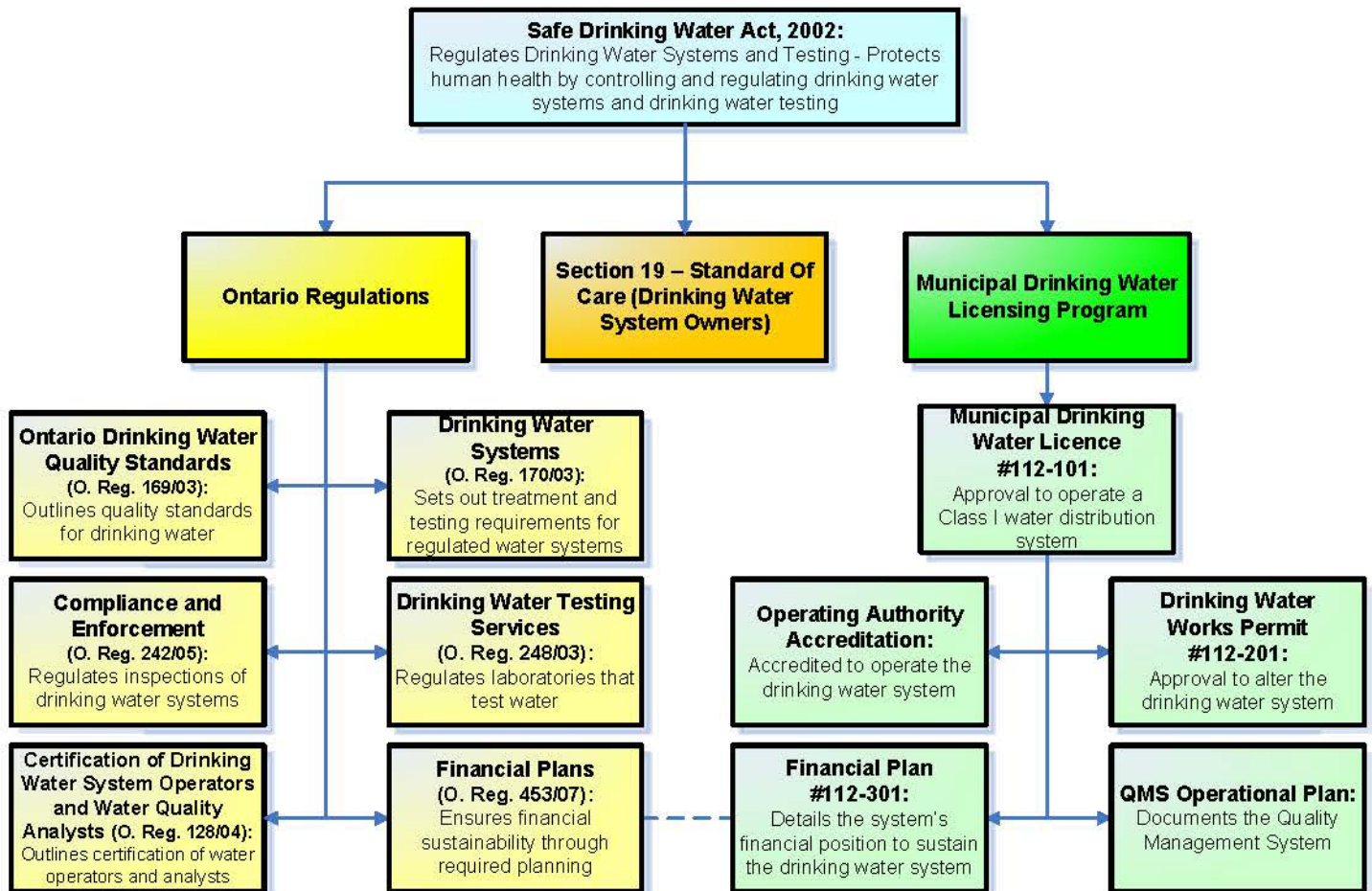
1.0 Introduction

Schedule 22 of Ontario Regulation 170/03 requires, for large municipal residential systems, that a Summary Report be prepared and submitted to members of municipal council by March 31, 2023 for the period of January 1 to December 31, 2022.

2.0 Applicable Legislation

Requirements for owning and operating Waterloo’s drinking water system are identified within the Safe Drinking Water Act, 2002 (SDWA), its applicable regulations and its approval mechanisms, as seen in the figure below.

Figure 1: Applicable Legislation



The Ministry of the Environment, Conservation and Parks (MECP) “Drinking Water Ontario” [website](#) provides the most current versions of the SDWA and its regulations.



3.0 Statement of Compliance

The Ministry of the Environment, Conservation and Parks aims to inspect every drinking water system annually. The MECP conducted a remote inspection of the drinking water distribution system from January 11 to February 7, 2022. The primary focus of this inspection was to confirm compliance with MECP legislation as well as evaluate conformance with ministry drinking water policies and guidelines during the inspection period. The ministry utilizes a comprehensive, multi-barrier approach in the inspection of water systems that focuses on the source, treatment, and distribution components as well as management practices. The inspection covered the period of February 1 to December 31, 2021.

There were no non-compliances with regulatory requirements. Three best practice recommendations were noted during the inspection period; all are in the process of being addressed. The City of Waterloo received a final inspection rating of 100%.

The inspection for the 2022 year has not been conducted to date.



4.0 Summary of Water Consumption and Flow Rates

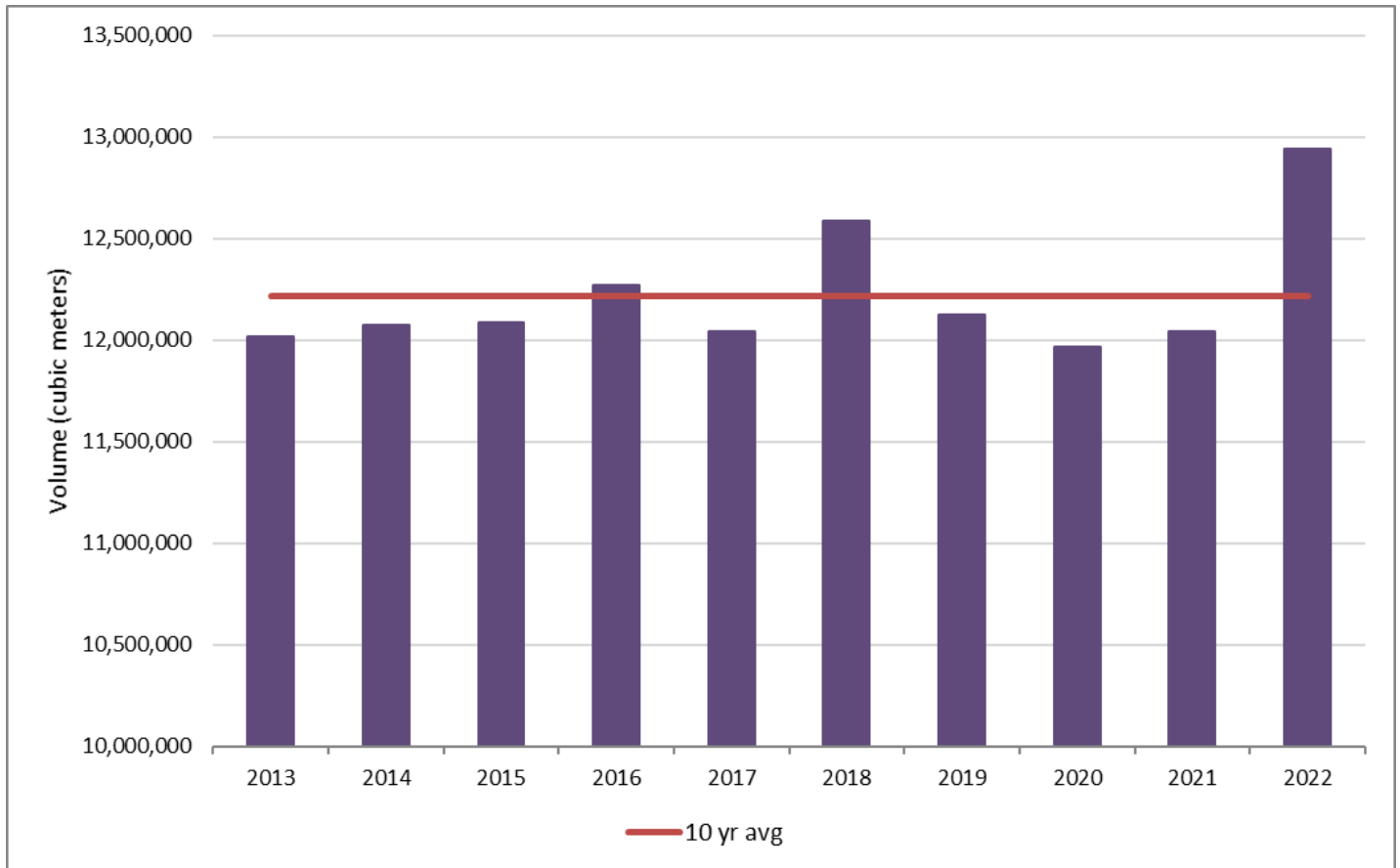
4.1 Water Consumption

Total Water Consumption

From January 1 to December 31, 2022, the City received 12,940,943 cubic meters of water from the Region of Waterloo, a 7.48% increase from 2021. This is the highest consumption seen in the last 10 years and the second highest consumption since tracking began in 2005. The Region of Waterloo stated that 2022 was a high usage year for all cities and townships and upon investigation determined it was strictly due to increased demand. It was additionally noted that 2023 is following a similar trend.

Figure 1 below, depicts the last ten years of total consumption against the average.

Figure 1: Total Water Consumption for the Past Ten Years



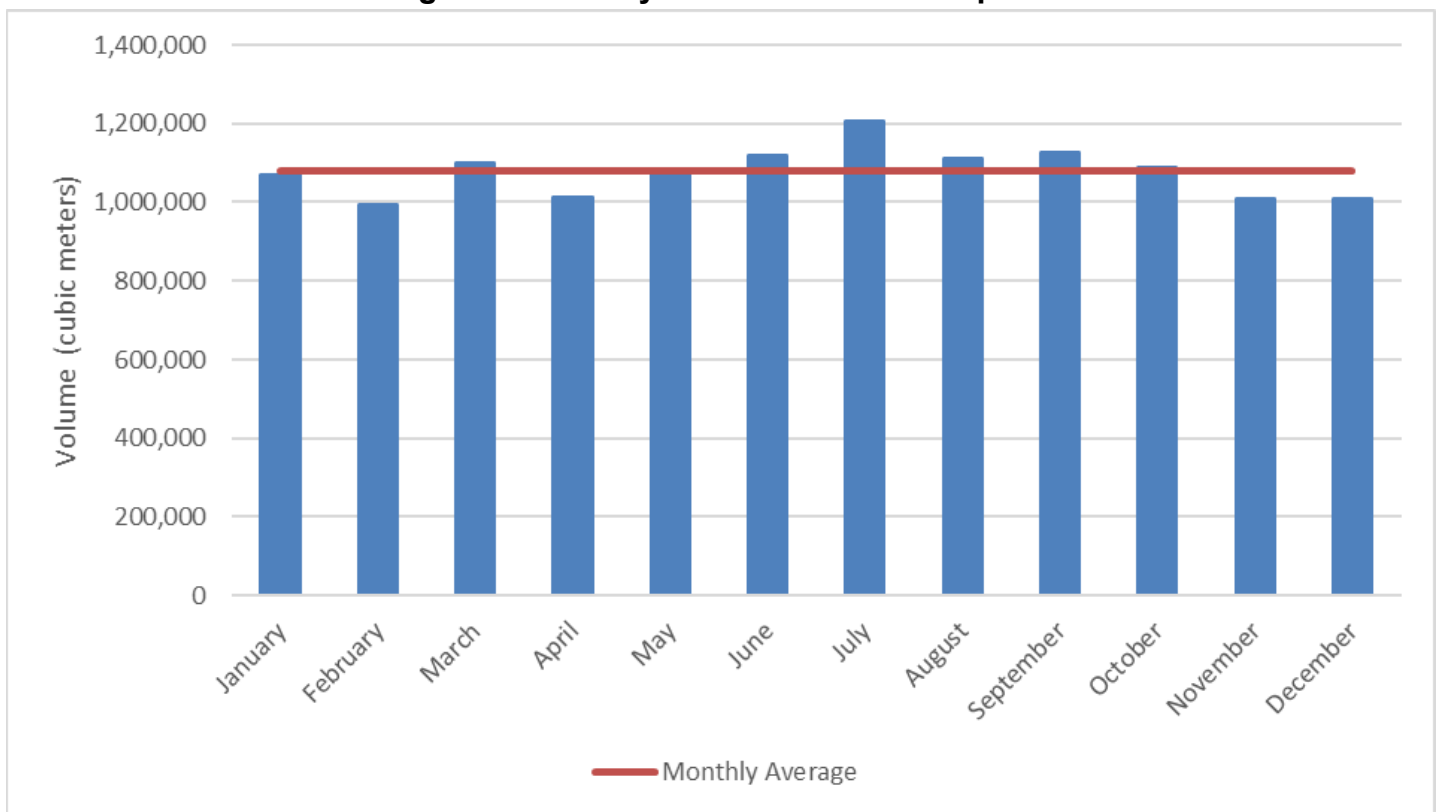


Monthly Water Consumption

The average monthly consumption in 2022 was 1,078,412 cubic meters, an increase from the monthly average of 1,003,385 cubic meters in 2022. July saw the highest consumption for the year, which was 11.98% above the monthly average. February saw the lowest consumption of 2022, just slightly above November and December; February's consumption was 7.91% below the monthly average.

Figure 2 shows the City's actual water consumption by month.

Figure 2: Monthly Total Water Consumption

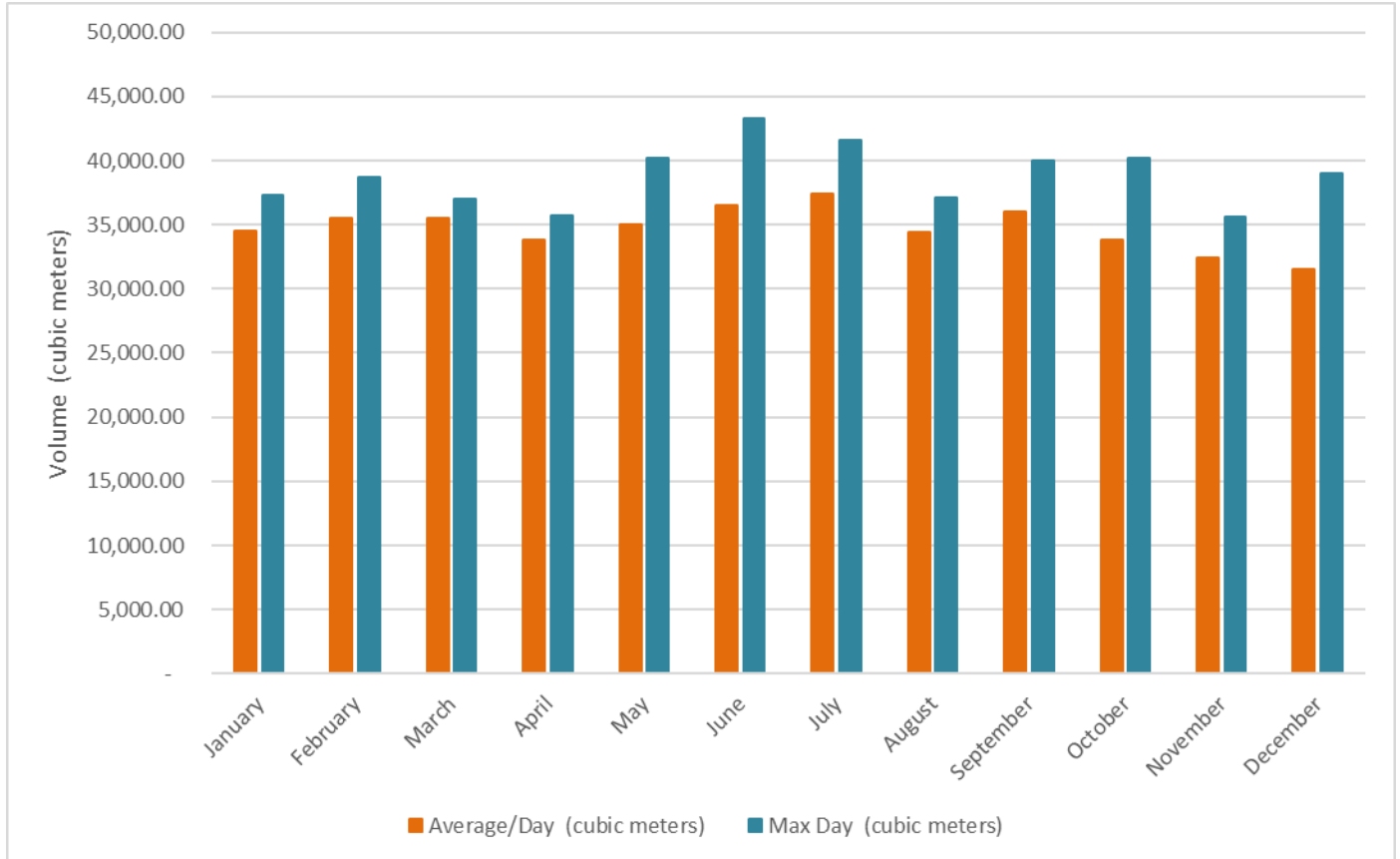




Average Daily and Maximum Daily Usage

Figure 3 shows the average daily and maximum daily usage for each month. July had the highest average day usage, while December had the lowest. June had the highest daily peak (max day), while November had the lowest.

Figure 3: Average Daily and Maximum Daily Usage per Month



4.2 Flow Rates

Rated capacity and flow rates refer to treatment subsystems. The City of Waterloo owns and operates the distribution system; therefore, these parameters do not apply. The Region of Waterloo is required to report on the rated capacity and flow rates of the supply system via the Summary Report to Regional Council. As per the regulation, a copy is provided to the City of Waterloo.

5.0 Communication

Since the City’s distribution system supplies drinking water to portions of the City of Kitchener, the Township of Woolwich and Wilmot Township, each municipality will be provided a copy of the 2022 Summary Report. Additionally, the Region of Waterloo will receive a copy for their records. All copies will be provided by March 31, 2023.