



THE CORPORATION OF THE TOWNSHIP OF HAMILTON

CAMBORNE AND CREIGHTON HEIGHTS

DRINKING WATER SYSTEMS

ANNUAL & SUMMARY REPORT for 2022

January 1 to December 31, 2022

Prepared By:

Township of Hamilton Water Operations Team

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1. WATER SYSTEMS INFORMATION

Camborne

- Drinking Water System # 220008113
- Municipal Drinking Water License # 139-103
- Drinking Water Works Permit # 139-203
- Permit to Take Water # 2140-AP5P6D

Creighton Heights

- Drinking Water System # 220008104
- Municipal Drinking Water License # 139-102
- Drinking Water Works Permit # 139-202
- Permit to Take Water # 2320-CGPMQ5

2. PURPOSE

The *Safe Drinking Water Act, 2002* sets out the framework for the treatment and distribution of safe drinking water in Ontario. Under the Act, *Ontario Regulation 170/03* sets requirements for public waterworks regarding treatment equipment, operational checks, maintenance, sampling and corrective actions. In addition to this, the regulation also has requirements for specific reports that must be prepared annually by the Operating Authority of a drinking water system.

This report for 2022, satisfies all conditions set out in *Ontario Regulation 170/03*, Section 11 – Annual Reports and Schedule 22 – Summary Reports.

This report is completed annually by the internal Water Operations Team which is the Operating Authority for the Township of Hamilton. The Township of Hamilton is the owner of the Camborne Drinking Water System and the Creighton Heights Drinking Water System.

2.1 Scope (Section 11 Annual Report Requirement)

This Annual & Summary Report contains information about the two Drinking Water Systems for the period of January 1, 2022 to December 31, 2022. *Ontario Regulation 170/03* requires this information be made available to the following stakeholders:

- Drinking Water System Owner (Mayor and Council)
- Operating Authority Top Management (CAO)
- The Public

2.2 Availability (Section 11 Annual Report Requirement)

A hard copy of this Annual & Summary Report are available for viewing at the Township of Hamilton office located at 8285 Majestic Hills Drive, Cobourg, ON. Alternatively, the report can be accessed online at www.hamiltontownship.ca. On the website, navigate to the Residents Services tab, then to Water Services and then to Annual Reports. Any queries regarding this document may be directed to the Manager of Water Operations at (905) 342-2810, extension 147 or by emailing aschoenleber@hamiltontownship.ca

3. DRINKING WATER SYSTEMS DESCRIPTIONS (Section 11 Annual Report Requirement)

Camborne

The Camborne Drinking Water System, considered a Small Residential system, provides potable water to approximately 71 water connections consisting of homes, the Camborne Public School, the Old Camborne Schoolhouse Community Hall and a church. There are no commercial or industrial service connections on this system.

The Camborne Water Treatment Plant (WTP) takes water from two drilled artesian wells that are considered Non GUDI (not Groundwater Under the Direct Influence of Surface Water). For the primary disinfection requirement, the raw water is dosed with sodium hypochlorite (liquid chlorine) before being directed through greensand filters which remove oxidized iron. Filtered water is discharged into underground clearwells which consist of two cells with baffle curtains which ensure proper chlorine contact time in the achievement of primary disinfection. A High Lift pumping system, consisting of three pumps and a series of large pressure tanks, is used to provide flow and adequate pressure to the end users in the distribution system. Continuous online monitoring instruments are used to measure chlorine residual, pressure and flow at all times to maintain regulatory compliance. These instruments are tied in with our Supervisory Control and Data Acquisition (SCADA) system. SCADA alarms notify the on-call Water Operator of any deviation from a control setpoint. The on-call Water Operator will respond and resolve the issue. Process wastewater is de-chlorinated using sodium thiosulfate and is allowed to settle before clear supernatant liquid is pumped to the storm water system. Solids from process wastewater tanks are removed periodically.

The distribution system consists of approximately 3.5 km of watermains throughout the settlement area ranging in size from 50mm to 150mm. The Camborne Drinking Water System is not designed to provide fire protection.

Creighton Heights

The Creighton Heights Drinking Water System, a Large Residential system, provides potable water to approximately 493 water connections consisting of residential customers, approximately 15 commercial/industrial properties, including the Baltimore Recreation Centre Arena, the Baltimore Fire Hall, the Baltimore Public School and the local golf course.

The Creighton Heights Water Treatment Plant takes water from three drilled wells that are considered non-GUDI. For iron and manganese control, the raw water is dosed with potassium permanganate before being directed through greensand filters. Greensand filtration, optimized by dosing with potassium permanganate, is used for removal of oxidized iron and manganese. Filtered water is dosed with sodium hypochlorite and then conveyed through Ultraviolet Reactors. UV disinfection achieves Primary Disinfection. Sodium hypochlorite is dosed for secondary disinfection prior to the water passing through the methane stripper which removes naturally occurring methane. Water is then discharged into underground clearwells which consist of cells with baffle curtains to ensure proper residence time. A High Lift pumping system, consisting of three pumps for regular system pressure and two pumps designed for fire protection, provide flow and pressure to the end users of the distribution system. A booster station is located within the highlift suction well and conveys drinking water to Deerfield Estates. Continuous online monitoring instruments are used to measure chloramine/chlorine residual, pressure and flow at all times, to maintain regulatory compliance. These instruments are tied in with our Supervisory Control and Data Acquisition (SCADA) system. SCADA alarms notify the on-call Water Operator of any deviation from a control setpoint. The on-call Water Operator will respond and resolve the issue. Process wastewater is de-chlorinated using sodium thiosulfate and allowed to settle before clear supernatant liquid is pumped to the storm water system. Solids from process wastewater tanks are removed periodically.

The distribution system consists of approximately 14 km of watermains ranging in diameter from 50 mm to 300 mm. The Creighton Heights Drinking Water System is designed for fire protection with 72 hydrants.

4. COMPLIANCE

4.1 License and Permit (Schedule 22 Summary Report Requirement)

The Camborne and Creighton Heights Drinking Water Systems were operated in accordance with all terms and conditions of their Municipal Drinking Water Licenses (MDWL), Drinking Water Works Permits (DWWP), Permits to Take Water (PTTW) and all relevant Provincial legislation for the year of 2022. The MDWL's and DWWP's for both Camborne and Creighton Heights Drinking Water Systems were renewed in Aug of 2021.

The PTTW governs the amount of groundwater allowed to be taken per day, at specified flow rates per minute. There were no instances of exceeding the permitted amount of water taking

on any day during 2022. Any peaks are attributed to well pump start up and the peaks quickly drop to normal. Creighton Heights PTTW was renewed in July of 2022 and requires renewal in 10 years. The Camborne PTTW requires renewal in June 2027.

Raw Water Source Description and Flow summaries for Camborne and Creighton Heights are detailed below:

Camborne

Camborne Raw Water

The two wells at Camborne are classified as artesian and thus overflow constantly to a storm water system which ultimately discharges to an adjacent creek. The artesian flow is relatively constant from both wells and is consistently below the permitted amount. Separate flow meters for both drinking water production and artesian flow, measure flow to ensure regulatory compliance. Only one well at a time can run for drinking water production.

Table 1. Camborne Permit to Take Water # 2140-AP5P6D, Maximum Flows and Totals

Well	Maximum Flow (L/min)	Maximum Total per Day (m ³)
Well 1A Plant Flow	200	288
Well 2A Plant Flow	286	412
Well 1A Artesian Overflow	340	489.6
Well 2A Artesian Overflow	360	518.4

Note: 1m³ = 1000 L

Table 2. Camborne Raw Water Taken for Drinking Water Production in 2022

Month	Total Raw Water Taken (m ³)	Average Daily Raw Taken (m ³)	Maximum Day of Raw Taken (m ³)
Well 1A			
January	633.84	20.40	56.27
February	547.84	19.60	47.03
March	184.54	39.55	94.83
April	219.91	7.3	43.20
May	91.45	3.0	23.55
June	216.86	7.2	47.20
July	129.60	4.2	45.68
August	97.89	3.2	23.15
September	217.52	7.3	38.5
October	160.82	5.2	28.12
November	57.50	1.9	13.25
December	427.20	13.8	55.48
	Total 2984.97	Avg 11.05/mth	

Month	Total Raw Water Taken (m ³)	Average Daily Raw Taken (m ³)	Maximum Day of Raw Taken (m ³)
Well 2A			
January	686.95	22.20	64.91
February	923.17	33.00	73.45
March	1022.53	33.00	81.93
April	1146.41	38.20	65.94
May	1608.45	51.90	89.65
June	1410.61	47.00	82.11
July	1483.07	47.80	90.73
August	1320.98	44.00	85.54
September	1013.31	33.8	68.04
October	963.44	31.10	59.73
November	979.91	32.70	56.73
December	802.32	25.9	71.75
	Total 13360.15	Avg 36.72/mth	

Non-production days for each well are included in the monthly average.

Average daily water taking remains relatively consistent throughout the year with slightly elevated averages during summer months. Overall daily average for Well 1A for the year is approximately 8.25 m³/day, which represents roughly 2.86% of the permitted water taking from Well 1A. Overall daily average for Well 2A for the year is approximately 36.72 m³/day which represents roughly 8.91% of the permitted water taking from Well 2A.

Camborne Treated Water

In accordance with the Camborne Municipal Drinking Water License, the “maximum daily volume of treated water that flows from the treatment subsystem into the distribution system shall not exceed the rated capacity of 415 m³/day”. Table 3 below illustrates the Treated flow data for 2022. The daily average for the year is approximately 41.98 m³/day, representing roughly 10% of the rated capacity.

Table 3. Camborne Treated Flow Data 2022

Month	Total Treated Water Discharged (m ³)	Average Daily Treated Water Discharged (m ³)	Maximum Day Treated Water Discharged (m ³)
January	1287.86	41.54	51.90
February	1117.76	39.92	52.61
March	1118.31	36.07	49.26
April	1170.23	39.01	47.77
May	1584.74	51.12	72.85
June	1401.24	46.71	68.17
July	1118.31	36.07	49.26

August	1369.57	44.18	63.40
September	1156.41	38.55	51.29
October	1085.59	59.93	59.93
November	988.90	32.96	37.81
December	1167.33	37.66	55.22
	Total 14566.25	Avg 41.98/mth	

The difference between Raw Water Taken for producing Drinking Water and Drinking Water conveyed to the Distribution, is in-house operational processes such as filter backwashing.

Creighton Heights

Creighton Heights Raw Water

The Creighton Heights Water Treatment Plant (WTP) takes water from three drilled wells. Wells TW 6 and TW 7 are the primary production wells and only one of these wells can operate at a time. Well TW 1 is a back-up well, designed to run in conjunction with either primary well. The water taken for treatment and distribution is metered to ensure compliance with permitted amounts.

Table 4. Creighton Heights Permit to Take Water # 2320-CGPMQ5, Maximum Flows and Totals

Well	Maximum Flow (L/min)	Maximum Total per Day (m ³)
TW 1	225	489.6
TW 6	680	979.2
TW 7	680	979.2

Table 5. Creighton Heights Raw Water Taken 2022

Month	Total Raw Water Taken (m ³)	Average Daily Raw Taken (m ³)	Maximum Day (m ³)
Raw TW 1			
January	1693.84	54.64	106.68
February	1691.76	60.42	102.17
March	1510.94	48.74	108.47
April	1057.57	35.25	88.84
May	2521.18	81.33	148.27
June	2568.07	85.60	152.16
July	3261.43	105.21	141.95

August	3112.87	100.42	171.96
September	2288.93	76.30	158.12
October	76.29	2.46	20.57
November	2507.18	83.57	162.30
December	2003.16	64.62	123.50
	Total 24293.22	Avg 66.56	

Month	Total Raw Water Taken (m ³)	Average Daily Raw Taken (m ³)	Maximum Day (m ³)
Raw TW 6			
January	2732.78	88.15	233.17
February	2077.53	74.20	218.83
March	2835.98	91.48	285.63
April	3527.49	117.58	274.04
May	2672.56	86.21	237.09
June	3070.24	102.34	294.47
July	3009.65	97.09	262.69
August	4717.29	152.17	341.20
September	3717.18	123.91	500.44
October	12033.81	388.19	20.57
November	3637.66	121.26	335.91
December	3017.07	97.32	231.76
	Total 47049.24	Avg 128.33	

Month	Total Raw Water Taken (m ³)	Average Daily Raw Taken (m ³)	Maximum Day (m ³)
Raw TW 7			
January	4070.41	131.30	357.01
February	3617.20	129.19	320.25
March	3900.46	125.82	296.72
April	3457.46	115.25	318.60
May	4977.20	160.55	340.02
June	5168.47	172.28	447.73
July	6380.21	205.81	436.67
August	4198.64	135.44	281.22
September	5344.30	178.14	370.87
October	579.95	18.70	281.24
November	4763.16	158.77	347.68
December	4804.76	154.99	321.09
	Total 51262.22	Avg 140.52	

Non-production days for each well are included in the monthly average.

Well TW 7 was rehabilitated in October as part of planned Capital Works. As a result, totals, averages and maximum flows for the 3 Wells, for the month of October are different from normal.

Average daily water taking remains relatively consistent throughout the year with slightly elevated averages during summer months and during the hydrant flushing program in the fall. Overall daily average for Well TW 1 is approximately 66 m³/day, representing roughly 13.6 % of the permitted water taking from Well TW 1. Overall daily average for Well TW 6 for the year is approximately 128 m³/day, which represents roughly 13.1 % of the permitted water taking from Well TW 6. Overall daily average for Well TW 7 for the year is approximately 140 m³/day which represents roughly 14.4 % of the permitted water taking from Well TW 7. These numbers indicate that we are within our regulated limits.

Creighton Heights Treated Water

In accordance with the Creighton Heights Municipal Drinking Water License, the “maximum daily volume of treated water that flows from the treatment subsystem into the distribution system shall not exceed the rated capacity of 979.2 m³/day”. Table 6 below illustrates the flow data for 2022. The daily average for the year is approximately 318 m³/day, which represents roughly 32% of the rated capacity and permitted discharge.

Table 6. Creighton Heights Treated Flow Data 2022

Month	Total Treated Water Discharged (m³)	Average Daily Treated Water Discharged (m³)	Maximum Day Treated Water Discharged (m³)
January	8116.74	261.83	288.36
February	7039.58	251.42	324.76
March	7789.13	251.26	290.10
April	7627.10	254.24	287.09
May	9650.23	311.29	452.66
June	10238.56	341.29	450.72
July	12103.29	390.43	525.82
August	11477.55	370.24	501.16
September	10950.00	365.00	454.16
October	11583.45	373.66	446.26
November	10363.94	345.46	417.61
December	9255.48	298.56	372.54
	Total 116195.05	Avg 317.89	

The difference between Raw Water Taken for producing Drinking Water and Drinking Water conveyed to the Distribution is in-house operational processes such as filter backwashing.

It should be noted that the Creighton Heights Drinking Water System appears to be below rated and/or permitted capacities as illustrated in the tables above. The design of the Water Treatment Plant and continued water processing challenges demonstrate that we are currently running close to the processing capabilities. If new development in the Creighton Heights Settlement Area is going to be considered, further review of WTP capacity and processing capabilities must be considered.

4.2 Ministry of Environment, Conservation and Parks (MECP) Annual Inspections (Schedule 22 Summary Report Requirement)

The 2022 MECP annual inspection for Camborne Drinking Water System was completed on December 5th of 2022 and the score was 100%. No conformance or compliance issues were found. The Creighton Heights Drinking Water System annual inspection was not completed yet as of the publishing date of this report. Once the inspection has taken place and the reports/scoring are received, the results will be available to the Public on the Township website. Both plants achieved 100% in their respective Ministry inspections for 2021. All Ministry Inspections and scoring, as they come available, are placed on our Township website for Public view.

4.3 Adverse Water Quality Incidents and Corrective Actions (Section 11 Annual Report Requirement)

There were no reportable adverse water quality incidences in the Camborne Drinking Water System during 2022.

There were the following reportable adverse water quality incidences (AWQI's) in the Creighton Heights Drinking Water System that occurred in 2022:

- Sodium testing is required every 5 years by O. Reg 170. The 5 year Sodium testing was completed in 2022 and the result was 32.4 mg/L, which was higher than 20 mg/L, the level at which the Health Unit wants customers to be informed. The result was reported as an AWQI by both the accredited Lab who tested the sample and by the Water Operations Department. The Public Health Unit prepared a letter which the Township sent to customers connected to the Water System. The result for Sodium in 2017 was 27.2 mg/L.
- 21Sept2022- On Call Operator called in for spike above 3.00 mg/L of Total Chlorine to 4.00 mg/L from 8:58pm-9:02pm on the continuous Total Chlorine analyzer. Reading before spike was 2.58 mg/L and the reading after was 2.59 mg/L. Monitor analyzer for any future anomaly.
- 28Oct2022 – while switching from Chloramination Disinfection to Free Chlorination Disinfection for the annual Autumn Creighton Heights Distribution watermain denitrification and flushing, the Total Chlorine residual on the online analyzer rose above

3.00 mg/L to 3.015 mg/L at 9:41 pm to 9:45 pm. The residual dropped back to 2.70 mg/L after the spike. Prior to the spike, the residual was 2.69 mg/L

5. CAPITAL AND OPERATING INFRASTRUCTURE UPGRADES (Section 11 Annual Report Requirement)

Camborne

- Replacement of degraded Camborne Water Treatment Plant roof shingles with 26 gauge steel roofing including snow stop. Cost: \$14829
- Improved ceiling insulation with 24" of blow-in insulation. Ice damming at eavestroughs has been minimized and there is a decrease in heating costs. Cost: \$2059

Creighton Heights

- In early 2022, a Request for Proposal (RFP) was written to test the market to determine if the Township should contract out the Operation of the Water Systems. The RFP was sent out, bidders submitted proposals and Council decided to retain the services of our Internal Water Operations Department. Cost for writing RFP: \$32,000
- In May, High Lift Pump #3 was rehabilitated. Cost: \$28,040
- In mid 2022, Walkerton Clean Water Centre began a pilot study for Creighton Heights to find ways to remove the naturally occurring ammonia and methane. Pilot study is on-going. Cost: \$20000 (total cost for whole project upon completion of project)
- In October, Well 7 was inspected and rehabilitated. Yield has increased from well. Cost: \$32,400
- Creighton Heights Control Panel 01 is to be replaced. Project not completed yet. Approved Budget: \$275,000
- Creighton Heights UV Disinfection Units to be replaced. Project not completed yet. Approved Budget: \$75,000
- A fire hydrant was replaced near 4136 County Rd 45. Seat failed in boot of original hydrant and thus began to leak. Cost: \$15,000

Both Systems

15 water meters were replaced with Radio Frequency meters based on condition, state of operation and age. Cost: \$10,600

6. SAMPLING AND ANALYSIS (Section 11 Annual Report Requirement)

As per O. Reg 170/03, water quality samples were collected throughout the Camborne and Creighton Heights Drinking Water Systems. The results are provided below.

Camborne

Table 7. Camborne Microbiological Testing (Schedule 11 of O. Reg 170/03)

	Number of Samples	E.Coli (cfu/100mL) (min #)-(max #)	Total Coliform (cfu/100mL) (min #)-(max #)	Number of HPC Samples	HPC Results (cfu/1mL) (min #)-(max #)
Raw	30	0 – 0	0 – 0	Not Applicable	Not Applicable
Distribution	52	0 – 0	0 – 0	52	0 – 26

Note: cfu refers to colony forming units

Table 8. Camborne Operational Testing (Schedule 7 of O. Reg 170/03)

	Number of Grab Samples	Range of Results (Min – Max)
Chlorine Residual (primary disinfection)	8760 (continuous monitoring)	0.90 mg/L – 1.36 mg/L
Chlorine Residual (secondary disinfection)	120 (grab)	0.44 mg/l – 1.18 mg/l

Table 9. Camborne Additional Sampling Requirements

Renewal Date of Municipal Drinking Water License (MDWL)	Parameter	Number of Samples	Maximum Allowable Annual Average Concentration	Actual Average Concentration over last 4 quarterly tests
21Aug2021	Total Suspended Solids	4 (Quarterly)	25 mg/L	10.0 mg/L

Table 10. Camborne Lead Testing (MDWL 139-103 Schedule D)

Location Type	Date	Sample Location	pH	Alkalinity	Lead
Distribution	24Jan2022	Old Schoolhouse	7.96	2.05 mg/L	0.27 ug/L
Distribution	16May2022	Old Schoolhouse	8.07	193 mg/L	0.28 ug/L

There are many other parameters that are tested on a less frequent basis. For these parameters, the most recent analysis is listed below in Table 11. <MDL refers to 'less than Method Detection Limit' which means the measured concentration of the parameter in our water is less than the lowest detectable measurement possible.

Table 11. Camborne Organic and Inorganic Sampling (Schedules 13, 23 and 24 of O.Reg 170/03)

Parameter	Sample Date	Result Value	Unit of Measure	Exceedance
Antimony	26May2021	0.9<MDL	ug/l	no
Arsenic	26May2021	1.0	ug/l	no
Barium	26May2021	125	ug/l	no
Boron	26May2021	20	ug/l	no
Cadmium	26May2021	0.003 <MDL	ug/l	no
Chromium	26May2021	0.29	ug/l	no
Mercury	26May2021	0.01<MDL	ug/l	no
Selenium	26May2021	0.04<MDL	ug/l	no
Sodium	June 1, 2022	9.29	mg/l	no
Uranium	26May2021	0.381	ug/l	no
Fluoride	June 1, 2022	0.14	mg/l	no
Nitrite	07Mar2022 09Jun2022 13Sept2022 06Dec2022	0.003<MDL 0.003<MDL 0.003<MDL 0.003<MDL	mg/l	no
Nitrate	07Mar2022 09Jun2022 13Sept2022 06Dec2022	0.006<MDL 0.006<MDL 0.006<MDL 0.006<MDL	mg/l	no
Alachlor	26May2021	0.02<MDL	ug/l	no
Atrazine	26May2021	0.01<MDL	ug/l	no
Atrazine + N-dealkylated metabolites	26May2021	0.01<MDL	ug/l	no
Desethyl atrazine	26May2021	0.01<MDL	ug/l	no
Azinphos-methyl	26May2021	0.05<MDL	ug/l	no
Benzene	26May2021	0.32<MDL	ug/l	no
Benzo(a)pyrene	26May2021	0.004<MDL	ug/l	no
Bromoxynil	26May2021	0.33<MDL	ug/l	no
Carbaryl	26May2021	0.05<MDL	ug/l	no
Carbofuran	26May2021	0.01<MDL	ug/l	no
Carbon Tetrachloride	26May2021	0.17<MDL	ug/l	no
Chlorpyrifos	26May2021	0.02<MDL	ug/l	no
Diazinon	26May2021	0.02<MDL	ug/l	no
Dicamba	26May2021	0.20<MDL	ug/l	no
1,2-Dichlorobenzene	26May2021	0.41<MDL	ug/l	no
1,4-Dichlorobenzene	26May2021	0.36<MDL	ug/l	no
1,2-Dichloroethane	26May2021	0.35<MDL	ug/l	no
1,1-Dichloroethylene (vinylidene chloride)	26May2021	0.33<MDL	ug/l	no
Dichloromethane	26May2021	0.35<MDL	ug/l	no
2-4 Dichlorophenol	26May2021	0.15<MDL	ug/l	no

2,4-Dichlorophenoxy acetic acid (2,4-D)	26May2021	0.19<MDL	ug/l	no
Diclofop-methyl	26May2021	0.40<MDL	ug/l	no
Dimethoate	26May2021	0.06<MDL	ug/l	no
Diquat	26May2021	1<MDL	ug/l	no
Diuron	26May2021	0.03<MDL	ug/l	no
Glyphosate	26May2021	1<MDL	ug/l	no
Haloacetic Acid (HAA)	As per O. Reg 170, ceased sampling for 8 consecutive quarters due to low conc in previous 12 quarters	Not applicable	ug/l	Not applicable
Malathion	26May2021	0.02<MDL	ug/l	no
Metolachlor	26May2021	0.01<MDL	ug/l	no
Metribuzin	26May2021	0.02<MDL	ug/l	no
Monochlorobenzene	26May2021	0.3<MDL	ug/l	no
MCPA	26May2021	0.00012<MDL	mg/l	no
Paraquat	26May2021	1<MDL	ug/l	no
Pentachlorophenol	26May2021	0.15<MDL	ug/l	no
Phorate	26May2021	0.01<MDL	ug/l	no
Picloram	26May2021	1<MDL	ug/l	no
Polychlorinated Biphenyls(PCB)	26May2021	0.04<MDL	ug/l	no
Prometryne	26May2021	0.03<MDL	ug/l	no
Simazine	26May2021	0.01<MDL	ug/l	no
Trihalomethane (THM)	As per O. Reg 170, ceased sampling for 8 consecutive quarters due to low conc in previous 12 quarters	Not applicable	ug/l	Not applicable
Terbufos	26May2021	0.01<MDL	ug/l	no
Tetrachloroethylene	26May2021	0.35<MDL	ug/l	no
2,3,4,6-Tetrachlorophenol	26May2021	0.20<MDL	ug/l	no
Triallate	26May2021	0.01<MDL	ug/l	no
Trichloroethylene	26May2021	0.44<MDL	ug/l	no
2,4,6-Trichlorophenol	26May2021	0.25<MDL	ug/l	no
Trifluralin	26May2021	0.02<MDL	ug/l	no
Vinyl Chloride	26May2021	0.17<MDL	ug/l	no

Creighton Heights

Table 12. Creighton Heights Microbiological Testing (Schedule 11 of O.Reg 170/03)

	Number of Samples	E.Coli (cfu/100mL) (min #)-(max #)	Total Coliform (cfu/100mL) (min #)-(max #)	Number of HPC Samples	HPC Results (cfu/1mL) (min #)-(max #)
Raw	156	0 - 0	0 – 29	Not Applicable	Not Applicable
Treated	52	0 – 0	0 – 0	52	0 – 152
Distribution	123	0 – 0	0 – 0	52	0 – <2000

Note: cfu-refers to colony forming units.

Table 13. Creighton Heights Operational Testing (Schedule 7 of O.Reg 170/03)

	Number of Grab Samples	Range of Results (Min – Max)
Chlorine Residual (secondary disinfection)	369	0.29 mg/L – 2.76 mg/L (Chloramination) 0.05 mg/L – 2.04 mg/L (Free Chlorination)

Note: System Free Chlorinated from 27Sept2022 to 2Nov2022 for Distribution maintenance and Denitrification. Lowest Free residual of 0.05 mg/L occurred during the switch from Chloramination to Free Chlorination. Total residual was 0.42 mg/L at that time.

Table 14. Creighton Heights Additional Sampling Requirements

Renewal Date of Municipal Drinking Water License (MDWL)	Parameter	Number of Samples	Maximum Allowable Annual Average Concentration	Actual Average Concentration over last 4 quarterly tests
21Aug2021	Total Suspended Solids	4 (Quarterly)	25 mg/L	11.25 mg/L

Table 15. Creighton Heights Lead Testing (MDWL 139-102 Schedule D)

Location Type	Date	Sample Location	pH	Alkalinity	Lead
Distribution	24Jan2022	37 Deerfield	8.16	213 mg/L	0.02 mg/L
		Hwy 45	8.09	210 mg/L	0.02 mg/L
Distribution	16May2022	9230 Burwash	7.91	196 mg/l	0.08 mg/L
		Hwy 45	7.86	192 mg/L	0.10 mg/L

There are many other parameters that are tested on a less frequent basis. For these parameters, the most recent analysis, is listed below in Table 16. <MDL refers to 'less than Method Detection Limit' which means the measured concentration of the parameter in our water is less than the lowest possible detectable measurement. The 5 year Sodium test was collected and tested for Creighton Heights and was found to be slightly over the Maximum Acceptable Concentration of 20 mg/L.

Table 16. Creighton Heights Organic and Inorganic Sampling (Schedules 13, 23 & 24 of O.Reg 170/03)

Parameter	Sample Date	Result Value	Unit of Measure	Exceedance
Antimony	26May2021	0.9<MDL	ug/l	no
Arsenic	26May2021	0.2 <MDL	ug/l	no
Barium	26May2021	20.4	ug/l	no
Boron	26May2021	65.0	ug/l	no
Cadmium	26May2021	0.003<MDL	ug/l	no
Chromium	26May2021	0.17	ug/l	no
Mercury	26May2021	0.01<MDL	ug/l	no
Selenium	26May2021	0.04< MDL	ug/l	no
Sodium	13June2022	32.4	mg/l	Yes
Uranium	26May2021	0.002	ug/l	no
Fluoride	1June2022	0.32	mg/l	no
Nitrite	07Mar2022	0.026	mg/l	no
	09Jun2022	0.019		
	13Sept2022	0.023		
	6Dec2022	0.016		
Nitrate	10Mar2022	0.023	mg/l	no
	18Jun2022	0.037		
	13Sept2022	0.023		
	6Dec2022	0.022		
Alachlor	26May2021	0.02<MDL	ug/l	no
Atrazine + N-dealkylated metabolites	26May2021	0.01<MDL	ug/l	no
Atrazine	26May2021	0.01<MDL	ug/l	no
Azinphos-methyl	26May2021	0.05<MDL	ug/l	no
Benzene	26May2021	0.32<MDL	ug/l	no
Benzo(a)pyrene	26May2021	0.004<MDL	ug/l	no
Bromoxynil	26May2021	0.33<MDL	ug/l	no
Carbaryl	26May2021	0.05<MDL	ug/l	no
Carbofuran	26May2021	0.01<MDL	ug/l	no
Carbon Tetrachloride	26May2021	0.17<MDL	ug/l	no
Chlorpyrifos	26May2021	0.02<MDL	ug/l	no
Desethyl atrazine	26May2021	0.01<MDL	ug/l	no
Diazinon	26May2021	0.02<MDL	ug/l	no
Dicamba	26May2021	0.20<MDL	ug/l	no
1,2-Dichlorobenzene	26May2021	0.41 <MDL	ug/l	no
1,4-Dichlorobenzene	26May2021	0.36>MDL	ug/l	no

1,2-Dichloroethane	26May2021	0.35<MDL	ug/l	no
1,1-Dichloroethylene (vinylidene chloride)	26May2021	0.33<MDL	ug/l	no
Dichloromethane	26May2021	0.35<MDL	ug/l	no
2-4 Dichlorophenol	26May2021	0.15<MDL	ug/l	no
2,4-Dichlorophenoxy acetic acid (2,4-D)	26May2021	0.19<MDL	ug/l	no
Diclofop-methyl	26May2021	0.40<MDL	ug/l	no
Dimethoate	26May2021	0.06<MDL	ug/l	no
Diquat	26May2021	1<MDL	ug/l	no
Diuron	26May2021	0.03<MDL	ug/l	no
Glyphosate	26May2021	1<MDL	ug/l	no
Haloacetic Acid HAA	07Mar2022 09Jun2022 13Sept2022 06Dec2022	5.58 (Running Annual Average)	ug/l	no
Malathion	26May2021	0.02<MDL	ug/l	no
MCPA, 2-methyl-4-chlorophenoxyacetic acid	26May2021	0.00012<MDL	mg/L	no
Metolachlor	26May2021	0.01<MDL	ug/l	no
Metribuzin	26May2021	0.02<MDL	ug/l	no
Monchlorobenzene	26May2021	0.3<MDL	ug/L	no
NDMA, N-nitrosodimethylamine As per new MDWL (12Aug2021) we are required to test for NDMA quarterly	07Mar2022 09Jun2022 13Sept2022 06Dec2022	0.0016 (Running Annual Average)	ug/L	no
Paraquat	26May2021	1<MDL	ug/l	no
Pentachlorophenol	26May2021	0.15<MDL	ug/l	no
Phorate	26May2021	0.01<MDL	ug/l	no
Picloram	26May2021	1<MDL	ug/l	no
Polychlorinated Biphenyls(PCB)	26May2021	0.04<MDL	ug/l	no
Prometryne	26May2021	0.03<MDL	ug/l	no
Simazine	26May2021	0.01<MDL	ug/l	no
Trihalomethane (THM)	07Mar2022 09Jun2022 13Sept2022 06Dec2022	1.47 (Running Annual Average)	ug/l	no
Terbufos	26May2021	0.01<MDL	ug/l	no
Tetrachloroethylene (perchloroethylene)	26May2021	0.35<MDL	ug/l	no
2,3,4,6-Tetrachlorophenol	26May2021	0.20<MDL	ug/l	no
Triallate	26May2021	0.01<MDL	ug/l	no
Trichloroethylene	26May2021	0.44<MDL	ug/l	no
2,4,6-Trichlorophenol	26May2021	0.25<MDL	ug/l	no
Trifluralin	26May2021	0.02<MDL	ug/l	no
Vinyl Chloride	26May2021	0.17<MDL	ug/l	no

This concludes the Annual and Summary Report for the Camborne and Creighton Heights Drinking Water Systems for 2022.