THE CORPORATION OF THE TOWNSHIP OF HAMILTON

CAMBORNE AND CREIGHTON HEIGHTS

DRINKING WATER SYSTEMS

2023 ANNUAL & SUMMARY REPORT

January 1 to December 31, 2023

Prepared By:

Township of Hamilton Water Operations Team

CONTENTS

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 2023, 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 to December 31, 2023. *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 is 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 Resident 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 (Groundwater that is not Under the Direct Influence of Surface Water). For the primary disinfection requirement, the raw water is dosed with sodium hypochlorite (liquid form of 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 at all times to measure chlorine residual, pressure and flow to prove 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 to the issue and resolve it. 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 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 508 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. The raw water is dosed with potassium permanganate before being directed through greensand filters. Greensand filtration, optimized by the dosing with potassium permanganate, is used for removal of oxidized iron and manganese. The Filtered water is then dosed with sodium hypochlorite and then conveyed through Ultraviolet Reactors. The UV disinfection achieves Primary Disinfection. That addition of the sodium hypochlorite achieves 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 located within the highlift suction well conveys drinking water to Deerfield Estates. Continuous online monitoring instruments are used to measure chloramine/chlorine residual, pressure and flow at all times, to prove 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 to the issue and resolve it. 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 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 79 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 2023. 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 2023. 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 July of 2032. 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: $1m^3$ = 1000 L

Table 2. Camborne Raw Water Taken for Drinking Water Production in 2023

Month	Total Raw Water Taken (m^3)	Average Daily Raw Taken (m^3)	Maximum Day of Raw Taken (m^3)
Well 1A			
January	591.83	19.1	49.5
February	493.02	17.6	82.5
March	542.38	17.5	42.5
April	624.80	20.8	46.3
May	789.36	25.5	61.02
June	733.97	24.5	46.71
July	551.95	17.8	41.31
August	449.24	14.5	65.31
September	665.74	22.2	66.32
October	577.82	18.6	62.35
November	665.57	22.2	60.24
December	629.10	20.3	46.11
	Total 7314.78	Avg 20.05/mth	

Month	Total Raw Water Taken (m^3)	Average Daily Raw Taken (m^3)	Maximum Day of Raw Taken (m^3)
Well 2A			
January	575.49	18.6	54.02
February	514.29	18.4	45.17
March	565.37	18.2	51.53

April	498.47	16.6	44.57
May	875.27	28.2	79.66
June	679.08	22.6	63.98
July	840.85	27.10	55.32
August	848.15	27.40	58.71
September	866.48	28.90	57.82
October	877.89	28.30	76.19
November	576.03	19.20	49.54
December	592.02	19.1	48.19
	Total 8309.39	Avg 22.72	

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 20.3 m^3/day, which represents roughly 7.05 % of the permitted water taking from Well 1A. Overall daily average for Well 2A for the year is approximately 22.7 m^3/day which represents roughly 4.6 % 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 m^3/day". Table 3 below illustrates the Treated flow data for 2023. The daily average for the year is approximately 41.09 m^3/day, representing roughly 9.9 % of the rated capacity.

Table 3. Camborne Treated Flow Data 2023

Month	Total Treated Water Discharged (m^3)	Average Daily Treated Water Discharged (m^3)	Maximum Day Treated Water Discharged (m^3)
January	1134.50	36.63	49.60
February	989.18	35.33	46.99
March	1050.99	33.90	47.10
April	1069.12	35.64	52.09
May	1583.00	51.06	82.53
June	1378.87	45.96	60.88
July	1367.96	44.13	69.93
August	1243.35	40.11	59.19
September	1464.49	48.82	62.83
October	1394.09	44.97	67.11
November	1191.00	39.70	53.78
December	1141.88	36.83	44.92
	Total 15007.93	Avg 41.09	

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 2023

Month	Total Raw Water Taken (m^3)	Average Daily Raw Taken (m^3)	Maximum Day (m^3)
	Raw TW 1		
January	1652.84	53.30	96.65
February	1560.76	55.74	119.41
March	1697.43	54.76	115.93
April	1934.74	64.49	108.38
May	2430.76	78.41	170.05
June	2532.21	84.41	187.66
July	2389.32	77.07	154.10
August	2367.59	76.37	158.02
September	2874.10	95.80	169.71
October	955.51	30.8	118.25
November	2449.64	81.65	121.47
December	2238.66	72.21	122.77
	Total 25083.56	Avg 68.75	

Month	Total Raw Water Taken (m^3)	Average Daily Raw Taken (m^3)	Maximum Day (m^3)
	Raw TW 6		
January	2996.11	96.65	298.62
February	2242.96	80.11	250.12
March	3760.54	121.31	253.87
April	3009.50	100.32	250.70
May	5851.35	188.75	456.39
June	3985.14	132.84	342.87
July	3016.41	97.30	297.06
August	4637.83	149.61	324.64
September	6247.29	208.24	494.69
October	9509.46	306.80	499.75
November	3714.39	123.81	292.06
December	3805.88	122.77	330.83
	Total 52776.86	Avg 144.04	

Month	Total Raw Water Taken (m^3)	Average Daily Raw Taken (m^3)	Maximum Day (m^3)
	Raw TW 7		
January	4162.64	134.28	318.18
February	3977.41	142.05	303.56
March	3455.17	111.46	346.25
April	3835.21	127.84	277.94
May	2683.92	86.58	341.12
June	4935.89	164.53	460.08
July	7306.63	235.70	436.62
August	4411.04	142.29	363.75
September	4317.92	143.93	422.29
October	1121.47	36.20	200.56
November	3397.09	113.24	290.45
December	4642.72	149.77	462.71
	Total 48247.11	Avg 132.32	

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 and during the hydrant flushing program in the fall. Overall daily average for Well TW 1 is approximately 68.75 m^3/day, representing roughly 14 % of the permitted water taking from Well TW 1. Overall daily average for Well TW 6 for the year is approximately 144.04 m^3/day, which represents roughly 14.7 % of the permitted water taking from Well TW 6. Overall daily average for Well TW 7 for the year is approximately 132.32 m^3/day which represents roughly 13.5 % 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 m^3/day". Table 6 below illustrates the flow data for 2023. The daily average for the year is approximately 328 m^3/day, which represents roughly 33 % of the rated capacity and permitted discharge.

Table 6. Creighton Heights Treated Flow Data 2023

Month	Total Treated Water Discharged (m^3)	Average Daily Treated Water Discharged (m^3)	Maximum Day Treated Water Discharged (m^3)
January	8361.49	269.73	310.18
February	7483.01	267.25	319.40
March	8389.73	270.64	321.16
April	8348.23	278.28	327.76
May	10342.63	333.64	467.75
June	10941.36	364.71	527.46
July	12235.97	394.71	575.22
August	10787.65	347.99	459.87
September	12971.02	432.34	549.73
October	10553.73	340.44	545.02
November	9005.53	300.19	371.09
December	10408.56	335.76	652.85
	Total 119828.91	Avg 327.97	

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. However, 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. Council approved a Water Supply Master Plan be conducted which will begin in early 2024.

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

The 2023 MECP Annual Inspection for the Camborne Drinking Water System occurred on 22Jan2024 and received 100% scoring. The 2023 MECP Annual Inspection for the Creighton Heights Drinking Water System occurred on 25Jan2024 and received 100% scoring. MECP

Inspection reports/scoring are available on the Township website and at the Township office front desk 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 2023.

There were the following reportable adverse water quality incidences (AWQI's) in the Creighton Heights Drinking Water System that occurred in 2023:

- CL17 analyzer spiked for a short duration on 15Jan2023 above 3.00 mg/L for chloramine residual. Analyzer spiked to 3.31mg/L at 1301. Analyzer dropped back down to 2.50 mg/L at 1305. Prior to spike, the chloramine residual was 2.51 mg/L.
- CL17 analyzer spiked for a short duration on 16Jan2023 above 3.00 mg/L for chloramine residual. Analyzer spiked to 3.42 mg/L at 0629. Analyzer dropped back down to 2.54 mg/L at 0642. Prior to spike, the chloramine residual was 2.53 mg/L.
- CL17 analyzer spiked for a short duration on 16Jan2023 above 3.00 mg/L for chloramine residual. Analyzer spiked to 3.16 mg/L at 1003. Analyzer dropped back down to 2.53 mg/L at 1008. Prior to spike, the chloramine residual was 2.53 mg/L.
- CL17 analyzer spiked for a short duration on 18Jan2023 above 3.00 mg/L for chloramine residual. Analyzer spiked to 3.28 mg/L at 0822. Analyzer dropped back down to 2.71 mg/L at 0826. Prior to spike, the chloramine residual was 2.49 mg/L.
- CL17 analyzer spiked for a short duration on 3Feb2023 above 3.00 mg/L for chloramine residual. Analyzer spiked to 3.43 mg/L at 1109. Analyzer dropped back down to 2.76 mg/L at 1112. Just prior to spike, the chloramine residual was 2.66 mg/L.
- CL17 analyzer spiked for a short duration in 18Feb2023 above 3.00 mg/L for chloramine residual. Analyzer spiked to 3.36 mg/L at 0054. Analyzer dropped back to 2.60 mg/L by 0105. Just prior to spike, the chloramine residual was 2.61 mg/L.
- CL17 analyzer spiked for a short duration on 26Feb2023 above 3.00 mg/L for chloramine residual. Analyzer spiked to 3.40 mg/L at 0750. Analyzer dropped back to 2.76 mg/L by 0804. Just prior to spike, the chloramine residual was 2.62 mg/L.
- CL17 analyzer spiked for a short duration on 05Mar2023 above 3.00 mg/L for chloramine residual. Analyzer spiked to 3.51 at 0120mg/L. Analyzer dropped back to 2.75 mg/L at 0125. Just prior to the spike, the chloramine residual was 2.61 mg/L.
- CL17 analyzer spiked for a short duration on 28Apr2023 above 3.00 mg/L for chloramine residual. Analyzer spiked to 3.12 mg/L at 0911. Analyzer dropped back to 2.67 mg/L at 0918. Just prior to the spike, the chloramine residual was 2.60 mg/L.
- CL17 analyzer dip on 17May2023 below 0.25 mg/L for chloramine residual. Reading dropped from 2.80 mg/L at 2114 to 0.04 mg/L at 2115 which alarmed out and called Operator in. The Operator tested with handheld upon arrival at plant at 2200 and the result was 2.80mg/L. The Operator checked the analyzer for issues and initiated a prime sequence. Operator also checked the sample line for blockage. After priming, the reading on the CL17 was 2.59 mg/L at 2304 and reading stable was stable. Analyzer

error as the actual residual was at a normal level as proven by testing with the handheld unit.

- At 12:50 pm on 28June2023, SGS Laboratories called with a Total Coliform result of 28 cfu (colony forming units) from our Cty Rd 45 bacti sample that was collected on 26June2023 at 0703. Distribution chloramine residual at the time of the bacti sample collection was 1.65 mg/L. Increased dosing of sodium hypochorite at Creighton Heights Water Treatment Plant. Reported to Health Unit and Spills Action Centre (SAC). Health Unit (HU) Inspector issued a Boil Water Advisory (BWA) for the residences impacted downstream of the location that gave rise to the adverse bacteriological result. The HU provided the Township with the BWA notice. Water Operations Staff distributed the BWA notices. Flushed watermain upstream of sample location that gave rise to the adverse, flushed watermain at the location that gave rise to the adverse and flushed watermain downstream of the location that gave rise to the adverse. Collected 1st set of bacti samples at the above noted locations on 28June2023 starting at 2:05pm. Collected 2nd set of bactis at the above noted locations more than 24 hrs after the 1st set was collected. 1st set of results were 0/0 for E. Coli/Total Coliform. 2nd set of results were 0/0 for E. Coli/Total Coliform. Notified HU Inspector and our Local Ministry of Environment, Conservation & Parks (MECP) Inspector of the results. Received direction from HU Inspector as to what to write on the rescind notice. Wrote up and delivered rescind notices to every residence impacted by the BWA. Spoke to most homeowners to communicate that the advisory had been rescinded.
- CL17 analyzer dip for short duration on 5Dec2023 below 0.25 mg/L. Reading dropped from 2.66 mg/L at 0434 to 0.09 mg/L at 0435 on 5Dec2023. Analyzer returned back up to 2.65 mg/L at 0438. Instrument error.
- CL17 analyzer dip for short duration on 14Dec2023 below 0.25 mg/L. Reading dropped from 2.38 mg/L at 1438 to 0.21 mg/L at 1439. Analyzer returned back up to 2.30 mg/L at 1441. Instrument error.

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

Camborne

- Replacement of 2 pressure tanks on the High Lift System: $3250.00

Creighton Heights

- In mid 2022, Walkerton Clean Water Centre was the approved bidder for a pilot study for Creighton Heights to find ways to remove the naturally occurring ammonia and methane from the raw water source. The pilot plant has been set up in January of 2024. The Pilot Plant will run for a year to reflect seasonal variances: $20000.
- Replacement of Filter Media in Filter 2 for improved Manganese and Iron Control: $33,990

- Creighton Heights Control Panel to be replaced. Project is ongoing: $275,000
- Creighton Heights UV Units for Primary Disinfection have been replaced: $95,764.00
- A fire hydrant was installed near 38 Maple Crescent: $15,000
- Replacement of failed service saddle on 12" watermain between 4210 and 4200 Cty Rd 45: $13,432
- Replacement of 2nd failed service saddle on 12" watermain between 4172 and 4168 Cty Rd 45: $10,720
- Mainline Valve replacement between 4172 and 4168 Cty Rd 45: $11,205

Both Systems

15 water meters were replaced with Radio Frequency meters based on condition, state of operation and age: $10,500

HST is not included in costs referenced above.

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	24	0 – 0	0 – 0	Not Applicable	Not Applicable
Distribution	52	0 – 0	0 – 0	52	0 – 23

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 of Free Chlorine (Min – Max)
Chlorine Residual (primary disinfection)	8760 (continuous monitoring)	0.78 mg/L – 1.54 mg/L
Chlorine Residual (secondary disinfection)	104 (grab)	0.68 mg/l – 1.31 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	5.75 mg/L

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

Location Type	Date	Sample Location	pH	Alkalinity	Lead
Distribution	09Jan2023	Old Schoolhouse	7.90	183 mg/L	Not req'd until 2025
Distribution	19Jun2023	Old Schoolhouse	7.92	195 mg/L	Not req'd until 2025

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
	06Mar2023		mg/l	

Nitrite	08Jun2023 13Sept2023 12Dec2023	0.003<MDL 0.003<MDL 0.003<MDL 0.003<MDL		no
Nitrate	06Mar2023 08Jun2023 13Sept2023 12Dec2023	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)	06Mar2023 05Jun2023 12Sep2023 12Dec2023	<5.3 MDL <5.3 MDL <5.3 MDL <5.3 MDL	ug/L ug/L ug/L ug/L	no no no no
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)	06Mar2023 05Jun2023 12Sep2023 12Dec2023	<5.3 MDL <5.3 MDL <5.3 MDL <5.3 MDL	ug/L ug/L ug/L ug/L	no no no no
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	155	0 - 0	0– 3	Not Applicable	Not Applicable
Treated	52	0 – 0	0 – 0	50	0 – 118
Distribution	119	0 – 0	0 – 28	36	0 – 29

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)	371	0.36 mg/L – 2.70 mg/L (Chloramination) 0.96 mg/L – 1.96 mg/L (Free Chlorination)

Note: System was Free Chlorinated from 25Sept to 18Oct2023 for Distribution maintenance and Denitrification.

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	9.0 mg/L

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

Location Type	Date	Sample Location	pH	Alkalinity
Distribution	10Jan2023	9230 Burwash Hwy 45	8.08 8.10	188 mg/L 189 mg/L
Distribution	19June2023	9230 Burwash Hwy 45	7.78 7.88	203 mg/l 204 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 32.4 mg/L which is 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	08Mar2023 05Jun2023 13Sept2023 12Dec2023	0.028 0.021 0.021 0.029	mg/l	no

Nitrate	08Mar2023 05Jun2023 13Sept2023 12Dec2023	0.031 0.025 0.026 0.065	mg/l	no
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	06Mar2023 05Jun2023 12Sept2023 12Dec2023	3.73 (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	06Mar2023 05Jun2023 12Sept2023 12Dec2023	0.0012 (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)	06Mar2023 05Jun2023 12Sept2023 12Dec2023	3.73 (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 2023.