



Kincardine Drinking Water System

2017 Annual Water Summary Report

1. INTRODUCTION AND BACKGROUND

The municipality owns and operates drinking water systems to provide residents with safe, potable water. These municipal drinking water systems are regulated under various legislation and legal documents including the Safe Drinking Water Act and Ontario Regulation 170/03 Drinking Water Systems. O. Reg. 170 requires that the municipality complete an annual water report (Section 11) and an annual summary report (Schedule 22). Previously two separate reports were completed, but for the 2017 reporting period, they have been combined into this one report.

The reports are available free of charge on the municipal website at www.kincardine.net or by contacting the Water Services Department at waterservice@kincardine.net.

1.1. System Description

Drinking-Water System Number:	220002716
Drinking-Water System Name:	Kincardine Drinking Water System
Drinking-Water System Owner:	Municipality of Kincardine
Drinking-Water System Category:	Large Municipal Residential
Period being reported:	Year 2017

The Kincardine Drinking Water System (DWS) consists of a surface water treatment plant that receives water from Lake Huron. The water treatment plant provides conventional filtration and consists of 2 Actiflo clarifiers, 4 filters, a chlorination system and an underground reservoir. The intake capacity is 18,750 m³/d and the treatment plant rated capacity is 11,563 m³/d. The chemicals used for treatment are Clar+ion A5, Magnafloc LT27AG, Actisand and chlorine gas. The distribution system serves the town of Kincardine and residents north of the town via a pipeline, plus the Huronville Subdivision Distribution System owned by the Township of Huron-Kinloss, with a total of over 3800 connections. There is a 3,360 m³ standpipe to provide water storage, pressure and fire protection for the distribution system and a Booster Chlorination Facility at the north end of the distribution system for the Inverhuron Provincial Park.

1.2. Major Expenses

The system required repairs and replacements in three main areas as follows:

Treatment and Monitoring Equipment repairs and replacements (\$18,300.00)

SCADA repairs (\$39,395.00)

Watermain repairs (\$60,230.00)

2. WATER QUALITY MONITORING

Each municipal drinking water system is required to do testing to ensure that the water supplied to consumers is safe for consumption. Some of these tests such as chlorine residuals are done on site while others, like microbiological testing, must be performed by a licenced laboratory.

2.1. Microbiological Testing

O. Reg. 170 Schedule 10, requires the Kincardine DWS to take a minimum of one sample per week of raw, treated and distribution water with a minimum of seventeen distribution samples required every month. All raw, treated and distribution samples must be tested for Escherichia coli (E. coli) and total coliforms. All the treated samples and twenty five percent of the distribution samples must also be tested for heterotrophic plate count (HPC). Our internal sampling schedule exceeds the minimum requirements by having operations staff collect one raw, one treated and five distribution sample every week and have them tested for E. coli, total coliform and HPC.

Any E. coli or total coliform results above 0 in treated or distribution water must be reported to the Ministry of Environment and Climate Change (MOECC) and Medical Officer of Health (MOH).

Heterotrophic plate count is a colony count of general bacteria population. There is no adverse limit for HPC samples. Results over 500 colonies per 1 mL may indicate a change in water quality but it is not considered an indicator of unsafe water.

The results from the 2017 sampling program are shown in the table below.

Water Source	Number of Samples	Range of Total Coliform Results (#-#)	Range of E. coli Results (#-#)	Number of HPC Samples	Range of HPC Results (#-#)
Raw	52	0 – 8,800	0 – 38	51	3 – 640
Treated	52	0 – 0	0 – 0	52	0 – 42
Distribution	260	0 – 0	0 – 0	255	0 – 72

2.2. Chemical Testing

The Safe Drinking Water Act Reg 170 Schedule 13 requires periodic testing of the water for chemical parameters. The Kincardine DWS is required to test for nitrite/nitrate, trihalomethane and haloacetic acid on a quarterly basis. The tables below outline these as well as other inorganic and organic parameters that are required to be tested for annually and include the date and result of the most recent test. Any result displayed as less than (<) are below the method detection limit of the lab.

Sodium and fluoride are not found in significant levels in the treated water and fluoride is not added to the drinking water. Sodium and fluoride are only required to be tested every five years.

In 2016, the MOECC removed some parameters and added others to the lists of those required to be tested for. The new parameters have been added to the tables below and for now the old parameters have still been included as well.

If the concentration of a parameter is above half of the Maximum Acceptable Concentration (MAC) under the Ontario Drinking Water Quality Standards, an increased testing frequency of once every three months is required by the Regulation. There were no parameters above the half MAC that were required to be tested for quarterly in 2017.

Inorganic Parameter	Sample Date	Result Value	Unit of Measure	Exceedance
Antimony	Oct 16/17	0.11	ug/L	No
Arsenic	Oct 16/17	0.2	ug/L	No
Barium	Oct 16/17	14.1	ug/L	No
Boron	Oct 16/17	24	ug/L	No
Cadmium	Oct 16/17	<0.003	ug/L	No
Chromium	Oct 16/17	0.88	ug/L	No
Mercury	Oct 16/17	< 0.01	ug/L	No
Selenium	Oct 16/17	0.13	ug/L	No
Sodium	Jan 14/14	5.27	mg/L	No
Uranium	Oct 16/17	0.047	ug/L	No
Fluoride	Oct 8/13	0.14	mg/L	No
Nitrite	Jan 9/17	<0.003	mg/L	No
	Apr 10/17	<0.003		
	July 17/17	<0.003		
	Oct 16/17	<0.003		
Nitrate	Jan 9/17	0.757	mg/L	No
	Apr 10/17	0.459		
	July 17/17	0.563		
	Oct 16/17	0.291		

Organic Parameter	Sample Date	Result Value	Unit of Measure	Exceedance
Alachlor	Oct 16/17	< 0.02	ug/L	No
Aldicarb	Oct 19/15	< 0.01	ug/L	No
Aldrin + Dieldrin	Oct 19/15	< 0.01	ug/L	No
Atrazine + N-dealkylated metabolites	Oct 16/17	0.03	ug/L	No
Azinphos-methyl	Oct 16/17	< 0.05	ug/L	No
Bendiocarb	Oct 19/15	< 0.01	ug/L	No
Benzene	Oct 16/17	< 0.32	ug/L	No
Benzo(a)pyrene	Oct 16/17	< 0.004	ug/L	No
Bromoxynil	Oct 16/17	< 0.33	ug/L	No
Carbaryl	Oct 16/17	< 0.05	ug/L	No
Carbofuran	Oct 16/17	< 0.01	ug/L	No
Carbon Tetrachloride	Oct 16/17	< 0.16	ug/L	No
Chlordane (Total)	Oct 19/15	< 0.01	ug/L	No
Chlorpyrifos	Oct 16/17	< 0.02	ug/L	No
Cyanazine	Oct 19/15	< 0.03	ug/L	No

Organic Parameter	Sample Date	Result Value	Unit of Measure	Exceedance
Diazinon	Oct 16/17	< 0.02	ug/L	No
Dicamba	Oct 16/17	< 0.20	ug/L	No
1,2-Dichlorobenzene	Oct 16/17	< 0.41	ug/L	No
1,4-Dichlorobenzene	Oct 16/17	< 0.36	ug/L	No
Dichlorodiphenyltrichloroethane (DDT) + metabolites	Oct 19/15	< 0.01	ug/L	No
1,2-Dichloroethane	Oct 16/17	< 0.35	ug/L	No
1,1-Dichloroethylene (vinylidene chloride)	Oct 16/17	< 0.33	ug/L	No
Dichloromethane	Oct 16/17	< 0.35	ug/L	No
2-4 Dichlorophenol	Oct 16/17	< 0.15	ug/L	No
2,4-Dichlorophenoxy acetic acid (2,4-D)	Oct 16/17	< 0.19	ug/L	No
Diclofop-methyl	Oct 16/17	< 0.40	ug/L	No
Dimethoate	Oct 16/17	< 0.03	ug/L	No
Dinoseb	Oct 19/15	< 0.36	ug/L	No
Diquat	Oct 16/17	< 1	ug/L	No
Diuron	Oct 16/17	< 0.03	ug/L	No
Glyphosate	Oct 16/17	< 1	ug/L	No
Heptachlor + Heptachlor Epoxide	Oct 19/15	< 0.01	ug/L	No
Lindane (Total)	Oct 19/15	< 0.01	ug/L	No
Malathion	Oct 16/17	< 0.02	ug/L	No
Methoxychlor	Oct 19/15	< 0.01	ug/L	No
2 methyl-4-chlorophenoxyacetic acid (MCPA)	Oct 16/17	< 0.00012	mg/L	No
Metolachlor	Oct 16/17	< 0.01	ug/L	No
Metribuzin	Oct 16/17	< 0.02	ug/L	No
Monochlorobenzene	Oct 16/17	< 0.3	ug/L	No
Paraquat	Oct 16/17	< 1	ug/L	No
Parathion	Oct 19/15	< 0.02	ug/L	No
Pentachlorophenol	Oct 16/17	< 0.15	ug/L	No
Phorate	Oct 16/17	< 0.01	ug/L	No
Picloram	Oct 16/17	< 1	ug/L	No
Polychlorinated Biphenyls (PCB)	Oct 16/17	< 0.04	ug/L	No
Prometryne	Oct 16/17	< 0.03	ug/L	No
Simazine	Oct 16/17	< 0.01	ug/L	No
Temephos	Oct 19/15	< 0.01	ug/L	No
Terbufos	Oct 16/17	< 0.01	ug/L	No
Tetrachloroethylene	Oct 16/17	< 0.35	ug/L	No
2,3,4,6-Tetrachlorophenol	Oct 16/17	< 0.20	ug/L	No
Triallate	Oct 16/17	< 0.01	ug/L	No
Trichloroethylene	Oct 16/17	< 0.44	ug/L	No
2,4,6-Trichlorophenol	Oct 16/17	< 0.25	ug/L	No
2,4,5-Trichlorophenoxy acetic acid (2,4,5-T)	Oct 19/15	< 0.22	ug/L	No
Trifluralin	Oct 16/17	< 0.02	ug/L	No
Vinyl Chloride	Oct 16/17	< 0.17	ug/L	No

Trihalomethane (THM) distribution sampling is required quarterly and must also be expressed as a running annual average. The limit as set in the Ontario Drinking Water Quality Standards is 100 ug/L. THMs are a by-product of the disinfection process.

Date Sampled	THM Result Value (ug/L)	Running Annual Average (ug/L)	Exceedance
January 9/17	20	26.0	No
April 10/17	12	24.0	No
July 17/17	33	23.8	No
October 16/17	26	22.8	No

Sampling and testing for Haloacetic Acid (HAA) in the distribution system is a new requirement in 2017. The limit as set in the Ontario Drinking Water Quality Standards is 80 ug/L and starting in 2020 must also be expressed as a running annual average. HAAs are a by-product of the disinfection process.

Date Sampled	HAA Result Value (ug/L)	Running Annual Average (ug/L)	Exceedance
January 9/17	5.7	5.7	No
April 10/17	<5.3	5.5	No
July 17/17	6.1	5.7	No
Oct 16/17	<5.3	5.6	No

The Kincardine DWS does not have significant levels of lead and so is currently under a reduced-sampling program. Under this sampling program, O. Reg 170 Schedule 15.1 requires sampling for lead every three years and lead-related parameters every year. Lead was last sampled in 2015 and was therefore not required to be sampled in 2017.

Parameter	Location Type	Number of Samples	Range of Results
Lead	Distribution	None	--
pH	Distribution	6	7.51 – 7.82
Alkalinity (mg/L)	Distribution	6	65 – 87

2.3. Operational Monitoring

The free chlorine residual must be monitored continuously on the treated water at the point of entry into the distribution system. A minimum of seven distribution samples must be taken weekly and tested for free chlorine residual. In addition, free chlorine levels are monitored continuously within the treatment process and at one location in the distribution system.

As a target, free chlorine residual within the distribution system should be above 0.20 mg/L. A free chlorine level lower than 0.05 mg/L must be reported and corrective action taken.

At the Kincardine Water Treatment Plant, turbidity is monitored continuously on the raw water, after each Actiflo unit, after each filter and at the point of entry into the distribution system. Turbidity is measured in nephelometric turbidity units (NTU).

The MOECC *Procedure for Disinfection of Drinking Water in Ontario* requires that the turbidity on each filter effluent line is less than or equal to 0.3 NTU 95% of the time each month. Filter #3 did not run during 2017.

Treated Water	Number of Grab Samples	Range of Results (#-#)
Turbidity	Continuous monitoring	0.072 – 1.99
Chlorine	Continuous monitoring	0.81 – 1.73

Distribution Water	Number of Grab Samples	Range of Results (#-#)
Free Chlorine Residual	365	0.35 – 1.72

Percentage that each filter was less than or equal to 0.3 NTU.

Month	Filter #1	Filter #2	Filter #3	Filter #4
January	99.84%	99.81%	Out of service	99.80%
February	99.92%	99.96%	Out of service	99.86%
March	99.99%	99.90%	Out of service	99.84%
April	99.97%	99.27%	Out of service	99.67%
May	99.98%	99.74%	Out of service	99.83%
June	100.00%	99.70%	Out of service	99.78%
July	99.75%	99.96%	Out of service	99.77%
August	99.98%	99.75%	Out of service	99.87%
September	99.99%	99.92%	Out of service	99.98%
October	100.00%	99.63%	Out of service	99.90%
November	99.64%	99.86%	Out of service	99.78%
December	100.00%	99.93%	Out of service	100.00%

3. WATER QUANTITY

The following tables list the quantities and flow rates of the water supplied to the distribution system during the reporting period covered by this report, including monthly average and maximum daily flows, and a comparison to the rated capacity specified in the system Municipal Drinking Water Licence. The rated capacity is 11,563 m³/day. There is no maximum flow rate specified for water supplied to the distribution system.

Month	Average Daily Flow (m ³ /day)	% Average Day Flow/ Rated Capacity	Maximum Daily Flow (m ³ /day)	% Maximum Day Flow/ Rated Capacity
January	2,154	19%	2,859	25%
February	2,192	19%	2,510	22%
March	1,970	17%	2,498	22%
April	2,239	19%	3,157	27%
May	2,614	23%	3,220	28%
June	3,069	27%	4,705	41%
July	3,185	28%	3,746	32%
August	3,528	31%	4,902	42%
September	2,918	25%	3,385	29%
October	2,485	21%	3,528	31%
November	2,224	19%	2,498	22%
December	2,300	20%	2,608	23%
Annual	2,573	22%	4,902	42%

Month	Average Daily Flow Rate (L/s)	Maximum Daily Flow Rate (L/s)
January	27	140
February	28.8	141
March	27.4	144
April	26.2	145
May	30.6	147
June	35.0	148
July	37.3	145
August	40.4	145
September	34.2	144
October	28.7	144
November	25.8	144
December	26.6	142
Annual	30.7	148

4. ADVERSE WATER QUALITY INCIDENTS AND NON-COMPLIANCE FINDINGS

Any adverse results from microbiological samples, chemical samples or observations of operational conditions that indicate adverse water quality are reported to the Spills Action Centre (SAC) of the MOECC and the Medical Officer of Health (MOH). All adverse conditions are responded to immediately and corrective actions taken.

The *MOECC Watermain Disinfection Procedure* requires that all watermain breaks are categorized (Category 1 or 2) and all Category 2 breaks must be reported to SAC. On April 1, a subdivision was isolated for repairs for a number of hours and was classified as a Category 2. All sampling showed no contamination in the drinking water.

On August 13, notification to the MOECC was required when the system switched over to the Lakeshore Drinking Water System so the water treatment plant could be shut down for SCADA repairs. As this was on a Sunday and the local MOECC office was closed, notification had to be done to SAC.

Incident Date	Parameter	Result	Unit of Measure	Corrective Action	Corrective Action Date
April 1, 2017 AWQI # 132764	Possible improperly disinfected water directed to users due to watermain break	--	--	Area flushed, samples collected, precautionary boil water issued	April 1, 2017
August 13, 2017 AWQI #135316	Notification to SAC that our system is being fed from the Lakeshore DWS	--	--	None	None

The annual MOECC Inspection took place on September 28, 2017. The inspection report identified two non-compliance issues. Both non-compliances were in regard to spikes on the filter effluent turbidity and the SCADA systems inability to alarm for these short duration spikes. The SCADA system was upgraded in January 2018 to eliminate these situations. The system received a final inspection rating of 96.17%.

O. Reg 170 Schedule 22 requires the municipality to identify any requirements of the Act, Regulations, Drinking Water Works Permit, Municipal Drinking Water Licence and any Order that the system failed to meet during the reporting period. These are detailed in the following table including the duration and the measures taken to correct each failure.

Drinking Water Legislation	Requirements the System Failed to Meet	Duration	Corrective Actions
O. Reg. 170, Schedule 22, Section 22-2(1)	The Summary Report was not given to Council prior to March 31, 2017	Summary Reports were given to Council on April 5, 2017	A copy of the annual Schedule of Council Meetings has been obtained from the Clerks department to ensure the Summary Reports are submitted prior to the cut-off date to ensure they are on the Consent Agenda prior to March 31 each year.
O. Reg. 170, Schedule 6, Section 6.5(1.1)	The SCADA system did not alarm on every filter turbidity spike over 1 NTU when the duration of the spikes were less than 15 minutes	Year 2017	The SCADA system was upgraded in 2018
Safe Drinking Water Act Section 18(1) and O. Reg. 170, Schedule 16, Sections 16-6 and 16-7	An adverse report was not made for turbidity spikes over 1 NTU on Filter 2 effluent line that were 15 minutes apart	April 12, 2017	An in-house training session was conducted on November 23 after this was non-compliance was identified by the MOECC. The SCADA system was upgraded in 2018 to ensure all filter turbidity spikes greater than 1 NTU would send an alarm to staff
Drinking Water Works Permit #088-202 Issue #4, Section 2.4	The Director was not notified within 30 days after the new high lift pump #2 and the standpipe mixer were put into service in 2016. The required Form 2s had been completed in 2016 for this equipment.	Notification was given March 27, 2017	Notification was given March 27, 2017