



## **Underwood 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](http://www.kincardine.net) or by contacting the Water Services Department at [waterservice@kincardine.net](mailto:waterservice@kincardine.net).

### 1.1. System Description

<b>Drinking-Water System Number:</b>	220007052
<b>Drinking-Water System Name:</b>	Underwood Drinking Water System
<b>Drinking-Water System Owner:</b>	Municipality of Kincardine
<b>Drinking-Water System Category:</b>	Small Municipal Residential
<b>Period being reported:</b>	Year 2017

The Underwood Drinking Water System (DWS) is a non-GUDI system (which means that it is a secure well and not under the influence of surface water) consisting of a single well located in the hamlet of Underwood. The well is a drilled type with a 203 mm (8 in.) casing and is 122 m (400 ft) deep. It was drilled in August 1972 and is equipped with a submersible pump. Raw and treated water are each metered by mag meters. Sodium hypochlorite is used for disinfection. There is on-line monitoring of the treated water free chlorine residual. There are hydropneumatic tanks located in the control building that provide continuous pressure in the distribution system and allow for intermittent operation of the well pump. A chlorine contact chamber consisting of an 8.3 m length of 600 mm diameter pipe provides the required contact time. This system has a standby generator.

### 1.2. Major Expenses

The system required repairs and replacements as follows:

- Data collection equipment replacement (\$4,776.00)
- Well inspection and pump replacement (\$8,500.00)
- Generator repairs (\$3,700.00)

## 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 11, requires the Underwood DWS to take a minimum of one sample per month of raw water from the well, and one sample every two weeks of distribution water and have them tested for Escherichia coli (E. coli) and total coliforms. 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 treated and one 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 TC/EC Samples	Range of Total Coliform Results (#-#)	Range of E. coli Results (#-#)	Number of HPC Samples	Range of HPC Results (#-#)
<b>Raw</b>	12	0 – 0	0 – 0	12	0 – 240
<b>Treated</b>	52	0 – 0	0 – 0	52	0 – 2
<b>Distribution</b>	52	0 – 0	0 – 0	51	0 – 17

### 2.2. Chemical Testing

The Safe Drinking Water Act Reg 170 Schedule 13 requires periodic testing of the water for chemical parameters. The Underwood DWS is required to test for nitrite/nitrate, trihalomethane and Haloacetic Acid on a quarterly basis. The tables below outline other inorganic and organic parameters that are required to be tested every five years 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 levels exceed the Ontario Drinking Water Quality Standards, but they are naturally occurring in the groundwater and do not need to be tested more frequently than 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
<b>Antimony</b>	July 8/13	< 0.02	ug/L	No
<b>Arsenic</b>	July 8/13	4.0	ug/L	No
<b>Barium</b>	July 8/13	22.1	ug/L	No
<b>Boron</b>	July 8/13	184	ug/L	No
<b>Cadmium</b>	July 8/13	0.005	ug/L	No
<b>Chromium</b>	July 8/13	< 0.5	ug/L	No
<b>Mercury</b>	July 8/13	<0.01	ug/L	No
<b>Selenium</b>	July 8/13	< 1	ug/L	No
<b>Sodium</b>	Oct 16/17	68.3	mg/L	Yes
	Oct 25/17	56.7		
<b>Uranium</b>	July 8/13	0.353	ug/L	No
<b>Fluoride</b>	April 8/13	1.70	mg/L	Yes
	April 16/13	1.69		
<b>Nitrite</b>	Jan 9/17	< 0.003	mg/L	No
	Apr 10/17	0.017		
	July 17/17	< 0.003		
	Oct 16/17	< 0.003		
<b>Nitrate</b>	Jan 9/17	0.008	mg/L	No
	Apr 10/17	0.009		
	July 17/17	0.009		
	Oct 16/17	0.009		

Organic Parameter	Sample Date	Result Value	Unit of Measure	Exceedance
<b>Alachlor</b>	July 8/13	< 0.02	ug/L	No
<b>Aldicarb</b>	July 8/13	< 0.01	ug/L	No
<b>Aldrin + Dieldrin</b>	July 8/13	< 0.01	ug/L	No
<b>Atrazine + N-dealkylated metabolites</b>	July 8/13	< 0.01	ug/L	No
<b>Azinphos-methyl</b>	July 8/13	< 0.02	ug/L	No
<b>Bendiocarb</b>	July 8/13	< 0.01	ug/L	No
<b>Benzene</b>	July 8/13	< 0.32	ug/L	No
<b>Benzo(a)pyrene</b>	July 8/13	< 0.004	ug/L	No
<b>Bromoxynil</b>	July 8/13	< 0.33	ug/L	No
<b>Carbaryl</b>	July 8/13	< 0.01	ug/L	No
<b>Carbofuran</b>	July 8/13	< 0.01	ug/L	No
<b>Carbon Tetrachloride</b>	July 8/13	< 0.16	ug/L	No

Organic Parameter	Sample Date	Result Value	Unit of Measure	Exceedance
Chlordane (Total)	July 8/13	< 0.01	ug/L	No
Chlorpyrifos	July 8/13	< 0.02	ug/L	No
Cyanazine	July 8/13	< 0.03	ug/L	No
Diazinon	July 8/13	< 0.02	ug/L	No
Dicamba	July 8/13	< 0.20	ug/L	No
1,2-Dichlorobenzene	July 8/13	< 0.41	ug/L	No
1,4-Dichlorobenzene	July 8/13	< 0.36	ug/L	No
Dichlorodiphenyltrichloroethane (DDT) + metabolites	July 8/13	< 0.01	ug/L	No
1,2-Dichloroethane	July 8/13	< 0.35	ug/L	No
1,1-Dichloroethylene (vinylidene chloride)	July 8/13	< 0.33	ug/L	No
Dichloromethane	July 8/13	< 0.35	ug/L	No
2-4 Dichlorophenol	July 8/13	< 0.15	ug/L	No
2,4-Dichlorophenoxy acetic acid (2,4-D)	July 8/13	< 0.19	ug/L	No
Diclofop-methyl	July 8/13	< 0.40	ug/L	No
Dimethoate	July 8/13	< 0.03	ug/L	No
Dinoseb	July 8/13	< 0.36	ug/L	No
Diquat	July 8/13	< 1	ug/L	No
Diuron	July 8/13	< 0.03	ug/L	No
Glyphosate	July 8/13	< 1	ug/L	No
Heptachlor + Heptachlor Epoxide	July 8/13	< 0.01	ug/L	No
Linadane (Total)	July 8/13	< 0.01	ug/L	No
Malathion	July 8/13	< 0.02	ug/L	No
Methoxychlor	July 8/13	< 0.01	ug/L	No
Metolachlor	July 8/13	< 0.01	ug/L	No
Metribuzin	July 8/13	< 0.02	ug/L	No
Monochlorobenzene	July 8/13	< 0.3	ug/L	No
Paraquat	July 8/13	< 1	ug/L	No
Parathion	July 8/13	< 0.02	ug/L	No
Pentachlorophenol	July 8/13	< 0.15	ug/L	No
Phorate	July 8/13	< 0.01	ug/L	No
Picloram	July 8/13	< 1	ug/L	No
Polychlorinated Biphenyls (PCB)	July 8/13	< 0.04	ug/L	No
Prometryne	July 8/13	< 0.03	ug/L	No
Simazine	July 8/13	< 0.01	ug/L	No
Temephos	July 8/13	< 0.01	ug/L	No
Terbufos	July 8/13	< 0.01	ug/L	No
Tetrachloroethylene	July 8/13	< 0.35	ug/L	No
2,3,4,6-Tetrachlorophenol	July 8/13	< 0.14	ug/L	No
Triallate	July 8/13	< 0.01	ug/L	No
Trichloroethylene	July 8/13	< 0.44	ug/L	No
2,4,6-Trichlorophenol	July 8/13	< 0.25	ug/L	No
2,4,5-Trichlorophenoxy acetic acid (2,4,5-T)	July 8/13	< 0.22	ug/L	No
Trifluralin	July 8/13	< 0.02	ug/L	No
Vinyl Chloride	July 8/13	< 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	41	48	No
April 10/17	33	45	No
July 17/17	47	39	No
Oct 16/17	72	48	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	6.0	6.0	No
April 10/17	< 5.3	5.7	No
July 17/17	< 5.3	5.5	No
Oct 16/17	9.2	6.5	No

The Underwood 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 (ug/L)	Distribution	None	None
pH	Distribution	2	7.85 – 8.05
Alkalinity (mg/L)	Distribution	2	102 – 104

### 2.3. Operational Monitoring

Sodium hypochlorite is used for primary and secondary disinfection. The free chlorine residual is monitored continuously on the treated water and must be checked a minimum of twice per week in the distribution system.

The MOECC *Procedure for Disinfection of Drinking Water in Ontario* outlines the minimum chlorine residual for adequate treatment. On September 22, a low chlorine residual was recorded but due to the short duration, was not considered adverse.

Free Chlorine Residual	Number of Grab Samples	Range of Results (#-#)
<b>Treated Water</b>	Continuous monitoring	0.01 – 5.34
<b>Distribution Water</b>	364	0.18 – 1.99

O. Reg 170 Schedule 7 requires that turbidity in the raw water is tested at least once every month. Consistent turbidity results greater than 1 NTU could indicate surface water influence on the well.

Raw Water	Number of Grab Samples	Range of Results (#-#)
<b>Turbidity</b>	48	0.14 – 0.60

### 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 of the treatment system is 90.8 m<sup>3</sup>/day. There is no maximum flow rate specified for water supplied to the distribution system.

Month	Average Daily Flow (m <sup>3</sup> /day)	% Average Day/Rated Capacity (m <sup>3</sup> /day)	Maximum Daily Flow (m <sup>3</sup> /day)	% Maximum Day/Rated Capacity (m <sup>3</sup> /day)
<b>January</b>	14	16%	24	26%
<b>February</b>	16	18%	41	45%
<b>March</b>	16	18%	27	30%
<b>April</b>	17	19%	29	32%
<b>May</b>	17	18%	23	25%
<b>June</b>	16	18%	22	24%
<b>July</b>	17	19%	23	25%
<b>August</b>	16	18%	21	23%
<b>September</b>	15	17%	21	23%
<b>October</b>	14	15%	18	20%
<b>November</b>	15	16%	18	20%
<b>December</b>	15	17%	18	20%
<b>Annual</b>	16	17%	41	45%

Month	Average Daily Flow Rate (L/s)	Maximum Daily Flow Rate (L/s)
January	0.17	1.33
February	0.19	3.35
March	0.19	2.95
April	0.20	2.98
May	0.19	1.75
June	0.20	2.80
July	0.19	1.29
August	0.18	2.57
September	0.17	3.09
October	0.16	1.59
November	0.17	1.38
December	0.17	1.53
Annual	0.18	3.35

#### 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. For sodium, a result above 20 mg/L must be reported. The municipality notifies residents of the elevated sodium annually in the first water bill each year.

Incident Date	Parameter	Result	Unit of Measure	Corrective Action	Corrective Action Date
October 24, 2018 #137541	Sodium	68.3	mg/L	Resample	October 25, 2018

The annual MOECC Inspection took place on April 10, 2017. The inspection report did not identify any non-compliance issues and the system received a final inspection rating of 100%.

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.



<b>Drinking Water Legislation</b>	<b>Requirements the System Failed to Meet</b>	<b>Duration</b>	<b>Corrective Actions</b>
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.