

# Killaloe Drinking Water System

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## 2017 Annual Water Report

Reporting period of January 1, 2017 – December 31, 2017



Prepared For: The Township of Killaloe, Hagarty and Richards

Prepared By:



**Ontario Clean Water Agency**  
**Agence Ontarienne Des Eaux**

This report has been prepared to satisfy the annual reporting requirements of the  
Provincial Regulations and Guidelines

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## Report Availability

This system does not serve more than 10,000 residence and the annual reports will be available to residents at the Township of Killaloe, Hagarty and Richards Municipal Office. Notification will be at the Municipal Office and copies provided free of charge if requested. The Township of Killaloe, Hagarty and Richards is located at, 1 John Street in the Village of Killaloe.

There are no systems additional drinking water systems that receive water from this facility.

## Compliance Report Card

Drinking Water System Number:	<b>220006026</b>
System Owner:	<b>Township of Killaloe, Hagarty and Richards</b>
Operating Authority:	Ontario Clean Water Agency
Drinking Water System Category:	Large Municipal Residential
Reporting Period:	January 1, 2017 – December 31, 2017

Compliance Event	# of Events	Details
Ministry of Environment Inspections	1	Report received from September 19, 2017 inspection on December 13, 2017. <ul style="list-style-type: none"> <li>No action required</li> <li>Inspection Rating 100%</li> </ul>
Ministry of Labour Inspections	0	
QEMS External Audit	0	
AWQI's	0	
Non-Compliance	1	Trending failure because the analyzer was not holding calibration.  San Eco Tech came on-site to fix issues with analyzer software.
Community Complaints	0	
Spills	0	

## Quality Control Measures

The Township of Killaloe, Hagarty and Richards facilities are part of OCWA's operational Eastern Regional Hub. The facilities are supported by cluster, regional and corporate resources. Operational Services are delivered by OCWA staff who live and work in the area.

OCWA operates facilities in compliance with applicable regulations. The facility has comprehensive manuals detailing operations, maintenance, instrumentation, and emergency procedures. All procedures are treated as active documents, with annual reviews.

OCWA has additional "Value Added" and operational support services that the Township of Killaloe, Hagarty and Richards benefits from including:

- Access to a network of operational compliance and support experts at the regional and corporate level, as well as affiliated programs that include the following:
  - Quality & Environmental Management System, Occupational Health & Safety System and an internal compliance audit system.
  - Process Data Management (PDM) facility operating information repository, which consolidates field data, online instrumentation, and electronic receipt of lab test results for reporting, tracking and analysis.
  - Work Management System (WMS) that tracks and reports maintenance activities, and creates predictive and preventative reports.
  - Outpost 5 wide-area SCADA system allows for process optimization and data logging, process trending, remote alarming and optimization of staff time.
- Client reporting which includes operational data, equipment inventory, financial statements, maintenance work orders, and capital status reports
- Site-Specific Contingency Plans and Standard Operating Procedures
- Use of accredited laboratories
- Additional support in response to unusual circumstances, and extra support in an emergency.
- Use of sampling schedules for external laboratory sampling

## System Process Description

### Raw Source

Raw water source for the Killaloe Drinking Water System is a well located at the Treatment Plant.



### Treatment

Killaloe Water Treatment Plant is a single well, groundwater system equipped with greensand contactors that provide iron and manganese removal.



Pre-disinfection is provided using sodium hypochlorite and ultraviolet light. Secondary disinfection is being provided using stabilized hydrogen peroxide. The peroxide is injected prior to the clearwells and a residual is maintained through the distribution system.



Treatment Chemicals used during the reporting year:

Chemical Name	Use	Supplier
Potassium Permanganate	Contactant	Cariox
Sodium Hypochlorite	Disinfection	Brenntag
Hydrogen Peroxide (Huwa San)	Disinfection	San Eco Tech

## Summary of Non-Compliance

### Adverse Water Quality Incidents

Date	AWQI #	Location	Problem	Legislation	Details	Corrective Action Taken
There were no Adverse Water Quality Incidents reported for this facility in 2017.						

### Non-Compliance

Legislation	requirement(s) system failed to meet	duration of the failure (i.e. date(s))	Corrective Action	Status
MDWL	Trending	05-Jul-2017 to 10-Jul-2017	San Eco Tech on-site to fix issues with analyzer software.	Repaired

### Non-Compliance Identified in a Ministry Inspection:

There was one (1) inspection reports received during this reporting period.

- Report received from December 13, 2017 inspection on September 19, 2017.
  - No action required
  - Inspection Rating 100%

Legislation	requirement(s) system failed to meet	duration of the failure (i.e. date(s))	Corrective Action	Status
No Actions Required in either inspection report received during this reporting period.				



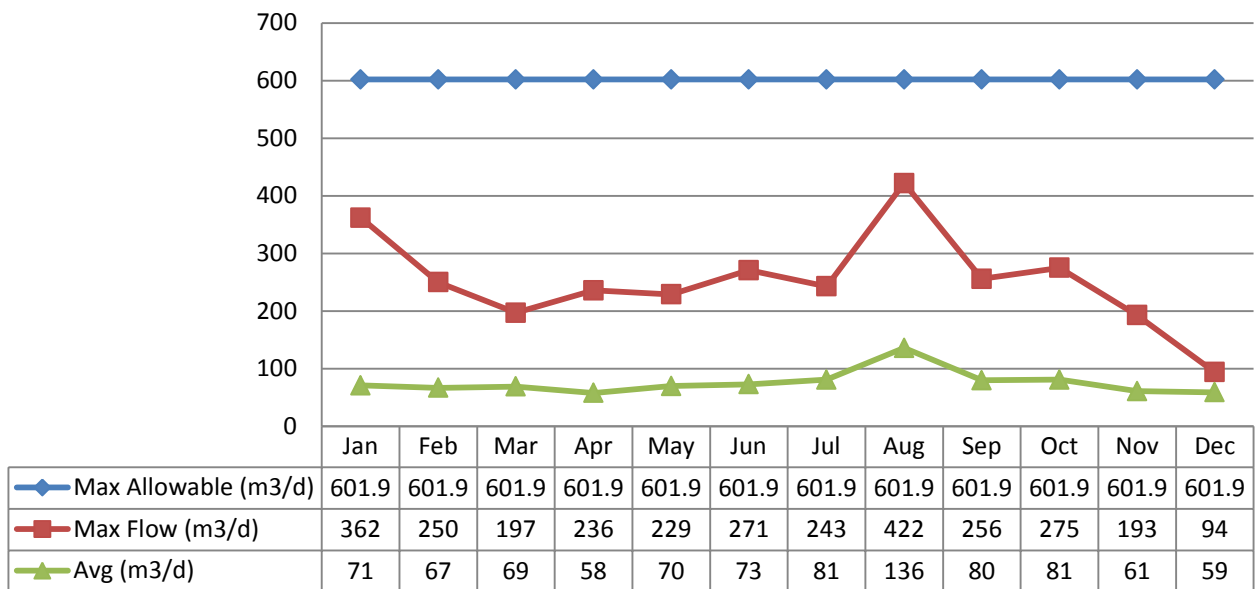
## Flows

The Killaloe Drinking Water System is operating on average under half the rated capacity.

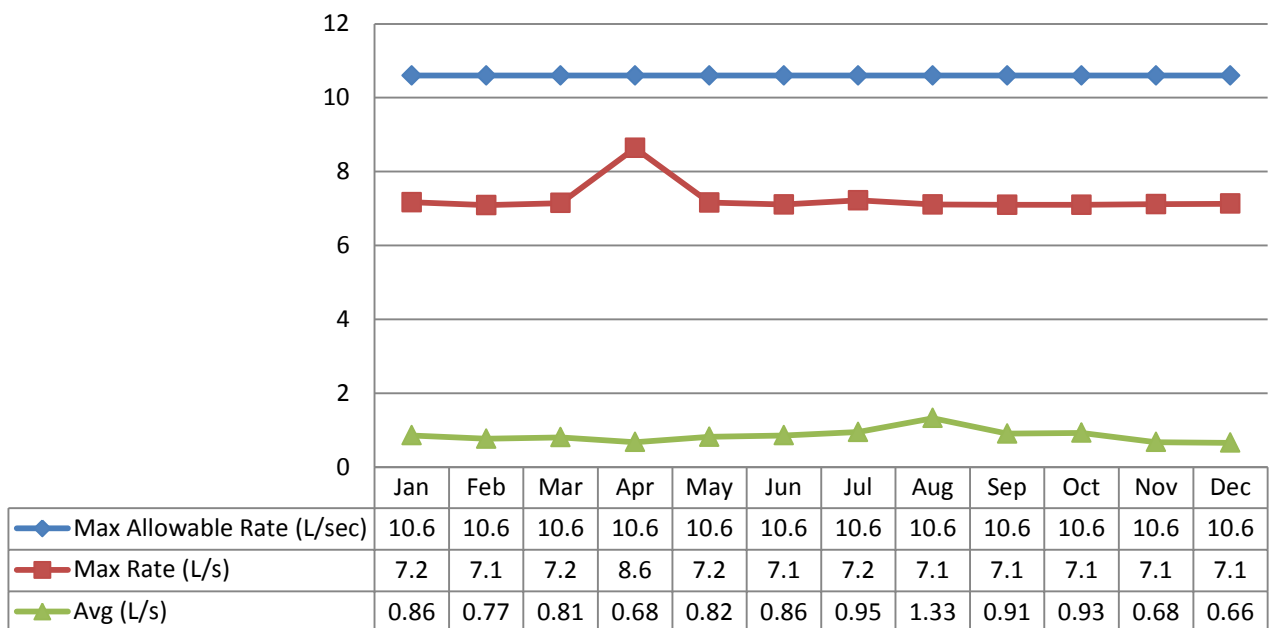
### Raw Water Flows

The Raw Water flows are regulated under the Permit to Take Water.

#### Total Monthly Flows (m3/d)



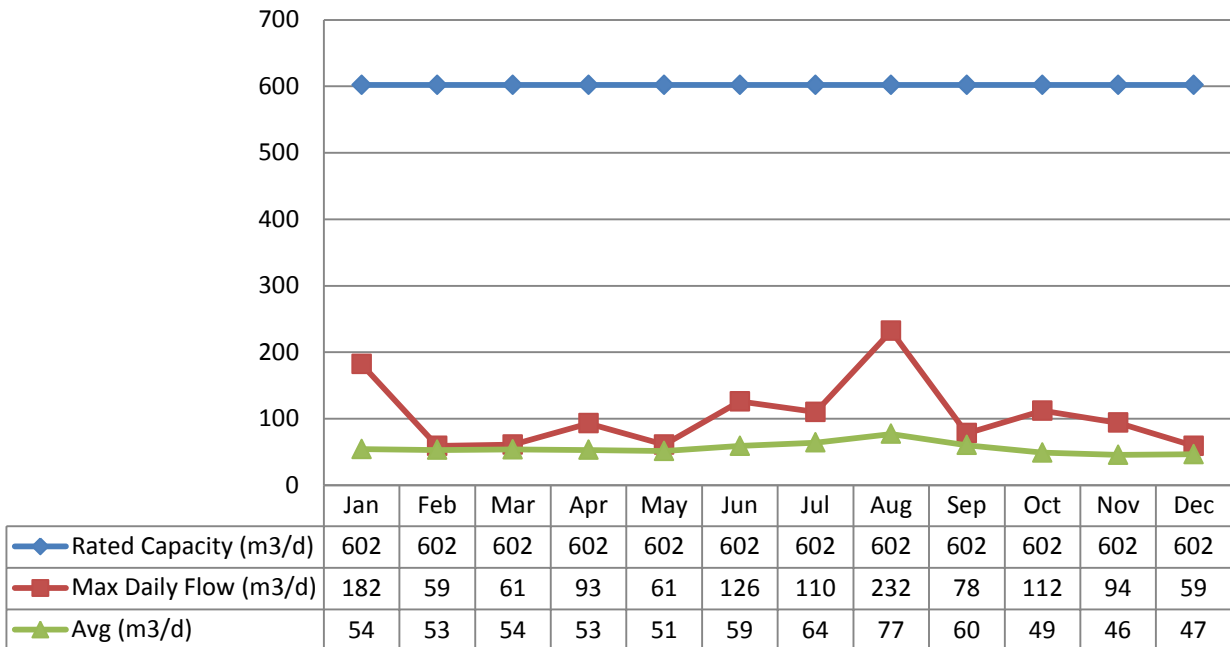
#### Monthly Rated Flows



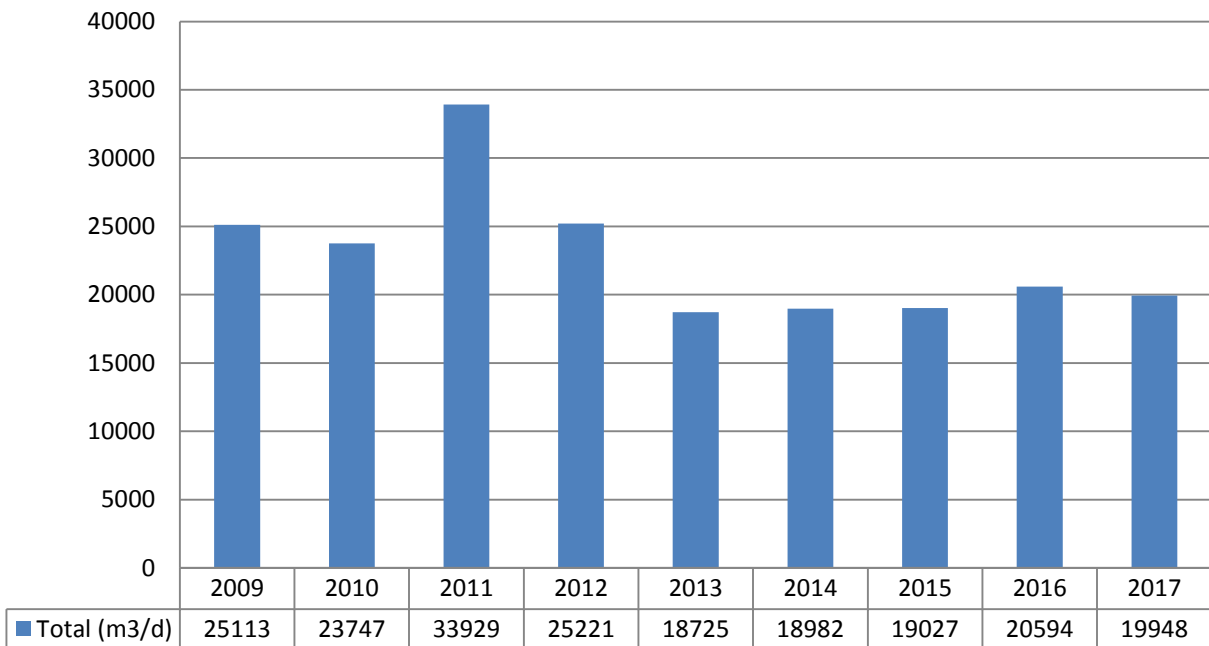
## Treated Water Flows

The Treated Water flows are regulated under the Municipal Licence.

### Total Monthly Flows (m3/d)



### Annual Total Flow Comparison



## Regulatory Sample Results Summary

### Microbiological Testing

	No. of Samples Collected	Range of E.Coli		Range of Total Coliform Results		Number of HPC Samples	Range of HPC Results	
		Min	Max	Min	Max		Min	Max
Raw Water	52	0	0	0	0	0		
Treated Water	52	0	0	0	0	52	0	20
Distribution Water	107	0	0	0	0	107	0	1780

### Operational Testing

Chlorine is only used for primary disinfection as Hydrogen Peroxide is used for secondary disinfection in the distribution system.

Fluoride is not added to the process.

### On-Line

Parameter	Range of Results (min # - max #)
Primary Free Chlorine	0.43 – 1.0 mg/L
Pre Clearwell Peroxide	0.023 – 19.995 ppm
Post Clearwell Peroxide	5.16 – 8.73 ppm
Distribution Peroxide	0.5 – 12.8 ppm

NOTE: spikes recorded by on-line instrumentation were a result of air bubbles and various maintenance/calibration activities. All spikes are reviewed for compliance with O.Reg 170/03 and the Municipal Drinking Water License

### In-House

Parameter	# of grab samples taken	Range of Results (min # - max #)
Primary Free Chlorine	248	0.51 – 1.01 mg/L
Raw Colour	104	2-6 TCU
Raw Iron	104	0.116 – 0.246 mg/L
Raw Manganese	104	0.161 – 0.263 mg/L
Raw Turbidity	248	0.17 – 0.22 NTU
Raw pH	105	7.8 – 8.1
Treated Turbidity	248	0.1 – 0.45 NTU
Treated Colour	104	0 – 8 TCU
Treated pH	105	7.8 – 8.21
Treated Iron	104	0.001 - 0.014 mg/L
Treated Manganese	104	0.011 - 0.04 mg/L
Distribution pH	52	7.8 – 8.1
Distribution Peroxide Residual	181	1.1 – 7 ppm

Laboratory

Parameter	# of Samples	Range of Results (min # - max #)
Raw Alkalinity	12	211 - 268 mg/L
Raw Colour	12	6 - 10 TCU
Raw pH	12	7.83 – 8.2
Raw Total Dissolved Solids	12	397 – 506 mg/L
Raw Hardness	12	289 – 390 mg/L
Treated Alkalinity	12	248 - 267 mg/L
Treated Colour	12	3 - 6 TCU
Treated pH	12	7.83 – 8.26
Treated Total Dissolved Solids	12	400 – 469 mg/L
Treated Hardness	12	308 – 369 mg/L
Distribution Alkalinity	13	239-267 mg/L
Distribution Colour	12	4 - 8 TCU
Distribution pH	12	7.86 – 8.25
Distribution Total Dissolved Solids	12	426 – 477 mg/L
Distribution Hardness	12	313 – 365 mg/L
Production Well Benzene	1	<0.32 ug/L
Production Well Ethylbenzene	1	<0.33 ug/L
Production Well m/p-xylene	1	<0.43 ug/L
Production Well o-xylene	1	<0.17 ug/L
Production Well Xylene: Total	1	<0.43 mg/L
Production Well Toluene	1	<0.36 ug/L
Test Well Benzene	1	<0.32 ug/L
Test Well Ethylbenzene	1	<0.33 ug/L
Test Well m/p-xylene	1	<0.43 ug/L
Test Well o-xylene	1	<0.17 ug/L
Test Well Xylene: Total	1	<0.43 mg/L
Test Well Toluene	1	<0.36 ug/L

## Additional Legislated Samples

Appendix C has monthly summary data for the Additional Legislated Samples.

Legal Document	Date of Issuance	Parameter	Date Sampled	Result	Unit of measure
Municipal License #259-101	02-Dec-2015	Backwash Effluent Suspended Solids	Annual Avg	2.455	mg/L
		Backwash Effluent pH	Annual Avg	7.79	no units
		Distribution Copper	January 2017	51.3 – 80.8	ug/L
			July 2017	49.4 – 53.1	ug/L
		Distribution Lead	January 2017	0.09 – 0.24	ug/L
			July 2017	0.21 – 0.23	ug/L

- Hydrogen peroxide residuals see Operational Testing
- HPC Testing Results see Microbiological testing
- pH testing results see Operational Testing

## Inorganic Parameters

These parameters are tested annually as a requirement under 170/03. Sodium and Fluoride are required to be tested every 5 years. Nitrates are tested quarterly as required under 170/03. In the event any of the parameters (except Sodium and Fluoride) exceed half of the maximum allowable concentration the parameter is required to be sampled quarterly.

- MAC = Maximum Allowable Concentration as per O.Reg 169/03
- BDL = Below the laboratory detection level

	Sample Date (mm/dd/yyyy)	Sample Result	MAC	No. of Exceedances	
				MAC	1/2 MAC
<b>Treated Water</b>					
Antimony: Sb (ug/L) - TW	2017/01/04	0.02	6.0	No	No
Arsenic: As (ug/L) - TW	2017/01/04	<MDL 0.2	25.0	No	No
Barium: Ba (ug/L) - TW	2017/01/04	171.0	1000.0	No	No
Boron: B (ug/L) - TW	2017/01/04	124.0	5000.0	No	No
Cadmium: Cd (ug/L) - TW	2017/01/04	0.005	5.0	No	No
Chromium: Cr (ug/L) - TW	2017/01/04	0.55	50.0	No	No
Mercury: Hg (ug/L) - TW	2017/01/04	<MDL 0.01	1.0	No	No
Selenium: Se (ug/L) - TW	2017/01/04	0.08	50.0	No	No
Uranium: U (ug/L) - TW	2017/01/04	2.2	20.0	No	No
<b>Additional Inorganics</b>					
Fluoride (mg/L) - TW	2013/01/03	0.27	1.5	No	No
Nitrite (mg/L) - TW	2017/01/03	<MDL 0.003	1.0	No	No
Nitrite (mg/L) - TW	2017/04/04	<MDL 0.003	1.0	No	No
Nitrite (mg/L) - TW	2017/07/04	0.04	1.0	No	No

	Sample Date (mm/dd/yyyy)	Sample Result	MAC	No. of Exceedances	
				MAC	1/2 MAC
Nitrite (mg/L) - TW	2017/10/03	<MDL 0.003	1.0	No	No
Nitrate (mg/L) - TW	2017/01/03	0.014	10.0	No	No
Nitrate (mg/L) - TW	2017/04/04	0.01	10.0	No	No
Nitrate (mg/L) - TW	2017/07/04	0.044	10.0	No	No
Nitrate (mg/L) - TW	2017/10/03	0.009	10.0	No	No
Sodium: Na (mg/L) - TW	2013/01/09	30.4	20*	Yes	Yes

\*There is no "MAC" for Sodium. The aesthetic objective for sodium in drinking water is 200 mg/L. The local Medical Officer of Health should be notified mg/L when the sodium concentration exceeds 20 mg/L so that this information may be communicated to local physicians for their use with patients on sodium restricted diets.

### Schedule 15 Sampling:

This facility is sampling under the exemption requirements of O.Reg 170/03 sampling program.

Location Type	Number of Samples	Range of Results		MAC (ug/L)	Number of Exceedances
		Minimum	Maximum		
Distribution Water - Lead Results (ug/L)	4	0.09	0.24	10	0
Distribution Water - Alkalinity (mg/L)	13	239	267	n/a	n/a
Distribution Water - pH	12	7.86	8.25	n/a	n/a

The Municipal License requires lead sampling to be sampled every 6 months. The sample results are included in this report under the "Additional Legislated Samples".

### Organic Parameters

These parameters are tested annually as a requirement under 170/03. In the event any of the parameters exceed half of the maximum allowable concentration the parameter is required to be sampled quarterly.

•

	Sample Date (mm/dd/yyyy)	Sample Result	MAC	Number of Exceedances	
				MAC	1/2 MAC
<b>TREATED WATER</b>					
Alachlor (ug/L) - TW	2017/01/04	<MDL 0.02	5.00	No	No
Atrazine + N-dealkylated metabolites (ug/L) - TW	2017/01/04	<MDL 0.01	5.00	No	No
Azinphos-methyl (ug/L) - TW	2017/01/04	<MDL 0.05	20.00	No	No
Benzene (ug/L) - TW	2017/01/04	<MDL 0.32	1.00	No	No
Benzo(a)pyrene (ug/L) - TW	2017/01/04	<MDL 0.004	0.01	No	No
Bromoxynil (ug/L) - TW	2017/01/04	<MDL 0.33	5.00	No	No
Carbaryl (ug/L) - TW	2017/01/04	<MDL 0.05	90.00	No	No
Carbofuran (ug/L) - TW	2017/01/04	<MDL 0.01	90.00	No	No

	Sample Date (mm/dd/yyyy)	Sample Result	MAC	Number of Exceedances	
				MAC	1/2 MAC
Carbon Tetrachloride (ug/L) - TW	2017/01/04	<MDL 0.16	2.00	No	No
Chlorpyrifos (ug/L) - TW	2017/01/04	<MDL 0.02	90.00	No	No
Diazinon (ug/L) - TW	2017/01/04	<MDL 0.02	20.00	No	No
Dicamba (ug/L) - TW	2017/01/04	<MDL 0.2	120.00	No	No
1,2-Dichlorobenzene (ug/L) - TW	2017/01/04	<MDL 0.41	200.00	No	No
1,4-Dichlorobenzene (ug/L) - TW	2017/01/04	<MDL 0.36	5.00	No	No
1,2-Dichloroethane (ug/L) - TW	2017/01/04	<MDL 0.35	5.00	No	No
1,1-Dichloroethylene (ug/L) - TW	2017/01/04	<MDL 0.33	14.00	No	No
Dichloromethane (Methylene Chloride) (ug/L) - TW	2017/01/04	<MDL 0.35	50.00	No	No
2,4-Dichlorophenol (ug/L) - TW	2017/01/04	<MDL 0.15	900.00	No	No
2,4-Dichlorophenoxy acetic acid (2,4-D) (ug/L) - TW	2017/01/04	<MDL 0.19	100.00	No	No
Diclofop-methyl (ug/L) - TW	2017/01/04	<MDL 0.4	9.00	No	No
Dimethoate (ug/L) - TW	2017/01/04	<MDL 0.03	20.00	No	No
Diquat (ug/L) - TW	2017/01/04	<MDL 1.0	70.00	No	No
Diuron (ug/L) - TW	2017/01/04	<MDL 0.03	150.00	No	No
Glyphosate (ug/L) - TW	2017/01/04	<MDL 1.0	280.00	No	No
Malathion (ug/L) - TW	2017/01/04	<MDL 0.02	190.00	No	No
Metolachlor (ug/L) - TW	2017/01/04	<MDL 0.01	50.00	No	No
2-Methyl-4chlorophenoxyacetic Acid (MCPA)	2017/01/04	<MDL 0.00012	0.00012	No	No
Metribuzin (ug/L) - TW	2017/01/04	<MDL 0.02	80.00	No	No
Monochlorobenzene (Chlorobenzene) (ug/L) - TW	2017/01/04	<MDL 0.3	80.00	No	No
Paraquat (ug/L) - TW	2017/01/04	<MDL 1.0	10.00	No	No
PCB (ug/L) - TW	2017/01/04	<MDL 0.04	3.00	No	No
Pentachlorophenol (ug/L) - TW	2017/01/04	<MDL 0.15	60.00	No	No
Phorate (ug/L) - TW	2017/01/04	<MDL 0.01	2.00	No	No
Picloram (ug/L) - TW	2017/01/04	<MDL 1.0	190.00	No	No
Prometryne (ug/L) - TW	2017/01/04	<MDL 0.03	1.00	No	No
Simazine (ug/L) - TW	2017/01/04	<MDL 0.01	10.00	No	No
Terbufos (ug/L) - TW	2017/01/04	<MDL 0.01	1.00	No	No
Tetrachloroethylene (ug/L) - TW	2017/01/04	<MDL 0.35	10.00	No	No
2,3,4,6-Tetrachlorophenol (ug/L) - TW	2017/01/04	<MDL 0.2	100.00	No	No
Triallate (ug/L) - TW	2017/01/04	<MDL 0.01	230.00	No	No
Trichloroethylene (ug/L) - TW	2017/01/04	<MDL 0.44	5.00	No	No
2,4,6-Trichlorophenol (ug/L) - TW	2017/01/04	<MDL 0.25	5.00	No	No
Trifluralin (ug/L) - TW	2017/01/04	<MDL 0.02	45.00	No	No
Vinyl Chloride (ug/L) - TW	2017/01/04	<MDL 0.17	1.00	No	No
<b>DISTRIBUTION WATER</b>					
Trihalomethane: Total (ug/L) Annual Average - DW	2017	32.0	100.00	No	No

## Evaluation of the Effectiveness of Secondary Disinfectant

The hydrogen peroxide continues to work well as a secondary disinfection while producing reduced THM's within the distribution system. All parameters that are being monitored are remaining within compliance and normal operating limits. There have been no significant anomalies in any tested levels.

On February 28, 2018 weekly bacti sampling included one raw water, one treated water and two distribution samples. The results returned an abnormally high HPC result in one of the two distribution bacti samples of 1780 cfu/1mL taken from 177 Queen Street. A hydrogen peroxide residual of 4.4 ppm was measured at the time of the abnormal HPC result. The treated water sample and the second distribution sample (taken from 1 John Street) had results of 0 cfu/1mL HPC. The following week a sample was again collected from 177 Queen Street, the HPC result was 0 cfu/1mL. Upon review of the 2017 HPC data this sample did not appear to be representative of the overall system.

It should be noted that no regulatory limits were exceeded.

More detailed sampling summaries for the additional parameters are available in Appendix C.

## Maintenance Summary

OCWA uses a risk-based preventative maintenance framework that ensures assets are maintained to manufacturer's and/or industry standards. Maintenance is completed using various tools and operational supports. The Eastern Regional Hub has specialized certified staff such as Millwrights, Electricians and Instrumentation Specialists to name a few.

OCWA uses a Workplace Maintenance System (WMS). WMS is a maintenance tracking system that can generate work orders as well as give summaries of completed and scheduled work. During the year, the operating authority at the facility generates scheduled work orders on a weekly, monthly and annual basis. The service work is recorded in the work order history. This ensures routine and preventive maintenance is carried out. Emergency and capital repair maintenance is completed and added to the system.

Capital projects are listed and provided to the Township of Killaloe, Hagarty and Richards in the form of a "Capital Forecast". This list is developed by facility staff and provides recommendations for facility components requiring upgrading or improvement.

Preventative Maintenance Work Orders Completed	194
Operational Maintenance Work Orders Completed	65
Corrective Maintenance Work Orders Completed	23

## Maintenance Highlights

WO#	Details
243677	SAI Global Internal Audit
344567	Avive Annual Maintenance
346282	H2Flow Annual UV system sensor calibrations



## Distribution Maintenance Highlights

Date of Incident	Street	Details	Corrective Action Taken
There were no Watermain Breaks during this reporting period.			

## Community Complaints

There were no complaints received during the reporting year.

## QEMS

The Ontario Clean Water Agency has received Full scope accreditation. There was an external surveillance audit completed. There were no non-conformances identified. The Internal Audit and Management Review were completed. Minutes from the Management Review were provided to the Town.

## Water Taking and Transfer Data

2017 data was submitted electronically on January 18, 2018 under permit #2835-9LMRUZ. The WTRS data and submission confirmation are attached in Appendix A.

## Small System Summary

The Ontario Clean Water Agency sampled at four (4) small Ministry of Health regulated systems owned by The Township of Killaloe, Hagarty and Richards. Below is a summary of the sample results.

## Sampling Results

Location	Number of Samples	E.coli Results (min) - (max)	Total Coliform Results (min) – (max)
Killaloe Rink	11	0 – 0	0 – 1
Killaloe Medical Center	4	0 – 0	0 – 0
Round Lake Arena	4	0 – 0	0 – 0

## Non-Compliance/Adverse Results

Facility	Date	Legislation	AWQI #	Problem	Corrective Action
Killaloe Rink	August 24, 2017	319/09	62404	1 Total Coliform	Resampled. No Action required due to low count

## Maintenance Highlights

- Operations staff clean UV system and replace sediment filters as required at the Killaloe Medical Center.

# Appendix A

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## **WTRS Data and Submission Confirmation**

Location: [WTRS](#) / [WT DATA](#) / [Input WT Record](#)

WTRS-WT-008

**Water Taking Data submitted successfully.****Confirmation:**

Thank you for submitting your water taking data online.

Permit Number: 2835-9LMRUZ

Permit Holder: THE CORPORATION OF THE TOWNSHIP OF KILLALOE, HAGARTY AND RICHARDS.

Received on: Jan 18, 2018 11:18 AM

This confirmation indicates that your data has been received by the Ministry, but should not be construed as acceptance of this data if it differs from that specified on the Permit Number, assigned to the Permit Holder stated above.

[Return to Main Page](#)

TOWNSHIP2 KILLALOE2 | 2018/01/18

version: v4.5.0.7 (build#: 17)

Last modified: 2017/09/15



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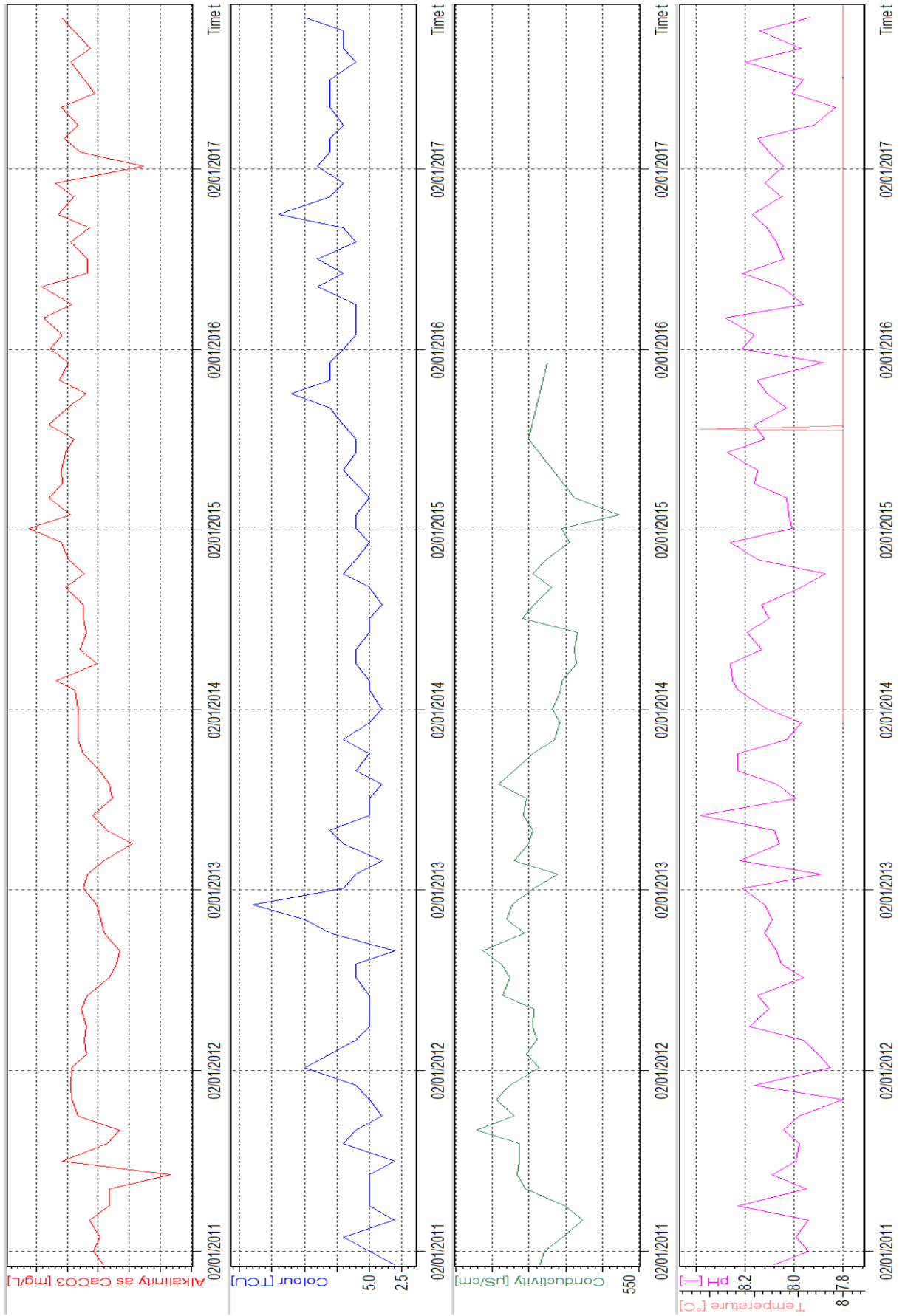
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# Appendix B

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## Raw Water Data

Killaloe Drinking Water System - RW Chems



# Appendix C

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## **Evaluation of the Effectiveness of Secondary Disinfectant**

Report extracted 03/20/2018 09:14

From: 01/01/2017 to 31/12/2017

Facility Works Number:

6069

Facility Name:

KILLALOE DRINKING WATER SYSTEM

Facility Owner:

Municipality: Township of Killaloe, Hagarty & Richards

Facility Classification:

Class 1 Water Treatment

Service Population:

602.0

Total Design Capacity:

602.0 m3/day

	01/2017	02/2017	03/2017	04/2017	05/2017	06/2017	07/2017	08/2017	09/2017	10/2017	11/2017	12/2017	Total	Avg	Max	Min
<b>Distribution Water / Copper: Cu - µg/l</b>																
Count Lab		2	0	0	0	0	2	0	0	0	0	0	4			
Max Lab		80.8					53.1								80.8	
Mean Lab		66.05					51.1							51.2		
Min Lab		51.3					49.1									49.1
<b>Distribution Water / HPC - cfu/mL</b>																
Count Lab		9	9	9	9	9	9	8	9	9	9	9	107			
Max Lab		4	1780	1	1	1	100	2	1	15	1	5			1780	
Mean Lab		0.556	198	0.444	0.222	0.333	11.444	0.556	0.111	1.889	0.111	0.111	0.556	18.895		
Min Lab		0	0	0	0	0	0	0	0	0	0	0				0
<b>Distribution Water / Hydrogen Peroxide - mg/L</b>																
Count IH		17	17	18	16	18	16	19	16	17	18	16	206			
Max IH		4.4	4.7	4.4	4.4	4.4	4.9	4.5	7	7	5.8	4	4.5		7	
Mean IH		3.023	3.672	3.276	2.941	3.074	2.965	3.135	3.882	3.702	2.52	3.4	2.561	3.135		
Min IH		2.2	2.8	2.5	2	2.2	2	2.1	2.1	2.2	1.6	1.5	1			1
Max OL		8.308	10.174	5.597	6.778	7.398	8.598	19.955	7.544	11.414	7.896	7.558	10.216		20	
Mean OL		4.464	4.406	4.227	3.835	3.464	4.385	3.918	3.485	3.886	3.775	3.493	3.414	3.896		
Min OL		2.521	2.11	3.416	1.832	1.845	1.243	0	0	0	1.303	0	0.121			0
<b>Distribution Water / Lead: Pb - µg/l</b>																
Count Lab		2	0	0	0	0	2	0	0	0	0	0	4			
Max Lab		0.24					0.23								0.24	
Mean Lab		0.165					0.22							0.193		
Min Lab		0.09					0.21									0.09
<b>Distribution Water / pH Field: Lab Upload - ---</b>																
Max IH		8.1	8.1	8.1	8.1	8.1	8.1	8.1	8	8	8.1	8.1			8.1	
Mean IH		8.083	8.1	8.09	8.1	8.1	8.075	8.1	7.96	8	7.98	8.075	8.025	8.057		
Min IH		8	8.1	8.06	8.1	8.1	8	8.1	7.8	8	7.9	8	8			7.8