



**RICHARDS LANDING
DRINKING WATER SYSTEM
WATERWORKS # 220007212**







**ANNUAL & SUMMARY
REPORTS 2018**



Introduction

This Annual and Summary Report has been prepared in accordance with both Schedule 22 and section 11 of Ontario Regulation 170/03. In this manner, the requirements by regulation for each report have been consolidated into a single document. This Report is intended to brief the ownership and consumers of the Richards Landing Drinking Water System on the system's performance over the past calendar year January 1 to December 31, 2018.

This report encompasses all elements as required by O. Reg. 170/03. Each section explains what is required for the category Large Municipal Residential DWS (as it pertains to the Richards Landing DWS) and how limits were met or if shortfalls were revealed. The last section contains a list of tables and definition of terms identified in this report.

 System Description	Page 3
 Water Quality	Page 4
 Compliance	Page 7
 Flows	Page 8
 Report Endorsement	Page 10
 Tables, Definition of Terms App: A/B	Page 11



System Description

The Richards Landing Well Pump house is owned by the Township of St. Joseph.

Richards Landing is located on the northern shore of St. Joseph Island, in the Township of St. Joseph. The Well Pumphouse was constructed in 1994 on the corner of Highway 548 and Lewellyn Street to replace the private well systems previously used in the community of Richard's Landing. The Township of St. Joseph Water Treatment facility is rated as a Class 1 Water Treatment subsystem, and is categorized under O. Reg. 170/03 as a Large Municipal Residential system. Approximately 400 of the Township's 1122 residents are provided with potable drinking water from the facility.

The system is comprised of the following equipment:

- Two wells equipped with submersible pumps, one monitoring well, instrumentation and controls
- Disinfection process including two filtration trains each consisting of one 10 micron bag filter system, disinfection facilities (two UV irradiation reactors and a sodium hypochlorite chemical feed system consisting of two chemical feed pumps),
- Corrosion control process including a blended phosphate chemical feed system consisting of two chemical feed pumps
- In-ground storage, four high lift pumps and one fire pump. A diesel generator is located on-site to provide emergency power, and two pressure tanks maintain distribution system pressure during low flow conditions.

The facility design capacity is 912 L/min and the high lift pumps maintain system pressure between 87 and 99 psi (600 to 680kPa) under normal operating conditions (maximum daily flow)

Chemicals

Chemicals utilized at the Richards Landing Treatment plant during 2018 include:

- Sodium Hypochlorite for primary and secondary disinfection
- Blended Phosphates - Carus 8500™

2018 Expenditures

During the year of 2018, expenses were incurred to maintain treatment and distribution functions:

- Highlift Pumps
- Well #1 submersible pump
- Desktop Computer – WTP
- 12 month surveillance audit by SAI Global

2018 Drinking Water System Changes

- Form 1 – Record of Watermains Authorized as a Future Alteration
- Form 2 – Record of Minor Modification or Replacements

Three forms were completed during 2018. One for the 3 highlift pump replacements, one for the Well pump replacement with the third completed for the replacement of the circuit board for UV#1 display.

- Form 3 – Record of addition, modification or replacement of equipment discharging a contaminant of concern to the atmosphere



Water Quality

Microbiological Sampling and Testing

Sampling is conducted weekly for the DWS at the frequencies and locations identified by Schedule 11 of O. Reg. 170/03 for Large Municipal Residential Systems.

Table 1: Microbiological sampling requirements

Location	Sample Analysis	# samples	Frequency
Raw	EC / TC	1 sample	weekly
Treated	EC/TC	1 sample	weekly
Distribution	EC / TC/ HPC-25%	8 samples	monthly

Richards Landing raw samples are collected from a sample tap from the raw water header. Treated samples are collected from a sample tap from the treated discharge header prior to distribution. Distribution samples are rotated weekly at the following locations representing areas throughout the village: 1669 Arthur, 1209 Catherine, 1211 Richards, 1250 Marguerite. Other locations may be sampled as required.

Table 1a: Microbiological Sample Results

Type	# samples	EC (range)	TC (range)	# samples	HPC (range)
Raw	104	0-1	0-39	-	-
Treated	52	0-0	0-0	52	0 - 2300
Distribution	102	0-0	0-0	42	0 - 22

Operational Checks and Testing

Operational testing is completed as per Schedules 6 & 7 of O. Reg. 170/03 for Large Municipal Residential Systems. These checks and testing are completed on site at the water treatment facility by licensed operators. Continuous monitoring analyzers (collecting at minimum 15 minute readings) are utilized for measurement of filter turbidity and chlorine residuals.

Table 2: Monthly Filter Turbidity Results

Month	Filter #1		Filter #2	
	Average (NTU)	Range (NTU)	Average (NTU)	Range (NTU)
January	0.16	0 - 2.04	0.14	0 - 2.03
February	0.20	0 - 2.04	0.13	0 - 2.03
March	0.17	0 - 2.04	0.18	0 - 2.03
April	0.24	0 - 2.04	0.18	0 - 2.03
May	0.19	0 - 2.04	0.17	0 - 2.03
June	0.17	0 - 2.04	0.19	0 - 2.03
July	0.14	0 - 2.04	0.11	0 - 2.03
August	0.13	0 - 0.80	0.11	0 - 2.03
September	0.13	0 - 1.61	0.14	0 - 0.91
October	0.27	0 - 2.04	0.22	0 - 2.03
November	0.23	0 - 2.04	0.20	0 - 2.03
December	0.26	0 - 2.04	0.28	0 - 2.03



Table 3: Treated Chlorine Residuals

Month	Average Chlorine Residual (mg/L)	Chlorine Residual Range (mg/L)
January	1.08	0.40 - 1.40
February	0.96	0.41 - 1.04
March	1.00	0.46 - 1.27
April	1.26	0.66 - 1.57
May	1.04	0.40 - 1.17
June	1.09	0.44 - 1.57
July	1.09	0.12 - 1.41
August	0.99	0.26 - 1.10
September	1.08	0.38 - 1.36
October	1.23	0.34 - 1.47
November	0.94	0.34 - 1.47
December	1.33	0.34 - 1.78

Chlorine residuals are continuously monitored and data is recorded at a minimum 5 minute intervals.

Chemical Sampling and Testing

Schedule 13 of O. Reg. 170/03 outlines chemical sampling regiments for Large Municipal Residential systems. Schedules 23 (inorganics) and 24 (organics) are collected every 12 months as well as sodium and fluoride every 60 months. This system requires quarterly sampling for Nitrites/Nitrates and THM's. Schedule 15.1 outlines the requirements for semi-annual lead testing (2 periods per year). Richards Landing Lead sampling follows the reduced sampling requirements every third year.

Table 4: Schedule 23 - Inorganics

Parameter	Sample Date	Result Value (µg/L)	Units	ODWS
Antimony	4-Jun-18	0.09	µg/L	6
Arsenic	4-Jun-18	<0.2	µg/L	25
Barium	4-Jun-18	17.5	µg/L	1000
Boron	4-Jun-18	24	µg/L	5000
Cadmium	4-Jun-18	0.006	µg/L	5
Chromium	4-Jun-18	0.80	µg/L	50
Fluoride	4-Jun-18	0.07	mg/L	1.5
Mercury	4-Jun-18	0.02	µg/L	1
Selenium	4-Jun-18	0.18	µg/L	10
Sodium	4-Jun-18	61.6	mg/L	20
Uranium	4-Jun-18	0.309	µg/L	20

All results for inorganic parameters are within the maximum acceptable concentrations (MAC) of the Ontario Drinking Water Quality Standards as defined in O. Reg. 169/03. No result is above the half MAC with the exception of sodium which has an aesthetic objective (AO) of 200 mg/L, but has a limit of 20 mg/L for medical reasons and would require notifications if exceeded.

Table 5: Nitrite/ Nitrate Results

Date	ODWS	26-Feb	4-Jun	20-Aug	15-Oct
Unit	mg/L	mg/L	mg/L	mg/L	mg/L
Nitrite	1.0	<0.003	<0.003	<0.003	<0.003
Nitrate	10	1.63	1.57	1.68	1.56

All quarterly results for Nitrites and Nitrates are well below ODWS.

Table 5a: THM/HAA Results

Date	ODWS	Q1	Q2	Q3	Q4	RAA
Unit	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
THM	100	45.0	39.0	35.0	43.0	40.5
HAA	-	44.3	-	28.0	35.3	35.9

ODWS established a MAC of 80 for HAAs effective January 1, 2020.



DWQMS Form 05-12 – Richards Landing DWS Annual & Summary Reports 2018



Table 6: Schedule 24 – Organics

Parameter	Date	Result	Unit	ODWS
Alachlor	4-Jun-18	<0.02	µg/L	5
Atrazine + N-dealkylated metabolites	4-Jun-18	<0.01	µg/L	5
Azinphos-methyl	4-Jun-18	<0.05	µg/L	20
Benzene	4-Jun-18	<0.32	µg/L	5
Benzo(a)pyrene	4-Jun-18	<0.004	µg/L	0.01
Bromoxynil	4-Jun-18	<0.33	µg/L	5
Carbaryl	4-Jun-18	<0.05	µg/L	90
Carbofuran	4-Jun-18	<0.01	µg/L	90
Carbon Tetrachloride	4-Jun-18	<0.16	µg/L	5
Chlorpyrifos	4-Jun-18	<0.02	µg/L	90
Diazinon	4-Jun-18	<0.02	µg/L	20
Dicamba	4-Jun-18	<0.20	µg/L	120
1,2-Dichlorobenzene	4-Jun-18	<0.41	µg/L	200
1,4-Dichlorobenzene	4-Jun-18	<0.36	µg/L	5
1,2-Dichloroethane	4-Jun-18	<0.35	µg/L	5
1,1-Dichloroethylene (vinylidene chloride)	4-Jun-18	<0.33	µg/L	14
Dichloromethane	4-Jun-18	<0.35	µg/L	50
2,4 Dichlorophenol	4-Jun-18	<0.15	µg/L	900
2,4-Dichlorophenoxy acetic acid	4-Jun-18	<0.19	µg/L	100
Diclofop-methyl	4-Jun-18	<0.40	µg/L	9
Dimethoate	4-Jun-18	<0.03	µg/L	20
Diquat	4-Jun-18	<1.0	µg/L	70

Parameter	Date	Result	Unit	ODWS
Diuron	4-Jun-18	<0.03	µg/L	150
Glyphosate	4-Jun-18	<1.0	µg/L	280
Malathion	4-Jun-18	<0.02	µg/L	190
2-Methyl-4-Chlorophenoxyacetic Acid (MCPA)	4-Jun-18	<0.12	µg/L	100
Metolachlor	4-Jun-18	<0.01	µg/L	50
Metribuzin	4-Jun-18	<0.02	µg/L	80
Monochlorobenzene	4-Jun-18	<0.3	µg/L	80
Paraquat	4-Jun-18	<1.0	µg/L	10
Pentachlorophenol	4-Jun-18	<0.15	µg/L	60
Phorate	4-Jun-18	<0.01	µg/L	2
Picloram	4-Jun-18	<1.0	µg/L	190
Polychlorinated Byphenols (PCB)	4-Jun-18	<0.04	µg/L	3
Prometryne	4-Jun-18	<0.03	µg/L	1
Simazine	4-Jun-18	<0.01	µg/L	10
Terbufos	4-Jun-18	<0.01	µg/L	1
Tetrachloroethylene	4-Jun-18	<0.35	µg/L	30
2,3,4,6-Tetrachlorophenol	4-Jun-18	<0.20	µg/L	100
Triallate	4-Jun-18	<0.01	µg/L	230
Trichloroethylene	4-Jun-18	<0.44	µg/L	5
2,4,6-Trichlorophenol	4-Jun-18	<0.25	µg/L	5
Trifluralin	4-Jun-18	<0.02	µg/L	45
Vinyl Chloride	4-Jun-18	<0.17	µg/L	2

All results for organic sampling of schedule 24 are below the MAC.



Lead Sampling: The maximum acceptable concentration for lead in drinking water is 10µg/L. This applies to water at the point of consumption since lead is only present as a result of corrosion of lead solder, lead containing brass fittings or lead pipes which are found close to or in domestic plumbing and the service connection to buildings.

Table 7: Community Lead Sampling Results

Location Type	Number of Samples	Range of Lead Results (min#) – (max #)	Number of Exceedances
Plumbing	6	0.03 - 1.26	0
Distribution	1	0.07	0

Lead samples are collected during the two prescribed periods each year (Dec 15 – Mar15 and June 15 – Oct 15).

Sample results revealed zero exceedances during the June 15-Oct 15, 2018 sampling period. The Dec 15-Mar 15, sampling will be conducted in 2019.

Compliance

Adverse Water Quality Incidents

During 2018, the Richards Landing DWS reported 0 incidents of adverse water quality.

Annual Drinking Water System Inspection

The annual DWS inspection took place on May 28, 2018 by MECP Drinking Water inspector Stephanie Robbins. Zero non-conformances and zero recommendations and best practice were identified.

The DWS received a final inspection rating of 100%



Flows

The Permit to Take Water authorizes the municipality to draw water from the wells at a rate not to exceed 1,037m³/d.

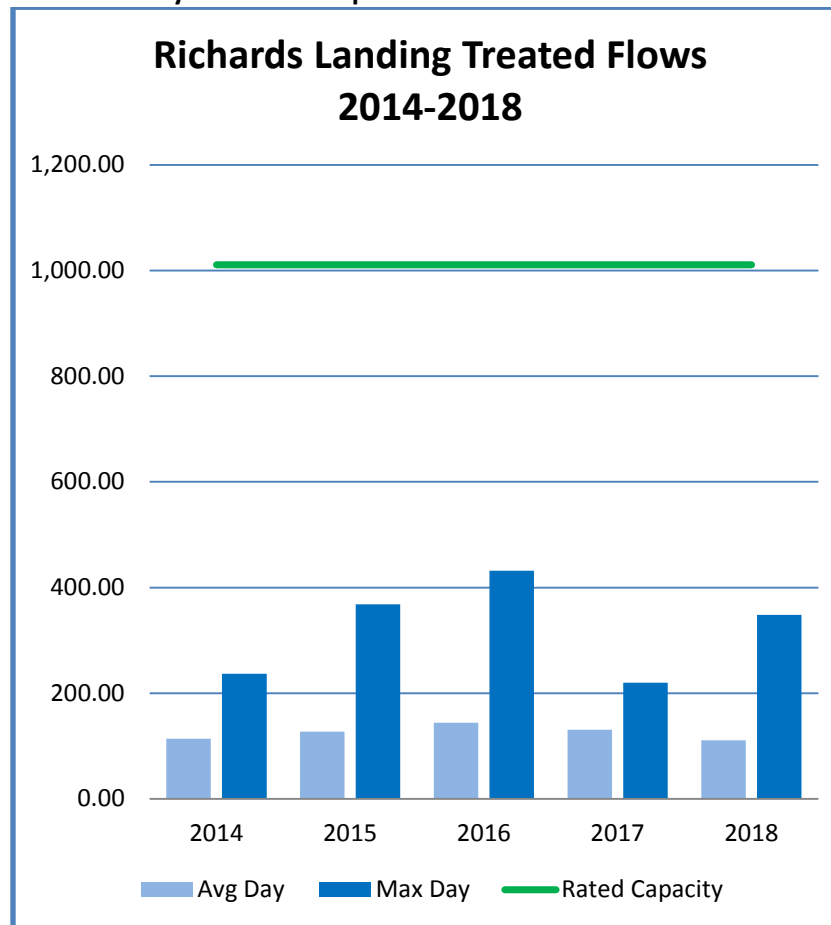
The maximum daily volume taken was 368m³, 35.5 % of the permit limit.

Municipal Drinking Water License: 205-101 specifies a maximum rated flow of 1,011m³/d.

The max flow rate reported was 348m³/d, 34.4 % of the rated capacity.

The Richards Landing WTP treated and distributed a total of 40,602m³ during the year of 2018. The average day treated flow demand was 111m³/d, and maximum day flow was 348m³/d on July 2, 2018.

Chart 1: Five year Flow Comparison





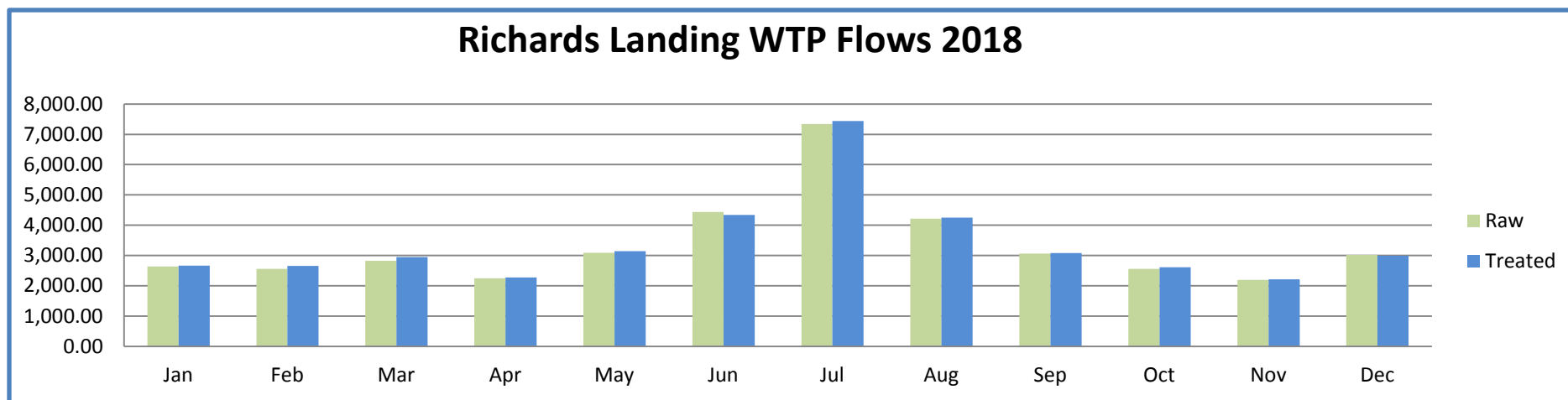
DWQMS Form 05-12 – Richards Landing DWS Annual & Summary Reports 2018



Table 8: Raw and Treated water Flows 2018

2018	Raw Water Flows					Treated Water Flows			
Month	Raw Water (m ³)	Minimum Day (m ³ /d)	Maximum Day (m ³ /d)	Average Day (m ³ /d)	% Max. Flow Day of rated Capacity	Treated Water (m ³)	Minimum Day (m ³ /d)	Maximum Day (m ³ /d)	Average Day (m ³ /d)
January	2,635	50	126	85.0	12.2	2,662	74	133	85.9
February	2,562	52	130	91.5	12.5	2,658	76	145	94.9
March	2,825	53	144	91.1	13.9	2,944	70	118	95.0
April	2,246	36	111	74.9	10.7	2,275	66	109	75.8
May	3,089	53	151	99.6	14.6	3,142	70	126	101.4
June	4,439	60	363	148.0	35.0	4,341	77	276	144.7
July	7,338	90	368	236.7	35.5	7,438	119	348	239.9
August	4,215	62	246	136.0	23.7	4,249	98	230	137.1
September	3,061	9	177	102.0	17.1	3,079	86	135	102.6
October	2,556	0	109	82.4	10.5	2,612	67	130	84.3
November	2,194	0	116	73.1	11.1	2,212	65	84	73.7
December	3,022	36	218	97.5	21.0	2,990	70	180	96.5

Chart 2: Richards Landing WTP Flows 2018





Report Endorsement

Report Availability

Section 11 of O. Reg. 170/03 defines that this Annual Report must be given, without charge, to every person who requests a copy. Effective steps must also be taken to advise users of water from the system that copies of the report are available, without charge, and of how a copy may be obtained. This Annual Report shall be made available for inspection by the public on the Town Office.

Township of St. Joseph
P.O. Box 187
1669 Arthur Street
Richards Landing, Ontario Canada
P0R 1J0

In accordance with Schedule 22 of O. Reg. 170/03, this Annual Report must be given to the members of the municipal council. Section 19 (Standard of care, municipal drinking-water system) of Ontario’s Safe Drinking Water Act also places certain responsibilities upon those municipal officials who oversee an accredited operating authority or exercise decision-making authority over a system.

Report Endorsement

This Summary report for The Richards Landing Drinking Water System for the period of January 1st to December 31st, 2018 has been prepared in accordance to Schedule 22 of O. Reg. 170/03. The report has been reviewed and accepted by the Township of St. Joseph council.

Date



Tables, Definition of Terms

Appendix A: List of Tables/ Charts

Table 1:	Microbiological sampling requirements
Table 1a:	Microbiological Sample Results
Table 2:	Monthly Filter Turbidity Results
Table 3:	Treated Chlorine Residuals
Table 4:	Schedule 23 - Inorganics
Table 5:	Nitrite/ Nitrate Results
Table 6:	Schedule 24 - Organics
Table 7:	Community Lead Sampling Results
Table 8:	Raw and Treated water Flows 2018
Chart 1:	5 year Flow Comparison
Chart 2:	Richards Landing WTP Flows 2018

Appendix B: Definition of Terms

Acronym	Definition
AWQI	Adverse water quality incident
DM	Dual Media
DWS	Drinking water system
EC	E. Coli
GUDI	Groundwater under direct influence of surface water
HAA	Haloacetic acids
HPC	Heterotrophic plate count
MAC	Maximum Acceptable Concentration
m³	Cubic metres
m³/d	Cubic metres per day
mg/L	Milligram per litre (part per million)
ML	Megalitre (1000 m ³)
NTU	Nephelometric turbidity unit
ODWS	Ontario Drinking Water Standards
O. Reg. 170/03	Ontario Regulation 170/03
PTTW	Permit to take water
SCADA	Supervisory control and data acquisition
TC	Total coliforms
THM	Trihalomethane
µg/L	Microgram per litre (part per billion)
WD	Water distribution
WT	Water treatment
WTP	Water treatment plant