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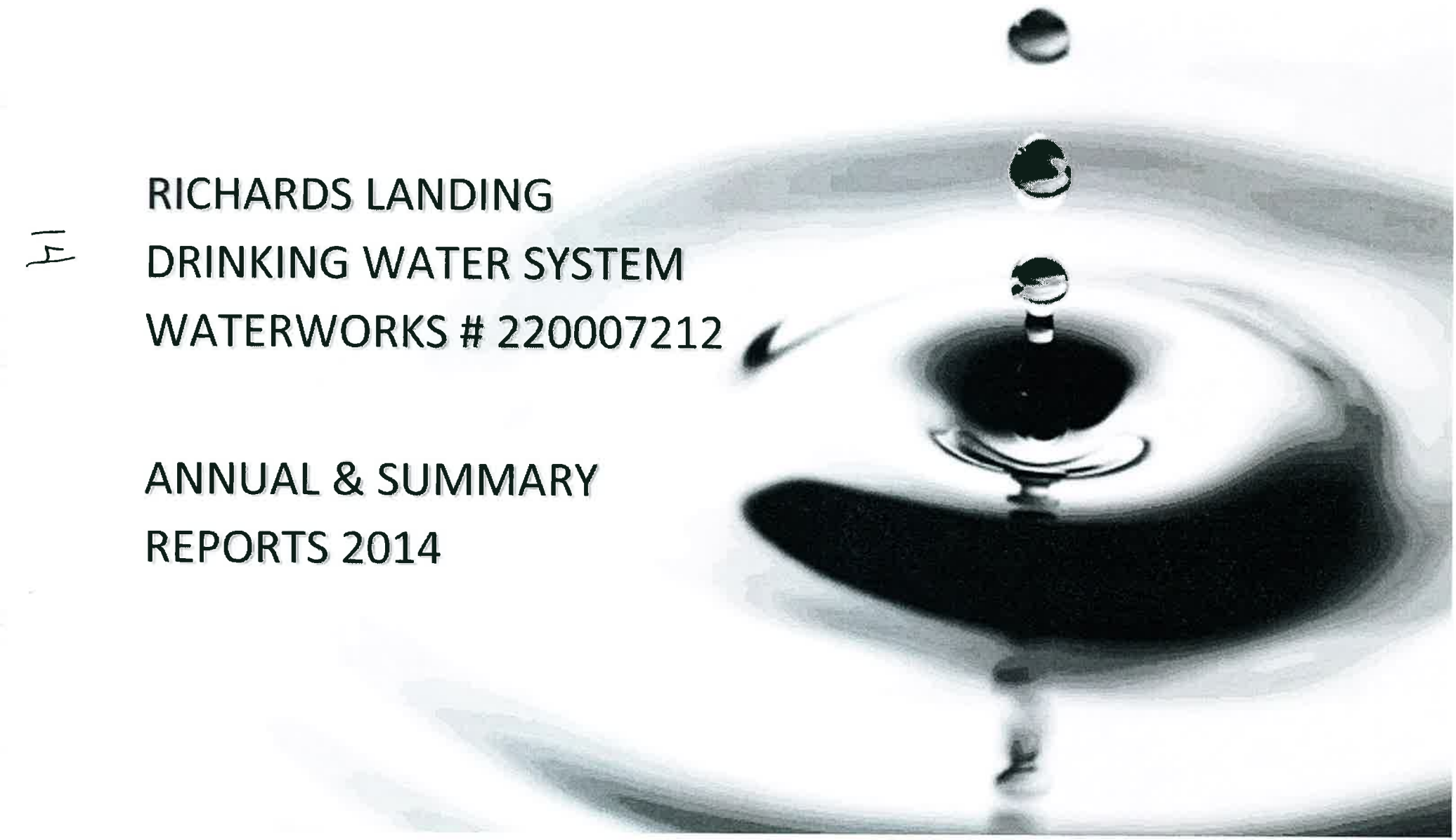
DWS 2014

PUC SERVICES



RICHARDS LANDING
DRINKING WATER SYSTEM
WATERWORKS # 220007212

ANNUAL & SUMMARY
REPORTS 2014

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, 2014.

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

The Richard's Landing Well Pump house is owned by the Township of St. Joseph.

Richard's 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 community'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 680 kPa) under normal operating conditions (maximum daily flow).

Chemicals

Chemicals utilized at the Richards Landing Treatment plant during 2014 include:

- Sodium Hypochlorite
- Blended Phosphates Carus™ 8500

2014 Expenditures

During the year of 2014, expenses were incurred to maintain treatment and distribution functions:

- Routine Maintenance
- Installation of a new datalogger with software to replace the facility's original obsolete monitoring and recording equipment

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	each well	weekly
Treated	EC / TC/ HPC	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, and 1250 Marguerite. Other locations may also be sampled as required.

Table 1a: Microbiological Sample Results

Type	# samples	EC (range)	TC (range)	# samples	HPC (range)
Raw	104	0 - 1	0 - 17	n/a	-
Treated	52	0	0	52	0 - 53
Distribution	109	0	0	59	0 - 1240

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 5 minute readings) are utilized for measurement of filter turbidity and chlorine residuals.

Table 2: Monthly Filter Turbidity Results

Month	Filter #1		Filter #2	
	Avg (NTU)	Range (NTU)	Avg (NTU)	Range (NTU)
January	0.21	0.00 - 2.04	0.18	0.00 - 2.03
February	0.11	0.01 - 2.04	0.16	0.01 - 2.03
March	0.10	0.00 - 2.04	0.19	0.00 - 0.98
April	0.11	0.02 - 2.01	0.11	0.10 - 2.03
May	0.17	0.00 - 2.04	0.16	0.00 - 2.03
June	0.12	0.00 - 1.15	0.14	0.00 - 2.03
July	0.12	0.00 - 2.04	0.10	0.00 - 2.03
August	0.14	0.00 - 2.04	0.15	0.00 - 2.03
September*	0.47	0.00 - 2.04	0.09	0.00 - 2.03
October	0.12	0.00 - 2.04	0.11	0.00 - 1.11
November	0.15	0.00 - 2.04	0.19	0.00 - 2.03
December	0.15	0.00 - 2.04	0.18	0.00 - 2.03

* Filter turbidity must not exceed 1.0 NTU for time limits defined in O. Reg. 170/03. One incident of non-compliance was reported during 2014 for filter turbidity.

Table 3: Treated Chlorine Residuals

Month	Average Chlorine Residual (mg/L)	Chlorine Residual Range (mg/L)
January	1.27	0.73 - 1.49
February	1.25	0.59 - 1.35
March	1.04	0.60 - 1.23
April	1.12	0.50 - 1.35
May	1.21	0.46 - 1.34
June	1.20	0.44 - 1.39
July	0.95	0.81 - 1.18
August	1.00	0.60 - 1.23
September	0.91	0.42 - 1.07
October	1.15	0.34 - 1.34
November	1.13	0.23 - 1.52
December	1.37	0.26 - 1.53

Chlorine residuals are continuously monitored and data is recorded on 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 annually. This system requires quarterly sampling for Nitrites/Nitrates and THM's, as well as sodium and fluoride every 60 months. Schedule 15.1 outlines the requirements for semi-annual lead testing (2 periods per year). Richards Landing's lead sampling follows the reduced sampling requirements every third year.

Table 4: Schedule 23 - Inorganics

Parameter	Sample Date	Units	Result (ug/L)	ODWS
Antimony	28-Apr-14	ug/L	<0.02	6
Arsenic	28-Apr-14	ug/L	0.30	25
Barium	28-Apr-14	ug/L	15.1	1000
Boron	28-Apr-14	ug/L	30.1	5000
Cadmium	28-Apr-14	ug/L	<0.004	5
Chromium	28-Apr-14	ug/L	0.92	50
Fluoride	28-Apr-14	mg/L	0.06	1.5
Mercury	28-Apr-14	ug/L	0.02	1
Selenium	28-Apr-14	ug/L	< 1.0	10
Sodium	28-Apr-14	mg/L	34.7*	20
Uranium	28-Apr-14	ug/L	0.299	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* (34.7 mg/L)which has an aesthetic objective (AO) of 200 mg/L, but has a limit of 20 mg/L for medical reasons and requires notifications if exceeded.

Table 5: Nitrite/ Nitrate Results

Date	ODWS	27-Jan-14	28-Apr-14	11-Aug-14	27-Oct-14
Unit	mg/L	mg/L	mg/L	mg/L	mg/L
Nitrite	1.0	<0.003	<0.003	<0.003	<0.003
Nitrate	10	1.53	1.34	1.42	1.39

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

Table 6: Schedule 24 - Organics

Parameter	Date	Unit	Result	ODWS
Alachlor	28-Apr-14	ug/L	<0.20	5
Aldicarb	28-Apr-14	ug/L	<0.01	9
Aldrin + Dieldrin	28-Apr-14	ug/L	<0.01	0.7
Atrazine + N-dealkylated metobolites	28-Apr-14	ug/L	<0.01	5
Azinphos-methyl	28-Apr-14	ug/L	<0.02	20
Bendiocarb	28-Apr-14	ug/L	<0.01	40
Benzene	28-Apr-14	ug/L	<0.32	5
Benzo(a)pyrene	28-Apr-14	ug/L	<0.004	0.01
Bromoxynil	28-Apr-14	ug/L	<0.33	5
Carbaryl	28-Apr-14	ug/L	<0.01	90
Carbofuran	28-Apr-14	ug/L	<0.01	90
Carbon Tetrachloride	28-Apr-14	ug/L	<0.16	5
Chlordane (Total)	28-Apr-14	ug/L	<0.01	7
Chlorpyrifos	28-Apr-14	ug/L	<0.02	90
Cyanazine	28-Apr-14	ug/L	<0.03	10
Diazinon	28-Apr-14	ug/L	<0.02	20
Dicamba	28-Apr-14	ug/L	<0.20	120
1,2-Dichlorobenzene	28-Apr-14	ug/L	<0.41	200
1,4-Dichlorobenzene	28-Apr-14	ug/L	<0.36	5
Dichlorodiphenyltrichloroethane (DDT) + metabolites	28-Apr-14	ug/L	<0.01	30
1,2-Dichloroethane	28-Apr-14	ug/L	<0.35	5
1,1-Dichloroethylene (vinylidene chloride)	28-Apr-14	ug/L	<0.33	14
Dichloromethane	28-Apr-14	ug/L	<0.35	50
2-4 Dichlorophenol	28-Apr-14	ug/L	<0.15	900
2,4-Dichlorophenoxy acetic acid	28-Apr-14	ug/L	<0.19	100
Diclofop-methyl	28-Apr-14	ug/L	<0.40	9
Dimethoate	28-Apr-14	ug/L	<0.03	20
Dinoseb	28-Apr-14	ug/L	<0.36	10

Parameter	Date	Unit	Result	ODWS
Diquat	28-Apr-14	ug/L	<1.0	70
Diuron	28-Apr-14	ug/L	<0.03	150
Glyphosate	28-Apr-14	ug/L	<1.0	280
Heptachlor + Heptachlor Epoxide	28-Apr-14	ug/L	<0.01	3
Lindane (Total)	28-Apr-14	ug/L	<0.01	4
Malathion	28-Apr-14	ug/L	<0.02	190
Methoxychlor	28-Apr-14	ug/L	<0.01	900
Metolachlor	28-Apr-14	ug/L	<0.01	50
Metribuzin	28-Apr-14	ug/L	<0.02	80
Monochlorobenzene	28-Apr-14	ug/L	<0.30	80
Paraquat	28-Apr-14	ug/L	<1.0	10
Parathion	28-Apr-14	ug/L	<0.02	50
Pentachlorophenol	28-Apr-14	ug/L	<0.15	60
Phorate	28-Apr-14	ug/L	<0.01	2
Picloram	28-Apr-14	ug/L	<1.0	190
Polychlorinated Byphenols (PCB)	28-Apr-14	ug/L	<0.04	3
Prometryne	28-Apr-14	ug/L	<0.03	1
Simazine	28-Apr-14	ug/L	<0.01	10
THM (RAA)	28-Apr-14	ug/L	41.5	100
Temephos	28-Apr-14	ug/L	<0.01	280
Terbufos	28-Apr-14	ug/L	<0.01	1
Tetrachloroethylene	28-Apr-14	ug/L	<0.35	30
2,3,4,6-Tetrachlorophenol	28-Apr-14	ug/L	<0.14	100
Triallate	28-Apr-14	ug/L	<0.01	230
Trichloroethylene	28-Apr-14	ug/L	<0.44	5
2,4,6-Trichlorophenol	28-Apr-14	ug/L	<0.25	5
2,4,5-Trichlorophenoxy acetic acid	28-Apr-14	ug/L	<0.22	280
Trifluralin	28-Apr-14	ug/L	<0.02	45
Vinyl Chloride	28-Apr-14	ug/L	<0.17	2

All results for the required organic sampling of Schedule 24 are below the MAC. Sample parameters exceeding half MAC are noted in Table 6a.

Table 6a: Organics - Sampling exceeding half MAC

Date of Sample	Parameter	Result Value
N/A		

Lead Sampling: The maximum acceptable concentration for lead in drinking water is 10 ug/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			
Distribution			

Lead samples are collected during the two prescribed periods each year (Dec 15 – Mar 15 and June 15- Oct 15). Richards Landing's lead sampling follows the reduced sampling requirements every third year, last sampled in 2013.

Compliance

Adverse Water Quality Incidents

During 2014, the Richards Landing DWS reported two incidents of adverse water quality.

Table 8: Adverse Water Quality Incidents

Date	Incident Reported
28-Feb-2014	Sodium (34.7 mg/L)
4-Sept-2014	Turbidity (> 1.0 NTU)

On February 28th, notifications to APH and SAC were completed due to sampling results revealing elevated sodium levels exceeding 20 mg/L. Although the aesthetic objective for sodium in drinking water is 200 mg/L, notifications are required when the sodium concentration exceeds 20 mg/L so that this information may be communicated by the local Medical Officer of Health to local physicians for their use with patients on sodium restricted diets.

On September 4th notifications were made for filter turbidity exceeding 1.0 NTU (as per O. Reg. 170/03). The operator found that the analyzer was reading correctly and switched over to the alternate turbidimeter. The faulty unit was taken off-line until required repairs were completed by instrumentation staff.

Annual Drinking Water System Inspection

Inspection Number: 1-BDU8G

The annual DWS inspection took place on June 5, 2014 by MOECC Drinking Water inspector Lori Greco. Zero non-conformances and no additional recommendations and best practice were identified. The DWS received a final inspection rating of 100%.

The following table identifies any non-compliance with requirement of the Act, the regulations, the system's approval, drinking water works permit, municipal drinking water license and any orders applicable to the system that were not met at any time during the period covered by the report.

Table 9: Non-compliances identified during Annual DWS Inspection

Non-compliance	N/A
Action	
Corrective Actions	

Flows

The Permit to Take Water authorizes the municipality to draw water from the wells at a rate not to exceed 1,037 m3/d. The maximum daily volume taken was 296 m3, 28.5 % of the permit limit.

Municipal Drinking Water Licence: 284-101 specifies a maximum rated flow of 1,011 m3/day. The max flow rate reported was 237 m3, 23.4 % of the rated capacity.

Trends reveal that the average and maximum days of 2014 are similar to the last 4 years. Flows remain well below the rated capacity design for the treatment facility. The Richards Landing WTP treated and distributed a total of 41.5 ML during the year of 2014. The average day treated flow demand was 113.6 m3/d, and maximum day flow was 237 m3/d on August 7, 2014.

Table 10: 4 year Flow Comparison

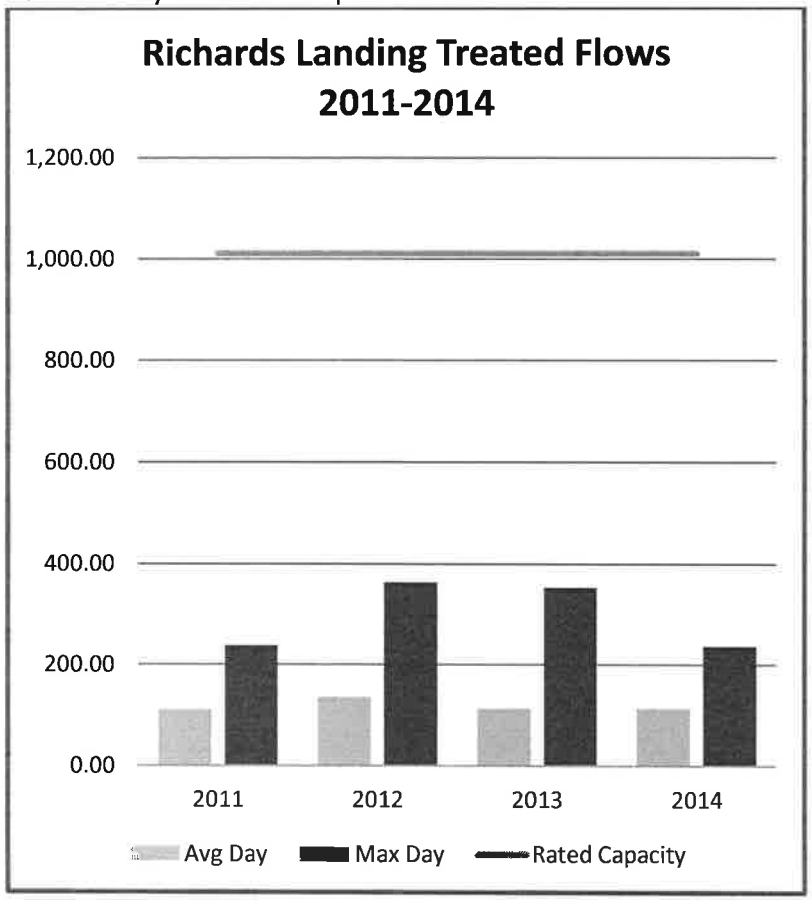
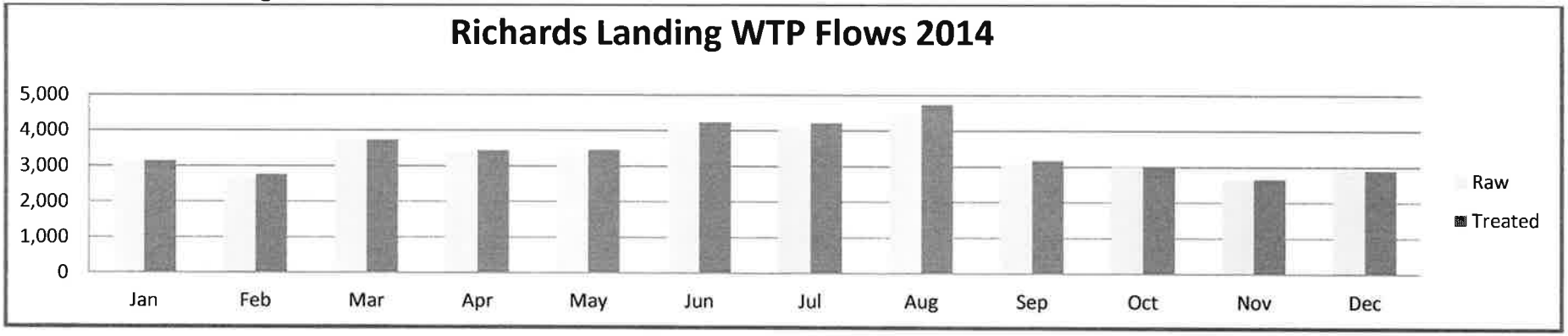


Table 11: Raw and Treated Water Flows 2014

2014	Raw Water Flows					Treated Water Flows			
Month	Raw Water (m3)	Minimum Day (m^3/d)	Maximum Day (m^3/d)	Average Day (m^3/d)	% Max. Flow Day of PTTW	Treated Water (m3)	Minimum Day (m^3/d)	Maximum Day (m^3/d)	Average Day (m^3/d)
January	3,132	0	200	101.0	19.3	3,148	84	156	101.5
February	2,691	0	203	96.1	19.6	2,757	85	111	98.5
March	3,739	0	219	120.6	21.2	3,737	84	156	120.5
April	3,387	55	136	112.9	13.1	3,440	100	138	114.7
May	3,378	40	181	109.0	17.5	3,463	83	155	111.7
June	4,198	77	240	139.9	13.5	4,237	107	185	141.2
July	4,066	75	231	131.2	12.7	4,220	111	165	136.1
August	4,464	82	296	144.0	28.5	4,741	109	237	152.9
September	3,103	0	163	103.0	15.7	3,180	79	156	106.0
October	3,008	0	123	97.0	11.9	3,030	75	122	97.7
November	2,612	0	129	87.1	12.4	2,664	78	118	88.8
December	2,895	0	169	93.4	16.3	2,902	81	116	93.6

Chart 1: Richards Landing WTP Flows 2014



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 2014 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.

April 15/15

Date

Tables, Definition of Terms

Appendix A: List of Tables/ Charts	
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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
HPC	Heterotrophic plate count
m^3	Cubic metres
m^3/d	Cubic metres per day
mg/L	Milligram per litre (part per million)
ML	Megalitre (1000 m3)
NTU	Nephelometric turbidity unit
O. Reg. 170/03	Ontario Regulation 170/03
PTTW	Permit to take water
SCADA	Supervisory control and data acquisition
TC	Total coliforms
THM	Trihalomethane
ug/L	Microgram per litre (part per billion)
WD	Water distribution
WT	Water treatment
WTP	Water treatment plant