Stirling
Drinking Water System

Annual Water Report

Reporting Period of January 1, 2017- December 31, 2017

This report has been prepared to satisfy the annual reporting requirements of the Provincial Regulations and Guidelines established by the Ministry of Environment and Climate Change including the section 11 and Schedule 22 reports identified in O.Reg 170/03, Drinking Water Systems Regulation and the Permit to Take Water Reports identified in O.Reg 387/04, Water taking and Transfer Regulation.

Report Availability

Population Served	< 10,000
Website where the annual report can be viewed by the public	www.stirling-rawdon.com
Alternate location where annual report is available free of charge.	Stirling-Rawdon Municipal Office
How the system users are notified that the annual report is available and is free of charge?	Public access/ notice via the web Public access/ notice via newspaper
Number of Designated Facilities Served	None
Has a copy of this report been provided to all Designated Facilities?	N/A
Number of Interested Parties reported to	2
Has a copy of this report been provided to all interested Parties?	Yes
The following Drinking Water Systems receive drinking water from this system	N/A
Has a copy of this report been provided to connected users?	N/A

Compliance Report Card

Drinking Water System Number	**220001566**
System Owner:	**The Corporation of The Township of Stirling-Rawdon**
Operating Authority	**The Township of Stirling-Rawdon**
Drinking Water System Category	**Large Municipal Residential**
Reporting Period	**January 1, 2017 – December 31, 2017**

Event Summary	# of Events	Date	Details
Ministry of Environment Inspections	**1**	**Feb 14, 2017**	**Unannounced Focused Inspection Rating of 100.0%**
Ministry of Labour Inspections	**0**		
DWQMS Audits	**2**	**Oct 31, 2017** **Nov 24, 2017**	**●Systems Audit** **●Initial Verification Audit**
AWQI's	**0**		
Non-Compliance	**0**		
Community Complaints	**2**	**April 10, 2017** **July 25, 2017**	**Both complaints originated from internal plumbing.**
Spills	**0**		

Quality Control Measures

The Township of Stirling-Rawdon Drinking Water and Wastewater Facilities are operated by Township of Stirling-Rawdon Staff. Each facility has comprehensive manuals that detail operations, maintenance, instrumentation and emergency procedures. All procedures are kept current and accurate through an annual review process detailed in the Municipalities Drinking Water Quality Management System (DWQMS). Additional quality control measures are exercised by:

- Tracking and implementing maintenance activities through a work order tracking system.
- Use of sampling schedules for external laboratory sampling
- Active member of the Ontario Water/Wastewater Agency Response Network
- Increased calibration frequencies to ensure equipment accuracy.

System Process Description

Raw Source

Raw water sources for the Stirling Drinking Water System are from four separate groundwater wells; Well 1,3,4 and 5. The groundwater wells are considered Ground Water Under The Direct Influence of Surface Water (GUDI) with effective in-situ treatment.

Treatment

The Facility utilizes sodium hypochlorite, and two ultraviolet disinfection units (one duty, one standby) for a two stage primary disinfection treatment. Secondary treatment is provided from the sodium hypochlorite injection at the water treatment plant. The treatment system at the plant has on-line chlorine analyzers for pre and post chlorine residuals, on-line turbidimeter for treated water turbidity and UV Dosage which is monitored on the individual reactor controls as well as the SCADA/PLC. The SCADA/PLC has alarming capabilities to lock the plant out during a failure of the disinfection system analyzers or components.

Treatment Chemicals used in the reporting period:

Chemical Name	Use	Supplier
Sodium Hypochlorite	Disinfection	Brenntag

Summary of Non-Compliance

Adverse Water Quality Incidents

Date	AWQI #	Cause			Corrective Action Taken
		Parameter	Result	Exceedance of	
N/A					

Non-Compliance Identified in a Ministry Inspection:

Ministry of The Environment and Climate Change Inspection Rating 100%

Legislation	**Requirement(s) system failed to meet**	**Duration of the failure (i.e. date(s))**	**Corrective Action**	**Status**
N/A				

Flows

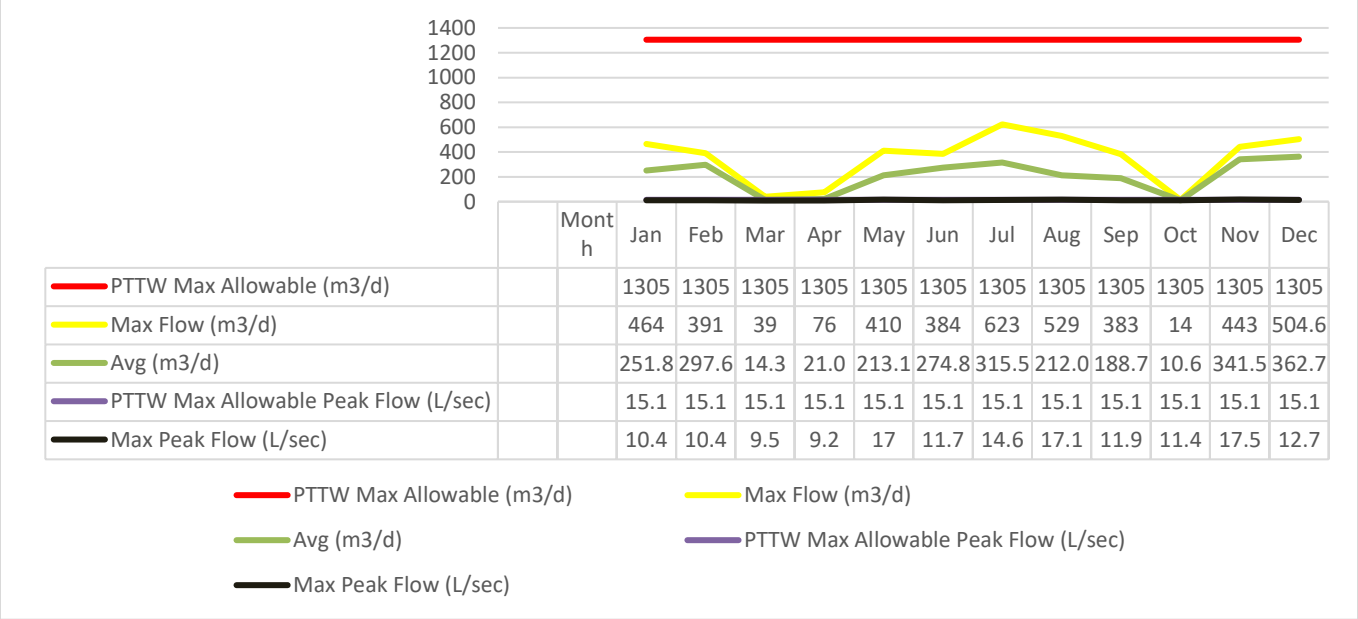
The Stirling Drinking Water System has a rated capacity of 2687 m³/day. Additional flow data can be found under the water taking and transfer data.

Raw Water Flows

The Raw Water flows are regulated under Permit to Take Water

- RW1 = Raw Water Well 1
- RW3 = Raw Water Well 3
- RW4 = Raw Water Well 4
- RW5 = Raw Water Well 5
- TW = Treated Water
- DW = Distribution Water

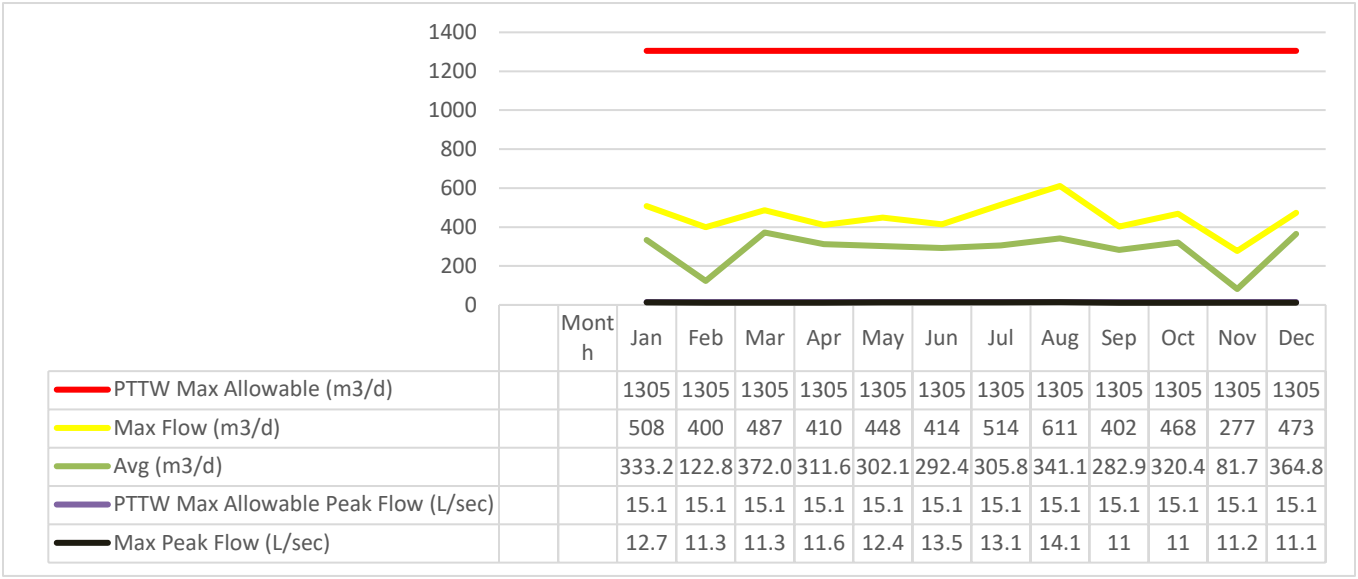
Raw Water Daily Rate of Taking: RW 1



Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
PTTW Max Allowable (m3/d)	1305	1305	1305	1305	1305	1305	1305	1305	1305	1305	1305	1305
Max Flow (m3/d)	464	391	39	76	410	384	623	529	383	14	443	504.6
Avg (m3/d)	251.8	297.6	14.3	21.0	213.1	274.8	315.5	212.0	188.7	10.6	341.5	362.7
PTTW Max Allowable Peak Flow (L/sec)	15.1	15.1	15.1	15.1	15.1	15.1	15.1	15.1	15.1	15.1	15.1	15.1
Max Peak Flow (L/sec)	10.4	10.4	9.5	9.2	17	11.7	14.6	17.1	11.9	11.4	17.5	12.7

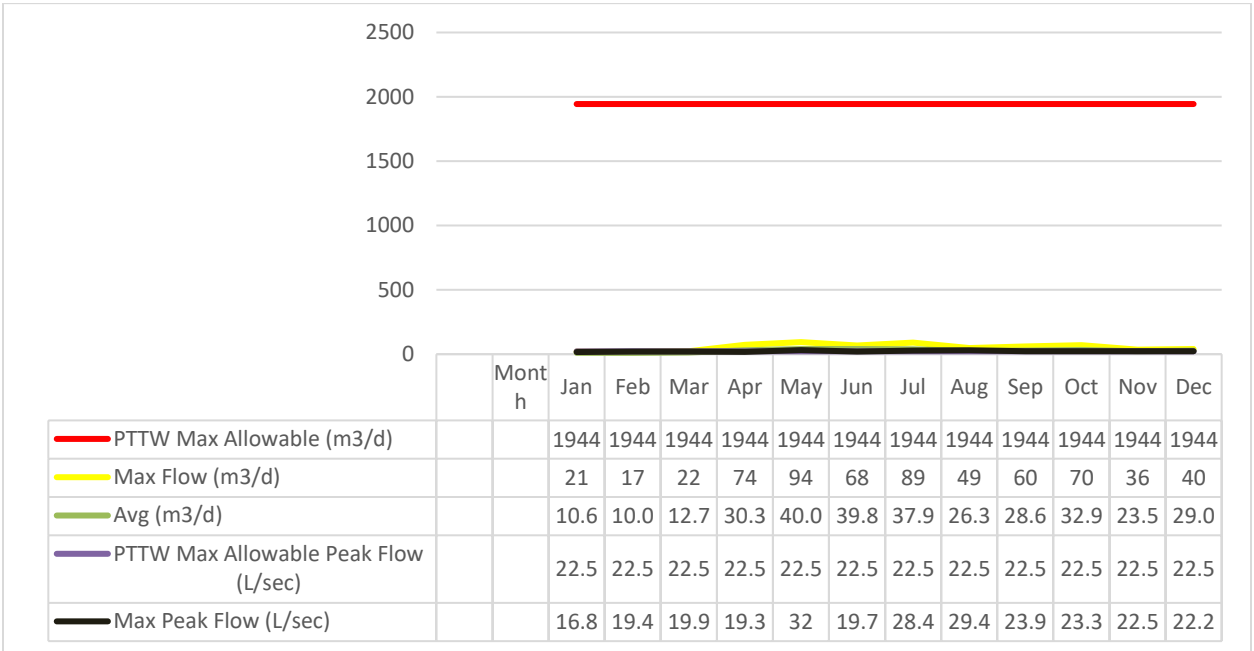
Exceedances of peak flow caused from flushing of fire hydrants.

Raw Water Daily Rate of Taking: RW 3



	Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
PTTW Max Allowable (m3/d)		1305	1305	1305	1305	1305	1305	1305	1305	1305	1305	1305	1305
Max Flow (m3/d)		508	400	487	410	448	414	514	611	402	468	277	473
Avg (m3/d)		333.2	122.8	372.0	311.6	302.1	292.4	305.8	341.1	282.9	320.4	81.7	364.8
PTTW Max Allowable Peak Flow (L/sec)		15.1	15.1	15.1	15.1	15.1	15.1	15.1	15.1	15.1	15.1	15.1	15.1
Max Peak Flow (L/sec)		12.7	11.3	11.3	11.6	12.4	13.5	13.1	14.1	11	11	11.2	11.1

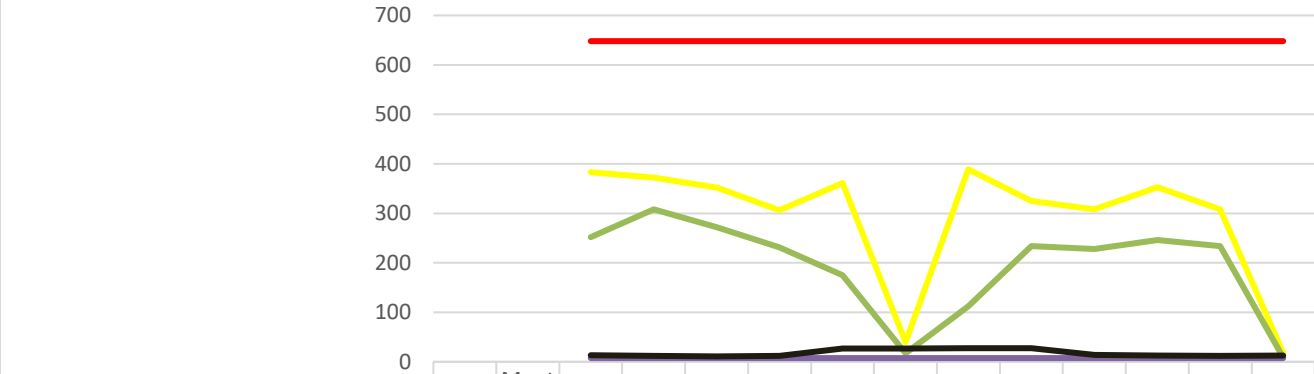
Raw Water Daily Rate of Taking: RW 4



	Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
PTTW Max Allowable (m3/d)		1944	1944	1944	1944	1944	1944	1944	1944	1944	1944	1944	1944
Max Flow (m3/d)		21	17	22	74	94	68	89	49	60	70	36	40
Avg (m3/d)		10.6	10.0	12.7	30.3	40.0	39.8	37.9	26.3	28.6	32.9	23.5	29.0
PTTW Max Allowable Peak Flow (L/sec)		22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5
Max Peak Flow (L/sec)		16.8	19.4	19.9	19.3	32	19.7	28.4	29.4	23.9	23.3	22.5	22.2

Well #4 was off-line and only pumped to waste in the 2017 reporting period.

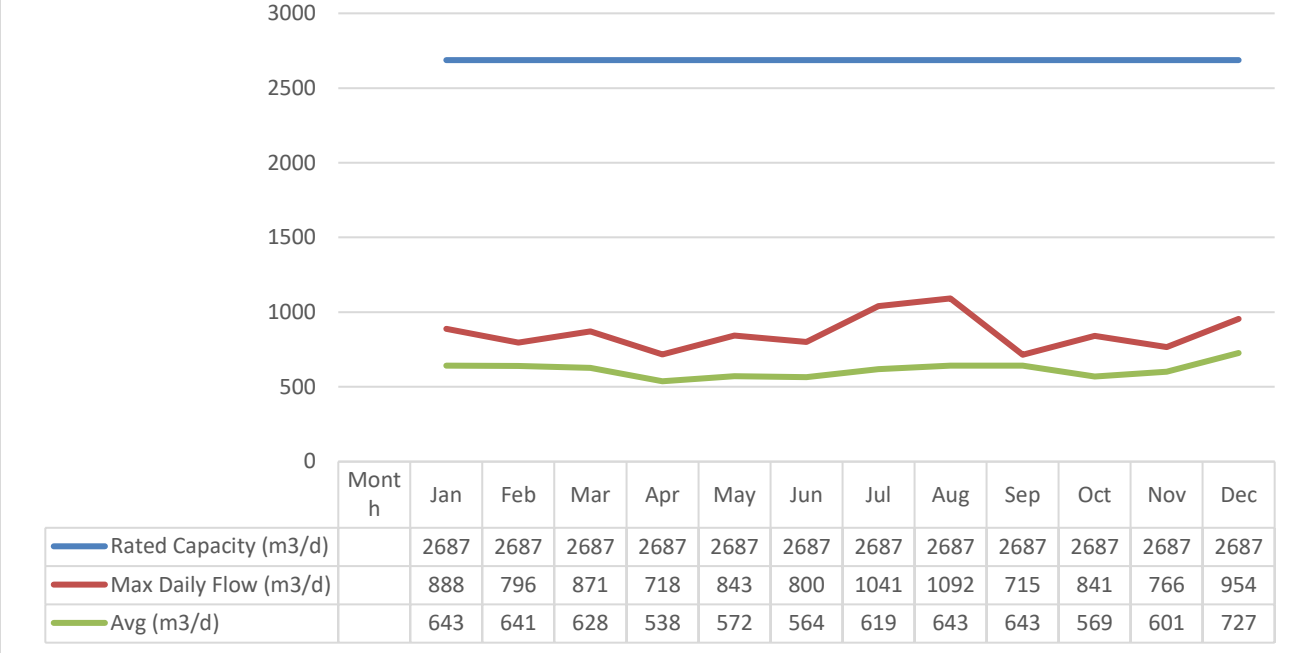
Raw Water Daily Rate of Taking: RW 5



	Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
PTTW Max Allowable (m3/d)		648	648	648	648	648	648	648	648	648	648	648	648
Max Flow (m3/d)		383	372	352	306	361	39.6	389	325	308	353	308	18
Avg (m3/d)		251.8	308.1	271.6	231.5	175.0	17.2	112.3	234.0	228.1	246.3	233.8	8.7
PTTW Max Allowable Peak Flow (L/sec)		7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5
Max Peak Flow (L/sec)		13.5	11.9	10.9	11.8	26.9	26.8	27.5	27.3	14.1	12.3	11.8	12.7

Peak flows exceed the PTTW Max Allowable Peak Flow instantaneously when the well pump starts and the system is pumping to waste.

Treated Water Flows



Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Rated Capacity (m3/d)	2687	2687	2687	2687	2687	2687	2687	2687	2687	2687	2687	2687
Max Daily Flow (m3/d)	888	796	871	718	843	800	1041	1092	715	841	766	954
Avg (m3/d)	643	641	628	538	572	564	619	643	643	569	601	727

Treated water flows are regulated under the Municipal Drinking Water Licence.

Regulatory Sample Results Summary

Microbiological Testing

Location	Number of Samples	E.Coli Results (min) – (max)	Total Coliform Results (min) – (max)	Number of HPC Samples	HPC Results (min) – (max)
Raw – RW1	*52*	*0-0*	*0-8*	-	-
Raw – RW3	*52*	*0-0*	*0-4*	-	-
Raw – RW4	*52*	*0-1*	*0-1640*	-	-
Raw – RW5	*52*	*0-3*	*0-144*	-	-
Treated - TW	*52*	*0-0*	*0-0*	*52*	*0-2*
Distribution - DW	*156*	*0-0*	*0-0*	*156*	*0-138*

Operational Testing

Parameter	Range of Results (Min-Max Value)
Turbidity, Treated	0.00-2.05 NTU *
Treated, Free Chlorine	0.02-4.93 mg/L
Distribution, Free Chorine	0.48-2.53 mg/L

*Instrument spikes and dips recorded by on-line instrumentation are result of various maintenance and calibration activities. Power interruptions may also cause instrument readings to provide inaccurate readings. All events are reviewed for compliance with O. Reg. 170/03 and if warranted, are reported to the Ministry of Environment as Adverse Water Quality Incidents.

In- House Testing

Parameter	# of grab samples taken	Range of Results (min # - max #)
Turbidity, Raw Well 1 (NTU)	52	0.07-0.7 NTU
Turbidity, Raw Well 3 (NTU)	52	0.06-0.38 NTU
Turbidity, Raw Well 4 (NTU)	52	0.09-0.59 NTU
Turbidity, Raw Well 5 (NTU)	52	0.07-0.37 NTU
Turbidity, Treated Water (NTU)	364	0.06-0.7 NTU
Treated, Free Chlorine (mg/L)	364	1.25-3.02 mg/L
Distribution, Free Chlorine (mg/L)	364	0.66-1.87 mg/L

Lead Sampling

The lead sampling program is required under 0.Reg 170/03. This system qualified for the plumbing exemption.

Location	Date	Lead	pH	Alkalinity (mg/L) as CaCO3
-	-	10 (MAC)	6.5-8.5	30-500
Hydrant # 85	21-Mar-17	0.5	6.89	294
Hydrant # 45	21-Mar-17	0.14	6.86	274
Hydrant # 85	26-Sep-17	0.37	7.15	274
Hydrant # 45	26-Sep-17	0.51	7.19	274

Inorganic Parameters							
Parameter	**Units**	**Sample Date**	**Sample Location**	**Result Value**	**MAC**	**Exceedance**	
						MAC	1/2 MAC
Antimony	ug/L	Oct 10 2017	TW	0.07	6	No	No
Arsenic	ug/L	Oct 10 2017	TW	0.40	25	No	No
Barium	ug/L	Oct 10 2017	TW	262.00	1000	No	No
Boron	ug/L	Oct 10 2017	TW	22.00	5000	No	No
Cadmium	ug/L	Oct 10 2017	TW	<0.003	5	No	No
Chromium	ug/L	Oct 10 2017	TW	0.68	50	No	No
Mercury	ug/L	Oct 10 2017	TW	0.02	1	No	No
Selenium	ug/L	Oct 10 2017	TW	0.25	10	No	No
Uranium	ug/L	Oct 10 2017	TW	1.48	20	No	No
Fluoride	mg/L	Oct 10 2017	TW	0.06	1.5	No	No
Nitrite	mg/L	Jan 17 2017	TW	0.003	1.000	No	No
Nitrite	mg/L	Apr 4 2017	TW	0.003	1.000	No	No
Nitrite	mg/L	Jul 11 2017	TW	0.003	1.000	No	No
Nitrite	mg/L	Oct 10 2017	TW	0.003	1.000	No	No
Nitrate	mg/L	Jan 17 2017	TW	1.410	10.000	No	No
Nitrate	mg/L	Apr 4 2017	TW	1.490	10.000	No	No
Nitrate	mg/L	Jul 11 2017	TW	1.870	10.000	No	No
Nitrate	mg/L	Oct 10 2017	TW	1.500	10.000	No	No

Organic Parameters							
Parameter	**Units**	**Sample Date**	**Sample Location**	**Result Value**	**MAC**	**Exceedance**	
						MAC	1/2 MAC
Alachlor	ug/l	Oct 10 2017	TW	0.02	5	No	No
Atrazine + N-dealkylated metabolites	ug/l	Oct 10 2017	TW	0.03	5	No	No
Azinphos-Methyl	ug/l	Oct 10 2017	TW	0.05	20	No	No
Benzene	ug/l	Oct 10 2017	TW	0.32	5	No	No
Benzo (a) pyrene	ug/l	Oct 10 2017	TW	0.004	0.01	No	No
Bromoxynil	ug/l	Oct 10 2017	TW	0.33	5	No	No
Carbaryl	ug/l	Oct 10 2017	TW	0.05	90	No	No
Carbofuran	ug/l	Oct 10 2017	TW	0.01	90	No	No
Carbon Tetrachloride	ug/l	Oct 10 2017	TW	0.16	5	No	No
Chlorpyrifos	ug/l	Oct 10 2017	TW	0.02	90	No	No
Diazinon	ug/l	Oct 10 2017	TW	0.02	20	No	No
Dicamba	ug/l	Oct 10 2017	TW	0.2	120	No	No
1,2-Dichlorobenzene	ug/l	Oct 10 2017	TW	0.41	200	No	No
1,4 - Dichlorobenzene	ug/l	Oct 10 2017	TW	0	5	No	No
1,2- Dichloroethane	ug/l	Oct 10 2017	TW	0.36	5	No	No
1,1- Dichloroethylene	ug/l	Oct 10 2017	TW	0.33	14	No	No
Dichloromethane (methylene Chloride)	ug/l	Oct 10 2017	TW	0.35	50	No	No
2,4-Dichlorophenol	ug/l	Oct 10 2017	TW	0.15	900	No	No
2,4-Dichlorophenoxy acetic acid)2,4-D)	ug/l	Oct 10 2017	TW	0.19	100	No	No
Diclofop-methyl	ug/l	Oct 10 2017	TW	0.4	9	No	No
Dimethoate	ug/l	Oct 10 2017	TW	0.03	20	No	No
Diquat	ug/l	Oct 10 2017	TW	1	70	No	No
Diuron	ug/l	Oct 10 2017	TW	0.03	150	No	No
Glyphosate	ug/l	Oct 10 2017	TW	1	280	No	No
Malathion	ug/l	Oct 10 2017	TW	0.02	190	No	No
Metolachlor	ug/l	Oct 10 2017	TW	0.01	50	No	No
Metribuzin	ug/l	Oct 10 2017	TW	0.02	80	No	No
MCPA	ug/l	Oct 10 2017	TW	0.00012		No	No
Monochlorobenzene Chlorobenzene)	ug/l	Oct 10 2017	TW	0.3	80	No	No
Paraquat	ug/l	Oct 10 2017	TW	1	10	No	No
PCB	ug/l	Oct 10 2017	TW	0.04	3	No	No
Pentachlorophenol	ug/l	Oct 10 2017	TW	0.15	60	No	No
Phorate	ug/l	Oct 10 2017	TW	0.01	2	No	No
Picloram	ug/l	Oct 10 2017	TW	1	190	No	No
Prometryne	ug/l	Oct 10 2017	TW	0.03	1	No	No
Simazine	ug/l	Oct 10 2017	TW	0.01	10	No	No

Terbufos	ug/l	Oct 10 2017	TW	0.01	1	No	No
Tetrachloroethylene	ug/l	Oct 10 2017	TW	0.35	30	No	No
2,3,4,6- Tetrachlorophenol	ug/l	Oct 10 2017	TW	0.2	100	No	No
Triallate	ug/l	Oct 10 2017	TW	0.01	230	No	No
Trichloroethylene	ug/l	Oct 10 2017	TW	0.44	50	No	No
2,4,6-Trichlorophenol	ug/l	Oct 10 2017	TW	0.25	5	No	No
Trifluralin	ug/l	Oct 10 2017	TW	0.02	45	No	No
Vinyl Chloride	ug/l	Oct 10 2017	TW	0.17	2	No	No
Trihalomethane Total	ug/l	Jan 17 2017	DW	55	100	No	Yes
	ug/l	Apr 4 2017	DW	21	100	No	No
	ug/l	Jul 11 2017	DW	25	100	No	No
	ug/l	Oct 10 2017	DW	29	100	No	No
	ug/l		DW	RAA= 32.5	100	No	No
Total Haloacetic Acids	ug/l	Jan 17 2017	DW	32.2			
	ug/l	Apr 4 2017	DW	16.2			
	ug/l	Jul 11 2017	DW	17.4			
	ug/l	Oct 10 2017	DW	19.5			
				RAA= 21.33			
60 months							
Sodium	mg/l	Oct 10 2017	TW	27	20	Yes	Yes
Fluoride	mg/l	Oct 10 2017	TW	0.16	1.5	No	No

- MAC= Maximum Allowable Concentration as per O.Reg 169/03
- Although Sodium and Fluoride were tested in 2017 it was not required to report in the 2017 reporting year.

Maintenance Summary Highlights:

Major expenses incurred to install, repair or replace required equipment

- **Annual flow meter calibrations**
- **Annual back flow prevention device inspection**
- **Annual lifting device inspections**
- **Annual Diesel Generator Inspection**
- **Installation of a new SCADA/ PLC system**
- **Installation of new pressure regulating valves on Well #1 & #3**

- **Installation of a new pump and check valve on Well # 1**
- **Inspection and cleaning of production Well # 1, #4 and #5**
- **Installation of new safety grating at the WTP**
- **Installation of a new electric heater at the WTP**
- **Completion of a drinking water feasibility study to assess options of providing an alternative water source.**
- **Development of a new pilot well at the current well field.**
- **Installation of a pressure transmitter on the treated water header**
- **Installation of a new well level probe on Well #4**

Maintenance Summary

The Township of Stirling-Rawdon uses a work order tracking system to ensure work orders are complete and equipment is maintained as per manufacturer's specifications. Work orders are issued on a weekly, monthly, annual or on an as needed basis to provide the required service to the drinking water system. Capital projects are listed each year in the annual capital budget and are ranked based on priority through the Municipalities Asset Management Plan.

Operation/maintenance work orders completed	**123**
Distribution system works orders completed	**127**

Drinking Water Quality Management System

The Township of Stirling-Rawdon contracted QMI-SAI Global Canada to conduct the DWQMS Audit for the Stirling Drinking Water System. On October 31, 2017 an off-site Systems Audit was conducted. In follow up an on-site Initial Verification Audit for Full Scope Accreditation was completed on November 24, 2017.

Water Taking and Transfer Data

Data for the reporting period of January 1, 2017 – December 31, 2017 was submitted electronically to the Ministry of the Environment and Climate Change on February 8, 2018 under Permit to Take Water PTTW 6214-8T3JXP.