Stirling
Drinking Water System

Annual Water Report

Reporting Period of January 1, 2021- December 31, 2021

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, 2021 – December 31, 2021**

Event Summary	# of Events	Date	Details
Ministry of Environment Conservation and Parks Inspections	**1**	**December 14, 2021**	**Announced Inspection**
Ministry of Labour Inspections	**0**		
DWQMS Audits	**2**	**(1)September 17-21, 2021 (2)November 12, 2021**	**(1)Internal Audit (2)Surveillance System Audit**
AWQI's	**0**	**N/A**	**N/A**
Non-Compliance	**0**	**N/A**	
Community Complaints	**14**	**February 11, 2021 February 11, 2021 February 22, 2021 June 10, 2021 November 30, 2021 November 30, 2021 November 30, 2021 November 30, 2021 November 30, 2021 November 30, 2021 December 1, 2021 December 1, 2021 December 6, 2021 December 15, 2021**	**Complaints mainly originated from internal plumbing and water service leaks. Eight complaints were submitted to council via a petition from a resident regarding health issues. These matters were addressed and no corrective action from the Health Unit or MECP has been provided.**
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	
None					

Non-Compliance Identified in a Ministry Inspection:

Ministry of The Environment and Conservation and Parks Inspection Rating of 100%

Legislation	**Requirement(s) system failed to meet**	**Duration of the failure (i.e. date(s))**	**Corrective Action**	**Status**
None				

Flows

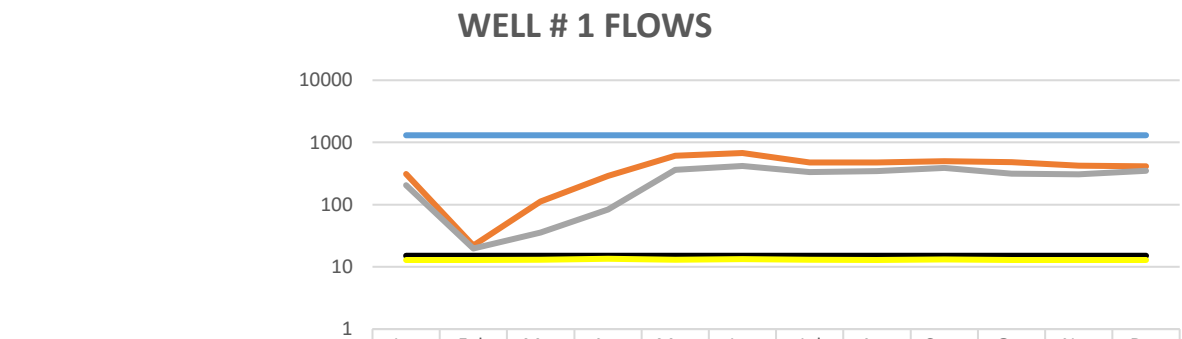
The Stirling Drinking Water System has a rated capacity of 2687 m³/day. Additional flow data can be found under the water taking and transfer data.

Raw Water Flows

The Raw Water flows are regulated under Permit to Take Water

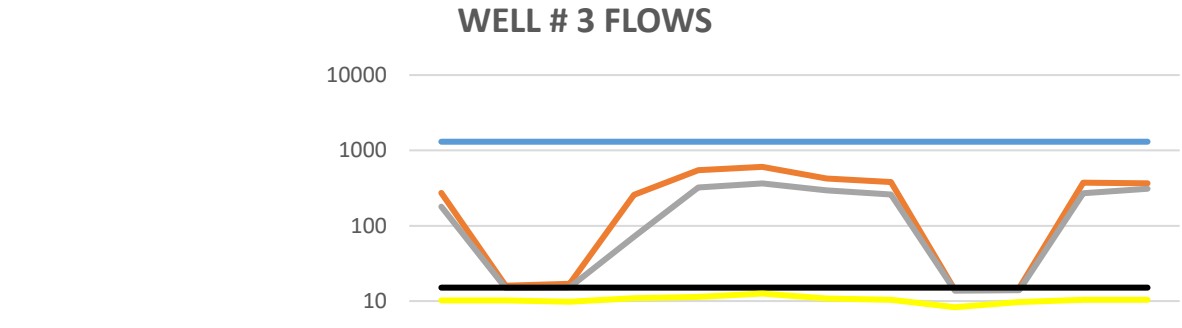
- RW1 = Raw Water Well 1
- RW3 = Raw Water Well 3
- RW4 = Raw Water Well 4
- RW5 = Raw Water Well 5
- TW = Treated Water
- DW = Distribution Water

Raw Water Daily Rate of Taking: RW 1



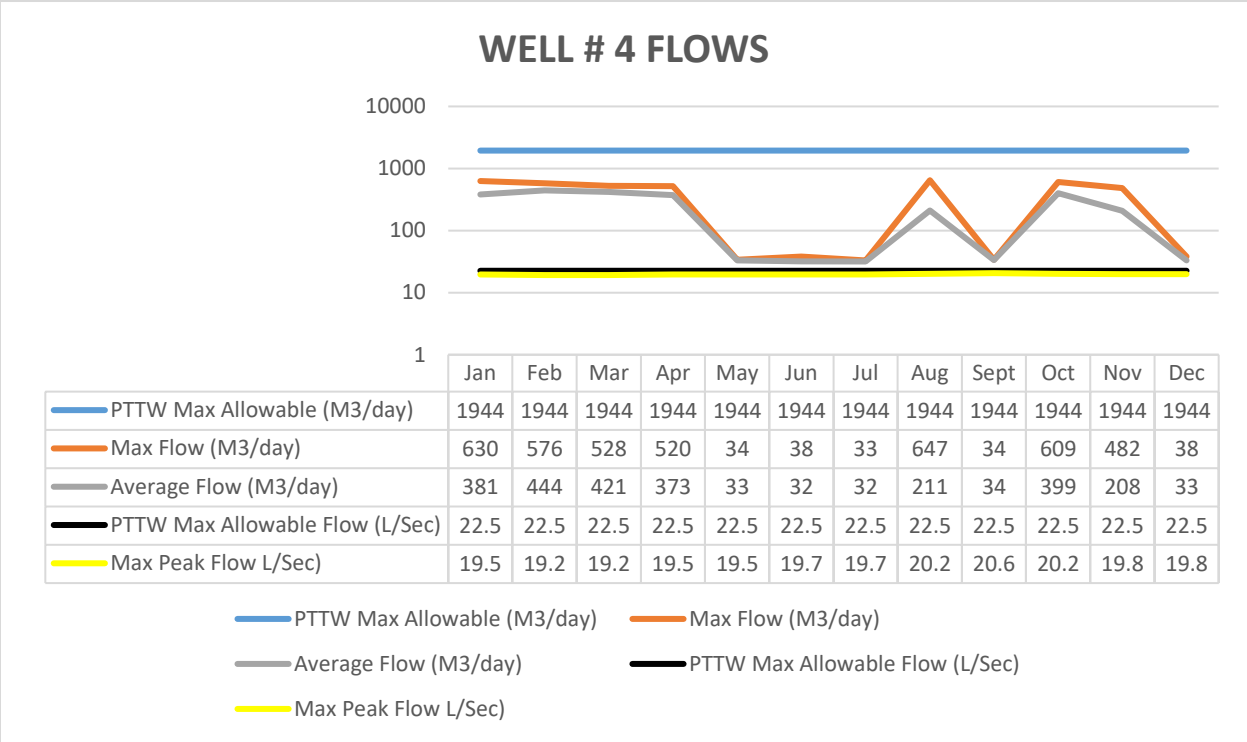
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
PTTW Max Allowable (M3/day)	1305	1305	1305	1305	1305	1305	1305	1305	1305	1305	1305	1305
Max Flow (M3/day)	312	22	113	291	612	677	475	476	500	482	424	414
Average Flow (M3/day)	206	20	36	84	364	419	336	346	389	315	307	350
PTTW Max Allowable Flow (L/Sec)	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)	12.9	12.9	13	13.5	13	13.3	13	12.9	13.1	12.9	12.9	12.9

Raw Water Daily Rate of Taking: RW 3



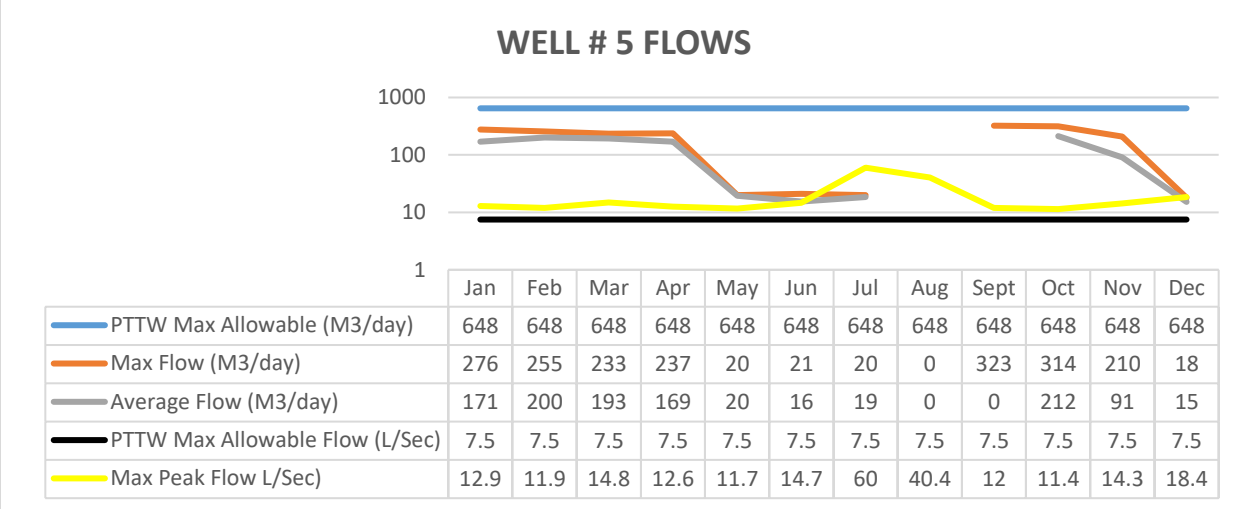
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
PTTW Max Allowable (M3/day)	1305	1305	1305	1305	1305	1305	1305	1305	1305	1305	1305	1305
Max Flow (M3/day)	272	16	17	257	546	605	423	380	14	15	374	367
Average Flow (M3/day)	179	15	15	72	322	365	294	259	14	14	270	309
PTTW Max Allowable Flow (L/Sec)	15.1	15.1	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)	10.2	10.2	9.8	10.9	11.4	12.6	10.8	10.4	8.3	9.7	10.4	10.4

Raw Water Daily Rate of Taking: RW 4



	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
PTTW Max Allowable (M3/day)	1944	1944	1944	1944	1944	1944	1944	1944	1944	1944	1944	1944
Max Flow (M3/day)	630	576	528	520	34	38	33	647	34	609	482	38
Average Flow (M3/day)	381	444	421	373	33	32	32	211	34	399	208	33
PTTW Max Allowable 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)	19.5	19.2	19.2	19.5	19.5	19.7	19.7	20.2	20.6	20.2	19.8	19.8

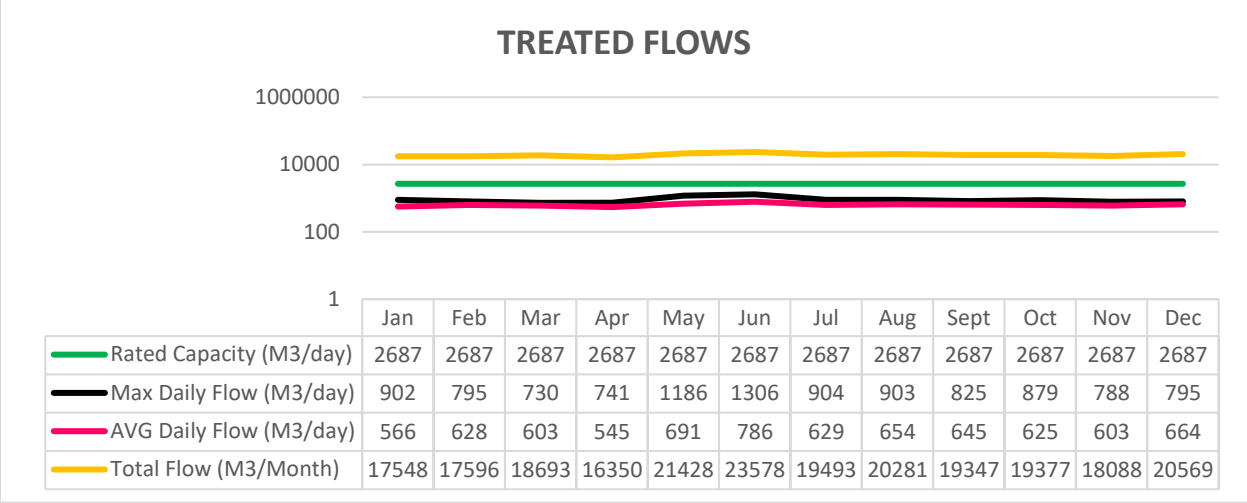
Raw Water Daily Rate of Taking: RW 5



	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
PTTW Max Allowable (M3/day)	648	648	648	648	648	648	648	648	648	648	648	648
Max Flow (M3/day)	276	255	233	237	20	21	20	0	323	314	210	18
Average Flow (M3/day)	171	200	193	169	20	16	19	0	0	212	91	15
PTTW Max Allowable 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)	12.9	11.9	14.8	12.6	11.7	14.7	60	40.4	12	11.4	14.3	18.4

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



	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
Rated Capacity (M3/day)	2687	2687	2687	2687	2687	2687	2687	2687	2687	2687	2687	2687
Max Daily Flow (M3/day)	902	795	730	741	1186	1306	904	903	825	879	788	795
AVG Daily Flow (M3/day)	566	628	603	545	691	786	629	654	645	625	603	664
Total Flow (M3/Month)	17548	17596	18693	16350	21428	23578	19493	20281	19347	19377	18088	20569

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*	*0-117*	-	-
Raw – RW3	*52*	*0-0*	*0-37*	-	-
Raw – RW4	*52*	*0-1*	*0-1*	-	-
Raw – RW5	*52*	*0-0*	*0-0*	-	-
Treated - TW	*52*	*0-0*	*0-0*	*52*	*0-1*
Distribution - DW	*156*	*0-0*	*0-0*	*156*	*0-2*

Operational Testing

Parameter	Range of Results (Min-Max Value)
Turbidity, Treated	0.005-2.05 NTU *
Treated, Free Chlorine	1.23-5.06 mg/L
Distribution, Free Chorine	0.59-2.76 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 Conservation and Parks as Adverse Water Quality Incidents.

In- House Testing

Parameter	# of grab samples taken	Range of Results (min # - max #)
Turbidity, Raw Well 1 (NTU)	52	0.08-0.61 NTU
Turbidity, Raw Well 3 (NTU)	52	0.08-0.60 NTU
Turbidity, Raw Well 4 (NTU)	52	0.09-0.56 NTU
Turbidity, Raw Well 5 (NTU)	52	0.09-0.60 NTU
Turbidity, Treated Water (NTU)	365	0.018-0.62 NTU
Treated, Free Chlorine (mg/L)	365	1.64-3.02 mg/L
Distribution, Free Chlorine (mg/L)	365	0.75-2.12 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	Mar 17 2021	0.16	7.36	280
Hydrant # 45	Mar 17 2021	0.36	7.36	283
Hydrant # 85	Sept 22 2021	0.52	8.08	278
Hydrant # 18	Sept 22 2021	3.10	8.02	283

Inorganic Parameters							
Parameter	**Units**	**Sample Date**	**Sample Location**	**Result Value**	**MAC**	**Exceedance**	
						MAC	1/2 MAC
Antimony	ug/L	Oct 12 2021	TW	0.60	6	No	No
Arsenic	ug/L	Oct 12 2021	TW	0.40	25	No	No
Barium	ug/L	Oct 12 2021	TW	296	1000	No	No
Boron	ug/L	Oct 12 2021	TW	18	5000	No	No
Cadmium	ug/L	Oct 12 2021	TW	0.003	5	No	No
Chromium	ug/L	Oct 12 2021	TW	0.30	50	No	No
Mercury	ug/L	Oct 12 2021	TW	0.01	1	No	No
Selenium	ug/L	Oct 12 2021	TW	0.26	5	No	No
Uranium	ug/L	Oct 12 2021	TW	1.66	20	No	No
Fluoride	mg/L	May 15 2018	TW	0.13	1.5	No	No
Nitrite	mg/L	Jan 12 2021	TW	0.003	1.000	No	No
Nitrite	mg/L	Apr 6 2021	TW	0.003	1.000	No	No
Nitrite	mg/L	Jul 13 2021	TW	0.003	1.000	No	No
Nitrite	mg/L	Oct 12 2021	TW	0.003	1.000	No	No
Nitrate	mg/L	Jan 12 2021	TW	1.50	10.000	No	No
Nitrate	mg/L	Apr 6 2021	TW	1.19	10.000	No	No
Nitrate	mg/L	Jul 13 2021	TW	1.42	10.000	No	No
Nitrate	mg/L	Oct 12 2021	TW	1.24	10.000	No	No

Organic Parameters							
Parameter	**Units**	**Sample Date**	**Sample Location**	**Result Value**	**MAC**	**Exceedance**	
						MAC	1/2 MAC
Alachlor	ug/l	Oct 12 2021	TW	0.02	5	No	No
Atrazine + N-dealkylated metabolites	ug/l	Oct 12 2021	TW	0.01	5	No	No
Azinphos-Methyl	ug/l	Oct 12 2021	TW	0.05	20	No	No
Benzene	ug/l	Oct 12 2021	TW	0.32	1	No	No
Benzo (a) pyrene	ug/l	Oct 12 2020	TW	0.004	0.01	No	No
Bromoxynil	ug/l	Oct 12 2021	TW	0.33	5	No	No
Carbaryl	ug/l	Oct 12 2021	TW	0.05	90	No	No
Carbofuran	ug/l	Oct 12 2021	TW	0.01	90	No	No
Carbon Tetrachloride	ug/l	Oct 12 2021	TW	0.17	5	No	No
Chlorpyrifos	ug/l	Oct 12 2021	TW	0.02	90	No	No
Diazinon	ug/l	Oct 12 2021	TW	0.02	20	No	No
Dicamba	ug/l	Oct 12 2021	TW	0.2	120	No	No
1,2-Dichlorobenzene	ug/l	Oct 12 2021	TW	0.41	200	No	No
1,4 - Dichlorobenzene	ug/l	Oct 12 2021	TW	0.36	5	No	No
1,2- Dichloroethane	ug/l	Oct 12 2021	TW	0.35	5	No	No
1,1- Dichloroethylene	ug/l	Oct 12 2021	TW	0.33	14	No	No
Dichloromethane (methylene Chloride)	ug/l	Oct 12 2021	TW	0.35	50	No	No
2,4-Dichlorophenol	ug/l	Oct 12 2021	TW	0.15	900	No	No
2,4-Dichlorophenoxy acetic acid)2,4-D)	ug/l	Oct 12 2021	TW	0.19	100	No	No
Diclofop-methyl	ug/l	Oct 12 2021	TW	0.4	9	No	No
Dimethoate	ug/l	Oct 12 2021	TW	0.06	20	No	No
Diquat	ug/l	Oct 12 2021	TW	1	70	No	No
Diuron	ug/l	Oct 12 2021	TW	0.03	150	No	No
Glyphosate	ug/l	Oct 12 2021	TW	1	280	No	No
Malathion	ug/l	Oct 12 2021	TW	0.02	190	No	No
Metolachlor	ug/l	Oct 12 2021	TW	0.01	50	No	No
Metribuzin	ug/l	Oct 12 2021	TW	0.02	80	No	No
MCPA	ug/l	Oct 12 2021	TW	0.00012	0.1	No	No
Monochlorobenzene Chlorobenzene)	ug/l	Oct 12 2021	TW	0.3	80	No	No
Paraquat	ug/l	Oct 12 2021	TW	1	10	No	No
PCB	ug/l	Oct 12 2021	TW	0.04	3	No	No
Pentachlorophenol	ug/l	Oct 12 2021	TW	0.15	60	No	No
Phorate	ug/l	Oct 12 2021	TW	0.01	2	No	No
Picloram	ug/l	Oct 12 2021	TW	1	190	No	No
Prometryne	ug/l	Oct 12 2021	TW	0.03	1	No	No
Simazine	ug/l	Oct 12 2021	TW	0.01	10	No	No

Terbufos	ug/l	Oct 12 2021	TW	0.01	1	No	No
Tetrachloroethylene	ug/l	Oct 12 2021	TW	0.35	10	No	No
2,3,4,6- Tetrachlorophenol	ug/l	Oct 12 2021	TW	0.2	100	No	No
Triallate	ug/l	Oct 12 2021	TW	0.01	230	No	No
Trichloroethylene	ug/l	Oct 12 2021	TW	0.44	50	No	No
2,4,6-Trichlorophenol	ug/l	Oct 12 2021	TW	0.25	5	No	No
Trifluralin	ug/l	Oct 12 2021	TW	0.02	45	No	No
Vinyl Chloride	ug/l	Oct 12 2021	TW	0.17	2	No	No
Trihalomethane Total	ug/l	Jan 12 2021	DW	51	100	No	No
	ug/l	Apr 6 2021	DW	38	100	No	No
	ug/l	Jul 13 2021	DW	36	100	No	No
	ug/l	Oct 12 2021	DW	70	100	No	No
	ug/l		DW	RAA= 48.75	100	No	No
Total Haloacetic Acids	ug/l	Jan 12 2021	DW	5.3	80	No	No
	ug/l	Apr 6 2021	DW	5.3	80	No	No
	ug/l	Jul 13 2021	DW	5.3	80	No	No
	ug/l	Oct 12 2021	DW	5.3	80	No	No
				RAA= 5.3	80	No	No
60 months							
Sodium	mg/l	May 15 2018	TW	29.6	20	Yes	Yes
Fluoride	mg/l	May 15 2018	TW	0.13	1.5	No	No

- MAC= Maximum Allowable Concentration as per O.Reg 169/03
- Sodium and Fluoride were tested in 2018. Sodium exceeded and was reported to MOH,MECP as well as public notification.

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**
- **Semiannual maintenance on UV disinfection equipment**
- **Distribution hydrant changed on Edward St.**
- **Distribution hydrant changed on North St.**

- **Cleaning and maintenance of Well #5 at the WTP**
- **Annual fire hydrant flushing and maintenance**
- **Annual distribution valve turning and maintenance**

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.

Water Treatment and Distribution Operation/maintenance work orders completed	Number of complete work orders 233

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 November 12, 2021 an off-site Surveillance System Audit was conducted.

Water Taking and Transfer Data

Data for the reporting period of January 1, 2021 – December 31, 2021 was submitted electronically to the Ministry of the Environment Conservation and Parks on January 13, 2022 under Permit to Take Water PTTW 6214-8T3JXP and 1760-C5UNBR.