



2018 Summary Report

for the

Town of Minto

HARRISTON DRINKING WATER SYSTEM

TABLE OF CONTENTS

1.0	INTRODUCTION	1
1.1	Background.....	1
1.2	Objective	2
1.3	Description of Drinking Water System	2
2.0	SUMMARY OF UPGRADES	3
2.1	Upgrades Completed in 2018	3
2.2	Upgrades Scheduled to be Completed in 2019.....	3
3.0	OPERATION OF THE DRINKING WATER SYSTEM	3
3.1	Summary of the Quantities and Flow Rates of Water Supplied	3
3.2	Comparison of Actual Flow and Maximum Allowable Rates	7
3.3	Raw Water Quality and Required Treatment.....	9
3.4	Summary of Treatment Chemicals Used	10
4.0	COMPLIANCE	11
4.1	Assessment of Compliance	11
4.2	Summary of Compliance.....	12

LIST OF TABLES

Table 3.1	Harriston Drinking Water System – Well #1	4
Table 3.2	Harriston Drinking Water System – Well #2	5
Table 3.3	Harriston Drinking Water System – Well #3	6
Table 3.4	Harriston Drinking Water System – Well # 1 & 3 Combined	7
Table 3.5	Comparison of Flow Rates and Flow Capacities	8
Table 3.6	2018 Maximum Water Usage Per Day by Month	8
Table 3.7	2018 Annual Summary of Raw Water Turbidity.....	10
Table 3.8	2018 Annual Summary of Treatment Chemicals Used	11
Table 4.1	Adverse Water Quality Incidents	12
Table 4.2	Requirements the System Failed to Meet.....	13

Date: March 8, 2019

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1.0 INTRODUCTION

1.1 Background

In December 2002, the Safe Drinking Water Act (SDWA) was enacted. Subsequently, on June 1, 2003, under the SDWA, a new *'Drinking-Water Systems Regulation'*, Ontario Regulation 170/03 (O. Reg. 170/03), was enacted. In addition, several supporting regulations and procedures were also enacted to assist with the administration of O. Reg 170/03. The list of relevant drinking-water legislation is presented in Appendix A.

The SDWA identifies the responsibilities of owners and operating authorities of municipal drinking water systems (SDWA, Sections 11 and 19). Their duties include ensuring that:

- All water provided by the drinking-water system meets prescribed drinking-water quality standards;
- The drinking-water system is operated in accordance with the Act and regulations and is kept in a good state of repair;
- All facilities are appropriately staffed and supervised;
- All sampling, testing and monitoring requirements are complied with;
- All reporting requirements are complied with; and
- Only persons holding valid operator's certificates operate the drinking-water-system.

O. Reg. 170/03 establishes the standard for protection of drinking water. It includes sets of Schedules, specific to municipal residential systems, that define requirements for:

- Minimum treatment levels;
- Operational checks;
- Chemical and microbiological sampling and testing;
- Adverse results reporting;
- Corrective procedures; and
- Report documentation and retention.

The system's Municipal Drinking Water Licence (MDWL), Drinking Water Works Permit (DWWP) and Permit To Take Water (PTTW) imposes system specific rules and conditions applicable to the standards set out in O. Reg. 170/03.

1.2 Objective

This Harriston Drinking Water System Summary Report is being prepared in fulfillment of Schedule 22 of O. Reg. 170/03, and will be given to Members of the Municipal Council. It covers the period from January 1, 2018 to December 31, 2018.

This Summary Report lists any requirements of the Act, the regulations, the PTTW, the MDWL, the DWWP and any order that the system failed to meet, during the period of this report. For any such failure, the measures that were taken to correct the failure are detailed. The report also includes relevant information that will assist the members of the Municipal Council for the Town, to assess the water work's capability to meet existing and future planned uses of the system.

1.3 Description of Drinking Water System

Harriston is a community with a population of approximately 2,130 persons, located within the Town of Minto within the northwest corner of Wellington County, at the intersection of Provincial Hwy. No. 9 and Hwy. No. 89.

Harriston is serviced by a waterworks that consists of: three drilled bedrock wells, three pumphouses, an elevated 1915 m³ steel storage tank and a distribution network of watermains, ranging in diameter from 100 mm to 300mm. In the event of a power outage, pump #1 & #3 is equipped with automatic back-up power supply. Well #2 has the capacity of connecting to a portable generator.

The bedrock wells are equipped with submersible pumps. Water from Wells #1 and #3 discharge into pumphouse #3, and water from Well #2 discharges into pumphouse #2, respectively, for flow measurement and treatment. In the pumphouse, the raw water supply is injected with 12% sodium hypochlorite for disinfection and the chemical PW1680, for iron sequestering. The treated water leaves the pumphouse and enters an underground contact pipe and is discharged into the distribution system after adequate contact time is achieved.

The wells are controlled (*start/stop*) automatically based on elevated storage tank liquid levels and pressures in the distribution system. Each pumphouse is equipped with alarms for chlorination system failure (*and corresponding lockout of well pumps*), low water level and intrusion. Each wellhouse has a continuous monitoring analyzer for chlorine.

The treated water leaves the wellhouse and enters an underground contact pipe and is discharged into the distribution system after adequate contact time is achieved.

The Harriston Drinking Water System operates under the MDWL 106-102 and DWWP 106-202 and PTTW #3012-A8QRPF.

2.0 SUMMARY OF UPGRADES

2.1 Upgrades Completed in 2018

The disinfection treatment system in the Harriston Drinking Water System meets all of the standards imposed by O. Reg. 170/03 and the MOECC's "*Procedures for Disinfection of Drinking Water in Ontario*".

Typically, maintaining the system includes repairs and/or replacement of individual components as necessary. In 2018 \$28,350 was spent on George Street South watermain replacement, \$30,600 on George Street North watermain replacement and \$14,400 was spent on designing the Lawrence Street extension.

The following purchases were also made on equipment that is shared between all of Minto's water systems. \$18,500 on the water meter installation program and \$86,000 on 2 new trucks.

Preventative maintenance measures are being followed to ensure proper operation of the Drinking Water System.

2.2 Upgrades Scheduled to be Completed in 2019

In 2019, the Town of Minto will be completing a robotic water tower inspection for \$6,000, \$5,000 for a flow control valve for Well #3 and \$125,000 on watermain on George St. N..

The following will also be purchased to be shared within the water department. \$53,500 for SCADA, computer hardware and software, \$20,000 for water meters, \$50,000.00 on vehicle replacement and \$10,000 on chemical pumps.

3.0 OPERATION OF THE DRINKING WATER SYSTEM

3.1 Summary of the Quantities and Flow Rates of Water Supplied

O. Reg. 170/03 stipulates that a summary of the quantities and flow rates of the water supplied from each of Harriston's wells be included in the Summary Report. Tables 3.1, 3.2 and 3.3 provide a summary of quantities and flow rates supplied during 2018 for Wells #1, #2 and #3 respectively, on a monthly basis. Well #1 is located in the Young Street wellhouse, but the raw water is directed to the King Street wellhouse for treatment. As such, raw supplies from Well #1 and Well #3 are treated in the King Street wellhouse, and raw water supply from Well #2 is treated in the John Street wellhouse.

Table 3.1
Harriston Drinking Water System – Well #1
Treated Water Flow, Turbidity, and Disinfectant Residual
January 1, 2018 – December 31, 2018

	Raw Water Flow (Max Flow Rate = 11.3 L/s)			Chlorine	Monthly Averages				Distribution System Disinfectant
	Operator Observed Peak Flow (L/s)	Maximum Day Flow (m ³ /day)	Monthly Total (m ³)		Treated Water Turbidity		Treated Water Disinfectant Point of Entry		
Month						Monthly Total (L)	No. of Samples Collected	Monthly Average Turbidity	No. of Treated Samples Collected
January	10.2	81	1,451	23	4	0.36	31	1.20	See Harriston Well #3 Data
February	10.2	96	1,329	53	7	0.38	28	1.22	
March	10.2	64	1,305	28	8	0.40	31	1.24	
April	10.1	71	1,206	15	7	0.48	30	1.23	
May	10.2	66	1,283	56	3	0.78	31	1.19	
June	10.2	85	1,329	22	7	0.58	30	1.15	
July	10.2	63	1,358	45	6	0.51	31	1.16	
August	10.2	76	1,488	41	8	0.52	31	1.19	
September	10.1	63	1,193	22	4	0.49	30	1.24	
October	10.3	67	1,437	54	4	0.53	31	1.22	
November	10.2	63	1,347	30	6	0.51	30	1.18	
December	10.0	68	1,273	41	7	0.39	31	1.25	
Total			15,999	430	71		365		
Average			1,333			0.49		1.21	
Maximum	10.3	96							

Disinfectant Compound Used: **12% Sodium Hypochlorite**
 Form of Residual Displayed: **Free**
 Quantity of Disinfectant Used During 2018: 430 L
 Distribution System Minimum Target Residual: **0.2 mg/L**

Table 3.2
Harriston Drinking Water System – Well #2
Treated Water Flow, Turbidity, and Disinfectant Residual
January 1, 2018 – December 31, 2018

Month	Raw Water Flow (Max Flow Rate = 23.9 L/s)			Chlorine Monthly Total (L)	Monthly Averages				Distribution System Disinfectant No. of Samples Collected
	Operator Observed Peak Flow (L/s)	Maximum Day Flow (m ³ /day)	Monthly Total (m ³)		Treated Water Turbidity		Treated Water Disinfectant Point of Entry		
					No. of Samples Collected	Monthly Average Turbidity	No. of Treated Samples Collected	Average Residual (mg/L)	
January	17.3	323	8,184	265	3	0.88	31	1.26	See Harriston Well #3 Data
February	17.4	351	6,804	219			28	1.25	
March	17.4	339	7,658	176	7	0.87	31	1.33	
April	17.3	438	7,782	262	5	0.68	30	1.2	
May	17.3	718	9,727	296	4	0.85	31	1.17	
June	17.4	615	7,804	234	2	0.79	30	1.15	
July	17.4	448	8,981	298	2	0.83	31	1.13	
August	17.5	542	8,876	309	4	0.58	31	1.22	
September	17.5	575	9,025	265			30	1.26	
October	17.4	818	11,714	377	3	0.74	31	1.37	
November	17.3	337	7,262	244	7	0.63	30	1.34	
December	17.3	291	7,467	223	8	0.71	31	1.32	
Total			101,284	3,168	45		365		
Average			8,440			0.76		1.25	
Maximum	17.5	818							

Disinfectant Compound Used: **12% Sodium Hypochlorite**
 Form of Residual Displayed: **Free**
 Quantity of Disinfectant Used During 2018: **3,168 L**
 Distribution System Minimum Target Residual: **0.2 mg/L**

Table 3.3
Harriston Drinking Water System – Well #3
Treated Water Flow, Turbidity, and Disinfectant Residual
January 1, 2018 – December 31, 2018

	Raw Water Flow (Max Flow Rate = 18.9 L/s)			Chlorine	Monthly Averages				Distribution System Disinfectant
	Operator Observed Peak Flow (L/s)	Maximum Day Flow (m ³ /day)	Monthly Total (m ³)		Treated Water Turbidity		Treated Water Disinfectant Point of Entry		
Month						Monthly Total (L)	No. of Samples Collected	Monthly Average Turbidity	No. of Treated Samples Collected
January	15.9	767	15,300	371	5	0.38	31	1.28	49
February	16.0	726	13,979	354	9	0.30	28	1.17	46
March	15.8	725	15,398	425	8	0.32	31	1.28	50
April	16.1	705	14,522	326	7	0.40	30	1.24	47
May	16.3	1,014	15,892	357	5	0.33	31	1.18	47
June	15.7	778	15,855	435	6	0.57	30	1.12	48
July	15.8	829	16,630	432	7	0.50	31	1.12	49
August	15.5	878	15,956	403	10	0.49	31	1.22	50
September	15.8	743	12,440	329	5	0.57	30	1.19	44
October	15.9	861	17,592	485	7	0.37	31	1.38	50
November	15.9	788	15,771	411	8	0.34	30	1.35	49
December	15.8	618	14,501	337	9	0.39	31	1.29	46
Total			183,836	4,665	86		365		575
Average			15,320			0.41		1.24	
Maximum	16.3	1,014							

Disinfectant Compound Used: **12% Sodium Hypochlorite**
 Form of Residual Displayed: **Free**
 Quantity of Disinfectant Used During 2018: **4,665 L**
 Distribution System Minimum Target Residual: **0.2 mg/L**

Table 3.4
Harriston Drinking Water System – Well #1 & 3 Combined
Treated Water Flow
January 1, 2018 – December 31, 2018

Month	Treated Water Flow (Well #1 Max Flow Rate = 11.3 L/s) (Well #3 Max Flow Rate = 18.9 L/s) (Max Daily Volume = 2,613 m ³ /d)				Chlorine
	Operator Observed Peak Flow (L/s)	Operator Observed Peak Flow (L/s)	Maximum Day Flow (m ³ /day)	Monthly Total (m ³)	Monthly Total (l)
January	10.2	15.9	767	16,751	394
February	10.2	16.0	726	15,308	407
March	10.2	15.8	725	16,703	453
April	10.1	16.1	705	15,728	341
May	10.2	16.3	1,014	17,175	413
June	10.2	15.7	778	17,184	457
July	10.2	15.8	829	17,988	477
August	10.2	15.5	878	17,444	444
September	10.1	15.8	743	13,633	351
October	10.3	15.9	861	19,029	539
November	10.2	15.9	788	17,118	441
December	10.0	15.8	618	15,774	378
Total				199,835	5,095
Average				16,653	
Maximum	10.3	16.3	1,014		

3.2 Comparison of Actual Flow and Maximum Allowable Rates

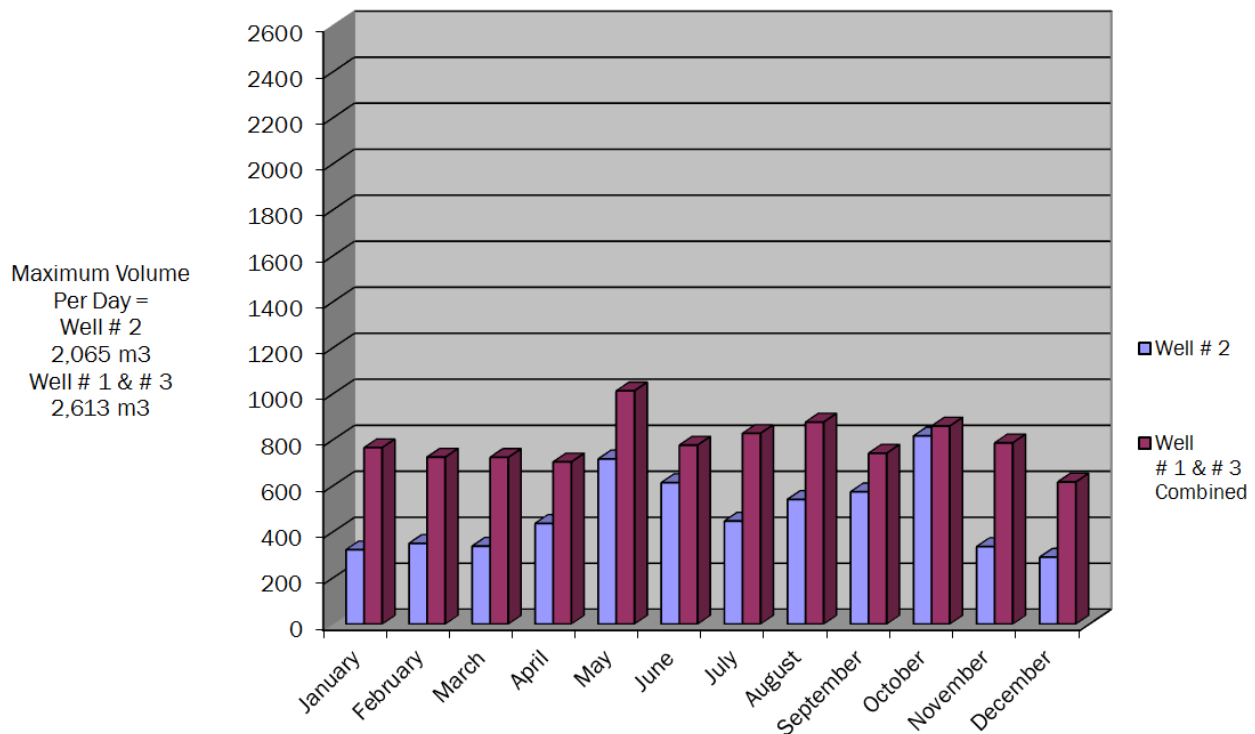
O. Reg. 170/03 stipulates that a summary of the quantities and flow rates of the water supplied from each of Harriston’s wells be included in the Summary Report and compared against the rated capacity and flow rate for the system. As such, a comparison of the instantaneous peak flow to the PTTW’s rated capacity is included and a comparison of the maximum daily flow to the MDWL’s rated capacity is included in Table 3.5. Table 3.4 reflects the comparisons between the PTTW and MDWL.

Table 3.5
Comparison of Flow Rates and Flow Capacities
To
Rated Flow Rate (PTTW) and Rated Capacity (MDWL)

Well Supply	PTTW Max. Flow Rate	Operator Observed Peak Flow	Percent of Maximum Allowable	MDWL Schedule C Maximum Daily Quantity	Maximum Daily Flow	Percent of Maximum Allowable
	L/s	L/s	%	m ³ /day	m ³ /day	%
Well #1	11.3	10.3	90	979	96	10
Well #2	23.9	17.5	73	2,065	818	40
Well #3	18.9	16.3	86	1,634	1,014	62

The MDWL stipulates, “The maximum daily volume of treated water that flows from the treatment subsystem to the distribution system shall not exceed the value identified as the rated capacity in Schedule C Table 1.”

Table 3.6
Maximum Water Usage Per Day by Month



Short-term peaks, in excess of permitted values, may occur at pump start up, while doing specific maintenance procedures or during emergency demand situations.

The time and duration of any flow exceedance is recorded for each event along with the reason for the occurrence. There were no extended exceedances or exceedances over the daily permitted rate in the Harriston Drinking Water System.

3.3 Raw Water Quality and Required Treatment

The Harriston Drinking Water System has no chemical parameters that exceed MAC (maximum acceptable limit) or IMAC (interim maximum acceptable limit). The Harriston Drinking Water System uses PW1680 to improve the disinfection process by controlling corrosion in water that is considered very hard and or contains high levels of iron. This is considered an aesthetic issue which is included in the technical support document for Ontario's Drinking Water Standards, Objectives and Guidelines.

The Harriston Drinking Water System utilizes continuous monitoring analyzers for free chlorine residual. The chlorine analyzer is equipped with an alarm. In the event of an adverse chlorine residuals reading, a signal is sent to the SCADA system, which in turn, shuts down the respective well pump. The average monthly turbidity and free chlorine residual measurements for treated water are presented in Tables 3.1, 3.2 and 3.3 for Well #1, Well #2 and Well # 3, respectively.

There were no high turbidity readings (>1.0 NTU) experienced during 2018. The minimum, maximum and average turbidity readings for raw water from each well are presented in Table 3.7.

12% sodium hypochlorite is the disinfectant used. Free chlorine residual is monitored continuously at the "Point of Entry" (POE) into the distribution system. Additional "grab samples" are taken daily (*excluding weekends and holidays*) within the distribution system and tested for the free chlorine residual. The minimum, maximum and average values of free chlorine residual at the POE are presented Table 3.5. Also included in Table 3.5 is the range of free chlorine residual within the distribution system.

The free chlorine residual in the distribution system ranged between 0.50 mg/L and 1.48 mg/L. O. Reg. 170/03, Schedule 1-2 stipulates that the free chlorine residual can never be less than 0.05 mg/L. In addition, O. Reg. 170-03, Schedule 1-4 stipulates that the water treatment equipment must be "...capable of achieving, at all locations within the distribution system, a free chlorine residual of 0.2 mg/L ...". The Harriston Drinking Water System meets both of these requirements.

Table 3.7
2018 Annual Summary of
Raw Water Turbidity and Free Chlorine Residual
for Harriston Drinking Water System

Location	Range	Raw Water Turbidity	Free Chlorine Residual at POE
		NTU	mg/L
Well #1	Minimum	0.10	0.90
	Maximum	0.89	1.65
	Average	0.45	1.21
Well #2	Minimum	0.17	0.83
	Maximum	0.89	1.59
	Average	0.44	1.25
Well #3	Minimum	0.12	0.88
	Maximum	0.83	1.62
	Average	0.41	1.24

3.4 Summary of Treatment Chemicals Used

The disinfectant chemical used in the Harriston Drinking Water System is 12% Sodium Hypochlorite. Measurements of free chlorine are recorded on a continuous basis. In 2018, 8,263 L of 12% Sodium Hypochlorite was used. The average dosage rates are presented in Table 3.8.

In 2018, 1,011 L of PW1680 was used for the sequestering of iron. Wells #1 and #3 share a common tank of PW1680. The average dosage rates are presented in Table 3.8.

Table 3.8
2018 Annual Summary of
Treatment Chemicals Used
for Harriston Drinking Water System

Treatment Chemical	Well	Volume Used	Mass Used	Annual Flow	Dosage Rate
		L	kg	m ³	mg/L
12 % Sodium Hypochlorite (NaOCl)	Well #1	430	51.6	15,999	3.23
	Well # 2	3,168	380.2	101,284	3.75
	Well # 3	4,665	559.8	183,836	3.05
	Total	8,263	991.6	301,119	3.29
PW1680	Well #1 & Well #3	230	322.0	199,835	1.61
	Well # 2	781	1,093	101,284	10.80
	Total	1,011	1,415	301,119	4.70

Note:

- 12% Sodium Hypochlorite = 120,000 mg/L = 120 kg/m³
- PW1680 has a specific gravity = 1.4

4.0 COMPLIANCE

4.1 Assessment of Compliance

The objective of the Summary Report is to list any requirements of the Act, the regulations, the PTTW, the MDWL, the DWWP and any MOECC order that the system failed to meet from January 1, 2018 to December 31, 2018, and the corresponding corrective measure(s) taken. Compliance was assessed as follows:

- MOECC Completed Inspection of the Harriston system completed November 16, 2018 Final inspection rating 91.88%
- There were **no MOECC Orders** issued to the Harriston Drinking Water System in 2018.
- The MDWL imposes the specific rules and conditions governing the standards set out in O. Reg. 170/03. It is an important instrument in defining the requirements of compliance of a Drinking Water System.
- O. Reg. 170/03 establishes the standard for protection of drinking water; specifically, through 12 schedules that municipal residential drinking systems must follow to meet the requirements of the regulation.

- The SDWA identifies the responsibilities of owners and operating authorities of municipal drinking water systems. It places a recommended statutory standard of care on those who have oversight of municipal drinking-water systems. In essence, the standard of care has two themes: be informed and exercise diligent oversight.
- Adverse Test Results reported under the Safe Drinking Water Act, 18(1) or O Reg.170/03, Schedule 16-4
 - a) Adverse Water Quality Incidents (AWQI) refer to any unusual test results that do not meet provincial water quality standard or situation where the disinfection of the drinking water may be compromised.

**Table 4.1
 Adverse Water Quality Incidents**

AWQI #	Date	Issue	Corrective Action
N/A			

4.2 Summary of Compliance

To the best of our knowledge and ability we are in, or diligently working towards, compliance with all of the requirements of the SDWA, O. Reg. 170/03, as well as the Harriston Water Work’s MDWL 106-102, DWWP 106-202 and PTTW #3012-A8QRPF. Every attempt has been made to ensure this document is an accurate representation of how the Drinking Water System is operated.


To the best of our knowledge, Table 4.2 identifies all of the requirements of the SDWA, the regulations, the MDWL, the DWWP and the PTTW.

**Table 4.2
 HARRISTON DRINKING WATER SYSTEM
 Requirements the System Failed to Meet**

Compliance With	Description of Item the System Failed to Meet	Correction of This Situation How/When
MDWL # 106-102	<i>Harriston Drinking Water System is in compliance with all of the requirements of the MDWL</i>	
DWWP # 106-202	<i>Harriston Drinking Water System is in compliance with all of the requirements of the DWWP</i>	
O. Reg. 170/03	<i>Harriston Drinking Water System is in compliance with all of the requirements of O. Reg. 170/03</i>	

Compliance With	Description of Item the System Failed to Meet	Correction of This Situation How/When
SDWA	<i>Harriston Drinking Water System is in compliance with all of the requirements of the SDWA</i>	

Dated this 8th day of March 2019.



Wayne Metzger
Water Foreman