

2020 Summary Report

for the

Town of Minto

HARRISTON DRINKING WATER SYSTEM

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Date: March 9, 2021

2020 Summary Report for the Town of Minto HARRISTON DRINKING WATER SYSTEM

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. This report covers the period from January 1, 2020 to December 31, 2020.

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 2,230 persons and approximately 820 residential properties, 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 1,915 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 high & low free chlorine residuals (and corresponding lockout of well pumps), low water level and intrusion. Each wellhouse has a continuous monitoring analyzer for POE free 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 2020

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

Typically, maintaining the system includes repairs and/or replacement of individual components as necessary. In 2020, \$41,465 was spent on watermain upgrades on Arthur Street East, \$154,100 on watermain replacement of Lawrence Avenue, \$2,432 on William Street East engineering and \$55,066 on the Water tower inspection and upgrades. The following purchases were also made on equipment that is shared between all of Minto's water systems. \$23,423 on the water meters, \$7,112 on equipment and \$22,522 on the modelling program that will allow us to run scenarios for risk assessment planning.

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

2.2 Upgrades Scheduled to be Completed in 2021

In 2021, the Town of Minto is planning to spend \$50,000 for watermain upgrades on Arthur St W, \$40,000 to video log wells #1 and #3 and \$3,500 for a new roof on Well #3. The following will also be purchased to be shared within the water department. \$5,000 for computer hardware and software, \$55,000 on the SCADA monitoring system and \$20,000 for water meters. \$100,000.00 on watermain replacement (location to be determined), \$15,000 on pumps and/or valves \$10,000 on equipment and \$15,000 for engineering of future water system needs.

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 2020 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, 2020 – December 31, 2020

						Monthly A	verages		Distribution
		aw Water Flow ow Rate = 11.3	ß L/s)	Chlorine	Treated Water Turbidity		Treated Water Disinfectant Point of Entry		System Disinfectant
Month	Operator Observed Peak Flow (L/s)	Maximum Day Flow (m³/day)	Monthly Total (m³)	Monthly Total (L)	No. of Samples Collected	Monthly Average Turbidity (NTU)	No. of Treated Samples Collected	Monthly Average Residual (mg/L)	No. of Samples Collected
January	9.8	69	1,315	31	6	0.37	31	1.26	
February	9.6	106	1.246	18	4	0.43	29	1.18	
March	9.6	80	1,487	35	7	0.38	31	1.29	-
April	9.5	67	1,195	25	13	0.42	30	1.36	-
May	9.5	57	1,125	45	13	0.42	31	1.37	See
June	9.5	45	1,258	47	13	0.49	30	1.35	Harriston Well
July	9.5	161	1,511	18	6	0.36	31	1.30	#3
August	9.5	164	1,413	54	4	0.44	32	1.19	Data
September	9.7	118	1,779	37	4	0.26	31	1.31	Data
October	9.6	175	2,616	72	3	0.23	30	1.38	1
November	9.5	96	2,015	38	5	0.21	30	1.16	1
December	9.5	82	1,574	52	4	0.22	31	1.19	1
2000111001	0.0		2,0			0.22		1.10	
Total			18,534	472	82		367		
Average			1,545			0.35		1.28	
Maximum	9.8	175	•						

Disinfectant Compound Used: 12% Sodium Hypochlorite

Form of Residual Displayed: Free

Quantity of Disinfectant Used During 2020: **472** 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, 2020 – December 31, 2020

		- W				Monthly A	verages		Distribution
	Raw Water Flow (Max Flow Rate = 23.9 L/s)			Chlorine	Treated Water Turbidity		Treated Water Disinfectant Point of Entry		System Disinfectant
Month	Operator Observed Peak Flow (L/s)	Maximum Day Flow (m³/day)	Monthly Total (m³)	Monthly Total (L)	No. of Samples Collected	Monthly Average Turbidity (NTU)	No. of Treated Samples Collected	Monthly Average Residual (mg/L)	No. of Samples Collected
lonuon/	17.3	398		216	6	0.77	31	1.10	
January		409	7,518	206		0.77	30	1.10	
February	17.6		7,072		4				
March	17.6	419	7,995	220	6	0.63	31	1.15	
April	17.6	713	8,159	271	12	0.55	31	1.18	
May	17.6	376	6,989	220	12	0.70	31	1.23	See
June	17.6	334	7,489	241	11	0.71	30	1.15	Harriston Well
July	17.6	527	9,237	316	4	0.91	31	1.25	#3
August	17.6	566	9,285	249	5	0.87	32	1.25	Data
September	17.4	602	9,424	286	3	0.66	31	1.25	
October	17.5	1,491	15,074	502	3	0.91	31	1.37	
November	5.8	394	6,950	183	5	0.93	30	1.23	
December	17.6	416	7,257	255	4	0.63	31	1.33	
Total			102,449	3,165	75		370		
Average			8,537			0.74		1.21	
Maximum	17.6	1,491							

Disinfectant Compound Used: 12% Sodium Hypochlorite

Form of Residual Displayed: Free

Quantity of Disinfectant Used During 2020: **3,165** 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, 2020 – December 31, 2020

	_	D 14/-4 Florid					Distribution		
	Raw Water Flow (Max Flow Rate = 18.9 L/s)			Chlorine	Treated Water Turbidity		Treated Water Disinfectant Point of Entry		System Disinfectant
Month	Operator Observed Peak Flow (L/s)	Maximum Day Flow (m³/day)	Monthly Total (m³)	Monthly Total (L)	No. of Samples Collected	Monthly Average Turbidity (NTU)	No. of Treated Samples Collected	Monthly Average Residual (mg/L)	No. of Samples Collected
January	15.7	867	15,641	383	7	0.46	31	1.25	49
February	15.7	838	14,964	351	5	0.37	30	1.13	44
March	15.6	1,221	18,423	459	7	0.43	31	1.22	49
April	15.8	994	16,581	461	14	0.36	31	1.34	45
May	16.3	812	15,610	404	13	0.36	31	1.34	47
June	16.3	1,039	18,440	456	12	0.29	30	1.20	49
July	15.8	1,066	22,192	585	5	0.36	31	1.25	49
August	15.7	875	13,544	313	5	0.47	32	1.24	48
September	15.9	797	12,639	352	4	0.32	30	1.21	47
October	16.2	806	12,373	311	3	0.19	31	1.27	49
November	16.2	713	15,907	327	5	0.25	30	1.09	47
December	16.4	809	16,068	415	5	0.17	31	1.12	49
Total			192,382	4,817	85		369		572
Average			16,032			0.34		1.22	
Maximum	16.4	1,221	•						

Disinfectant Compound Used: 12% Sodium Hypochlorite

Form of Residual Displayed: Free

Quantity of Disinfectant Used During 2020: **4,817 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, 2020 – December 31, 2020

	(Chlorine			
Month	Operator Observed Peak Flow	Monthly Total	Monthly Total		
	(L/s)	(L/s)	(m ³ /day)	(m³)	(L)
January	9.8	15.7	867	16,956	414
February	9.6	15.7	838	16,210	369
March	9.6	15.6	1,221	19,910	494
April	9.5	15.8	994	17,776	486
May	9.5	16.3	812	16,735	449
June	9.5	16.3	1,039	19,698	503
July	9.5	15.8	1,066	23,703	603
August	9.5	15.7	875	14,957	367
September	9.7	15.9	797	14,418	389
October	9.6	16.2	806	14,989	383
November	9.5	16.2	713	17,922	365
December	9.5	16.4	809	17,642	467
Total	·			210,916	5,289
Average				17,576	
Maximum	9.8	16.4	1,221		

3.2 Comparison of Actual Flow and Maximum Allowable Rates

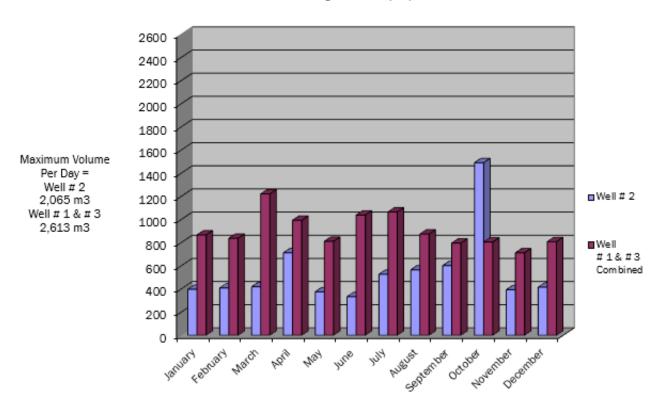
O. Reg. 170/03 stipulates that a summary of the quantities and flow rates of the water supplied from each of Harriston's wells be included in the Summary Report and compared against the rated capacity and flow rate for the system. As such, a comparison of the instantaneous peak flow to the PTTW's rated 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	%	m³/day	m³/day	%
Well #1	11.3	9.8	86	979	175	18
Well #2	23.9	17.6	74	2,065	1,491	72
Well #3	18.9	16.4	87	1,634	1,221	75

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 for high and low free chlorine. In the event of a high and/or low chlorine residual 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 turbidity readings exceeding 1.0 NTU during 2020. 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 3.7.

The free chlorine residual in the distribution system ranged between 0.39 mg/L and 1.42 mg/L. 0. Reg. 170/03, Schedule 1-2 stipulates that the free chlorine residual can never be less than 0.05 mg/L. In addition, 0. 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
2020 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
	Minimum	0.15	0.62
Well #1	Maximum	0.87	1.80
	Average	0.37	1.28
	Minimum	0.06	0.55
Well #2	Maximum	0.72	1.64
	Average	0.28	1.21
	Minimum	0.11	0.80
Well #3	Maximum	0.77	1.80
	Average	0.38	1.22

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 2020, 8,454 L of 12% Sodium Hypochlorite was used. The average dosage rates are presented in Table 3.8.

In 2020, 1,478 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
2020 Annual Summary of
Treatment Chemicals Used
for Harriston Drinking Water System

Treatment	Well	Volume Used	Mass Used	Annual Flow	Dosage Rate
Chemical		L	kg	m³	mg/L
	Well #1	472	56.6	18,534	3.06
12 % Sodium	Well # 2	3,165	379.8	102,449	3.71
Hypochlorite	Well # 3	4,817	578.0	192,382	3.00
(NaOCI)	Total	8,454	1014.5	313,365	3.24

Treatment	Well	Volume Used	Mass Used	Annual Flow	Dosage Rate
Chemical		L	kg	m³	mg/L
	Well #1 & Well #3	239	333.9	210,916	1.58
PW1680	Well # 2	1,240	1,735	102,449	16.94
	Total	1,478	2,069	313,365	6.60

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 MECP order that the system failed to meet from January 1, 2020 to December 31, 2020, and the corresponding corrective measure(s) taken. Compliance was assessed as follows:

- MECP Completed Inspection of the Harriston system completed July 16, 2020. Final inspection rating 100%
- There were **no MECP Orders** issued to the Harriston Drinking Water System in 2020.
- 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

The Town of Minto works diligently to maintain 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.

Table 4.2 identifies any non-compliances related to the following: SDWA, O. Reg. 170/03, 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	Harriston Drinking Water System is in compliance w of the requirements of the MDWL			
DWWP # 106-202	Harriston Drinking Water System is in compliance with all of the requirements of the DWWP			
O. Reg. 170/03	Harriston Drinking Water System is in compliance with all of the requirements of O. Reg. 170/03			
SDWA	Harriston Drinking Water System is in compliance with all of the requirements of the SDWA			
PTTW #3012-A8QRPF	Harriston Drinking Water System is in compliance with all of the requirements of the PTTW			

Dated this 9th day of March 2021.

Todd Rogers Water Foreman