



2013 Summary Report

for the

Town of Minto

HARRISTON DRINKING WATER SYSTEM

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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) and Drinking Water Works Permit (DWWP) 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, 2013 to December 31, 2013.

This Summary Report lists any requirements of the Act, the regulations, the MDWL, 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 2108 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 250mm. 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 #8430-85KS2X.

2.0 SUMMARY OF UPGRADES

2.1 Upgrades Completed in 2013

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

Typically, maintaining the system includes repairs and/or replacement of individual components as necessary. In 2013, \$2,520.00 was spent on flow control valve replacement, \$6,000.00 on the Elora St. Connecting Link project and \$10,793.00 on preparations for the Queen St. and George St. watermain replacement projects.

The following purchases were also made on equipment that is shared between all of Minto's water systems. \$3,015.00 on computer equipment, \$6,353.00 on PLC upgrades for the SCADA system, \$386,129.00 on the water meter installation program and \$23,863.00 to replace a truck.

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

2.2 Upgrades Scheduled to be Completed in 2014

In 2014, the Town of Minto is planning to upgrade the flow controls in the pumphouse for an estimated cost of \$7,000.00, water tower inspection for \$23,000.00, installation of oversized will begin on George St for approximately \$133,000.00, watermain installation on Queen St. behind Murphy's at an estimated cost of \$50,000.00 and George St. watermain design for approximately \$15,000. Valve replacements at an estimated cost of \$1,500.00 will also be done.

In 2014 the following will be purchased to be shared within the water department.

One vehicle replacement for approximately \$20,000.00, upgrades to the SCADA system at an estimated cost of \$30,000.00, \$650,000.00 on the water meter installation program, \$15,000.00 on a rate study, \$35,000.00 on generator replacements and \$3,500.00 on hydrants.

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 2013 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, 2013 – December 31, 2013

Month	Raw Water Flow (Max Flow Rate = 11.4 L/s)			Chlorine Monthly Total (L)	Monthly Averages				Distribution System Disinfectant	
	Instantaneous Peak Flow (L/s)	Maximum Day Flow (m ³ /day)	Monthly Total (m ³)		Treated Water Turbidity		Treated Water Disinfectant		No. of Dis. Samples Collected	No. of Samples with Detectable Residual
					No. of Samples Collected	Daily Average Turbidity	No. of Treated Samples Collected	Average Residual (mg/L)		
January	10.0	134	1,052	20	4	0.5	18	1.21	See Harriston Well #3 Data	
February	10.4	127	1,378	39	4	0.31	29	1.25		
March	10.9	599	6,912	114	5	0.38	32	1.19		
April	10.7	503	1,509	39	3	0.43	29	1.17		
May	10.7	89	1,282	20	3	0.3	30	1.16		
June	10.3	79	1,452	44	6	0.55	29	1.17		
July	10.4	214	1,686	20	0		30	1.06		
August	10.7	132	1,545	40	6	0.47	31	1.07		
September	10.9	97	1,643	40	2	0.44	30	1.13		
October	10.7	103	1,550	42	2	0.4	31	1.26		
November	10.4	111	1,442	23	3	0.45	30	1.28		
December	10.7	73	1,426	44	3	0.35	30	1.36		
Total			22,877	485	41		349			
Average			1,906			0.42		1.19		
Maximum	10.9	599								

Disinfectant Compound Used: **12% Sodium Hypochlorite**
 Form of Residual Displayed: **Free**
 Quantity of Disinfectant Used During 2013: **485 L**
 Distribution System Target Residual: **0.2 mg/L**

Table 3.2
Harriston Drinking Water System - Well #2
Treated Water Flow, Turbidity, and Disinfectant Residual
January 1, 2013 - December 31, 2013

Month	Raw Water Flow (Max Flow Rate = 23.9 L/s)			Chlorine Monthly Total (L)	Monthly Averages			Distribution System Disinfectant		
	Average Day Flow (L/s)	Maximum Day Flow (m ³ /day)	Monthly Total (m ³)		Treated Water Turbidity		Treated Water Disinfectant		No. of Dis. Samples Collected	No. of Samples with Detectable Residual
					No. of Samples Collected	Daily Average Turbidity	No. of Treated Samples Collected	Average Residual (mg/L)		
January	18.5	770	12,385	384	4	0.77	31	1.27	See Harriston Well #3 Data	
February	18.6	635	11,140	325	4	0.62	29	1.22		
March	18.3	1,120	12,615	362	4	0.63	32	1.19		
April	18.3	714	9,775	277	2	0.9	29	1.24		
May	19.2	1,042	11,836	395	3	0.8	31	1.1		
June	19.8	672	11,506	315	7	0.6	31	1.06		
July	19.6	608	11,059	335	0		31	1.05		
August	19.5	796	12,210	385	5	0.55	31	1.17		
September	19.4	494	10,326	354	2	0.48	30	1.23		
October	19.6	613	10,603	349	3	0.71	30	1.22		
November	19.5	812	10,890	365	2	0.61	30	1.23		
December	19.7	613	12,693	453	3	0.45	30	1.37		
Total			137,038	4,299	39		365			
Average			11,420			0.65				
Maximum	19.8	1120						1.20		

Disinfectant Compound Used: 12% Sodium Hypochlorite
 Form of Residual Displayed: Free
 Quantity of Disinfectant Used During 2013: 4,299 L
 Distribution System Target Residual: 0.2 mg/L

Table 3.3
Harriston Drinking Water System – Well #3
Treated Water Flow, Turbidity, and Disinfectant Residual
January 1, 2013 – December 31, 2013

Month	Raw Water Flow (Max Flow Rate = 18.9 L/s)			Chlorine	Monthly Averages			Distribution System Disinfectant		
	Instantaneous Peak Flow (L/s)	Maximum Day Flow (m ³ /day)	Monthly Total (m ³)		Treated Water Turbidity		Treated Water Disinfectant		No. of Dis. Samples Collected	No. of Samples with Detectable Residual
					No. of Samples Collected	Daily Average Turbidity	No. of Treated Samples Collected	Average Residual (mg/L)		
January	16.7	798	15,753	227	2	0.30	31	48	48	
February	16.9	725	14,017	279	3	0.28	29	44	44	
March	16.6	885	8,985	200	2	0.24	20	47	47	
April	16.5	801	16,318	392	3	0.28	30	47	47	
May	16.6	920	16,825	408	4	0.33	31	48	48	
June	16.5	958	18,513	453	7	0.38	30	42	42	
July	16.6	1,003	21,540	549	1	0.52	31	45	45	
August	16.6	916	18,517	472	6	0.36	31	52	52	
September	16.6	837	16,386	387	3	0.25	30	48	48	
October	16.6	985	18,230	411	3	0.30	31	44	44	
November	15.9	899	16,865	416	3	0.31	30	48	48	
December	16.7	1,009	20,691	506	4	0.24	30	47	47	
Total			202,640	4,700	41		354	560	560	
Average			16,887			0.32			1.24	
Maximum	16.9	1,009								

Form of Residual Displayed: Free
Quantity of Disinfectant Used During 2013: 4,700 L
Distribution System Target Residual: 0.2 mg/L

Table 3.4
Harriston Drinking Water System – Well #1 & 3 Combined
Treated Water Flow
January 1, 2013 – December 31, 2013

Month	Treated Water Flow (Max Daily Volume = 1309 m ³ /d) (Max Flow Rate = 15.2 L/s)			Chlorine
	Instantaneous Peak flow (L/s)	Maximum Day Flow (m ³ /day)	Monthly Total (m ³)	Monthly Total (l)
January	26.7	798	16,805	247
February	27.3	725	15,395	318
March	27.5	885	15,897	314
April	27.2	801	17,827	431
May	27.2	920	18,107	428
June	26.8	958	19,965	497
July	27.1	1,003	23,226	569
August	27.3	916	20,062	512
September	27.4	837	18,029	427
October	27.2	985	19,780	453
November	26.3	899	18,307	439
December	27.4	1,009	22,117	550
Total			225,517	5,185
Average			18,793	
Maximum	27.5	1,009		

3.2 Comparison of Actual Flow and Maximum Allowable Rates

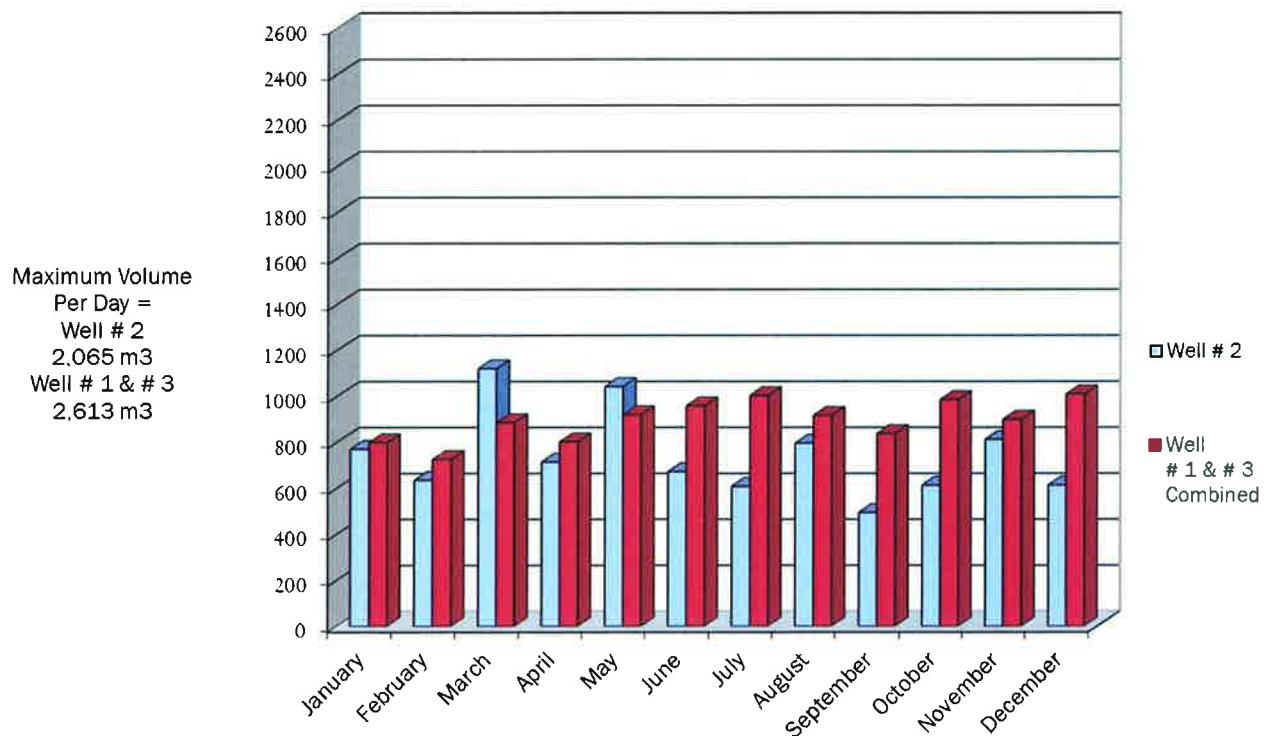
O. Reg. 170/03 stipulates that a summary of the quantities and flow rates of the water supplied from each of Harriston’s wells be included in the Summary Report and compared against the rated capacity and flow rate for the system. As such, a comparison of the instantaneous peak flow to the PTTW’s rated 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	Instantaneous Peak Flow	Percent of Maximum Allowable	MDWL Schedule C Maximum Daily Quantity	PTTW Maximum Daily Flow	Percent of Maximum Allowable
	L/s	L/s	%	m ³ /day	m ³ /day	%
Well #1	11.4	10.9	95	981	599	61
Well #2	23.9	19.8	83	2,100	1,120	53
Well #3	18.9	16.9	89	1,600	1,009	63

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. An occurrence of this nature is not considered an exceedance.

The time and duration of any flow exceedance is recorded for each event along with the reason for the occurrence. There were no exceedances of the allowable flow rates 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 or IMAC limits; it is iron. 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 2013. 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 0.40 mg/L and 1.50 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
2013 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	0.15	0.71
	Maximum	0.81	1.79
	Average	0.39	1.19
Well #2	Minimum	0.1	0.66
	Maximum	0.84	1.62
	Average	0.35	1.20
Well #3	Minimum	0.09	0.81
	Maximum	0.71	1.74
	Average	0.32	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 2013, 4,784 L of 12% Sodium Hypochlorite was used. The average dosage rates are presented in Table 3.8.

In 2013, 1,595 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
2013 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	Well #1	485	58.2	22,877	2.54
	Well # 2	4,299	515.9	137,038	3.76
	Well # 3	4,700	564.0	202,640	2.78
	Total	4,784	574.1	362,555	1.58

Treatment Chemical	Well	Volume Used	Mass Used	Annual Flow	Dosage Rate
		L	kg	m ³	mg/L
PW1680	Well #1 & Well #3	317	440.6	225,517	1.95
	Well # 2	1,278	1775.9	137,038	12.96
	Total	1,595	2216.5	362,555	6.11

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 MDWL, the DWWP and any MOE order that the system failed to meet from January 1, 2013 to December 31, 2013, and the corresponding corrective measure(s) taken. Compliance was assessed as follows:

- There were no MOE Orders issued to the Harriston Drinking Water System in 2013.
- 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. A detailed 'checklist' was developed, based on the terms and conditions of the MDWL and DWWP for the Harriston 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.

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 #8430-85KS2X. 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 4.1 identifies all of the requirements of the SDWA, the regulations, the MDWL, the DWWP and the PTTW.

Table 4.1
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>	
SDWA	<i>Harriston Drinking Water System is in compliance with all of the requirements of the SDWA</i>	

Dated this 7th day of March 2014.



Brian Hansen
Public Works Director