



2014 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), 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, 2014 to December 31, 2014.

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 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 2014

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 2014, \$4,275.00 was spent on a drained water tower inspection, \$51,540.00 was spent installing watermain on Queen St. S. near Jessie St., \$137,135.00 was spent replacing watermain on George St. N. to allow for new development and \$2,515.00 was spent on the design work for the Elora St. downtown watermain replacement project.

The following purchases were also made on equipment that is shared between all of Minto's water systems. \$13,890.00 on a truck to share with the roads and wastewater departments, \$24,425.00 on new generators, \$225.00 on emergency lights, \$1,115.00 on computer equipment, \$500,000.00 on the water meter installation program and \$3,715.00 on the Water and Wastewater rate study and Financial Plan.

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

2.2 Upgrades Scheduled to be Completed in 2015

In 2015, the Town of Minto is planning to replace watermain downtown on Elora St. at an estimated cost of \$520,200.00 as well as complete upgrades to Well #2 at an estimated cost of \$85,000.00.

In 2015 the following will be purchased to be shared within the water department.

One vehicle replacement for approximately \$45,000.00, upgrades to the SCADA system at an estimated cost of \$100,000.00, \$30,000.00 on the water meter installation program, \$26,000.00 on a rate study, \$25,000.00 on a vacuum trailer 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 2014 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, 2014 – December 31, 2014

Month	Raw Water Flow (Max Flow Rate = 11.4 L/s)			Chlorine		Monthly Averages				Distribution System Disinfectant	
	Instantaneous Peak Flow (L/s)	Maximum Day Flow (m ³ /day)	Monthly Total (m ³)	Monthly Total (L)	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	10.6	76	1,476	38	3	0.52	31	1.38	See Harriston Well #3 Data		
February	10.6	66	1,438	43	1	0.21	28	1.29			
March	10.5	124	1,705	22	5	0.30	31	1.30			
April	10.6	423	1,920	69	6	0.31	30	1.25			
May	15.3	547	2,571	43	9	0.39	31	1.10			
June	10.5	131	1,587	28	7	0.31	30	1.07			
July	10.6	68	1,383	46	12	0.26	31	1.08			
August	10.7	96	1,496	23	5	0.42	31	1.06			
September	10.4	324	1,872	85	3	0.39	29	1.21			
October	10.7	107	1,613	0	7	0.45	32	1.14			
November	10.6	86	1,520	48	7	0.31	30	1.15			
December	10.6	84	1,564	44	11	0.24	31	1.18			
Total			20,145	489	76		365				
Average			1,679			0.34		1.18			
Maximum	15.3	547									

Disinfectant Compound Used: 12% Sodium Hypochlorite
 Form of Residual Displayed: Free
 Quantity of Disinfectant Used During 2014: 489 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, 2014 – December 31, 2014

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	19.7	603	11,791	352	4	0.56	31	See Harriston Well #3 Data		
February	19.8	780	11,169	339	0		28			
March	19.8	600	12,882	373	6	0.67	31			
April	19.9	866	12,932	403	5	0.68	30			
May	19.8	926	11,820	323	7	0.54	30			
June	20.0	563	10,605	343	7	0.50	30			
July	19.9	612	10,717	351	12	0.37	31			
August	20.1	641	10,862	534	6	0.29	31			
September	20.0	1,557	11,384	366	3	0.69	30			
October	20.0	1,069	11,852	389	6	0.54	28			
November	20.0	554	9,174	291	6	0.40	30			
December	20.0	478	10,168	286	10	0.40	31			
Total			135,356	4,350	72		361			
Average			11,280			0.51			1.19	
Maximum	20.1	1557								

Disinfectant Compound Used: 12% Sodium Hypochlorite
Form of Residual Displayed: Free
Quantity of Disinfectant Used During 2014: 4,350 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, 2014 – December 31, 2014

Month	Raw Water Flow (Max Flow Rate = 18.9 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			
January	16.7	827	18,430	409	3	0.34	31	49	49
February	16.5	913	19,118	423	0		28	43	43
March	16.7	949	21,637	509	5	0.24	31	49	49
April	16.7	885	18,119	394	6	0.22	28	45	45
May	16.8	874	16,149	335	11	0.36	30	49	49
June	17.3	844	19,630	478	6	0.24	30	46	46
July	17.6	829	18,796	469	15	0.24	31	45	45
August	17.8	819	18,498	469	9	0.29	31	48	48
September	17.5	979	13,996	351	2	0.35	30	48	48
October	17.2	744	14,437	324	6	0.50	31	50	50
November	17.2	712	14,140	324	8	0.31	30	41	41
December	17.1	776	16,394	338	11	0.26	31	49	49
Total			209,344	4,823	82		362	562	562
Average			17,445			0.30		1.19	
Maximum	17.8	979							

Disinfectant Compound Used: 12% Sodium Hypochlorite
 Form of Residual Displayed: Free
 Quantity of Disinfectant Used During 2014: 4,823 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, 2014 – December 31, 2014

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	27.3	827	19,906	447
February	27.1	913	20,556	466
March	27.3	949	23,342	531
April	27.4	885	20,039	463
May	32.0	874	18,720	378
June	27.9	844	21,217	506
July	28.2	829	20,179	515
August	28.5	819	19,994	492
September	27.9	979	15,868	436
October	27.9	744	16,050	324
November	27.8	712	15,660	372
December	27.7	776	17,958	382
Total			229,489	5,312
Average			19,124	
Maximum	32.0	979		

3.2 Comparison of Actual Flow and Maximum Allowable Rates

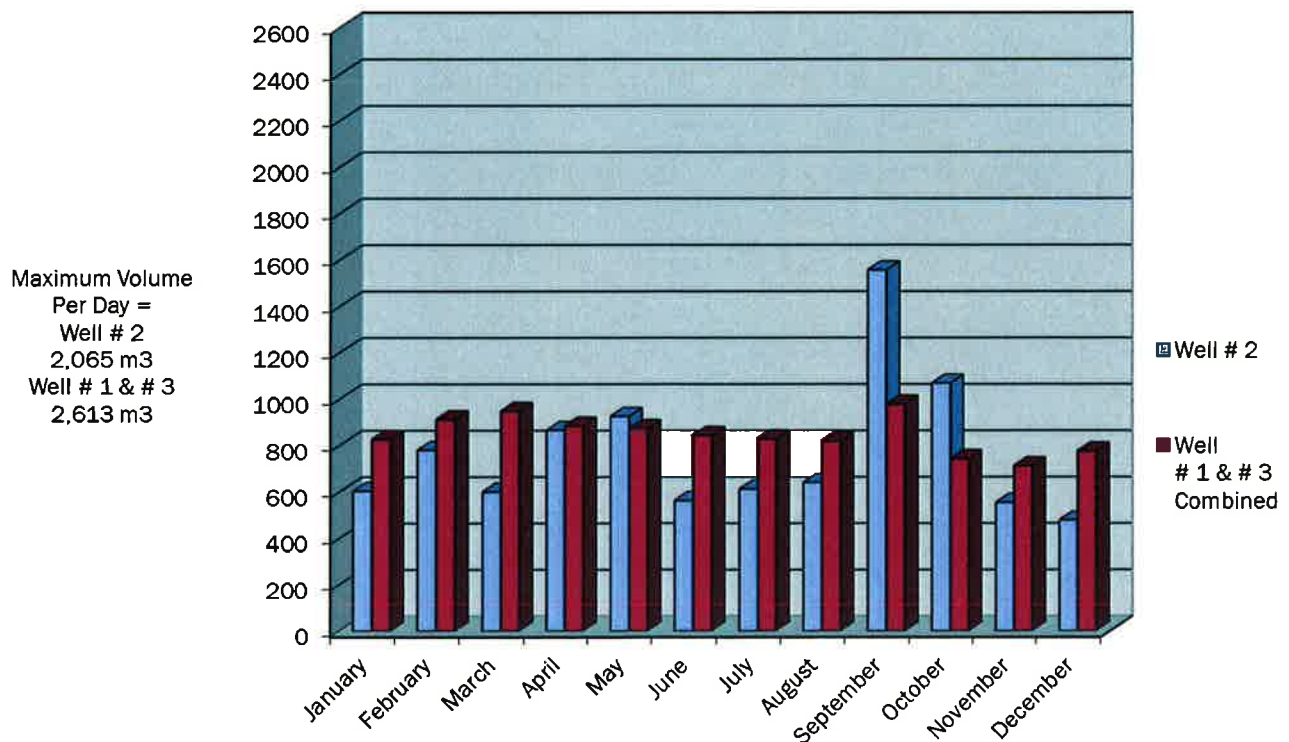
O. Reg. 170/03 stipulates that a summary of the quantities and flow rates of the water supplied from each of Harriston’s wells be included in the Summary Report and compared against the rated capacity and flow rate for the system. As such, a comparison of the instantaneous peak flow to the PTTW’s rated 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	15.3	134	981	547	56
Well #2	23.9	20.1	84	2,100	1,557	74
Well #3	18.9	17.8	94	1,600	979	61

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 2014. 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 0.43 mg/L and 1.62 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
 2014 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	0.09	0.86
	Maximum	0.94	1.60
	Average	0.37	1.18
Well #2	Minimum	0.06	0.74
	Maximum	0.90	1.56
	Average	0.29	1.19
Well #3	Minimum	0.06	0.70
	Maximum	0.88	1.63
	Average	0.33	1.19

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 2014, 4,839 L of 12% Sodium Hypochlorite was used. The average dosage rates are presented in Table 3.8.

In 2014, 2,354 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
 2014 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	489	58.7	20,145	2.91
	Well # 2	4,350	522.0	135,356	3.86
	Well # 3	4,823	578.8	209,344	2.76
	Total	4,839	580.7	364,845	1.59

Treatment Chemical	Well	Volume Used	Mass Used	Annual Flow	Dosage Rate
		L	kg	m ³	mg/L
PW1680	Well #1 & Well #3	260	361.4	229,489	1.57
	Well # 2	2,094	2910.7	135,356	21.50
	Total	2,354	3272.1	364,845	8.97

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 MOE order that the system failed to meet from January 1, 2014 to December 31, 2014, 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 2014.
- 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 12th day of March 2015.



Brian Hansen
Public Works Director