



2013 Summary Report

for the

Town of Minto

PALMERSTON 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 2013.....	3
2.2	Upgrades Scheduled to be Completed in 2014	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	8
3.3	Raw Water Quality and Required Treatment.....	10
3.4	Summary of Treatment Chemicals Used	11
4.0	COMPLIANCE	12
4.1	Assessment of Compliance	12
4.2	Summary of Compliance	13

LIST OF TABLES

Table 3.1	Palmerston Drinking Water System - Well #1	4
Table 3.2	Palmerston Drinking Water System - Well #2	5
Table 3.3	Palmerston Drinking Water System - Well #3	6
Table 3.4	Palmerston Drinking Water System - Well #4	7
Table 3.5	Palmerston Drinking Water System - Well # 1 & 2 Combined	8
Table 3.6	Palmerston Drinking Water System - Well # 3 & 4 Combined	8
Table 3.7	Comparison of Flow Rates and Flow Capacities.....	9
Table 3.8	2013 Maximum Water Usage Per Day by Month	9
Table 3.9	2013 Annual Summary of Raw Water Turbidity	11
Table 3.10	2013 Annual Summary of Treatment Chemicals Used	12
Table 4.1	Requirement the System Failed to Meet.....	13

**2013 Summary Report
for the
Town of Minto
PALMERSTON 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) 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 Summary Report for the Palmerston Drinking Water System 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 Town of Minto to assess the water work's capability to meet existing and future planned uses of the system.

1.3 Description of Drinking Water System

Palmerston is located in the Town of Minto within the northwest corner of Wellington County, along the route of Provincial Hwy. No. 23.

The Palmerston Drinking Water System services a permanent population of approximately 2,579, comprised of approximately 910 residential premises, as well as Industrial, Commercial, Institutional premises. The municipal water system is also used for fire protection.

Palmerston is currently serviced by a waterworks that consists of: four drilled bedrock wells, two wellhouses, an elevated 2500 m³ steel storage tank and a distribution network of watermains, ranging in diameter from 100 mm to 250 mm. There are approximately 102 fire hydrants in the Town of Palmerston. In the event of a prolonged power outage, a portable generator is available to either wellhouse to supply back-up power.

The bedrock wells are equipped with submersible pumps that discharge directly into the William Street Wellhouse (Wells #1 and #2) or the Whites Road Wellhouse (Well #3 and #4). In the wellhouse, the raw water supply is injected with 12% sodium hypochlorite for disinfection and the chemical PW1680 for iron sequestering.

The wells are controlled (*start/stop*) automatically based on elevated storage tank liquid levels and pressures in the distribution system. Each wellhouse is equipped with alarms for chlorination system failure (*and corresponding lockout of well pumps*), low water level and intrusion. Each wellhouse has continuous monitoring analyzers 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 Palmerston Drinking Water System operates under MDWL 106-103, 106-103 Schedule C (proposed alterations), DWWP 106-203 and PTTW #8374-8HSPD5.

2.0 SUMMARY OF UPGRADES

2.1 Upgrades Completed in 2013

The disinfection treatment system in the Palmerston 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, \$26,115.00 was spent on well # 4 and \$2,520.00 on hydrant replacement and \$285.00 on watermain replacement.

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 spend \$20,000 on wellhouse #3 & #4, valve replacements are also planned at an estimated cost of \$14,500.00 as well as watermain replacement on James St. for an estimated cost of \$143,000.00 and on Lowe and Walker for \$70,000.00 and \$1,500 on water tower upgrades and maintenance.

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 Palmerston's wells be included in the Summary Report. Tables 3.1, 3.2, 3.3 and 3.4 provide a summary of quantities and flow rates supplied during 2013 for Wells #1, #2, #3 and #4 respectively, on a monthly basis. Wells #1 and #2 supply the William Street Wellhouse and the two wells alternate duties as primary supply. As such, Wells #1 and #2 are permitted as one and provide standby duty to each other. Well #3 and #4 supply the White's Road Wellhouse and the two wells alternate duties as primary supply.

Table 3.1
Palmerston 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 = 22.8 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	14.1	124	1,916	0	15	0.44	31	1.29	See Palmerston Well #2 Data	
February	14.0	80	1,616	46	16	0.40	28	1.34		
March	14.1	227	2,049	20	15	0.45	32	1.39		
April	14.0	97	1,636	28	14	0.51	28	1.30		
May	14.0	83	1,674	44	18	0.50	30	1.30		
June	14.0	272	1,912	40	16	0.55	29	1.25		
July	14.0	99	1,885	0	13	0.60	31	1.19		
August	14.0	83	1,718	40	16	0.60	30	1.30		
September	13.9	79	1,824	20	15	0.60	30	1.22		
October	13.8	86	1,812	23	12	0.66	31	1.34		
November	13.8	102	1,640	43	13	0.64	30	1.32		
December	13.5	90	1,718	27	16	0.62	30	1.40		
Total			21,400	331	179		360			
Average			1,783			0.55		1.30		
Maximum	14.1	272								

Disinfectant Compound Used: 12% Sodium Hypochlorite
 Form of Residual Displayed: Free
 Quantity of Disinfectant Used During 2013: 331 L
 Distribution System Target Residual: 0.2 mg/L

Table 3.2
Palmerston 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 = 22.8 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	18.2	498	8,157	154	17	0.43	30	47	47	
February	18.4	377.9	7,014	167	16	0.4	29	43	43	
March	18.7	335	7,363	177	15	0.45	32	47	47	
April	18.9	403	7,736	151	17	0.54	30	47	47	
May	18.7	389.8	8,354	192	17	0.53	31	50	50	
June	18.8	508	9,219	210	16	0.53	30	44	44	
July	18.6	554	8,331	177	12	0.45	31	49	49	
August	18.2	378	7,951	222	17	0.6	31	49	49	
September	17.6	345	6,825	153	14	0.54	30	48	48	
October	17.7	507	8,025	173	9	0.59	31	47	47	
November	17.7	269	7,061	178	14	0.67	30	48	48	
December	17.6	274	7,475	148	16	0.68	30	47	47	
Total			93,511	2,102	180		365	566	566	
Average	18.3		7,793			0.53				
Maximum		554								

Disinfectant Compound Used: **12% Sodium Hypochlorite**
 Form of Residual Displayed: **Free**
 Quantity of Disinfectant Used During 2013: **2,102 L**
 Distribution System Target Residual: **0.2 mg/L**

Table 3.3
Palmerston 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 = 26.7 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	21.9	670	7,865	304	15	0.54	31	1.40		
February	24.5	697	13,328	286	16	0.62	29	1.42		
March	24.1	649	13,531	331	16	0.65	32	1.40		
April	24.7	619	14,767	316	15	0.70	29	1.27		
May	34.6	900	17,675	379	17	0.53	31	1.34		
June	24.9	982	16,067	375	16	0.62	30	1.24		
July	24.1	641	15,275	321	12	0.58	31	1.17		
August	24.4	664	14,913	339	16	0.63	31	1.20		
September	24.5	725	14,952	370	15	0.56	30	1.46		
October	22.1	1,024	14,843	394	12	0.66	31	1.32		
November	21.9	490	10,348	264	13	0.65	28	1.22		
December	22.2	478	13,506	289	14	0.55	30	1.26		
Total				3,968	177		363			
Average	24.5		13,923			0.61		1.31		
Maximum		1,024								

Disinfectant Compound Used: 12% Sodium Hypochlorite
 Form of Residual Displayed: Free
 Quantity of Disinfectant Used During 2013: 3,968 L
 Distribution System Target Residual: 0.2 mg/L

Table 3.4
Palmerston Drinking Water System – Well #4
Treated Water Flow, Turbidity, and Disinfectant Residual
January 1, 2013 – December 31, 2013

Month	Raw Water Flow (Max Flow Rate = 26.7 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	20.8	565	9,794	See Palmerston Well #3 Data	11	0.52	20	1.23		
February	21.1	314	2,932		15	0.59	28	1.42		
March	21.2	129	3,064		15	0.55	32	1.40		
April	21.0	263	2,730		14	0.63	28	1.37		
May	20.9	280	2,791		16	0.60	30	1.32		
June	20.8	126	2,145		15	0.56	27	1.30		
July	20.8	117	2,771		12	0.60	30	1.20		
August	20.8	117	2,309		17	0.52	30	1.17		
September	20.8	216	2,824		15	0.65	30	1.45		
October	20.6	145	2,770		9	0.60	30	1.45		
November	20.6	175	3,802		13	0.53	30	1.30		
December	20.4	118	2,417		14	0.57	30	1.23		
Total			40,349		166		345			
Average			3,362							
Maximum	21.2	565						1.32		

Disinfectant Compound Used: 12% Sodium Hypochlorite
Form of Residual Displayed: Free
Quantity of Disinfectant Used During 2013: 0 L
Distribution System Target Residual: 0.2 mg/L

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 Palmerston'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 3.6. Table 3.5 and Table 3.6 reflect the comparisons between the PTTW and MDWL.

Table 3.5
Palmerston Drinking Water System
Well #1 & 2 Combined
Treated Water Flow
January 1, 2013 – December 31, 2013

Month	Treated Water Flow			Chlorine
	Instantaneous Peak flow (L/s)	Maximum Day Flow (m ³ /day)	Monthly Total (m ³)	
January	18.2	498	10,073	154
February	18.4	378	8,630	213
March	18.7	335	9,412	197
April	18.9	403	9,372	179
May	18.7	390	10,028	236
June	18.8	508	11,131	250
July	18.6	554	10,216	177
August	18.2	378	9,669	262
September	17.6	345	8,649	173
October	17.7	507	9,837	196
November	17.7	269	8,701	221
December	17.6	274	9,193	175
Total			114,911	2,433
Average			9,576	
Maximum	18.9	554		

Table 3.6
Palmerston Drinking Water System
Well #3 & 4 Combined
Treated Water Flow
January 1, 2013 – December 31, 2013

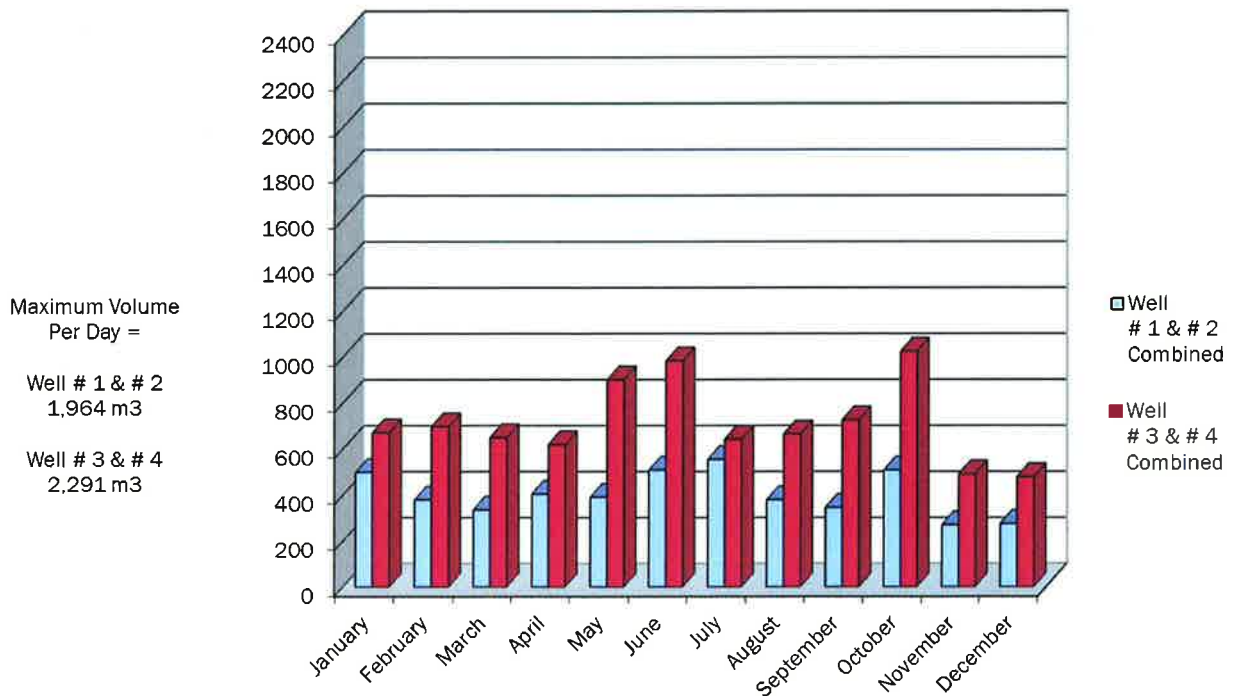
Month	Treated Water Flow			Chlorine
	Instantaneous Peak flow (L/s)	Maximum Day Flow (m ³ /day)	Monthly Total (m ³)	
January	21.9	670	17,659	304
February	24.5	697	16,260	286
March	24.1	649	16,595	331
April	24.7	619	17,497	316
May	24.7	900	20,466	379
June	24.9	982	18,212	375
July	24.1	641	18,046	321
August	24.4	664	17,222	339
September	24.5	725	17,776	370
October	22.1	1,024	17,613	394
November	21.9	490	14,150	264
December	22.2	478	15,923	289
Total			207,419	3,968
Average			17,285	
Maximum	24.9	1,024		

Table 3.7
Comparison of Flow Rates and Flow Capacities
To
Rated Flow Rate (PTTW) and Rated Capacity (MDWL)

Well Supply	PTTW Max. Flow Rate	Maximum 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	22.8	14.1	62	1,964	272	14
Well #2	22.8	18.9	83	1,964	554	28
Well #3	26.7	24.9	93	2,291	1,024	45
Well #4	26.7	21.2	93	2,291	565	29

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 3.8
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 Palmerston Drinking Water System.

3.3 Raw Water Quality and Required Treatment

The Palmerston Drinking Water System has no naturally occurring chemical parameters that exceed MAC or IMAC limits. The Palmerston 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.

The William Street Wellhouse (*Well #1 and #2*) and the Whites Road Wellhouse (*Well #3 and #4*) are equipped with continuous monitoring analyzers for measuring free chlorine residual. The chlorine analyzers are equipped with alarms. In the event of an adverse 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, 3.3 and 3.4 for Well #1, Well #2, Well # 3 and Well # 4, respectively.

There were no high turbidity readings (>1.0 NTU) experienced in 2013. The minimum, maximum and average turbidity readings for raw water from each well are presented in Table 3.9.

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 3.9. Also included in Table 3.9 is the range of free chlorine residual within the distribution system.

The free chlorine residual in the distribution system ranged between 0.71 mg/L and 1.64 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 with the distribution system, a free chlorine residual of 0.2 mg/L ...". The Palmerston Drinking Water System meets both of these requirements.

**Table 3.9
 Palmerston Drinking Water System
 2013 Annual Summary of
 Raw Water Turbidity and Free Chlorine Residual**

Location	Range	Raw Water Turbidity	Free Chlorine Residual at POE
		NTU	mg/L
Well #1	Minimum	0.37	0.91
	Maximum	0.88	1.65
	Average	0.62	1.30
Well #2	Minimum	0.32	0.89
	Maximum	0.89	1.65
	Average	0.55	1.24
Well #3	Minimum	0.30	0.92
	Maximum	0.84	1.73
	Average	0.60	1.31
Well #4	Minimum	0.22	0.89
	Maximum	0.90	1.99
	Average	0.59	1.32

3.4 Summary of Treatment Chemicals Used

The disinfectant chemical used in the Palmerston Drinking Water System is 12% Sodium Hypochlorite. Measurements of free chlorine residual are recorded on a continuous basis. In 2013, 6,401 L of 12% Sodium Hypochlorite was used. The average dosage rates are presented in Table 3.10.

In 2013, 4,650 L of PW1680 was used for the sequestering of iron. Wells #1 and #2 share a common tank of PW1680. The average dosage rates are presented in Table 3.10.

**Table 3.10
 Palmerston Drinking Water System
 2013 Annual Summary of
 Treatment Chemicals Used**

Treatment Chemical	Well	Volume Used	Mass Used	Annual Flow	Dosage Rate
		L	kg	m ³	mg/L
12% Sodium Hypochlorite	Well #1	331	39.7	21,400	1.86
	Well #2	2,102	252.2	93,511	2.70
	Well #3 & 4	3,968	476.2	207,419	2.30
	Total	6,401	768.1	322,330	2.38
PW1680	Well #1 & Well #2	2,365	3,287.4	114,911	28.61
	Well #3 & Well #4	2,285	3,176.2	207,419	15.31
	Total	4,650	6,463.5	322,330	20.05

- Note:
- Wells #1 and #2 share the same PW1680 storage container; 2,365 L is the combined PW1680 usage for both wells
 - Wells #3 and #4 share the same PW1680 storage container; 2,285 L is the combined PW1680 usage for both wells
 - 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 Palmerston 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.
- 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 Palmerston Water Work's MDWL 106-103, DWWP 106-203 and PTTW #8374-8HSPD5. 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
 Palmerston 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 # 106-103	<i>Palmerston Drinking Water System is in compliance with all of the requirements of the MDWL</i>	
DWWP # 106-203	<i>Palmerston Drinking Water System is in compliance with all of the requirements of the DWWP.</i>	
O. Reg. 170/03	<i>Palmerston Drinking Water System is in compliance with all of the requirements of O. Reg. 170/03.</i>	
SDWA	<i>Palmerston 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