

# 2021 Summary Report

# for the

## Town of Minto

# PALMERSTON DRINKING WATER SYSTEM

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## 2021 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.

0. 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 Summary Report for the Palmerston Drinking Water System is being prepared in fulfillment of Schedule 22 of 0. Reg. 170/03 and will be given to members of the Municipal Council. This report covers the period from January 1, 2021 to December 31, 2021.

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 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 2,940, comprised of approximately 1,140 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 m<sup>3</sup> steel storage tank and a distribution network of watermains, ranging in diameter from 100 mm to 350 mm. There are approximately 102 fire hydrants in the Town of Palmerston. In the event of a prolonged power outage, two portable generators are available for 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 high & low free chlorine residuals (*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 Palmerston Drinking Water System operates under MDWL 106-103 Issue 4, DWWP 106-203 Issue 4 and PTTW #8374-8HSPD5 to March  $31^{st}$  and PTTW #8341-BZLRR9 starting April  $1^{st}$ .

#### 2.0 SUMMARY OF UPGRADES

#### 2.1 Upgrades Completed in 2021

The disinfection treatment system in the Palmerston Drinking Water System meets all of the standards imposed by 0. 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 2021 \$237,255 was spent painting the Water Tower, \$12,960 to Videolog Well #1, \$46,035 on engineering for Whites Road watermain upgrades and \$14,640 to repair the Whites Road service line. \$2,945 was spent replacing the plumbing to the analyzer in Well #1 & #2 and Well #3 & #4, \$2,545 for SCADA panel upgrades in Well #1 & #2, \$23,095 for the Well #2 VFD and \$3,400 replacing a flow meter in Well #4.

The following purchases were also made on equipment that is shared between all of Minto's water systems. \$29,725 on the water meters, \$4,048 on equipment and \$40,625 to replace a truck. \$19,545 on engineering for our future servicing needs and \$2,195 on our computer system upgrade plan.

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

#### 2.2 Upgrades Scheduled to be Completed in 2022

In 2022, the Town of Minto is planning to spend \$10,000.00 on Well Exploration and \$5,000 on engineering for the Main St. Watermain replacement.

The following will also be purchased to be shared within the water department. \$5,000 for computer hardware and software, \$110,000 on the SCADA monitoring system and \$20,000 for water meters. \$100,000 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 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 2021 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, 2021 – December 31, 2021

	_					Monthly	/ Averages		Distribution	
		v Water Flow v Rate = 22.8	L/s)	Chlorine		Treated Water Turbidity Turbidity Turbidity Treated Water Disinfectant Point of Entry		fectant	System Disinfectant	
Month	Operator Observed Peak Flow (L/s)	Maximum Day Flow (m³/day)	Monthly Total (m <sup>3</sup> )	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	15.1	144	2,357	69	14	0.52	31	1.34		
February	15.2	141	2,114	23	14	0.47	28	1.32		
March	15.3	438	2,824	67	5	0.45	25	1.35		
April	15.0	226	2,793	67	13	0.42	31	1.39		
May	15.2	134	984	23	5	0.40	14	1.27	0	
June	15.3	77	433	0	1	0.74	5	1.20	See Palmerston Well	
July	11.9	117	1,516	44	1	0.56	22	1.28	#2 Data	
August	14.6	119	2,184	44	2	0.62	30	1.38	#2 Dala	
September	14.7	98	1,880	44	3	0.59	30	1.34		
October	14.5	108	1,945	67	0		31	1.34		
November	14.6	113	2,059	46	0		29	1.31		
December	14.5	106	2,111	46	1	0.22	31	1.36		
Total			23,200	540	59		307			
Average			1,933			0.50		1.32		
Maximum	15.3	438								

Disinfectant Compound Used: **12% Sodium Hypochlorite** Form of Residual Displayed: **Free** Quantity of Disinfectant Used During 2021: **540 L** Distribution System Minimum Target Residual: **0.2 mg/L** 

#### Table 3.2 Palmerston Drinking Water System – Well #2 Treated Water Flow, Turbidity, and Disinfectant Residual January 1, 2021 – December 31, 2021

	_					Monthly	/ Averages		Distribution	
		aw Water Flow ow Rate = 22.8	L/s)	Chlorine		Treated Water Trebidity Trebidity Treated Water Disinfecta		ectant	System Disinfectant	
Month	Operator Observed Peak Flow (L/s)	Maximum Day Flow (m³/day)	Monthly Total (m <sup>3</sup> )	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	18.3	564	8,175	155	14	0.57	31	1.24	45	
February	18.3	475	7,765	177	14	0.57	28	1.23	43	
March	18.3	435	9,359	201	9	0.58	30	1.20	50	
April	18.2	693	10,588	184	15	0.52	30	1.19	48	
May	15.0	734	13,944	267	5	0.34	31	1.22	53	
June	13.6	721	15,249	311	3	0.37	30	1.23	48	
July	16.1	999	12,053	242	1	0.28	31	1.19	53	
August	17.8	396	9,549	179	2	0.47	31	1.31	48	
September	17.7	455	8,698	201	3	0.43	30	1.21	45	
October	17.9	368	7,771	154	0		31	1.16	47	
November	17.7	770	8,217	155	0		29	1.26	48	
December	18.3	298	7,453	133	1	0.29	32	1.22	49	
Total			118,821	2,359	67		364		577	
Average	17.3		9,902			0.44		1.22		
Maximum		999								

Disinfectant Compound Used: **12% Sodium Hypochlorite** Form of Residual Displayed: **Free** Quantity of Disinfectant Used During 2021: **2,359 L** Distribution System Minimum Target Residual: **0.2 mg/L** 

#### Table 3.3 Palmerston Drinking Water System – Well #3 Treated Water Flow, Turbidity, and Disinfectant Residual January 1, 2021 – December 31, 2021

	_					Monthly	/ Averages		Distribution
	Raw Water Flow (Max Flow Rate = 26.7 L/s)		Chlorine		d Water bidity	Disint	d Water fectant of Entry	System Disinfectant	
Month	Operator Observed Peak Flow (L/s)	Maximum Day Flow (m³/day)	Monthly Total (m <sup>3</sup> )	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	21.5	510	10,732	244	13	0.47	31	1.34	
February	21.8	584	11.552	244	13	0.47	28	1.34	
March	21.1	884	14,828	306	5	0.45	31	1.30	
April	21.0	712	12.969	289	10	0.40	30	1.30	
May	20.9	825	9,180	400	0	0.40	29	1.30	
June	20.5	257	4,212	377	0		23	1.23	See
July	20.2	1,237	9,294	370	1	0.64	27	1.29	Palmerston Well
August	20.2	545	11,220	278	2	0.26	31	1.32	#2 Data
September	20.2	441	10,287	264	3	0.35	30	1.32	
October	20.2	441	9,721	242	0	0.00	31	1.35	
November	20.0	640	11,234	242	0		30	1.21	
December	19.9	423	9,782	287	1	0.62	32	1.37	
			<u>, , , , , , , , , , , , , , , , , , , </u>						
Total			125,011	3,563	48		353		
Average	20.6		10,418			0.45		1.31	
Maximum		1,237							

Disinfectant Compound Used: **12% Sodium Hypochlorite** Form of Residual Displayed: **Free** Quantity of Disinfectant Used During 2021: **3,563 L** Distribution System Minimum Target Residual: **0.2 mg/L** 

#### Table 3.4 Palmerston Drinking Water System – Well #4 Treated Water Flow, Turbidity, and Disinfectant Residual January 1, 2021 – December 31, 2021

						Monthly	Averages		Distribution
	Raw Water Flow (Max Flow Rate = 26.7 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 (m <sup>3</sup> )	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	16.6	132	2.299		12	0.56	31	1.32	
February	16.2	124	2,075		13	0.46	28	1.38	
March	15.2	393	3,030		5	0.35	28	1.38	
April	16.6	169	2,441		10	0.36	31	1.36	
May	17.5	710	12,598	See	0		26	1.30	
June	18.2	725	17,915	Palmerston	0		29	1.34	Palmerston Well
July	18.2	950	9,110	Well #3	2	0.50	30	1.26	#2 Data
August	17.4	129	2,221	Data	1	0.51	31	1.17	
September	18.0	93	2,096		3	0.58	30	1.30	
October	18.4	119	2,374	]	0		31	1.40	
November	18.6	123	2,495	]	0		30	1.22	
December	18.8	125	2,552		1	0.43	31	1.36	
Total			61,205	3,563	47		356		
Average			5,100			0.47		1.32	
Maximum	18.8	950							

Disinfectant Compound Used: 12% Sodium Hypochlorite

Form of Residual Displayed: Free

Quantity of Disinfectant Used During 2021 for Wells #3 and #4 combined: **3,563 L** \*(Wells #3 and #4 share the same NaOCI storage container) Distribution System Minimum Target Residual: **0.2 mg/L** 

#### 3.2 Comparison of Actual Flow and Maximum Allowable Rates

O. Reg. 170/O3 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, 2021 – December 31, 2021 Table 3.6 Palmerston Drinking Water System Well #3 & 4 Combined Treated Water Flow January 1, 2021 – December 31, 2021

		Treated Wat – Daily Volume Clow Rate = 22. 22.3	1,964 m3/d	ŧ 1	Chlorine
Month	Operator Observed Peak Flow Well #1	Operator Observed Peak Flow Well #2	Maximum Day Flow	Monthly Total	Monthly Total
	(L/s)	(L/s)	(m <sup>3</sup> /day)	(m <sup>3</sup> )	(L)
January	15.1	18.3	564	10,532	224
February	15.2	18.3	475	9,879	200
March	15.3	18.3	438	12,183	268
April	15.0	18.2	693	13,381	251
May	15.2	15.0	734	14,928	290
June	15.3	13.6	721	15,682	311
July	11.9	16.1	999	13,569	286
August	14.6	17.8	396	11,733	223
September	14.7	17.7	455	10,578	245
October	14.5	17.9	368	9,716	221
November	14.6	17.7	770	10,276	201
December	14.5	18.3	298	9,564	179
Total				142,021	2,899
Average				11,835	
Maximum	15.3	18.3	999		

		Treated Wate - Daily Volume Flow Rate = 26 26.	2,291 m3/da	3	Chlorine
Month	Operator Observed Peak Flow Well #3 (L/s)	Operator Observed Peak Flow Well #4 (L/s)	Maximum Day Flow (m <sup>3</sup> /day)	Monthly Total (m <sup>3</sup> )	Monthly Total (L)
January	21.5	16.6	510	13,031	244
February	21.8	16.2	584	13,627	264
March	21.1	15.2	884	17,858	306
April	21.0	16.6	712	15,410	289
May	20.9	17.5	825	21,778	400
June	20.5	18.2	725	22,127	377
July	20.2	18.2	1,237	18,404	370
August	20.1	17.4	545	13,441	278
September	20.2	18.0	441	12,383	264
October	20.1	18.4	441	12,095	242
November	20.0	18.6	640	13,729	242
December	19.9	18.8	423	12,334	287
Total				186,216	3,563
Average				15,518	
Maximum	21.8	18.8	1,237		

#### 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	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	22.8	15.3	67	1,964	438	22
Well #2	22.8	18.3	69	1,964	999	51
Well #3	26.7	21.8	81.5	2,291	1,237	54
Well #4	26.7	18.8	70	2,291	950	41

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."

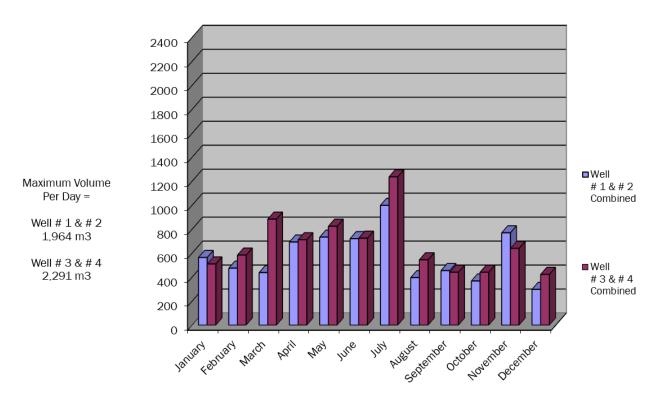


Table 3.8Maximum Water Usage Per Day by Month

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 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 (maximum acceptable concentration) or IMAC (interim maximum acceptable concentration). 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 turbidity readings exceeding 1.0 NTU in 2021. 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.

The free chlorine residual in the distribution system ranged between 0.53 mg/L and 1.56 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
2021 Annual Summary of
Raw Water Turbidity and Free Chlorine Residual

Location	Range	Raw Water Turbidity NTU	Free Chlorine Residual at POE mg/L
	Minimum	0.23	0.92
Well #1	Maximum	0.94	2.21
	Average	0.55	1.32
	Minimum	0.16	0.78
Well #2	Maximum	0.82	1.72
	Average	0.42	1.22
	Minimum	0.15	1.04
Well #3	Maximum	0.96	1.93
	Average	0.47	1.31
	Minimum	0.13	0.93
Well #4	Maximum	0.86	1.96
	Average	0.47	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 2021, 6,462 L of 12% Sodium Hypochlorite was used. The average dosage rates are presented in Table 3.10.

In 2021, 3,303 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 2021 Annual Summary of Treatment Chemicals Used

Treatment Chemical	Well	Volume Used	Mass Used	Annual Flow	Dosage Rate
		L	kg	m³	mg/L
	Well #1	540	64.8	23,200	2.79
12 % Sodium	Well #2	2,359	283.1	118,821	2.38
Hypochlorite (NaOCI)	Well #3 & 4	3,563	427.6	186,216	2.30
	Total	6,462	775.4	328,237	2.36
	Well #1 & Well #2	957	1,339.8	142,021	9.43
PW1680	Well #3 & Well #4	2,346	3,284.4	186,216	17.64
	Total	3,303	4,624.2	328,237	14.09

Wells #1 and #2 share the same PW1680 storage container; 1,068 L is the combined PW1680 usage for both wells
Wells #3 and #4 share the same PW1680 storage container; 1,982 L is the combined PW1680 usage for both wells

- 12% Sodium Hypochlorite = 120,000 mg/L = 120 kg/m<sup>3</sup>
- 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, 2021 to December 31, 2021, and the corresponding corrective measure(s) taken. Compliance was assessed as follows:

- MECP Completed Inspection of the Palmerston drinking water system completed September 2, 2021, Final inspection rating 100%
- There were **no MECP Orders** issued to the Palmerston Drinking Water System in 2021.
- 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.

- 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 0 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 Palmerston Water Work's MDWL 106-103 Issue 4, DWWP 106-203 Issue 4, and PTTW #8374-8HSPD5 (to March  $31^{st}$ ) and PTTW #8341-BZLRR9 (starting April  $1^{st}$ ).

Table 4.2 identifies any non-compliance related to the following: SDWA, O. Reg. 170/03, the MDWL, the DWWP and the PTTW.

#### Table 4.2 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 Issue 4	Palmerston Drinking Water System is in compliance with all of the requirements of the MDWL		
DWWP # 106-203 Issue 4	Palmerston Drinking Water System is in compliance with all of the requirements of the DWWP.		

Compliance With	Description of Item the System Failed to Meet	Correction of This Situation How/When	
0. Reg. 170/03	Palmerston Drinking Water System is in compliance with all of the requirements of O. Reg. 170/03.		
SDWA	Palmerston Drinking Water System is in compliance with all of the requirements of the SDWA.		
PTTW #8374-8HSPD5 To March 31, 2021 PTTW #8341-BZLRR9 Starting April 1, 2021	Palmerston Drinking Water System is in compliance with all of the requirements of the PTTW		

Dated this 8<sup>th</sup> day or March 2022

Todd Rogers Water Services Manager