



2015 Summary Report

for the

Town of Minto

PALMERSTON DRINKING WATER SYSTEM

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**2015 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), 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 O. Reg. 170/03, and will be given to members of the Municipal Council. It covers the period from January 1, 2015 to December 31, 2015.

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 2,579, 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 350 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, 106-203 Schedule C (proposed alterations), DWWP 106-203 and PTTW #8374-8HSPD5.

2.0 SUMMARY OF UPGRADES

2.1 Upgrades Completed in 2015

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 2015, \$23,400 was spent on Water Tower maintenance, \$56,650 on watermain on James Street and \$2,500 on Lowe Street and Walker Street. The following purchases were also made on equipment that is shared between all of Minto's water systems. \$25,350.00 on a vacuum trailer to share with the roads and wastewater departments, \$55,600.00 on a new truck, \$4,880.00 on computer equipment, \$18,800.00 on the water meter installation program and \$26,150.00 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 2016

In 2016, the Town of Minto is planning to spend \$138,000.00 replacing watermain on James St., \$140,000.00 on watermain replacement on Inkerman St. and \$281,000.00 on watermain on Jane St. from Inkerman to the dead end. An additional \$5,000.00 will be spent on valve replacements and \$7,000.00 on flow control valves.

In 2016 the following will be purchased to be shared within the water department. One vehicle replacement for approximately \$45,000.00, service truck replacement \$45,000.00, \$10,000.00 equipment, \$20,000.00 on water meters, upgrades to the SCADA system at an estimated cost of \$100,000.00, and \$10,000.00 on engineering for future projects.

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 2015 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, 2015 – December 31, 2015

| 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 Reviewed | Average Residual (mg/L) | | |
| January | 15.4 | 107 | 1,906 | 66 | 15 | 0.64 | 31 | 1.33 | See Palmerston Well #2 Data | |
| February | 15.5 | 94 | 1,926 | 20 | 14 | 0.75 | 28 | 1.39 | | |
| March | 15.5 | 107 | 2,144 | 29 | 10 | 0.67 | 31 | 1.28 | | |
| April | 15.5 | 98 | 1,889 | 43 | 12 | 0.68 | 30 | 1.29 | | |
| May | 15.5 | 112 | 1,656 | 74 | 9 | 0.56 | 29 | 1.36 | | |
| June | 15.5 | 155 | 2,335 | 44 | 16 | 0.66 | 30 | 1.39 | | |
| July | 15.5 | 95 | 1,935 | 22 | 15 | 0.61 | 31 | 1.29 | | |
| August | 15.5 | 124 | 1,925 | 44 | 14 | 0.58 | 31 | 1.21 | | |
| September | 15.4 | 86 | 1,813 | 46 | 14 | 0.49 | 30 | 1.14 | | |
| October | 15.4 | 103 | 1,990 | 32 | 16 | 0.59 | 31 | 1.39 | | |
| November | 15.2 | 104 | 2,037 | 44 | 13 | 0.62 | 30 | 1.37 | | |
| December | 15.1 | 103 | 2,059 | 56 | 10 | 0.64 | 31 | 1.31 | | |
| Total | | | 23,615 | 520 | 158 | | 363 | | | |
| Average | | | 1,968 | | | 0.62 | | 1.31 | | |
| Maximum | 15.5 | 155 | | | | | | | | |

Disinfectant Compound Used: **12% Sodium Hypochlorite**
 Form of Residual Displayed: **Free**
 Quantity of Disinfectant Used During 2015: **520 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, 2015 – December 31, 2015

| | 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 Collected | | | | Daily Average Turbidity | | No. of Treated Samples Reviewed | Average Residual (mg/L) | | | |
| January | 17.6 | 344 | 7,867 | 150 | 15 | 0.67 | 31 | 1.22 | 47 | 47 |
| February | 17.6 | 721 | 7,871 | 153 | 14 | 0.75 | 28 | 1.28 | 43 | 43 |
| March | 18.7 | 416 | 9,594 | 141 | 10 | 0.77 | 31 | 1.24 | 46 | 46 |
| April | 21.3 | 355 | 8,416 | 172 | 12 | 0.73 | 30 | 1.12 | 45 | 45 |
| May | 20.5 | 1148 | 11,151 | 232 | 10 | 0.60 | 32 | 1.27 | 46 | 46 |
| June | 18.2 | 379 | 8,532 | 132 | 16 | 0.63 | 29 | 1.22 | 49 | 49 |
| July | 18.3 | 366 | 7,688 | 176 | 15 | 0.61 | 31 | 1.21 | 48 | 48 |
| August | 18.4 | 284 | 7,863 | 153 | 14 | 0.59 | 31 | 1.21 | 48 | 48 |
| September | 18.5 | 337 | 7,647 | 197 | 14 | 0.58 | 30 | 1.31 | 46 | 46 |
| October | 18.9 | 613 | 7,331 | 163 | 16 | 0.71 | 31 | 1.36 | 49 | 49 |
| November | 18.7 | 366 | 7,187 | 131 | 13 | 0.64 | 30 | 1.28 | 47 | 47 |
| December | 18.8 | 275 | 6,227 | 123 | 10 | 0.71 | 31 | 1.21 | 45 | 45 |
| Total | | | 97,374 | 1,923 | 159 | | 365 | | 559 | 559 |
| Average | 18.8 | | 8,115 | | | 0.67 | | 1.24 | | |
| Maximum | | 1,148 | | | | | | | | |

Disinfectant Compound Used: **12% Sodium Hypochlorite**
 Form of Residual Displayed: **Free**
 Quantity of Disinfectant Used During 2015: **1,923 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, 2015 – December 31, 2015

| 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 Reviewed | Average Residual (mg/L) | | |
| January | 21.8 | 585 | 14,025 | 306 | 15 | 0.60 | 31 | 1.23 | | |
| February | 20.3 | 431 | 3,662 | 261 | 1 | 0.89 | 4 | 1.32 | | |
| March | 21.4 | 738 | 16,499 | 342 | 10 | 0.67 | 30 | 1.36 | | |
| April | 26.6 | 521 | 13,503 | 303 | 12 | 0.70 | 30 | 1.26 | | |
| May | 22.0 | 1,673 | 14,590 | 362 | 11 | 0.49 | 32 | 1.41 | | |
| June | 21.1 | 665 | 14,971 | 306 | 16 | 0.54 | 30 | 1.39 | | |
| July | 21.2 | 704 | 12,988 | 266 | 15 | 0.55 | 31 | 1.23 | | |
| August | 21.2 | 470 | 11,217 | 262 | 13 | 0.57 | 30 | 1.33 | | |
| September | 21.2 | 542 | 12,372 | 307 | 15 | 0.50 | 30 | 1.32 | | |
| October | 21.4 | 602 | 11,643 | 262 | 16 | 0.62 | 31 | 1.33 | | |
| November | 22.7 | 470 | 11,335 | 221 | 13 | 0.69 | 30 | 1.25 | | |
| December | 23.1 | 428 | 11,064 | 242 | 10 | 0.65 | 31 | 1.22 | | |
| Total | | | 147,869 | 3,440 | 147 | | 340 | | | |
| Average | 22.0 | | 12,322 | | | 0.62 | | 1.30 | | |
| Maximum | | 1,673 | | | | | | | | |

Disinfectant Compound Used: **12% Sodium Hypochlorite**
 Form of Residual Displayed: **Free**
 Quantity of Disinfectant Used During 2015: **3,440 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, 2015 – December 31, 2015

| | 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) | | Monthly Total (L) | Treated Water Turbidity | | Treated Water Disinfectant | | No. of Dis. Samples Collected |
| Month | | | | | No. of Samples Collected | Daily Average Turbidity | No. of Treated Samples Reviewed | Average Residual (mg/L) | | |
| January | 23.7 | 153 | 2,853 | See Palmerston Well #3 Data | 14 | 0.63 | 33 | 1.21 | | |
| February | 23.8 | 640 | 11,463 | | 14 | 0.69 | 28 | 1.22 | | |
| March | 24.3 | 557 | 5,202 | | 9 | 0.70 | 30 | 1.30 | | |
| April | 26.1 | 154 | 3,016 | | 11 | 0.68 | 30 | 1.28 | | |
| May | 22.5 | 133 | 2,597 | | 11 | 0.53 | 30 | 1.36 | | |
| June | 21.9 | 174 | 3,020 | | 16 | 0.55 | 30 | 1.36 | | |
| July | 22.4 | 125 | 2,836 | | 15 | 0.52 | 31 | 1.23 | | |
| August | 22.5 | 112 | 3,258 | | 13 | 0.56 | 31 | 1.30 | | |
| September | 22.1 | 130 | 2,456 | | 15 | 0.49 | 30 | 1.25 | | |
| October | 22.7 | 151 | 2,792 | | 16 | 0.51 | 31 | 1.34 | | |
| November | 22.2 | 126 | 2,728 | | 12 | 0.56 | 30 | 1.28 | | |
| December | 21.6 | 136 | 2,783 | | 10 | 0.54 | 31 | 1.31 | | |
| Total | | | 45,004 | | 156 | | 365 | | | |
| Average | | | 3,750 | | | 0.58 | | 1.29 | | |
| Maximum | 26.1 | 640 | | | | | | | | |

Disinfectant Compound Used: **12% Sodium Hypochlorite**
 Form of Residual Displayed: **Free**
 Quantity of Disinfectant Used During 2015:
 Distribution System Minimum 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, 2015 – December 31, 2015

| Month | Treated Water Flow Max Daily Volume - 1964 m ³ /day Max Flow Rate = 22.83 L/s Well # 1 22.83 L/s Well # 2 | | | | Chlorine |
|----------------|---|---------------------------------------|--|---------------------------------|-------------------|
| | Instantaneous Peak flow Well #1 (L/s) | Instantaneous Peak flow Well #2 (L/s) | Maximum Day Flow (m ³ /day) | Monthly Total (m ³) | Monthly Total (l) |
| January | 15.4 | 17.6 | 344 | 9,773 | 216 |
| February | 15.5 | 17.6 | 721 | 9,797 | 173 |
| March | 15.5 | 18.7 | 416 | 11,738 | 170 |
| April | 15.5 | 21.3 | 355 | 10,305 | 215 |
| May | 15.5 | 20.5 | 1,148 | 12,807 | 306 |
| June | 15.5 | 18.2 | 379 | 10,867 | 176 |
| July | 15.5 | 18.3 | 366 | 9,623 | 198 |
| August | 15.5 | 18.4 | 284 | 9,788 | 197 |
| September | 15.4 | 18.5 | 337 | 9,460 | 243 |
| October | 15.4 | 18.9 | 613 | 9,321 | 195 |
| November | 15.2 | 18.7 | 366 | 9,224 | 175 |
| December | 15.1 | 18.8 | 275 | 8,286 | 179 |
| Total | | | | 120,989 | 2,443 |
| Average | | | | 10,082 | |
| Maximum | 15.5 | 21.3 | 1,148 | | |

Table 3.6
Palmerston Drinking Water System
Well #3 & 4 Combined
Treated Water Flow
January 1, 2015 – December 31, 2015

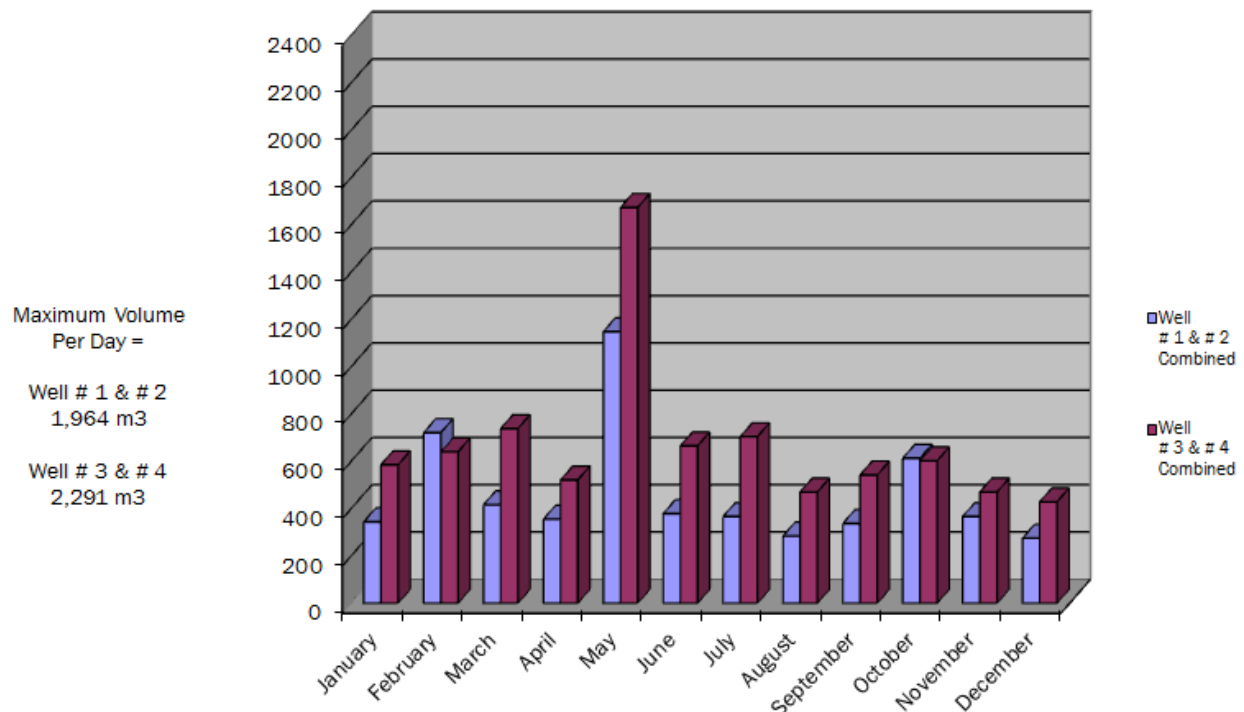
| Month | Treated Water Flow Max Daily Volume - 2291 m ³ /day Max Flow Rate = 26.7 L/s Well # 3 26.7 L/s Well # 4 | | | | Chlorine |
|----------------|---|---------------------------------------|--|---------------------------------|-------------------|
| | Instantaneous Peak flow Well #3 (L/s) | Instantaneous Peak flow Well #4 (L/s) | Maximum Day Flow (m ³ /day) | Monthly Total (m ³) | Monthly Total (l) |
| January | 21.8 | 23.7 | 585 | 16,878 | 306 |
| February | 20.3 | 23.8 | 640 | 15,125 | 261 |
| March | 21.4 | 24.3 | 738 | 21,701 | 342 |
| April | 26.6 | 26.1 | 521 | 16,519 | 303 |
| May | 22.0 | 22.5 | 1,673 | 17,187 | 362 |
| June | 21.1 | 21.9 | 665 | 17,991 | 306 |
| July | 21.2 | 22.4 | 704 | 15,824 | 266 |
| August | 21.2 | 22.5 | 470 | 14,475 | 262 |
| September | 21.2 | 22.1 | 542 | 14,828 | 307 |
| October | 21.4 | 22.7 | 602 | 14,435 | 262 |
| November | 22.7 | 22.2 | 470 | 14,063 | 221 |
| December | 23.1 | 21.6 | 428 | 13,847 | 242 |
| Total | | | | 192,873 | 3,440 |
| Average | | | | 16,073 | |
| Maximum | 26.6 | 26.1 | 1,673 | | |

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 | Maximum Daily Flow | Percent of Maximum Allowable |
|-------------|---------------------|---------------------------------|------------------------------|--|---------------------|------------------------------|
| | L/s | L/s | % | m ³ /day | m ³ /day | % |
| Well #1 | 22.8 | 15.5 | 68 | 1,964 | 155 | 8 |
| Well #2 | 22.8 | 21.3 | 80 | 1,964 | 1,148 | 58 |
| Well #3 | 26.7 | 26.6 | 99.6 | 2,291 | 1,673 | 73 |
| Well #4 | 26.7 | 26.1 | 98 | 2,291 | 640 | 33 |

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 2015. 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 0.48 mg/L and 1.55 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
 2015 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 | 0.35 | 0.92 |
| | Maximum | 0.90 | 2.15 |
| | Average | 0.66 | 1.31 |
| Well #2 | Minimum | 0.15 | 0.90 |
| | Maximum | 0.90 | 1.61 |
| | Average | 0.56 | 1.24 |
| Well #3 | Minimum | 0.23 | 0.94 |
| | Maximum | 0.96 | 1.72 |
| | Average | 0.55 | 1.30 |
| Well #4 | Minimum | 0.12 | 0.97 |
| | Maximum | 0.93 | 1.61 |
| | Average | 0.60 | 1.29 |

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 2015, 5,883 L of 12% Sodium Hypochlorite was used. The average dosage rates are presented in Table 3.10.

In 2015, 3,703 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
2015 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 (NaOCl) | Well #1 | 520 | 62.4 | 23,615 | 2.64 |
| | Well #2 | 1,923 | 230.8 | 97,374 | 2.37 |
| | Well #3 & 4 | 3,440 | 412.8 | 192,873 | 2.14 |
| | Total | 5,883 | 706.0 | 313,862 | 2.25 |
| PW1680 | Well #1 & Well #2 | 2,081 | 2,913.4 | 120,989 | 24.08 |
| | Well #3 & Well #4 | 1,622 | 2,270.8 | 192,873 | 11.77 |
| | Total | 3,703 | 5,184.2 | 313,862 | 16.52 |

- 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 PTTW, the MDWL, the DWWP and any MOE Order that the system failed to meet from January 1, 2015 to December 31, 2015, 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 2015.
- 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 3rd day of March 2016.



Brian Hansen
 Public Works Director