

2023 Summary Report

for the

Town of Minto

CLIFFORD DRINKING WATER SYSTEM

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Date: March 8, 2024

2023 Summary Report for the Town of Minto CLIFFORD 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 Clifford 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, 2023 to December 31, 2023.

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

Clifford is a community with a population of approximately 1000 people and approximately 400 residential properties, located within the Town of Minto at the northwest corner of Wellington County, along the route of Provincial Hwy. No. 9.

Clifford is serviced by a municipal Drinking Water System that is comprised of: three drilled well supplies, two pumphouses, an elevated 1,275 m³ storage tank and a distribution network of watermains. The watermains range in diameter from 100 mm to 300 mm. The municipal water system is also used for fire protection and has approximately 56 fire hydrants throughout the distribution system. In the event of a prolonged power outage, a portable generator can be moved to Wells #1, #3 & # 4 to supply back-up power.

Well #3 is a deep overburden well and serves as the primary production well for the system. Wells #1 and #4 are bedrock wells and provide peak flows and redundancy to the system. Wells #3 and #4 are a *combined supply* and are not allowed to operate together. All three operating wells are equipped with submersible pumps; the pump in Well #3 is a variable speed pump.

The pumphouse on Allan Street serves Well #1. The second pumphouse is in the base of the elevated storage tank on Nelson Street and serves Wells #3 and #4. The treatment employed in both pumphouses includes the use of sodium silicate for the sequestering of iron and sodium hypochlorite for disinfection of the raw water. A continuous online analyzer measures the levels of free chlorine residual at point of entry (POE). When an alarm for high and/or low free chlorine is activated, there is a corresponding lockout of well pumps. Subsequent to treatment, supply from Well #1 is discharged from the chlorine contact pipe into the distribution system, while supply from Wells #3 and #4 is discharged from the chlorine contact pipe directly into the elevated storage tank once adequate contact time has been achieved.

The Clifford Drinking Water System operates under MDWL 106-101 Issue 3, DWWP 106-201 Issue 3 and PTTW #0441-AQ4H8H.

2.0 SUMMARY OF UPGRADES

2.1 Upgrades Completed in 2023

The disinfection treatment system in the Clifford Drinking Water System meets all of the standards imposed by O. 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 2023 \$1,630 was spent on engineering to create a servicing strategy for future system needs.

The following purchases were made to be shared between all of Minto's water systems. \$13,210 on the SCADA Server upgrade, \$27,910 on water meters, \$2,035 on shared equipment, \$7,145 on Radio upgrades and 2 truck replacements for \$126,275.

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

All routine maintenance throughout the year and planned maintenance during the monthly scheduled maintenance programs was completed by Minto Operations Staff.

2.2 Upgrades Scheduled to be Completed in 2024

In 2024, the Town of Minto is planning to spend \$5,000.00 for water treatment equipment. The following will also be purchased to be shared within the water department. \$55,000 on the SCADA monitoring system and \$25,000 for water meters. \$15,000 on pumps and or valves, \$15,000 on equipment, \$20,000 for ground water modelling 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 Clifford'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 2023, for Wells #1, #3 and #4 respectively, on a monthly basis. Well #1 supplies the Allan Street Wellhouse. Wells #3 and #4 supply the Nelson Street Wellhouse; they are a *combined* supply and are not allowed to operate together.

Table 3.1
Clifford Drinking Water System – Well #1
Treated Water Flow, Turbidity, and Disinfectant Residual
January 1, 2023 – December 31, 2023

	R	aw Water Flow			Monthly Averages				Distribution
	(Max Daily Volume = 1,309 m³/day) (Max Flow Rate = 15.15 L/s				Treated Turb		Disin	ed Water fectant of Entry	System Disinfectant
Month	Operator Observed Peak Flow (L/s)	Maximum Day Flow (m³/day)	Monthly Total (m³)	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	10.5	127	2,967	65	5	0.37	31	1.15	
February	10.2	122	2,056	45	6	0.30	28	1.27	
March	10.1	130	2,051	70	8	0.22	31	1.29	
April	10.1	175	2,105	66	5	0.31	30	1.24	
May	10.1	137	2,428	45	7	0.26	31	1.29]
June	9.9	155	2,139	86	7	0.30	30	1.30	See See
July	9.9	133	2,339	44	7	0.25	31	1.28	Clifford Well #3 Data
August	9.9	185	2,300	66	8	0.30	31	1.22	Data
September	9.9	143	1,952	66	5	0.28	30	1.33	1
October	9.9	175	2,527	88	5	0.24	31	1.33	1
November	9.9	110	1,661	44	7	0.26	30	1.24	1
December	9.9	104	1,571	45	5	0.41	31	1.27	
Total			26,095	730	75		365		
Average			2,175			0.29		1.27	
Maximum	10.5	185							

Disinfectant Compound Used: 12% Sodium Hypochlorite

Form of Residual Displayed: Free

Quantity of Disinfectant Used During 2023: 730 L Distribution System Minimum Target Residual: 0.2 mg/L

Table 3.2
Clifford Drinking Water System – Well #3
Treated Water Flow, Turbidity, and Disinfectant Residual
January 1, 2023 – December 31, 2023

		aw Water Flow Flow Rate = 7.6	L/s)			Monthly	Averages		Distribution
Month		Volume = 1,30	9 m³/d)	Chlorine Treated Water Turbidity		Treated Water Disinfectant Point of Entry		System Disinfectant	
Month	Operator Observed Peak Flow	Maximum Day Flow	Monthly Total	Monthly Total	No. of Samples Collected	Monthly Average Turbidity (NTU)	No. of Treated Samples Collected	Monthly Average Residual	No. of Samples Collected
	(L/s)	(m³/day)	(m³)	(L)				(mg/L)	
January	4.6	113	1,614	43	5	0.21	31	1.10	48
February	4.5	147	2,150	45	6	0.23	28	1.24	43
March	4.5	165	2,552	66	8	0.21	31	1.21	50
April	4.5	203	2,580	67	5	0.34	30	1.22	42
May	4.4	226	2,715	65	7	0.25	31	1.29	49
June	4.6	184	3,250	88	7	0.20	30	1.23	49
July	4.4	222	2,633	33	8	0.26	31	1.19	48
August	4.4	127	2,556	66	8	0.29	31	1.22	46
September	4.4	179	3,488	88	5	0.20	30	1.28	47
October	4.4	228	3,582	88	6	0.24	31	1.23	48
November	4.5	164	2,757	66	8	0.30	30	1.22	46
December	4.5	157	2,875	64	5	0.24	31	1.27	46
Total			32,753	779	78		365		562
Average			2,729	<u> </u>		0.25		1.22	
Maximum	4.6	228							

Disinfectant Compound Used: 12% Sodium Hypochlorite

Form of Residual Displayed: Free

Quantity of Disinfectant Used During 2023 for Wells #3 and #4 combined: 779 L *(Wells #3 and #4 share the same NaOCI storage container)

Distribution System Minimum Target Residual: 0.2 mg/L

Table 3.3
Clifford Drinking Water System – Well #4
Treated Water Flow, Turbidity, and Disinfectant Residual
January 1, 2023 – December 31, 2023

	• •	Raw Water Flow ow Rate = 15.1	5 L/s)			Monthly	Averages		Distribution				
Month	(Max Daily	(Max Daily Volume = 1,309 m ³ /d) This is the allowable combined limits for Well # 3 & Well # 4		(Max Daily Volume = 1,309 m ³ /d) his is the allowable combined limits for Well #		(Max Daily Volume = 1,309 m³/d) This is the allowable combined limits for Well #		Chlorine	Treated Turb		Disin	ed Water fectant of Entry	System Disinfectant
Month	Operator Observed Peak Flow	Maximum Day Flow	Monthly Total	Monthly Total	No. of Samples Collected	Monthly Average Turbidity (NTU)	No. of Treated Samples Collected	Monthly Average Residual	No. of Samples Collected				
	(L/s)	(m ³ /day)	(m³)	(L)		(1110)		(mg/L)					
January	10.0	96	1,312		5	0.60	31	1.24					
February	10.0	62	1,030		7	0.37	28	1.32					
March	10.0	48	1,095		6	0.24	31	1.22					
April	9.9	74	1,116		5	0.43	30	1.26					
May	9.9	56	1,132	See	7	0.28	31	1.27	0				
June	9.9	62	1,022	Clifford	7	0.28	30	1.18	See Clifford Well #3				
July	9.9	62	1,008	Well #3	8	0.26	31	1.15	Data				
August	9.9	160	1,151	Data	7	0.26	31	1.19	Data				
September	9.9	54	1,087		4	0.22	30	1.28					
October	9.9	67	1,157		6	0.27	31	1.39					
November	9.9	84	1,062		7	0.25	30	1.30					
December	9.9	80	1,161		5	0.48	31	1.28					
Total			13,332	779	74		365						
Average			1,111			0.33		1.26					
Maximum	10.0	160											

Disinfectant Compound Used: 12% Sodium Hypochlorite

Form of Residual Displayed: Free

Quantity of Disinfectant Used During 2023 for Wells #3 and #4 combined: 779 L *(Wells #3 and #4 share the same NaOCI storage container)

Distribution System Minimum Target Residual: 0.2 mg/L

Table 3.4
Clifford Drinking Water System – Well #3 & #4 Combined
Treated Water Flow
January 1, 2023 – December 31, 2023

	(Chlorine			
Month	Operator Observed Peak flow Well #3	Operator Observed Peak Flow Well #4	Maximum Day Flow	Monthly Total	Monthly Total
	(L/s)	(L/s)	(m ³ /day)	(m³)	(L)
January	4.6	10.0	112.74	2,926	43
February	4.5	10.0	147.30	3,180	45
March	4.5	10.0	164.51	3,647	66
April	4.5	9.9	202.67	3,696	67
May	4.4	9.9	225.73	3,846	65
June	4.6	9.9	184.09	4,272	88
July	4.4	9.9	222.02	3,641	33
August	4.4	9.9	159.90	3,707	66
September	4.4	9.9	178.73	4,575	88
October	4.4	9.9	227.74	4,739	88
November	4.5	9.9	163.73	3,819	66
December	4.5	9.9	157.38	4,036	64
Total				46,084	779
Average				3,840	
Maximum	4.6	10.0	227.738		

3.2 Comparison of Actual Rates and Maximum Allowable Rates

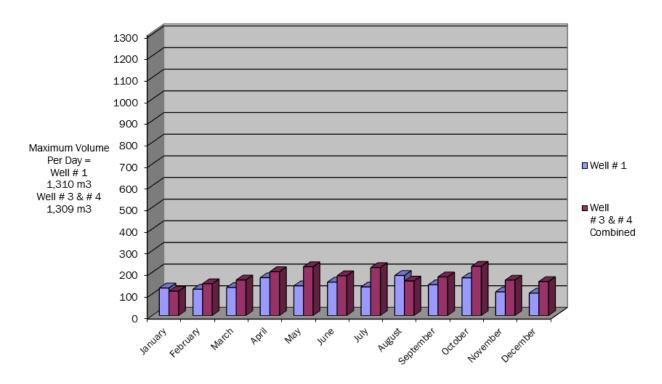
O. Reg. 170/03 stipulates that a summary of the quantities and flow rates of the water supplied from each of Clifford's wells be included in the Summary Report and compared against the rated capacity and flow rate for the system. As such, a comparison of the instantaneous peak flow to the PTTW's rated capacity is included and a comparison of the maximum daily flow to the MDWL's rated capacity is included in Table 3.5.

Table 3.5
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 Maximum Daily Quantity	Maximum Daily Flow	Percent of Maximum Allowable
	L/s	L/s	%	m³/day	m³/day	%
Well #1	15.1	10.5	70	1,310	185	14
Well #3	7.6	4.6	60	655	228	35
Well #4	15.1	10.0	66	1,310	160	12

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.

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 Clifford Drinking Water System.

3.3 Raw Water Qualities and Required Treatment

The Clifford Drinking Water System has Arsenic (As) levels for wells #1 and #4 which exceed half the MAC (maximum acceptable concentration) of 10 ug/L. Reg. 170/03 Section 13.5 states "If a test result obtained under section 13-2 or 13-4 for a parameter exceeds half of the standard prescribed for the parameter in Schedule 2 to the Ontario Drinking Water Quality Standards, the frequency of sampling and testing for that parameter under that section shall be increased so that at least one water sample is taken and tested every three months", therefore this will result in continuous quarterly sampling for the Clifford wells, see Table below.

Table 3.7
2023 Arsenic Quarterly Sample Results
for Clifford Drinking Water System

	Parameter	Sample Date	Result Value	Unit of Measure	MAC
	Arsenic	24/02/23	6.6	ug/L	10
Well # 1	Arsenic	12/05/23	7.1	ug/L	10
Well# 1	Arsenic	11/08/23	7.4	ug/L	10
	Arsenic	10/11/23	6.5	ug/L	10
	Arsenic	24/02/23	8.4	ug/L	10
Well # 4	Arsenic	12/05/23	8.1	ug/L	10
WEII#4	Arsenic	11/08/23	8.5	ug/L	10
	Arsenic	10/11/23	7.4	ug/L	10

The Allan Street Wellhouse (*Well #1*) and the Nelson Street Wellhouse (*Wells #3 and #4*) are equipped with continuous monitoring analyzers for measuring free chlorine residuals. The chlorine analyzer is equipped with an alarm to a monitoring centre who will call the on-call water operator to notify of a critical alarm. The average monthly turbidity and free chlorine residual measurements for treated water are presented in Tables 3.1, 3.2 and 3.3.

There were no turbidity readings exceeding 1.0 NTU in 2023. The minimum, maximum, and average turbidity readings for raw water from each well are presented in Table 3.8.

Sodium Hypochlorite is the disinfectant used for Wells #1, #3 and #4. 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 in Table 3.8.

The free chlorine residual in the distribution system ranged between 0.56 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 Clifford Drinking Water System meets both of these requirements.

Table 3.8
2023 Annual Summary of
Raw Water Turbidity and POE Free Chlorine Residual
for Clifford Drinking Water System

Location	Range	Raw Water Turbidity	Free Chlorine Residual at POE
		NTU	mg/L
	Minimum	0.08	0.80
Well #1	Maximum	0.66	1.85
	Average	0.29	1.27
	Minimum	0.07	0.84
Well #3	Maximum	0.94	1.76
	Average	0.33	1.22
	Minimum	0.09	0.93
Well #4	Maximum	0.88	1.59
	Average	0.31	1.26

3.4 Summary of Treatment Chemicals Used

The disinfectant chemical used in the Clifford Drinking Water System is 12% sodium hypochlorite. Measurements of free residual are recorded on a continuous basis. Wells #3 and #4 share the same storage container; 779 L of is the combined usage for Wells #3 and #4. In 2023, a total of 1,509 L was used for all three wells. The annual average dosage rates for Well #1, and Wells #3 and #4 are presented in Table 3.9.

In 2023, 1,054 L of sodium silicate was used for the sequestering of iron. The annual average dosage rates for Well #1, Well #3 and Well #4 are presented in Table 3.9.

Table 3.9 Clifford Drinking Water System 2023 Annual Summary of Treatment Chemicals Used

Treatment Chemical	Well	Volume Used	Mass Used	Annual Flow	Dosage Rate
		L	kg	m³	mg/L
12 % Sodium	Well #1	730	87.6	26,095	3.36
Hypochlorite	Well #3 & Well #4	779	93.5	46,084	2.03
(NaClO)	Total	1,509	181.1	72,179	2.51
	Well #1	526	731.1	26,095	28.02
Sodium Silicate (<i>Na</i> ₂S <i>iO</i> ₃)	Well # 3 & Well #4	528	733.9	46,084	15.93
(1422103)	Total	1,054	1,465	72,179	20.30

Note:

- Wells #3 and #4 share the same Sodium Hypochlorite storage container; 896 L is the combined NaOCI usage for both wells.
- Wells #3 and #4 share the same storage container for the sequestering agent, sodium silicate;670 L is the combined usage for both wells
- 12% Sodium Hypochlorite = 120,000 mg/L = 120 kg/m³
- Sodium Silicate has a specific gravity = 1.39

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, 2023 to December 31, 2023, and the corresponding corrective measure(s) taken. Compliance was assessed as follows:

- MECP Completed their Annual Inspection of the Clifford DWS on May 30, 2023. Final inspection rating score 100%
- There were No MECP Orders issued for the Clifford Drinking Water System in 2023.
- 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 water systems must follow to meet the requirements of the regulation.

- The SDWA clearly 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	Parameter	Result	Corrective Action

4.2 Summary of Compliance

The Town of Minto works diligently to maintain compliance, with all the requirements of the SDWA, O. Reg. 170/03, as well as the Clifford Drinking Water System's MDLW 106-101 Issue 3, DWWP 106-201 Issue 3 and PTTW #0441-AQ4H8H.

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

Table 4.2
Clifford 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 # 106-101 Issue 3	Clifford Drinking Water System is in compliance with all of the requirements of the MDWL				
DWWP # 106-201 Issue 3		Clifford Drinking Water System is in compliance with all of the requirements of the DWWP			
O. Reg. 170/03	Clifford Drinking Water System of the requirements of	-			

Compliance With	Description of Item the System Failed to Meet	Correction of This Situation How/When			
SDWA		Clifford Drinking Water System is in compliance with all of the requirements of the SDWA.			
PTTW #0441-AQ4H8H	Clifford Drinking Water System is in requirements of	-			

Dated this 8^{th} day of March 2024

Todd Rogers

Water Services Manager