



2020 Summary Report

for the

Town of Minto

CLIFFORD 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 2020	3
2.2	Upgrades Scheduled to be Completed in 2021.....	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 Rates and Maximum Allowable Rates	7
3.3	Raw Water Qualities and Required Treatment.....	9
3.4	Summary of Treatment Chemicals Used	10
4.0	COMPLIANCE	11
4.1	Assessment of Compliance	11
4.2	Summary of Compliance.....	12

LIST OF TABLES

Table 3.1	Clifford Drinking Water System – Well #1.....	4
Table 3.2	Clifford Drinking Water System – Well #3.....	5
Table 3.3	Clifford Drinking Water System – Well #4.....	6
Table 3.4	Clifford Drinking Water System – Well # 3 & 4 Combined.....	7
Table 3.5	Comparison of Flow Rates and Flow Capacities	8
Table 3.6	2020 Maximum Water Usage Per Day by Month	8
Table 3.7	2020 Arsenic Sample Results.....	9
Table 3.8	2020 Annual Summary of Raw Water Turbidity.....	10
Table 3.9	2020 Annual Summary of Treatment Chemicals Used.....	11
Table 4.1	Adverse Water Quality Incidents	12
Table 4.2	Requirements the System Failed to Meet.....	12

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1.0 INTRODUCTION

1.1 Background

In December 2002, the Safe Drinking Water Act (SDWA) was enacted. Subsequently, on June 1, 2003, under the SDWA, a new *'Drinking-Water Systems Regulation'*, Ontario Regulation 170/03 (O. Reg. 170/03), was enacted. In addition, several supporting regulations and procedures were also enacted to assist with the administration of O. Reg 170/03. The list of relevant drinking-water legislation is presented in Appendix A.

The SDWA identifies the responsibilities of owners and operating authorities of municipal drinking water systems (SDWA, Sections 11 and 19). Their duties include ensuring that:

- All water provided by the drinking-water system meets prescribed drinking-water quality standards;
- The drinking-water system is operated in accordance with the Act and regulations and is kept in a good state of repair;
- All facilities are appropriately staffed and supervised;
- All sampling, testing and monitoring requirements are complied with;
- All reporting requirements are complied with; and
- Only persons holding valid operator's certificates operate the drinking-water-system.

O. Reg. 170/03 establishes the standard for protection of drinking water. It includes sets of schedules, specific to municipal residential systems that define requirements for:

- Minimum treatment levels;
- Operational checks;
- Chemical and microbiological sampling and testing;
- Adverse results reporting;
- Corrective procedures; and
- Report documentation and retention.

The system's Municipal Drinking Water Licence (MDWL), Drinking Water Works Permit (DWWP) and Permit To Take Water (PTTW) imposes system specific rules and conditions applicable to the standards set out in O. Reg. 170/03.

1.2 Objective

This Summary Report for the Clifford 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. This report covers the period from January 1, 2020 to December 31, 2020.

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 950 persons and approximately 380 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 46 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 analyser 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 from the chlorine contact pipe.

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

2.0 SUMMARY OF UPGRADES

2.1 Upgrades Completed in 2020

The disinfection treatment system in the Clifford Drinking Water System meets all of the standards imposed by O. Reg. 170/03 and the MOECC's "*Procedures for Disinfection of Drinking Water in Ontario*".

Typically, maintaining the system includes repairs and/or replacement of individual components as necessary. In 2020 \$40,415 was spent to video log all 3 wells.

The following purchases were also made on equipment that is shared between all of Minto's water systems. \$23,423 on the water meters, \$7,112 on equipment and \$22,522 on the modelling program that will allow us to run scenarios for risk assessment planning.

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

2.2 Upgrades Scheduled to be Completed in 2021

In 2021, the Town of Minto is planning to spend \$20,000.00 to perform an inspection on the water tower.

The following will also be purchased to be shared within the water department. \$5,000 for computer hardware and software, \$55,000 on the SCADA monitoring system and \$20,000 for water meters. \$100,000.00 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 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 2020, 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, 2020 – December 31, 2020

Month	Raw Water Flow (Max Daily Volume = 1,309 m ³ /day) (Max Flow Rate = 15.15 L/s)			Chlorine	Monthly Averages				Distribution System Disinfectant
	Operator Observed Peak Flow (L/s)	Maximum Day Flow (m ³ /day)	Monthly Total (m ³)		Monthly Total (L)	Treated Water Turbidity		Treated Water Disinfectant Point of Entry	
				No. of Samples Collected		Monthly Average Turbidity (NTU)	No. of Treated Samples Collected	Monthly Average Residual (mg/L)	
January	12.1	143	2,926	65	11	0.45	31	1.34	See Clifford Well #3 Data
February	12.1	133	2,411	67	8	0.48	30	1.26	
March	12.0	126	2,462	64	10	0.36	31	1.23	
April	12.0	130	2,499	88	12	0.32	31	1.35	
May	12.0	154	2,382	66	10	0.30	31	1.27	
June	11.6	171	3,156	67	9	0.32	29	1.27	
July	11.5	146	2,867	130	7	0.44	31	1.35	
August	11.5	147	2,626	45	7	0.38	32	1.24	
September	11.6	123	1,974	67	8	0.26	31	1.19	
October	11.6	181	2,537	88	7	0.25	31	1.32	
November	11.6	159	2,017	44	5	0.24	22	1.20	
December	11.3	131	2,346	86	11	0.34	31	1.20	
Total			30,203	877	105		361		
Average			2,517			0.34		1.27	
Maximum	12.1	181							

Disinfectant Compound Used: **12% Sodium Hypochlorite**
 Form of Residual Displayed: **Free**
 Quantity of Disinfectant Used During 2020: **877 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, 2020 – December 31, 2020

Month	Raw Water Flow (Max Flow Rate = 7.6 L/s) (Max Daily Volume = 1,309 m ³ /d) This is the allowable combined limits for Well # 3 & Well # 4			Chlorine	Monthly Averages				Distribution System Disinfectant
	Operator Observed Peak Flow (L/s)	Maximum Day Flow (m ³ /day)	Monthly Total (m ³)		Monthly Total (L)	Treated Water Turbidity		Treated Water Disinfectant Point of Entry	
				No. of Samples Collected		Monthly Average Turbidity (NTU)	No. of Treated Samples Collected	Monthly Average Residual (mg/L)	
January	4.6	219	3,255	45	11	0.45	31	1.23	49
February	4.5	146	2,542	65	8	0.42	30	1.31	45
March	4.5	147	3,232	66	11	0.31	31	1.34	49
April	4.5	173	2,684	54	11	0.30	30	1.34	47
May	4.5	273	3,488	100	10	0.34	31	1.28	48
June	4.5	226	3,562	59	10	0.29	30	1.28	49
July	4.5	247	4,009	89	8	0.49	31	1.21	49
August	4.5	159	3,129	40	8	0.26	32	1.17	48
September	4.5	221	3,097	116	7	0.20	30	1.27	46
October	4.5	169	2,858	69	9	0.24	31	1.27	49
November	2.8	267	3,480	38	8	0.23	24	1.30	47
December	4.5	182	2,997	106	10	0.25	31	1.26	48
Total			38,333	847	111		362		574
Average			3,194			0.32		1.27	
Maximum	4.6	273							

Disinfectant Compound Used: **12% Sodium Hypochlorite**

Form of Residual Displayed: **Free**

Quantity of Disinfectant Used During 2020 for Wells #3 and #4 combined: **847 L** *(Wells #3 and #4 share the same NaOCl 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, 2020 – December 31, 2020

Month	Raw Water Flow (Max Flow Rate = 15.15 L/s) (Max Daily Volume = 1,309 m ³ /d) This is the allowable combined limits for Well # 3 & Well # 4			Chlorine	Monthly Averages				Distribution System Disinfectant
	Operator Observed Peak Flow (L/s)	Maximum Day Flow (m ³ /day)	Monthly Total (m ³)		Monthly Total (L)	Treated Water Turbidity		Treated Water Disinfectant Point of Entry	
				No. of Samples Collected		Monthly Average Turbidity (NTU)	No. of Treated Samples Collected	Monthly Average Residual (mg/L)	No. of Samples Collected
January	10.0	48	1,015	See Clifford Well #3 Data	11	0.46	31	1.34	See Clifford Well #3 Data
February	10.1	40	878		8	0.36	29	1.31	
March	10.0	56	967		10	0.40	31	1.27	
April	9.9	52	910		11	0.36	31	1.29	
May	9.9	44	920		10	0.33	31	1.25	
June	10.0	38	988		9	0.43	30	1.21	
July	9.9	67	981		6	0.55	31	1.18	
August	9.9	62	1,142		7	0.33	32	1.15	
September	9.9	51	1,150		7	0.34	31	1.27	
October	9.9	96	1,107		5	0.31	22	1.40	
November	10.0	57	1,222		9	0.33	30	1.35	
December	10.0	42	985		10	0.39	31	1.28	
Total			12,265	847	103		360		
Average			1,022			0.38		1.27	
Maximum	10.1	96							

Disinfectant Compound Used: **12% Sodium Hypochlorite**
 Form of Residual Displayed: **Free**
 Quantity of Disinfectant Used During 2020 for Wells #3 and #4 combined: **847 L** *(Wells #3 and #4 share the same NaOCl 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, 2020 – December 31, 2020

Month	Treated Water Flow (Well #3 Max Flow Rate = 7.6 L/s) (Well #4 Max Flow Rate = 15.1 L/s) (Max Daily Volume = 1309 m ³ /d)				Chlorine
	Operator Observed Peak flow Well #3 (L/s)	Operator Observed Peak Flow Well #4 (L/s)	Maximum Day Flow (m ³ /day)	Monthly Total (m ³)	Monthly Total (L)
January	4.6	10.0	219	4,270	45
February	4.5	10.1	146	3,420	65
March	4.5	10.0	147	4,199	66
April	4.5	9.9	173	3,594	54
May	4.5	9.9	273	4,408	100
June	4.5	10.0	226	4,550	59
July	4.5	9.9	247	4,990	89
August	4.5	9.9	159	4,271	40
September	4.5	9.9	221	4,247	116
October	4.5	9.9	169	3,965	69
November	2.8	10.0	267	4,702	38
December	4.5	10.0	182	3,982	106
Total				50,598	847
Average				4,217	
Maximum	4.6	10.1	273		

3.2 Comparison of Actual Rates and Maximum Allowable Rates

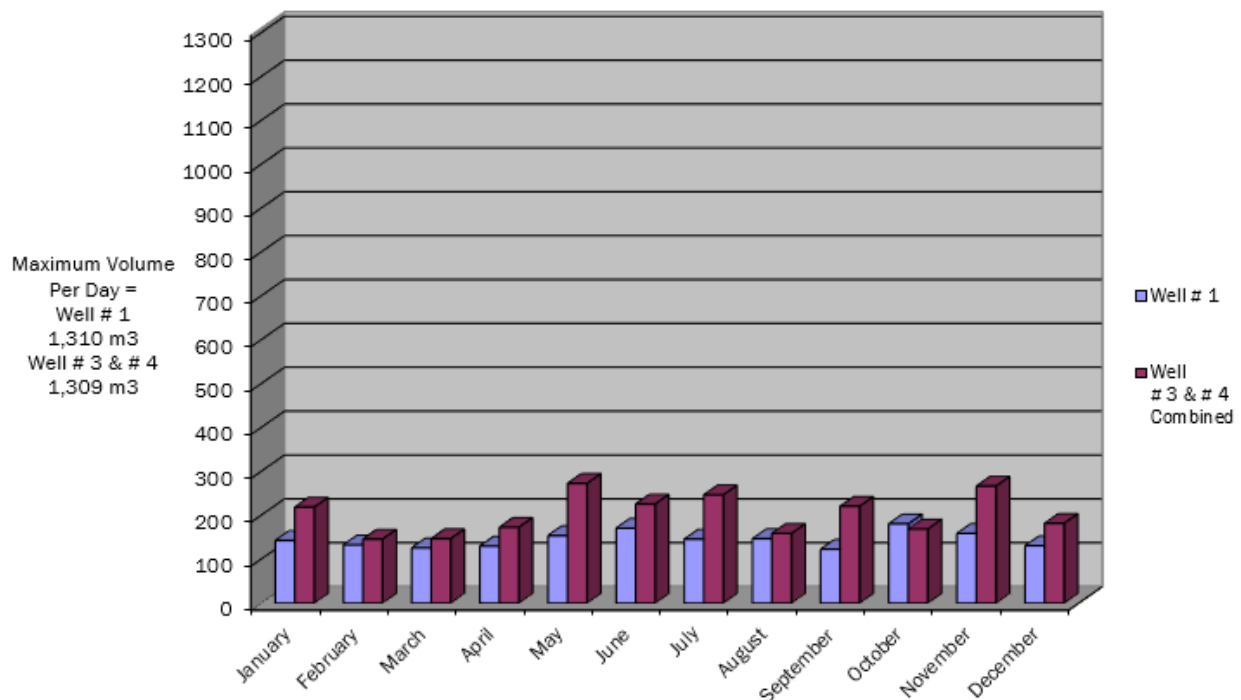
O. Reg. 170/03 stipulates that a summary of the quantities and flow rates of the water supplied from each of Clifford’s wells be included in the Summary Report and compared against the rated capacity and flow rate for the system. As such, a comparison of the instantaneous peak flow to the PTTW’s rated 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	%	m ³ /day	m ³ /day	%
Well #1	15.1	12.1	80	1,310	181	14
Well #3	7.6	4.6	60	655	273	42
Well #4	15.1	10.1	67	1,310	96	7

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 no naturally occurring chemical parameters that exceed MAC (maximum acceptable limit) or IMAC (interim maximum acceptable limit). Starting Jan 1/2020 the MAC for Arsenic (As) was lowered from 0.025mg/L (25 ug/L) to 0.010mg/L (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”. The Clifford Drinking Water System does contain the naturally occurring chemical parameter Arsenic, therefore this will result in continuous quarterly sampling for the Clifford wells, see Table below.

**Table 3.7
 2020 Arsenic Sample Results
 for Clifford Drinking Water System**

	Parameter	Sample Date	Result Value	Unit of Measure	Exceedance
Well # 1	Arsenic	18/02/20	7.7	ug/L	10
	Arsenic	19/05/20	8.5	ug/L	10
	Arsenic	04/08/20	6.3	ug/L	10
	Arsenic	30/11/20	5.8	ug/L	10
Well # 3	Arsenic	18/02/20	0.7	ug/L	10
	Arsenic	19/05/20	0.8	ug/L	10
	Arsenic	04/08/20	0.6	ug/L	10
	Arsenic	23/11/20	0.8	ug/L	10
Well # 4	Arsenic	18/02/20	7.9	ug/L	10
	Arsenic	19/05/20	9.1	ug/L	10
	Arsenic	04/08/20	8.1	ug/L	10
	Arsenic	23/11/20	8.0	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 2020. 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 Table 3.8.

The free chlorine residual in the distribution system ranged between 0.39 mg/L and 1.49 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
2020 Annual Summary of
Raw Water Turbidity and Free Chlorine Residual
for Clifford Drinking Water System

Location	Range	Raw Water Turbidity	Free Chlorine Residual at POE
		NTU	mg/L
Well #1	Minimum	0.07	0.61
	Maximum	0.81	1.69
	Average	0.30	1.27
Well #3	Minimum	0.09	0.69
	Maximum	0.80	1.60
	Average	0.31	1.27
Well #4	Minimum	0.11	0.81
	Maximum	0.84	1.64
	Average	0.38	1.27

3.4 Summary of Treatment Chemicals Used

The disinfectant chemical used in the Clifford Drinking Water System is 12% sodium hypochlorite (NaOCl). Measurements of free residual are recorded on a continuous basis. Wells #3 and #4 share the same NaOCl storage container; ~~793~~ 847 L of NaOCl is the combined usage for Wells #3 and #4. In 2020, a total of ~~1,670~~ 1,724 L of NaOCl 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 2020, ~~1,059~~ 1,248 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
2020 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	877	105.2	30,203	3.48
	Well #3 & Well #4	847	101.6	50,598	2.01
	Total	1,724	206.9	80,801	2.56
Sodium Silicate (NaSi)	Well #1	456	633.8	30,203	20.99
	Well # 3 & Well #4	792	1,100.9	50,598	21.76
	Total	1,248	1,735	80,801	21

- Note:**
- Wells #3 and #4 share the same NaOCl storage container; ~~793~~ 847 L is the combined NaOCl usage for both wells.
 - Wells #3 and #4 share the same storage container for the sequestering agent, sodium silicate (NaSi); ~~633~~ 792 L is the combined NaSi 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, 2020 to December 31, 2020, and the corresponding corrective measure(s) taken. Compliance was assessed as follows:

- MECP Completed Inspection of the Clifford system completed July 16, 2020, Final inspection rating 100%
- There were **no MECP Orders** issued to the Clifford Drinking Water System in 2020.
- 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 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 O 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 the requirements of the SDWA, O. Reg. 170/03, as well as the Clifford Water Work’s MDLW 106-101, DWWP 106-201 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	<i>Clifford Drinking Water System is in compliance with all of the requirements of the MDWL</i>	
DWWP # 106-201	<i>Clifford Drinking Water System is in compliance with all of the requirements of the DWWP</i>	

Compliance With	Description of Item the System Failed to Meet	Correction of This Situation How/When
O. Reg. 170/03	<i>Clifford Drinking Water System is in compliance with all of the requirements of O. Reg. 170/03</i>	
SDWA	<i>Clifford Drinking Water System is in compliance with all of the requirements of the SDWA.</i>	
PTTW #0441-AQ4H8H	<i>Clifford Drinking Water System is in compliance with all of the requirements of the PTTW</i>	

Dated this 9th day of March 2021.



Todd Rogers
Water Foreman