



2012 Summary Report

for the

Town of Minto

CLIFFORD DRINKING WATER SYSTEM

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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) and Drinking Water Works Permit (DWWP) imposes system specific rules and conditions applicable to the standards set out in O. Reg. 170/03.

1.2 Objective

This Summary Report for the 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. It covers the period from January 1, 2012 to December 31, 2012.

This Summary Report lists any requirements of the Act, the regulations, the MDWL, DWWP and any order that the system failed to meet during the period of this report. For any such failure, the measures that were taken to correct the failure are detailed. The report also includes relevant information that will assist the Town of Minto to assess the water work's capability to meet existing and future planned uses of the system.

1.3 Description of Drinking Water System

Clifford is a community with a population of approximately 804 persons, 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 wellhouses, 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 is available in Wellhouse #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 wellhouse on Allan Street serves Well #1. The second wellhouse is in the base of the elevated storage tank on Nelson Street and serves Wells #3 and #4. The treatment employed in both wellhouses 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 the alarm for chlorination system failure 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 Cl₂ contact pipe.

The Clifford Drinking Water System operates under MDWL 106-101, DWWP 106-201, PTTW #6117-62MQDH (Well #1) and PTTW #5364-7ZWRQJ (Wells #3 and #4).

2.0 SUMMARY OF UPGRADES

2.1 Upgrades Completed in 2012

The disinfection treatment system in the Clifford 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 2012, \$4,175.00 was spent on the water tower inspection. \$4,500.00 on flow control valve replacements, \$4,000.00 on a new motor for well # 1 and approximately \$294,000.00 was spent installing and replacing watermain.

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

2.2 Upgrades Scheduled to be Completed in 2013

In 2013, the Town of Minto is planning to replace watermain on Ann St. and Queen St. at an estimated cost of \$160,000.00 and valve replacements at an estimated cost of \$5,000.00. In 2013 the following will be purchased to be shared within the water department. Two new vehicles will be purchased for approximately \$90,000.00. Upgrades will be made to the SCADA system at an estimated cost of \$30,000.00. Water meters will start being installed in homes at an estimated cost of \$500,000.00.

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 2012, 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, 2012 – December 31, 2012

Month	Raw Water Flow (Max Flow Rate = 15.15 L/s)			Chlorine	Monthly Averages				Distribution System Disinfectant	
	Instantaneous Peak flows (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 Collected	Average Residual (mg/L)		
January	14.1	341	4,668	100	4	0.48	16	1.06	See Clifford Well #3 Data	
February	13.9	329	7,202	161	2	0.51	29	1.25		
March	13.6	327	7,272	120	6	0.50	31	1.19		
April	13.6	353	6,988	120	7	0.49	28	1.08		
May	13.6	369	7,572	160	4	0.59	31	1.17		
June	13.5	369	7,854	180	7	0.50	30	1.28		
July	13.3	410	11,046	220	8	0.52	32	1.03		
August	13.1	334	8,463	220	8	0.41	32	1.14		
September	13.3	296	7,890	140	6	0.46	30	1.09		
October	13.3	528	9,641	201	5	0.39	32	1.27		
November	13.4	424	5,330	145	9	0.26	30	1.25		
December	13.4	390	5,442	120	7	0.31	31	1.21		
Total			89,368	1,887	73		352			
Average			7,447			0.45		1.17		
Maximum	14.1	528								

Disinfectant Compound Used: **12% Sodium Hypochlorite**
 Form of Residual Displayed: **Free**
 Quantity of Disinfectant Used During 2012: **1,887 L**
 Distribution System Target Residual: **0.2 mg/L**

Table 3.2
Clifford Drinking Water System – Well #3
Treated Water Flow, Turbidity, and Disinfectant Residual
January 1, 2012 – December 31, 2012

Month	Raw Water Flow (Max Flow Rate = 7.58 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 Collected	Average Residual (mg/L)		
January	4.7	387	7,810	156	6	0.36	29	1.35	49	49
February	4.5	369	5,521	80	3	0.30	29	1.33	45	45
March	4.5	254	5,414	100	6	0.52	31	1.17	49	49
April	4.5	239	5,508	60	7	0.45	29	1.28	46	46
May	4.5	349	4,971	80	2	0.38	31	1.27	47	47
June	4.5	266	4,962	91	6	0.55	30	1.24	46	46
July	4.5	266	6,585	80	7	0.19	32	1.24	48	48
August	4.5	258	5,851	100	8	0.36	32	1.18	50	50
September	4.5	278	5,224	54	5	0.46	31	1.17	42	42
October	4.6	257	4,342	20	5	0.51	31	1.32	47	47
November	4.5	218	4,072	80	7	0.28	30	1.25	48	48
December	4.5	253	4,058	100	7	0.25	31	1.19	48	48
Total			64,318	1,001	69		366		565	565
Average			5,360			0.38		1.25		
Maximum	4.7	387								

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

Form of Residual Displayed: **Free**

Quantity of Disinfectant Used During 2012 for Wells #3 and #4 combined: **1,001 L** *(Wells #3 and #4 share the same Cl₂ storage container)

Distribution System Target Residual: **0.2 mg/L**

Table 3.3
Clifford Drinking Water System – Well #4
Treated Water Flow, Turbidity, and Disinfectant Residual
January 1, 2012 – December 31, 2012

Month	Raw Water Flow (Max Flow Rate = 15.15 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 Collected	Average Residual (mg/L)		
January	10.5	290	3,131	See Clifford Well #3 Data	9	0.59	29	1.36	See Clifford Well #3 Data	
February	10.2	89	1,106		4	0.66	29	1.26		
March	10.1	82	835		9	0.72	22	1.30		
April	10.4	82	926		7	0.62	26	1.29		
May	10.2	348.5	1,590		4	0.64	27	1.32		
June	10.2	57	1,108		7	0.43	30	1.25		
July	10.1	71	969		9	0.62	32	1.00		
August	10.1	228	1,239		8	0.73	31	1.11		
September	10.0	68	980		6	0.65	30	1.14		
October	10.0	672	2,681		5	0.64	32	1.33		
November	9.7	55	980		8	0.46	29	1.22		
December	10.2	49	1,014		7	0.45	29	1.19		
Total			16,559	1,001	83		346			
Average			1,380			0.60		1.23		
Maximum	10.5	672								

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

Form of Residual Displayed: **Free**

Quantity of Disinfectant Used During 2012 for Wells #3 and #4 combined: **1,001 L** *(Wells #3 and #4 share the same Cl₂ storage container)

Distribution System Target Residual: **0.2 mg/L**

Table 3.4
Clifford Drinking Water System – Well #3 & #4 Combined
Treated Water Flow
January 1, 2012 – December 31, 2012

Month	Treated Water Flow Max Daily Volume = 1309 m ³ /d Max Flow Rate = 7.58 L/s Well # 3 = 15.15 L/s Well # 4			Chlorine	
	Instantaneous Peak Flow (L/s)		Maximum Day Flow	Monthly Total	Monthly Total
	Well # 3	Well # 4	(m ³ /day)	(m ³)	(l)
January	4.7	10.5	387	10941	156
February	4.5	10.2	369	6627	80
March	4.5	10.1	254	6249	100
April	4.5	10.4	239	6434	60
May	4.5	10.2	349	6561	80
June	4.5	10.2	266	6070	91
July	4.5	10.1	266	7554	80
August	4.5	10.1	258	7090	100
September	4.5	10.0	278	6204	54
October	4.6	10.0	672	7023	20
November	4.5	9.7	218	5052	80
December	4.5	10.2	253	5072	100
Total				80,877	1,001
Average				6,740	
Maximum	4.7	10.5	672		

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 3.4 reflects the comparisons between the PTTW and MDWL.

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	Maximum Instantaneous Peak Flow	Percent of Maximum Allowable	MDWL Schedule C Maximum Daily Quantity	PTTW Maximum Daily Flow Allowed	Maximum Daily Flow	Percent of Maximum Allowable
	L/s	L/s	%	m ³ /day	m ³ /day	m ³ /day	%
Well #1	15.15	14.1	93	1,309	1,310	528	40
Well #3	7.58	4.7	62	1,309	655	387	59
Well #4	15.15	10.5	69		1,309	672	51

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.”

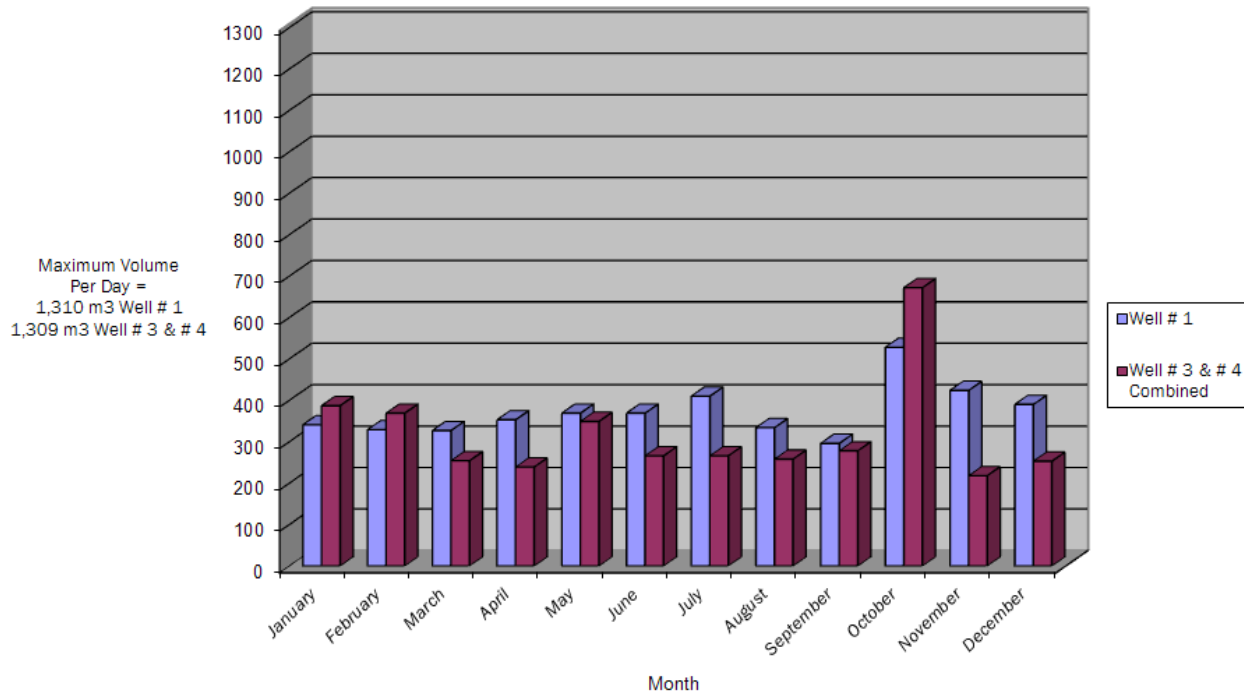
Table 3.6
Comparison of Flow Rates To Rated Flow Rate (PTTW)

Well Supply	PTTW Max. Flow Rate	Maximum Instantaneous Peak Flow	Percent of Maximum Allowable
	L/s	L/s	%
Well #1	15.15	14.1	93
Well #3	7.58	4.7	62
Well #4	15.15	10.5	69

Table 3.7
Comparison of Flow Capacities To Rated Capacity (MDWL)

Well Supply	MDWL Maximum	Maximum Daily Flow	Percent of Maximum Allowable
	m ³ /day	m ³ /day	%
Well #1	1,309	528	40
Well #3 & # 4	1,309	672	51

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 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 or IMAC limits.

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 high turbidity readings (>1.0 NTU) experienced in 2012. The minimum, maximum, and average turbidity readings for raw water from each well are presented in Table 3.9.

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 3.9. 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 0.42 mg/L and 1.94 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 3.9
2012 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	0.01	0.62
	Maximum	0.89	1.64
	Average	0.39	1.17
Well #3	Minimum	0.01	0.91
	Maximum	0.89	1.69
	Average	0.38	1.25
Well #4	Minimum	0.21	0.78
	Maximum	0.94	1.69
	Average	0.63	1.23

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 Cl₂ storage container; 1,001 L of Cl₂ is the combined usage for Wells #3 and #4. In 2012, a total of 1,442 L of 12% sodium hypochlorite was used for all three wells. The annual average dosage rates for Well #1, and Wells #3 and #4 are presented in Table 3.10.

In 2012, 1,442 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 3.10.

Table 3.10
Clifford Drinking Water System
2012 Annual Summary of
Treatment Chemicals Used

Treatment Chemical	Well	Volume Used	Mass Used	Annual Flow	Dosage Rate
		L	kg	m ³	mg/L
12 % Cl ₂	Well #1	1,887	226.4	89,368	2.53
	Well #3 & Well #4	1,001	120.1	80,877	1.49
	Total	2,888	346.6	170,245	2.04
Sodium Silicate	Well #1	1,065	1,480.4	89,368	16.56
	Well # 3 & Well #4	377	524.0	80,877	6.48
	Total	1,442	2,004	170,245	12

- Note:**
- Wells #3 and #4 share the same Cl₂ storage container; 1,001 L is the combined Cl₂ usage for both wells.
 - Wells #3 and #4 share the same storage container for the sequestering agent, sodium silicate (NaSi); 377 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 MDWL, the DWWP and any MOE order that the system failed to meet from January 1, 2012 to December 31, 2012, and the corresponding corrective measure(s) taken. Compliance was assessed as follows:

- There were **no MOE Orders** issued to the Clifford Drinking Water System in 2012.
- 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.

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 Clifford Water Work's MDLW 106-101, DWWP 106-201, Well #1 PTTW #6117-62MQDH, and Well #3 & #4 PTTW #5364-7ZWRQJ. 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
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>	
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>	

Dated this 19th day of March 2013.

Brian Hansen
Public Works Director