

March 31, 2016

File: 5610-55

Environmental Health Officer  
Central Vancouver Island Health Region  
1665 Grant Avenue  
NANAIMO BC V9S 5K7

**Re: Crofton Water System Water Quality Report  
Premises Number 1310822  
Report for the Period Jan 1/15 to Dec 31/15**

Please find the Municipality of North Cowichan's Water quality report for the Crofton Water System attached.

Sincerely

Clay Reitsma, M. Eng., P. Eng  
Manager of Engineering (Infrastructure & Environment)

[clay.reitsma@northcowichan.ca](mailto:clay.reitsma@northcowichan.ca)



## 1 General

This report is comprised of two parts.

- The first part provides a summary of the data along with a compliance assessment. This part is provided to the VIHA and is also published on the Municipality's website at [www.northcowichan.ca](http://www.northcowichan.ca) on an annual basis.
- The second part includes all of the relevant data tables and charts that back up the summary report. Any data points that are non-compliant with the Canadian Drinking Water Quality Guidelines (CDWQGs) are flagged in red. This part is provided to the VIHA only but is available to the public upon request.

## 2 Operator Information

Contact Name	Clay Reitsma, M.Eng. , P.Eng.
Phone	250-746-3100
Email	<a href="mailto:clay.reitsma@northcowichan.ca">clay.reitsma@northcowichan.ca</a>

## 3 System Description

This is a surface water supply. Water is pumped from the Cowichan River to Catalyst's water treatment plant. The water treatment plant consists of a coagulation and flocculation process, followed by sedimentation and filtration. The water is chlorinated at the water treatment plant and pumped to the Robert Street Reservoir where a small amount of additional chlorine is added to ensure adequate reduction of Giardia and Cryptosporidium cysts.

## 4 Boil Advisories

None.

### *4.1 Future Improvements*

No future improvements are contemplated at this time.

## 5 Results

### 5.1 Water Consumption

Table 1: Average daily water consumption by month and quarter.

Item	Average Daily Consumption (m <sup>3</sup> /d)
<b>Observed</b>	
- Jan	546
- Feb	564
- Mar	573
- Quarter 1	561
<b>Observed</b>	
- Apr	640
- May	719
- Jun	951
- Quarter 2	769
<b>Observed</b>	
- Jul	847
- Aug	722
- Sep	572
- Quarter 3	716
<b>Observed</b>	
- Oct	563
- Nov	571
- Dec	587
- Quarter 4	573
<b>Annual</b>	655

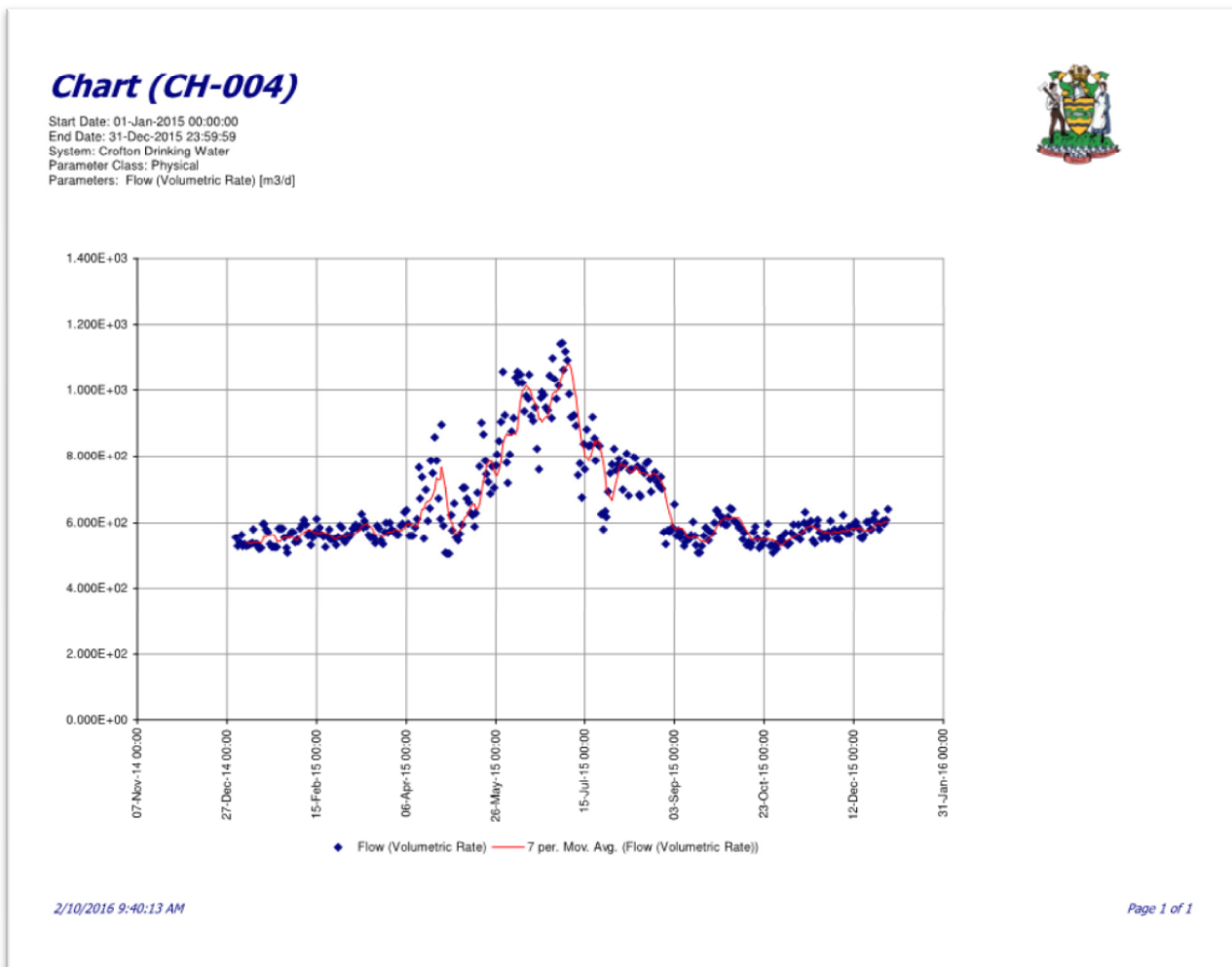
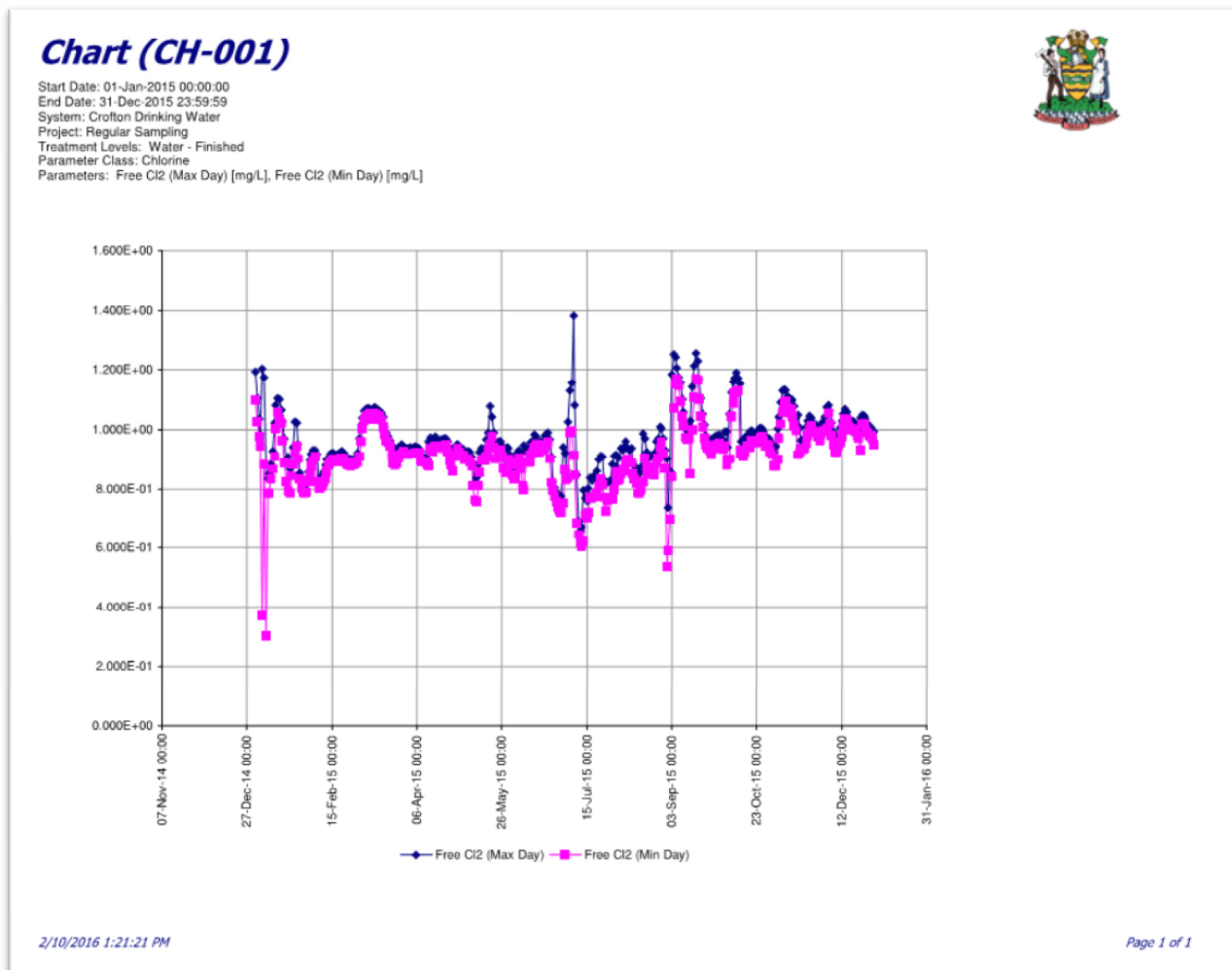


Figure 1: Average daily water consumption.

## 5.2 Residual Chlorine

**Table 2: Finished water minimum and maximum free chlorine residual by quarter.**

Item	Minimum (mg/L)	Maximum (mg/L)	Percent of Samples in Compliance (%)	
Compliance Requirement			100 % >= 0.20 mg/L	100 % <= 4.00 mg/L
<b>Observed</b>				
- Quarter 1	0.303	1.203	100.00	100.00
- Quarter 2	0.720	1.077	100.00	100.00
- Quarter 3	0.537	1.383	100.00	100.00
- Quarter 4	0.857	1.191	100.00	100.00
<b>Annual</b>	0.303	1.203	100.00	100.00



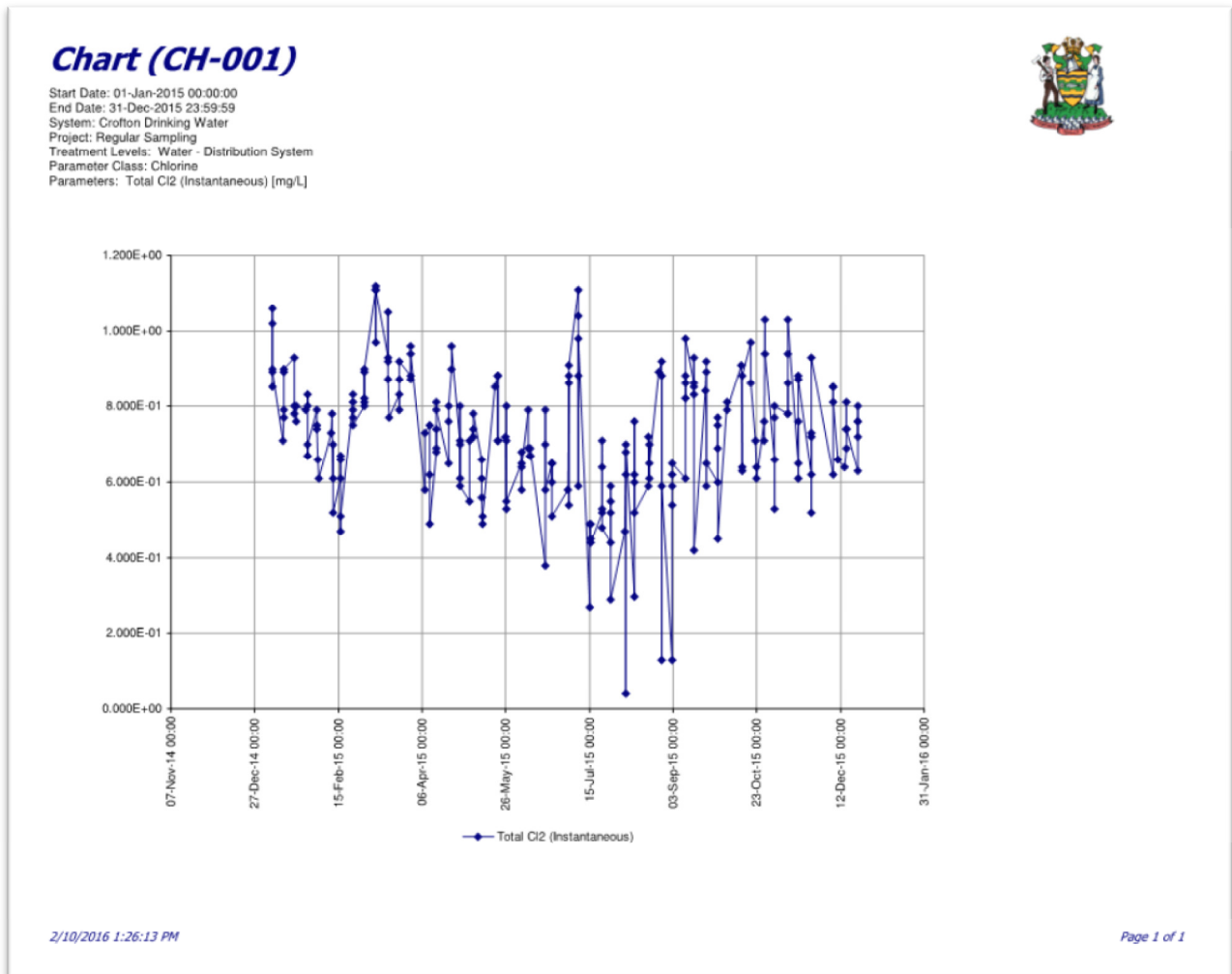
**Figure 2: Finished water daily minimum and maximum free chlorine residual [1].**

[1] The analyzer will occasionally register low and high spikes. Chlorine residual data is logged every 1 to 5 minutes continuously. The way the data is processed for this report is as follows: for each day the maximum and minimum free chlorine residuals over a 24 hour period are extracted from the data reported as the maximum or minimum instantaneous free chlorine residual. This is a very stringent application of the compliance criteria since any spike or dip detected will be reported as the maximum or minimum and may differ greatly from the bulk of the data.

When we observe spikes or dips of this nature it is normally caused by instrument error. Spikes and dips can also occur when staff undertakes maintenance on the analyzer equipment. It has been concluded that the spikes and dips reported do not reflect the true concentration of free chlorine in the finished water.

**Table 3: Distribution system minimum total chlorine residual by quarter.**

Item	Minimum (mg/L)	Percent of Samples in Compliance (%)
Compliance Requirements		100 % >= 0.05 mg/L
<b>Observed</b>		
- Quarter 1	0.470	100.00
- Quarter 2	0.380	100.00
- Quarter 3	0.040	98.57
- Quarter 4	0.520	100.00
<b>Annual</b>	0.040	99.58



**Figure 3: Distribution system minimum total chlorine residual.**

**Table 4(a): Distribution system maximum free chlorine residual by quarter.**

Item	Maximum (mg/L)	Percent of Samples in Compliance (%)
Compliance Requirement		100% <= 4.00 mg/L
<b>Observed</b>		
- Quarter 1	1.060	100.00
- Quarter 2	0.940	100.00
- Quarter 3	1.010	100.00
- Quarter 4	0.920	100.00
<b>Annual</b>	1.060	100.00

**Table 4(b): Distribution system minimum free chlorine residual by quarter (VIHA Proposed Standard).**

Item	Minimum (mg/L)	Percent of Samples in Compliance (%)
Compliance Requirements		100 % >= 0.2 mg/L 100% <= 4.0
<b>Observed</b>		
- Quarter 1	0.450	100.00
- Quarter 2	0.340	100.00
- Quarter 3	0.020	95.71
- Quarter 4	0.410	100.00
<b>Annual</b>	0.020	98.76



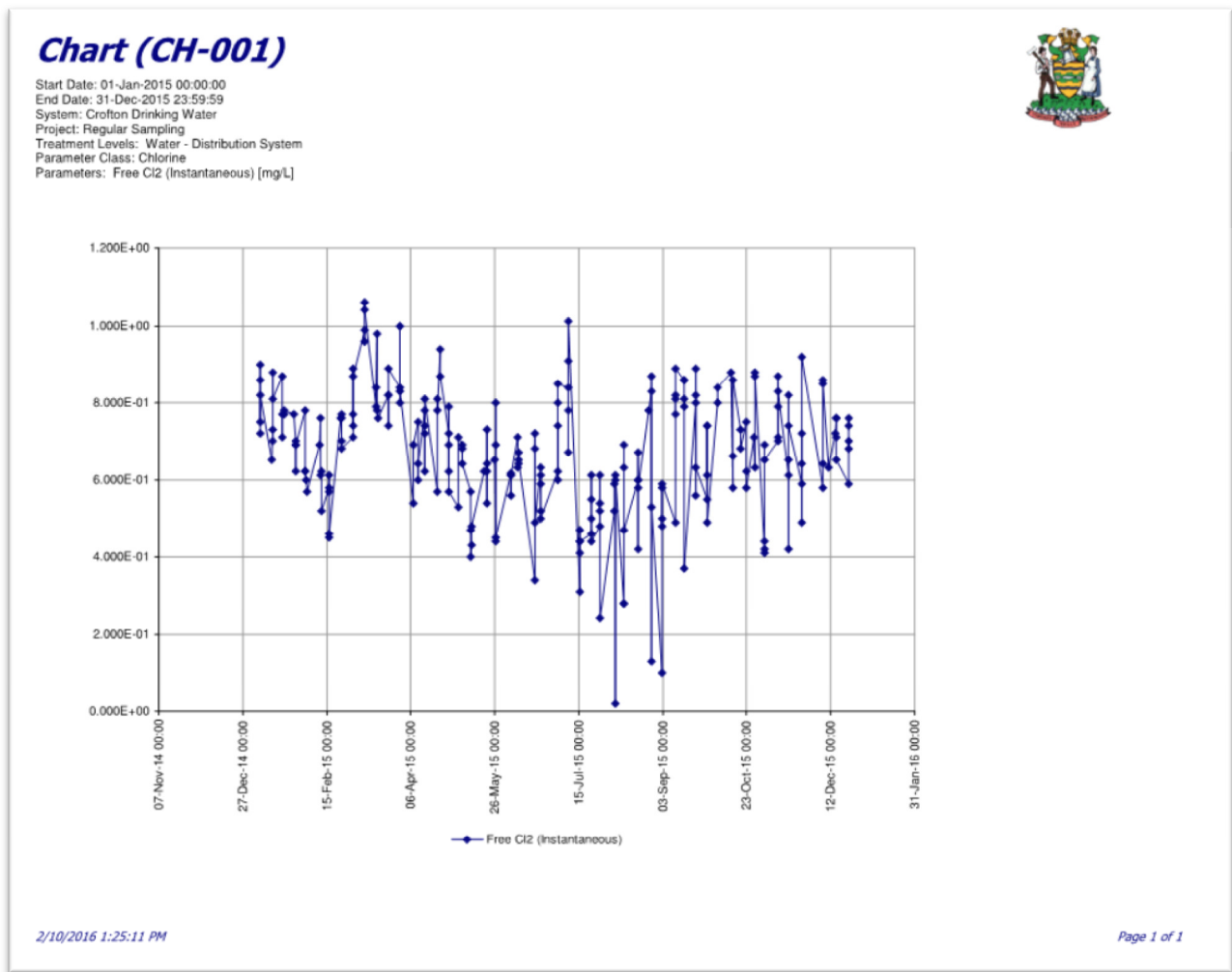


Figure 4: Distribution system maximum free chlorine residual.

### 5.3 Turbidity

**Table 5: Finished water maximum turbidity by month and quarter.**

Item	Maximum (NTU)	Percent of Samples in Compliance (%)	
		100% <= 5 NTU	>95% <= 1 NTU (In A Month)
Compliance Requirement		100% <= 5 NTU	>95% <= 1 NTU (In A Month)
<b>Observed</b>			
- Jan	0.136	100.00	100.00
- Feb	0.256	100.00	100.00
- Mar	0.203	100.00	100.00
- Quarter 1	0.256	100.00	100.00
<b>Observed</b>			
- Apr	0.138	100.00	100.00
- May	0.225	100.00	100.00
- Jun	0.276	100.00	100.00
- Quarter 2	0.276	100.00	100.00
<b>Observed</b>			
- Jul	0.330	100.00	100.00
- Aug	0.256	100.00	100.00
- Sep	0.155	100.00	100.00
- Quarter 3	0.330	100.00	100.00
<b>Observed</b>			
- Oct	0.277	100.00	100.00
- Nov	0.538	100.00	100.00
- Dec	0.352	100.00	100.00
- Quarter 4	0.538	100.00	100.00
<b>Annual</b>	0.538	100.00	100.00

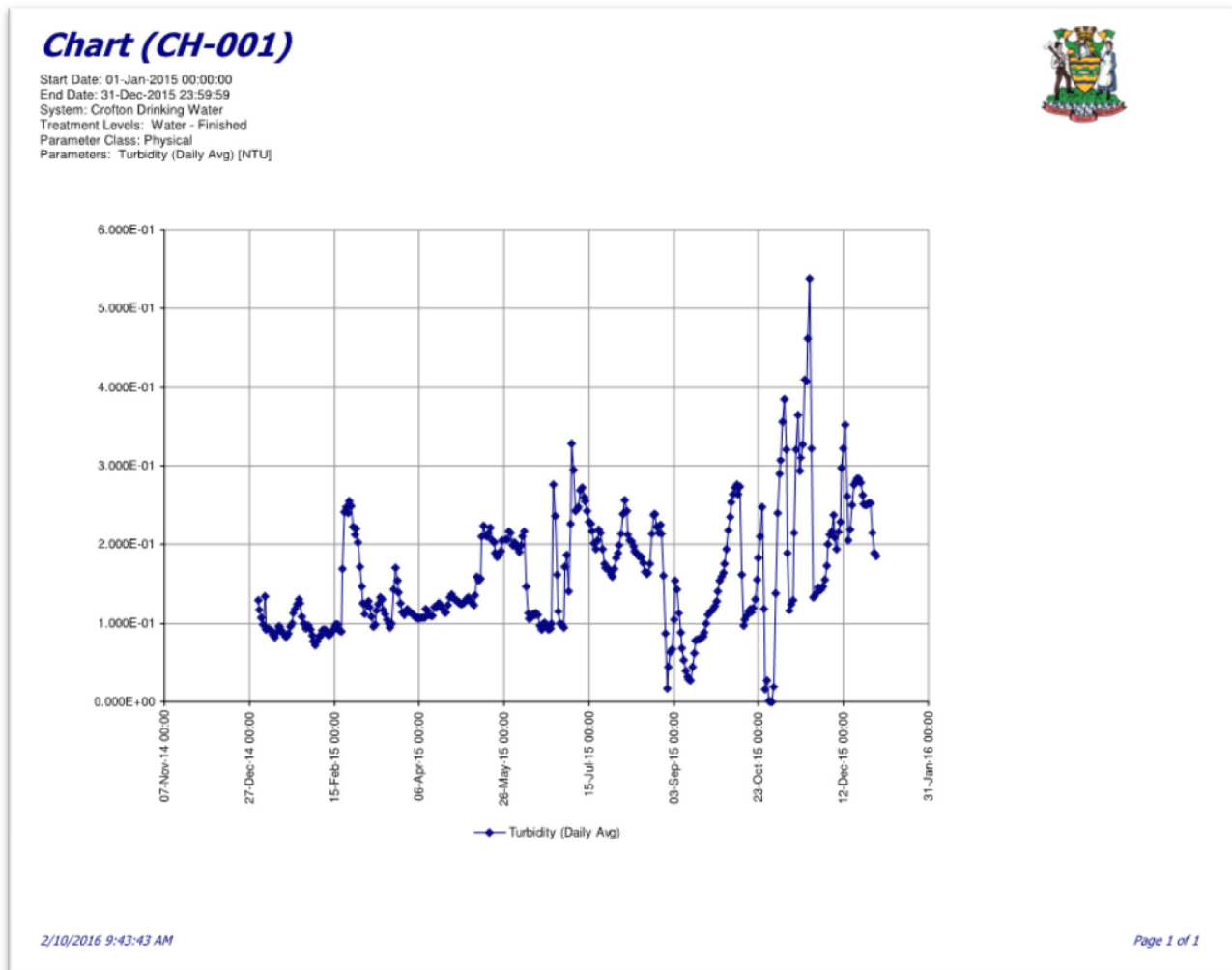


Figure 5: Finished water turbidity.

## 5.4 Coliforms

Table 6: Distribution system maximum total coliforms by quarter.

Item	Maximum (CFU/100 mL)	Percentage of Samples in Compliance (%)	
		100% < 10 CFU/100 mL	>90% < 1 CFU/100 mL
CDWQG Requirement		100% < 10 CFU/100 mL	>90% < 1 CFU/100 mL
<b>Observed</b>			
- Quarter 1	0.000	100.00	100.00
- Quarter 2	0.000	100.00	100.00
- Quarter 3	0.000	100.00	100.00
- Quarter 4	0.550	100.00	100.00
<b>Annual</b>	0.000	100.00	100.00

**Table 7: Distribution system maximum *Escherichia coliforms* by quarter.**

Item	Maximum (CFU/100 mL)	Percentage of Samples in Compliance (%)
CDWQG Requirements		100 % < 1 CFU/100 mL
<b>Observed</b>		
- Quarter 1	0.000	100.00
- Quarter 2	0.000	100.00
- Quarter 3	0.000	100.00
- Quarter 4	0.000	100.00
<b>Annual</b>	0.000	100.00

## 5.5 Cysts

**Table 8: Raw water maximum number of *Giardia* cysts by quarter.**

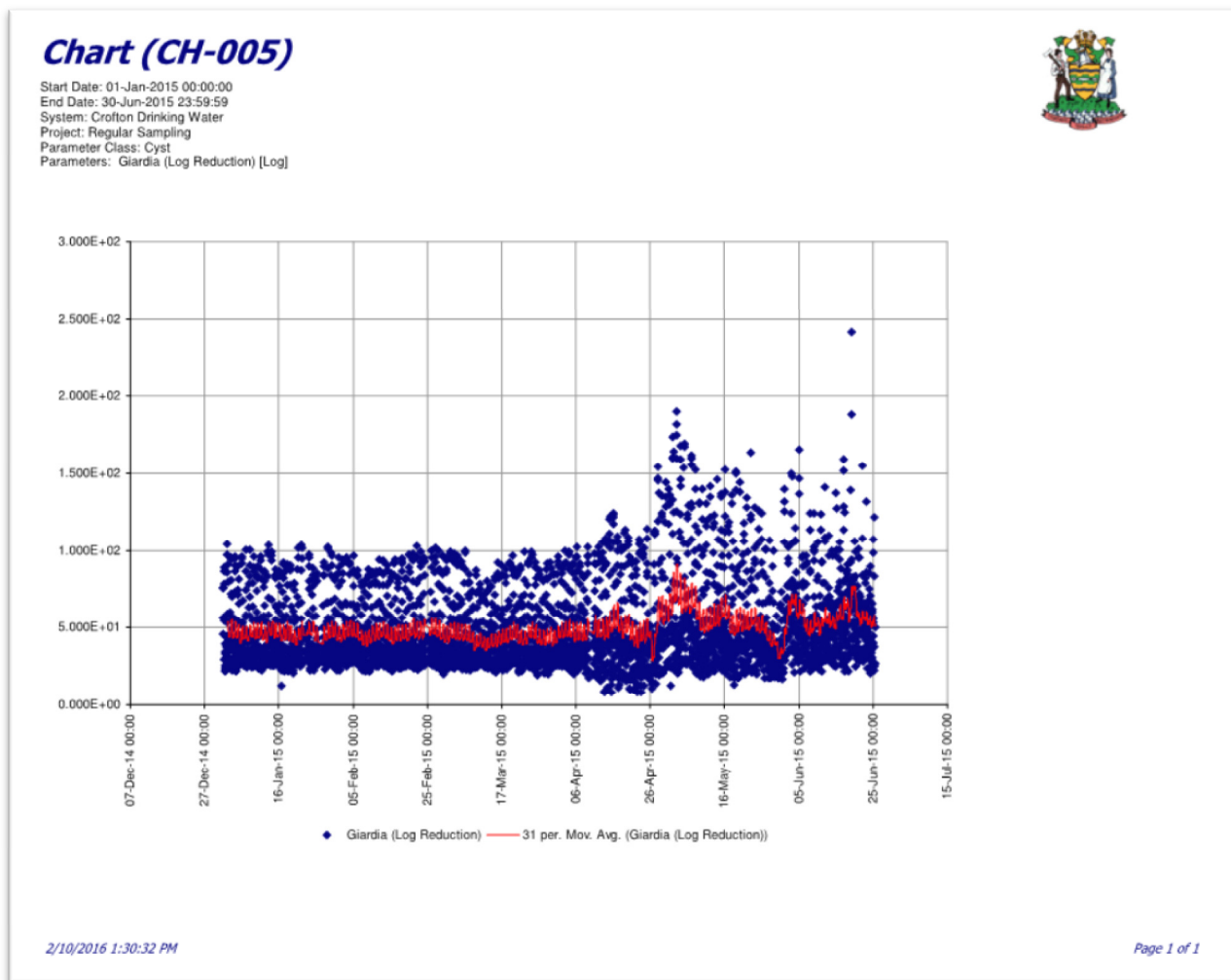
Item	Maximum (Cysts/100 L)
<b>Observed</b>	
- Quarter 1	0.000
- Quarter 2	No Data
- Quarter 3	0.000
- Quarter 4	No Data
<b>Annual</b>	0.000

**Table 9: Raw water maximum number of *Cryptosporidium* cysts by quarter.**

Item	Maximum (Cysts/100 L)
<b>Observed</b>	
- Quarter 1	0.000
- Quarter 2	No Data
- Quarter 3	0.000
- Quarter 4	No Data
<b>Annual</b>	0.000

**Table 10: Finished water *Giardia* cysts minimum log reduction by quarter.**

Item	Minimum (Log Reduction)	Percent of Samples in Compliance (%)
Compliance Requirement		100 > 1.5 Log
<b>Observed</b>		
- Quarter 1	12.849	100.00
- Quarter 2	8.149	100.00
- Quarter 3	14.648	100.00
- Quarter 4	15.287	100.00
<b>Annual</b>	8.149	100.00



**Figure 6: Finished water *Giardia* Log Reduction (Jan 1 to Jun 30).**

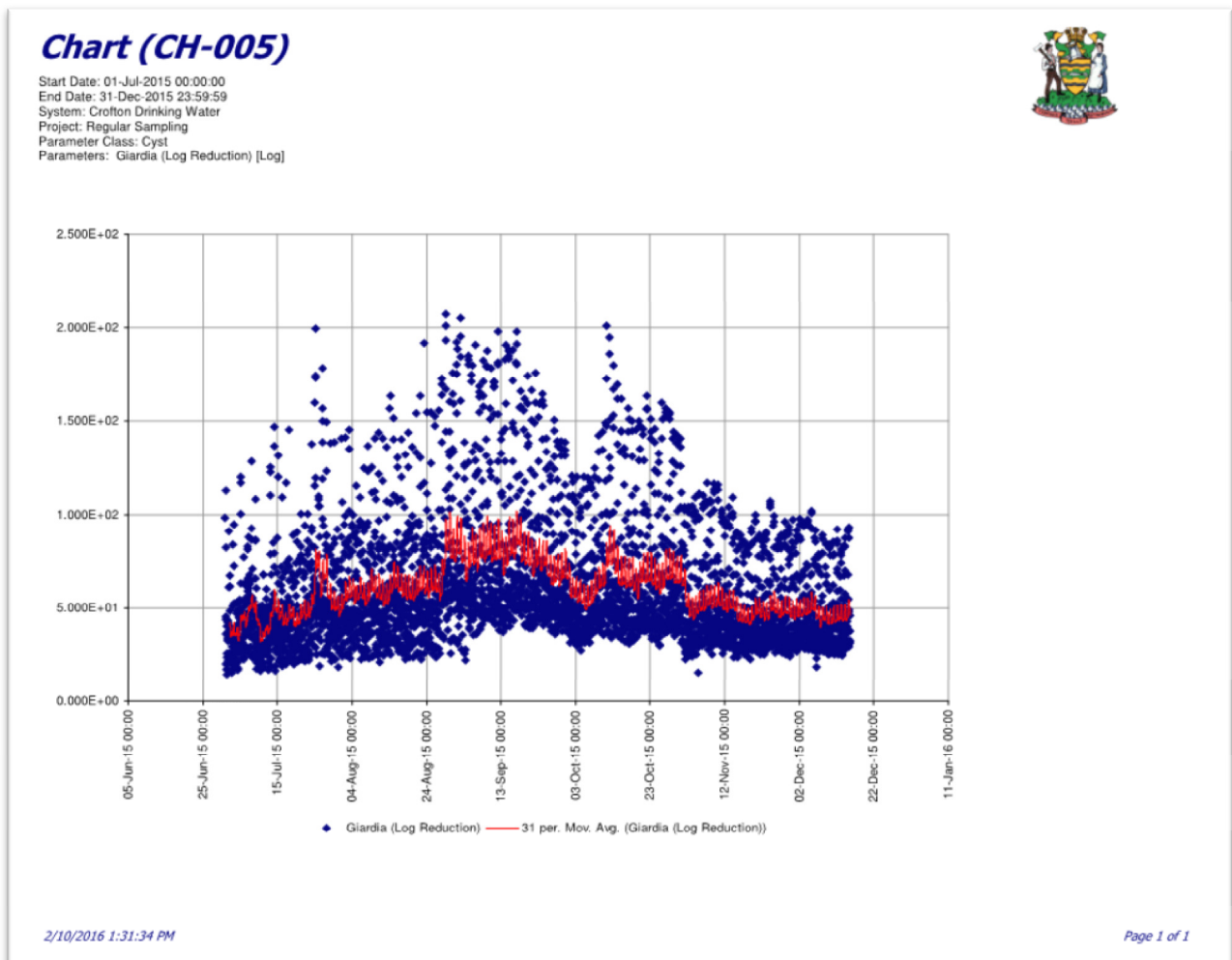


Figure 7: Giardia log reduction (July-Sept 30).

### 5.7 Total THMs

Table 11: Finished water maximum THMs by quarter [3].

Item	Maximum (ug/L)	Percent of Samples in Compliance (%)
CDWQG Requirements		100 % <= 100 ug/L
<b>Observed</b>		
- Quarter 1	No Data	No Data
- Quarter 2	No Data	No Data
- Quarter 3	No Data	No Data
- Quarter 4	No Data	No Data
<b>Annual</b>	No Data	No Data

[3] THMs are typically not an issue in this system as the water is filtered. THMs were not sampled for this reporting period.

## 5.8 Miscellaneous Items

**Table 12: Finished water miscellaneous parameters [4].**

Item	Compliance Assessment
Metals	All parameters meet CDWQG limits. See attached data.
Microorganisms	No limits exist. See attached data.
Algae	No limits exist. See attached data.
PAH	All parameters meet the CDWQG limits. See attached data.
Chemical [5]	All parameters meet the CDWQG limits. See attached data.

[4] Compliance standards for miscellaneous metals and chemicals vary depending on the substance.

[5] pH limits are not minimum or maximum acceptable limits; rather they are aesthetic objectives. The pH can be low, particularly where the water has limited buffering capacity and alum is used as a flocculent, as is the case for this water supply.

## 6 Additional Comments

Should you have any questions regarding this report, please do not hesitate to contact the Municipality at (250) 746-3100.

Sincerely



Clay Reitsma, M.Eng., P.Eng.  
Manager of Engineering (Infrastructure & Environment)

cc: Robert Bell, Assistant Manager of Operations (Utilities)  
Brian Houle, Catalyst Paper

CR/cr  
Enclosures