

# Tsawwassen First Nation

## 2022 Drinking Water Quality Monitoring Report

**May 2023**

Prepared by Darcy Dion

## **Executive Summary**

Tsawwassen First Nation (TFN) provides this report in fulfillment of the Drinking Water Protection Act, Section 15. This report outlines a summary of water quality testing results, water flows, as well as, system improvement actions, and plans.

A total of 86 samples were taken from the water distribution system during 2022 for Escherichia Coli, and total coliforms analyses. Quarterly samples were taken for disinfection by-products, and semi-annual samples were taken for metals and vinyl chloride. No samples exceeded the limits set out in the Drinking Water Protection Act and Regulation and the Guidelines for Canadian Drinking Water Quality. TFN is committed to delivery of water of the highest quality and will continue to make the necessary investments to ensure its continued success.

**Any questions regarding this report can be directed to Michael Murphy, Utilities Supervisor, at 604.868.3550 or [mmurphy@tsawwassenfirstnation.com](mailto:mmurphy@tsawwassenfirstnation.com).**



## Table of Contents

1.0 Introduction .....	3
2.0 Water Distribution System.....	4
Table 1 Sampling Locations .....	4
2.1 Facility Classification and Certifications .....	5
2.2 Connections and Population .....	5
3.0 Testing and Monitoring.....	5
3.1 Routine Monitoring .....	5
3.2 Sampling Parameters .....	6
Chlorine.....	6
Total Coliforms and E. Coli.....	6
Vinyl Chloride and Metals.....	6
Disinfection by-products (THMs and HAAs) .....	6
3.3 Sampling Locations & Frequency .....	7
3.4 Non-routine Monitoring.....	7
4.0 Water Quality Results .....	7
4.1 Coliform and Escherichia Coli Results .....	7
4.2 Sample Range and Chlorine Residual Results .....	9
4.3 Disinfection By Product (DBP) Results .....	10
Table 4 DPB Analyses and results .....	10
4.4 Metals Results .....	11
Table 5 Metals analyses and results .....	11
5.0 Flow Data .....	12
Figure 1 Monthly Water Usage 2021/2022 .....	12
6.0 Upgrades and Improvements .....	12
7.0 Summary .....	13
Appendix A.....	14
Distribution Map .....	14
.....	14
Figure 2 Distribution Map.....	14
References.....	15



## 1.0 Introduction

This report provides a summary of the Drinking Water Quality Monitoring Program during the 2022 calendar year for Tsawwassen First Nation's (TFN) Distribution System.

The supply of drinking water is governed by the Drinking Water Protection Regulation (pursuant to the Drinking Water Protection Act) and requires suppliers in British Columbia to:

1. Develop a process to notify the Drinking Water Officer (DWO) of situations or conditions that render or could render the water unfit to drink.
2. Implement a plan for collecting, shipping, and analyzing drinking water samples in compliance with the directives set by the DWO.
3. Implement a plan for reporting monitoring results to the DWO and to water users, including the preparation of an annual report.

TFN is required to hold an annual Operating Permit to monitor the water quality in the distribution system. Section 4 of this report provides a summary of the test results for 2022.

The 2022 Drinking Water Quality Monitoring Report provides a summary of TFN's water distribution system and discusses the monitoring results, performance, and improvements of the system.



## 2.0 Water Distribution System

An overview of the existing TFN water distribution system is available in [Appendix A](#) as a distribution map. The system services residential, commercial, and operation sites on TFN lands. Water quality is monitored at five sampling sites throughout the distribution network, summarized in Table 1:

**Note: W-6 Sample point was added in October 2022 after discussions with Fraser Health to increase our sample locations and frequency. Data for W-6 is only available beginning October 2022.**

Site	Location	Category	Flow Category	Description
W-1	101 Tsatsu Shores, Tsatsu Condo	Strata Residence	Dead End	Boiler Room
W-2	1926 Tsawwassen Drive Admin Office	TFN Facility	Medium	Lunchroom Tap
W-3	4515 Salish Sea Way	TFN Facility	Medium	Plant Lab Tap
W-4	4786 Fisherman way	TFN Sample Point	Medium	Sample Station
W-5	Falcon Way, Lands Office	TFN Facility	Dead End	Lunchroom Tap
W-6	27B Avenue	TFN Sample Point	Dead End	Sample Station

*Table 1 Sampling Locations*

Drinking water is supplied to TFN by Metro Vancouver and the Corporation of Delta. Two primary connections to the Metro Vancouver South Delta 350mm trunk watermain are located along 52<sup>nd</sup> Street. Two additional connections to a 450mm trunk main owned by Delta are located on Highway 17.

The connection south of Salish Sea Drive services the Big Splash Waterpark, while the connection at Tsawwassen Drive north of highway 17 is a back up. There are also two areas where TFN is directly serviced by Delta’s water system located at Pacific Drive and Tsawwassen Beach Road. The areas serviced by Delta are not part of this monitoring report as their operation and maintenance is provided by the Corporation of Delta.

The main distribution system is comprised of pipes ranging in size from 150mm diameter to 500mm and consists of PVC and HDPE materials.



## 2.1 Facility Classification and Certifications

Under the Environmental Operator's Certification Program, TFN is classified as a Level II Water Distribution System. There are currently two operators and one supervisor who oversee day to day operations regarding maintenance, water quality, sampling, etc.

Mike Murphy, Supervisor – Level II Water Distribution

Roberto Di Lorenzo, Operator – Level II Water Distribution

Darcy Dion, Operator – Level I Water Distribution

## 2.2 Connections and Population

Currently, Tsawwassen First Nation has about 950 water service connections, that provide water to a population of about 3,900. This does not include the Stahaken subdivision as the water system in this area is operated and managed by Delta. Of these 950 connections, approximately 35 are commercial and 915 are residential.

## 3.0 Testing and Monitoring

Drinking water quality varies from place to place and is dependent on the condition of the source water and the degree of treatment it receives. As a result, water quality monitoring is performed throughout all stages of its supply from source to tap. While Metro Vancouver carries out testing of water at the source and after treatment, TFN's Drinking Water Quality Monitoring Program (DWQMP) is focused on the water quality within our own distribution system. No additional treatment is provided to the water at TFN.

The DWQMP consists of routine monitoring to obtain an accurate overview of water quality within the distribution system. The program also includes non-routine monitoring for handling complaints and emergency situations. Monitoring includes two components: safe, representative collection of the sample, and accurate laboratory analysis. The analyses are performed by the BCCDC Public Health Laboratory and by the Metro Vancouver Water Laboratory.

### 3.1 Routine Monitoring

The collection of water samples is performed by certified TFN staff and forwarded to a qualified lab for the analysis of Total Coliforms, E. coli, vinyl chloride, and metals. All microbiological and chemical analyses were conducted by laboratories that have been approved by the Canadian Association of Environmental Analytical Laboratories or an equivalent certification program. Results of the analyses are reported by the Fraser Health Authority.

## 3.2 Sampling Parameters

The significance of the parameters is briefly discussed below. Further details can be found by accessing the supporting documents of the Guidelines for Canadian Drinking Water Quality (GCDWQ) through the following web site, <http://www.hc-sc.gc.ca/ewh-semt/water-eau/drink-potab/guide/index-eng.php>, or by contacting Health Canada at (613) 957-2991.

### Chlorine

Chlorine is added to drinking water prior to entry into TFN by Metro Vancouver. Chlorine is necessary to ensure water stays disinfected and to avoid pathogens developing in water mains, we verify this by testing chlorine residuals. Chlorine residuals in the distribution system must be above 0.2mg/L, including dead ends. At no point did the chlorine residual in TFN drop below 0.4mg/L, and typically is above 0.60mg/L. Watermain flushing is conducted twice per year throughout TFN's distribution system to ensure optimal chlorine residuals.

### Total Coliforms and E. Coli

One of the primary concerns in water quality is the growth of coliform bacteria. The presence of total coliforms could indicate that treatment is inadequate, the distribution system is experiencing regrowth, or infiltration to the system is occurring. Escherichia coli, (a species in the fecal coliform group) is a definite indicator of the presence of contamination within the distribution system.

### Vinyl Chloride and Metals

Samples for Metals and Vinyl chloride are taken twice per year. Vinyl chloride is a manufactured substance that does not occur naturally, however, it can be formed in the environment when other manufactured substances are broken down by certain microorganisms. Vinyl chloride can enter the environment from manufacturing or processing plants which release to the air or into wastewater. This substance is harmful to humans in that it is carcinogenic and causes damage to the liver and central nervous system. Metals are usually present in trace amounts in natural waters, but many of them are toxic even at low concentrations. Quarterly, samples were taken for metals in our drinking water. Neither vinyl chloride or metals samples exceeded the MAC or AO for drinking water quality.

### Disinfection by-products (THMs and HAAs)

Samples for disinfection by-products are taken four times per year. Trihalomethanes (THMs) and haloacetic acids (HAAs) are the two major groups of carcinogenic disinfection by-products (CDBPs). The concentrations of these contaminants can be used as indicators of the total loading of all CDBPs which may be found in drinking water supplies. Essentially, CDBPs can be formed when high



amounts of organic matter are present in water during the chlorination process. Effective water treatment strategies prior to disinfection help mitigate potential formation of CDBPs.

### **3.3 Sampling Locations & Frequency**

Sampling locations throughout TFN are detailed in [Table 1](#) of Section 2. The distribution system map is available in [Appendix A](#) while [Appendix B](#) contains the results of the testing conducted throughout the year.

In 2018, the sampling sites were amended by Fraser Health to reduce the number of residential homes on the sampling program. There is now only one “residence” within the sampling program, which is crucial as it is a dead end in the system.

In 2022, the sampling program was increased from 5 sampling locations to 6 at an increased frequency from once per calendar month to once every two weeks. This amendment took place after discussions with Fraser Health officer due to increased population and to ensure water quality at a dead end in the water system.

### **3.4 Non-routine Monitoring**

Consumer complaints are recorded so that water quality concerns can be tracked and responded to efficiently. The parameters to be sampled for depend on the nature of the complaint. In any emergency, the procedures outlined in the TFN Emergency Response Plan were followed. There were no reported events in 2022 that required emergency sampling.

## **4.0 Water Quality Results**

There were 86 samples collected from the water distribution system in 2022. No samples exceeded the limits set out in the BC Drinking Water Protection Regulation (BCDWPR) and the GCDWQ. The sample analysis results are summarized in [Table 2](#) below.

### **4.1 Coliform and Escherichia Coli Results**

The BCDWPR requires that (1) no sample should contain fecal coliform and Escherichia coli (E. Coli) and that (2) samples should contain more than 10 total coliforms per 100 millilitre or not more than 10% of samples from the distribution system in each calendar month should show the presence of total coliform Bacteria.

Of the 86 samples analysed for microbiological criteria in 2022, no E. coli or total coliforms were detected. All colony forming units (CFU) were reported as <1 CFU/100mL. Therefore, all samples met the water quality requirements of the BCDWPR.





Sample Station	Samples Tested	Total Coliform CFU/100mL			E. Coli CFU/100mL			Positive Coliform Tests	Positive E. Coli Tests
		Low	Average	High	Low	Average	High		
W-1	12	<1	N/A	<1	<1	N/A	<1	None	None
W-2	12	<1	N/A	<1	<1	N/A	<1	None	None
W-3	12	<1	N/A	<1	<1	N/A	<1	None	None
W-4	12	<1	N/A	<1	<1	N/A	<1	None	None
W-5	12	<1	N/A	<1	<1	N/A	<1	None	None
W-6	5	<1	N/A	<1	<1	N/A	<1	None	None

*Table 2 Coliform Testing Results*

*\*Samples for W-6 commenced in October 2022 after discussions with Fraser Health Officer*



## 4.2 Sample Range and Chlorine Residual Results

The following Table 3 details the samples obtained throughout the 2022 year and their respective free chlorine residual results in mg/L:

Date	W-1	W-2	W-3	W-4	W-5	W-6
20-Jan-22	0.92	0.89	0.81	0.68	0.95	
17-Feb-22	0.45	0.66	0.81	0.53	0.69	
22-Mar-22	0.58	0.61	0.8	0.6	0.87	
21-Apr-22	0.6	0.71	0.78	0.67	0.61	
19-May-22	0.61	0.63	0.71	0.62	0.67	
16-Jun-22	0.54	0.57	0.7	0.67	0.67	
28-Jul-22	0.67	0.64	0.73	0.68	0.75	
25-Aug-22	0.59	0.59	0.87	0.66	0.75	
22-Sep-22	0.69	0.63	0.74	0.62	0.74	
6-Oct-22	0.47	0.59	0.67	0.62	0.63	0.4
20-Oct-22	0.55	0.62	0.68	0.63	0.72	0.66
3-Nov-22	0.61	0.57	0.7	0.56	0.62	0.52
17-Nov-22	0.59	0.75	0.79	0.56	0.8	0.59
30-Nov-22	0.59	0.75	0.79	0.56	0.8	0.63
15-Dec-22	0.64	0.7	0.76	0.63	0.84	0.7
21-Dec-22	0.71	0.69	0.82	0.56	0.79	0.63

*\*Sample frequency increased, and additional sample point added October 2022*

Table 3 Sample Range and Chlorine Residual (mg/L) Results

### 4.3 Disinfection By Product (DBP) Results

TFN-832 4515 Salish Sea Way		Q1	Q2	Q3	Q4
Analyses	Units	17-Feb-22	10-May-22	22-Aug-22	15-Nov-22
Bromodichloromethane	ppb	<1	<1	<1	1
Bromoform	ppb	<1	<1	<1	<1
Chlorodibromomethane	ppb	<1	<1	<1	<1
Chloroform	ppb	22	24	26	26
THM-Total Trihalomethanes	ppb	23	25	26	28
Dibromoacetic Acid	µg/L	<0.5	<0.5	<0.5	<0.5
Dichloroacetic Acid	µg/L	11	13	10	6.8
Monobromoacetic Acid	µg/L	<0.5	<0.5	<0.5	<0.5
Monochloroacetic Acid	µg/L	<0.5	2.6	0.8	0.6
Trichloroacetic Acid	µg/L	8.4	9	7.4	5.5
HAA - Total Haloacetic Acid	µg/L	19	24	19	13
pH	pH	8	8.1	8.2	8.0

*Table 4 DPB Analyses and results*

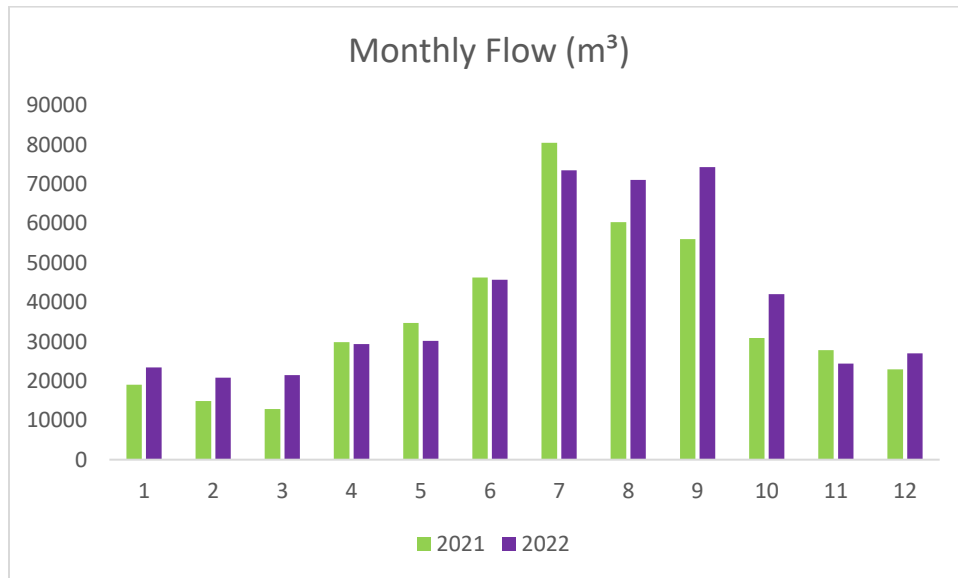
## 4.4 Metals Results

TFN-834 4786 Fisherman Way			
Analyses	Units	3-May-22	3-Nov-22
Aluminum Total	µg/L	27	32
Antimony Total	µg/L	<0.5	<0.5
Arsenic Total	µg/L	<0.5	<0.5
Barium Total	µg/L	2.3	2.8
Boron Total	µg/L	<10	<10
Cadmium Total	µg/L	<0.2	<0.2
Calcium Total	µg/L	8310	7330
Chromium Total	µg/L	<0.05	0.06
Cobalt Total	µg/L	<0.5	<0.5
Copper Total	µg/L	0.9	1.2
Iron Total	µg/L	9	22
Lead Total	µg/L	<0.5	<0.5
Magnesium Total	µg/L	191	214
Manganese Total	µg/L	2.9	5.8
Mercury Total	µg/L	<0.05	<0.05
Molybdenum Total	µg/L	<0.5	<0.5
Nickel Total	µg/L	<0.5	<0.5
Potassium Total	µg/L	153	212
Selenium Total	µg/L	<0.5	<0.5
Silver Total	µg/L	<0.5	<0.5
Sodium Total	µg/L	1610	2580
Zinc Total	µg/L	<3.0	<3.0

Table 5 Metals analyses and results

## 5.0 Flow Data

The total annual flow for 2022 to TFN was 483,551m<sup>3</sup>. Compared to 2021's water usage, this is an increase of 47,356 m<sup>3</sup>. There are two flow meters along 52<sup>nd</sup> Avenue which indicate total flow received from Metro Vancouver. The chart below demonstrates the monthly water usage comparison between 2021 and 2022:



*Figure 1 Monthly Water Usage 2021/2022*

## 6.0 Upgrades and Improvements

In 2022, various construction projects have added growth to our community and water system. More townhomes and homes have brought greater population and demand to areas which have otherwise been low water use zones.

In 2023, there will be even more townhomes, apartments and detached homes becoming occupied, including Phase 1 of three six story apartment buildings. Developers of these areas are now required to install dedicated sample stations, as well.

Construction of townhomes, apartments, and detached home developments have brought greater population and increased demand to areas which have otherwise been low water use zones. This has aided in ensuring water quality by eliminating stagnant sections of watermain.

Implementation and active use of our maintenance program, Lucity, has been beneficial in tracking water distribution maintenance. We track and record all flushing, repairs, and upgrades to our water system. Lucity ensures our flushing is completed within an acceptable time frame twice per year.

## 7.0 Summary

Tsawwassen First Nation (TFN) provides this report in fulfillment of the Drinking Water Protection Act. This report outlines a summary of water quality testing, monitoring, and improvements for ensuring water quality for the 2022 calendar year.

86 samples were taken from the water distribution system, all of which were compliant with the limits set out in the Drinking Water Protection Regulation Sections 2 and 9, Schedule A and Section 8, Schedule B. Each month, 1 sample was taken at each of the 5 sample points throughout the distribution system, this is above the required minimum of 4 samples per month.

Improvements to the TFN water distribution system in 2023 will aid in maintaining water quality. Administrative and operations measures, controls, and procedures have also been implemented to maintain compliance, exceed regulatory requirements, and ensure clean and safe drinking water is delivered to all consumers within Tsawwassen First Nations' water distribution system.



# Appendix A

## Distribution Map

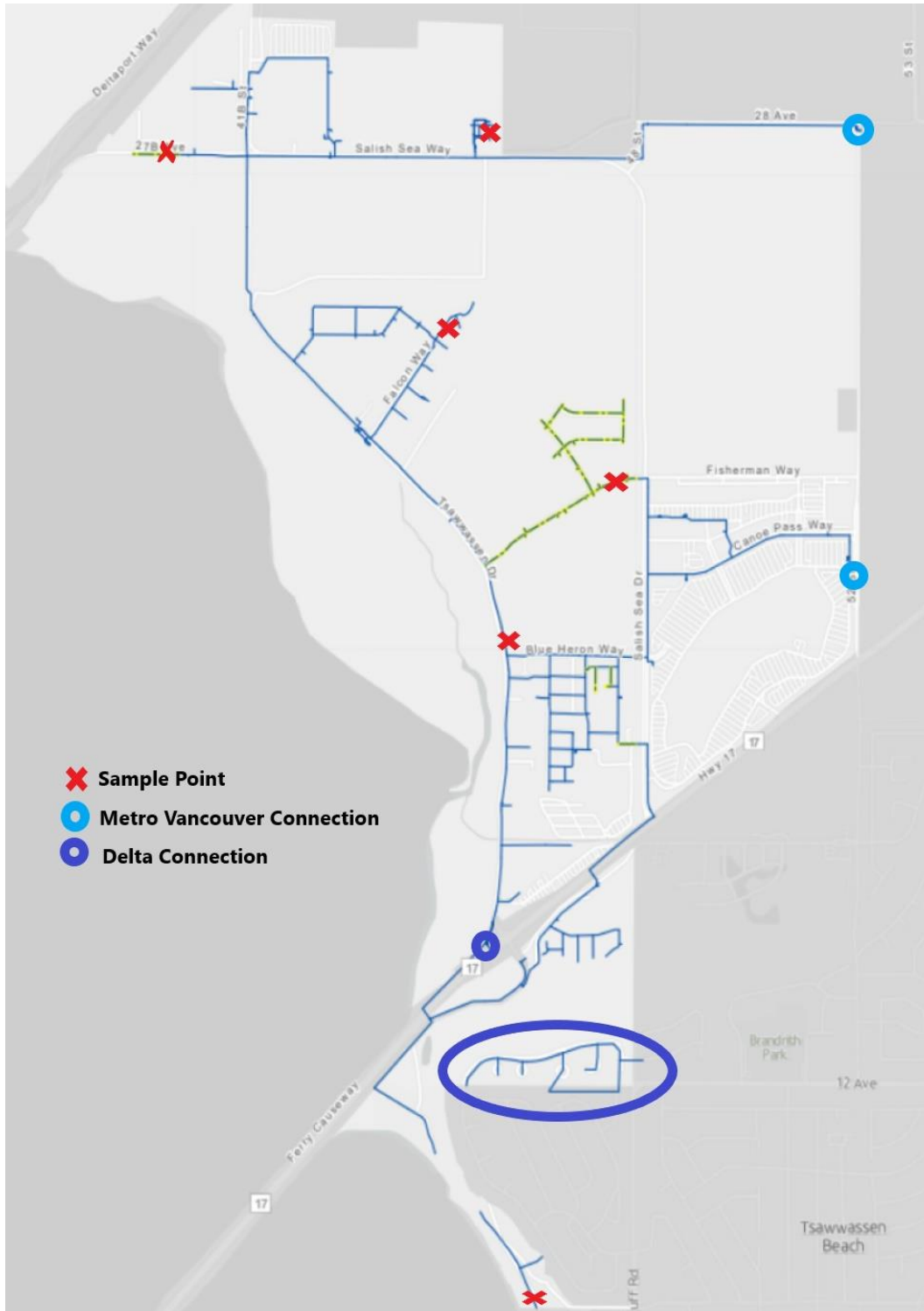


Figure 2 Distribution Map



## References

1. [British Columbia Drinking Water Protection Act](#)
2. [British Columbia Drinking Water Regulation](#)
3. Water Quality Monitoring and Reporting Plan for the GVRD and Member Municipalities <http://www.metrovancouver.org/services/water/quality-treatment-testing/quality-and-testing/Pages/default.aspx>
4. [Guidelines for Canadian Drinking Water Quality \(October 2014\)](#)





# Metals in Drinking Water – “Flush” Message



February 1, 2021

Water System Operators

## **Re: Metals in Drinking Water – “Flush” Message in Annual Reports**

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Fraser Health has recently revised its metals at the tap “Flush” message and we are asking all water systems to please include the following health message with your next annual reports to your users.

***Anytime the water in a particular faucet has not been used for six hours or longer, “flush” your cold-water pipes by running the water until you notice a change in temperature. (This could take as little as five to thirty seconds if there has been recent heavy water use such as showering or toilet flushing. Otherwise, it could take two minutes or longer.) The more time water has been sitting in your home’s pipes, the more lead it may contain.***

***Use only water from the cold-tap for drinking, cooking, and especially making baby formula. Hot water is likely to contain higher levels of lead.***

***The two actions recommended above are very important to the health of your family. They will probably be effective in reducing lead levels because most of the lead in household water usually comes from the plumbing in your house, not from the local water supply.***

***Conserving water is still important. Rather than just running the water down the drain you could use the water for things such as watering your plants.***

If you have any questions, please contact our Drinking Water Program at 604-870-7903.

Sincerely,

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Health Protection

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