

2023
DRINKING WATER QUALITY ANNUAL REPORT

VERSION 1 SUBMITTED TO VCH 26 JUNE 2024
VERSION 2 SUBMITTED TO VCH 23 JAN 2025
VERSION 3 SUBMITTED TO VCH 25 JUNE 2025

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1. EXECUTIVE SUMMARY

The Village of Lions Bay is a British Columbia municipality of 1400 residents, located midway between Vancouver and Squamish on the steep eastern slopes of Howe Sound. Unlike most of the other 22 jurisdictional members of the Metro Vancouver Regional District which receive drinking water from the Greater Vancouver Water District, Lions Bay operates its own water supply and treatment system.

The foundation for delivering safe drinking water is the use of multiple barriers to limit exposure to hazards. Lions Bay's drinking water supply originates from rainfall, snowmelt and groundwater flows in creeks above the village. Source water protection barriers are described in detail in the municipality's Source Water Protection Plan: in summary, raw water is drawn on demand at weirs on Harvey and Magnesia Creeks, and piped by gravity to two ultraviolet/chlorination plants for treatment and distribution through 16.1 km of watermains to approximately 560 residences, one 35-student school, three multi-family structures (15 total dwellings), three commercial accounts (a café/store, a marina, a marine service centre) and a dozen municipal facilities and parks.

To quantify water quality, samples are drawn throughout the year from multiple locations in the treatment and distribution system.

In 2023, the municipality met the *Drinking Water Protection Regulation* that no treated water sample be positive for *E. coli* and that "in each 30-day period, over 90 percent of…samples [had] zero Total Coliform, and no sample [had] more than 10 Total Coliform per 100 millilitres" (in fact, no treated water sample tested positive for Total Coliform).

The municipality also monitors unregulated water parameters including pH (acidity), chemicals, metals and more, according to recommendations from:

- The Health Canada *Guidelines for Drinking Water Quality;*
- The Drinking Water Officer assigned to Lions Bay;
- World Health Organisation (WHO) and U.S. Environmental Protection Agency (USEPA), where there are no Health Canada recommendations for given parameters.

In 2023, the municipality met all recommended limits for pH, chemicals and metals.

2. INTRODUCTION

Lions Bay operates as a Municipal Water Utility under the *Local Government Act,* the *Drinking Water Protection Act* and the *Drinking Water Protection Regulation*, which collectively obligate the municipality to:

- Operate the utility under operating permit(s) issued by the Ministry of Health Services;
- Engage in water quality monitoring;
- Prepare [this] annual report on water quality for the year.

Administration and enforcement of the regulations falls to regional Health Authorities, which are represented by Drinking Water Officers. Lions Bay's health authority is Vancouver Coastal Health (VCH).

The kilogram, the SI unit of mass, was originally defined as the mass of a litre volume of water. Concentrations for water solutions and suspensions stated in mass per volume measures such as milligrams per litre (mg/l) therefore happen to be effectively equivalent to volume per volume measures such as parts per million (ppm). For rigour, concentrations are reported herein in mass per volume units, typically mg/ℓ or µg/ℓ (micrograms per litre), even if they are traditionally reported in ppm.

This report provides a synopsis of the year's water quality testing and the municipality's water treatment and distribution measures to protect and enhance drinking water quality. Per Treatment Plant Operating Permits, this report is due no later than six months from the end of the prior calendar year reporting period, with the 2023 report being submitted on 26 June, 2024.

With low economies of scale, Lions Bay drinking water is expensive: the 2023 water operating budget was $1,054,000, approximately 28 percent of the total municipal operating budget before amortisation. The water budget is funded by flat annual utility fees on several classes of user, averaging $1945 each.

Since the 2022 reporting year, the VCH Medical Health Officer has required the following letter to be included in Annual Reports:

Vancouver Coastal Health
800 – 601 West Broadway
Vancouver, BC V5Z 4C2

May 12th, 2022

Water System Operators

Re: Metals in Drinking Water – "Flush" Message in Annual Reports

Vancouver Coastal Health (VCH) is requiring all water systems to include the following health message with your next annual reports to your users:

> ***Contamination of drinking water with Lead can have health impacts over time, and in BC the source is most likely to be plumbing fixtures within a building. 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 you closest Drinking Water Officer noted below.

Sincerely,

Dr. Michael Schwandt
Medical Health Officer
Vancouver Coastal Health

- (604) 983-6793 Central Coast
- (604) 983-6793 North Shore
- (604) 485-3310 Powell River
- (604) 233-3147 Richmond
- (604) 885-5164 Sechelt
- (604) 892-2293 Squamish
- (604) 675-3800 Vancouver
- (604) 932-3202 Whistler

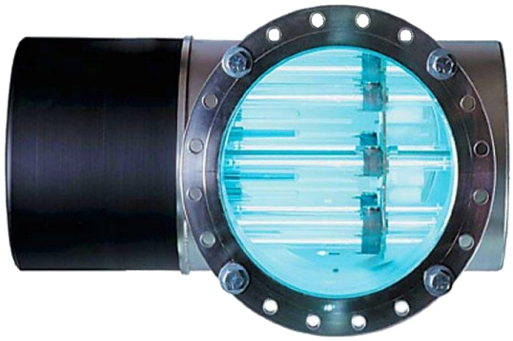
3. SOURCE WATER

At weirs on the creeks, water is screened for rocks, branches and leaves, and then flows by gravity to the Harvey and Magnesia Treatment Plants. The *Village of Lions Bay Source Water Protection Plan* provides further details on Lions Bay's source water.

4. TREATMENT

Parameter	Magnesia Plant	Harvey Plant
VCH Operating Permit	Facility 3317552347	Facility 3317552348
Environmental Operators Certification Program (EOCP) classification	Class I Water Treatment Facility, certification renewed in 2023 and valid until November 16, 2028	
Storage	100,000 iG nominal (125,000 USG, 470,000 ℓ actual)	500,000 iG nominal (625,000 USG, 2,370,000 ℓ actual)

4.1 PRIMARY TREATMENT – UV DISINFECTION



Both treatment plants use ultraviolet and chlorine treatment to respectively inactivate bacterial and viral pathogens, and to prevent regrowth in the distribution system. Incoming raw water flows through ultraviolet (UV) reactor chambers in which light alters microorganisms' cell DNA, preventing their reproduction. UV is very effective against chlorine-resistant *Giardia* and *Cryptosporidium* protozoa, and against bacteria. UV reactors automatically adjust lamp intensity to maintain the required UV dose and when adequate dosing cannot be maintained, flow stops and the system alarms.

4.2 SECONDARY TREATMENT – CHLORINE

Past the UV stage, water is injected with aqueous sodium hypochlorite, the same substance used to disinfect swimming pools, and the active ingredient of bleach. Sodium hypochlorite hydrolyses in aqueous solution to HOCl (hypochlorous acid) and the hypochlorite (OCl^-) ion, which in aqueous solution disrupt microorganism respiration and reproduction. "Hypo" is used worldwide as a safe, inexpensive and effective barrier against viruses that cause cholera, polio, typhoid, hepatitis, enteric and other waterborne diseases. The following Frequently Asked Questions (distilled from HealthLink BC and Minnesota Dept. of Health source material) speak to some aspects of using chorine for water treatment.

What is chlorine?

Chlorine is a common element in nature, usually found combined with other elements. The largest amount of chlorine on earth is in the oceans as sodium chloride, salt. Salt and water are used to manufacture the chlorine used to treat drinking water.

Why is chlorine added to drinking water?

Water producers add chlorine to drinking water as a versatile disinfectant to protect public health. Chlorine kills many bacteria, viruses and parasites that cause water-borne infections, illnesses and even death.

How long has chlorine been used to disinfect water?

Chlorine disinfectants were first added to a public water supply in North America in 1908. By the 1920s, thousands of cities worldwide were using chlorine disinfectants to treat drinking water. There was a drastic reduction in water-borne infections such as typhoid fever and cholera. Infant mortality also declined. Most cities or towns in Canada now use chlorine disinfectants to treat drinking water.

How is chlorine added to drinking water?

There are different chlorine products and each is added to water using a different approach. These products can be solid, liquid or gas, but once added to water they all work in a similar way and get the generic label of "chlorine." Water suppliers choose the product used based on factors such as cost, source water, size of the water system and whether other forms of treatment are needed.

What is secondary disinfection?

After being disinfected in a treatment plant, water travels through the distribution system to users. In some cases, pipes can leak or break and contaminate the water. Chlorine disinfectants protect water against this contamination too.

Can water suppliers use anything else to disinfect drinking water?

Ultraviolet (UV) light and ozone are also used to disinfect drinking water. These do not give protection against contamination from the pipes water travels through, which is why chlorine is still used.

Can the chlorine added to drinking water be harmful?

Chlorine is dangerous in very high concentrations but there is no evidence that it is harmful to people in the concentrations used to disinfect drinking water.

Are chlorine by-products harmful?

When chlorine is added to water it reacts with any organic content and creates chlorine by-products. Health Canada sets limits for chlorine by-products, and current scientific data show that the benefits of chlorination are much greater than any health risks from by-products.

What can be done about the chlorine taste and smell?

- *Put a pitcher of water in the refrigerator and let it sit uncovered for a few hours. This will allow the chlorine smell to leave the water.*
- *Use cold water for all drinking water. Cold water has fewer taste and smell concerns. Using cold water also makes the water less likely to absorb lead and copper from plumbing.*
- *Use a filter.*
    - *Most common point-of-use filters (e.g. pitcher filters) will remove chlorine taste and smell.*

- *Granular activated carbon filters will remove chlorine taste and smell. They can be more effective but are usually more expensive than point-of-use filters. They can be installed either at the tap/sink or as whole-house filters. All water treatment units require regular maintenance to work properly. Water treatment units that are not properly maintained will lose their effectiveness over time. In some cases, unmaintained units can make water quality worse.*

4.3 TERTIARY TREATMENT – SAMPLING AND ANALYSIS

Treatment and testing assure drinking water quality within the municipal system, although end-user water quality also depends on premise plumbing, especially pipe material and condition, as well as standing time and temperature. Every workday, municipal staff draw water samples at 10 locations to test in-house for turbidity and chlorine residual. One sample a week is sent to the VCH central laboratory for *E. coli* and Total Coliform testing. More extensive bi-annual testing at an accredited third-party lab is conducted for general water chemistry, metals and other contaminants. There are 13 total sample locations:

Sample Location	**Usual Source (under conventional operations)**	**Free chlorine**	**Turbidity**	**Bacteriological**	**Metals, chemicals**
Harvey Plant raw	Harvey Creek raw	NA: before chlorination	Daily	Weekly	Biannual
Harvey Tank treated	Harvey Plant	Daily	Daily	Weekly	Biannual
PRV-3 (Highway Tank)		Daily	Daily	Weekly	NA: mid-system
Store/Cafe sink		Daily	Daily	Weekly	Biannual
Lions Bay Avenue cul-de-sac		Daily	Daily	Weekly	Biannual
Kelvin Grove cul-de-sac		Daily	Daily	Weekly	Biannual
Harvey UV Reactor (pre chlorination)		NA: before chlorination	NA: same water as Harvey Plant	Monthly	NA: same water as Harvey Plant
Community Centre (municipal offices)		None		Biannual only	
Lions Bay Beach Park		None		Biannual only	
Magnesia Plant raw	Magnesia Creek raw	NA: before chlorination	Daily	Weekly	Biannual
Magnesia Tank treated	Magnesia Plant	Daily	Daily	Weekly	Biannual
PRV-5 north Bayview		Daily	Daily	Weekly	NA: mid-system
Brunswick Beach cul-de-sac		Daily	Daily	Weekly	Biannual

Sample Location	Usual Source (under conventional operations)	Free chlorine	Turbidity	Bacteriological	Metals, chemicals
Magnesia UV Reactor pre chlorination		NA: before chlorination	NA: same water as Magnesia Plant	Monthly	NA: same water as Magnesia Plant

In consultation with VCH, the municipality's response to unexpected results depends on the significance of the parameter and how out of range it is, as outlined in SITUATION PROTOCOLS starting on p.35.

Lions Bay's last boil water advisory was in December 2014.

BACTERIOLOGICAL ANALYSIS

The *Drinking Water Protection Regulation* requires routine sampling and testing for *E. coli* and Total Coliform bacteria. Named for discoverer Theodor von Escherich, *Escherichia coliform* or *E. coli* is a group of bacteria that form in the colon of warm-blooded animals, particularly mammals, and also birds. Presence of *E. coli* in a water sample indicates recent fecal contamination, and thus the possible presence of additional disease-causing bacteria, viruses and protozoa. The *Drinking Water Protection Regulation* standard for *E. coli* in treated water is None Detectable; **in 2023, no treated water sample tested positive for *E. coli*, as follows.**

Total Coliform measures a wider group of bacteria with similar characteristics to *E. coli*. Members of this group range from being fecal-specific, to those widely distributed in water, soil and vegetation. The *Drinking Water Protection Regulation* standards for Total Coliform for systems with more than 1 sample taken per month require at least 90 percent of samples with no detectable Total Coliform bacteria per 100 ml; and no one sample with more than 10 Total Coliform bacteria per 100 ml; **in 2023, no treated water sample tested positive for Total Coliform, as follows.**

2023 sample dates	Days since last	TREATED WATER SAMPLE LOCATION (based on operational needs[1] sampled water can be from the Harvey or Magnesia System)																			
		Harvey UV reactors		Harvey Tank		PRV-3		Store/Café		Lions Bay Ave.		Kelvin Grove		Magnesia UV reactors		Magnesia Tank		PRV-5		Brunswick	
		Total Coliform (TC) and *E. coli*, colony-forming units per 100 ml																			
		TC	*E. coli*	TC	*E. coli*	TC	*E. coli*	TC	*E. coli*	TC	*E. coli*	TC	*E. coli*	TC	*E. coli*	TC	*E. coli*	TC	*E. coli*	TC	*E. coli*
Wed. Jan 04	4	<1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Mon. Jan 09	5			< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1			< 1	< 1	< 1	< 1	< 1	< 1
Mon. Jan 16	7	NS	NS	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	NS	NS	< 1	< 1	< 1	< 1	< 1	< 1
Mon. Jan 23	7			< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1			< 1	< 1	< 1	< 1	< 1	< 1
Mon. Jan 30	7			< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1			< 1	< 1	< 1	< 1	< 1	< 1
Mon. Feb 06	7	<1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Mon. Feb 13	7			< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1			< 1	< 1	< 1	< 1	< 1	< 1
Tue. Feb 21	8	NS	NS	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	NS	NS	< 1	< 1	< 1	< 1	< 1	< 1
Wed. Mar 01	8			< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1			N/A	N/A	< 1	< 1	< 1	< 1
Mon. Mar 06	5			< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1			< 1	< 1	< 1	< 1	< 1	< 1
Mon. Mar 13	7	<1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	N/A	N/A	< 1	< 1	< 1	< 1	< 1	< 1
Mon. Mar 20	7	NS	NS	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	NS	NS	< 1	< 1	< 1	< 1	< 1	< 1
Mon. Mar 27	7			< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1			< 1	< 1	< 1	< 1	< 1	< 1
Mon. Apr 03	7	<1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Tue. Apr 11	8			< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1			N/A	N/A	< 1	< 1	< 1	< 1
Mon. Apr 17	6	NS	NS	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	NS	NS	< 1	< 1	< 1	< 1	< 1	< 1
Mon. Apr 24	7			< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1			< 1	< 1	N/A	N/A	< 1	< 1
Mon. May 01	7	<1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Mon. May 08	7			< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1			< 1	< 1	< 1	< 1	< 1	< 1
Mon. May 15	7	NS	NS	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	NS	NS	< 1	< 1	< 1	< 1	< 1	< 1
Mon. May 23	8			< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1			< 1	< 1	< 1	< 1	< 1	< 1
Mon. May 29	6			< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1			< 1	< 1	< 1	< 1	< 1	< 1
Mon. Jun 05	7	<1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Mon. Jun 12	7			< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1			< 1	< 1	< 1	< 1	< 1	< 1
Mon. Jun 19	7	NS	NS	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	NS	NS	< 1	< 1	< 1	< 1	RMFL	RMFL
Mon. Jun 26	7			< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1			< 1	< 1	< 1	< 1	< 1	< 1
Tue. Jul 04	8	<1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Thu. Jul 13	9			< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1			< 1	< 1	< 1	< 1	< 1	< 1
Mon. Jul 17	4	NS	NS	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	NS	NS	< 1	< 1	< 1	< 1	< 1	< 1
Mon. Jul 24	7			< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1			< 1	< 1	< 1	< 1	< 1	< 1
Mon. Jul 31	7			< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1			< 1	< 1	< 1	< 1	< 1	< 1
Tue. Aug 08	8	<1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Mon. Aug 14	6			< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1			< 1	< 1	< 1	< 1	< 1	< 1
Mon. Aug 21	7	NS	NS	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	NS	NS	< 1	< 1	< 1	< 1	< 1	< 1
Mon. Aug 28	7			< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1			< 1	< 1	< 1	< 1	< 1	< 1
Tue. Sep 05	8	<1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Mon. Sep 11	6	NS	NS	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	NS	NS	< 1	< 1	< 1	< 1	< 1	< 1
Mon. Sep 18	7			< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1			< 1	< 1	< 1	< 1	< 1	< 1

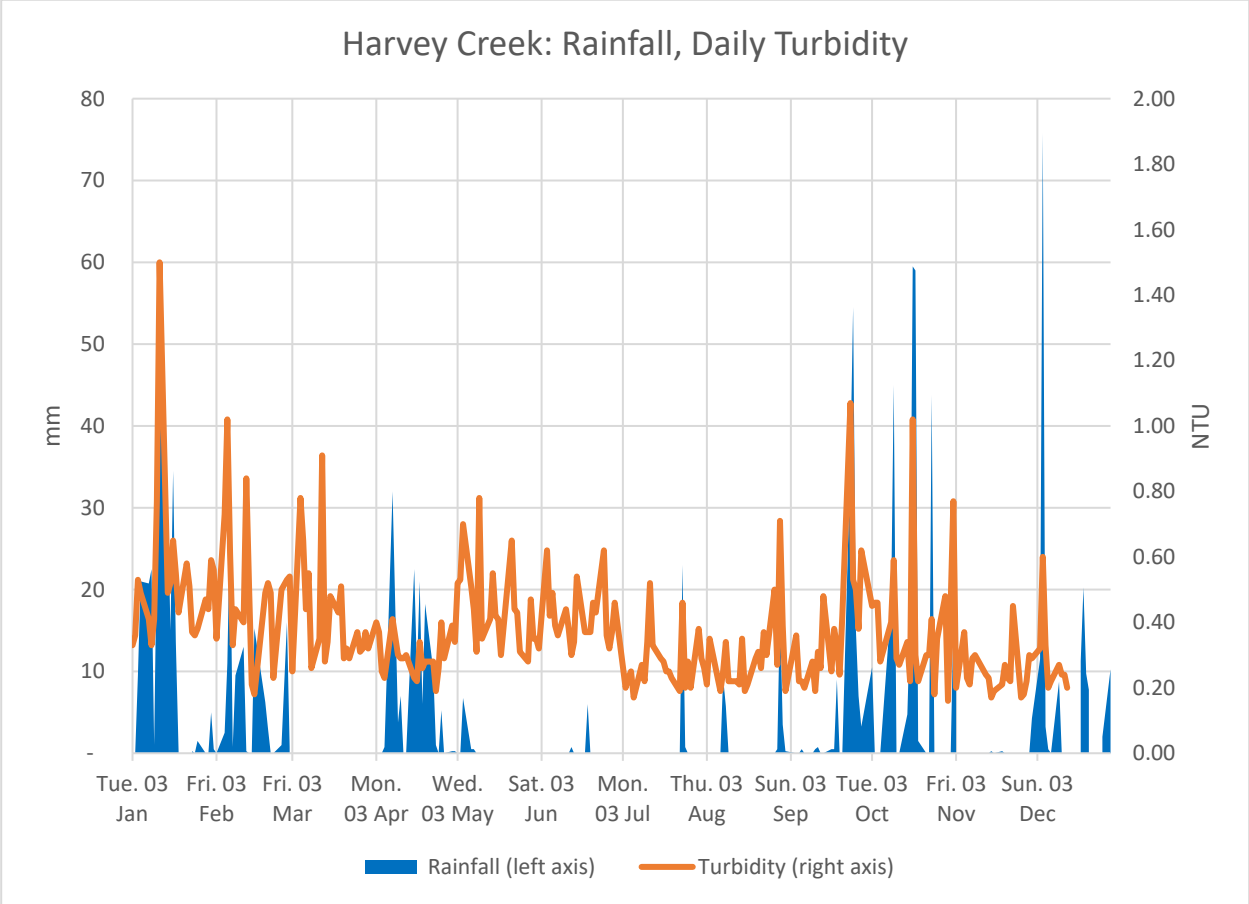
[1] For example an intake being blocked or maintenance on a plant

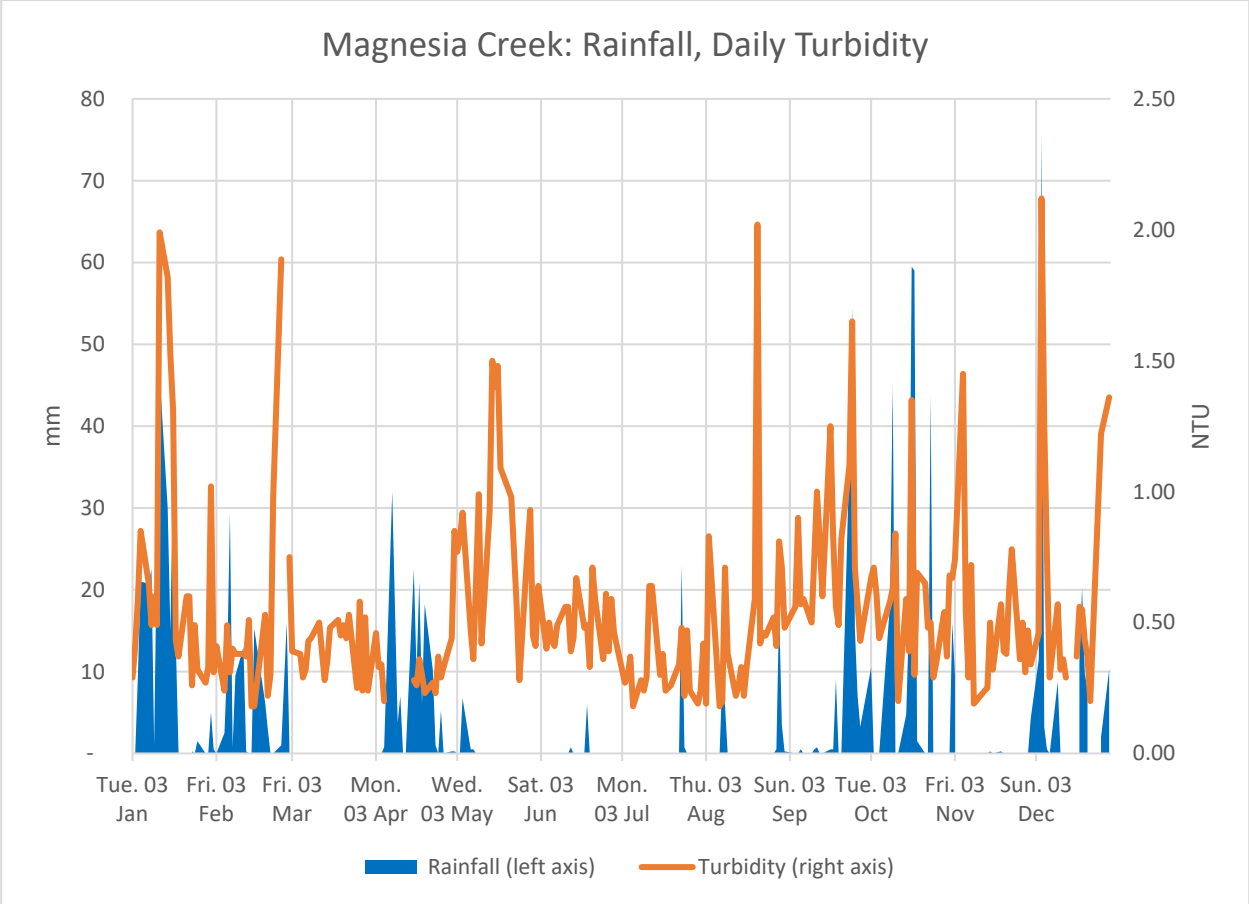
Mon. Sep 25	7			< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1			< 1	< 1	< 1	< 1	< 1	< 1
Tue. Oct 03	8	<1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Tue. Oct 10	7			< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1			< 1	< 1	< 1	< 1	< 1	< 1
Mon. Oct 16	6	NS	NS	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	NS	NS	< 1	< 1	< 1	< 1	< 1	< 1
Mon. Oct 23	7			< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1			< 1	< 1	< 1	< 1	< 1	< 1
Mon. Oct 30	7			< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1			< 1	< 1	< 1	< 1	RMFL	RMFL
Mon. Nov 06	7	<1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Tue. Nov 14	8			< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1			< 1	< 1	< 1	< 1	< 1	< 1
Mon. Nov 20	6	NS	NS	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	NS	NS	< 1	< 1	< 1	< 1	< 1	< 1
Mon. Nov 27	7			< 1	< 1	< 1	< 1	Closed	Closed	< 1	< 1	< 1	< 1			< 1	< 1	< 1	< 1	< 1	< 1
Mon. Dec 04	7	<1	< 1	< 1	< 1	< 1	< 1	Closed	Closed	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Mon. Dec 11	7			< 1	< 1	< 1	< 1	Closed	Closed	< 1	< 1	< 1	< 1			< 1	< 1	< 1	< 1	< 1	< 1
Mon. Dec 18	7	NS	NS	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	NS	NS	< 1	< 1	< 1	< 1	< 1	< 1
Wed. Dec 27	9			RMFL	RMFL	RMFL	RMFL	RMFL	RMFL	RMFL	RMFL	RMFL	RMFL			RMFL	RMFL	RMFL	RMFL	RMFL	RMFL

NS = Not Sampled this day
N/A = Not Available or plant
RMFL = Result Missing From Lab

A NOTE ON TURBIDITY

Lions Bay raw water arises in steep, forested catchments, and is particularly subject to fluctuating turbidity, which is haziness from organic, inorganic and mineral particulates washing into the creeks during rain events. Measured in Nephelometric Turbidity Units (NTU), turbidity is a measure of the concentration of suspended particles in a sample of water, determined using a light-scattering method. Both UV and chlorine treatment are affected by turbidity. Particulates shadow, absorb and scatter UV light, and microorganisms obscured in particulate crevices may avoid direct contact with chlorine (chlorine residual levels are therefore increased whenever turbidity rises above 1 NTU in finished water). In 2023, based on weekday-only daily readings, turbidity never exceeded 3 NTU in either Harvey or Magnesia Creek, and there were no periods of more than one day with NTU between 2 and 3 NTU:





Detailed NTU data are provided in an appendix on p.40.

A NOTE ON CHLORINE RESIDUAL

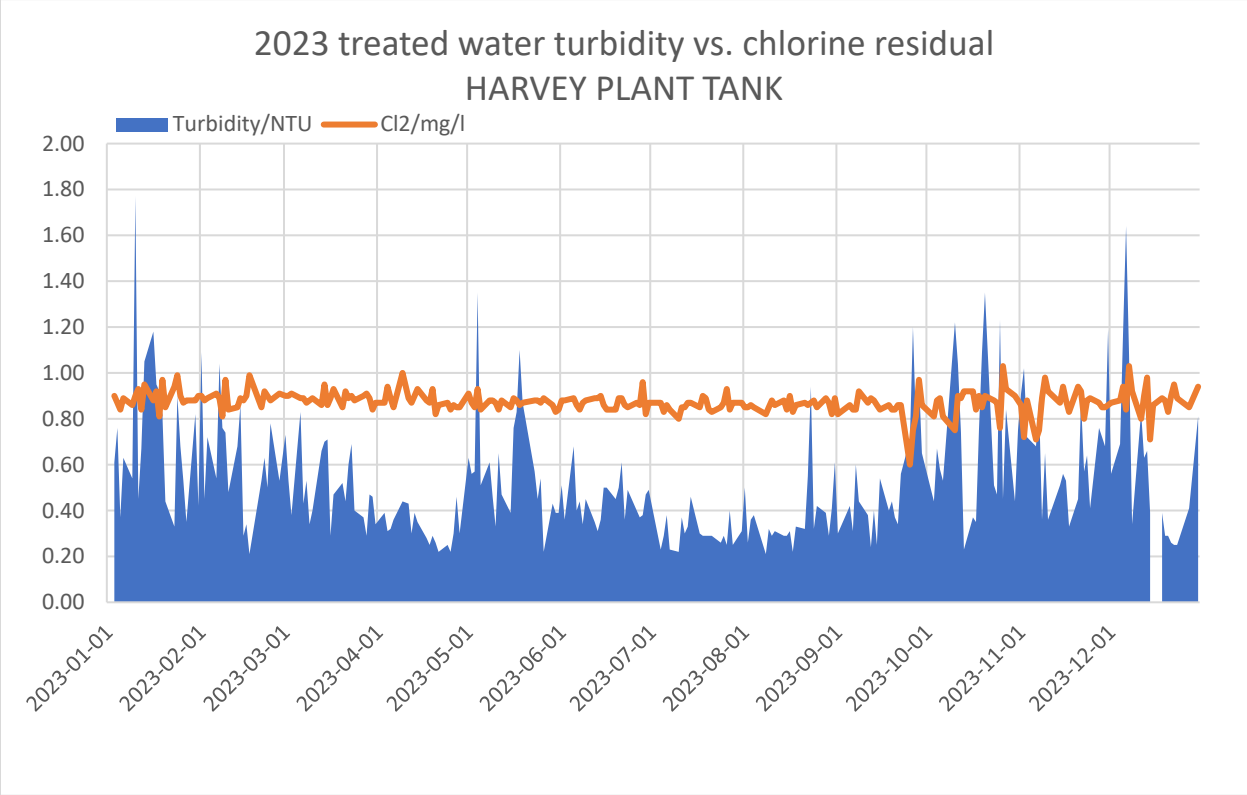
Chlorine residual levels are not directly regulated by the *Drinking Water Protection Act* or the *Drinking Water Protection Regulation:*

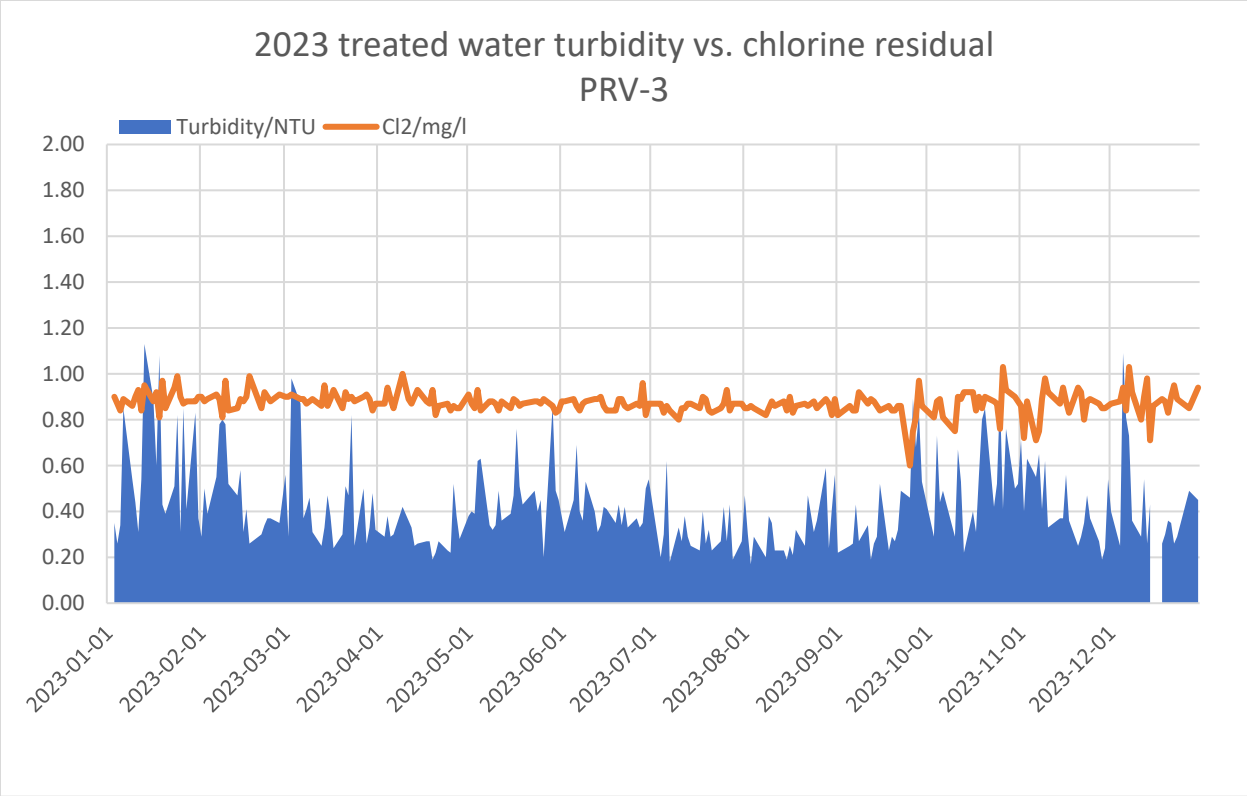
- On the high end of possible concentrations, *Guidelines for Canadian Drinking Water Quality* state that a "guideline value [for maximum concentration of chlorine] is not necessary due to low toxicity at concentrations [typically] found in drinking water."
- At the low end, no minimum chlorine concentration regulations exist for British Columbia. However, the current *Health Canada Guidelines for Canadian Drinking Water Quality: Guideline Technical Document—Chlorine* indicates:
    - The USEPA Surface Water Treatment Rule requires a minimum disinfectant residual of 0.2 mg/ℓ for water entering the distribution system and that a detectable level be maintained throughout the distribution system.
    - Chlorine concentrations in most Canadian drinking water distribution systems range from 0.04 to 2.0 mg/ℓ.
    - In general, a chlorine residual of 0.2 mg/ℓ is considered a minimum level for the control of bacterial regrowth in the distribution system by WHO and USEPA

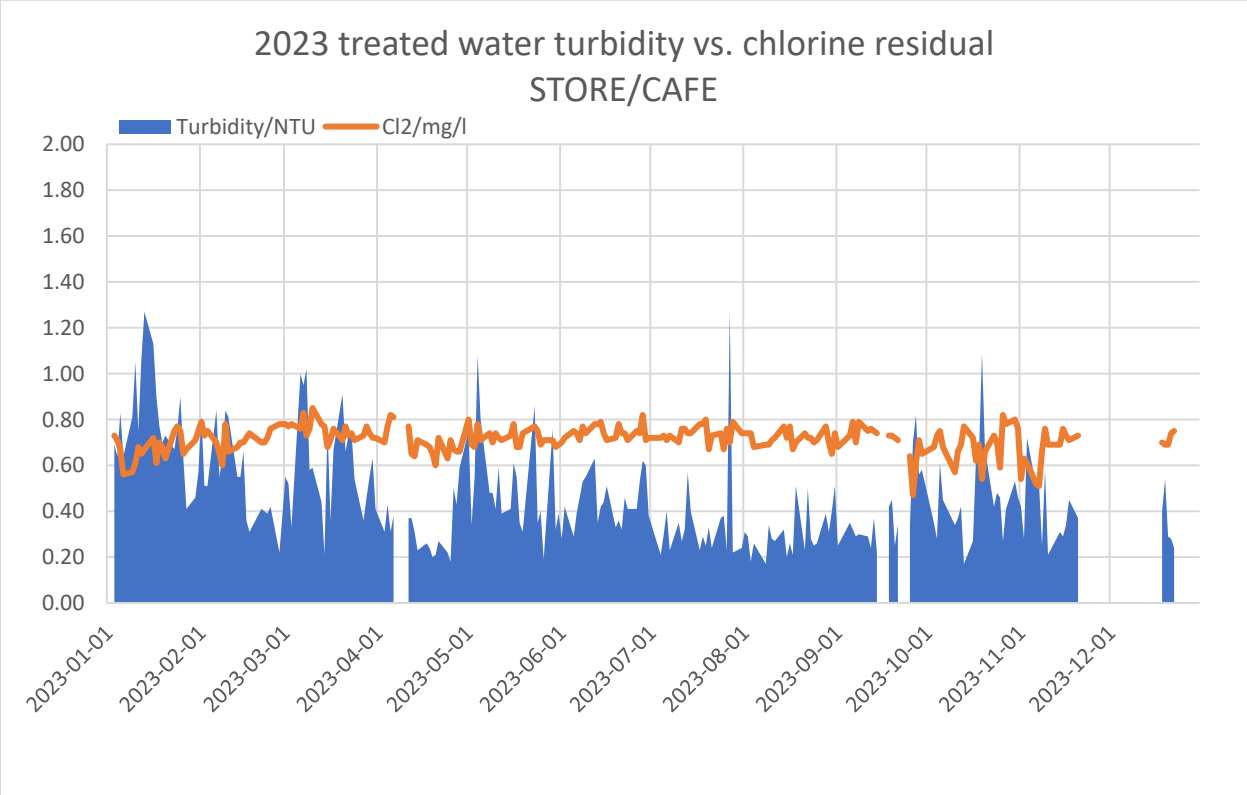
The municipality's objective is to maintain at least 0.2 mg/ℓ chlorine residuals in all parts of the system. In practice, two to five times that level is generally present, leading to occasional user complaint of bleach or chemical smell.

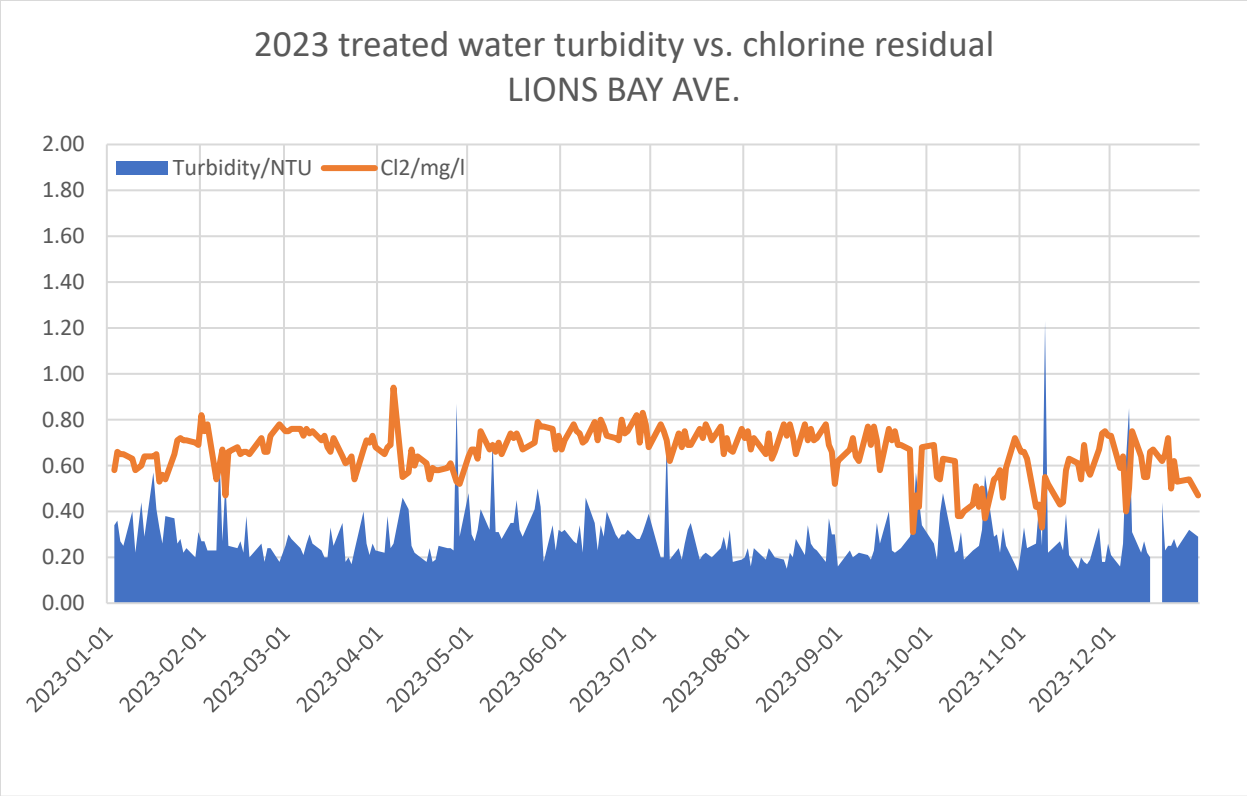
Summary of 2023 chlorine residuals/mg/ℓ								
	Harvey Plant Tank	PRV-3	Café	Lions Bay Ave	Kelvin Grove	Magnesia Plant Tank	PRV-5	Brunswick Beach
SAMPLE COUNT	247	247	222	247	247	244	247	247
MIN	0.60	0.61	0.47	0.31	0.20	0.46	0.58	0.20
MAX	1.03	1.02	0.85	0.94	0.85	1.23	0.92	0.87
MED	0.87	0.83	0.72	0.67	0.46	0.86	0.78	0.62
AVG	0.87	0.83	0.71	0.66	0.47	0.86	0.78	0.61

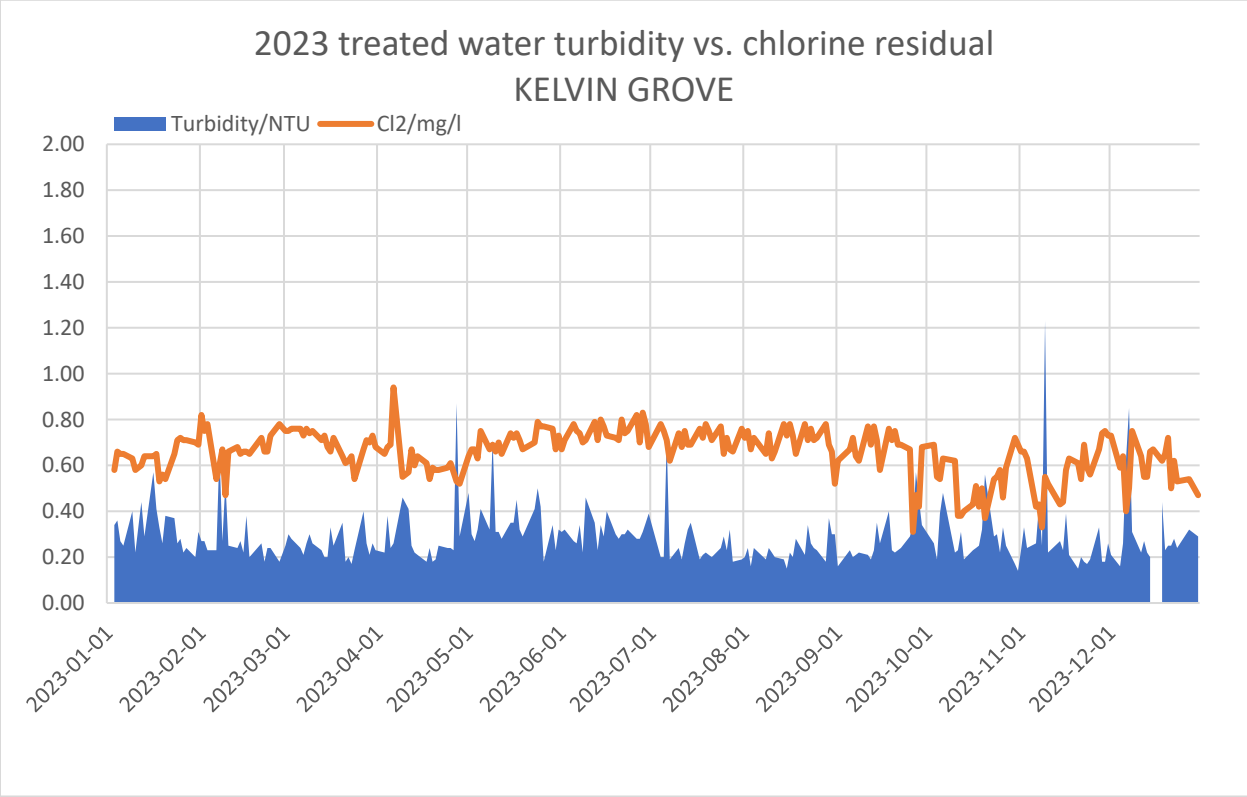
Detailed numerical data on turbidity and chlorine residual at each sample station are provided in APPENDIX: *TREATED* WATER TURBIDITY, Cl2 RESIDUAL. Graphical representation follows.

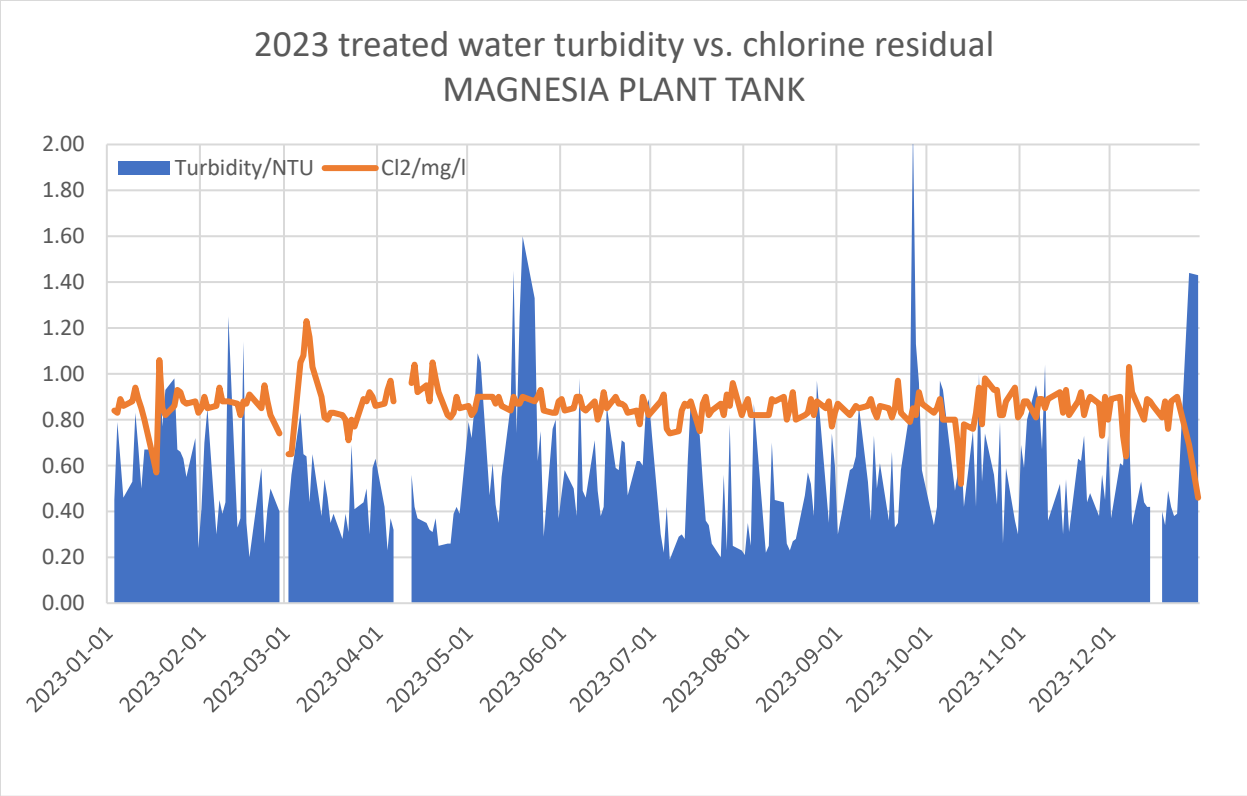


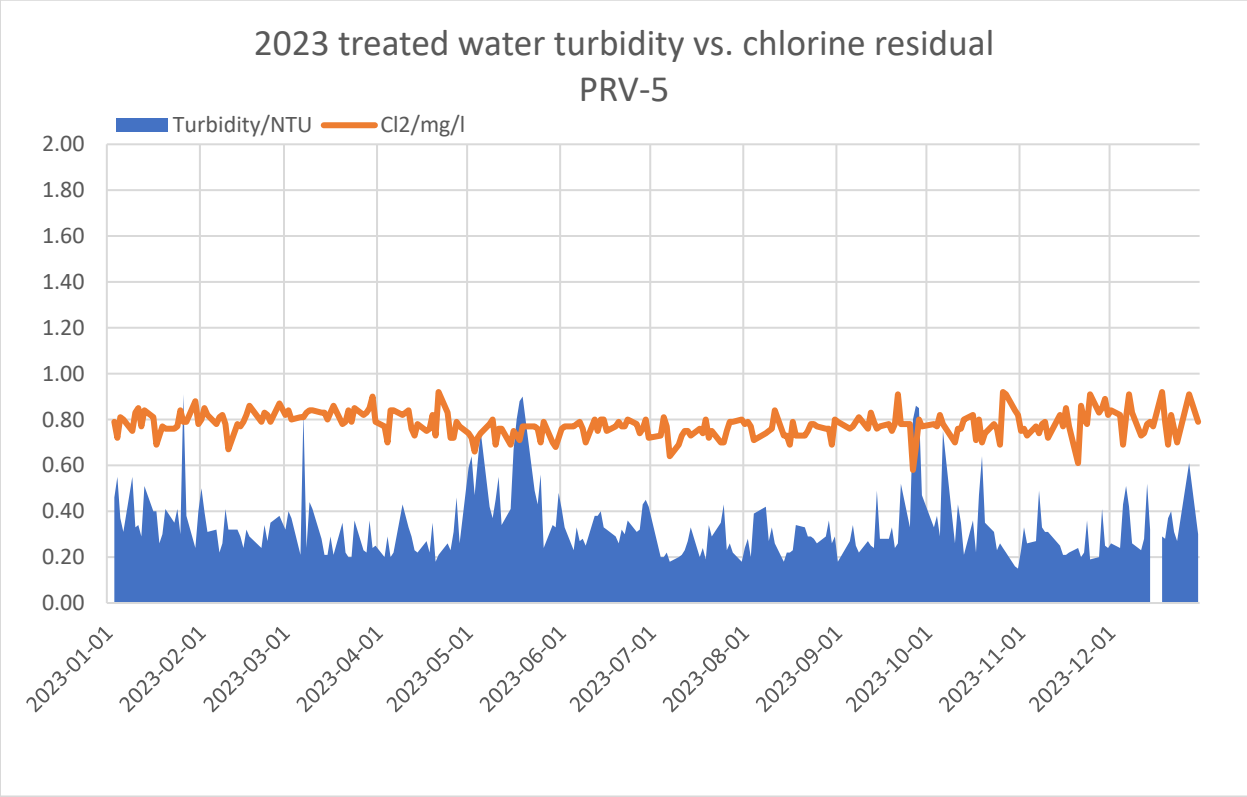

2023 treated water turbidity vs. chlorine residual
PRV-3
Turbidity/NTU
Cl2/mg/l
2.00
1.80
1.60
1.40
1.20
1.00
0.80
0.60
0.40
0.20
0.00
2023-01-01
2023-02-01
2023-03-01
2023-04-01
2023-05-01
2023-06-01
2023-07-01
2023-08-01
2023-09-01
2023-10-01
2023-11-01
2023-12-01

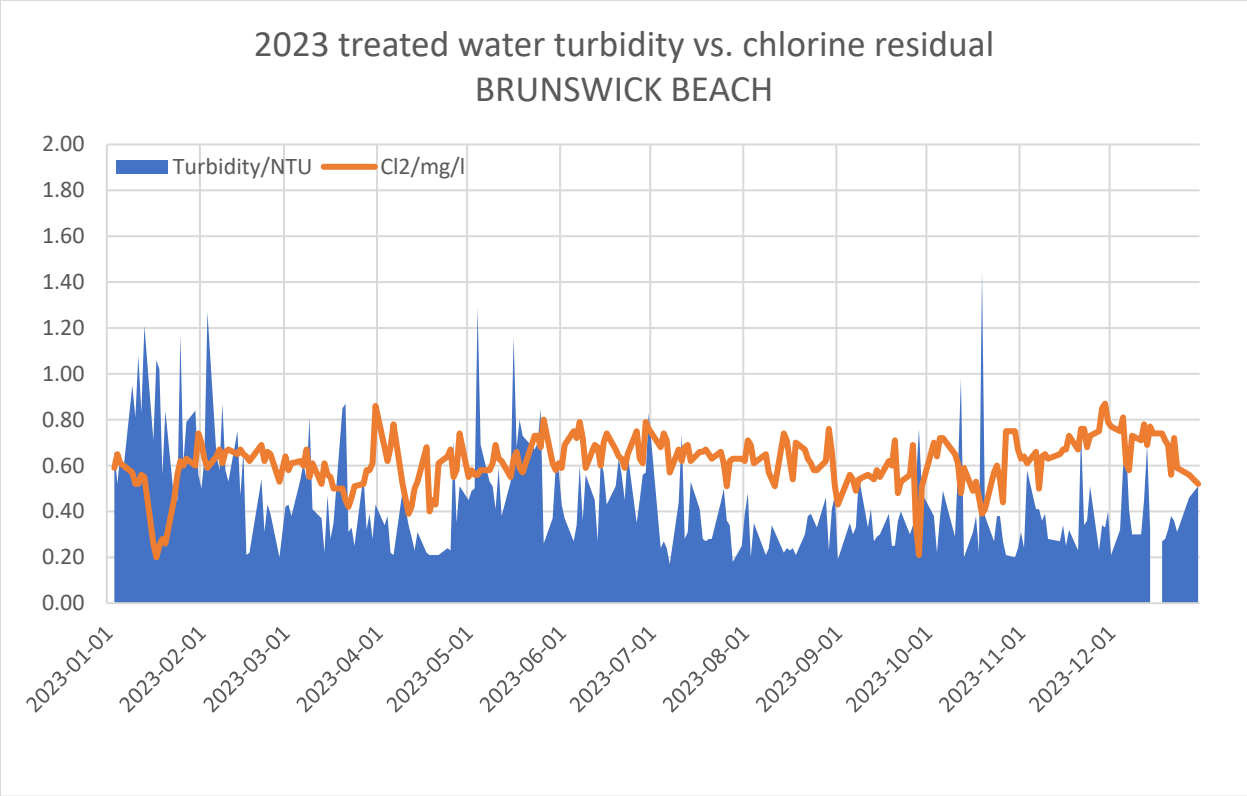

2023 treated water turbidity vs. chlorine residual
STORE/CAFE
Turbidity/NTU
Cl2/mg/l
2.00
1.80
1.60
1.40
1.20
1.00
0.80
0.60
0.40
0.20
0.00
2023-01-01
2023-02-01
2023-03-01
2023-04-01
2023-05-01
2023-06-01
2023-07-01
2023-08-01
2023-09-01
2023-10-01
2023-11-01
2023-12-01


2023 treated water turbidity vs. chlorine residual
LIONS BAY AVE.
Turbidity/NTU
Cl2/mg/l
2.00
1.80
1.60
1.40
1.20
1.00
0.80
0.60
0.40
0.20
0.00
2023-01-01
2023-02-01
2023-03-01
2023-04-01
2023-05-01
2023-06-01
2023-07-01
2023-08-01
2023-09-01
2023-10-01
2023-11-01
2023-12-01


2023 treated water turbidity vs. chlorine residual
KELVIN GROVE
Turbidity/NTU
Cl2/mg/l
2.00
1.80
1.60
1.40
1.20
1.00
0.80
0.60
0.40
0.20
0.00
2023-01-01
2023-02-01
2023-03-01
2023-04-01
2023-05-01
2023-06-01
2023-07-01
2023-08-01
2023-09-01
2023-10-01
2023-11-01
2023-12-01


2023 treated water turbidity vs. chlorine residual
MAGNESIA PLANT TANK
Turbidity/NTU
Cl2/mg/l
2.00
1.80
1.60
1.40
1.20
1.00
0.80
0.60
0.40
0.20
0.00
2023-01-01
2023-02-01
2023-03-01
2023-04-01
2023-05-01
2023-06-01
2023-07-01
2023-08-01
2023-09-01
2023-10-01
2023-11-01
2023-12-01


2023 treated water turbidity vs. chlorine residual
PRV-5
Turbidity/NTU
Cl2/mg/l
2.00
1.80
1.60
1.40
1.20
1.00
0.80
0.60
0.40
0.20
0.00
2023-01-01
2023-02-01
2023-03-01
2023-04-01
2023-05-01
2023-06-01
2023-07-01
2023-08-01
2023-09-01
2023-10-01
2023-11-01
2023-12-01



A NOTE ON CHLORINE DISINFECTION BY-PRODUCTS

Chlorine combines with natural organic matter in the water to form compounds called disinfection byproducts (DBPs). Health Canada and USEPA has set limits for several types of DBPs and public water systems that disinfect with chlorine must regularly analyse their treated water to measure regulated DBP level, specifically trihalomethane (THM), which Health Canada considers potentially carcinogenic:

> *"High levels of THMs may also have an effect on pregnancy. A California study found that pregnant women who drank large amounts of tap water with high THMs had an increased risk of miscarriage. These studies do not prove that there is a link between THMs and cancer or miscarriage. However, they do show the need for further research in this area to confirm potential health effects."*

Health Canada recommends total THMs below 100 µg/ℓ (micrograms per litre) averaged over quarterly sample results. This criterion was met by Lions Bay in 2023:

Lions Bay 2023 total trihalomethanes/µg/ℓ (see Appendix for details)				
Sample location → Sample date ↓	**Lions Bay Ave.**	**Kelvin Grove**	**Community Centre**	**Brunswick Beach**
Tue. March14	23.6	27.9	31.3	28.9
Wed. June 7	30.6	47.1	36.9	27.7
Tue. September 26	42.6	43.2	60.6	24.8
Wed. December 6	97.3	72.1	59.3	66.5
Average	**48.5**	**47.6**	**47.0**	**37.0**

While not required by regulation, Lions Bay also tests for DBP haloacetic acid (HAA). Various Health Canada publications state a maximum acceptable concentration for HAA in drinking water of 80 µg/ℓ based on a running annual average of at least quarterly samples, and that utilities should make every effort to maintain concentrations ALARA ("as low as reasonably achievable") without compromising the effectiveness of disinfection. Lions Bay commenced testing for HAAs starting in the 4th Quarter 2023 and four samples were all below 80 µg/ℓ:

Lions Bay 2023 total haloacetic acids/µg/ℓ (see Appendix for detail)				
Sample location → Sample date ↓	**Lions Bay Avenue**	**Kelvin Grove (Works Yard)**	**Community Centre**	**Brunswick Beach**
Wed. December 6	57.7	52.9	55.9	66.6

A NOTE ON pH

pH is a logarithmic scale that specifies the acidity or basicity of water solutions. Values range from zero, the most acidic, to 14, the most basic. Pure water has a pH of 7, considered neutral.

Sodium hypochlorite hydrolyses in aqueous solution: $NaOCl + H_2O \leftrightarrow Na^+ + HOCl + OH^-$. HOCl (hypochlorous acid) disassociates to $H^+ + OCl^-$, more so at alkali (high) pHs. HOCl is 20 times more germicidal than its OCl^-(hypochlorite) ion, so NaOCl is less effective at higher pHs.

pH is of concern in water systems because at lower (acidic) values, water is corrosive to metals such as iron in water mains and copper and lead solder in residential plumbing. Conversely, at higher (alkali or basic) pH values, carbonate scale forms and disinfection is less efficient (see box). Health Canada indicates an acceptable pH range for drinking water of 7.0 to 10.5. Lions Bay water is consistently slightly more acidic than this guideline:

Lions Bay 2023 pH at 10 sample locations, after flush		
Sample date → Sample location ↓	**6 Mar.**	**26 Sep.**
Harvey raw water	6.93	6.64
Magnesia raw water	6.88	6.67
Harvey Tank	6.99	6.62
Store/café	6.93	6.62
Lions Bay Ave.	6.96	6.74
Kelvin Grove	6.99	6.92
Community Centre	6.94	6.72
Magnesia Tank	6.91	6.76
Brunswick Beach	7.03	6.98
Lions Bay Beach Park	6.93	6.78

Consideration of active pH control commenced in 2023, for implementation when funds allow, probably utilising soda ash injection.

A NOTE ON ALKALINITY & HARDNESS

Water alkalinity is a measure of the presence of bicarbonate, carbonate and hydroxide ions. It

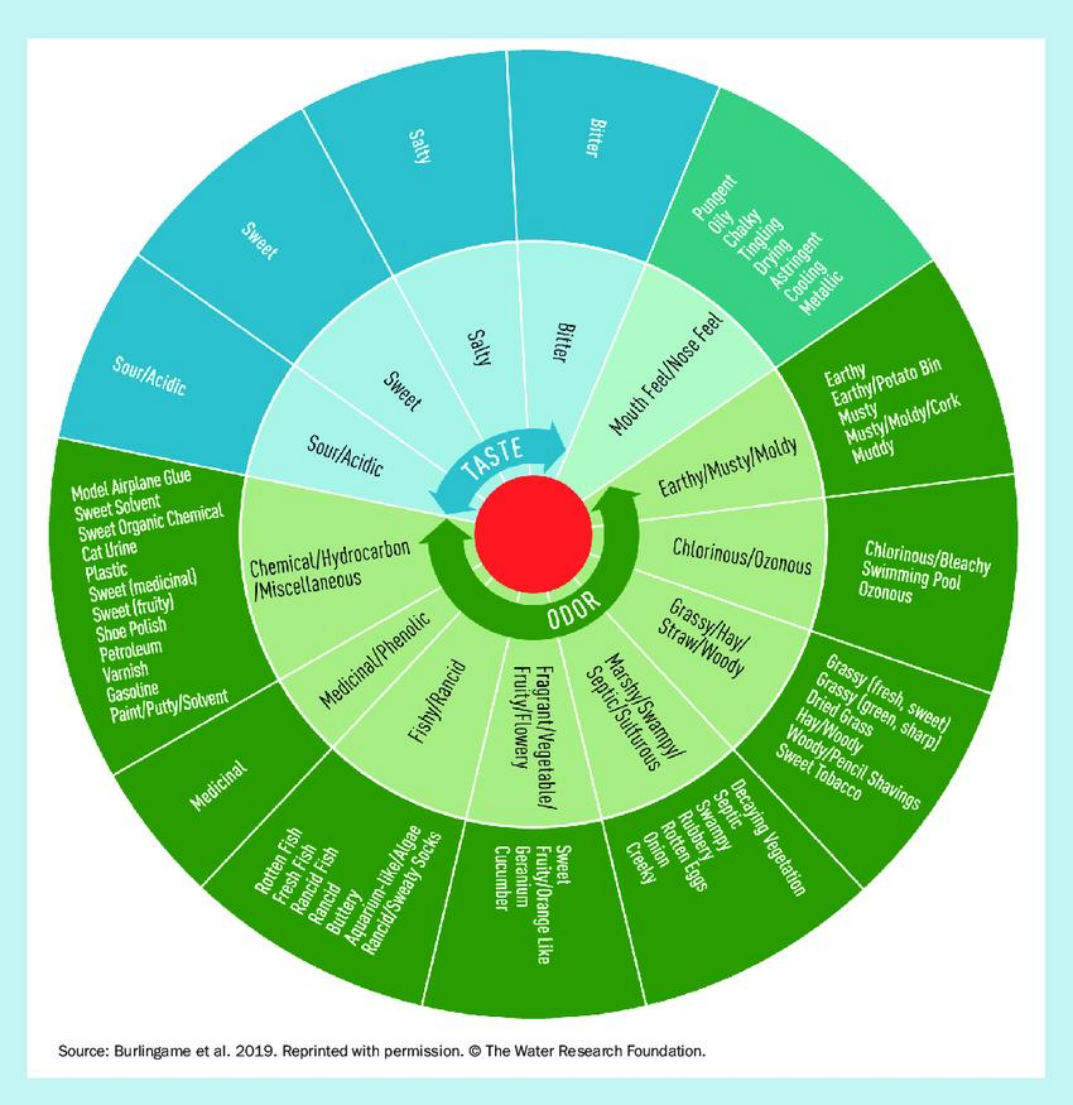
represents a water's capacity to buffer pH swings that could compromise water quality or taste. Adequate alkalinity helps control corrosion, prevents scaling, and ensures the effectiveness of disinfection processes. The recommended alkalinity range for drinking water is typically 20-200 mg/ℓ. Lions Bay's alkalinity is significantly lower, as expected from a catchment geology with non-carbonate rocks. Hardness is a measure of dissolved calcium and magnesium minerals. Hard water is not a health risk, but a nuisance because of mineral buildup and poor soap and detergent performance. The hardness of water is measured as milligrams of calcium carbonate per litre of water; in general, water with less than 60 mg/ℓ CaCO3 is considered soft, water with 60-120 mg/ℓ moderately hard, and water with greater than 120 mg/ℓ hard. Lions Bay water is very soft, for the same reasons it is not alkaline:

Lions Bay 2023 alkalinity and hardness at 10 sample locations, after flush				
Sample date ➔	**6 Mar.**		**26 Sep.**	
Sample location ⬇	**Alkalinity (as mg/ℓ $CaCO_3$)**	**Hardness (as mg/ℓ CaCO3)**	**Alkalinity (as mg/ℓ $CaCO_3$)**	**Hardness (as mg/ℓ CaCO3)**
Harvey raw water	5.8	7.29	3.4	3.82
Magnesia raw water	5.6	17.8	3.9	6.88
Harvey Tank (glass-lined steel)	6.6	7.28	4.7	5.27
Store/café	6.2	7.23	5.1	5.78
Lions Bay Ave.	6.5	7.46	6.4	7.66
Kelvin Grove	7.0	7.90	8.8	9.66
Community Centre	6.3	7.40	5.8	6.74
Magnesia Tank (concrete)	5.8	16.4	4.4	11.7
Brunswick Beach	6.7	8.11	6.6	23.5
Lions Bay Beach Park	6.1	7.08	4.9	5.78

Details are available in APPENDIX: BIANNUAL METALS AND CHEMISTRY RESULTS (ABRIDGED REPORT OF MARCH. 2023) starting on p.53.

A NOTE ON TASTE & ODOUR

Public Works staff are proud of Lions Bay's water quality and that there has been no need for a Boil Water Advisory in ten years. Taste and odour considerations include:



Source: Burlingame et al. 2019. Reprinted with permission. © The Water Research Foundation.

A NOTE ON METALS AND OTHER SUBSTANCES

Trace metals enter the water supply through natural and human means. Some metals are essential for life, while others can cause chronic or acute poisoning. Health Canada has set maximum concentration limits for most metals except calcium (chemical symbol Ca), cobalt (Co), magnesium (Mg), molybdenum (Mo), nickel (Ni) and potassium (K). Twice-annual testing for a wide range of substances is performed as provided in APPENDIX: BIANNUAL METALS AND CHEMISTRY RESULTS (ABRIDGED REPORT OF MARCH. 2023) starting on p.53. In general, there is not much evidence of any substantial metal corrosion in delivered Lions Bay water, but maybe slightly higher metals in some locations.

All 2023 samples were within the limits for metals and other substances set in the Guidelines for Canadian Drinking Water Quality.

A NOTE ON ASBESTOS

Health Canada concludes there is no convincing evidence that asbestos ingested through drinking of water is harmful to health and has not established drinking water guidelines for asbestos. However, USEPA's enforceable maximum contaminant level (MCL) for asbestos is set at 7 million fibres per litre (MFL), on findings that some people who drink water containing asbestos well in excess of the MCL for many years may have an increased risk of developing benign intestinal polyps. A portion of the municipality's water mains are still asbestos-cement (A-C), and in an abundance of caution samples are taken once per year in two pertinent locations and analysed for asbestos. 2023 results are zero asbestos above an analytical sensitivity of 0.42 million fibers per liter:

Asbestos analysis by transmission electron microscope to EPA Standard 100.2mf		
Sample 07 Nov. 2023 Analysis 14 Nov. 2023	**Upper Bayview Rd. (sample location downstream of 450 m of A-C piping)**	**Oceanview Rd. (always same water as Upper Bayview, w. no A-C piping)**
Analytical sensitivity (AS), million fibers per liter (MFL)*	0.42	0.42
Chrysotile, count	0	0
Amosite, count	0	0
Crocidolite, count	0	0
Actinolite, count	0	0
Tremolite, count	0	0
Anthophyllite, count	0	0
Total asbestos, count	*0*	*0*

*USEPA indicates an AS of less than 0.2 MFL is desired for drinking water, so the lab will be exhorted to achieve this sensitivity in future by analysing sufficient volumes of sample.

5. DISTRIBUTION SYSTEM

After treatment, water flows to consumers through an EOCP Class II Water Distribution System, also requiring the equivalent operators (and also renewed in 2023 and valid until November 16, 2028) comprising:

- 3 potable water tanks, Harvey, Magnesia and Highway;
- 16.8 km of watermain (various sizes and materials from the 1960s to 2010)
- 13 pressure reducing valve arrangements (3 updated, 10 overdue for replacement);
- 2 water treatment plants (Harvey Creek WTP, Magnesia Creek WTP)
- 529 property connections, also referred to as curb stops (20 strata accounts are covered by three curb stops);
- 72 fire hydrants
- 250 shutoff, blowoff, sampling and isolation valves.

5.1 STORAGE TANKS

Unit	**Material**	**Dimensions**	**Actual capacity**			**Year built**
			ℓ	**iG**	**USG**	
500,000 Harvey Tank	Glass-	11.446 m max.	2,343,000	515,000	618,000	2019

	fused bolted steel	operating depth. Fill on 1 cm-sensitivity ultrasound height sensor.				
100,000 Magnesia Tank	Cast-in place concrete	10.0 m X 10.0 m footprint, 4.300 m max. operating depth. Fill on 1 cm-sensitivity ultrasound height sensor.	440,000	97,000	116,000	1997
20,000 Highway Tank. Obsoleted in 2017 with advent of Harvey Tank. Slated for replacement (2025?) by small break-head tank or PRV.	Cast-in place concrete	5.87 m diameter X 3.66 m operating depth. Fill on 1-foot mechanical valve cycle	95,500	20,500	25,000	1959
100,000 Oceanview Tank. Obsoleted in 2017 with advent of Harvey Tank. Had been planned for demolition, until May 2024 repurposing to buffer raw water supply for the Alberta Supply-Augmentation Project	Cast-in place concrete	8.6 m diameter X 7.3 m operating depth.	424,000	93,000	112,000	1984
20,000 iG Phase IV Tank, obsoleted 2021	Function replaced by PRV at Upper Bayview Road					
25,000 iG Phase V Tank, obsoleted 2021						
30,000 iG Brunswick Tank, obsoleted mid-2000s	Air gap to distribution network.					
35,000 iG Phase VI (Sunset) Tank, obsoleted late 1990s						

Inspection and cleaning of the municipality's water storage tanks occurs on a five-year cycle, using either a remotely operated vehicle (ROV) or a diver disinfected with chlorinated water. All drinking water tanks were inspected and cleaned in March 2022, next due in 2027.

5.2 WATERMAINS

primarily made from ductile iron, with some asbestos-cement (AC), cast iron and polyvinyl chloride (PVC) lines in service:

Installed treated water mains (excluding pipes from intakes to plants)		
NOMINAL ID		**INSTALLED LENGTH/m**
mm	**inch**	
100	4	602
150	6	10,060
200	8	4,430
250	10	1,010
	Total	16,102

The municipality aims to flush distribution mains twice per year, which is accomplished by opening fire hydrants and blow off valves to briefly produce flowrates high enough to scour pipe walls. To not affect summer conservation efforts, flushing usually takes place March-April and October-November. The scouring of pipe walls and the pressure fluctuations that occur despite careful planning and usage often cause additional breaks and leakage, so flushing is not engaged in lightly.

5.3 FILTRATION EXEMPTION

Drinking Water Microbial Treatment Objectives for Surface Water Supplies in BC recommends filtration and one form of disinfection for drinking water treatment, but provides for filtration exemption upon meeting four conditions:

CONDITION 1

Provide overall inactivation using a minimum of two disinfection processes of 4-log (99.99%) reduction of viruses and 3-log (99.9%) reduction of Cryptosporidium *and* Giardia*.*

The municipality utilises UV as the primary and chlorine as the secondary disinfection pathway. Manufacturer specifications for the dual Trojan Swift UV reactor units installed at both treatment plants indicate a 3-log reduction of *Cryptosporidium* and *Giardia* at raw water ultraviolet transmittance (UVT) values down to 70%. 2023 UVT was (full data on p.40):

Lions Bay water systems raw water UVT, 2023		
	Harvey/%	**Magnesia/%**
MIN	77.0	82.1
MAX	96.4	97.6
MED	92.1	95.1
AVG	91.6	94.2

In 2021 the UV reactors at the Harvey Plant were upgraded from two to four lamps to offer UV disinfection capacity at lower UVTs and higher flowrates.

Chlorine contact time (CT) is achieved in storage and transit as follows:

Retention and contact times at various consumption rates			
At daily USG consumption of …	**In Harvey tank (when supplying normal 80% of demand)**	**In Magnesia tank (when supplying normal 20% of demand)**	**In system overall, including 98,000 USG volume in watermains**
350,000	53 hours	40 hours	57 hours
500,000	37 hours	28 hours	40 hours
650,000	29 hours	21 hours	31 hours

Status at end of 2023: condition met.

CONDITION 2

E. coli *in raw water not to exceed 20 colony-forming units per 100 ml…in at least 90% of weekly samples from the previous six months.*

In 2023 *E. coli* in raw water did not exceed 20 colony-forming units per 100 mL in 48 of 50 (96%) of samples for Harvey Creek, and 47 of 47 (100%) of samples for Magnesia Creek, meeting this criterion:

Raw water *E. coli*, colony-forming units/100 ml		
2023	**Harvey Creek**	**Magnesia Creek**
Wed. Jan 04	2.0	<1
Mon. Jan 09	44.1	4.1
Mon. Jan 16	RMFL	RMFL
Mon. Jan 23	9.8	1.0
Mon. Jan 30	<1	<1
Mon. Feb 06	<1	<1
Mon. Feb 13	2.0	4.1
Tue. Feb 21	1.0	<1
Wed. Mar 01	<1	N/A
Mon. Mar 06	<1	<1
Mon. Mar 13	<1	<1
Mon. Mar 20	<1	1.0
Mon. Mar 27	<1	<1
Mon. Apr 03	<1	<1
Tue. Apr 11	1.0	N/A
Mon. Apr 17	<1	<1
Mon. Apr 24	<1	<1
Mon. May 01	<1	<1
Mon. May 08	<1	<1
Mon. May 15	<1	<1
Mon. May 23	<1	<1
Mon. May 29	11.0	3.1
Mon. Jun 05	<1	<1
Mon. Jun 12	<1	<1
Mon. Jun 19	<1	<1
Mon. Jun 26	<1	<1
Tue. Jul 04	<1	<1
Thu. Jul 13	<1	<1
Mon. Jul 17	<1	<1
Mon. Jul 24	<1	1.0
Mon. Jul 31	<1	<1
Tue. Aug 08	<1	<1
Mon. Aug 14	<1	<1
Mon. Aug 21	<1	<1
Mon. Aug 28	<1	<1
Tue. Sep 05	<1	<1
Mon. Sep 11	<1	<1
Mon. Sep 18	<1	<1
Mon. Sep 25	186.0	14.6
Tue. Oct 03	2.0	<1

Tue. Oct 10	3.1	1.0
Mon. Oct 16	<1	1.0
Mon. Oct 23	<1	1.0
Mon. Oct 30	1.0	<1
Mon. Nov 06	<1	<1
Tue. Nov 14	<1	<1
Mon. Nov 20	<1	<1
Mon. Nov 27	<1	<1
Mon. Dec 04	<1	<1
Mon. Dec 11	<1	<1
Mon. Dec 18	<1	1.0
Mon. Dec 25	Lab closed	Lab closed

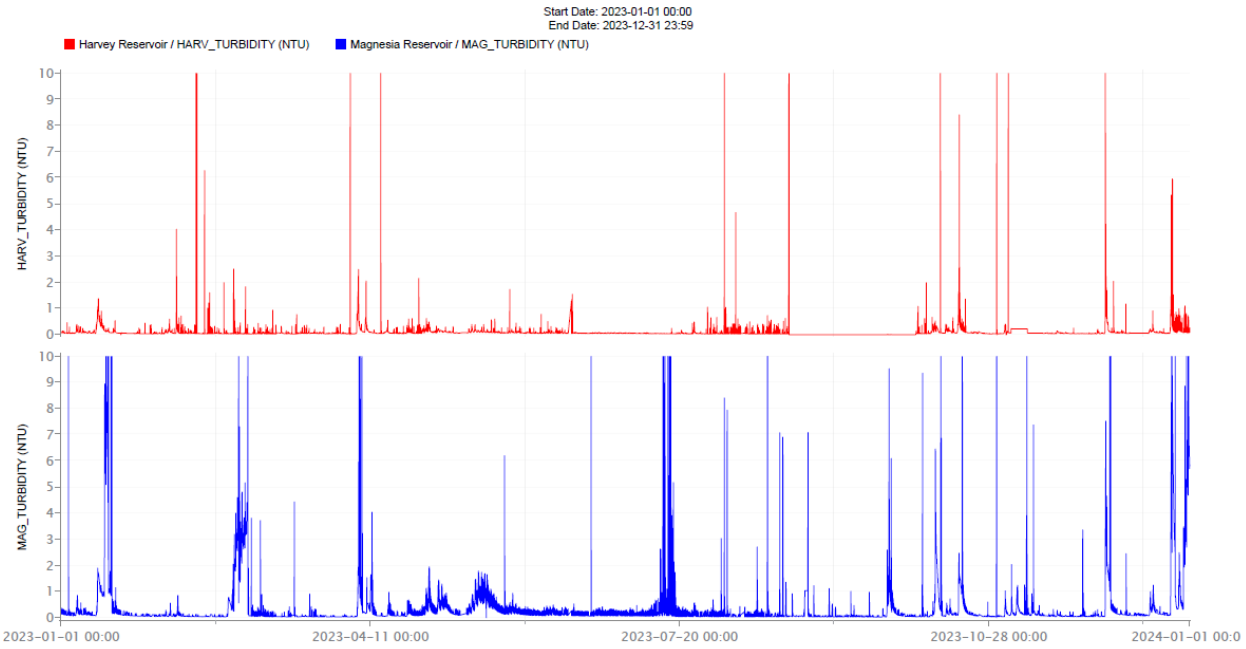
RMFL=Results Missing From Laboratory

Status in 2023: condition met.

CONDITION 3

[Maintain] average daily turbidity levels measured at equal intervals (at least every four hours) immediately before the disinfectant is applied…around 1 NTU, but…not exceed[ing] 5 NTU for more than two days in a 12-month period.

As discussed in 13 on p.13 above, no single *daily* turbidity readings reached 5 NTU, but to satisfy the 4-hour minimum interval criterion of the Condition, the 2.1 million readings taken by the plants' NTU meters every 30 seconds were plotted using the FlowWorks visualisation tool:



The data were averaged by hour to find that **in only one two-day period was the average of NTU sampled at least every four hours higher than 5, namely the one ending at 22:30 on Dec. 31, when the average of the previous 48 hours of NTU readings from Magnesia Creek was 5.07.** On the other hand,

the NTU meters' current upper cutoff is 10 NTU, so this assessment might be entirely spurious. The municipality is thus proceeding with plans to handle situations where NTU exceeds a certain level (>5 proposed) for a certain period (4 hours proposed), via a programmatic process control change (ENSuRe, Excessive Ntu ShUtdown RoutinE) that will:

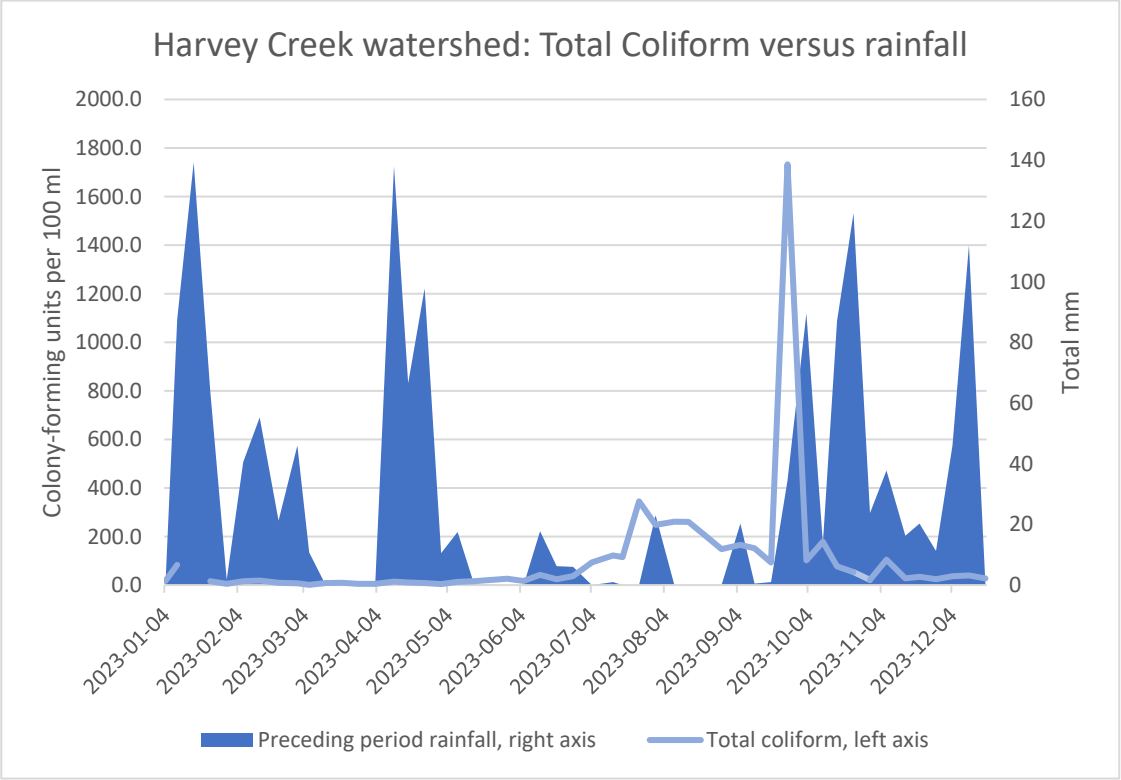
- Shut down the given plant if the UV reactor has not already shut down due to insufficient UV dosage, and lock it out until explicitly cleared
- Throw necessary alarm notifications by text, email and voice dial (utilising recent upgrades to the SCADA platform) to bring operators to site to:
    - Reconfigure the network to bring the Village's entire supply onto the unaffected plant (unless the excess NTU period is likely to be short)
    - Watch the affected intake for clearing, and flush the line when it does
    - Bring the affected plant back online.

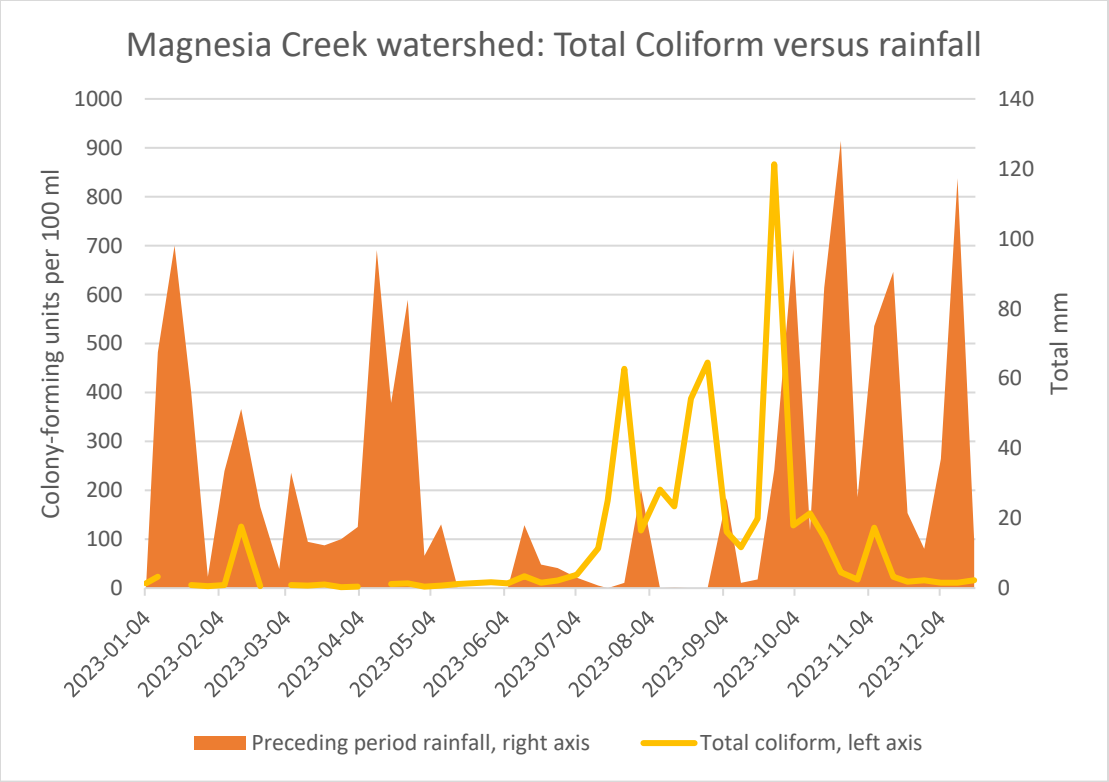
Status in 2023: open (to be implemented before the 2024 rains arrive in late September).

CONDITION 4

A watershed control program…that minimizes the potential for fecal contamination in the source water.

The municipality's separate Source Water Protection Plan outlines the measures used to control and protect the watersheds, including for fecal contamination. 2023-specific TC results are:





TC spikes in different watersheds in the same week (Sep. 25) are notable, and assumed to be due to the first significant rain, which fell in both watersheds that week, and washed the preceding three months of detritus into the creek. Independent of rain, TC readings also climb in summer due to rising temperature.

Status in 2023: open.

6. OPERATOR TRAINING

A further approach employed by the municipality to operate the water system is enhanced operator training. Under the *Drinking Water Protection Act* and the *Drinking Water Protection Regulation,* the Environmental Operators Certification Program (EOCP) classifies water supply and distribution systems in order to determine training requirements for operators; each system is required to have at least one Chief Operator certified to the classification level of the system. Additionally, any person whose actions may affect the operation of a water system requires certification. Certified Operators are required to earn continuing education units to remain in good standing. EOCP classifies Lions Bay's water treatment system as Class 1, and distribution system as Level 2 (certificates at p.39). In 2023, EOCP-certified municipal personnel were:

STAFF MEMBER	JOB CLASSIFICATION	EOCP CERTIFICATIONS
AU (Chief Operator)	Treatment Plant Operator 1	Water Treatment Plant Operator 1, Water Distribution System Operator 2
AY	Foreman 1	Water Treatment Plant Operator 1, Water Distribution System Operator 2

GS (since Nov. 2023)	Public Works Technician 1	Small Water Systems, Water Treatment Plant Operator 1

7. STRATEGIC WATER ISSUES

Supply

Year to year, creek flows are subject to rainfall, groundwater entering the channel (which is subject to when groundwater was last fully replenished), and melt from fluctuating snowpack (which is subject to rain-on-snow, insolation (sunshine), wind and cloud cover). For much of the year, creek flow exceeds the capacity of both treatment plants, but in summer it seems to be trending increasingly tight. Local climate projections call for warmer winters and longer, hotter summers, with total rainfall levels similar to today, but occurring more intensely. With no raw water storage, Lions Bay currently relies entirely on water being in the creeks when it is needed. In recent late summers supply has been around 300,000 GPD in Harvey Ck. and 190,000 GPD in Magnesia Ck. In summer staff watch rainfall predictions and manage fill levels to use as much of the creeks as possible.

In 2017 the municipality commenced working with the Hydrotechnical Engineering group at UBC's Civil Engineering Department[2], to jointly collect data from the watersheds to model the relationship between snowpack, weather and supply, particularly the relative contribution of (presumably) steady groundwater flows, all to be able to model supply in order to make operating decisions…

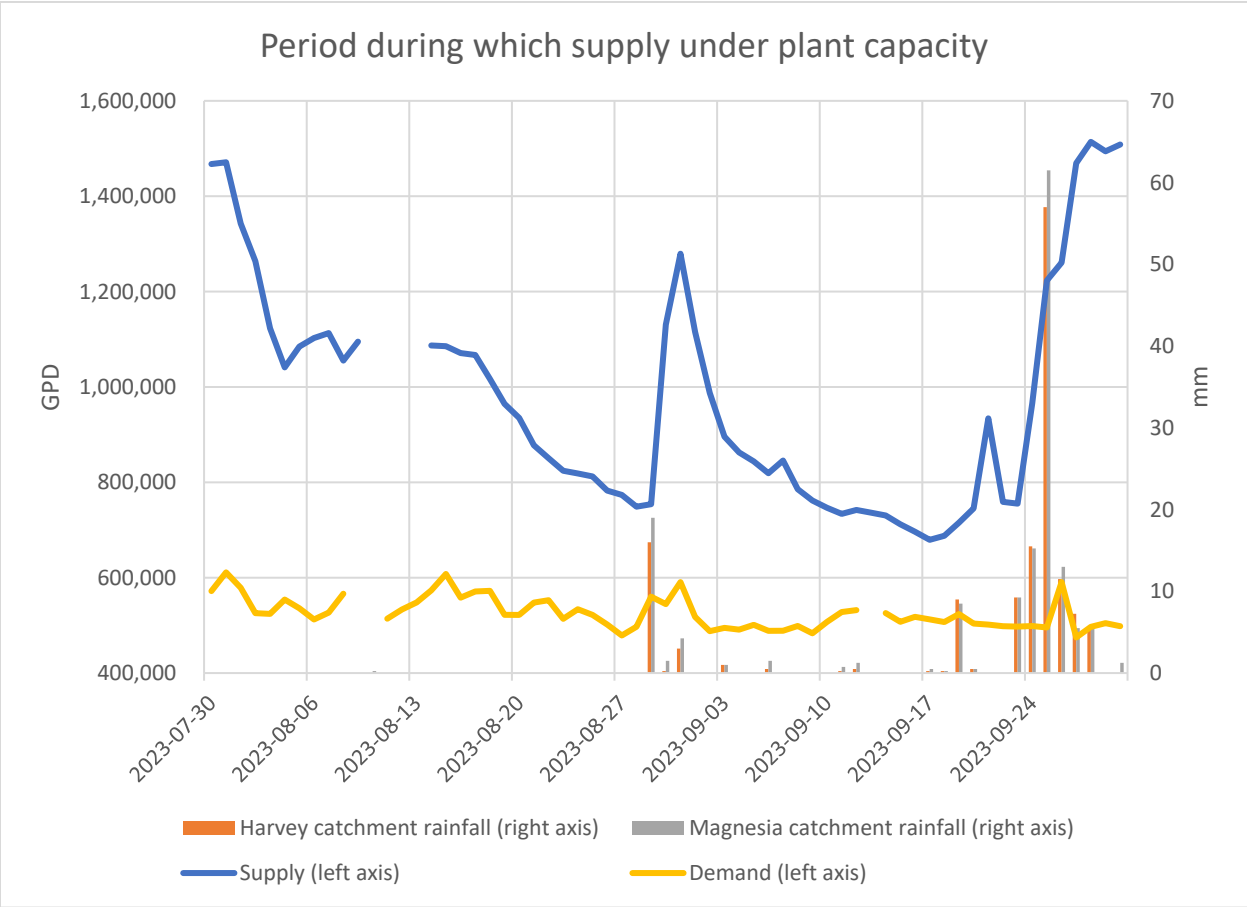
- …in the short term by knowing what creek supply will do until the next rainfall event, to know what conservation level to set;
- …in the long term by knowing when to begin considering supply alternatives including:
    - Wells
    - A modular full-supply or peak-shaving desalination plant—in 2018 the municipality acquired the last remaining undeveloped waterfront land in the community to hold in reserve for a plant site;
    - A pipeline to the MVWD.

Direct measurement of creek supply at intake level was implemented in late 2023[3], but is not yet integrated with SCADA. Pending access to those data, creek flow can also be deduced from plant inlet flowrate during periods of low supply, because when the plant is taking in water, it takes the entire production of the creek. Using that data, in 2023 Lions Bay reached groundwater-only supply on August 17, after which supply decayed linearly other than just after two fortuitous rain events, which allowed

[2] Driven by Associate Professor Dr. Steven Weijs, whose research interests include water resources management, mountain & catchment hydrology, flood forecasting, uncertainty, information theory and control of water systems, with a larger research question of how to use observations of complex water systems to enable informed decisions about water resources.

[3] Using pressure transducers in whole flow pools just above creek intakes, correlated using rating curves produced from salt-dosing proportional measurements just downstream.

the municipality to avoid Level 3 conservation for the entire non-excess supply period (in which a given creek flowrate is under the approx. 900,000 GPD capacity of either plant):



Problematic intakes

Lions Bay's water catchments are mountainous and unstable. Access to the creek intakes is by narrow gravel roads subject to rock and tree fall on which safety protocols restrict access whenever rainfall parameters are exceeded, just when decreased flow or increased turbidity need to be investigated. The geomorphology of the watersheds is a product of glaciation and post-glacial erosion. At what is now Howe Sound, the most recent or Fraser glaciation began 33,500 years ago and peaked 17,500 years ago. As the climate rewarmed, ice retreat was delayed several thousand years by floating glaciers grounding on the seabed, with several minor readvances. Glacial marine sedimentation--mud and rock dropped from icebergs--is believed to have ceased by 10,600 years before present. With the ice gone, water erosion and mass wasting (debris slides and flows, rockfall, avalanches) rapidly reworked unstable glacial sediments, declining over time such that by no later than 7,500 years ago the landscape was similar to today. Steep rockfall aprons developed on mid to lower slopes. Magnesia, Alberta and Harvey Creeks re-incised their debris cones and alluvial fans have formed at their mouths into the ocean.

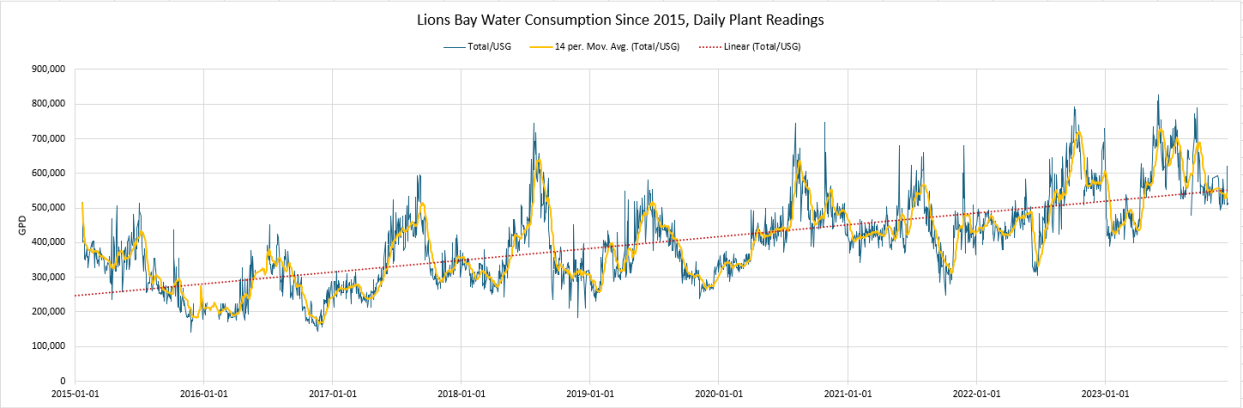
The watersheds are heavily forested with western big-leaf maple and conifers producing copious leaves and needles which build up on intake screens, occasionally requiring clearing twice a day. Large rocks (over 0.5 m) move down the creeks during heavy rain and fill the intake weirs. Medium rocks (10 – 50

cm) block the intake grates. Small rocks (1-10 cm) fill the settling chambers.

A 2017 design to screen small solids at the Magnesia weir was a failure; in late 2023 engineers were engaged to consider a better approach, perhaps an open raceway/riffle design to float off vegetation and to drop out medium and small rocks, not requiring confined-space safe work protocols to clear, with a fuel-cell powered gate valve to close off feed when not in use to prevent debris buildup on the grate. A better-designed 2018 upgrade to the profile of the Harvey weir allows it to self-clear blockages at the intake grate.

Excessive demand due to leakage

Measured water demand has been increasing since 2015 at an average rate of 14% a year, to an all-time high in early summer 2023 of 810,000 GPD:



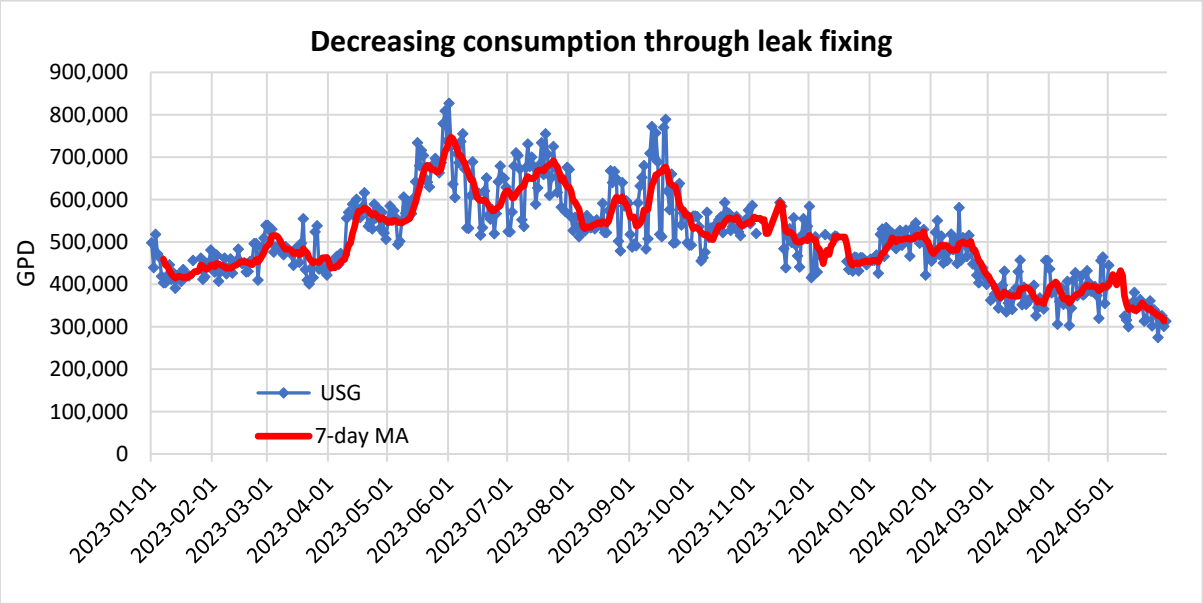
At the end of 2023 annual average consumption was 1689 liters per person per day (ℓ/p/d), almost four times the 464 ℓ/p/d (2021 data) demand of nearby District of West Vancouver with its similar weather, residents per property and outdoor water use:

Year	Consumption/m^3 (methodology potentially suspect < 2023)	Census population	ℓ/capita/day
2016	351,318	1334	722
2017	472,527		970
2018	533,000		1095
2019	508,000		1043
2020	623,000		1279
2021	612,000	1390	1206
2022	699,000		1378
2023	856,939		1689

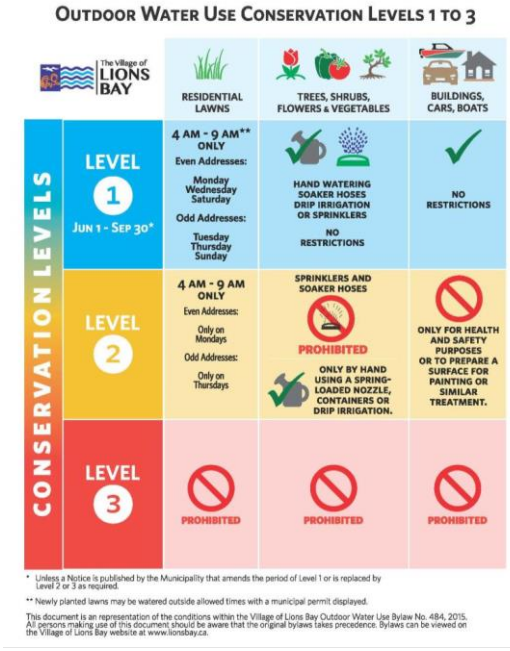
With Lions Bay not having added population in the period, and with no expectation that residents use water differently to 10 years ago, increasing consumption is seen to be due to accelerating leakage, primarily in aging private-side service lines installed from the late 1950s through the 1970s. Poor service line condition is exacerbated by the use of polybutylene installed in over 700,000 Canadian homes between 1978 and 1995 as a lighter and cheaper option than copper, but now banned under the National Plumbing Code due to its consistent failure in use. Residential service lines are also being damaged by growing tree roots: what was a 2-inch sapling when a line was installed 50 years ago is

today a 24-inch tree pushing pre-Code backfill into the line (most municipal watermains run in roads where there are no trees, although there are runs through the forest that are maintained by removing vegetation every five years).

By late 2023, leakage was determined based on overnight flows to be 380,000 GPD, 80% of overall demand at the time, and the municipality launched a crash program to find and address public and private leaks, especially when by Sep. 2023 all indications were that supply in summer 2024 was going to be tight. Consumption has been brought from 650,000 GPD in June 2023, to under 300,000 GPD in June 2024:



Outdoor Water Use Bylaw No. 484, 2015 restricts residential, commercial, and public water uses during low supply periods:



In 2023, Conservation Level 1 was set on June 1, and Level 2 from Aug. 1 through Oct. 12. Level 3 was not required.

Limited capital

No major water projects were undertaken in 2023, although several system enhancements were implemented:

- New process control routines, *Overnight Leakage Determination Routine (OLDeR)* and *Excessive NTU Shutdown Routine (ENSuRe),* discussed elsewhere in this report
- Pressure transducers installed in total-flow pools just upstream of the Magnesia and Harvey weirs to correlate to the streams' rating curves, in order to provide direct measurement of available water, particularly in times of tight supply. These installations will be connected to the system by cellular modem or private radio mesh in late 2024.

As a small residential community with a limited tax base, Lions Bay's infrastructure spending shortfall is growing. While an Infrastructure Levy has been collected since 2019, capital spending still requires federal and provincial grant help. Outstanding water capital projects include:

- Replacing 1065 meters of 1960s era cast iron pipe as well as remaining asbestos-cement pipe, the Centre, Upper Bayview, Bayview Place, or CUBB Project. Three grant applications for this $3-4 mil. project have been unsuccessful.
- Replacement of 795 meters of water main at Bayview Road from Stewart to Mountain, the so-called DWIP (Drainage & Water Infrastructure Project), now turned down in four grant-funding applications
- Pressure reducing valve (PRV) stations that are not compliant with confined-space worker safety requirements, and that have outlived twice the best practice replacement cycles. Three such PRV stations were replaced at Mountain Drive, Upper Bayview Road, and mid-Bayview Road in 2021 and brought online in 2022, at a cost of $500,000 each.
- The 20,000 Highway Tank was obsoleted for fire reserve volume in 2017 with the advent of Harvey Tank. Slated for future replacement with small break-head tank or PRV.
- Filtration, which would cost $10-20 mil. in 2017 dollars to implement at two plants
- Operators tend to dial in conservative (high) chlorine dosing to ensure adequate chlorine residual throughout the distribution network. But high chlorine causes negative customer feedback, especially close to the plants. In 2024, realtime remote chlorine metering will be installed at the far ends of the distribution system, to allow use of chlorine concentrations to control dosing pumps, rather than staff setting an injection rate and watching the response manually over a timespan of days.
- A problematic Magnesia Intake, as discussed above
- pH adjustment to meet *Guidelines for Canadian Drinking Water Quality* pH regulations, and to mitigate the effects of corrosion in homes with copper plumbing.

2023 work program

The municipality's annual drinking water work program is driven by regulatory monitoring and reporting

to meet *Drinking Water Protection Act* and *Drinking Water Protection Regulation* requirements. The municipality's Core Service Level Review (available at www.lionsbay.ca) details the routine tasks and staff resources involved in operating and maintaining the water system.

All core maintenance was completed in 2023 except for two watermain flushes; one full mains flush was conducted over a week in Nov. 2023. The Harvey Intake and Plant gave virtually no trouble in 2023, unlike the Magnesia Plant:

System outages, 2023			
From	**To**	**Days**	**Notes**
13 Jan.	19 Jan.	7	Magnesia Creek intake clogged w. vegetation. Entire Village fed from Harvey Plant.
24 Feb.	17 Mar.	3	Magnesia Creek intake frozen. Entire Village fed from Harvey Plant.
18 Mar.	29 Mar.	21	Magnesia Plant on lo-flow bypass to restore chlorine residual. Entire Village fed from Harvey Plant to allow use of Harvey network flowmeters to deduce overnight leakage rates.
7 Apr.	16 Apr.	10	Magnesia Creek intake blocked. Entire Village fed from Harvey Plant.
19 Apr.	20 Apr.	2	Magnesia Plant on lo-flow bypass to restore chlorine residual. Entire Village fed from Harvey Plant.
18 Jul.	19 Jul.	1	Magnesia Creek intake blocked. Entire Village fed from Harvey Plant.
29 Aug.	30 Aug.	2	Magnesia Plant down due to lightning-caused SCADA outage[4]. Tank drawn down by distribution without impacting fire reserve.
11 Oct.	12 Oct.	2	Magnesia Creek intake blocked. Entire Village fed from Harvey Plant.
13 Oct.	2 Nov.	21	Magnesia Plant on lo-flow bypass to put entire Village on Harvey Plant to allow use of Harvey System flowmeters to deduce overnight leakage rates
2 Nov.	3 Nov.	2	Harvey communication fault. Plant continued operating as normal with on-site staff attendance.
5 Dec.	7 Dec.	3	Magnesia Plant on lo-flow bypass to allow use of Harvey System flowmeters to deduce overnight leakage rates
27 Dec.	31 Dec.	5	Magnesia Creek intake blocked. Entire Village fed from Harvey Plant.

8. SITUATION PROTOCOLS

VOLB = Village of Lions Bay Public Works Manager (or designee)
VCH = Vancouver Coastal Health

SITUATION	NOTIFYING AGENCY	AGENCY NOTIFIED	NOTIFICATION TIME FRAME
E. coli positive for any treated water sample	VCH Labs	VOLB & VCH	Immediate
VOLB and VCH will be notified immediately by VCH Labs. Any subsequent samples from the same sampling station will be immediately examined by the laboratory. The chlorine residual noted on the Water Operator's field sheet will be reviewed by VCH Labs and compared to lab analysis test results to determine if there is any			

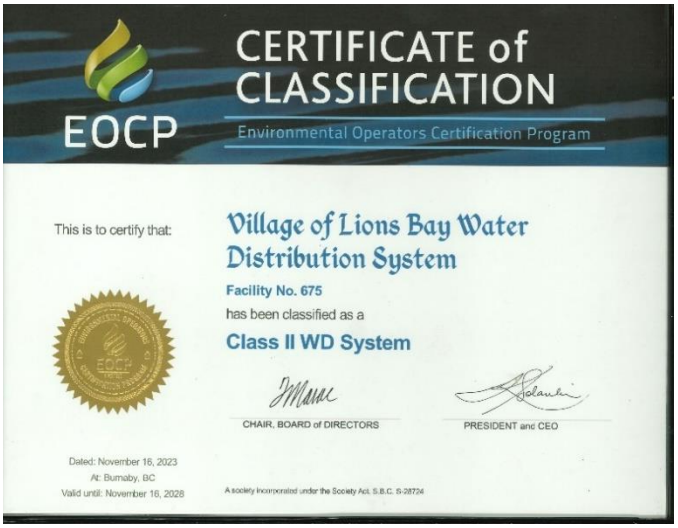
[4]In Aug. 2023, City of Burnaby SCADA personnel attended the Magnesia Plant as a municipality-to-municipality favour to help with a control system outage caused by lightning strike. While here, they indicated that running an electromagnetic data line in the same conduit as a 600 V power feed is not only not to Code, but may be inducing stray voltages and spurious control signals. This possible issue was addressed by switching to fibreoptic data cable service in mid-2024.

SITUATION	NOTIFYING AGENCY	AGENCY NOTIFIED	NOTIFICATION TIME FRAME
local decrease of chlorine residual. Immediate collection and test of a repeat sample, where possible both upstream and downstream of the positive sample location. VCH and VOLB will liaise and determine the need for a Boil Water Advisory (BWA) to be issued by VCH. VCH Lab will test subsequent samples. Once consecutive negative sample results are returned, VOLB will liaise again with VCH and determine whether the BWA can be lifted.			
Total coliform >10/100 ml in raw water AND low chlorine residual in treated water in any sample station	VCH Labs (for TC), VOLB (for chlorine)	VCH	Immediate
VOLB and VCH will be notified immediately by VCH Labs of a TC reading over 10, but it is unlikely that the low chlorine residual condition would apply, since the municipality maintains at least 0.2 ppm throughout the network, with response times to dose changes ranging from minutes close to source, to over 24 hours at the far ends of the network. Nevertheless, any available samples from the same sampling station will be immediately examined by the laboratory, and a repeat sample will be collected, where possible both upstream and downstream of the positive sample location. All other station's TC results will be compared, and VCH and VOLB will liaise and determine the need for a Boil Water Advisory (BWA) to be issued by VCH. Where possible the distribution network will be reconfigured to shut out the creek producing the high TC until offline samples are clear, after which VOLB will again liaise with VCH on lifting the BWA.			
Chemical contamination	VOLB	VCH	Immediate
Chemical contaminants may include nitrates and nitrites, salts, pesticides, metals and toxins. While it is recognised that with only semi-annual sampling, timely detection may not be possible, when they are, VCH will immediately be notified, and steps will commence to isolate the contaminated area. The level of contamination will be determined through sampling and analysis, and public health risk factors will be determined. If necessary a public advisory will be issued and carried out by VOLB under the guidance of VCH. Once the contamination is remedied and consecutive negative sample results are returned from VCH Lab, VOLB will again liaise with VCH and determine whether the public advisory can be lifted.			
Turbidity events >5 NTU	VOLB	VCH	Immediate
UV treatment effectiveness diminishes with increased turbidity due to UV absorbance and reflection and a correspondingly low UV transmittance (UVT) rate. The system automatically increases UV lamp intensity to counter lower UVT. Once the UV dose drops below a minimum of 26.25 mJ/cm^2, the UV reactors stop flow and alert on-call VOLB staff. Long before 5 NTU is reached, high turbidity readings are flagged, with affected sections of the distribution system field-checked and flushed if deemed advisable by VOLB. For turbidity > 5 NTU, microbiological testing is increased at all sampling locations; chlorine residual sampling and testing is likewise increased and VOLB contacts VCH, which may issue a Boil Water Advisory.			
Disinfection failures/continued loss of residual	VOLB	VCH	Immediate for continued loss of residual
If a daily chlorine residual anywhere in the system is below 0.2 mg/ℓ, operators increase dosage at the affected plant, and depending on conditions may dump stored water from the tank to bring in higher chlorine.			

SITUATION	NOTIFYING AGENCY	AGENCY NOTIFIED	NOTIFICATION TIME FRAME
Should chlorine residual remain below 0.2 mg/ℓ for 24 hours, chlorine will be added directly to the tank and chlorine residuals will be checked frequently throughout the system, while investigating the root cause. VOLB will contact VCH, who may issue a Boil Water Advisory if continued loss of residual is observed.			
Loss of distribution pressure due to high demand	VOLB	VCH	Immediate
In the event of adverse pressure loss due to high demand, VOLB will adjust the distribution system to supplement pressure in the affected area. VCH will be notified.			
Water main breaks	VOLB	VCH	Immediate
In the event of a water main break where chemical or microbiological contamination of the system is suspected, VOLB will adjust the system to isolate the contaminated section and consult with VCH regarding further actions; all water quality complaints from the public will be immediately and thoroughly investigated for potential contamination. Water samples will be taken from the vicinity and downstream of the break if possible and tested for the suspected contamination. The same procedures as noted under *E. coli* above will be implemented if required.			
Low supply due to drought or other causes	VOLB	EMCR & VCH	Information only; as drought situation progresses
The control system alarms if supply pressure at a plant decreases rapidly, and staff ascertain and address the root cause of the problem (i.e. whether the decrease is due to an intake blockage or a break in the feed line). Low supply results in conservation measures being instituted. Level 1 of the municipality's Outdoor Water Use Bylaw (www.lionsbay.ca/entails only restricting lawn watering to three days a week, and is set around June 1 every year, as much for awareness as conservation. Level 2 is utilized to further reduce outdoor use of water, and Level 3 is reserved for serious supply shortage. In late 2023, in anticipation of unprecedented supply shortage in 2024, further considerations were mooted to Council for Level 3 with no decision taken: CODE RED: 3-day-average supply within 125% of demand • Town Hall and information campaign • Activate Outdoor Water Use Bylaw Level 3 with stringent enforcement, including drone overflight (subject to Federal regulations) and zero-tolerance ticketing for offenses • Building Inspector lock out of private irrigation systems and decommissioning of indoor and outdoor water features per OWU • Full court press on locating remaining 30 lost curb stops • Implement IR heat detection cameras viewing the upslopes • Implement Trail Ambassadors program (for wildfire mitigation). Two further conservation levels, Orange and White, have also been mooted: CODE ORANGE: 3-day-average supply within 110% of demand • Town Hall and information campaign • Subject to prospects for worthwhile rain, declaration of a state local emergency to allow shutoff of suspect service connections (known faulty services can already be shut off by bylaw as noted above) • Because the critical requirements for a residence to remain habitable are flushing toilets and dishwashing, commence sourcing curbside water barrels labelled "*NON-POTABLE WATER: NOT FOR HUMAN OR ANIMAL CONSUMPTION. Free to residents for indoor use only: bathing, cleaning, toilet tanks, dishwashing.*" • Commence sourcing bottled drinking and cooking water			

SITUATION	NOTIFYING AGENCY	AGENCY NOTIFIED	NOTIFICATION TIME FRAME
• Mutual aid negotiations, including but not limited to shower facilities at West Vancouver's Gleneagles community centre, mobile laundromat trailer (filtered non-potable water), nearby fire departments. CODE WHITE: supply less than demand • Declare State of Local Emergency • Town Hall and information campaign • In sufficient time for no user to receive water that has been exposed to dried mains, shut off all street mains and 550+ service curb stops • With hydrants no longer operational, institute previously recruited citizen/contractor firewatch • Place remaining curbside barrels and commence roving tanker top-up service • Activate mutual aid agreements • When creek supply reliably returns, in consultation with water authority flush and hyper-chlorinate tanks and mains (7 – 14 days) • Reopen curb stops under Boil Water Order, then Boil Water Advisory • Refund water utility fees. VOLB will liaise with EMCR and VCH for a coordinated response as events unfold.			

APPENDIX: CERTIFICATIONS



EOCP

CERTIFICATE of CLASSIFICATION

Environmental Operators Certification Program

This is to certify that:

Village of Lions Bay Water Distribution System

Facility No. 675

has been classified as a

Class II WD System

CHAIR, BOARD of DIRECTORS

PRESIDENT and CEO

Dated: November 16, 2023
At: Burnaby, BC
Valid until: November 16, 2028

A society incorporated under the Society Act, S.B.C. S-28724



EOCP

CERTIFICATE of CLASSIFICATION

Environmental Operators Certification Program

This is to certify that:

Village of Lions Bay - Magnesia Water Treatment Plant

Facility No. 2330

has been classified as a

Class I WT Facility

CHAIR, BOARD of DIRECTORS

PRESIDENT and CEO

Dated: November 16, 2023
At: Burnaby, BC
Valid until: November 16, 2028

A society incorporated under the Society Act, S.B.C. S-28724



EOCP

CERTIFICATE of CLASSIFICATION

Environmental Operators Certification Program

This is to certify that:

Village of Lions Bay - Harvey Water Treatment Plant

Facility No. 2329

has been classified as a

Class I WT Facility

CHAIR, BOARD of DIRECTORS

PRESIDENT and CEO

Dated: November 16, 2023
At: Burnaby, BC
Valid until: November 16, 2028

A society incorporated under the Society Act, S.B.C. S-28724

APPENDIX: *SOURCE* WATER NTU AND UVT AGAINST RAINFALL

UV transmittance (under 89% flagged), manual-measure NTU, rainfall						
Source ➔ ⬇ 2023	Harvey Creek			Magnesia Creek		
	UVT (%)	NTU	24 h rain (mm)	UVT (%)	NTU	24 h rain (mm)
Tue. 03 Jan	90.6	0.33	0.00	95.0	0.29	0.00
Wed. 04 Jan	91.9	0.36	0.00	94.6	0.41	0.00
Thu. 05 Jan	89.0	0.53	9.50	94.9	0.59	8.50
Fri. 06 Jan	86.9	0.49	21.00	91.6	0.85	21.50
Mon. 09 Jan	87.4	0.41	20.75	91.8	0.65	13.75
Tue. 10 Jan	86.9	0.33	22.50	92.3	0.49	15.00
Wed. 11 Jan	90.1	0.41	1.00	94.1	0.60	0.75
Thu. 12 Jan	82.1	0.77	25.75	92.6	0.49	18.50
Fri. 13 Jan	86.2	1.50	46.50	88.4	1.99	33.75
Mon. 16 Jan	82.5	0.49	30.00	89.0	1.82	20.25
Tue. 17 Jan	86.4	0.52	15.00	89.0	1.52	12.75
Wed. 18 Jan	80.4	0.65	34.50	89.2	1.31	22.00
Thu. 19 Jan	89.6	0.55	13.50	94.4	0.43	9.25
Fri. 20 Jan	91.1	0.43	0.25	94.8	0.37	0.25
Mon. 23 Jan	90.7	0.58	N/A	95.1	0.60	0.50
Tue. 24 Jan	91.9	0.51	N/A	95.6	0.60	0.25
Wed. 25 Jan	92.5	0.37	0.25	96.2	0.26	1.00
Thu. 26 Jan	92.6	0.36	0.00	96.5	0.49	0.00
Fri. 27 Jan	93.1	0.38	1.50	96.6	0.32	2.00
Mon. 30 Jan	93.9	0.47	0.00	97.6	0.27	0.00
Tue. 31 Jan	94.1	0.44	0.00	96.9	0.33	0.00
Wed. 01 Feb	94.6	0.59	5.00	97.5	1.02	0.00
Thu. 02 Feb	94.3	0.56	0.50	97.4	0.31	9.25
Fri. 03 Feb	93.8	0.35	0.00	97.2	0.41	0.00
Mon. 06 Feb	89.0	0.73	2.50	95.7	0.24	3.00
Tue. 07 Feb	82.5	1.02	11.00	94.9	0.49	9.75
Wed. 08 Feb	88.4	0.61	29.25	94.3	0.31	18.25
Thu. 09 Feb	90.2	0.33	0.75	95.2	0.40	1.00
Fri. 10 Feb	90.7	0.44	9.50	95.8	0.38	9.00
Mon. 13 Feb	90.3	0.40	13.00	95.4	0.38	13.75
Tue. 14 Feb	91.7	0.84	0.25	95.4	0.37	0.50
Wed. 15 Feb	91.8	0.51	0.00	95.6	0.51	0.51
Thu. 16 Feb	92.9	0.21	0.00	96.3	0.18	0.75
Fri. 17 Feb	92.9	0.18	15.25	96.6	0.18	8.25
Tue. 21 Feb	91.4	0.49	6.25	96.3	0.53	6.25
Wed. 22 Feb	91.8	0.52	3.00	96.7	0.22	2.25
Thu. 23 Feb	93.2	0.49	0.00	96.1	0.30	0.00
Fri. 24 Feb	95.6	0.23	0.00	96.3	0.98	0.00
Mon. 27 Feb	93.7	0.50	1.00	95.3	1.89	2.00
Wed. 01 Mar	93.9	0.53	16.00	N/A	N/A	N/A
Thu. 02 Mar	94.1	0.54	0.75	96.3	0.75	8.75
Fri. 03 Mar	93.7	0.25	N/A	96.7	0.39	9.75
Mon. 06 Mar	93.2	0.78	N/A	96.2	0.38	3.25
Tue. 07 Mar	93.9	0.65	N/A	96.9	0.29	6.25
Wed. 08 Mar	93.9	0.44	0.00	96.8	0.32	1.50
Thu. 09 Mar	94.0	0.55	0.00	96.7	0.43	1.00
Fri. 10 Mar	93.8	0.26	0.00	97.2	0.44	0.00
Mon. 13 Mar	85.3	0.35	N/A	97.0	0.50	14.00

UV transmittance (under 89% flagged), manual-measure NTU, rainfall						
Source ➔ ⬇ 2023	Harvey Creek			Magnesia Creek		
	UVT (%)	NTU	24 h rain (mm)	UVT (%)	NTU	24 h rain (mm)
Tue. 14 Mar	89.1	0.91	N/A	95.7	0.39	0.25
Wed. 15 Mar	91.8	0.28	N/A	97.1	0.28	0.28
Thu. 16 Mar	92.6	0.34	N/A	96.6	0.35	N/A
Fri. 17 Mar	92.4	0.48	N/A	96.6	0.48	0.00
Mon. 20 Mar	89.0	0.43	N/A	89.1	0.51	0.25
Tue. 21 Mar	90.0	0.51	N/A	95.3	0.45	3.00
Wed. 22 Mar	90.4	0.29	N/A	95.5	0.49	0.00
Thu. 23 Mar	91.6	0.32	N/A	95.6	0.44	0.00
Fri. 24 Mar	91.5	0.29	N/A	95.4	0.53	3.00
Mon. 27 Mar	91.9	0.37	N/A	96.0	0.25	0.00
Tue. 28 Mar	92.8	0.31	N/A	96.7	0.58	0.00
Wed. 29 Mar	93.2	0.32	N/A	96.9	0.24	0.00
Thu. 30 Mar	93.3	0.37	N/A	96.9	0.52	0.00
Fri. 31 Mar	93.4	0.32	N/A	96.7	0.24	0.00
Mon. 03 Apr	92.9	0.40	N/A	96.9	0.46	13.75
Tue. 04 Apr	92.7	0.37	N/A	96.5	0.33	0.25
Wed. 05 Apr	92.8	0.25	0.00	96.4	0.34	0.34
Thu. 06 Apr	92.6	0.23	0.75	96.4	0.20	0.25
Sun. 09 Apr	92.1	0.41	32.00	N/A	N/A	N/A
Tue. 11 Apr	91.0	0.30	3.75	N/A	N/A	N/A
Wed. 12 Apr	91.1	0.29	7.00	94.6	N/A	N/A
Thu. 13 Apr	91.5	0.29	0.00	94.1	N/A	N/A
Fri. 14 Apr	92.1	0.30	0.00	95.3	N/A	N/A
Mon. 17 Apr	88.3	0.23	22.50	90.5	0.28	17.25
Tue. 18 Apr	90.9	0.22	10.00	94.4	0.26	9.00
Wed. 19 Apr	89.4	0.34	21.00	89.3	0.36	16.50
Thu. 20 Apr	87.9	0.26	6.00	89.2	0.30	6.00
Fri. 21 Apr	88.1	0.28	18.25	82.8	0.23	0.23
Mon. 24 Apr	86.7	0.28	10.25	85.5	0.27	0.27
Tue. 25 Apr	93.6	0.19	1.00	88.2	0.23	1.25
Wed. 26 Apr	90.9	0.26	0.00	94.4	0.37	0.00
Thu. 27 Apr	87.7	0.40	5.25	93.7	0.29	5.00
Fri. 28 Apr	89.6	0.29	0.00	93.3	0.33	0.00
Mon. 01 May	90.5	0.39	0.25	92.6	0.44	0.25
Tue. 02 May	89.5	0.34	0.25	92.7	0.85	0.25
Wed. 03 May	89.9	0.52	0.00	91.3	0.77	0.00
Thu. 04 May	89.7	0.53	0.00	91.1	0.82	0.00
Fri. 05 May	89.3	0.70	6.75	92.1	0.92	8.50
Mon. 08 May	91.1	0.51	0.50	94.6	0.47	0.00
Tue. 09 May	90.7	0.44	0.50	94.3	0.36	0.00
Wed. 10 May	90.3	0.31	0.00	94.2	0.66	0.00
Thu. 11 May	89.6	0.78	0.00	93.3	0.99	0.00
Fri. 12 May	90.3	0.35	0.00	93.2	0.42	0.00
Mon. 15 May	89.6	0.41	0.00	91.6	0.92	0.00
Tue. 16 May	90.0	0.55	0.00	91.9	1.50	0.00
Wed. 17 May	90.6	0.42	0.00	91.8	1.40	0.00
Thu. 18 May	89.5	0.41	0.00	92.0	1.48	0.00
Fri. 19 May	89.7	0.30	0.00	92.2	1.09	0.00
Tue. 23 May	91.8	0.65	0.00	94.4	0.98	0.00
Wed. 24 May	92.1	0.44	0.00	94.7	0.77	0.00
Thu. 25 May	92.0	0.43	0.00	94.3	0.56	0.00
Fri. 26 May	89.9	0.31	0.00	92.1	0.28	0.00

UV transmittance (under 89% flagged), manual-measure NTU, rainfall						
Source ➔ ⬇ 2023	Harvey Creek			Magnesia Creek		
	UVT (%)	NTU	24 h rain (mm)	UVT (%)	NTU	24 h rain (mm)
Mon. 29 May	91.3	0.28	0.00	92.9	0.78	0.00
Tue. 30 May	92.2	0.47	0.00	94.4	0.93	0.00
Wed. 31 May	92.3	0.35	0.00	94.9	0.45	0.00
Thu. 01 Jun	92.3	0.35	0.00	95.0	0.41	0.00
Fri. 02 Jun	94.5	0.32	0.00	94.2	0.64	0.00
Mon. 05 Jun	92.4	0.62	0.00	94.7	0.40	0.00
Tue. 06 Jun	92.6	0.42	0.00	94.2	0.50	0.00
Wed. 07 Jun	90.4	0.49	0.00	92.4	0.43	0.00
Thu. 08 Jun	92.0	0.39	0.00	93.3	0.41	0.00
Fri. 09 Jun	92.6	0.36	0.00	93.4	0.49	0.00
Mon. 12 Jun	91.6	0.44	0.00	92.5	0.56	0.00
Tue. 13 Jun	93.1	0.38	0.00	93.3	0.56	0.00
Wed. 14 Jun	93.6	0.30	0.75	94.0	0.39	1.25
Thu. 15 Jun	94.2	0.34	0.00	95.4	0.44	0.00
Fri. 16 Jun	93.9	0.54	0.00	95.2	0.67	0.00
Mon. 19 Jun	94.5	0.37	0.00	95.3	0.48	0.00
Tue. 20 Jun	93.7	0.37	6.00	94.9	0.49	6.25
Wed. 21 Jun	94.0	0.37	0.00	95.4	0.33	0.00
Thu. 22 Jun	94.1	0.46	0.00	94.8	0.71	0.00
Fri. 23 Jun	92.9	0.43	0.00	93.4	0.59	0.00
Mon. 26 Jun	93.3	0.62	0.00	93.3	0.36	0.00
Tue. 27 Jun	94.3	0.36	0.00	94.4	0.61	0.00
Wed. 28 Jun	94.8	0.32	0.00	94.5	0.39	0.00
Thu. 29 Jun	94.9	0.37	0.00	94.3	0.59	0.00
Fri. 30 Jun	95.2	0.46	0.00	94.9	0.46	0.00
Tue. 04 Jul	94.2	0.20	0.00	94.7	0.27	0.00
Wed. 05 Jul	95.3	0.23	0.00	95.5	0.29	0.00
Thu. 06 Jul	93.8	0.25	0.00	94.3	0.37	0.00
Fri. 07 Jul	94.0	0.17	0.00	94.1	0.18	0.00
Mon. 10 Jul	94.6	0.27	0.00	95.2	0.28	0.00
Tue. 11 Jul	95.0	0.22	0.00	95.1	0.24	0.00
Wed. 12 Jul	95.5	0.34	0.00	95.8	0.29	0.00
Thu. 13 Jul	95.5	0.52	0.00	95.6	0.64	0.00
Fri. 14 Jul	94.7	0.33	0.00	95.3	0.64	0.00
Mon. 17 Jul	95.0	0.29	0.00	95.6	0.30	0.00
Tue. 18 Jul	95.6	0.28	0.00	96.3	0.38	0.00
Wed. 19 Jul	96.1	0.25	0.00	96.7	0.24	0.00
Thu. 20 Jul	94.5	0.25	0.00	95.4	0.25	0.00
Fri. 21 Jul	95.1	0.23	0.00	95.2	0.26	0.00
Mon. 24 Jul	95.4	0.19	0.00	95.6	0.34	0.00
Tue. 25 Jul	92.8	0.46	23.00	95.7	0.48	29.00
Wed. 26 Jul	93.7	0.20	0.75	95.5	0.22	1.00
Thu. 27 Jul	94.6	0.28	0.00	96.1	0.47	0.00
Fri. 28 Jul	94.7	0.20	0.00	96.1	0.24	0.00
Mon. 31 Jul	95.8	0.38	0.00	96.5	0.19	0.00
Tue. 01 Aug	96.2	0.29	0.00	96.8	0.24	0.00
Wed. 02 Aug	94.3	0.26	0.00	94.8	0.42	0.00
Thu. 03 Aug	94.0	0.21	0.00	95.2	0.19	0.00
Fri. 04 Aug	95.2	0.35	0.00	95.9	0.83	0.00
Tue. 08 Aug	94.2	0.19	0.00	95.5	0.18	0.00
Wed. 09 Aug	92.3	0.25	9.25	94.3	0.20	9.25
Thu. 10 Aug	92.8	0.34	5.75	95.8	0.71	4.75

UV transmittance (under 89% flagged), manual-measure NTU, rainfall						
Source ➔ ⬇ 2023	Harvey Creek			Magnesia Creek		
	UVT (%)	NTU	24 h rain (mm)	UVT (%)	NTU	24 h rain (mm)
Fri. 11 Aug	94.3	0.22	0.00	96.1	0.38	0.00
Mon. 14 Aug	95.0	0.22	0.00	95.9	0.22	0.00
Tue. 15 Aug	94.5	0.21	0.00	95.6	0.26	0.00
Wed. 16 Aug	95.1	0.35	0.00	94.7	0.33	0.00
Thu. 17 Aug	94.8	0.19	0.00	96.1	0.22	0.00
Fri. 18 Aug	95.1	0.21	0.00	96.4	0.33	0.00
Mon. 21 Aug	95.9	0.29	0.00	96.7	0.59	0.00
Tue. 22 Aug	95.8	0.31	0.00	95.2	2.02	0.00
Wed. 23 Aug	95.3	0.26	0.00	96.0	0.42	0.00
Thu. 24 Aug	95.5	0.37	0.00	96.5	0.46	0.00
Fri. 25 Aug	96.0	0.30	0.00	96.9	0.45	0.00
Mon. 28 Aug	95.5	0.50	0.00	96.5	0.52	0.00
Tue. 29 Aug	96.0	0.27	0.50	96.4	0.41	0.75
Wed. 30 Aug	92.8	0.71	17.75	96.4	0.81	N/A
Thu. 31 Aug	94.5	0.39	3.50	96.3	0.71	4.25
Fri. 01 Sep	94.9	0.19	0.25	96.4	0.48	0.00
Tue. 05 Sep	95.9	0.36	0.00	97.6	0.56	0.00
Wed. 06 Sep	96.2	0.22	0.00	96.6	0.90	0.00
Thu. 07 Sep	94.6	0.22	0.50	96.8	0.57	1.50
Fri. 08 Sep	95.7	0.20	0.00	96.3	0.59	0.00
Mon. 11 Sep	96.3	0.28	0.00	96.8	0.50	0.00
Tue. 12 Sep	95.3	0.19	0.50	95.9	0.75	0.75
Wed. 13 Sep	95.8	0.31	0.75	96.8	1.00	1.25
Thu. 14 Sep	95.8	0.26	0.00	96.4	0.82	0.00
Fri. 15 Sep	95.6	0.48	0.00	96.5	0.60	0.00
Mon. 18 Sep	96.3	0.25	0.50	96.5	1.25	1.25
Tue. 19 Sep	96.4	0.38	0.50	97.0	0.82	0.50
Wed. 20 Sep	95.5	0.33	9.00	96.7	0.56	8.50
Thu. 21 Sep	95.5	0.24	0.00	96.9	0.49	0.00
Fri. 22 Sep	96.2	0.42	0.00	96.6	0.82	0.00
Mon. 25 Sep	77.0	1.07	36.50	89.7	1.10	29.75
Tue. 26 Sep	89.2	0.53	54.50	90.1	1.65	51.50
Wed. 27 Sep	87.5	0.50	15.25	89.1	0.71	15.50
Thu. 28 Sep	90.3	0.38	7.00	91.1	0.57	8.25
Fri. 29 Sep	91.1	0.62	3.25	93.0	0.43	4.50
Tue. 03 Oct	91.1	0.45	10.50	95.2	0.67	11.00
Wed. 04 Oct	92.9	0.46	0.00	93.8	0.71	0.00
Thu. 05 Oct	92.9	0.46	0.00	93.3	0.61	0.00
Fri. 06 Oct	92.7	0.28	0.00	95.3	0.44	0.00
Tue. 10 Oct	86.8	0.40	18.25	90.6	0.58	21.25
Wed. 11 Oct	84.8	0.59	45.00	89.3	0.63	46.75
Thu. 12 Oct	90.2	0.29	0.00	87.8	0.84	0.25
Fri. 13 Oct	91.2	0.27	0.00	93.8	0.20	0.00
Mon. 16 Oct	90.0	0.34	4.75	92.4	0.59	5.75
Tue. 17 Oct	90.4	0.22	16.25	92.1	0.39	15.25
Wed. 18 Oct	79.3	1.02	59.50	85.9	1.35	66.80
Thu. 19 Oct	83.6	0.30	59.00	82.8	0.30	59.50
Fri. 20 Oct	89.5	0.22	1.50	91.6	0.69	1.50
Mon. 23 Oct	92.0	0.30	0.00	95.3	0.65	0.00
Tue. 24 Oct	91.2	0.30	0.00	95.9	0.48	0.00
Wed. 25 Oct	86.1	0.41	43.75	94.3	0.50	46.75
Thu. 26 Oct	90.5	0.18	0.00	94.7	0.29	0.00

UV transmittance (under 89% flagged), manual-measure NTU, rainfall						
Source ➔ ⬇ 2023	Harvey Creek			Magnesia Creek		
	UVT (%)	NTU	24 h rain (mm)	UVT (%)	NTU	24 h rain (mm)
Fri. 27 Oct	90.9	0.35	0.00	94.3	0.34	0.00
Mon. 30 Oct	93.0	0.48	0.00	95.7	0.54	0.00
Tue. 31 Oct	91.2	0.16	0.00	96.1	0.37	0.00
Wed. 01 Nov	93.0	0.46	0.00	96.2	0.68	0.00
Thu. 02 Nov	79.8	0.77	16.00	93.0	0.67	22.50
Fri. 03 Nov	88.3	0.20	9.50	91.4	0.74	13.00
Mon. 06 Nov	80.3	0.37	N/A	85.6	1.45	25.00
Tue. 07 Nov	87.7	0.23	N/A	91.3	0.55	8.25
Wed. 08 Nov	90.5	0.21	N/A	90.0	0.29	0.00
Thu. 09 Nov	90.9	0.29	N/A	94.2	0.72	1.25
Fri. 10 Nov	96.2	0.30	N/A	92.8	0.19	17.50
Tue. 14 Nov	90.5	0.24	N/A	93.9	0.24	0.00
Wed. 15 Nov	91.5	0.23	0.00	94.7	0.25	0.00
Thu. 16 Nov	92.3	0.17	0.25	95.1	0.50	0.50
Fri. 17 Nov	92.5	0.19	0.00	95.6	0.32	0.00
Mon. 20 Nov	90.1	0.21	0.25	93.9	0.57	0.25
Tue. 21 Nov	91.2	0.27	0.00	94.9	0.39	0.00
Wed. 22 Nov	88.5	0.23	0.00	94.7	0.38	0.00
Thu. 23 Nov	91.2	0.22	0.00	95.2	0.62	0.00
Fri. 24 Nov	90.9	0.45	0.00	95.5	0.78	0.00
Mon. 27 Nov	93.1	0.17	0.00	95.9	0.36	0.00
Tue. 28 Nov	92.5	0.18	0.00	95.8	0.50	0.00
Wed. 29 Nov	93.0	0.22	0.00	96.1	0.31	0.00
Thu. 30 Nov	93.8	0.30	0.00	95.6	0.47	0.00
Fri. 01 Dec	93.0	0.29	4.25	96.4	0.34	5.50
Mon. 04 Dec	86.9	0.32	11.50	94.6	0.46	10.50
Tue. 05 Dec	84.2	0.60	75.75	82.1	2.12	81.75
Wed. 06 Dec	87.6	0.33	3.25	86.5	1.26	3.50
Thu. 07 Dec	89.7	0.20	0.50	92.9	0.75	0.75
Fri. 08 Dec	90.2	0.22	0.00	94.2	0.29	0.00
Mon. 11 Dec	88.1	0.27	8.75	93.7	0.57	5.75
Tue. 12 Dec	90.2	0.24	0.00	93.4	0.32	0.00
Wed. 13 Dec	91.2	0.24	0.00	95.6	0.36	0.00
Thu. 14 Dec	91.2	0.20	N/A	95.6	0.29	2.25
Fri. 15 Dec	90.3	N/A	N/A	95.0	N/A	4.00
Mon. 18 Dec	89.0	N/A	N/A	94.8	0.37	4.75
Tue. 19 Dec	86.7	0.50	11.25	90.5	0.56	13.50
Wed. 20 Dec	86.5	0.32	20.25	88.4	0.55	18.75
Thu. 21 Dec	86.7	0.33	9.75	91.0	0.43	10.50
Fri. 22 Dec	88.0	0.27	7.75	92.4	0.37	10.50
Sat. 23 Dec	89.7	0.31	N/A	93.6	0.20	N/A
Wed. 27 Dec	89.8	0.28	2.00	92.4	1.22	5.45
Sat. 30 Dec	88.6	0.38	10.25	86.1	1.36	8.00
MIN	77.0	0.16	N/A	82.1	0.18	N/A
MAX	96.4	1.50	N/A	97.6	2.12	N/A
MED	92.1	0.34	N/A	95.1	0.46	N/A
AVG	91.6	0.38	N/A	94.2	0.55	N/A

APPENDIX: *TREATED* WATER TURBIDITY, Cl_2 RESIDUAL

2023 date	Days since last	SAMPLE LOCATION (based on operational needs[5] sampled water can be from the Harvey or Magnesia System.															
		HARVEY		PRV-3		STORE/CAFÉ		LIONS BAY		KELVIN		MAGNESIA		PRV-5		BRUNSWICK	
		Turbidity/ NTU*	Chlorine/ mg/ℓ **	Turbidity/ NTU*	Chlorine/ mg/ℓ **	Turbidity/ NTU*	Chlorine/ mg/ℓ **	Turbidity/ NTU*	Chlorine/ mg/ℓ **	Turbidity/ NTU*	Chlorine/ mg/ℓ **	Turbidity/ NTU*	Chlorine/ mg/ℓ **	Turbidity/ NTU*	Chlorine/ mg/ℓ **	Turbidity/ NTU*	Chlorine/ mg/ℓ **
Tue, 03 Jan		0.61	0.90	0.3	0.8	0.69	0.73	0.34	0.58	0.25	0.75	0.45	0.84	0.4	0.7	0.67	0.59
Wed, 04 Jan	1	0.76	0.87	0.2	0.8	0.64	0.71	0.36	0.66	0.26	0.67	0.79	0.83	0.5	0.7	0.52	0.65
Thu, 05 Jan	1	0.37	0.84	0.3	0.8	0.83	0.67	0.27	0.65	0.45	0.70	0.63	0.89	0.3	0.8	0.65	0.61
Fri, 06 Jan	1	0.63	0.89	0.8	0.8	0.64	0.56	0.25	0.65	0.18	0.51	0.46	0.86	0.3	0.8	0.58	0.60
Mon, 09 Jan	3	0.54	0.86	0.5	0.8	0.81	0.57	0.40	0.63	0.25	0.36	0.53	0.88	0.5	0.7	0.95	0.57
Tue, 10 Jan	1	1.77	0.90	0.4	0.8	1.05	0.61	0.22	0.58	0.96	0.40	0.83	0.94	0.3	0.8	0.81	0.52
Wed, 11 Jan	1	0.45	0.93	0.3	0.8	0.75	0.68	0.33	0.59	0.21	0.46	0.68	0.89	0.3	0.8	1.08	0.52
Thu, 12 Jan	1	0.67	0.84	0.5	0.8	1.06	0.65	0.44	0.60	0.47	0.35	0.50	0.85	0.2	0.7	0.83	0.56
Fri, 13 Jan	1	1.05	0.95	1.1	0.8	1.27	0.67	0.29	0.64	0.19	0.47	0.67	0.80	0.5	0.8	1.21	0.55
Mon, 16 Jan	3	1.18	0.88	0.8	0.8	1.13	0.72	0.57	0.64	0.32	0.30	0.67	0.63	0.4	0.8	0.71	0.26
Tue, 17 Jan	1	0.95	0.92	0.6	0.8	0.90	0.61	0.41	0.65	0.32	0.60	0.69	0.57	0.4	0.6	1.06	0.20
Wed, 18 Jan	1	0.92	0.81	1.0	0.7	0.77	0.70	0.33	0.53	0.32	0.35	1.07	1.06	0.2	0.7	1.02	0.25
Thu, 19 Jan	1	0.82	0.97	0.4	0.8	0.70	0.68	0.26	0.56	0.27	0.21	0.77	0.85	0.3	0.7	0.56	0.28
Fri, 20 Jan	1	0.44	0.85	0.3	0.7	0.73	0.63	0.38	0.54	0.24	0.30	0.93	0.82	0.4	0.7	0.84	0.26
Mon, 23 Jan	3	0.33	0.94	0.5	0.8	0.67	0.75	0.37	0.65	0.25	0.26	0.98	0.86	0.3	0.7	0.44	0.46
Tue, 24 Jan	1	0.90	0.99	0.8	0.8	0.76	0.77	0.26	0.71	0.19	0.65	0.67	0.93	0.4	0.7	0.45	0.56
Wed, 25 Jan	1	0.68	0.90	0.3	0.8	0.90	0.75	0.28	0.72	0.22	0.46	0.66	0.92	0.3	0.8	1.17	0.62
Thu, 26 Jan	1	0.53	0.87	0.8	0.8	0.63	0.65	0.22	0.71	0.40	0.55	0.63	0.88	0.9	0.7	0.61	0.60
Fri, 27 Jan	1	0.35	0.88	0.4	0.8	0.41	0.67	0.24	0.71	0.34	0.66	0.55	0.87	0.3	0.7	0.79	0.63
Mon, 30 Jan	3	0.82	0.88	0.8	0.8	0.46	0.71	0.20	0.70	0.25	0.36	0.72	0.88	0.2	0.8	0.84	0.60
Tue, 31 Jan	1	0.42	0.90	0.3	0.8	0.57	0.75	0.31	0.69	0.32	0.80	0.24	0.83	0.4	0.7	0.56	0.74
Wed, 01 Feb	1	1.09	0.90	0.2	0.8	0.82	0.79	0.27	0.82	0.22	0.65	0.41	0.85	0.5	0.8	0.50	0.70
Thu, 02 Feb	1	0.45	0.88	0.5	0.8	0.51	0.73	0.27	0.75	0.38	0.78	0.70	0.90	0.4	0.8	0.63	0.63
Fri, 03 Feb	1	0.72	0.89	0.3	0.8	0.51	0.75	0.23	0.78	0.67	0.75	0.85	0.85	0.3	0.8	1.27	0.59
Mon, 06 Feb	3	0.54	0.91	0.5	0.8	0.84	0.70	0.23	0.54	0.28	0.46	0.30	0.86	0.3	0.7	0.65	0.64
Tue, 07 Feb	1	1.04	0.89	0.7	0.8	0.55	0.65	0.66	0.60	0.24	0.51	0.45	0.94	0.2	0.8	0.58	0.67
Wed, 08 Feb	1	0.76	0.81	0.8	0.7	0.64	0.60	0.27	0.67	0.30	0.51	0.39	0.88	0.2	0.8	0.87	0.61

[5] For example an intake being blocked or maintenance on a plant

2023 date	Days since last	SAMPLE LOCATION (based on operational needs[5] sampled water can be from the Harvey or Magnesia System.															
		HARVEY		PRV-3		STORE/CAFÉ		LIONS BAY		KELVIN		MAGNESIA		PRV-5		BRUNSWICK	
		Turbidity/ NTU*	Chlorine/ mg/ℓ **	Turbidity/ NTU*	Chlorine/ mg/ℓ **	Turbidity/ NTU*	Chlorine/ mg/ℓ **	Turbidity/ NTU*	Chlorine/ mg/ℓ **	Turbidity/ NTU*	Chlorine/ mg/ℓ **	Turbidity/ NTU*	Chlorine/ mg/ℓ **	Turbidity/ NTU*	Chlorine/ mg/ℓ **	Turbidity/ NTU*	Chlorine/ mg/ℓ **
Thu, 09 Feb	1	0.74	0.97	0.7	0.9	0.84	0.78	0.53	0.47	0.31	0.35	0.44	0.88	0.4	0.7	0.58	0.66
Fri, 10 Feb	1	0.48	0.84	0.5	0.7	0.81	0.66	0.25	0.66	0.42	0.27	1.25	0.88	0.3	0.6	0.53	0.67
Mon, 13 Feb	3	0.68	0.85	0.4	0.8	0.55	0.68	0.24	0.68	0.30	0.37	0.33	0.87	0.3	0.7	0.75	0.65
Tue, 14 Feb	1	0.86	0.89	0.5	0.8	0.55	0.70	0.27	0.65	0.27	0.70	0.37	0.82	0.2	0.7	0.47	0.67
Wed, 15 Feb	1	0.29	0.88	0.3	0.8	0.66	0.70	0.22	0.66	0.21	0.65	1.14	0.88	0.2	0.7	0.66	0.65
Thu, 16 Feb	1	0.34	0.90	0.4	0.8	0.36	0.72	0.38	0.66	0.36	0.64	0.35	0.87	0.3	0.8	0.21	0.64
Fri, 17 Feb	1	0.21	0.99	0.2	0.8	0.31	0.74	0.20	0.65	0.39	0.48	0.20	0.91	0.2	0.8	0.22	0.62
Tue, 21 Feb	4	0.53	0.85	0.3	0.8	0.41	0.70	0.26	0.72	0.49	0.32	0.59	0.85	0.2	0.7	0.54	0.69
Wed, 22 Feb	1	0.63	0.92	0.3	0.8	0.40	0.70	0.18	0.66	0.27	0.59	0.26	0.95	0.3	0.8	0.31	0.62
Thu, 23 Feb	1	0.50	0.90	0.3	0.8	0.39	0.72	0.24	0.66	0.19	0.61	0.41	0.88	0.2	0.8	0.43	0.66
Fri, 24 Feb	1	0.78	0.88	0.3	0.8	0.42	0.76	0.24	0.73	0.26	0.59	0.50	0.82	0.3	0.7	0.39	0.65
Mon, 27 Feb	3	0.53	0.91	0.3	0.9	0.22	0.78	0.18	0.78	0.19	0.79	0.40	0.74	0.3	0.8	0.20	0.53
Wed, 01 Mar	2	0.73	0.90	0.5	0.8	0.55	0.78	0.25	0.75	0.25	0.64	N/A	N/A	0.3	0.8	0.42	0.64
Thu, 02 Mar	1	0.53	0.90	0.2	0.9	0.52	0.77	0.30	0.75	0.23	0.64	0.41	0.65	0.4	0.8	0.43	0.58
Fri, 03 Mar	1	0.38	0.91	0.9	0.8	0.33	0.78	0.28	0.76	0.22	0.68	0.56	0.65	0.3	0.8	0.38	0.61
Mon, 06 Mar	3	0.83	0.89	0.8	0.8	1.00	0.76	0.24	0.76	0.22	0.58	0.83	1.05	0.2	0.8	0.54	0.62
Tue, 07 Mar	1	0.43	0.89	0.3	0.8	0.95	0.83	0.21	0.73	0.29	0.70	0.65	1.08	0.8	0.8	0.61	0.60
Wed, 08 Mar	1	0.53	0.87	0.4	0.9	1.02	0.73	0.26	0.76	0.34	0.64	0.64	1.23	0.2	0.8	0.54	0.67
Thu, 09 Mar	1	0.34	0.88	0.4	0.8	0.58	0.76	0.30	0.74	0.32	0.70	0.44	1.16	0.4	0.8	0.81	0.55
Fri, 10 Mar	1	0.40	0.89	0.3	0.8	0.59	0.85	0.26	0.75	0.28	0.68	0.65	1.03	0.4	0.8	0.41	0.61
Mon, 13 Mar	3	0.66	0.86	0.2	0.8	0.44	0.78	0.23	0.71	0.30	0.49	0.38	0.90	0.2	0.8	0.37	0.52
Tue, 14 Mar	1	0.70	0.95	0.3	0.9	0.21	0.77	0.20	0.73	0.21	0.68	0.54	0.81	0.2	0.8	0.22	0.61
Wed, 15 Mar	1	0.71	0.86	0.4	0.8	0.77	0.68	0.20	0.68	0.25	0.58	0.46	0.80	0.2	0.8	0.47	0.56
Thu, 16 Mar	1	0.29	0.89	0.3	0.8	0.36	0.71	0.33	0.66	0.26	0.52	0.35	0.83	0.2	0.8	0.28	0.55
Fri, 17 Mar	1	0.47	0.93	0.2	0.8	0.67	0.76	0.25	0.72	0.20	0.52	0.39	0.83	0.2	0.8	0.35	0.50
Mon, 20 Mar	3	0.52	0.85	0.3	0.8	0.91	0.71	0.35	0.64	0.34	0.50	0.28	0.82	0.3	0.7	0.85	0.50
Tue, 21 Mar	1	0.44	0.92	0.5	0.8	0.66	0.77	0.18	0.61	0.29	0.57	0.39	0.80	0.2	0.7	0.87	0.45
Wed, 22 Mar	1	0.60	0.89	0.4	0.8	0.73	0.73	0.20	0.62	0.26	0.49	0.31	0.71	0.2	0.8	0.31	0.42
Thu, 23 Mar	1	0.69	0.90	0.8	0.8	0.75	0.74	0.17	0.64	0.23	0.42	0.69	0.80	0.2	0.7	0.33	0.46
Fri, 24 Mar	1	0.40	0.88	0.2	0.8	0.54	0.71	0.23	0.54	0.26	0.42	0.41	0.77	0.3	0.8	0.25	0.51
Mon, 27 Mar	3	0.37	0.90	0.5	0.8	0.36	0.73	0.40	0.67	0.25	0.25	0.44	0.89	0.2	0.8	0.56	0.52
Tue, 28 Mar	1	0.29	0.91	0.2	0.8	0.46	0.77	0.26	0.71	0.36	0.55	0.50	0.88	0.2	0.8	0.32	0.58
Wed, 29 Mar	1	0.47	0.89	0.3	0.8	0.55	0.74	0.21	0.70	0.28	0.57	0.30	0.92	0.3	0.8	0.39	0.58
Thu, 30 Mar	1	0.46	0.84	0.4	0.8	0.63	0.72	0.26	0.73	0.26	0.57	0.59	0.90	0.2	0.9	0.28	0.61

2023 date	Days since last	SAMPLE LOCATION (based on operational needs[5] sampled water can be from the Harvey or Magnesia System.															
		HARVEY		PRV-3		STORE/CAFÉ		LIONS BAY		KELVIN		MAGNESIA		PRV-5		BRUNSWICK	
		Turbidity/ NTU*	Chlorine/ mg/ℓ **	Turbidity/ NTU*	Chlorine/ mg/ℓ **	Turbidity/ NTU*	Chlorine/ mg/ℓ **	Turbidity/ NTU*	Chlorine/ mg/ℓ **	Turbidity/ NTU*	Chlorine/ mg/ℓ **	Turbidity/ NTU*	Chlorine/ mg/ℓ **	Turbidity/ NTU*	Chlorine/ mg/ℓ **	Turbidity/ NTU*	Chlorine/ mg/ℓ **
Fri, 31 Mar	1	0.34	0.87	0.3	0.8	0.41	0.72	0.23	0.68	0.52	0.54	0.63	0.86	0.2	0.7	0.43	0.86
Mon, 03 Apr	3	0.39	0.87	0.2	0.8	0.31	0.70	0.22	0.65	0.37	0.28	0.42	0.87	0.2	0.7	0.34	0.68
Tue, 04 Apr	1	0.31	0.94	0.3	0.9	0.43	0.77	0.38	0.68	0.23	0.71	0.23	0.93	0.2	0.7	0.38	0.62
Wed, 05 Apr	1	0.32	0.89	0.2	0.8	0.31	0.82	0.24	0.69	0.27	0.65	0.37	0.97	0.2	0.8	0.22	0.68
Thu, 06 Apr	1	0.36	0.85	0.3	1.0	0.38	0.81	0.26	0.94	0.23	0.62	0.32	0.88	0.2	0.8	0.21	0.78
Sun, 09 Apr	3	0.44	1.00	0.4	0.8	N/A	N/A	0.46	0.55	0.35	0.57	N/A	N/A	0.4	0.8	0.49	0.52
Tue, 11 Apr	2	0.43	0.89	0.3	0.8	0.37	0.77	0.41	0.57	0.33	0.49	N/A	N/A	0.3	0.8	0.34	0.39
Wed, 12 Apr	1	0.30	0.87	0.3	0.8	0.37	0.65	0.25	0.67	0.26	0.68	0.56	0.96	0.2	0.7	0.29	0.42
Thu, 13 Apr	1	0.39	0.90	0.2	0.9	0.31	0.64	0.22	0.60	0.31	0.33	0.42	1.04	0.2	0.7	0.23	0.50
Fri, 14 Apr	1	0.35	0.93	0.2	0.8	0.23	0.71	0.21	0.64	0.28	0.64	0.37	0.92	0.2	0.7	0.31	0.53
Mon, 17 Apr	3	0.28	0.88	0.2	0.8	0.26	0.69	0.18	0.61	0.22	0.56	0.35	0.95	0.2	0.7	0.22	0.68
Tue, 18 Apr	1	0.25	0.87	0.2	0.8	0.24	0.68	0.24	0.54	0.20	0.59	0.32	0.88	0.2	0.7	0.21	0.40
Wed, 19 Apr	1	0.29	0.93	0.1	0.8	0.20	0.65	0.18	0.59	0.30	0.80	0.31	1.05	0.3	0.8	0.21	0.45
Thu, 20 Apr	1	0.26	0.82	0.2	0.7	0.21	0.60	0.19	0.58	0.24	0.40	0.37	0.98	0.1	0.7	0.21	0.43
Fri, 21 Apr	1	0.22	0.86	0.2	0.8	0.27	0.72	0.25	0.58	0.20	0.45	0.25	0.92	0.2	0.9	0.21	0.61
Mon, 24 Apr	3	0.25	0.87	0.2	0.8	0.22	0.63	0.24	0.59	0.25	0.35	0.26	0.82	0.2	0.8	0.24	0.64
Tue, 25 Apr	1	0.22	0.84	0.2	0.8	0.18	0.71	0.24	0.61	0.21	0.37	0.26	0.81	0.2	0.7	0.23	0.67
Wed, 26 Apr	1	0.30	0.86	0.5	0.8	0.50	0.67	0.23	0.57	0.30	0.37	0.39	0.83	0.3	0.7	0.71	0.55
Thu, 27 Apr	1	0.46	0.85	0.3	0.8	0.43	0.66	0.87	0.53	0.23	0.38	0.42	0.90	0.4	0.7	0.35	0.58
Fri, 28 Apr	1	0.30	0.85	0.2	0.7	0.59	0.66	0.29	0.52	0.22	0.39	0.39	0.85	0.2	0.7	0.51	0.74
Mon, 01	3	0.63	0.91	0.3	0.8	0.75	0.80	0.48	0.64	0.25	0.21	0.79	0.86	0.5	0.7	0.45	0.55
Tue, 02 May	1	0.56	0.87	0.4	0.8	0.34	0.69	0.30	0.67	0.31	0.31	0.72	0.82	0.6	0.7	0.49	0.58
Wed, 03	1	0.57	0.85	0.3	0.7	0.55	0.68	0.27	0.67	0.46	0.60	0.86	0.84	0.4	0.6	0.50	0.56
Thu, 04 May	1	1.35	0.93	0.6	0.8	1.08	0.78	0.32	0.63	0.28	0.44	1.09	0.90	0.6	0.7	1.29	0.56
Fri, 05 May	1	0.51	0.84	0.6	0.8	0.80	0.71	0.41	0.75	0.43	0.36	1.05	0.90	0.7	0.7	0.69	0.58
Mon, 08	3	0.61	0.88	0.3	0.8	0.48	0.74	0.32	0.67	0.38	0.72	0.47	0.90	0.4	0.7	0.53	0.58
Tue, 09 May	1	0.46	0.88	0.3	0.8	0.48	0.70	0.71	0.69	0.27	0.48	0.61	0.90	0.3	0.8	0.51	0.61
Wed, 10	1	0.33	0.87	0.3	0.8	0.41	0.74	0.31	0.66	0.32	0.33	0.43	0.87	0.4	0.6	0.41	0.69
Thu, 11 May	1	0.65	0.84	0.4	0.8	0.59	0.72	0.31	0.70	0.46	0.32	0.35	0.90	0.5	0.7	0.59	0.63
Fri, 12 May	1	0.47	0.88	0.3	0.8	0.39	0.71	0.28	0.65	0.34	0.29	0.55	0.86	0.3	0.7	0.38	0.62
Mon, 15	3	0.39	0.85	0.3	0.7	0.41	0.73	0.35	0.74	0.74	0.65	0.86	0.84	0.4	0.6	0.53	0.55
Tue, 16 May	1	0.76	0.89	0.4	0.8	0.61	0.78	0.35	0.72	0.35	0.56	1.45	0.90	0.6	0.7	1.16	0.63
Wed, 17	1	0.83	0.88	0.7	0.7	0.55	0.68	0.45	0.74	1.15	0.41	0.74	0.87	0.8	0.7	0.68	0.66
Thu, 18 May	1	1.10	0.86	0.5	0.8	0.35	0.68	0.32	0.71	0.33	0.32	1.25	0.87	0.8	0.7	0.80	0.59

2023 date	Days since last	SAMPLE LOCATION (based on operational needs[5] sampled water can be from the Harvey or Magnesia System.															
		HARVEY		PRV-3		STORE/CAFÉ		LIONS BAY		KELVIN		MAGNESIA		PRV-5		BRUNSWICK	
		Turbidity/ NTU*	Chlorine/ mg/ℓ **	Turbidity/ NTU*	Chlorine/ mg/ℓ **	Turbidity/ NTU*	Chlorine/ mg/ℓ **	Turbidity/ NTU*	Chlorine/ mg/ℓ **	Turbidity/ NTU*	Chlorine/ mg/ℓ **	Turbidity/ NTU*	Chlorine/ mg/ℓ **	Turbidity/ NTU*	Chlorine/ mg/ℓ **	Turbidity/ NTU*	Chlorine/ mg/ℓ **
Fri, 19 May	1	0.87	0.87	0.4	0.8	0.31	0.74	0.29	0.67	0.38	0.28	1.60	0.90	0.9	0.7	0.73	0.57
Tue, 23 May	4	0.57	0.88	0.4	0.8	0.86	0.77	0.41	0.70	0.52	0.30	1.33	0.88	0.4	0.7	0.67	0.73
Wed, 24	1	0.45	0.88	0.4	0.8	0.35	0.75	0.50	0.79	0.39	0.36	0.62	0.90	0.4	0.7	0.70	0.73
Thu, 25 May	1	0.54	0.87	0.4	0.7	0.40	0.69	0.42	0.77	0.28	0.26	0.75	0.93	0.5	0.7	0.85	0.68
Fri, 26 May	1	0.22	0.89	0.2	0.7	0.19	0.71	0.18	0.77	0.23	0.40	0.29	0.84	0.2	0.7	0.26	0.80
Mon, 29	3	0.43	0.86	0.8	0.7	0.76	0.71	0.34	0.76	0.24	0.34	0.76	0.83	0.3	0.7	0.37	0.61
Tue, 30 May	1	0.39	0.83	0.4	0.7	0.32	0.68	0.23	0.67	0.35	0.31	0.80	0.83	0.3	0.6	0.59	0.58
Wed, 31	1	0.39	0.84	0.4	0.8	0.39	0.69	0.32	0.73	0.30	0.37	0.37	0.88	0.4	0.7	0.58	0.61
Thu, 01 Jun	1	0.51	0.88	0.3	0.8	0.28	0.70	0.31	0.67	0.34	0.26	0.48	0.89	0.4	0.7	0.43	0.59
Fri, 02 Jun	1	0.36	0.88	0.3	0.8	0.42	0.72	0.32	0.71	0.43	0.29	0.58	0.84	0.3	0.7	0.37	0.69
Mon, 05 Jun	3	0.68	0.89	0.4	0.8	0.29	0.75	0.27	0.78	0.25	0.22	0.50	0.85	0.2	0.7	0.27	0.75
Tue, 06 Jun	1	0.40	0.86	0.6	0.8	0.39	0.74	0.26	0.75	0.22	0.35	0.38	0.90	0.3	0.7	0.34	0.72
Wed, 07 Jun	1	0.44	0.84	0.4	0.7	0.46	0.71	0.34	0.74	0.27	0.52	0.98	0.90	0.2	0.7	0.60	0.79
Thu, 08 Jun	1	0.34	0.87	0.3	0.8	0.53	0.77	0.22	0.70	0.23	0.42	0.49	0.85	0.2	0.7	0.36	0.72
Fri, 09 Jun	1	0.45	0.88	0.5	0.8	0.55	0.74	0.46	0.71	0.33	0.54	0.46	0.84	0.2	0.7	0.56	0.59
Mon, 12 Jun	3	0.35	0.89	0.4	0.8	0.63	0.78	0.35	0.79	0.36	0.55	0.71	0.88	0.3	0.8	0.45	0.69
Tue, 13 Jun	1	0.31	0.89	0.3	0.8	0.35	0.78	0.23	0.71	0.25	0.41	0.49	0.80	0.3	0.7	0.27	0.68
Wed, 14 Jun	1	0.36	0.90	0.3	0.8	0.42	0.79	0.34	0.80	0.29	0.34	0.38	0.84	0.4	0.8	0.62	0.60
Thu, 15 Jun	1	0.50	0.86	0.4	0.8	0.44	0.74	0.29	0.77	0.29	0.29	0.42	0.92	0.3	0.8	0.57	0.70
Fri, 16 Jun	1	0.50	0.84	0.4	0.8	0.51	0.71	0.40	0.73	0.23	0.46	0.86	0.85	0.3	0.7	0.43	0.74
Mon, 19 Jun	3	0.45	0.84	0.3	0.8	0.33	0.72	0.30	0.72	0.30	0.53	0.59	0.90	0.2	0.7	0.51	0.67
Tue, 20 Jun	1	0.50	0.89	0.4	0.8	0.36	0.78	0.28	0.71	0.34	0.41	0.58	0.87	0.2	0.7	0.63	0.64
Wed, 21 Jun	1	0.61	0.89	0.3	0.8	0.32	0.74	0.30	0.80	0.25	0.36	0.71	0.87	0.3	0.7	0.56	0.63
Thu, 22 Jun	1	0.36	0.86	0.4	0.8	0.46	0.74	0.30	0.74	0.31	0.39	0.70	0.86	0.3	0.7	0.45	0.59
Fri, 23 Jun	1	0.49	0.85	0.3	0.7	0.41	0.71	0.32	0.75	0.31	0.39	0.47	0.83	0.3	0.8	0.65	0.65
Mon, 26 Jun	3	0.40	0.87	0.3	0.8	0.41	0.75	0.28	0.82	0.26	0.47	0.62	0.84	0.3	0.7	0.35	0.75
Tue, 27 Jun	1	0.37	0.86	0.3	0.8	0.53	0.74	0.28	0.70	0.26	0.49	0.62	0.78	0.3	0.7	0.45	0.63
Wed, 28 Jun	1	0.38	0.96	0.3	0.9	0.62	0.82	0.31	0.83	0.25	0.43	0.60	0.90	0.4	0.7	0.56	0.61
Thu, 29 Jun	1	0.47	0.82	0.5	0.8	0.60	0.71	0.35	0.78	0.25	0.43	0.84	0.86	0.4	0.8	0.57	0.79
Fri, 30 Jun	1	0.49	0.87	0.5	0.8	0.38	0.72	0.39	0.68	0.38	0.44	0.89	0.82	0.4	0.7	0.83	0.76
Tue, 04 Jul	4	0.23	0.87	0.2	0.8	0.21	0.72	0.20	0.78	0.21	0.38	0.30	0.88	0.2	0.7	0.24	0.68
Wed, 05 Jul	1	0.29	0.83	0.3	0.8	0.30	0.73	0.20	0.75	0.19	0.52	0.22	0.91	0.2	0.8	0.27	0.74
Thu, 06 Jul	1	0.38	0.86	0.6	0.7	0.40	0.71	0.71	0.71	0.23	0.41	0.42	0.76	0.2	0.7	0.24	0.71
Fri, 07 Jul	1	0.23	0.84	0.1	0.7	0.23	0.73	0.19	0.62	0.21	0.58	0.19	0.74	0.1	0.6	0.17	0.57

2023 date	Days since last	SAMPLE LOCATION (based on operational needs[5] sampled water can be from the Harvey or Magnesia System.															
		HARVEY		PRV-3		STORE/CAFÉ		LIONS BAY		KELVIN		MAGNESIA		PRV-5		BRUNSWICK	
		Turbidity/ NTU*	Chlorine/ mg/ℓ **	Turbidity/ NTU*	Chlorine/ mg/ℓ **	Turbidity/ NTU*	Chlorine/ mg/ℓ **	Turbidity/ NTU*	Chlorine/ mg/ℓ **	Turbidity/ NTU*	Chlorine/ mg/ℓ **	Turbidity/ NTU*	Chlorine/ mg/ℓ **	Turbidity/ NTU*	Chlorine/ mg/ℓ **	Turbidity/ NTU*	Chlorine/ mg/ℓ **
Mon, 10 Jul	3	0.22	0.80	0.3	0.7	0.35	0.70	0.24	0.74	0.26	0.46	0.29	0.75	0.2	0.6	0.44	0.67
Tue, 11 Jul	1	0.37	0.85	0.2	0.8	0.27	0.76	0.19	0.68	0.20	0.47	0.30	0.84	0.2	0.7	0.74	0.62
Wed, 12 Jul	1	0.30	0.85	0.3	0.8	0.32	0.76	0.26	0.75	0.26	0.46	0.28	0.87	0.2	0.7	0.28	0.68
Thu, 13 Jul	1	0.33	0.87	0.2	0.8	0.57	0.74	0.32	0.69	0.38	0.39	0.62	0.86	0.2	0.7	0.31	0.69
Fri, 14 Jul	1	0.46	0.87	0.2	0.8	0.40	0.74	0.35	0.69	0.30	0.55	0.88	0.88	0.3	0.7	0.53	0.62
Mon, 17 Jul	3	0.30	0.85	0.2	0.8	0.23	0.78	0.19	0.76	0.20	0.35	0.73	0.75	0.2	0.7	0.41	0.66
Tue, 18 Jul	1	0.29	0.90	0.4	0.8	0.29	0.78	0.21	0.72	0.22	0.42	0.53	0.87	0.2	0.7	0.28	0.66
Wed, 19 Jul	1	0.29	0.89	0.2	0.8	0.25	0.80	0.22	0.78	0.23	0.46	0.36	0.90	0.1	0.8	0.27	0.67
Thu, 20 Jul	1	0.29	0.84	0.3	0.7	0.33	0.67	0.21	0.75	0.31	0.52	0.34	0.82	0.3	0.7	0.28	0.65
Fri, 21 Jul	1	0.29	0.83	0.2	0.7	0.24	0.73	0.20	0.71	0.26	0.59	0.26	0.84	0.2	0.7	0.28	0.63
Mon, 24 Jul	3	0.26	0.85	0.2	0.7	0.37	0.74	0.24	0.77	0.27	0.52	0.20	0.87	0.3	0.7	0.44	0.66
Tue, 25 Jul	1	0.29	0.87	0.4	0.7	0.38	0.67	0.29	0.65	0.37	0.44	0.56	0.82	0.4	0.7	0.50	0.61
Wed, 26 Jul	1	0.25	0.93	0.2	0.8	0.23	0.76	0.23	0.72	0.22	0.28	0.23	0.91	0.2	0.7	0.36	0.51
Thu, 27 Jul	1	0.40	0.84	0.4	0.7	1.28	0.70	0.32	0.67	0.25	0.27	0.78	0.86	0.2	0.7	0.34	0.62
Fri, 28 Jul	1	0.25	0.87	0.1	0.8	0.22	0.79	0.18	0.66	0.22	0.55	0.25	0.96	0.2	0.7	0.18	0.63
Mon, 31 Jul	3	0.31	0.87	0.2	0.7	0.24	0.74	0.19	0.76	0.17	0.54	0.23	0.82	0.1	0.8	0.25	0.63
Tue, 01 Aug	1	0.50	0.85	0.4	0.8	0.31	0.74	0.20	0.72	0.20	0.61	0.21	0.86	0.2	0.7	0.39	0.62
Wed, 02 Aug	1	0.26	0.85	0.3	0.8	0.29	0.74	0.24	0.75	0.22	0.44	0.35	0.89	0.2	0.7	0.48	0.71
Thu, 03 Aug	1	0.36	0.86	0.1	0.7	0.18	0.74	0.16	0.67	0.20	0.54	0.25	0.82	0.2	0.7	0.20	0.69
Fri, 04 Aug	1	0.38	0.85	0.2	0.8	0.26	0.68	0.24	0.72	0.27	0.51	0.87	0.82	0.3	0.7	0.35	0.61
Tue, 08 Aug	4	0.21	0.82	0.2	0.7	0.17	0.69	0.19	0.65	0.20	0.32	0.22	0.82	0.4	0.7	0.21	0.65
Wed, 09 Aug	1	0.32	0.85	0.3	0.8	0.34	0.69	0.24	0.74	0.23	0.41	0.25	0.82	0.2	0.7	0.24	0.57
Thu, 10 Aug	1	0.29	0.88	0.3	0.7	0.28	0.71	0.22	0.63	0.27	0.40	0.70	0.89	0.3	0.7	0.34	0.54
Fri, 11 Aug	1	0.31	0.86	0.2	0.8	0.27	0.72	0.20	0.66	0.21	0.48	0.45	0.88	0.2	0.8	0.31	0.51
Mon, 14 Aug	3	0.29	0.88	0.2	0.8	0.32	0.77	0.19	0.78	0.17	0.43	0.44	0.90	0.1	0.7	0.22	0.74
Tue, 15 Aug	1	0.29	0.84	0.1	0.8	0.20	0.72	0.15	0.73	0.16	0.42	0.26	0.80	0.2	0.7	0.24	0.71
Wed, 16 Aug	1	0.31	0.90	0.2	0.8	0.26	0.77	0.22	0.78	0.18	0.38	0.23	0.85	0.2	0.6	0.23	0.62
Thu, 17 Aug	1	0.22	0.83	0.2	0.8	0.21	0.67	0.20	0.73	0.18	0.58	0.27	0.92	0.2	0.7	0.24	0.54
Fri, 18 Aug	1	0.33	0.86	0.3	0.8	0.51	0.70	0.28	0.65	0.35	0.67	0.28	0.80	0.3	0.7	0.21	0.70
Mon, 21 Aug	3	0.32	0.87	0.2	0.8	0.23	0.74	0.21	0.78	0.23	0.32	0.47	0.82	0.3	0.7	0.30	0.67
Tue, 22 Aug	1	0.55	0.86	0.4	0.8	0.50	0.72	0.34	0.71	0.28	0.41	0.57	0.83	0.2	0.7	0.38	0.63
Wed, 23 Aug	1	0.94	0.87	0.3	0.8	0.28	0.72	0.26	0.76	0.27	0.36	0.52	0.89	0.2	0.7	0.39	0.61
Thu, 24 Aug	1	0.32	0.88	0.3	0.8	0.25	0.70	0.24	0.71	0.25	0.43	0.38	0.82	0.2	0.7	0.36	0.58
Fri, 25 Aug	1	0.42	0.85	0.3	0.8	0.26	0.71	0.23	0.72	0.25	0.73	0.97	0.88	0.2	0.7	0.33	0.58

2023 date	Days since last	SAMPLE LOCATION (based on operational needs[5] sampled water can be from the Harvey or Magnesia System.															
		HARVEY		PRV-3		STORE/CAFÉ		LIONS BAY		KELVIN		MAGNESIA		PRV-5		BRUNSWICK	
		Turbidity/ NTU*	Chlorine/ mg/ℓ **	Turbidity/ NTU*	Chlorine/ mg/ℓ **	Turbidity/ NTU*	Chlorine/ mg/ℓ **	Turbidity/ NTU*	Chlorine/ mg/ℓ **	Turbidity/ NTU*	Chlorine/ mg/ℓ **	Turbidity/ NTU*	Chlorine/ mg/ℓ **	Turbidity/ NTU*	Chlorine/ mg/ℓ **	Turbidity/ NTU*	Chlorine/ mg/ℓ **
Mon, 28 Aug	3	0.39	0.89	0.5	0.8	0.39	0.77	0.18	0.78	0.19	0.44	0.51	0.85	0.2	0.7	0.46	0.62
Tue, 29 Aug	1	0.29	0.87	0.2	0.8	0.31	0.70	0.37	0.69	0.41	0.45	0.35	0.88	0.3	0.7	0.23	0.76
Wed, 30 Aug	1	0.41	0.82	0.4	0.8	0.40	0.65	0.30	0.66	0.27	0.41	0.74	0.77	0.2	0.6	0.41	0.66
Thu, 31 Aug	1	0.61	0.89	0.5	0.8	0.51	0.74	0.30	0.52	0.22	0.50	0.60	0.83	0.2	0.8	0.47	0.51
Fri, 01 Sep	1	0.30	0.82	0.2	0.8	0.25	0.68	0.16	0.62	0.21	0.56	0.30	0.87	0.1	0.7	0.19	0.43
Tue, 05 Sep	4	0.42	0.86	0.2	0.8	0.35	0.73	0.23	0.67	0.20	0.29	0.58	0.82	0.2	0.7	0.35	0.56
Wed, 06 Sep	1	0.31	0.84	0.2	0.7	0.32	0.79	0.20	0.72	0.22	0.36	0.59	0.84	0.3	0.7	0.30	0.54
Thu, 07 Sep	1	0.60	0.84	0.4	0.8	0.29	0.70	0.21	0.64	0.22	0.36	0.64	0.86	0.2	0.7	0.33	0.49
Fri, 08 Sep	1	0.44	0.92	0.2	0.8	0.30	0.79	0.22	0.62	0.26	0.74	0.86	0.85	0.2	0.8	0.55	0.54
Mon, 11 Sep	3	0.38	0.87	0.3	0.8	0.29	0.75	0.21	0.77	0.27	0.38	0.53	0.86	0.2	0.7	0.33	0.56
Tue, 12 Sep	1	0.24	0.89	0.1	0.8	0.24	0.76	0.19	0.69	0.28	0.41	0.36	0.89	0.2	0.8	0.41	0.55
Wed, 13 Sep	1	0.40	0.88	0.2	0.8	0.37	0.75	0.23	0.77	0.23	0.42	0.73	0.84	0.2	0.7	0.27	0.54
Thu, 14 Sep	1	0.25	0.86	0.2	0.8	0.22	0.74	0.35	0.71	0.27	0.44	0.50	0.81	0.4	0.7	0.29	0.58
Fri, 15 Sep	1	0.54	0.84	0.5	0.8	Close	Close	0.26	0.58	0.35	0.64	0.61	0.86	0.2	0.7	0.30	0.55
Mon, 18 Sep	3	0.40	0.86	0.2	0.7	0.42	0.73	0.40	0.76	0.34	0.43	0.36	0.85	0.2	0.7	0.39	0.62
Tue, 19 Sep	1	0.44	0.84	0.2	0.8	0.45	0.73	0.23	0.71	0.27	0.58	0.66	0.81	0.3	0.7	0.25	0.60
Wed, 20 Sep	1	0.37	0.84	0.2	0.7	0.25	0.72	0.22	0.75	0.21	0.67	0.33	0.85	0.2	0.7	0.25	0.71
Thu, 21 Sep	1	0.34	0.86	0.3	0.7	0.34	0.71	0.23	0.69	0.22	0.64	0.35	0.97	0.2	0.9	0.36	0.48
Fri, 22 Sep	1	0.56	0.86	0.4	0.8	Close	Close	0.24	0.69	0.19	0.57	0.58	0.83	0.5	0.7	0.40	0.53
Mon, 25 Sep	3	0.71	0.60	0.4	0.6	0.34	0.64	0.29	0.67	0.59	0.30	0.84	0.79	0.3	0.7	0.30	0.56
Tue, 26 Sep	1	1.20	0.75	0.8	0.6	0.70	0.47	0.34	0.31	0.31	0.26	2.08	0.85	0.8	0.5	0.34	0.69
Wed, 27 Sep	1	0.78	0.81	0.6	0.7	0.82	0.61	0.57	0.47	0.58	0.59	1.13	0.82	0.8	0.6	0.53	0.34
Thu, 28 Sep	1	0.97	0.97	0.8	0.9	0.56	0.71	0.45	0.42	0.54	0.73	0.96	0.92	0.8	0.8	0.76	0.21
Fri, 29 Sep	1	0.65	0.86	0.5	0.8	0.58	0.65	0.34	0.68	0.29	0.75	0.58	0.87	0.4	0.7	0.48	0.51
Tue, 03 Oct	4	0.44	0.81	0.2	0.7	0.35	0.68	0.26	0.69	0.26	0.33	0.34	0.83	0.3	0.7	0.38	0.70
Wed, 04 Oct	1	0.67	0.88	0.7	0.8	0.28	0.73	0.19	0.55	0.24	0.26	0.42	0.85	0.3	0.7	0.22	0.64
Thu, 05 Oct	1	0.58	0.89	0.4	0.8	0.61	0.75	0.39	0.54	0.26	0.21	0.97	0.89	0.2	0.8	0.37	0.72
Fri, 06 Oct	1	0.53	0.81	0.4	0.7	0.45	0.68	0.48	0.63	0.19	0.41	0.93	0.80	0.7	0.7	0.49	0.72
Tue, 10 Oct	4	1.22	0.75	0.2	0.6	0.34	0.57	0.22	0.62	0.43	0.64	0.49	0.80	0.2	0.7	0.29	0.65
Wed, 11 Oct	1	1.04	0.90	0.6	0.8	0.37	0.66	0.23	0.38	0.22	0.21	0.57	0.69	0.4	0.7	0.58	0.61
Thu, 12 Oct	1	0.74	0.89	0.5	0.8	0.42	0.69	0.31	0.38	0.29	0.22	0.68	0.52	0.3	0.7	0.98	0.48
Fri, 13 Oct	1	0.23	0.92	0.2	0.9	0.17	0.77	0.19	0.40	0.26	0.47	0.42	0.78	0.2	0.8	0.20	0.59
Mon, 16 Oct	3	0.37	0.92	0.4	0.8	0.27	0.72	0.23	0.43	0.27	0.82	0.75	0.76	0.3	0.8	0.31	0.49
Tue, 17 Oct	1	0.35	0.84	0.3	0.7	0.63	0.62	0.24	0.51	0.23	0.23	0.42	0.83	0.2	0.7	0.38	0.53

2023 date	Days since last	SAMPLE LOCATION (based on operational needs[5] sampled water can be from the Harvey or Magnesia System.															
		HARVEY		PRV-3		STORE/CAFÉ		LIONS BAY		KELVIN		MAGNESIA		PRV-5		BRUNSWICK	
		Turbidity/ NTU*	Chlorine/ mg/ℓ **	Turbidity/ NTU*	Chlorine/ mg/ℓ **	Turbidity/ NTU*	Chlorine/ mg/ℓ **	Turbidity/ NTU*	Chlorine/ mg/ℓ **	Turbidity/ NTU*	Chlorine/ mg/ℓ **	Turbidity/ NTU*	Chlorine/ mg/ℓ **	Turbidity/ NTU*	Chlorine/ mg/ℓ **	Turbidity/ NTU*	Chlorine/ mg/ℓ **
Wed, 18 Oct	1	0.75	0.90	0.5	0.7	0.64	0.69	0.25	0.42	0.19	0.28	1.00	0.94	0.4	0.8	0.22	0.46
Thu, 19 Oct	1	1.09	0.85	0.8	0.8	1.09	0.54	0.32	0.50	0.45	0.23	0.53	0.78	0.6	0.7	1.45	0.39
Fri, 20 Oct	1	1.35	0.90	0.8	0.9	0.67	0.66	0.56	0.37	0.30	0.26	0.74	0.98	0.3	0.7	0.38	0.41
Mon, 23 Oct	3	0.51	0.88	0.4	0.8	0.42	0.73	0.29	0.54	0.32	0.73	0.56	0.93	0.3	0.7	0.27	0.57
Tue, 24 Oct	1	0.47	0.87	0.5	0.8	0.48	0.70	0.30	0.55	0.26	0.34	0.43	0.93	0.2	0.7	0.38	0.60
Wed, 25 Oct	1	1.23	0.76	0.9	0.7	0.46	0.59	0.22	0.58	0.51	0.41	0.79	0.82	0.2	0.6	0.38	0.54
Thu, 26 Oct	1	0.45	1.03	0.4	0.9	0.27	0.82	0.33	0.46	0.22	0.20	0.26	0.82	0.2	0.9	0.27	0.44
Fri, 27 Oct	1	0.84	0.93	0.7	0.9	0.41	0.78	0.25	0.59	0.18	0.30	0.59	0.88	0.2	0.9	0.21	0.75
Mon, 30 Oct	3	0.44	0.90	0.5	0.8	0.53	0.80	0.17	0.72	0.37	0.32	0.36	0.94	0.1	0.8	0.20	0.75
Tue, 31 Oct	1	0.75	0.88	0.5	0.8	0.46	0.76	0.14	0.69	0.16	0.33	0.30	0.81	0.1	0.8	0.24	0.67
Wed, 01 Nov	1	0.91	0.86	0.7	0.8	0.42	0.54	0.23	0.66	0.15	0.50	0.69	0.83	0.2	0.7	0.31	0.63
Thu, 02 Nov	1	1.02	0.72	0.4	0.7	0.28	0.63	0.33	0.66	0.23	0.36	0.59	0.88	0.3	0.7	0.24	0.64
Fri, 03 Nov	1	0.72	0.88	0.6	0.8	0.72	0.61	0.24	0.63	0.26	0.33	0.80	0.88	0.2	0.7	0.58	0.61
Mon, 06 Nov	3	0.68	0.71	0.5	0.6	0.51	0.52	0.26	0.42	0.22	0.20	0.95	0.81	0.2	0.7	0.41	0.66
Tue, 07 Nov	1	0.88	0.75	0.6	0.7	0.52	0.51	0.43	0.43	0.22	0.20	0.87	0.89	0.4	0.7	0.41	0.50
Wed, 08 Nov	1	0.36	0.89	0.4	0.8	0.25	0.66	0.25	0.33	0.24	0.75	0.67	0.89	0.3	0.7	0.36	0.64
Thu, 09 Nov	1	0.65	0.98	0.6	0.9	0.58	0.76	1.23	0.55	0.21	0.27	1.04	0.85	0.3	0.7	0.39	0.65
Fri, 10 Nov	1	0.36	0.92	0.3	0.8	0.21	0.69	0.22	0.52	0.24	0.85	0.36	0.89	0.3	0.7	0.28	0.63
Tue, 14 Nov	4	0.51	0.87	0.3	0.7	0.31	0.69	0.27	0.43	0.24	0.71	0.52	0.92	0.2	0.8	0.27	0.65
Wed, 15 Nov	1	0.56	0.94	0.3	0.9	0.29	0.76	0.23	0.44	0.20	0.47	0.30	0.83	0.2	0.7	0.34	0.67
Thu, 16 Nov	1	0.53	0.88	0.5	0.8	0.34	0.73	0.39	0.58	0.23	0.75	0.54	0.93	0.2	0.8	0.25	0.67
Fri, 17 Nov	1	0.33	0.83	0.3	0.8	0.45	0.71	0.21	0.63	0.33	0.64	0.31	0.82	0.2	0.7	0.32	0.73
Mon, 20 Nov	3	0.45	0.94	0.2	0.8	0.37	0.73	0.15	0.61	0.18	0.42	0.63	0.88	0.2	0.6	0.23	0.67
Tue, 21 Nov	1	0.88	0.92	0.2	0.8	Close	Close	0.20	0.54	0.16	0.40	0.62	0.92	0.2	0.8	0.75	0.76
Wed, 22 Nov	1	0.57	0.80	0.3	0.7	Close	Close	0.18	0.69	0.16	0.34	0.73	0.82	0.2	0.8	0.34	0.76
Thu, 23 Nov	1	0.64	0.88	0.4	0.8	Close	Close	0.17	0.59	0.20	0.77	0.44	0.87	0.3	0.7	0.36	0.68
Fri, 24 Nov	1	0.41	0.89	0.3	0.8	Close	Close	0.19	0.56	0.17	0.69	0.48	0.90	0.1	0.9	0.51	0.73
Mon, 27 Nov	3	0.76	0.87	0.2	0.8	Close	Close	0.33	0.67	0.23	0.30	0.38	0.87	0.2	0.8	0.23	0.75
Tue, 28 Nov	1	0.72	0.85	0.1	0.8	Close	Close	0.18	0.74	0.21	0.58	0.56	0.73	0.4	0.8	0.34	0.85
Wed, 29 Nov	1	0.68	0.85	0.2	0.8	Close	Close	0.18	0.75	0.34	0.50	0.45	0.90	0.2	0.8	0.33	0.87
Thu, 30 Nov	1	1.19	0.86	0.5	0.8	Close	Close	0.26	0.73	0.29	0.71	0.73	0.80	0.2	0.8	0.40	0.79
Fri, 01 Dec	1	0.56	0.87	0.4	0.8	Close	Close	0.21	0.73	0.18	0.61	0.37	0.89	0.2	0.8	0.21	0.77
Mon, 04 Dec	3	0.69	0.88	0.2	0.8	Close	Close	0.16	0.59	0.15	0.28	0.61	0.90	0.2	0.8	0.32	0.75
Tue, 05 Dec	1	1.17	0.94	1.0	0.8	Close	Close	0.26	0.64	0.20	0.44	0.60	0.73	0.4	0.6	0.59	0.81

2023 date	Days since last	SAMPLE LOCATION (based on operational needs[5] sampled water can be from the Harvey or Magnesia System.															
		HARVEY		PRV-3		STORE/CAFÉ		LIONS BAY		KELVIN		MAGNESIA		PRV-5		BRUNSWICK	
		Turbidity/ NTU*	Chlorine/ mg/ℓ **	Turbidity/ NTU*	Chlorine/ mg/ℓ **	Turbidity/ NTU*	Chlorine/ mg/ℓ **	Turbidity/ NTU*	Chlorine/ mg/ℓ **	Turbidity/ NTU*	Chlorine/ mg/ℓ **	Turbidity/ NTU*	Chlorine/ mg/ℓ **	Turbidity/ NTU*	Chlorine/ mg/ℓ **	Turbidity/ NTU*	Chlorine/ mg/ℓ **
Wed, 06 Dec	1	1.64	0.84	0.8	0.8	Close	Close	0.63	0.40	0.41	0.33	0.80	0.64	0.5	0.8	0.70	0.61
Thu, 07 Dec	1	1.08	1.03	0.7	0.9	Close	Close	0.85	0.50	0.44	0.34	0.76	1.03	0.4	0.9	0.41	0.58
Fri, 08 Dec	1	0.34	0.92	0.3	0.8	Close	Close	0.31	0.75	0.44	0.31	0.34	0.92	0.2	0.8	0.30	0.73
Mon, 11 Dec	3	0.83	0.80	0.2	0.7	Close	Close	0.22	0.64	0.21	0.51	0.53	0.83	0.2	0.7	0.30	0.71
Tue, 12 Dec	1	0.63	0.90	0.5	0.8	Close	Close	0.27	0.55	0.23	0.41	0.44	0.80	0.2	0.7	0.45	0.78
Wed, 13 Dec	1	0.66	0.98	0.2	0.9	Close	Close	0.22	0.55	0.27	0.37	0.42	0.89	0.5	0.7	0.69	0.69
Thu, 14 Dec	1	0.39	0.71	0.4	0.7	Close	Close	0.20	0.66	0.17	0.73	0.42	0.88	0.3	0.7	0.32	0.77
Fri, 15 Dec	1	N/A	0.86	N/A	0.8	Close	Close	N/A	0.67	N/A	0.46	N/A	0.86	N/A	0.7	N/A	0.74
Mon, 18 Dec	3	0.39	0.89	0.2	0.8	0.40	0.70	0.44	0.62	0.33	0.49	0.40	0.81	0.2	0.9	0.27	0.74
Tue, 19 Dec	1	0.29	0.88	0.3	0.8	0.54	0.69	0.23	0.65	0.21	0.50	0.34	0.88	0.2	0.7	0.28	0.71
Wed, 20 Dec	1	0.29	0.83	0.3	0.8	0.29	0.69	0.25	0.72	0.35	0.44	0.49	0.76	0.3	0.6	0.32	0.69
Thu, 21 Dec	1	0.26	0.90	0.3	0.8	0.28	0.74	0.25	0.50	0.23	0.39	0.42	0.88	0.4	0.8	0.38	0.56
Fri, 22 Dec	1	0.25	0.95	0.2	0.8	0.24	0.75	0.28	0.62	0.25	0.46	0.38	0.89	0.3	0.7	0.36	0.72
Sat, 23 Dec	1	0.25	0.89	0.2	0.8	Close	Close	0.24	0.53	0.22	0.47	0.39	0.90	0.2	0.7	0.31	0.59
Wed, 27 Dec	4	0.41	0.85	0.4	0.7	Close	Close	0.32	0.54	0.35	0.64	1.44	0.69	0.6	0.9	0.46	0.56
Sat, 30 Dec	3	0.81	0.94	0.4	0.8	Close	Close	0.29	0.47	0.29	0.81	1.43	0.46	0.3	0.7	0.51	0.52

*TURBIDITY > 0.90 NTU HIGHLIGHTED

**Cl_2 RESIDUAL <0.2 mg/ℓ HIGHLIGHED (NONE)

APPENDIX: BIANNUAL METALS AND CHEMISTRY RESULTS

ABRIDGED REPORT OF 21 MAR. 2023 (SAMPLES 14 MAR.)

Analytical Results

Sub-Matrix: **Surface Water**
(Matrix: **Water**)

Analyte	CAS Number	Method	LOR	Unit	Client sample ID	Harvey Raw Water	Magnesia Raw Water	----	----	----
					Client sampling date / time	14-Mar-2023 12:45	14-Mar-2023 10:30	----	----	----
						VA23A5458-017	VA23A5458-018	--------	--------	--------
						Result	Result	----	----	----
Physical Tests										
Absorbance, UV (@ 254nm)	----	E404	0.0050	AU/cm		0.0410	0.0150	----	----	----
Alkalinity, total (as CaCO3)	----	E290	1.0	mg/L		5.8	5.6	----	----	----
Hardness (as CaCO3), from total Ca/Mg	----	EC100A	0.50	mg/L		7.29	17.8	----	----	----
pH	----	E108	0.10	pH units		6.93	6.88	----	----	----
Solids, total suspended [TSS]	----	E160	3.0	mg/L		<3.0	<3.0	----	----	----
Turbidity	----	E121	0.10	NTU		<0.10	0.12	----	----	----
Transmittance, UV (@ 254nm)	----	E404	1.0	% T/cm		91.0	96.6	----	----	----
Organic / Inorganic Carbon										
Carbon, total organic [TOC]	----	E355-L	0.50	mg/L		1.65	0.68	----	----	----
Total Metals										
Aluminum, total	7429-90-5	E420	0.0030	mg/L		0.0383	0.0190	----	----	----
Antimony, total	7440-36-0	E420	0.00010	mg/L		<0.00010	<0.00010	----	----	----
Arsenic, total	7440-38-2	E420	0.00010	mg/L		0.00011	0.00010	----	----	----
Barium, total	7440-39-3	E420	0.00010	mg/L		0.00179	0.00261	----	----	----
Beryllium, total	7440-41-7	E420	0.000020	mg/L		<0.000020	<0.000020	----	----	----
Bismuth, total	7440-69-9	E420	0.000050	mg/L		<0.000050	<0.000050	----	----	----
Boron, total	7440-42-8	E420	0.010	mg/L		<0.010	0.010	----	----	----
Cadmium, total	7440-43-9	E420	0.0000050	mg/L		<0.0000050	0.0000172	----	----	----
Calcium, total	7440-70-2	E420	0.050	mg/L		2.40	5.98	----	----	----
Cesium, total	7440-46-2	E420	0.000010	mg/L		<0.000010	<0.000010	----	----	----
Chromium, total	7440-47-3	E420	0.00050	mg/L		<0.00050	<0.00050	----	----	----
Cobalt, total	7440-48-4	E420	0.00010	mg/L		<0.00010	<0.00010	----	----	----
Copper, total	7440-50-8	E420	0.00050	mg/L		0.00068	0.00672	----	----	----
Iron, total	7439-89-6	E420	0.010	mg/L		<0.010	0.015	----	----	----
Lead, total	7439-92-1	E420	0.000050	mg/L		<0.000050	0.000149	----	----	----
Lithium, total	7439-93-2	E420	0.0010	mg/L		<0.0010	<0.0010	----	----	----
Magnesium, total	7439-95-4	E420	0.0050	mg/L		0.316	0.698	----	----	----
Manganese, total	7439-96-5	E420	0.00010	mg/L		0.00014	0.00087	----	----	----
Mercury, total	7439-97-6	E508	0.0000050	mg/L		<0.0000050	<0.0000050	----	----	----

Analytical Results

Sub-Matrix: Surface Water (Matrix: Water)					Client sample ID	Harvey Raw Water	Magnesia Raw Water	----	----	----
					Client sampling date / time	14-Mar-2023 12:45	14-Mar-2023 10:30	----	----	----
Analyte	CAS Number	Method	LOR	Unit		VA23A5458-017	VA23A5458-018	--------	--------	--------
						Result	Result	----	----	----
Total Metals										
Molybdenum, total	7439-98-7	E420	0.000050	mg/L		0.000466	0.000274	----	----	----
Nickel, total	7440-02-0	E420	0.00050	mg/L		<0.00050	<0.00050	----	----	----
Phosphorus, total	7723-14-0	E420	0.050	mg/L		<0.050	<0.050	----	----	----
Potassium, total	7440-09-7	E420	0.050	mg/L		0.101	0.088	----	----	----
Rubidium, total	7440-17-7	E420	0.00020	mg/L		<0.00020	<0.00020	----	----	----
Selenium, total	7782-49-2	E420	0.000050	mg/L		<0.000050	0.000124	----	----	----
Silicon, total	7440-21-3	E420	0.10	mg/L		2.64	5.17	----	----	----
Silver, total	7440-22-4	E420	0.000010	mg/L		<0.000010	<0.000010	----	----	----
Sodium, total	7440-23-5	E420	0.050	mg/L		0.978	1.99	----	----	----
Strontium, total	7440-24-6	E420	0.00020	mg/L		0.00676	0.0304	----	----	----
Sulfur, total	7704-34-9	E420	0.50	mg/L		0.96	5.05	----	----	----
Tellurium, total	13494-80-9	E420	0.00020	mg/L		<0.00020	<0.00020	----	----	----
Thallium, total	7440-28-0	E420	0.000010	mg/L		<0.000010	<0.000010	----	----	----
Thorium, total	7440-29-1	E420	0.00010	mg/L		<0.00010	<0.00010	----	----	----
Tin, total	7440-31-5	E420	0.00010	mg/L		<0.00010	<0.00010	----	----	----
Titanium, total	7440-32-6	E420	0.00030	mg/L		<0.00030	<0.00030	----	----	----
Tungsten, total	7440-33-7	E420	0.00010	mg/L		<0.00010	<0.00010	----	----	----
Uranium, total	7440-61-1	E420	0.000010	mg/L		0.000038	<0.000010	----	----	----
Vanadium, total	7440-62-2	E420	0.00050	mg/L		<0.00050	<0.00050	----	----	----
Zinc, total	7440-66-6	E420	0.0030	mg/L		0.0042	0.0064	----	----	----
Zirconium, total	7440-67-7	E420	0.00020	mg/L		<0.00020	<0.00020	----	----	----
Aggregate Organics										
Biochemical oxygen demand [BOD]	----	E550	2.0	mg/L		<2.0	<2.0	----	----	----

Please refer to the General Comments section for an explanation of any qualifiers detected.

Analytical Results

Sub-Matrix: **Water**
(Matrix: **Water**)

Analyte	CAS Number	Method	LOR	Unit	Client sample ID	Harvey Tank First Draw	Harvey Tank	Store / Cafe First Draw	Store / Cafe	Lions Bay Ave. First Draw
					Client sampling date / time	14-Mar-2023 12:35	14-Mar-2023 12:35	14-Mar-2023 09:00	14-Mar-2023 09:00	14-Mar-2023 06:35
						VA23A5458-001	VA23A5458-002	VA23A5458-003	VA23A5458-004	VA23A5458-005
						Result	Result	Result	Result	Result
Physical Tests										
Alkalinity, total (as CaCO3)	----	E290	1.0	mg/L		----	6.6	----	6.2	----
Hardness (as CaCO3), from total Ca/Mg	----	EC100A	0.50	mg/L		7.42	7.28	7.82	7.23	7.38
pH	----	E108	0.10	pH units		----	6.99	----	6.93	----
Solids, total suspended [TSS]	----	E160	3.0	mg/L		----	<3.0	----	<3.0	----
Turbidity	----	E121	0.10	NTU		----	<0.10	----	<0.10	----
Organic / Inorganic Carbon										
Carbon, total organic [TOC]	----	E355-L	0.50	mg/L		----	1.86	----	2.04	----
Total Metals										
Aluminum, total	7429-90-5	E420	0.0030	mg/L		0.208	0.0413	0.0379	0.0370	0.0251
Antimony, total	7440-36-0	E420	0.00010	mg/L		<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic, total	7440-38-2	E420	0.00010	mg/L		0.00017	0.00011	<0.00010	<0.00010	<0.00010
Barium, total	7440-39-3	E420	0.00010	mg/L		0.00246	0.00178	0.00180	0.00174	0.00175
Beryllium, total	7440-41-7	E420	0.000020	mg/L		<0.000020	<0.000020	<0.000020	<0.000020	<0.000020
Bismuth, total	7440-69-9	E420	0.000050	mg/L		<0.000050	<0.000050	<0.000050	<0.000050	0.000071
Boron, total	7440-42-8	E420	0.010	mg/L		<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium, total	7440-43-9	E420	0.0000050	mg/L		0.0000055	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Calcium, total	7440-70-2	E420	0.050	mg/L		2.42	2.41	2.44	2.40	2.46
Cesium, total	7440-46-2	E420	0.000010	mg/L		<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Chromium, total	7440-47-3	E420	0.00050	mg/L		<0.00050	<0.00050	<0.00050	<0.00050	0.00124
Cobalt, total	7440-48-4	E420	0.00010	mg/L		0.00016	<0.00010	0.00017	<0.00010	<0.00010
Copper, total	7440-50-8	E420	0.00050	mg/L		0.0156	0.00434	0.0160	0.00493	0.00144
Iron, total	7439-89-6	E420	0.010	mg/L		0.141	<0.010	0.038	0.036	0.010
Lead, total	7439-92-1	E420	0.000050	mg/L		0.000473	0.000050	0.000720	0.000261	<0.000050
Lithium, total	7439-93-2	E420	0.0010	mg/L		<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Magnesium, total	7439-95-4	E420	0.0050	mg/L		0.334	0.307	0.420	0.301	0.300
Manganese, total	7439-96-5	E420	0.00010	mg/L		0.00508	0.00019	0.00046	0.00042	0.00093
Mercury, total	7439-97-6	E508	0.0000050	mg/L		----	<0.0000050	----	<0.0000050	----
Molybdenum, total	7439-98-7	E420	0.000050	mg/L		0.000474	0.000482	0.000478	0.000489	0.000539
Nickel, total	7440-02-0	E420	0.00050	mg/L		<0.00050	<0.00050	<0.00050	<0.00050	0.00050
Phosphorus, total	7723-14-0	E420	0.050	mg/L		<0.050	<0.050	<0.050	<0.050	<0.050

Analytical Results

Sub-Matrix: **Water**
(Matrix: **Water**)

Analyte	CAS Number	Method	LOR	Unit	Client sample ID	Harvey Tank First Draw	Harvey Tank	Store / Cafe First Draw	Store / Cafe	Lions Bay Ave. First Draw
					Client sampling date / time	14-Mar-2023 12:35	14-Mar-2023 12:35	14-Mar-2023 09:00	14-Mar-2023 09:00	14-Mar-2023 06:35
						VA23A5458-001	VA23A5458-002	VA23A5458-003	VA23A5458-004	VA23A5458-005
						Result	Result	Result	Result	Result
Total Metals										
Potassium, total	7440-09-7	E420	0.050	mg/L		0.111	0.103	0.103	0.100	0.106
Rubidium, total	7440-17-7	E420	0.00020	mg/L		0.00024	<0.00020	0.00023	<0.00020	0.00024
Selenium, total	7782-49-2	E420	0.000050	mg/L		<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Silicon, total	7440-21-3	E420	0.10	mg/L		2.66	2.48	2.46	2.51	2.50
Silver, total	7440-22-4	E420	0.000010	mg/L		<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium, total	7440-23-5	E420	0.050	mg/L		2.13	2.09	2.04	2.11	1.88
Strontium, total	7440-24-6	E420	0.00020	mg/L		0.00686	0.00665	0.00659	0.00653	0.00675
Sulfur, total	7704-34-9	E420	0.50	mg/L		0.82	0.56	0.55	0.50	0.67
Tellurium, total	13494-80-9	E420	0.00020	mg/L		<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Thallium, total	7440-28-0	E420	0.000010	mg/L		<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Thorium, total	7440-29-1	E420	0.00010	mg/L		<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Tin, total	7440-31-5	E420	0.00010	mg/L		<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium, total	7440-32-6	E420	0.00030	mg/L		0.00448	<0.00030	<0.00030	<0.00030	<0.00030
Tungsten, total	7440-33-7	E420	0.00010	mg/L		<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Uranium, total	7440-61-1	E420	0.000010	mg/L		0.000066	0.000037	0.000038	0.000040	0.000032
Vanadium, total	7440-62-2	E420	0.00050	mg/L		<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Zinc, total	7440-66-6	E420	0.0030	mg/L		0.0041	<0.0030	0.0081	<0.0030	<0.0030
Zirconium, total	7440-67-7	E420	0.00020	mg/L		<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Aggregate Organics										
Biochemical oxygen demand [BOD]	----	E550	2.0	mg/L		----	<2.0	----	<2.0	----
Volatile Organic Compounds [THMs]										
Bromodichloromethane	75-27-4	E611B	1.0	µg/L		----	<1.0	----	<1.0	----
Bromoform	75-25-2	E611B	1.0	µg/L		----	<1.0	----	<1.0	----
Chloroform	67-66-3	E611B	1.0	µg/L		----	26.6	----	30.7	----
Dibromochloromethane	124-48-1	E611B	1.0	µg/L		----	<1.0	----	<1.0	----
Trihalomethanes [THMs], total	----	E611B	2.0	µg/L		----	26.6	----	30.7	----
Volatile Organic Compounds [THMs] Surrogates										
Bromofluorobenzene, 4-	460-00-4	E611B	1.0	%		----	90.5	----	91.1	----
Difluorobenzene, 1,4-	540-36-3	E611B	1.0	%		----	99.9	----	99.7	----

Analytical Results

Sub-Matrix: **Water**
(Matrix: **Water**)

Analyte	CAS Number	Method	LOR	Unit	Client sample ID	Lions Bay Ave.	Kelvin Grove First Draw	Kelvin Grove	Community Centre First Draw	Community Centre
					Client sampling date / time	14-Mar-2023 06:35	14-Mar-2023 05:30	14-Mar-2023 05:30	14-Mar-2023 05:55	14-Mar-2023 05:55
						VA23A5458-006	VA23A5458-007	VA23A5458-008	VA23A5458-009	VA23A5458-010
						Result	Result	Result	Result	Result
Physical Tests										
Alkalinity, total (as CaCO3)	----	E290	1.0	mg/L		6.5	----	7.0	----	6.3
Hardness (as CaCO3), from total Ca/Mg	----	EC100A	0.50	mg/L		7.46	9.82	7.90	11.9	7.40
pH	----	E108	0.10	pH units		6.96	----	6.99	----	6.94
Solids, total suspended [TSS]	----	E160	3.0	mg/L		<3.0	----	<3.0	----	<3.0
Turbidity	----	E121	0.10	NTU		<0.10	----	<0.10	----	<0.10
Organic / Inorganic Carbon										
Carbon, total organic [TOC]	----	E355-L	0.50	mg/L		1.31	----	1.32	----	1.45
Total Metals										
Aluminum, total	7429-90-5	E420	0.0030	mg/L		0.0287	0.0275	0.0291	0.0219	0.0351
Antimony, total	7440-36-0	E420	0.00010	mg/L		<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic, total	7440-38-2	E420	0.00010	mg/L		<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Barium, total	7440-39-3	E420	0.00010	mg/L		0.00177	0.00232	0.00207	0.00146	0.00171
Beryllium, total	7440-41-7	E420	0.000020	mg/L		<0.000020	<0.000020	<0.000020	<0.000020	<0.000020
Bismuth, total	7440-69-9	E420	0.000050	mg/L		<0.000050	<0.000050	<0.000050	0.00361	<0.000050
Boron, total	7440-42-8	E420	0.010	mg/L		<0.010	0.014	<0.010	0.035	<0.010
Cadmium, total	7440-43-9	E420	0.0000050	mg/L		<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Calcium, total	7440-70-2	E420	0.050	mg/L		2.50	3.16	2.70	2.23	2.49
Cesium, total	7440-46-2	E420	0.000010	mg/L		<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Chromium, total	7440-47-3	E420	0.00050	mg/L		<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Cobalt, total	7440-48-4	E420	0.00010	mg/L		<0.00010	<0.00010	<0.00010	0.00012	<0.00010
Copper, total	7440-50-8	E420	0.00050	mg/L		0.00074	0.0503	0.00360	0.130	0.0267
Iron, total	7439-89-6	E420	0.010	mg/L		<0.010	0.112	0.021	0.029	0.029
Lead, total	7439-92-1	E420	0.000050	mg/L		<0.000050	0.00463	0.000199	0.00214	0.000208
Lithium, total	7439-93-2	E420	0.0010	mg/L		<0.0010	0.0024	<0.0010	0.0046	<0.0010
Magnesium, total	7439-95-4	E420	0.0050	mg/L		0.297	0.470	0.282	1.53	0.288
Manganese, total	7439-96-5	E420	0.00010	mg/L		0.00014	0.00114	0.00018	0.00030	0.00035
Mercury, total	7439-97-6	E508	0.0000050	mg/L		<0.0000050	----	<0.0000050	----	<0.0000050
Molybdenum, total	7439-98-7	E420	0.000050	mg/L		0.000520	0.000484	0.000501	0.000374	0.000460
Nickel, total	7440-02-0	E420	0.00050	mg/L		<0.00050	0.00254	<0.00050	0.00790	<0.00050

Analytical Results

Sub-Matrix: **Water**
(Matrix: **Water**)

Analyte	CAS Number	Method	LOR	Unit	Client sample ID	Lions Bay Ave.	Kelvin Grove First Draw	Kelvin Grove	Community Centre First Draw	Community Centre
					Client sampling date / time	14-Mar-2023 06:35	14-Mar-2023 05:30	14-Mar-2023 05:30	14-Mar-2023 05:55	14-Mar-2023 05:55
						VA23A5458-006	VA23A5458-007	VA23A5458-008	VA23A5458-009	VA23A5458-010
						Result	Result	Result	Result	Result
Total Metals										
Phosphorus, total	7723-14-0	E420	0.050	mg/L		<0.050	<0.050	<0.050	<0.050	<0.050
Potassium, total	7440-09-7	E420	0.050	mg/L		0.104	0.107	0.102	0.091	0.100
Rubidium, total	7440-17-7	E420	0.00020	mg/L		<0.00020	0.00023	0.00021	0.00020	0.00021
Selenium, total	7782-49-2	E420	0.000050	mg/L		<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Silicon, total	7440-21-3	E420	0.10	mg/L		2.53	2.39	2.51	2.04	2.42
Silver, total	7440-22-4	E420	0.000010	mg/L		<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium, total	7440-23-5	E420	0.050	mg/L		1.88	1.93	1.88	1.90	2.05
Strontium, total	7440-24-6	E420	0.00020	mg/L		0.00687	0.00702	0.00678	0.00600	0.00683
Sulfur, total	7704-34-9	E420	0.50	mg/L		0.74	0.58	0.73	<0.50	0.63
Tellurium, total	13494-80-9	E420	0.00020	mg/L		<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Thallium, total	7440-28-0	E420	0.000010	mg/L		<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Thorium, total	7440-29-1	E420	0.00010	mg/L		<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Tin, total	7440-31-5	E420	0.00010	mg/L		<0.00010	<0.00010	<0.00010	0.00468	<0.00010
Titanium, total	7440-32-6	E420	0.00030	mg/L		<0.00030	<0.00030	<0.00030	<0.00030	<0.00030
Tungsten, total	7440-33-7	E420	0.00010	mg/L		<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Uranium, total	7440-61-1	E420	0.000010	mg/L		0.000032	0.000029	0.000033	0.000012	0.000036
Vanadium, total	7440-62-2	E420	0.00050	mg/L		<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Zinc, total	7440-66-6	E420	0.0030	mg/L		<0.0030	0.0358	<0.0030	0.372	<0.0030
Zirconium, total	7440-67-7	E420	0.00020	mg/L		<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Aggregate Organics										
Biochemical oxygen demand [BOD]	----	E550	2.0	mg/L		<2.0	----	<2.0	----	<2.0
Volatile Organic Compounds [THMs]										
Bromodichloromethane	75-27-4	E611B	1.0	µg/L		<1.0	----	<1.0	----	<1.0
Bromoform	75-25-2	E611B	1.0	µg/L		<1.0	----	<1.0	----	<1.0
Chloroform	67-66-3	E611B	1.0	µg/L		26.3	----	27.9	----	31.3
Dibromochloromethane	124-48-1	E611B	1.0	µg/L		<1.0	----	<1.0	----	<1.0
Trihalomethanes [THMs], total	----	E611B	2.0	µg/L		26.3	----	27.9	----	31.3
Volatile Organic Compounds [THMs] Surrogates										
Bromofluorobenzene, 4-	460-00-4	E611B	1.0	%		91.6	----	91.9	----	92.5

Analytical Results

Sub-Matrix: **Water**
(Matrix: **Water**)

					Client sample ID	Lions Bay Ave.	Kelvin Grove First Draw	Kelvin Grove	Community Centre First Draw	Community Centre
					Client sampling date / time	14-Mar-2023 06:35	14-Mar-2023 05:30	14-Mar-2023 05:30	14-Mar-2023 05:55	14-Mar-2023 05:55
Analyte	*CAS Number*	*Method*	*LOR*	*Unit*		**VA23A5458-006**	**VA23A5458-007**	**VA23A5458-008**	**VA23A5458-009**	**VA23A5458-010**
						Result	Result	Result	Result	Result
Volatile Organic Compounds [THMs] Surrogates										
Difluorobenzene, 1,4-	540-36-3	E611B	1.0	%		99.6	----	99.6	----	98.9

Please refer to the General Comments section for an explanation of any qualifiers detected.

Analytical Results

Sub-Matrix: **Water**
(Matrix: **Water**)

Analyte	CAS Number	Method	LOR	Unit	Client sample ID	Magnesia Tank First Draw	Magnesia Tank	Brunswick Beach First Draw	Brunswick Beach	Lions Bay Beach Park First Draw
					Client sampling date / time	14-Mar-2023 10:20	14-Mar-2023 10:20	14-Mar-2023 10:50	14-Mar-2023 10:50	14-Mar-2023 08:20
						VA23A5458-011	VA23A5458-012	VA23A5458-013	VA23A5458-014	VA23A5458-015
						Result	Result	Result	Result	Result
Physical Tests										
Alkalinity, total (as CaCO3)	----	E290	1.0	mg/L		----	5.8	----	6.7	----
Hardness (as CaCO3), from total Ca/Mg	----	EC100A	0.50	mg/L		16.8	16.4	8.00	8.11	7.16
pH	----	E108	0.10	pH units		----	6.91	----	7.03	----
Solids, total suspended [TSS]	----	E160	3.0	mg/L		----	<3.0	----	<3.0	----
Turbidity	----	E121	0.10	NTU		----	<0.10	----	<0.10	----
Organic / Inorganic Carbon										
Carbon, total organic [TOC]	----	E355-L	0.50	mg/L		----	0.86	----	1.17	----
Total Metals										
Aluminum, total	7429-90-5	E420	0.0030	mg/L		0.0095	0.0190	0.0215	0.0259	0.0426
Antimony, total	7440-36-0	E420	0.00010	mg/L		<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic, total	7440-38-2	E420	0.00010	mg/L		<0.00010	0.00012	<0.00010	0.00011	0.00010
Barium, total	7440-39-3	E420	0.00010	mg/L		0.00239	0.00238	0.00202	0.00204	0.00200
Beryllium, total	7440-41-7	E420	0.000020	mg/L		<0.000020	<0.000020	<0.000020	<0.000020	<0.000020
Bismuth, total	7440-69-9	E420	0.000050	mg/L		<0.000050	<0.000050	0.000051	<0.000050	<0.000050
Boron, total	7440-42-8	E420	0.010	mg/L		<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium, total	7440-43-9	E420	0.0000050	mg/L		0.0000897	0.0000148	0.0000105	<0.0000050	0.0000055
Calcium, total	7440-70-2	E420	0.050	mg/L		5.69	5.52	2.72	2.76	2.36
Cesium, total	7440-46-2	E420	0.000010	mg/L		<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Chromium, total	7440-47-3	E420	0.00050	mg/L		<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Cobalt, total	7440-48-4	E420	0.00010	mg/L		<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper, total	7440-50-8	E420	0.00050	mg/L		0.607	0.00353	0.00283	0.00094	0.0431
Iron, total	7439-89-6	E420	0.010	mg/L		0.022	0.013	0.015	0.016	<0.010
Lead, total	7439-92-1	E420	0.000050	mg/L		0.00181	<0.000050	0.000073	<0.000050	0.00171
Lithium, total	7439-93-2	E420	0.0010	mg/L		<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Magnesium, total	7439-95-4	E420	0.0050	mg/L		0.641	0.644	0.294	0.295	0.307
Manganese, total	7439-96-5	E420	0.00010	mg/L		0.00080	0.00074	0.00091	0.00020	0.00021
Mercury, total	7439-97-6	E508	0.0000050	mg/L		----	<0.0000050	----	<0.0000050	----
Molybdenum, total	7439-98-7	E420	0.000050	mg/L		0.000246	0.000262	0.000541	0.000492	0.000444
Nickel, total	7440-02-0	E420	0.00050	mg/L		0.00119	<0.00050	0.00062	<0.00050	0.00237

Analytical Results

Sub-Matrix: **Water**
(Matrix: **Water**)

Analyte	CAS Number	Method	LOR	Unit	Client sample ID	Magnesia Tank First Draw	Magnesia Tank	Brunswick Beach First Draw	Brunswick Beach	Lions Bay Beach Park First Draw
					Client sampling date / time	14-Mar-2023 10:20	14-Mar-2023 10:20	14-Mar-2023 10:50	14-Mar-2023 10:50	14-Mar-2023 08:20
						VA23A5458-011	VA23A5458-012	VA23A5458-013	VA23A5458-014	VA23A5458-015
						Result	Result	Result	Result	Result
Total Metals										
Phosphorus, total	7723-14-0	E420	0.050	mg/L		<0.050	<0.050	<0.050	<0.050	<0.050
Potassium, total	7440-09-7	E420	0.050	mg/L		0.091	0.090	0.104	0.107	0.103
Rubidium, total	7440-17-7	E420	0.00020	mg/L		<0.00020	<0.00020	0.00021	0.00023	<0.00020
Selenium, total	7782-49-2	E420	0.000050	mg/L		0.000110	0.000144	<0.000050	<0.000050	<0.000050
Silicon, total	7440-21-3	E420	0.10	mg/L		5.10	5.22	2.51	2.53	2.54
Silver, total	7440-22-4	E420	0.000010	mg/L		<0.000010	<0.000010	<0.000010	<0.000010	0.000018
Sodium, total	7440-23-5	E420	0.050	mg/L		3.27	3.31	1.86	1.88	2.12
Strontium, total	7440-24-6	E420	0.00020	mg/L		0.0272	0.0274	0.00808	0.00778	0.00662
Sulfur, total	7704-34-9	E420	0.50	mg/L		4.69	4.67	0.67	0.62	0.76
Tellurium, total	13494-80-9	E420	0.00020	mg/L		<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Thallium, total	7440-28-0	E420	0.000010	mg/L		<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Thorium, total	7440-29-1	E420	0.00010	mg/L		<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Tin, total	7440-31-5	E420	0.00010	mg/L		<0.00010	<0.00010	<0.00010	<0.00010	0.00285
Titanium, total	7440-32-6	E420	0.00030	mg/L		<0.00030	<0.00030	<0.00030	<0.00030	<0.00030
Tungsten, total	7440-33-7	E420	0.00010	mg/L		<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Uranium, total	7440-61-1	E420	0.000010	mg/L		<0.000010	<0.000010	0.000029	0.000033	0.000038
Vanadium, total	7440-62-2	E420	0.00050	mg/L		<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Zinc, total	7440-66-6	E420	0.0030	mg/L		0.172	<0.0030	<0.0030	<0.0030	0.0198
Zirconium, total	7440-67-7	E420	0.00020	mg/L		<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Aggregate Organics										
Biochemical oxygen demand [BOD]	----	E550	2.0	mg/L		----	<2.0	----	<2.0	----
Volatile Organic Compounds [THMs]										
Bromodichloromethane	75-27-4	E611B	1.0	µg/L		----	<1.0	----	<1.0	----
Bromoform	75-25-2	E611B	1.0	µg/L		----	<1.0	----	<1.0	----
Chloroform	67-66-3	E611B	1.0	µg/L		----	14.8	----	28.9	----
Dibromochloromethane	124-48-1	E611B	1.0	µg/L		----	<1.0	----	<1.0	----
Trihalomethanes [THMs], total	----	E611B	2.0	µg/L		----	14.8	----	28.9	----
Volatile Organic Compounds [THMs] Surrogates										
Bromofluorobenzene, 4-	460-00-4	E611B	1.0	%		----	91.3	----	91.0	----

Analytical Results

Sub-Matrix: **Water**
(Matrix: **Water**)

Analyte	CAS Number	Method	LOR	Unit	Client sample ID	Magnesia Tank First Draw	Magnesia Tank	Brunswick Beach First Draw	Brunswick Beach	Lions Bay Beach Park First Draw
					Client sampling date / time	14-Mar-2023 10:20	14-Mar-2023 10:20	14-Mar-2023 10:50	14-Mar-2023 10:50	14-Mar-2023 08:20
						VA23A5458-011	VA23A5458-012	VA23A5458-013	VA23A5458-014	VA23A5458-015
						Result	Result	Result	Result	Result
Volatile Organic Compounds [THMs] Surrogates										
Difluorobenzene, 1,4-	540-36-3	E611B	1.0	%		----	99.5	----	99.5	----

Please refer to the General Comments section for an explanation of any qualifiers detected.

Analytical Results

Sub-Matrix: Water (Matrix: Water)					Client sample ID	Lions Bay Beach Park	----	----	----	----
					Client sampling date / time	14-Mar-2023 08:20	----	----	----	----
Analyte	CAS Number	Method	LOR	Unit		VA23A5458-016	--------	--------	--------	--------
						Result	----	----	----	----
Physical Tests										
Alkalinity, total (as CaCO3)	----	E290	1.0	mg/L		6.1	----	----	----	----
Hardness (as CaCO3), from total Ca/Mg	----	EC100A	0.50	mg/L		7.08	----	----	----	----
pH	----	E108	0.10	pH units		6.93	----	----	----	----
Solids, total suspended [TSS]	----	E160	3.0	mg/L		<3.0	----	----	----	----
Turbidity	----	E121	0.10	NTU		<0.10	----	----	----	----
Organic / Inorganic Carbon										
Carbon, total organic [TOC]	----	E355-L	0.50	mg/L		1.65	----	----	----	----
Total Metals										
Aluminum, total	7429-90-5	E420	0.0030	mg/L		0.0383	----	----	----	----
Antimony, total	7440-36-0	E420	0.00010	mg/L		<0.00010	----	----	----	----
Arsenic, total	7440-38-2	E420	0.00010	mg/L		<0.00010	----	----	----	----
Barium, total	7440-39-3	E420	0.00010	mg/L		0.00184	----	----	----	----
Beryllium, total	7440-41-7	E420	0.000020	mg/L		<0.000020	----	----	----	----
Bismuth, total	7440-69-9	E420	0.000050	mg/L		<0.000050	----	----	----	----
Boron, total	7440-42-8	E420	0.010	mg/L		<0.010	----	----	----	----
Cadmium, total	7440-43-9	E420	0.0000050	mg/L		<0.0000050	----	----	----	----
Calcium, total	7440-70-2	E420	0.050	mg/L		2.34	----	----	----	----
Cesium, total	7440-46-2	E420	0.000010	mg/L		<0.000010	----	----	----	----
Chromium, total	7440-47-3	E420	0.00050	mg/L		<0.00050	----	----	----	----
Cobalt, total	7440-48-4	E420	0.00010	mg/L		<0.00010	----	----	----	----
Copper, total	7440-50-8	E420	0.00050	mg/L		0.0188	----	----	----	----
Iron, total	7439-89-6	E420	0.010	mg/L		<0.010	----	----	----	----
Lead, total	7439-92-1	E420	0.000050	mg/L		0.000564	----	----	----	----
Lithium, total	7439-93-2	E420	0.0010	mg/L		<0.0010	----	----	----	----
Magnesium, total	7439-95-4	E420	0.0050	mg/L		0.300	----	----	----	----
Manganese, total	7439-96-5	E420	0.00010	mg/L		0.00020	----	----	----	----
Mercury, total	7439-97-6	E508	0.0000050	mg/L		<0.0000050	----	----	----	----
Molybdenum, total	7439-98-7	E420	0.000050	mg/L		0.000484	----	----	----	----
Nickel, total	7440-02-0	E420	0.00050	mg/L		<0.00050	----	----	----	----
Phosphorus, total	7723-14-0	E420	0.050	mg/L		<0.050	----	----	----	----

Analytical Results

Sub-Matrix: Water (Matrix: Water)					Client sample ID	Lions Bay Beach Park	----	----	----	----
					Client sampling date / time	14-Mar-2023 08:20	----	----	----	----
Analyte	CAS Number	Method	LOR	Unit		VA23A5458-016	--------	--------	--------	--------
						Result	----	----	----	----
Total Metals										
Potassium, total	7440-09-7	E420	0.050	mg/L		0.099	----	----	----	----
Rubidium, total	7440-17-7	E420	0.00020	mg/L		0.00020	----	----	----	----
Selenium, total	7782-49-2	E420	0.000050	mg/L		<0.000050	----	----	----	----
Silicon, total	7440-21-3	E420	0.10	mg/L		2.50	----	----	----	----
Silver, total	7440-22-4	E420	0.000010	mg/L		<0.000010	----	----	----	----
Sodium, total	7440-23-5	E420	0.050	mg/L		2.10	----	----	----	----
Strontium, total	7440-24-6	E420	0.00020	mg/L		0.00683	----	----	----	----
Sulfur, total	7704-34-9	E420	0.50	mg/L		0.74	----	----	----	----
Tellurium, total	13494-80-9	E420	0.00020	mg/L		<0.00020	----	----	----	----
Thallium, total	7440-28-0	E420	0.000010	mg/L		<0.000010	----	----	----	----
Thorium, total	7440-29-1	E420	0.00010	mg/L		<0.00010	----	----	----	----
Tin, total	7440-31-5	E420	0.00010	mg/L		<0.00010	----	----	----	----
Titanium, total	7440-32-6	E420	0.00030	mg/L		<0.00030	----	----	----	----
Tungsten, total	7440-33-7	E420	0.00010	mg/L		<0.00010	----	----	----	----
Uranium, total	7440-61-1	E420	0.000010	mg/L		0.000036	----	----	----	----
Vanadium, total	7440-62-2	E420	0.00050	mg/L		<0.00050	----	----	----	----
Zinc, total	7440-66-6	E420	0.0030	mg/L		<0.0030	----	----	----	----
Zirconium, total	7440-67-7	E420	0.00020	mg/L		<0.00020	----	----	----	----
Aggregate Organics										
Biochemical oxygen demand [BOD]	----	E550	2.0	mg/L		<2.0	----	----	----	----
Volatile Organic Compounds [THMs]										
Bromodichloromethane	75-27-4	E611B	1.0	µg/L		<1.0	----	----	----	----
Bromoform	75-25-2	E611B	1.0	µg/L		<1.0	----	----	----	----
Chloroform	67-66-3	E611B	1.0	µg/L		31.2	----	----	----	----
Dibromochloromethane	124-48-1	E611B	1.0	µg/L		<1.0	----	----	----	----
Trihalomethanes [THMs], total	----	E611B	2.0	µg/L		31.2	----	----	----	----
Volatile Organic Compounds [THMs] Surrogates										
Bromofluorobenzene, 4-	460-00-4	E611B	1.0	%		92.7	----	----	----	----
Difluorobenzene, 1,4-	540-36-3	E611B	1.0	%		98.7	----	----	----	----

ABRIDGED REPORT OF 28 SEP. 2023 (SAMPLES 26 SEP.)

Analytical Results

Sub-Matrix: **Surface Water**
(Matrix: **Water**)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	Harvey Raw Water	Magnesia Raw Water	----	----	----
					Client sampling date / time	26-Sep-2023 12:45	26-Sep-2023 10:30	----	----	----
						VA23C2879-017	VA23C2879-018	--------	--------	--------
						Result	Result	----	----	----
Physical Tests										
Absorbance, UV (@ 254nm)	----	E404/VA	0.0050	AU/cm		0.0470	0.0430	----	----	----
Alkalinity, total (as CaCO3)	----	E290/VA	1.0	mg/L		3.4	3.9	----	----	----
Hardness (as CaCO3), from total Ca/Mg	----	EC100A/VA	0.50	mg/L		3.82	6.88	----	----	----
pH	----	E108/VA	0.10	pH units		6.64	6.67	----	----	----
Solids, total suspended [TSS]	----	E160/VA	3.0	mg/L		<3.0	<3.0	----	----	----
Turbidity	----	E121/VA	0.10	NTU		0.13	0.19	----	----	----
Transmittance, UV (@ 254nm)	----	E404/VA	1.0	% T/cm		89.7	90.6	----	----	----
Organic / Inorganic Carbon										
Carbon, total organic [TOC]	----	E355-L/VA	0.50	mg/L		1.68	1.67	----	----	----
Total Metals										
Aluminum, total	7429-90-5	E420/VA	0.0030	mg/L		0.0525	0.0527	----	----	----
Antimony, total	7440-36-0	E420/VA	0.00010	mg/L		<0.00010	<0.00010	----	----	----
Arsenic, total	7440-38-2	E420/VA	0.00010	mg/L		<0.00010	0.00012	----	----	----
Barium, total	7440-39-3	E420/VA	0.00010	mg/L		0.00143	0.00129	----	----	----
Beryllium, total	7440-41-7	E420/VA	0.000020	mg/L		<0.000020	<0.000020	----	----	----
Bismuth, total	7440-69-9	E420/VA	0.000050	mg/L		<0.000050	<0.000050	----	----	----
Boron, total	7440-42-8	E420/VA	0.010	mg/L		<0.010	<0.010	----	----	----
Cadmium, total	7440-43-9	E420/VA	0.0000050	mg/L		0.0000064	0.0000142	----	----	----
Calcium, total	7440-70-2	E420/VA	0.050	mg/L		1.27	2.31	----	----	----
Cesium, total	7440-46-2	E420/VA	0.000010	mg/L		<0.000010	<0.000010	----	----	----
Chromium, total	7440-47-3	E420/VA	0.00050	mg/L		<0.00050	<0.00050	----	----	----
Cobalt, total	7440-48-4	E420/VA	0.00010	mg/L		<0.00010	<0.00010	----	----	----
Copper, total	7440-50-8	E420/VA	0.00050	mg/L		0.00133	0.00520	----	----	----
Iron, total	7439-89-6	E420/VA	0.010	mg/L		<0.010	0.021	----	----	----
Lead, total	7439-92-1	E420/VA	0.000050	mg/L		0.000089	0.000112	----	----	----
Lithium, total	7439-93-2	E420/VA	0.0010	mg/L		<0.0010	<0.0010	----	----	----
Magnesium, total	7439-95-4	E420/VA	0.0050	mg/L		0.158	0.270	----	----	----
Manganese, total	7439-96-5	E420/VA	0.00010	mg/L		0.00057	0.00094	----	----	----
Mercury, total	7439-97-6	E508/VA	0.0000050	mg/L		<0.0000050	<0.0000050	----	----	----

Analytical Results

Sub-Matrix: Surface Water (Matrix: Water)					Client sample ID	Harvey Raw Water	Magnesia Raw Water	----	----	----
					Client sampling date / time	26-Sep-2023 12:45	26-Sep-2023 10:30	----	----	----
Analyte	CAS Number	Method/Lab	LOR	Unit		VA23C2879-017	VA23C2879-018	--------	--------	--------
						Result	Result	----	----	----
Total Metals										
Molybdenum, total	7439-98-7	E420/VA	0.000050	mg/L		0.000159	0.000154	----	----	----
Nickel, total	7440-02-0	E420/VA	0.00050	mg/L		<0.00050	<0.00050	----	----	----
Phosphorus, total	7723-14-0	E420/VA	0.050	mg/L		<0.050	<0.050	----	----	----
Potassium, total	7440-09-7	E420/VA	0.050	mg/L		0.114	0.072	----	----	----
Rubidium, total	7440-17-7	E420/VA	0.00020	mg/L		0.00026	<0.00020	----	----	----
Selenium, total	7782-49-2	E420/VA	0.000050	mg/L		<0.000050	0.000060	----	----	----
Silicon, total	7440-21-3	E420/VA	0.10	mg/L		1.63	2.69	----	----	----
Silver, total	7440-22-4	E420/VA	0.000010	mg/L		<0.000010	<0.000010	----	----	----
Sodium, total	7440-23-5	E420/VA	0.050	mg/L		0.524	0.965	----	----	----
Strontium, total	7440-24-6	E420/VA	0.00020	mg/L		0.00420	0.0126	----	----	----
Sulfur, total	7704-34-9	E420/VA	0.50	mg/L		<0.50	1.61	----	----	----
Tellurium, total	13494-80-9	E420/VA	0.00020	mg/L		<0.00020	<0.00020	----	----	----
Thallium, total	7440-28-0	E420/VA	0.000010	mg/L		<0.000010	<0.000010	----	----	----
Thorium, total	7440-29-1	E420/VA	0.00010	mg/L		<0.00010	<0.00010	----	----	----
Tin, total	7440-31-5	E420/VA	0.00010	mg/L		<0.00010	<0.00010	----	----	----
Titanium, total	7440-32-6	E420/VA	0.00030	mg/L		0.00041	0.00046	----	----	----
Tungsten, total	7440-33-7	E420/VA	0.00010	mg/L		<0.00010	<0.00010	----	----	----
Uranium, total	7440-61-1	E420/VA	0.000010	mg/L		0.000043	<0.000010	----	----	----
Vanadium, total	7440-62-2	E420/VA	0.00050	mg/L		<0.00050	<0.00050	----	----	----
Zinc, total	7440-66-6	E420/VA	0.0030	mg/L		<0.0030	<0.0030	----	----	----
Zirconium, total	7440-67-7	E420/VA	0.00020	mg/L		<0.00020	<0.00020	----	----	----
Aggregate Organics										
Biochemical oxygen demand [BOD]	----	E550/VA	2.0	mg/L		<2.0	<2.0	----	----	----

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

Analytical Results

Sub-Matrix: **Water**
(Matrix: **Water**)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	Harvey Tank First Draw	Harvey Tank	Store / Cafe First Draw	Store / Cafe	Lions Bay Ave. First Draw
					Client sampling date / time	26-Sep-2023 12:35	26-Sep-2023 12:35	26-Sep-2023 09:00	26-Sep-2023 09:00	26-Sep-2023 06:35
						VA23C2879-001	VA23C2879-002	VA23C2879-003	VA23C2879-004	VA23C2879-005
						Result	Result	Result	Result	Result
Physical Tests										
Alkalinity, total (as CaCO3)	----	E290/VA	1.0	mg/L		----	4.7	----	5.1	----
Hardness (as CaCO3), from total Ca/Mg	----	EC100A/VA	0.50	mg/L		5.14	5.27	8.44	5.78	8.33
pH	----	E108/VA	0.10	pH units		----	6.62	----	6.62	----
Solids, total suspended [TSS]	----	E160/VA	3.0	mg/L		----	<3.0	----	<3.0	----
Turbidity	----	E121/VA	0.10	NTU		----	0.52	----	0.37	----
Organic / Inorganic Carbon										
Carbon, total organic [TOC]	----	E355-L/VA	0.50	mg/L		----	2.02	----	2.06	----
Total Metals										
Aluminum, total	7429-90-5	E420/VA	0.0030	mg/L		0.0879	0.0852	0.0332	0.0643	0.0177
Antimony, total	7440-36-0	E420/VA	0.00010	mg/L		<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic, total	7440-38-2	E420/VA	0.00010	mg/L		0.00011	0.00012	0.00010	0.00010	<0.00010
Barium, total	7440-39-3	E420/VA	0.00010	mg/L		0.00211	0.00204	0.00270	0.00208	0.00264
Beryllium, total	7440-41-7	E420/VA	0.000020	mg/L		<0.000020	<0.000020	<0.000020	<0.000020	<0.000020
Bismuth, total	7440-69-9	E420/VA	0.000050	mg/L		<0.000050	<0.000050	<0.000050	<0.000050	0.000090
Boron, total	7440-42-8	E420/VA	0.010	mg/L		<0.010	<0.010	0.015	<0.010	<0.010
Cadmium, total	7440-43-9	E420/VA	0.0000050	mg/L		0.0000100	0.0000073	<0.0000050	0.0000055	<0.0000050
Calcium, total	7440-70-2	E420/VA	0.050	mg/L		1.70	1.75	2.62	1.95	2.78
Cesium, total	7440-46-2	E420/VA	0.000010	mg/L		<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Chromium, total	7440-47-3	E420/VA	0.00050	mg/L		<0.00050	<0.00050	<0.00050	<0.00050	0.00102
Cobalt, total	7440-48-4	E420/VA	0.00010	mg/L		<0.00010	<0.00010	0.00012	<0.00010	<0.00010
Copper, total	7440-50-8	E420/VA	0.00050	mg/L		0.00810	0.00715	0.0681	0.00535	0.00136
Iron, total	7439-89-6	E420/VA	0.010	mg/L		0.028	0.026	0.021	0.038	<0.010
Lead, total	7439-92-1	E420/VA	0.000050	mg/L		0.000113	0.000101	0.00687	0.000314	<0.000050
Lithium, total	7439-93-2	E420/VA	0.0010	mg/L		<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Magnesium, total	7439-95-4	E420/VA	0.0050	mg/L		0.217	0.219	0.462	0.221	0.337
Manganese, total	7439-96-5	E420/VA	0.00010	mg/L		0.00199	0.00194	0.00075	0.00148	0.00081
Mercury, total	7439-97-6	E508/VA	0.0000050	mg/L		----	<0.0000050	----	<0.0000050	----
Molybdenum, total	7439-98-7	E420/VA	0.000050	mg/L		0.000362	0.000381	0.000593	0.000375	0.000771
Nickel, total	7440-02-0	E420/VA	0.00050	mg/L		<0.00050	<0.00050	0.00299	<0.00050	0.00057
Phosphorus, total	7723-14-0	E420/VA	0.050	mg/L		<0.050	<0.050	<0.050	<0.050	<0.050

Analytical Results

Sub-Matrix: **Water**
(Matrix: **Water**)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	Harvey Tank First Draw	Harvey Tank	Store / Cafe First Draw	Store / Cafe	Lions Bay Ave. First Draw
					Client sampling date / time	26-Sep-2023 12:35	26-Sep-2023 12:35	26-Sep-2023 09:00	26-Sep-2023 09:00	26-Sep-2023 06:35
						VA23C2879-001	VA23C2879-002	VA23C2879-003	VA23C2879-004	VA23C2879-005
						Result	Result	Result	Result	Result
Total Metals										
Potassium, total	7440-09-7	E420/VA	0.050	mg/L		0.141	0.136	0.154	0.142	0.160
Rubidium, total	7440-17-7	E420/VA	0.00020	mg/L		0.00030	0.00032	0.00033	0.00031	0.00037
Selenium, total	7782-49-2	E420/VA	0.000050	mg/L		<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Silicon, total	7440-21-3	E420/VA	0.10	mg/L		1.76	1.71	2.33	1.80	2.44
Silver, total	7440-22-4	E420/VA	0.000010	mg/L		<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium, total	7440-23-5	E420/VA	0.050	mg/L		2.71	2.66	2.38	2.58	2.32
Strontium, total	7440-24-6	E420/VA	0.00020	mg/L		0.00562	0.00552	0.00807	0.00589	0.00824
Sulfur, total	7704-34-9	E420/VA	0.50	mg/L		<0.50	0.56	0.87	0.56	0.93
Tellurium, total	13494-80-9	E420/VA	0.00020	mg/L		<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Thallium, total	7440-28-0	E420/VA	0.000010	mg/L		<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Thorium, total	7440-29-1	E420/VA	0.00010	mg/L		<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Tin, total	7440-31-5	E420/VA	0.00010	mg/L		<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium, total	7440-32-6	E420/VA	0.00030	mg/L		0.00107	0.00097	<0.00030	0.00060	<0.00030
Tungsten, total	7440-33-7	E420/VA	0.00010	mg/L		<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Uranium, total	7440-61-1	E420/VA	0.000010	mg/L		0.000061	0.000060	0.000027	0.000057	0.000028
Vanadium, total	7440-62-2	E420/VA	0.00050	mg/L		<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Zinc, total	7440-66-6	E420/VA	0.0030	mg/L		<0.0030	<0.0030	0.0242	<0.0030	<0.0030
Zirconium, total	7440-67-7	E420/VA	0.00020	mg/L		<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Aggregate Organics										
Biochemical oxygen demand [BOD]	----	E550/VA	2.0	mg/L		----	<2.0	----	<2.0	----
Volatile Organic Compounds [THMs]										
Bromodichloromethane	75-27-4	E611B/VA	1.0	µg/L		----	<1.0	----	<1.0	----
Bromoform	75-25-2	E611B/VA	1.0	µg/L		----	<1.0	----	<1.0	----
Chloroform	67-66-3	E611B/VA	1.0	µg/L		----	48.5	----	57.6	----
Dibromochloromethane	124-48-1	E611B/VA	1.0	µg/L		----	<1.0	----	<1.0	----
Trihalomethanes [THMs], total	----	E611B/VA	2.0	µg/L		----	48.5	----	57.6	----
Volatile Organic Compounds [THMs] Surrogates										
Bromofluorobenzene, 4-	460-00-4	E611B/VA	1.0	%		----	100	----	102	----
Difluorobenzene, 1,4-	540-36-3	E611B/VA	1.0	%		----	99.9	----	99.8	----

Analytical Results

Sub-Matrix: **Water**
(Matrix: **Water**)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	Lions Bay Ave.	Kelvin Grove First Draw	Kelvin Grove	Community Centre First Draw	Community Centre
					Client sampling date / time	26-Sep-2023 06:35	26-Sep-2023 05:30	26-Sep-2023 05:30	26-Sep-2023 05:55	26-Sep-2023 05:55
						VA23C2879-006	VA23C2879-007	VA23C2879-008	VA23C2879-009	VA23C2879-010
						Result	Result	Result	Result	Result
Physical Tests										
Alkalinity, total (as CaCO3)	----	E290/VA	1.0	mg/L		6.4	----	8.8	----	5.8
Hardness (as CaCO3), from total Ca/Mg	----	EC100A/VA	0.50	mg/L		7.66	11.9	9.66	14.2	6.74
pH	----	E108/VA	0.10	pH units		6.74	----	6.92	----	6.72
Solids, total suspended [TSS]	----	E160/VA	3.0	mg/L		<3.0	----	<3.0	----	<3.0
Turbidity	----	E121/VA	0.10	NTU		<0.10	----	<0.10	----	0.38
Organic / Inorganic Carbon										
Carbon, total organic [TOC]	----	E355-L/VA	0.50	mg/L		1.46	----	0.82	----	2.04
Total Metals										
Aluminum, total	7429-90-5	E420/VA	0.0030	mg/L		0.0302	0.0313	0.0348	0.0169	0.0583
Antimony, total	7440-36-0	E420/VA	0.00010	mg/L		<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic, total	7440-38-2	E420/VA	0.00010	mg/L		<0.00010	0.00010	0.00010	<0.00010	0.00011
Barium, total	7440-39-3	E420/VA	0.00010	mg/L		0.00248	0.00256	0.00267	0.00222	0.00224
Beryllium, total	7440-41-7	E420/VA	0.000020	mg/L		<0.000020	<0.000020	<0.000020	<0.000020	<0.000020
Bismuth, total	7440-69-9	E420/VA	0.000050	mg/L		<0.000050	<0.000050	<0.000050	0.00147	<0.000050
Boron, total	7440-42-8	E420/VA	0.010	mg/L		<0.010	0.034	<0.010	0.064	<0.010
Cadmium, total	7440-43-9	E420/VA	0.0000050	mg/L		<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000051
Calcium, total	7440-70-2	E420/VA	0.050	mg/L		2.58	3.63	3.44	2.68	2.30
Cesium, total	7440-46-2	E420/VA	0.000010	mg/L		<0.000010	0.000015	<0.000010	0.000012	<0.000010
Chromium, total	7440-47-3	E420/VA	0.00050	mg/L		<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Cobalt, total	7440-48-4	E420/VA	0.00010	mg/L		<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper, total	7440-50-8	E420/VA	0.00050	mg/L		0.00088	0.0222	0.00125	0.0725	0.0332
Iron, total	7439-89-6	E420/VA	0.010	mg/L		0.011	0.162	0.055	<0.010	0.048
Lead, total	7439-92-1	E420/VA	0.000050	mg/L		<0.000050	0.00588	0.000148	0.000827	0.000326
Lithium, total	7439-93-2	E420/VA	0.0010	mg/L		<0.0010	0.0061	<0.0010	0.0086	<0.0010
Magnesium, total	7439-95-4	E420/VA	0.0050	mg/L		0.297	0.697	0.259	1.82	0.242
Manganese, total	7439-96-5	E420/VA	0.00010	mg/L		0.00052	0.00281	0.00060	0.00018	0.00152
Mercury, total	7439-97-6	E508/VA	0.0000050	mg/L		<0.0000050	----	<0.0000050	----	<0.0000050
Molybdenum, total	7439-98-7	E420/VA	0.000050	mg/L		0.000677	0.000725	0.000729	0.000579	0.000482
Nickel, total	7440-02-0	E420/VA	0.00050	mg/L		<0.00050	0.00173	<0.00050	0.0244	<0.00050

Analytical Results

Sub-Matrix: **Water**
(Matrix: **Water**)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	Lions Bay Ave.	Kelvin Grove First Draw	Kelvin Grove	Community Centre First Draw	Community Centre
					Client sampling date / time	26-Sep-2023 06:35	26-Sep-2023 05:30	26-Sep-2023 05:30	26-Sep-2023 05:55	26-Sep-2023 05:55
						VA23C2879-006	VA23C2879-007	VA23C2879-008	VA23C2879-009	VA23C2879-010
						Result	Result	Result	Result	Result
Total Metals										
Phosphorus, total	7723-14-0	E420/VA	0.050	mg/L		<0.050	<0.050	<0.050	<0.050	<0.050
Potassium, total	7440-09-7	E420/VA	0.050	mg/L		0.153	0.175	0.156	0.165	0.152
Rubidium, total	7440-17-7	E420/VA	0.00020	mg/L		0.00028	0.00038	0.00036	0.00036	0.00035
Selenium, total	7782-49-2	E420/VA	0.000050	mg/L		<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Silicon, total	7440-21-3	E420/VA	0.10	mg/L		2.12	2.38	2.40	1.91	1.95
Silver, total	7440-22-4	E420/VA	0.000010	mg/L		<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium, total	7440-23-5	E420/VA	0.050	mg/L		2.32	2.50	2.30	2.42	2.58
Strontium, total	7440-24-6	E420/VA	0.00020	mg/L		0.00784	0.00841	0.00858	0.00794	0.00695
Sulfur, total	7704-34-9	E420/VA	0.50	mg/L		0.84	1.08	1.08	1.05	0.69
Tellurium, total	13494-80-9	E420/VA	0.00020	mg/L		<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Thallium, total	7440-28-0	E420/VA	0.000010	mg/L		<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Thorium, total	7440-29-1	E420/VA	0.00010	mg/L		<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Tin, total	7440-31-5	E420/VA	0.00010	mg/L		<0.00010	<0.00010	<0.00010	0.00082	<0.00010
Titanium, total	7440-32-6	E420/VA	0.00030	mg/L		0.00031	<0.00030	<0.00030	<0.00030	0.00063
Tungsten, total	7440-33-7	E420/VA	0.00010	mg/L		<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Uranium, total	7440-61-1	E420/VA	0.000010	mg/L		0.000034	0.000023	0.000030	<0.000010	0.000053
Vanadium, total	7440-62-2	E420/VA	0.00050	mg/L		<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Zinc, total	7440-66-6	E420/VA	0.0030	mg/L		<0.0030	0.0103	<0.0030	0.292	0.0037
Zirconium, total	7440-67-7	E420/VA	0.00020	mg/L		<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Aggregate Organics										
Biochemical oxygen demand [BOD]	----	E550/VA	2.0	mg/L		<2.0	----	<2.0	----	<2.0
Volatile Organic Compounds [THMs]										
Bromodichloromethane	75-27-4	E611B/VA	1.0	µg/L		<1.0	----	<1.0	----	<1.0
Bromoform	75-25-2	E611B/VA	1.0	µg/L		<1.0	----	<1.0	----	<1.0
Chloroform	67-66-3	E611B/VA	1.0	µg/L		42.6	----	43.2	----	60.6
Dibromochloromethane	124-48-1	E611B/VA	1.0	µg/L		<1.0	----	<1.0	----	<1.0
Trihalomethanes [THMs], total	----	E611B/VA	2.0	µg/L		42.6	----	43.2	----	60.6
Volatile Organic Compounds [THMs] Surrogates										
Bromofluorobenzene, 4-	460-00-4	E611B/VA	1.0	%		100	----	101	----	100

Analytical Results

Sub-Matrix: **Water**
(Matrix: **Water**)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	Lions Bay Ave.	Kelvin Grove First Draw	Kelvin Grove	Community Centre First Draw	Community Centre
					Client sampling date / time	26-Sep-2023 06:35	26-Sep-2023 05:30	26-Sep-2023 05:30	26-Sep-2023 05:55	26-Sep-2023 05:55
						VA23C2879-006	VA23C2879-007	VA23C2879-008	VA23C2879-009	VA23C2879-010
						Result	Result	Result	Result	Result
Volatile Organic Compounds [THMs] Surrogates										
Difluorobenzene, 1,4-	540-36-3	E611B/VA	1.0	%		99.7	----	100	----	101

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

Analytical Results

Sub-Matrix: **Water**
(Matrix: **Water**)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	Magnesia Tank First Draw	Magnesia Tank	Brunswick Beach First Draw	Brunswick Beach	Lions Bay Beach Park First Draw
					Client sampling date / time	26-Sep-2023 10:20	26-Sep-2023 10:20	26-Sep-2023 10:50	26-Sep-2023 10:50	26-Sep-2023 08:20
						VA23C2879-011	VA23C2879-012	VA23C2879-013	VA23C2879-014	VA23C2879-015
						Result	Result	Result	Result	Result
Physical Tests										
Alkalinity, total (as CaCO3)	----	E290/VA	1.0	mg/L		----	4.4	----	6.6	----
Hardness (as CaCO3), from total Ca/Mg	----	EC100A/VA	0.50	mg/L		14.9	11.7	23.6	23.5	6.61
pH	----	E108/VA	0.10	pH units		----	6.76	----	6.98	----
Solids, total suspended [TSS]	----	E160/VA	3.0	mg/L		----	<3.0	----	<3.0	----
Turbidity	----	E121/VA	0.10	NTU		----	0.72	----	<0.10	----
Organic / Inorganic Carbon										
Carbon, total organic [TOC]	----	E355-L/VA	0.50	mg/L		----	1.86	----	0.57	----
Total Metals										
Aluminum, total	7429-90-5	E420/VA	0.0030	mg/L		0.0268	0.0976	0.0144	0.0138	0.0600
Antimony, total	7440-36-0	E420/VA	0.00010	mg/L		<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic, total	7440-38-2	E420/VA	0.00010	mg/L		<0.00010	0.00015	0.00012	0.00012	0.00012
Barium, total	7440-39-3	E420/VA	0.00010	mg/L		0.00250	0.00214	0.00410	0.00387	0.00248
Beryllium, total	7440-41-7	E420/VA	0.000020	mg/L		<0.000020	<0.000020	<0.000020	<0.000020	<0.000020
Bismuth, total	7440-69-9	E420/VA	0.000050	mg/L		<0.000050	<0.000050	<0.000050	<0.000050	0.000158
Boron, total	7440-42-8	E420/VA	0.010	mg/L		0.010	<0.010	0.015	0.015	<0.010
Cadmium, total	7440-43-9	E420/VA	0.0000050	mg/L		0.0000589	0.0000154	0.0000201	0.0000163	0.0000077
Calcium, total	7440-70-2	E420/VA	0.050	mg/L		5.13	3.98	8.24	8.24	2.22
Cesium, total	7440-46-2	E420/VA	0.000010	mg/L		0.000010	0.000012	0.000013	0.000012	<0.000010
Chromium, total	7440-47-3	E420/VA	0.00050	mg/L		<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Cobalt, total	7440-48-4	E420/VA	0.00010	mg/L		<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper, total	7440-50-8	E420/VA	0.00050	mg/L		0.538	0.00572	0.00132	0.00087	0.0693
Iron, total	7439-89-6	E420/VA	0.010	mg/L		0.015	0.051	0.038	0.022	0.026
Lead, total	7439-92-1	E420/VA	0.000050	mg/L		0.00183	0.000077	<0.000050	<0.000050	0.00115
Lithium, total	7439-93-2	E420/VA	0.0010	mg/L		<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Magnesium, total	7439-95-4	E420/VA	0.0050	mg/L		0.505	0.425	0.735	0.711	0.259
Manganese, total	7439-96-5	E420/VA	0.00010	mg/L		0.00129	0.00232	0.00066	0.00042	0.00178
Mercury, total	7439-97-6	E508/VA	0.0000050	mg/L		----	<0.0000050	----	<0.0000050	----
Molybdenum, total	7439-98-7	E420/VA	0.000050	mg/L		0.000171	0.000175	0.000228	0.000255	0.000500
Nickel, total	7440-02-0	E420/VA	0.00050	mg/L		0.00099	<0.00050	<0.00050	<0.00050	0.00321

Analytical Results

Sub-Matrix: **Water**
(Matrix: **Water**)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	Magnesia Tank First Draw	Magnesia Tank	Brunswick Beach First Draw	Brunswick Beach	Lions Bay Beach Park First Draw
					Client sampling date / time	26-Sep-2023 10:20	26-Sep-2023 10:20	26-Sep-2023 10:50	26-Sep-2023 10:50	26-Sep-2023 08:20
						VA23C2879-011	VA23C2879-012	VA23C2879-013	VA23C2879-014	VA23C2879-015
						Result	Result	Result	Result	Result
Total Metals										
Phosphorus, total	7723-14-0	E420/VA	0.050	mg/L		<0.050	<0.050	<0.050	<0.050	<0.050
Potassium, total	7440-09-7	E420/VA	0.050	mg/L		0.106	0.096	0.129	0.126	0.145
Rubidium, total	7440-17-7	E420/VA	0.00020	mg/L		<0.00020	<0.00020	0.00022	0.00020	0.00032
Selenium, total	7782-49-2	E420/VA	0.000050	mg/L		0.000090	0.000089	0.000113	0.000099	<0.000050
Silicon, total	7440-21-3	E420/VA	0.10	mg/L		3.99	3.46	5.38	5.15	1.95
Silver, total	7440-22-4	E420/VA	0.000010	mg/L		<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium, total	7440-23-5	E420/VA	0.050	mg/L		3.50	3.43	3.68	3.51	2.43
Strontium, total	7440-24-6	E420/VA	0.00020	mg/L		0.0259	0.0212	0.0409	0.0410	0.00678
Sulfur, total	7704-34-9	E420/VA	0.50	mg/L		4.19	3.33	7.32	7.18	0.65
Tellurium, total	13494-80-9	E420/VA	0.00020	mg/L		<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Thallium, total	7440-28-0	E420/VA	0.000010	mg/L		<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Thorium, total	7440-29-1	E420/VA	0.00010	mg/L		<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Tin, total	7440-31-5	E420/VA	0.00010	mg/L		<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium, total	7440-32-6	E420/VA	0.00030	mg/L		0.00036	0.00097	<0.00030	<0.00030	0.00083
Tungsten, total	7440-33-7	E420/VA	0.00010	mg/L		<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Uranium, total	7440-61-1	E420/VA	0.000010	mg/L		<0.000010	<0.000010	<0.000010	<0.000010	0.000055
Vanadium, total	7440-62-2	E420/VA	0.00050	mg/L		<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Zinc, total	7440-66-6	E420/VA	0.0030	mg/L		0.171	<0.0030	0.0039	<0.0030	0.0160
Zirconium, total	7440-67-7	E420/VA	0.00020	mg/L		<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Aggregate Organics										
Biochemical oxygen demand [BOD]	----	E550/VA	2.0	mg/L		----	<2.0	----	<2.0	----
Volatile Organic Compounds [THMs]										
Bromodichloromethane	75-27-4	E611B/VA	1.0	µg/L		----	<1.0	----	<1.0	----
Bromoform	75-25-2	E611B/VA	1.0	µg/L		----	<1.0	----	<1.0	----
Chloroform	67-66-3	E611B/VA	1.0	µg/L		----	37.9	----	24.8	----
Dibromochloromethane	124-48-1	E611B/VA	1.0	µg/L		----	<1.0	----	<1.0	----
Trihalomethanes [THMs], total	----	E611B/VA	2.0	µg/L		----	37.9	----	24.8	----
Volatile Organic Compounds [THMs] Surrogates										
Bromofluorobenzene, 4-	460-00-4	E611B/VA	1.0	%		----	103	----	101	----

Analytical Results

Sub-Matrix: **Water**
(Matrix: **Water**)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	Magnesia Tank First Draw	Magnesia Tank	Brunswick Beach First Draw	Brunswick Beach	Lions Bay Beach Park First Draw
					Client sampling date / time	26-Sep-2023 10:20	26-Sep-2023 10:20	26-Sep-2023 10:50	26-Sep-2023 10:50	26-Sep-2023 08:20
						VA23C2879-011	VA23C2879-012	VA23C2879-013	VA23C2879-014	VA23C2879-015
						Result	Result	Result	Result	Result
Volatile Organic Compounds [THMs] Surrogates										
Difluorobenzene, 1,4-	540-36-3	E611B/VA	1.0	%		----	101	----	98.7	----

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

Analytical Results

Sub-Matrix: Water (Matrix: Water)					Client sample ID	Lions Bay Beach Park	----	----	----	----
					Client sampling date / time	26-Sep-2023 08:20	----	----	----	----
Analyte	CAS Number	Method/Lab	LOR	Unit		VA23C2879-016	--------	--------	--------	--------
						Result	----	----	----	----
Physical Tests										
Alkalinity, total (as CaCO3)	----	E290/VA	1.0	mg/L		4.9	----	----	----	----
Hardness (as CaCO3), from total Ca/Mg	----	EC100A/VA	0.50	mg/L		5.78	----	----	----	----
pH	----	E108/VA	0.10	pH units		6.78	----	----	----	----
Solids, total suspended [TSS]	----	E160/VA	3.0	mg/L		<3.0	----	----	----	----
Turbidity	----	E121/VA	0.10	NTU		0.49	----	----	----	----
Organic / Inorganic Carbon										
Carbon, total organic [TOC]	----	E355-L/VA	0.50	mg/L		2.14	----	----	----	----
Total Metals										
Aluminum, total	7429-90-5	E420/VA	0.0030	mg/L		0.0776	----	----	----	----
Antimony, total	7440-36-0	E420/VA	0.00010	mg/L		<0.00010	----	----	----	----
Arsenic, total	7440-38-2	E420/VA	0.00010	mg/L		0.00011	----	----	----	----
Barium, total	7440-39-3	E420/VA	0.00010	mg/L		0.00221	----	----	----	----
Beryllium, total	7440-41-7	E420/VA	0.000020	mg/L		<0.000020	----	----	----	----
Bismuth, total	7440-69-9	E420/VA	0.000050	mg/L		0.000053	----	----	----	----
Boron, total	7440-42-8	E420/VA	0.010	mg/L		<0.010	----	----	----	----
Cadmium, total	7440-43-9	E420/VA	0.0000050	mg/L		0.0000074	----	----	----	----
Calcium, total	7440-70-2	E420/VA	0.050	mg/L		1.93	----	----	----	----
Cesium, total	7440-46-2	E420/VA	0.000010	mg/L		<0.000010	----	----	----	----
Chromium, total	7440-47-3	E420/VA	0.00050	mg/L		<0.00050	----	----	----	----
Cobalt, total	7440-48-4	E420/VA	0.00010	mg/L		<0.00010	----	----	----	----
Copper, total	7440-50-8	E420/VA	0.00050	mg/L		0.0174	----	----	----	----
Iron, total	7439-89-6	E420/VA	0.010	mg/L		0.046	----	----	----	----
Lead, total	7439-92-1	E420/VA	0.000050	mg/L		0.000493	----	----	----	----
Lithium, total	7439-93-2	E420/VA	0.0010	mg/L		<0.0010	----	----	----	----
Magnesium, total	7439-95-4	E420/VA	0.0050	mg/L		0.233	----	----	----	----
Manganese, total	7439-96-5	E420/VA	0.00010	mg/L		0.00190	----	----	----	----
Mercury, total	7439-97-6	E508/VA	0.0000050	mg/L		<0.0000050	----	----	----	----
Molybdenum, total	7439-98-7	E420/VA	0.000050	mg/L		0.000439	----	----	----	----
Nickel, total	7440-02-0	E420/VA	0.00050	mg/L		<0.00050	----	----	----	----
Phosphorus, total	7723-14-0	E420/VA	0.050	mg/L		<0.050	----	----	----	----

Analytical Results

Sub-Matrix: Water (Matrix: Water)					Client sample ID	Lions Bay Beach Park	----	----	----	----
					Client sampling date / time	26-Sep-2023 08:20	----	----	----	----
Analyte	CAS Number	Method/Lab	LOR	Unit		VA23C2879-016	--------	--------	--------	--------
						Result	----	----	----	----
Total Metals										
Potassium, total	7440-09-7	E420/VA	0.050	mg/L		0.138	----	----	----	----
Rubidium, total	7440-17-7	E420/VA	0.00020	mg/L		0.00031	----	----	----	----
Selenium, total	7782-49-2	E420/VA	0.000050	mg/L		<0.000050	----	----	----	----
Silicon, total	7440-21-3	E420/VA	0.10	mg/L		1.76	----	----	----	----
Silver, total	7440-22-4	E420/VA	0.000010	mg/L		<0.000010	----	----	----	----
Sodium, total	7440-23-5	E420/VA	0.050	mg/L		2.66	----	----	----	----
Strontium, total	7440-24-6	E420/VA	0.00020	mg/L		0.00600	----	----	----	----
Sulfur, total	7704-34-9	E420/VA	0.50	mg/L		0.55	----	----	----	----
Tellurium, total	13494-80-9	E420/VA	0.00020	mg/L		<0.00020	----	----	----	----
Thallium, total	7440-28-0	E420/VA	0.000010	mg/L		<0.000010	----	----	----	----
Thorium, total	7440-29-1	E420/VA	0.00010	mg/L		<0.00010	----	----	----	----
Tin, total	7440-31-5	E420/VA	0.00010	mg/L		<0.00010	----	----	----	----
Titanium, total	7440-32-6	E420/VA	0.00030	mg/L		0.00081	----	----	----	----
Tungsten, total	7440-33-7	E420/VA	0.00010	mg/L		<0.00010	----	----	----	----
Uranium, total	7440-61-1	E420/VA	0.000010	mg/L		0.000059	----	----	----	----
Vanadium, total	7440-62-2	E420/VA	0.00050	mg/L		<0.00050	----	----	----	----
Zinc, total	7440-66-6	E420/VA	0.0030	mg/L		<0.0030	----	----	----	----
Zirconium, total	7440-67-7	E420/VA	0.00020	mg/L		<0.00020	----	----	----	----
Aggregate Organics										
Biochemical oxygen demand [BOD]	----	E550/VA	2.0	mg/L		<2.0	----	----	----	----
Volatile Organic Compounds [THMs]										
Bromodichloromethane	75-27-4	E611B/VA	1.0	µg/L		<1.0	----	----	----	----
Bromoform	75-25-2	E611B/VA	1.0	µg/L		<1.0	----	----	----	----
Chloroform	67-66-3	E611B/VA	1.0	µg/L		52.6	----	----	----	----
Dibromochloromethane	124-48-1	E611B/VA	1.0	µg/L		<1.0	----	----	----	----
Trihalomethanes [THMs], total	----	E611B/VA	2.0	µg/L		52.6	----	----	----	----
Volatile Organic Compounds [THMs] Surrogates										
Bromofluorobenzene, 4-	460-00-4	E611B/VA	1.0	%		99.2	----	----	----	----
Difluorobenzene, 1,4-	540-36-3	E611B/VA	1.0	%		100	----	----	----	----

APPENDIX: ASBESTOS REPORT OF 10 NOV. 2023 (SAMPLES 7 NOV.)

Contact: Thomas Chang
Company: ALS Environmental
Address: 8081 Lougheed HWY, Suite 100
Burnaby, BC V5A 1W9

Project / Location: VA23C6772
PO Number: VA23C6772
ALS Work Order: 23110415

NARRATIVE: Analysis performed on FEI Tecnai TEM equipped with EDAX Octane T Plus Silicon Drift Detector and Z2 Analyzer. Fiber morphology, selected area electron diffraction (SAED), and energy dispersive x-ray analysis (EDXA) used to determine species. All sample collection is performed outside of ALS Cincinnati is therefore the sole responsibility of the client. Contact your local authority for information on method selection, sampling instructions, and reporting requirements prior to submission.

NOTICE: All US EPA Public Water System (PWS) drinking water compliance samples must be filtered by the laboratory within 48 hours of sampling. ALS cannot report analytical results directly to the EPA unless all of the information required by the state EPA agency is provided via the COC at the time of receipt. Report revisions resulting from failure to provide this information via the COC will result in additional administrative fees. ALS is not responsible for late or inaccurate EPA reporting as a result of client sample collection errors or sample information omissions. Water samples originating from outside the United States do not fall under the US EPA drinking water guidelines and are therefore not required to meet the 48 hour hold and are not reported to any agency.

METHOD CODES: "EPA 100.2" refers only to drinking (potable) PWS samples for EPA compliance which are required to be filtered within 48 hours of sampling and are analyzed at >10,000x for asbestos fibers >10µm long. "ENV 005" refers to a modified version of EPA 100.2 developed for all other non-potable, non-compliance, and non-US waters which are also analyzed at >10,000x for asbestos fibers >10µm long but are not required to meet the 48 hour hold time. "EPA 100.1" refers to waters analyzed by a modified version of the method for asbestos fibers of any size. All excess water is disposed immediately following adequate filtration. All filtered samples are disposed after 60 day archive. All TEM grids analyzed are archived for a minimum of 3 years. Results apply only to portions of samples analyzed.

SUMMARY: An AS of <0.2 MFL is desired for drinking (potable) waters, and an AS of <7 MFL is generally acceptable for non-potable waters. Whenever possible, a sufficient volume is analyzed to yield the desired AS based on the detection of 1 confirmed asbestos fiber in the total area analyzed. However, waters containing excessive solids may require filtration of volumes too low to achieve the desired AS. In any case, a minimum of 4 and maximum of 10 grid openings are analyzed regardless of the AS reached or the asbestos concentration detected. Representative EDXA spectra and/or photomicrographs are available upon request for an additional fee.

NA=Not Applicable, AS=Analytical Sensitivity, MFL=Millions of Fibers per Liter, MRL=Method Reporting Limit

ALS Cincinnati accredited by NY ELAP for Asbestos in Water by EPA 100.2

OH State Lab No.: 4077, OH Analyst Nos.: 2268 (P. Hizar), 3431 (A. Sohn)
PA State Lab No.: 68-01320, PA Certification No.: 003
WA State Lab No.: 211
NY State Lab No.: 11371

Pamela M. Hizar

Pamela M. Hizar
ALS Asbestos Technical Lead & Microscopy Department Manager

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IDENTIFICATION

Client ID:	VA23C6772-001	VA23C6772-002
ALS ID:	23110415-01A	23110415-02A
Method:	ENV 005	ENV 005
MRL:	<7MFL	<7MFL
Collection:	11/7/23 2:30 PM	11/7/23 2:50 PM
Filtration:	11/10/23 10:30 AM	11/10/23 10:30 AM
Elapsed:	NA	NA
Sample Comments:	*HIGH SUSPENDED SOLIDS CONTENT*	*HIGH SUSPENDED SOLIDS CONTENT*

ANALYSIS

Analyst:	Pamela Hizar	Pamela Hizar
Completed:	11/10/23 2:00 PM	11/10/23 2:30 PM
Volume (L):	0.025	0.025
Avg. Opening Area (mm^2):	0.0102	0.0102
No. Openings Analyzed:	10	10
AS (MFL):	0.42	0.42

COUNT

Chrysotile:	0	0
Amosite:	0	0
Crocidolite:	0	0
Actinolite:	0	0
Tremolite:	0	0
Anthophyllite:	0	0
Total Asbestos:	0	0

CONCENTRATION (MFL)

Chrysotile:	<AS	<AS
Amosite:	<AS	<AS
Crocidolite:	<AS	<AS
Actinolite:	<AS	<AS
Tremolite:	<AS	<AS
Anthophyllite:	<AS	<AS
Total Asbestos:	<AS	<AS
Analysis Comments:	*NONE*	*NONE*

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