

Village of Lions Bay

2022 ANNUAL DRINKING WATER REPORT Version.4a

VERSION CONTROL		
VERSION	**DATE**	**CHANGES**
0	28 Sep. 2023	Prelim. draft for internal review
1	29 Sep. 2023	Draft submitted to VCH
2	17 Oct. 2023	Draft incorporating VCH initial comments
3	26 Oct. 2023	Pre-final incorporating VCH written & meeting comments
4	1 Nov. 2023	Final
4a	1 Nov. 2023	Public issue, incorporating VCH response letter

Vancouver CoastalHealth

Office of the Medical Health Officer
132 Esplanade West
North Vancouver, BC V7M 1A2
604 983 6700

November 1, 2023

Mayor and Council
Municipality for the Village of Lions Bay
PO Box 141, 400 Centre Road
Lions Bay, BC V0N 2E0

Dear Mayor and Council,

Re: Report of the Medical Health Officer
Village of Lions Bay – 2022 Annual Drinking Water Report

The Village of Lions Bay's 2022 annual drinking water report has been reviewed. The report is strong and showcases continued efforts by the municipality towards maintaining and improving water quality throughout the distribution system.

Your commitment to ongoing operational measures such as staff education and training, preventative maintenance, distribution system upgrade, water quality monitoring and emergency response planning will result in high quality water being delivered to residents and businesses in the Village of Lions Bay.

In our continued effort to highlight the presence of the annual drinking water quality report, please continue to provide information on the Village's website along with other communications to residents.

Thank you for the report. I look forward to our continued collaboration on improving drinking water quality in the Village of Lions Bay.

Sincerely,



Dr. Alex Choi, MD, MHSc, CCFP, FRCPC
Medical Health Officer
Vancouver Coastal Health

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EXECUTIVE SUMMARY

Water samples are drawn throughout the year at multiple locations in the Village of Lions Bay's municipal drinking water system, and depending on parameter, analysed internally, at the BC Centre for Disease Control's Public Health Laboratory and at accredited third-party laboratories.

In 2022, the municipality met the requirements of the *Drinking Water Protection Regulation* that no treated water sample tested 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 several unregulated drinking water quality parameters including chemicals, metals and more, according to recommendations from:

- Health Canada *Guidelines for Drinking Water Quality;*
- Lions Bay's Drinking Water Officer;
- U.S. Environmental Protection Agency (EPA) where there are no Health Canada recommendations for given parameters.

In 2022, the municipality met all recommended limits for chemicals, metals and all other parameters tested.

1. AVOIDING LEAD IN HOUSEHOLD WATER

Vancouver CoastalHealth

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

2. INTRODUCTION

Lions Bay is a small residential municipality in British Columbia, Canada, located midway between the cities of Vancouver and Squamish on the steep eastern shore of Howe Sound. Lions Bay's 2021 census population was 1,390, making it BC's 36th smallest municipality by population. At 2.53 square kilometres, it is BC's 10th smallest municipality by land area. Originally a boat-access summer camping destination for Vancouverites, Lions Bay began to be permanently settled in the 1960s. The community incorporated as a village municipality in January 1971. In 1999 it amalgamated with the adjacent water improvement district of Brunswick Beach. Unlike most members of the Metro Vancouver Regional District, Lions Bay does not receive drinking water from Metro, but instead operates its own supply, treatment and distribution system to provide potable water for domestic and fire protection use.

As such, Lions Bay is a Municipal Water Utility under the *Local Government Act,* the *Drinking Water Protection Act* and the *Drinking Water Protection Regulation*, which obligate the municipality to:

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

Administration and enforcement of drinking water regulations fall to Drinking Water Officers representing regional Health Authorities. Lions Bay's health authority is Vancouver Coastal Health (VCH). This **Drinking Water Quality Annual Report** presents the prior year's water quality testing results, and provides a synopsis of the municipality's measures to protect and enhance drinking water quality.

Per the VCH Treatment Plant Operating Permits for Facility 3317552347 (the Magnesia Creek Plant) and Facility 3317552348 (the Harvey Creek Plant), this report is due no later than six months from the end of the calendar year reporting period; this year, due to management turnover, the Drinking Water Officer provided dispensation for a delay, gratefully acknowledged.

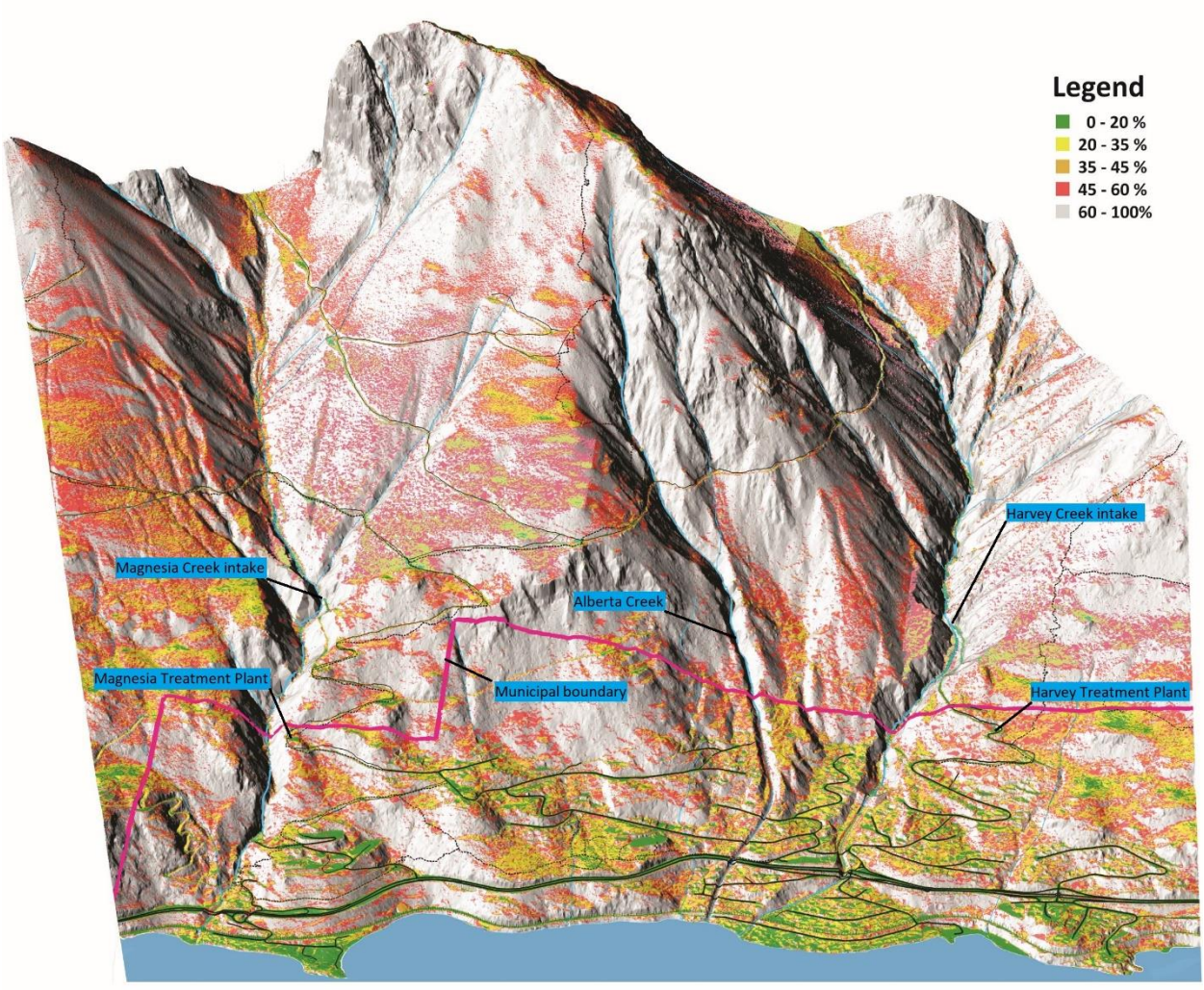
A note on units used in this report: since the kilogram was originally defined as the mass of a litre volume of water, concentrations for water solutions and suspensions stated in milligrams per litre, a mass per volume measure, are equivalent to parts per million (ppm), a volume per volume measure. For consistency, concentrations are quoted in this report as mass per volume, typically mg/ℓ (milligrams per litre) or µg/ℓ (micrograms per litre), whether or not they are traditionally reported in ppm.

Lions Bay's 2022 water operating budget was $1,145,282 including allocated staff costs, approximately 24 percent of the municipality's total annual budget. The water budget is funded by flat utility fees on approximately 550 residential, 3 institutional/school, 3 multi-family and 3 commercial accounts, an average charge of $2041 each in 2022.

3. SOURCE

Lions Bay's drinking water is sourced from rainfall-, snowmelt- and groundwater-fed surface creeks above the community, under provincial Water Licenses:

Stream, catchment area	License	Licensed quantity (m^3/year)	Drawn in 2022 (m^3)
Harvey Creek, 635 hectares	C119916	41,483	636,000 (219% of license)
	C119917	248,898	
Magnesia Creek, 421 hectares	C059405	45,461	63,000 (109% of license)
	C065267	19,912	
	C065316	33,186	
Alberta Creek, 51 hectares	C042330	82,966	0 (not currently utilised)



With no dams and reservoirs feasible in the steep terrain, water is drawn direct from the creeks at intake weirs, screened for vegetation and rocks, then fed by gravity to two 1990s-era water treatment plants. Following UV and chlorine disinfection treatment at the plants, water flows to end-users through a distribution network comprising:

- 550,000, 100,000 and 20,000 imperial gallon[1] potable water tanks, providing storage for 20-50 hours of treated water demand, which has to be balanced with required firefighting reserve. More stored water risks it becoming stale at lower flowrates, while less provides insufficient chlorine contact time;
- 17 km of water mains of various sizes and materials, installed between the early 1960s to 2010;
- 13 pressure reducing valve stations to reduce significant head pressures in the system between sea level and 617 meters above sea level (2 updated, 11 overdue for replacement);
- 551 property service connections, about 50 of which are not currently locatable due to slope creep and unapproved construction;
- 72 fire hydrants requiring A and B services annually;
- 250 system shutoff and isolation valves.

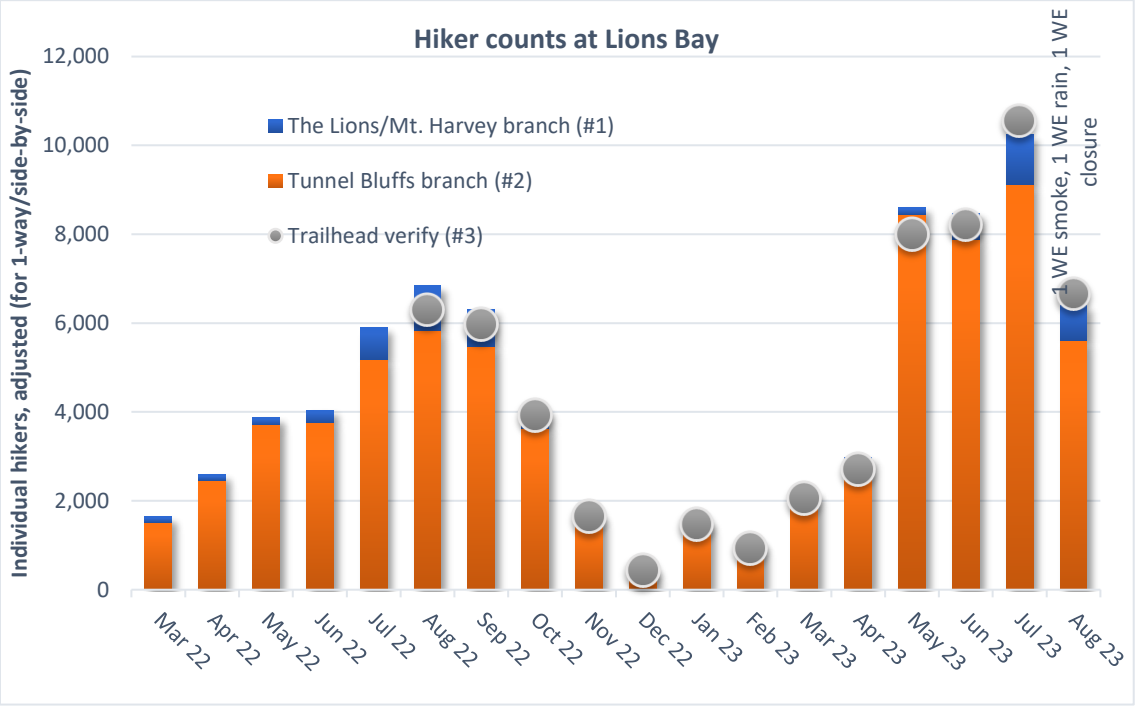
[1] Imperial gallons are used for historical reasons. Metric equivalents are 2,500,000, 450,000 and 90,000 litres respectively

4. MULTIPLE BARRIERS

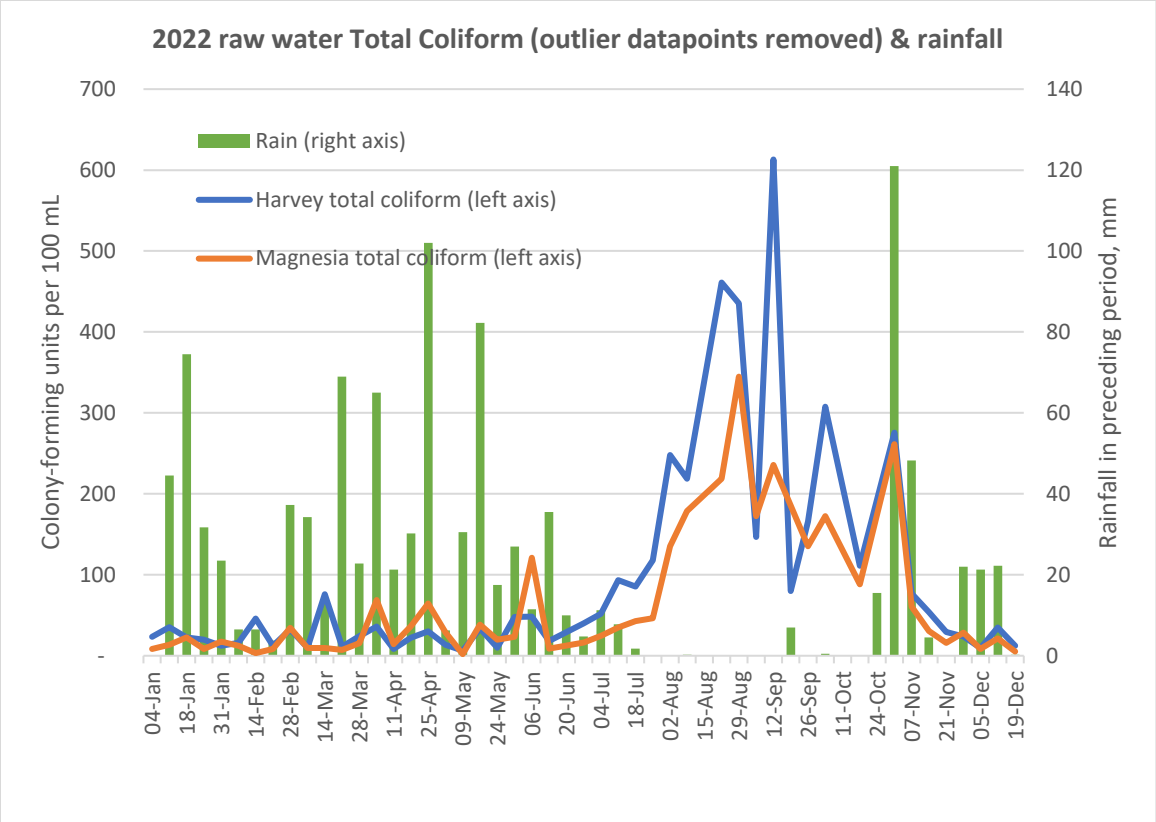
BARRIER 1: SOURCE WATER PROTECTION

The municipality's water catchments are outside municipal boundaries, on lands under the jurisdiction of the Ministry of Forests, Land and Natural Resource Operations (FLNRO). The lands are designated "Community Watershed," which provides some protection under the Forest and Range Practices Act, but recreational access, mining, forestry and energy development are not excluded.

The main need for watershed protection anywhere, and particularly at Lions Bay, arises from potential fecal contamination of source water. Fecal Coliform (FC) is a group of bacteria found only in the intestines of mammals, and its presence in an environment indicates recent contamination by mammalian fecal matter. Wild mammals including bear, deer, goats, squirrels and mice are abundant in Lions Bay's watersheds, but hard to quantify. However, trail counter data commencing March 2022 quantify human mammals above the level of the intakes, in the Magnesia watershed using the popular Tunnel Bluffs trail, and in the Harvey watershed on the Lions/Mt. Harvey trail:



The Total Coliform (TC) group of bacteria includes FC, plus bacteria found in the soil and in water that has been influenced by surface water (Escherichia coli, *E. coli*, the major species in the fecal coliform group, is discussed in more details later in this report). At Lions Bay, TC in source water increases in the summer:



While there seems to be some correlation between rainfall and rises in TC January to June and November to December, major mid-summer TC spikes are not correlated to rainfall at all. However, TC is temperature sensitive, and blooms are expected at warmer temperatures. To better understand the FC in Lions Bay raw water, depending on laboratory capacity, DNA testing will be run in 2023 and 2024 to determine the relative contribution of human and animal sources. That TC concentrations are similar for two physically distinct watersheds is assumed to be a coincidental combination of creek flowrates and water catchment areas. Further discussion of how the municipality mitigates TC and FC contamination of publicly-accessible watersheds is found in *CONDITION 4: "[Maintain] a watershed control program…that minimizes the potential for fecal contamination* in the source water" on p.28 below.

BARRIER 2: DRINKING WATER TREATMENT

Because no single disinfectant is equally effective against all pathogens, both UV and chlorine disinfection technologies are used in Lions Bay.

ULTRAVIOLET LIGHT DISINFECTION



At Lions Bay's two treatment plants, incoming raw water flows through ultraviolet (UV) reactors which alter microorganism cell DNA, preventing reproduction. UV has been found to be very effective against bacteria and viruses that cause cholera, polio, typhoid, hepatitis, enteric and other waterborne disease, and against chlorine-resistant *Giardia* and *Cryptosporidium* protozoa. UV treatment is affected by **turbidity**, the cloudiness or haziness in water arising from organic, mineral and chemical particulates, which absorb and scatter UV light. UV reactors automatically increase lamp intensity to maintain the required UV dose and when adequate dosing cannot be maintained, they shut down and the system alarms.

CHLORINE DISINFECTION

Following UV disinfection, water is further disinfected by injecting a 12 percent solution of sodium hypochlorite, the active ingredient of bleach. The chlorine constituent of sodium hypochlorite disrupts cell respiration and reproduction and is used worldwide as a safe and effective water disinfectant. Chlorine reacts with and is depleted by all organic (carbon-containing) matter, so enough is dosed at the plants such that a **residual** is maintained throughout the system to ensure that any bacteria that get past the initial disinfection steps or that enter the system downstream are also disinfected. Chlorine residual is discussed in detail later in this report.

SAMPLING & ANALYSIS

Every Monday to Friday except statutory holidays, municipal staff draw water samples throughout the network and test in-house for turbidity and chlorine residual. Weekly samples are sent to the BC Centre for Disease Control's Public Health Laboratory for *E. coli* and Total Coliform testing. More extensive bi-annual testing is conducted for general water chemistry, metals and other contaminants:

Sample Location	Source	Free chlorine	Turbidity	Bacteriological	Metals, chemicals
Harvey Plant	Harvey Creek raw	-	Daily	Monthly	Biannual
Harvey Tank	Harvey Plant	Daily	Daily	Weekly	Biannual
PRV-3		Daily	Daily	Weekly	-
Store/Cafe		Daily	Daily	Weekly	Biannual
Lions Bay Avenue		Daily	Daily	Weekly	Biannual
Kelvin Grove		Daily	Daily	Weekly	Biannual
Harvey UV Reactor		-	-	Monthly	-
Community Centre		-	-	-	Biannual
Magnesia Plant	Magnesia Creek raw	-	Daily	Monthly	Biannual
Magnesia Tank	Magnesia Plant	Daily	Daily	Weekly	Biannual
PRV-5		Daily	Daily	Weekly	-
Brunswick Beach		Daily	Daily	Weekly	Biannual
Magnesia UV Reactor		-	-	Monthly	-

Operational responses to out-of-range or unexpected sampling results depend on the significance of the parameter, and range from resampling, to flushing water mains, to issuing boil water advisories or orders. The municipality's response protocol to various drinking water contingencies is provided in APPENDIX: CONTAMINATION RESPONSE PROTOCOL on p.23. Lions Bay's last boil water advisory was in December 2014.

BACTERIOLOGICAL TESTING

The *Drinking Water Protection Regulation* requires routine sampling and testing for *E. coli* and Total Coliform bacteria. *E. coli* is a specific coliform bacteria present in the digestive tracts and resulting fecal matter of mammals, including humans. Presence of *E. coli* in a water sample is indicative of recent fecal contamination and the likely presence of further disease-causing bacteria, viruses and protozoa. The *Drinking Water Protection Regulation* standard for *E. coli* in treated water is None Detectable.



The Total Coliform group of bacteria is composed of various bacteria with similar characteristics to *E. coli*. Natural niches for members of this group range from being fecal-specific, to being widely distributed in soil and vegetation. The *Drinking Water Protection Regulation* standards for Total Coliform (for 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 2022, no tested sample from Lions Bay's treated water system tested positive for *E. coli* or Total Coliform:**

2022	Harvey Plant system sample locations										Magnesia Plant system sample locations					
	Harvey Tank		PRV-3		Store/Café		Lions Bay Ave.		Kelvin Grove		Magnesia Tank		PRV-5		Brunswick Beach	
	Total coliform/ 100 ml	*E. coli*/100 ml	Total coliform/ 100 ml	*E. coli*/100 ml	Total coliform/ 100 ml	*E. coli*/100 ml	Total coliform/ 100 ml	*E. coli*/100 ml	Total coliform/ 100 ml	*E. coli*/100 ml	Total coliform/ 100 ml	*E. coli*/100 ml	Total coliform/ 100 ml	*E. coli*/100 ml	Total coliform/ 100 ml	*E. coli*/100 ml
04-Jan	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
10-Jan	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
18-Jan	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
24-Jan	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
31-Jan	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
07-Feb	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
14-Feb	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
22-Feb	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
28-Feb	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
07-Mar	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
14-Mar	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
21-Mar	<1	<1	<1	<1	<1	<1	<1	<1	RMFL	RMFL	<1	<1	<1	<1	<1	<1
28-Mar	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
04-Apr	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
11-Apr	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
19-Apr	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
25-Apr	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
02-May	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
09-May	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
16-May	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
24-May	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
30-May	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
06-Jun	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
13-Jun	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
27-Jun	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
04-Jul	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
11-Jul	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
18-Jul	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
25-Jul	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
02-Aug	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
08-Aug	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
15-Aug	RMFL	RMFL	RMFL	RMFL	RMFL	RMFL	RMFL	RMFL	RMFL	RMFL	RMFL	RMFL	RMFL	RMFL	RMFL	RMFL
23-Aug	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
29-Aug	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
06-Sep	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
12-Sep	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
21-Sep	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
26-Sep	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
04-Oct	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
11-Oct	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1

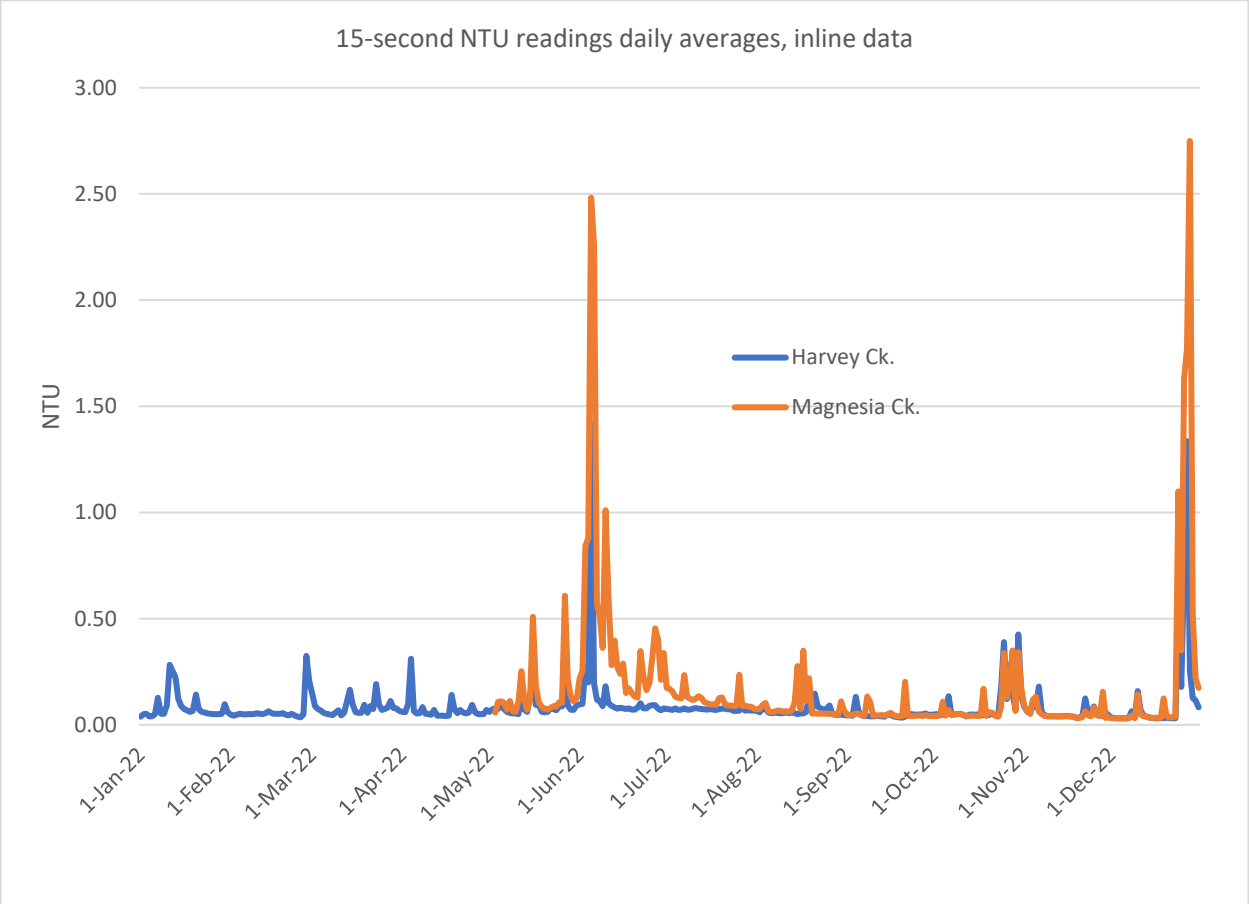
17-Oct	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
24-Oct	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
31-Oct	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
07-Nov	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
14-Nov	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
21-Nov	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
28-Nov	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
05-Dec	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
12-Dec	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
19-Dec	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1

RMFL = Result Missing From Lab

RAW WATER TURBIDITY

Due to steep forested watersheds, Lions Bay's raw water is particularly subject to fluctuating turbidity arising from organic and inorganic particulates washing into the creeks, especially during rain; heavy rain regularly causes debris flows. Turbidity also arises within the water distribution system from flushing, fire fighting draws and leaks. Measured in Nephelometric Turbidity Units (NTU), turbidity is a measure of the concentration of suspended particles in a sample of water of particular importance in UV disinfection systems.

Inline turbidity readings taken at the plants are logged every 15 seconds, resulting in 2.4 million records per plant for a given year, which can be imported to a database and summarised. Magnesia Plant's NTU meter was offline Jan 1 through May 2, but daily averages determined from available data never exceeded 3 NTU in 2022:



Detailed NTU data are provided in

APPENDIX: RAW WATER UVT, NTU (HAND SAMPLED) on p.38.

CHLORINE RESIDUAL

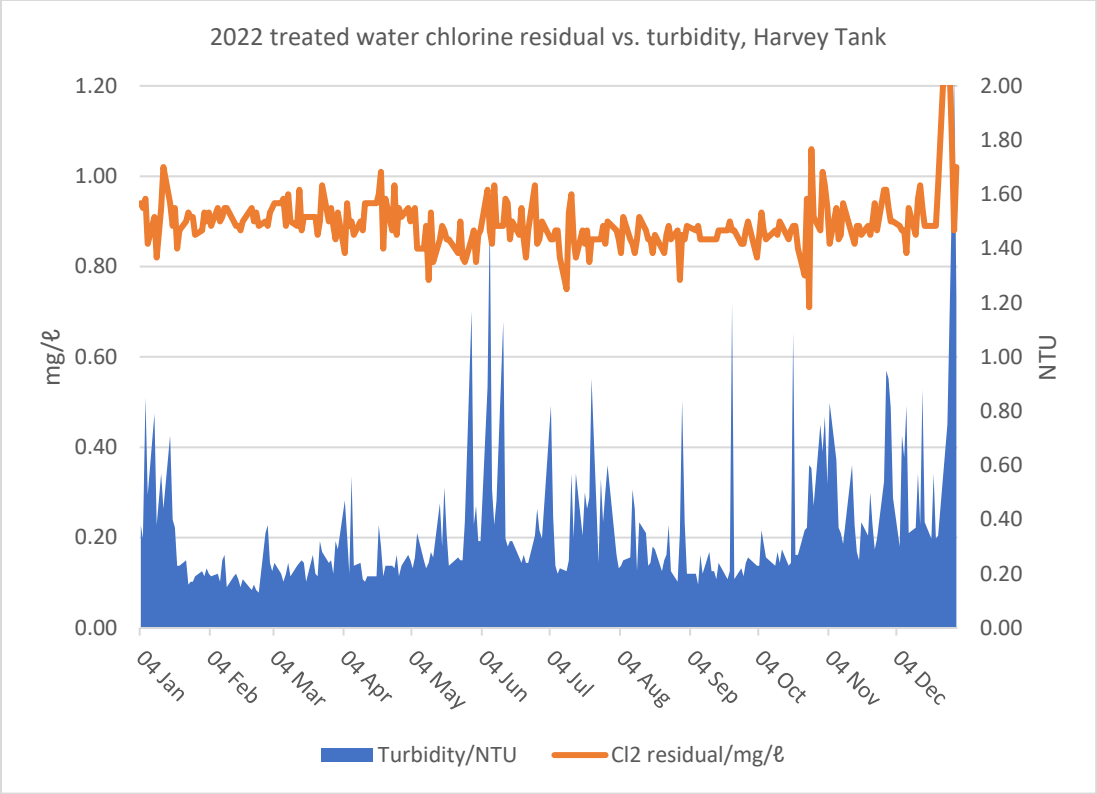
Chlorine residual levels are not explicitly regulated by the *Drinking Water Protection Act* or the *Drinking Water Protection Regulation. Guidelines for Canadian Drinking Water Quality* indicate that a "value [for maximum concentration of chlorine] is not necessary due to low toxicity at concentrations found in drinking water." As to minimum chlorine concentrations, the *Guidelines* indicate:

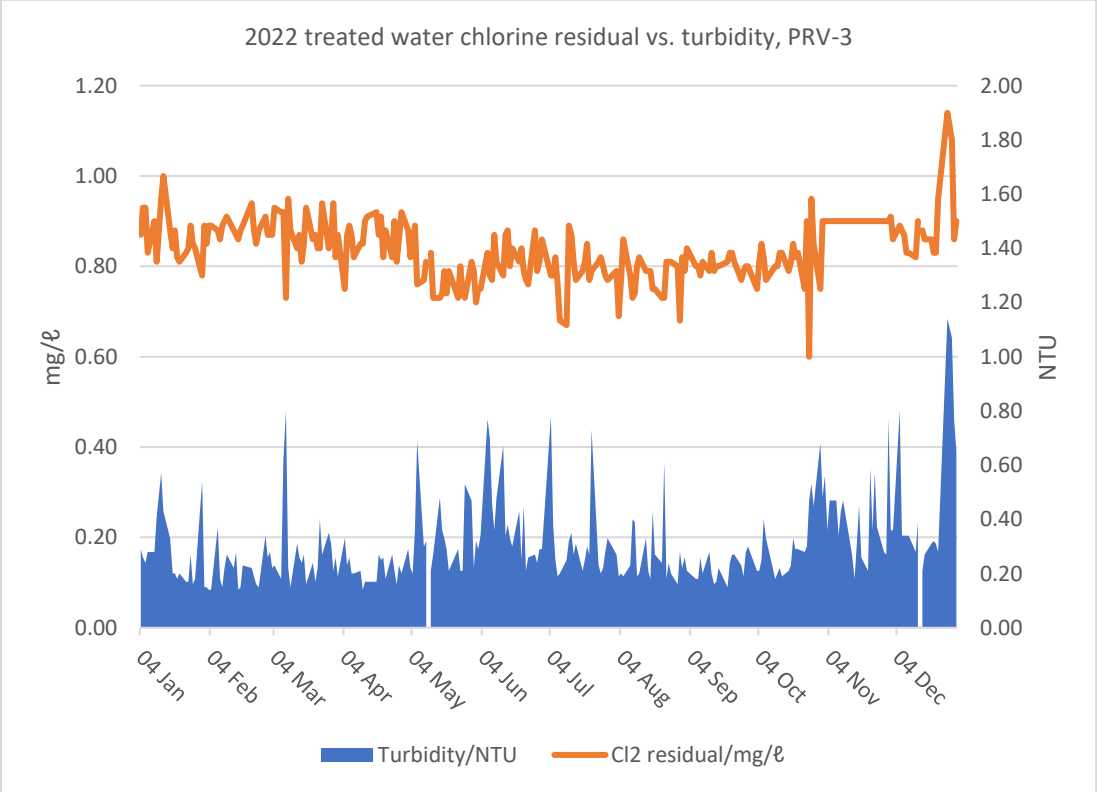
- The U.S. Environmental Protection Agency Surface Water Treatment Rule requires a minimum disinfectant residual of 0.2 mg/ℓ for water entering the distribution system and a detectable level throughout the distribution system.
- Free chlorine concentrations in most Canadian drinking water distribution systems range from 0.04 to 2.0 mg/ℓ.
- In general, a free chlorine residual of 0.2 mg/ℓ is considered the minimum level for the control of bacterial regrowth in the distribution system.

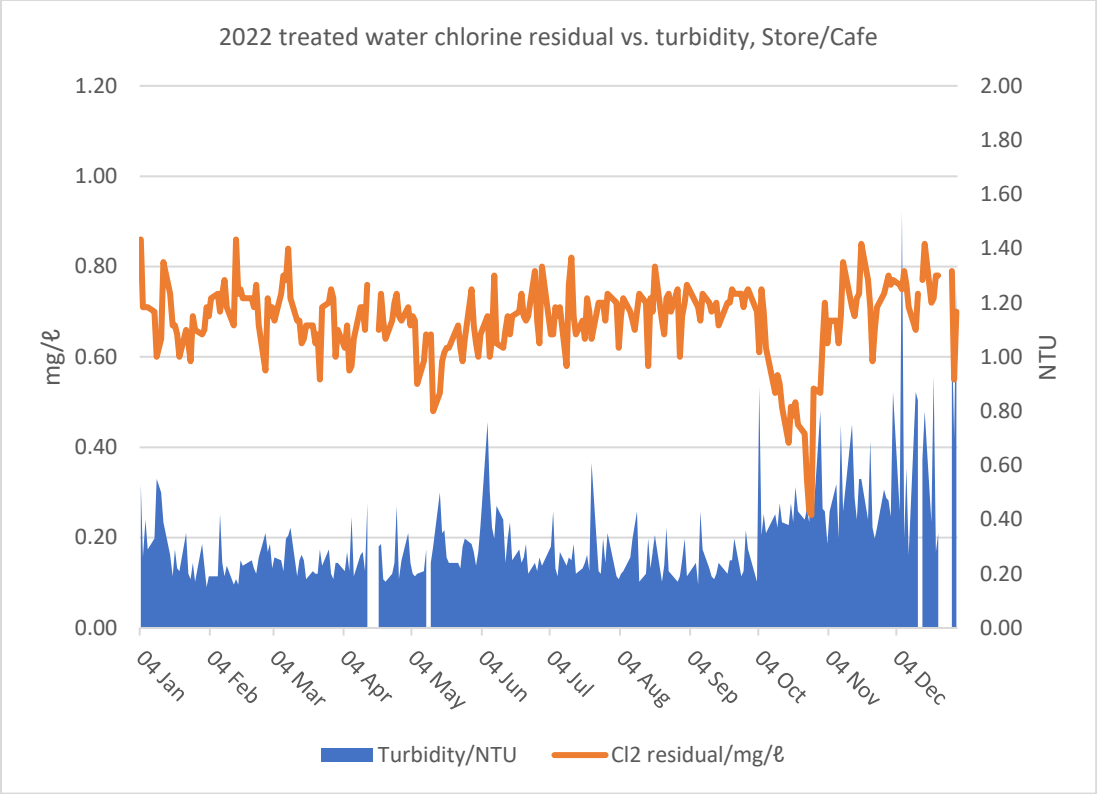
Lions Bay municipality's objective is to maintain a minimum chlorine residual of at least 0.2 mg/ℓ throughout the system. In practice, two to three times that level is generally present. Annual average free chlorine residual at eight sampling stations was as follows.

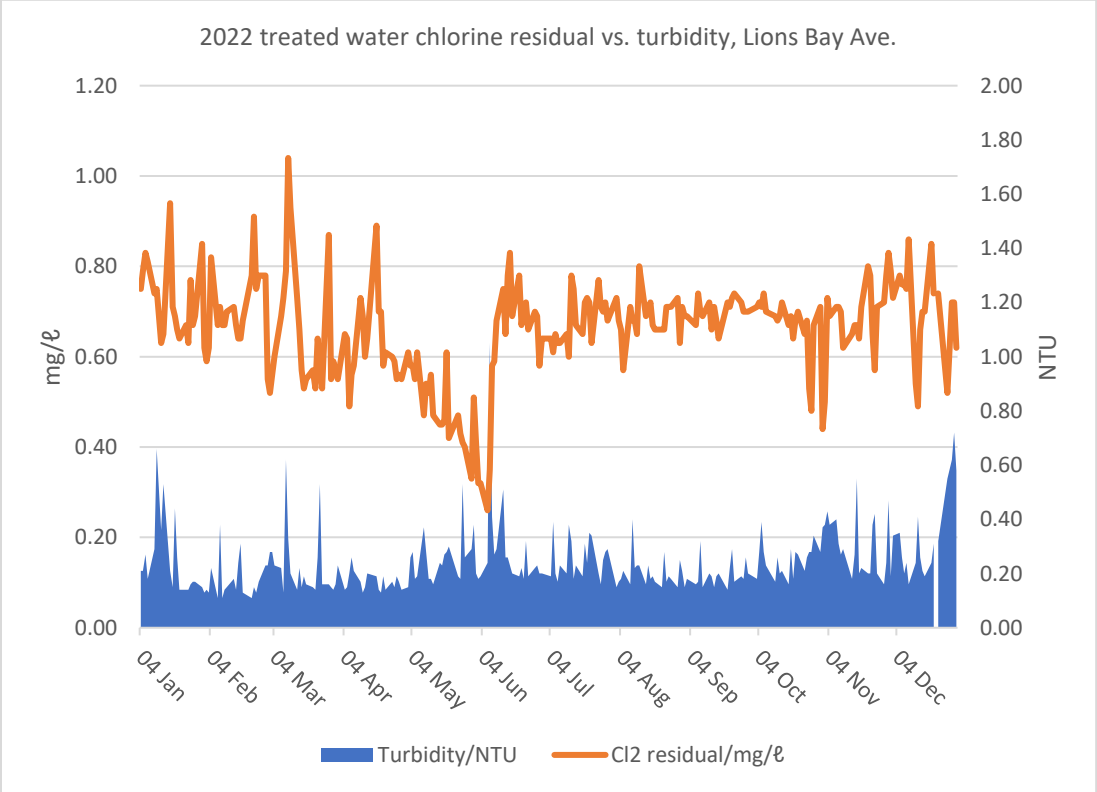
2022 annual chlorine residuals/mg/ℓ								
	Harvey Creek System					**Magnesia Creek System**		
	Tank	**PRV-3**	**Cafe**	**LBA**	**KGW**	**Tank**	**PRV-5**	**BBR**
Average	0.88	0.83	0.62	0.67	0.49	0.87	0.84	0.66
Maximum	1.05	1.00	0.90	0.88	1.05	1.21	1.14	1.02
Minimum	0.71	0.63	0.33	0.20	0.20	0.50	0.59	0.20
LBA=Lions Bay Avenue, KGW=Kelvin Grove Way, BBR=Brunswick Beach Road								

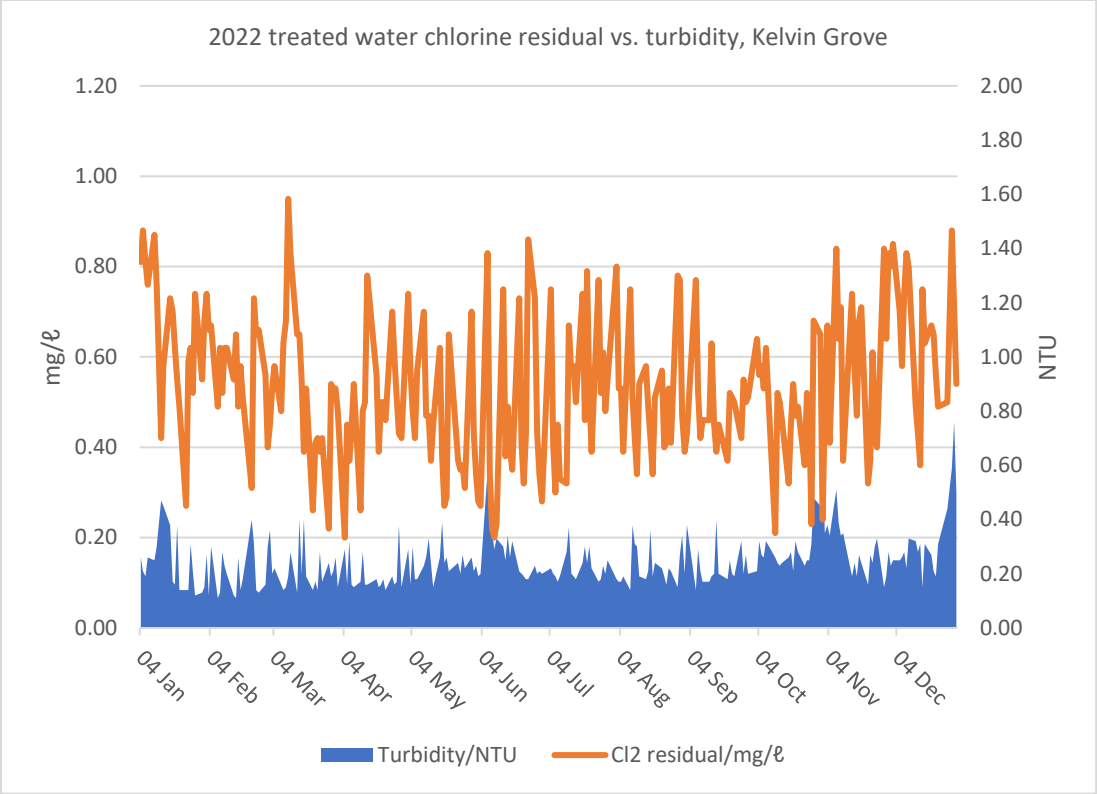
Turbidity and chlorine residuals for each sample station follow.

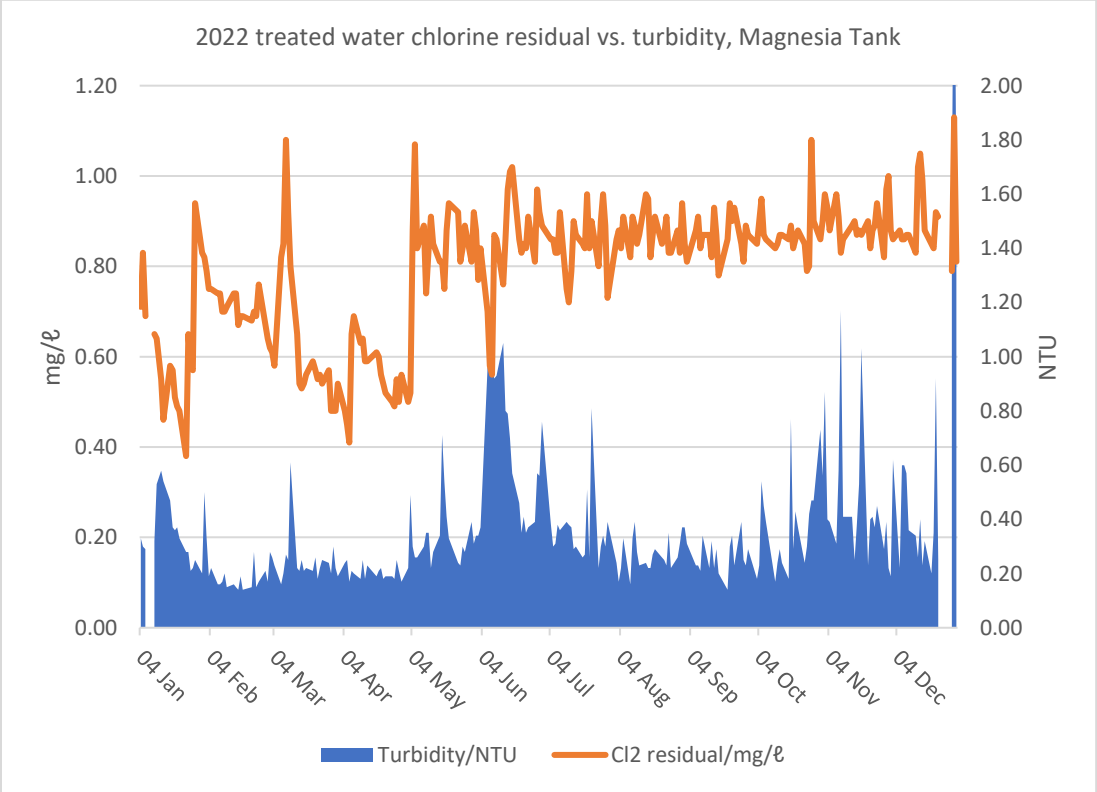

2022 treated water chlorine residual vs. turbidity, Harvey Tank
mg/ℓ
NTU
1.20
1.00
0.80
0.60
0.40
0.20
0.00
2.00
1.80
1.60
1.40
1.20
1.00
0.80
0.60
0.40
0.20
0.00
04 Jan
04 Feb
04 Mar
04 Apr
04 May
04 Jun
04 Jul
04 Aug
04 Sep
04 Oct
04 Nov
04 Dec
Turbidity/NTU
Cl2 residual/mg/ℓ

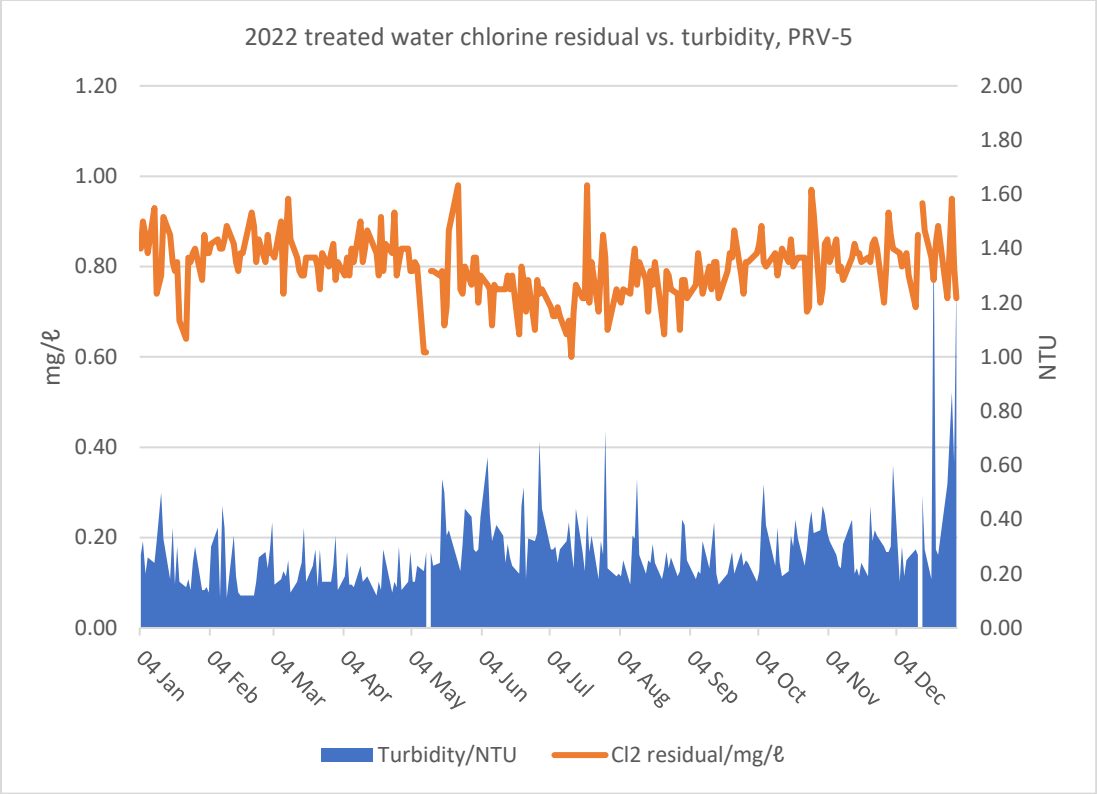

2022 treated water chlorine residual vs. turbidity, PRV-3
mg/ℓ
NTU
1.20
1.00
0.80
0.60
0.40
0.20
0.00
2.00
1.80
1.60
1.40
1.20
1.00
0.80
0.60
0.40
0.20
0.00
04 Jan
04 Feb
04 Mar
04 Apr
04 May
04 Jun
04 Jul
04 Aug
04 Sep
04 Oct
04 Nov
04 Dec
Turbidity/NTU
Cl2 residual/mg/ℓ

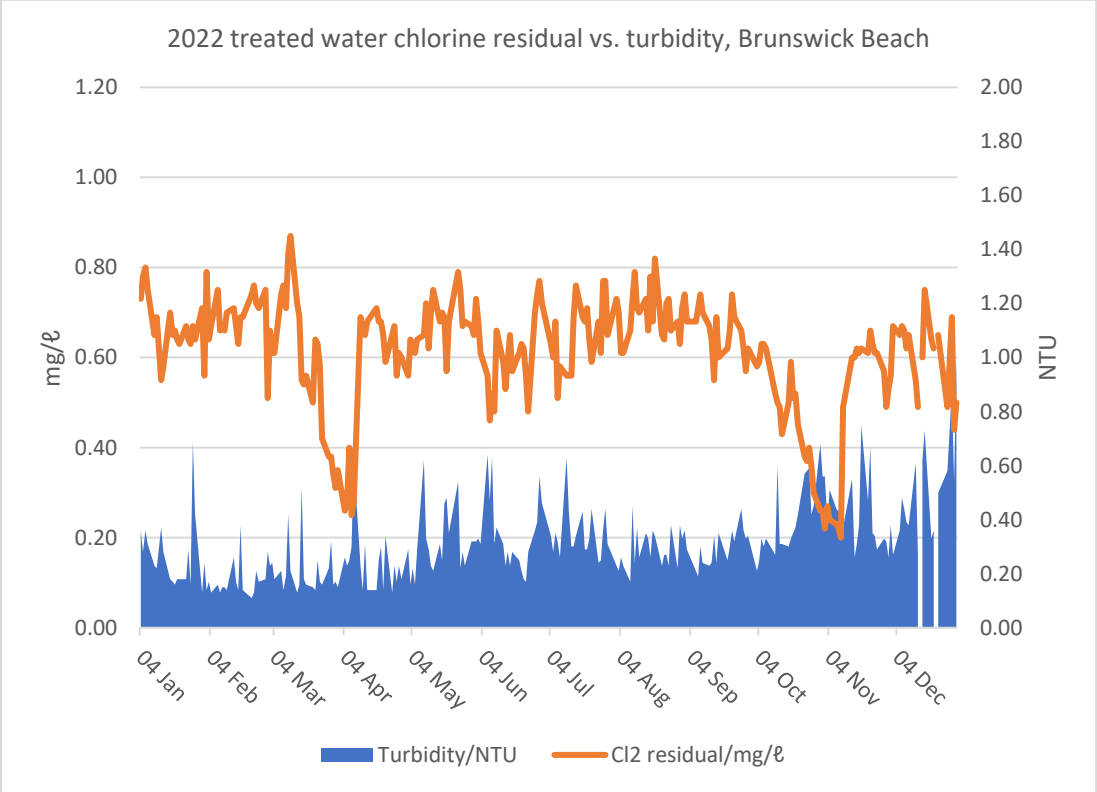

2022 treated water chlorine residual vs. turbidity, Store/Cafe
1.20
1.00
0.80
0.60
0.40
0.20
0.00
mg/ℓ
2.00
1.80
1.60
1.40
1.20
1.00
0.80
0.60
0.40
0.20
0.00
NTU
04 Jan
04 Feb
04 Mar
04 Apr
04 May
04 Jun
04 Jul
04 Aug
04 Sep
04 Oct
04 Nov
04 Dec
Turbidity/NTU
Cl2 residual/mg/ℓ


2022 treated water chlorine residual vs. turbidity, Lions Bay Ave.
1.20
1.00
0.80
0.60
0.40
0.20
0.00
mg/ℓ
2.00
1.80
1.60
1.40
1.20
1.00
0.80
0.60
0.40
0.20
0.00
NTU
04 Jan
04 Feb
04 Mar
04 Apr
04 May
04 Jun
04 Jul
04 Aug
04 Sep
04 Oct
04 Nov
04 Dec
Turbidity/NTU
Cl2 residual/mg/ℓ


2022 treated water chlorine residual vs. turbidity, Kelvin Grove
1.20
1.00
0.80
0.60
0.40
0.20
0.00
mg/ℓ
2.00
1.80
1.60
1.40
1.20
1.00
0.80
0.60
0.40
0.20
0.00
NTU
04 Jan
04 Feb
04 Mar
04 Apr
04 May
04 Jun
04 Jul
04 Aug
04 Sep
04 Oct
04 Nov
04 Dec
Turbidity/NTU
Cl2 residual/mg/ℓ


2022 treated water chlorine residual vs. turbidity, Magnesia Tank
1.20
1.00
0.80
0.60
0.40
0.20
0.00
mg/ℓ
2.00
1.80
1.60
1.40
1.20
1.00
0.80
0.60
0.40
0.20
0.00
NTU
04 Jan
04 Feb
04 Mar
04 Apr
04 May
04 Jun
04 Jul
04 Aug
04 Sep
04 Oct
04 Nov
04 Dec
Turbidity/NTU
Cl2 residual/mg/ℓ


2022 treated water chlorine residual vs. turbidity, PRV-5
1.20
1.00
0.80
0.60
0.40
0.20
0.00
mg/ℓ
2.00
1.80
1.60
1.40
1.20
1.00
0.80
0.60
0.40
0.20
0.00
NTU
04 Jan
04 Feb
04 Mar
04 Apr
04 May
04 Jun
04 Jul
04 Aug
04 Sep
04 Oct
04 Nov
04 Dec
Turbidity/NTU
Cl2 residual/mg/ℓ


2022 treated water chlorine residual vs. turbidity, Brunswick Beach
1.20
1.00
0.80
0.60
0.40
0.20
0.00
mg/ℓ
2.00
1.80
1.60
1.40
1.20
1.00
0.80
0.60
0.40
0.20
0.00
NTU
04 Jan
04 Feb
04 Mar
04 Apr
04 May
04 Jun
04 Jul
04 Aug
04 Sep
04 Oct
04 Nov
04 Dec
Turbidity/NTU
Cl2 residual/mg/ℓ

A NOTE ON CHLORINE DISINFECTION BY-PRODUCTS

Trihalomethane (THM) and haloacetic acid (HAA) byproducts form when chlorine reacts with organic matter. Health Canada considers THMs to be 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 2022:

Total trihalomethanes/µg/ℓ				
2022 sample date	**Lions Bay Ave.**	**Kelvin Grove**	**Community Centre**	**Brunswick Beach**
29 Mar.	67.2	71.0	61.3	79.8
7 Jun.	72.0	80.9	64.3	70.3
20 Sep.	20.8	43.7	19.1	23.3
7 Dec.	24.2	29.3	21.9	23.1
Annual average	46.1	56.2	41.7	49.1

While VCH has not required the municipality to test for HAAs, various Health Canada publications state a maximum acceptable concentration for total haloacetic acids 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 will commence testing for HAAs starting in the 4th Quarter 2023.

A NOTE ON pH

pH is a measure of the acidity or alkalinity of water. pH is of concern in a water distribution system because at low (acidic) pH values, water is corrosive to metals such as water mains and the lead solder in residential copper piping. Conversely, at high (alkali) pH values, carbonate scale can form, and chlorine disinfection is less efficient (see box adjacent). Health Canada indicates an acceptable range for drinking water of 7.0 to 10.5 pH. Lions Bay water is consistently slightly more acidic than this guideline:

Sodium hypochlorite hydrolyses in aqueous solution: $NaOCl + H2O \leftrightarrow Na^+ + HOCl + OH^-$. HOCl (hypochlorous acid) disassociates to $H^+ + OCl^-$, preferentially at high (alkali) pHs. HOCl is 20 times more germicidal than the OCl^-(hypochlorite) ion, so NaOCl is more effective at low pHs.

Sample location, after flush	**March 2022/pH**	**September 2022/pH**
Harvey raw water	6.76	6.95
Magnesia raw water	6.87	6.80
Harvey Tank	6.81	6.93
Store/café	6.82	6.97
Lions Bay Ave.	6.90	6.98
Kelvin Grove	6.95	7.28
Community Centre	6.90	6.99

Magnesia Tank	6.98	6.82
Brunswick Beach	7.03	6.93
Lions Bay Beach Park	6.82	6.98

Further, in addition to the water being acidic, it also has low total alkalinity, further creating conditions for corrosion to occur. In 2024, active pH control will be considered, probably utilising soda ash injection. Data are available in APPENDIX: BIANNUAL METALS AND CHEMISTRY RESULTS (ABRIDGED REPORT OF MARCH. 2022) starting on p.50.

A NOTE ON METALS AND OTHER SUBSTANCES

Other than through corrosion as discussed above, 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 (other than calcium, cobalt, magnesium, molybdenum, nickel and potassium). Bi-annual testing on a wide range of substances was performed, as found in APPENDIX: BIANNUAL METALS AND CHEMISTRY RESULTS (ABRIDGED REPORT OF MARCH. 2022) starting on p.50.

In 2022, all 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 has concluded that there is no convincing evidence that asbestos ingested through water is harmful to health, and it has not established drinking water guidelines for asbestos. However, EPA's enforceable maximum contaminant level (MCL) for asbestos is set at 7 million fibres per litre (MFL), on the grounds 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. Given that a significant portion of the municipality's water mains are still asbestos cement, in an abundance of caution asbestos samples are taken in two pertinent locations:

Asbestos analysis by transmission electron microscope (to EPA 100.2: at >10,000x for asbestos fibers >10µm long)		
Sample 08Nov2022, analysis 17Nov2022	**Upper Bayview Rd. sample**	**Oceanview Rd. sample**
Analytical sensitivity (AS), million fibres per litre*	0.21	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

*US EPA indicates an AS of <0.2 million fibres per litre is desired for drinking water

BARRIER 3: DRINKING WATER DISTRIBUTION SYSTEM

TANKS AND WATER MAINS

Treated water storage tank	Material	Dimensions	Actual capacity			Year built
			ℓ	iG	USG	
500,000 iG Harvey Tank	Glass-fused bolted steel	16.10 m diameter, 11.5 m depth	2,343,000	515,000	618,000	2019
100,000 iG Magnesia Tank	Cast-in place concrete	10.000 X 10.000 m, 4.4 m depth	440,000	97,000	116,000	1997
20,000 iG Highway Tank, planned for replacement with new break-head tank or PRV (preferred for leak detection purposes)	Cast-in place concrete	6.3 m diameter, 3.0 m depth	95,500	20,500	25,000	1960
20,000 iG Phase IV Tank, obsoleted 2021 (replaced by PRV at Upper Bayview Road)	Air gap to distribution network. Slated for demolition.					
25,000 iG Phase V Tank, obsoleted 2021 (replaced by PRV at Upper Bayview Road)						
100,000 iG Oceanview Tank, obsoleted 2017						
30,000 iG Brunswick Tank, obsoleted mid-2000s						
35,000 iG Phase VI (Sunset) Tank, obsoleted late 1990s						

Water mains are primarily ductile iron, with some asbestos cement (AC), cast iron and polyvinyl chloride (PVC):

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

The municipality aims to flush its 17 km of distribution mains twice per year, which is accomplished by opening fire hydrants and blow off valves to provide flowrates high enough to scour pipe walls. Discharging water carries sediment and other solids with it, assisting in the scouring effect. To not affect summer water conservation efforts, flushing takes place March-April and October-November.

Inspection and cleaning of the municipality's water storage tanks occurs on a five-year cycle by two methods:

1. Tanks are isolated but not drained and a remotely operated submersible vehicle (ROV) or divers are disinfected with chlorinated water before entering the tanks to visually inspect and vacuum sediment.
2. Tanks are isolated and drained, and personnel enter under confined space protocols to

manually scrub surfaces.

All three tanks were diver inspected in March 2022:

Tanks	Method	Report summary
Harvey	ROV	In very good working condition. Recommendations: • Install adhesive neoprene gasket to top hatch to avoid any insect intrusion to system • Continued ROV inspection program for monitoring sediment build-up 3 to 5 years • Remove/keep vegetation down from around reservoir • Label on site valves for fast accurate identification.
Magnesia	Diver	In good working condition. Recommendations: • Young saplings along the East side wall should be removed before their root systems begin to interfere with the floor of the system • 8 cracks on the external walls measured and documented for future reference.
Highway (slated for replacement, as discussed in this report)	Diver	In medium to poor working condition. Concrete liner is failing uniformly around the inside of the system. Subject to intrusion by rainwater/weather, insects/organics, or anyone with a ladder. Possible leak found near the outlet pipe. Drain valve is seized closed. Recommendations: • More frequent cleaning/inspection program • Routinely exercise all system valves to avoid seizing • Replace top hatch with locking mechanism and weatherproof gasket • Further investigate damaged wall liner and potential repairs, damaged floor concrete and potential repairs and damaged concrete around the outlet pipe that could be seeping/leaking water out of the system.

A NOTE ON 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 by meeting four conditions:

CONDITION 1: "provide overall inactivation using a minimum of two disinfection processes of 4-log (1/10,000th) reduction of viruses and 3-log (1/1000th) reduction of *Cryptosporidium* and *Giardia*"

This condition was met in 2022. The municipality utilises UV and chlorine disinfection, and the manufacturer's specifications for the Trojan Swift UV reactor units at both treatment plants indicate a

3-log reduction of *Cryptosporidium* and *Giardia* at raw water ultraviolet transmittance (UVT) values as low as 70%. UVT data is presented on p.38; in summary hand-measured UVTs in 2022 were:

2022 UVT	Harvey/%	Magnesia/%
MIN	81.1	85.3
MAX	97.2	97.8
MED	93.2	95.1
AVG	91.7	94.7

In 2021 the reactors at the Harvey Creek plant were upgraded from two-lamp to four-lamp systems to provide additional dosing capacity at lower UVTs and higher flowrates. Subsequent to 2022 the municipality and VCH are discussing whether real-time UVT measurement beyond the internal control system of the UV reactors is required to provide confidence that the set UV dose of 26.5 millijoules per square centimeter is being maintain at UVTs that occasionally dip under 90 percent.

Chlorine residual is discussed above starting on p.12. Contact time for such residual is achieved in storage and transit as follows:

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

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"

This condition was met in 2022. *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 50 of 50 (100%) of samples for Magnesia Creek in the entire year of 2022, thus meeting this criterion:

2022	Harvey raw water, *E. coli* per 100 ml	Magnesia raw water, *E. coli* per 100 ml
04-Jan	<1	<1
10-Jan	<1	<1
18-Jan	<1	<1
24-Jan	<1	<1
31-Jan	<1	<1
07-Feb	<1	<1
14-Feb	<1	<1
22-Feb	<1	<1
28-Feb	<1	<1
07-Mar	<1	<1
14-Mar	<1	<1
21-Mar	<1	<1
28-Mar	<1	<1
04-Apr	<1	1.0

2022	Harvey raw water, *E. coli* per 100 ml	Magnesia raw water, *E. coli* per 100 ml
11-Apr	<1	<1
19-Apr	<1	<1
25-Apr	<1	<1
02-May	<1	<1
09-May	<1	<1
16-May	<1	<1
24-May	<1	<1
30-May	<1	<1
06-Jun	<1	<1
13-Jun	<1	<1
27-Jun	<1	<1
04-Jul	<1	<1
11-Jul	<1	<1
18-Jul	<1	<1
25-Jul	<1	<1
02-Aug	1.0	<1
08-Aug	1.0	<1
15-Aug	RMFL	RMFL
23-Aug	<1	<1
29-Aug	<1	<1
06-Sep	2.0	<1
12-Sep	2.0	<1
21-Sep	1.0	1.0
26-Sep	2.0	<1
04-Oct	<1	<1
11-Oct	RMFL	RMFL
17-Oct	2.0	<1
24-Oct	37.3	9.7
31-Oct	27.9	2.0
07-Nov	2.0	2.0
14-Nov	2.0	<1
21-Nov	<1	<1
28-Nov	<1	<1
05-Dec	<1	<1
12-Dec	1.0	<1
19-Dec	<1	<1

RMFL=Results Missing From Laboratory

CONDITION 3: "Average daily turbidity levels measured at equal intervals (at least every four hours) immediately before the disinfectant is applied, are around 1 NTU, but do not exceed 5 NTU for more than two days in a 12-month period"

As discussed in TURBIDITY on p.16 above, daily average turbidity never reached 5 NTU, so this condition was met in 2022. Nevertheless, at VCH direction, the municipality is proceeding with reconfiguring the treatment plants by instituting a process control change (named ENSuRe, Excessive NTU Shutdown Routine) that will automatically shut off UV reactors during periods of high turbidity, irrespective of their ability to maintain UV dosage. Initially, staff will attend the affected plant to flush the intake line until it runs clear (a matter of hours to days depending on the cause of the turbidity) and then return

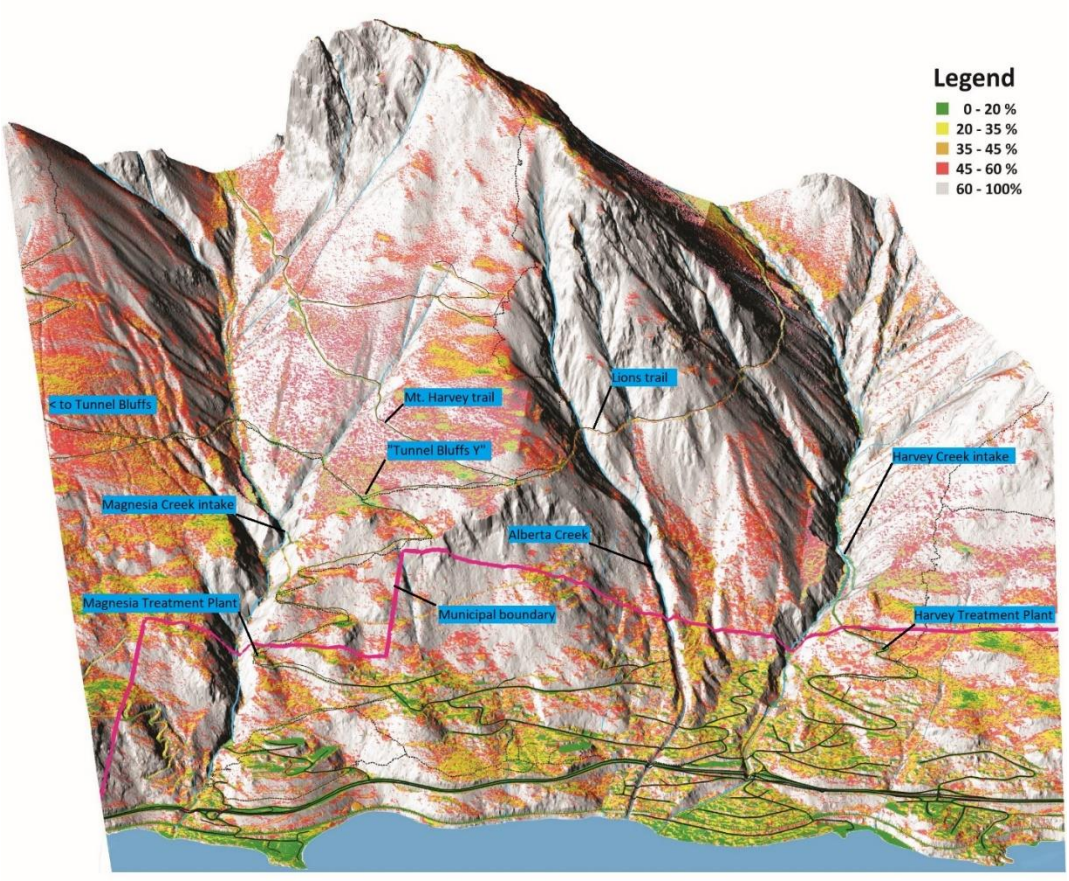
the plant to service. Depending on the frequency of the routine being activated, piping and controls can be installed to automatically run a bleed stream over the given plant's NTU sensor to determine when the turbidity clears, flush the intake line, and put it back in service.

Status at end of 2022: open.

CONDITION 4: "[Maintain] a watershed control program…that minimizes the potential for fecal contamination in the source water"

As discussed above in SOURCE (p.8), source water coliform concentrations rise in the summer months. The municipality is working with the health authority on a program to meet this condition, including:

- To the extent that signage is heeded, installing informational signs in areas on trails at higher risk for human contamination entering creeks.
- Provision of portable toilets at various backcountry trail access areas (although typically trail users don't need to use toilet facilities at the *beginning* of their day's hike).
- Longer term, consideration of permanent toilet facilities at the "Tunnel Bluffs Y" as illustrated below. Since backcountry composting units do not have adequate capacity for conceivable uses arising from current hiker numbers, a pumped cesspit design will likely be required, requiring the access road to be regraded for pumper access, and re-ditched so that it doesn't continue to wash out every winter. Cooperation from several stakeholders and funding will be required including FLNRO, BC Parks, MVRD, BC EMCR and BC Mountain Club.



Status at end of 2022: open.

SYSTEM OPERATION

The Environmental Operators Certification Program (EOCP) classifies water supply and distribution systems to determine training requirements for operators; Lions Bay's water treatment system is classified as Class 1, and distribution system as Class 2. Under the *Drinking Water Protection Act* and the *Drinking Water Protection Regulation,* each water 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 for their certification to remain in good standing. In 2022, Lions Bay EOCP-certified municipal water 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	Public Works Technician 2 (to Foreman 1, May 2023)	Water Treatment Plant Operator 1 Water Distribution System Operator 2
KM	Public Works Technician 2 (departed Dec. 2022)	Water Treatment Plant Operator 1 Water Distribution System Operator 2
CE	Public Works Technician 1 (departed Dec. 2022)	Water Distribution System Operator 1

2022 work program

The municipality's annual drinking water work program is driven by 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.

Core maintenance activities

All core maintenance was completed in 2022 except for biannual watermain flush: the four skilled outdoor staff required were never available together. Outside contractors will be brought in to complete a full mains flush by late-October 2023.

As reported last year, commencing October 2021 data communication with the Magnesia plant became unreliable. Lacking the ability to watch chlorine dosing live on the process control screens, a bleed stream from the Magnesia tank was established to continually bring in new chlorinated water to ensure that chlorine residuals were maintained, until a coax-based broadband internet connection replaced the copper line running through the forest mid-2022.

Water system faults in 2022 were:

System outages			
From	**To**	**Days**	**Notes**

2022-01-03	2022-03-07	63	Magnesia Plant communication fault
2022-03-14	2022-05-06	53	Magnesia Plant communication fault
2022-06-06	2022-06-24	18	Magnesia Creek intake blocked
2022-12-26	2022-12-29	3	Magnesia Creek intake blocked

5. STRATEGIC & TACTICAL ISSUES

Supply constraints

For most of the year, flows in Harvey and Magnesia creeks are more than adequate to supply Lions Bay's water demand. But summer creek flow is subject to the previous winter's snowpack and to the spring and summer rainfall, insolation (sunshine), wind and cloud cover that dictate how long it lasts. In some years the snowpack lasts through to the winter snow; in others it is gone by July, and creekflow depend on groundwater supply and summer rain.

Metro Vancouver Regional District climate projections call for warmer winters and longer, hotter summers, with rainfall amounts similar to today's but occurring more intensely. **With no raw water storage, Lions Bay currently relies entirely on water being in the creeks when it is needed.** Since 2017 the municipality has worked 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 stream flow, particularly the relative contribution of groundwater flows, all to be able to make operating decisions in the short term by knowing what creek supply will do until the next rainfall event, and in the long term by knowing when to begin considering supply alternatives including:

a) Shallow GUDI ("groundwater under direct influence" of surface water) wells

b) Deep wells producing water that does not require initial treatment

c) A third intake that would utilise the small water license at Alberta Creek--two years of testing has found no arsenic, as can happen in arsenical copper country—but getting it to an existing treatment plant is not trivial

d) A modular peak-shaving desalination plant—in 2018 the municipality acquired the last remaining available waterfront land in the community to hold in reserve for a plant site

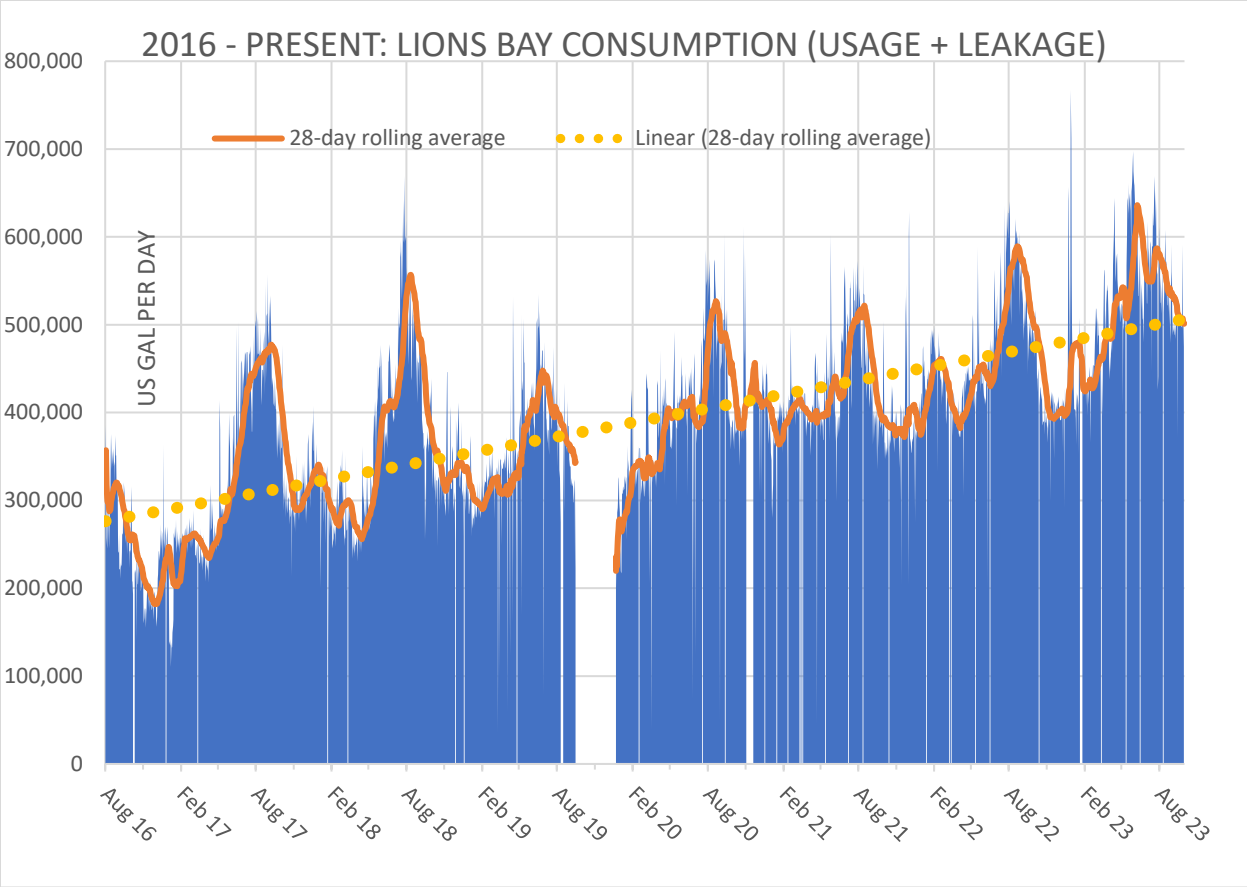
e) A pipeline to the MVWD.

The last two options will produce expensive water, first requiring Lions Bay's excessive leakage to be brought under control, addressed next.

High consumption

Since at least 2016 drinking water consumption has increased at about 11 percent a year, while the spread between summer and winter consumption diminishes:

[2] Currently led by Associate Professor Dr. Steven Weijs, whose research interests include "Water Resources Management, Mountain Hydrology, 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."



Municipal staff believe that accelerating leakage is caused by:

- Deteriorating distribution system materials ranging in age from 60 to 10 years
- Piping moving a little more every year as the terrain creeps downhill
- Aging private-side service lines made of brittle polybutylene and soft copper, in many cases being damaged by growing tree roots.

The last explicit leak rate measurement was performed in Mar. 2016 and found to be was 124,600 GPD, about 27% of consumption at the time. With simplifications to the water distribution network and improved instrumentation, a system routine (OLDer, Overnight Leak DetERmination) was implemented in July. 2023, subsequent to the coverage period of this report, that will automatically shut off supply between 2 and 4 am (as long as supply is sufficient to refill both main tanks within the next two hours). Outflows between 2 and 4 am can be considered to be leakage, particularly in winter months when no timed irrigation or swimming pool filling is expected. Flowmeters are not currently installed in the right places, but a numerical technique can be used to determine leak flows from tank level data.

Per-capita consumption in Lions Bay is exceptionally high and increasing. In 2022 it was over 1300 litres per capita per day, more than three times the regional average of 405 ℓ/capita/day (see APPENDIX: REGIONAL CONSUMPTION on p.49):

Year	Consumption (ℓ)	Census population	ℓ/capita/day
2016	351,318,000	1,334	722
2017	472,527,000	1,334	970
2018	533,000,000	1,334	1095
2019	508,000,000	1,334	1043
2020	623,000,000	1,334	1279
2021	612,000,000	1,390	1206
2022	699,000,000	1,390	1378

Since late 2022, the municipality has prioritised finding and addressing public and private leaks. The advent of online flowmeters in the new Upper Bayview and Mountain PRVs has already proved a useful tool in detecting network leaks. In 2023 and 2024 trial water meters will be installed at select users, and clamp-on zone water meters will be installed to better localise leakage. Outdoor Water Use Bylaw No. 484, 2015 restricts residential, commercial, and public water uses during low supply periods:



Problematic raw water intakes

Lions Bay's watersheds are steep and unstable. Access to the intakes is by narrow gravel roads subject to rock and tree fall, and safety protocols restrict access when rainfall parameters are exceeded, usually just when decreased flow or increased turbidity need to be investigated. Large rocks (of over 0.5 m

dimensions) 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. The watersheds are heavily forested with alder, big-leaf maple and conifers, all producing copious leaves and needles which build up on the screens, sometimes requiring cleaning twice a day.

A 2017-19 attempt to screen small solids prior to the settling building at the Magnesia weir was a failure—despite a last-minute attempt to improve the original design prior to installation, a so-called "infiltration gallery" plugged at the first significant rain event. It was removed. A better-designed upgrade to the exit profile of the Harvey weir allows it to self-clear blockages at the intake grate. An clarifier/millpond system not requiring confined-space safe work protocols, that will float off leaves and needles and drop out rocks post-weir but pre-settling building, is at the concept stage for the Magnesia intake.

Limited capital

No major water capital projects were undertaken in 2022. As a small community with a largely residential tax base, Lons Bay's infrastructure funding gap is growing. While an Infrastructure Levy has been collected since 2019, capital spending still requires federal and provincial grant help. Key water infrastructure capital projects, identified since the municipality's 2017 Infrastructure Master Plan, include:

- 1960s-era cast iron watermains that are unable to provide the requisite fire flows in a community classified at 'high-risk' of wildfire (https://www.lionsbay.ca/public-safety/community-wildfire-protection-plan was released in 2022);
- 1970s-era asbestos-cement watermains situated in circuitous streets with steep gradients, prone to slope creep, with significant washout expected in the event of a break;
- 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;
- A lack of filtration, which would cost $10-14 mil. in 2017 dollars to implement at two plants;
- Replacement of 1065 meters of water main on Centre Road, Bayview Road, and Bayview Place, the so-called CUBB Project, consisting of 1960s era cast iron pipe as well as the largest remaining section of asbestos-cement pipe in the municipality;
- Replacement of 795 meters of water main at Bayview Road from Stewart to Mountain, the so-called DWIP (Drainage & Watermain Infrastructure Project), unfortunately turned down in three grant-funding applications so far.

Control system improvements

After the close of 2022, several system enhancements have been implemented:

- New process control routines, *Overnight Leakage Determination Routine (OLDeR)* and *Excessive NTU Shutdown Routine (ENSuRe),* discussed elsewhere in this report;
- Pressure transducers have been 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 (as opposed to the previous method of

totalising flowrates from periods a given plant was taking its creek's entire production, which proved inaccurate for Magnesia Creek since the volume of the intake pipeline is greater than the typical volume of a fill cycle). These installations will be connected to the system by cellular modem or private radio mesh in late 2023;

- 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 2023 and 2024, online remote chlorine metering will be installed at the far ends of the distribution system, to provide faster warning of low chlorine residuals to a process control routine that will use chlorine concentrations to control dosing pumps, rather than staff setting an injection rate and watching the response manually.

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APPENDIX: CONTAMINATION RESPONSE PROTOCOL

Notification of Unusual Situations Potentially Affecting Water Quality

Situation	Notifying Agency	Agency Notified	Notification Time Frame
E. coli – positive sample	VCH Labs	VOLB & VCH	Immediate
The Public Works Manager (or designate) and VCH will be notified immediately by the laboratory. 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 the laboratory and compared to lab analysis test results to determine if there is any localized loss of disinfectant residual. Immediate collection of a repeat sample, where possible both upstream and downstream of the positive sample location. VCH and the Public Works Manager (or designate) will liaise and determine the need for a Boil Water Advisory (BWA) to be issued. If it is determined to be warranted, VCH will issue the BWA. The laboratory will continue to test the subsequent samples. Once consecutive negative sample results are returned, the Public Works Manager (or designate) will liaise again with VCH and determine whether the BWA can be lifted.			
Total coliform >10/100 ml & low chlorine residual	VOLB	VCH	Immediate
Chemical contamination	VOLB	VCH	Immediate
Chemical contaminants may include nitrates and nitrites, salts, pesticides, metals and toxins. While the municipality recognizes that timely detection of some chemical contaminants may not be possible, when it is detected, 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 the Public Works Manager (or designate) under the guidance of VCH. Once the contamination is remedied and consecutive negative sample results are returned from the laboratory, the Public Works Manager (or designate) will again liaise with VCH and determine whether the public advisory can be lifted.			
Turbidity events >5 NTU	VOLB	VCH	Immediate
Turbidity in the municipality's treated water system is monitored. Water sample turbidity results that register >1 - 3 NTU are scrutinized, along with corresponding chlorine residual levels, and actively monitored. Any sections of the water distribution system generating high turbidity results are field-checked and flushed if required. Turbidity events in the raw source water affect the municipality's water treatment plants. The performance of the primary UV treatment is diminished by increased turbidity due to absorbance and reflection and a correspondingly low UV transmittance (UVT) rate. The UV system automatically increases lamp intensity to counter the lower UVT. Once the UVT drops below the minimum set point of 26.25 mJ/cm^2, the UV reactors shut down and an alarm signal is sent via SCADA to municipal on-call staff. Municipal staff will immediately inform the Public Works Manager (or designate) and investigate the alarm at the plant. During turbidity events in excess of 5 NTU, microbiological sampling and testing is increased at all sampling locations; chlorine residual sampling and testing is likewise increased and the municipality contacts VCH, which may issue a Boil Water Advisory.			
Disinfection failures/continued loss of residual	VOLB	VCH	Immediate for continued loss of residual
Chlorine residuals in the municipality's treated water system are monitored. If a daily sample registers below the accepted minimum of 0.2 mg/ℓ, the Water Operator will first flush the system to attempt to bring the chlorine residual up to the minimum required. Should the chlorine residual continue to be below the minimum level, the municipality will immediately commence increased monitoring of all chlorine residuals in the system, including the storage tanks, and determine the root cause of the problem. Chlorine will be added manually to the storage reservoirs if necessary, and residuals checked frequently at all locations.			

The Public Works Manager (or designate) will contact VCH, which may issue a Boil Water Advisory if continued loss of residual is observed.

Loss of pressure due to high demand	VOLB	VCH	Immediate

In the event of adverse pressure loss due to high demand, Municipal crews will adjust the system to isolate the affected section, and then take measures to supplement pressure in the affected area. The Public Works Manager (or designate) will immediately consult with VCH regarding further actions; all water quality complaints from the public will be immediately and thoroughly investigated for potential contamination.

Water main breaks	VOLB	VCH	Immediate

In the event of a water main break where chemical or microbiological contamination of the system is suspected, Municipal crews will adjust the system to isolate the contaminated section from the rest of the distribution system. The Public Works Manager (or designate) will immediately 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 positive samples above will be implemented if required.

Lack of water due to drought or other causes	VOLB	EMBC & VCH	Information only; as drought situation progresses

The flow rate of raw water entering the creek intakes to their respective water treatment plants is monitored daily, during the water sampling and testing program. If the water flow entering either plant is compromised, Municipal crews ascertain the root cause of the problem (i.e. whether the decrease is due to a blockage or drought) and work to either repair (if blocked) and/or mitigate the impact on the system as a whole by implementing conservation measures noted below.

In the event of a lack of water due to low streamflow or other causes affecting supply (such as debris torrents, lack of safe access to intakes, or municipality-wide water use in excess of supply), an escalating conservation system is implemented to address the lack of water in the system. Conservation efforts commence June 1 with Level 1 of the municipality's Outdoor Water Use Bylaw to increase awareness. Level 2 is utilized as required to reduce the outdoor use of water in the municipality, combined with extensive public notification (via electronic notifications, printed media delivered to every home, and town hall meetings). The highest levels of restriction, Level 3, is reserved for serious supply shortages, and entails setting and enforcing no outdoor use at all.

When a lack of water continues despite conservation efforts, Municipal staff will liaise with EMBC, VCH, and FLNRO for both information and a consolidated response to events as they unfold. Municipal staff will then arrange for water tankers to truck in potable water and use this method to fill one or both tanks to keep potable water in the water system. Neighboring municipalities will also be informed in the event they can lend assistance. Increased testing and monitoring of the water system is undertaken in conjunction with VCH, until the system as a whole is once again restored.

APPENDIX: RAW WATER UVT, NTU (HAND SAMPLED)

2022 UV transmittance (under 89% flagged), manual-measure NTU, rainfall						
Date	Harvey			Magnesia		
	UVT (%)	NTU	24 h rain (mm)	UVT (%)	NTU	24 h rain (mm)
04 Jan 2022	93.8	0.26	6.25	97.6	0.33	N/A
05 Jan 2022	93.8	0.24	12.75	97.3	0.32	N/A
06 Jan 2022	94.2	0.31	6.75	97.5	0.25	N/A
07 Jan 2022	86.6	0.37	18.75	N/A	N/A	N/A
10 Jan 2022	90.2	0.49	0.00	96.4	0.27	N/A
11 Jan 2022	82.3	0.47	24.50	92.5	0.52	N/A
13 Jan 2022	86.3	1.65	50.00	87.0	1.45	N/A
14 Jan 2022	89.1	0.36	0.00	91.1	0.83	N/A
17 Jan 2022	90.6	0.22	0.00	94.5	0.34	N/A
18 Jan 2022	90.9	0.16	0.75	95.5	0.29	N/A
19 Jan 2022	91.1	0.20	2.25	95.5	0.23	N/A
20 Jan 2022	82.7	0.27	28.00	94.1	0.32	N/A
21 Jan 2022	90.8	0.23	0.75	93.4	0.28	N/A
24 Jan 2022	92.6	0.15	0.00	95.6	0.31	N/A
25 Jan 2022	92.0	0.17	0.00	95.5	0.46	N/A
26 Jan 2022	92.9	0.13	0.00	96.1	0.19	N/A
27 Jan 2022	93.5	0.14	0.00	96.6	0.34	N/A
28 Jan 2022	92.8	0.21	0.00	96.3	0.22	N/A
31 Jan 2022	88.2	0.18	23.50	93.6	0.26	N/A
01 Feb 2022	90.5	0.17	0.00	95.0	0.20	N/A
02 Feb 2022	91.0	0.19	0.00	95.5	0.18	N/A
03 Feb 2022	92.5	0.22	1.50	96.0	0.31	N/A
04 Feb 2022	92.2	0.14	4.50	95.8	0.20	N/A
07 Feb 2022	91.4	0.14	0.50	95.3	0.36	N/A
08 Feb 2022	90.3	0.12	0.00	94.8	0.23	N/A
09 Feb 2022	91.3	0.13	6.00	95.1	0.21	N/A
10 Feb 2022	90.6	0.13	0.00	95.2	0.16	N/A
11 Feb 2022	91.3	0.17	0.25	95.4	0.21	N/A
14 Feb 2022	91.9	0.23	0.25	96.3	0.16	N/A
15 Feb 2022	91.2	0.22	3.75	95.7	0.20	N/A
16 Feb 2022	92.5	0.17	0.00	96.2	0.25	N/A
17 Feb 2022	92.3	0.38	0.00	95.2	0.20	N/A
18 Feb 2022	92.6	0.13	0.00	96.5	0.21	N/A
22 Feb 2022	92.9	0.15	0.00	96.8	0.19	N/A
23 Feb 2022	93.8	0.15	0.00	96.8	0.23	N/A
24 Feb 2022	93.8	0.15	0.00	97.0	0.21	N/A
25 Feb 2022	94.4	0.16	0.00	97.3	0.21	N/A
28 Feb 2022	83.5	0.30	37.25	93.4	0.42	N/A
01 Mar 2022	86.8	0.25	6.00	92.3	0.24	N/A
02 Mar 2022	87.0	0.20	14.50	93.2	0.21	N/A
03 Mar 2022	88.4	0.25	11.00	93.6	0.18	N/A
04 Mar 2022	88.7	0.16	2.75	93.2	0.17	N/A
07 Mar 2022	92.0	0.15	0.00	95.3	0.17	N/A
08 Mar 2022	92.6	0.36	0.00	96.2	0.16	N/A
09 Mar 2022	93.0	0.13	0.00	95.7	0.45	N/A
10 Mar 2022	93.6	0.15	0.00	96.4	0.14	N/A
11 Mar 2022	93.8	0.20	0.00	96.8	0.15	N/A
14 Mar 2022	83.6	0.25	13.00	96.2	0.39	N/A
15 Mar 2022	81.3	0.30	39.75	93.9	0.40	N/A

2022 UV transmittance (under 89% flagged), manual-measure NTU, rainfall						
Date	Harvey			Magnesia		
	UVT (%)	NTU	24 h rain (mm)	UVT (%)	NTU	24 h rain (mm)
16 Mar 2022	88.5	0.19	2.25	94.6	0.21	N/A
17 Mar 2022	90.0	0.33	2.00	94.9	0.17	N/A
18 Mar 2022	89.3	0.15	12.00	95.3	0.17	N/A
21 Mar 2022	86.8	0.15	13.00	95.2	0.16	N/A
22 Mar 2022	88.7	0.25	5.00	95.2	0.16	N/A
23 Mar 2022	87.0	0.36	3.25	94.9	0.31	N/A
24 Mar 2022	89.8	0.34	7.25	91.3	0.30	N/A
25 Mar 2022	91.4	0.22	0.00	91.2	0.25	N/A
28 Mar 2022	88.2	0.21	7.25	94.1	0.26	N/A
29 Mar 2022	90.1	0.33	4.00	92.5	0.23	N/A
30 Mar 2022	88.4	0.41	6.25	92.7	0.41	N/A
31 Mar 2022	90.3	0.25	0.25	93.9	0.35	N/A
01 Apr 2022	91.2	0.16	0.00	94.5	0.17	N/A
04 Apr 2022	81.3	0.24	54.50	93.6	0.40	N/A
05 Apr 2022	88.1	0.24	10.00	92.6	0.21	N/A
06 Apr 2022	89.6	0.17	0.25	94.5	0.26	N/A
07 Apr 2022	91.0	0.14	0.00	94.9	0.26	N/A
08 Apr 2022	86.8	0.23	8.75	94.2	0.18	N/A
11 Apr 2022	92.3	0.14	2.25	95.1	0.23	N/A
12 Apr 2022	92.3	0.14	1.25	95.6	0.36	N/A
13 Apr 2022	92.7	0.24	16.00	95.8	0.25	N/A
14 Apr 2022	92.8	0.21	0.00	96.0	0.17	N/A
18 Apr 2022	91.2	0.16	13.00	94.8	0.14	N/A
19 Apr 2022	84.6	0.24	55.75	89.1	0.35	N/A
20 Apr 2022	89.6	0.21	0.00	95.0	0.23	N/A
21 Apr 2022	85.8	0.26	18.50	93.4	0.24	N/A
22 Apr 2022	86.4	0.17	16.25	93.5	0.23	N/A
25 Apr 2022	85.9	0.30	11.50	94.6	0.21	N/A
26 Apr 2022	88.7	0.33	2.25	94.3	0.18	N/A
27 Apr 2022	90.4	0.32	1.25	94.7	0.16	N/A
28 Apr 2022	91.1	0.15	2.25	95.1	0.32	N/A
29 Apr 2022	91.6	0.21	0.00	95.5	0.36	N/A
02 May 2022	89.0	0.17	0.50	94.5	0.29	N/A
03 May 2022	89.5	0.25	0.50	94.1	0.23	N/A
04 May 2022	88.9	0.21	12.25	93.2	0.28	N/A
05 May 2022	88.6	0.22	6.50	93.6	0.21	N/A
06 May 2022	87.9	0.22	11.25	92.8	0.33	N/A
09 May 2022	90.9	0.17	0.00	94.3	0.18	N/A
10 May 2022	91.1	0.31	1.75	94.7	0.23	N/A
11 May 2022	91.1	0.21	2.25	95.1	0.43	N/A
12 May 2022	85.2	0.31	15.75	94.0	0.26	N/A
13 May 2022	86.5	0.28	47.50	91.6	0.26	N/A
16 May 2022	87.4	0.40	15.00	90.3	0.63	16.50
17 May 2022	90.1	0.22	0.50	91.5	0.39	0.75
18 May 2022	84.1	0.30	16.00	92.0	0.29	12.75
19 May 2022	90.0	0.36	1.00	93.6	0.22	0.25
20 May 2022	91.0	0.39	0.00	94.1	0.34	0.34
24 May 2022	90.0	0.24	0.00	93.2	0.27	0.27
25 May 2022	88.9	0.24	3.50	92.9	0.40	4.00
26 May 2022	89.7	0.27	0.25	92.4	0.31	0.00
27 May 2022	82.3	0.96	21.00	86.6	2.04	24.50
30 May 2022	89.5	0.31	2.25	93.2	0.36	2.75

2022 UV transmittance (under 89% flagged), manual-measure NTU, rainfall						
Date	Harvey			Magnesia		
	UVT (%)	NTU	24 h rain (mm)	UVT (%)	NTU	24 h rain (mm)
31 May 2022	90.2	0.29	2.75	93.5	0.27	2.00
01 Jun 2022	89.5	0.26	0.00	91.6	0.37	0.00
02 Jun 2022	90.3	0.25	0.00	92.2	0.45	0.00
03 Jun 2022	89.7	0.28	3.50	91.8	0.48	5.75
06 Jun 2022	89.5	0.64	5.25	85.3	3.28	1.50
07 Jun 2022	90.6	0.44	0.00	93.0	0.75	0.00
08 Jun 2022	90.1	0.31	2.00	93.5	0.73	2.25
09 Jun 2022	91.3	0.48	0.75	92.7	0.57	1.00
10 Jun 2022	88.7	0.48	29.50	88.9	1.89	41.75
13 Jun 2022	91.7	0.29	3.25	94.1	0.61	1.00
14 Jun 2022	91.0	0.24	0.00	94.0	0.53	0.25
15 Jun 2022	91.5	0.30	0.00	94.5	0.42	0.00
16 Jun 2022	90.9	0.52	7.50	94.0	0.56	8.00
17 Jun 2022	91.5	0.32	2.00	93.7	0.50	2.50
20 Jun 2022	91.7	0.28	0.50	93.8	0.50	0.50
21 Jun 2022	92.1	0.26	0.00	93.7	0.31	0.00
22 Jun 2022	91.2	0.23	4.00	92.0	0.58	5.00
23 Jun 2022	91.7	0.23	0.75	92.4	0.45	0.00
24 Jun 2022	91.3	0.21	0.00	93.8	0.27	0.00
27 Jun 2022	92.3	0.22	0.00	92.2	0.49	0.00
28 Jun 2022	92.7	0.32	0.00	92.7	0.62	0.00
29 Jun 2022	92.9	0.44	0.50	94.1	0.61	0.50
30 Jun 2022	93.6	0.24	0.00	94.1	1.34	0.00
04 Jul 2022	92.8	0.24	10.75	93.9	0.33	12.25
05 Jul 2022	93.1	0.27	1.00	94.2	0.28	0.50
06 Jul 2022	93.0	0.22	3.00	93.8	0.29	2.75
07 Jul 2022	92.8	0.20	2.75	92.2	0.79	2.50
08 Jul 2022	93.2	0.27	1.00	92.9	0.35	1.50
11 Jul 2022	93.8	0.26	0.00	94.5	0.46	0.00
12 Jul 2022	94.0	0.32	0.00	92.1	0.34	0.00
13 Jul 2022	94.5	0.36	0.00	94.9	0.42	0.00
14 Jul 2022	94.5	0.30	0.00	94.9	0.32	0.00
15 Jul 2022	94.1	0.28	0.00	94.6	0.35	0.00
18 Jul 2022	94.6	0.30	1.75	95.3	0.27	2.50
19 Jul 2022	94.0	0.30	0.00	95.2	0.41	0.25
20 Jul 2022	94.5	0.28	0.00	94.9	0.28	0.28
21 Jul 2022	94.3	0.40	0.00	95.5	0.45	0.00
22 Jul 2022	94.7	0.47	0.00	95.0	0.57	0.00
25 Jul 2022	94.4	0.26	0.00	94.9	0.28	0.00
26 Jul 2022	94.8	0.28	0.00	95.1	0.33	0.00
27 Jul 2022	94.8	0.32	0.00	95.4	0.26	0.00
28 Jul 2022	94.4	0.46	0.00	94.6	0.31	0.00
29 Jul 2022	94.2	0.31	0.00	94.9	0.25	0.00
02 Aug 2022	94.7	0.29	0.00	94.9	0.27	0.00
03 Aug 2022	95.2	0.26	0.00	95.3	0.24	0.00
04 Aug 2022	91.6	0.37	0.00	93.8	0.24	0.00
05 Aug 2022	93.9	0.21	0.25	95.6	0.20	0.25
08 Aug 2022	95.1	0.20	0.00	96.0	0.28	0.00
09 Aug 2022	95.3	0.37	0.00	96.4	0.39	0.00
10 Aug 2022	94.3	0.31	0.00	95.4	0.21	0.00
11 Aug 2022	94.8	0.32	0.00	96.2	0.30	0.25
12 Aug 2022	95.0	0.40	0.00	95.9	0.21	0.00

2022 UV transmittance (under 89% flagged), manual-measure NTU, rainfall						
Date	Harvey			Magnesia		
	UVT (%)	NTU	24 h rain (mm)	UVT (%)	NTU	24 h rain (mm)
15 Aug 2022	95.1	0.25	0.00	96.4	0.22	0.00
16 Aug 2022	95.1	0.27	0.00	96.2	0.26	0.00
17 Aug 2022	94.5	0.30	0.00	95.9	0.24	0.00
18 Aug 2022	94.7	0.29	0.00	95.9	0.37	0.00
19 Aug 2022	93.8	0.16	0.00	94.5	0.18	0.00
22 Aug 2022	94.1	0.16	0.00	94.7	0.26	0.00
23 Aug 2022	94.2	0.26	0.00	95.4	0.24	0.00
24 Aug 2022	95.3	0.39	0.00	96.3	0.33	0.00
25 Aug 2022	95.2	0.33	0.00	96.4	0.24	0.00
26 Aug 2022	95.5	0.69	0.00	96.4	0.30	0.00
29 Aug 2022	96.1	0.22	0.00	96.8	0.20	0.00
30 Aug 2022	95.0	0.29	0.00	94.9	0.30	0.00
31 Aug 2022	95.5	0.45	0.00	96.6	0.51	0.00
01 Sep 2022	95.3	0.26	0.00	96.3	0.23	0.00
02 Sep 2022	95.8	0.21	0.00	96.2	0.22	0.00
06 Sep 2022	94.9	0.27	0.00	95.6	0.26	0.00
07 Sep 2022	95.8	0.17	0.00	96.7	0.20	0.00
08 Sep 2022	96.2	0.36	0.00	97.2	0.39	0.00
09 Sep 2022	95.4	0.21	0.00	96.5	0.31	0.00
12 Sep 2022	96.1	0.25	0.00	97.0	0.18	0.00
13 Sep 2022	95.8	0.24	0.00	96.9	0.38	0.00
14 Sep 2022	95.1	0.57	0.00	96.1	0.21	0.00
15 Sep 2022	95.9	0.39	0.00	96.9	0.34	0.00
16 Sep 2022	94.3	0.16	7.00	95.6	0.22	8.75
20 Sep 2022	96.6	0.21	0.00	97.0	0.15	0.00
21 Sep 2022	97.0	0.20	0.00	96.3	1.54	0.00
22 Sep 2022	97.2	0.41	0.00	97.8	0.22	0.00
23 Sep 2022	96.1	0.21	0.00	97.2	0.30	0.00
26 Sep 2022	95.5	0.28	0.00	96.6	0.22	0.00
27 Sep 2022	96.4	0.33	0.00	97.1	0.27	0.00
28 Sep 2022	96.1	0.32	0.00	96.9	0.28	0.00
29 Sep 2022	94.6	0.52	0.50	96.2	0.37	1.50
03 Oct 2022	94.3	0.28	0.00	95.1	0.22	0.00
04 Oct 2022	94.8	0.39	0.00	96.0	0.26	0.00
05 Oct 2022	95.8	0.36	0.00	96.4	0.34	0.00
06 Oct 2022	96.2	0.35	0.00	96.5	0.38	0.00
07 Oct 2022	95.8	0.46	0.00	96.8	0.32	0.00
11 Oct 2022	95.7	0.26	0.00	96.8	0.22	0.00
12 Oct 2022	96.1	0.36	0.00	97.1	0.35	0.00
13 Oct 2022	96.5	0.28	0.00	97.3	0.23	0.00
14 Oct 2022	96.6	0.21	0.00	97.1	0.26	0.00
17 Oct 2022	95.7	0.26	0.00	96.6	0.21	0.00
18 Oct 2022	96.1	0.44	0.00	95.5	1.54	0.00
19 Oct 2022	96.7	0.21	0.00	97.6	0.23	0.00
20 Oct 2022	95.6	0.26	0.00	96.4	0.30	0.00
21 Oct 2022	95.6	0.25	0.00	96.4	0.30	0.00
24 Oct 2022	84.8	0.35	15.50	93.4	0.35	15.50
25 Oct 2022	91.1	0.51	3.25	92.8	0.57	2.25
26 Oct 2022	85.6	0.52	38.75	93.1	0.57	29.50
27 Oct 2022	88.8	0.35	4.50	95.2	0.31	5.25
28 Oct 2022	91.1	0.95	29.75	91.5	0.56	33.75
31 Oct 2022	89.5	0.87	44.75	91.3	0.82	41.75

2022 UV transmittance (under 89% flagged), manual-measure NTU, rainfall						
Date	Harvey			Magnesia		
	UVT (%)	NTU	24 h rain (mm)	UVT (%)	NTU	24 h rain (mm)
01 Nov 2022	92.2	0.68	2.25	93.1	1.17	2.25
02 Nov 2022	93.5	0.31	0.00	95.2	0.64	0.00
03 Nov 2022	94.1	0.28	0.00	95.7	0.53	0.00
04 Nov 2022	81.1	0.47	25.25	92.0	0.30	29.25
07 Nov 2022	92.0	0.34	20.75	95.2	0.32	17.75
08 Nov 2022	92.9	0.41	3.50	95.8	0.58	0.00
09 Nov 2022	93.5	0.31	1.00	96.3	0.38	1.25
10 Nov 2022	93.2	0.34	N/A	95.7	0.26	N/A
14 Nov 2022	93.0	0.39	0.00	96.1	0.54	0.00
15 Nov 2022	91.9	0.36	0.00	96.3	0.23	0.00
16 Nov 2022	92.7	0.25	0.00	95.9	0.30	0.00
17 Nov 2022	92.6	0.32	0.00	96.4	0.25	0.00
18 Nov 2022	93.5	0.31	0.00	93.5	0.51	0.00
21 Nov 2022	93.7	0.38	0.00	96.2	0.51	0.00
22 Nov 2022	93.7	0.46	0.75	96.4	0.27	1.25
23 Nov 2022	88.5	0.33	8.75	94.2	0.33	0.33
24 Nov 2022	90.1	0.36	0.00	94.6	0.32	0.32
25 Nov 2022	82.9	0.38	12.00	91.7	0.26	0.26
28 Nov 2022	92.0	0.54	0.50	94.4	0.64	0.50
29 Nov 2022	93.4	0.57	0.00	95.9	0.72	0.72
30 Nov 2022	93.2	0.27	15.50	95.2	0.23	N/A
01 Dec 2022	93.9	0.32	5.75	96.4	0.26	1.25
02 Dec 2022	94.1	0.61	0.00	96.6	0.23	0.00
05 Dec 2022	94.9	0.24	0.00	97.2	0.47	0.25
06 Dec 2022	94.1	0.48	0.00	96.9	0.38	0.38
07 Dec 2022	95.2	0.56	0.00	96.7	0.30	5.25
08 Dec 2022	85.5	0.72	22.00	94.3	0.36	19.75
09 Dec 2022	89.8	0.37	0.25	95.1	0.34	0.75
12 Dec 2022	89.1	0.40	0.00	95.3	0.23	0.00
13 Dec 2022	90.9	0.46	0.00	96.2	0.43	0.00
14 Dec 2022	92.1	0.36	0.25	96.2	0.44	0.75
15 Dec 2022	92.1	0.37	0.00	92.3	0.36	0.00
16 Dec 2022	92.9	0.65	0.00	96.6	0.37	0.00
19 Dec 2022	94.0	0.55	0.00	97.1	0.36	0.00
20 Dec 2022	94.0	0.48	0.00	97.4	0.27	0.00
21 Dec 2022	94.2	0.24	1.50	96.2	0.16	0.00
22 Dec 2022	94.0	0.36	0.00	96.5	0.32	0.00
26 Dec 2022	82.4	1.74	111.00	N/A	N/A	79.00
28 Dec 2022	88.5	0.60	60.50	87.0	3.44	53.00
29 Dec 2022	89.6	0.59	6.00	91.8	1.34	3.50
30 Dec 2022	84.0	0.96	34.50	91.6	0.83	23.00
MIN	81.1	0.1		85.3	0.1	
MAX	97.2	1.7		97.8	3.4	
MED	93.2	0.3		95.1	0.3	
AVG	91.7	0.3		94.7	0.4	

APPENDIX: TREATED WATER: TURBIDITY, CHLORINE RESIDUAL

2022	HARVEY PLANT										MAGNESIA PLANT					
	HARVEY TANK		PRV-3		STORE/CAFÉ		LIONS BAY AVE.		KELVIN GROVE		MAGNESIA TANK		PRV-5		BRUNSWICK B.	
	Turbidity /NTU	Cl_2 Residual/mg/ℓ	Turbidity/ NTU	Cl_2 Residual/ mg/ℓ	Turbidity/ NTU	Cl_2 Residual/ mg/ℓ	Turbidity/ NTU	Cl_2 Residual/ mg/ℓ	Turbidity/ NTU	Cl_2 Residual/ mg/ℓ	Turbidity/ NTU	Cl_2 Residual/ mg/ℓ	Turbidity/ NTU	Cl_2 Residual/ mg/ℓ	Turbidity/ NTU	Cl_2 Residual/ mg/ℓ
04 Jan	0.38	0.94	0.29	0.87	0.53	0.86	0.21	0.75	0.26	0.81	0.33	0.71	0.27	0.84	0.36	0.73
05 Jan	0.33	0.93	0.26	0.93	0.26	0.71	0.21	0.79	0.21	0.88	0.30	0.83	0.32	0.90	0.28	0.78
06 Jan	0.85	0.95	0.24	0.93	0.40	0.71	0.27	0.83	0.19	0.81	0.29	0.69	0.20	0.87	0.36	0.80
07 Jan	0.49	0.85	0.28	0.83	0.29	0.71	0.18	0.81	0.26	0.76	N/A	N/A	0.26	0.83	0.31	0.75
10 Jan	0.79	0.91	0.28	0.90	0.33	0.70	0.29	0.74	0.25	0.87	0.32	0.65	0.24	0.93	0.23	0.65
11 Jan	0.38	0.82	0.41	0.81	0.55	0.60	0.66	0.75	0.30	0.76	0.53	0.64	0.32	0.74	0.22	0.69
13 Jan	0.57	0.93	0.57	0.95	0.50	0.64	0.36	0.63	0.47	0.42	0.58	0.55	0.50	0.78	0.37	0.55
14 Jan	0.44	1.02	0.43	1.00	0.39	0.81	0.53	0.65	0.45	0.58	0.54	0.46	0.33	0.91	0.28	0.58
17 Jan	0.71	0.94	0.33	0.88	0.27	0.74	0.21	0.94	0.38	0.73	0.47	0.58	0.18	0.87	0.18	0.70
18 Jan	0.40	0.89	0.20	0.84	0.19	0.67	0.15	0.71	0.17	0.70	0.37	0.57	0.37	0.81	0.17	0.65
19 Jan	0.37	0.93	0.20	0.88	0.29	0.67	0.44	0.69	0.16	0.62	0.36	0.51	0.16	0.79	0.16	0.66
20 Jan	0.23	0.84	0.18	0.82	0.22	0.65	0.26	0.66	0.38	0.55	0.37	0.49	0.30	0.81	0.18	0.64
21 Jan	0.23	0.88	0.20	0.81	0.21	0.60	0.14	0.64	0.14	0.49	0.33	0.48	0.17	0.68	0.18	0.63
24 Jan	0.25	0.90	0.17	0.83	0.35	0.66	0.14	0.67	0.14	0.27	0.28	0.38	0.15	0.64	0.18	0.67
25 Jan	0.16	0.92	0.17	0.84	0.20	0.63	0.14	0.63	0.14	0.59	0.28	0.65	0.18	0.82	0.29	0.64
26 Jan	0.17	0.91	0.27	0.89	0.18	0.59	0.16	0.77	0.31	0.62	0.21	0.58	0.14	0.81	0.16	0.63
27 Jan	0.17	0.91	0.16	0.85	0.24	0.69	0.17	0.67	0.21	0.52	0.22	0.57	0.24	0.83	0.69	0.67
28 Jan	0.19	0.87	0.18	0.84	0.17	0.66	0.17	0.69	0.12	0.74	0.25	0.94	0.30	0.84	0.42	0.64
31 Jan	0.21	0.88	0.54	0.78	0.31	0.65	0.15	0.85	0.13	0.55	0.20	0.83	0.14	0.77	0.13	0.71
01 Feb	0.19	0.92	0.15	0.89	0.23	0.66	0.13	0.62	0.15	0.68	0.50	0.82	0.14	0.87	0.24	0.56
02 Feb	0.22	0.90	0.15	0.85	0.15	0.71	0.14	0.59	0.27	0.74	0.33	0.79	0.15	0.83	0.14	0.79
03 Feb	0.20	0.92	0.14	0.89	0.19	0.69	0.13	0.62	0.12	0.66	0.19	0.75	0.13	0.83	0.17	0.64
04 Feb	0.19	0.89	0.14	0.89	0.19	0.73	0.22	0.82	0.30	0.67	0.22	0.75	0.30	0.85	0.13	0.67
07 Feb	0.20	0.93	0.37	0.88	0.19	0.74	0.11	0.67	0.11	0.49	0.16	0.74	0.37	0.86	0.16	0.75
08 Feb	0.17	0.90	0.18	0.86	0.42	0.70	0.38	0.71	0.13	0.62	0.16	0.74	0.11	0.84	0.13	0.66
09 Feb	0.25	0.91	0.15	0.89	0.24	0.74	0.11	0.67	0.28	0.52	0.17	0.70	0.45	0.84	0.15	0.67
10 Feb	0.27	0.93	0.22	0.90	0.19	0.77	0.14	0.67	0.23	0.62	0.20	0.70	0.37	0.86	0.15	0.66
11 Feb	0.15	0.93	0.27	0.91	0.23	0.71	0.15	0.70	0.20	0.62	0.15	0.71	0.11	0.89	0.14	0.70
14 Feb	0.19	0.90	0.22	0.88	0.16	0.67	0.18	0.71	0.12	0.55	0.16	0.74	0.34	0.85	0.26	0.71
15 Feb	0.20	0.89	0.28	0.87	0.18	0.86	0.14	0.67	0.11	0.65	0.15	0.74	0.19	0.81	0.17	0.67
16 Feb	0.18	0.89	0.14	0.86	0.16	0.74	0.24	0.64	0.26	0.49	0.14	0.67	0.13	0.79	0.14	0.63
17 Feb	0.15	0.88	0.15	0.88	0.25	0.75	0.31	0.64	0.14	0.58	0.19	0.69	0.12	0.83	0.38	0.69
18 Feb	0.18	0.90	0.23	0.89	0.23	0.73	0.13	0.68	0.18	0.51	0.14	0.69	0.12	0.83	0.14	0.69
22 Feb	0.14	0.93	0.22	0.94	0.25	0.73	0.11	0.78	0.40	0.31	0.15	0.68	0.12	0.92	0.11	0.74
23 Feb	0.16	0.90	0.19	0.88	0.22	0.71	0.15	0.91	0.31	0.73	0.28	0.70	0.12	0.89	0.13	0.76
24 Feb	0.14	0.92	0.16	0.85	0.20	0.76	0.13	0.75	0.14	0.65	0.15	0.69	0.17	0.81	0.21	0.72
25 Feb	0.13	0.89	0.15	0.88	0.26	0.67	0.17	0.78	0.13	0.66	0.17	0.76	0.26	0.86	0.17	0.71
28 Feb	0.35	0.90	0.34	0.91	0.35	0.57	0.23	0.78	0.16	0.56	0.21	0.67	0.28	0.81	0.18	0.75
01 Mar	0.38	0.89	0.26	0.87	0.28	0.73	0.23	0.55	0.30	0.40	0.17	0.64	0.22	0.87	0.28	0.51
02 Mar	0.24	0.92	0.28	0.87	0.31	0.69	0.28	0.52	0.36	0.45	0.28	0.62	0.29	0.83	0.23	0.66

2022	HARVEY PLANT										MAGNESIA PLANT					
	HARVEY TANK		PRV-3		STORE/CAFÉ		LIONS BAY AVE.		KELVIN GROVE		MAGNESIA TANK		PRV-5		BRUNSWICK B.	
	Turbidity /NTU	Cl_2 Residual/mg/ℓ	Turbidity/ NTU	Cl_2 Residual/ mg/ℓ	Turbidity/ NTU	Cl_2 Residual/ mg/ℓ	Turbidity/ NTU	Cl_2 Residual/ mg/ℓ	Turbidity/ NTU	Cl_2 Residual/ mg/ℓ	Turbidity/ NTU	Cl_2 Residual/ mg/ℓ	Turbidity/ NTU	Cl_2 Residual/ mg/ℓ	Turbidity/ NTU	Cl_2 Residual/ mg/ℓ
03 Mar	0.21	0.93	0.22	0.87	0.22	0.71	0.28	0.56	0.20	0.53	0.26	0.61	0.39	0.83	0.24	0.61
04 Mar	0.24	0.94	0.23	0.93	0.26	0.68	0.23	0.60	0.22	0.58	0.23	0.58	0.16	0.82	0.18	0.61
07 Mar	0.20	0.94	0.18	0.92	0.25	0.74	0.22	0.69	0.16	0.48	0.16	0.82	0.18	0.90	0.21	0.74
08 Mar	0.17	0.95	0.62	0.92	0.21	0.78	0.13	0.73	0.14	0.63	0.20	0.85	0.21	0.74	0.14	0.76
09 Mar	0.20	0.89	0.80	0.73	0.33	0.77	0.62	0.79	0.15	0.68	0.27	1.08	0.19	0.86	0.19	0.71
10 Mar	0.24	0.96	0.22	0.95	0.34	0.84	0.33	1.04	0.19	0.95	0.25	0.92	0.25	0.95	0.42	0.83
11 Mar	0.19	0.90	0.15	0.88	0.37	0.73	0.20	0.93	0.28	0.83	0.61	0.80	0.13	0.86	0.21	0.87
14 Mar	0.23	0.89	0.31	0.84	0.19	0.68	0.14	0.73	0.13	0.65	0.22	0.65	0.17	0.82	0.13	0.72
15 Mar	0.24	0.97	0.26	0.87	0.25	0.68	0.22	0.66	0.40	0.65	0.21	0.54	0.21	0.79	0.16	0.69
16 Mar	0.25	0.88	0.24	0.81	0.27	0.63	0.15	0.57	0.20	0.55	0.25	0.53	0.24	0.78	0.52	0.55
17 Mar	0.24	0.91	0.27	0.85	0.25	0.64	0.19	0.53	0.40	0.39	0.21	0.54	0.37	0.78	0.18	0.54
18 Mar	0.17	0.91	0.16	0.93	0.18	0.67	0.16	0.55	0.19	0.53	0.22	0.56	0.17	0.82	0.16	0.56
21 Mar	0.27	0.91	0.24	0.86	0.21	0.67	0.15	0.57	0.14	0.26	0.21	0.59	0.23	0.82	0.15	0.50
22 Mar	0.20	0.91	0.17	0.87	0.20	0.63	0.14	0.53	0.17	0.41	0.26	0.57	0.29	0.82	0.14	0.64
23 Mar	0.19	0.87	0.22	0.84	0.20	0.65	0.26	0.64	0.14	0.42	0.18	0.55	0.15	0.80	0.25	0.63
24 Mar	0.32	0.90	0.40	0.84	0.29	0.55	0.53	0.59	0.28	0.39	0.22	0.56	0.29	0.75	0.17	0.58
25 Mar	0.28	0.98	0.27	0.94	0.23	0.71	0.16	0.53	0.17	0.42	0.25	0.54	0.17	0.83	0.16	0.42
28 Mar	0.24	0.90	0.35	0.84	0.29	0.72	0.16	0.87	0.24	0.22	0.24	0.57	0.17	0.80	0.22	0.38
29 Mar	0.25	0.93	0.31	0.86	0.20	0.75	0.15	0.55	0.19	0.54	0.20	0.48	0.17	0.83	0.32	0.38
30 Mar	0.20	0.89	0.21	0.94	0.18	0.73	0.14	0.59	0.21	0.53	0.30	0.48	0.23	0.85	0.16	0.34
31 Mar	0.32	0.86	0.26	0.82	0.24	0.60	0.16	0.57	0.26	0.53	0.22	0.48	0.34	0.77	0.17	0.31
01 Apr	0.29	0.92	0.19	0.87	0.24	0.66	0.23	0.55	0.15	0.48	0.19	0.54	0.14	0.81	0.15	0.35
04 Apr	0.47	0.83	0.33	0.75	0.21	0.62	0.14	0.65	0.29	0.20	0.24	0.48	0.19	0.78	0.26	0.26
05 Apr	0.34	0.94	0.23	0.87	0.28	0.67	0.15	0.64	0.16	0.45	0.25	0.45	0.28	0.82	0.23	0.28
06 Apr	0.20	0.89	0.26	0.89	0.21	0.57	0.20	0.49	0.32	0.37	0.17	0.41	0.16	0.78	0.25	0.40
07 Apr	0.56	0.90	0.20	0.87	0.41	0.58	0.26	0.56	0.16	0.44	0.21	0.65	0.16	0.84	0.30	0.25
08 Apr	0.23	0.87	0.20	0.82	0.19	0.64	0.21	0.58	0.15	0.54	0.20	0.69	0.15	0.81	0.62	0.28
11 Apr	0.24	0.90	0.21	0.85	0.27	0.71	0.17	0.73	0.17	0.26	0.18	0.63	0.23	0.90	0.23	0.69
12 Apr	0.18	0.88	0.14	0.85	0.28	0.71	0.13	0.69	0.28	0.48	0.25	0.64	0.17	0.81	0.14	0.66
13 Apr	0.17	0.94	0.17	0.90	0.21	0.66	0.15	0.60	0.16	0.50	0.18	0.59	0.18	0.84	0.31	0.65
14 Apr	0.19	0.94	0.17	0.91	0.46	0.76	0.20	0.64	0.16	0.78	0.23	0.59	0.19	0.88	0.14	0.68
18 Apr	0.19	0.94	0.17	0.92	N/A	N/A	0.19	0.89	0.18	0.56	0.19	0.61	0.12	0.83	0.14	0.71
19 Apr	0.38	0.96	0.27	0.87	0.30	0.66	0.14	0.70	0.15	0.39	0.21	0.60	0.17	0.78	0.25	0.68
20 Apr	0.30	1.01	0.25	0.91	0.31	0.74	0.13	0.70	0.16	0.50	0.22	0.56	0.14	0.91	0.30	0.68
21 Apr	0.19	0.84	0.26	0.82	0.18	0.68	0.19	0.58	0.18	0.50	0.18	0.54	0.29	0.79	0.14	0.65
22 Apr	0.23	0.95	0.18	0.88	0.17	0.64	0.14	0.61	0.14	0.46	0.19	0.52	0.25	0.85	0.34	0.59
25 Apr	0.23	0.88	0.27	0.82	0.20	0.68	0.17	0.60	0.19	0.70	0.19	0.50	0.13	0.83	0.13	0.65
26 Apr	0.22	0.98	0.21	0.90	0.24	0.72	0.15	0.59	0.16	0.60	0.18	0.49	0.17	0.92	0.23	0.67
27 Apr	0.27	0.87	0.16	0.81	0.45	0.74	0.19	0.55	0.17	0.51	0.25	0.55	0.15	0.78	0.17	0.56
28 Apr	0.19	0.93	0.23	0.86	0.18	0.69	0.17	0.56	0.38	0.43	0.21	0.50	0.30	0.81	0.23	0.61
29 Apr	0.23	0.91	0.20	0.92	0.25	0.68	0.14	0.55	0.15	0.42	0.17	0.56	0.14	0.84	0.18	0.60
02 May	0.27	0.93	0.29	0.88	0.35	0.71	0.15	0.61	0.29	0.74	0.22	0.50	0.17	0.84	0.29	0.56
03 May	0.25	0.90	0.22	0.82	0.24	0.67	0.26	0.58	0.16	0.57	0.49	0.52	0.28	0.79	0.16	0.64

2022	HARVEY PLANT										MAGNESIA PLANT					
	HARVEY TANK		PRV-3		STORE/CAFÉ		LIONS BAY AVE.		KELVIN GROVE		MAGNESIA TANK		PRV-5		BRUNSWICK B.	
	Turbidity /NTU	Cl_2 Residual/mg/ℓ	Turbidity/ NTU	Cl_2 Residual/ mg/ℓ	Turbidity/ NTU	Cl_2 Residual/ mg/ℓ	Turbidity/ NTU	Cl_2 Residual/ mg/ℓ	Turbidity/ NTU	Cl_2 Residual/ mg/ℓ	Turbidity/ NTU	Cl_2 Residual/ mg/ℓ	Turbidity/ NTU	Cl_2 Residual/ mg/ℓ	Turbidity/ NTU	Cl_2 Residual/ mg/ℓ
04 May	0.22	0.92	0.20	0.85	0.20	0.69	0.28	0.58	0.30	0.48	0.30	0.88	0.17	0.79	0.22	0.62
05 May	0.26	0.93	0.36	0.89	0.19	0.68	0.18	0.55	0.18	0.42	0.26	1.07	0.17	0.81	0.16	0.61
06 May	0.35	0.84	0.69	0.76	0.20	0.54	0.19	0.61	0.18	0.57	0.26	0.84	0.23	0.80	0.29	0.64
09 May	0.25	0.84	0.30	0.77	0.21	0.59	0.37	0.47	0.23	0.70	0.30	0.89	0.21	0.61	0.62	0.65
10 May	0.22	0.89	0.32	0.81	0.29	0.65	0.28	0.54	0.26	0.47	0.35	0.74	0.28	0.61	0.33	0.72
11 May	0.24	0.77	N/A	N/A	N/A	N/A	0.18	0.52	0.33	0.47	0.35	0.84	N/A	N/A	0.29	0.62
12 May	0.28	0.92	0.21	0.83	0.24	0.65	0.18	0.56	0.24	0.37	0.22	0.91	0.28	0.79	0.23	0.70
13 May	0.26	0.81	0.27	0.73	0.30	0.48	0.16	0.47	0.15	0.45	0.28	0.85	0.23	0.79	0.21	0.75
16 May	0.46	0.86	0.48	0.73	0.50	0.52	0.24	0.45	0.26	0.62	0.34	0.81	0.24	0.78	0.31	0.68
17 May	0.30	0.89	0.36	0.74	0.35	0.59	0.23	0.45	0.39	0.38	0.71	0.81	0.55	0.79	0.25	0.70
18 May	0.52	0.88	0.33	0.79	0.36	0.61	0.27	0.46	0.24	0.27	0.54	0.75	0.50	0.67	0.46	0.69
19 May	0.35	0.86	0.29	0.74	0.26	0.62	0.28	0.61	0.26	0.29	0.41	0.88	0.34	0.71	0.48	0.57
20 May	0.23	0.86	0.21	0.79	0.24	0.62	0.30	0.42	0.21	0.65	0.33	0.94	0.36	0.88	0.35	0.68
24 May	0.26	0.83	0.29	0.73	0.24	0.67	0.19	0.47	0.24	0.37	0.24	0.92	0.24	0.98	0.54	0.79
25 May	0.25	0.90	0.21	0.80	0.22	0.62	0.18	0.43	0.20	0.35	0.23	0.81	0.21	0.75	0.22	0.75
26 May	0.25	0.82	0.21	0.74	0.30	0.59	0.53	0.41	0.27	0.36	0.30	0.84	0.31	0.74	0.28	0.67
27 May	0.39	0.81	0.53	0.73	0.33	0.64	0.26	0.40	0.22	0.31	0.28	0.89	0.44	0.80	0.23	0.68
30 May	1.17	0.86	0.47	0.81	0.31	0.75	0.29	0.33	0.26	0.70	0.39	0.81	0.41	0.76	0.32	0.67
31 May	0.38	0.88	0.22	0.79	0.28	0.67	0.38	0.51	0.21	0.43	0.31	0.92	0.29	0.82	0.32	0.65
01 Jun	0.45	0.81	0.32	0.72	0.23	0.63	0.20	0.41	0.23	0.34	0.34	0.88	0.28	0.82	0.32	0.73
02 Jun	0.32	0.87	0.29	0.75	0.28	0.60	0.18	0.32	0.19	0.28	0.34	0.77	0.29	0.72	0.33	0.68
03 Jun	0.32	0.88	0.34	0.75	0.38	0.65	0.19	0.32	0.20	0.27	0.37	0.84	0.41	0.78	0.31	0.61
06 Jun	0.89	0.97	0.77	0.83	0.76	0.69	0.24	0.26	0.58	0.83	0.96	0.70	0.63	0.76	0.64	0.56
07 Jun	1.52	0.88	0.70	0.78	0.50	0.60	1.05	0.35	0.53	0.34	0.97	0.58	0.42	0.75	0.47	0.46
08 Jun	0.51	0.85	0.46	0.77	0.37	0.64	0.41	0.58	0.36	0.22	0.97	0.56	0.32	0.67	0.63	0.52
09 Jun	0.38	0.98	0.36	0.87	0.33	0.78	0.27	0.59	0.29	0.20	0.92	0.87	0.35	0.76	0.31	0.48
10 Jun	0.47	0.89	0.48	0.81	0.45	0.63	0.29	0.68	0.33	0.23	0.93	0.86	0.38	0.75	0.37	0.66
13 Jun	1.13	0.89	0.67	0.78	0.40	0.62	0.51	0.75	0.30	0.75	1.05	0.76	0.34	0.75	0.31	0.59
14 Jun	0.33	0.95	0.34	0.87	0.24	0.66	0.26	0.65	0.25	0.38	0.80	0.86	0.24	0.75	0.23	0.53
15 Jun	0.30	0.94	0.38	0.88	0.33	0.69	0.26	0.78	0.34	0.49	0.79	0.97	0.31	0.78	0.28	0.59
16 Jun	0.32	0.86	0.33	0.80	0.39	0.65	0.23	0.83	0.26	0.40	0.70	1.01	0.26	0.75	0.23	0.65
17 Jun	0.32	0.90	0.30	0.84	0.25	0.69	0.20	0.69	0.32	0.35	0.57	1.02	0.23	0.78	0.28	0.57
20 Jun	0.26	0.87	0.43	0.81	0.29	0.70	0.19	0.78	0.21	0.73	0.46	0.86	0.20	0.65	0.25	0.61
21 Jun	0.24	0.93	0.25	0.84	0.24	0.74	0.22	0.67	0.20	0.41	0.35	0.83	0.45	0.80	0.21	0.63
22 Jun	0.27	0.86	0.45	0.79	0.26	0.69	0.18	0.71	0.19	0.32	0.41	0.85	0.52	0.77	0.18	0.62
23 Jun	0.24	0.82	0.21	0.77	0.31	0.68	0.32	0.72	0.18	0.43	0.35	0.84	0.18	0.70	0.17	0.56
24 Jun	0.24	0.88	0.26	0.76	0.20	0.69	0.19	0.66	0.18	0.86	0.37	0.91	0.33	0.77	0.28	0.48
27 Jun	0.34	0.98	0.27	0.88	0.24	0.79	0.22	0.70	0.23	0.73	0.39	0.81	0.32	0.66	0.36	0.70
28 Jun	0.44	0.85	0.24	0.79	0.21	0.68	0.23	0.69	0.20	0.43	0.57	0.97	0.35	0.77	0.39	0.74
29 Jun	0.36	0.86	0.29	0.81	0.26	0.63	0.20	0.58	0.21	0.34	0.56	0.92	0.69	0.74	0.56	0.77
30 Jun	0.33	0.90	0.29	0.86	0.23	0.80	0.20	0.64	0.20	0.28	0.76	0.89	0.44	0.75	0.46	0.72
04 Jul	0.82	0.86	0.78	0.78	0.30	0.65	0.19	0.64	0.22	0.75	0.38	0.86	0.29	0.71	0.34	0.63
05 Jul	0.41	0.86	0.38	0.78	0.43	0.65	0.39	0.61	0.20	0.41	0.30	0.86	0.29	0.69	0.28	0.60

2022	HARVEY PLANT										MAGNESIA PLANT					
	HARVEY TANK		PRV-3		STORE/CAFÉ		LIONS BAY AVE.		KELVIN GROVE		MAGNESIA TANK		PRV-5		BRUNSWICK B.	
	Turbidity /NTU	Cl_2 Residual/mg/ℓ	Turbidity/ NTU	Cl_2 Residual/ mg/ℓ	Turbidity/ NTU	Cl_2 Residual/ mg/ℓ	Turbidity/ NTU	Cl_2 Residual/ mg/ℓ	Turbidity/ NTU	Cl_2 Residual/ mg/ℓ	Turbidity/ NTU	Cl_2 Residual/ mg/ℓ	Turbidity/ NTU	Cl_2 Residual/ mg/ℓ	Turbidity/ NTU	Cl_2 Residual/ mg/ℓ
06 Jul	0.23	0.88	0.25	0.82	0.22	0.71	0.20	0.65	0.19	0.30	0.31	0.83	0.30	0.69	0.35	0.68
07 Jul	0.20	0.88	0.19	0.76	0.19	0.69	0.17	0.63	0.17	0.45	0.38	0.83	0.24	0.71	0.32	0.51
08 Jul	0.22	0.82	0.20	0.68	0.28	0.71	0.23	0.63	0.19	0.33	0.36	0.92	0.29	0.69	0.26	0.58
11 Jul	0.21	0.75	0.25	0.67	0.23	0.58	0.20	0.65	0.28	0.32	0.39	0.75	0.32	0.65	0.63	0.56
12 Jul	0.25	0.92	0.32	0.89	0.26	0.76	0.38	0.60	0.37	0.67	0.38	0.72	0.39	0.68	0.43	0.56
13 Jul	0.57	0.96	0.35	0.87	0.25	0.82	0.32	0.78	0.20	0.56	0.37	0.79	0.29	0.60	0.30	0.56
14 Jul	0.33	0.86	0.27	0.81	0.31	0.69	0.18	0.75	0.19	0.58	0.29	0.90	0.22	0.70	0.30	0.69
15 Jul	0.57	0.82	0.31	0.77	0.20	0.65	0.23	0.67	0.18	0.50	0.30	0.87	0.44	0.76	0.34	0.76
18 Jul	0.34	0.88	0.21	0.79	0.22	0.68	0.19	0.65	0.24	0.74	0.26	0.85	0.28	0.73	0.43	0.69
19 Jul	0.50	0.85	0.25	0.81	0.24	0.64	0.31	0.72	0.30	0.46	0.27	0.84	0.21	0.73	0.29	0.68
20 Jul	0.44	0.88	0.30	0.85	0.27	0.73	0.24	0.73	0.24	0.79	0.51	0.96	0.42	0.98	0.29	0.71
21 Jul	0.48	0.81	0.27	0.77	0.21	0.70	0.35	0.72	0.30	0.52	0.26	0.84	0.28	0.72	0.33	0.64
22 Jul	0.92	0.86	0.73	0.79	0.61	0.64	0.34	0.63	0.22	0.39	0.81	0.90	0.34	0.81	0.44	0.59
25 Jul	0.24	0.86	0.23	0.81	0.21	0.72	0.20	0.77	0.17	0.77	0.22	0.80	0.18	0.70	0.24	0.68
26 Jul	0.55	0.86	0.20	0.82	0.20	0.72	0.16	0.71	0.18	0.52	0.30	0.90	0.32	0.79	0.25	0.61
27 Jul	0.39	0.89	0.22	0.80	0.33	0.72	0.25	0.70	0.23	0.61	0.34	0.96	0.27	0.87	0.36	0.77
28 Jul	0.50	0.85	0.28	0.78	0.24	0.68	0.28	0.72	0.20	0.48	0.30	0.89	0.73	0.82	0.44	0.77
29 Jul	0.60	0.90	0.33	0.77	0.35	0.74	0.29	0.68	0.25	0.55	0.39	0.73	0.22	0.66	0.31	0.65
02 Aug	0.27	0.88	0.27	0.79	0.19	0.72	0.15	0.73	0.18	0.80	0.24	0.86	0.19	0.75	0.23	0.73
03 Aug	0.22	0.86	0.19	0.69	0.18	0.62	0.17	0.68	0.17	0.53	0.17	0.88	0.20	0.73	0.21	0.70
04 Aug	0.23	0.83	0.20	0.77	0.20	0.69	0.18	0.66	0.17	0.53	0.22	0.84	0.19	0.72	0.26	0.61
05 Aug	0.25	0.91	0.19	0.86	0.21	0.73	0.21	0.57	0.19	0.39	0.33	0.91	0.25	0.75	0.23	0.61
08 Aug	0.26	0.86	0.23	0.78	0.26	0.70	0.16	0.71	0.14	0.75	0.16	0.82	0.16	0.74	0.17	0.66
09 Aug	0.51	0.85	0.40	0.73	0.33	0.68	0.40	0.68	0.38	0.51	0.33	0.91	0.34	0.80	0.45	0.73
10 Aug	0.44	0.83	0.39	0.74	0.38	0.66	0.22	0.68	0.31	0.42	0.39	0.89	0.33	0.84	0.24	0.79
11 Aug	0.21	0.86	0.19	0.80	0.43	0.70	0.23	0.65	0.30	0.34	0.28	0.85	0.55	0.76	0.37	0.71
12 Aug	0.39	0.91	0.20	0.82	0.17	0.74	0.23	0.80	0.19	0.54	0.23	0.87	0.27	0.81	0.26	0.70
15 Aug	0.35	0.88	0.33	0.79	0.20	0.72	0.16	0.69	0.18	0.58	0.24	0.96	0.20	0.77	0.35	0.73
16 Aug	0.23	0.86	0.21	0.79	0.33	0.58	0.23	0.70	0.21	0.49	0.22	0.95	0.25	0.70	0.33	0.66
17 Aug	0.24	0.86	0.18	0.79	0.22	0.73	0.18	0.72	0.36	0.42	0.22	0.82	0.24	0.79	0.26	0.78
18 Aug	0.30	0.83	0.43	0.75	0.28	0.70	0.19	0.67	0.19	0.34	0.27	0.87	0.31	0.76	0.36	0.68
19 Aug	0.29	0.87	0.27	0.75	0.34	0.80	0.17	0.66	0.24	0.51	0.29	0.91	0.24	0.81	0.34	0.82
22 Aug	0.21	0.84	0.24	0.73	0.17	0.68	0.15	0.66	0.22	0.57	0.26	0.85	0.18	0.69	0.23	0.65
23 Aug	0.25	0.83	0.61	0.73	0.23	0.65	0.28	0.66	0.19	0.40	0.25	0.87	0.22	0.65	0.27	0.64
24 Aug	0.27	0.87	0.18	0.81	0.37	0.73	0.17	0.71	0.16	0.41	0.23	0.91	0.28	0.79	0.27	0.72
25 Aug	0.38	0.89	0.24	0.81	0.21	0.74	0.19	0.71	0.22	0.53	0.35	0.83	0.22	0.78	0.23	0.73
26 Aug	0.21	0.86	0.20	0.81	0.20	0.70	0.18	0.71	0.21	0.41	0.22	0.83	0.26	0.75	0.38	0.66
29 Aug	0.17	0.88	0.16	0.80	0.17	0.75	0.15	0.73	0.15	0.78	0.26	0.88	0.19	0.74	0.22	0.68
30 Aug	0.35	0.77	0.28	0.68	0.19	0.60	0.25	0.63	0.27	0.77	0.31	0.83	0.21	0.66	0.38	0.63
31 Aug	0.84	0.87	0.22	0.82	0.25	0.69	0.21	0.71	0.34	0.47	0.37	0.94	0.40	0.77	0.33	0.71
01 Sep	0.39	0.86	0.26	0.79	0.33	0.72	0.15	0.69	0.20	0.39	0.37	0.85	0.38	0.77	0.36	0.74
02 Sep	0.20	0.89	0.21	0.84	0.19	0.76	0.18	0.69	0.38	0.43	0.31	0.81	0.25	0.73	0.29	0.68
06 Sep	0.20	0.88	0.18	0.80	0.24	0.72	0.16	0.67	0.14	0.77	0.23	0.88	0.18	0.76	0.21	0.68

2022	HARVEY PLANT										MAGNESIA PLANT					
	HARVEY TANK		PRV-3		STORE/CAFÉ		LIONS BAY AVE.		KELVIN GROVE		MAGNESIA TANK		PRV-5		BRUNSWICK B.	
	Turbidity /NTU	Cl_2 Residual/mg/ℓ	Turbidity/ NTU	Cl_2 Residual/ mg/ℓ	Turbidity/ NTU	Cl_2 Residual/ mg/ℓ	Turbidity/ NTU	Cl_2 Residual/ mg/ℓ	Turbidity/ NTU	Cl_2 Residual/ mg/ℓ	Turbidity/ NTU	Cl_2 Residual/ mg/ℓ	Turbidity/ NTU	Cl_2 Residual/ mg/ℓ	Turbidity/ NTU	Cl_2 Residual/ mg/ℓ
07 Sep	0.16	0.89	0.18	0.80	0.16	0.71	0.17	0.74	0.29	0.52	0.23	0.91	0.21	0.83	0.19	0.71
08 Sep	0.27	0.86	0.26	0.78	0.43	0.68	0.32	0.70	0.21	0.42	0.21	0.84	0.20	0.79	0.30	0.74
09 Sep	0.20	0.86	0.20	0.81	0.29	0.74	0.15	0.69	0.17	0.46	0.34	0.87	0.32	0.74	0.24	0.70
12 Sep	0.28	0.86	0.28	0.79	0.22	0.72	0.20	0.72	0.17	0.46	0.22	0.87	0.22	0.80	0.23	0.67
13 Sep	0.21	0.86	0.20	0.83	0.19	0.70	0.19	0.66	0.19	0.63	0.32	0.82	0.30	0.75	0.24	0.64
14 Sep	0.21	0.86	0.16	0.79	0.18	0.71	0.15	0.71	0.20	0.45	0.22	0.93	0.39	0.81	0.34	0.55
15 Sep	0.18	0.86	0.17	0.80	0.20	0.72	0.19	0.68	0.40	0.39	0.29	0.87	0.20	0.81	0.24	0.69
16 Sep	0.24	0.88	0.22	0.80	0.24	0.67	0.20	0.64	0.20	0.45	0.20	0.78	0.16	0.73	0.35	0.60
20 Sep	0.18	0.88	0.15	0.81	0.20	0.72	0.14	0.72	0.18	0.37	0.14	0.86	0.20	0.79	0.25	0.62
21 Sep	0.21	0.90	0.24	0.83	0.25	0.72	0.22	0.71	0.25	0.52	0.30	0.94	0.24	0.83	0.30	0.66
22 Sep	1.20	0.88	0.27	0.83	0.25	0.75	0.29	0.73	0.20	0.51	0.34	0.90	0.28	0.82	0.36	0.74
23 Sep	0.18	0.88	0.27	0.81	0.33	0.74	0.17	0.74	0.19	0.50	0.23	0.93	0.20	0.88	0.32	0.69
26 Sep	0.22	0.85	0.23	0.77	0.19	0.74	0.19	0.72	0.32	0.42	0.39	0.85	0.28	0.78	0.44	0.66
27 Sep	0.19	0.85	0.19	0.79	0.21	0.71	0.18	0.70	0.20	0.55	0.25	0.81	0.23	0.74	0.36	0.62
28 Sep	0.24	0.88	0.28	0.80	0.36	0.74	0.26	0.70	0.27	0.50	0.23	0.89	0.25	0.81	0.33	0.57
29 Sep	0.26	0.90	0.30	0.80	0.29	0.75	0.20	0.70	0.20	0.51	0.29	0.87	0.24	0.81	0.34	0.62
03 Oct	0.23	0.82	0.21	0.75	0.17	0.70	0.18	0.71	0.21	0.64	0.18	0.85	0.17	0.83	0.21	0.58
04 Oct	0.23	0.87	0.21	0.81	0.89	0.61	0.28	0.72	0.32	0.56	0.23	0.90	0.21	0.85	0.25	0.59
05 Oct	0.36	0.92	0.25	0.85	0.34	0.75	0.39	0.71	0.27	0.58	0.54	0.95	0.40	0.89	0.33	0.63
06 Oct	0.31	0.88	0.40	0.82	0.42	0.70	0.28	0.74	0.26	0.53	0.45	0.87	0.53	0.81	0.30	0.63
07 Oct	0.26	0.86	0.33	0.77	0.35	0.62	0.23	0.70	0.32	0.62	0.39	0.86	0.38	0.80	0.33	0.62
11 Oct	0.23	0.88	0.18	0.80	0.42	0.52	0.17	0.69	0.26	0.21	0.17	0.84	0.23	0.83	0.27	0.52
12 Oct	0.28	0.87	0.20	0.80	0.37	0.56	0.26	0.68	0.24	0.52	0.24	0.85	0.37	0.78	0.60	0.50
13 Oct	0.24	0.90	0.22	0.83	0.46	0.54	0.20	0.69	0.23	0.50	0.29	0.87	0.24	0.81	0.31	0.49
14 Oct	0.29	0.89	0.19	0.83	0.39	0.49	0.21	0.72	0.24	0.46	0.24	0.87	0.19	0.84	0.31	0.43
17 Oct	0.23	0.86	0.21	0.79	0.38	0.41	0.16	0.67	0.26	0.32	0.18	0.86	0.21	0.81	0.30	0.50
18 Oct	0.24	0.88	0.23	0.81	0.46	0.49	0.29	0.69	0.28	0.45	0.77	0.89	0.34	0.86	0.33	0.59
19 Oct	1.09	0.89	0.33	0.85	0.39	0.47	0.18	0.64	0.21	0.54	0.29	0.84	0.30	0.80	0.35	0.51
20 Oct	0.27	0.89	0.29	0.82	0.52	0.50	0.28	0.68	0.32	0.47	0.43	0.86	0.40	0.81	0.37	0.52
21 Oct	0.27	0.84	0.29	0.83	0.43	0.45	0.27	0.70	0.28	0.49	0.37	0.88	0.33	0.82	0.42	0.45
24 Oct	0.36	0.78	0.28	0.75	0.40	0.43	0.21	0.65	0.23	0.36	0.24	0.85	0.23	0.82	0.57	0.38
25 Oct	0.37	0.95	0.30	0.90	0.44	0.33	0.26	0.68	0.25	0.52	0.30	0.79	0.29	0.70	0.58	0.37
26 Oct	0.60	0.71	0.47	0.60	0.39	0.26	0.28	0.53	0.25	0.49	0.42	0.80	0.38	0.71	0.59	0.40
27 Oct	0.59	1.06	0.53	0.95	0.52	0.25	0.28	0.48	0.31	0.23	0.47	1.08	0.43	0.97	0.42	0.36
28 Oct	0.45	0.91	0.45	0.85	0.43	0.53	0.34	0.67	0.48	0.68	0.47	0.90	0.35	0.92	0.45	0.30
31 Oct	0.75	0.88	0.68	0.75	0.80	0.52	0.28	0.71	0.45	0.65	0.73	0.86	0.36	0.72	0.68	0.26
01 Nov	0.65	1.01	0.48	0.90	0.44	0.63	0.37	0.44	0.62	0.24	0.56	0.90	0.45	0.75	0.56	0.26
02 Nov	0.78	0.98	0.56	0.90	0.43	0.72	0.38	0.50	0.35	0.48	0.87	0.96	0.42	0.85	0.56	0.22
03 Nov	0.53	0.93	0.36	0.90	0.31	0.63	0.43	0.73	0.38	0.67	0.40	0.93	0.35	0.86	0.39	0.27
04 Nov	0.83	0.85	0.47	0.90	0.43	0.68	0.38	0.69	0.34	0.41	0.39	0.88	0.32	0.81	0.51	0.24
07 Nov	0.62	0.93	0.47	0.90	0.53	0.68	0.40	0.71	0.51	0.84	0.31	0.96	0.27	0.86	0.44	0.23
08 Nov	0.37	0.86	0.34	0.90	0.33	0.63	0.31	0.71	0.39	0.64	0.58	0.91	0.23	0.79	0.43	0.22
09 Nov	0.35	0.87	0.43	0.90	0.75	0.69	0.27	0.70	0.34	0.71	1.17	0.83	0.22	0.80	0.48	0.20

2022	HARVEY PLANT										MAGNESIA PLANT					
	HARVEY TANK		PRV-3		STORE/CAFÉ		LIONS BAY AVE.		KELVIN GROVE		MAGNESIA TANK		PRV-5		BRUNSWICK B.	
	Turbidity /NTU	Cl_2 Residual/mg/ℓ	Turbidity/ NTU	Cl_2 Residual/ mg/ℓ	Turbidity/ NTU	Cl_2 Residual/ mg/ℓ	Turbidity/ NTU	Cl_2 Residual/ mg/ℓ	Turbidity/ NTU	Cl_2 Residual/ mg/ℓ	Turbidity/ NTU	Cl_2 Residual/ mg/ℓ	Turbidity/ NTU	Cl_2 Residual/ mg/ℓ	Turbidity/ NTU	Cl_2 Residual/ mg/ℓ
10 Nov	0.31	0.94	0.47	0.90	0.43	0.81	0.29	0.62	0.35	0.37	0.41	0.86	0.31	0.77	0.37	0.49
14 Nov	0.60	0.87	0.27	0.90	0.75	0.71	0.18	0.65	0.19	0.74	0.41	0.89	0.40	0.82	0.55	0.60
15 Nov	0.38	0.85	0.18	0.90	0.48	0.69	0.27	0.67	0.24	0.57	0.25	0.90	0.20	0.85	0.26	0.60
16 Nov	0.28	0.89	0.31	0.90	0.40	0.73	0.55	0.67	0.19	0.47	0.38	0.87	0.22	0.83	0.31	0.62
17 Nov	0.25	0.89	0.45	0.90	0.55	0.74	0.20	0.64	0.27	0.68	0.53	0.88	0.19	0.83	0.38	0.61
18 Nov	0.39	0.87	0.26	0.90	0.55	0.85	0.22	0.71	0.24	0.71	1.03	0.87	0.24	0.81	0.75	0.62
21 Nov	0.34	0.89	0.21	0.90	0.40	0.77	0.20	0.80	0.16	0.32	0.23	0.90	0.19	0.82	0.47	0.61
22 Nov	0.50	0.87	0.59	0.90	0.69	0.71	0.20	0.78	0.27	0.37	0.40	0.84	0.45	0.81	0.67	0.66
23 Nov	0.38	0.90	0.36	0.90	0.37	0.59	0.38	0.65	0.24	0.61	0.41	0.88	0.32	0.85	0.35	0.63
24 Nov	0.29	0.94	0.57	0.90	0.33	0.66	0.42	0.57	0.30	0.43	0.37	0.89	0.36	0.86	0.34	0.61
25 Nov	0.33	0.88	0.37	0.90	0.37	0.71	0.20	0.71	0.33	0.40	0.45	0.94	0.34	0.84	0.29	0.61
28 Nov	0.54	0.97	0.28	0.90	0.51	0.74	0.16	0.72	0.15	0.84	0.29	0.82	0.30	0.72	0.33	0.57
29 Nov	0.95	0.97	0.27	0.90	0.48	0.76	0.24	0.78	0.19	0.64	0.39	0.97	0.28	0.80	0.32	0.49
30 Nov	0.92	0.93	0.77	0.90	0.47	0.78	0.47	0.83	0.28	0.83	0.22	1.00	0.28	0.92	0.26	0.53
01 Dec	0.81	0.90	0.36	0.91	0.41	0.76	0.19	0.79	0.23	0.80	0.19	0.88	0.30	0.87	0.38	0.56
02 Dec	0.48	0.90	0.36	0.86	0.87	0.77	0.34	0.73	0.25	0.85	0.62	0.86	0.60	0.84	0.27	0.67
05 Dec	0.30	0.89	0.80	0.89	0.43	0.76	0.35	0.78	0.25	0.70	0.22	0.88	0.17	0.83	0.36	0.65
06 Dec	0.71	0.88	0.34	0.88	1.54	0.75	0.26	0.76	0.26	0.58	0.60	0.86	0.30	0.80	0.48	0.67
07 Dec	0.63	0.88	0.34	0.87	0.33	0.79	0.20	0.76	0.28	0.74	0.60	0.86	0.19	0.81	0.44	0.66
08 Dec	0.82	0.83	0.34	0.83	0.59	0.76	0.24	0.75	0.22	0.83	0.57	0.87	0.25	0.83	0.39	0.62
09 Dec	0.35	0.93	0.34	0.83	0.27	0.71	0.16	0.86	0.33	0.80	0.36	0.87	0.26	0.78	0.38	0.65
12 Dec	0.37	0.87	0.28	0.82	0.87	0.66	0.24	0.54	0.32	0.49	0.34	0.83	0.29	0.71	0.61	0.55
13 Dec	0.57	0.95	0.39	0.90	0.84	0.74	0.41	0.49	0.28	0.43	0.26	1.02	0.27	0.87	0.28	0.49
14 Dec	0.38	0.98	N/A	N/A	N/A	N/A	0.26	0.66	0.31	0.36	0.40	1.05	N/A	N/A	N/A	N/A
15 Dec	0.88	0.93	0.21	0.88	0.62	0.77	0.21	0.70	0.15	0.75	0.23	0.99	0.49	0.94	0.62	0.60
16 Dec	0.39	0.89	0.27	0.86	0.80	0.85	0.19	0.70	0.31	0.63	0.32	0.88	0.29	0.88	0.73	0.75
19 Dec	0.33	0.89	0.31	0.86	0.39	0.72	0.24	0.85	0.27	0.67	0.20	0.85	0.18	0.82	0.33	0.64
20 Dec	0.57	0.89	0.32	0.83	0.93	0.73	0.31	0.74	0.21	0.65	0.35	0.84	1.47	0.77	0.36	0.62
21 Dec	0.33	0.89	0.31	0.83	0.28	0.78	N/A	N/A	0.19	0.56	0.92	0.92	0.29	0.85	N/A	N/A
22 Dec	0.34	0.98	0.28	0.95	0.35	0.78	0.32	0.74	0.31	0.49	0.25	0.91	0.27	0.89	0.50	0.65
26 Dec	0.75	1.40	1.14	1.14	N/A	N/A	0.55	0.52	0.44	0.50	N/A	N/A	0.53	0.73	0.58	0.49
28 Dec	1.57	1.08	1.07	1.08	1.11	0.79	0.62	0.72	0.59	0.88	1.60	0.79	0.87	0.95	0.88	0.69
29 Dec	2.04	0.88	0.77	0.86	0.70	0.55	0.72	0.72	0.76	0.71	2.77	1.13	0.61	0.80	0.54	0.44
30 Dec	1.22	1.02	0.65	0.90	1.25	0.70	0.58	0.62	0.50	0.54	1.63	0.81	1.28	0.73	1.00	0.50

APPENDIX: COMPARATIVE REGIONAL CONSUMPTIONS

GVWD ANNUAL AVERAGE LITRES PER CAPITA PER DAY[3]								
JURISDICTION	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**
ANMORE	323	336	392	371	391	332	355	N/A at date of report
BELCARRA	197	236	335	272	300	431	318	
BURNABY	464	445	447	440	420	402	410	
COQUITLAM	336	329	372	363	356	339	363	
DELTA	625	620	608	600	608	591	638	
LANGLEY CITY	396	389	379	371	335	341	360	
LANGLEY TOWNSHIP[4]	406	380	389	392	388	364	389	
MAPLE RIDGE[5]	390	363	373	370	355	357	369	
NEW WESTMINSTER	335	318	317	311	296	277	272	
NORTH VAN. CITY	416	436	461	425	408	387	409	
NORTH VAN. DIST.	580	575	595	602	583	541	539	
PITT MEADOWS	476	447	534	511	488	393	494	
PORT COQUITLAM	409	403	415	426	404	398	469	
PORT MOODY	389	362	377	382	378	370	354	
RICHMOND	463	460	457	456	443	404	412	
SURREY	338	341	329	327	320	309	315	
TSAWASSEN FIRST NATION	325	816	548	705	699	692	285	
UEL[6]	798	803	718	714	682	568	398	
VANCOUVER	477	459	458	454	437	427	420	
WEST VANCOUVER[7]	569	579	572	530	487	435	464	
TOTAL SYSTEM (EXCL. LIONS BAY)[8]	438	435	440	434	424	403	405	

[3] https://metrovancouver.org/services/water/Documents/water-consumption-statistics-report-2021.pdf
[4] As Township of Langley has its own secondary supply sources, the GVWD service population was used to compute per capita consumption (see Notes section).
[5] Although jurisdiction has its own secondary supply source(s), total jurisdiction population has been used to calculate per capita consumption (see Notes section).
[6] Per capita flows are high because the calculation is (UBC + UEL flow) / (UEL + a portion of UBC population).
[7] Starting with 2017 Consumption Statistics Report, GVWD service population will be used to calculate District of West Vancouver's per capita flows from 1995 and onwards.
[8] Weighted by population.

APPENDIX: BIANNUAL METALS AND CHEMISTRY RESULTS (ABRIDGED REPORT OF MARCH. 2022)

Analytical Results

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

Analyte	CAS Number	Method	LOR	Unit	Client sample ID	Harvey Raw Water After Flush	Magnesia Raw Water After Flush	----	----	----
					Client sampling date / time	29-Mar-2022 11:10	29-Mar-2022 08:40	----	----	----
						VA22A6453-009	VA22A6453-010	--------	--------	--------
						Result	Result	----	----	----
Physical Tests										
absorbance, UV (@ 254nm)	----	E404	0.0050	AU/cm		0.0460	0.0320	----	----	----
alkalinity, total (as CaCO3)	----	E290	1.0	mg/L		2.9	4.6	----	----	----
hardness (as CaCO3), from total Ca/Mg	----	EC100A	0.50	mg/L		3.51	7.53	----	----	----
pH	----	E108	0.10	pH units		6.76	6.87	----	----	----
solids, total suspended [TSS]	----	E160	3.0	mg/L		<3.0	<3.0	----	----	----
turbidity	----	E121	0.10	NTU		<0.10	<0.10	----	----	----
transmittance, UV (@ 254nm)	----	E404	1.0	% T/cm		89.9	92.9	----	----	----
Organic / Inorganic Carbon										
carbon, total organic [TOC]	----	E355-L	0.50	mg/L		1.39	1.18	----	----	----
Total Metals										
aluminum, total	7429-90-5	E420	0.0030	mg/L		0.0612	0.0377	----	----	----
antimony, total	7440-36-0	E420	0.00010	mg/L		<0.00010	<0.00010	----	----	----
arsenic, total	7440-38-2	E420	0.00010	mg/L		<0.00010	<0.00010	----	----	----
barium, total	7440-39-3	E420	0.00010	mg/L		0.00118	0.00113	----	----	----
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	0.0000129	----	----	----
calcium, total	7440-70-2	E420	0.050	mg/L		1.16	2.50	----	----	----
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		0.00104	0.00516	----	----	----
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	0.000105	----	----	----
lithium, total	7439-93-2	E420	0.0010	mg/L		<0.0010	<0.0010	----	----	----
magnesium, total	7439-95-4	E420	0.0050	mg/L		0.150	0.312	----	----	----
manganese, total	7439-96-5	E420	0.00010	mg/L		0.00033	0.00058	----	----	----
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 After Flush	Magnesia Raw Water After Flush	----	----	----
					Client sampling date / time	29-Mar-2022 11:10	29-Mar-2022 08:40	----	----	----
Analyte	CAS Number	Method	LOR	Unit		VA22A6453-009	VA22A6453-010	--------	--------	--------
						Result	Result	----	----	----
Total Metals										
molybdenum, total	7439-98-7	E420	0.000050	mg/L		0.000161	0.000131	----	----	----
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		0.074	0.061	----	----	----
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	<0.000050	----	----	----
silicon, total	7440-21-3	E420	0.10	mg/L		1.53	2.93	----	----	----
silver, total	7440-22-4	E420	0.000010	mg/L		<0.000010	<0.000010	----	----	----
sodium, total	7440-23-5	E420	0.050	mg/L		0.478	0.955	----	----	----
strontium, total	7440-24-6	E420	0.00020	mg/L		0.00386	0.0127	----	----	----
sulfur, total	7704-34-9	E420	0.50	mg/L		<0.50	1.38	----	----	----
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		0.000043	<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		<0.0030	<0.0030	----	----	----
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 After Flush	Store / Cafe After Flush	Lions Bay Ave. After Flush	Kelvin Grove After Flush	Community Centre After Flush
Client sampling date / time					29-Mar-2022 11:00	29-Mar-2022 09:10	29-Mar-2022 06:15	29-Mar-2022 05:40	29-Mar-2022 07:00
					VA22A6453-001	VA22A6453-002	VA22A6453-003	VA22A6453-004	VA22A6453-005
					Result	Result	Result	Result	Result
Physical Tests									
alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	4.2	4.2	4.9	5.2	4.6
hardness (as CaCO3), from total Ca/Mg	----	EC100A	0.50	mg/L	3.72	3.90	4.51	5.09	4.28
pH	----	E108	0.10	pH units	6.81	6.82	6.90	6.95	6.90
solids, total suspended [TSS]	----	E160	3.0	mg/L	<3.0	<3.0	<3.0	<3.0	<3.0
turbidity	----	E121	0.10	NTU	<0.10	<0.10	<0.10	<0.10	<0.10
Organic / Inorganic Carbon									
carbon, total organic [TOC]	----	E355-L	0.50	mg/L	1.86	1.42	1.42	1.48	1.57
Total Metals									
aluminum, total	7429-90-5	E420	0.0030	mg/L	0.0661	0.0599	0.0562	0.0607	0.0592
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	0.00121	0.00124	0.00133	0.00158	0.00125
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	<0.000050
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	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
calcium, total	7440-70-2	E420	0.050	mg/L	1.24	1.31	1.52	1.76	1.46
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	<0.00050
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	0.00640	0.00577	0.00086	0.00350	0.0421
iron, total	7439-89-6	E420	0.010	mg/L	0.011	0.046	0.018	0.026	0.055
lead, total	7439-92-1	E420	0.000050	mg/L	0.000067	0.000351	<0.000050	0.000396	0.000277
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	0.152	0.154	0.173	0.168	0.154
manganese, total	7439-96-5	E420	0.00010	mg/L	0.00038	0.00057	0.00026	0.00036	0.00052
mercury, total	7439-97-6	E508	0.0000050	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
molybdenum, total	7439-98-7	E420	0.000050	mg/L	0.000184	0.000190	0.000234	0.000238	0.000209
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 After Flush	Store / Cafe After Flush	Lions Bay Ave. After Flush	Kelvin Grove After Flush	Community Centre After Flush
					Client sampling date / time	29-Mar-2022 11:00	29-Mar-2022 09:10	29-Mar-2022 06:15	29-Mar-2022 05:40	29-Mar-2022 07:00
						VA22A6453-001	VA22A6453-002	VA22A6453-003	VA22A6453-004	VA22A6453-005
						Result	Result	Result	Result	Result
Total Metals										
potassium, total	7440-09-7	E420	0.050	mg/L		0.073	0.074	0.082	0.078	0.073
rubidium, total	7440-17-7	E420	0.00020	mg/L		<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
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		1.55	1.51	1.74	1.76	1.63
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		1.75	1.78	1.76	1.84	1.80
strontium, total	7440-24-6	E420	0.00020	mg/L		0.00392	0.00406	0.00476	0.00477	0.00450
sulfur, total	7704-34-9	E420	0.50	mg/L		<0.50	<0.50	<0.50	<0.50	<0.50
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		<0.00030	<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		0.000051	0.000050	0.000055	0.000054	0.000052
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	<0.0030	<0.0030	<0.0030	0.0036
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	<2.0	<2.0
Volatile Organic Compounds [THMs]										
bromodichloromethane	75-27-4	E611B	1.0	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
bromoform	75-25-2	E611B	1.0	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
chloroform	67-66-3	E611B	1.0	µg/L		48.0	56.1	67.2	71.0	61.3
dibromochloromethane	124-48-1	E611B	1.0	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
trihalomethanes [THMs], total	----	E611B	2.0	µg/L		48.0	56.1	67.2	71.0	61.3
Volatile Organic Compounds [THMs] Surrogates										
bromofluorobenzene, 4-	460-00-4	E611B	1.0	%		91.4	93.7	92.4	88.4	97.6
difluorobenzene, 1,4-	540-36-3	E611B	1.0	%		107	105	112	105	107

Analytical Results

Sub-Matrix: Water
(Matrix: Water)

Analyte	CAS Number	Method	LOR	Unit	Client sample ID: Magnesia Tank After Flush	Brunswick Beach After Flush	Lions Bay Beach Park After Flush	Harvey Tank First Draw	Store / Cafe First Draw
Client sampling date / time					29-Mar-2022 08:30	29-Mar-2022 11:30	29-Mar-2022 06:40	29-Mar-2022 11:00	29-Mar-2022 09:10
					VA22A6453-006	VA22A6453-007	VA22A6453-008	VA22A6453-011	VA22A6453-012
					Result	Result	Result	Result	Result
Physical Tests									
alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	5.5	5.9	4.0	----	----
hardness (as CaCO3), from total Ca/Mg	----	EC100A	0.50	mg/L	10.8	5.80	3.95	3.92	4.34
pH	----	E108	0.10	pH units	6.98	7.03	6.82	----	----
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	0.93	1.67	1.50	----	----
Total Metals									
aluminum, total	7429-90-5	E420	0.0030	mg/L	0.0341	0.0598	0.0684	0.129	0.0448
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	0.00012	<0.00010	<0.00010	0.00013	0.00010
barium, total	7440-39-3	E420	0.00010	mg/L	0.00168	0.00162	0.00124	0.00187	0.00138
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	<0.000050
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	0.0000138	<0.0000050	<0.0000050	0.0000119	0.0000090
calcium, total	7440-70-2	E420	0.050	mg/L	3.57	2.02	1.32	1.28	1.40
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	0.00352	0.00088	0.0329	0.376	0.231
iron, total	7439-89-6	E420	0.010	mg/L	0.013	0.043	0.013	0.060	0.039
lead, total	7439-92-1	E420	0.000050	mg/L	<0.000050	<0.000050	0.00184	0.00269	0.0150
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	0.461	0.184	0.160	0.177	0.204
manganese, total	7439-96-5	E420	0.00010	mg/L	0.00060	0.00043	0.00038	0.00243	0.00069
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	0.000189	0.000230	0.000195	0.000185	0.000207
nickel, total	7440-02-0	E420	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	0.00667
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	Magnesia Tank After Flush	Brunswick Beach After Flush	Lions Bay Beach Park After Flush	Harvey Tank First Draw	Store / Cafe First Draw
					Client sampling date / time	29-Mar-2022 08:30	29-Mar-2022 11:30	29-Mar-2022 06:40	29-Mar-2022 11:00	29-Mar-2022 09:10
						VA22A6453-006	VA22A6453-007	VA22A6453-008	VA22A6453-011	VA22A6453-012
						Result	Result	Result	Result	Result
Total Metals										
potassium, total	7440-09-7	E420	0.050	mg/L		0.080	0.094	0.078	0.091	0.096
rubidium, total	7440-17-7	E420	0.00020	mg/L		<0.00020	0.00023	<0.00020	<0.00020	<0.00020
selenium, total	7782-49-2	E420	0.000050	mg/L		0.000126	<0.000050	<0.000050	<0.000050	<0.000050
silicon, total	7440-21-3	E420	0.10	mg/L		4.09	1.79	1.54	1.59	1.71
silver, total	7440-22-4	E420	0.000010	mg/L		<0.000010	<0.000010	<0.000010	<0.000010	0.000012
sodium, total	7440-23-5	E420	0.050	mg/L		2.54	1.80	1.84	1.93	2.08
strontium, total	7440-24-6	E420	0.00020	mg/L		0.0183	0.00641	0.00420	0.00447	0.00432
sulfur, total	7704-34-9	E420	0.50	mg/L		2.53	<0.50	<0.50	<0.50	<0.50
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		<0.00030	<0.00030	<0.00030	0.00228	<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	0.000049	0.000058	0.000050	0.000042
vanadium, total	7440-62-2	E420	0.00050	mg/L		<0.00050	<0.00050	<0.00050	0.00089	0.00075
zinc, total	7440-66-6	E420	0.0030	mg/L		<0.0030	<0.0030	0.0046	0.0572	0.0888
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		33.5	79.8	55.0	----	----
dibromochloromethane	124-48-1	E611B	1.0	µg/L		<1.0	<1.0	<1.0	----	----
trihalomethanes [THMs], total	----	E611B	2.0	µg/L		33.5	79.8	55.0	----	----
Volatile Organic Compounds [THMs] Surrogates										
bromofluorobenzene, 4-	460-00-4	E611B	1.0	%		91.6	96.5	91.3	----	----
difluorobenzene, 1,4-	540-36-3	E611B	1.0	%		102	108	106	----	----

Analytical Results

Sub-Matrix: Water
(Matrix: Water)

Analyte	CAS Number	Method	LOR	Unit	Client sample ID	Lions Bay Ave. First Draw	Kelvin Grove First Draw	Community Centre First Draw	Magnesia Tank First Draw	Brunswick Beach First Draw
					Client sampling date / time	29-Mar-2022 06:15	29-Mar-2022 05:40	29-Mar-2022 07:00	29-Mar-2022 08:30	29-Mar-2022 11:30
						VA22A6453-013	VA22A6453-014	VA22A6453-015	VA22A6453-016	VA22A6453-017
						Result	Result	Result	Result	Result
Physical Tests										
hardness (as CaCO3), from total Ca/Mg	-----	EC100A	0.50	mg/L		4.51	8.18	8.03	10.5	5.66
Total Metals										
aluminum, total	7429-90-5	E420	0.0030	mg/L		0.0507	0.0498	0.0243	0.0197	0.0735
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		0.00012	0.00012	0.00012	0.00012	0.00012
barium, total	7440-39-3	E420	0.00010	mg/L		0.00134	0.00184	0.00166	0.00164	0.00159
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		0.000134	<0.000050	0.00458	<0.000050	0.000068
boron, total	7440-42-8	E420	0.010	mg/L		<0.010	0.030	0.052	<0.010	<0.010
cadmium, total	7440-43-9	E420	0.0000050	mg/L		<0.0000050	<0.0000050	0.0000058	0.0000372	<0.0000050
calcium, total	7440-70-2	E420	0.050	mg/L		1.50	1.93	1.58	3.48	1.97
cesium, total	7440-46-2	E420	0.000010	mg/L		<0.000010	0.000010	0.000011	<0.000010	<0.000010
chromium, total	7440-47-3	E420	0.00050	mg/L		0.00060	<0.00050	<0.00050	<0.00050	0.00115
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		0.00198	0.0614	0.228	0.426	0.00374
iron, total	7439-89-6	E420	0.010	mg/L		0.023	0.105	0.027	<0.010	0.074
lead, total	7439-92-1	E420	0.000050	mg/L		0.000086	0.00734	0.00375	0.00103	0.000271
lithium, total	7439-93-2	E420	0.0010	mg/L		<0.0010	0.0073	0.0077	<0.0010	<0.0010
magnesium, total	7439-95-4	E420	0.0050	mg/L		0.185	0.815	0.992	0.444	0.180
manganese, total	7439-96-5	E420	0.00010	mg/L		0.00119	0.00082	0.00036	0.00056	0.00211
molybdenum, total	7439-98-7	E420	0.000050	mg/L		0.000250	0.000225	0.000222	0.000169	0.000274
nickel, total	7440-02-0	E420	0.00050	mg/L		0.00098	0.00273	0.00242	0.00070	0.00091
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		0.103	0.111	0.100	0.094	0.112
rubidium, total	7440-17-7	E420	0.00020	mg/L		<0.00020	<0.00020	<0.00020	<0.00020	0.00021
selenium, total	7782-49-2	E420	0.000050	mg/L		<0.000050	<0.000050	<0.000050	0.000102	<0.000050
silicon, total	7440-21-3	E420	0.10	mg/L		1.74	1.80	1.66	4.03	1.75
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		1.90	2.21	2.28	2.64	2.09
strontium, total	7440-24-6	E420	0.00020	mg/L		0.00480	0.00497	0.00491	0.0181	0.00609

Analytical Results

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

Analyte	CAS Number	Method	LOR	Unit	Client sample ID	Lions Bay Ave. First Draw	Kelvin Grove First Draw	Community Centre First Draw	Magnesia Tank First Draw	Brunswick Beach First Draw
					Client sampling date / time	29-Mar-2022 06:15	29-Mar-2022 05:40	29-Mar-2022 07:00	29-Mar-2022 08:30	29-Mar-2022 11:30
						VA22A6453-013	VA22A6453-014	VA22A6453-015	VA22A6453-016	VA22A6453-017
						Result	Result	Result	Result	Result
Total Metals										
sulfur, total	7704-34-9	E420	0.50	mg/L		<0.50	<0.50	<0.50	2.34	<0.50
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	0.00736	<0.00010	<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		0.000053	0.000042	0.000013	<0.000010	0.000052
vanadium, total	7440-62-2	E420	0.00050	mg/L		0.00069	0.00069	0.00050	0.00056	0.00058
zinc, total	7440-66-6	E420	0.0030	mg/L		<0.0030	0.0227	0.403	0.0973	<0.0030
zirconium, total	7440-67-7	E420	0.00020	mg/L		<0.00020	<0.00020	<0.00020	<0.00020	<0.00020

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 First Draw	----	----	----	----
				Client sampling date / time	29-Mar-2022 06:40	----	----	----	----
Analyte	CAS Number	Method	LOR	Unit	VA22A6453-018	--------	--------	--------	--------
					Result	----	----	----	----
Physical Tests									
hardness (as CaCO3), from total Ca/Mg	----	EC100A	0.50	mg/L	3.92	----	----	----	----
Total Metals									
aluminum, total	7429-90-5	E420	0.0030	mg/L	0.0447	----	----	----	----
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	0.00138	----	----	----	----
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	0.0000367	----	----	----	----
calcium, total	7440-70-2	E420	0.050	mg/L	1.29	----	----	----	----
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	0.220	----	----	----	----
iron, total	7439-89-6	E420	0.010	mg/L	0.013	----	----	----	----
lead, total	7439-92-1	E420	0.000050	mg/L	0.00534	----	----	----	----
lithium, total	7439-93-2	E420	0.0010	mg/L	<0.0010	----	----	----	----
magnesium, total	7439-95-4	E420	0.0050	mg/L	0.169	----	----	----	----
manganese, total	7439-96-5	E420	0.00010	mg/L	0.00036	----	----	----	----
molybdenum, total	7439-98-7	E420	0.000050	mg/L	0.000221	----	----	----	----
nickel, total	7440-02-0	E420	0.00050	mg/L	0.00255	----	----	----	----
phosphorus, total	7723-14-0	E420	0.050	mg/L	<0.050	----	----	----	----
potassium, total	7440-09-7	E420	0.050	mg/L	0.094	----	----	----	----
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	1.58	----	----	----	----
silver, total	7440-22-4	E420	0.000010	mg/L	<0.000010	----	----	----	----
sodium, total	7440-23-5	E420	0.050	mg/L	1.96	----	----	----	----
strontium, total	7440-24-6	E420	0.00020	mg/L	0.00419	----	----	----	----

Analytical Results

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

				Client sample ID	**Lions Bay Beach Park First Draw**	**----**	**----**	**----**	**----**
				Client sampling date / time	29-Mar-2022 06:40	----	----	----	----
Analyte	*CAS Number*	*Method*	*LOR*	*Unit*	**VA22A6453-018**	**--------**	**--------**	**--------**	**--------**
					Result	----	----	----	----
Total Metals									
sulfur, total	7704-34-9	E420	0.50	mg/L	<0.50	----	----	----	----
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	0.00024	----	----	----	----
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	0.000048	----	----	----	----
vanadium, total	7440-62-2	E420	0.00050	mg/L	<0.00050	----	----	----	----
zinc, total	7440-66-6	E420	0.0030	mg/L	0.185	----	----	----	----
zirconium, total	7440-67-7	E420	0.00020	mg/L	<0.00020	----	----	----	----

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

APPENDIX: BIANNUAL METALS AND CHEMISTRY RESULTS (ABRIDGED REPORT OF SEP. 2022)

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: 20-Sep-2022 10:35	20-Sep-2022 08:50	----	----	----
					VA22C2522-017	VA22C2522-018	--------	--------	--------
					Result	Result	----	----	----
Physical Tests									
absorbance, UV (@ 254nm)	----	E404	0.0050	AU/cm	0.0170	0.0140	----	----	----
alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	6.3	4.5	----	----	----
hardness (as CaCO3), from total Ca/Mg	----	EC100A	0.50	mg/L	8.15	21.0	----	----	----
pH	----	E108	0.10	pH units	6.95	6.80	----	----	----
solids, total suspended [TSS]	----	E160	3.0	mg/L	<3.0	<3.0	----	----	----
turbidity	----	E121	0.10	NTU	<0.10	<0.10	----	----	----
transmittance, UV (@ 254nm)	----	E404	1.0	% T/cm	96.2	96.8	----	----	----
Organic / Inorganic Carbon									
carbon, total organic [TOC]	----	E355-L	0.50	mg/L	<0.50	0.72	----	----	----
Total Metals									
aluminum, total	7429-90-5	E420	0.0030	mg/L	0.0205	0.0172	----	----	----
antimony, total	7440-36-0	E420	0.00010	mg/L	<0.00010	<0.00010	----	----	----
arsenic, total	7440-38-2	E420	0.00010	mg/L	<0.00010	0.00014	----	----	----
barium, total	7440-39-3	E420	0.00010	mg/L	0.00298	0.00345	----	----	----
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	0.013	----	----	----
cadmium, total	7440-43-9	E420	0.0000050	mg/L	<0.0000050	0.0000245	----	----	----
calcium, total	7440-70-2	E420	0.050	mg/L	2.69	7.20	----	----	----
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	0.00078	0.00700	----	----	----
iron, total	7439-89-6	E420	0.010	mg/L	<0.010	<0.010	----	----	----
lead, total	7439-92-1	E420	0.000050	mg/L	<0.000050	0.000148	----	----	----
lithium, total	7439-93-2	E420	0.0010	mg/L	<0.0010	<0.0010	----	----	----
magnesium, total	7439-95-4	E420	0.0050	mg/L	0.349	0.745	----	----	----
manganese, total	7439-96-5	E420	0.00010	mg/L	0.00013	0.00065	----	----	----
mercury, total	7439-97-6	E508	0.0000050	mg/L	<0.0000050	<0.0000050	----	----	----
molybdenum, total	7439-98-7	E420	0.000050	mg/L	0.000652	0.000222	----	----	----

Analytical Results

Sub-Matrix: Surface Water (Matrix: Water)			Client sample ID		Harvey Raw Water	Magnesia Raw Water	----	----	----
			Client sampling date / time		20-Sep-2022 10:35	20-Sep-2022 08:50	----	----	----
Analyte	CAS Number	Method	LOR	Unit	VA22C2522-017	VA22C2522-018	--------	--------	--------
					Result	Result	----	----	----
Total Metals									
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	0.147	0.110	----	----	----
rubidium, total	7440-17-7	E420	0.00020	mg/L	0.00029	<0.00020	----	----	----
selenium, total	7782-49-2	E420	0.000050	mg/L	<0.000050	0.000115	----	----	----
silicon, total	7440-21-3	E420	0.10	mg/L	2.61	5.31	----	----	----
silver, total	7440-22-4	E420	0.000010	mg/L	<0.000010	<0.000010	----	----	----
sodium, total	7440-23-5	E420	0.050	mg/L	1.16	2.22	----	----	----
strontium, total	7440-24-6	E420	0.00020	mg/L	0.00805	0.0375	----	----	----
sulfur, total	7704-34-9	E420	0.50	mg/L	0.92	6.90	----	----	----
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	0.000022	<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	<0.0030	0.0051	----	----	----
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	20-Sep-2022 10:30	20-Sep-2022 10:30	20-Sep-2022 09:10	20-Sep-2022 09:10	20-Sep-2022 06:30
						VA22C2522-001	VA22C2522-002	VA22C2522-003	VA22C2522-004	VA22C2522-005
						Result	Result	Result	Result	Result
Physical Tests										
alkalinity, total (as CaCO3)	----	E290	1.0	mg/L		----	6.8	----	7.1	----
hardness (as CaCO3), from total Ca/Mg	----	EC100A	0.50	mg/L		8.47	8.20	8.70	8.29	8.23
pH	----	E108	0.10	pH units		----	6.93	----	6.97	----
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		----	<0.50	----	<0.50	----
Total Metals										
aluminum, total	7429-90-5	E420	0.0030	mg/L		0.203	0.0216	0.0229	0.0226	0.0217
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		0.00020	0.00010	0.00010	0.00011	<0.00010
barium, total	7440-39-3	E420	0.00010	mg/L		0.00400	0.00318	0.00295	0.00288	0.00301
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	0.000102
boron, total	7440-42-8	E420	0.010	mg/L		<0.010	<0.010	0.011	<0.010	<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		2.76	2.71	2.78	2.78	2.74
cesium, total	7440-46-2	E420	0.000010	mg/L		0.000015	<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	0.00087
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		0.0321	0.00555	0.0691	0.00400	0.00160
iron, total	7439-89-6	E420	0.010	mg/L		0.169	<0.010	0.018	0.024	<0.010
lead, total	7439-92-1	E420	0.000050	mg/L		0.00147	0.000052	0.00332	0.000309	<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		0.383	0.348	0.426	0.327	0.337
manganese, total	7439-96-5	E420	0.00010	mg/L		0.00479	0.00014	0.00037	0.00035	0.00139
mercury, total	7439-97-6	E508	0.0000050	mg/L		----	<0.0000050	----	<0.0000050	----
molybdenum, total	7439-98-7	E420	0.000050	mg/L		0.000641	0.000635	0.000639	0.000623	0.000683
nickel, total	7440-02-0	E420	0.00050	mg/L		<0.00050	<0.00050	0.0121	<0.00050	<0.00050
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		0.163	0.149	0.154	0.147	0.166

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	20-Sep-2022 10:30	20-Sep-2022 10:30	20-Sep-2022 09:10	20-Sep-2022 09:10	20-Sep-2022 06:30
						VA22C2522-001	VA22C2522-002	VA22C2522-003	VA22C2522-004	VA22C2522-005
						Result	Result	Result	Result	Result
Total Metals										
rubidium, total	7440-17-7	E420	0.00020	mg/L		0.00044	0.00030	0.00034	0.00035	0.00034
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		2.70	2.49	2.39	2.49	2.51
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		2.34	2.37	2.32	2.28	2.30
strontium, total	7440-24-6	E420	0.00020	mg/L		0.00844	0.00807	0.00807	0.00820	0.00836
sulfur, total	7704-34-9	E420	0.50	mg/L		0.95	0.92	0.83	0.88	0.95
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		0.00530	<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		0.000048	0.000023	0.000016	0.000024	0.000024
vanadium, total	7440-62-2	E420	0.00050	mg/L		0.00054	<0.00050	<0.00050	<0.00050	<0.00050
zinc, total	7440-66-6	E420	0.0030	mg/L		0.0077	<0.0030	0.0546	<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		----	15.5	----	18.6	----
dibromochloromethane	124-48-1	E611B	1.0	µg/L		----	<1.0	----	<1.0	----
trihalomethanes [THMs], total	----	E611B	2.0	µg/L		----	15.5	----	18.6	----
Volatile Organic Compounds [THMs] Surrogates										
bromofluorobenzene, 4-	460-00-4	E611B	1.0	%		----	82.2	----	82.7	----
difluorobenzene, 1,4-	540-36-3	E611B	1.0	%		----	95.6	----	96.6	----

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	Lions Bay Ave.	Kelvin Grove First Draw	Kelvin Grove	Community Centre First Draw	Community Centre
					Client sampling date / time	20-Sep-2022 06:30	20-Sep-2022 05:45	20-Sep-2022 05:45	20-Sep-2022 07:10	20-Sep-2022 07:10
						VA22C2522-006	VA22C2522-007	VA22C2522-008	VA22C2522-009	VA22C2522-010
						Result	Result	Result	Result	Result
Physical Tests										
alkalinity, total (as CaCO3)	----	E290	1.0	mg/L		7.0	----	10.6	----	7.0
hardness (as CaCO3), from total Ca/Mg	----	EC100A	0.50	mg/L		8.23	11.7	11.9	10.3	8.33
pH	----	E108	0.10	pH units		6.98	----	7.28	----	6.99
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		<0.50	----	<0.50	----	<0.50
Total Metals										
aluminum, total	7429-90-5	E420	0.0030	mg/L		0.0223	0.0344	0.0861	0.0215	0.0238
antimony, total	7440-36-0	E420	0.00010	mg/L		<0.00010	0.00011	<0.00010	<0.00010	<0.00010
arsenic, total	7440-38-2	E420	0.00010	mg/L		0.00010	0.00012	0.00012	<0.00010	<0.00010
barium, total	7440-39-3	E420	0.00010	mg/L		0.00320	0.00352	0.00317	0.00222	0.00280
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		0.000056	<0.000050	<0.000050	0.00171	<0.000050
boron, total	7440-42-8	E420	0.010	mg/L		<0.010	0.049	<0.010	0.057	0.010
cadmium, total	7440-43-9	E420	0.0000050	mg/L		<0.0000050	<0.0000050	<0.0000050	0.0000057	<0.0000050
calcium, total	7440-70-2	E420	0.050	mg/L		2.74	3.18	4.50	2.20	2.80
cesium, total	7440-46-2	E420	0.000010	mg/L		<0.000010	0.000019	<0.000010	0.000010	<0.000010
chromium, total	7440-47-3	E420	0.00050	mg/L		<0.00050	<0.00050	0.00070	<0.00050	<0.00050
cobalt, total	7440-48-4	E420	0.00010	mg/L		<0.00010	0.00019	<0.00010	0.00010	<0.00010
copper, total	7440-50-8	E420	0.00050	mg/L		0.00092	0.0262	0.00128	0.0869	0.0291
iron, total	7439-89-6	E420	0.010	mg/L		<0.010	0.074	0.107	0.010	0.025
lead, total	7439-92-1	E420	0.000050	mg/L		<0.000050	0.00564	0.000300	0.00112	0.000260
lithium, total	7439-93-2	E420	0.0010	mg/L		<0.0010	0.0111	<0.0010	0.0081	<0.0010
magnesium, total	7439-95-4	E420	0.0050	mg/L		0.338	0.907	0.164	1.17	0.325
manganese, total	7439-96-5	E420	0.00010	mg/L		0.00014	0.00227	0.00057	0.00020	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		0.000634	0.000567	0.000644	0.000479	0.000619
nickel, total	7440-02-0	E420	0.00050	mg/L		<0.00050	0.00584	<0.00050	0.00580	<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	Lions Bay Ave.	Kelvin Grove First Draw	Kelvin Grove	Community Centre First Draw	Community Centre
					Client sampling date / time	20-Sep-2022 06:30	20-Sep-2022 05:45	20-Sep-2022 05:45	20-Sep-2022 07:10	20-Sep-2022 07:10
						VA22C2522-006	VA22C2522-007	VA22C2522-008	VA22C2522-009	VA22C2522-010
						Result	Result	Result	Result	Result
Total Metals										
potassium, total	7440-09-7	E420	0.050	mg/L		0.161	0.175	0.156	0.143	0.152
rubidium, total	7440-17-7	E420	0.00020	mg/L		0.00034	0.00037	0.00035	0.00034	0.00027
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		2.51	2.34	2.69	1.91	2.48
silver, total	7440-22-4	E420	0.000010	mg/L		<0.000010	0.000014	<0.000010	<0.000010	<0.000010
sodium, total	7440-23-5	E420	0.050	mg/L		2.35	2.59	2.35	2.42	2.30
strontium, total	7440-24-6	E420	0.00020	mg/L		0.00838	0.00824	0.00898	0.00674	0.00823
sulfur, total	7704-34-9	E420	0.50	mg/L		0.84	0.81	0.94	0.68	0.83
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	0.00034	<0.00010	0.00137	<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		0.000025	0.000023	0.000040	<0.000010	0.000022
vanadium, total	7440-62-2	E420	0.00050	mg/L		<0.00050	<0.00050	0.00065	<0.00050	<0.00050
zinc, total	7440-66-6	E420	0.0030	mg/L		<0.0030	0.0192	<0.0030	0.383	0.0036
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		20.8	----	43.7	----	19.1
dibromochloromethane	124-48-1	E611B	1.0	µg/L		<1.0	----	<1.0	----	<1.0
trihalomethanes [THMs], total	----	E611B	2.0	µg/L		20.8	----	43.7	----	19.1
Volatile Organic Compounds [THMs] Surrogates										
bromofluorobenzene, 4-	460-00-4	E611B	1.0	%		78.6	----	87.9	----	84.4
difluorobenzene, 1,4-	540-36-3	E611B	1.0	%		95.1	----	95.8	----	94.8

Analytical Results

Sub-Matrix: Water
(Matrix: Water)

Analyte	CAS Number	Method	LOR	Unit	Client sample ID	Brunswick Beach First Draw	Brunswick Beach	Lions Bay Beach Park First Draw	Lions Bay Beach Park	Magnesia Tank First Draw
					Client sampling date / time	20-Sep-2022 11:05	20-Sep-2022 11:05	20-Sep-2022 06:50	20-Sep-2022 06:50	20-Sep-2022 08:45
						VA22C2522-011	VA22C2522-012	VA22C2522-013	VA22C2522-014	VA22C2522-015
						Result	Result	Result	Result	Result
Physical Tests										
alkalinity, total (as CaCO3)	----	E290	1.0	mg/L		----	6.2	----	6.7	----
hardness (as CaCO3), from total Ca/Mg	----	EC100A	0.50	mg/L		21.5	20.8	8.00	8.09	20.3
pH	----	E108	0.10	pH units		----	6.93	----	6.98	----
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		----	<0.50	----	<0.50	----
Total Metals										
aluminum, total	7429-90-5	E420	0.0030	mg/L		0.0182	0.0180	0.0214	0.0202	0.0126
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	0.00014	0.00011	<0.00010	<0.00010
barium, total	7440-39-3	E420	0.00010	mg/L		0.00465	0.00404	0.00305	0.00305	0.00353
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		0.00840	0.000050	<0.000050	<0.000050	<0.000050
boron, total	7440-42-8	E420	0.010	mg/L		0.013	0.012	<0.010	<0.010	0.012
cadmium, total	7440-43-9	E420	0.0000050	mg/L		0.0000347	0.0000204	<0.0000050	<0.0000050	0.000113
calcium, total	7440-70-2	E420	0.050	mg/L		7.44	7.17	2.64	2.67	6.96
cesium, total	7440-46-2	E420	0.000010	mg/L		0.000014	0.000012	<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		0.278	0.00128	0.0447	0.0113	0.512
iron, total	7439-89-6	E420	0.010	mg/L		0.056	0.042	<0.010	<0.010	<0.010
lead, total	7439-92-1	E420	0.000050	mg/L		0.00412	<0.000050	0.000675	0.000284	0.00108
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		0.703	0.700	0.341	0.345	0.714
manganese, total	7439-96-5	E420	0.00010	mg/L		0.00272	0.00059	0.00016	0.00014	0.00047
mercury, total	7439-97-6	E508	0.0000050	mg/L		----	<0.0000050	----	<0.0000050	----
molybdenum, total	7439-98-7	E420	0.000050	mg/L		0.000220	0.000234	0.000653	0.000649	0.000213
nickel, total	7440-02-0	E420	0.00050	mg/L		0.00222	<0.00050	0.00393	<0.00050	0.00138
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	Brunswick Beach First Draw	Brunswick Beach	Lions Bay Beach Park First Draw	Lions Bay Beach Park	Magnesia Tank First Draw
					Client sampling date / time	20-Sep-2022 11:05	20-Sep-2022 11:05	20-Sep-2022 06:50	20-Sep-2022 06:50	20-Sep-2022 08:45
						VA22C2522-011	VA22C2522-012	VA22C2522-013	VA22C2522-014	VA22C2522-015
						Result	Result	Result	Result	Result
Total Metals										
potassium, total	7440-09-7	E420	0.050	mg/L		0.130	0.128	0.153	0.153	0.112
rubidium, total	7440-17-7	E420	0.00020	mg/L		0.00021	0.00021	0.00035	0.00032	<0.00020
selenium, total	7782-49-2	E420	0.000050	mg/L		0.000255	0.000121	<0.000050	<0.000050	0.000094
silicon, total	7440-21-3	E420	0.10	mg/L		5.10	5.20	2.54	2.55	5.12
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		3.79	3.87	2.34	2.32	3.85
strontium, total	7440-24-6	E420	0.00020	mg/L		0.0384	0.0368	0.00822	0.00810	0.0365
sulfur, total	7704-34-9	E420	0.50	mg/L		6.30	6.26	0.80	0.94	6.53
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		<0.00030	<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	0.000020	0.000022	<0.000010
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		0.376	<0.0030	0.0178	<0.0030	0.242
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		----	23.3	----	17.0	----
dibromochloromethane	124-48-1	E611B	1.0	µg/L		----	<1.0	----	<1.0	----
trihalomethanes [THMs], total	----	E611B	2.0	µg/L		----	23.3	----	17.0	----
Volatile Organic Compounds [THMs] Surrogates										
bromofluorobenzene, 4-	460-00-4	E611B	1.0	%		----	82.1	----	79.9	----
difluorobenzene, 1,4-	540-36-3	E611B	1.0	%		----	96.6	----	96.8	----

Analytical Results

Sub-Matrix: Water (Matrix: Water)				Client sample ID	Magnesia Tank	----	----	----	----
				Client sampling date / time	20-Sep-2022 08:45	----	----	----	----
Analyte	CAS Number	Method	LOR	Unit	VA22C2522-016	--------	--------	--------	--------
					Result	----	----	----	----
Physical Tests									
alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	4.7	----	----	----	----
hardness (as CaCO3), from total Ca/Mg	----	EC100A	0.50	mg/L	20.6	----	----	----	----
pH	----	E108	0.10	pH units	6.82	----	----	----	----
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	<0.50	----	----	----	----
Total Metals									
aluminum, total	7429-90-5	E420	0.0030	mg/L	0.0178	----	----	----	----
antimony, total	7440-36-0	E420	0.00010	mg/L	<0.00010	----	----	----	----
arsenic, total	7440-38-2	E420	0.00010	mg/L	0.00014	----	----	----	----
barium, total	7440-39-3	E420	0.00010	mg/L	0.00360	----	----	----	----
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	0.013	----	----	----	----
cadmium, total	7440-43-9	E420	0.0000050	mg/L	0.0000255	----	----	----	----
calcium, total	7440-70-2	E420	0.050	mg/L	7.06	----	----	----	----
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	0.00661	----	----	----	----
iron, total	7439-89-6	E420	0.010	mg/L	<0.010	----	----	----	----
lead, total	7439-92-1	E420	0.000050	mg/L	<0.000050	----	----	----	----
lithium, total	7439-93-2	E420	0.0010	mg/L	<0.0010	----	----	----	----
magnesium, total	7439-95-4	E420	0.0050	mg/L	0.712	----	----	----	----
manganese, total	7439-96-5	E420	0.00010	mg/L	0.00060	----	----	----	----
mercury, total	7439-97-6	E508	0.0000050	mg/L	<0.0000050	----	----	----	----
molybdenum, total	7439-98-7	E420	0.000050	mg/L	0.000216	----	----	----	----
nickel, total	7440-02-0	E420	0.00050	mg/L	<0.00050	----	----	----	----
phosphorus, total	7723-14-0	E420	0.050	mg/L	<0.050	----	----	----	----
potassium, total	7440-09-7	E420	0.050	mg/L	0.111	----	----	----	----

Analytical Results

Sub-Matrix: Water (Matrix: Water)					Client sample ID	Magnesia Tank	----	----	----	----
					Client sampling date / time	20-Sep-2022 08:45	----	----	----	----
Analyte	CAS Number	Method	LOR	Unit		VA22C2522-016	--------	--------	--------	--------
						Result	----	----	----	----
Total Metals										
rubidium, total	7440-17-7	E420	0.00020	mg/L		<0.00020	----	----	----	----
selenium, total	7782-49-2	E420	0.000050	mg/L		0.000123	----	----	----	----
silicon, total	7440-21-3	E420	0.10	mg/L		5.19	----	----	----	----
silver, total	7440-22-4	E420	0.000010	mg/L		<0.000010	----	----	----	----
sodium, total	7440-23-5	E420	0.050	mg/L		3.89	----	----	----	----
strontium, total	7440-24-6	E420	0.00020	mg/L		0.0360	----	----	----	----
sulfur, total	7704-34-9	E420	0.50	mg/L		6.62	----	----	----	----
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		<0.000010	----	----	----	----
vanadium, total	7440-62-2	E420	0.00050	mg/L		<0.00050	----	----	----	----
zinc, total	7440-66-6	E420	0.0030	mg/L		0.0031	----	----	----	----
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		14.8	----	----	----	----
dibromochloromethane	124-48-1	E611B	1.0	µg/L		<1.0	----	----	----	----
trihalomethanes [THMs], total	----	E611B	2.0	µg/L		14.8	----	----	----	----
Volatile Organic Compounds [THMs] Surrogates										
bromofluorobenzene, 4-	460-00-4	E611B	1.0	%		79.2	----	----	----	----
difluorobenzene, 1,4-	540-36-3	E611B	1.0	%		95.8	----	----	----	----

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