



MONTHLY REPORTING PERIOD - JANUARY, 2022

1. SUMMARY

The list below provides a summary of the water quantity information collected by BMID in January 2022. Documentation and figures are provided on the following pages to support this submission.

Source	Total (US Gals)	Total (Mega Litres)
Mission Creek	64,476,090	244.04
Well 4	2,264,000	8.57
Well 5	0	0
Scotty Creek (Irrigation Only)	0	0
Total	66,740,090	252.61

1. A single positive Presence/Absence bacteriological sample was found at the Campion Rd sample station on January 17, 2022. BMID crews resampled the location for third-party analysis. The third-party analysis did not indicate the presence of either *Total Coliforms* or *E. Coli* bacteria.
2. A portion of the BMID's transmission main west of the Mission Creek Intake and east of the tunnel is located on an unstable slope. Slope movement continues to be monitored. It is currently stable and not moving.
3. The Water Treatment Plant began the month on stand-by mode as raw water quality in Mission Creek had improved enough to eliminate the necessity of chemical treatment upstream of the disinfection facilities. The WTP resumed operations between January 14th to the 24th and raw water quality necessitated chemical treatment to reduce turbidity and colour in the creek. The WTP remained in stand-by mode from January 24th to the end of the month;
4. Raw water turbidity levels in Mission Creek peaked at 2.72 NTU (average daily turbidity) on January 18. Average daily raw water turbidity for January was 1.45 NTU at the Mission Creek intake;
5. Turbidity levels at the Distribution Intake (end of Hadden Reservoir) high reading was 0.48 NTU on January 7, 2022. Average clarified water turbidity for January was 0.40 NTU at the Distribution Intake at the lower end of Hadden Reservoir. Colder water temperatures make chemical treatment more challenging;
6. The highest recorded monthly turbidity level at the first customer (Booster #1) was 0.55 NTU on January 06, 2022. Average monthly turbidity at the first customer was 0.37 NTU for January;
7. BMID's Ultraviolet Treatment Facility treated 244,068 m³ of water, none of which was "Off-Spec" (0.00%). Average UV Transmissivity was 86.4%. The average inlet chlorine residual level at the UV site was 1.09 mg/L. With the cold temperatures, minimum chlorine addition was required. The average outgoing chlorine was 1.45 mg/L after the sodium hypochlorite top-up system;

8. BMID's Scotty Creek source, used for irrigation in the north-end, ran from May 25, 2021 until it was placed in bypass mode on August 21. The Scotty Creek source will remain in bypass mode until irrigation begins again in the late spring of 2022;
9. Well #4 resumed operations as a source for domestic water in the north-end of the distribution system on August 24, 2021 and will remain in operation until the spring of 2022 when Well #5 will be needed to meet demand;
10. Well #5, used as the primary domestic water source in the north-end of the system for both irrigation and domestic consumption during the summer months, was placed in stand-by mode on September 1, 2021;
11. Well #6, which supplies irrigation water to the twinned north-end water distribution systems, was placed in standby on August 21, 2021. This is a result of reduced irrigation demand in the north-end of the distribution system from the peak flows experienced in early summer. Well #6 will resume operations in 2022;
12. *E.Coli* levels at Mission Creek's Point-of-Diversion (creek intake prior to WTP) had low counts for early winter with a peak count of 3 on January 24, 2022. The average creek *E.Coli* count was 1.2 for January based on 5 samples;
13. *E.Coli* levels in the raw water at the water distribution system intake at the east end of Hadden Reservoir, immediately prior to disinfection, had zero counts on 3 out of 5 samples, with a peak count of 1 on January 17th and 24th, 2022. The reduction in *E.Coli* levels is credited to the clarification process and the further settling of particles in the water in Stevens and Hadden Reservoirs;
14. No *E.Coli* or *Total Coliforms* were found in treated water in the distribution system through third-party analysis. In addition, one positive sample was detected by BMID's in-house presence/absence testing throughout January;

1.0 FLOWS - JANUARY, 2022

The Maximum Daily Flow was on January 25, at 3,198,785 US gallons (12.11 ML)

The Minimum Daily Flow was on January 21, at 1,882,686 US gallons (7.13 ML)

Mission Creek provided 97% of domestic and irrigation flow throughout January.

Figure 1.1 - Domestic Water System Flow

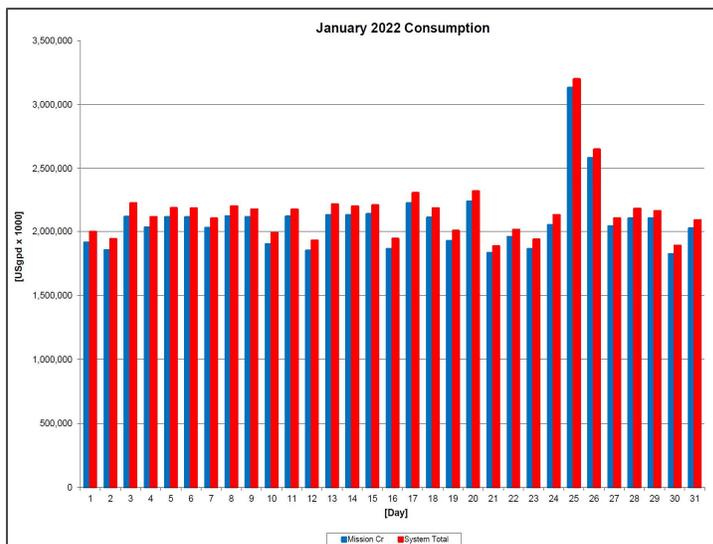


Table 1.2 - January 2022 - Daily Consumption Report

Year	Mission Cr	Well #4	Well #5	Well #6	System Total	System Total
2022	Usgpd	Usgpd	Usgpd	Usgpd	Usgpd	ML/Day
1-Jan	1,912,605	83,000	-	-	1,995,605	7.55
2-Jan	1,852,321	86,000	-	-	1,938,321	7.34
3-Jan	2,112,900	107,000	-	-	2,219,900	8.40
4-Jan	2,031,588	80,000	-	-	2,111,588	7.99
5-Jan	2,109,889	72,000	-	-	2,181,889	8.26
6-Jan	2,109,942	70,000	-	-	2,179,942	8.25
7-Jan	2,027,177	74,000	-	-	2,101,177	7.95
8-Jan	2,116,440	79,000	-	-	2,195,440	8.31
9-Jan	2,111,580	60,000	-	-	2,171,580	8.22
10-Jan	1,898,683	89,000	-	-	1,987,683	7.52
11-Jan	2,115,542	54,000	-	-	2,169,542	8.21
12-Jan	1,848,094	79,000	-	-	1,927,094	7.29
13-Jan	2,126,981	84,000	-	-	2,210,981	8.37
14-Jan	2,127,034	67,000	-	-	2,194,034	8.30
15-Jan	2,134,298	68,000	-	-	2,202,298	8.34
16-Jan	1,860,378	81,000	-	-	1,941,378	7.35
17-Jan	2,220,313	79,000	-	-	2,299,313	8.70
18-Jan	2,106,640	74,000	-	-	2,180,640	8.25
19-Jan	1,925,470	78,000	-	-	2,003,470	7.58
20-Jan	2,232,385	80,000	-	-	2,312,385	8.75
21-Jan	1,830,686	52,000	-	-	1,882,686	7.13
22-Jan	1,956,035	56,000	-	-	2,012,035	7.62
23-Jan	1,861,726	74,000	-	-	1,935,726	7.33
24-Jan	2,048,997	79,000	-	-	2,127,997	8.05
25-Jan	3,131,785	67,000	-	-	3,198,785	12.11
26-Jan	2,581,859	66,000	-	-	2,647,859	10.02
27-Jan	2,038,140	64,000	-	-	2,102,140	7.96
28-Jan	2,101,673	75,000	-	-	2,176,673	8.24
29-Jan	2,101,726	56,000	-	-	2,157,726	8.17
30-Jan	1,820,568	67,000	-	-	1,887,568	7.14
31-Jan	2,022,633	64,000	-	-	2,086,633	7.90
Totals Usgpd	64,476,090	2,264,000	0	0	66,740,090	252.61
Totals ML	244.04	8.57	0.00	0.00		
Avg's	2,081,782	7.88			2,155,115	8.16
Max	3,131,785	11.85			3,198,785	12.11
Min	1,820,568	6.89			1,882,686	7.13

2.0 RAW WATER QUALITY - BACTERIOLOGICAL MONITORING

Raw water samples were taken at three points at BMID settling ponds before chlorination

Samples were taken at the Distribution Intake's Point of Disinfection and at the Mission Creek raw water Point of Diversion and at Stevens Pond outlet (point halfway between WTP Outlet and Distribution Intake).

Samples from the previous month are also provided to show a two-month trend

The WTP lowers colour, turbidity and particle counts in the raw water. The *E. Coli* readings are consistent with the reduction in those other parameters. The *E. Coli* readings confirm the WTP's effectiveness in reducing raw water quality risks with coagulation, flocculation, and sedimentation process followed by settling times across Stevens and Hadden Reservoirs.

Figure 2.1 - Raw Water *E. Coli* Readings (CARO Lab results) December 2021 - January 2022

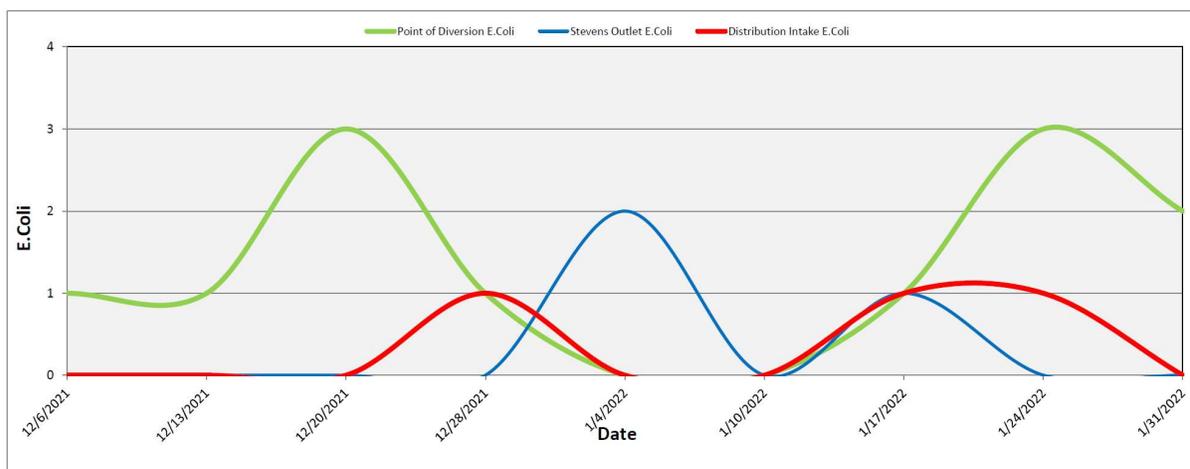


Table 2.1 - *E. Coli* Readings (CARO Labs)

Date	Point of Diversion E.Coli	Stevens Outlet E.Coli	Distribution Intake E.Coli
6-Dec-21	1	0	0
13-Dec-21	1	0	0
20-Dec-21	3	0	0
28-Dec-21	1	0	1
4-Jan-22	0	2	0
10-Jan-22	0	0	0
17-Jan-22	1	1	1
24-Jan-22	3	0	1
31-Jan-22	2	0	0

Stevens or WTP Intake (Raw) - Sampling of raw water at intake from Mission Creek

Stevens Outlet (Raw) - Sampling point after exiting 142,000 m³ 1st upper balancing reservoir (Stevens Res.)

Hadden Outlet (Raw) - Sampling point after exiting 75,000 m³ 2nd lower balancing reservoir (Hadden Res.)

(Hadden Outlet = Distribution Intake - Point of Disinfection)

3.0 RAW AND TREATED WATER TURBIDITY

Through January 2022, turbidity for the Mission Creek source was measured at Booster Station No. 1 on Gallagher’s Road, which is the approximate location of the first-customer. The highest turbidity level recorded at this location was 0.55 NTU on January 06, 2022.

The distribution intake is where the water leaves Hadden Reservoir. Turbidity levels are greatly reduced through the settling process as Mission Creek treated water makes its way through the reservoirs.

Figure 3.1 – Daily Turbidity Readings (Distribution Intake and Booster Station 1)

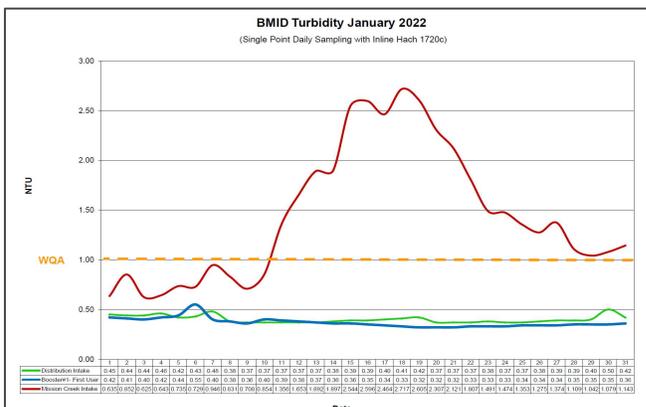


Table 3.1 - Daily Monitoring Record – Turbidity at Distribution Intake & Bst Stn 1

Turbidity Point Sampling for January 2022			
Date	Mission Creek Intake Daily Average [NTU]	Distribution Intake Daily Average NTU	Booster#1- First User Daily Average NTU
1	0.635	0.45	0.42
2	0.852	0.44	0.41
3	0.625	0.44	0.40
4	0.643	0.46	0.42
5	0.735	0.42	0.44
6	0.729	0.43	0.55
7	0.946	0.48	0.40
8	0.831	0.38	0.38
9	0.708	0.37	0.36
10	0.854	0.37	0.40
11	1.356	0.37	0.39
12	1.653	0.37	0.38
13	1.892	0.37	0.37
14	1.897	0.38	0.36
15	2.544	0.39	0.36
16	2.596	0.39	0.35
17	2.464	0.40	0.34
18	2.717	0.41	0.33
19	2.605	0.42	0.32
20	2.307	0.37	0.32
21	2.121	0.37	0.32
22	1.807	0.37	0.33
23	1.491	0.38	0.33
24	1.474	0.37	0.33
25	1.353	0.37	0.34
26	1.275	0.38	0.34
27	1.374	0.39	0.34
28	1.109	0.39	0.35
29	1.042	0.40	0.35
30	1.079	0.50	0.35
31	1.143	0.42	0.36
AVG	1.45	0.40	0.37

4.0 CHLORINE CONTACT TIME

Temperature, pH, peak flow and chlorine residual levels are recorded to determine the CT levels that are required to provide 3 log inactivation of *Giardia*. Chlorine Contact times exceeded the CT levels required to provide 3 log (99.9%) inactivation of *Giardia Lamblia* throughout the month of January, 2022.

Figure 4.1 - CT Trending – BMID Mission Creek Source – January 2022

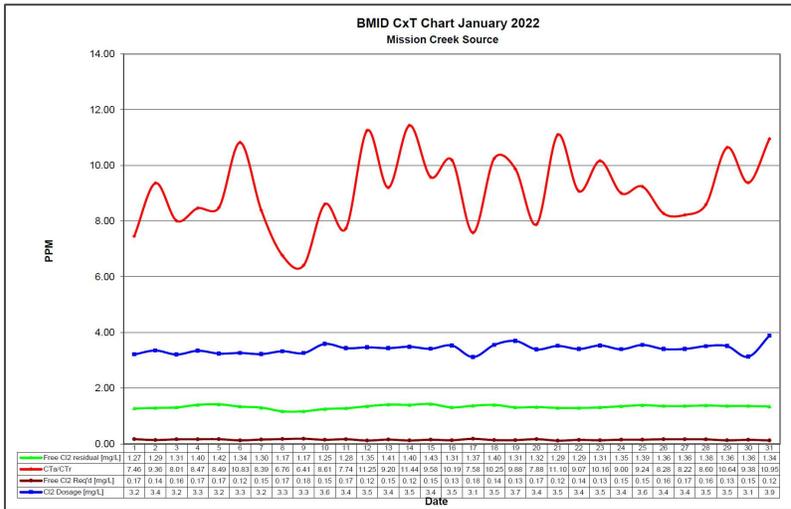


Table 4.2 - CT Table – Mission Creek Source

BMID January 2022 Mission Creek Source													
DATE	pH	TEMP	PEAK	Free Cl ₂	CT	CT	CTa/CTR	Free Cl ₂	Cl ₂	VOLUME	TIME	FLOW	CL ₂ DOSAGE
	Average	(Present)	FLOW	residual	achieved	req'd		Req'd	Dosage	TOTAL		Daily Average	Average
January		[°C]	[USgpm]	[mg/L]				[mg/L]	[mg/L]	[USgal]	[mins]	USGPM	[PPD]
1	7.22	3.0	2190	1.27	1536.7	206.0	7.46	0.17	3.2	2649600	1210	1366	53
2	7.22	3.9	1881	1.29	1816.7	194.0	9.36	0.14	3.4	2649600	1408	1288	52
3	7.23	4.7	2346	1.31	1479.6	184.6	8.01	0.16	3.2	2649600	1129	1514	58
4	7.24	4.8	2357	1.40	1573.8	185.9	8.47	0.17	3.3	2649600	1124	1396	56
5	7.24	4.5	2331	1.42	1614.2	190.2	8.49	0.17	3.2	2649600	1137	1489	58
6	7.20	4.3	1741	1.34	2039.1	188.4	10.83	0.12	3.3	2649600	1522	1280	50
7	7.19	5.3	2356	1.30	1461.9	174.3	8.39	0.15	3.2	2649600	1125	1442	56
8	7.19	4.2	2475	1.17	1252.5	185.2	6.76	0.17	3.3	2649600	1071	1459	58
9	7.20	5.1	2769	1.17	1119.5	174.6	6.41	0.18	3.3	2649600	957	1534	60
10	7.21	4.6	2100	1.25	1577.0	183.2	8.61	0.15	3.6	2649600	1262	1299	56
11	7.21	5.3	2502	1.28	1355.5	175.2	7.74	0.17	3.4	2649600	1059	1494	62
12	7.21	5.6	1838	1.35	1946.3	173.0	11.25	0.12	3.5	2649600	1442	1303	54
13	7.21	5.9	2381	1.41	1569.2	170.5	9.20	0.15	3.4	2649600	1113	1499	62
14	7.22	5.5	1845	1.40	2010.6	175.8	11.44	0.12	3.5	2649600	1436	1284	54
15	7.22	6.2	2355	1.43	1609.2	168.0	9.58	0.15	3.4	2649600	1125	1518	62
16	7.22	6.1	2040	1.31	1701.5	166.9	10.19	0.13	3.5	2649600	1299	1291	55
17	7.22	6.1	2848	1.37	1274.4	168.1	7.58	0.18	3.1	2649600	930	1702	64
18	7.23	6.1	2139	1.40	1734.2	169.2	10.25	0.14	3.5	2649600	1239	1435	61
19	7.23	6.1	2098	1.31	1654.6	167.5	9.88	0.13	3.7	2649600	1263	1270	56
20	7.23	6.3	2682	1.32	1304.1	165.4	7.88	0.17	3.4	2649600	988	1576	64
21	7.23	6.3	1868	1.29	1829.8	164.9	11.10	0.12	3.5	2649600	1418	1278	54
22	7.24	5.6	2168	1.29	1576.3	173.7	9.07	0.14	3.4	2649600	1222	1399	57
23	7.24	5.7	1975	1.31	1757.5	172.9	10.16	0.13	3.5	2649600	1342	1295	55
24	7.24	5.7	2288	1.35	1563.4	173.7	9.00	0.15	3.4	2649600	1158	1467	60
25	7.24	5.1	2191	1.39	1680.7	181.9	9.24	0.15	3.6	2649600	1209	1358	58
26	7.25	5.1	2393	1.36	1505.6	181.9	8.28	0.16	3.4	2649600	1107	1417	58
27	7.25	4.6	2327	1.36	1548.7	188.4	8.22	0.17	3.4	2649600	1139	1452	60
28	7.25	4.9	2301	1.38	1589.3	184.9	8.60	0.16	3.5	2649600	1152	1444	61
29	7.26	5.5	1906	1.36	1890.6	177.6	10.64	0.13	3.5	2649600	1390	1220	52
30	7.24	6.4	2320	1.36	1553.4	165.6	9.38	0.15	3.1	2649600	1142	1439	54
31	7.22	6.4	1976	1.34	1797.0	164.0	10.95	0.12	3.9	2649600	1341	1270	59
Averages	7.23	5.3	2225	1.33	1610.4	177.3	9.11	0.15	3.4				

5.0 ULTRAVIOLET DISINFECTION

Total Water Treated: 244,068 m³ 100.00%
 On-Spec Water: 244,068 m³ 100.00%
 Off-Spec Water: 0 m³ 0.000%

Average monthly chlorine residual before UV Treatment was 1.09 mg/L
 The average monthly chlorine residual after UV treatment and re-chlorination was 1.45 mg/L.

Figure 5.1 - UV Disinfection – BMID Mission Creek Source – January 2022

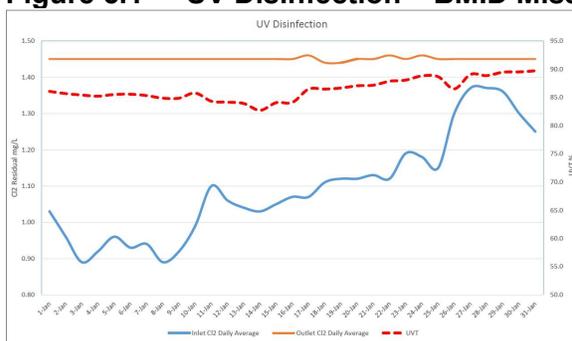


Table 5.2 - UV Disinfection Table – Mission Creek Source

	Inlet Cl2 Daily Average	Outlet Cl2 Daily Average	UVT		In Spec Water Volume	Off Spec Water Volume	Off Spec % of Water Volume
Date	mg/L	mg/L	% T		Cubic Meters	Cubic Meters	Percentage
1-Jan	1.03	1.45	86.1		7240	0	0.00%
2-Jan	0.96	1.45	85.7		7012	0	0.00%
3-Jan	0.89	1.45	85.4		7998	0	0.00%
4-Jan	0.92	1.45	85.2		7690	0	0.00%
5-Jan	0.96	1.45	85.5		7987	0	0.00%
6-Jan	0.93	1.45	85.6		7987	0	0.00%
7-Jan	0.94	1.45	85.3		7674	0	0.00%
8-Jan	0.89	1.45	84.9		8012	0	0.00%
9-Jan	0.92	1.45	84.9		7993	0	0.00%
10-Jan	0.99	1.45	85.8		7187	0	0.00%
11-Jan	1.10	1.45	84.3		8008	0	0.00%
12-Jan	1.06	1.45	84.2		6996	0	0.00%
13-Jan	1.04	1.45	83.9		8052	0	0.00%
14-Jan	1.03	1.45	82.7		8052	0	0.00%
15-Jan	1.05	1.45	84.1		8079	0	0.00%
16-Jan	1.07	1.45	84.1		7042	0	0.00%
17-Jan	1.07	1.46	86.5		8405	0	0.00%
18-Jan	1.11	1.44	86.5		7975	0	0.00%
19-Jan	1.12	1.44	86.7		7289	0	0.00%
20-Jan	1.12	1.45	87.1		8451	0	0.00%
21-Jan	1.13	1.45	87.2		6930	0	0.00%
22-Jan	1.12	1.46	87.9		7404	0	0.00%
23-Jan	1.19	1.45	88.1		7047	0	0.00%
24-Jan	1.18	1.46	88.8		7756	0	0.00%
25-Jan	1.15	1.45	88.7		11855	0	0.00%
26-Jan	1.30	1.45	86.5		9773	0	0.00%
27-Jan	1.37	1.45	89.1		7715	0	0.00%
28-Jan	1.37	1.45	88.9		7956	0	0.00%
29-Jan	1.36	1.45	89.5		7956	0	0.00%
30-Jan	1.30	1.45	89.5		6892	0	0.00%
31-Jan	1.25	1.45	89.7		7657	0	0.00%
Average	1.09	1.45	86.4	Total	244068.6	0	0.000%

6.0 WATER DISTRIBUTION SAMPLING (TREATED)

Third Party Analysis (CARO Analytical Services)

- Samples taken once per week at ten locations around the BMID service area
- 30 samples were found to be absent of Coliforms.
- 30 samples were found to be absent of *E. Coli*.

Table 6.1 - CARO Independent Lab Testing – Total Coliforms – E.Coli

Date	2021 Belgo Rd		Booster 1		Elison Blow-Off		Elison School		3976 Highway 97		Prospect Reservoir		Tower Reservoir		Well #4		Kirschner Res		Pearson School	
	Coliforms	E.coli	Coliforms	E.coli	Coliforms	E.coli	Coliforms	E.coli	Coliforms	E.coli	Coliforms	E.coli	Coliforms	E.coli	Coliforms	E.coli	Coliforms	E.coli	Coliforms	E.coli
6-Dec-21	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13-Dec-21	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20-Dec-21	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
28-Dec-21	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Jan-22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10-Jan-21	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17-Jan-22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
25-Jan-22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
31-Jan-22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

In-House Analysis (BMID Staff)

- Presence/Absence samples taken on a three-week cycle at seven sites around the BMID service area.
- 11 samples were found to be absent of both *Total Coliforms* and *E.Coli*.
- One sample was positive for bacteria.
 - Retesting through third-party analysis did not find any *Total Coliforms* or *E.Coli* bacteria.

Table 6.2 - BMID In-house Testing – Presence Absence

Location	1/4/2022				1/10/2022				1/17/2022				1/24/2022				1/31/2022			
	Cl2	Temp.	Pres.	Abs.	Cl2	Temp.	Pres.	Abs.	Cl2	Temp.	Pres.	Abs.	Cl2	Temp.	Pres.	Abs.	Cl2	Temp.	Pres.	Abs.
Sylvania Cres					0.58	8.8	-	X									0.83	8.8	-	X
170 Kneller Rd					0.68	9.0	-	X									0.99	8.8	-	X
2105 Morrison	0.52	10.2	-	X									0.56	10.6	-	X				
Staymen Rd	0.74	9.8	-	X									0.47	8.2	-	X				
260 Campion Rd									0.29	10.2	X	-								
Fenwick Rd									0.62	8.2	-	X								
Solly Ct					0.57	9.4	-	X									0.83	9.4	-	X

Table 6.3 - Disinfection By-Products

- All samples were within the limits for Disinfection By-Products

01-04-2022 / 01-12-2022		
Location	THM (mg/L)	HAA (mg/L)
UV Plant	0.0685	0.0551
Pearson School	0.0670	0.0860

- BMID Population = 28,000

RECOMMENDED TESTS

- Recommended number of samples per month = 28
(as per Guide for Canadian Drinking Water Quality)

ACTUAL TESTS

- Total tests by BMID staff (presence/absence) = 12 (One Positive)
- Total tests sampled by BMID and tested by Caro Labs = 31 (including Resample at Campion Rd)
- Total tests sampled in BMID treated distribution system = 43 (One Positive Sample)