



MONTHLY REPORTING PERIOD - MARCH, 2022

1. SUMMARY

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

Source	Total (US Gals)	Total (Mega Litres)
Mission Creek	61,085,416	231.21
Well 4	5,333,000	20.19
Well 5	0	0
Scotty Creek (Irrigation Only)	0	0
Total	66,418,416	251.39

1. 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.
2. The WTP resumed operation on February 8th and remained in operation throughout March as raw water quality in Mission Creek required treatment to lower both turbidity and colour;
3. Raw water turbidity levels in Mission Creek peaked at 23.84 NTU (average daily turbidity) on March 23. Average daily raw water turbidity for March was 6.34 NTU at the Mission Creek intake;
4. Turbidity levels at the Distribution Intake (end of Hadden Reservoir) high reading was 0.61 NTU on March 25, 2022. Average clarified water turbidity for March was 0.51 NTU at the Distribution Intake at the lower end of Hadden Reservoir. Colder water temperatures make chemical treatment more challenging;
5. The highest recorded monthly turbidity level at the first customer (Booster #1) was 0.54 NTU on March 28. Average monthly turbidity at the first customer was 0.46 NTU for March;
6. BMID's Ultraviolet Treatment Facility treated 231,233 m³ of water, none of which was "Off-Spec" (0.00%). Average UV Transmissivity was 87.6%. The average inlet chlorine residual level at the UV site was 1.20 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;
7. 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;
8. 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;
9. 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;

10. 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;
11. *E.Coli* levels at Mission Creek's Point-of-Diversion (creek intake prior to WTP) had low counts for early spring with the exception of the March 28 sample which had a peak count of 53. The three weekly samples in early March all had zero counts, however, the average creek *E.Coli* count was 13.25 based on 4 samples;
12. *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 all 4 samples. 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;
13. No *E.Coli* or *Total Coliforms* were found in treated water in the distribution system through third-party analysis. In addition, zero positive samples were detected by BMID's in-house presence/absence testing throughout March;

1.0 FLOWS - MARCH, 2022

The Maximum Daily Flow was on March 23, at 2,975,850 US gallons (11.26 ML)

The Minimum Daily Flow was on March 15, at 1,757,787 US gallons (6.65 ML)

Mission Creek provided 92% of domestic and irrigation flow throughout March.

Figure 1.1 - Domestic Water System Flow

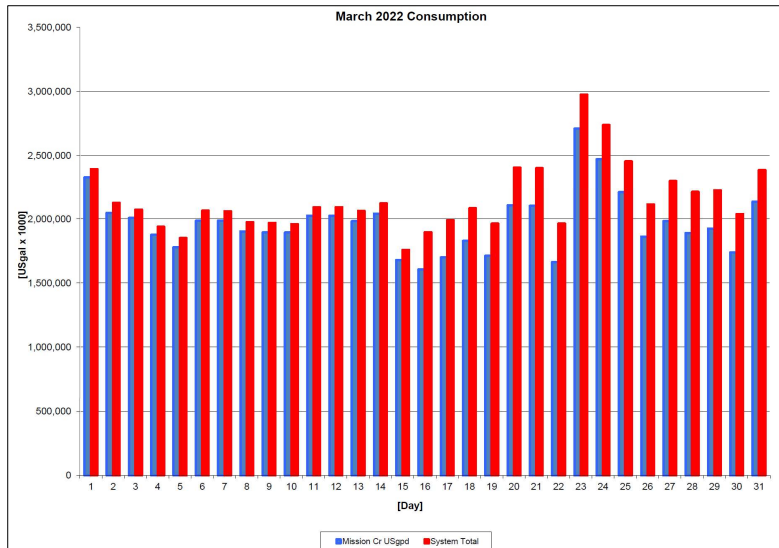


Table 1.2 - March 2022 - Daily Consumption Report

Year	Mission Cr	Well #4	Well #5	System Total	System Total
2022	Usgpd	Usgpd	Usgpd	Usgpd	ML/Day
1-Mar	2,330,869	64,000	0.0	2,394,869	9.06
2-Mar	2,046,012	79,000	0.0	2,125,012	8.04
3-Mar	2,006,941	65,000	0.0	2,071,941	7.84
4-Mar	1,874,459	64,000	0.0	1,938,459	7.34
5-Mar	1,778,987	71,000	0.0	1,849,987	7.00
6-Mar	1,985,728	78,000	0.0	2,063,728	7.81
7-Mar	1,985,781	73,000	0.0	2,058,781	7.79
8-Mar	1,902,223	71,000	0.0	1,973,223	7.47
9-Mar	1,893,215	75,000	0.0	1,968,215	7.45
10-Mar	1,893,294	66,000	0.0	1,959,294	7.42
11-Mar	2,024,192	67,000	0.0	2,091,192	7.92
12-Mar	2,024,244	67,000	0.0	2,091,244	7.92
13-Mar	1,981,871	80,000	0.0	2,061,871	7.80
14-Mar	2,040,227	80,000	0.0	2,120,227	8.03
15-Mar	1,678,787	79,000	0.0	1,757,787	6.65
16-Mar	1,607,777	288,000	0.0	1,895,777	7.18
17-Mar	1,698,890	291,000	0.0	1,989,890	7.53
18-Mar	1,827,991	255,000	0.0	2,082,991	7.88
19-Mar	1,712,231	251,000	0.0	1,963,231	7.43
20-Mar	2,105,292	301,000	0.0	2,406,292	9.11
21-Mar	2,101,620	301,000	0.0	2,402,620	9.09
22-Mar	1,663,650	300,000	0.0	1,963,650	7.43
23-Mar	2,709,850	266,000	0.0	2,975,850	11.26
24-Mar	2,471,778	266,000	0.0	2,737,778	10.36
25-Mar	2,208,293	247,000	0.0	2,455,293	9.29
26-Mar	1,862,175	250,000	0.0	2,112,175	7.99
27-Mar	1,981,264	321,000	0.0	2,302,264	8.71
28-Mar	1,889,464	321,000	0.0	2,210,464	8.37
29-Mar	1,924,599	298,000	0.0	2,222,599	8.41
30-Mar	1,739,678	298,000	0.0	2,037,678	7.71
31-Mar	2,134,034	253,000	0.0	2,387,034	9.03
Totals Usgpd	61,085,416	5,333,000	0	66,418,416	251.39
Totals ML	231.21	20.19	0.00	251.39	
Avg's	1,965,046	7.44		2,142,813	8.11
Max	2,709,850	10.26		2,975,850	11.26
Min	1,607,777	6.09		1,757,787	6.65

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) February 2022 - March 2022

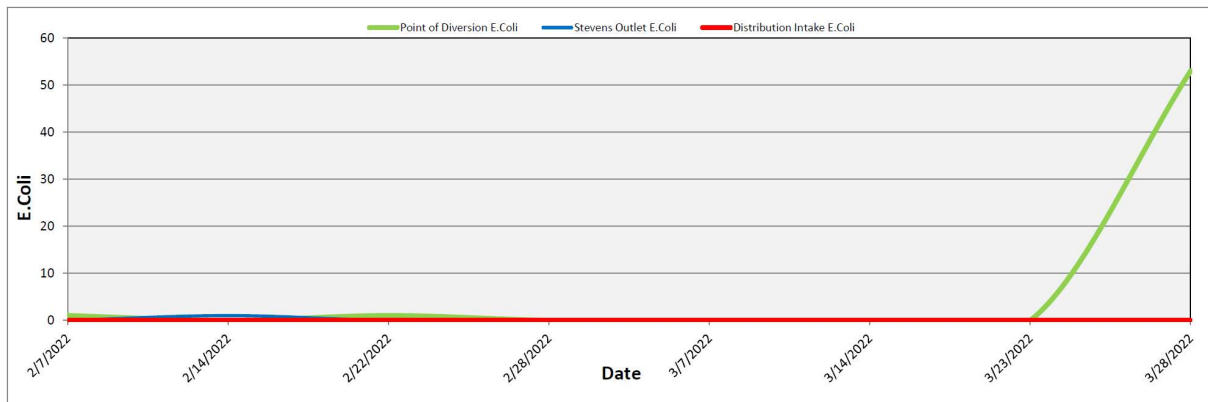


Table 2.1 - *E. Coli* Readings (CARO Labs)

Date	Point of Diversion E.Coli	Stevens Outlet E.Coli	Distribution Intake E.Coli
7-Feb-22	1	0	0
14-Feb-22	0	1	0
22-Feb-22	1	0	0
28-Feb-22	0	0	0
7-Mar-22	0	0	0
14-Mar-22	0	0	0
23-Mar-22	0	0	0
28-Mar-22	53	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 March 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 0.54 NTU on March 28, 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)

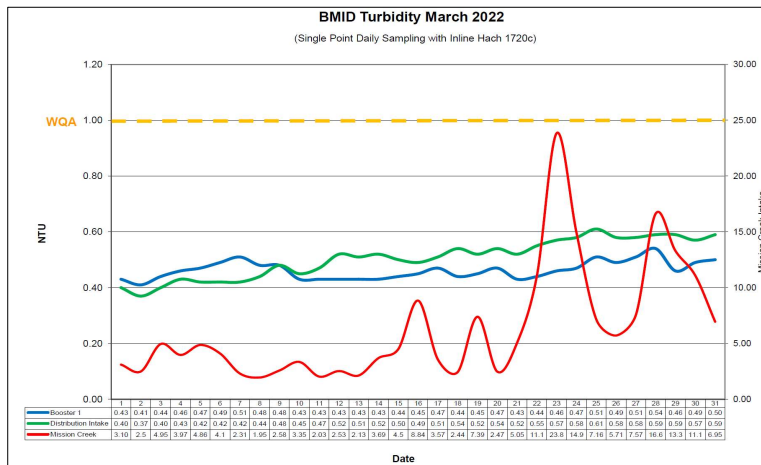


Table 3.1 - Daily Monitoring Record – Turbidity at Distribution Intake & Bst Stn 1

Date	Mission Creek Intake Daily Average [NTU]	Distribution Intake Daily Average NTU	Booster#1- First User Daily Average NTU
1	3.10	0.40	0.43
2	2.5	0.37	0.41
3	4.95	0.40	0.44
4	3.97	0.43	0.46
5	4.86	0.42	0.47
6	4.1	0.42	0.49
7	2.31	0.42	0.51
8	1.95	0.44	0.48
9	2.58	0.48	0.48
10	3.35	0.45	0.43
11	2.03	0.47	0.43
12	2.53	0.52	0.43
13	2.13	0.51	0.43
14	3.69	0.52	0.43
15	4.5	0.50	0.44
16	8.84	0.49	0.45
17	3.57	0.51	0.47
18	2.44	0.54	0.44
19	7.39	0.52	0.45
20	2.47	0.54	0.47
21	5.05	0.52	0.43
22	11.07	0.55	0.44
23	23.84	0.57	0.46
24	14.89	0.58	0.47
25	7.16	0.61	0.51
26	5.71	0.58	0.49
27	7.57	0.58	0.51
28	16.62	0.59	0.54
29	13.29	0.59	0.46
30	11.08	0.57	0.49
31	6.95	0.59	0.50
AVG	6.34	0.51	0.46

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 March, 2022.

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

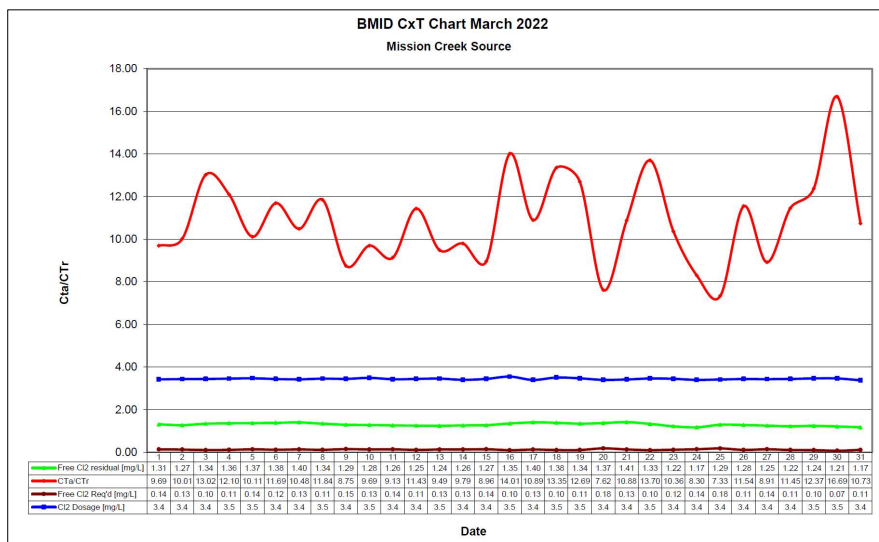


Table 4.2 - CT Table – Mission Creek Source

BMID March 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
March		[°C]	[USgpm]	[mg/L]				[mg/L]	[mg/L]	[USgal]	[mins]	[USGPM]	[PPD]
1	7.53	7.8	2156	1.31	1610.2	166.1	9.69	0.14	3.4	2649600	1229	1442	59.3
2	7.54	8.7	2156	1.27	1561.0	155.9	10.01	0.13	3.4	2649600	1229	1411	58.2
3	7.56	9.0	1759	1.34	2018.0	155.0	13.02	0.10	3.4	2649600	1506	1300	53.7
4	7.57	8.2	1807	1.36	1994.2	164.8	12.10	0.11	3.5	2649600	1466	1316	54.6
5	7.59	6.0	1854	1.37	1957.4	193.6	10.11	0.14	3.5	2649600	1429	1252	52.2
6	7.60	9.9	2108	1.38	1734.5	148.4	11.69	0.12	3.4	2649600	1257	1395	57.6
7	7.62	9.2	2251	1.40	1648.1	157.2	10.48	0.13	3.4	2649600	1177	1347	55.4
8	7.58	9.1	1934	1.34	1836.1	155.1	11.84	0.11	3.5	2649600	1370	1316	54.6
9	7.62	7.7	2267	1.29	1508.0	172.3	8.75	0.15	3.4	2649600	1169	1331	55.1
10	7.63	6.3	1839	1.28	1844.6	190.3	9.69	0.13	3.5	2649600	1441	1205	50.5
11	7.64	8.6	2251	1.26	1483.3	162.5	9.13	0.14	3.4	2649600	1177	1427	58.7
12	7.66	9.0	1823	1.25	1817.0	158.9	11.43	0.11	3.4	2649600	1454	1379	57.0
13	7.67	9.7	2282	1.24	1439.5	151.8	9.49	0.13	3.5	2649600	1161	1442	59.9
14	7.68	10.7	2393	1.26	1394.9	142.4	9.79	0.13	3.4	2649600	1107	1442	58.9
15	7.70	9.7	2441	1.27	1378.6	153.9	8.96	0.14	3.4	2649600	1085	1189	49.2
16	7.72	9.7	1633	1.35	2191.0	156.4	14.01	0.10	3.5	2649600	1623	1110	47.3
17	7.73	10.0	2203	1.40	1683.7	154.6	10.89	0.13	3.4	2649600	1203	1220	49.8
18	7.74	10.3	1807	1.38	2023.6	151.6	13.35	0.10	3.5	2649600	1466	1268	53.4
19	7.75	9.6	1759	1.34	2018.0	159.0	12.69	0.11	3.5	2649600	1506	1205	50.2
20	7.76	9.3	2916	1.37	1244.6	163.4	7.62	0.18	3.4	2649600	908	1490	60.8
21	7.77	10.6	2282	1.41	1636.8	150.5	10.88	0.13	3.4	2649600	1161	1474	60.5
22	7.78	10.0	1648	1.33	2137.8	156.1	13.70	0.10	3.5	2649600	1607	1173	48.8
23	7.79	10.3	2061	1.22	1568.8	151.4	10.36	0.12	3.4	2649600	1286	1347	55.8
24	7.80	10.1	2441	1.17	1270.0	153.1	8.30	0.14	3.4	2649600	1085	1522	62.1
25	7.81	10.5	3075	1.29	1111.5	151.6	7.33	0.18	3.4	2649600	862	1553	63.7
26	7.82	9.9	1854	1.28	1828.8	158.4	11.54	0.11	3.4	2649600	1429	1316	54.3
27	7.81	9.0	2219	1.25	1492.5	167.5	8.91	0.14	3.4	2649600	1194	1395	57.5
28	7.79	10.1	1839	1.22	1758.1	153.5	11.45	0.11	3.4	2649600	1441	1331	55.0
29	7.48	10.4	1965	1.24	1671.6	135.1	12.37	0.10	3.5	2649600	1348	1347	56.1
30	7.13	11.3	1728	1.21	1855.7	111.2	16.69	0.07	3.5	2649600	1534	1220	50.8
31	7.15	10.9	2520	1.17	1230.1	114.6	10.73	0.11	3.4	2649600	1051	1522	61.7
Averages	7.65	9.41	2106	1.30	1635.4	155.4	11.12	0.12	3.4				

5.0 ULTRAVIOLET DISINFECTION

Total Water Treated: 231,233 m³ 100.00%
On-Spec Water: 231,233 m³ 100.00%
Off-Spec Water: 0 m³ 0.000%

Average monthly chlorine residual before UV Treatment was 1.20 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 – March 2022

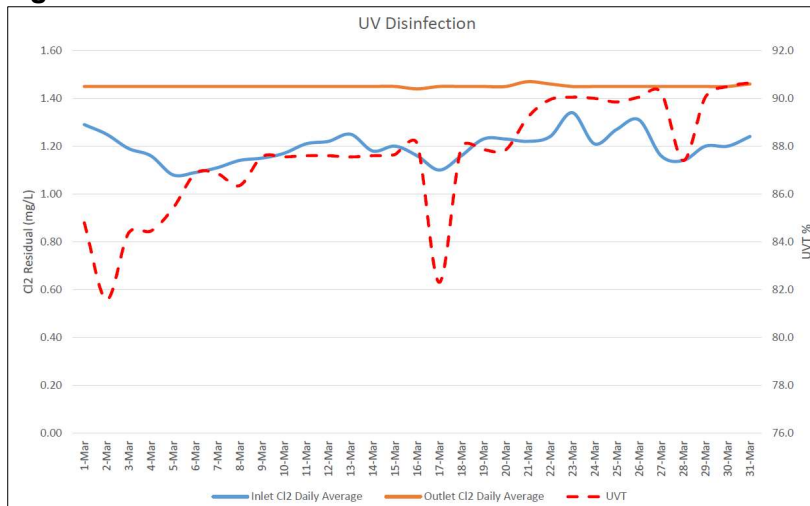


Table 5.2 - UV Disinfection Table – Mission Creek Source

	Inlet Cl2 Daily	Outlet Cl2 Daily	UVT		In Spec Water Volume	Off Spec Water Volume	Off Spec % of Water
Date	mg/L	mg/L	% T		Cubic Meters	Cubic Meters	Percentage
1-Mar	1.29	1.45	84.8		8823.3	0	0.00%
2-Mar	1.25	1.45	81.6		7745.0	0	0.00%
3-Mar	1.19	1.45	84.4		7597.1	0	0.00%
4-Mar	1.16	1.45	84.5		7095.6	0	0.00%
5-Mar	1.08	1.45	85.4		6734.2	0	0.00%
6-Mar	1.09	1.45	86.9		7516.8	0	0.00%
7-Mar	1.11	1.45	86.9		7517.0	0	0.00%
8-Mar	1.14	1.45	86.4		7200.7	0	0.00%
9-Mar	1.15	1.45	87.6		7166.6	0	0.00%
10-Mar	1.17	1.45	87.6		7166.9	0	0.00%
11-Mar	1.21	1.45	87.6		7662.4	0	0.00%
12-Mar	1.22	1.45	87.6		7662.6	0	0.00%
13-Mar	1.25	1.45	87.6		7502.2	0	0.00%
14-Mar	1.18	1.45	87.6		7723.1	0	0.00%
15-Mar	1.20	1.45	87.7		6354.9	0	0.00%
16-Mar	1.16	1.44	88.1		6086.1	0	0.00%
17-Mar	1.10	1.45	82.3		6431.0	0	0.00%
18-Mar	1.16	1.45	88.0		6919.7	0	0.00%
19-Mar	1.23	1.45	87.9		6481.5	0	0.00%
20-Mar	1.23	1.45	87.9		7969.4	0	0.00%
21-Mar	1.22	1.47	89.2		7955.5	0	0.00%
22-Mar	1.24	1.46	90.0		6297.6	0	0.00%
23-Mar	1.34	1.45	90.1		10257.9	0	0.00%
24-Mar	1.21	1.45	90.0		9356.7	0	0.00%
25-Mar	1.27	1.45	89.9		8359.3	0	0.00%
26-Mar	1.31	1.45	90.1		7049.1	0	0.00%
27-Mar	1.16	1.45	90.3		7499.9	0	0.00%
28-Mar	1.14	1.45	87.4		7152.4	0	0.00%
29-Mar	1.20	1.45	90.1		7285.4	0	0.00%
30-Mar	1.20	1.45	90.5		6585.4	0	0.00%
31-Mar	1.24	1.46	90.7		8078.2	0	0.00%
Average	1.20	1.45	87.6	Total	231233.5	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
- 25 samples were found to be absent of Coliforms.
- 25 samples were found to be absent of *E. Coli*.

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

Date	2021 Belgio 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
7-Feb-22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14-Feb-22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16-Feb-22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
22-Feb-22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
28-Feb-22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-Mar-22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7-Mar-22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14-Mar-22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21-Mar-22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24-Mar-22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
28-Mar-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.
- All 9 samples were found to be absent of both *Total Coliforms* and *E. Coli*.

Table 6.2 - BMID In-house Testing – Presence Absence

Location	3/7/2022				3/14/2022				3/21/2022				3/28/2022			
	Cl2	Temp.	Pres.	Abs.	Cl2	Temp.	Pres.	Abs.	Cl2	Temp.	Pres.	Abs.	Cl2	Temp.	Pres.	Abs.
Sylvania Cres					0.81	8.0	-	X								
170 Kneller Rd					0.86	8.2	-	X								
2105 Morrison	0.57	11.0	-	X									0.56	12.6	-	X
Staymen Rd	0.41	12.0	-	X									0.69	12.6	-	X
260 Campion Rd									0.69	13.4	-	X				
Fenwick Rd									0.45	12.0	-	X				
Solly Ct					0.96	8.4	-	X								

- 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) = 9
- Total tests sampled by BMID and tested by Caro Labs 25
- Total tests sampled in BMID treated distribution system = 34