



MONTHLY REPORTING PERIOD - AUGUST, 2022

1. SUMMARY

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

Source	Total (US Gals)	Total (Mega Litres)
Mission Creek	603,308,696	2,283.52
Well 4	517,509	1.96
Well 5	30,969,671	117.22
Well 6 (Irrigation Only)	5,765,496	21.82
Scotty Creek (Irrigation Only)	14,942,000	56.56
Total	665,503,372	2,481.08

1. The August 2nd bacterial sample taken at 3976 Highway 97 was found to have a positive Total Coliform bacteria coliform. One the sample was confirmed positive, the area was flushed, bringing in fresh water, and re-sampled on August 4th. The August 4th resample was found to be free of any bacteria. It is assumed that the positive sample was a result of sampling error;
2. An Off-Spec incident occurred on August 29th at BMID's Ultraviolet disinfection facility. The incident was the result of operator error resulting the shut-down of one of the UV reactors. The error was noticed immediately, however, it took several minutes for the reactivated lamps to warm up and resume normal operation. Throughout the incident, primary disinfection (chlorination upstream of the UV facility) as well as re-chlorination after UV remained in operation;
3. 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;
4. The WTP resumed operation on February 8th and remained in operation throughout August as raw water quality in Mission Creek required treatment to lower both turbidity and colour;
5. Raw water turbidity levels in Mission Creek peaked at 4.81 NTU (average daily turbidity) on August 3. Average daily raw water turbidity for August was 2.16 NTU the Mission Creek intake;
6. Turbidity levels at the Distribution Intake (end of Hadden Reservoir) high reading was 0.61 NTU on August 29, 2022. Average clarified water turbidity for August was 0.42 NTU at the Distribution Intake at the lower end of Hadden Reservoir;
7. The highest recorded monthly turbidity level at the first customer (Booster #1) was 0.50 NTU on August 30. Average monthly turbidity at the first customer was 0.39 NTU for August;
8. The highest monthly turbidity daily average at the UV plant was 0.48 NTU on August 26. Average monthly turbidity at the UV plant was 0.38 NTU throughout the month;

9. BMID's Ultraviolet Treatment Facility treated 2,283,772.3 m³ of water, with 5,156.6 m³ of which was "Off-Spec" (0.226%);
10. BMID's Scotty Creek source, used for irrigation in the north-end, resumed operations on May 27, 2022. The Scotty Creek source will remain in operation until irrigation demands reduce in the fall of 2022;
11. Well #4, used as a source for domestic water in the north-end of the distribution system was in operation from August 26 until the end of the month;
12. 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 in operation throughout August. Well #5 will continue to operate throughout the remainder of the summer;
13. Well #6, which supplies irrigation water to the twinned north-end water distribution systems, resumed operations for the summer on May 26. Well #6 was placed on stand-by mode on August 25 as irrigation flows began to reduce from the peak flows of July and early August;
14. *E. Coli* levels at Mission Creek's Point-of-Diversion (creek intake prior to WTP) had normal counts for late summer. The peak count was on the August 2nd sample with a count of 26 coliforms. The average monthly *E. Coli* was 15.6, based on 5 samples;
15. *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 normal counts on all 5 samples. A peak count of 3 was sampled on August 2nd. Average *E. Coli* results for the month indicated 1.6 *E. Coli* coliforms per sample. 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;
16. No *E. Coli* were found in treated water in the distribution system through third-party analysis. However, one sample (3976 Highway 97) had a single Total Coliform colony on the August 2nd sample. In addition, zero positive samples were detected by BMID's in-house presence/absence testing throughout August;

1.0 FLOWS - AUGUST, 2022

The Maximum Daily Flow was on August 1, at 26,171,754 US gallons (99.06 ML)

The Minimum Daily Flow was on August 24, at 13,209,097 US gallons (50.00 ML)

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

Figure 1.1 - Domestic Water System Flow

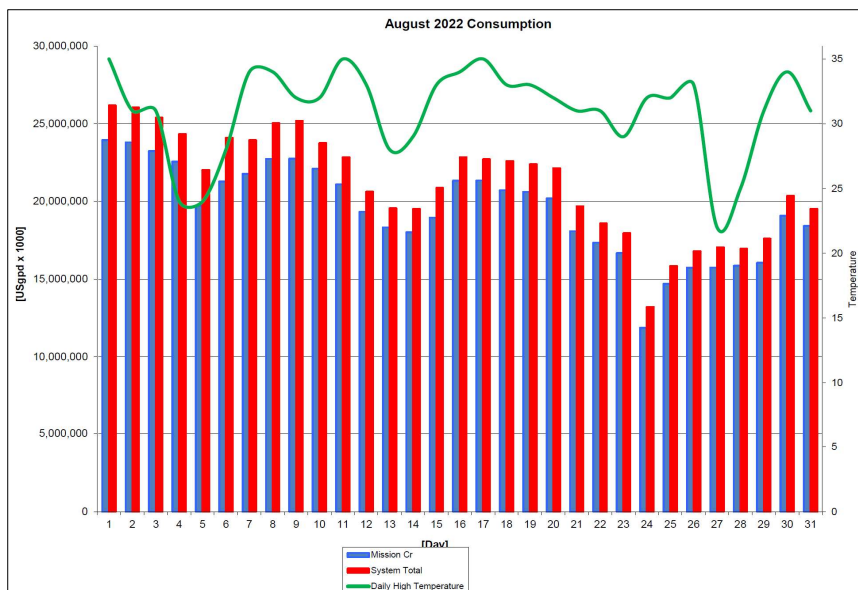


Table 1.2 - August 2022 - Daily Consumption Report

Year	Mission Cr	Well #4	Well #5	Well #6	Scotty Crk	System Total	System Total
2022	Usgpd	Usgpd	Usgpd	Usgpd	Usgpd	Usgpd	ML/Day
1-Aug	23,946,188	0	999,254	279,312	947,000	26,171,754	99.06
2-Aug	23,801,792	0	998,879	278,256	961,000	26,039,927	98.56
3-Aug	23,238,735	0	999,022	277,200	876,000	25,390,957	96.10
4-Aug	22,557,858	0	998,784	268,224	505,000	24,329,866	92.09
5-Aug	19,713,254	0	999,338	276,144	1,033,000	22,021,736	83.35
6-Aug	21,275,541	0	999,164	278,256	1,532,000	24,084,961	91.16
7-Aug	21,766,346	0	998,663	278,256	890,000	23,933,265	90.59
8-Aug	22,735,118	0	998,838	276,408	1,017,000	25,027,364	94.73
9-Aug	22,750,096	0	999,885	275,616	1,162,000	25,187,597	95.34
10-Aug	22,108,766	0	997,306	265,056	379,000	23,750,128	89.89
11-Aug	21,097,199	0	998,135	271,392	476,000	22,842,726	86.46
12-Aug	19,328,488	0	999,524	219,384	73,000	20,620,396	78.05
13-Aug	18,327,619	0	999,593	217,008	14,000	19,558,220	74.03
14-Aug	18,009,186	0	999,146	239,712	261,000	19,509,044	73.84
15-Aug	18,952,043	0	997,350	175,560	735,000	20,859,953	78.95
16-Aug	21,334,108	0	999,459	229,416	273,000	22,835,983	86.43
17-Aug	21,349,879	0	998,943	273,504	93,000	22,715,326	85.98
18-Aug	20,718,667	0	998,705	271,392	598,000	22,586,764	85.49
19-Aug	20,611,016	0	999,993	271,392	509,000	22,391,401	84.75
20-Aug	20,189,556	0	999,278	274,560	673,000	22,136,394	83.79
21-Aug	18,072,403	0	999,336	274,560	342,000	19,688,299	74.52
22-Aug	17,341,439	0	999,228	163,944	72,000	18,576,611	70.31
23-Aug	16,670,099	0	999,318	97,152	181,000	17,947,569	67.93
24-Aug	11,860,530	0	999,775	33,792	315,000	13,209,097	50.00
25-Aug	14,695,228	0	999,337	0	144,000	15,838,565	59.95
26-Aug	15,729,012	38,305	999,051	0	37,000	16,803,368	63.60
27-Aug	15,738,839	93,780	999,087	0	203,000	17,034,707	64.48
28-Aug	15,851,139	93,780	999,718	0	0	16,944,637	64.14
29-Aug	16,046,151	94,045	998,011	0	454,000	17,592,206	66.59
30-Aug	19,075,517	98,800	999,332	0	181,000	20,354,648	77.04
31-Aug	18,416,883	98,800	998,219	0	6,000	19,519,902	73.88
Totals Usgpd	603,308,696	517,509	30,969,671	5,765,496	14,942,000	655,503,372	2481.08
Totals ML	2,283.52	1.96	117.22	21.82	56.56		
Avg's	19,461,571	73.66				21,199,449	80.03
Max	23,946,188	90.64				26,171,754	99.06
Min	11,860,530	44.89				13,209,097	50.00

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) July 2022 - August 2022

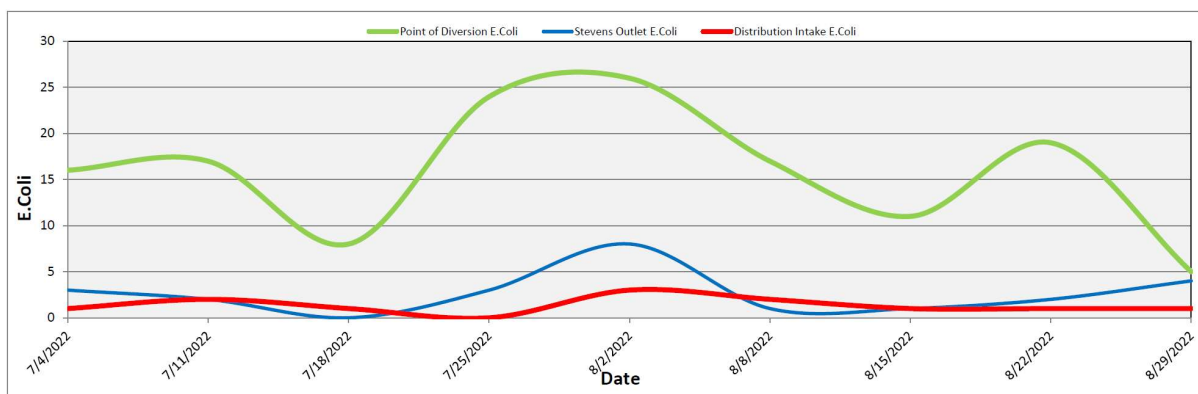


Table 2.1 - *E. Coli* Readings (CARO Labs)

Date	Point of Diversion E.Coli	Stevens Outlet E.Coli	Distribution Intake E.Coli
4-Jul-22	16	3	1
11-Jul-22	17	2	2
18-Jul-22	8	0	1
25-Jul-22	24	3	0
2-Aug-22	26	8	3
8-Aug-22	17	1	2
15-Aug-22	11	1	1
22-Aug-22	19	2	1
29-Aug-22	5	4	1

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 August 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 0.61 NTU on August 29, 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)

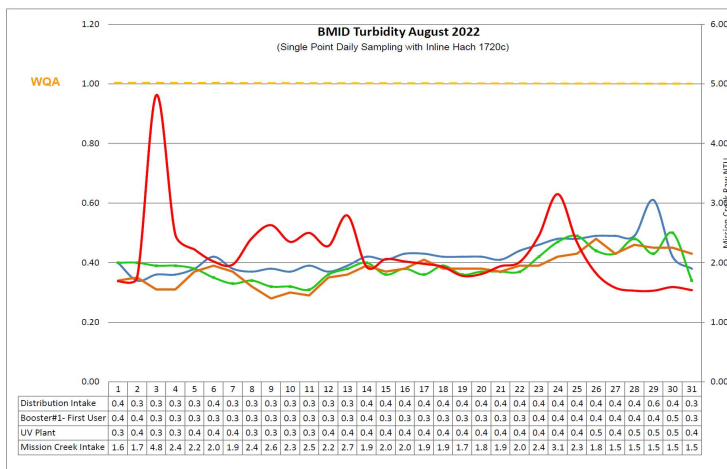


Table 3.1 - Daily Monitoring Record – Turbidity at Distribution Intake & Bst Stn 1

Turbidity Point Sampling for August 2022				
Date	Mission Creek Intake	Distribution Intake	Booster#1- First User	UV Plant
	Daily Average [NTU]	Daily Average [NTU]	Daily Average [NTU]	Daily Average [NTU]
1	1.69	0.40	0.40	0.34
2	1.75	0.34	0.40	0.35
3	4.81	0.36	0.39	0.31
4	2.47	0.36	0.39	0.31
5	2.22	0.38	0.38	0.37
6	2.02	0.42	0.35	0.39
7	1.97	0.38	0.33	0.37
8	2.41	0.37	0.34	0.32
9	2.63	0.38	0.32	0.28
10	2.35	0.37	0.32	0.30
11	2.50	0.39	0.31	0.29
12	2.28	0.37	0.36	0.35
13	2.79	0.39	0.38	0.36
14	1.93	0.42	0.40	0.39
15	2.06	0.41	0.36	0.37
16	2.02	0.43	0.38	0.38
17	1.98	0.43	0.36	0.41
18	1.93	0.42	0.39	0.38
19	1.78	0.42	0.36	0.38
20	1.81	0.42	0.37	0.38
21	1.94	0.41	0.37	0.37
22	2.01	0.44	0.37	0.39
23	2.45	0.46	0.42	0.39
24	3.15	0.48	0.47	0.42
25	2.34	0.48	0.49	0.43
26	1.82	0.49	0.44	0.48
27	1.58	0.49	0.43	0.43
28	1.53	0.49	0.48	0.46
29	1.53	0.61	0.43	0.45
30	1.59	0.42	0.50	0.45
31	1.54	0.38	0.34	0.43
AVG	2.16	0.42	0.39	0.38

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 August, 2022.

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

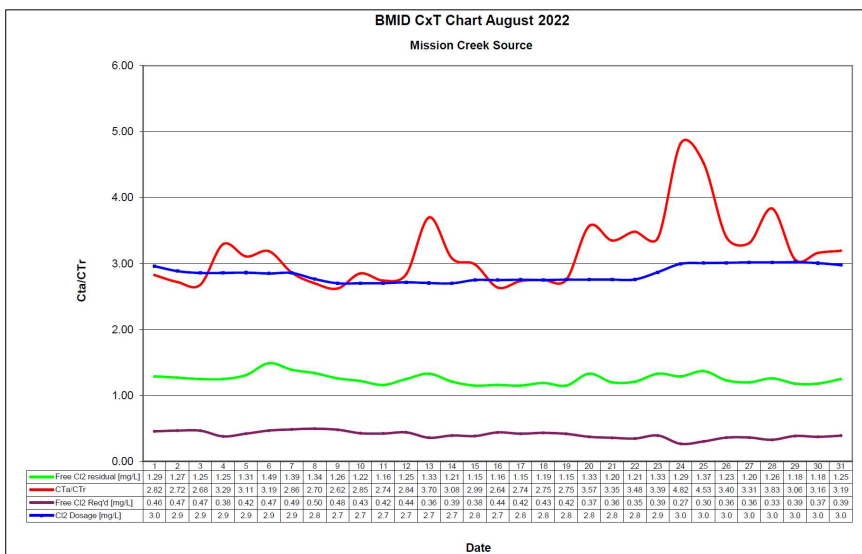


Table 4.2 - CT Table – Mission Creek Source

BMID August 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
August	(Average)	(Present)	FLOW	residual	achieved	req'd		Req'd	Dosage	TOTAL	[mins]	Daily Average	Average
		[°C]	[USgpm]	[mg/L]				[mg/L]	[mg/L]	[USgal]		[USGPM]	[PPD]
1	7.52	21.9	19480	1.29	175.5	62.1	2.82	0.46	3.0	2649600	136	16817	598
2	7.43	21.5	20051	1.27	167.8	61.7	2.72	0.47	2.9	2649600	132	16437	570
3	7.35	19.5	18006	1.25	183.9	68.7	2.68	0.47	2.9	2649600	147	15692	539
4	7.32	21.2	16659	1.25	198.8	60.4	3.29	0.38	2.9	2649600	159	13505	464
5	7.34	19.7	16437	1.31	211.2	67.9	3.11	0.42	2.9	2649600	161	13679	471
6	7.36	19.4	17388	1.49	227.0	71.2	3.19	0.47	2.9	2649600	152	15074	516
7	7.36	19.0	17752	1.39	207.5	72.5	2.86	0.49	2.9	2649600	149	15391	529
8	7.34	19.0	18371	1.34	193.3	71.6	2.70	0.50	2.8	2649600	144	16072	534
9	7.32	19.6	18862	1.26	177.0	67.5	2.62	0.48	2.7	2649600	140	15628	507
10	7.30	19.5	16881	1.22	191.5	67.2	2.85	0.43	2.7	2649600	157	14915	484
11	7.28	19.5	16944	1.16	181.4	66.2	2.74	0.42	2.7	2649600	156	13615	442
12	7.31	19.3	17007	1.25	194.7	68.6	2.84	0.44	2.7	2649600	156	12886	421
13	7.31	20.5	14947	1.33	235.8	63.7	3.70	0.36	2.7	2649600	177	10651	346
14	7.36	19.3	14963	1.21	214.3	69.5	3.08	0.39	2.7	2649600	177	12760	414
15	7.32	19.9	15628	1.15	195.0	65.2	2.99	0.38	2.8	2649600	170	13425	444
16	7.30	19.9	17974	1.16	171.0	64.8	2.64	0.44	2.7	2649600	147	15105	499
17	7.35	20.4	17483	1.15	174.3	63.7	2.74	0.42	2.8	2649600	152	14646	485
18	7.47	20.4	17134	1.19	184.0	66.9	2.75	0.43	2.8	2649600	155	14582	482
19	7.42	20.6	17166	1.15	177.5	64.5	2.75	0.42	2.8	2649600	154	14249	472
20	7.38	20.7	15311	1.33	230.2	64.5	3.57	0.37	2.8	2649600	173	12760	423
21	7.34	20.7	15169	1.20	209.6	62.6	3.35	0.36	2.8	2649600	175	12236	406
22	7.35	21.2	15153	1.21	211.6	60.7	3.48	0.35	2.8	2649600	175	11761	390
23	7.46	20.3	15248	1.33	231.1	68.2	3.39	0.39	2.9	2649600	174	7592	262
24	7.47	20.5	10540	1.29	324.3	67.2	4.82	0.27	3.0	2649600	251	8385	302
25	7.45	20.8	12157	1.37	298.6	66.0	4.53	0.30	3.0	2649600	218	10430	377
26	7.46	19.8	13726	1.23	237.4	69.8	3.40	0.36	3.0	2649600	193	11143	403
27	7.48	19.3	13235	1.20	240.2	72.5	3.31	0.36	3.0	2649600	200	10002	363
28	7.50	20.5	12855	1.26	259.7	67.7	3.83	0.33	3.0	2649600	206	11206	407
29	7.49	19.0	13774	1.18	227.0	74.1	3.06	0.39	3.0	2649600	192	10715	389
30	7.46	20.3	14757	1.18	211.9	67.0	3.16	0.37	3.0	2649600	180	12363	447
31	7.46	20.5	15549	1.25	213.0	66.7	3.19	0.39	3.0	2649600	170	13077	468
Averages	7.39	20.12	16020	1.25	211.48	66.81	3.17	0.40	2.84				

5.0 ULTRAVIOLET DISINFECTION

Total Water Treated:	2,283,772 m ³	100.00%
On-Spec Water:	2,278,616 m ³	99.74%
Off-Spec Water:	5,156 m ³	0.226%

Average monthly chlorine residual before UV Treatment was 1.33 mg/L
The average monthly chlorine residual after UV treatment and re-chlorination was 1.33 mg/L.

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

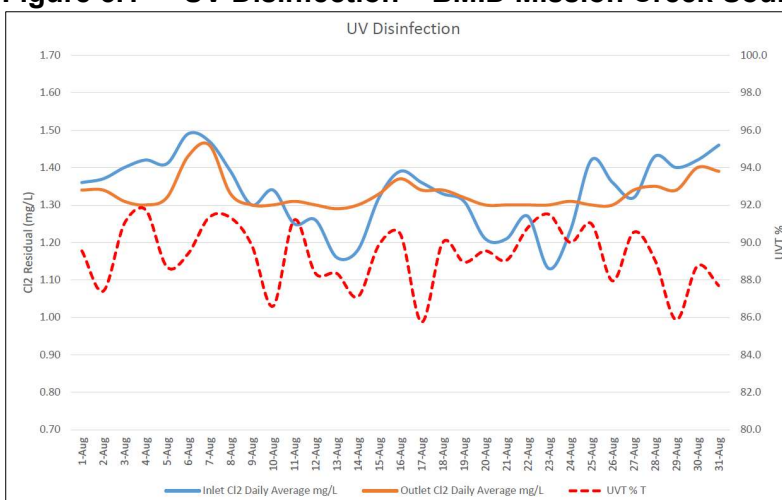


Table 5.2 - UV Disinfection Table – Mission Creek Source

Date	Inlet Cl2	Outlet Cl2	UVT	Turbidity	In Spec Water	Off Spec	Off Spec %
	Daily	Daily					
	mg/L	mg/L			Cubic Meters	Cubic Meters	Percentage
1-Aug	1.36	1.34	89.6	0.34	90,646	0	0.00%
2-Aug	1.37	1.34	87.4	0.35	90,100	0	0.00%
3-Aug	1.40	1.31	91.0	0.31	87,968	0	0.00%
4-Aug	1.42	1.30	91.8	0.31	84,050	1341	1.60%
5-Aug	1.41	1.32	88.7	0.37	73,282	1341	1.83%
6-Aug	1.49	1.43	89.4	0.39	80,537	0	0.00%
7-Aug	1.47	1.46	91.4	0.37	82,395	0	0.00%
8-Aug	1.39	1.33	91.3	0.32	86,062	0	0.00%
9-Aug	1.30	1.30	89.9	0.28	86,119	0	0.00%
10-Aug	1.34	1.30	86.6	0.30	83,691	0	0.00%
11-Aug	1.25	1.31	91.2	0.29	79,862	0	0.00%
12-Aug	1.26	1.30	88.4	0.35	72,877	289	0.40%
13-Aug	1.16	1.29	88.4	0.36	69,088	289	0.42%
14-Aug	1.18	1.30	87.1	0.39	68,172	0	0.00%
15-Aug	1.32	1.33	89.9	0.37	71,741	0	0.00%
16-Aug	1.39	1.37	90.5	0.38	80,758	0	0.00%
17-Aug	1.36	1.34	85.8	0.41	80,818	0	0.00%
18-Aug	1.33	1.34	90.0	0.38	78,429	0	0.00%
19-Aug	1.31	1.32	89.0	0.38	78,021	0	0.00%
20-Aug	1.21	1.30	89.6	0.38	76,299	127	0.17%
21-Aug	1.21	1.30	89.1	0.37	68,284	127	0.19%
22-Aug	1.27	1.30	90.8	0.39	65,521	123	0.19%
23-Aug	1.13	1.30	91.5	0.39	62,980	123	0.20%
24-Aug	1.23	1.31	90.0	0.42	44,897	0	0.00%
25-Aug	1.42	1.30	91.0	0.43	55,628	0	0.00%
26-Aug	1.36	1.30	88.0	0.48	59,541	0	0.00%
27-Aug	1.32	1.34	90.6	0.43	59,578	0	0.00%
28-Aug	1.43	1.35	89.1	0.46	60,003	0	0.00%
29-Aug	1.40	1.34	85.9	0.45	60,044	697	1.16%
30-Aug	1.42	1.40	88.7	0.45	71,512	697	0.97%
31-Aug	1.46	1.39	87.7	0.43	69,716	0	0.00%
Average	1.33	1.33	89.31	0.38	Total 2,278,615.70	5156.6	0.226%

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
- 32 samples were found to be absent of Coliforms.
 - 1 Positive sample on August 2, 222 – 3976 Highway 97
- 33 samples were found to be absent of *E. Coli*.

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

Date	2921 Belgo Rd		Booster 1		Elison Blow-Off		Elison School		3976 Highway 97		Prospect Reservoir		Tower Reservoir		Well #5		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	Coliforms	E.coli
4-Jul-22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11-Jul-22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18-Jul-22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
25-Jul-22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-Aug-22	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Aug-22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8-Aug-22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-Aug-22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
22-Aug-22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
29-Aug-22	0	0	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 12 samples were found to be absent of both *Total Coliforms* and *E. Coli*.

Table 6.2 - BMID In-house Testing – Presence Absence

Location	8/2/2022				8/8/2022				8/15/2022				8/22/2022				8/29/2022					
	Cl2	Temp.	Pres.	Abs.	Cl2	Temp.	Pres.	Abs.	Cl2	Temp.	Pres.	Abs.	Cl2	Temp.	Pres.	Abs.	Cl2	Temp.	Pres.	Abs.		
Sylvania Cres	0.42	21.0	-	X									0.62	22.8	-	X						
170 Kneller Rd	0.71	21.6	-	X									0.64	22.6	-	X						
2105 Morrison Staymen Rd									0.86	20.8	-	X										
260 Campion Rd					0.48	22.8	-	X											0.25	21.6	-	X
Fenwick Rd					0.26	22.4	-	X											0.22	22.2	-	X
Solly Ct	0.88	20.4	-	X									0.7	21.2	-	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) = 12
- Total tests sampled by BMID and tested by Caro Labs 33
- Total tests sampled in BMID treated distribution system = 45
- 1 Positive Total Coliform Sample