



MONTHLY REPORTING PERIOD - JULY, 2021

1. SUMMARY

The list below provides a summary of the water quality information collected by BMID in July 2021. Documentation and figures are provided on the following pages to support this submission.

Source	Total (US Gals)	Total (Mega Litres)
Mission Creek	766,893,429	2902.69
Well 4	0	0
Well 5	30,973,296	117.23
Well 6 (Irrigation Only)	30,499,000	115.44
Scotty Creek (Irrigation Only)	51,463,000	194.79
Total	879,828,725	3,330.15

1. The month of July had minimal precipitation and water demands were very high. The overall consumption for July 2021 was 126% of the ten-year average for the month. Overall flows through the WTP and through the system were much higher than normal.
2. 27 of the 31 days in July experienced temperatures above 30 degrees Celsius. Additionally, only 0.2mm of rainfall was recorded for the month;
3. Stage 1 water restrictions were introduced by BMID on July 16. There was an 8% reduction in average daily water consumption from the first 15 days of the month to the last 16 days of July;
4. Resulting from the record heat and prolonged dry spring/summer, BMID began to release water from its high-elevation storage reservoirs some three weeks earlier than usual. Although the reservoirs were full in the spring, BMID staff will continue to monitor water levels throughout the summer;
5. Beginning on June 28 and extending to July 8, the demand on the Water Treatment Plant was above capacity. As a result, the secondary intake from Mission Creek was utilized to make up the shortfall. This intake bypasses the WTP, however, the raw water quality in Mission Creek had improved enough to allow for blending. It is estimated that this raw water accounted for under 10% of the total Mission Creek volume for those eleven days. All water quality guidelines continued to be met during this period;
6. 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 has been minimal over the past 12 months. Monitoring has showed minor variations in groundwater levels, but no substantial changes. The hillside is being monitored for surface movement on a monthly basis and groundwater levels as required.
7. The WTP resumed full-time operations on March 21, 2021 as turbidity levels began to necessitate treatment. The WTP ran throughout July and will continue to operate until raw water quality improves in the late-fall or early-Winter;

8. Raw water turbidity levels in Mission Creek peaked at 1.72 NTU (average daily turbidity) on July 1 as Mission Creek's freshet ended the previous month. Average daily turbidity for July was 1.04 NTU at the intake;
9. Turbidity levels at the Distribution Intake (end of Hadden Reservoir) high reading was 0.55 NTU on July 03, 2021. Average turbidity for July was 0.43 NTU at the Distribution Intake at the lower end of Hadden Reservoir;
10. The highest recorded monthly turbidity level at the first customer (Booster #1) was 0.45 NTU on July 2, 2021. Average monthly turbidity at the first customer was 0.30 NTU for July;
11. BMID's Ultraviolet Treatment Facility treated 2,903,008 m³ of water, 695 m³ of which was "Off-Spec" (0.024%). Average UV Transmissivity was 88.57%. The average inlet chlorine residual level at the UV site was 1.27 mg/L. The average outgoing chlorine was 1.29 mg/L after the sodium hypochlorite top-up system;
12. BMID's Scotty Creek source, used for irrigation in the north-end, resumed operations on May 25, 2021. The Scotty Creek source will remain available for irrigation use until flows reduce later in the fall;
13. Well #4 was placed on stand-by on May 15 and will be available to provide domestic water when flows reduce in the fall;
14. Well #5, used as the primary domestic water source in the north-end of the system for both irrigation and domestic consumption, resumed operations on May 4. Well #5 remained in operation for all of July. Well #5 will continue to provide both domestic and irrigation water until flows reduce later in the fall;
15. Well #6, which supplies irrigation water to the twinned north-end water distribution systems, resumed operation on May 14 and will continue to operate for the remainder of the summer;
16. *E.Coli* levels at Mission Creek's Point-of-Diversion (creek intake prior to WTP) had normal counts for summer with a peak count of 93 on July 5, 2021. The average *E.Coli* count was 60.25 for the month based on 4 samples;
17. *E.Coli* levels in the raw water at the water distribution system intake down-stream of the WTP, immediately prior to disinfection, had zero counts on 2 out of 4 samples with a peak count of 2 on July 19, 2021. The reduction in *E.Coli* levels is credited to the settling of particles in the water in Stevens and Hadden Reservoirs;
18. No *E.Coli* or *Total Coliforms* were found in treated water in the distribution system through third-party analysis. In addition, no positive samples were detected by BMID's in-house presence/absence testing throughout July;
19. On June 30, 2021, there were three fires started by lightning in the upper Mission Creek watershed. The largest is the Derickson Lake fire. The fire is located just below the catchment area of the three BMID reservoirs on the Graystoke plateau. BMID is staying in contact with the BC Wildfire Service in regards to the location and protection of BMID facilities in the watershed that consist of 3 reservoir/dam sites at Graystoke, Fish Hawk and Loch Long.

1.0 FLOWS - JULY, 2021

The Maximum Daily Flow was on July 1, at 34,406,928 US gallons (130.23 ML)

The Minimum Daily Flow was on July 31, at 24,498,175 US gallons (92.73 ML)

Mission Creek provided 87% of domestic and irrigation flow throughout July.

Figure 1.1 - Domestic Water System Flow

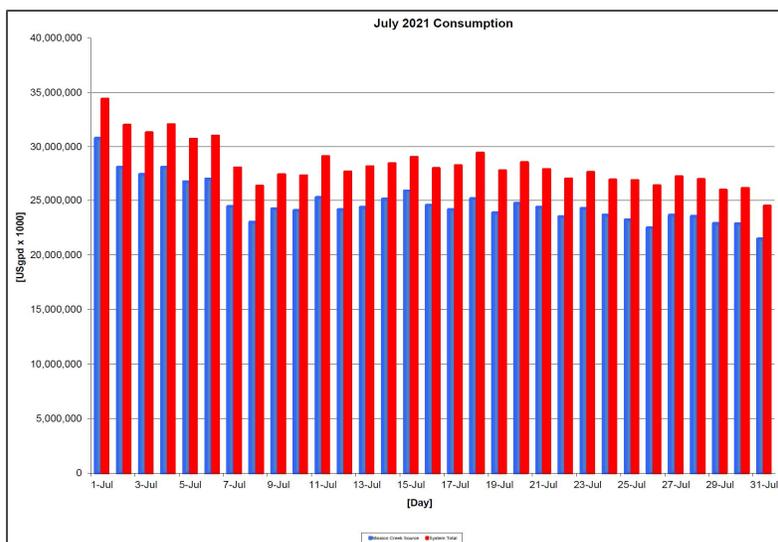


Table 1.2 - July 2021 - Daily Consumption Report

Year	Mission Cr	Well #4	Well #5	Well #6	Scotty Crk	System Total	System Total
2021	Usgpd	Usgpd	Usgpd	Usgpd	Usgpd	Usgpd	ML/Day
1-Jul	30,779,868	0	999,060	1,043,000	1,585,000	34,406,928	130.23
2-Jul	28,106,923	0	999,487	1,038,000	1,877,000	32,021,410	121.20
3-Jul	27,447,286	0	999,880	1,036,000	1,838,000	31,321,166	118.55
4-Jul	28,116,301	0	998,580	1,035,000	1,913,000	32,062,881	121.36
5-Jul	26,788,388	0	999,941	1,031,000	1,915,000	30,734,329	116.33
6-Jul	27,048,941	0	997,608	1,030,000	1,942,000	31,018,549	117.41
7-Jul	24,429,253	0	999,961	1,029,000	1,643,000	28,101,214	106.36
8-Jul	22,988,617	0	998,739	1,031,000	1,390,000	26,408,356	99.96
9-Jul	24,210,386	0	999,677	1,028,000	1,226,000	27,464,063	103.95
10-Jul	24,063,058	0	999,722	1,027,000	1,278,000	27,367,780	103.59
11-Jul	25,253,522	0	999,089	1,023,000	1,858,000	29,133,611	110.27
12-Jul	24,133,142	0	999,699	1,023,000	1,566,000	27,721,841	104.93
13-Jul	24,348,628	0	998,962	1,022,000	1,836,000	28,205,590	106.76
14-Jul	25,095,521	0	998,558	1,006,000	1,376,000	28,476,079	107.78
15-Jul	25,876,123	0	999,459	949,000	1,237,000	29,061,582	110.00
16-Jul	24,551,432	0	999,347	909,000	1,574,000	28,033,779	106.11
17-Jul	24,152,638	0	999,567	848,000	2,289,000	28,289,205	107.07
18-Jul	25,147,827	0	999,087	873,000	2,440,000	29,459,914	111.51
19-Jul	23,848,867	0	998,671	854,000	2,131,000	27,832,538	105.35
20-Jul	24,726,763	0	999,769	870,000	1,989,000	28,585,532	108.20
21-Jul	24,368,837	0	998,828	984,000	1,596,000	27,947,665	105.78
22-Jul	23,507,028	0	998,669	942,000	1,629,000	27,076,697	102.49
23-Jul	24,243,408	0	999,332	974,000	1,448,000	27,664,740	104.71
24-Jul	23,643,922	0	999,324	923,000	1,412,000	26,978,246	102.11
25-Jul	23,201,012	0	998,443	924,000	1,818,000	26,941,455	101.97
26-Jul	22,478,792	0	998,521	1,008,000	1,961,000	26,446,313	100.10
27-Jul	23,631,823	0	998,368	1,006,000	1,647,000	27,283,191	103.27
28-Jul	23,539,627	0	999,110	1,009,000	1,477,000	27,024,737	102.29
29-Jul	22,874,389	0	999,347	1,009,000	1,165,000	26,047,736	98.59
30-Jul	22,843,323	0	999,097	1,007,000	1,364,000	26,213,420	99.22
31-Jul	21,447,781	0	999,394	1,008,000	1,043,000	24,498,175	92.73
Totals Usgpd	766,893,429		30,973,296	30,499,000	51,463,000	879,828,725	3,330
Totals ML	2,902.69	0.00	117.23	115.44	194.79		
Avg's	24,738,498	93.64				28,381,572	107.42
Max	30,779,868	116.50				34,406,928	130.23
Min	21,447,781	81.18				24,498,175	92.73

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) June 2021 - July 2021

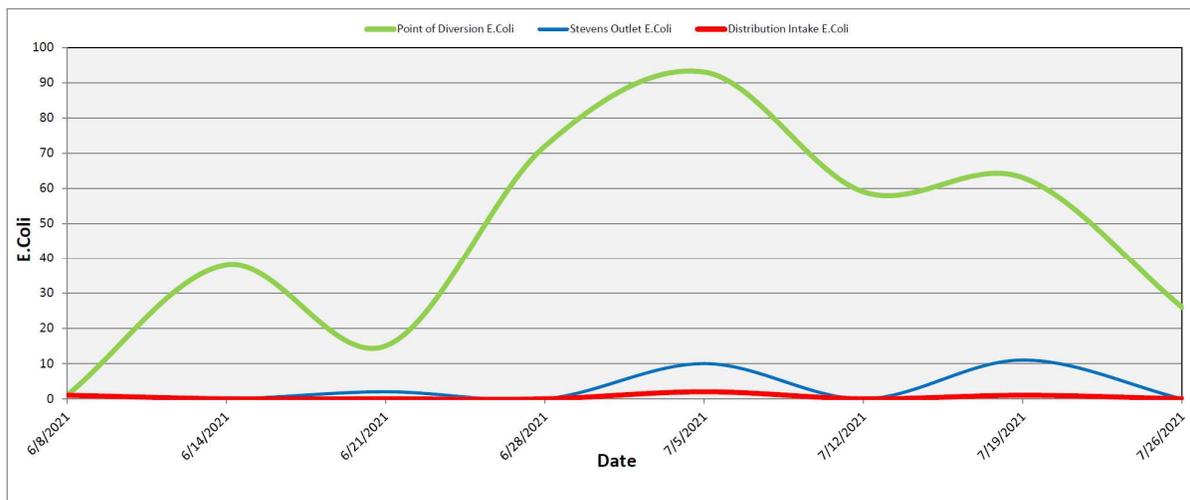


Table 2.1 - *E. Coli* Readings (CARO Labs)

Date	Point of Diversion E.Coli	Stevens Outlet E.Coli	Distribution Intake E.Coli
8-Jun-21	1	1	1
14-Jun-21	38	0	0
21-Jun-21	15	2	0
28-Jun-21	72	0	0
5-Jul-21	93	10	2
12-Jul-21	59	0	0
19-Jul-21	63	11	1
26-Jul-21	26	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 July 2021, 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 0.45 NTU on July 2, 2021.

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)

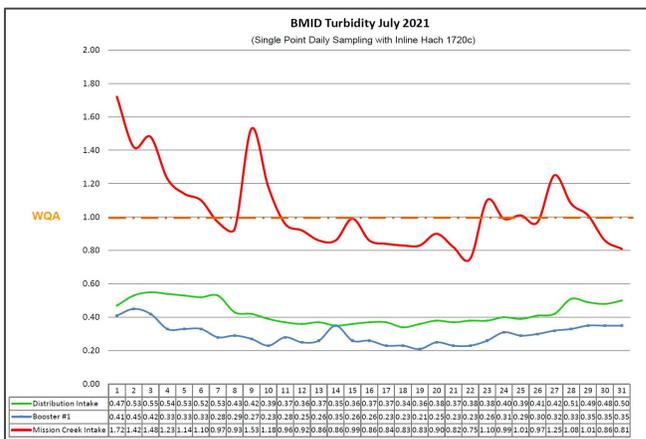


Table 3.1 - Daily Monitoring Record – Turbidity at Distribution Intake & Bst Stn 1

Turbidity Point Sampling for July 2021			
Date	Mission Creek Intake Daily Average [NTU]	Distribution Intake Daily Average [NTU]	Booster#1- First User Daily Average [NTU]
1	1.72	0.47	0.41
2	1.42	0.53	0.45
3	1.48	0.55	0.42
4	1.23	0.54	0.33
5	1.14	0.53	0.33
6	1.10	0.52	0.33
7	0.97	0.53	0.28
8	0.93	0.43	0.29
9	1.53	0.42	0.27
10	1.18	0.39	0.23
11	0.96	0.37	0.28
12	0.92	0.36	0.25
13	0.86	0.37	0.26
14	0.86	0.35	0.35
15	0.99	0.36	0.26
16	0.86	0.37	0.26
17	0.84	0.37	0.23
18	0.83	0.34	0.23
19	0.83	0.36	0.21
20	0.90	0.38	0.25
21	0.82	0.37	0.23
22	0.75	0.38	0.23
23	1.10	0.38	0.26
24	0.99	0.40	0.31
25	1.01	0.39	0.29
26	0.97	0.41	0.30
27	1.25	0.42	0.32
28	1.08	0.51	0.33
29	1.01	0.49	0.35
30	0.86	0.48	0.35
31	0.81	0.50	0.35
AVG	1.04	0.43	0.30

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 July, 2021.

Figure 4.1 - CT Trending – BMID Mission Creek Source – July 2021

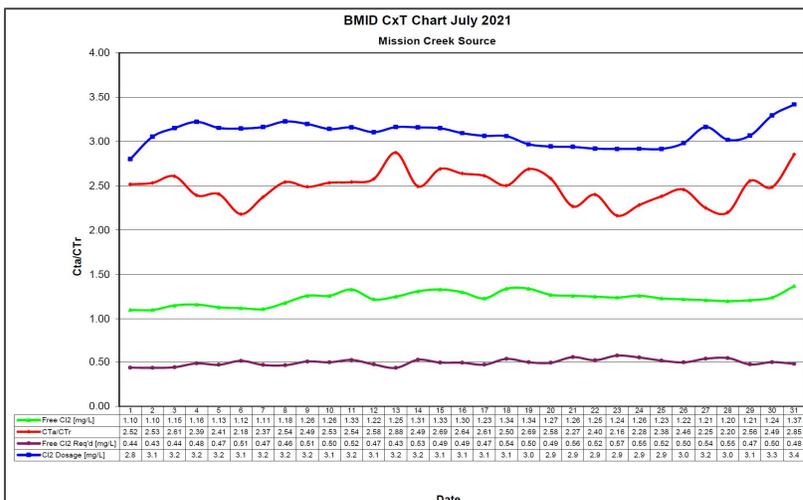


Table 4.2 - CT Table – Mission Creek Source

BMID July 2021													
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	[mg/L]	achieved	req'd		Req'd	Dosage	TOTAL	[mins]	Daily Average	Average
July		[°C]	[Usgpm]					[mg/L]	[mg/L]	[USgal]		[USGPM]	[PPD]
1	7.51	25.3	24,251	1.10	120.2	47.7	2.52	0.44	2.8	2649600	109	21,763	733
2	7.54	24.8	23,031	1.10	126.6	50.0	2.53	0.43	3.1	2649600	115	19,876	729
3	7.54	23.9	21,826	1.15	139.6	53.5	2.61	0.44	3.2	2649600	121	19,401	735
4	7.57	23.5	23,062	1.16	133.3	55.7	2.39	0.48	3.2	2649600	115	19,417	752
5	7.57	22.9	21,509	1.13	139.2	57.8	2.41	0.47	3.2	2649600	123	18,941	718
6	7.56	22.2	22,523	1.12	131.8	60.4	2.18	0.51	3.1	2649600	118	19,147	724
7	7.53	23.0	21,937	1.11	134.1	56.5	2.37	0.47	3.2	2649600	121	17,261	656
8	7.54	21.1	18,846	1.18	165.9	65.3	2.54	0.46	3.2	2649600	141	16,278	631
9	7.56	21.2	20,352	1.26	164.0	65.9	2.49	0.51	3.2	2649600	130	17,103	657
10	7.56	21.1	19,845	1.26	168.2	66.4	2.53	0.50	3.1	2649600	134	17,118	646
11	7.53	21.1	20,938	1.33	168.3	66.2	2.54	0.52	3.2	2649600	127	17,848	678
12	7.53	21.2	19,322	1.22	167.3	64.9	2.58	0.47	3.1	2649600	137	17,007	635
13	7.51	22.7	19,765	1.25	167.6	58.3	2.88	0.43	3.2	2649600	134	17,150	652
14	7.50	21.2	21,446	1.31	161.9	64.9	2.49	0.53	3.2	2649600	124	17,737	674
15	7.49	21.6	20,780	1.33	169.6	63.0	2.69	0.49	3.1	2649600	128	18,339	694
16	7.52	21.4	20,273	1.30	169.9	64.4	2.64	0.49	3.1	2649600	131	17,356	646
17	7.54	21.0	18,862	1.23	172.8	66.1	2.61	0.47	3.1	2649600	140	17,071	629
18	7.54	20.9	21,033	1.34	168.8	67.4	2.50	0.54	3.1	2649600	126	17,768	654
19	7.56	21.0	19,575	1.34	181.4	67.5	2.69	0.50	3.0	2649600	135	16,865	602
20	7.58	21.1	19,480	1.27	172.7	66.9	2.58	0.49	2.9	2649600	136	17,499	619
21	7.61	19.9	20,051	1.26	166.5	73.4	2.27	0.56	2.9	2649600	132	17,214	608
22	7.64	20.0	18,735	1.25	176.8	73.6	2.40	0.52	2.9	2649600	141	16,611	583
23	7.67	19.9	20,304	1.24	161.8	74.8	2.16	0.57	2.9	2649600	130	17,134	601
24	7.63	19.5	19,227	1.26	173.6	76.0	2.28	0.55	2.9	2649600	138	16,706	586
25	7.64	20.8	19,702	1.23	165.4	69.5	2.38	0.52	2.9	2649600	134	16,421	576
26	7.65	20.9	19,020	1.22	169.9	69.1	2.46	0.50	3.0	2649600	139	15,882	569
27	7.64	20.6	20,273	1.21	158.1	70.3	2.25	0.54	3.2	2649600	131	15,930	606
28	7.64	19.8	19,480	1.20	163.2	74.2	2.20	0.55	3.0	2649600	136	16,627	603
29	7.62	21.3	18,878	1.21	169.8	66.5	2.56	0.47	3.1	2649600	140	16,167	596
30	7.61	20.8	19,211	1.24	171.0	68.8	2.49	0.50	3.3	2649600	138	16,152	639
31	7.58	20.8	18,402	1.37	197.3	69.1	2.85	0.48	3.4	2649600	144	15,169	623
Averages	7.57	21.5	20385	1.23	161.18	65	2.49	0.4969	3.087				

5.0 ULTRAVIOLET DISINFECTION

Total Water Treated:	2,903,008.0 m ³	100.00%
On-Spec Water:	2,902,312.7 m ³	99.976%
Off-Spec Water:	695.3 m ³	0.024%

Average monthly chlorine residual before UV Treatment was 1.27 mg/L
The average monthly chlorine residual after UV treatment and re-chlorination was 1.29 mg/L.

Figure 5.1 - UV Disinfection – BMID Mission Creek Source – July 2021

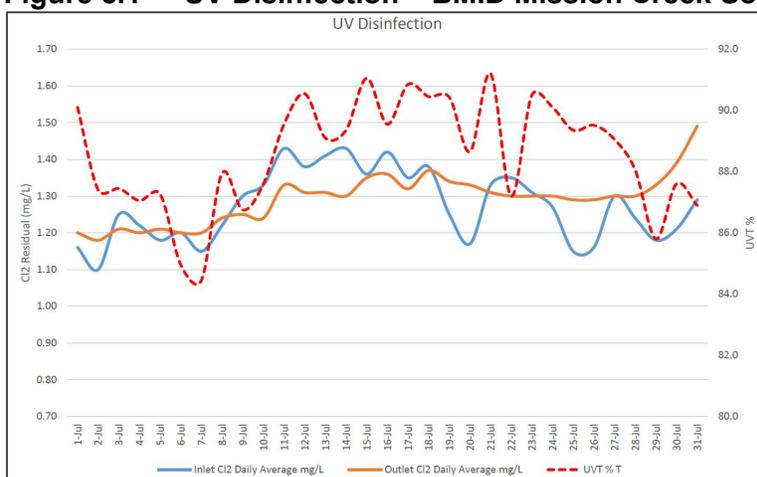


Table 5.2 - UV Disinfection Table – Mission Creek Source

	Inlet Cl2	Outlet Cl2		UVT		In Spec Water	Off Spec Water	Off Spec % of
Date	Daily	Daily		% T		Volume	Volume	Water Volume
	mg/L	mg/L				Cubic Meters	Cubic Meters	Percentage
1-Jul	1.16	1.20		90.1		116,467.90	46.6	0.04%
2-Jul	1.10	1.18		87.4		106,394.00	2.3	0.00%
3-Jul	1.25	1.21		87.5		103,899.30	0	0.00%
4-Jul	1.22	1.20		87.1		106,431.80	0	0.00%
5-Jul	1.18	1.21		87.3		101,405.10	0	0.00%
6-Jul	1.20	1.20		85.0		102,391.40	0	0.00%
7-Jul	1.15	1.20		84.5		92,474.80	0	0.00%
8-Jul	1.22	1.24		88.0		87,021.40	0	0.00%
9-Jul	1.30	1.25		86.8		91,646.30	0	0.00%
10-Jul	1.33	1.24		87.6		91,088.60	0	0.00%
11-Jul	1.43	1.33		89.6		95,595.00	0	0.00%
12-Jul	1.38	1.31		90.5		91,046.80	307.1	0.34%
13-Jul	1.41	1.31		89.1		91,846.50	323.1	0.35%
14-Jul	1.43	1.30		89.4		94,980.70	16.2	0.02%
15-Jul	1.36	1.35		91.1		97,951.80	0	0.00%
16-Jul	1.42	1.36		89.6		92,937.30	0	0.00%
17-Jul	1.35	1.32		90.9		91,427.70	0	0.00%
18-Jul	1.38	1.37		90.5		95,194.90	0	0.00%
19-Jul	1.25	1.34		90.4		90,277.80	0	0.00%
20-Jul	1.17	1.33		88.7		93,601.00	0	0.00%
21-Jul	1.33	1.31		91.2		92,246.10	0	0.00%
22-Jul	1.35	1.30		87.2		88,983.80	0	0.00%
23-Jul	1.31	1.30		90.5		91,771.30	0	0.00%
24-Jul	1.27	1.30		90.1		89,502.00	0	0.00%
25-Jul	1.15	1.29		89.4		87,825.40	0	0.00%
26-Jul	1.16	1.29		89.5		85,091.50	0	0.00%
27-Jul	1.30	1.30		89.1		89,456.20	0	0.00%
28-Jul	1.24	1.30		88.1		89,107.20	0	0.00%
29-Jul	1.18	1.33		85.8		86,589.00	0	0.00%
30-Jul	1.21	1.39		87.6		86,471.40	0	0.00%
31-Jul	1.29	1.49		86.9		81,188.70	0	0.00%
Average	1.27	1.29		88.57	Total	2,902,312.70	695.3	0.024%

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	2921 Belgio Rd		Booster 1		Elison Blow-Off		Elison School		3976 Highway 97		Prospect Reservoir		Tower Reservoir		Well #6		Well #5		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
8-Jun-21	0	0	0	0	-	-	-	-	-	-	0	0	-	-	0	0	0	0	0	0	0	0
14-Jun-21	-	-	0	0	0	0	-	-	-	-	-	-	-	-	0	0	0	0	-	-	-	-
21-Jun-21	0	0	0	0	-	-	-	-	-	-	0	0	-	-	-	-	0	0	0	0	0	0
28-Jun-21	-	-	0	0	0	0	0	0	0	0	-	-	-	-	0	0	0	0	-	-	-	-
5-Jul-21	0	0	0	0	-	-	-	-	-	-	0	0	-	-	0	0	0	0	0	0	0	0
12-Jul-21	-	-	0	0	0	0	0	0	0	0	-	-	0	0	-	-	0	0	-	-	-	-
19-Jul-21	0	0	0	0	-	-	-	-	-	-	0	0	-	-	-	-	0	0	0	0	0	0
26-Jul-21	-	-	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 nine samples were found to be absent of both *Total Coliforms* and *E.Coli*.

Table 6.2 - BMID In-house Testing – Presence Absence

Location	7/5/2021				7/12/2021				7/19/2021				7/26/2021				
	Cl2	Temp.	Pres.	Abs.	Cl2	Temp.	Pres.	Abs.	Cl2	Temp.	Pres.	Abs.	Cl2	Temp.	Pres.	Abs.	
Sylvania Cres	0.36	23.0	-	X											22.4	-	X
170 Kneller Rd	0.55	23.0	-	X													
2105 Morrison Staymen Rd									1.12	21.4	-	X					
260 Campion Rd					0.25	21.6	-	X	0.99	20.8	-	X					
Fenwick Rd					0.17	22.8	-	X									
Solly Ct	0.57	23	-	X											21.8	-	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 (Zero Positive Samples)