



MONTHLY REPORTING PERIOD - JULY, 2020

1. SUMMARY

The list below provides a summary of the water quality information collected by BMID in July, 2020. Documentation and figures are provided on the following pages to support this submission.

Source	Total (US Gals)	Total (Mega Litres)
Mission Creek	605,963,238	2,293.57
Well 4	3,730,000	14.12
Well 5	25,940,041	98.18
Well 6 (Irrigation Only)	16,512,000	62.50
Scotty Creek (Irrigation Only)	13,026,000	49.30
Total	665,171,279	2,517.67

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 has been minimal over the past 12 months. Monitoring has not showed any increase in the groundwater levels. The hillside is being monitored for surface movement on a monthly basis and groundwater levels as required.
2. The Water Treatment Plant resumed full-time operations in April, and the plant continued to operate throughout July. It is expected that the WTP will continue to run until raw water quality improves in late fall or early winter;
3. Raw water turbidity levels in Mission Creek peaked at 14.42 NTU on July 2, 2020. Turbidity levels at the Distribution Intake (end of Hadden Reservoir) peaked at 0.36 NTU on July 4, 2020. The significant reduction in turbidity demonstrates the effectiveness of BMID's Water Treatment Plant. Average turbidity for July was 0.24 NTU at the Distribution Intake;
4. The highest recorded monthly turbidity level at the first customer (Booster #1) was 0.38 NTU on July 5 and 6, 2020. Average monthly turbidity at the first customer was 0.22 NTU for July;
5. BMID's Ultraviolet Treatment Facility treated 2,033,661.3 m³ of water of which only 149.8 m³ was "Off-Spec". Average UV Transmissivity was 93.11%. The average inlet chlorine residual level at the UV site was 1.35 mg/L. The average outgoing chlorine was 1.39 mg/L after the sodium hypochlorite top-up system;
6. BMID's Scotty Creek source, used for irrigation in the north-end, resumed summer operations on July 10 and the source was in use for the remainder of the month;
7. Well # 4 was used as a domestic water source throughout early July, as the source was used to provide additional supply during the transition to high flow periods;
8. Well #5, commonly used as the primary domestic water source in the north-end of the system for both irrigation and domestic consumption during the summer was used for the majority of the month. Well #5 is expected to supply domestic water to the north-end until flows reduce later in the fall;

9. Well #6, which supplies irrigation water to the dual north-end water distribution systems was used in the latter half of July beginning on the 14th;
10. *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 82 on July 3, 2020. The average *E.Coli* count was 22.9 for the month based on 9 samples;
11. *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 most samples. Peak *E.Coli* counts were sampled on July 15 and 22 with counts of 2 respectively. The reduction in *E.Coli* levels is credited to the settling of particles in the water in Stevens and Hadden Reservoirs;
12. 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;
13. Disinfection by-products (Haloacetic acids and Trihalomethanes) were monitored at four sites throughout the distribution system. Both THMs and HAAs were below the Canadian Drinking Water Guidelines;

1.0 FLOWS - JULY, 2020

The Maximum Daily Flow was on July 29, at 30,567,700 US gallons (115.70 ML)

The Minimum Daily Flow was on July 2, at 6,372,404 US gallons (24.12 ML)

Mission Creek provided 91% of domestic and irrigation flow throughout July.

Figure 1.1 - Domestic Water System Flow

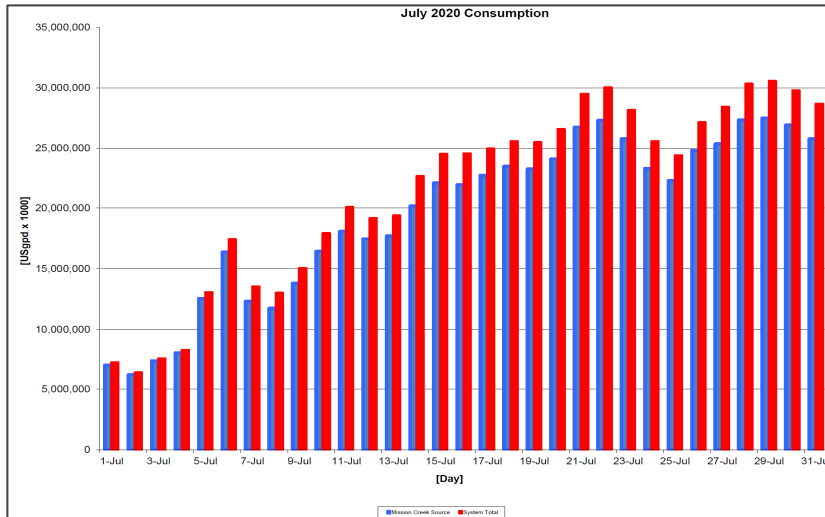


Table 1.2 - July 2020 - Daily Consumption Report

Year	Mission Cr	Well #4	Well #5	Well #6	Scotty Crk	System Total	System Total
2020	Usgpd	Usgpd	Usgpd	Usgpd	Usgpd	Usgpd	ML/Day
1-Jul	6,989,939	210,000	0	0	0	7,199,939	27.25
2-Jul	6,187,404	185,000	0	0	0	6,372,404	24.12
3-Jul	7,342,052	193,000	0	0	0	7,535,052	28.52
4-Jul	7,991,137	273,000	0	0	0	8,264,137	31.28
5-Jul	12,556,065	302,000	200,893	0	0	13,058,958	49.43
6-Jul	16,356,520	310,000	756,493	0	0	17,423,013	65.95
7-Jul	12,322,926	225,000	999,873	0	0	13,547,799	51.28
8-Jul	11,747,350	269,000	999,987	0	0	13,016,337	49.27
9-Jul	13,802,272	245,000	999,235	0	0	15,046,507	56.95
10-Jul	16,421,377	341,000	999,774	0	161,000	17,923,151	67.84
11-Jul	18,068,775	347,000	998,791	0	667,000	20,081,566	76.01
12-Jul	17,461,914	289,000	999,265	0	412,000	19,162,179	72.53
13-Jul	17,689,627	337,000	999,206	0	345,000	19,370,833	73.32
14-Jul	20,160,498	144,000	998,982	290,000	1,108,000	22,701,480	85.93
15-Jul	22,049,324	0	999,741	0	1,488,000	24,537,065	92.87
16-Jul	21,904,033	0	999,825	540,000	1,140,000	24,583,858	93.05
17-Jul	22,762,188	0	999,354	1,084,000	126,000	24,971,542	94.52
18-Jul	23,513,738	0	999,494	1,056,000	0	25,569,232	96.78
19-Jul	23,291,447	60,000	998,776	1,057,000	95,000	25,502,223	96.53
20-Jul	24,131,811	0	998,738	1,064,000	398,000	26,592,549	100.65
21-Jul	26,750,990	0	998,579	1,069,000	693,000	29,511,569	111.70
22-Jul	27,308,613	0	998,600	1,068,000	662,000	30,037,213	113.69
23-Jul	25,788,969	0	999,755	1,055,000	326,000	28,169,724	106.62
24-Jul	23,339,289	0	999,288	1,053,000	197,000	25,588,577	96.85
25-Jul	22,249,180	0	999,534	1,051,000	128,000	24,427,714	92.46
26-Jul	24,831,332	0	999,909	1,057,000	264,000	27,152,241	102.77
27-Jul	25,376,066	0	999,756	970,000	1,078,000	28,423,822	107.58
28-Jul	27,350,943	0	999,969	941,000	1,056,000	30,347,912	114.87
29-Jul	27,507,916	0	999,784	1,053,000	1,007,000	30,567,700	115.70
30-Jul	26,918,027	0	997,637	1,064,000	817,000	29,796,664	112.78
31-Jul	25,791,516	0	998,803	1,040,000	858,000	28,688,319	108.59
Totals Usgpd	605,963,238	3,730,000	25,940,041	16,512,000	13,026,000	665,171,279	2517.67
Totals ML	2,293.57	14.12	98.18	62.50	49.30		
Avg's	19,547,201	73.99				21,216,099	81.22
Max	27,507,916	104.12				30,567,700	115.70
Min	6,187,404	23.42				6,372,404	24.12

2.0 RAW WATER QUALITY - BACTERIOLOGICAL MONITORING

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

Samples were taken twice per week at the Distribution Intake's Point of Disinfection and at the Mission Creek raw water Point of Diversion; one sample is taken per week 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 2019 -July 2020

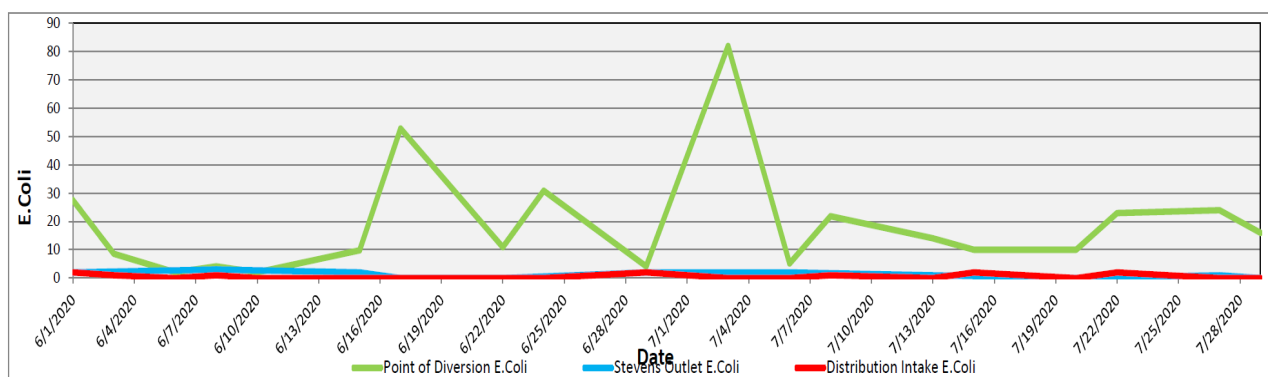


Table 2.1 - *E. Coli* Readings (CARO Labs)

Date	Point of Diversion E. Coli	Stevens Outlet E. Coli	Distribution Intake E. Coli
1-Jun-20	27.5	2	2
3-Jun-20	8.6	1	1
6-Jun-20	2	0	0
8-Jun-20	4.1	3	1
10-Jun-20	2	0	0
15-Jun-20	9.8	2	0
17-Jun-20	52.9	0	0
22-Jun-20	10.9	0	0
24-Jun-20	30.9	0	0
29-Jun-20	4.1	2	2
3-Jul-20	82	0	0
6-Jul-20	5.2	2	0
8-Jul-20	21.8	1	1
13-Jul-20	14.1	0	0
15-Jul-20	10	0	2
20-Jul-20	10	0	0
22-Jul-20	23	2	2
27-Jul-20	24	1	0
29-Jul-20	16	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 2020, 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 0.38 NTU on July 5 and 6.

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

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

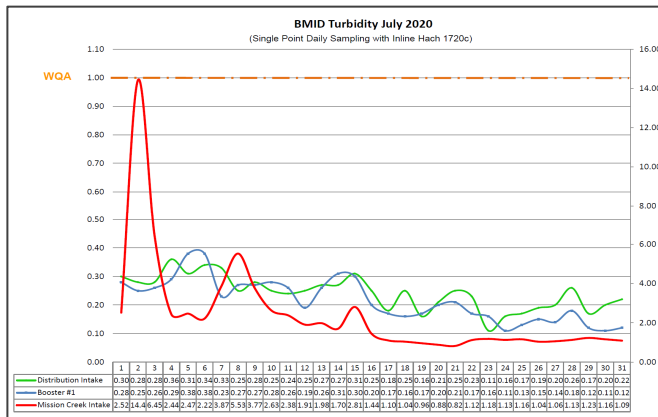


Table 3.1 - Daily Monitoring Record – Turbidity at Distribution Intake & Bst Stn 1

Turbidity Point Sampling for July 2020			
Date	Mission Creek Intake	Distribution Intake	Booster#1- First User
	Daily Average [NTU]	Daily Average [NTU]	Daily Average [NTU]
1	2.52	0.30	0.28
2	14.42	0.28	0.25
3	6.45	0.28	0.26
4	2.44	0.36	0.29
5	2.47	0.31	0.38
6	2.22	0.34	0.38
7	3.87	0.33	0.23
8	5.53	0.25	0.27
9	3.77	0.28	0.27
10	2.63	0.25	0.28
11	2.38	0.24	0.26
12	1.91	0.25	0.19
13	1.98	0.27	0.26
14	1.70	0.27	0.31
15	2.81	0.31	0.30
16	1.44	0.25	0.20
17	1.10	0.18	0.17
18	1.04	0.25	0.16
19	0.96	0.16	0.17
20	0.88	0.21	0.20
21	0.82	0.25	0.21
22	1.12	0.23	0.17
23	1.18	0.11	0.16
24	1.13	0.16	0.11
25	1.16	0.17	0.13
26	1.04	0.19	0.15
27	1.06	0.20	0.14
28	1.13	0.26	0.18
29	1.23	0.17	0.12
30	1.16	0.20	0.11
31	1.09	0.22	0.12
AVG	2.41	0.24	0.22

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, 2020.

Figure 4.1 - CT Trending – BMID Mission Creek Source – July 2020

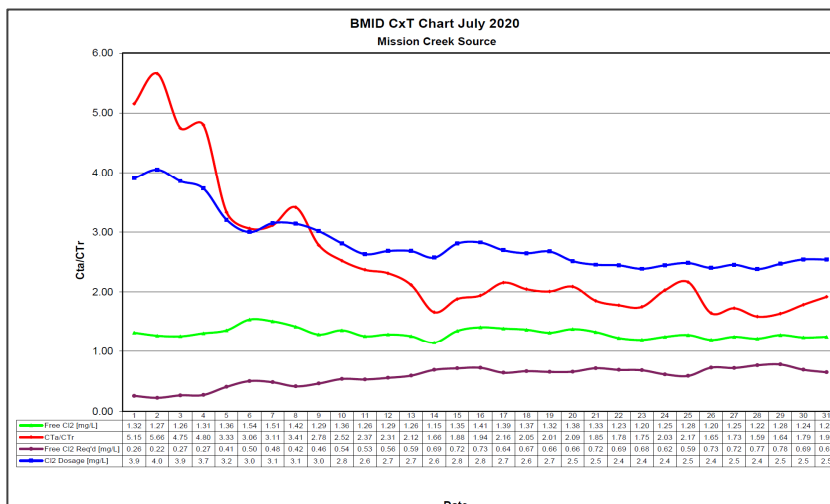


Table 4.2 - CT Table – Mission Creek Source

BMID July 2020													
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
July	(Average)	(Present)	[USgpm]	[mg/L]	achieved	req'd		[mg/L]	[mg/L]	[USgal]	[mins]	Daily Average	Average
1	7.39	15.5	7321	1.32	477.7	92.7	5.15	0.26	3.9	2649600	362	4857	228
2	7.41	15.0	6189	1.27	543.7	96.1	5.66	0.22	4.0	2649600	428	4296	209
3	7.39	15.0	7381	1.26	452.3	95.3	4.75	0.27	3.9	2649600	359	5113	237
4	7.39	15.0	7545	1.31	460.0	95.9	4.80	0.27	3.7	2649600	351	5547	249
5	7.41	15.6	11608	1.36	310.4	93.2	3.33	0.41	3.2	2649600	228	8731	336
6	7.36	15.9	14614	1.54	279.2	91.3	3.06	0.50	3.0	2649600	181	11381	410
7	7.40	15.7	13721	1.51	291.6	93.6	3.11	0.48	3.1	2649600	193	8543	323
8	7.42	15.6	11714	1.42	321.2	94.1	3.41	0.42	3.1	2649600	226	8167	308
9	7.43	16.1	13669	1.29	250.1	89.9	2.78	0.46	3.0	2649600	194	9583	347
10	7.45	15.6	15113	1.36	238.4	94.5	2.52	0.54	2.8	2649600	175	11420	386
11	7.47	15.7	15063	1.26	221.6	93.5	2.37	0.53	2.6	2649600	176	12546	397
12	7.52	15.1	14845	1.29	230.2	99.5	2.31	0.56	2.7	2649600	178	12130	391
13	7.54	14.8	15452	1.26	216.1	102.0	2.12	0.59	2.7	2649600	171	12304	397
14	7.56	15.1	18457	1.15	165.1	99.3	1.66	0.69	2.6	2649600	144	14020	434
15	7.58	15.7	19342	1.35	184.9	98.2	1.88	0.72	2.8	2649600	137	15320	517
16	7.58	16.2	20140	1.41	185.5	95.5	1.94	0.73	2.8	2649600	132	15228	517
17	7.60	16.5	18164	1.39	202.8	94.0	2.16	0.64	2.7	2649600	146	15821	513
18	7.62	16.6	18897	1.37	192.1	93.8	2.05	0.67	2.6	2649600	140	16324	519
19	7.64	17.4	19585	1.32	178.6	88.9	2.01	0.66	2.7	2649600	135	16171	520
20	7.65	17.7	19895	1.38	183.8	87.9	2.09	0.66	2.5	2649600	133	16789	508
21	7.67	17.5	21298	1.33	165.5	89.3	1.85	0.72	2.5	2649600	124	18588	549
22	7.70	18.3	21715	1.23	150.1	84.4	1.78	0.69	2.4	2649600	122	18950	557
23	7.73	18.7	21955	1.20	144.8	82.6	1.75	0.68	2.4	2649600	121	17938	515
24	7.75	18.9	19742	1.25	167.8	82.5	2.03	0.62	2.4	2649600	134	16174	476
25	7.78	18.2	17810	1.28	190.4	87.9	2.17	0.59	2.5	2649600	149	15465	462
26	7.83	17.8	21191	1.20	150.0	91.0	1.65	0.73	2.4	2649600	125	17251	498
27	7.86	17.7	20549	1.25	161.2	93.2	1.73	0.72	2.5	2649600	129	17627	520
28	7.84	18.2	22822	1.22	141.6	89.1	1.59	0.77	2.4	2649600	116	19016	544
29	7.87	18.4	23145	1.28	146.5	89.4	1.64	0.78	2.5	2649600	114	19121	568
30	7.86	19.2	21896	1.24	150.1	83.9	1.79	0.69	2.5	2649600	121	18710	572
31	7.84	19.5	21104	1.25	156.9	81.7	1.92	0.65	2.5	2649600	126	17900	547
Averages	7.60	16.71613	16837	1.31	235.816	91.7	2.55	0.5782	2.826				

5.0 ULTRAVIOLET DISINFECTION

Total Water Treated: 2,033,661.3 m³ 100.0%
On-Spec Water: 2,033,511.5 m³ 99.993%
Off-Spec Water: 149.8 m³ 0.007%

Average monthly chlorine residual before UV Treatment was 1.35 mg/L
The average monthly chlorine residual after UV treatment and re-chlorination was 1.39 mg/L.

Figure 5.1 - UV Disinfection – BMID Mission Creek Source – July 2020

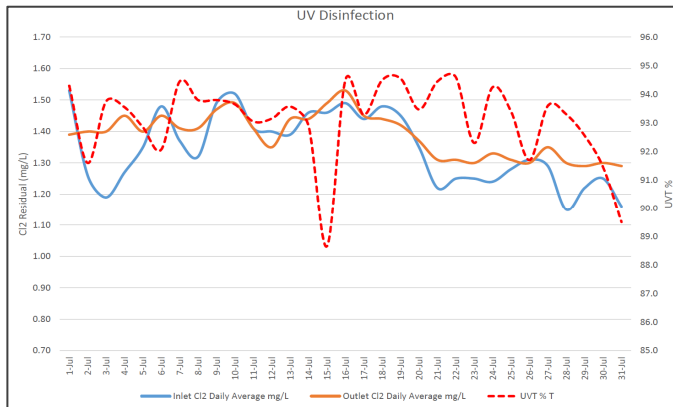


Table 5.2 - UV Disinfection Table – Mission Creek Source

	Inlet Cl2 Daily	Outlet Cl2 Daily		UVT		In Spec Water Volume	Off Spec Water Volume	Off Spec % of Water Volume
Date	mg/L	mg/L		% T		Cubic Meters	Cubic Meters	Percentage
1-Jul	1.53	1.39		94.3		38,869.80	0	0.00%
2-Jul	1.26	1.40		91.6		21,790.30	0	0.00%
3-Jul	1.19	1.40		93.8		23,362.90	0	0.00%
4-Jul	1.27	1.45		93.6		25,341.30	0	0.00%
5-Jul	1.35	1.40		92.9		40,087.90	0	0.00%
6-Jul	1.48	1.45		92.1		53,890.40	0	0.00%
7-Jul	1.37	1.41		94.5		53,928.80	0	0.00%
8-Jul	1.32	1.41		93.8		40,030.60	0	0.00%
9-Jul	1.49	1.47		93.8		45,041.10	0	0.00%
10-Jul	1.52	1.49		93.7		54,436.70	0	0.00%
11-Jul	1.41	1.41		93.1		58,607.50	0	0.00%
12-Jul	1.40	1.35		93.2		58,648.50	0	0.00%
13-Jul	1.39	1.44		93.6		58,624.50	0	0.00%
14-Jul	1.46	1.44		92.9		65,888.20	0	0.00%
15-Jul	1.46	1.49		88.7		73,202.40	0	0.00%
16-Jul	1.49	1.53		94.5		73,248.00	0	0.00%
17-Jul	1.44	1.45		93.3		74,433.90	0	0.00%
18-Jul	1.48	1.44		94.5		77,820.60	0	0.00%
19-Jul	1.45	1.42		94.6		77,985.70	0	0.00%
20-Jul	1.35	1.37		93.5		78,534.50	0	0.00%
21-Jul	1.22	1.31		94.5		88,447.90	0	0.00%
22-Jul	1.25	1.31		94.6		91,971.80	0	0.00%
23-Jul	1.25	1.30		92.3		85,340.90	0	0.00%
24-Jul	1.24	1.33		94.3		77,323.80	0	0.00%
25-Jul	1.28	1.31		93.4		74,473.00	0	0.00%
26-Jul	1.31	1.30		91.7		81,935.10	0	0.00%
27-Jul	1.29	1.35		93.6		84,598.90	0	0.00%
28-Jul	1.15	1.30		93.3		89,432.60	0	0.00%
29-Jul	1.22	1.29		92.6		91,324.80	149.8	0.16%
30-Jul	1.25	1.30		91.5		91,129.80	0	0.00%
31-Jul	1.16	1.29		89.5		83,759.30	0	0.00%
Average	1.35	1.39		93.11	Total	2,033,511.50	149.8	0.007%

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
- 43 samples were found to be absent of Coliforms.
- 43 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
1-Jun-20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	0	0	0	0
8-Jun-20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	0	0	0	0	0	0
15-Jun-20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	0	0	0	0	0	0
22-Jun-20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	0	0	0	0	0	0
29-Jun-20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6-Jul-20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13-Jul-20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-Jul-20	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
19-Jul-20	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
20-Jul-20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	0	0	0	0
27-Jul-20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	0	0	0	0

Table 6.3 – Disinfection By-Products - THM and HAA Results

Location	THM (mg/L)	HAA (mg/L)
Kirschner Reservoir		0.046
2921 Belgo Rd	0.0358	
Pearson School	0.0389	0.0377
3976 Highway 97	0.0378	

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 6.4 - BMID In-house Testing – Presence Absence

Location	7/6/2020				7/13/2020				7/20/2020				7/27/2020			
	Cl2	Temp.	Pres.	Abs.	Cl2	Temp.	Pres.	Abs.	Cl2	Temp.	Pres.	Abs.	Cl2	Temp.	Pres.	Abs.
Sylvania Cres									0.77	21.2	-	X				
170 Kneller Rd									0.92	21.2	-	X				
2105 Morrison					1.52	17.6	-	X								
Staymen Rd					1.13	17.2	-	X								
260 Campion Rd	0.64	17.0	-	X									0.42	20.8	-	X
Fenwick Rd	0.43	18.6	-	X									0.59	22.8	-	X
Solly Ct									1.02	20	-	X				

- BMID Population = 25,000

RECOMMENDED TESTS

- Recommended number of samples per month = 25
(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 = 43
- Total tests sampled in BMID treated distribution system = 52 (Zero Positive Samples)