



MONTHLY REPORTING PERIOD - DECEMBER, 2017

1. SUMMARY

The list below provides a summary of the water quality information collected by BMID in December, 2017. Documentation and figures are provided on the following pages to support this submission.

	December 2017	
Source	Total (US Gals)	Total (Mega Litres)
Mission Creek	60,726,000	229.85
Well 4	0	0
Well 5	1,361,000	5.15
Scotty Creek (Irrigation Only)	0	0
Total	62,087,000	235.00

1. Turbidity levels at the Distribution Intake remained below 1.0 NTU for all of December. Peak turbidity at the Distribution Intake was 0.42 NTU on December 8, 2017;
2. The highest monthly turbidity level recorded at the first customer (Booster #1) was 0.46 NTU on December 19 and 21, 2017 and average monthly turbidity was 0.34 NTU;
3. Mission Creek experienced normal flows for December as freezing conditions in the watershed for early winter;
4. BMID's Scotty Creek source, used for irrigation in the north end was shut-off for the season on September 10, 2017;
5. Well #5 was used throughout December as a source for domestic water in the north-end of the system in conjunction with Mission Creek system water as determined by usage and pressures in the area;
6. *E.Coli* levels at Mission Creek's Point of Diversion were average during December. The highest raw water *E.Coli* count was 4 on December 1, 2017;
7. *E.Coli* levels at the Distribution Intake had zero counts on all samples during December, 2017;
8. No *E.Coli* and no *Coliforms* were found in treated water in the distribution system through third-party analysis. In addition, no positive bacteria tests were found from the in-house presence-absence tests during routine testing;
9. BMID's Water Treatment Plant was first placed on stand-by on October 13. The WTP resumed operations on November 24-29 as water quality in Mission Creek was not of sufficient quality to by-pass treatment. Throughout December the WTP was remained on stand-by;

1.0 FLOWS - DECEMBER, 2017

Maximum est. Daily Flow was on December 13, 2017 at 2,443,000 US gallons (9.25 ML)

Minimum est. Daily Flow was on December 7, 2017 at 1,579,000 US gallons (5.98 ML)

Mission Creek provided 98% of domestic flow throughout December.

Figure 1.1 - Domestic Water System Flow

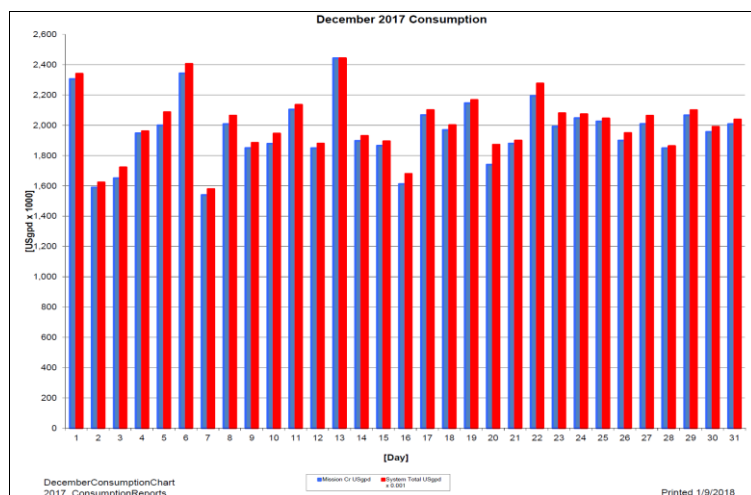


Table 1.2 - December, 2017 Daily Consumption Report

Year	Mission Cr	Well #4	Well #5	System Total	System Total
2017	Usgpd	Usgpd	Usgpd	Usgpd	ML/Day
1-Dec	2306000.0	0.0	34000.0	2340000.0	8.86
2-Dec	1589000.0	0.0	34000.0	1623000.0	6.14
3-Dec	1650000.0	0.0	72000.0	1722000.0	6.52
4-Dec	1947000.0	0.0	14000.0	1961000.0	7.42
5-Dec	2000000.0	0.0	86000.0	2086000.0	7.90
6-Dec	2343000.0	0.0	63000.0	2406000.0	9.11
7-Dec	1539000.0	0.0	40000.0	1579000.0	5.98
8-Dec	2008000.0	0.0	56000.0	2064000.0	7.81
9-Dec	1850000.0	0.0	34000.0	1884000.0	7.13
10-Dec	1878000.0	0.0	67000.0	1945000.0	7.36
11-Dec	2104000.0	0.0	31000.0	2135000.0	8.08
12-Dec	1849000.0	0.0	30000.0	1879000.0	7.11
13-Dec	2443000.0	0.0	0.0	2443000.0	9.25
14-Dec	1897000.0	0.0	33000.0	1930000.0	7.31
15-Dec	1865000.0	0.0	29000.0	1894000.0	7.17
16-Dec	1612000.0	0.0	67000.0	1679000.0	6.36
17-Dec	2067000.0	0.0	34000.0	2101000.0	7.95
18-Dec	1969000.0	0.0	32000.0	2001000.0	7.57
19-Dec	2146000.0	0.0	21000.0	2167000.0	8.20
20-Dec	1740000.0	0.0	132000.0	1872000.0	7.09
21-Dec	1879000.0	0.0	20000.0	1899000.0	7.19
22-Dec	2194000.0	0.0	82000.0	2276000.0	8.61
23-Dec	1992000.0	0.0	88000.0	2080000.0	7.87
24-Dec	2047000.0	0.0	26000.0	2073000.0	7.85
25-Dec	2025000.0	0.0	20000.0	2045000.0	7.74
26-Dec	1899000.0	0.0	50000.0	1949000.0	7.38
27-Dec	2009000.0	0.0	54000.0	2063000.0	7.81
28-Dec	1849000.0	0.0	14000.0	1863000.0	7.05
29-Dec	2066000.0	0.0	34000.0	2100000.0	7.95
30-Dec	1956000.0	0.0	34000.0	1990000.0	7.53
31-Dec	2008000.0	0.0	30000.0	2038000.0	7.71
Totals Usgpd	60726000.00	0.00	1361000.00	62087000.00	235.00
Totals ML	229.85	0.00	5.15		
Avg's	1957266.67	7.41		2001633.33	7.58
Max	2443000.00	9.25		2443000.00	9.25
Min	1539000.00	5.83		1579000.00	5.98

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

Figure 2.1 - E.Coli Readings (CARO Lab results) November 2017 - December 2017

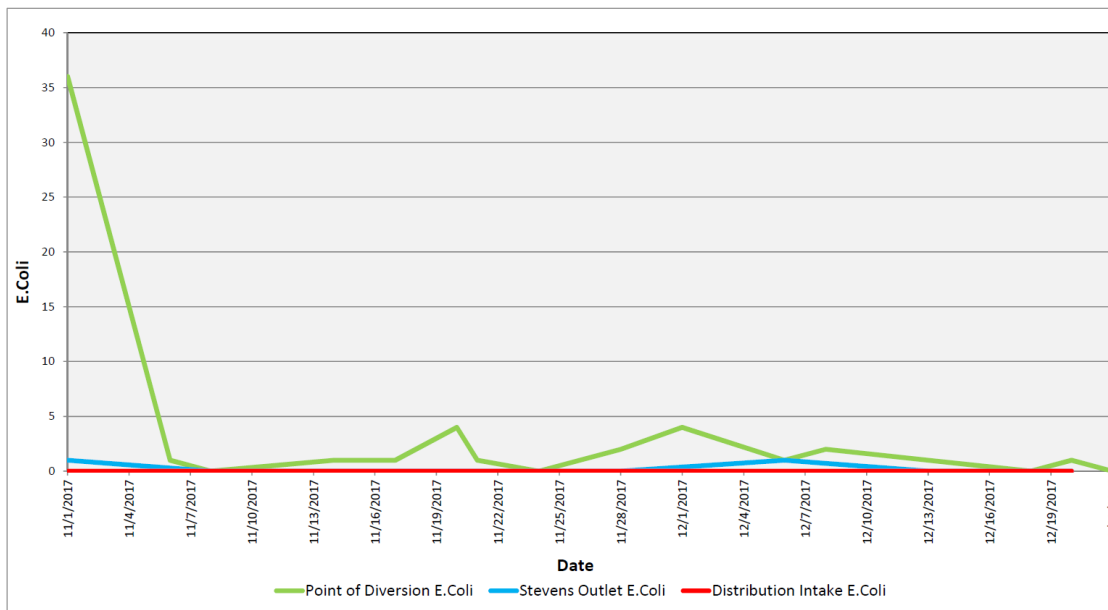


Table 2.2 - E.Coli Readings (CARO Labs)

Date	Point of Diversion E.Coli	Stevens Outlet E.Coli	Distribution Intake E.Coli
1-Nov-17	36	1	0
6-Nov-17	1	0	0
8-Nov-17	0	0	0
14-Nov-17	1	0	0
17-Nov-17	1	0	0
20-Nov-17	4	0	0
21-Nov-17	1	0	0
24-Nov-17	0	0	0
28-Nov-17	2	0	0
1-Dec-17	4	1	0
6-Dec-17	1	1	0
8-Dec-17	2	0	0
13-Dec-17	1	0	0
18-Dec-17	0	0	0
20-Dec-17	1	0	0
22-Dec-17	0	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

Turbidity for the Mission Creek source was measured at Booster Station No. 1 on Gallagher's Road, the first-customer, through December 2017. The highest turbidity recorded at this location was 0.46 NTU on December 19 and 21, 2017.

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

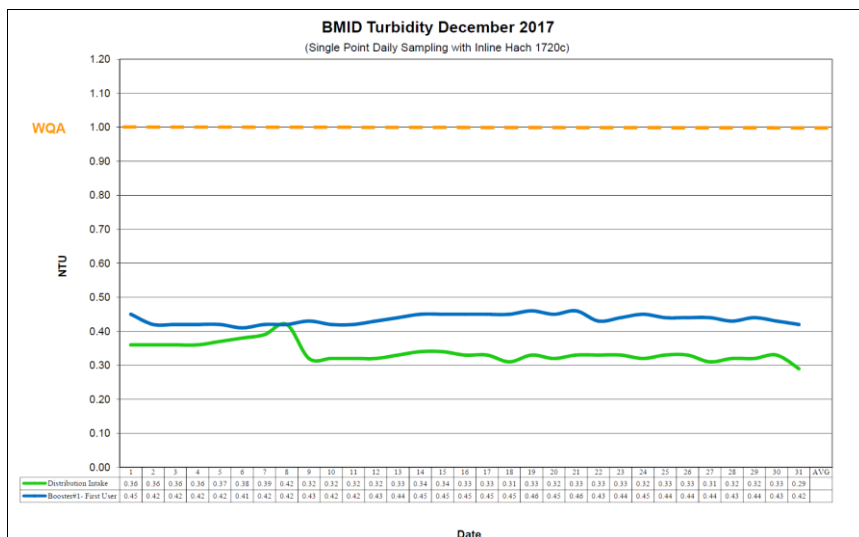


Table 3.2 - Daily Monitoring Record – Turbidity at Distribution Intake & Bst Stn 1

Turbidity Point Sampling for December 2017				
Date	Distribution Intake		Booster#1- First User	
	Sample Time	[NTU]	Sample Time	[NTU]
1	1:47 PM	0.36	1:05 PM	0.45
2	8:53 AM	0.36	8:30 AM	0.42
3	8:20 AM	0.36	7:40 AM	0.42
4	8:41 AM	0.36	8:01 AM	0.42
5	8:37 AM	0.37	8:02 AM	0.42
6	2:30 PM	0.38	12:53 PM	0.41
7	8:36 AM	0.39	7:59 AM	0.42
8	11:41 AM	0.42	8:37 AM	0.42
9	7:55 AM	0.32	7:35 AM	0.43
10	8:38 AM	0.32	8:07 AM	0.42
11	9:09 AM	0.32	8:32 AM	0.42
12	9:11 AM	0.32	8:38 AM	0.43
13	2:12 PM	0.33	1:50 PM	0.44
14	3:18 PM	0.34	1:49 PM	0.45
15	1:31 PM	0.34	10:51 AM	0.45
16	9:05 AM	0.33	8:24 AM	0.45
17	9:13 AM	0.33	8:28 AM	0.45
18	11:30 AM	0.31	9:41 AM	0.45
19	1:42 PM	0.33	11:40 AM	0.46
20	9:48 AM	0.32	9:05 AM	0.45
21	9:08 AM	0.33	8:31 AM	0.46
22	11:31 AM	0.33	10:48 AM	0.43
23	11:09 AM	0.33	10:50 AM	0.44
24	1:00 PM	0.32	11:12 AM	0.45
25	1:01 PM	0.33	12:40 PM	0.44
26	12:47 PM	0.33	12:35 PM	0.44
27	12:57 PM	0.31	12:17 PM	0.44
28	1:35 PM	0.32	12:15 PM	0.43
29	12:39 PM	0.32	12:16 PM	0.44
30	1:21 PM	0.33	11:50 AM	0.43
31	1:17 PM	0.29	11:58 AM	0.42
AVG		0.43		0.44

4.0 CHLORINE CONTACT TIME

Temperature, pH, current 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 Lambli*a throughout the month of December, 2017.

Figure 4.1 - CT Trending – BMID Mission Creek Source – December 2017

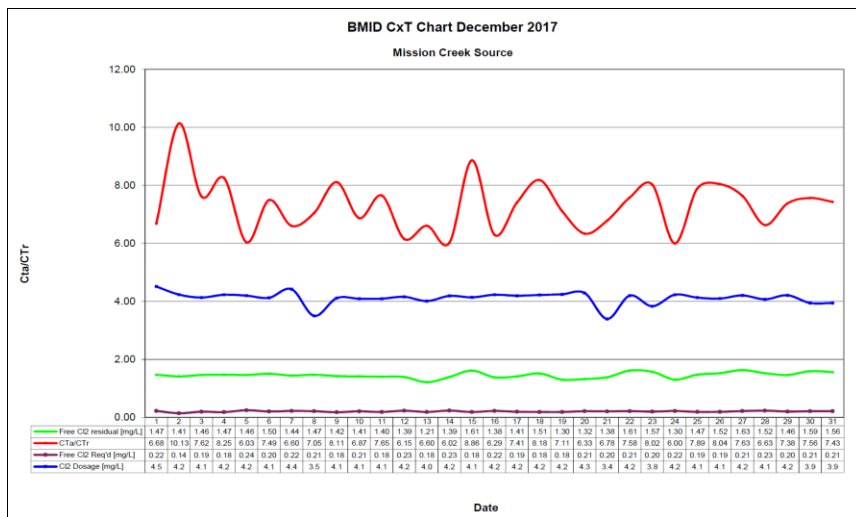


Table 4.2 - CT Table – Mission Creek Source

BMID December 2017 Mission Creek Source													
DATE	pH (highest)	TEMP (lowest) [°C]	PEAK FLOW [USgpm]	Free Cl ₂ residual [mg/L]	CT achieved	CT req'd	CTa/CTR	Free Cl ₂ Req'd [mg/L]	Cl ₂ Dosage [mg/L]	VOLUME TOTAL [USgal]	TIME [mins]	FLOW PRESENT [USGPM]	CL ₂ DOSAGE PRESENT [PPD]
December 1	7.68	3.9	2501	1.47	1557.3	233.1	6.68	0.22	4.5	2649600	1059	1624	88
2	7.69	7.8	2080	1.41	1796.1	177.3	10.13	0.14	4.2	2649600	1274	1337	68
3	7.67	3.8	2173	1.46	1780.2	233.7	7.62	0.19	4.1	2649600	1219	1350	67
4	7.66	3.6	1998	1.47	1949.4	236.2	8.25	0.18	4.2	2649600	1326	1280	65
5	7.66	3.7	2733	1.46	1415.4	234.6	6.03	0.24	4.2	2649600	969	1250	63
6	7.66	3.8	2265	1.50	1754.7	234.3	7.49	0.20	4.1	2649600	1170	1151	57
7	7.65	3.6	2464	1.44	1548.5	234.6	6.60	0.22	4.4	2649600	1075	1074	57
8	7.67	3.6	2326	1.47	1674.5	237.7	7.05	0.21	3.5	2649600	1139	1404	59
9	7.67	3.6	1958	1.42	1921.6	236.9	8.11	0.18	4.1	2649600	1353	1195	59
10	7.67	3.6	2306	1.41	1620.1	235.9	6.87	0.21	4.1	2649600	1149	1466	72
11	7.67	3.4	2030	1.40	1827.3	238.9	7.65	0.18	4.1	2649600	1305	1302	64
12	7.68	3.4	2501	1.39	1472.6	239.5	6.15	0.23	4.2	2649600	1059	1242	62
13	7.69	3.4	2057	1.21	1558.6	236.0	6.60	0.18	4.0	2649600	1288	1038	50
14	7.69	3.4	2535	1.39	1452.8	241.5	6.02	0.23	4.2	2649600	1045	1312	66
15	7.69	3.3	1938	1.61	2201.2	248.4	8.86	0.18	4.1	2649600	1367	1348	67
16	7.70	3.3	2383	1.38	1534.4	243.8	6.29	0.22	4.2	2649600	1112	1536	78
17	7.71	3.2	2047	1.41	1825.1	246.4	7.41	0.19	4.2	2649600	1294	1469	74
18	7.71	3.1	1956	1.51	2045.4	250.0	8.18	0.18	4.2	2649600	1355	1164	59
19	7.72	3.1	1964	1.30	1753.8	246.7	7.11	0.18	4.2	2649600	1349	981	50
20	7.71	3.0	2226	1.32	1571.2	248.1	6.33	0.21	4.3	2649600	1190	1204	62
21	7.68	2.8	2153	1.38	1698.3	250.4	6.78	0.20	3.4	2649600	1231	1570	64
22	7.69	2.9	2204	1.61	1935.5	255.4	7.58	0.21	4.2	2649600	1202	1368	69
23	7.70	2.9	2029	1.57	2050.2	255.5	8.02	0.20	3.8	2649600	1306	1673	77
24	7.68	2.4	2259	1.30	1524.8	254.3	6.00	0.22	4.2	2649600	1173	1477	75
25	7.67	2.4	1905	1.47	2044.6	259.2	7.89	0.19	4.1	2649600	1391	1351	67
26	7.68	2.4	1919	1.52	2098.7	261.0	8.04	0.19	4.1	2649600	1381	1341	66
27	7.66	2.3	2149	1.63	2009.7	263.2	7.63	0.21	4.2	2649600	1233	1208	61
28	7.66	2.3	2339	1.52	1721.8	259.8	6.63	0.23	4.1	2649600	1133	1268	62
29	7.67	2.4	2027	1.46	1908.4	258.7	7.38	0.20	4.2	2649600	1307	1246	63
30	7.60	2.3	2176	1.59	1936.1	256.0	7.56	0.21	3.9	2649600	1218	1372	65
31	7.64	2.3	2149	1.56	1923.4	258.9	7.43	0.21	3.9	2649600	1233	1478	70
Averages	7.68	3.25	2185.48	1.45	1777.80	244.06	7.30	0.20	4.11				

5.0 WATER DISTRIBUTION SAMPLING (TREATED)

Third Party Analysis (CARO Analytical Services)

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

Table 5.1 - CARO Independent Lab Testing – Total Coliforms – E.Coli

Date	PRV 7		Booster 1		Ellison Blow-Off		Ellison School		612 Adams Rd		Prospect Reservoir		Tower Reservoir		Well #5	
	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-Nov-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	/	/
8-Nov-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	/	/
17-Nov-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	/	/
21-Nov-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	/	/
28-Nov-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	/	/
6-Dec-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	/	/
13-Dec-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20-Dec-17	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 ten sites around the BMID service area.
- All samples were found to be absent of both Total Coliforms and *E.Coli*.

Table 5.2 - BMID In-house Testing – Presence Absence

Location	12/4/2017				12/11/2017				12/18/2017			
	Cl2	Temp.	Pres.	Abs.	Cl2	Temp.	Pres.	Abs.	Cl2	Temp.	Pres.	Abs.
2670 Enterprise Way	1.27	5.4	-	X								
#5 217 Franklin Rd									0.44	5.6	-	X
2105 Morrison	0.54	4.4	-	X								
Pearson School					1.21	6.8	-	X				
Staymen Rd									0.59	4.4	-	X
PRV #10	0.89	5.0	-	X								
260 Campion Rd					0.62	7.0	-	X				
Fenwick Rd									0.53	5.8	-	X
2931 Belgo Rd					0.63	7.4	-	X				

- BMID Population = 22,550

RECOMMENDED TESTS

- Recommended number of samples per month = 22
(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 = 22
- Total tests sampled in BMID treated distribution system = 31 (Zero Positive Samples)