



## MONTHLY REPORTING PERIOD - SEPTEMBER, 2018

### 1. SUMMARY

The list below provides a summary of the water quality information collected by BMID in September, 2018. Documentation and figures are provided on the following pages to support this submission.

Source	Total (US Gals)	Total (Mega Litres)
Mission Creek	264,326,000	1,000.47
Well 4	2,223,611	8.42
Well 5	10,183,811	38.55
Well 6 (Irrigation Only)	60,259	0.23
Scotty Creek (Irrigation Only)	0	0
Total	276,793,681	1047.66

1. Turbidity levels at the Distribution Intake peaked at 0.34 NTU on September 26. Average turbidity for September was 0.26 NTU;
2. The highest monthly turbidity level recorded at the first customer (Booster #1) was 0.39 NTU on September 27 and 28. Average monthly turbidity was 0.28 NTU for September;
3. Mission Creek experienced average flows for September. BMID continued to release water from the upper watershed reservoirs to supplement Mission Creek flows;
4. BMID's Scotty Creek source, used for irrigation in the north-end, was closed for the year on August 24;
5. Well #5 was used throughout September as a source for both domestic and irrigation 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. Well #6 supplies irrigation water in the north-end of the system and was only utilized for a single day in September. Well #6 will be placed on stand-by until spring;
7. *E. Coli* levels at Mission Creek's Point of Diversion averaged 8 counts per sample. The highest raw water *E. Coli* count was 14 on September 4 and 13, 2018;
8. *E. Coli* levels at the Distribution Intake, down-stream of the WTP, had low counts on all samples throughout September, averaging < 1 count per sample, with a peak count of 3 on September 19, 2018;
9. No *E. Coli* or *Total 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;
10. BMID commissioned a new concrete reservoir in the distribution system named Kirschner Reservoir. This will be an additional weekly sampling location going forward;
11. The WTP remained in use through September as Mission Creek had high colour in the water due to a high contribution from Belgo Reservoir;
12. A chlorine incident occurred on Sept 12 and a report was filed with IH on the incident.

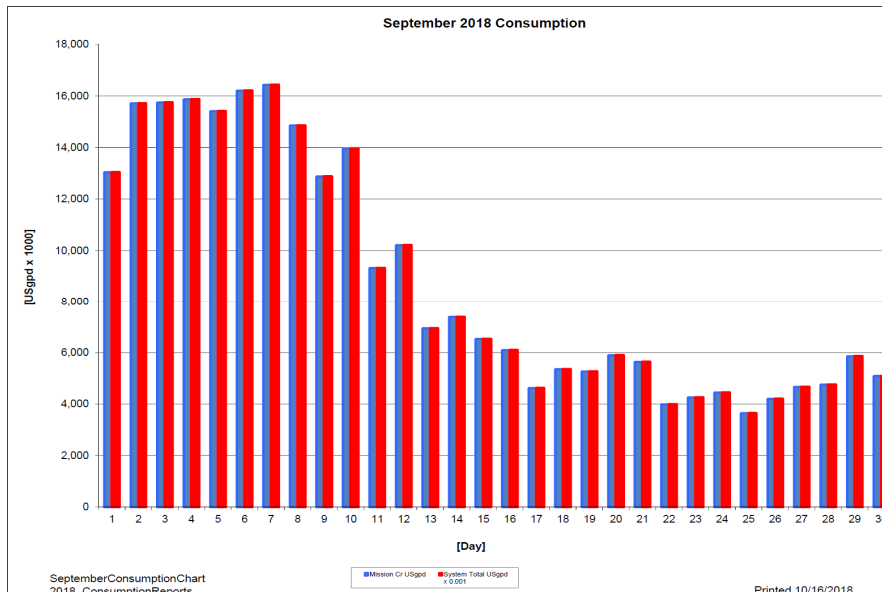
## 1.0 FLOWS - SEPTEMBER, 2018

Maximum Daily Flow was on September 6, 2018 at 17,343,940 US gallons (65.65 ML)

Minimum Daily Flow was on September 25, 2018 at 3,749,493 US gallons (14.19 ML)

Mission Creek provided 96% of domestic flow throughout September.

**Figure 1.1 - Domestic Water System Flow**



**Table 1.2 - September, 2018 Daily Consumption Report**

Year	Mission Cr	Well #4	Well #5	Well #6	Scotty Crk	System Total	System Total
2018	Usgpd	Usgpd	Usgpd	Usgpd	Usgpd	Usgpd	ML/Day
1-Sep	13,039,000	0	646,111.0	0.0	0.0	13,685,111	51.80
2-Sep	15,714,000	0	995,456.0	0.0	0.0	16,709,456	63.25
3-Sep	15,747,000	0	902,704.0	0.0	0.0	16,649,704	63.02
4-Sep	15,873,000	0	1,055,777.0	0.0	0.0	16,928,777	64.08
5-Sep	15,408,000	0	1,068,810.0	60,259.0	0.0	16,537,069	62.59
6-Sep	16,206,000	0	1,137,940.0	0.0	0.0	17,343,940	65.65
7-Sep	16,432,000	0	859,212.0	0.0	0.0	17,291,212	65.45
8-Sep	14,852,000	0	908,747.0	0.0	0.0	15,760,747	59.65
9-Sep	12,878,000	0	938,352.0	0.0	0.0	13,816,352	52.29
10-Sep	13,966,000	0	836,112.0	0.0	0.0	14,802,112	56.03
11-Sep	9,323,000	0	189,088.0	0.0	0.0	9,512,088	36.00
12-Sep	10,209,000	0	81,190.0	0.0	0.0	10,290,190	38.95
13-Sep	6,948,000	0	547,472.0	0.0	0.0	7,495,472	28.37
14-Sep	7,390,000	173,267	0.0	0.0	0.0	7,563,267	28.63
15-Sep	6,529,000	154,407	0.0	0.0	0.0	6,683,407	25.30
16-Sep	6,099,000	183,465	0.0	0.0	0.0	6,282,465	23.78
17-Sep	4,624,000	181,110	0.0	0.0	0.0	4,805,110	18.19
18-Sep	5,360,000	143,559	0.0	0.0	0.0	5,503,559	20.83
19-Sep	5,267,000	145,305	0.0	0.0	0.0	5,412,305	20.49
20-Sep	5,900,000	163,229	0.0	0.0	0.0	6,063,229	22.95
21-Sep	5,639,000	126,558	0.0	0.0	0.0	5,765,558	21.82
22-Sep	3,992,000	78,441	0.0	0.0	0.0	4,070,441	15.41
23-Sep	4,258,000	122,175	0.0	0.0	0.0	4,380,175	16.58
24-Sep	4,447,000	146,891	0.0	0.0	0.0	4,593,891	17.39
25-Sep	3,644,000	105,493	0.0	0.0	0.0	3,749,493	14.19
26-Sep	4,207,000	105,492	2,981.0	0.0	0.0	4,315,473	16.33
27-Sep	4,666,000	85,006	0.0	0.0	0.0	4,751,006	17.98
28-Sep	4,758,000	113,041	0.0	0.0	0.0	4,871,041	18.44
29-Sep	5,861,000	80,054	13,859.0	0.0	0.0	5,954,913	22.54
30-Sep	5,090,000	116,118	0.0	0.0	0.0	5,206,118	19.71
Totals Usgpd	264,326,000	2,223,611	10,183,811	60,259	0	276,793,681	1047.66
Totals ML	1,000.47	8.42	38.55	0.23	0.00		
Avg's	8,810,867	33.35				9,226,456	34.92
Max	16,432,000	62.20				17,343,940	65.65
Min	3,644,000	13.79				3,749,493	14.19

## 2.0 RAW WATER QUALITY - BACTERIOLOGICAL MONITORING

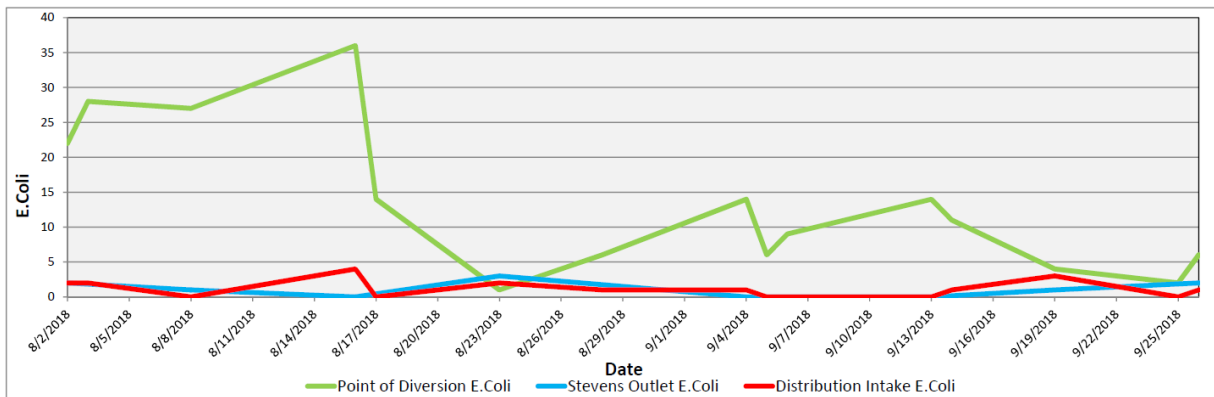
Raw water samples were taken at three points at BMID settling ponds before chlorination

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 E.Coli readings clearly show the effectiveness in risk reduction from the Water Treatment Plant and extended settling times in Stevens and Hadden Reservoirs.

**Figure 2.1 - E.Coli Readings (CARO Lab results) August 2018 - September 2018**



**Table 2.2 - E.Coli Readings (CARO Labs)**

Date	Point of Diversion E.Coli	Stevens Outlet E.Coli	Distribution Intake E.Coli
2-Aug-18	22	2	2
3-Aug-18	28	1	2
8-Aug-18	27	0	0
16-Aug-18	36	0	4
17-Aug-18	14	0	0
23-Aug-18	1	3	2
28-Aug-18	6	1	1
4-Sep-18	14	0	1
5-Sep-18	6	0	0
6-Sep-18	9	0	0
13-Sep-18	14	0	0
14-Sep-18	11	0	1
19-Sep-18	4	1	3
25-Sep-18	2	0	0
26-Sep-18	6	2	1

Stevens or WTP Intake (Raw) - Sampling of raw water at intake from Mission Creek

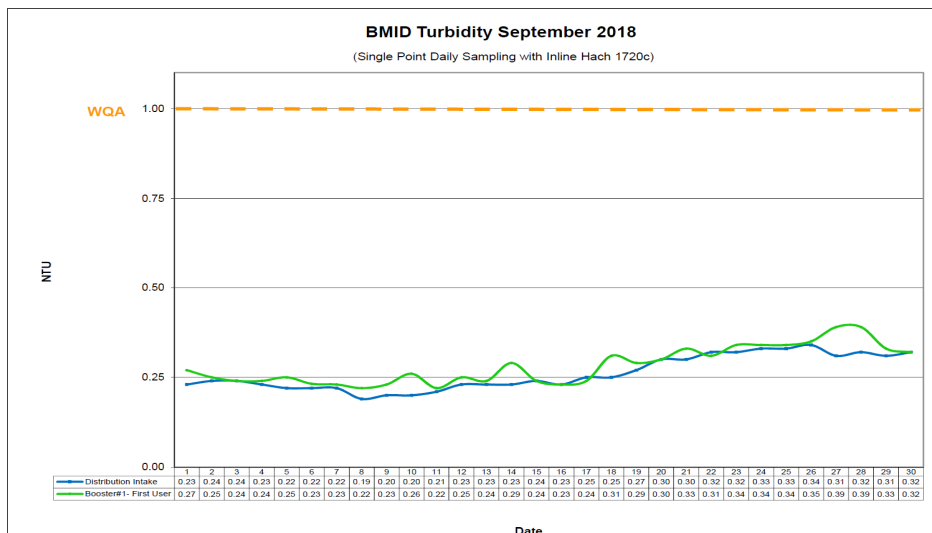
Stevens Outlet (Raw) - Sampling point after exiting 142,000 m<sup>3</sup> 1<sup>st</sup> upper balancing reservoir (Stevens Res.)

Hadden Outlet (Raw) - Sampling point after exiting 75,000 m<sup>3</sup> 2<sup>nd</sup> 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 September 2018. The highest turbidity recorded at this location was 0.39 NTU on September 27 and 28, 2018. The lowest reading was 0.22 NTU on September 8 and 11.

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



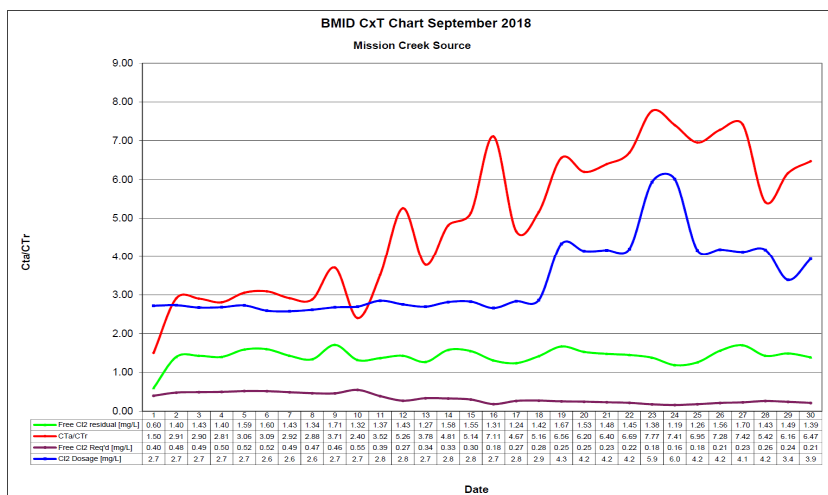
**Table 3.2 - Daily Monitoring Record – Turbidity at Distribution Intake & Bst Stn 1**

Turbidity Point Sampling for September 2018				
Date	Distribution Intake		Booster#1- First User	
	Sample Time	[NTU]	Sample Time	[NTU]
1	7:40 AM	0.23	7:00 AM	0.27
2	9:05 AM	0.24	8:15 AM	0.25
3	8:25 AM	0.24	8:10 AM	0.24
4	8:56 AM	0.23	8:20 AM	0.24
5	8:39 AM	0.22	8:00 AM	0.25
6	8:30 AM	0.22	7:59 AM	0.23
7	8:42 AM	0.22	8:02 AM	0.23
8	11:32 AM	0.19	9:22 AM	0.22
9	8:26 AM	0.20	7:56 AM	0.23
10	8:48 AM	0.20	8:08 AM	0.26
11	8:28 AM	0.21	7:56 AM	0.22
12	8:58 AM	0.23	8:22 AM	0.25
13	8:35 AM	0.23	8:02 AM	0.24
14	8:44 AM	0.23	8:07 AM	0.29
15	7:35 AM	0.24	7:10 AM	0.24
16	9:08 AM	0.23	8:28 AM	0.23
17	8:57 AM	0.25	8:13 AM	0.24
18	8:25 AM	0.25	7:52 AM	0.31
19	8:48 AM	0.27	8:08 AM	0.29
20	8:46 AM	0.30	8:19 AM	0.30
21	9:26 AM	0.30	8:00 AM	0.33
22	7:44 AM	0.32	7:27 AM	0.31
23	8:00 AM	0.32	7:35 AM	0.34
24	9:03 AM	0.33	8:22 AM	0.34
25	8:48 AM	0.33	7:53 AM	0.34
26	9:04 AM	0.34	7:58 AM	0.35
27	8:45 AM	0.31	8:08 AM	0.39
28	9:48 AM	0.32	8:56 AM	0.39
29	1:10 PM	0.31	12:01 PM	0.33
30	12:45 PM	0.32	11:41 AM	0.32
Average		0.26		0.28

## 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 Lamblia* throughout the month of September, 2018.

**Figure 4.1 - CT Trending – BMID Mission Creek Source – September 2018**



**Table 4.2 - CT Table – Mission Creek Source**

BMID September 2018 Mission Creek Source													
DATE	pH	TEMP	PEAK	Free Cl <sub>2</sub>	CT	CT	CTa/CTr	Free Cl <sub>2</sub>	Cl <sub>2</sub>	VOLUME	TIME	FLOW	CL <sub>2</sub> DOSAGE
September	(highest)	(lowest)	FLOW	residual	achieved	req'd		Req'd	Dosage	TOTAL	[mins]	PRESENT	PRESENT
		[°C]	[USgpm]	[mg/L]				[mg/L]	[mg/L]	[USgal]		[USGPM]	[PPD]
1	7.34	14.9	12543	0.60	126.7	84.3	1.50	0.40	2.7	2649600	211	7926	259
2	7.35	14.7	13081	1.40	283.6	97.4	2.91	0.48	2.7	2649600	203	10045	330
3	7.33	15.0	13728	1.43	276.0	95.0	2.90	0.49	2.7	2649600	193	8221	264
4	7.34	14.8	13699	1.40	270.8	96.4	2.81	0.50	2.7	2649600	193	8378	270
5	7.35	14.5	13692	1.59	307.7	100.7	3.06	0.52	2.7	2649600	194	9915	325
6	7.37	14.4	13412	1.60	316.1	102.2	3.09	0.52	2.6	2649600	198	11268	351
7	7.37	14.3	12838	1.43	295.1	101.2	2.92	0.49	2.6	2649600	206	9879	306
8	7.35	14.3	12382	1.34	286.7	99.5	2.88	0.47	2.6	2649600	214	7505	236
9	7.31	14.5	12185	1.71	371.8	100.3	3.71	0.46	2.7	2649600	217	8232	265
10	7.32	14.5	15031	1.32	232.7	96.8	2.40	0.55	2.7	2649600	176	6725	218
11	7.33	14.5	10554	1.37	343.9	97.7	3.52	0.39	2.8	2649600	251	6921	237
12	7.34	14.4	7246	1.43	522.9	99.4	5.26	0.27	2.8	2649600	366	5980	198
13	7.36	14.3	8977	1.27	374.8	99.1	3.78	0.34	2.7	2649600	295	5000	162
14	7.36	13.9	8262	1.58	506.7	105.3	4.81	0.33	2.8	2649600	321	5617	190
15	7.39	13.6	7381	1.55	556.4	108.3	5.14	0.30	2.8	2649600	359	5210	177
16	7.38	13.5	4605	1.31	753.7	106.0	7.11	0.18	2.7	2649600	575	3597	115
17	7.41	13.2	6489	1.24	506.3	108.5	4.67	0.27	2.8	2649600	408	4195	143
18	7.40	12.9	6471	1.42	581.4	112.7	5.16	0.28	2.9	2649600	409	4327	149
19	7.37	12.7	5826	1.67	759.5	115.8	6.56	0.25	4.3	2649600	455	2802	146
20	7.39	12.7	5684	1.53	713.2	115.1	6.20	0.25	4.2	2649600	466	5012	250
21	7.40	12.5	5259	1.48	745.7	116.5	6.40	0.23	4.2	2649600	504	3072	154
22	7.43	12.5	4886	1.45	786.3	117.5	6.69	0.22	4.2	2649600	542	3169	160
23	7.40	12.5	4080	1.38	896.2	115.3	7.77	0.18	5.9	2649600	649	2384	170
24	7.41	12.4	3735	1.19	844.2	114.0	7.41	0.16	6.0	2649600	709	2354	170
25	7.38	12.3	4192	1.26	796.4	114.5	6.95	0.18	4.2	2649600	632	3673	184
26	7.37	12.2	4785	1.56	863.8	118.6	7.28	0.21	4.2	2649600	554	2742	138
27	7.36	12.4	5140	1.70	876.3	118.1	7.42	0.23	4.1	2649600	515	3630	180
28	7.37	12.4	6056	1.43	625.6	115.5	5.42	0.26	4.2	2649600	438	3106	156
29	7.32	11.2	5165	1.49	764.4	124.0	6.16	0.24	3.4	2649600	513	4026	164
30	7.33	11.8	4816	1.39	764.7	118.1	6.47	0.21	3.9	2649600	550	3256	154
Averages	7.36	13.46	8407	1.42	544.996	107	4.95	0.33	3.39				

## 5.0 WATER DISTRIBUTION SAMPLING (TREATED)

### Third Party Analysis (CARO Analytical Services)

- Samples taken once per week at ten locations around the BMID service area
- 50 samples were found to be absent of Coliforms.
- 50 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		3976 Highway 97		Prospect Reservoir		Tower Reservoir		Well #5		Kirschner Res	
	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
2-Aug-18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-
8-Aug-18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-
16-Aug-18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-
23-Aug-18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-
4-Sep-18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-
6-Sep-18	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	0
13-Sep-18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
19-Sep-18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
26-Sep-18	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 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	9/4/2018				9/10/2018				9/17/2018				9/24/2018			
	Cl2	Temp.	Pres.	Abs.	Cl2	Temp.	Pres.	Abs.	Cl2	Temp.	Pres.	Abs.	Cl2	Temp.	Pres.	Abs.
Sylvania Cres					1.03	17.4	-	X								
170 Kneller Rd									0.95	13.4	-	X				
2105 Morrison					1.19	16.0	-	X								
Pearson School	1.22		-	X									1.20	17.0	-	X
Staymen Rd									0.70	15.2	-	X				
PRV #10					1.12	13.2	-	X								
260 Campion Rd	0.12		-	X									0.20	16.5	-	X
Fenwick Rd									0.53	18.0	-	X				
2931 Belgo Rd	1.02		-	X									0.36	16.6		
Solly Ct	1.38		-	X									1.25	12.4	-	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) = 14
- Total tests sampled by BMID and tested by Caro Labs = 50
- Total tests sampled in BMID treated distribution system = 64 (Zero Positive Samples)