2025 Annual Report

1.0 - Operator Certification

BMID is administered by Robert Hrasko, P.Eng., who reports directly to the elected Board of Trustees. The EOCP has classified BMID's water distribution (WD) system as a Level IV system, and BMID's Water Treatment (WT) system as a Level IV system.

BMID continues to undertake a continuous, informal program to have Level IV operators for both the Water Distribution System and the Water Treatment Plant. This is a requirement by EOCP for facility classifications. Currently, Bryan Vig, Jeff Clark, Kurt Kover and Scott Alexander are Level IV Water Distribution certified operators. In addition, Chase Elliott is certified as Level IV Water Treatment Plant operator.

Table 1.1 – BMID Operator Certification

BMID's certified operators are as follows (End of 2025):

Name	WD Level	WT Level	Chlorine Handling
Bryan Vig	IV	I	Yes
Chase Elliott	II	IV	Yes
Keith Jensen	III	I	Yes
Geoffrey Caldwell	II	-	Yes
Jeff Clark	IV	I	Yes
Kurt Kover	IV	I	Yes
Adrien Remillard	II	I	Yes
Logan Archer	II	-	Yes
Jonathan Bauer	II	-	Yes
Anthony Bafaro	II	-	Yes
Scott Alexander	IV	I	Yes
Mathew Poynter	II	-	Yes
Tyler Bateman	II	-	
Dustin Pedherny	I	III	Yes

2.0 - Cross-Connection Control Program

Working in partnership with the City of Kelowna, BMID staff help to ensure that all backflow prevention assemblies installed within our service area are tested annually by an approved tester. The program is to limit any potential hazards from entering the BMID water distribution system through commercial, industrial and/or institutional connections. The program is administered by the City of Kelowna using their Backflow Prevention Monitoring Software, BMID is in contact with the City when a backflow assembly is past-due for testing or when an assembly fails a test. When such an event occurs, BMID contacts the customer to ensure compliance with the program.

BMID staff are in regular contact with City of Kelowna staff to confirm that all backflow assemblies installed in BMID's service area are tested and functioning. BMID works to maintain 100% compliance within our Cross-Connection program. In addition, new and renovated facilities are inspected by the Building Inspection Departments at the City of Kelowna to ensure that all backflow prevention assemblies are installed as required. Apart from new and renovated facilities, BMID's cross-connection control program continues to run in the same manner in 2025 as in previous years. There are 944 backflow assemblies currently found in the BMID system including 30 new assemblies installed in 430 separate facility accounts.

3.0 - Water Monitoring Plan

BMID's 2025 water monitoring plan has only minor changes from the current Monitoring Plan. Recent changes to the Monitoring Plan are as follows:

1. Sampling at Well #4 only took place during the fall/winter when the well provided water for domestic consumption;
2. Sampling took place at Well #5 during the spring/summer when the well provided domestic water for the north-end of the system;
3. Sampling for surface water (Mission Creek source) took place at Wells 4 and 5 sampling point when neither of the wells were in operation. When one of the two wells is operational, only groundwater will be sampled at this location;
4. A new sample location was added at Esquire reservoir in the north end of the district;
5. The Pearson school and the 3976 Highway 97 sample changed from bi-weekly to weekly to increase the number of samples taken in the distribution system;
6. Both THM and HAA sampling in the distribution system were taken at the following locations:
    a. Kirschner Reservoir – Continuously running sample tap in locked building
    b. Pearson School – Dedicated sample station
    c. 2921 Belgo – Dedicated sample station
    d. Ellison School- Dedicated sample station – Well water/surface water
    e. 3976 Highway 97- Dedicated sample station
7. As in previous years, full parameters were carried out on all raw water sources in BMID's high elevation drinking water reservoirs. Samples were also collected at the intakes of BMID's drinking water sources. Starting in 2021, Pearson Sample station replaced Booster #1 (first customer) as the location of BMID's comprehensive distribution samples for both winter and summer samples. Well water is used as a supplemental drinking water source in the north-end for both domestic use and irrigation use. Well #4, used as the low flow winter source, was sampled in January 2025. Well #5, used as the high-flow summer source, was sampled in July 2025;
8. Weekly raw water samples at the Scotty Creek Intake are no longer being taken as the source is used only for irrigation. All domestic connections in the Scotty Creek subdivision and the north-end of BMID's distribution system are fed off of a combination of Mission Creek system water (via PRV 10) and ground water (Wells 4 and Well 5) after the water mains were twinned and separated for domestic and irrigation use in 2009;
9. Well #6, currently used for irrigation in the north-end, will have increased bacterial sampling when the well is available to operate. BMID is investigating the possibility of utilizing Well #6 as a potable water source;
10. Well #6 Annual comprehensive testing took place in July 2025. In addition, Well #6 was tested in April, July, and October for quarterly samples including total metals,

microbiological parameters, Anions and general parameters. As Well #6 is only in use during the height of summer, a special testing procedure will need to be developed to test the well when it is not in operation.

Table 3.1 – BMID Water Sampling Summary

Watershed & Sources	Biological	Chemical	Full Parameters	Special Testing	Frequency	Sample By
Graystoke Reservoir			X		Annual	LARRATT
Fishhawk Reservoir			X		Annual	LARRATT
Loch Long			X		Annual	LARRATT
Belgo Reservoir			X		Annual	LARRATT
James Lake Reservoir			X		Annual	LARRATT
Mission (Crescent) Lake				X	Varies	CARO - BMID
St. Margaret's Lake				X	Varies	CARO - BMID
Mission Creek Intake			X		Semi-annual	CARO - BMID
Scotty Creek Intake				X	Varies	CARO - BMID
Cornish Well				X	Varies	CARO - BMID
Well #4			X		Annual	CARO - BMID
Well #5			X		Annual	CARO - BMID
Well #6			X	X	Quarterly	CARO - BMID
Raw Water Microbiological Monitoring						
Scotty Creek Intake				X	Varies	BMID
WTP Intake	X	X	X		Weekly	CARO-BMID
Stevens – Outlet	X	X	X		Weekly	CARO-BMID
Hadden Outlet (at Screens)	X	X	X		Weekly	CARO-BMID
Distribution System Monitoring						
Booster #1	X				Weekly	CARO
Screen Works		X			Weekly	CARO
2921 Belgo	X	X		X	Bi-Weekly	CARO
Ellison Blow-Off	X				Bi-Weekly	CARO
Surface water at Wells	X				Weekly	CARO
Esquire Reservoir	X				Bi-Weekly	CARO
Pearson Rd	X	X	X	X	Weekly	CARO
3976 Hwy 97	X			X	Weekly	CARO
Prospect Reservoir	X				Bi-Weekly	CARO
Tower's Ranch Reservoir	X				Bi-Weekly	CARO
Kirschner Reservoir	X	X		X	Bi-Weekly	CARO
Ellison School	X			X	Bi-Weekly	CARO
Well 4	X		X		Weekly	CARO
Well 5	X		X		Weekly	CARO
Well 6	X	X	X	X	Monthly	CARO
UV Treatment Plant				X	Varies	CARO
7 Sites through WD System on a 3-week rotation		Sampled for Presence Absence			Rotation	BMID
On-Line Monitoring						
Point of Diversion (Mission Creek Intake)	On-line turbidity meter					
Water Treatment Plant	Parameters of turbidity, water consumption and particle charge (streaming current monitor) are all operating on-line at WTP					
Distribution Intake (Hadden Outlet at Screens)	On-line residual chlorine downstream of dosing location, pH and turbidity					
Surge Tower	On-line residual chlorine					
Booster Station #1	On-line residual chlorine, pH, and turbidity					
BMID UV Reactor	On-line upstream/downstream chlorine, UV transmissivity, turbidity, pH and pressure					
Towers Reservoir	On-line residual chlorine					
Kirschner Reservoir	On-line residual chlorine					
Prospect Reservoir	On-line residual chlorine					
PRV #24	On-line residual chlorine					
Well 4	On-line residual chlorine, Well Level					
Well 5	On-line residual chlorine, Well Level					
Well 6	On-line residual chlorine, Well Level					

Table 3.1 – BMID Water Sampling Summary (continued)

Biological Parameters						
Weekly Tests by CARO	Free Chlorine Residual (field) (mg/L)	Temperature (field) (degrees C)	Total Coliforms Colonies/100 ml	E.Coli colonies /100ml		
Chemical Parameters						
Weekly Tests by CARO	Turbidity (NTU)	Colour (TCU)	pH (pH units)	Alkalinity (mg/L Caco3)	Free Chlorine Residual (field) (mg/L)	Temperature (field) (degrees C)
Quarterly Tests By CARO	Disinfection Byproducts	Trihalomethanes	Haloacetic Acids			
Special Water Quality Parameters						
Mission Creek Source	UV Trans.					
Mission Creek Source	TOC					
Screen Works	TOC					
Stevens Reservoir	Metals					
Full Parameters						
Carried out at Pearson School sample stn, on all raw water sources for consumption and on watershed drinking water reservoirs						
Parameter	Units					
Alkalinity (total)	mg/L as CaCO3					
Calcium (total)	mg/L					
Colour (true)	Colour units					
Conductivity	Umhos/cm					
Hardness	mg/L as CaCO3					
Iron (total)	mg/L					
Magnesium (total	mg/L					
Manganese (total)	mg/L					
Nitrate & Nitrite	mg/L as N					
pH	pH units					
Potassium (total)	mg/L					
Sodium (total)	mg/L					
Sulfate	mg/L					
Total Dissolved Solids	mg/L					
Turbidity	NTU					
Ortho Phosphate	mg/L as P					
Dissolved Phosphorus	mg/L as P					
Total Phosphorus	mg/L as P					
Total Organic Carbon	mg/L					
Total Coliform	MPN/100ml					
E.Coli Coliform	MPN/100ml					
UV Transmissivity @ 254u	%/cm					
Ammonia	mg/L as N					
Total Kjeldahl Nitrogen	mg/L as N					
Chloride	mg/L					
Fluoride	mg/L					
Cyanide	mg/L					
Aluminum	mg/L					
Antimony	mg/L					
Arsenic	mg/L					
Barium	mg/L					
Boron	mg/L					
Cadmium	mg/L					
Calcium	mg/L					
Chromium	mg/L					
Cobalt	mg/L					
Copper	mg/L					
Lead	mg/L					
Mercury	mg/L					
Molybdenum	mg/L					
Nickel	mg/L					
Selenium	mg/L					
Uranium	mg/L					
Zinc	mg/L					
Total Coliforms	CFU/100 Ml					
E.Coli Coliforms	CFU/100 Ml					

3.2 – BMID Water Sampling Summary (continued)

BMID staff take weekly samples from 10 locations in the distribution system. For 2025, 310 samples were collected and taken to CARO Analytical for testing. Of the 310 samples collected all came back negative for *E.*Coli representing 100% of the total samples taken. Of the 310 samples taken for Total Coliforms, 309 came back as negative for Total Coliforms representing 99.7% of samples. The lone positive sample (June 30 at 3976 Highway 97) was resampled twice by BMID staff and analyzed by CARO analytical services. Both retested samples came back negative for bacteria. It is assumed that the positive sample was a result of operator error. The inactivation of total coliforms and E.Coli coliforms in the distribution system demonstrates the effectiveness of the Water Treatment Plant, Primary Chlorination works, Ultraviolet Disinfection Plant and the secondary sodium hypochlorite top up system currently employed by BMID.

In addition to the testing conducted by CARO, BMID staff also sampled for Presence/Absence (PA) of bacteria and incubated the samples in-house. These samples took place throughout the distribution system at 7 locations. In total 121 PA samples were collected and incubated with zero positive sample showing the presence of bacteria. Therefore, 100% of the samples came back as negative for bacteria.

BMID staff also collected raw-water samples from three locations between Mission Creek and the point of chlorination. Samples at the Point of Diversion Intake (WTP intake or Stevens Pond intake depending on time of the year), Stevens Pond Outlet and the Distribution Intake at Hadden Pond Outlet (just prior to chlorination) are taken weekly. There is a substantive reduction in the number of *E.Coli* colonies present between the Mission Creek Intake and the Distribution Intake which demonstrates the effective settling of particles by the WTP, and as the water moves through Stevens Reservoir and Hadden Reservoir. Only *E.Coli* results for these samples are as follows:

Location	**Average *E.Coli* counts per sample**	**Max *E.Coli* count**
Creek Intake	12.25	590
Stevens Outlet	1.25	11
Hadden Outlet	0.72	13

4.0 – Water Quality Events of Note

Water advisories, positive samples, loss of service, off-spec water and customer complaints were rare throughout 2025. However, BMID noted the following occurrences when water quality issues/changes did arise.

1. Operational Changes of Note:
    a. May - The turbidity meter at the UV plant typically reads higher than other distribution turbidity meters. The turbidity at the Distribution Intake (upstream) and Booster #1 (downstream) had lower turbidity throughout May. Turbidity levels climbed artificially high during the middle of May. After maintenance on May 28th, the turbidity meter reading lowered to acceptable levels at the UV Plant. Because disinfection was not compromised due to the error in instrumentation, no Water Quality Advisory was called.
    b. Beginning July 16th, BMID blended raw and treated water at the WTP leading to a slight drop in UVT% at the UV treatment plant. UV disinfection continued uninterrupted for the remainder of July as the UVT% remained within the operational guideline of the UV plant.
2. Off-Spec Incidences:
    a. On February 24th, BMID crews were involved in troubleshooting programing at the UV plant. 82m3 of off-spec water was created during this event. Primary disinfection remained operational throughout the event. Additionally, the UVT meter was bypassed for 2.5 hours on February 11 for routine maintenance leading to a mis-recorded 118 m3 of off-spec water.
    b. On October 29th, a false" off-spec" reading of 1,872 m3 was recorded at the UV plant. A programming error in reactor 102 recorded water as "off-spec" during routine CIP. The plant continued to run normally and provided secondary disinfection throughout the event.
3. Noteworthy Water Quality Occurrences:
    a. Turbidity is measured online at four locations, Mission Creek raw water intake, the Distribution Intake, the UV treatment plant, and Booster #1. The first user of the BMID system is located near Booster #1. The highest turbidity level recorded at this location was 1.11 NTU on May 5th, 2025.
    b. The June 30th sample at 3976 Highway 97 North had high Total Coliform counts. This location was resampled and tested by Caro Analytical Services. Subsequent results did not find any Total Coliforms at the location. It is assumed that the positive sample was due to operator error.
    c. None of BMID's comprehensive testing results exceeded the Maximum Acceptable Concentrations as detailed in the Guidelines for Canadian Drinking Water Quality. Only the July sample at the Pearson School had an exceedance of the operational guidance value for Aluminum (OG limit of 0.10 mg/L) BMID's sampling indicated 0.247 mg/L of Aluminum (MAC limit of 2.9mg/L).

Table 4.1 – Disinfection By-Product Testing

1. Disinfection by-product (THM and HAA) testing took place at four surface water locations and at one groundwater location. Both THM and HAA yearly averages are within the guidelines as set out in the Guidelines for Canadian Drinking Water Quality.

	THM		HAA	
Sample	Mission Creek Source	Groundwater Source	Mission Creek Source	Groundwater Source
Q1 Average	0.1130	0.0111	0.1160	0.00238
Q2 Average	0.1730	0.0085	0.1017	0.00208
Q3 Average	0.0836	0.0062	0.0594	0.00321
Q4 Average	0.0880	0.0056	0.1013	<0.00600
Source Average	**0.1146**	**0.0078**	**0.0946**	**0.00342**
Total Average	**0.0932**		**0.0764**	

5.0 - Annual Consumption Data

CONSUMPTION: Total annual consumption was 12,639 ML which was 107% of the five-year average of 11,795 ML. The average daily flow for 2025 was 34.5 ML/day. The maximum daily flow was on July 2, 2025, when 109.31 ML of water was consumed.

WATERSHED: Belgo, Graystoke, Fish Hawk and Loch Long Reservoirs are high elevation reservoirs that BMID utilizes to store the highest water quality available throughout the summer months. This year, BMID's watershed experienced a lower-than-normal snowpack. Fortunately, the upper watershed received a significant late season snow fall in late-May which delayed the need for storage water releases for several weeks..

Water from James Lake Reservoir is only used as an irrigation source for the Scotty Creek area of the distribution network in BMID's north-end.

The reservoir levels at 2025 year-end are summarized below. To accommodate maintenance work, Graystoke was drained completely.

Table 5.1 – Watershed Reservoir Data

Reservoir	Capacity (ML)	Volume at Yr End (ML)	% Full
Belgo Reservoir	6,815	2,316	34%
Graystoke Reservoir	5,095	0	0%
Fishhawk Reservoir	2,106	809	38%
Loch Long Reservoir	625	307	49%
James Lake Reservoir	1,538	568	37%
TOTAL	**16,183**	**4,000**	**25%**

Graph 5.2 – Monthly Consumption

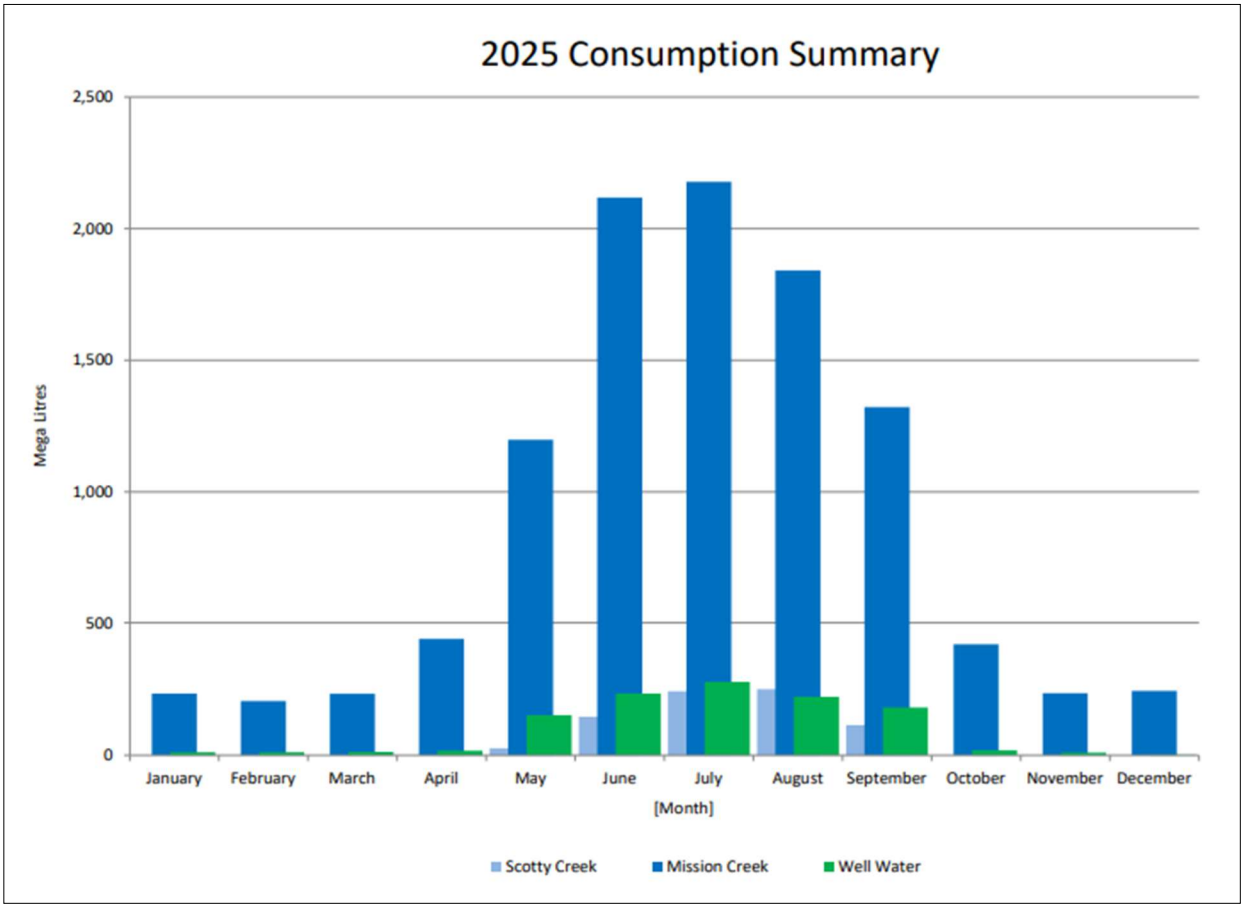


Table 5.3 – Monthly Consumption

BLACK MOUNTAIN IRRIGATION DISTRICT									
MONTHLY CONSUMPTION TOTALS AND YEAR END SUMMARY									
Year	Mission Creek	Well #4	Well #5	Well #6	Scotty Creek	NE Production	Well Water	Surface Water	Total, all sources
2025	Mega Litres	Mega Litres	Mega Litres	Mega Litres	Mega Litres	Mega Litres	Mega Litres	Mega Litres	Mega Litres
January	232.70	11.57	0.00	0.00	0.00	11.57	11.57	232.70	244.27
February	204.41	11.26	0.00	0.00	0.00	11.26	11.26	204.41	215.67
March	231.88	13.10	0.00	0.00	0.00	13.10	13.10	231.88	244.98
April	438.69	17.20	0.00	0.00	0.00	17.20	17.20	438.69	455.89
May	1,197.97	15.63	109.67	25.66	26.97	177.93	150.96	1,224.93	1375.90
June	2,117.77	0.00	179.34	53.14	145.72	378.20	232.48	2,263.49	2495.97
July	2,177.97	0.00	188.89	87.47	241.48	517.84	276.36	2,419.45	2695.81
August	1,900.54	0.00	185.92	34.30	249.56	469.77	220.22	2,150.10	2370.31
September	1,322.24	9.33	150.89	19.53	113.90	293.66	179.76	1,436.14	1615.90
October	418.20	18.48	0.00	0.00	0.00	18.48	18.48	418.20	436.68
November	233.88	9.82	0.00	0.00	0.00	9.82	9.82	233.88	243.69
December	242.77	1.19	0.00	0.00	0.00	1.19	1.19	242.77	243.95
Total	10,719.00	107.57	814.72	220.10	777.63	1,920.02	1142.39	11496.63	12639.02

6.0 – Completed and Ongoing Water Infrastructure Projects

- BMID staff, consultants, and contractors continued with two dam safety and expansion projects from 2024. These include, Graystoke Dam stability improvement design, and the Loch Long expansion design. In addition, the District also began the James lake stability and expansion design.
- Approximately 13 connections on our primary high-pressure-concrete transmission mains were renewed along McKenzie Rd just north of PRV #3. These air valves, low-point drains, and services, which were over 55 years old and had reached the end of their service life.
- PRV #29 on Gallagher Rd was increased in size and brought above ground into a kiosk. This upgrade improves redundancy for the water system and safety for the Operators.
- Approximately 55 commercial and agricultural meters were replaced as a part of ongoing renewal work that started in 2022.
- SCADA connections were added to PRVs #3, #26, and #28. These connections add to BMID's large data communications network that assists our operators in monitoring and controlling the water system.
- Approximately 300 meters of 250mm diameter watermain was relocated at the BMID Works Yard. This project renewed the section of main in addition to setting up the site in preparation for the future BMID office to be relocated.
- In preparation for refurbishment of the main Cornish well, BMID crews worked with a contractor to decommission the test well on the property that was drilled in 1965. This work eliminates risk and liability as this was an artesian well under pressure and could have become susceptible to uncontrolled leakage as the casing aged.
- Upgraded stainless steel bracing for electrical trays in flocculation basin 2Installation of two Pro-Mag magnetic meters, at the Water Treatment Plant, on the polymer flocculant chemical lines to ensure appropriate dosing in mixing trains.

7.0 - WTP OPERATIONS

The Black Mountain Irrigation District's Class IV Water Treatment Plant (WTP) performed very well throughout the 2025 treatment season. Improved water quality was achieved in all water quality measurements, especially in the reduction of color, turbidity, total organic carbon levels, and disinfection by-products (Trihalomethanes and Haloacetic acids).

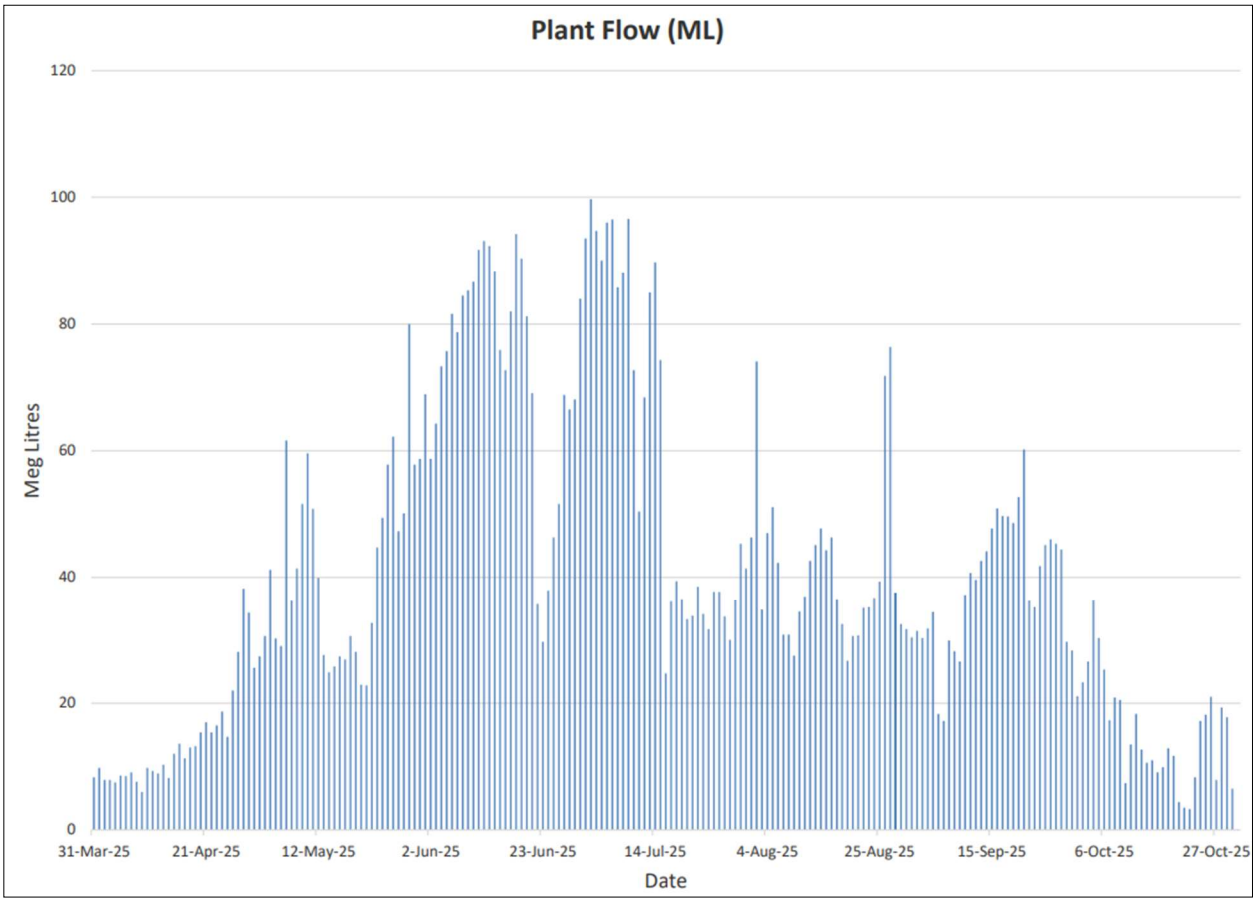
During the treatment season, precipitation and temperatures varied significantly from early April to the end of October. May and June typically receive the most rain for the year which helps to reduce water consumption in the spring. The spring of 2025 received significant levels of precipitation. However, as the summer progressed, conditions turned drier and warmer than average leading to increased demands on the water treatment plant. The snowpack in the upper watershed lasted until mid-June and the reservoirs achieved full pool before the dry summer. In addition, July experienced some precipitation mitigating the effects of the relatively dry conditions of late summer and early autumn.

Turbidity spikes during freshet in Mission Creek were common, as experienced in the past. However, the 2025 season had lower peak creek run-off levels compared to some previous treatment seasons, and fortunately, Mission Creek did not encounter the same significant flooding and high stream flow events that occurred in past years. The 2025 treatment season experienced less severe spikes in turbidity and colour compared to many previous treatment seasons. The Water Treatment Plant was able to maintain turbidity levels below 1.0 NTU (Nephelometric Turbidity Units) at the point of disinfection for the entire time which the WTP was in operation.

7.1 - PLANT FLOW

For the Mission Creek source, peak daily water production of 99.7 ML occurred on July 2, 2025. Peak instantaneous demand was recorded at 1,119 L/s. For the 2025 season, 8,651.1 ML of water was treated compared to an average of 9,935 ML over the past five years. In total, the WTP treated 68.5% of all water that entered the BMID distribution system throughout 2025. Moreover, an additional 1,198 ML of raw water went through the plant by blending raw water with treated water during the late summer of 2025. The Water Treatment Plant was placed in stand-by mode on October 31st, 2025, when the raw water quality had improved enough to no longer require chemical treatment.

Graph 7.2 – WTP Plant Flow



Daily plant flow ML for 2025 combined total for both trains

7.3 – TURBIDITY RESULTS

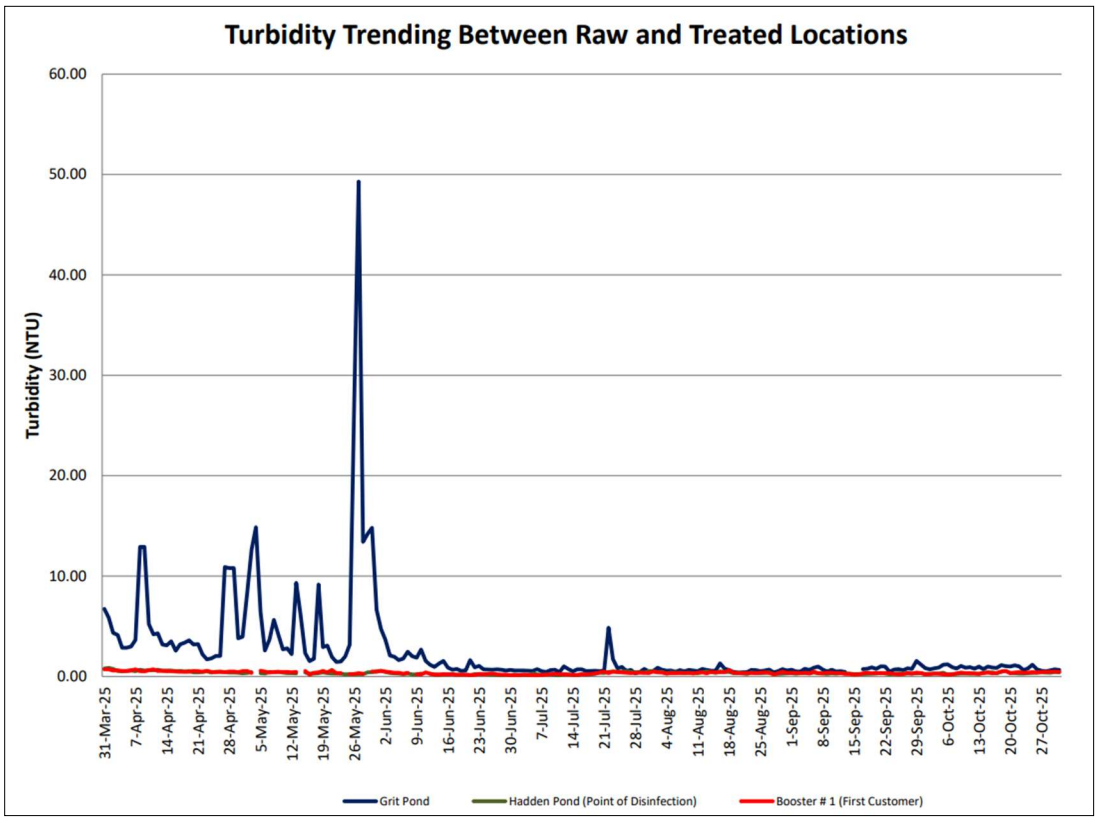
As set by the Canadian Drinking Water Guidelines, Black Mountain's system turbidity is to be less than at 24-hour average of 1.0 NTU at its first customer (Booster 1). Throughout the treatment season, the Water Treatment Plant was able to maintain acceptable turbidity below this guideline. Turbidity at the first customer peaked at 0.72 NTU on March 31st and April 1st (single-point grab sample analysed at the WTP). During spring freshet, raw water turbidity at the Grit Pond peaked at 49.3 NTU on May 27th, 2025. This is well below the peak turbidity that the plant usually experiences during freshet.

In addition, the recorded highest turbidity at the Distribution Intake, Hadden Pond, was 0.85 NTU on April 1st, 2025, with the data obtained through a single point grab sample.

Average turbidity levels over the treatment period at locations in the water supply system are as follows:

Location	Lab (NTU)	On-line (NTU)
Raw Grit Pond	2.46	3.97
Stevens Intake	0.26	-
Stevens Outlet	0.31	-
Hadden Outlet	0.34	-
Screen Works	0.35	0.38
Booster Stn No. 1	0.36	0.50

Graph 7.4 – WTP Turbidity Results



Daily turbidity (NTU) results between raw water (Grit Pond) and treated water (Steven's Intake and Booster 1)