

2018 SUMMARY REPORT FOR THE NORTH BAY WATER TREATMENT SYSTEM

This report is a summary of water quality information for the North Bay Water Treatment System, published in accordance with Schedule 22 of Ontario's Drinking-Water Systems Regulation for the reporting period of January 1, 2018 to December 31, 2018. This report is based on all information received within the stated reporting period and items that remained outstanding in the last reporting periods that have been carried forward.

The North Bay Water Treatment System is categorized as a Large Municipal Residential Drinking Water System. The City of North Bay is the Operating Authority for the Water Treatment Plant and water distribution system. The following table lists the requirements that the system failed to meet and the measures taken to correct the failure:

The following is a list of the adverse sampling results from the North Bay WTP and Distribution System (DS) over the year of 2018.

List the requirement(s) the system failed to meet	Specify duration of the failure (i.e. date(s))	Describe the measures taken to correct the failure	Status (complete or outstanding)
Failure to meet secondary disinfection - chlorine residual	July 5, 2018	Failed to meet secondary disinfection. Free chlorine residual of 0.04mg/L at hydrant #8-1509. Flushed and re-sampled. Results met Ontario Drinking Water Quality Standards. AWQI #140259	Complete
Total Coliform units found in sample	August 11, 2018	Total coliforms detected as 6 cfu in sample. Reported to MECP as required, resampled at Zepher Heights. Results met the Ontario Drinking Water Quality Standards. AWQI#141564.	Complete
Failure to meet secondary disinfection - chlorine residual	September 30, 2018	Failed to meet secondary disinfection. Free chlorine residual of 0.01mg/L at 1125 Vanier St. Flushed and resampled. Results met Ontario Drinking Water Quality Standards. AWQI # 142422	Complete
Failure to meet secondary disinfection - chlorine residual	October 1, 2018	Failed to meet secondary disinfection. Free chlorine residual of <0.05mg/L at hydrant 16-1560. Flushed and resampled. Results met Ontario Drinking Water Quality Standards. AWQI # 143301	Complete

List the requirement(s) the system failed to meet	Specify duration of the failure (i.e. date(s))	Describe the measures taken to correct the failure	Status (complete or outstanding)
Failure to meet secondary disinfection - chlorine residual	November 5, 2018	Failed to meet secondary disinfection. Free chlorine residual of 0.00mg/L at Airport Sample Station. Flushed and resampled. Results met Ontario Drinking Water Quality Standards. AWQI # 143884	Complete
Failure to prove Primary Disinfection	December 24, 2018	Turbidity analyzer had a hardware malfunction, setting the scale to be different than SCADA trending. Not allowing us to represent true turbidity value. Reported to MECP, had taken rack offline and reset equipment AWQI # 144404	Complete

The North Bay WTP has the design capacity of 79,500 cubic meters of water per day. The WTP is a SCADA controlled membrane filtration system with ultraviolet and chlorine disinfection systems. The plant also includes fluoride addition along with caustic for pH adjustment and control max for corrosion control prior to delivery to the distribution. The WTP meets the Ontario Drinking Water Standards requirements for the removal/disinfection of 2-log *Cryptosporidium* oocysts, 3-log *Giardia* cysts, and 4-log Viruses.

The North Bay WTP achieves the above performance criteria using membrane filtration (0.1 micron pore size), ultraviolet (UV) inactivation and chlorine disinfection.

The filtration process meets the criteria listed in the Procedure for Disinfection of Drinking Water in Ontario for membrane filtration, including;

1. Maintain effective backwash procedures, including filter-to-waste or an equivalent procedure, to ensure that the effluent turbidity requirements are met at all times;
2. Monitor integrity of the membrane by continuous particle counting or equivalent effective means (e.g., intermittent pressure decay measurements) (Note: intermittent pressure decay monitored at the North Bay WTP).
3. Continuously monitor filtrate turbidity; and,
4. Meet the performance criterion for filtered water turbidity of less than or equal to 0.1 NTU in 99% of the measurements each month.

The following is a breakdown of the pathogen removal credits for the North Bay WTP:

- Membrane filtration provides 3.0 log removal of *Giardia*, 2-log removal of *Cryptosporidium*
- UV inactivation provides 0.5-log removal of *Giardia* and 0.5-log removal of *Cryptosporidium*
- Chlorine disinfection provides 4-log removal of viruses

All of the filter rack effluent lines are equipped with continuously monitored, recorded and alarmed turbidity analyzers which will shut down the respective rack if a reading exceeds 0.1 NTU.

Filtered water is directed through the UV disinfection units prior to entering the contact chambers. The two chlorine contact tanks can be operated separately or in sequence and still provide the required 4 log disinfection. This facility is equipped with continuously monitored, recorded and alarmed CT calculation. The SCADA system also automatically takes data from several sources (flow, temperature, free chlorine residual, pH, water depth in contact tanks, and which contact tank is in service) and calculates the log removal credits achieved for Giardia & Viruses.

The following information presents the Annual Record of Water Taking for the North Bay Water Treatment Plant and the treated water consumption.

Raw Water Taking

In overview some 7,265,251 cubic meters of water were taken from Trout Lake during the year of 2018. The average water taking for 2018 was 19,905 cubic meters per day. The maximum water taking per day was 27,500 cubic meters in July and this was 35% of the maximum 79,500 cubic meters per day allowed under the Permit to Take Water.

Raw Water Taking	Total Taking (m3)	Average Day (m3/d)	Max Day (m3/d)	Max Day % of PTTW allowable (79,500 m3/d)
2018	7,265,251	19,905	27,500	35%
2017	6,881,781	18,851	28,818	36%
2016	7,677,448	20,973	27,638	35%
2015	10,244,897	28,149	39,531	50%
2014	10,451,967	28,645	41,509	52%
2013	10,713,683	29,257	43,560	55%
2012	11,804,231	32,227	51,963	65%
2011	12,752,104	34,925	51,870	65%

The 2018 total raw water taking was up by 5% from 2017.

Treated Water

In overview some 7,146,560 cubic meters of water were delivered to the distribution system during the year 2018. The average treated water delivered to the distribution system was 19,573 cubic metres per day for 2018. The maximum water delivered to the distribution system per day during 2018 was 27,074 cubic meters in June and this was 34% of the 78,700 cubic meters per day rated capacity of the plant.

Treated Water Taking	Total Treated (m3)	Average Day (m3/d)	Max Day (m3/d)	Max Day % of PTTW allowable (78,700 m3/d)
2018	7,146,560	19,573	27,074	34%
2017	6,788,663	18,597	28,655	36%
2016	7,564,121	20,720	27,290	35%
2015	10,228,009	28,019	39,128	50%
2014	10,337,724	28,335	41,399	52%
2013	10,578,115	28,962	43,235	55%
2012	11,659,907	31,910	51,534	65%
2011	12,563,903	34,408	51,450	65%

The 2018 total treated water volume delivered into the distribution system was up by 5% from 2017.

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