

2016 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, 2016 to December 31, 2016. 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 2016.

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)
Lead Adverse	Mar. 31, 2016	Lead result at Hydrant 12-190 (Wyld at Third) exceeded 0.10 ug/L. Reported to MOE and MOH as required. Flush and re-sample. Results met Ontario Drinking Water Quality Standards. AWQI #122560	Complete
Failure to meet secondary disinfection - chlorine residual	13 June 2016	Free chlorine residual of 0.00 mg/L at 621 McPhail St. Flushed and re-sampled. Results met the Ontario Drinking Water Quality Standards. AWQI#12764.	Complete
Failure to meet primary disinfection – UV Dosage	22 June 2016	UV Dosage below required 10mJ/cm ² off and on between 7:30PM and 11:30PM. Log giardia removal through contact tanks dipped below 0.5 4 times in this time frame. Reported to MOE and MOH immediately. UV dose was above 6mJ/cm ² in all instances of low giardia through the contact tanks therefore the plant continued	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)
		to meet the 0.5 log giardia removal over (UV + chlorine). UV units re-set and set low dose alarm to page to on-call pager. AWQI #129879	

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 pH adjustment 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 7,667,448 cubic meters of water were taken from Trout Lake during the year of 2016. The average water taking for 2016 was 20,973 cubic meters per day. The maximum water taking per day was 27,638 cubic meters in August 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)
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 2015 total raw water taking was down by 25% from 2014.

Treated Water

In overview some 7,564,121 cubic meters of water were delivered to the distribution system during the year 2016. The average treated water delivered to the distribution system was 20,720 cubic metres per day for 2016. The maximum water delivered to the distribution system per day during 2016 was 27,290 cubic meters in August and this was 35% of the 78,700 cubic meters per day rated capacity of the plant.

Treated Water Taking	Total Taking (m3)	Average Day (m3/d)	Max Day (m3/d)	Max Day % of PTTW allowable (78,700 m3/d)
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 2016 total treated water volume delivered into the distribution system was down by 26% from 2015.

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