



**BLIND RIVER  
DRINKING WATER SYSTEM  
WATERWORKS # 210000041**

**ANNUAL & SUMMARY  
REPORTS 2014**



## Introduction

This Annual and Summary Report has been prepared in accordance with both Schedule 22 and section 11 of Ontario Regulation 170/03. In this manner, the requirements by regulation for each report have been consolidated into a single document. This Report is intended to brief the ownership and consumers of the Blind River Drinking Water System on the system's performance over the past calendar year January 1 to December 31, 2014.

This report encompasses all elements as required by O. Reg. 170/03. Each section explains what is required for the category Large Municipal Residential DWS (as it pertains to the Blind River DWS) and how limits were met or if shortfalls were revealed. The last section contains a list of tables and definition of terms identified in this report.

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## Tables, Definition of Terms

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## System Description

The facility is owned by the Corporation of the Town of Blind River and operated under contract by PUC Services Inc. The treatment plant is a Class 3 WT subsystem and the distribution is a Class 2 WD subsystem and is classified as a Large Municipal Residential system. The drinking water system serves a population of approximately 3,500. The surface water treatment plant is rated for a maximum capacity of 6,000 m<sup>3</sup>/day.

Water is drawn from the Blind River well field located along the east shoreline of the Blind River on Riverside Drive, and subjected to alkalinity/pH adjustment, chemically assisted coagulation and flocculation, dual-media direct filtration and activated carbon adsorption. Sodium Hypochlorite is used for primary disinfection and secondary disinfection. Hydrofluosilicic acid is used for fluoridation. Treated water is pumped into an elevated tank as well as feeding the water distribution system.

## Chemicals

Chemicals utilized at the Blind River Treatment plant during 2014 include:

- Sodium Hypochlorite for primary and secondary disinfection
- Aluminum Chlorohydrate for coagulation
- Polymer (LT20 & LT25) as a coagulant aid
- Potassium Hydroxide for pH and alkalinity adjustment
- Hydrofluosilic acid for fluoridation

## 2014 Expenditures

During the year of 2014, expenses were incurred to maintain treatment and distribution functions:

- Plumbing, electrical, and modification to SCADA programming for the connection of Well 9 was completed to provide additional source water.
- maintenance of plant equipment and instrumentation
- chemicals for process operations
- distribution repairs (water mains, hydrant and valve replacement)
- Uni-directional flushing and Leak detection programs
- SWI project for well 6

## Water Quality

### Microbiological Sampling and Testing

Sampling is conducted weekly for the DWS at the frequencies and locations identified by Schedule 10 of O.Reg 170/03 for Large Municipal Residential Systems.

Table 1: Microbiological sampling requirements

Location	Sample Analysis	# samples	Frequency
Raw	EC / TC	Each well	weekly
Treated	EC / TC / HPC	1 sample	weekly
Distribution	EC / TC/ HPC-25%	8 samples	monthly

Blind River’s raw samples are comprised of the five production wells (Wells 5, 6, 7, 8, & 9). Treated samples are collected from the WTP lab, distribution sampling sites are from locations from throughout the system not limited to but including: Colonization Bleeder, Woodward Bleeder, and Kennedy Bleeder.

Table 1a: Microbiological Sample Results

Type	# samples	EC (range)	TC (range)	# samples	HPC (range)
Raw	249	0	0 – 440	-	-
Treated	53	0	0	53	0 – 60
Distribution	176	0	0	162	0 – 1370

### Operational Checks and Testing

Operational testing is completed as per Schedule 7 of O.Reg. 170/03 for Large Municipal Residential Systems. These checks and testing are completed on site at the water treatment facility by licensed operators. Continuous monitoring analyzers are utilized for measurement of filter turbidity, chlorine and fluoride residuals.

Table 2: Monthly Filter Turbidity Results

Month	Avg turbidity (NTU)			Range (NTU)	Monthly Filter Efficiency
	DM #1	DM #2	DM #3		
January	0.08	0.06	0.08	0.02 – 1.18	99.59
February	0.08	0.09	0.09	0.02 – 2.43	99.43
March	0.07	0.06	0.07	0.02 – 0.75	99.82
April	0.09	0.09	0.09	0.02 – 1.23	99.16
May	0.09	0.06	0.05	0.02 – 10.0	99.49
June	0.09	0.05	0.06	0.02 – 0.98	99.56
July	0.08	0.05	0.07	0.02 – 0.66	99.79
August	0.10	0.07	0.07	0.02 – 1.41	99.07
September	0.12	0.09	0.12	0.02 – 6.06	99.63
October	0.13	0.09	0.12	0.03 – 1.25	98.51
November	0.07	0.08	0.08	0.02 – 0.90	99.27
December	0.06	0.06	0.06	0.02 – 0.87	99.83

Filter Efficiency is monitored by tracking the run time above and below 0.30 NTU during filter run time. Blind River maintained filter compliance each month above 95%, the required limit for dual media filtration to achieve necessary filtration credits for primary disinfection.

Table 3: Chlorine and Fluoride Residuals

Month	Average Chlorine Residual (mg/L)	Chlorine Residual Range (mg/L)	Average Fluoride Residual (mg/L)	Fluoride Residual Range (mg/L)
January	1.24	0.84 – 1.74	0.63	0.06 - 0.87
February	1.04	0.80 – 1.58	0.61	0.11 - 0.80
March	1.08	0.84 – 1.64	0.64	0.11 - 0.74
April	0.99	0.75 – 1.27	0.64	0.40 – 0.78
May	0.94	0.73 – 1.20	0.44	0.08 – 0.54
June	1.24	0.77 – 2.45	0.60	0.07 – 0.82
July	1.08	0.76 – 1.66	0.53	0.03 – 0.87
August	0.94	0.70 – 1.57	0.51	0.07 – 0.68
September	1.02	0.51 – 1.94	0.61	0.11 – 1.02
October	1.09	0.32 – 1.85	0.60	0.10 – 0.73
November	1.36	0.91 – 1.94	0.58	0.08 – 0.78
December	1.43	0.77 – 2.31	0.20	0.02 – 1.20

Chlorine and fluoride residuals are continuously monitored and trended to real time on SCADA.

### Chemical Sampling and Testing

Schedule 13 of O.Reg 170/03 outlines chemical sampling regiments for Large Municipal Residential systems. Annual sampling of Schedule 23 (inorganics) and 24 (organics), as well as quarterly sampling for Nitrites/Nitrates and THM’s. Sodium and fluoride are required every 60 months. Schedule 15.1 outlines the requirements for semi-annual lead testing (2 periods per year). Blind River’s lead sampling requirements are outlined in the current DWWP which extends until the end of 2016.

Table 4: Schedule 23 - Inorganics

Parameter	Sample Date	Units	Result Value (ug/L)	ODWS
Antimony	26-Feb-14	ug/L	< 0.60	6
Arsenic	26-Feb-14	ug/L	< 1.0	25
Barium	26-Feb-14	ug/L	23	1000
Boron	26-Feb-14	ug/L	< 50	5000
Cadmium	26-Feb-14	ug/L	< 0.10	5
Chromium	26-Feb-14	ug/L	< 1.0	50
Fluoride	26-Feb-14	mg/L	0.432	1.5
Mercury	26-Feb-14	ug/L	< 0.10	1
Selenium	26-Feb-14	ug/L	< 1.0	10
Sodium	26-Feb-14	mg/L	15.4	20
Uranium	26-Feb-14	ug/L	< 2.0	20

All results for inorganic parameters are within the maximum acceptable concentrations (MAC) of the Ontario Drinking Water Quality Standards as defined in O.Reg 169/03. No result is above the half MAC with the exception of sodium which has an aesthetic objective (AO) of 200 mg/L, but has a limit of 20 mg/L for medical reasons and would require notifications if exceeded.

Table 5: Nitrite/ Nitrate Results

Date	26-Feb-14	21-May-14	5-Aug-14	1-Dec-14	ODWS
Unit	mg/L	mg/L	mg/L	mg/L	mg/L
Nitrite	<0.020	<0.020	<0.020	<0.020	1.0
Nitrate	0.736	0.602	0.682	0.557	10

All quarterly results for Nitrites and Nitrates are well below ODWS.

Table 6: Schedule 24 - Organics

Parameter	Date	Unit	Result	ODWS
Alachlor	26-Feb-14	ug/L	< 0.10	5
Aldicarb	26-Feb-14	ug/L	< 1.0	9
Aldrin + Dieldrin	26-Feb-14	ug/L	< 0.040	0.7
Atrazine + N-dealkylated metabolites	26-Feb-14	ug/L	< 0.20	5
Azinphos-methyl	26-Feb-14	ug/L	< 0.10	20
Bendiocarb	26-Feb-14	ug/L	< 0.20	40
Benzene	26-Feb-14	ug/L	< 0.50	5
Benzo(a)pyrene	26-Feb-14	ug/L	< 0.010	0.01
Bromoxynil	26-Feb-14	ug/L	< 0.20	5
Carbaryl	26-Feb-14	ug/L	< 0.20	90
Carbofuran	26-Feb-14	ug/L	< 0.20	90
Carbon Tetrachloride	26-Feb-14	ug/L	< 0.50	5
Chlordane (Total)	26-Feb-14	ug/L	< 0.30	7
Chlorpyrifos	26-Feb-14	ug/L	< 0.10	90
Cyanazine	26-Feb-14	ug/L	< 0.10	10
Diazinon	26-Feb-14	ug/L	< 0.10	20
Dicamba	26-Feb-14	ug/L	< 0.20	120
1,2-Dichlorobenzene	26-Feb-14	ug/L	< 0.50	200
1,4-Dichlorobenzene	26-Feb-14	ug/L	< 0.50	5
Dichlorodiphenyltrichloroethane (DDT) + metabolites	26-Feb-14	ug/L	< 0.40	30
1,2-Dichloroethane	26-Feb-14	ug/L	< 0.50	5
1,1-Dichloroethylene (vinylidene chloride)	26-Feb-14	ug/L	< 0.50	14
Dichloromethane	26-Feb-14	ug/L	< 5.0	50
2-4 Dichlorophenol	26-Feb-14	ug/L	< 0.30	900
2,4-Dichlorophenoxy acetic acid	26-Feb-14	ug/L	< 0.20	100
Diclofop-methyl	26-Feb-14	ug/L	< 0.20	9
Dimethoate	26-Feb-14	Ug/L	< 0.10	20

Parameter	Date	Unit	Result	ODWS
Dinoseb	26-Feb-14	ug/L	< 0.20	10
Diquat	26-Feb-14	ug/L	< 1.0	70
Diuron	26-Feb-14	ug/L	< 1.0	150
Glyphosate	26-Feb-14	ug/L	< 5.0	280
Heptachlor + Heptachlor Epoxide	26-Feb-14	ug/L	< 0.20	3
Lindane (Total)	26-Feb-14	ug/L	< 0.10	4
Malathion	26-Feb-14	ug/L	< 0.10	190
Methoxychlor	26-Feb-14	ug/L	< 0.10	900
Metolachlor	26-Feb-14	ug/L	< 0.10	50
Metribuzin	26-Feb-14	ug/L	< 0.10	80
Monochlorobenzene	26-Feb-14	ug/L	< 0.50	80
Paraquat	26-Feb-14	ug/L	< 1.0	10
Parathion	26-Feb-14	ug/L	< 0.10	50
Pentachlorophenol	26-Feb-14	ug/L	< 0.50	60
Phorate	26-Feb-14	ug/L	< 0.10	2
Picloram	26-Feb-14	ug/L	< 0.20	190
Polychlorinated Byphenols (PCB)	26-Feb-14	ug/L	< 0.035	3
Prometryne	26-Feb-14	ug/L	< 0.10	1
Simazine	26-Feb-14	ug/L	< 0.10	10
THM (RAA)	2014	ug/L	65.7	100
Temephos	26-Feb-14	ug/L	< 0.10	280
Terbufos	26-Feb-14	ug/L	< 0.20	1
Tetrachloroethylene	26-Feb-14	ug/L	< 0.50	30
2,3,4,6-Tetrachlorophenol	26-Feb-14	ug/L	< 0.50	100
Triallate	26-Feb-14	ug/L	< 0.10	230
Trichloroethylene	26-Feb-14	ug/L	< 0.50	5
2,4,6-Trichlorophenol	26-Feb-14	ug/L	< 0.50	5
2,4,5-Trichlorophenoxy acetic acid	26-Feb-14	ug/L	< 0.20	280
Trifluralin	26-Feb-14	ug/L	< 0.10	45
Vinyl Chloride	26-Feb-14	ug/L	< 0.20	2

All results for the required organic sampling of schedule 24 are below the MAC. The only parameter exceeding half MAC are THM's sampled on the following dates noted in Table 6a.

Table 6a: Organics - Sampling exceeding half MAC

Date of Sample	Parameter	Result Value
28-Apr-2014	THM	54.2 ug/L
30-Jun-2014	THM	57.8 ug/L
30-Jun-2014	THM	71.3 ug/L
5-Aug-2014	THM	60.4 ug/L
5-Aug-2014	THM	55.7 ug/L
5-Aug-2014	THM	65.7 ug/L
25-Aug-2014	THM	61.5 ug/L
8-Sept-2014	THM	69.8 ug/L
21-Oct-2014	THM	54.4 ug/L
3-Nov-2014	THM	75.6 ug/L

THM sampling is completed more frequent than required by regulation to effectively monitor processes that may affect THM formation.

Lead Sampling: The maximum acceptable concentration for lead in drinking water is 10 ug/L. This applies to water at the point of consumption since lead is only present as a result of corrosion of lead solder, lead containing brass fittings or lead pipes which are found close to or in domestic plumbing and the service connection to buildings.

Table 7: Community Lead Sampling Results

Location Type	Number of Samples	Range of Lead Results (min#) – (max #)	Number of Exceedances
Plumbing	20	0 – 3.5	0
Distribution	16	0 – 8.1	0

Lead samples are collected during the two prescribed periods each year (Dec 15 – Mar15 and June 15- Oct 15). Sampling frequency and locations are defined in Sample results revealed zero exceedances during year 2014.

## Compliance

### Adverse Water Quality Incidents

During 2014, the Blind River DWS reported eight incidents of adverse water quality. Six incidents were reported due to loss of pressure within the distribution system during planned repairs for main breaks and hydrant repairs. Affected residents were placed on precautionary boil water advisories until microbiological sampling was completed with 2 sets of samples resulting in no presence of total coliform or E. Coli. Two other incidents were reported for exceedances of filter turbidity. The turbidity incidents occur during the drawdown phase of a filter backwash. Resolution to avoid this circumstance was completed by implementing a timed limit which takes the filter out of service if turbidity values exceed a defined limit for a determined time period to eliminate any possible future exceedances.

Table 8: Adverse Water Quality Incidents

Date	Incident Reported
6-Feb-2014	Loss of distribution pressure (Woodward/Dawsy)
24-Feb-2014	Loss of distribution pressure (hydrant repair)
5-May-2014	Loss of distribution pressure (hydrant repair)
8-May-2014	Loss of data (8hours), unable to confirm filter turbidity
17-May-2014	Filter Turbidity > 1.0 (25 min)
26-Nov-2014	Loss of distribution pressure (Robb Rd.)
8-Dec-2014	Loss of distribution pressure (Mc Arthur Ave.)
11-Dec-2014	Loss of distribution pressure(Mc Arthur Ave.)



### Annual Drinking Water System Inspection

The annual DWS inspection took place on Mar 5, 2014 by MOECC Drinking Water inspector Maureen Spinney. Three non-conformances and additional recommendations and best practice were identified. The DWS received a final inspection rating of 92.99%

The following table identifies any non-compliance with requirement of the Act, the regulations, the system’s approval, drinking water works permit, municipal drinking water license and any orders applicable to the system that were not met at any time during the period covered by the report.

Table 9: Non-compliances identified during Annual DWS Inspection

Non-compliance	The Operator-in-Charge had not ensured that all equipment used in the processes was monitored, inspected, and evaluated.
Action	Provide a copy of the work order summary to the Ministry for review
Corrective Actions	The work order summary was reviewed, additions were made to include work identified by Form 17-01 (DWQMS). A master list is sent to the BR Lead Hand as well as individual work orders, issued monthly, quarterly, semi-annual and annual. This revised listing was forwarded to the inspector.
Non-compliance	Adjustments to the treatment equipment were not made only by certified operators.
Action	The municipality must ensure that a licensed operator is present when required, prior to work being done in the distribution system. To assist in achieving this requirement, and in response to inconsistent communications between the operating authority and unlicensed distribution system/Public Works staff, the Municipality is required to ensure at least one Public Works Department employee working in the distribution system is trained specifically in the Walkerton Clean Water Centre two week course entitled "Entry Level Drinking Water Operator Course". The course is offered in Sudbury in November 2014. The Municipality must also ensure that employees working in the distribution system are provided with a copy of the AWWA Standard C651-05, Disinfecting Water Mains. The Municipality must also ensure that employees

	working in the distribution system are provided with pages 10 through 12 of the Ministry of Environment Certification Guide for Operators, dated April 2010, provided during the inspection. A Provincial Officer's Order will be issued.
Corrective Actions	In response to the Provincial Officer’s Order, a public works employee registered for and attended the week long mandatory OIT training course “Entry Level Drinking Water Operator Course”. Public Works staff was supplied with the requested “AWWA Standards” and the “Certification Guide for Operators” for their review. PUC Services developed an SOP to define roles and responsibilities for distribution activity and currently conduct monthly operations meetings to keep open lines of communication between the Operating Authority and the Town.
Non-compliance	<ol style="list-style-type: none"> <li>1. Equipment operating status must be documented by the OIC the end of every shift in accordance with Section 26,(2)(d), Regulation 128.</li> <li>2. Though the operating authority has verified that CT was achieved, calculations for January 25, 2014 and February 18, 2014, were questionable, yet no information is contained within the plant logbook.</li> </ol>
Action	<ol style="list-style-type: none"> <li>1. In accordance with Section 26,(2)(d), Regulation 128, the OIC must record equipment operating status at the end of every shift. By July 1, 2014, provide written confirmation to the undersigned that operators will document equipment operating status at the end of every shift.</li> <li>2. By July 1, 2014, provide to the undersigned written confirmation that abnormal circumstances will be described within the logbook, in accordance with Section 27, Regulation 128.</li> </ol>
Corrective Actions	<ol style="list-style-type: none"> <li>1. PUC Services created a form to document a current listing of equipment out of service at the end of each working day.</li> <li>2. Discussions with operators as well as an SOP (BR-WT-015 Blind River WTP Daily Report and Data Review) for guidance and future reference for documenting abnormal operating conditions.</li> </ol>



## Flows

Raw water flows are controlled by demand and operator determined set-points to maintain 24 hour operation. Of the 5 GUDI wells, only 4 were available for service during most of 2014, due to unrepaired breaks in the transmission line of Well 8, which froze early in the year. All well flow takings are well below the PTTW limits defined for each well.

Municipal Drinking Water Licence: 205-101 specifies a maximum rated flow of 6000 m<sup>3</sup>/d. The max raw flow rate reported was 1,957.9 m<sup>3</sup>/d, 32.6 % of the rated capacity.

The Blind River WTP treated and distributed a total of 407.6 ML during the year of 2014. The average day treated flow demand was 1,117 m<sup>3</sup>/d, and maximum day flow was 1,659 m<sup>3</sup>/d on December 18, 2014. .

The Blind River GUDI wells have a history of deterioration. Even though the current years flow demands are low, the well yield is declining and well rehabilitation may be required.

Plant flow rates are considered daily to evaluate required demand but also to ensure processes are monitored and minimum retentions for THM control. The plant buffers a higher capacity during winter months when breaks may occur and consumers may run water to avoid frozen services and mains.

Table 10: 5 year Flow Comparison

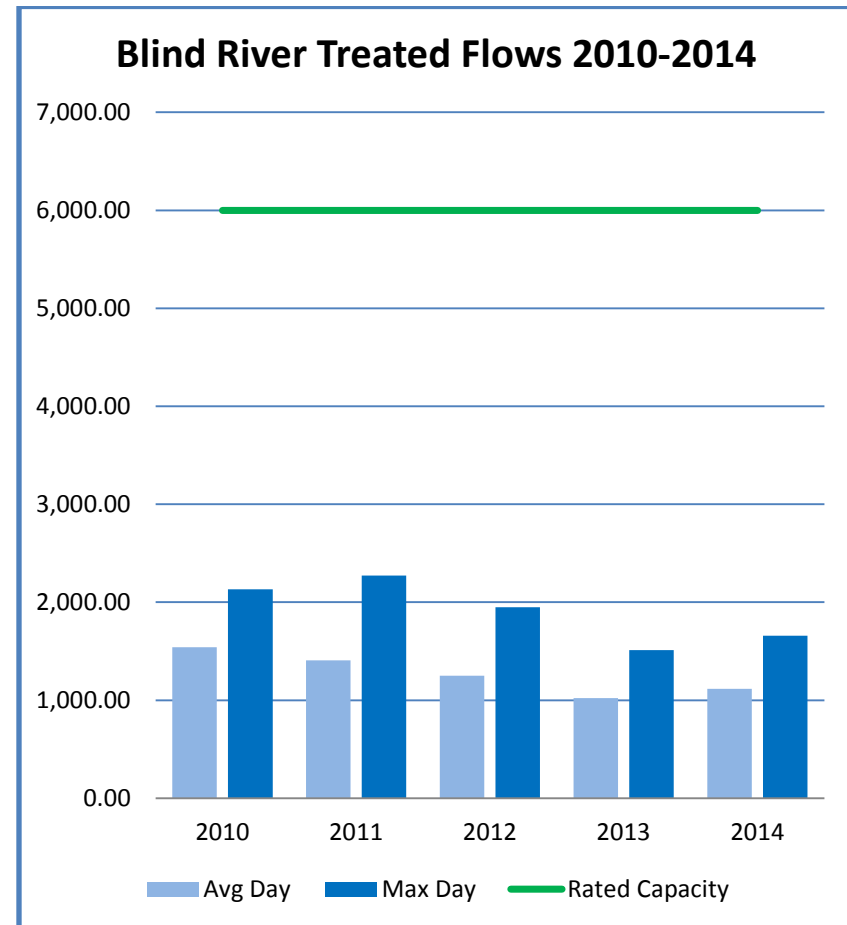
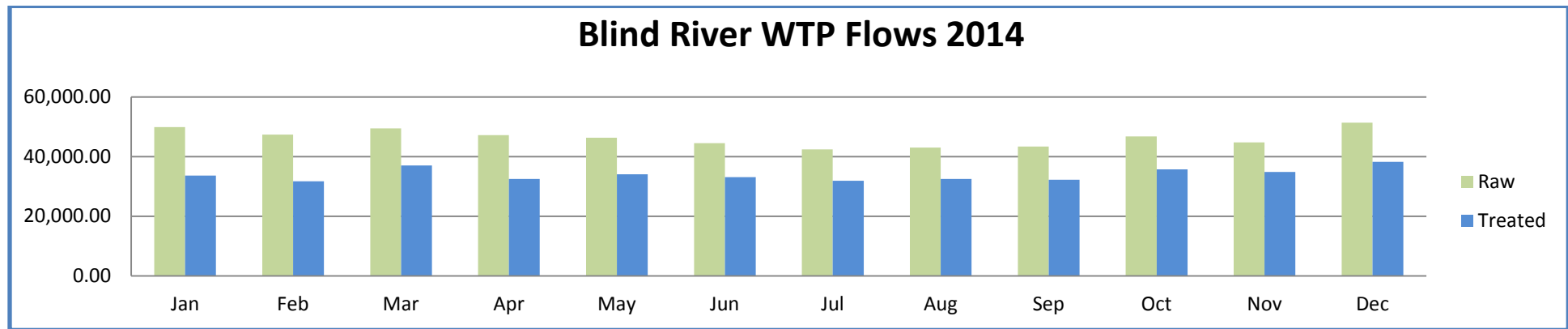


Table 11: Raw and Treated water Flows 2014

2014	Raw Water Flows					Treated Water Flows			
Month	Raw Water (m3)	Minimum Day (m <sup>3</sup> /d)	Maximum Day (m <sup>3</sup> /d)	Average Day (m <sup>3</sup> /d)	% Max. Flow Day of rated Capacity	Treated Water (m3)	Minimum Day (m <sup>3</sup> /d)	Maximum Day (m <sup>3</sup> /d)	Average Day (m <sup>3</sup> /d)
January	49,925.8	1,458.8	1,758.0	1,610.5	29.3	33,615.8	829.2	1,250.9	1,084.4
February	47,338.7	1,604.9	1,750.9	1,690.7	29.2	31,734.3	830.8	1,398.7	1,133.4
March	49,475.9	1,535.3	1,669.7	1,596.0	27.8	37,011.4	953.8	1,490.9	1,193.9
April	47,186.0	1,477.6	1,656.3	1,572.9	27.6	32,538.6	878.5	1,282.8	1,084.6
May	46,367.0	1,092.9	1,655.7	1,495.7	27.6	34,038.7	799.8	1,407.6	1,098.0
June	44,483.7	1,212.8	1,786.7	1,482.8	29.8	33,089.3	776.4	1,498.9	1,102.9
July	42,419.6	1,184.0	1,591.6	1,386.4	26.5	31,901.0	786.9	1,349.2	1,029.1
August	43,031.3	1,113.0	1,637.5	1,388.1	27.3	32,531.4	820.3	1,265.9	1,049.4
September	43,333.1	1,174.8	1,687.7	1,444.4	28.1	32,290.5	766.0	1,230.3	1,076.4
October	46,765.2	1,120.6	1,798.8	1,508.6	29.9	35,699.7	803.1	1,478.6	1,151.6
November	44,767.9	1,202.5	1,672.3	1,492.3	27.9	34,840.3	915.2	1,309.9	1,161.3
December	51,399.8	1,492.5	1,957.9	1,658.1	32.6	38,237.7	747.9	1,658.6	1,233.5

Chart 1: Blind River WTP Flows 2014



## Report Endorsement

### Report Availability

Section 11 of O. Reg. 170/03 defines that this Annual Report must be given, without charge, to every person who requests a copy. Effective steps must also be taken to advise users of water from the system that copies of the report are available, without charge, and of how a copy may be obtained. This Annual Report shall be made available for inspection by the public on the Town Office.

Town of Blind River Municipal Office  
11 Hudson St  
Blind River, ON  
POH 1B0

In accordance with Schedule 22 of O. Reg. 170/03, this Annual Report must be given to the members of the municipal council. Section 19 (Standard of care, municipal drinking-water system) of Ontario's Safe Drinking Water Act also places certain responsibilities upon those municipal officials who oversee an accredited operating authority or exercise decision-making authority over a system

### Report Endorsement

This Summary report for The Blind River Drinking Water System for the period of January 1st to December 31st 2014 has been prepared in accordance to Schedule 22 of O. Reg 170/03. The report has been reviewed and accepted by the Town of Blind River council.

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**Date**

## Tables, Definition of Terms

### Appendix A: List of Tables/ Charts

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Acronym	Definition
<b>AO</b>	Aesthetic Objective
<b>AWQI</b>	Adverse water quality incident
<b>DM</b>	Dual Media
<b>DWS</b>	Drinking water system
<b>EC</b>	E. Coli
<b>GUDI</b>	Groundwater under direct influence of surface water
<b>HPC</b>	Heterotrophic plate count
<b>m<sup>3</sup></b>	Cubic metres
<b>m<sup>3</sup>/d</b>	Cubic metres per day
<b>mg/L</b>	Milligram per litre (part per million)
<b>ML</b>	Megalitre (1000 m3)
<b>NTU</b>	Nephelometric turbidity unit
<b>O. Reg. 170/03</b>	Ontario Regulation 170/03
<b>PTTW</b>	Permit to take water
<b>SCADA</b>	Supervisory control and data acquisition
<b>TC</b>	Total coliforms
<b>THM</b>	Trihalomethane
<b>ug/L</b>	Microgram per litre (part per billion)
<b>WD</b>	Water distribution
<b>WT</b>	Water treatment
<b>WTP</b>	Water treatment plant