BLIND RIVER
DRINKING WATER SYSTEM
WATERWORKS # 210000041

ANNUAL & SUMMARY
REPORTS 2023

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, 2023.

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 definitions of terms identified in this report.

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 1 WD subsystem and is classified as a Large Municipal Residential system. The drinking water system serves a population of approximately 2,500. The surface water treatment plant is rated for a maximum capacity of 6,000 m^3/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 2023 include:

- Sodium hypochlorite for primary and secondary disinfection
- Poly aluminum chloride for coagulation
- Polymer as a coagulant aid
- Potassium hydroxide for pH and alkalinity adjustment
- Hydrofluosilicic acid for fluoridation

2023 Expenditures

During the year of 2023, expenses were incurred to maintain treatment and distribution functions:

- ESA
- SAI Global External Audits
- Dehumidifiers WTP & Wells
- New chemical panels and pumps (6) for primary and secondary disinfection (sodium hypochlorite)
- Well rehabilitation for Well 7, 8, & 5

2023 Drinking Water System Changes

Form 1 – Record of Watermains Authorized as a Future Alteration

- Woodward St. Construction

Form 2 – Record of Minor Modification or Replacements

- Chemical feed pumps for primary and secondary disinfection (6)

Form 3 – Record of addition, modification or replacement of equipment discharging a contaminant of concern to the atmosphere

- n/a

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%	11 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: Youngfox Bleeder, Woodward Bleeder, and Kennedy Bleeder.

Table 2: Microbiological Sample Results

Type	# samples	EC (range)	TC (range)	# samples	HPC (range)
Raw	260	0	0 - 91	n/a	n/a
Treated	52	0	0	52	0 - 20
Distribution	156	0	0	156	0 - 10

Operational Checks and Testing

Operational testing is completed as per Schedule 7 of O. Reg. 170/03 for Large Municipal Residential Systems. 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 3: Monthly Filter Turbidity Results

Month	Avg turbidity (NTU)			Range (NTU)	Monthly Filter Efficiency
	DM #1	DM #2	DM #3		
January	0.03	0.09	0.12	0.01 - 1.78	99.4
February	0.03	0.06	0.08	0.01 - 0.44	99.9
March	0.02	0.08	0.08	0.01 - 0.65	99.9
April	0.02	0.05	0.08	0.01 - 0.91	99.9
May	0.04	0.08	0.1	0.01 - 1.69	99.9
June	0.03	0.08	0.12	0.01 - 1.79	99.9
July	0.03	0.08	0.11	0.01 - 0.94	99.6
August	0.03	0.06	0.11	0.01 - 1.10	99.8
September	0.03	0.05	0.12	0.01 - 1.21	99.6
October	0.05	0.09	0.12	0.01 - 1.38	98.4
November	0.04	0.04	0.07	0.01 - 1.28	99.8
December	0.02	0.04	0.04	0.01 - 1.97	98.8

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 4: 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	1.14	0.76 - 1.53	0.73	0.19 - 0.93
February	1.08	0.80 - 1.54	0.63	0.12 - 0.80
March	1.22	0.66 - 2.22	0.71	0.17 - 0.86
April	1.08	0.59 - 2.35	0.72	0.17 - 0.86
May	1.15	0.70 - 1.78	0.65	0.10 - 0.93
June	1.09	0.62 - 1.38	0.7	0.10 - 0.93
July	1.13	0.64 - 4.06	n/a	n/a
August	1.12	0.73 - 1.60	0.67	0.01 - 0.77
September	1.33	0.83 - 1.92	0.66	0.06 - 0.85
October	1.47	1.16 - 1.74	0.63	0.06 - 0.84
November	1.3	0.59 - 1.87	0.7	0.07 - 0.87
December	1.17	0.84 - 1.60	0.73	0.07 - 0.88

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 is completed for Schedules 23 (inorganics) and 24 (organics), as well as quarterly sampling for nitrites/nitrates, THMs and HAAs. 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 is under relief. Relief requirements are outlined in the current DWWP which extends until the end of the first round of 2022.

Table 5: Schedule 23 - Inorganics

Parameter	Sample Date	Result Value (µg/L)	Units	ODWS
Antimony	3-Apr-23	<0.5	µg/L	6
Arsenic	3-Apr-23	<1	µg/L	10
Barium	3-Apr-23	18	µg/L	1000
Boron	3-Apr-23	6	µg/L	5000
Cadmium	3-Apr-23	<0.1	µg/L	5
Chromium	3-Apr-23	2	µg/L	50
Fluoride	20-Jun-22	0.19	mg/L	1.5
Mercury	3-Apr-23	<0.1	µg/L	1
Selenium	3-Apr-23	<0.2	µg/L	50
Sodium	4-Apr-22	15.8	mg/L	20
Uranium	3-Apr-23	<1	µg/L	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 6: Nitrate/ Nitrite Results

Date	ODWS	03-Jan-23	03-Apr-23	21-Jul-23	02-Oct-23
Unit	mg/L	mg/L	mg/L	mg/L	mg/L
Nitrate	10	0.55	0.47	0.36	0.45
Nitrite	1.0	<0.05	<0.05	<0.05	<0.05

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

Table 7: Disinfection By-products Results (THM/HAA)

Date	ODWS	03-Jan-23	03-Apr-23	21-Jul-23	02-Oct-23	RAA
Unit	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
THM	100	42	41.6	45	74.5	50.8
HAA	80	35	40	39	49	40.8

ODWS established a MAC of 80 for HAAs effective January 1, 2020.

Table 8: Schedule 24 - Organics

Parameter	Date	Result	Unit	ODWS
Alachlor	03-Apr-23	<0.236	µg/L	5
Atrazine + N-dealkylated metobolites	03-Apr-23	<0.5	µg/L	5
Azinphos-methyl	03-Apr-23	<0.177	µg/L	20
Benzene	03-Apr-23	<0.1	µg/L	1
Benzo(a)pyrene	03-Apr-23	<0.008	µg/L	0.01
Bromoxynil	03-Apr-23	<0.0935	µg/L	5
Carbaryl	03-Apr-23	<3	µg/L	90
Carbofuran	03-Apr-23	<4	µg/L	90
Carbon Tetrachloride	03-Apr-23	<0.2	µg/L	2
Chlorpyrifos	03-Apr-23	<0.177	µg/L	90
Diazinon	03-Apr-23	<0.177	µg/L	20
Dicamba	03-Apr-23	<0.0819	µg/L	120
1,2-Dichlorobenzene	03-Apr-23	<0.2	µg/L	200
1,4-Dichlorobenzene	03-Apr-23	<0.3	µg/L	5
1,2-Dichloroethane	03-Apr-23	<0.2	µg/L	5
1,1-Dichloroethylene (vinylidene chloride)	03-Apr-23	<0.3	µg/L	14
Dichloromethane	03-Apr-23	<1	µg/L	50
2-4 Dichlorophenol	03-Apr-23	<0.2	µg/L	900
2,4-Dichlorophenoxy acetic acid	03-Apr-23	<1	µg/L	100
Diclofop-methyl	03-Apr-23	<0.117	µg/L	9
Dimethoate	03-Apr-23	<0.177	µg/L	20
Diquat	03-Apr-23	<0.2	µg/L	70
Diuron	03-Apr-23	<10	µg/L	150

Parameter	Date	Result	Unit	ODWS
Glyphosate	03-Apr-23	<20	µg/L	280
Malathion	03-Apr-23	<0.177	µg/L	190
2-Methyl-4-Chlorophenoxyacetic Acid (MCPA)	03-Apr-23	<5.85	µg/L	100
Metolachlor	03-Apr-23	<0.118	µg/L	50
Metribuzin	03-Apr-23	<0.118	µg/L	80
Monochlorobenzene	03-Apr-23	<0.5	µg/L	80
Paraquat	03-Apr-23	<0.2	µg/L	10
Pentachlorophenol	03-Apr-23	<0.3	µg/L	60
Phorate	03-Apr-23	<0.118	µg/L	2
Picloram	03-Apr-23	<0.0819	µg/L	190
Polychlorinated Byphenols (PCB)	03-Apr-23	<0.06	µg/L	3
Prometryne	03-Apr-23	<0.059	µg/L	1
Simazine	03-Apr-23	<0.177	µg/L	10
Terbufos	03-Apr-23	<0.118	µg/L	1
Tetrachloroethylene	03-Apr-23	<0.118	µg/L	10
2,3,4,6-Tetrachlorophenol	03-Apr-23	<0.3	µg/L	100
Triallate	03-Apr-23	<0.118	µg/L	230
Trichloroethylene	03-Apr-23	<0.118	µg/L	5
2,4,6-Trichlorophenol	03-Apr-23	<0.2	µg/L	5
Trifluralin	03-Apr-23	<0.118	µg/L	45
Vinyl Chloride	03-Apr-23	<0.118	µg/L	1

All results for the required organic sampling of schedule 24 are below the MAC. Parameters exceeding half MAC are noted in Table 9.

Table 9: Organics - Sampling exceeding half MAC

Date of Sample	Parameter	Result Value (ug/L)
Oct 2, 2023	THM	74.5
Oct 2, 2023	HAA	49

Lead Sampling: The maximum acceptable concentration for lead in drinking water is 10 µg/L. This applies to water at the point of consumption since lead is only present because 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 10: Community Lead Sampling Results

Location Type	Number of Samples	Range of Lead Results (min#) – (max #)	Number of Exceedances
Plumbing	12	0 - 1.4	0
Distribution	2	0.4 - 0.5	0

2023 Lead sampling revealed 0 exceedance in plumbing and 0 exceedance in distribution sampling results.

Lead samples are collected during the two prescribed periods each year (Dec 15 – Apr 15 and June 15- Oct 15).

Compliance

Adverse Water Quality Incidents

During 2023, the Blind River DWS reported zero incidents of adverse water quality.

Annual Drinking Water System Inspection

The annual DWS inspection took place on November 14, 2023, by MECP Drinking Water Inspector Parise Drolet. Zero non-conformances and additional recommendations and best practice were identified.
The DWS received a final inspection rating of 100%.

Flows

Raw water flows are controlled by demand and operator determined set-points to maintain 24-hour operation. 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 6,000 m^3/d.
The max flow rate reported was 1,504 m^3/d, 25.1% of the rated capacity.

The Blind River WTP treated and distributed a total of 367 ML during the year of 2023. The average day treated flow demand was 1,006 m^3/d, and maximum day flow was 1,504 m^3/d on June 24, 2023.

The Blind River GUDI wells have a history of deterioration. Well rehabilitation is scheduled routinely to ensure adequate supply. Three of five wells were last rehabilitated in 2023.

Plant flow rates are considered daily to evaluate required demand but also to ensure processes are monitored and minimum retentions for DBP 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.

Chart 1: 5-year Production Comparison

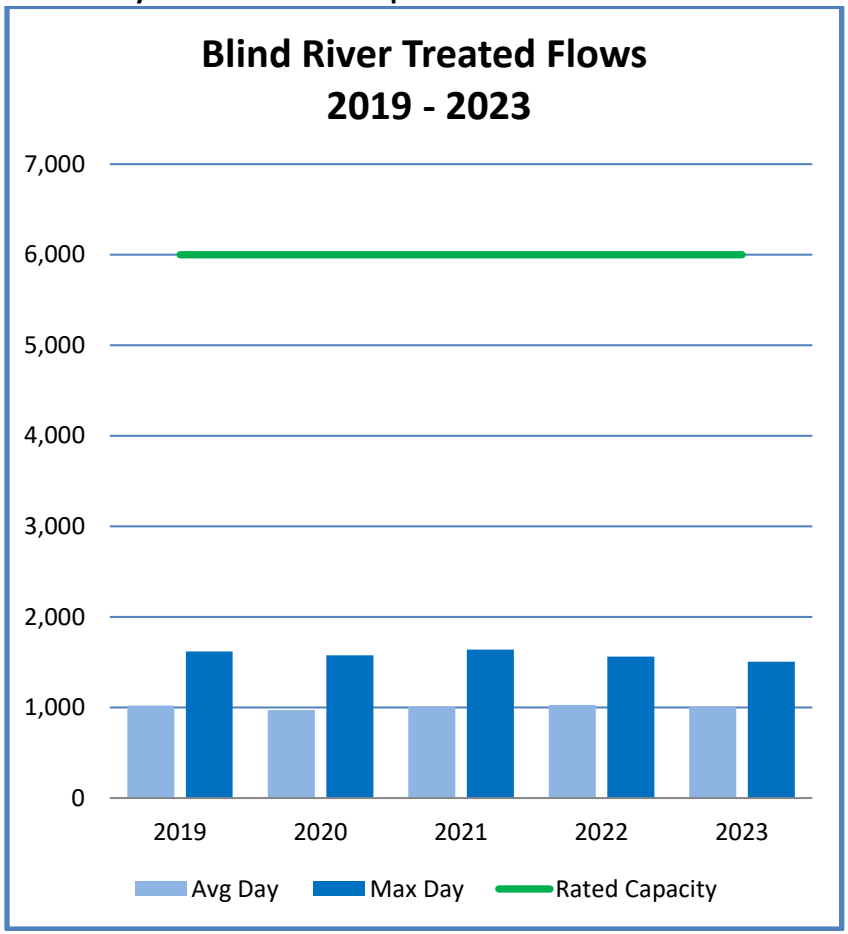
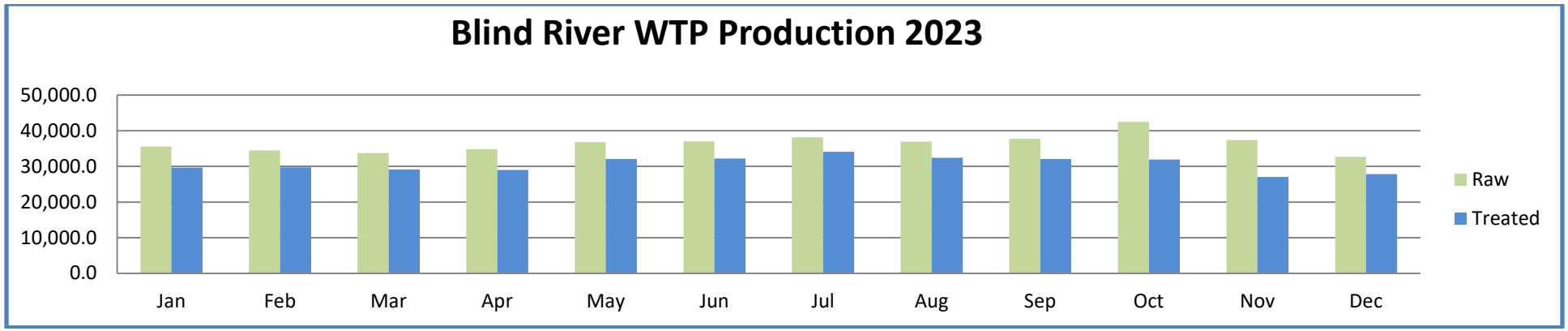


Table 11: Raw and Treated Water Production 2023

2023	Raw Water Flows					Treated Water Flows				
Month	Raw Water (m^3)	Minimum Day (m^3/d)	Maximum Day (m^3/d)	Average Day (m^3/d)	% Max. Flow Day of PTTW	Treated Water (m^3)	Minimum Day (m^3/d)	Maximum Day (m^3/d)	Average Day (m^3/d)	% Max. Flow Day of Rated Capacity
January	35,561.9	1,015.1	1,513.1	1,147.2	26.2	29,678.3	755.3	1,227.1	957.4	20.5
February	34,490.0	1,028.4	1,490.1	1,231.8	25.8	29,738.3	804.3	1,388.8	1,062.1	23.1
March	33,754.4	908.4	1,223.9	1,088.9	21.2	29,145.2	553.5	1,330.7	940.2	22.2
April	34,815.5	1,012.5	1,338.4	1,160.5	23.1	28,999.1	850.3	1,288.8	966.6	21.5
May	36,803.3	590.6	1,378.6	1,187.2	23.8	32,073.0	767.4	1,258.0	1,034.6	21.0
June	36,978.9	988.7	1,585.9	1,232.6	27.4	32,169.9	845.8	1,504.1	1,072.3	25.1
July	38,174.6	895.7	1,481.9	1,231.4	25.6	34,113.2	803.3	1,482.8	110.4	24.7
August	36,917.2	970.4	1,352.8	1,190.9	23.4	32,389.6	779.3	1,197.7	1,044.8	20.0
September	37,718.9	1,062.2	1,382.6	1,257.3	23.9	32,038.2	766.4	1,325.0	1,068.0	22.1
October	42,430.5	1,095.7	1,467.0	1,368.7	25.4	31,927.8	814.0	1,485.6	1,029.9	24.8
November	37,404.2	1,064.5	1,408.1	1,246.8	24.3	27,030.9	693.0	1,174.2	901.0	19.6
December	32,623.3	884.2	1,327.4	1,052.4	22.9	27,823.2	569.7	1,223.2	897.5	20.4

PTTW limit total – 5,785.2 m3/d, Rated Capacity plant flows – 6,000m3/d

Chart 2: Blind River WTP Production 2023



Report Availability

Annual Report

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 at the Town Office.

Town of Blind River Municipal Office
11 Hudson St
Blind River, ON
P0H 1B0

Summary Report

This Summary report for The Blind River Drinking Water System for the period of January 1st to December 31st, 2023, has been prepared in accordance to Schedule 22 of O. Reg. 170/03.

In accordance with Schedule 22 of O. Reg. 170/03, this Summary Report has been provided to the Town of Blind River.

Tables, Definition of Terms

Appendix A: List of Tables/ Charts

Appendix B: Definition of Terms

Acronym	Definition
AWQI	Adverse water quality incident
DM	Dual Media
DPB	Disinfection Byproducts
DWS	Drinking water system
EC	E. Coli
GUDI	Groundwater under direct influence of surface water
HAA	Haloacetic acids
HPC	Heterotrophic plate count
MAC	Maximum Acceptable Concentration
m^3	Cubic metres
m^3/d	Cubic metres per day
mg/L	Milligram per litre (part per million)
ML	Megalitre (1,000 m^3)
NTU	Nephelometric turbidity unit
ODWS	Ontario Drinking Water Standards
O. Reg. 170/03	Ontario Regulation 170/03
PTTW	Permit to take water
SCADA	Supervisory control and data acquisition
TC	Total coliforms
THM	Trihalomethane
µg/L	Microgram per litre (part per billion)
WD	Water distribution
WT	Water treatment
WTP	Water treatment plant