

2023

DISTRICT OF CHETWYND

COMMUNITY WATER SYSTEM ANNUAL REPORT



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1. Water System Description

1.1 Demand

The District of Chetwynd serves a population of approximately 2,300 (Statistics Canada, Census of Population 2021), and has roughly 1140 serviced buildings, including residential and commercial buildings. Many rural properties outside of the District's boundary also use the water produced by the District of Chetwynd Water Treatment Facilities by filling tanks at the bulk water filling station.

1.2 Water System Overview

The District sources its water from the Pine River, which is located south of town and flows east. The water is pumped from the river to settling/storage ponds. After the water has settled it is pumped into the water treatment plant, where it goes through strainers, membrane filtration and is chlorinated. The treated water is stored in two clear wells, while the backwash water is directed to the backwash ponds south of the settling ponds. The high lift pumping station pumps water from the clear wells to the distribution system and water reservoirs for storage. The figure below (Figure 1) shows a simplified overview of the water treatment process from the river intake to the distribution system.

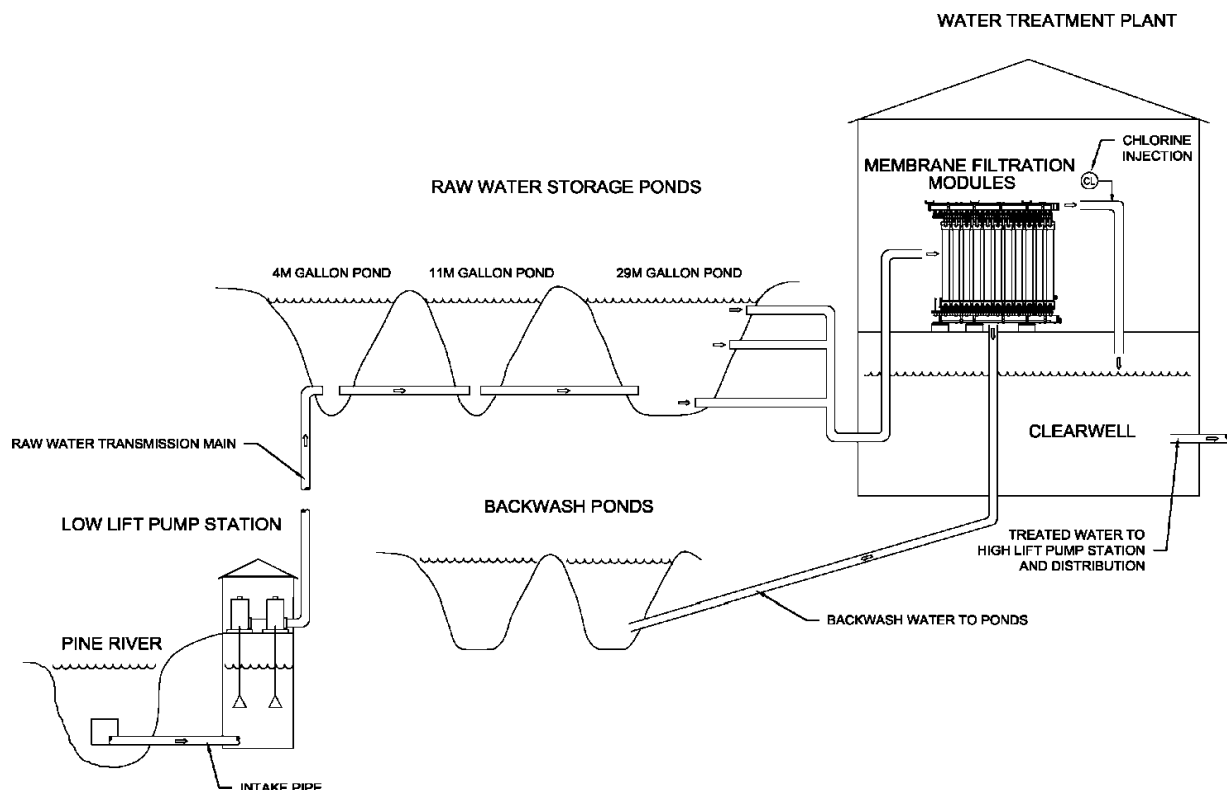


Figure 1. Simplified Overview of the Water System

1.3 Source Water & Raw Water Storage

In 2023, the primary raw water source for the District of Chetwynd was the Pine River. The water is gravity fed from the intake in the river to the low lift pump station wet well. The water is pumped from the low lift pump station to the raw water settling ponds, which also act as raw water storage. The raw water ponds are comprised of 3 cells providing a total storage capacity of 44 million gallons which accounts for approximately 80 days of water supply for Chetwynd.

1.4 Water Treatment

The District of Chetwynd was upgraded to a Pall Aria Microfiltration System in 2017. The water is pumped from the raw water ponds to the balancing tanks, where it is stored until needed (Figure 2). When the water levels are low enough in the clear well the treatment plant will start up. The raw water is pumped from the balancing tank to the self-cleaning strainer (Figure 3).



Figure 2. Balancing Tanks



Figure 3. Self-cleaning Strainer

After the strainer removes larger particles, the water enters the microfiltration modules (Figure 4). The microfiltration modules work by forcing water through membranes. The membranes trap bacteria, cysts, and other tiny suspended particles, which removes turbidity and brings us one step closer to providing the community with clean potable water.

After the water goes through the membrane modules it is injected with chlorine to kill any remaining pathogens. The District of Chetwynd generates its chlorine onsite using a Sodium

Hypochlorite Generation System (Figure 5) After the chlorine is generated it is pumped through the injection line into the water using peristaltic pumps (Figure 6)



Figure 4. Microfiltration Modules



Figure 5. Sodium Hypochlorite Generation System



Figure 6. Peristaltic Pumps for Chemical Dosing

Compressed air is used to perform air scrubs, which clean the debris from the membranes, and integrity tests of the membrane filtration modules. Figure 7 shows the air compressors and compressed air storage tank. The CHN Skid (Figure 8) mixes chemicals and warm water that circulate through the membrane modules for Enhanced Flux Maintenance (EFM) and Clean in Place (CIP) processes.



Figure 7. Air Compressors & Storage Tank



Figure 8. CHN Skid

Once the water has gone through the entire treatment process it enters the clear well that is located under the water treatment facility. The water is gravity fed from this clear well to the clear well located beneath the high lift pumping station. Once the water storage reservoir levels get low enough the high lift will begin pumping water, Figure 9 shows the three high lift pumps. The water will go through the distribution system and service some of the buildings on its way to the storage reservoirs.



Figure 9. High Lift Pumps

All of this is controlled and automated utilizing a Supervisory Control and Data Acquisition (SCADA) system. In case of a power outage, the backup generator provides power to operate the water treatment plant and the high lift pumping station. Other portions of the distribution system can be controlled manually in the case of a power outage.

2. Water Quality Data

2.1 Summary

The District of Chetwynd conducts various water quality sampling and testing processes. Samples and tests completed in 2023 include the following:

- 7 samples were taken throughout the water distribution system on a bi-weekly basis (~182 samples total in 2023) and analyzed for free chlorine residual, Total Coliforms and E.Coli. (Figures 10-16)
- Daily tests were conducted to check temperature and pH on raw water at the water treatment plant (Figure 17)
- Daily tests were conducted to check temperature, pH, and turbidity on treated water at the water treatment plant (Figures 18 and 19)
- Chlorine analyzers at the High Lift Pump Station and Water Treatment Plant were checked daily to ensure they were appropriately calibrated.

- Annually, water samples from various locations within the distribution and treatment system were collected for a full analysis of several parameters, as described in Section 3, Water Chemistry.

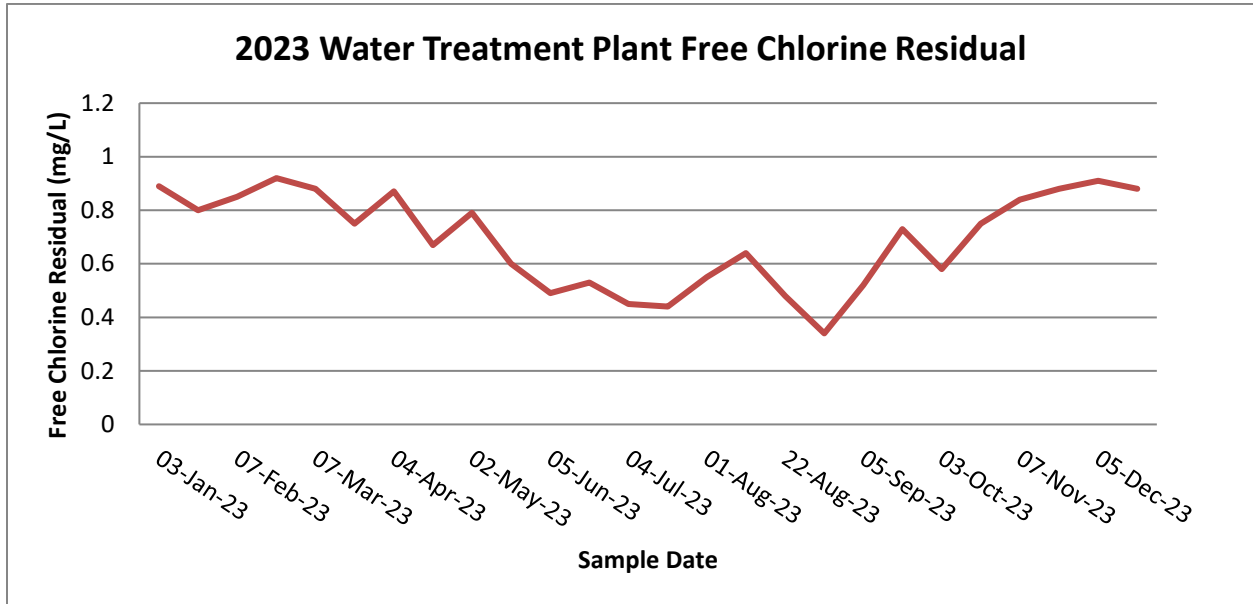


Figure 10. Graph of free chlorine residuals from each sampling date from the Water Treatment Plant lab tap

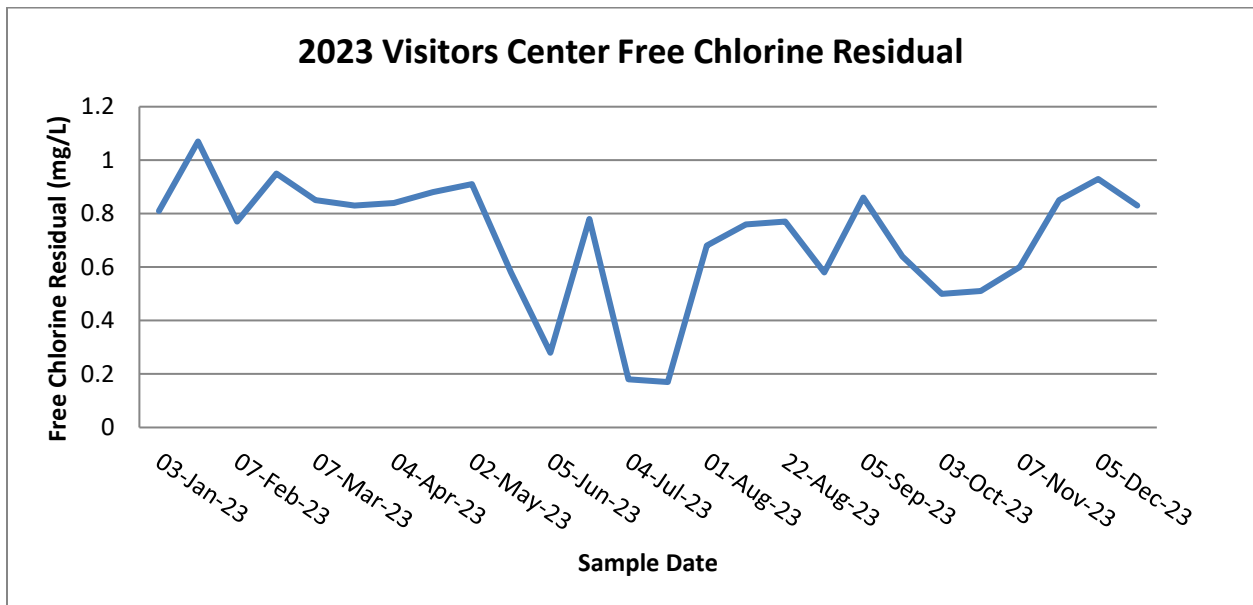


Figure 11. Graph of free chlorine residuals from each sampling date from the Visitors Center bathroom tap

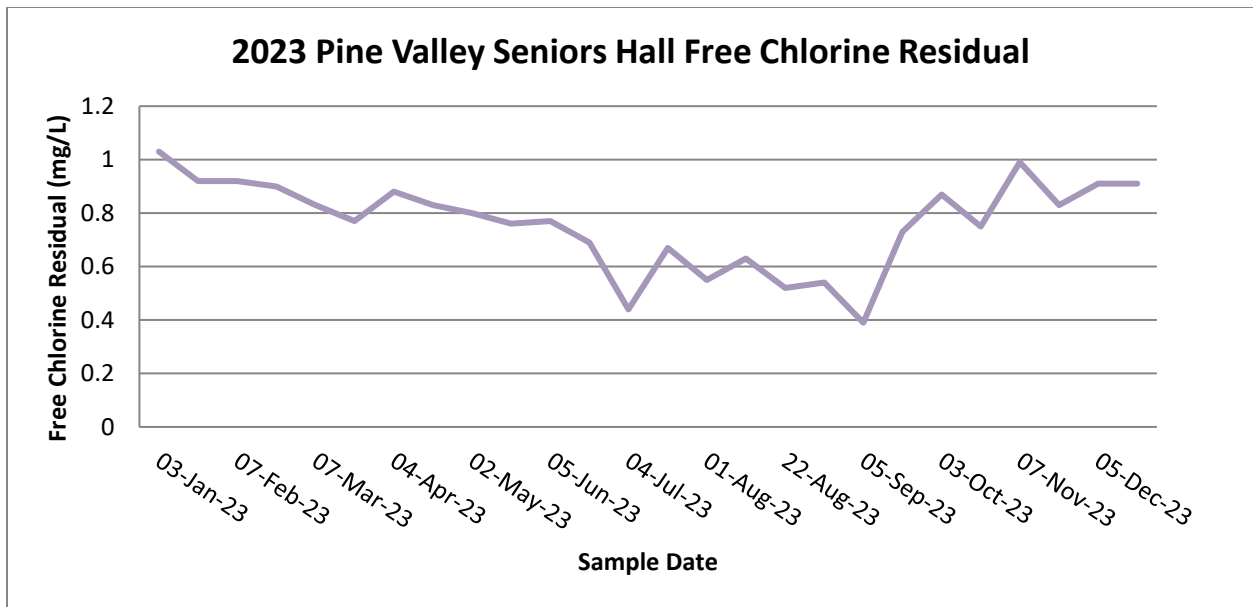


Figure 12. Graph of free chlorine residuals from each sampling date from the Pine Valley Seniors Hall kitchen tap

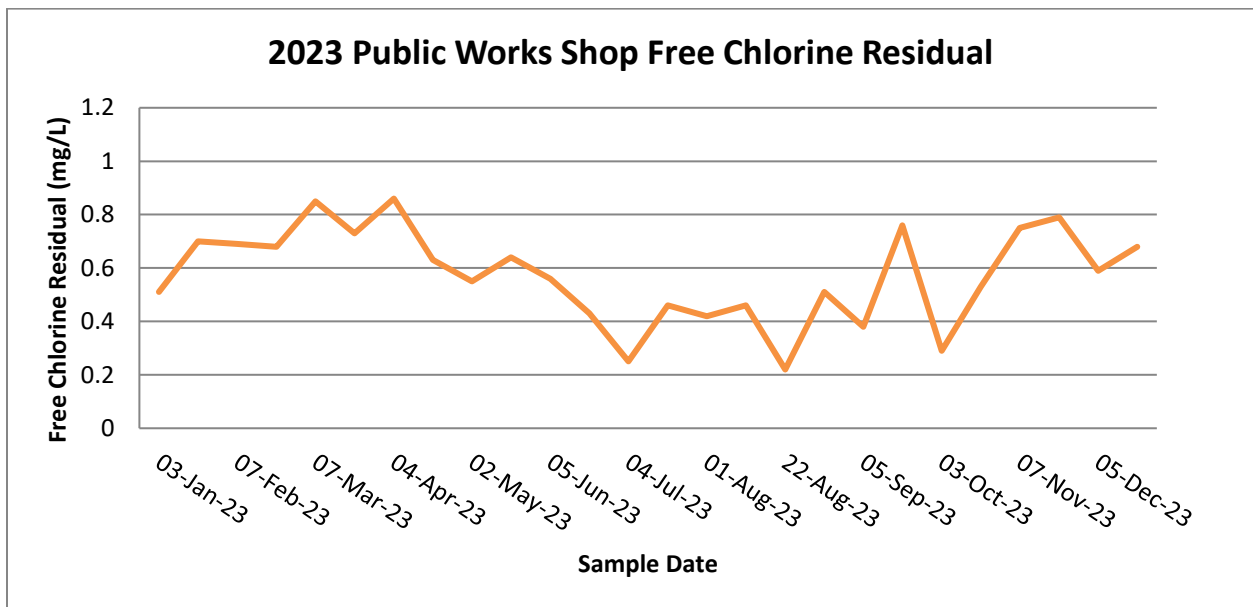


Figure 13. Graph of free chlorine residuals from each sampling date from the Public Works Shop time room tap

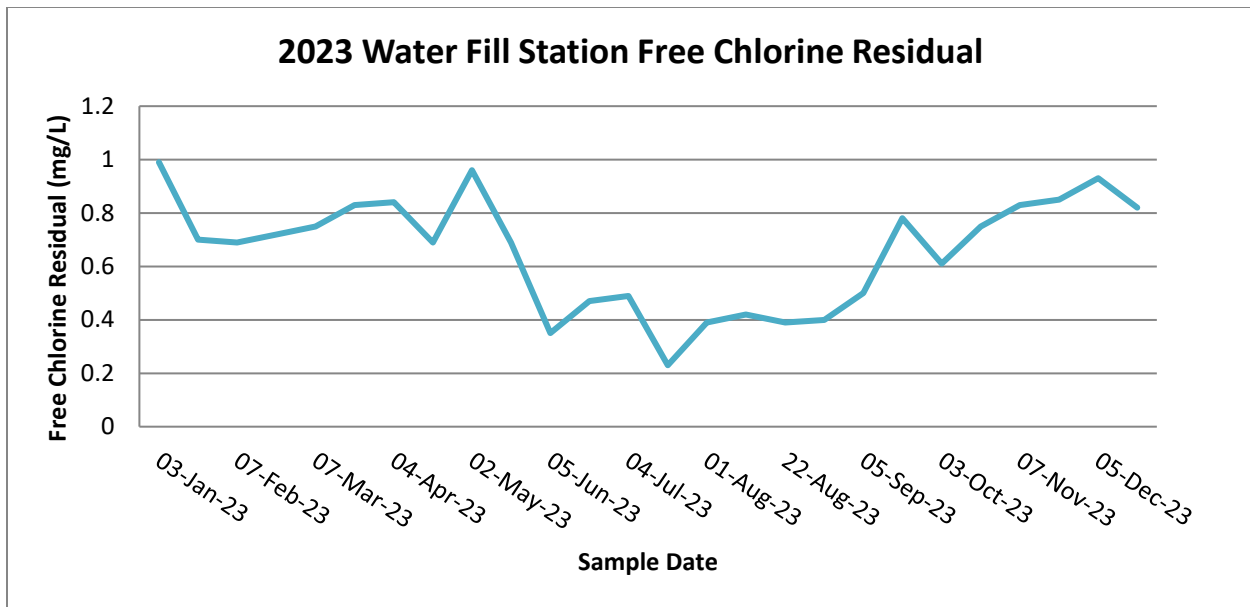


Figure 14. Graph of free chlorine residuals from each sampling date from the Water Fill Station sample port

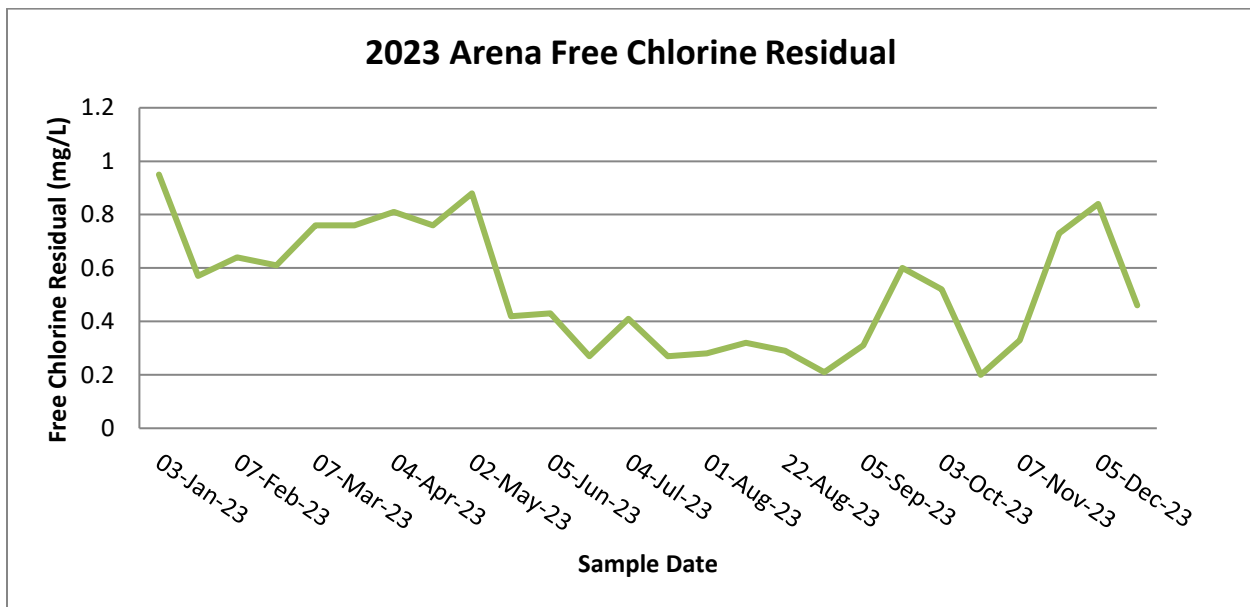


Figure 15. Graph of free chlorine residuals from each sampling date from the Arena bathroom tap

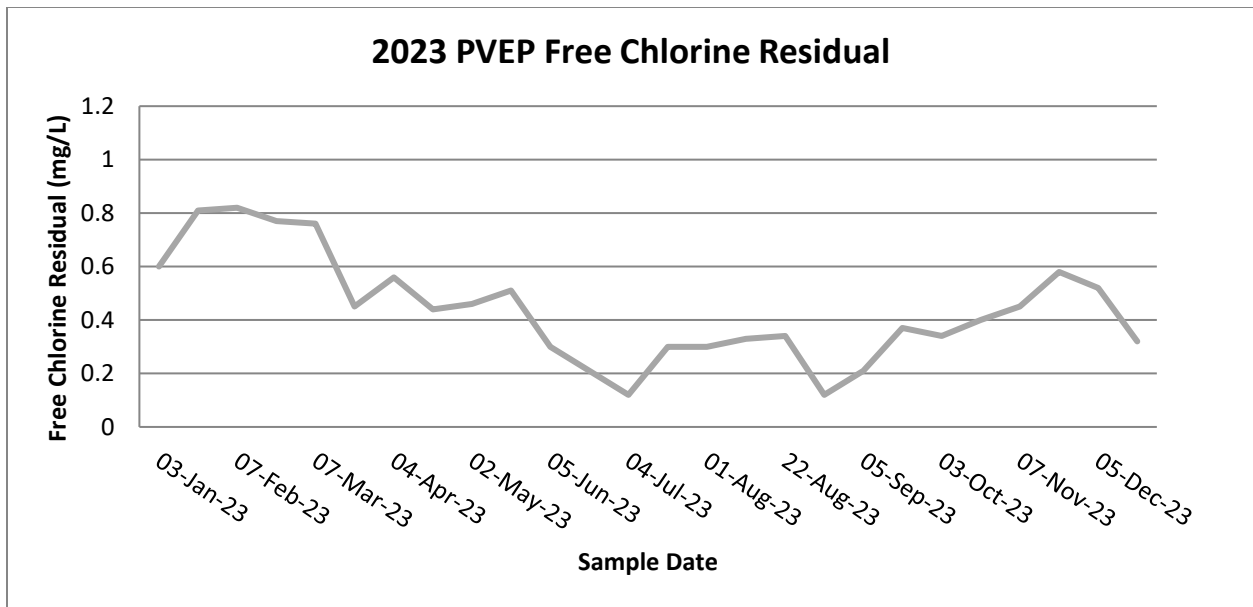


Figure 16. Graph of free chlorine residuals from each sampling date from the PVEP bathroom tap

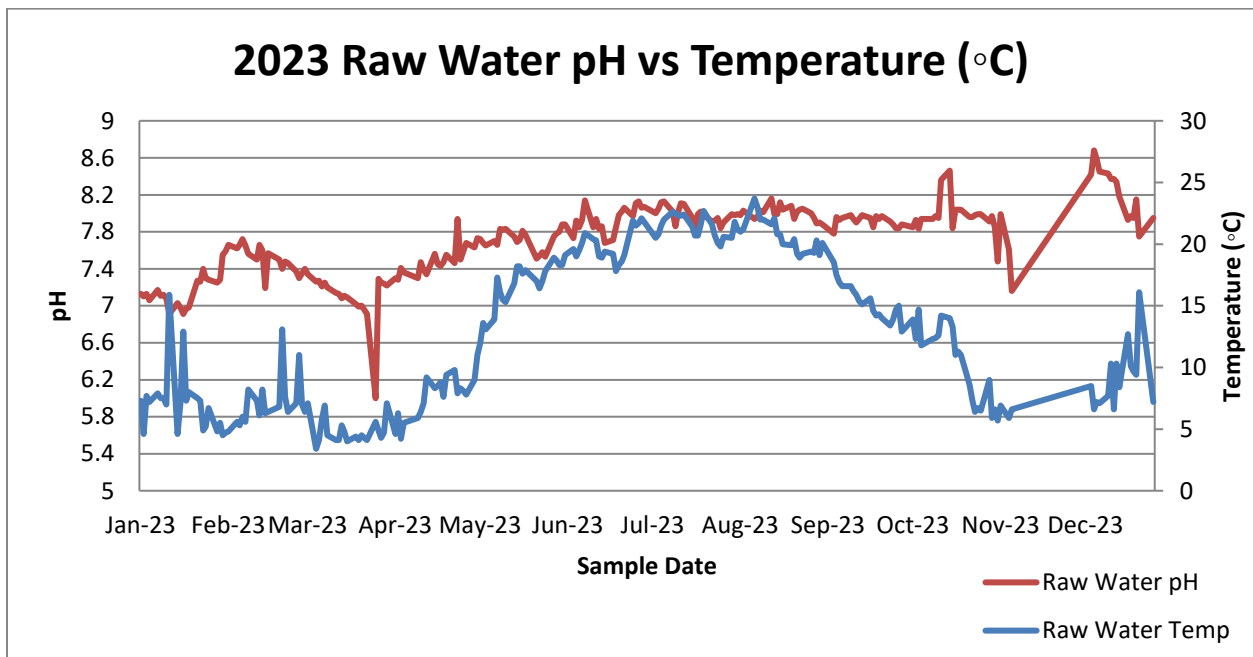


Figure 17. Graph of the raw water pH and temperature over the year of 2023

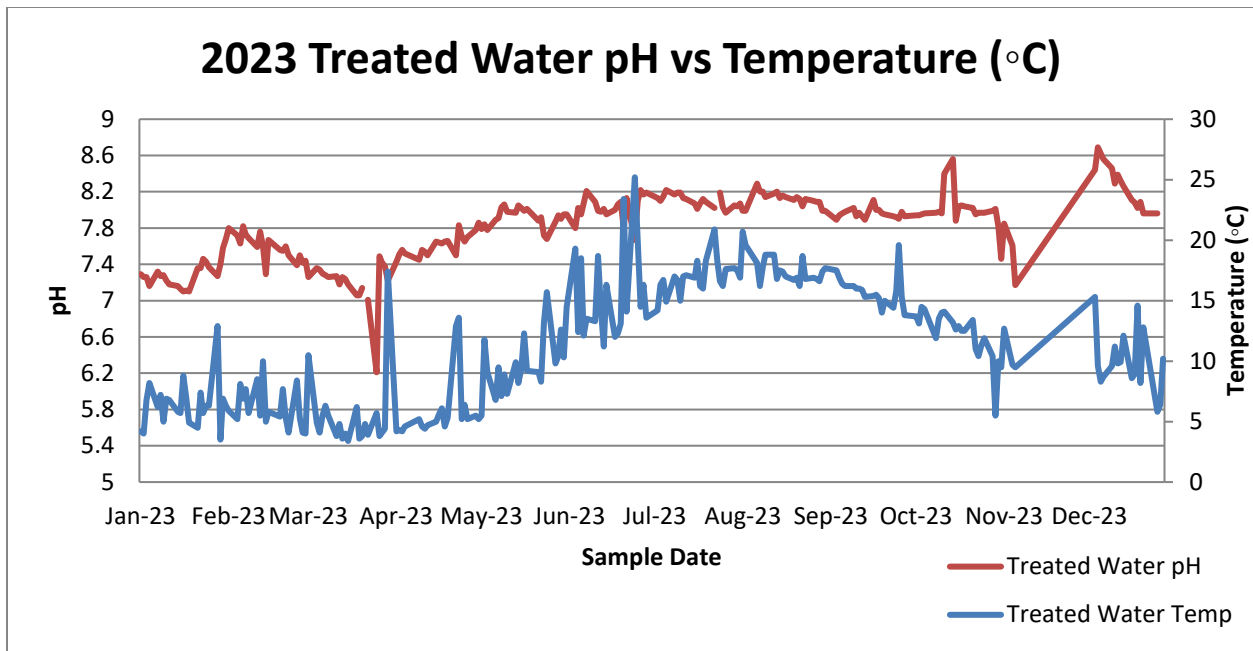


Figure 18. Graph of the treated water pH and temperature over the year of 2023

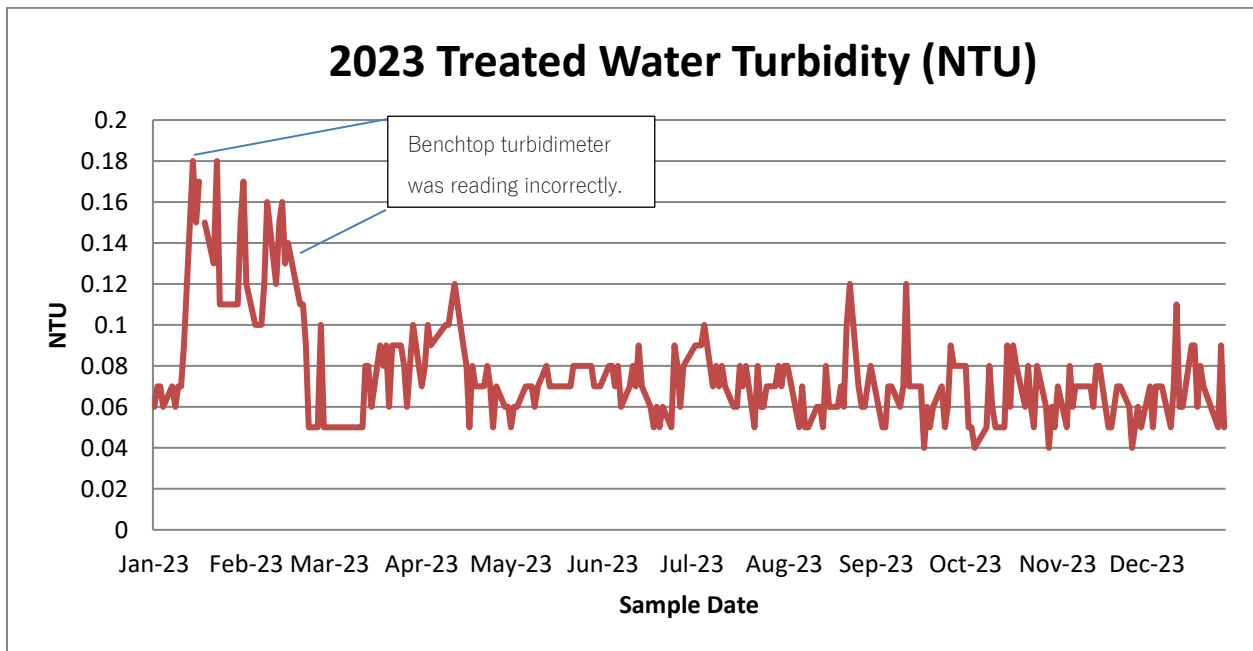


Figure 19. Graph of the treated water turbidity over the year of 2023

2.2 Sampling Results

2.2.1 Distribution System Samples

The results from the bacteriological analysis at all sample sites can be found at the link below. All samples tested negative for Total Coliforms and E.Coli in Chetwynd's distribution system during 2023 (Table 1.)

https://www.healthspace.ca/Clients/NHA/NHA_Website.nsf

Table 1. Results from the bacteriological analysis. All sample locations showed the same result

Date	Total Coliform	E. Coli	Date	Total Coliform	E. Coli
03-Jan-23	L1*	L1	04-Jul-23	L1	L1
17-Jan-23	L1	L1	18-Jul-23	L1	L1
07-Feb-23	L1	L1	22-Aug-23	L1	L1
21-Feb-23	L1	L1	29-Aug-23	L1	L1
07-Mar-23	L1	L1	05-Sep-23	L1	L1
21-Mar-23	L1	L1	19-Sep-23	L1	L1
04-Apr-23	L1	L1	03-Oct-23	L1	L1
18-Apr-23	L1	L1	17-Oct-23	L1	L1
02-May-23	L1	L1	07-Nov-23	L1	L1
16-May-23	L1	L1	21-Nov-23	L1	L1
05-Jun-23	L1	L1	05-Dec-23	L1	L1
20-Jun-23	L1	L1	19-Dec-23	L1	L1

Samples that were collected on August 1 and August 15 did not reach the lab within the prescribed timeframe and were repeated on the dates listed here.

*note: "L1" indicates less than 1 (<1); acceptable

2.2.2 Daily Sample Results

Daily sample results for temperature, pH, and turbidity for both the raw and treated water can be found in figures 17, 18, and 19. In November 2023 and the beginning of December 2023 the bench top pH and temperature probes were malfunctioning. Table 2. shows the list of outliers and the results due to this malfunction. This data is not included in the graphs above.

Table 2. Raw and Treated Water Temperature and pH Outliers

Sample Date	Raw Water Temp	Raw Water pH	Treated Water Temp	Treated Water pH
	° C		° C	
08-Nov-23	6.6	5.75	9.7	5.78
09-Nov-23	6.5	5.48	11	5.53
10-Nov-23	6.8	5.07	10.4	5.04
14-Nov-23	21.8	6.173	21.8	6.66
15-Nov-23	6	6.76	9	6.6
16-Nov-23	7	6.3	10	6.19
17-Nov-23	7.1	6.04	9.9	5.89
20-Nov-23	10.1	5.7	11.1	5.6
21-Nov-23	9.5	6.53	9	6.48
22-Nov-23	21.4	5.74	21.4	5.78
23-Nov-23	9	6.21	10.5	6.15
24-Nov-23	9.1	6.19	7.5	6.29
27-Nov-23	7.9	6.44	9	6.43
28-Nov-23	7.7	6.52	8.9	6.54
29-Nov-23	8.1	6.48	9.5	6.52
30-Nov-23	10.7	6.36	10.1	6.41
01-Dec-23	7.7	6.63	8.3	6.65
04-Dec-23	8.3	6.51	10	6.49

3. Water Chemistry

On an annual basis, the District of Chetwynd collects water samples throughout the treatment and distribution system to be analyzed by ALS Laboratories for many other parameters including hardness, conductivity, pH, metals, organic compounds, and hydrocarbons. The results of these analyses are compared with the maximum acceptable concentrations (MAC) from the Guidelines for Canadian Drinking Water Quality (GCDWQ); the concentrations for all analytes were below the MACs, where applicable. Full results can be viewed in Appendix A.

4. System Improvements

4.1 Low Lift Water Main Upgrade

During the summer of 2023, the water main that conveys raw water from the Pine River to settling/storage ponds next to the Water Treatment Plant was replaced and upgraded to a larger diameter pipe, from 150mm to 200mm. This upgrade reduces the time it takes to replenish the ponds, which allows the District to choose more suitable times to pump from the river and increases overall water quality while reducing the strain on the treatment and pumping systems.

4.2 Distribution System Repairs & Replacements

Various small repairs were completed over 2023. Several curb stops were replaced, and numerous service connections were repaired.

4.3 Water Main Flushing

The water main flushing program was completed and date, time, static pressure, pitot pressure, flow, time flushed, and condition of every hydrant that was flushed was recorded.

4.4 Water Fill Station Panel Upgrade

In June 2023, both residential and commercial Water Fill Station panels, screens, and keypads were upgraded. As our facilities age the technology becomes obsolete and more difficult to maintain. The upgraded panels, screens, and keypads allow the District to maintain the stations, order parts, and complete repairs when needed with smaller impact on customers.

5. Feedback and Response

5.1 Earthy Odour and Taste

The District of Chetwynd has received complaints of the water having an earthy or musty taste and odour. These complaints often occur when operators are unable to pump fresh raw water from the Pine River into the settling/storage ponds next to the Water Treatment Plant, which causes the stored water to take on an earthy smell before it is treated. Since the treatment system is not intended to address issues with smell and taste, this earthy aroma translates into the treated water that is then pumped into the distribution system, however, the water is still safe for consumption.

Generally, the low lift pumps that pump from the river are shut down when the flow rate of the Pine River increases substantially due to melting snow or heavy rainfall. This time period is referred to as “spring freshet”, and typically occurs each year in April and May. The high flow rate causes turbulence in the river water causing sediments to be suspended in the water, which reduces water quality and causes considerable wear and tear on pumps, filters, and other treatment equipment.

5.2 Discoloured Water

The District of Chetwynd receives a few complaints each year about the water being discoloured. These complaints occur during or shortly after the water mains and hydrants have been flushed. Water main flushing is important to remove any sediments or deposits in the pipe. Removing loose sediment and mineral deposits from the pipe will improve taste, odour, and colour in the long term, but can also disturb the sediment and introduce it to service connections. Although this water may not be pleasing to see or drink the District ensures it is still safe to consume.

6. Compliance

The District of Chetwynd continues to meet the conditions of the Northern Health Water System Operating Permit.

7. Conclusion

The upgraded water treatment plant is providing healthy drinking water for the community. All samples and test were within guidelines and regulations. As the distribution system ages, the district will continue to prioritize the upgrading, repairing and replacement of components that need it the most.

Contact for Additional Information

If you have any questions or concerns, or are in need of additional information please contact the District of Chetwynd at 250-401-4100

APPENDIX A

Water Chemistry Data

Appendix A: Water Chemistry Data

Sample ID			WATER TREATMENT PLANT	SKID B	29 MILLION GALLON POND	LOWLIFT	PVEP
Date Sampled			13-Sep-2023	13-Sep-2023	13-Sep-2023	13-Sep-2023	13-Sep-2023
Time Sampled			09:15	09:25	09:00	09:45	10:00
Analyte	Lowest Detection Limit	Units					
Physical Tests							
Conductivity	2.0	µS/cm	261				
Absorbance, UV (@ 254nm)	0.0050	AU/cm			0.0430		0.0270
Alkalinity, total (as CaCO3)	1.0	mg/L	100				
Colour, true	5.0	CU	<5.0				
Hardness (as CaCO3), dissolved	0.60	mg/L	112				
Hardness (as CaCO3), from total Ca/Mg	0.60	mg/L	116				
Solids, total dissolved [TDS]	10	mg/L	197				
Solids, total suspended [TSS]	3.0	mg/L	<3.0				
Turbidity	0.10	NTU	<0.10				
pH	0.10	pH units	8.36				
Transmittance, UV (@ 254nm)	1.0	% T/cm			90.6		94.0
Anions and Nutrients							
Ammonia, total (as N)	0.0050	mg/L	0.0072				
Bromide	0.050	mg/L	<0.050				
Chloride	0.50	mg/L	8.15				
Fluoride	0.020	mg/L	0.078				
Kjeldahl nitrogen, total [TKN]	0.050	mg/L	0.123				
Nitrate (as N)	0.0050	mg/L	0.0051				
Nitrite (as N)	0.0010	mg/L	<0.0010				
Phosphorus, total	0.0020	mg/L	<0.0020				
Sulfate (as SO4)	0.30	mg/L	23.9				
Organic / Inorganic Carbon							
Carbon, dissolved organic [DOC]	0.50	mg/L		2.41			
Carbon, total inorganic [TIC]	0.50	mg/L	19.2				
Carbon, total organic [TOC]	0.50	mg/L	2.71	2.79			
Total Metals							
Aluminum, total	0.0030	mg/L	0.0371	<0.0150	<0.0150		
Antimony, total	0.00010	mg/L	<0.00010	<0.00050	<0.00050		
Arsenic, total	0.00010	mg/L	0.00054	0.00054	0.00057		
Barium, total	0.00010	mg/L	0.0856	0.0879	0.0900		
Beryllium, total	0.000100	mg/L	<0.000100	<0.000100	<0.000100		
Bismuth, total	0.000050	mg/L	<0.000050	<0.000250	<0.000250		
Boron, total	0.010	mg/L	0.020	<0.050	<0.050		
Cadmium, total	0.0000050	mg/L	<0.0000050	<0.0000250	<0.0000250		
Calcium, total	0.050	mg/L	28.1	29.0	30.5		
Cesium, total	0.000010	mg/L	<0.000010	<0.000050	<0.000050		
Chromium, total	0.00050	mg/L	<0.00050	<0.00050	<0.00050		
Cobalt, total	0.00010	mg/L	<0.00010	<0.00050	<0.00050		
Copper, total	0.00050	mg/L	0.00958	<0.00250	<0.00250		
Iron, total	0.010	mg/L	<0.010	<0.050	<0.050		
Lead, total	0.000050	mg/L	<0.000050	<0.000250	<0.000250		

Appendix A: Water Chemistry Data

Sample ID			WATER TREATMENT PLANT	SKID B	29 MILLION GALLON POND	LOWLIFT	PVEP
Date Sampled			13-Sep-2023	13-Sep-2023	13-Sep-2023	13-Sep-2023	13-Sep-2023
Time Sampled			09:15	09:25	09:00	09:45	10:00
Analyte	Lowest Detection Limit	Units					
Lithium, total	0.0010	mg/L	0.0131	0.0115	0.0125		
Magnesium, total	0.0050	mg/L	11.2	11.3	11.0		
Manganese, total	0.00010	mg/L	0.00047	<0.00050	0.00685		
Mercury, total	0.0000050	mg/L	<0.0000050				
Molybdenum, total	0.000050	mg/L	0.00138	0.00131	0.00127		
Nickel, total	0.00050	mg/L	<0.00050	<0.00250	<0.00250		
Phosphorus, total	0.050	mg/L	<0.050	<0.250	<0.250		
Potassium, total	0.050	mg/L	0.609	0.596	0.568		
Rubidium, total	0.00020	mg/L	0.00032	<0.00100	<0.00100		
Selenium, total	0.000050	mg/L	0.000246	0.000278	<0.000250		
Silicon, total	0.10	mg/L	1.16	1.16	1.23		
Silver, total	0.000010	mg/L	<0.000010	<0.000050	<0.000050		
Sodium, total	0.050	mg/L	8.09	5.07	3.56		
Strontium, total	0.00020	mg/L	0.257	0.254	0.258		
Sulfur, total	0.50	mg/L	9.21	9.53	8.85		
Tellurium, total	0.00020	mg/L	<0.00020	<0.00100	<0.00100		
Thallium, total	0.000010	mg/L	<0.000010	<0.000050	<0.000050		
Thorium, total	0.00010	mg/L	<0.00010	<0.00050	<0.00050		
Tin, total	0.00010	mg/L	<0.00010	<0.00050	<0.00050		
Titanium, total	0.00030	mg/L	<0.00030	<0.00150	<0.00150		
Tungsten, total	0.00010	mg/L	<0.00010	<0.00050	<0.00050		
Uranium, total	0.000010	mg/L	0.000403	0.000391	0.000400		
Vanadium, total	0.00050	mg/L	<0.00050	<0.00250	<0.00250		
Zinc, total	0.0030	mg/L	<0.0030	<0.0150	<0.0150		
Zirconium, total	0.00020	mg/L	<0.00020	<0.00100	<0.00100		
Dissolved Metals							
Aluminum, dissolved	0.0010	mg/L	0.0317	<0.0050	<0.0050		
Antimony, dissolved	0.00010	mg/L	<0.00010	<0.00050	<0.00050		
Arsenic, dissolved	0.00010	mg/L	0.00055	<0.00050	0.00056		
Barium, dissolved	0.00010	mg/L	0.0856	0.0847	0.0860		
Beryllium, dissolved	0.000100	mg/L	<0.000100	<0.000100	<0.000100		
Bismuth, dissolved	0.000050	mg/L	<0.000050	<0.000250	<0.000250		
Boron, dissolved	0.010	mg/L	0.019	<0.050	<0.050		
Cadmium, dissolved	0.0000050	mg/L	<0.0000050	<0.0000250	<0.0000250		
Calcium, dissolved	0.050	mg/L	27.0	28.9	29.5		
Cesium, dissolved	0.000010	mg/L	<0.000010	<0.000050	<0.000050		
Chromium, dissolved	0.00050	mg/L	<0.00050	<0.00050	<0.00050		
Cobalt, dissolved	0.00010	mg/L	<0.00010	<0.00050	<0.00050		
Copper, dissolved	0.00020	mg/L	0.00853	<0.00100	<0.00100		
Iron, dissolved	0.010	mg/L	<0.010	<0.050	<0.050		
Lead, dissolved	0.000050	mg/L	<0.000050	<0.000250	<0.000250		
Lithium, dissolved	0.0010	mg/L	0.0127	0.0118	0.0122		
Magnesium, dissolved	0.0050	mg/L	10.8	11.1	10.9		
Manganese, dissolved	0.00010	mg/L	0.00032	<0.00050	<0.00050		
Mercury, dissolved	0.0000050	mg/L	<0.0000050				
Molybdenum, dissolved	0.000050	mg/L	0.00136	0.00128	0.00128		
Nickel, dissolved	0.00050	mg/L	<0.00050	<0.00250	<0.00250		

Appendix A: Water Chemistry Data

Sample ID			WATER TREATMENT PLANT	SKID B	29 MILLION GALLON POND	LOWLIFT	PVEP
Date Sampled			13-Sep-2023	13-Sep-2023	13-Sep-2023	13-Sep-2023	13-Sep-2023
Time Sampled			09:15	09:25	09:00	09:45	10:00
Analyte	Lowest Detection Limit	Units					
Phosphorus, dissolved	0.050	mg/L	<0.050	<0.250	<0.250		
Potassium, dissolved	0.050	mg/L	0.594	0.597	0.592		
Rubidium, dissolved	0.00020	mg/L	0.00031	<0.00100	<0.00100		
Selenium, dissolved	0.000050	mg/L	0.000260	<0.000250	<0.000250		
Silicon, dissolved	0.050	mg/L	1.08	1.11	1.14		
Silver, dissolved	0.000010	mg/L	<0.000010	<0.000050	<0.000050		
Sodium, dissolved	0.050	mg/L	7.71	5.13	3.48		
Strontium, dissolved	0.00020	mg/L	0.257	0.252	0.250		
Sulfur, dissolved	0.50	mg/L	8.76	9.36	8.98		
Tellurium, dissolved	0.00020	mg/L	<0.00020	<0.00100	<0.00100		
Thallium, dissolved	0.000010	mg/L	<0.000010	<0.000050	<0.000050		
Thorium, dissolved	0.00010	mg/L	<0.00010	<0.00050	<0.00050		
Tin, dissolved	0.00010	mg/L	<0.00010	<0.00050	<0.00050		
Titanium, dissolved	0.00030	mg/L	<0.00030	<0.00150	<0.00150		
Tungsten, dissolved	0.00010	mg/L	<0.00010	<0.00050	<0.00050		
Uranium, dissolved	0.000010	mg/L	0.000392	0.000387	0.000396		
Vanadium, dissolved	0.00050	mg/L	<0.00050	<0.00250	<0.00250		
Zinc, dissolved	0.0010	mg/L	0.0020	<0.0050	<0.0050		
Zirconium, dissolved	0.00020	mg/L	<0.00020	<0.00100	<0.00100		
Volatile Organic Compounds							
Chlorobenzene	0.50	µg/L	<0.50		<0.50	<0.50	
Chloromethane	5.0	µg/L	<5.0		<5.0	<5.0	
Dichlorobenzene, 1,2-	0.50	µg/L	<0.50		<0.50	<0.50	
Dichlorobenzene, 1,3-	0.50	µg/L	<0.50		<0.50	<0.50	
Dichlorobenzene, 1,4-	0.50	µg/L	<0.50		<0.50	<0.50	
Dichloropropane, 1,2-	0.50	µg/L	<0.50		<0.50	<0.50	
Dichloropropylene, cis+trans-1,3-	0.75	µg/L	<0.75		<0.75	<0.75	
Dichloropropylene, cis-1,3-	0.50	µg/L	<0.50		<0.50	<0.50	
Tetrachloroethane, 1,1,1,2-	0.50	µg/L	<0.50		<0.50	<0.50	
Tetrachloroethane, 1,1,2,2-	0.20	µg/L	<0.20		<0.20	<0.20	
Trichloroethane, 1,1,2-	0.50	µg/L	<0.50		<0.50	<0.50	
Trichlorofluoromethane	0.50	µg/L	<0.50		<0.50	<0.50	
Volatile Organic Compounds [Drycleaning]							
Carbon tetrachloride	0.50	µg/L	<0.50		<0.50	<0.50	
Chloroethane	0.50	µg/L	<0.50		<0.50	<0.50	
Dichloroethane, 1,1-	0.50	µg/L	<0.50		<0.50	<0.50	
Dichloroethane, 1,2-	0.50	µg/L	<0.50		<0.50	<0.50	
Dichloroethylene, 1,1-	0.50	µg/L	<0.50		<0.50	<0.50	
Dichloroethylene, cis-1,2-	0.50	µg/L	<0.50		<0.50	<0.50	
Dichloroethylene, trans-1,2-	0.50	µg/L	<0.50		<0.50	<0.50	
Dichloromethane	1.0	µg/L	<1.0		<1.0	<1.0	
Dichloropropylene, trans-1,3-	0.50	µg/L	<0.50		<0.50	<0.50	
Tetrachloroethylene	0.50	µg/L	<0.50		<0.50	<0.50	
Trichloroethane, 1,1,1-	0.50	µg/L	<0.50		<0.50	<0.50	
Trichloroethylene	0.50	µg/L	<0.50		<0.50	<0.50	
Vinyl chloride	0.40	µg/L	<0.40		<0.40	<0.40	

Appendix A: Water Chemistry Data

Sample ID			WATER TREATMENT PLANT	SKID B	29 MILLION GALLON POND	LOWLIFT	PVEP
Date Sampled			13-Sep-2023	13-Sep-2023	13-Sep-2023	13-Sep-2023	13-Sep-2023
Time Sampled			09:15	09:25	09:00	09:45	10:00
Analyte	Lowest Detection Limit	Units					
Volatile Organic Compounds [Fuels]							
Benzene	0.50	µg/L	<0.50		<0.50	<0.50	
Ethylbenzene	0.50	µg/L	<0.50		<0.50	<0.50	
Methyl-tert-butyl ether [MTBE]	0.50	µg/L	<0.50		<0.50	<0.50	
Styrene	0.50	µg/L	<0.50		<0.50	<0.50	
Toluene	0.40	µg/L	<0.40		<0.40	<0.40	
Xylene, m+p-	0.40	µg/L	<0.40		<0.40	<0.40	
Xylene, o-	0.30	µg/L	<0.30		<0.30	<0.30	
Xylenes, total	0.50	µg/L	<0.50		<0.50	<0.50	
Volatile Organic Compounds [THMs]							
Bromodichloromethane	1.0	µg/L	6.6 6.61		<0.50	<0.50	7.4
Bromoform	1.0	µg/L	<1.0 <0.50		<0.50	<0.50	<1.0
Chloroform	1.0	µg/L	53.0 53.0		<0.50	<0.50	60.6
Dibromochloromethane	1.0	µg/L	<1.0 0.53		<0.50	<0.50	<1.0
Trihalomethanes [THMs], total	2.0	µg/L	59.6				68.0
Volatile Organic Compounds [THMs] Surrogates							
Bromofluorobenzene, 4-	1.0	%	85.1				83.0
Difluorobenzene, 1,4-	1.0	%	86.9				84.6
Volatile Organic Compounds Surrogates							
Bromofluorobenzene, 4-	1.0	%	85.1		78.4	83.9	
Difluorobenzene, 1,4-	1.0	%	86.9		86.5	85.8	
Polycyclic Aromatic Hydrocarbons							
Acenaphthene	0.010	µg/L			<0.010	<0.010	
Acenaphthylene	0.010	µg/L			<0.010	<0.010	
Acridine	0.010	µg/L			<0.010	<0.010	
Anthracene	0.010	µg/L			<0.010	<0.010	
Benz(a)anthracene	0.010	µg/L			<0.010	<0.010	
Benzo(a)pyrene	0.0050	µg/L			<0.0050	<0.0050	
Benzo(b+j)fluoranthene	0.010	µg/L			<0.010	<0.010	
Benzo(b+j+k)fluoranthene	0.015	µg/L			<0.015	<0.015	
Benzo(g,h,i)perylene	0.010	µg/L			<0.010	<0.010	
Benzo(k)fluoranthene	0.010	µg/L			<0.010	<0.010	
Chrysene	0.010	µg/L			<0.010	<0.010	

Appendix A: Water Chemistry Data

Sample ID			WATER TREATMENT PLANT	SKID B	29 MILLION GALLON POND	LOWLIFT	PVEP
Date Sampled			13-Sep-2023	13-Sep-2023	13-Sep-2023	13-Sep-2023	13-Sep-2023
Time Sampled			09:15	09:25	09:00	09:45	10:00
Analyte	Lowest Detection Limit	Units					
Dibenz(a,h)anthracene	0.0050	µg/L			<0.0050	<0.0050	
Fluoranthene	0.010	µg/L			<0.010	<0.010	
Fluorene	0.010	µg/L			<0.010	<0.010	
Indeno(1,2,3-c,d)pyrene	0.010	µg/L			<0.010	<0.010	
Methylnaphthalene, 1+2-	0.015	µg/L			<0.015	<0.015	
Methylnaphthalene, 1-	0.010	µg/L			<0.010	<0.010	
Methylnaphthalene, 2-	0.010	µg/L			<0.010	<0.010	
Naphthalene	0.050	µg/L			<0.050	<0.050	
Phenanthrene	0.020	µg/L			<0.020	<0.020	
Pyrene	0.010	µg/L			<0.010	<0.010	
Quinoline	0.050	µg/L			<0.050	<0.050	
B(a)P total potency equivalents [B(a)P TPE]	0.010	µg/L			<0.010	<0.010	
PAHs, high molecular weight (BC AWQ)	0.030	µg/L			<0.030	<0.030	
PAHs, low molecular weight (BC AWQ)	0.060	µg/L			<0.060	<0.060	
PAHs, total (EPA 16)	0.065	µg/L			<0.065	<0.065	
Polycyclic Aromatic Hydrocarbons Surrogates							
Chrysene-d12	0.1	%			107	108	
Naphthalene-d8	0.1	%			115	112	
Phenanthrene-d10	0.1	%			102	94.8	
Haloacetic Acids							
Bromochloroacetic acid	1.00	µg/L	1.23				<1.00
Dibromoacetic acid	1.00	µg/L	<1.00				<1.00
Dichloroacetic acid	1.00	µg/L	14.0				6.69
Monobromoacetic acid	1.00	µg/L	<1.00				<1.00
Monochloroacetic acid	1.00	µg/L	<1.00				<1.00
Trichloroacetic acid	1.00	µg/L	11.8				12.7
Haloacetic acids, total [HAA5]	5.00	µg/L	25.8				19.4