



RUTLAND WATERWORKS DISTRICT

Water System Annual Report

2023



Water System Annual Report

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Memorandum to: Interior Health – Judi Ekkert, Specialist Environmental Health Officer
From:
Issue: Water System Annual Report – 2023

Recommendation

It is recommended that this report be received for informational purposes only.

1.0 System Description and Classification

Rutland Waterworks District obtains its water from 15 deep operating wells in the Greater Kelowna Aquifer. There are two zones to the system. The Upper zone, which in combination, pumps directly to that zone and to a 1.8 million US gallon reservoir on Teasdale Road. This reservoir then gravity feeds to the upper zone. The lower zone is run by pressure and directly from pumps, some of which are controlled by variable speed drives. As most of the wells are in the lower zone, there are two booster stations that boost water from the lower zone to the upper zone.

RWD operates two pressure reducing stations that regulate pressures between the upper and lower zones. These stations respond to high demands by opening valves to allow water to flow between zones and the storage reservoir.

The RWD office is located at #106 - 200 Dougall Road North, and the shop and utility yard is located at 1175 Hollywood Road South.

The pump stations properties have several types of legal titles. Some station sites are owned by RWD, some sites are held by Statutory Rights of Way on properties owned by FortisBC, the Central Okanagan Regional District and School District No. 23.

Total annual water consumption for 2023 was over 794 million US gallons.

RWD is classified by the Environmental Operators Certification Program (E.O.C.P) as a Level III Water Distribution System. RWD has seven operators with Water Distribution Classifications and are continually upgrading their training and certifications in compliance with Interior Health who issue RWD's Annual Operating Permits.

2.0 Annual Operations Summary

2.1 Seasonal Operation

RWD has seasonal operational procedures to adapt to water quality and water consumption changes.

The winter months are the lowest consumption months. This demand is supplied primarily from three wells. These wells are of excellent quality and operate with variable speed drives which provide power efficiencies while stabilizing the demand surges in the system.

The spring and fall months have significant demand ranges depending on the weather. The water consumption can change significantly in any given day during this period. These changes are managed by using variable speed drives, the reservoir and by automatic controls that sequence pumps off and on as demands change.

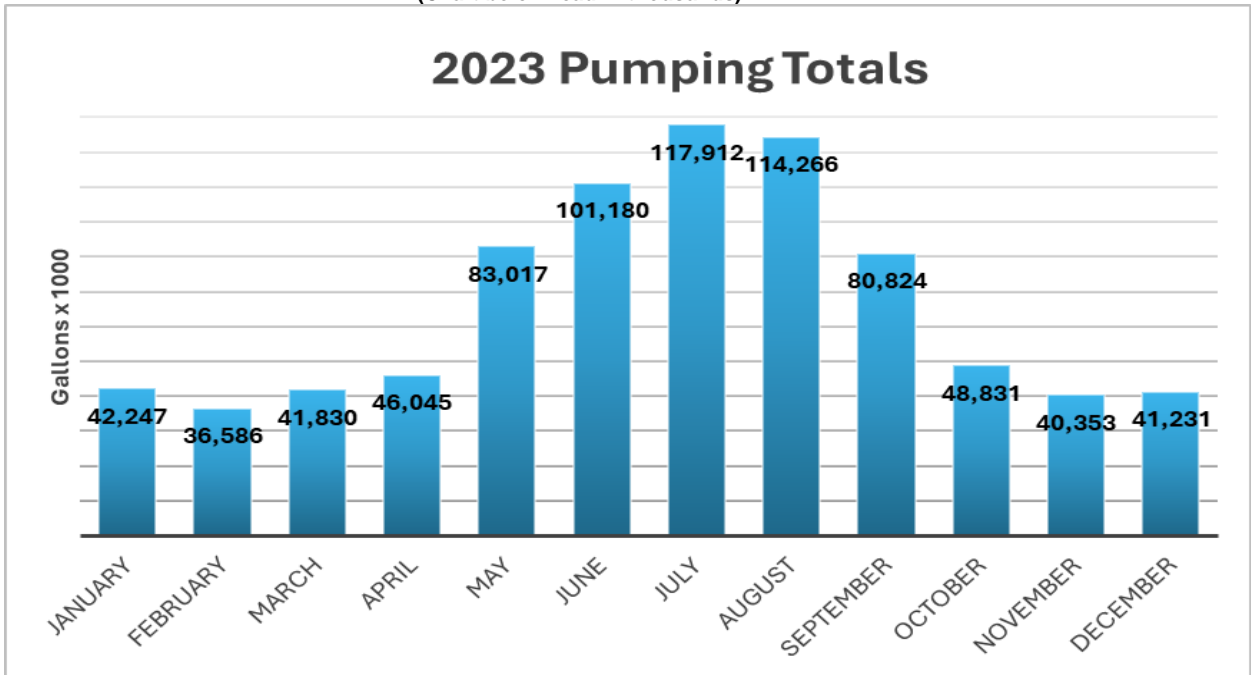
The summer months are the highest consumption months. The demand is met using a sequentially controlled pump program that call for additional pumps as required. These rapid changes in water demands can change water quality significantly as well water with higher mineral content enters the system.

Daily Operations:

- Daily rounds (Recording gallons pumped, Chlorine used, and visual inspection of equipment & grounds)
- Reservoir grounds inspection
- Cl₂ monitoring

Total Gallons Pumped (US Gallons) – 2023

(Chart below read in thousands)



2023 Combined Total 794,322,000 US Gallons

2.2 Flushing

A flushing program for both the pipelines and the wells minimizes the effects of varying water quality in the system.

RWD has a flushing program that is primarily designed to remove mineralization build up. These



minerals come out of suspension in the water during the disinfection process. The mineral residue tends to adhere to the pipe walls and only moves during higher flows from flushing or fire suppression.

Spring & Fall Flushing Program:

- Spring Flushing Upper Zone. April to June 2023
- Fall Flushing Lower Zone. September to November 2023

2.3 Valve, Meter and Hydrant Maintenance

Mainline valves are regularly inspected to confirm the open/close position and their ease of operation. Water meters are replaced or repaired as required to ensure accuracy and performance. Hydrants are serviced annually according to the KWC Service & Maintenance Specifications Agreement with the City of Kelowna.

2.4 Service and Main Repairs

RWD repaired approximately 25 water service connections and responded to approximately 44 customer related service breaks. There was 1 water main break in 2023, and 313m of new water main installed. As very few city projects like expansion of city sewer system, road widening, and sidewalks were performed within the Rutland Waterworks District's distribution system area it kept service and water main repairs to a minimum for 2023



RWD has vigorous inspections and specifications for work around our infrastructure, especially for the repair and disinfection of water mains should a break occur.

During the sewer upgrade in the upper zone, RWD was able to perform preventive maintenance on roughly 20 water service lines.



2.5 New Connections

RWD boundaries are relatively fixed. Any change in connection numbers is primarily through densification.

There were 10 new connections added to the system with the removal and decommissioning of 12 old connections.

Lot amalgamations can reduce the number of services, but the number of dwelling and commercial units can increase.



3.0 Water Quality Controls

Rutland Waterworks District has a rigorous program for monitoring and controlling our water quality.

Rutland Waterworks Water Quality Technicians collect from 11 sample sites throughout RWD. These sample sites have been strategically chosen to ensure a good representative of our water in the system.

Rutland Waterworks uses Caro Environmental Services for bacteriological testing (Total Coliform and E. coli).

RWD schedules chemical analysis testing on each well every 2 years. Chemical testing was performed on nine wells in 2019. Those wells were #3, #6, #7E, #8, #10, #12, #13S, #13N, & #15.

As one of our wells (#12) has been close to the MAC (0.02) for Uranium it is closely monitored in the summer or when in use. If the levels increased above the MAC, it would immediately be removed from the sequence for further testing. Once we receive those results and they comply with the GCDWQ it would then be put back online. Uranium testing is also done by Caro Environmental Services.



The testing results have indicated very little change in the mineral levels and are within the GCDWQ table.

RWD Water Quality Testing/Monitoring Program:

Sites that are currently monitored 24 hours/day for Cl₂ free and pH and linked to the SCADA:

- #106 – 200 Dougall Rd. N. - Cl₂ free.
- 2982 Springfield Rd. (Pump Station #9) - Cl₂ free and pH.

RWD Regular Sample Site List

Seven sites that are currently tested/monitored twice weekly are:

- #106 – 200 Dougall Rd. North (Office/Lab)
- 420 Pine Road
- 920 Saskatoon Road
- 955 Gerstmar Road
- 2592 Highway 97 North
- 2080 Hollywood Road South
- 1040 Villa Vista Road

RWD Total Coliform / E. coli Sample Site List

Ten sites we are currently testing/monitoring are:

- #106 – 200 Dougall Rd. North
- 420 Pine Road
- 1040 Villa Vista Road
- South Rutland Elementary
- Belgo Elementary
- Quigley Elementary
- 2080 Hollywood Road South
- 920 Saskatoon Road
- Springvalley Elementary
- 2592 Highway 97 North
- Wells #3, #6, #7E, #8, #10, #12, #13S, #13N, & #15.

Total Coliform / E. coli testing is on a rotation schedule of 15 per month, more added if situation warrants it.

Every Tuesday:

Seven samples are tested for Cl₂ free, Cl₂ total, pH, Turbidity & Temperature (**short test**) (plus 2-4 from the **Total Coliform / E. coli** list) Depending on the rotation list; we could be collecting up to 11 samples on that day.

Friday:

Two types of testing are performed on Fridays, (**short test**) and (**full parameter test**).

Friday short test -- RWD Standard Sample Site List

Samples taken are tested for Cl₂ free, Cl₂ total, pH, Turbidity & Temperature.

Friday full parameter test (every second Friday) RWD Regular Sample Site List

Friday samples are tested for Cl₂ free, Cl₂ total, pH, Turbidity & Temperature. With the addition of testing for Hardness as CaCO₃, Iron, Nitrate, Nitrite, Manganese. An estimated 350 tests are performed in any given month.

This does not include testing that is requested by our customers, specific wells or during our annual mainline flushing program.



Backflow Prevention Program

Background:

In conjunction with the Kelowna Joint Water Committee's Centralized CCC Program, we first perform a hazard analysis of our district. We then rate our ICI customers as High, Moderate and Low and then we work at inspecting these properties from High to Low. All new developments go through the City of Kelowna Planning & Building departments and the city inspectors determine installation requirements and follow to completion.

RWD annually re-evaluates our ICI customers during the first quarter readings to visually determine if anything has changed.

3.1 Deviation Response Plan

RWD has an established Deviation Response Plan set of data monitoring parameters to respond to any changes outside the normal ranges of the operating parameters.

Deviations in any tested parameter trigger several responses that vary from retesting, levels of public notification and Interior Health consultations.

4.0 Emergency Response Plan

RWD has an Emergency Response Plan that is updated regularly. Our plan follows the standards established within the WRF Pocket Guide which provides the necessary procedures, notification lists in order of priority, action items including equipment, manpower, emergency services, etc. to respond to potential emergency situations.

RWD works in conjunction with health agencies, first responders and other networked groups to foster a cooperative/coordinated response.

5.0 Training and Education

All our operators regularly attend seminars and workshops to upgrade and maintain a high skill level.

Safety meetings are a documented regular bi-weekly activity in our operations. The EOCP monitors and certifies the status of all our operators.

RWD maintains an active role in the water industry with direct involvement with the Kelowna Water Committee and membership in the Water Supply Association of British Columbia, British Columbia Ground Water Association, British Columbia Water and Wastewater Association and the American Water works Association – to name just a few.

6.0 Water Supply and System Sustainability

RWD operates nine deep water wells and has an additional eleven wells for monitoring and future expansion. The wells are checked regularly by our operators as they conduct standard “daily rounds” throughout RWD.

Our water system wells, and infrastructure are maintained by a series of seasonal procedures that include:

- Flushing dormant wells to treat and freshen them before they are brought online.
- Treating specific wells to control regrowth and screen plugging
- Measuring static well levels, temperature and checking well performance through specific capacity calculations and current demand/water pumped calculations.
- Motor and pump efficiency tests and reports.

Several consultants who specialize in the industry are regularly consulted for current performance and sustainability of all facets of the water system.

RWD has a working computer model of the system that varies fire flows and directional flushing efficiencies. Annual tests are performed to monitor efficiencies of pumps, motors, wells, and power consumption.

6.1 Well Head Protection/Aquifer Protection

Our engineers have designed well head protection into the pump stations and well head design. Our operators are trained to recognize deterioration of any protective equipment or materials.

In 2011 the City of Kelowna Mayor & Council adopted the 2030 the Official Community Plan, which now has a plan for groundwater protection. This plan is called the Natural Environment Development Permit Guidelines. The City of Kelowna has designated environmentally sensitive areas and groundwater

resources which have a high intrinsic value and are therefore important to the city and its residents and by using established capture zones to limit or regulate new development within wellhead capture zone areas should better protect the groundwater from inappropriate development. The Development Permit Area designation is intended to complement the federal and/or provincial acts and regulations.

The Kelowna Joint Water Committee, Golder Engineering and the City of Kelowna IT department have developed a program called BITS (Borehole Information Tracking System). This program will collect and register all new groundwater well information that's in the Greater Kelowna Aquifer. This information is then registered through the City of Kelowna Planning and Permit departments for review. This step is to help minimize negative impacts to groundwater by:

- Protecting and/or enhancing water quality
- Protecting drinking water sources against possible contamination from land use and development activities
- Protecting subsurface aquifers forming part of the City of Kelowna water supply
- Promoting the efficient use of water to ensure a sustainable hydrologic system in the watershed.

The work to date has been performed by a prominent hydrogeologist. Several agencies have been involved to assist with data collection, interpretation and current and future planning.

6.2 Capital Works Plan

A Capital Works Plan is prepared and updated regularly. The plans are driven by changes in zoning, area specific City of Kelowna plans, rapid development and social needs, rising construction and material costs, etc.

The plans identify specific expansion upgrades to keep pace with development demand and land use changes. The plan is approved by the Ministry of Community, Sport and Cultural Development who control and verify the funds collected and released specifically for Capital Works Projects. The RWD Board of Trustees reviewed and approved the Capital Works Plan 2018 - 2027

6.3 Water Use Efficiency

Most of RWD is metered and has developed a sustainable toll structure to maintain and upgrade the program. Water rates have been developed to encourage responsible water use by keeping water tolls low for basic water requirements and then developing an increasing block rate structure for consumers with higher non-essential water demands.

RWD has been active with the KJWC with appropriately timed messaging that encourages education and awareness of the costs and benefits of using water responsibly. In 2020 we continued our partnership with the Okanagan Waterwise program.

RWD enforces water regulations by patrols of residences and by acting on neighbor complaints, etc. Generally, we have found that we have a very responsible customer base with a few exceptions. Water consumption is tracked daily in the system and this data aids in the timely actions RWD takes to maintain a level of responsible water use.

7.0 Long Term Plans

RWD designs the system's long-term plans by identifying future demands and aligning those demands with area development.

Future well locations and increased yield from existing wells are identified and secured when appropriate. Reserves are put aside and used when required.

Future well yield capacity for Wells No. 7 East, 7 West, and 12, reserve Wells No. 14 East, No. 14 West and Well No. 16 is planned to meet RWD's demands for a 20-year projection. In the fall of 2018, we removed power and isolated Well No. 2 from the grid. It is now being used as an observation well until further notice.

Looping of dead-end lines has been a mandated plan for RWD and good progress has been made over the past couple of years.

8.0 Appendix A - Water Testing Results 2023

RWD Monthly Average Water Testing Results

200 Dougall Road North

Date	Free CL2 mg/L	Total CL2 mg/L	pH	Hardness mg/L	Iron mg/L	Nitrite mg/L	Nitrate mg/L	Mn mg/L	Turbidity NTU	Temp °C
2023-01	0.14	0.16	7.2	266	0.02	0.002	1.8	0.017	0.09	11
2023-02	0.20	0.30	7.3	240	0.00	0.009	1.0	0.014	0.14	12
2023-03	0.15	0.21	7.2	253	0.02	0.006	1.7	0.032	0.11	11
2023-04	0.20	0.23	7.2	209	0.04	0.002	2.0	0.011	0.12	13
2023-05	0.14	0.17	7.3	218	0.02	0.005	1.7	0.025	0.14	14
2023-06	0.10	0.13	7.2	321	0.02	0.003	1.8	0.036	0.23	16
2023-07	0.12	0.17	7.4	326	0.04	0.007	1.1	0.059	0.21	17
2023-08	0.08	0.11	7.4	311	0.06	0.004	1.2	0.008	0.18	18
2023-09	0.14	0.17	7.5	221	0.02	0.005	1.2	0.032	0.16	17
2023-10	0.22	0.27	7.3	201	0.01	0.007	1.6	0.015	0.20	16
2023-11	0.28	0.31	7.3	175	0.02	0.002	1.9	0.000	0.12	14
2023-12	0.18	0.22	7.3	194	0.02	0.004	2.1	0.012	0.12	12
MAC	NA	NA	NA	NA	NA	1	10	0.12	1	NA

420 Pine Road

Date	Free CL2 mg/L	Total CL2 mg/L	pH	Hardness mg/L	Iron mg/L	Nitrite mg/L	Nitrate mg/L	Mn mg/L	Turbidity NTU	Temp °C
2023-01	0.13	0.15	7.1	217	0.02	0.003	1.7	0.015	0.09	6
2023-02	0.17	0.27	7.2	213	0.01	0.001	1.2	0.019	0.18	6
2023-03	0.14	0.17	7.3	214	0.02	0.005	1.8	0.035	0.11	6
2023-04	0.15	0.20	7.3	238	0.02	0.005	1.8	0.029	0.11	8
2023-05	0.13	0.15	7.3	207	0.02	0.004	2.1	0.021	0.13	13
2023-06	0.18	0.21	7.2	265	0.02	0.004	2.2	0.034	0.24	15
2023-07	0.11	0.14	7.5	303	0.02	0.004	1.5	0.034	0.20	17
2023-08	0.11	0.14	7.4	387	0.02	0.001	1.3	0.010	0.16	18
2023-09	0.14	0.18	7.4	205	0.01	0.007	1.5	0.014	0.14	17
2023-10	0.16	0.19	7.4	165	0.02	0.002	1.2	0.006	0.26	15
2023-11	0.23	0.26	7.3	229	0.00	0.004	1.6	0.000	0.12	12
2023-12	0.14	0.17	7.3	253	0.01	0.003	1.4	0.016	0.11	10
MAC	NA	NA	NA	NA	NA	1	10	0.12	1	NA

2592 Highway 97 North

Date	Free CL2 mg/L	Total CL2 mg/L	pH	Hardness mg/L	Iron mg/L	Nitrite mg/L	Nitrate mg/L	Mn mg/L	Turbidity NTU	Temp °C
2023-01	0.32	0.35	7.1	222	0.01	0.006	2.1	0.015	0.09	8
2023-02	0.37	0.43	7.3	173	0.00	0.021	2.4	0.025	0.14	8
2023-03	0.29	0.32	7.2	197	0.01	0.011	2.3	0.023	0.09	7
2023-04	0.37	0.42	7.2	212	0.01	0.010	2.9	0.011	0.10	10
2023-05	0.24	0.27	7.3	210	0.05	0.008	2.1	0.067	0.13	14
2023-06	0.12	0.28	6.1	292	0.04	0.017	1.9	0.095	0.14	13
2023-07	0.17	0.25	7.5	307	0.05	0.004	1.0	0.143	0.22	17
2023-08	0.07	0.11	7.5	312	0.09	0.002	1.5	0.046	0.17	18
2023-09	0.14	0.17	7.4	219	0.04	0.006	1.5	0.038	0.18	17
2023-10	0.29	0.33	7.3	203	0.03	0.003	2.2	0.012	0.22	15
2023-11	0.35	0.37	7.2	139	0.02	0.002	3.1	0.000	0.13	12
2023-12	0.22	0.24	7.3	227	0.00	0.002	2.0	0.009	0.11	11
MAC	NA	NA	NA	NA	NA	1	10	0.12	1	NA

920 Saskatoon Road

Date	Free CL2 mg/L	Total CL2 mg/L	pH	Hardness mg/L	Iron mg/L	Nitrite mg/L	Nitrate mg/L	Mn mg/L	Turbidity NTU	Temp °C
2023-01	0.32	0.36	7.1	283	0.00	0.004	2.1	0.011	0.09	9
2023-02	0.33	0.42	7.2	154	0.01	0.010	1.7	0.021	0.14	9
2023-03	0.30	0.33	7.2	218	0.02	0.011	2.2	0.020	0.10	8
2023-04	0.35	0.44	7.2	230	0.02	0.005	2.6	0.017	0.10	10
2023-05	0.19	0.25	7.3	203	0.05	0.012	1.5	0.080	0.13	11
2023-06	0.19	0.23	7.3	226	0.05	0.004	1.8	0.104	0.21	15
2023-07	0.19	0.25	7.6	305	0.08	0.002	0.8	0.161	0.23	16
2023-08	0.10	0.14	7.6	295	0.15	0.001	2.0	0.058	0.19	16
2023-09	0.13	0.20	7.5	199	0.03	0.007	1.5	0.074	0.15	15
2023-10	0.33	0.36	7.3	187	0.01	0.004	2.3	0.009	0.21	14
2023-11	0.37	0.40	7.3	248	0.02	0.002	2.1	0.000	0.13	11
2023-12	0.17	0.20	7.4	222	0.00	0.004	2.0	0.014	0.12	11
MAC	NA	NA	NA	NA	NA	1	10	0.12	1	NA

955 Gerstmar Road

Date	Free CL2 mg/L	Total CL2 mg/L	pH	Hardness mg/L	Iron mg/L	Nitrite mg/L	Nitrate mg/L	Mn mg/L	Turbidity NTU	Temp °C
2023-01	0.33	0.35	7.2	280	0.01	0.002	1.6	0.012	0.09	8
2023-02	0.43	0.51	7.1	152	0.01	0.007	2.0	0.018	0.14	7
2023-03	0.31	0.35	7.2	212	0.08	0.003	2.4	0.021	0.11	7
2023-04	0.34	0.41	7.2	227	0.01	0.002	2.7	0.012	0.11	10
2023-05	0.24	0.27	7.2	200	0.04	0.020	1.5	0.031	0.12	12
2023-06	0.47	0.51	7.1	177	0.08	0.007	2.5	0.014	0.23	14
2023-07	0.48	0.50	7.2	204	0.05	0.004	0.7	0.009	0.19	15
2023-08	0.49	0.51	7.3	262	0.01	0.002	2.0	0.026	0.15	16
2023-09	0.37	0.42	7.4	173	0.03	0.006	2.0	0.012	0.13	15
2023-10	0.55	0.58	7.2	193	0.01	0.002	2.3	0.003	0.22	14
2023-11	0.52	0.59	7.3	223	0.02	0.002	2.0	0.000	0.13	12
2023-12	0.29	0.36	7.3	221	0.00	0.002	2.0	0.008	0.12	10
MAC	NA	NA	NA	NA	NA	1	10	0.12	1	NA

2080 Hollywood Road South

Date	Free CL2 mg/L	Total CL2 mg/L	pH	Hardness mg/L	Iron mg/L	Nitrite mg/L	Nitrate mg/L	Mn mg/L	Turbidity NTU	Temp °C
2023-01	0.21	0.24	7.2	264	0.01	0.010	1.9	0.010	0.09	6
2023-02	0.17	0.21	7.3	198	0.02	0.010	1.0	0.019	0.16	6
2023-03	0.15	0.19	7.3	236	0.02	0.006	1.6	0.021	0.11	6
2023-04	0.17	0.23	7.3	241	0.00	0.002	1.9	0.014	0.10	9
2023-05	0.14	0.16	7.2	191	0.06	0.007	2.2	0.025	0.12	13
2023-06	0.23	0.26	7.1	217	0.02	0.017	1.6	0.017	0.21	14
2023-07	0.17	0.21	7.4	245	0.04	0.006	1.2	0.015	0.19	16
2023-08	0.17	0.19	7.4	250	0.01	0.009	1.3	0.016	0.15	17
2023-09	0.21	0.23	7.4	208	0.01	0.013	1.2	0.017	0.13	16
2023-10	0.25	0.28	7.3	192	0.02	0.005	1.4	0.019	0.22	14
2023-11	0.31	0.35	7.3	224	0.01	0.006	1.9	0.000	0.12	11
2023-12	0.17	0.20	7.4	217	0.02	0.000	0.9	0.049	0.11	10
MAC	NA	NA	NA	NA	NA	1	10	0.12	1	NA

1040 Villa Vista Road

Date	Free CL2 mg/L	Total CL2 mg/L	pH	Hardness mg/L	Iron mg/L	Nitrite mg/L	Nitrate mg/L	Mn mg/L	Turbidity NTU	Temp °C
2023-01	0.14	0.16	7.2	249	0.01	0.001	1.5	0.014	0.10	8
2023-02	0.20	0.27	7.3	203	0.02	0.007	0.9	0.013	0.17	7
2023-03	0.14	0.19	7.2	242	0.02	0.004	1.6	0.020	0.11	7
2023-04	0.17	0.19	7.3	207	0.02	0.001	1.8	0.000	0.11	10
2023-05	0.29	0.34	7.2	164	0.09	0.005	2.1	0.018	0.14	12
2023-06	0.31	0.35	7.1	203	0.03	0.006	1.7	0.018	0.20	13
2023-07	0.22	0.25	7.2	272	0.03	0.003	1.4	0.014	0.21	15
2023-08	0.16	0.19	7.3	307	0.01	0.001	1.1	0.034	0.17	14
2023-09	0.21	0.24	7.4	178	0.04	0.008	0.8	0.025	0.15	13
2023-10	0.35	0.40	7.3	196	0.00	0.001	1.1	0.004	0.27	12
2023-11	0.32	0.34	7.3	200	0.01	0.003	1.6	0.000	0.14	10
2023-12	0.22	0.25	7.3	214	0.02	0.006	0.7	0.049	0.12	10
MAC	NA	NA	NA	NA	NA	1	10	0.12	1	NA

Appendix B - Bacteriological Results 2023

CARO Independent Lab Testing for Total Coliform & E. coli

1. 200 Dougall Road North
2. 420 Pine Road
3. 2592 Highway 97 North
4. 920 Saskatoon Road
5. 955 Gerstmar Road
6. 2080 Hollywood Road South
7. 1040 Villa Vista Road
8. 200 Mallach Road
9. 125 Adventure Road
10. 705 Kitch Road
11. 470 Ziprick Road

Every location produced a Total Coliform and E. coli result of <1 in 2023.

