Village of Kaslo

2023 ANNUAL
WATER SYSTEM REPORT

2023.06.10

Table of Contents

1.0 Introduction

This report has been published to meet the requirement for water suppliers to produce an annual report on water quality as per Section 15 of the *Drinking Water Protection Act* and Section 11 of the *Drinking Water Protection Regulation*.

The annual report covers the period from January 1, 2023 to December 31, 2023 and uses data that is regularly obtained by the Village of Kaslo to highlight water quality issues and to discuss the monitoring results of the Village's water system.

This report aims to convey information to residents regarding the overall operation of the municipal water system and describe the Village of Kaslo's approach to the operation and maintenance of the water system.

For more detailed information on drinking water health effects, the Village of Kaslo recommends the following web sites:

Interior Health Authority
http://www.interiorhealth.ca/health-and-safety.aspx?id=534

Health Canada:
http://www.hc-sc.gc.ca/ewh-semt/water-eau/drink-potab/index-eng.php

World Health Organization:
http://www.who.int/water_sanitation_health/dwq/en/

2.0 Water System Overview

The Village of Kaslo was incorporated in 1893 and is home to approximately 1000 residents. It is located 70 kilometres north of Nelson along Highway 31, on the western shore of Kootenay Lake. The Village of Kaslo is the oldest incorporated municipality in the Kootenays.

The Village of Kaslo's water distribution system is rated by the Environmental Operator Certification Program as Level II. This classification level is based on the system's complexities and the number of homes serviced. The Village of Kaslo obtains its domestic water supply from 3 primary sources. The first source consists of the springs known as Brooks, Clarke and Cross Creek, located outside the Village boundaries. This source is the most reliable and economical water supply for the municipality, providing 50 gallons per minute all year round. Kemp Creek and the Kaslo River are the Village's other two primary sources. The Kaslo River is used, for the most part, during times of peak demand or in an emergency situation.

2.1 Service Area

The current water system supplies domestic water to residents, businesses and the local golf course located within municipal boundaries and to the McDonald Creek water user group located outside the Village of Kaslo (Appendix 1). In addition, it acts as the primary source of water for the Kaslo and Area Volunteer Fire Department.

2.2 Source

The Village currently has four sources for water:

Source	Licensed volume (Gallons/year)
Kaslo River	109,5000,000.000
Brooks, Clark and Cross Creek	182,500,000.000
Kemp Creek	218,365,000.000
McDonald Creek	730,000.000

95% from Kemp Creek and 5% from Kaslo River

2.3 Storage

The Village of Kaslo reservoir is located west of the Kaslo aerodrome on a small bench above the Kaslo River.

The Reservoir, constructed in the early 1980s, is an earthen pond with a synthetic liner. It was built to fulfill three functions;

a) Provide a pressure break to atmosphere for the Kemp Creek supply pipe;
b) Provide storage for fire protection and peak demands;
c) Provide a settling basin for silt-laden water during spring runoff.

The liner was replaced in 2011 with 60mil High Density Polyethylene (HDPE) liner. The reservoir has a storage capacity of 5700 m^3, with a depth of approximately 5 meters.

2.4 Water Treatment Plant

Due to perpetual boil water advisories, the water treatment plant was constructed in 1999 to provide a safe, reliable water supply for the Village of Kaslo. The structure was built by Graham Construction, with components from Westech Controls with funding from the Province of British Columbia. Built to the Interior Health Authority (IHA) standards, the plant is a gravity fed rapid sand filtration system, including 3 auto-backwash filter trains of 350 gallons per minute each. Chlorine is added before entering the 200,000-gallon closed reservoir. This reservoir gives us the contact time (ct) to achieve a 3-log removal. The entire process is monitored by SCADA (Supervisory Control and Data Acquisition). The system has a more than adequate available contact time for 3-log Giardia inactivation which is the Interior Health Authority standard.

2.5 Distribution System

In total, the Village of Kaslo and the McDonald Creek water users have approximately 23 kilometers of water main comprised of mainly polyvinyl chloride C900 pipes. Sizes range from 50 mm to 300 mm in diameter with five pressure reducing stations within the system. The municipality has numerous standpipes and 62 fire hydrants for fire

protection. There are an additional 12 fire hydrants in the McDonald Creek Water System and through a service agreement with the RDCK, the Village maintains and services the water infrastructure within the area.

2.6 Supervisory Control and Data Acquisition Software (SCADA)

Connected via the internet, the Village of Kaslo's SCADA software is able to monitor sensors at source (raw water reservoir), and storage (water treatment plant) points within the system. Interpreting data received, the software is able to automatically turn pumps on and off, and keep the system running smoothly. When any sign of trouble is detected, the software issues alarms to notify Village staff.

3.0 Water System Maintenance

3.1 Water Treatment Plant Maintenance

The plant is inspected daily by a certified operator and any maintenance is performed as required.

3.2 Reservoir Maintenance

The reservoir is cleaned yearly to flush sediments through a drain.

3.3 Distribution System Maintenance

The distribution system in the Village of Kaslo consists of watermains, valves, service connections and fire hydrants. Proper maintenance of the distribution system allows the municipality to monitor the quality of water as well as to take a proactive approach to mitigate potential causes for concern.

3.3.1 Watermain Flushing and Hydrant Maintenance

Currently, the Village of Kaslo does not have a formal unidirectional flushing (UDF) program for the annual flushing of watermains. However, as the Village continuously

inspects and maintains hydrants within the municipality, mains are exposed to flushing activities.

Hydrants are inspected yearly to determine the unit's ability to function properly and to provide adequate fire protection. Village staff perform inspections such as checking the hydrant pressure, exposing any worn parts, and updating service records.

3.3.2 Watermain Breaks

Unfortunately, municipalities will always have to deal with both unexpected watermain breaks and the disruption of those breaks to the domestic water system. However, most problems associated with breaks can be remedied in a short amount of time and thus, regular service can be quickly restored.

3.3.3 Cross Connection

The Village of Kaslo continues to develop a cross connection control program. High risk connections have been identified within the municipality and staff continue to develop preventative measures to safeguard the community's water. Bylaws and policies have also been put in place for safeguard measures. The Village's public works yard, sewer treatment plant and majority of the parks have backflow preventers installed and are tested annually by a certified operator.

4.0 Water System Operator Training Program

The Village of Kaslo's water system is classified as a Level II water system. This classification level is based on system complexities and the number of homes serviced. The Conditions of Permit to operate the water system are established and monitored by IHA and call for continual operator training and upgrading. This also includes the attainment of operator certification levels applicable to the level of classification of the municipal water system. The Village continues to meet all of these IHA requirements.

In 2023 the Village of Kaslo had three certified Water Distribution and Water Treatment system operators. One operator had Level II in Water Distribution and in Water Treatment, the second operator had Level I in Water Treatment and Level I in Water Distribution, while the third operator had Level I in Water Distribution. Each of these operators take new courses as required to keep their certificates current and to gain knowledge, providing the municipality with safe, highly skilled water system operation.

5.0 Monitoring and Testing Program

The *Drinking Water Protection Regulation* sets minimal guidelines that water purveyors must meet in respect to water monitoring analysis. Therefore, the Village of Kaslo is required to maintain the following components within its testing program:

1. Monitor the drinking water source, the water in its system and the water it provides;
2. Monitor the above not less than 4 times per month;
3. Monitor for both Total Coliform Bacteria and E. Coli;
4. Have the analyses required for monitoring carried out by accredited laboratories that meet the requirements of the Drinking Water Protection Act and Public Health Officer; and
5. Send weekly reports to the Public Health Inspector that summarize the above test results and daily water consumption totals.

The Village of Kaslo takes weekly water samples from the end of the distribution system on 2nd Street and the results are forwarded directly by the laboratory to the Interior Health Authority.

All water analysis on domestic water in the Village of Kaslo is performed by CARO Analytical Services, located in Kelowna, BC. CARO Analytical Services employs methods, which are based on those foundations in *Standard Methods for the Examination of Water and Wastewater*, *online Edition*, published by the American Public Health Association, US EPA protocols found in *Test Methods for Evaluating Solid Waste, Physical/ Chemical Methods, SW846, 3rd Edition* and protocols published by the British Columbia Ministry of Environment.

5.1 Parameters

A Maximum Allowable Concentration (MAC) has been established by Health Canada for microbiological criteria. Each MAC has been designed to safeguard human health and is based on projecting lifelong consumption of drinking water that contains the substances at the maximum concentration level. These MAC's are identified in Schedule A of the Drinking Water Protection Regulation as follows:

Water Quality Standards for Potable Water

Parameter:	**Standard:**
Fecal coliform bacteria	No detectable fecal coliform bacteria per 100 ml
Escherichia coli	No detectable Escherichia coli per 100 ml
Total coliform bacteria:	
(a) 1 sample in a 30 day period	No detectable total coliform bacteria per 100 ml
(b) more than 1 sample in a 30 day period	At least 90% of samples have no detectable total coliform bacteria per 100 ml and no sample has more than 10 total coliform bacteria per 100 ml

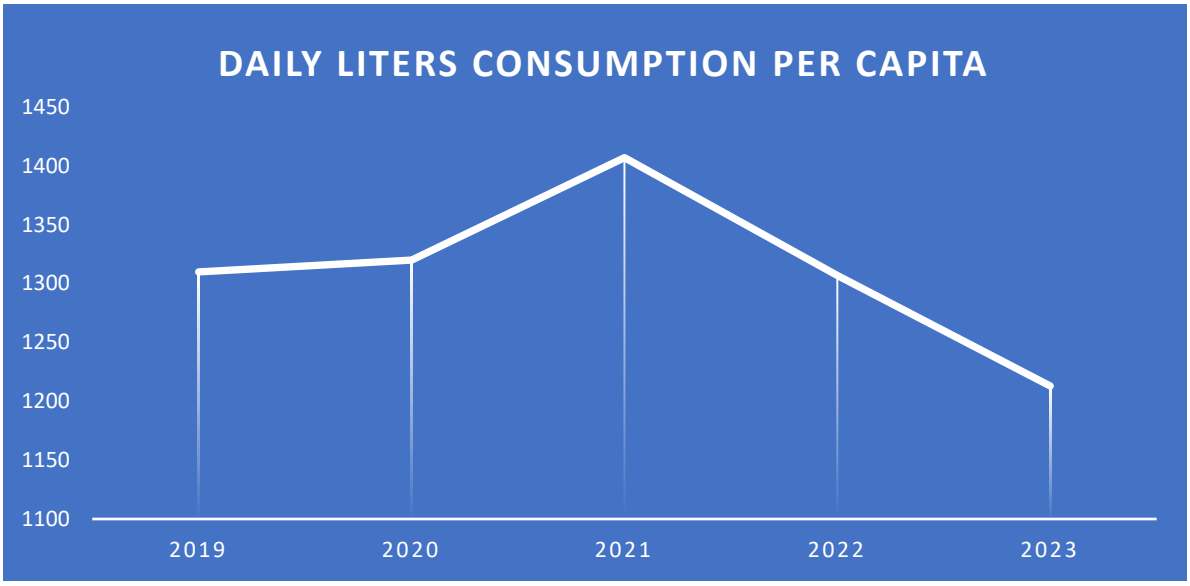
5.2 Results

Overall results indicate that the Village of Kaslo falls below the required Maximum Allowable Concentrations allowed by Health Canada and the *Drinking Water Protection*

Regulations in respect to Total Coliform concentrations, with no abnormal counts in respect to E. coli for 2023. These results also indicate that the municipality falls well within the required MAC allowed by Health Canada and the *Drinking Water Protection Regulations* in respect to E. coli concentrations. The Village's weekly water sampling results are forwarded to Interior Health and summarized in Appendix 2.

6.0 Annual Consumption Records

The Village of Kaslo has a higher total average daily flow rate than the BC average at 1213 liters per capita, per day, while the provincial average is 494 liters [2023 data - Environment Canada]. In 2021 Kerr Wood Leidal consulting engineers updated the Water Loss Management and Water Conservation plan and with 2023 data it is showing a downward trend.



Since 2017 the Village of Kaslo has had the following Water Conservation Measures Policy in place. This policy is included in **Appendix 3**.

7.0 2018-2023 Capital Works and Projected 2023/2024 Capital Works

The municipality upgraded PRV#1 with a backup generator and an airburst system in 2018-2019. This system allows the Kaslo river backup intake to be blown out with air to allow maximum flow to the pumps, which then feed the water treatment plant. This backup system is used if the waterline from the dam or reservoir breaks. In the event the municipality is on the backup pumps in PRV#1 when power goes out, we are then able to run the pumps off the new backup generator.

In November of 2022, work was finished on the new A Ave water main which allowed the abandonment of the old 1940's main water feed for lower Kaslo. The old steel line

was unserviceable due to the depth and location underneath Highway 31. The new High-Density Polyethylene 10" line crosses the highway at A Ave and 6th Street and then continues down the hill along the foot path through the Royal Canadian Legion parking lot.

8.0 Emergency Response and Contingency Plan

The Village of Kaslo currently has established procedures for dealing with water quality notification and emergency call outs. These procedures are included in **Appendix 4.**

Water Events 2020-2023

On June 1st, 2020, a debris torrent washed out some of the dam infrastructure and left the water line and road access divided and inaccessible. The Public Works crew quickly built a temporary water intake, lower down on Kemp Creek. In the meantime, a local contractor was hired to rebuild the road access and re-connect the water line to the dam. Repair work on the dam and road were completed in October 2021.

Looking down from the dam June 2020.

Photo of the dam shortly after the 2020 debris event.

9.0 Conclusion

Since the implementation of the BC Government *Drinking Water Protection Act* and *Drinking Water Protection Regulation*, standards for ongoing operator training, water sampling, system monitoring, emergency response plans, long-range planning and public reporting have increased dramatically.

The Village of Kaslo aims to comply with Provincial legislation and welcomes the opportunity to inform residents of the municipality's practices regarding the supply and distribution of domestic potable water. As a result of presenting this Annual Report, the Village hopes that residents understand the current complexities municipalities face in supplying an adequate water source to its residents and further, encourages the residents to help the Village maintain a safe, reliable water source for both current and future generations.

Appendix 1:
Village of Kaslo Water Service Area

Appendix 2:
2023 CARO Drinking Water Bacteriology Sampling Results

CERTIFICATE OF ANALYSIS

REPORTED TO	Kaslo, Village of PO Box 576 Kaslo, BC V0G 1M0		
ATTENTION	CAO	**WORK ORDER**	See Page 2 for list
PO NUMBER		**RECEIVED / TEMP**	See Page 2 for list
PROJECT	Drinking Water	**REPORTED**	2024-03-13 07:22
PROJECT INFO		**COC NUMBER**	

Introduction:

CARO Analytical Services is a testing laboratory full of smart, engaged scientists driven to make the world a safer and healthier place. Through our clients' projects we become an essential element for a better world. We employ methods conducted in accordance with recognized professional standards using accepted testing methodologies and quality control efforts. CARO is accredited by the Canadian Association for Laboratories Accreditation (CALA) to ISO/IEC 17025:2017 for specific tests listed in the scope of accreditation approved by CALA.

Big Picture Sidekicks

You know that the sample you collected after snowshoeing to site, digging 5 meters, and racing to get it on a plane so you can submit it to the lab for time sensitive results needed to make important and expensive decisions (whew) is VERY important. We know that too.

We've Got Chemistry

It's simple. We figure the more you enjoy working with our fun and engaged team members; the more likely you are to give us continued opportunities to support you.

Ahead of the Curve

Through research, regulation knowledge, and instrumentation, we are your analytical centre for the technical knowledge you need, BEFORE you need it, so you can stay up to date and in the know.

By engaging our services, you are agreeing to CARO Analytical Service's Standard Terms and Conditions outlined here: https://www.caro.ca/terms-conditions

If you have any questions or concerns, please contact me at TeamCaro@caro.ca

Authorized By:

Team CARO
Client Service Representative

CARO ANALYTICAL SERVICES

WORK ORDER INFORMATION

REPORTED TO Kaslo, Village of
PROJECT Drinking Water

REPORTED 2024-03-13 07:22

Work Order	Received	Temp (C)	COC Number(s)
23A0113	2023-01-04 08:00	7	B107988
23A0829	2023-01-11 08:00	4	B107988
23A1626	2023-01-18 07:55	8	B107988
23A2364	2023-01-25 08:00	6	B107988
23B0081	2023-02-01 08:45	6	B107988
23B0822	2023-02-08 08:24	8	B107988
23B1551	2023-02-15 08:12	3	B107988
23B2153	2023-02-22 08:20	2	B107988
23C0090	2023-03-01 08:15	7	B107988
23C0822	2023-03-08 08:20	4	B107988
23C1590	2023-03-15 08:13	5	B107988
23C2348	2023-03-22 08:05	5	B107988
23C3101	2023-03-29 08:08	7	B107988
23D0341	2023-04-05 08:00	9	B107988
23D1205	2023-04-13 08:00	9	B107988
23D1809	2023-04-19 08:15	7	B107988
23D2750	2023-04-26 08:15	12	B107988
23E0348	2023-05-03 08:30	19	B107988
23E1189	2023-05-10 09:25	17	B107988
23E2142	2023-05-17 08:15	21	B107988
23E2924	2023-05-24 09:00	17	B107988
23E3786	2023-05-31 08:05	19	B107988
23F0851	2023-06-07 08:40	18	B107988
23F1753	2023-06-14 08:25	18	B107988
23F2726	2023-06-21 08:23	14	B107988
23F3591	2023-06-28 08:20	22	B107988
23G0210	2023-07-05 08:30	17	B107988
23G1199	2023-07-12 08:26	17	B107988
23G2206	2023-07-19 07:56	17	B107988
23G3136	2023-07-25 09:30	16	B107988
23H0292	2023-08-02 08:26	19	B107988
23H1220	2023-08-09 08:09	18	B107988
23H2106	2023-08-16 08:00	21	B107988
23H2942	2023-08-23 08:30	13	B107988
23H3960	2023-08-31 08:08	18	B107988
23I0348	2023-09-06 08:45	12	B107988
23I1370	2023-09-13 08:30	16	B107988
23I2375	2023-09-20 09:00	15	B107988
23I3249	2023-09-27 08:05	12	B107988
23J0186	2023-10-04 08:15	11	B107988
23J1059	2023-10-11 08:42	12	B107988
23J2094	2023-10-18 08:45	13	B107988
23J2968	2023-10-25 09:00	10	B107988
23K0123	2023-11-01 12:02	6	eCOC#00007884
23K0926	2023-11-08 08:38	8	B107988
23K1703	2023-11-15 08:48	9	eCOC#00008208
23K2501	2023-11-22 08:14	13	eCOC#00008351
23K3352	2023-11-29 08:30	8	eCOC#00008541

WORK ORDER INFORMATION

REPORTED TO	Kaslo, Village of				
PROJECT	Drinking Water			**REPORTED**	2024-03-13 07:22

23L0529	2023-12-06 08:20	8	eCOC#00008698
23L1503	2023-12-13 08:15	6	eCOC#00008916
23L2492	2023-12-20 08:27	11	eCOC#00009170
23L3053	2023-12-29 07:56	5	eCOC#00009263

CARO ANALYTICAL SERVICES

TEST RESULTS

REPORTED TO Kaslo, Village of
PROJECT Drinking Water

REPORTED 2024-03-13 07:22

Analyte	Result	Guideline	RL	Units	Analyzed	Qualifier
End of Distribution (23A0113-01) | Matrix: Water | Sampled: 2023-01-03 10:00						
Microbiological Parameters						
Coliforms, Total	< 1	MAC = 0	1	CFU/100 mL	2023-01-04	
E. coli	< 1	MAC = 0	1	CFU/100 mL	2023-01-04	
End of Distribution (23A0829-01) | Matrix: Water | Sampled: 2023-01-10 08:50						
Microbiological Parameters						
Coliforms, Total	< 1	MAC = 0	1	CFU/100 mL	2023-01-11	
E. coli	< 1	MAC = 0	1	CFU/100 mL	2023-01-11	
End of Distribution (23A1626-01) | Matrix: Water | Sampled: 2023-01-17 08:15						
Microbiological Parameters						
Coliforms, Total	< 1	MAC = 0	1	CFU/100 mL	2023-01-18	
E. coli	< 1	MAC = 0	1	CFU/100 mL	2023-01-18	
End of Distribution (23A2364-01) | Matrix: Water | Sampled: 2023-01-24 10:00						
Microbiological Parameters						
Coliforms, Total	< 1	MAC = 0	1	CFU/100 mL	2023-01-25	
E. coli	< 1	MAC = 0	1	CFU/100 mL	2023-01-25	
End of Distribution (23B0081-01) | Matrix: Water | Sampled: 2023-01-31 10:00						
Microbiological Parameters						
Coliforms, Total	< 1	MAC = 0	1	CFU/100 mL	2023-02-01	
E. coli	< 1	MAC = 0	1	CFU/100 mL	2023-02-01	
End of Distribution (23B0822-01) | Matrix: Water | Sampled: 2023-02-07 10:00						
Microbiological Parameters						
Coliforms, Total	< 1	MAC = 0	1	CFU/100 mL	2023-02-08	
E. coli	< 1	MAC = 0	1	CFU/100 mL	2023-02-08	
End of Distribution (23B1551-01) | Matrix: Water | Sampled: 2023-02-14 09:00						
Microbiological Parameters						
Coliforms, Total	< 1	MAC = 0	1	CFU/100 mL	2023-02-15	
E. coli	< 1	MAC = 0	1	CFU/100 mL	2023-02-15	
End of Distribution (23B2153-01) | Matrix: Water | Sampled: 2023-02-21 09:00						

TEST RESULTS

REPORTED TO Kaslo, Village of
PROJECT Drinking Water

REPORTED 2024-03-13 07:22

Analyte	Result	Guideline	RL	Units	Analyzed	Qualifier
End of Distribution (23B2153-01) | Matrix: Water | Sampled: 2023-02-21 09:00, Continued						
Microbiological Parameters						
Coliforms, Total	< 1	MAC = 0	1	CFU/100 mL	2023-02-22	
E. coli	< 1	MAC = 0	1	CFU/100 mL	2023-02-22	
End of Distribution (23C0090-01) | Matrix: Water | Sampled: 2023-02-28 10:00						
Microbiological Parameters						
Coliforms, Total	< 1	MAC = 0	1	CFU/100 mL	2023-03-01	
E. coli	< 1	MAC = 0	1	CFU/100 mL	2023-03-01	
End of Distribution (23C0822-01) | Matrix: Water | Sampled: 2023-03-07 10:00						
Microbiological Parameters						
Coliforms, Total	< 1	MAC = 0	1	CFU/100 mL	2023-03-08	
E. coli	< 1	MAC = 0	1	CFU/100 mL	2023-03-08	
End of Distribution (23C1590-01) | Matrix: Water | Sampled: 2023-03-14 09:15						
Microbiological Parameters						
Coliforms, Total	< 1	MAC = 0	1	CFU/100 mL	2023-03-15	
E. coli	< 1	MAC = 0	1	CFU/100 mL	2023-03-15	
End of Distribution (23C2348-01) | Matrix: Water | Sampled: 2023-03-21 09:00						
Microbiological Parameters						
Coliforms, Total	< 1	MAC = 0	1	CFU/100 mL	2023-03-22	
E. coli	< 1	MAC = 0	1	CFU/100 mL	2023-03-22	
End of Distribution (23C3101-01) | Matrix: Water | Sampled: 2023-03-28 10:00						
Microbiological Parameters						
Coliforms, Total	< 1	MAC = 0	1	CFU/100 mL	2023-03-29	
E. coli	< 1	MAC = 0	1	CFU/100 mL	2023-03-29	
End of Distribution (23D0341-01) | Matrix: Water | Sampled: 2023-04-04 11:00						
Microbiological Parameters						
Coliforms, Total	< 1	MAC = 0	1	CFU/100 mL	2023-04-05	
E. coli	< 1	MAC = 0	1	CFU/100 mL	2023-04-05	
End of Distribution (23D1205-01) | Matrix: Water | Sampled: 2023-04-11 09:40						

CARO ANALYTICAL SERVICES

TEST RESULTS

REPORTED TO Kaslo, Village of
PROJECT Drinking Water

REPORTED 2024-03-13 07:22

Analyte	Result	Guideline	RL	Units	Analyzed	Qualifier
End of Distribution (23D1205-01) | Matrix: Water | Sampled: 2023-04-11 09:40, Continued						
Microbiological Parameters						
Coliforms, Total	< 1	MAC = 0	1	CFU/100 mL	2023-04-13	HT3
E. coli	< 1	MAC = 0	1	CFU/100 mL	2023-04-13	HT3
End of Distribution (23D1809-01) | Matrix: Water | Sampled: 2023-04-18 10:00						
Microbiological Parameters						
Coliforms, Total	< 1	MAC = 0	1	CFU/100 mL	2023-04-19	
E. coli	< 1	MAC = 0	1	CFU/100 mL	2023-04-19	
End of Distribution (23D2750-01) | Matrix: Water | Sampled: 2023-04-25 10:00						
Microbiological Parameters						
Coliforms, Total	< 1	MAC = 0	1	CFU/100 mL	2023-04-26	
E. coli	< 1	MAC = 0	1	CFU/100 mL	2023-04-26	
End of Distribution (23E0348-01) | Matrix: Water | Sampled: 2023-05-02 08:00						
Microbiological Parameters						
Coliforms, Total	< 1	MAC = 0	1	CFU/100 mL	2023-05-03	
E. coli	< 1	MAC = 0	1	CFU/100 mL	2023-05-03	
End of Distribution (23E1189-01) | Matrix: Water | Sampled: 2023-05-09 10:00						
Microbiological Parameters						
Coliforms, Total	< 1	MAC = 0	1	CFU/100 mL	2023-05-10	
E. coli	< 1	MAC = 0	1	CFU/100 mL	2023-05-10	
End of Distribution (23E2142-01) | Matrix: Water | Sampled: 2023-05-16 10:00						
Microbiological Parameters						
Coliforms, Total	1	MAC = 0	1	CFU/100 mL	2023-05-17	
E. coli	< 1	MAC = 0	1	CFU/100 mL	2023-05-17	
End of Distribution (23E2924-01) | Matrix: Water | Sampled: 2023-05-23 10:00						
Microbiological Parameters						
Coliforms, Total	< 1	MAC = 0	1	CFU/100 mL	2023-05-24	
E. coli	< 1	MAC = 0	1	CFU/100 mL	2023-05-24	
End of Distribution (23E3786-01) | Matrix: Water | Sampled: 2023-05-30 11:30						

CARO ANALYTICAL SERVICES

TEST RESULTS

REPORTED TO Kaslo, Village of
PROJECT Drinking Water

REPORTED 2024-03-13 07:22

Analyte	Result	Guideline	RL	Units	Analyzed	Qualifier
End of Distribution (23E3786-01) | Matrix: Water | Sampled: 2023-05-30 11:30, Continued						
Microbiological Parameters						
Coliforms, Total	< 1	MAC = 0	1	CFU/100 mL	2023-05-31	
E. coli	< 1	MAC = 0	1	CFU/100 mL	2023-05-31	
End of Distribution (23F0851-01) | Matrix: Water | Sampled: 2023-06-06 08:15						
Microbiological Parameters						
Coliforms, Total	< 1	MAC = 0	1	CFU/100 mL	2023-06-07	HT3
E. coli	< 1	MAC = 0	1	CFU/100 mL	2023-06-07	HT3
End of Distribution (23F1753-01) | Matrix: Water | Sampled: 2023-06-13 10:00						
Microbiological Parameters						
Coliforms, Total	< 1	MAC = 0	1	CFU/100 mL	2023-06-14	
E. coli	< 1	MAC = 0	1	CFU/100 mL	2023-06-14	
End of Distribution (23F2726-01) | Matrix: Water | Sampled: 2023-06-20 10:00						
Microbiological Parameters						
Coliforms, Total	< 1	MAC = 0	1	CFU/100 mL	2023-06-21	
E. coli	< 1	MAC = 0	1	CFU/100 mL	2023-06-21	
End of Distribution (23F3591-01) | Matrix: Water | Sampled: 2023-06-27 10:00						
Microbiological Parameters						
Coliforms, Total	< 1	MAC = 0	1	CFU/100 mL	2023-06-28	
E. coli	< 1	MAC = 0	1	CFU/100 mL	2023-06-28	
End of Distribution (23G0210-01) | Matrix: Water | Sampled: 2023-07-04 09:00						
Microbiological Parameters						
Coliforms, Total	< 1	MAC = 0	1	CFU/100 mL	2023-07-05	
E. coli	< 1	MAC = 0	1	CFU/100 mL	2023-07-05	
End of Distribution (23G1199-01) | Matrix: Water | Sampled: 2023-07-11 08:30						
Microbiological Parameters						
Coliforms, Total	< 1	MAC = 0	1	CFU/100 mL	2023-07-12	
E. coli	< 1	MAC = 0	1	CFU/100 mL	2023-07-12	
End of Distribution (23G2206-01) | Matrix: Water | Sampled: 2023-07-18 08:15						

CARO ANALYTICAL SERVICES

TEST RESULTS

REPORTED TO Kaslo, Village of
PROJECT Drinking Water

REPORTED 2024-03-13 07:22

Analyte	Result	Guideline	RL	Units	Analyzed	Qualifier
End of Distribution (23G2206-01) | Matrix: Water | Sampled: 2023-07-18 08:15, Continued						
Microbiological Parameters						
Coliforms, Total	< 1	MAC = 0	1	CFU/100 mL	2023-07-19	
E. coli	< 1	MAC = 0	1	CFU/100 mL	2023-07-19	
End of Distribution (23G3136-01) | Matrix: Water | Sampled: 2023-07-25 09:30						
Microbiological Parameters						
Coliforms, Total	< 1	MAC = 0	1	CFU/100 mL	2023-07-26	
E. coli	< 1	MAC = 0	1	CFU/100 mL	2023-07-26	
End of Distribution (23H0292-01) | Matrix: Water | Sampled: 2023-08-01 09:00						
Microbiological Parameters						
Coliforms, Total	< 1	MAC = 0	1	CFU/100 mL	2023-08-02	
E. coli	< 1	MAC = 0	1	CFU/100 mL	2023-08-02	
End of Distribution (23H1220-01) | Matrix: Water | Sampled: 2023-08-08 10:20						
Microbiological Parameters						
Coliforms, Total	< 1	MAC = 0	1	CFU/100 mL	2023-08-09	
E. coli	< 1	MAC = 0	1	CFU/100 mL	2023-08-09	
End of Distribution (23H2106-01) | Matrix: Water | Sampled: 2023-08-15 08:30						
Microbiological Parameters						
Coliforms, Total	< 1	MAC = 0	1	CFU/100 mL	2023-08-16	
E. coli	< 1	MAC = 0	1	CFU/100 mL	2023-08-16	
End of Distribution (23H2942-01) | Matrix: Water | Sampled: 2023-08-22 09:00						
Microbiological Parameters						
Coliforms, Total	< 1	MAC = 0	1	CFU/100 mL	2023-08-23	
E. coli	< 1	MAC = 0	1	CFU/100 mL	2023-08-23	
End of Distribution (23H3960-01) | Matrix: Water | Sampled: 2023-08-29 08:00						
Microbiological Parameters						
Coliforms, Total	< 1	MAC = 0	1	CFU/100 mL	2023-08-31	HT3
E. coli	< 1	MAC = 0	1	CFU/100 mL	2023-08-31	HT3
End of Distribution (23I0348-01) | Matrix: Water | Sampled: 2023-09-05 09:05						

CARO ANALYTICAL SERVICES

TEST RESULTS

REPORTED TO Kaslo, Village of
PROJECT Drinking Water

REPORTED 2024-03-13 07:22

Analyte	Result	Guideline	RL	Units	Analyzed	Qualifier
End of Distribution (23I0348-01) | Matrix: Water | Sampled: 2023-09-05 09:05, Continued						
Microbiological Parameters						
Coliforms, Total	< 1	MAC = 0	1	CFU/100 mL	2023-09-06	
E. coli	< 1	MAC = 0	1	CFU/100 mL	2023-09-06	
End of Distribution (23I1370-01) | Matrix: Water | Sampled: 2023-09-12 10:00						
Microbiological Parameters						
Coliforms, Total	< 1	MAC = 0	1	CFU/100 mL	2023-09-13	
E. coli	< 1	MAC = 0	1	CFU/100 mL	2023-09-13	
End of Distribution (23I2375-01) | Matrix: Water | Sampled: 2023-09-19 08:30						
Microbiological Parameters						
Coliforms, Total	< 1	MAC = 0	1	CFU/100 mL	2023-09-20	HT3
E. coli	< 1	MAC = 0	1	CFU/100 mL	2023-09-20	HT3
End of Distribution (23I3249-01) | Matrix: Water | Sampled: 2023-09-26 10:00						
Microbiological Parameters						
Coliforms, Total	< 1	MAC = 0	1	CFU/100 mL	2023-09-27	
E. coli	< 1	MAC = 0	1	CFU/100 mL	2023-09-27	
End of Distribution (23J0186-01) | Matrix: Water | Sampled: 2023-10-03 09:45						
Microbiological Parameters						
Coliforms, Total	< 1	MAC = 0	1	CFU/100 mL	2023-10-04	
E. coli	< 1	MAC = 0	1	CFU/100 mL	2023-10-04	
End of Distribution (23J1059-01) | Matrix: Water | Sampled: 2023-10-10 09:20						
Microbiological Parameters						
Coliforms, Total	< 1	MAC = 0	1	CFU/100 mL	2023-10-11	
E. coli	< 1	MAC = 0	1	CFU/100 mL	2023-10-11	
End of Distribution (23J2094-01) | Matrix: Water | Sampled: 2023-10-17 09:00						
Microbiological Parameters						
Coliforms, Total	< 1	MAC = 0	1	CFU/100 mL	2023-10-18	
E. coli	< 1	MAC = 0	1	CFU/100 mL	2023-10-18	
End of Distribution (23J2968-01) | Matrix: Water | Sampled: 2023-10-24 10:00						

CARO ANALYTICAL SERVICES

TEST RESULTS

REPORTED TO Kaslo, Village of
PROJECT Drinking Water

REPORTED 2024-03-13 07:22

Analyte	Result	Guideline	RL	Units	Analyzed	Qualifier
End of Distribution (23J2968-01) | Matrix: Water | Sampled: 2023-10-24 10:00, Continued						
Microbiological Parameters						
Coliforms, Total	< 1	MAC = 0	1	CFU/100 mL	2023-10-25	
E. coli	< 1	MAC = 0	1	CFU/100 mL	2023-10-25	
End of Distribution (23K0123-01) | Matrix: Drinking Water | Sampled: 2023-10-31 09:30						
Microbiological Parameters						
Coliforms, Total	< 1	MAC = 0	1	CFU/100 mL	2023-11-01	
E. coli	< 1	MAC = 0	1	CFU/100 mL	2023-11-01	
End of Distribution (23K0926-01) | Matrix: Drinking Water | Sampled: 2023-11-07 09:00						
Microbiological Parameters						
Coliforms, Total	< 1	MAC = 0	1	CFU/100 mL	2023-11-08	
E. coli	< 1	MAC = 0	1	CFU/100 mL	2023-11-08	
End of Distribution (23K1703-01) | Matrix: Drinking Water | Sampled: 2023-11-14 10:00						
Microbiological Parameters						
Coliforms, Total	< 1	MAC = 0	1	CFU/100 mL	2023-11-15	
E. coli	< 1	MAC = 0	1	CFU/100 mL	2023-11-15	
Village of Kaslo (23K2501-01) | Matrix: Drinking Water | Sampled: 2023-11-21 09:00						
Microbiological Parameters						
Coliforms, Total	< 1	MAC = 0	1	CFU/100 mL	2023-11-22	
E. coli	< 1	MAC = 0	1	CFU/100 mL	2023-11-22	
End of Distribution (23K3352-01) | Matrix: Drinking Water | Sampled: 2023-11-28 08:30						
Microbiological Parameters						
Coliforms, Total	< 1	MAC = 0	1	CFU/100 mL	2023-11-29	
E. coli	< 1	MAC = 0	1	CFU/100 mL	2023-11-29	
Village of Kaslo (23L0529-01) | Matrix: Drinking Water | Sampled: 2023-12-05 07:30						
Microbiological Parameters						
Coliforms, Total	< 1	MAC = 0	1	CFU/100 mL	2023-12-06	
E. coli	< 1	MAC = 0	1	CFU/100 mL	2023-12-06	
Village of Kaslo (23L1503-01) | Matrix: Drinking Water | Sampled: 2023-12-12 09:30						

TEST RESULTS

REPORTED TO Kaslo, Village of
PROJECT Drinking Water

REPORTED 2024-03-13 07:22

Analyte	Result	Guideline	RL	Units	Analyzed	Qualifier
Village of Kaslo (23L1503-01) | Matrix: Drinking Water | Sampled: 2023-12-12 09:30, Continued						
Microbiological Parameters						
Coliforms, Total	< 1	MAC = 0	1	CFU/100 mL	2023-12-13	
E. coli	< 1	MAC = 0	1	CFU/100 mL	2023-12-13	
Village of Kaslo (23L2492-01) | Matrix: Drinking Water | Sampled: 2023-12-19 09:15						
Microbiological Parameters						
Coliforms, Total	< 1	MAC = 0	1	CFU/100 mL	2023-12-20	
E. coli	< 1	MAC = 0	1	CFU/100 mL	2023-12-20	
Village of Kaslo (23L3053-01) | Matrix: Drinking Water | Sampled: 2023-12-28 08:50						
Microbiological Parameters						
Coliforms, Total	< 1	MAC = 0	1	CFU/100 mL	2023-12-29	
E. coli	< 1	MAC = 0	1	CFU/100 mL	2023-12-29	

Sample Qualifiers:

HT3 Microbiological analysis was initiated beyond the maximum holding time of 30 hours. Results may not be valid.

APPENDIX 1: SUPPORTING INFORMATION

REPORTED TO Kaslo, Village of
PROJECT Drinking Water

REPORTED 2024-03-13 07:22

Analysis Description	Method Ref.	Technique	Accredited	Location
Coliforms, Total in Water	SM 9222* (2015)	Membrane Filtration / Chromocult Agar	✓	Kelowna
E. coli in Water	SM 9222* (2015)	Membrane Filtration / Chromocult Agar	✓	Kelowna

Note: An asterisk in the Method Reference indicates that the CARO method has been modified from the reference method

Glossary of Terms:

RL	Reporting Limit (default)
<	Less than the specified Reporting Limit (RL) - the actual RL may be higher than the default RL due to various factors
CFU/100 mL	Colony Forming Units per 100 millilitres
MAC	Maximum Acceptable Concentration (health based)
SM	Standard Methods for the Examination of Water and Wastewater, American Public Health Association

General Comments:

The results in this report apply to the received samples analyzed in accordance with the Chain of Custody document. This analytical report must be reproduced in its entirety. CARO is not responsible for any loss or damage resulting directly or indirectly from error or omission in the conduct of testing. Liability is limited to the cost of analysis. Caro will dispose of all samples within 30 days of sample receipt, unless otherwise agreed. The quality control (QC) data is available upon request

Results in **Bold** indicate values that are above CARO's method reporting limits. Any results that are above regulatory limits are highlighted **red**. Please note that results will only be highlighted red if the regulatory limits are included on the CARO report. Any Bold and/or highlighted results do not take into account method uncertainty. If you would like method uncertainty or regulatory limits to be included on your report, please contact your Account Manager:TeamCaro@caro.ca

Please note any regulatory guidelines applied to this report are added as a convenience to the client, at their request, to help provide some initial context to analytical results obtained. Although CARO makes every effort to ensure accuracy of the associated regulatory guideline(s) applied, the guidelines applied cannot be assumed to be correct due to a variety of factors and as such CARO Analytical Services assumes no liability or responsibility for the use of those guidelines to make any decisions. The original source of the regulation should be verified and a review of the guideline(s) should be validated as correct in order to make any decisions arising from the comparison of the analytical data obtained to the relevant regulatory guideline for one's particular circumstances. Further, CARO Analytical Services assumes no liability or responsibility for any loss attributed from the use of these guidelines in any way.

Appendix 3:
Water Conservation Measures Policy

THE VILLAGE OF KASLO
Resolution 212/2017

POLICY TITLE: Water Conservation Measures

POLICY STATEMENT:

The Village seeks to align Water Conservation measures with those of the Regional District of Central Kootenay given that unincorporated utility customers and municipal residents should receive clear, consistent information at times of shortage or drought. In a period of serious concerns with respect to climate change adaptation, the public is encouraged to take water conservation measures seriously and comply voluntarily.

1. Stage 1 Water Conservation Measures go into effect every year regardless of seasonal weather patterns. These measures are in effect from June 1st to September 30th. The Village may, upon notification, impose further water conservation measures (Stages 2-4) as necessary and will additionally request the Regional District to inform their **municipal customers** accordingly.

2. Public Works may, in response to complaints or observed non-compliance, plant *Water Smart* flags in front of properties to encourage initial compliance through a friendly warning that additionally alerts the passing public to the situation. This will not be done in unincorporated customer areas.

3. Conservation enforcement with respect to unincorporated customers shall be done through the Regional District of Central Kootenay with their cooperation and agreement with respect to actions.

4. As per municipal bylaws and powers under the *Community Charter,* Public Works may shut off the water connection to properties in serious cases of non-compliance after serving one written warning to the tenant/ owner/ occupant.

5. Water Conservation stage changes will be communicated by physical posting and social media/ website.

6. Activities and stages are described in the table appended to this policy. If Regional District of Central Kootenay conservation measures change, this policy shall automatically be updated by staff to reflect that change and shall be provided to Council for information and review.

7. **Council or the CAO will review requests to vary or relax the restrictions in specific situations.** Any approval will be issued in writing.

8. Serious noncompliance at specific properties within the Village may be partly mitigated by the CAO recommending to Council that a water meter be installed at the owner's expense and the property billed at the appropriate metered rate going forward.

Activity	Mandatory Restrictions			
	Stage 1	Stage 2	Stage 3	Stage 4
Watering of lawns	**ONLY** between the hours 7 pm - 10 am	**ONLY** between the hours 6 am – 10 am, and 8 pm – 10 pm	Prohibited	Prohibited
Watering of new lawns (seed within 45 days and sod within 21 days of installation)	**ONLY** between the hours 7 pm - 10 am	**ONLY** between the hours 6 am – 10 am, and 8 pm – 10 pm	**ONLY** between the hours 6 am – 10 am, and 8 pm – 10 pm	Prohibited (Except where permitted by the Manager)
Watering of gardens, trees and shrubs (excluding watering of commercial agricultural products)	**ONLY** between the hours 7 pm - 10 am	**ONLY** between the hours 6 am – 10 am, and 8 pm – 10 pm	**ONLY** between the hours 6 am – 10 am, and 8 pm – 10 pm	Prohibited
	Watering using drip irrigation, a watering can, and or hand held hose, which eliminates over-spray is permitted at any time.*			
Watering of Commercial Agricultural Products (production and sales)	Permitted	Permitted	Permitted	Permitted (Voluntary Conservation)
Wash down (sidewalks, walkways, driveways, exterior building surfaces, window, vehicles or other outdoor surface)	Permitted	**ONLY** between the hours 6 am – 10 am, and 8 pm – 10 pm	Prohibited (Except where critical for health and safety, & business operations)	Prohibited (Except where critical for health and safety)
Filling of fountains or other decorative features	Permitted	Prohibited (Except where permitted by the Manager)	Prohibited	Prohibited
Filling of outdoor hot tubs and/or wading pools.	Permitted	Permitted	Prohibited	Prohibited
Filling of swimming pools	**ONLY** between the hours 8 pm - 7 am	Prohibited (Except where permitted by the Manager)	Prohibited	Prohibited
Dwelling water consuming appliances such as washing machines and dishwashers	Permitted	Permitted	Permitted (Voluntary Conservation)	Permitted (Voluntary Conservation)
Large commercial water use such as laundromats, washers, carwashes, etc.	Permitted	Permitted	Permitted (Voluntary Conservation)	Permitted (Voluntary Conservation)

**Drip irrigation delivers water to the root zone of the plants where individual emitters use less than 2 gallons per hours (7.6L/hr) at less than 20psi (140Kpa). This does not include soaker hoses or micro sprayers.*

THIS POLICY WAS CONSIDERED AND ADOPTED BY COUNCIL ON November 14th 2017
RESOLUTION 212/2017

SUPERCEDES: Standard operating guideline on water conservation measures

Appendix 4:
Water Treatment Plant Emergency Response Plan

Village of Kaslo

WATER TREATMENT PLANT

EMERGENCY RESPONSE PLAN

2024.03.01

WATER ADVISORY PROTOCOL

The following steps are to be taken to notify the appropriate agencies.

1.	Notify Chief Administrative Officer	250-353-2311
2.	Notify Mayor	
3.	Notify Interior Health: Pouria Mojtahedi	250-365-4311
	Pouria.Mojtahedi@interiorhealth.ca	
	IHA After Hours - Medical health officer	1-866-457-5648

INFORMATION REQUIRED

1. Identify yourself: Village of Kaslo; Water Treatment Plant
2. Relay circumstances or event causing water advisory
3. Relay action being undertaken to correct problem

ACTION REQUIRED BY OFFICE STAFF

1. Notify High Risk Facilities
2. Contact Media to Communicate Water Advisory to Public
3. Post Water Advisory Sign for Travelers in Parks, Motels, And Gas Stations

ACTION REQUIRED BY PUBLIC WORKS

1. Arrange Alternate Sources of Water If Applicable
2. Expedite Remediation of Problem Causing Advisory
3. Update CAO

PHONE LISTS

PRIMARY CONTACT

GEOFF SCOTT - Treatment plant operator	Work Cell	[redacted]
	Cell	
JASON TURNER - Utility Operator	Cell	
POURIA MOJTAHEDI - Interior Health Authority	Cell	
	Office	250-551-1911
INTERIOR HEALTH AUTHORITY - Cranbrook		250-365-4311
		250-421-3471
ROBRT BAKER - Chief Administrative Officer		250-353-2311
SUSAN HEWAT - Mayor	Cell	[redacted]
INTERIOR HEALTH AUTHORITY:		
- After Hours Manager on Call		1-855-851-4194
- Medical Health Officer		1-866-457-5648

SECONDARY CONTACTS

YRB		250-353-2453
YRB AFTER HOURS		1-888-352-0356
	Cell	250-505-2804
BRENTON INDUSTRIES	Cell	250-551-4058
EMERGENCY MANAGEMENT B.C.		1-800-663-3456
D.F.O.		1-800- 663-2224
HOSPITAL - EMERGENCY		911
FIRE DEPARTMENT EMERGENC		911
POLICE - KASLO DETACHMENT		911
FORTIS BC - EMERGENCY		1-866-436-7847
BELL MEDIA		250-352-5510
THE BRIDGE		250-365-0694
MOUNTIAN FM		news@mountianfm.net
KOOTENAY CO-OP RADIO		250-352-9600
ASTRAL MEDIA		250-868-4720
		Jgarry@astral.com
CBC RADIO		1-866-306-4636

HIGH RISKS

JV HUMPHRIES SCHOOL	250-353-2227
VICTORIAN HOSPITAL	250-353-2211
	250-353-2291
PERIWINKLE/KLISS PRESCHOOL	250-353-2222
	250-505 6091
ABBEY MANOR	250-353-7745

FOOD STORES

KASLO FRONT STREET MARKET		250-353-2331
ERICS MEAT MARKET		250-353-2436
CORNUCOPIA		250-353-2594
SUNNYSIDE		250-353-9667
KASLO SOURDOUGH		250-353-7656

RESTAURANTS

KASLO HOTEL & BREW PUB		250-353-7714
TREEHOUSE		250-353-2955
BUDDY'S PIZZERIA		250-353-2282
TERESA'S COFFEE SHOP		250-353-2115
BLUEBELL BISTRO		250-353-7361
ANGRY HEN		250-353-7446
THE PARLOUR		250-353-1217
CHEZ SERGE		250-777-4016
GOLF COURSE CLUB HOUSE		250-353-2262

ACCOMODATIONS

KASLO CAMPGROUND		250-353-2662
KASLO HOTEL		250-353-7714
KASLO MOTEL		250-353-2431
TRUE BLUE LODGE		250-353-7599
TRUE BLUE LODGE		250-215-4438
SUNNY BLUFFS		250-353-7728
KANES LANDING		250-353-8582
AIR BnB		

HIGH DEMAND INDUSTRIES

KASLO FIRE DEPT	Office	250-353-2314
	Cell	250-505-8175
KASLO GOLF COURSE		250-353-2262
		250-353-2355
JV HUMPHRIES SCHOOL		250-353-2227
KASLO AUTOMOTIVE		250-353-2645

TYPES OF EMERGENCIES

A: CONTAMINATION OF SOURCE

ACTION: Switch to alternate raw water source.
Primary raw water source contamination would require the isolation of the contaminated system and activation of the secondary source.
If contaminant could be in distribution system activate appropriate advisory (i.e. “do not use” or “boil water” or “water quality advisory”).

CONTACTS: Notify personnel listed in primary contacts as required.
Notify secondary contacts if applicable.

B: LOSS OF SOURCE

ACTION: Switch to alternate water source.
Notify appropriate government agencies.

CONTACTS: Notify personnel listed in primary contacts as required.
notify secondary contacts if applicable.

C: LOSS OF BOTH PRIMARY AND SECONDARY SOURCES

ACTION: Repair as quickly as possible.
Fire-pump from lake into pumper trucks.
Bottled water delivery for drinking water within 24 hours.

CONTACTS: Notify primary contacts.
Notify secondary contacts if applicable.

D: FLOODING

ACTION: Use alternate water source if possible
Advisory protocol 1-5 ntu = Water Quality Advisory
+5 ntu = Boil Water Advisory

CONTACTS: Notify primary contact list.
Notify secondary list if required.

E: BROKEN WATER MAIN

ACTION: Notify users of interruption to service and advise users to restrict usage until service restored.
Notify high risk facilities of water quality advisory until system is tested.
Shut down main for repair.

CONTACTS: Notify primary contacts listed.
Notify the fire department.
Notify high risk facilities.

F: <u>CHLORINATOR FAILURE</u>

ACTION: Prioritize chlorinator repairs.

CONTACTS: Notify primary contact list.
Notify all users of boil water advisory.
Notify chlorinator manufacturer.

G: <u>PUMP FAILURE</u>

ACTION: Switch to gravity system if available.
Prioritize repairs.

CONTACTS: Notify primary contact list.
Notify pump manufacturer.

H: <u>POWER FAILURE</u>

ACTION: Switch raw water source to gravity System.
Notify users if there is an interruption to service or quality.

CONTACTS: Notify Village Foreman & treatment plant operator.
Notify CAO.
Notify fortis BC.

I: <u>FIRE</u>

ACTION: Call 911.
Identify self.
Give location of fire.

CONTACTS: 911 FIRE.
Notify primary contact list.

J: <u>EARTHQUAKE</u>

ACTIONS: Evaluate damage to infrastructure.
Arrange alternate source.
Increase disinfection.

CONTACTS: Notify primary contact list.
Notify the fire department.
Notify the media.
Notify appropriate ministry in secondary contact list.