THE VILLAGE OF

NAKUSP

WATER OPERATIONS REPORT 2024

Nakusp Water System
Facility #0211995

1.0 Introduction:

Under the terms of the Village of Nakusp Operating Permit for the Nakusp Water System, Facility #0211995, as per Section 8 of the *Drinking Water Protection Act*, the Village is required to provide an annual report to the public and users of the water system. This report is to provide a summary of the water system operation, maintenance, upgrades, and testing procedures and is submitted to Interior Health.

Please note that Sections 2, 3, 4 and 10 are taken directly from the Village of Nakusp Emergency Response Plan, as prepared by Austin Engineering, 2016.

Inquiries relating to the water system should be directed to the Public Works Department:

Cavan Gates, Director of Operations
91 1st Street Nakusp, BC, V0G 1R0
Phone: 250-265-35689
Email: operations@nakusp.com

2.0 CUSTOMER DEMOGRAPHICS:

2024 annual invoiced customers are as follows[1]:

Rate Code	Rate Description	Customer Count	Strata Units
01 W01	Water Single Family Dwelling	754	772
01 W02	Water Duplex, Triplex or Apartment - first unit	32	32
01 W03	Water Retail and Other Business	62	81
01 W04	Water Hotel/motel - owner/manager residence	2	2
01 W05	Water Cafe, Restaurant, Drive-in	7	7
01 W08	Water Large Grocer	1	1
01 W09	Church or Church Hall	8	8
01 W10	WATER HALL OR AMUSEMENT PLACE	3	3
01 W11	Water Licenced Lounge	4	4
01 W12	Water Car Wash - per wash unit	2	3
01 W13	Water bottling plant - $0.13464/cubic meter based on 2013 usage	3	3
01 W14	Water Hospital, Intermediate Care Facility - per bed	2	41
01 W17	WATER SPORTS COMPLEX	1	1
01 W18	WATER CONCRETE PLANT	1	1
01 W19	WATER CEMETERY	1	3
01 W20	WATER MOBILE HOME - each pad	4	54
01 W21	WATER Drive In Restaurant (no indoor seating)	2	2
01 W24	WATER LAUNDROMAT PER WASHER	1	4
01 W25	WATER BEACH PARK WASHROOMS	1	2
01 W26	WATER BEACH PARK SPRINKLING	1	5
01 W30	Water Campground - per site	3	79
01 W40	WATER FARM WITH LIVESTOCK	6	6
01 W41	Water Garage, Service Station or Body Shop	13	13
01 W52	Water - Apartment - each additional unit	28	98
01 W84	Water Hotel/motel - per room	7	118
01 W99	WATER Vacant lot with service available	20	20
01 WES	WATER NAKUSP ELEMENTARY SCHOOL	1	1
01 WSS	WATER NAKUSP SECONDARY SCHOOL	1	1
		971	**1,365**

A number of these connections are located outside of the Village of Nakusp's municipal boundary.

3.0 WATER COLLECTION, TREATMENT & DISTRIBUTION SYSTEM:

The Village of Nakusp's water system is supplied by both surface and groundwater sources. Typical system operation can be described as operating in two zones:

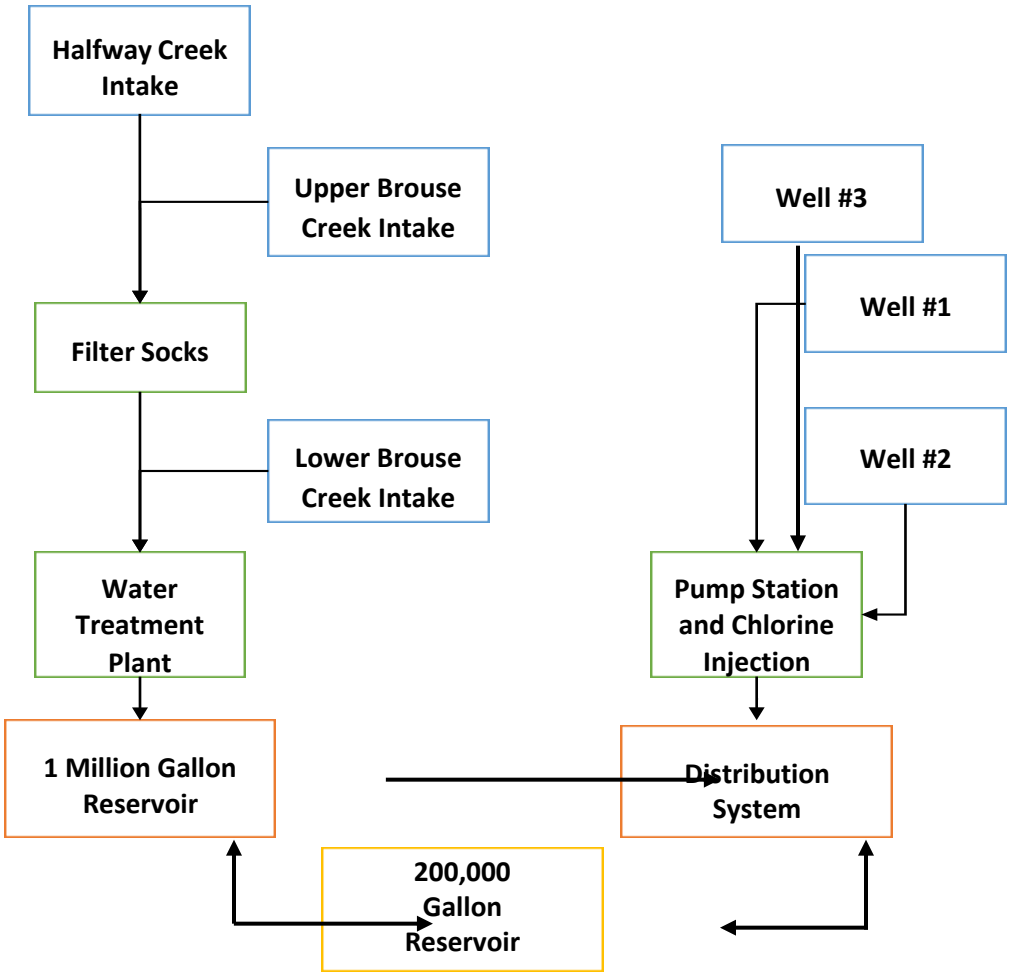


Figure 1: Nakusp Water System Schematic

Upper Distribution Zone

Raw water is supplied by surface water intakes on Halfway Creek, Upper Brouse Creek and Lower Brouse Creek. The surface water then undergoes membrane ultrafiltration, ultraviolet (UV) light, and chlorine injection treatment at the water treatment plant. The water treatment plant directly supplies the 1,000,000 gallons (3,785,000 L) upper reservoir which subsequently services the upper and lower distribution system

Lower Distribution Zone

Raw water is supplied by three groundwater wells located in the same aquifer. Groundwater undergoes chlorine injection prior to suppling the 200,000 gallons (757,000 L) lower reservoir which subsequently services the lower distribution zone.

Together these systems contain one treatment plant, three groundwater wells, three surface water intakes, 26.7 km of water main, two reservoirs, two pressure reducing stations and one booster pump

station.

The upper reservoir is capable of supplying water to the lower reservoir (gravity) and the lower reservoir to the upper reservoir (by means of the booster station) therefore each source can indirectly supply water to any location within the system providing system redundancy under emergency circumstances.

Village of Nakusp Water Treatment Plant (WTP)

The Village of Nakusp Water Treatment Plant (WTP) is supplied with raw water from the surface water intakes located at Brouse Creek and Halfway Creek. Raw water is gravity fed through a coarse filter sock chamber and a micro hydro facility before reaching the WTP. At the plant water is treated using membrane ultrafiltration, ultraviolet (UV) light, and chlorine disinfection. The maximum capacity of the WTP is 25 L/s. A general process for the water treatment plant can be found below in Figure 2: General WTP Process.

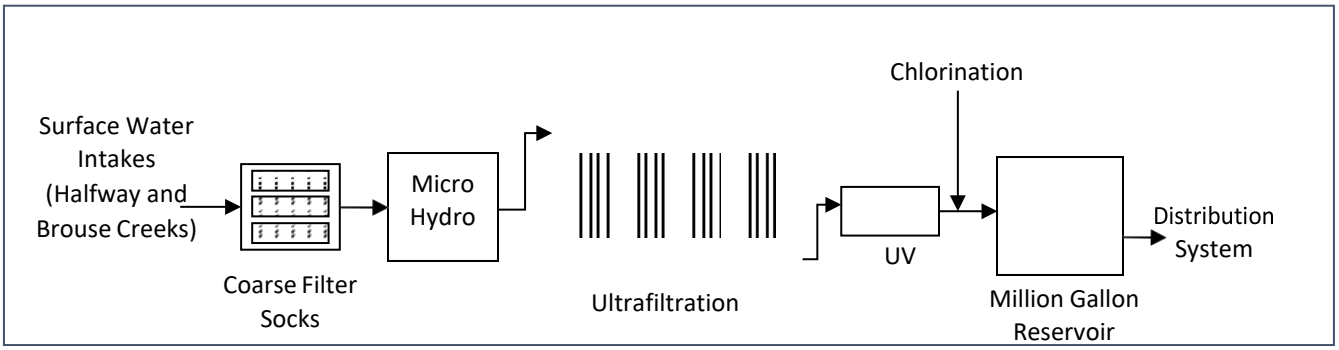


Figure 2: General WTP Process

Groundwater Wells

The Village of Nakusp water system contains three groundwater wells. The wells are located in close proximity to each other, north of the arena in the Nakusp Recreation Park within a "confined to semi-confined aquifer comprised of coarse- grained alluvial fan sediments overlain by silt and clay" with a static water level of approximately 18 m below ground surface (Golder Associates, 2014).

Groundwater sourced from the wells undergoes chlorine injection prior to being routed indirectly into the 200,000 Gallon Reservoir and the rest of the distribution system. Connection between the WTP and the groundwater wells is available however the water typically mixes within the distribution network.

Due to the proximity of the groundwater wells, a groundwater contamination event is likely to impact all wells. The wells can therefore only be considered as redundant to each other for supply related emergency situations. Neither well should be utilized if the other has a contaminant related emergency as both are likely to be impacted. A summary of well characteristics is outlined below in Table 2.

Table 2: Well Summary (Golder Associates, 2014 and the Village of Nakusp)

	Well #1 (Golder Associates, 2014)	Well #2 (Golder Associates, 2014 & Village of Nakusp)	Well #3
BC Ministry of Environment Well Tag Number	88581	104165	123070
Installation Year	2004	2009	2021
Total Depth	84.0 m	83.2 m	83.7 m
Capacity[2] (Limited Based on Current Pump)	42.6 L/s (675 US gpm)	80.1 L/s[3] (1,270 US gpm)	37.9 L/s (600 US gpm)
Current Pump	50 hp	75 hp	75 hp
Typical Pump Flowrate at Maximum Power	23 L/s (364 US gpm)	28 L/s (444 US gpm)	28 L/s (444 US gpm)

[1] **Capacity is limiteddue to the current pump installed in the wells**

[3] **Limited to a maximum of 63 L/s (1,000 US gpm) as an environmental assessment has not been completed under the *BC Environmental Assessment Act*.**

4.0 OPERATIONS & MAINTENANCE:

Operations and maintenance procedures are important safeguards for several potential emergency risks and can help to reduce the impact of unavoidable emergency situations. Notable operations and maintenance procedures that the Village of Nakusp employs, related to potential emergencies and their response, are outlined in Table 3 below.

O&M Procedure	Emergency Effects	Potential for Improvement
Locked buildings, fenced reservoir	Protection from tampering	Increased security measures (cameras/security company/better signage/lock gates providing vehicle access to intake locations.
SCADA system connected to all water system entities	Response time is reduced due to on-going/constant surveillance and effective notification system	
Recorded routine O&M checks performed and recorded	Likelihood of unexpected failure reduced	
Documented cross connection control program in place	Reduce likelihood of contamination	
Multiple water supply sources available for whole system (Groundwater wells and WTP)	Redundancy for potential loss/reduction of available water supply	Investigate options to increase supply from the surface water Halfway and Brouse Creeks intakes.
Distribution system flushing program (annually in spring and fall)	Reduce potential of stagnation/ contamination	

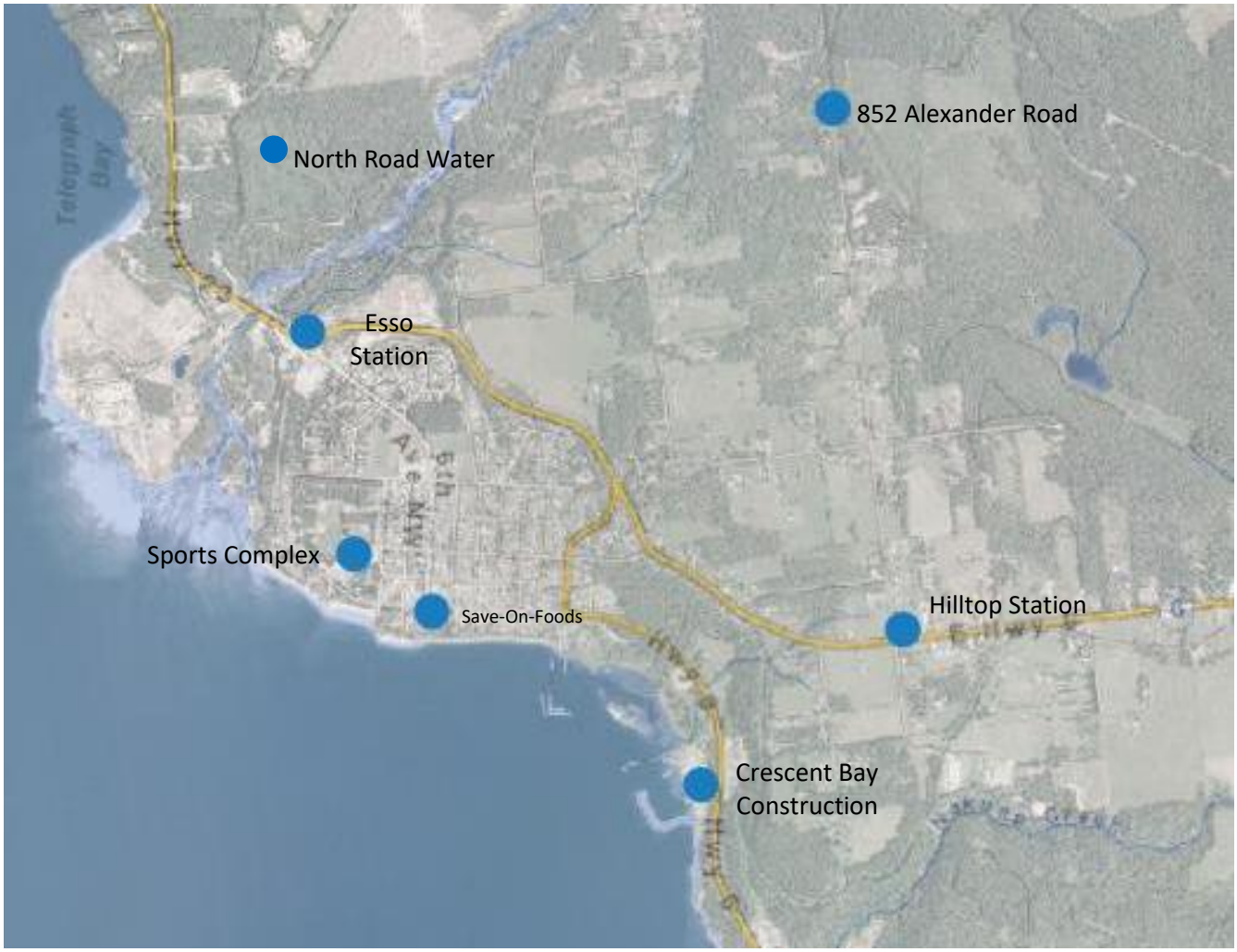
Table 3: Operations and Maintenance Procedures

5.0 WATER QUALITY SAMPLING:

Water quality sampling frequency and procedures are important to the realization of a potential emergency event. The *BC Drinking Water Protection Regulation* – *Schedule B* outlines the required frequency of monitoring samples. The Village of Nakusp's Water System falls into the category for populations of less than 5,000 which requires four (4) samples per month. The Village of Nakusp currently meets this sampling requirement by taking samples from seven (7) distinct locations within the system. Approximate sampling locations are outlined in Figure 3.

Samples for external analysis are taken by qualified Water Operators and sent monthly to qualified laboratories (CARO Analytical Services, or BC Centre for Disease Control Laboratory Services). All lab results are documented and kept on file. A summary of water system monitoring is outlined in Table 4

Figure 3: Sampling Locations



Contamination Events

In the event of suspected or realized contamination in the water system, further water quality sampling is a critical step in resolving the situation. Due to the time required for sampling, laboratory analysis, and results, it should occur as quickly as possible (notification of Interior Health and possible public notification are the priority).

Potential water contaminants that would need to be sampled for in an emergency event can be categorized as:

- Microbial Pathogens
- Chemical and Physical
- Radiological

In the event of a water quality emergency, both the relevance of a test and the turn-around time for result delivery required for decision making, should be considered on a case-by-case basis as required. Once results are available, a comparison should be made to the relevant *BC Water Quality Guideline*. Water sampling Standard Operating Procedures (SOPs) should be followed under all situations.

Table 4: Sampling Overview

Frequency	Test
Weekly	Microbial (E.Coli and Total Coliform)
Monthly	Turbidity monitoring data UV and UV sensor data Chlorine monitoring data
Quarterly	Trihalomethane Haloacetic acids
Semi-Annually	Baseline analysis for potential contaminants of groundwater, including: metals, nitrates; nitrites and phosphorus; and/or microbiological parameters (coliforms, E. coli)
Annually	Full comprehensive raw water analysis for each source

6.0 2024 WATER QUALITY ANALYSIS RESULTS

SITE	DATE	Residual Cl2 ppm	TC Count/100 ML	EC Count /100 ML
Crescent Bay				
	January 3, 2024	0.56	<1	<1
	February 6, 2024	0.07	<1	<1
	March 26, 2024	0.36	<1	<1
	May 14, 2024	0.22	<1	<1
	July 3, 2024	0.6	<1	<1
	August 20, 2024	0.25	<1	<1
	October 8, 2024	0.5	<1	<1
	November 26, 2024	0.1	<1	<1
Save-On-Foods				
	January 11, 2024	0.52	<1	<1
	February 13, 2024	1.11	<1	<1
	April 3, 2024	0.36	<1	<1
	May 22, 2024	0.72	<1	<1
	July 9, 2024	0.36	<1	<1
	August 27, 2024	0.42	<1	<1
	October 16, 2024	0.31	<1	<1
	December 3, 2024	0.38	<1	<1
North Road (NRW)				
	January 16, 2024	0.41	<1	<1
	February 21, 2024	0.25	<1	<1
	March 5, 2024	0.17	<1	<1
	April 23, 2024		<1	<1
	June 11, 2024	0.23	<1	<1
	July 30, 2024	0.26	<1	<1
	September 17,	0.22	<1	<1
	November 5, 2024	0.33	<1	<1
852 Alexander				
	January 25, 2024	0.49	<1	<1
	February 28, 2024	0.76	<1	<1
	March 12, 2024	0.47	<1	<1
	April 30, 2024	0.51	<1	<1
	June 18, 2024	0.73	<1	<1
	August 7, 2024	0.49	<1	<1
	September 24,	0.65	<1	<1
	November 13, 2024	0.281	<1	<1
Arena				
	January 30, 2024	0.33	<1	<1
	March 19, 2024	0.58	<1	<1
	May 8, 2024		<1	<1
	June 25, 2024	0.22	<1	<1
	August 13, 2024	0.24	<1	<1
	October 2, 2024	0.34	<1	<1
	November 19, 2024	0.21	<1	<1
Esso				
	April 9, 2024	0.3	<1	<1
	May 28, 2024	0.22	<1	<1
	July 16, 2024	0.24	<1	<1
	September 4, 2024	0.29	<1	<1
Hill Top				
	April 16, 2024	0.48	<1	<1
	June 4, 2024	N/A	<1	<1
	July 23, 2024	0.16	<1	<1
	September 10,	0.81	<1	<1
	October 29, 2024	0.32	<1	<1
	December 17, 2024	0.52	<1	<1

2024 Annual Comprehensive Source Water Analysis (Untreated Water)

Location				Well #1 RAW WATER	Well #2 RAW WATER	Well #3 RAW WATER	Water treatment plant RAW WATER
Date sampled				2024-12-03	2024-12-03	2024-12-03	2024-12-03
Date received				2024-12-04	2024-12-04	2024-12-04	2024-12-04
Analyte	**Units**	**MRL**	**Std (CDWQG)**				
Chloride	mg/L	0.1	AO<=250	14.5	8.91	15.3	0.12
Fluoride	mg/L	0.1	MAC=1.5	0.2	0.23	0.19	0.45
Nitrate (as N)	mg/L	0.01	MAC=10	0.496	0.958	0.516	<0.010
Nitrite (as N)	mg/L	0.01	MAC=1	<0.010	<0.010	<0.010	<0.010
Sulfate	mg/L	1	AO<=500	6.3	5.1	4.9	12.8
Hardness, Dissolved (as CaCO3)	mg/L	0.5	N/A	173	107	161	52.9
Hardness, Total (as CaCO3)	mg/L	0.5	None Required	169	106	155	51.4
Solids, Total Dissolved (calc)	mg/L	1	AO<=500	180	117	170	60.1
Aluminum, dissolved	mg/L	0.005	N/A	<0.0050	<0.0050	<0.0050	0.0054
Antimony, dissolved	mg/L	0.0002	N/A	<0.00020	<0.00020	<0.00020	<0.00020
Arsenic, dissolved	mg/L	0.0005	N/A	<0.00050	<0.00050	<0.00050	<0.00050
Barium, dissolved	mg/L	0.005	N/A	0.448	0.251	0.447	0.0419
Beryllium, dissolved	mg/L	0.0001	N/A	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth, dissolved	mg/L	0.0001	N/A	<0.00010	<0.00010	<0.00010	<0.00010
Boron, dissolved	mg/L	0.05	N/A	<0.0500	<0.0500	<0.0500	<0.0500
Cadmium, dissolved	mg/L	1E-05	N/A	<0.000010	<0.000010	0.000011	<0.000010
Calcium, dissolved	mg/L	0.2	N/A	55.8	34.4	51.7	18.4
Chromium, dissolved	mg/L	0.0005	N/A	0.0021	0.0018	<0.00050	0.00052
Cobalt, dissolved	mg/L	0.0001	N/A	<0.00010	<0.00010	<0.00010	<0.00010
Copper, dissolved	mg/L	0.0004	N/A	0.00124	0.002	<0.00040	0.00526
Iron, dissolved	mg/L	0.01	N/A	<0.010	<0.010	<0.010	<0.010
Lead, dissolved	mg/L	0.0002	N/A	<0.00020	<0.00020	<0.00020	<0.00020
Lithium, dissolved	mg/L	0.0001	N/A	0.00559	0.00509	0.00818	0.002
Magnesium, dissolved	mg/L	0.01	N/A	8.26	5.01	7.78	1.7
Manganese, dissolved	mg/L	0.0002	N/A	<0.00020	0.00217	0.0512	<0.00020
Molybdenum, dissolved	mg/L	0.0001	N/A	0.00016	0.00019	<0.00010	0.00112
Nickel, dissolved	mg/L	0.0004	N/A	<0.00040	0.00054	0.00099	<0.00040
Phosphorus, dissolved	mg/L	0.05	N/A	<0.050	<0.050	<0.050	<0.050
Potassium, dissolved	mg/L	0.1	N/A	1.53	1.43	1.82	0.75
Selenium, dissolved	mg/L	0.0005	N/A	<0.00050	<0.00050	<0.00050	<0.00050
Silicon, dissolved	mg/L	1	N/A	11.6	12.2	13.4	7.3
Silver, dissolved	mg/L	5E-05	N/A	<0.000050	<0.000050	<0.000050	<0.000050
Sodium, dissolved	mg/L	0.1	N/A	5.27	4.64	6.73	1.67

Location				Well #1 RAW WATER	Well #2 RAW WATER	Well #3 RAW WATER	Water treatment plant RAW WATER
Strontium, dissolved	mg/L	0.001	N/A	1.09	0.539	0.891	0.699
Sulfur, dissolved	mg/L	3	N/A	<3.0	<3.0	<3.0	4.5
Tellurium, dissolved	mg/L	0.0005	N/A	<0.00050	<0.00050	<0.00050	<0.00050
Thallium, dissolved	mg/L	2E-05	N/A	<0.000020	<0.000020	<0.000020	<0.000020
Thorium, dissolved	mg/L	0.0001	N/A	<0.00010	<0.00010	<0.00010	<0.00010
Tin, dissolved	mg/L	0.0002	N/A	<0.00020	<0.00020	<0.00020	<0.00020
Titanium, dissolved	mg/L	0.005	N/A	<0.0050	<0.0050	<0.0050	<0.0050
Tungsten, dissolved	mg/L	0.001	N/A	<0.0010	<0.0010	<0.0010	<0.0010
Uranium, dissolved	mg/L	2E-05	N/A	0.00178	0.000483	0.000739	0.000942
Vanadium, dissolved	mg/L	0.005	N/A	<0.0050	<0.0050	<0.0050	<0.0050
Zinc, dissolved	mg/L	0.004	N/A	<0.0040	0.0076	0.0113	0.0079
Zirconium, dissolved	mg/L	0.0001	N/A	<0.00010	<0.00010	<0.00010	<0.00010
Alkalinity, Total (as CaCO3)	mg/L	1	N/A	144	88.1	134	41.7
Alkalinity, Phenolphthalein (as CaCO3)	mg/L	1	N/A	<1.0	<1.0	<1.0	<1.0
Alkalinity, Bicarbonate (as CaCO3)	mg/L	1	N/A	144	88.1	134	41.7
Alkalinity, Carbonate (as CaCO3)	mg/L	1	N/A	<1.0	<1.0	<1.0	<1.0
Alkalinity, Hydroxide (as CaCO3)	mg/L	1	N/A	<1.0	<1.0	<1.0	<1.0
Cyanide, Total	mg/L	0.002	MAC=0.2	<0.0020	<0.0020	<0.0020	0.0031
Turbidity	NTU	0.1	OG<1	<0.10	0.38	8.36	0.15
pH	pH units	0.1	7.0-10.5	7.95	7.7	7.71	7.51
Conductivity (EC)	uS/cm	2	N/A	352	230	336	117
Coliforms, Total	CFU/100 mL	1	MAC = 0	<1	<1	<1	4
E. coli	CFU/100 mL	1	MAC = 0	<1	<1	<1	<1
Aluminum, total	mg/L	0.005	OG<0.1	<0.0050	<0.0050	<0.0050	0.0083
Antimony, total	mg/L	0.0002	MAC=0.006	<0.00020	<0.00020	<0.00020	<0.00020
Arsenic, total	mg/L	0.0005	MAC=0.01	<0.00050	<0.00050	<0.00050	<0.00050
Barium, total	mg/L	0.005	MAC=2	0.452	0.259	0.447	0.0412
Boron, total	mg/L	0.05	MAC=5	<0.0500	<0.0500	<0.0500	<0.0500
Cadmium, total	mg/L	1E-05	MAC=0.007	<0.000010	0.000012	0.000014	<0.000010
Calcium, total	mg/L	0.2	None Required	54.3	34.6	49.9	17.8
Chromium, total	mg/L	0.0005	MAC=0.05	0.0023	0.00254	0.00076	0.00062
Copper, total	mg/L	0.0004	MAC=2	0.00131	0.0042	<0.00040	0.00171
Iron, total	mg/L	0.01	AO<=0.3	<0.010	0.022	0.949	<0.010
Lead, total	mg/L	0.0002	MAC=0.005	<0.00020	<0.00020	<0.00020	<0.00020

Location				Well #1 RAW WATER	Well #2 RAW WATER	Well #3 RAW WATER	Water treatment plant RAW WATER
Magnesium, total	mg/L	0.01	None Required	7.99	4.83	7.48	1.67
Manganese, total	mg/L	0.0002	MAC=0.12	<0.00020	0.0327	0.0574	0.00072
Potassium, total	mg/L	0.1	N/A	1.57	1.4	1.85	0.75
Selenium, total	mg/L	0.0005	MAC=0.05	<0.00050	<0.00050	<0.00050	<0.00050
Sodium, total	mg/L	0.1	AO<=200	5.15	4.27	6.42	1.57
Strontium, total	mg/L	0.001	MAC=7	1.05	0.51	0.877	0.669
Uranium, total	mg/L	2E-05	MAC=0.02	0.00178	0.00056	0.000755	0.000932
Zinc, total	mg/L	0.004	AO<=5	<0.0040	0.0097	0.0141	0.0051

Trihalomethane (THM) and Haloacetic Acid (HAA) Results

Quarterly water samples are tested for Trihalomethanes: Bromodichloromethane; Bromoform; Chloroform; and Dibromochloromethane. The Draft Guidelines for Canadian Drinking Water Quality propose a maximum acceptable concentration of 0.1 mg/L. Another major group of chlorinated disinfection by-products found in drinking water, besides Trihalomethanes, are Haloacetic Acids. Together they can be used as indicators for the presence of all chlorinated disinfection by-products. The Maximum Allowable Concentration of HAAs is 0.08 mg/L (80 µg/L).

Results are reported in mg/L.

LAB ID		24B0773-01	24C0819-01	24F0648-01	24H0951-01	24I0584-01	24J0440-01	24K0633-01	24L0381-01
Location		Crescent Bay	North Rd	Hilltop	Alexander	Esso	Sports complex	NRW	Save On
DATE SAMPLED		2024-02-06	2024-03-05	2024-06-04	2024-08-07	2024-09-04	2024-10-02	2024-11-05	2024-12-03
Analyte	**MAC**								
Total Trihalomethanes	0.1	0.0858	0.0186	0.0544	0.03	0.00534	<0.00400	0.00431	<0.00400
Bromodichloromethane		<0.0010	0.0032	<0.0010	<0.0010	0.0016	<0.0010	0.0014	<0.0010
Bromoform		<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Chloroform		0.0858	0.0137	0.0544	0.03	0.0024	<0.0010	0.0014	<0.0010
Dibromochloromethane		<0.0010	0.0017	<0.0010	<0.0010	0.0013	<0.0010	0.0014	<0.0010
Total Haloacetic Acids (HAA5)	0.08			0.0481		<0.00200	<0.00200		<0.00200
Monochloroacetic Acid				<0.0020		<0.0020	<0.0020		<0.0020
Monobromoacetic Acid				<0.0020		<0.0020	<0.0020		<0.0020
Dichloroacetic Acid				0.0242		<0.0020	<0.0020		<0.0020
Trichloroacetic Acid				0.0239		<0.0020	<0.0020		<0.0020
Dibromoacetic Acid				<0.0020		<0.0020	<0.0020		<0.0020

7.0 OPERATOR CERTIFICATION:

Utilities and Utility Operators are certified through the Environmental Operators Certification Program (EOCP). The water treatment plant is classified as a Water Treatment Level II and Water Distribution Level II Facility, which requires Level II Operators to run it.

In 2024, our staff was certified to the following levels:

Employee	Water Treatment	Water Distribution
Terry Flamond	WT - 2	WD - 2
Taylor Cooke	MU - 2	MU - 1
Cory Jackson	WT - 1	MU - 1

8.0 CHALLENGES & DIFFICULTIES:

Perhaps the biggest challenge is addressing aging water infrastructure and securing funding for improvement initiatives. Water utility projects are notoriously difficult to fund compared to other infrastructure initiatives. One major reason is that these systems are much less visible compared to roads and bridges, which makes it harder to generate public support for improvement and maintenance. As the old saying goes, out of sight, out of mind.

Another challenge is water consumption. Our water use can increase up to 150% in summer and early fall, largely due to lawn watering.

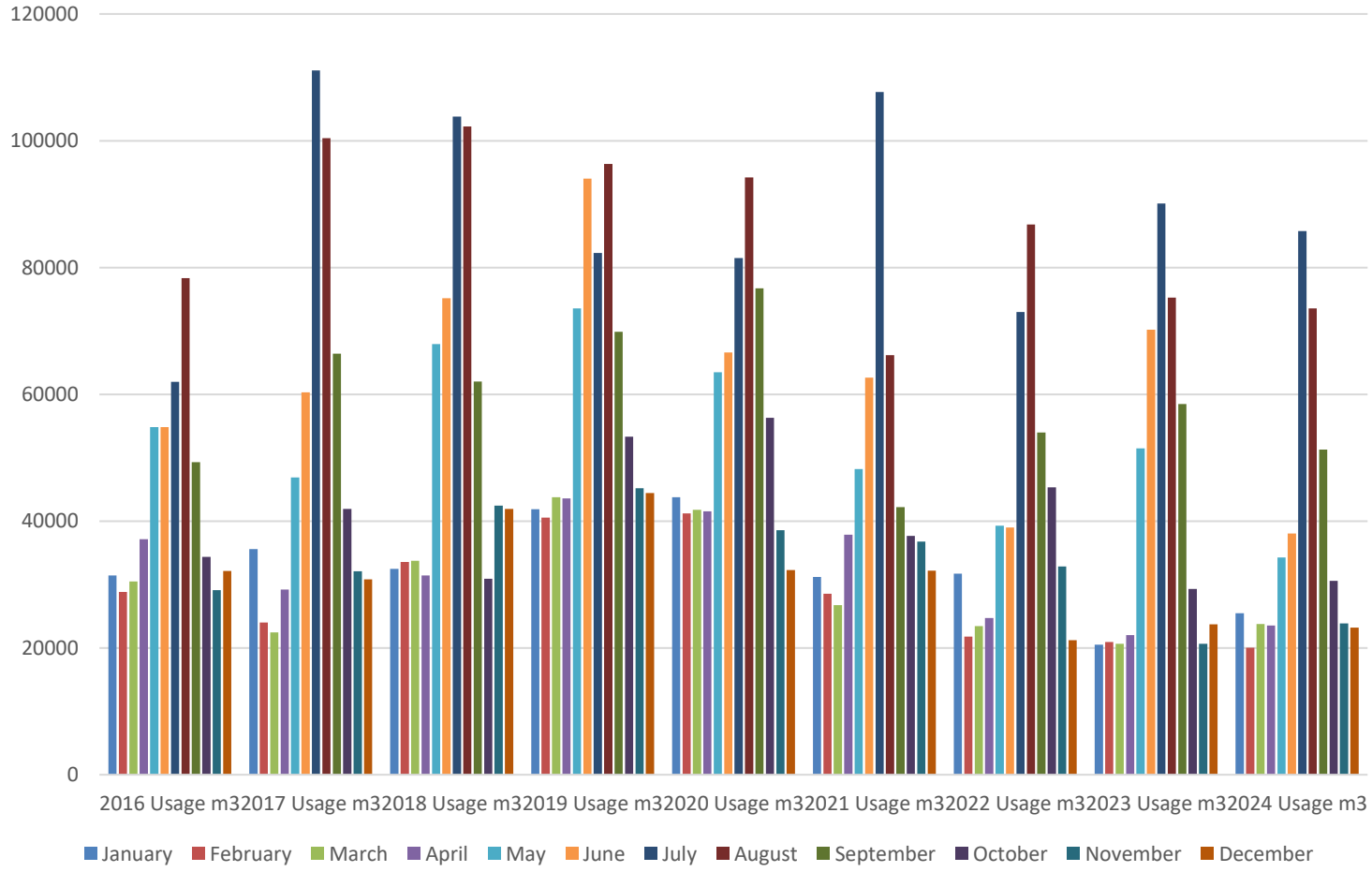
9.0 WATER CONSUMPTION DATA:

Water Supplied:

Surface Water:	177,775 m3
Well #1:	77,735 m3
Well #2:	134,660 m3
Well #3:	63,134 m3
Total:	**453,304 m3**

The average 2024 per capita consumption based on the number of Village strata units (1,288 total) equals 352 m3 per unit. This number includes industrial, commercial and institutional usage. In comparison to the 2023 average per capita consumption of 390 m3 by 1,288 strata units, this accounts for a significant decrease. The total 2024 consumption of 453,304 m3 was down 50,007 m3 from 2023's annual consumption of 503,311 m3. The most likely cause of the decrease was less irrigation in May and June of 2024 than during the heat dome in June 2023.

Figure 4: 2016 - 2024 Historic Monthly Water Usage (m3)



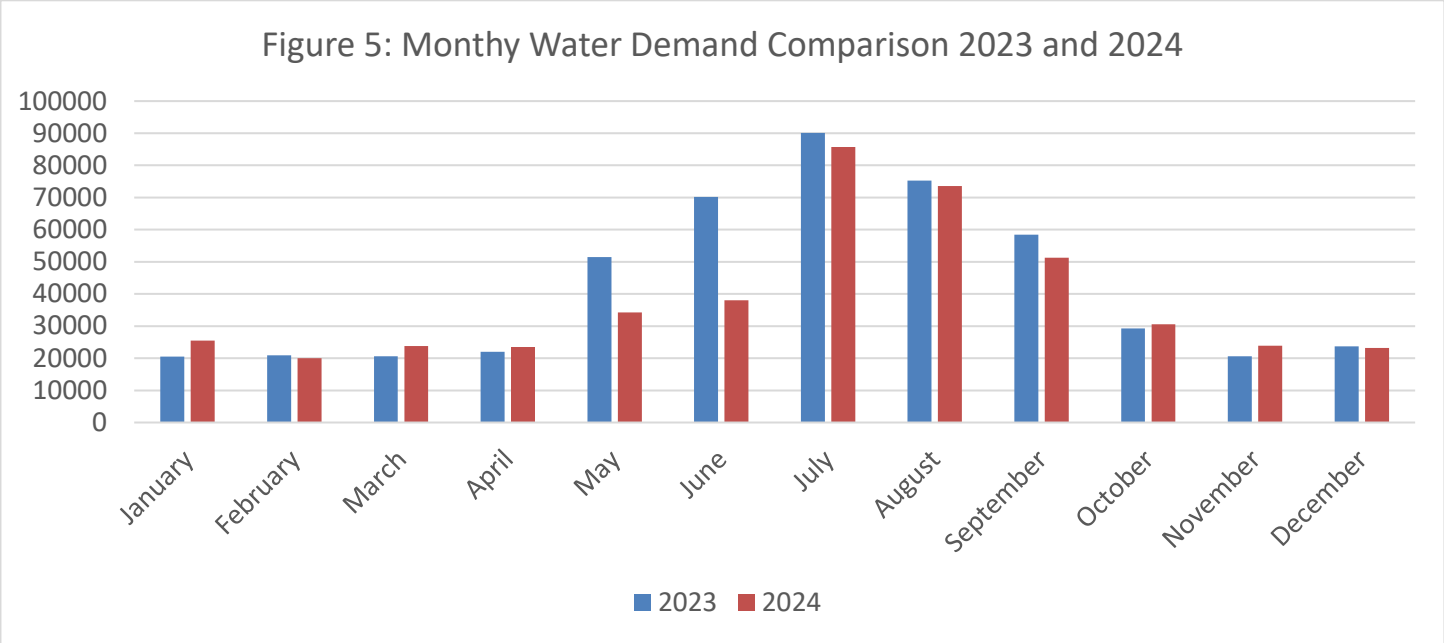


Figure 5: Monthy Water Demand Comparison 2023 and 2024
100000
90000
80000
70000
60000
50000
40000
30000
20000
10000
0
January
February
March
April
May
June
July
August
September
October
November
December
2023
2024

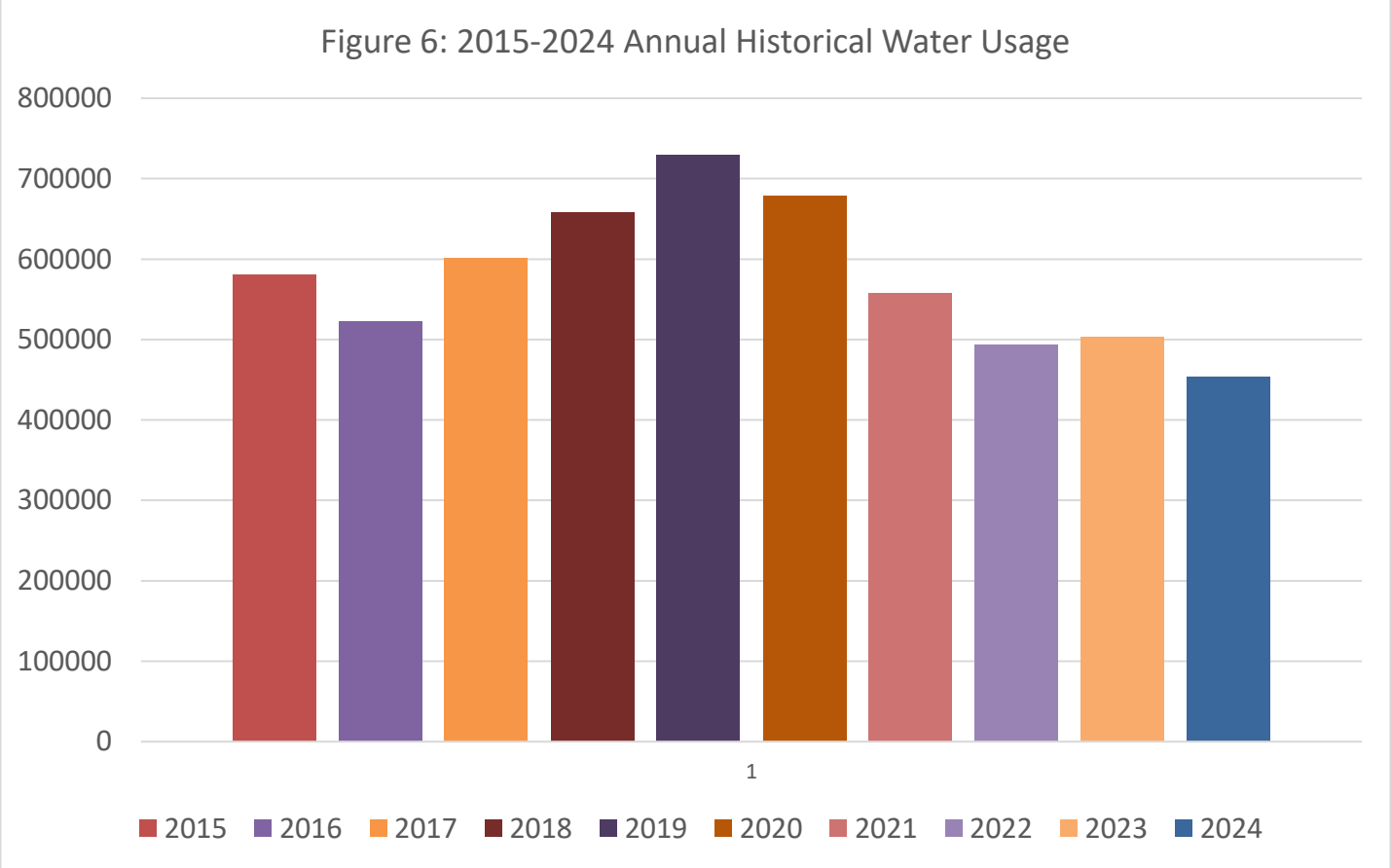


Figure 6: 2015-2024 Annual Historical Water Usage
800000
700000
600000
500000
400000
300000
200000
100000
0
1
2015
2016
2017
2018
2019
2020
2021
2022
2023
2024

Figure 7: 2024 Monthly Water Use Data

2024 GRAVITY SYSTEM									
MONTH	DAYS RUNNING	MAX. DAY WATER USED	DAY OF MONTH MAX.	MIN. DAY WATER USED	DAY OF MONTH MIN.	READING @ START OF MONTH	READING @ END OF MONTH	READING FOR MONTH M3	DAILY AVG
January	31	1,108	18	117	25	153,505	176,897	23,392	755
February	29	826	10	194	29	176,897	190,066	13,169	454
March	31	322	16	192	3	190,066	198,053	7,987	258
April	30	338	21	182	2	198,053	206,012	7,959	265
May	31	486	12	152	31	206,012	216,126	10,114	326
June	31	1,573	11	392	1	216,126	248,715	32,589	1051
July	30	1,464	6	372	24	248,715	276,622	27,907	930
August	31	1,042	1	244	14	276,622	294,457	17,835	575
September	30	566	3	318	29	294,457	307,744	13,287	443
October	31	699	3	125	28	307,744	316,341	8,597	277
November	30	289	23	177	18	316,341	323,575	7,234	241
December	31	307	7	190	9	323,575	331,280	7,705	249

2024 WELL #1 SYSTEM									
MONTH	DAYS RUNNING	MAX. DAY WATER USED	DAY OF MONTH MAX.	MIN. DAY WATER USED	DAY OF MONTH MIN.	READING @ START OF MONTH	READING @ START OF NEXT MONTH	READING FOR MONTH M3	DAILY AVG
January	0	0	0	0	0	1,766,597	1,766,597	0	0
February	0	0	0	0	0	1,766,597	1,766,597	0	0
March	0	0	0	0	0	1,766,597	1,766,599	2	0
April	0	0	0	0	0	1,766,599	1,766,599	0	0
May	0	0	0	0	0	1,766,599	1,766,599	0	0
June	5	9	26	2	5	1,766,599	1,766,623	24	5
July	23	1862	16	11	9	1,766,623	1,785,068	18,445	23
August	26	772	15	101	4	1,785,068	1,792,876	7,808	26
September	26	1334	18	184	3	1,792,876	1,817,462	24,586	26
October	27	485	1	13	29	1,817,462	1,826,329	8,867	27
November	5	601	30	14	20	1,826,329	1,828,838	2,509	5
December	31	634	22	352	15	1,828,838	1,844,332	15,494	31

2024 WELL #2 SYSTEM									
MONTH	DAYS RUNNING	MAX. DAY WATER USED	DAY OF MONTH MAX.	MIN. DAY WATER USED	DAY OF MONTH MIN.	READING @ START OF MONTH	READING @ START OF NEXT MONTH	READING FOR MONTH M3	DAILY AVG.
January	1	2,097	26	0	0	2,890,627	2,892,724	2,097	1
February								0	
March	7	7	13	1	19	2,892,724	2,892,751	27	7
April	8	94	6	1	16	2,892,751	2,892,891	140	8
May	8	68	10	2	14	2,892,891	2,892,995	104	8
June	15	765	26	2	5	2,892,995	2,897,453	4,458	15
July	31	2365	25	220	1	2,897,453	2,936,790	39,337	31
August	29	3757	3	783	6	2,936,790	2,984,672	47,882	29
September	22	1482	4	62	14	2,984,672	2,998,088	13,416	22
October	27	639	30	275	7	2,998,088	3,011,178	13,090	27
November	26	1322	2	0	27	3,011,178	3,025,280	14,102	26
December	1	7	4	0	1	3,025,280	3025287	7	1

2024 WELL #3 SYSTEM									
MONTH	DAYS RUNNING	MAX. DAY WATER USED	DAY OF MONTH MAX.	MIN. DAY WATER USED	DAY OF MONTH MIN.	READING @ START OF MONTH	READING @ START OF NEXT MONTH	READING FOR MONTH M3	DAILY AVG.
January	0							0	
February	14	938	26	269	29	3,277	10,123	6,846	14
March	31	715	16	270	21	10,123	25,901	15,778	31
April	30	753	13	289	10	25,901	41,344	15,443	30
May	30	1582	10	735	1	41,344	65,374	24,030	30
June	5	21	26	2	5	65,374	66,333	959	5
July	5	44	25	1	3	66,333	66,395	62	5
August	2	6	31	1	10	66,395	66,403	8	2
September	2	1	13	1	26	66,403	66,405	2	2
October	17	1	6	0	4	66,405	66,408	3	17
November	1	1	27	0	29	66,408	66,410	2	1
December	1	1	10	0	1	66,410	66411	1	1

9.0 CROSS CONNECTION CONTROL PROGRAM:

The Village of Nakusp has developed a Cross Connection Control Program, as required by the Drinking Water Protection Act. The purpose of this program is to protect public health, by preventing potential non-potable water sources from cross contaminating the domestic water supply. This is achieved through the installation, maintenance, and inspection of back-flow prevention devices.
Utilities Operator Cory Jackson received Backflow training and certification in 2024.

10.0 EMERGENCY RESPONSE: Notifications

Clear and timely communication to all stakeholders in an emergency situation is critical to the effective management and resolution for any situation. Internal, government and public notifications should be made in a timely manner as each situation necessitates.

In the event of water quality exceedances, the first point of contact is the local public health officer at Interior Health. Any laboratory drinking water sample with positive E. coli or fecal coliform bacteria results, or threat of unsafe drinking water must be reported to Interior Health as per the *BC Drinking Water Protection Act*:

- During regular Interior Health office hours (weekdays, 08:00 to 16:30) the local public health officer should be the first point of contact.
- Should the local public health officer be unavailable during office hours the Nelson Health Unit, Health Protection Office can be contacted as an alternate.
- The Medical Health Officer Emergency Contact Number should only be used for emergency situations that occur outside of regular office hours.

In the event that public notice is required, multiple methods should be utilized to ensure all effected parties are adequately informed. This may include the use of notices, public meetings, radio advertisements, newspaper advertisements, television advertisements or direct individual notice.

Public notices regarding water quality issues have been developed for distribution in the following scenarios:

- **Water Quality Advisory:** Addresses situations where “at risk populations” (such as the elderly, infants, and people with weakened immune systems) may be at risk due to increased turbidity and potentially higher bacterial, virus, and parasite risks.
- **Boil Water Notice:** Addresses situations with high turbidity and potential bacterial, virus and parasite contamination of the water.
- **Do Not Consume Notice:** Addresses situations where water is not safe and should not be consumed due to untreated chemical contaminants, or other extreme cases in which contaminants cannot be inactivated by boiling water.

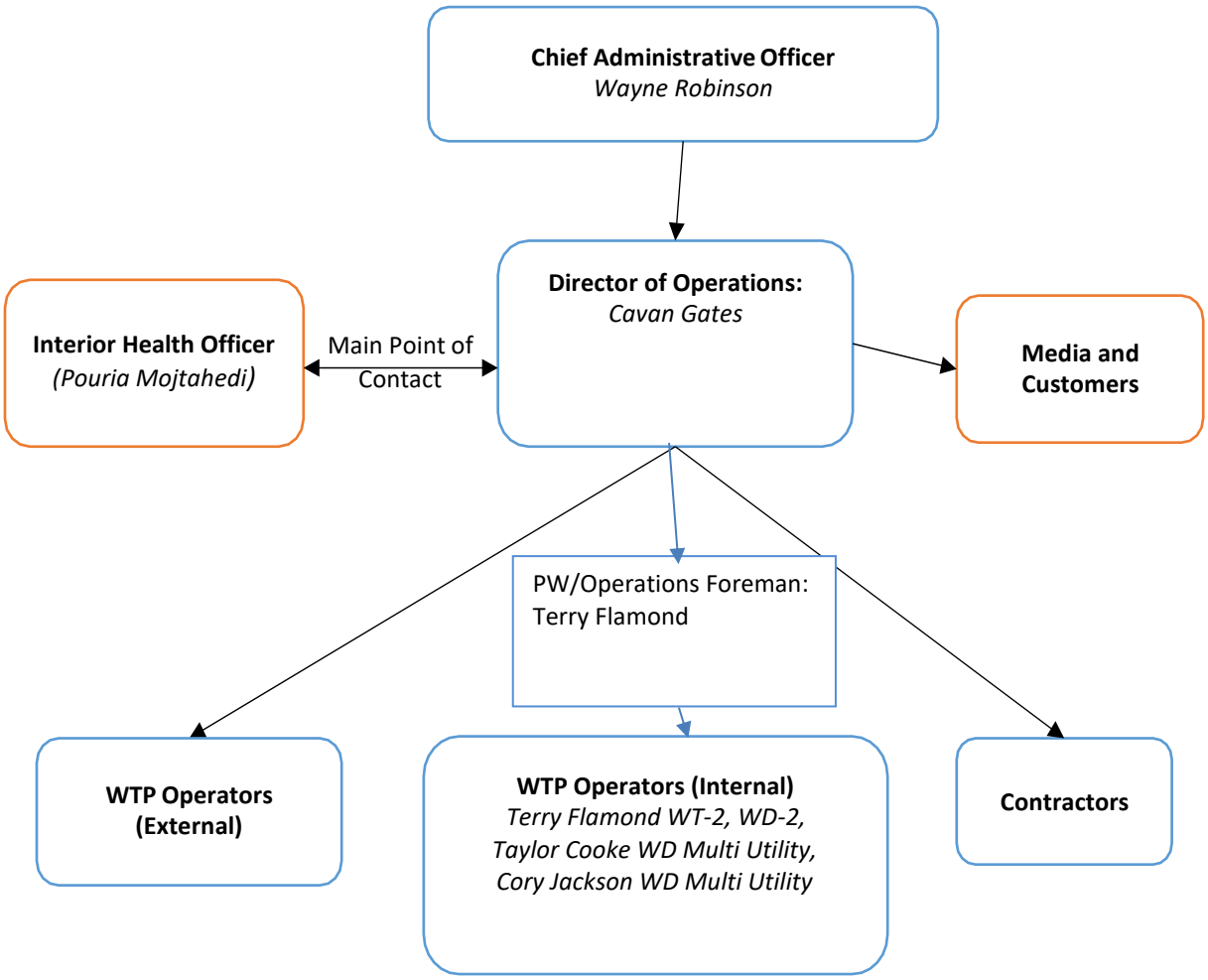
These notices should be tailored to each specific situation to provide the public with accurate and relevant information. Once the issues have been resolved, the public will also need to be informed that it is safe to resume with normal use of water.

In the event that water use restrictions need to be implemented, it should be in accordance with the current *Village of Nakusp Water Rates and Regulations Bylaw.*

It is effective to designate a spokesperson to focus on communicating all relevant information to impacted parties. A summary of the ERP should be distributed and made available to all customers to alleviate questions and concerns in an emergency event.

Internal communication is also important in an emergency event, and a chain of command should be developed to ensure efficiency and that no information is lost.

The following is an example of a chain of command system for implementation.



11.0 PROJECTS & IMPROVEMENTS:

Project Summary & Timeline

Capital Improvements	
Project Title	**Estimated Completion Date**
Well 3 design, build, install and tie-in	Completed late 2023
New reservoir cover	2025

Engineering Studies/Plans &Technical Reports	
Implement leak detection program	2024
Operations & Maintenance	
1 Mil Reservoir Inspection	Completed 2023
200K Reservoir Inspection (camera)	Completed 2023
Ground Water Licence Amendment to include Well 3 capacity	2025