2022

ANNUAL WATER QUALITY MONITORING REPORT

OLALLA WATER SYSTEM

Olalla Well Pump Station

Regional District of Okanagan-Similkameen

February, 2024

2022 ANNUAL WATER QUALITY MONITORING REPORT
OLALLA WATER SYSTEM
OLALLA, B.C.

Copy prepared for:

INTERIOR HEALTH AUTHORITY (IHA)

Interior Health Drink Water Program

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1. Introduction

As the owner and operator of the Olalla water system, the Regional District Okanagan-Similkameen is responsible for the following Annual Report summarizing the results from the 2022 *Water Quality Monitoring Program*. The report is a conditional requirement of the *Permit to Operate* issued by the Interior Health Authority (IHA) and the *BC Drinking Water Protection Act and Regulatio*n.

2. System Description

The Olalla water system is located approximately 40 km to the southwest of Penticton and approximately 8 km north of Keremeos within Electoral Area G. The system consists of a single deep source groundwater well, storage reservoir and distribution system. Water is pumped from the well into the distribution system and to an elevated storage reservoir. There is no treatment of the groundwater supplying the system. . This water supplies domestic water to the community of Olalla, approximately 250 connections and supports fire protection.

3. System Classification and Operator Certifications

3.1. System Classification

The *British Columbia Environmental Operators Certification Program (BC EOCP)* is responsible for the classification of potable water systems in BC. The Olalla system remained classified as a *Small Water System (SWS)* in 2022.

3.2. Operator Certification

The *British Columbia Environmental Operators Certification Program (BC EOCP)* is also responsible for certification of all water system operators. Operators may hold certification(s) in the disciplines of Water Distribution and/or Water Treatment with four levels of certification achievable within each discipline. RDOS Operators annually attend courses, seminars and complete online training required to maintain their levels of certification. In addition, all operators annually continue to work on augmenting and furthering their levels of certification. All RDOS Operators are certified through the BC EOCP as indicated in the Table 1 below.

OPERATOR EOCP CERTIFICATION No.	WATER DISTRIBUTION CERTIFICATION LEVELS				WATER TREATMENT CERTIFICATION LEVELS			
	IV	III	II	I	IV	III	II	I
1162	X						X	
4194			X					
4840			X				X	
4839		X						X
6926		X						X
8761		X						X
9322		X						X

Table 1: RDOS Operator Certifications 2022

4. Annual Water Usage

The annual pumping volumes extracted from the Olalla well from 2005 to 2022 is presented below. In 2022, a total of 150,773 m^3 of water was pumped from the Olalla well down from 187,044 m^3 in 2021.

4.1. Consumption Records

	Cubic Meters (m^3)	US Gallons	
Annual Total Usage	150,773	39,830,012	**Date**
Minimum Daily Flow	81	21,397	February 19, 2022
Maximum Daily Flow	1,910	504,568	August 4, 2022

Table 2: Annual Water Consumption 2022

Both annual and monthly water consumption has been trended as shown in the following two graphs.

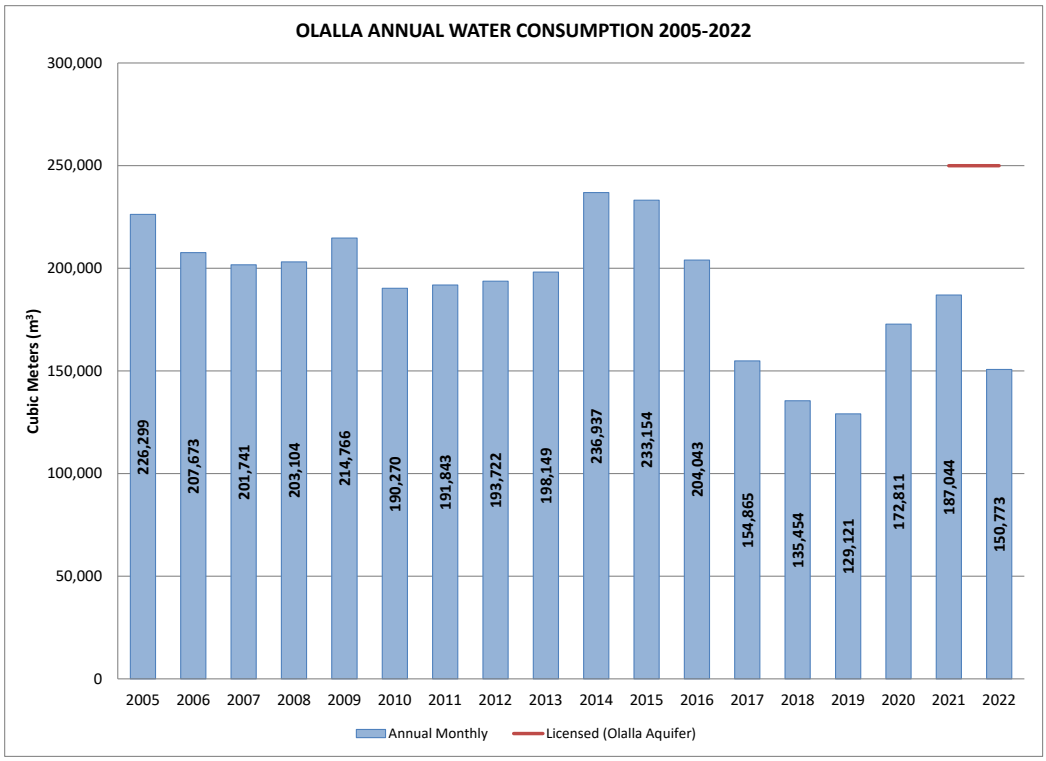

Figure 1: Annual Water Consumption 2005 to 2022

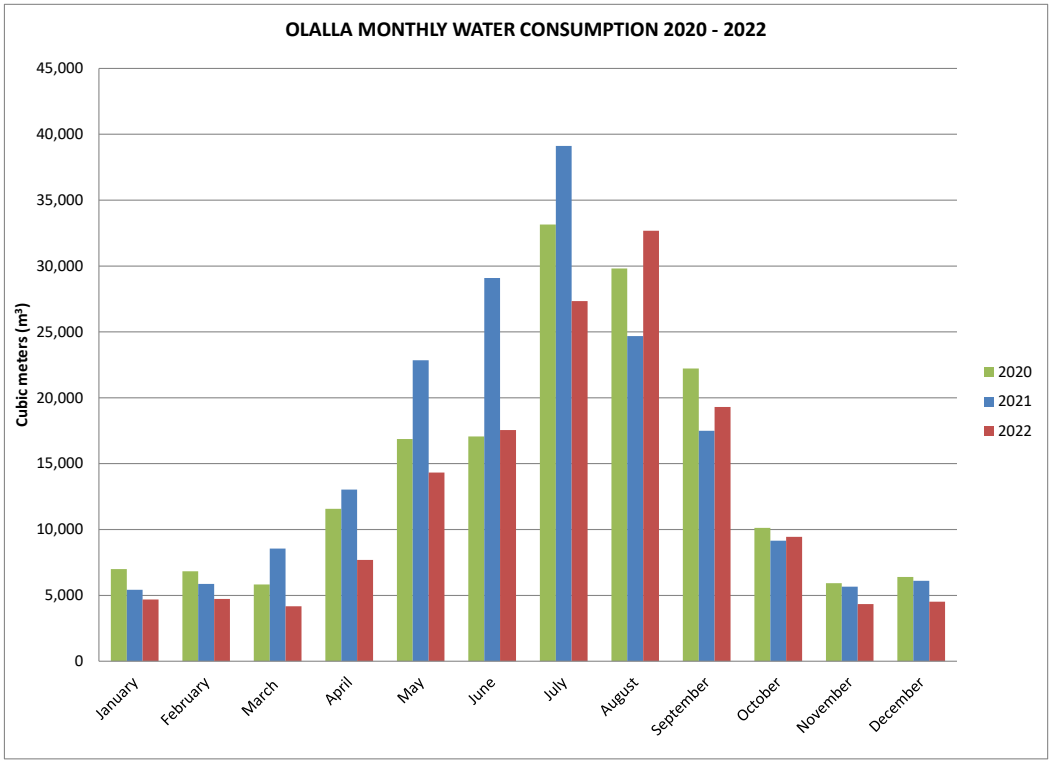

Figure 2: Monthly Water Consumption 2020 to 2022

4.2. Water Conservation

The Olalla system remained under Stage "Normal" for water conservation in 2022. However, there was increase demand on the system in August because of a wildfire north of the Village of Olalla. Water trucks were filling up at hydrants and transporting the water to the wildfire. An evacuation order was issued for the village of Olalla. Sprinkler usage increased while the wildfire was a threat to the community.

5. Aquifer Monitoring

The RDOS monitors the aquifer level using the Olalla well. Below is the well level measurement trend for the Olalla well from 2018 to 2022.

Note: the measurements below are assumed in feet of water above the top of the well pump.

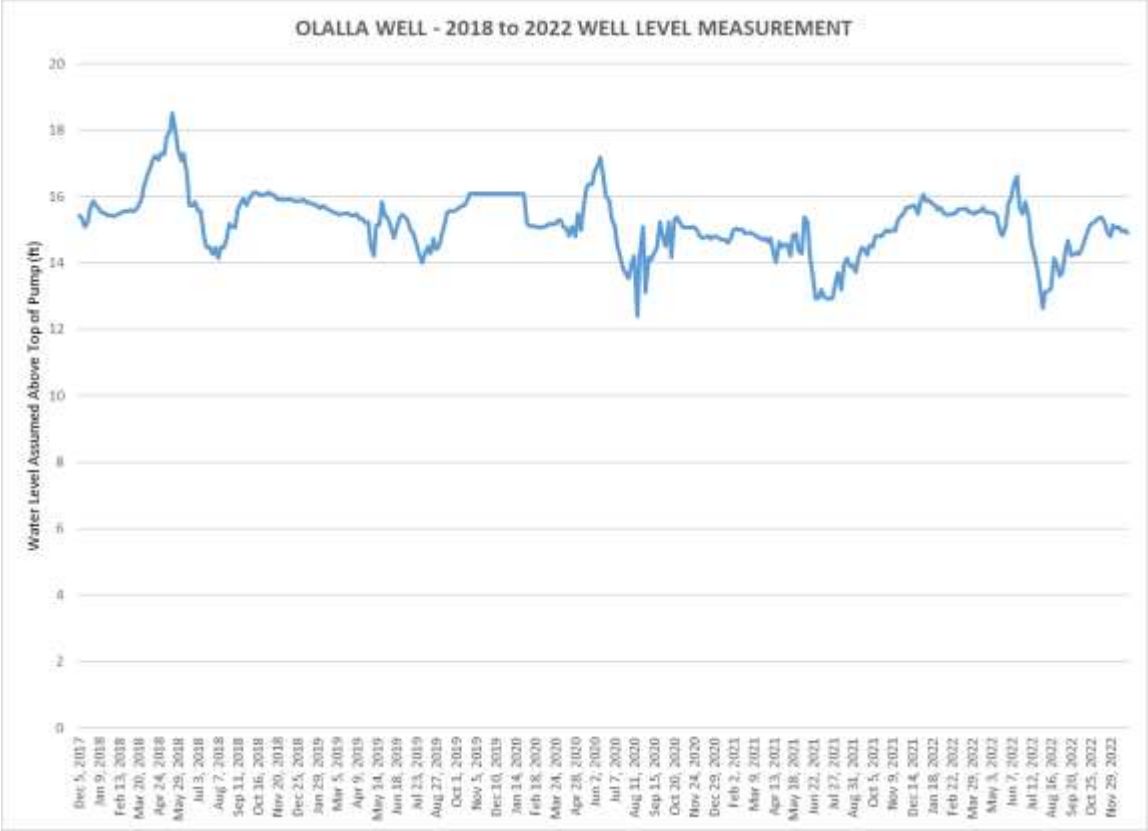

Figure 3: Olalla Aquifer Level

6. Source Water Quality Monitoring

All untreated source water quality parameters are compared to the *British Columbia Drinking Water Protection Act and Regulation* (*DWPA*) and the *Guidelines for Canadian Drinking Water Quality* (*GCDWQ*) unless otherwise noted, which could be indicated as an Operational Guideline (OG). The *DWPA* and *GCDWQ* define these parameters and set Aesthetic Objectives (AO) and Maximum Acceptable Concentrations (MAC).

All accredited laboratory tests in 2022 were performed by Caro Analytical Services (Kelowna, B.C.)

6.1. Source Water Bi-Weekly Monitoring

Bi-weekly monitoring of the Olalla well includes bacteriological grab samples and field measured parameters using field kits. Samples from the well were analyzed for Total Coliforms and *Escherichia coli* (*E.coli*). The table below summaries the bacteriological laboratory results and the field measured parameters from the Olalla groundwater well.

Analyte	Unit	Average	Minimum	Maximum	Number of Results	Number of Results with Exceedances
Field Results						
Conductivity	µS/cm	469	420	594	21	0
pH		7.64	7.04	7.9	21	0
Total dissolved solids	mg/L	333	297	422	21	0
Temperature	°C	9.9	8	11.6	21	0
Turbidity	NTU	0.16	0.06	0.77	25	0
Lab Results: Microbiological						
Background bacteria	CFU/100 mL	<1	<1	3	23	0
E. coli (counts)	CFU/100 mL	<1	<1	<1	26	0
Total coliforms (counts)	CFU/100 mL	<1	<1	<1	26	0

Table 3: Olalla Well Bi-Weekly Testing 2022 Summary

6.2. Source Water Potable Water Testing

Annually, the RDOS submits a sample of the untreated well water to an accredited lab for comprehensive potable water testing. The results of these test are compared against the *Guidelines for Canadian Drinking Water Quality*. The *GCDWQ* establishes Maximum Allowable Concentration (MAC), Interim Maximum Acceptable Concentrations (IMAC) and Aesthetic Objectives (AO) for parameters if applicable.

This comprehensive test includes physical parameters (e.g. color, turbidity, temperature, ultraviolet transmittance), chemical parameters (e.g. hardness, total metals and nutrients). Changes in these parameters may result in the need for water notifications for customers (i.e. Boil Water Notice or Water Quality Advisory) or the requirement for treatment processes to be implemented. The following tables display the results for the respective comprehensive potable water tests.

All tested source water parameters met the applicable guidelines in 2022 with no notable increasing or decreasing trends.

6.2.1. Source Water General Potability Parameters 2022

Analyte	Unit	Guideline		Sampling Location: Well	Well	Well
				Date Sampled: 15-Sep-20	13-Sep-21	26-Sep-22
		GCDWQ MAC	GCDWQ AO			
Lab Results						
General						
Alkalinity (total, as CaCO3)	mg/L	NG	NG	133	168	188
Total organic carbon	mg/L	NG	NG	1.37	0.59	1.21
Chloride	mg/L	NG	250	9.29	9.30	10.3
Colour	CU	NG	15	<5.0	<5.0	<5.0
Conductivity	µS/cm	NG	NG	411	416	399
Total cyanide	mg/L	0.2 [1.1]	NG	<0.0020	<0.0020	<0.0020
Fluoride	mg/L	1.5	NG	0.15	<0.10	<0.10
Hardness (as CaCO3), from total Ca/Mg	mg/L	NG	NG	202	193	187
Langelier Index		NG	NG	0.5	0.7	0.5
pH		NG	7.0 - 10.5 [2.1]	8.06	8.12	8.01
Total dissolved solids (computed)	mg/L	NG	500	236	250	262
Sulphate	mg/L	NG	500 [2.2]	57.8	56.1	57.1
Sulphide (total, as S)	mg/L	NG	0.047 [2.3]	<0.020	<0.020	<0.020
Turbidity	NTU	N [1.2]	NG	<0.10	<0.10	<0.10
UV transmittance at 254 nm - filtered	%	NG	NG	98.3	98.7	98.9
Nutrients						
Ammonia (total, as N)	mg/L	NG	NG	0.199	<0.050	0.053
Nitrate (as N)	mg/L	10	NG	0.376	0.247	0.359
Nitrite (as N)	mg/L	1	NG	<0.010	<0.010	<0.010
Potassium (total)	mg/L	NG	NG	2.52	2.35	2.24

See Guideline Notes in Section 6.2.2

Table 4: Olalla Well General Potability Parameters 2020 to 2022

6.2.2. Guideline Notes for General Potability Parameters

1. **Notes for Guidelines for Canadian Drinking Water Quality - Maximum Acceptable Concentrations (GCDWQ MAC)**

Note 1.1 for Total cyanide:
The MAC for free cyanide is 0.2 mg/L. A maximum of 0.2 mg/L was used, in this report, to identify exceedances for total cyanide as means for determining the potential for exceeding the free cyanide guideline.

Note 1.2 for Turbidity:
"Waterworks systems that use a surface water source or a groundwater source under the direct influence of surface water should filter the source water to meet health-based turbidity limits, as defined for specific treatment **technologies**. Where possible, filtration systems should be designed and operated to reduce turbidity levels as low as possible, with a treated water turbidity target of less than 0.1 NTU at all times. Where this is not achievable, the treated water turbidity levels from individual filters should meet the requirements described in **GCDWQ**.
For systems that use groundwater that is not under the direct influence of surface water, which are considered less vulnerable to faecal contamination, turbidity should generally be below 1.0 NTU.
For effective operation of the distribution system, it is good practice to ensure that water entering the distribution system has turbidity levels below 1.0 NTU."

2. **Notes for Guidelines for Canadian Drinking Water Quality - Aesthetic Objectives (GCDWQ AO)**

Note 2.1 for pH:
The operational guideline for pH is a range of 7.0 to 10.5 in finished drinking water.
Note 2.2 for Sulphate:
There may be a laxative effect in some individuals when sulphate levels exceed 500 mg/L. Health authorities should be notified of drinking water sources containing above 500 mg/L.

Note 2.3 for Sulphide (total, as S):
The aesthetic objective for sulphide (as H2S) is 0.05 mg/L. This is equivalent to 0.047 mg/L sulphide (as S).

6.2.3. Source Water Total Metals 2022

			Sampling Location	Well	Well	Well
			Date Sampled	15-Sep-20	13-Sep-21	26-Sep-22
Analyte	**Unit**	**Guideline**				
		GCDWQ MAC	GCDWQ AO			
Lab Results						
Total Metals						
Aluminum (total)	mg/L	2.9 [1.1]	0.100 [2.1]	<0.0050	0.0093	<0.0050
Antimony (total)	mg/L	0.006	NG	<0.00020	<0.00020	<0.00020
Arsenic (total)	mg/L	0.010 [1.2]	NG	0.00110	0.00099	0.00093
Barium (total)	mg/L	2.0 [1.3]	NG	0.0742	0.0732	0.0706
Boron (total)	mg/L	5	NG	<0.0500	<0.0500	<0.0500
Cadmium (total)	mg/L	0.007 [1.4]	NG	<0.000010	<0.000010	<0.000010
Calcium (total)	mg/L	NG	NG	58.5	56.9	55.8
Chromium (total)	mg/L	0.05	NG	0.00082	0.00051	0.00091
Cobalt (total)	mg/L	NG	NG	<0.00010	<0.00010	<0.00010
Copper (total)	mg/L	2 [1.5]	1	0.00110	0.00240	0.00194
Iron (total)	mg/L	NG	0.3	0.024	<0.010	<0.010
Lead (total)	mg/L	0.005 [1.6]	NG	<0.00020	<0.00020	<0.00020
Magnesium (total)	mg/L	NG	NG	13.5	12.3	11.6
Manganese (total)	mg/L	0.12 [1.7]	0.02 [2.2]	<0.00020	<0.00020	<0.00020
Mercury (total)	mg/L	0.001	NG	<0.000010	<0.000010	<0.000010
Molybdenum (total)	mg/L	NG	NG	0.00549	0.00461	0.00415
Nickel (total)	mg/L	NG	NG	0.00050	<0.00040	<0.00040
Selenium (total)	mg/L	0.05	NG	0.00119	0.00112	0.00109
Sodium (total)	mg/L	NG	200	11.3	10.1	9.08
Strontium (total)	mg/L	7.0 [1.8]	NG	0.313	0.289	0.284
Uranium (total)	mg/L	0.02	NG	0.000969	0.000877	0.000704
Zinc (total)	mg/L	NG	5.0	<0.0040	0.0060	<0.0040

See Guideline Notes in Section 6.2.4

Table 5: Olalla Well Total Metals Potability 2020 to 2022

6.2.4. Guideline Notes for Total Metals Potability

1. **Notes for Guidelines for Canadian Drinking Water Quality - Maximum Acceptable Concentrations (GCDWQ MAC)**

   Note 1.1 for Aluminum (total): The maximum acceptable concentration (MAC) for total aluminum in drinking water is 2.9 mg/L (2 900 µg/L) based on a locational running annual average of a minimum of quarterly samples taken in the distribution system. (Update March 5, 2021)

   Note 1.2 for Arsenic (total): Every effort should be made to maintain arsenic levels in drinking water as low as reasonably achievable.

   Note 1.3 for Barium (total): Update January 24, 2020. The MAC was revised from 1.0 mg/L to 2.0 mg/L.

   Note 1.4 for Cadmium (total): A maximum acceptable concentration (MAC) of 0.007 mg/L (7 µg/L) is established for total cadmium in drinking water, based on a sample of water taken at the tap. (Update July 14, 2020)

   Note 1.5 for Copper (total): A maximum acceptable concentration (MAC) of 2 mg/L is established for total copper in drinking water, based on a sample of water taken at the tap. Guidelines for Canadian Drinking Water Quality - Guideline Technical Document on Copper, June 2019.

   Note 1.6 for Lead (total): The maximum acceptable concentration (MAC) for total lead in drinking water is 0.005 mg/L (5 µg/L), based on a sample of water taken at the tap and using the appropriate protocol for the type of building being sampled. Every effort should be made to maintain lead levels in drinking water as low as reasonably achievable (or ALARA). (GCDWQ: Guideline Technical Document; March, 2019)

   Note 1.7 for Manganese (total): Guidelines for Canadian Drinking Water Quality - Guideline Technical Document on manganese, May 2019.

   Note 1.8 for Strontium (total): Guidelines for Canadian Drinking Water Quality - Guideline Technical Document on strontium, May 2019.

2. **Notes for Guidelines for Canadian Drinking Water Quality - Aesthetic Objectives (GCDWQ AO)**

Note 2.1 for Aluminum (total): The operational guidance (OG) value for total aluminum in drinking water is 0.100 mg/L (100 µg/L) to optimize water treatment and distribution system operations. This value is based on a locational running annual average. The sampling frequency required to calculate the locational running annual average will vary based on the type of treatment facility and the sampling location. (Update March 5, 2021)

Note 2.2 for Manganese (total): Guidelines for Canadian Drinking Water Quality - Guideline Technical Document on manganese, May 2019.

7. Distribution System Water Quality

All treated distribution system water quality parameters are compared to the *British Columbia Drinking Water Protection Act and Regulation (DWPA*) and the *Guidelines for Canadian Drinking Water Quality* (*GCDWQ*) unless otherwise noted, which could be indicated as an operational guideline (OG). The *DWPA* and G*CDWQ* define these parameters and set Aesthetic Objectives (AO) and Maximum Allowable Concentrations (MAC).

All accredited laboratory tests in 2022 were performed by Caro Analytical Services (Kelowna, B.C.)

7.1. Distribution System Bacteriological Results

The Olalla distribution system has two dedicated sample stations that are alternated between bi-weekly. Samples from the distribution system were analyzed for Total Coliforms and *Escherichia coli* (*E.coli*). Schedule A of the BC *Drinking Water Protection Regulation* provides bacteriological testing criteria as given below.

Schedule A

Water Quality Standards for Potable Water
(sections 2 and 9)

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

In 2022, two distribution samples reported results for background bacteria and one distributions sample reported results for Total Coliforms. In the background bacteria positive samples, 2 and 1 CFU/100mL were reported. Similarly, in the Total Coliform positive samples, only 1 CFU/100mL was reported. All distribution samples had no detections for *E.coli*.

The following is a summary of the bacteriological laboratory results from the distribution system.

Analyte	Sampling Location	Unit	Average	Min	Max	Number of Results	Number of Results with Exceedances
Lab Results: Microbiological							
Background bacteria	12th St	CFU/100 mL	<1	<1	2	12	0
	N. Main St	CFU/100 mL	<1	<1	1	14	0
E. coli (counts)	12th St	CFU/100 mL	<1	<1	<1	12	0
	N. Main St	CFU/100 mL	<1	<1	<1	16	0
Total coliforms (counts)	12th St	CFU/100 mL	<1	<1	<1	12	0
	N. Main St	CFU/100 mL	<1	<1	1	16	1

Table 6: Distribution Water Bacteriological Testing 2022 Summary

7.2. Distribution Water Quality Field Parameters

The following is a summary of the field parameters that are measured routinely in the distribution system.

Analyte	Sampling Location	Unit	Average	Min	Max	Number of Results	Number of Results with Exceedances
Field Results							
Conductivity	12th St	µS/cm	475	425	731	10	0
	N. Main St	µS/cm	434	410	447	10	0
pH	12th St		7.7	7.45	7.88	10	0
	N. Main St		7.75	7.61	7.84	10	0
Total dissolved solids	12th St	mg/L	334	302	520	10	0
	N. Main St	mg/L	309	292	317	10	0
Temperature	12th St	°C	10.8	4.4	15.9	10	0
	N. Main St	°C	10.8	6	14.2	10	0
Turbidity	12th St	NTU	0.20	0.06	0.66	12	0
	N. Main St	NTU	0.21	0.08	0.52	12	0

Table 7: Distribution Field Measured Parameters 2022 Summary

7.3. Water Quality Complaints

None to report for 2022.

8. Water System Notifications

The Interior Health Authority's team of drinking water officers are responsible for providing the oversight to ensure compliance and drinking water safety. The IHA is responsible for issuing *Permits to Operate* to drinking water systems. The Interior Health Authority has four (4) types of water notifications to inform users of negative impacts to water quality.

8.1. Water Quality Advisory (WQA)

There is some level of risk associated with consuming the drinking water but a Boil Water Notice is not needed. The risk is elevated for people with weakened immune systems, the elderly and infants and young children.

No WQAs issued in 2022.

8.2. Boil Water Notice (BWN)

There are organisms in the water that can make you sick. To safely consume (swallow) the water, you must bring it to a rolling boil for at least 60 seconds, or use a safe alternate source of water.

No BWNs issued in 2022.

8.3. Do Not Consume (DNC)

There are harmful chemicals or other bad things in the water that can make you sick. You cannot make the water safe by boiling. The water can make you sick if you consume (swallow) it. You cannot used the water for drinking, brushing teeth, washing/preparing/cooking food or pet's drinking water. You can bath, shower and water plants and gardens with the water.

No DNCs issued in 2022.

8.4. Do Not Use (DNU)

There are known microbial, chemical or radiological contaminants in the water and that any contact with the water with the skin, lungs or eyes can be dangerous. Do not turn on your tap for any reason and do not use your water. You CANNOT make the water safe by boiling it.

No DNUs issued in 2022.

9. Program Updates and Status

9.1. Cross Connection Control Program

The RDOS continued work in 2022 towards implementing an official Cross Connection Control program and bylaw. On January 21, 2021 the RDOS adopted Bylaw No 2851, 2020 Cross Connection Control. Bylaw 2851 is a Regional bylaw that will be applicable to all RDOS owned water systems.

9.2. Capital Works / System Additions

No items of note in 2022.

9.3. Emergency Response Plan

The *Emergency Response Plan* is scheduled to be updated in 2024.

9.4. Future System Upgrades

No items of note for 2022.

9.5. Supervisory Control and Data Acquisition (SCADA System) Upgrades

No items of note for 2022.

9.6. System Maintenance/Upgrades

No items of note for 2022.

9.7. Water Quality Monitoring Program

The *Water Quality Monitoring Program* is scheduled to be updated in 2024.

10. Summary

All tested source water parameters from the Olalla groundwater well met the applicable criteria in 2022. All tested distribution water parameters met the applicable criteria in 2022 with the exception of one routine bacteriological test that resulted in Total Coliforms being reported. The operation of the Olalla water system by a team of RDOS *EOCP* certified Operators resulted in the supply of the highest quality water possible to the community of Olalla. The RDOS continues to work on reviewing and upgrading the various programs that support facilitating the highest quality of water possible.