



# City of Courtenay 2020 Annual Drinking Water Quality Report



CITY OF  
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# Table of Contents

1. Introduction .....	4
2. General Description .....	4
3. Island Health .....	4
4. Source Water .....	5
4.1 Source Water Quality .....	5
4.2 Source Water Testing .....	5
4.3 Transmission System .....	5
5. Distribution Sampling .....	5
5.1 Sample Requirements .....	5
5.2 Sample Stations .....	5
5.3 Distribution Sampling Overview .....	5
6. Standards & Regulatory Distribution Testing .....	6
6.1 Distribution Testing Parameters .....	6
6.1.1 Physical Parameters .....	7
6.2 Free Chlorine Residual .....	7
6.2.1 Results .....	7
6.3 Turbidity .....	7
6.3.1 Results .....	7
6.4 Total Coliforms & Escherichia coli .....	7
6.4.1 Total coliform bacteria .....	7
6.4.2 Escherichia coli .....	8
6.4.3 Results .....	8
6.5 Trihalomethanes & Haloacetic Acids .....	8
6.5.1 Trihalomethanes .....	8
6.5.2 Haloacetic Acids .....	8
6.5.3 Results .....	8
6.6 Total Metals .....	8
6.6.1 Total Metals .....	8
6.6.2 Results .....	8
7. Unidirectional Flushing Program .....	9

8. Cross Connection Control Program.....9

9. System Improvements .....11

10. Operator Qualifications .....11

11. Emergency Response Plan.....11

# 1. Introduction

In 2003, the Provincial Government passed legislation that brought into effect the *British Columbia Drinking Water Protection Act* (the Act) and the *Drinking Water Protection Regulation* (the Regulation). The Act and Regulation detail municipal responsibilities as a water supplier.

The Act covers all water systems other than single-family dwellings and systems excluded through the regulation. It outlines requirements for water suppliers in terms of ensuring that the water supplied to their users is potable — and meets any additional requirements established by the Regulation or by the water supply system's operating permit, as set by the local drinking water officer. The Regulation sets out requirements for drinking water quality including treatment, construction and operation of water systems, monitoring, reporting, and public notification for water quality advisories.

The City of Courtenay (the City) supplies potable water to approximately 25,000 residents and ICIA customers within City boundaries. The City has a bulk water agreement in place to purchase water from the Comox Valley Regional District (CVRD).

## 2. General Description

The City operates and maintains an Class III Water Distribution System. This classification is determined through BC's Environmental Operation Certificate Program (EOCP) and is reviewed every 5 years. Following the review in 2020, the City's distribution system was changed from a Class IV to a Class III. System risk has been reduced through the introduction of new preventative maintenance programs, implementation of SCADA monitoring, and initiation of the robust asset management program.

The City's water system consists of:

- 173 km of water mains;
- 786 hydrants;
- 5 pressure reducing valve stations;
- 1724 mainline valves; and
- 1 booster station containing 5 pumps.

This system is designed to adequately supply water to its end users and in the event of an emergency provides the required flow for fire protection.



## 3. Island Health

Island Health administers the Act and the Regulation. The Drinking Water Officer is responsible for issuing operating permits and monitoring compliance of drinking water systems. In BC the surface water treatment objectives for microbiological parameters are:

- 4 log (99.99%) removal or inactivation of viruses;
- 3 log (99.9%) removal or inactivation of *Giardia Lamblia* and *Cryptosporidium*;
- 2 treatment processes in place;
- 1 NTU or less turbidity in finished water; and
- 0 detected *E.coli*, total and fecal coliforms.

The City of Courtenay is required to meet these objectives under their operating permit.

## 4. Source Water

The water provided by the CVRD is sourced from Comox Lake and collected from the Puntledge River at the BC Hydro penstock. Water travels from the penstock via two transmission pipelines to the CVRD's chlorination station where it is metered, sampled and chlorinated.

### 4.1 Source Water Quality

The CVRD is constructing a new deep water intake in Comox Lake and a treatment plant that includes filtration to meet the Surface Water Objectives by 2021, as required by Island Health. The commissioning of the treatment plant is expected in Fall 2021.

### 4.2 Source Water Testing

Quality of the source water is monitored and tested by the Comox Valley Regional District. The CVRD water quality reports can be found on their website at <https://www.comoxvalleyrd.ca/waterquality>.

### 4.3 Transmission System

Water supply is distributed to two reservoirs in Courtenay via large transmission mains all owned and operated by the CVRD. The Courtenay East reservoir is located off Ryan Road, the Courtenay West reservoir is located on Lake Trail Road. These reservoirs connect with the City's distribution mains to transport water to residential, commercial and institutional water services.

## 5. Distribution Sampling

In order to ensure water quality standards and regulations are met the City continuously tests the water quality throughout the distribution system. Under guidance from Island Health the City has installed a series of water sampling test points. The City completes weekly sampling and submits the samples to Island Health for testing.

If a sample shows evidence of Total Coliforms and/or E.coli, the Lab will immediately contact, by phone, both the City Public Works and Island Health in keeping with the requirements of the *Regulation*.

### 5.1 Sample Requirements

The *Regulation* requires the City to take a minimum number of samples per month based on the following population figures:

- Less than 5,000                    4
- 5,000 to 90,000                1 per 1,000 population
- More than 90,000              90 plus 1 per 10,000 population in excess of 90,000

### 5.2 Sample Stations

The City has eleven sample stations located throughout the distribution system with varying flow patterns, rates and conditions. See Figure 1 for sample station locations.

### 5.3 Distribution Sampling Overview

The City's current population mandates a minimum of 26 samples to be collected and tested each month. Sampling frequency and locations continue to meet the monitoring protocol set out by Island Health.

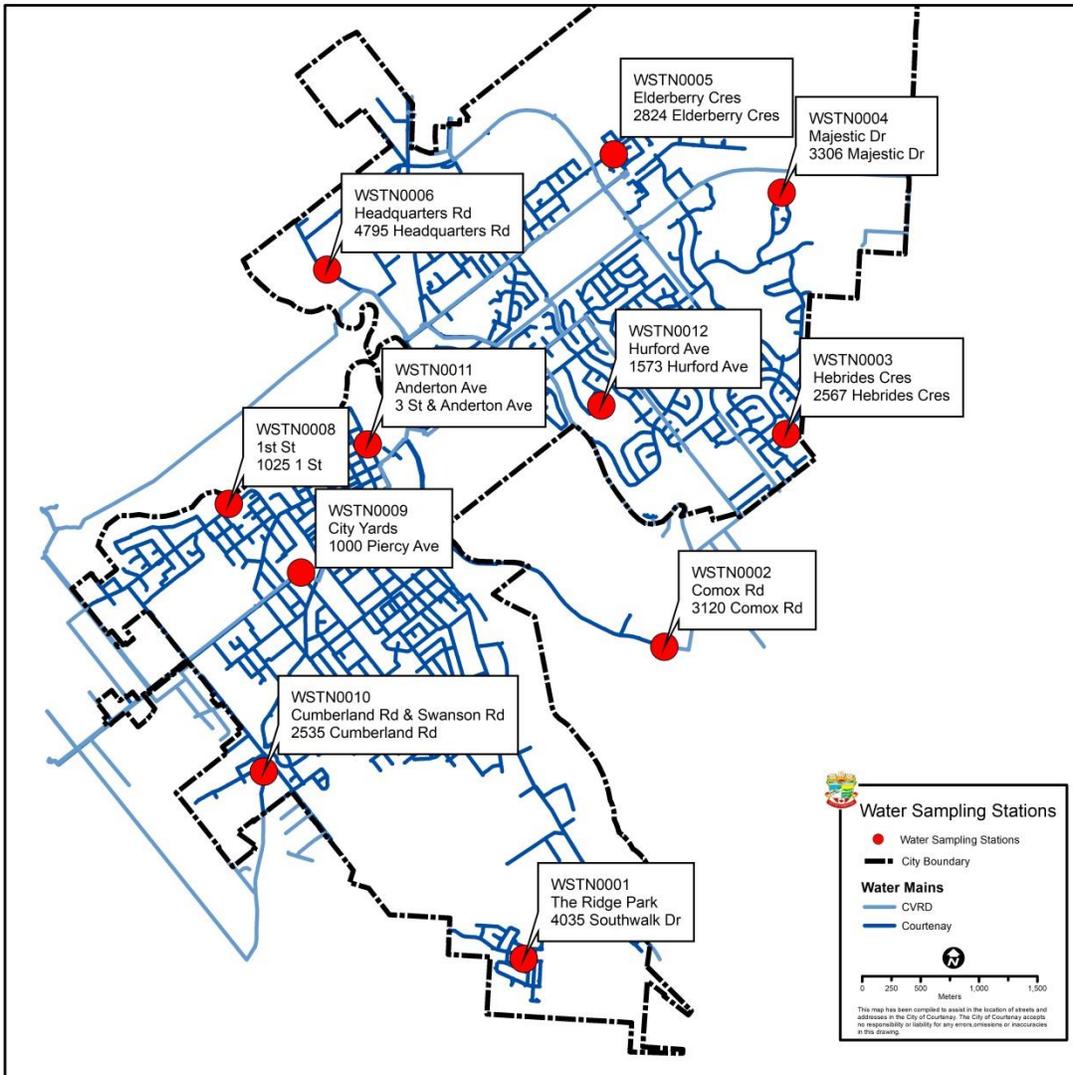


Figure 1. Sample Station Locations.

## 6. Standards & Regulatory Distribution Testing

The *Regulation* requires a supplier to collect and test samples from the distribution system. The Canadian Centre for Disease Control (CDC) Laboratory in Vancouver analyzes all water samples sent by Island Health. Due to the Covid-19 pandemic 3 sets of samples taken were rejected at the CDC Laboratory due to delays in analysis. This occurred for a set of samples in March and 2 sets of samples in November.

Water sampling results for 2020 can be found on the Island Health website:

<https://www.islandhealth.ca/learn-about-health/drinking-water/water-sampling-results>

### 6.1 Distribution Testing Parameters

Physical and bacteriological parameters are collected, sampled and tested from each of the City's sampling sites; 4 sites are sampled weekly, 7 are sampled on an alternating weekly schedule.

### 6.1.1 Physical Parameters

- Free chlorine residual measured in milligrams per litre (mg/L)
  - Guideline is 0.2mg/L
- Turbidity measured in nephelometric turbidity units (NTU)
  - Guideline is 1 NTU
  - Guideline is < 0.5 µg/L

## 6.2 Free Chlorine Residual

In order to control the re-growth of bacteria in the distribution system it is important to maintain a disinfectant residual. The minimum disinfectant residual of 0.2 mg/L (milligrams per liter) free chlorine is maintained.

### 6.2.1 Results

In 2020, 395 samples were collected and tested; no samples fell below the benchmark of 0.2mg/L of free chlorine residual.

## 6.3 Turbidity

Turbidity is a valuable indicator of water quality. Turbidity is a measure of the cloudiness of water caused by suspended particles given in NTU. The measurement is a quantification of the scattering and absorption of light by these suspended particles; the higher the turbidity the cloudier the water. Water with high turbidity may shield harmful organisms which increases disinfectant demand.

In 2018 the CVRD installed UV treatment as an interim measure pending construction of the water treatment plant. With the UV in place VIHA approved an increase from 1 NTU to 3 NTU of source water before a boil water advisory is required.

### 6.3.1 Results

In 2020, average turbidity within the distribution system was 0.52 NTU. There were no boil water advisories issued.

## 6.4 Total Coliforms & Escherichia coli

Total coliform and *E. coli* are typically used as indicators for overall drinking water quality. The *Regulation* establishes the parameter and standards for the microbiological quality of water.

### 6.4.1 Total coliform bacteria

- Standard:**
- (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.

## 6.4.2 Escherichia coli

**Standard:** No detectable *E. coli* per 100 ml

## 6.4.3 Results

In 2020, 3 collected samples in the City of Courtenay tested positive for total coliforms and 1 sample tested positive for 'other' bacterial colony. Follow up sampling after flushing indicated no total coliforms present. Island Health did not request follow up sampling for the 'other' bacterial colony positive test result. No samples tested positive for *E. coli*.

## 6.5 Trihalomethanes & Haloacetic Acids

Trihalomethane and haloacetic acids are used to indicate the potential creation of harmful bi-products during the chlorination process due to organic matter in the source water. Samples are collected for trihalomethanes and haloacetic acids quarterly. The City of Courtenay began sampling for these parameters in July 2019.

### 6.5.1 Trihalomethanes

- Trihalomethane measured in parts per billion.
  - Guideline is 100 ppb.

### 6.5.2 Haloacetic Acids

- Haloacetic Acid measured in parts mg/L.
  - Guideline is 0.08 mg/L.

### 6.5.3 Results

In 2020, no collected samples in the City of Courtenay exceeded the guidelines for trihalomethanes and haloacetic acids.

## 6.6 Total Metals

Total metals are sampled to monitor ongoing water quality. Samples are collected for total metals bi-annually. The City of Courtenay began sampling for these parameters in July 2019.

### 6.6.1 Total Metals

**Standard:** Maximum allowable concentrations for total metals are listed individually in the Canadian Water Quality Guidelines.

### 6.6.2 Results

In 2020, no total metal concentrations in collected samples in the City of Courtenay exceeded the guidelines.

## 7. Unidirectional Flushing Program

The City of Courtenay's Unidirectional Flushing (UDF) program is aimed to enhance the overall water quality within the water distribution system and improve systems operations by: reducing turbidity, removing sediment, silt and biofilms, lowering chlorine demand, increasing system hydraulic capacity and increasing the life of system components. This program supports the City's Asset Management System as it allows for in situ condition inspections of the water system and helps maintain water infrastructure integrity, thus increasing the service life of the system and its appurtenances. In 2020 the UDF program completed flushing in Area 1 and 2 (see Figure 2). For each run turbidity, static/residual hydrant pressure, and flushing time data was collected.

Area 1. A total of 11 km of watermain was flushed in a series of 29 runs. Flush times ranged from 15-45 minutes with an average time of 30 minutes. Turbidity readings ranged from 0.9-359 NTU, with an average of 28 NTU.

Area 2. A total of 10 km of watermain was flushed in a series of 28 runs. Flush times ranged from 10-60 minutes with an average time of 34 minutes. Turbidity readings ranged from 0.9-389 NTU, with an average of 26 NTU.

## 8. Cross Connection Control Program

The City of Courtenay's Cross Connection Control Program is aimed to reduce risks and the likelihood of contamination by eliminating or controlling unprotected cross connections within the potable water system. The program will be implemented in stages; initially the program will be focused on City-owned assets, buildings and facilities and will then be expanded to include Industrial, Commercial, Institutional and Agricultural (ICIA) customers. See Table 1 for the five year implementation plan. In 2020, all existing cross connection control devices in City owned buildings were tested; any deficiencies were repaired.

Table 1. Cross Connection Control Program Implementation

Year	Program Actions
2019	Conduct City-owned facility inspections and complete replacement/repair/testing of existing devices and complete new installs.
2020	Continue with City program.
2021	Continue with City program.
2022	Develop and adopt Cross Connection Control Bylaw, and develop education and outreach program for ICIA customers. Deliver ICIA education program, identify severe and moderate hazard customers, schedule inspection surveys to confirm level of protection required and provide surveys to customers for device installation.
2023	Continue with ICIA program, once severe and moderate level hazard inspections are complete follow with minor level hazard customers, provide surveys to customers for device installation. Develop and deliver residential awareness campaign.

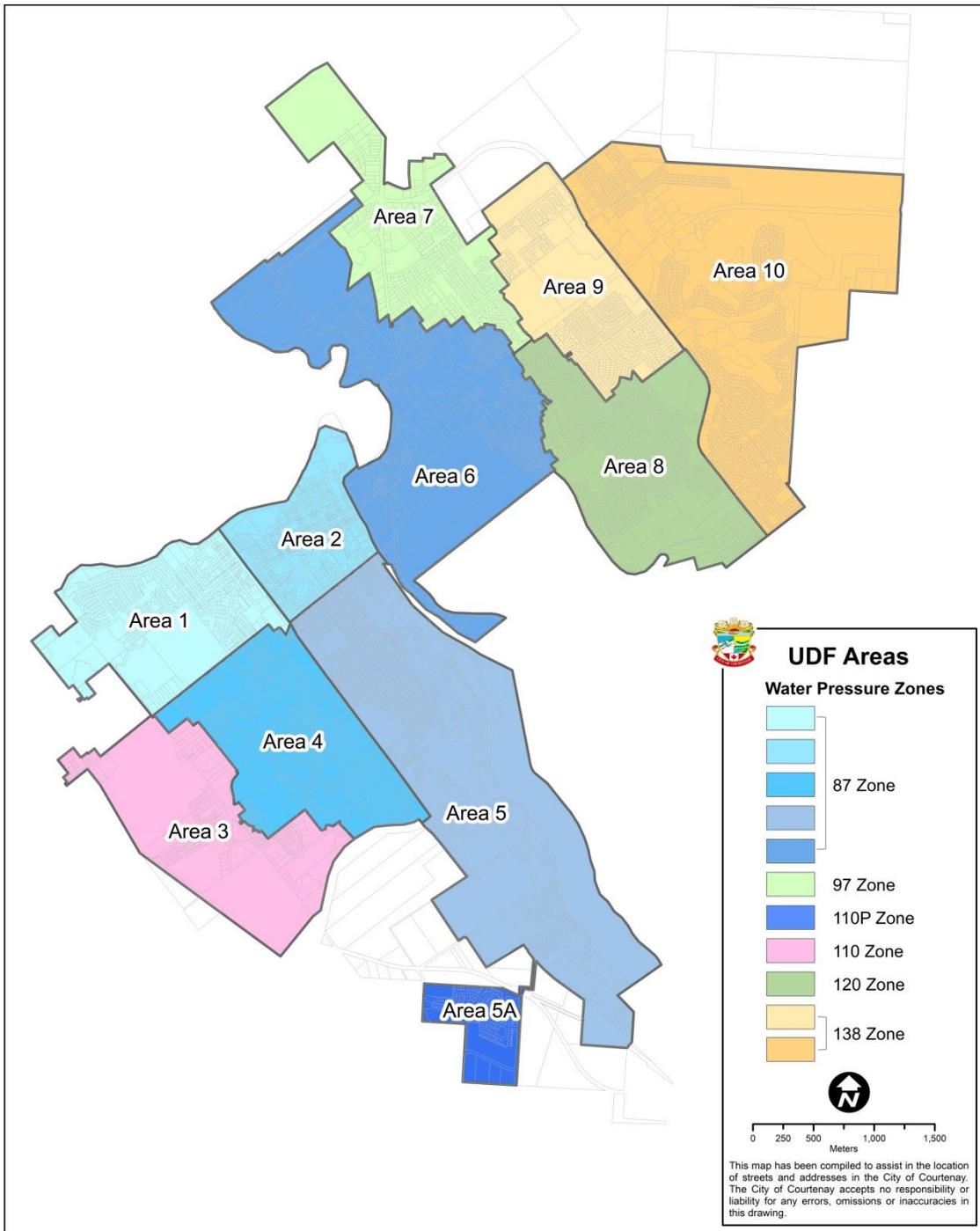


Figure 2.  
UDF Areas.

## 9. System Improvements

The City continues to make improvements to the overall distribution system and its appurtenances. Projects are identified and prioritized within the Asset Management Program enabling sound financial planning to maintain and enhance level of service to the community.

System Improvements in 2020 included:

- Completion of the Beachwood Booster Station improvements to support Phase 3A development of the Buckstone neighbourhood.
- Conversion of the Dingwall Well into a City-use non-potable bulk water fill station.
- Installation of a new service and meter chamber for the CVRD Bulk Water Station Upgrade project.

## 10. Operator Qualifications

The Environmental Operator Certification Program (EOCP) is a not-for-profit society that oversees the certification of water and wastewater operators in BC. The City has 11 EOCP-certified water operators with the following qualifications:

- Water Distribution I - 1 certified employee
- Water Distribution II - 6 certified employees
- Water Distribution III - 2 certified employees
- Water Distribution IV - 2 certified employees
- Water Treatment I - 1 certified employee

## 11. Emergency Response Plan

The *Emergency Response Plan* has been prepared to provide staff with an effective plan to respond to an emergency related to the City's water distribution system. In response to the 2020 COVID-19 pandemic this plan was amended to include viral outbreak as a risk; contingency documentation was further developed detailing operator requirements and workload management if staffing were to be impacted by high rates of infection.