



# 2019 Annual Report

North Shore Water Utility  
Nelson Ltd.

January, 2020

Prepared by:



© AquaDiversities Inc., 2020

*ALL RIGHTS RESERVED. This report is copyrighted and contains proprietary and privileged technical information that is the intellectual property of AquaDiversities Inc. Any unauthorized reprint or use of this material is prohibited*

Version: 1.0

## Table of Contents

<b>1.0 Introduction .....</b>	<b>3</b>
<b>2.0 Water System Overview .....</b>	<b>3</b>
2.1 Source Description.....	3
2.2 Regulatory Requirements .....	3
2.3 Treatment System Description .....	4
2.4 Delivery and Distribution .....	4
<b>3.0 Consumption Data .....</b>	<b>4</b>
<b>4.0 Operational Improvements and Capital Upgrades.....</b>	<b>4</b>
4.1 Improvements to Date.....	4
4.2 Future Operational Improvements.....	5
<b>5.0 Water Quality Monitoring Program .....</b>	<b>5</b>
5.1 Parameters for Water Quality Monitoring .....	5
5.2 Real-time Monitoring .....	6
5.3 Microbiological Monitoring .....	6
5.4 Chemical Monitoring .....	7
5.5 Volume Monitoring at Reservoirs.....	7
<b>6.0 Water Quality Concerns.....</b>	<b>7</b>
<b>7.0 Major Operational Events.....</b>	<b>7</b>
<b>8.0 Future Water Treatment.....</b>	<b>7</b>
<b>9.0 EOCP Classification and Certification.....</b>	<b>7</b>
<b>10.0 Summary.....</b>	<b>7</b>

## List of Tables

Table No. 1 - Water Quality Standards for Potable Water .....	4
Table No. 2 - Real-time Monitoring Results .....	5
Table No. 3 - Microbiological Monitoring Results .....	5

## 1.0 Introduction

As part of the conditions outlined in the Interior Health Authority Operating Permit for the North Shore Water Utility Nelson Ltd. (NSWU), this document will summarize and report the operations and maintenance of the utility in 2019 under the management of AquaDiversities Inc. Future treatment upgrades plans and customer feedback has also been included in this report. In an effort to provide transparency and inform the customers of the utility, this report will be posted on the new NSWU website at <http://northshorewaterutility.com>.

Since September 2014 AquaDiversities Inc. (Aqua) has owned and operated NSWU (a private water utility) under the *Water Utility Act*. The act regulates utilities to ensure the provision of safe and adequate water service at rates that are fair, reasonable and sufficient to operate their water systems sustainably.

## 2.0 Water System Overview

NSWU has been in operation since 1978 and services 140 active residential connections along with two motels, one commercial building, and one restaurant.

### 2.1 Source Description

The surface water that supplies NSWU comes from two parallel sources consisting of high flow springs exiting the steep mountainside. They are known as Sutherland Creek and Collin Spring/Isaac Creek. Each of the sources has a wooden frame structure built over the spring to protect the intake infiltration galleries. These intakes supply the 20,000 imperial gallon reservoirs located at each source. Flow to the reservoirs is controlled by an on-demand system of level switches and actuating valves. Access to each reservoir is contained within a building that houses the treatment components of the system and is locked to prevent unauthorized access. Both reservoirs are at the same elevation, providing gravity flow to the distribution system. In the high consumption summer months, both reservoirs are utilized to meet the demand of the consumers. For the majority of the year, the Collin Spring/Isaac Creek reservoir is ample supply to meet the demand.

### 2.2 Regulatory Requirements

Interior Health Authority (IHA) is the regulatory agency for the NSWU. In British Columbia, water quality standards for potable water are regulated by *Drinking Water Protection Act* (2001), which provides the basic, minimum framework towards goals for drinking water treatment for pathogens in surface water supply systems. Specific water quality standards, monitoring schedules, applicability and recommended treatments are outlined in the *Drinking Water Protection Regulation* (2003). The objectives outlined in the *Guidelines for Canadian Drinking Water Quality* (Health Canada 2012) as well as the *Drinking Water Treatment Objectives for Surface Water Supplies in British Columbia* (2012) are used to provide the treatment parameters for the treatment objectives implemented by the IHA. All results are reported to IHA to ensure compliance.

## 2.3 Treatment System Description

The system utilizes NSF approved chlorination disinfection to maintain the recommended operational range within the distribution system as outlined in the *Guidelines for Canadian Drinking Water Quality*. Each reservoir building houses a chemical dosing pump that doses 12% sodium hypochlorite (chlorine) proportionally to the flow of water being delivered to the reservoir. Aqua maintains the minimum level of chlorine required to ensure safe drinking water while preserving aesthetic quality.

## 2.4 Delivery and Distribution

The system provides potable water to approximately 2.5 km of distribution system main via gravity flow. The distribution system is comprised primarily of 6" diameter PVC, with some 2" and 4" diameter pipe. There are 10 fire hydrants and one standpipe that are utilized for system flushing. Each house has a curb stop valve connected to the main, which allows for isolation of the residence. In 2019 an extension of the NSWU was conducted with an additional 5 new connections along a 6" main which included 3 new hydrants.

## 3.0 Consumption Data

As part of a pilot project, a totalizing flow meter was installed at Isaac Creek. The non-intrusive flow meter (bolted to outside of pipe) was installed in October. Average daily consumption and average flow ( $\text{m}^3/\text{hour}$ ) was reported monthly since installation.

The following information was extrapolated:

- Average daily consumption from January 1<sup>st</sup> – December 31<sup>st</sup> was 241.8  $\text{m}^3/\text{day}$
- Average daily flow of 10.1  $\text{m}^3/\text{hour}$
- Total flow of 88,273.1  $\text{m}^3$

## 4.0 Operational Improvements and Capital Upgrades

### 4.1 Improvements to Date

Since 2014 and throughout 2019, Aqua worked diligently to ensure safe drinking water to the consumers of NSWU while making upgrades to the aging infrastructure and acquiring/documenting knowledge on the system.

Upgrades and improvements made to the NSWU 2019 include:

- Conducting routine chlorine residual and turbidity monitoring and bi-monthly microbiological sampling to ensure treatment targets were achieved. A monthly report is submitted to the Environmental Health Officer;

- Maintaining/implementing a Water Conservation Program with established procedures for administering water restrictions, as well as water conservation tips for users;
- Maintaining the access road to the Isaac Creek reservoir;
- Compiling information on the collection, storage, usage, and distribution system of the utility. The comprehensive base map of the system is added to as more information becomes available.
- Extension of the NSWU distribution system to include 5 new connections and 3 new hydrants.
- Exercising of all main control isolation valves.

These improvements as well as the documents outlined above are available to the customers on the NSWU website.

## 4.2 Future Operational Improvements

A Master Plan was prepared in 2017/2018, with some action items being carried out in 2019, outlining a projected schedule and budget to develop and implement a Cross Connection Control Program and a Capital Works Plan. In addition, annual updates and revisions to the ERP are completed to ensure an effective and comprehensive contingency plan.

## 5.0 Water Quality Monitoring Program

A Water Quality Monitoring Program provides established schedules for systematic, routine sampling to ensure that the parameters outlined in the *Guidelines for Canadian Drinking Water Quality* are maintained. The NSWU monitoring program has been developed with the approval of the EHO.

### 5.1 Parameters for Water Quality Monitoring

Parameters for water quality monitoring applicable to treatment currently being implemented at NSWU are summarized in **Table No. 1** below, with the exception of chemical parameters which can be found in the following link: [http://www.hc-sc.gc.ca/ewh-semt/pubs/water-eau/sum\\_guide-res\\_recom/index-eng.php#t2](http://www.hc-sc.gc.ca/ewh-semt/pubs/water-eau/sum_guide-res_recom/index-eng.php#t2).

**Table No. 1 - Water Quality Standards for Potable Water**

Parameter	Standard
Fecal Coliform Bacteria	No detectable fecal coliform bacteria per 100 ml
Escherichia Coli (E. Coli)	No detectable E. Coli per 100 ml
Total Coliform Bacteria	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.

Turbidity	Less than or equal to 1 Nephelometric Turbidity Unit (NTU)
Chlorine Residual	Greater than or equal to 0.2 mg/L at the end of the distribution system.

## 5.2 Real-time Monitoring

Real-time monitoring is data collected by the operators on an interval determined by the local EHO for turbidity and chlorine residual to ensure they are within drinking water quality standards. Samples are collected three times per week at one or both reservoirs, depending on operation, and at two locations at the ends of the distribution system. The system is also monitored remotely on a daily basis. Results are forwarded to the EHO in the Operator Log Sheets as part of the Monthly Report. Any sample results that fall outside of the standards are immediately addressed in accordance to the procedures outlined in the ERP.

**Table No. 2 - Real-time Monitoring Results**

Parameter	No. of Samples Taken	Range	No. of Samples Outside of Standards Requiring Action
Raw Turbidity (Reservoir)	152	0.09 - 2.49 NTU	23 (15%)
Chlorine Residual Distribution- SD8/ 538 Johnstone Rd.	97	0.2 - 0.91mg/L	0
Chlorine Residual Distribution –Main Jet	101	0.21 - 0.97mg/L	0
Chlorine Residual Reservoir	152	0.51 – 2.91mg/L	0

## 5.3 Microbiological Monitoring

Microbiological monitoring occurs through bi-weekly sample collections at two locations in the distribution system. These samples are sent to a provincially accredited lab and tested for total and fecal coliforms. **Table No. 2** outlines the number of samples and results from this monitoring. Samples collected that exceed the parameters are immediately reported to the EHO and responded to in accordance to the procedures outlined in the ERP.

**Table No. 3 - Microbiological Monitoring Results**

Parameter	Number of Samples	Number of Exceedances
E. Coli	26	0
Total Coliform	26	0

## 5.4 Chemical Monitoring

A comprehensive chemical analysis is recommended every five years to ensure there are no exceedances to the Maximum Allowable Concentration (MAC) as defined in *Guidelines for Canadian Drinking Water Quality*. A routine comprehensive chemical analysis was performed at both intakes was conducted in 2019 and included Trihalomethanes and Halo Acetic Acid testing. Full chemical analysis results can be found on the NSWU website at <http://northshorewaterutility.com>.

## 5.5 Volume Monitoring at Reservoirs

Operators monitor the volumes at the Isaac Creek reservoir closely in order to determine when the reservoir at Sutherland Creek will need to be brought online to supply the increased demand. Level 1 Water Restrictions were in effect from June 1st to September 30<sup>th</sup>. The Sutherland reservoir was brought on-line June 19<sup>th</sup> and remained on-line until September 23<sup>rd</sup>.

## 6.0 Water Quality Concerns

Although the water source at NSWU is of pristine quality, seasonal turbidity issues remains a concern, particularly with high precipitation weather events and spring freshet. *The Drinking Water Treatment Objectives for Surface Water Supplies in BC (November 2012)* states the following:

“For non-filtered surface water to be acceptable as a drinking water source supply...turbidity levels of around 1 NTU but not exceeding 5.0 NTU for more than 2 days in a 12-month period should be demonstrated in the absence of filtration.”

The NSWU had a Water Quality Advisory (WQA) in place March 15<sup>th</sup> – August 27<sup>th</sup>. The average turbidity throughout the duration of the WQA was 1.32 NTU. Had the turbidity levels exceed 5.0 NTU, a Boil Water Advisory would have been posted. All WQA can be attributed to an influx of natural organic matter due to heavy amounts of melting snow and heavy rainfall events, it should be noted that chlorine residuals were monitored and maintained on these dates.

In an effort to mitigate turbidity levels above 1 NTU, operators clean both intakes on regular intervals to remove sediment build-up. A flushing program to remove distribution system sedimentation was carried out in the fall of 2019.

## 7.0 Major Operational Events

On October 8<sup>th</sup> and 9<sup>th</sup> Isaac Creek reservoir was temporarily taken offline for cleaning and infrastructure upgrades. The reservoir was drained, had sediment buildup removed, was shocked, drained with effluent dechlorinated and refilled. During the sediment removal process a new chlorine analyzer booster pump supply line was installed. There was no interruption to service during the cleaning and infrastructure upgrade procedure.

## 8.0 Future Water Treatment

In August 2016 a pilot treatment system project was installed at the Isaac Creek reservoir. This pilot system includes sand filtration, cartridge filtration, ultra-violet treatment, and a totalizing flow meter to the existing chlorination treatment. The pilot remains installed at the time of report writing as it continues to collect necessary information on water quality, water consumption rates, consumable and operating costs, and treatment effectiveness. This accrued knowledge will aid in developing a long-term plan for installing the water system to achieve treatment levels that meet the *Drinking Water Treatment Objectives for Surface Water Supplies in British Columbia*.

## 9.0 EOCB Classification and Certification

The Environmental Operators Certification Program (EOCP) classifications are done in accordance with the B.C. Guidelines that were established based on the classification templates developed in conjunction with the Association of Boards of Certification. It is used to determine the level of Operator Certification required to operate and maintain the treatment system and is reclassified every 5 years. NSWU was classified as a Small Water System by the EOCB on August 29, 2014 and as such requires a certified operator.

## 10.0 Summary

Throughout the 2019 operating season NSWU water quality results were within the *Maximum Acceptable Concentrations* (MAC) identified in the *Guidelines for Canadian Drinking Water Quality*. Operation and maintenance issues were resolved in a timely manner by Aqua Diversities. Overall in 2017 the NSWU system was very stable, showing overall excellent water quality with the primary concern being the seasonal turbidity during freshet. Plans for upgrades to the NSWU will be undertaken in the future, including potential plans to permanently install the water treatment system at the Isaac Creek reservoir will address this issue. These upgrades will be implemented to comply with regulatory requirements (IHA) in an effort to provide the customers of the NSWU a safe and sustainable potable water source and a satisfying relationship with the utility.

*This report is for information purposes only. Aqua Diversities Inc. has provided accurate information to the best of their ability, and is not responsible for the inaccuracies that may occur from the collection of monitoring data.*