City of Parksville

2020 Annual Water Report

1116 Herring Gull Way
Parksville, BC V9P 1R2

P O Box 1390
Parksville, BC V9P 2H3

Phone: 250 248-5412
Fax: 250 248-6140

Report by: Barbara Silenieks
Utilities Technician

arrowsmith WATER SERVICE & englishman river WATER SERVICE

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1.0 Introduction

This report provides information on water source, water test results, maintenance programs and improvements to the water system. This is a requirement under the City of Parksville operating conditions, shown in Appendix G.

This report has been submitted to Island Health and is available on the City of Parksville website at Parksville.ca *[City Hall/Departments/Operations/Water]*.

2.0 Parksville Water System

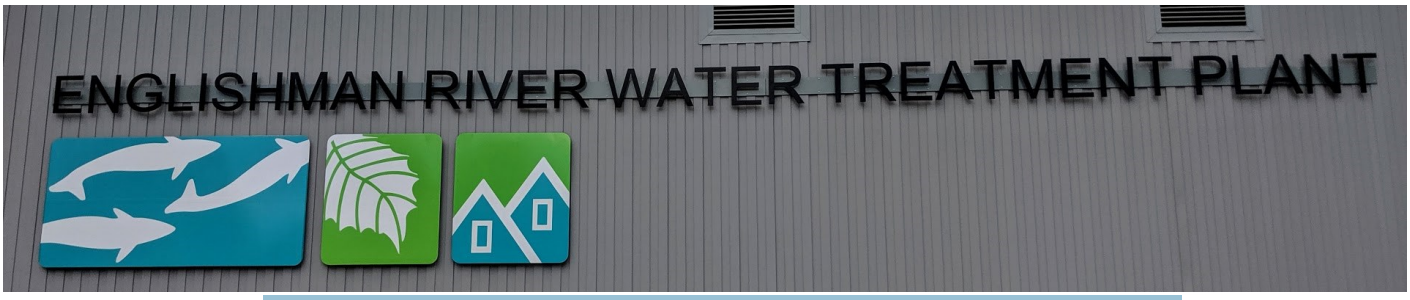
The City of Parksville has about 5,000 water connections serving over 12,500 permanent residents as well as supplying water to the Regional District of Nanaimo (Nanoose Bay Peninsula system). The City has four reservoirs at either end of the City.

The City gets water from three sources.

- Englishman River
- Springwood Well Field
- Railway Well Field

The water from the Englishman River goes through the Englishman River Water Treatment Plant, which can produce up to 16 megalitres per day (ML/d) by way of intake screens, sand separators, coagulation, fine strainers, primary and secondary ultrafiltration (UF) membranes, ultraviolet (UV) disinfection and chlorination. The plant focuses on addressing biological contaminants such as bacteria, Cryptosporidium, Giardia and viruses.

Well water is treated using liquid chlorine and stored in four reservoirs where it gets mixed with the water from the treatment plant before distribution.



Englishman River Water Treatment Plant
Operational Since October 2019

2.1 Groundwater Wells

The City's groundwater is pumped from a confined quadra sands aquifer. The wells run alongside the railway tracks from Trill Drive to the City's boundary in the southwest. The City currently has 12 production wells online.

See **Appendix A** for well locations.

Springwood Well #1, #7, Railway Well # 7 and #8 are being repaired at the beginning of 2021.

Well Name	Pump intake (m)	Production (l/s)
Springwood Well #1	35.00	OFF
Springwood Well #3	29.00	3.7
Springwood Well #5	31.33	5.2
Springwood Well #6	31.80	6.0
Springwood Well #7	22.35	6.5
Springwood Well #8	23.71	10.0
Springwood Well #9	-	-
Springwood Well #10	30.18	6.0
Springwood Well #11	30.42	5.6
Railway Well#1	34.50	5.1
Railway Well#2	33.54	6.4
Railway Well#3	38.46	2.9
Railway Well#4	36.00	4.0
Railway Well#5	36.00	Flow not recording
Railway Well#6	35.00	1.7
Railway Well#7	35.00	OFF
Railway Well #8	35.68	OFF
Industrial Well#8	-	-

Pump Depth and Production Information

2.2 River Intake

In 2020, the City pumped 1,638,360 m^3 of water from the Englishman River via the new intake. The water in the Englishman River is partially supplied from the Arrowsmith Dam which was discharging from July 5 to October 17, 2020. The Ministry of Environment, Fisheries and the Arrowsmith Water Service (AWS) developed an operating rule curve in an effort to conserve reservoir storage water for critical fisheries rearing periods. A minimum flow is released into the river based on this curve between June and October .

2.3 Arrowsmith Dam

The City of Parksville, the Regional District of Nanaimo, and the Town of Qualicum are partners in the Arrowsmith Water Service (AWS). The concrete gravity dam located at Arrowsmith Lake about nineteen km south of Parksville, was commissioned in 2000. The dam has a capacity of 9,000,000 m^3 and is operated and maintained by the City of Parksville utilities staff. Water is released to the Englishman River through two pipes, a 900 mm and a 600 mm with flows and lake levels monitored by the City's Supervisory Control and Data Acquisition (SCADA) system.

See **Appendix B** for Arrowsmith Dam Lakes Levels 2020.

2.4 Reservoirs

Water which has been pumped either from the ground or from the river is stored in four reservoirs. Reservoirs numbers 1, 2 and 4 are located in the Springwood Water Complex on Despard Road. These three are concrete with two being partially below ground and one above. Storage capacities are:

- Reservoir #1 - 616 m^3 (135,500 Imp. gal).
- Reservoir #2 - 2023 m^3 (445,000 Imp. gal).
- Reservoir #4 - 4559 m^3 (1,000,000 Imp. gal).

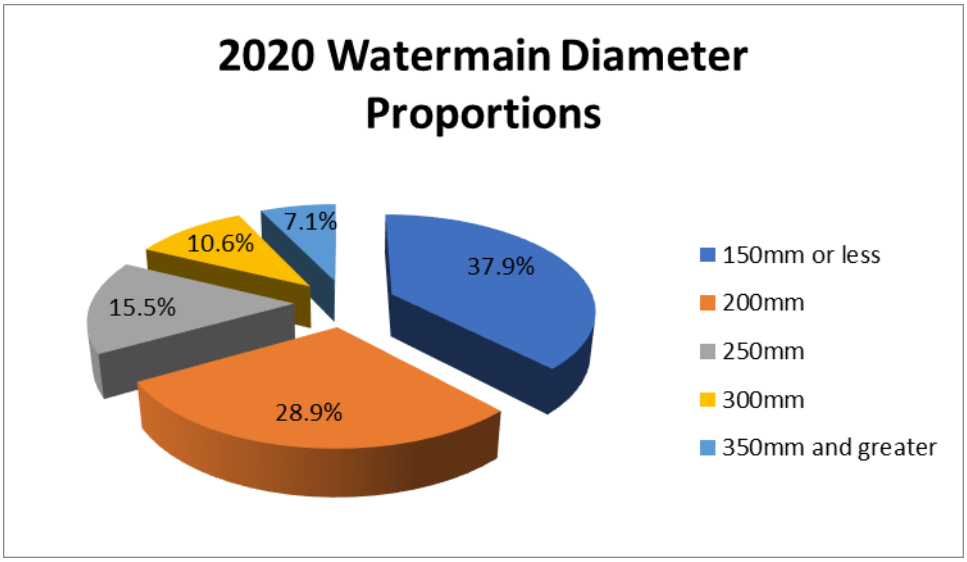
There are two additional reservoirs in the Top Bridge Park area, numbers 3 and 5. Reservoir #5 is a glass fused steel tank, Reservoir #3 is a steel tank although currently not in use. Storage capacities are:

- Reservoir #3 - 671m^3 (148,000 Imp. gal) - Not in use.
- Reservoir #5 - 4300 m^3 (950,000 Imp. gal).

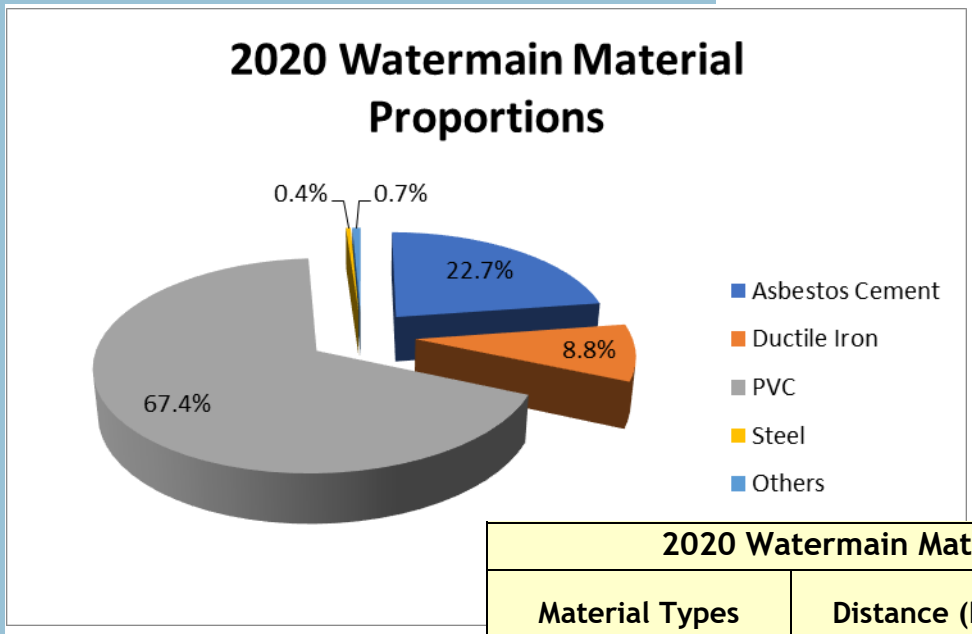
3.0 Distribution System

The distribution system consists of 70.5 km of PVC pipe, 9.2 km of Ductile Iron pipe and 23.7 km of AC (Asbestos Cement) pipe. Sizes range from 100 mm (4") to 400 mm (16"). There are over 600 fire hydrants and one pressure reducing valve (PRV).

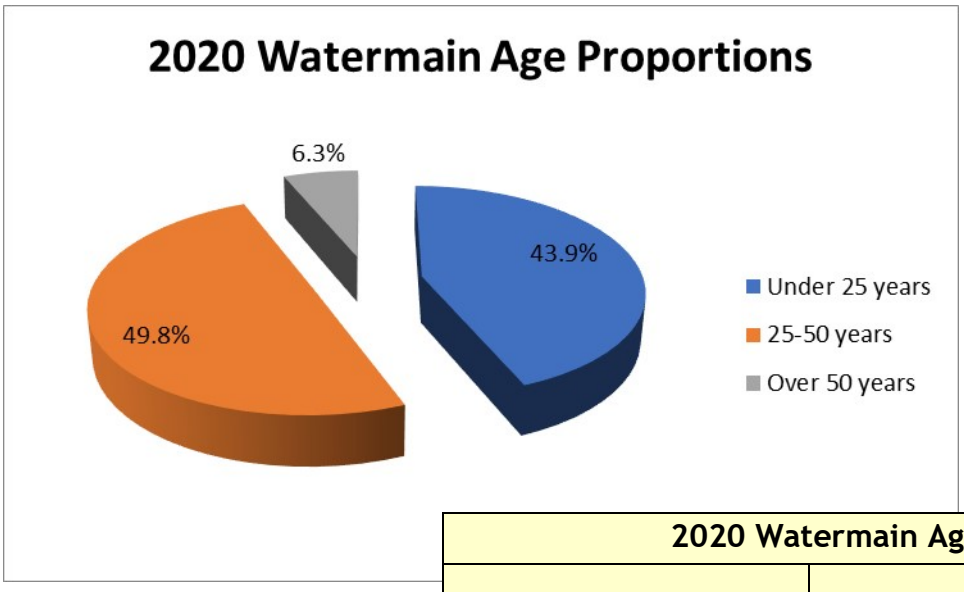
Like all municipalities, the infrastructure is aging and watermains are being replaced through capital improvements and development. The following shows the size, age and material of the mains in the Parksville Water System in 2020. Some of these pipes have been replaced over the past year but newer data sometimes takes a few months to be updated.



2020 Watermain Diameter Proportions				
Diameter	**No Pipes**	**Distance (km)**	**Percentage**	**Type**
150 mm or less	667	39.67	37.9%	Distribution Mains 66.8%
200 mm	587	30.20	28.9%	
250 mm	268	16.23	15.5%	Supply Mains 33.2%
300 mm	199	11.09	10.6%	
350 mm and greater	113	7.45	7.1%	
Total:	1834	=	104.64 km	



2020 Watermain Material Proportions		
Material Types	**Distance (km)**	**Percentage**
Asbestos Cement	23.71	22.7%
Ductile Iron	9.21	8.8%
PVC	70.49	67.4%
Steel	0.41	0.4%
Others	0.75	0.7%
Total:	104.57	km



2020 Watermain Age Proportions			
Age	**No Pipes**	**Distance (km)**	**Percentage**
Under 25 Years (≥1994)	1007	45.92	43.9%
25 - 50 Years (1970 - 1993)	744	52.15	49.8%
Over 50 Years (<1969)	87	6.62	6.3%
Total:	1838	104.69	km

3.1 Pressure Zones

The City is divided into two pressure zones; low pressure and high pressure. The low pressure is a gravity-fed system based on the elevation of Reservoir #4 and Reservoir #5. A top water level of 73.74 m above sea level (geodetic) gives a range of 55 psi to 85 psi throughout the system, depending on the geographic location.

The high pressure system was initially developed for higher elevation regions of the City which do not have sufficient pressures or flows to meet firefighting flows. This high pressure zone has been expanded to areas furthest from the pump stations that lose pressure and flow due to line losses. In order to maintain a balance between high and low pressures but still keep a safe pressure in the lower areas, a PRV was installed to drop the pressure from 80 psi to 60 psi.

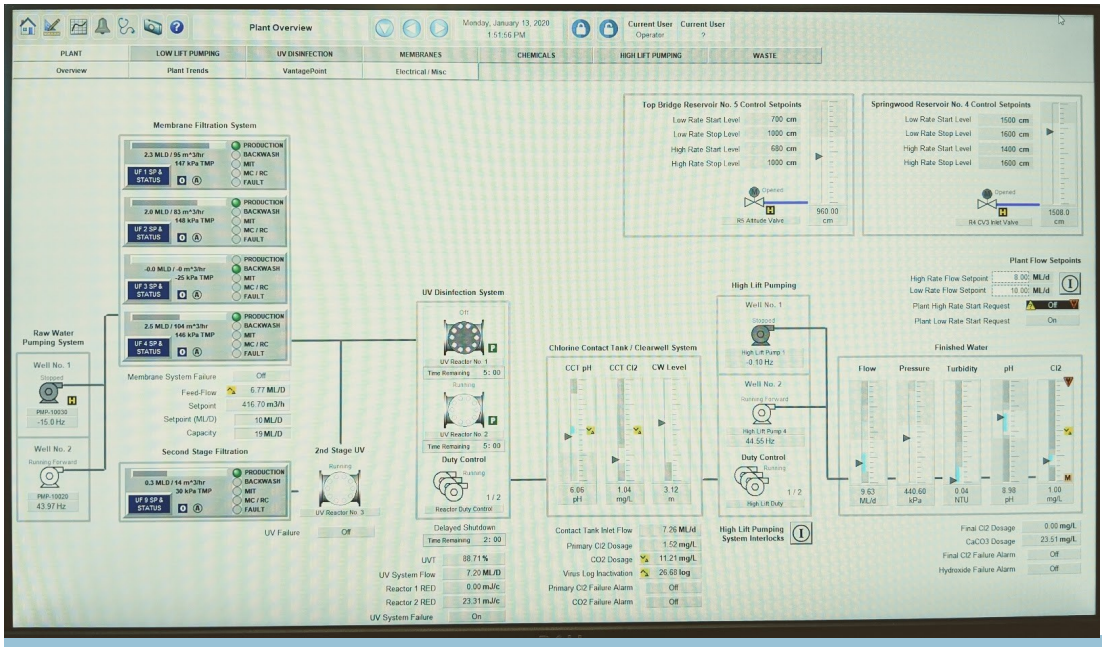
The high pressure water in this zone is supplied from four pumps, a 15 hp, two 40 hp and a 100 hp. These pumps are controlled through the SCADA system which automatically watches flows and switches on however many pumps it needs to meet the flow requirements.

See **Appendix C** for Map of Pressure Zone Boundaries.

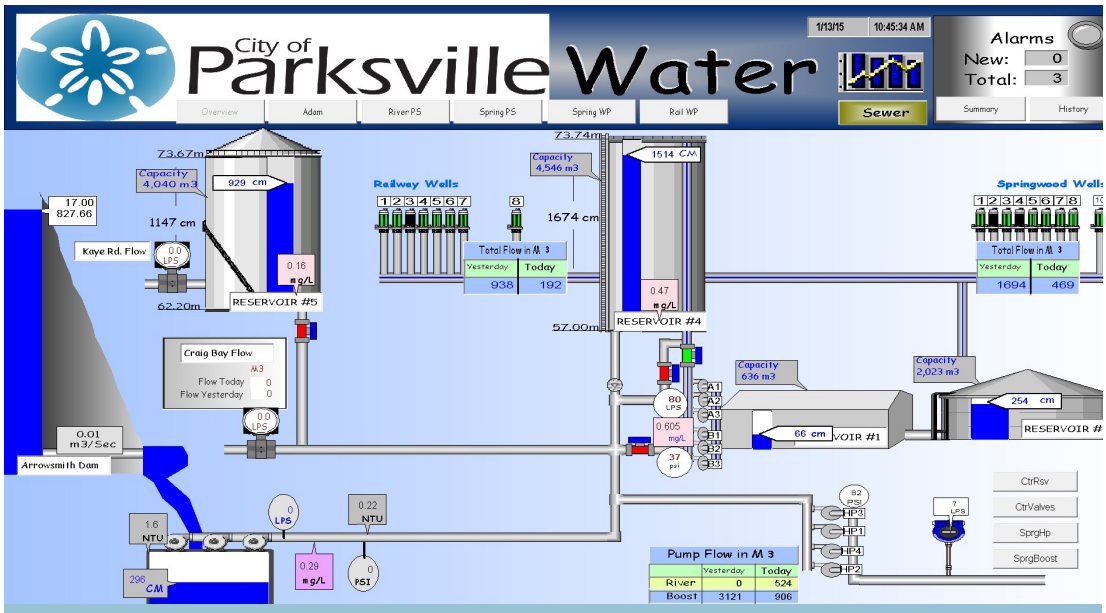
Watermain Flushing

4.0 SCADA (Supervisory Control and Data Acquisition)

The water treatment plant, water distribution system, wells and sewer pump stations are controlled by a computerized control system called SCADA. This system allows the operators to monitor water treatment plant functions, reservoir levels, the status and flows of pumps, and chlorine residuals. The operator can change set points and check on the system remotely. Alarms are automatically called out to City staff who monitors the system 24 hours a day, 7 days a week.



Water Treatment Plant SCADA system



Distribution System SCADA system

5.0 Water Sampling and Testing

5.1 Bacteriological

As required by Island Health, City staff takes bacteriological samples from 16 test ports around the City and a sample from the water treatment plant every month.

See **Appendix D** for 2020 test results (L1 means Less than 1 - no detectable bacteria - Acceptable). For a detailed list of water samples: https://www.islandhealth.ca/learn-about-health/drinking-water/water-sampling-results

5.2 Full Spectrum Analysis

In addition to monthly sampling throughout the distribution system, the City also sent samples for a full spectrum analysis in February. As seen in Appendix E, parameters such as metals (iron, manganese) conventional parameters (pH, turbidity, hardness) and disinfection byproducts (Trihalomethane) are tested.

The source water is aesthetically acceptable as set by the "Guidelines for Canadian Drinking Water Summary Table". Aesthetic qualities apply to certain substances or characteristics such as high iron content which will stain fixtures red or manganese which will stain black.

Hardness in the water comes from calcium carbonate ($CaCO_3$). The river water is considered "soft" under the guidelines and the well water is "moderate". Hardness levels above 500 mg/l are normally considered unacceptable.

All parameters meet Canadian Drinking Water Guidelines.

See **Appendix E** for the 2020 Full Spectrum Analysis of the Parksville Water System Source Water. Note: Most of the water tested (Full Spectrum) is in its raw form before any type of treatment, Memorial is the only sample where the water was treated.

1116 Herring Gull Way sampling site

5.3 Trihalomethane Analyses

The City also take Trihalomethanes (THMs) samples four times per year. THMs are disinfection by-products that form when chlorine is added to water containing elevated levels of natural organic matter. See Appendix F for THM results.

See **Appendix F** for the Trihalomethane results.

6.0 Water Quality Complaints and Incidents

The operations department had few water quality complaints in 2020. During watermain flushing and fire hydrant maintenance, there were a few calls related to “brown or dirty” water. City of Parksville crews would either re-flush the mains through a hydrant or a flushout at a location closest to the dead end or advise the homeowner to run an outside tap for a few minutes to clear up the problem.

There were a couple of complaints about the taste of chlorine in the water. Chlorine residuals are tested weekly throughout the system and are kept at a safe level.

There were a few hardness related complaints, mostly contributed to new homeowners from other municipalities who are used to different water composition. There were also a few calls concerning buildup in washing machines and toilet bowls although the water is only considered “moderately hard” on the hardness scale.

Some complaints were related to pressure drop. The cause for most of the pressure drop complaints were from a faulty PRV (responsibility of the homeowner). There was the odd occasion where staff had to flush the line in order to clear debris (from construction) or where the setter needed to be replaced.

There were calls related to water leaks. Most were regarding leaky services or water meters.

The new water treatment plant can now handle the sloughing of the clay banks. Between the sand separator, strainers, and the ultrafiltration membranes, the turbidity of the water is kept below the allowable levels.

Clay Bank at Englishman River

7.0 Englishman River Water Service

The Englishman River Water Service is a joint venture between the City of Parksville and the Regional District of Nanaimo, formed to secure a bulk water supply from the Englishman River. This regional partnership supplements existing well supply sources owned and operated by the City of Parksville and Nanoose Bay Peninsula Water Service Area.

Englishman River Water Service joint venture agreement (percentages of interest).

- City of Parksville 74%
- Regional District of Nanaimo 26%

ERWS Water Treatment Plant

The Englishman River Water Treatment Plant can produce 16 megalitres per day (ML/d) by way of intake screens, sand separators, coagulation, fine strainers, primary and secondary ultrafiltration (UF) membranes, ultraviolet (UV) disinfection and chlorination.

The intake structure has screens to protect fish and other aquatic life from entering the intake, and to keep debris from entering the system. The sand separators remove sand and heavy suspended solids during high turbidity events (turbidity is the cloudiness/haziness of the water).

Coagulation clumps particles together so they can be easily strained. A coagulant is added to the raw water before it gets to the water treatment plant to allow for sufficient contact time before being removed by fine strainers which can remove material greater than 200 microns (0.2mm) in size. The purpose of the strainers is to protect the membranes from fine particles that could break or clog them.

Ultrafiltration (UF) membrane is a pressure driven separation process that uses microporous membranes to remove contaminant (bacteria, viruses, Cryptosporidium and Giardia) from the water. The process forces water through the UF membranes, leaving contaminants behind. Once enough contaminants accumulate on the feed side of the membrane, a cleaning process occurs to bring the membrane back to a good working pressure. The first stage process recovers approximately 95% of the water. The remaining 5% is used for backwash and cleaning, which than goes through the second stage membrane which can treat 80 to 90% of that dirty water (the 5%), this brings the total recovery to over 99%. The dirty 1% has its pH equalized before being dumped.

Ultraviolet disinfection inactivates Cryptosporidium, Giardia and viruses. UV light disinfects water by altering the DNA or RNA of pathogens and destroys their ability to reproduce. Chlorination inactivates viruses. In the plant there is sufficient contact time to disinfect the water, and chlorine is added so the distribution system will have enough chlorine to continue disinfecting the water outside of the plant.

Once the water goes through all these steps, it gets pumped into the City reservoirs, which than goes to the distribution system. The water is continually sampled to provide water quality assurance and to meet regulatory requirement.

For more information visit englishmanriverwaterservice.ca

8.0 Routine Maintenance Program

8.1 Distribution

- Watermains are flushed using a unidirectional flushing program
- Air relief valves are cleaned
- Fire line meters are cleaned
- Fire hydrants are completely disassembled and inspected on a two-year rotation
- Paint and brush out around hydrants as needed
- All irrigation backflow prevention devices tested and repaired if needed

8.2 Wells

- Daily security check of all wells
- Rehabilitation of one to two wells per year
- Pumps and motors replaced as necessary
- Filling chlorine tank on Springwood Well #1 as needed
- Annual water sampling

8.3 Old River Intake

- Monthly calibration of turbidity analyzers

8.4 Reservoirs

- Daily security check of tanks and compounds
- Yearly cleaning of Reservoir #1 and 2
- Clean Reservoir #4 and 5 using divers every five years
- Sustaining valves cleaned monthly

8.5 Pump Stations

- Daily checks of pumps and chlorination system
- Security checks of compounds
- Bi-annual calibration of chlorine analyzers and turbidimeters

8.6 Water Treatment Plant

8.6.1 Raw Water Pump Station

Daily checks of intake structure, pumps, air burst, sand separator, analyzers and security.
Power consumption reading, and engage power failure monthly
Daily sample for water quality parameters.
Monthly flush 2" port at the bottom of the pump and headers.
Switch sand separator duty monthly.
Raw water THM (Trihalomethanes) samples quarterly.

8.6.2 Strainers and Coagulant (pretreatment system)

Strainer maintenance as needed.
Coagulant daily dosage evaluation in comparison with raw water quality.
Monitor strainer's differential pressure, and check for leaks daily.

8.6.3 Membrane System

Daily checks of blowers, BW pumps, UF (Ultra Filtration) 1 to 4, UF second stage.
Daily maintenance cleans.
Monthly recovery cleans.
Analyzers serviced monthly.
Daily monitoring of TMP (Trans Membrane Pressure) and flow rate.

8.6.4 Disinfection System

Daily monitoring of UVT (Ultraviolet Transmittance) trend and calculation of log removal performance.
Quarterly validation for intensity of UV.
Annual Service of UV units.
Daily continuous pH monitoring on the contact tank.
Daily contact time calculation on the contact tank.
Daily continuous monitoring of chlorine dosage.

8.6.5 Finished Water System

Daily checks of high lift pump, and flow monitoring.
Daily continuous monitoring of pH on clear well.

8.6.6 Chemical and Auxiliary Systems

Daily check for leaks.
Daily checks of exhaust fans.
Eyewash station checked monthly.
Chemical tank levels checked monthly at a minimum.

8.6.7 Air Compressor

Annual service.
Oil change as needed.
Maintenance and valve adjusting in pneumatic valves as needed.
Replace and adjust stops as needed.

UV Disinfection System

Chemical Room

9.0 2020 Projects & Improvements

- Continued to replace 3/4” water meter.
- Continued to update the water meter route maps.
- Coagulant pump sent for reprogramming.
- Heat trace removed, and evaluation of strength of hydroxide at water treatment plant.
- Upgraded/modified strainer piping to ensure easy access to strainer.
- Additional mechanical aeration during cleaning on membrane system to aid in solid binding release.

10.0 2020 Capital Projects

- AC pipe replaced on Pym Street and Forsyth Avenue.

11.0 2021 Projects & Improvements

- Springwood well #7 and Railway well #7 fixed January 2021.
- Springwood well #1 being re-wired at the beginning of 2021.
- Design of Hirst and Memorial Avenue from Alberni Hwy to McMillan will be ready for tendering.
- Continue working on the cross connection control program.
- Possible well rehabilitation.
- Continue with water meter replacement program.
- Remove old coagulant from tank at the Water treatment Plant.
- Replace both failed steel heater with titanium heater at water treatment plant.
- Replace exhaust fan at water treatment plant.
- City to continue working with engineers and contractors to identify and resolve deficiencies at the water treatment plant.

12.0 Cross Connection Control Program

Irrigation cross connection

The cross connection program is currently addressing medium and high hazard water use. These include Industrial, Commercial and Institutional (ICI) users. Each ICI user will be assessed as to the potential risk to the water system. Any costs associated with installation, replacement and testing of an approved backflow device will have to be covered by the property owner.

A tracking program called FAST is used to track devices around the City (both City-owned and privately-owned devices). Property owners are required to send the annual test report to the utilities technician at the City of Parksville.

City staff remains watchful of potential cross connections around the City and problems are reported to the utilities technician.

13.0 Emergency Response Plan

The City has three Emergency Response Plans (ERP) pertaining to the water system. These documents outline the strategies to deal with events such as contamination of water supply, pump failures and turbidity events. The plans are updated annually.

Turbidity is the cloudiness or haziness of a fluid caused by a large number of individual particles that are generally invisible to the naked eye.

Power loss at Springwood Station due to a tree falling on power lines January 1, 2020

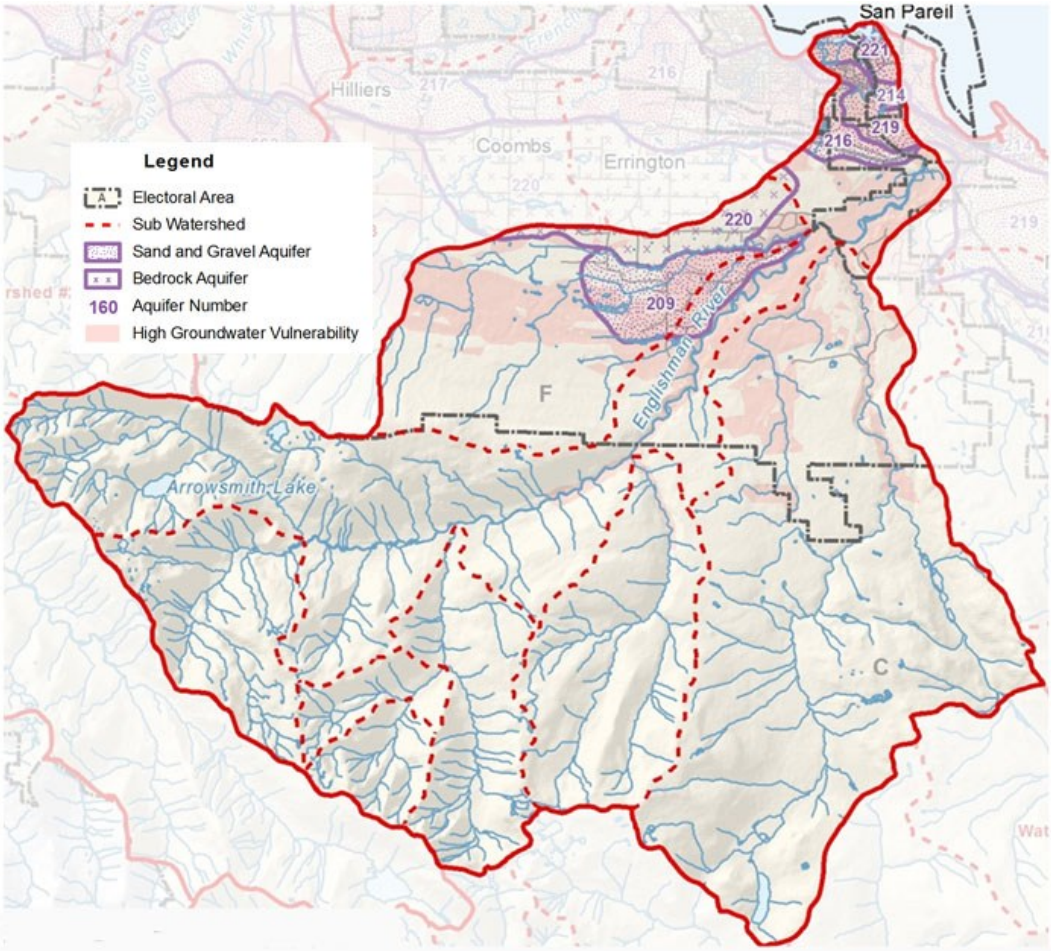
14.0 Watershed Protection Program

The Englishman River flows in an easterly direction from Mount Arrowsmith and discharges into the Strait of Georgia, north of Craig Bay. The highest elevation in the watershed is Mount Arrowsmith, at 1819 metres and this important watershed has a drainage area of 324 km^2.

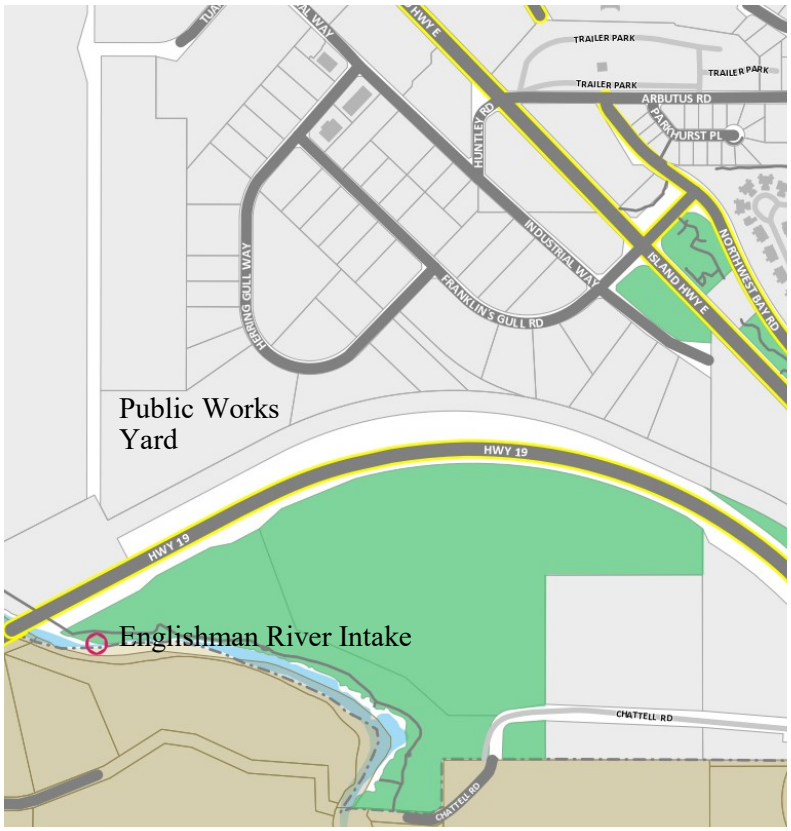
The South Englishman River, Swane Creek, Morison Creek, Shelly Creek and Centre Creek all drain into the Englishman River. The Englishman River is an important fisheries river and through the Arrowsmith Water Service, provides water supply for the City of Parksville and the Nanoose Peninsula. Water is stored behind a dam at Arrowsmith Lake and released as needed. Fish in the Englishman River include trout, steelhead and salmon. The Englishman River is identified as a 'sensitive stream' requiring special management attention under the Fisheries Protection Act. This is because of the risk to fish populations due to inadequate water flows and other habitat concerns.

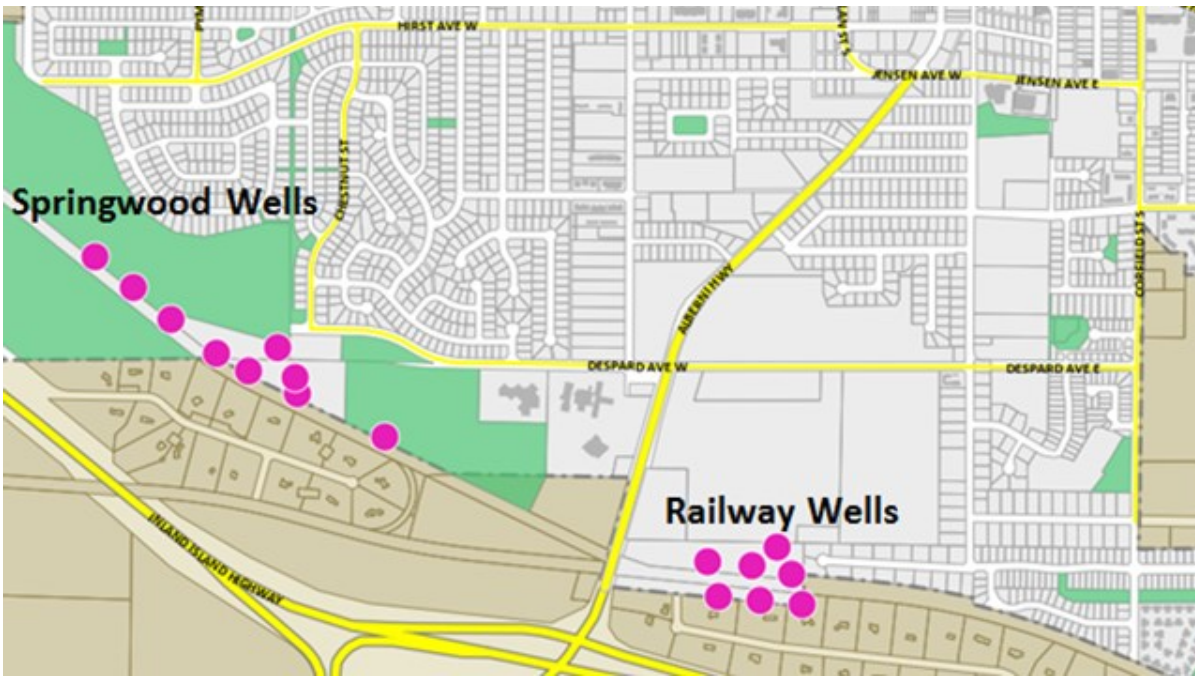
Several aquifers in this watershed area are showing signs of stress. The good news is that the water levels in aquifer 216 have been showing signs of recovery over the past couple of years. Aquifer 220 is still showing signs of stress, this means less water is available for rural residents who rely on wells for drinking water and less water is available in streams for fish. Surface water and groundwater are connected in this watershed, and in the summer when there is no rain, groundwater should be contributing base flow to the local rivers.

Unfortunately, dropping groundwater levels mean lower flows in streams and decreased fish health in the Englishman River and its tributaries.



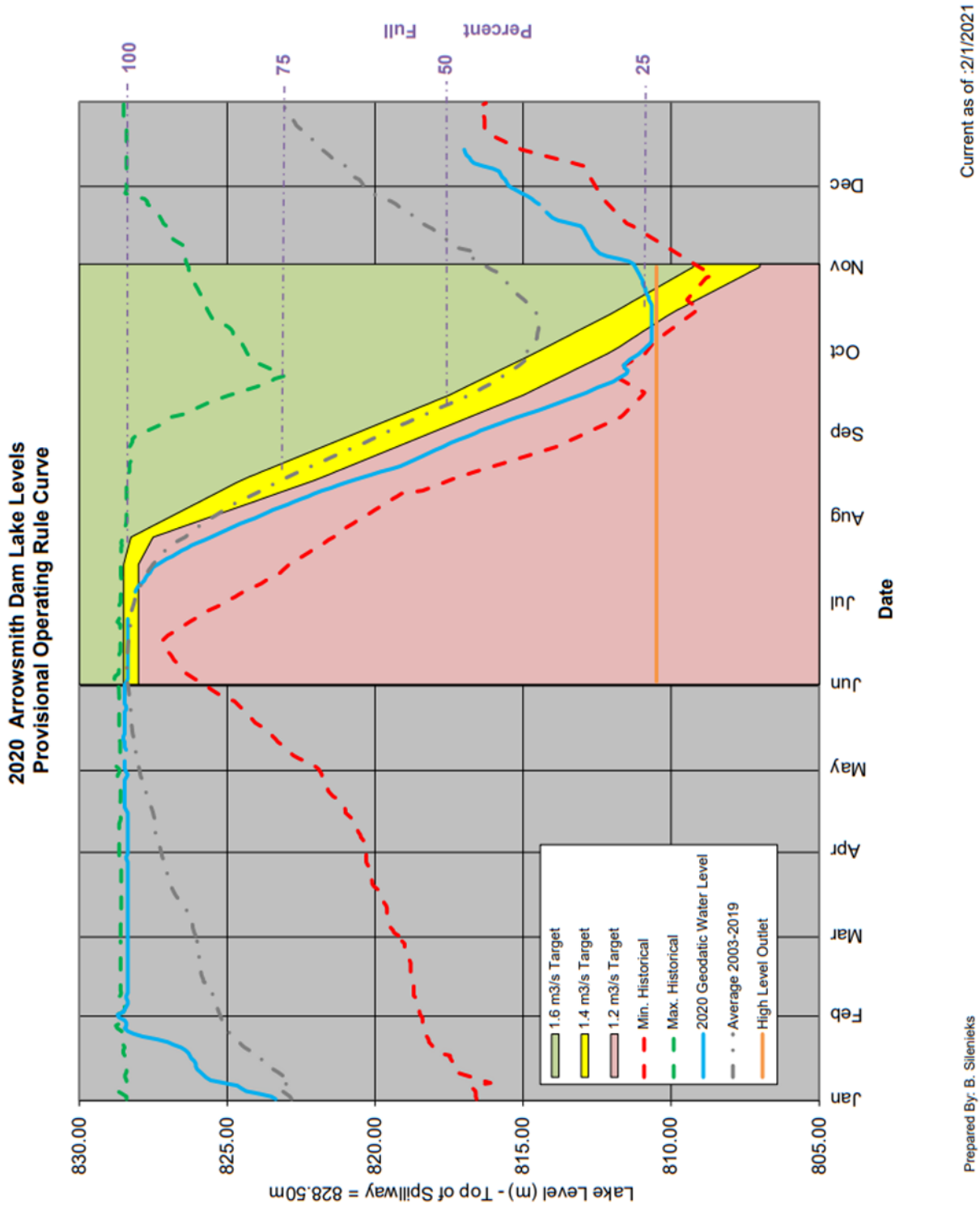
Appendix A





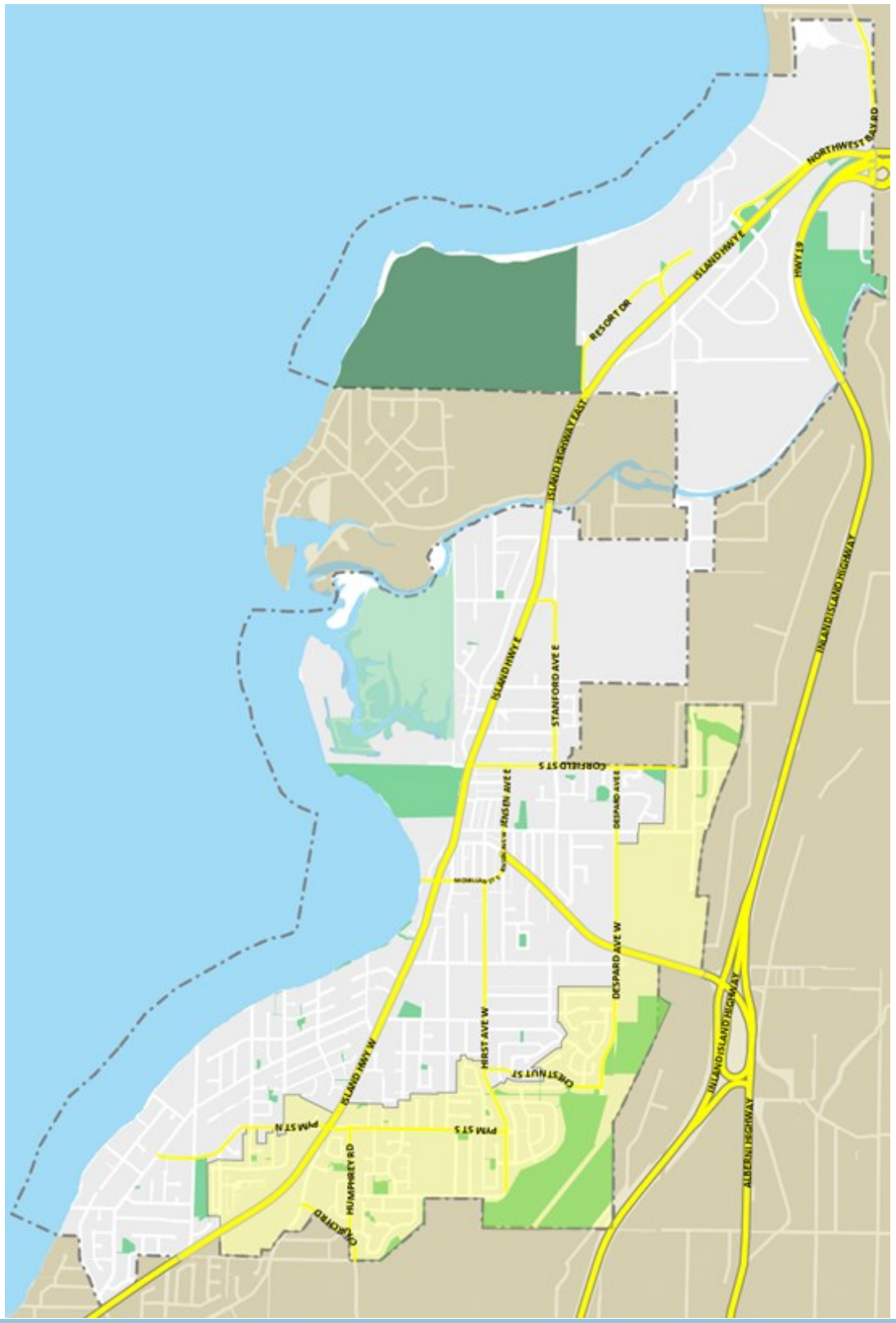
Water Source Locations Map

Appendix B



Arrowsmith Dam Lake Levels

Appendix C



Map of Pressure Zones (Yellow is High Pressure)

Appendix D

Location	Date	Total Coliform	E.coli
1247 Arbutus Rd	7-Jan-2020	L1	L1
Island Highway, by Temple	7-Jan-2020	L1	L1
770 Soriel	7-Jan-2020	L1	L1
271 Chestnut Street	7-Jan-2020	L1	L1
Works Yard, 1390 Herring Gull Way	13-Jan-2020	L1	L1
Top of Corfield	13-Jan-2020	L1	L1
Despard & Moilliet, 401 S. Moiliet Street	13-Jan-2020	L1	L1
613 Chinook Avenue	13-Jan-2020	L1	L1
River Pump Station, Englishman River Intake	20-Jan-2020	L1	L1
Daffodil at Camas	20-Jan-2020	L1	L1
Community Park, 193 East Island Highway	20-Jan-2020	L1	L1
across from 450 Wisteria	20-Jan-2020	L1	L1
330 Park View	28-Jan-2020	L1	L1
136 Memorial	28-Jan-2020	L1	L1
851 Temple	28-Jan-2020	L1	L1
Wheeler, Top of Kingsley, 378 Kingsley Street	28-Jan-2020	L1	L1
1247 Arbutus Rd	5-Feb-2020	L1	L1
Island Highway, by Temple	5-Feb-2020	L1	L1
770 Soriel	5-Feb-2020	L1	L1
271 Chestnut Street	5-Feb-2020	L1	L1
Works Yard, 1390 Herring Gull Way	11-Feb-2020	L1	L1
Top of Corfield	11-Feb-2020	L1	L1
Despard & Moilliet, 401 S. Moiliet Street	11-Feb-2020	L1	L1
613 Chinook Avenue	11-Feb-2020	L1	L1
River Pump Station, Englishman River Intake	18-Feb-2020	L1	L1
Community Park, 193 East Island Highway	18-Feb-2020	L1	L1
across from 450 Wisteria	18-Feb-2020	L1	L1
Daffodil at Camas	18-Feb-2020	L1	L1
330 Park View	25-Feb-2020	L1	L1
136 Memorial	25-Feb-2020	L1	L1
851 Temple	25-Feb-2020	L1	L1
Wheeler, Top of Kingsley, 378 Kingsley Street	25-Feb-2020	L1	L1
1247 Arbutus Rd	3-Mar-2020	L1	L1
Island Highway, by Temple	3-Mar-2020	L1	L1
770 Soriel	3-Mar-2020	L1	L1
271 Chestnut Street	3-Mar-2020	L1	L1
Works Yard, 1390 Herring Gull Way	10-Mar-2020	L1	L1
Top of Corfield	10-Mar-2020	L1	L1
Despard & Moilliet, 401 S. Moiliet Street	10-Mar-2020	L1	L1
Community Park, 193 East Island Highway	17-Mar-2020	L1	L1
613 Chinook Avenue	17-Mar-2020	L1	L1
River Pump Station, Englishman River Intake	24-Mar-2020	L1	L1

2020 Bacteriological Results—Facility type 301-10000 (DWT)

Appendix D

across from 450 Wisteria	24-Mar-2020	L1	L1
Daffodil at Camas	24-Mar-2020	L1	L1
136 Memorial	31-Mar-2020	L1	L1
330 Park View	31-Mar-2020	L1	L1
Wheeler, Top of Kingsley, 378 Kingsley Street	31-Mar-2020	L1	L1
851 Temple	31-Mar-2020	L1	L1
1247 Arbutus Rd	7-Apr-2020	L1	L1
Island Highway, by Temple	7-Apr-2020	L1	L1
271 Chestnut Street	7-Apr-2020	L1	L1
Works Yard, 1390 Herring Gull Way	14-Apr-2020	L1	L1
Top of Corfield	14-Apr-2020	L1	L1
Despard & Moilliet, 401 S. Moiliet Street	14-Apr-2020	L1	L1
770 Soriel	14-Apr-2020	L1	L1
613 Chinook Avenue	14-Apr-2020	L1	L1
River Pump Station, Englishman River Intake	21-Apr-2020	L1	L1
Community Park, 193 East Island Highway	21-Apr-2020	L1	L1
across from 450 Wisteria	21-Apr-2020	L1	L1
Daffodil at Camas	21-Apr-2020	L1	L1
330 Park View	27-Apr-2020	L1	L1
136 Memorial	27-Apr-2020	L1	L1
851 Temple	27-Apr-2020	L1	L1
Wheeler, Top of Kingsley, 378 Kingsley Street	27-Apr-2020	L1	L1
1247 Arbutus Rd	5-May-2020	L1	L1
Island Highway, by Temple	5-May-2020	L1	L1
770 Soriel	5-May-2020	L1	L1
271 Chestnut Street	5-May-2020	L1	L1
Works Yard, 1390 Herring Gull Way	12-May-2020	L1	L1
Top of Corfield	12-May-2020	L1	L1
613 Chinook Avenue	12-May-2020	L1	L1
Despard & Moilliet, 401 S. Moiliet Street	12-May-2020	L1	L1
River Pump Station, Englishman River Intake	19-May-2020	L1	L1
Community Park, 193 East Island Highway	19-May-2020	L1	L1
across from 450 Wisteria	19-May-2020	L1	L1
Daffodil at Camas	19-May-2020	L1	L1
330 Park View	26-May-2020	L1	L1
136 Memorial	26-May-2020	L1	L1
Wheeler, Top of Kingsley, 378 Kingsley Street	26-May-2020	L1	L1
851 Temple	26-May-2020	L1	L1
1247 Arbutus Rd	2-Jun-2020	L1	L1
Wheeler, Top of Kingsley, 378 Kingsley Street	2-Jun-2020	L1	L1
770 Soriel	2-Jun-2020	L1	L1
271 Chestnut Street	2-Jun-2020	L1	L1
Works Yard, 1390 Herring Gull Way	9-Jun-2020	L1	L1
Despard & Moilliet, 401 S. Moiliet Street	9-Jun-2020	L1	L1

2020 Bacteriological Results—Facility type 301-10000 (DWT)

Appendix D

Top of Corfield	9-Jun-2020	L1	L1
River Pump Station, Englishman River Intake	16-Jun-2020	L1	L1
Community Park, 193 East Island Highway	16-Jun-2020	L1	L1
613 Chinook Avenue	16-Jun-2020	L1	L1
across from 450 Wisteria	16-Jun-2020	L1	L1
Daffodil at Camas	23-Jun-2020	L1	L1
330 Park View	23-Jun-2020	L1	L1
136 Memorial	23-Jun-2020	L1	L1
Wheeler, Top of Kingsley, 378 Kingsley Street	30-Jun-2020	Reject Delay	Reject Delay
851 Temple	30-Jun-2020	Reject Delay	Reject Delay
1247 Arbutus Rd	7-Jul-2020	L1	L1
Wheeler, Top of Kingsley, 378 Kingsley Street	7-Jul-2020	L1	L1
Island Highway, by Temple	7-Jul-2020	L1	L1
770 Soriel	7-Jul-2020	L1	L1
851 Temple	7-Jul-2020	L1	L1
271 Chestnut Street	7-Jul-2020	L1	L1
Works Yard, 1390 Herring Gull Way	14-Jul-2020	L1	L1
Top of Corfield	14-Jul-2020	1	L1
Despard & Moilliet, 401 S. Moiliet Street	14-Jul-2020	L1	L1
613 Chinook Avenue	14-Jul-2020	L1	L1
330 Park View	21-Jul-2020	L1	L1
Top of Corfield	21-Jul-2020	L1	L1
Community Park, 193 East Island Highway	21-Jul-2020	L1	L1
across from 450 Wisteria	21-Jul-2020	L1	L1
Daffodil at Camas	21-Jul-2020	L1	L1
River Pump Station, Englishman River Intake	28-Jul-2020	L1	L1
136 Memorial	28-Jul-2020	L1	L1
Wheeler, Top of Kingsley, 378 Kingsley Street	28-Jul-2020	L1	L1
851 Temple	28-Jul-2020	L1	L1
1247 Arbutus Rd	4-Aug-2020	L1	L1
Island Highway, by Temple	4-Aug-2020	L1	L1
770 Soriel	4-Aug-2020	L1	L1
271 Chestnut Street	4-Aug-2020	L1	L1
Works Yard, 1390 Herring Gull Way	11-Aug-2020	L1	L1
Top of Corfield	11-Aug-2020	L1	L1
613 Chinook Avenue	11-Aug-2020	L1	L1
Community Park, 193 East Island Highway	18-Aug-2020	L1	L1
across from 450 Wisteria	18-Aug-2020	L1	L1
Daffodil at Camas	18-Aug-2020	L1	L1
Despard & Moilliet, 401 S. Moiliet Street	18-Aug-2020	L1	L1
River Pump Station, Englishman River Intake	25-Aug-2020	L1	L1
330 Park View	25-Aug-2020	L1	L1
136 Memorial	25-Aug-2020	L1	L1
Wheeler, Top of Kingsley, 378 Kingsley Street	25-Aug-2020	L1	L1

2020 Bacteriological Results—Facility type 301-10000 (DWT)

Appendix D

851 Temple	25-Aug-2020	L1	L1
1247 Arbutus Rd	1-Sept-2020	L1	L1
Island Highway, by Temple	1-Sept-2020	L1	L1
770 Soriel	1-Sept-2020	L1	L1
271 Chestnut Street	1-Sept-2020	L1	L1
Works Yard, 1390 Herring Gull Way	9-Sept-2020	L1	L1
Top of Corfield, Parksville	9-Sept-2020	L1	L1
613 Chinook Avenue	9-Sept-2020	L1	L1
Despard & Moilliet, 401 S. Moiliet Street	15-Sept-2020	L1	L1
Community Park, 193 East Island Highway	15-Sept-2020	L1	L1
across from 450 Wisteria	15-Sept-2020	L1	L1
River Pump Station, Englishman River Intake	22-Sept-2020	L1	L1
613 Chinook Avenue	22-Sept-2020	L1	L1
Daffodil at Camas	22-Sept-2020	L1	L1
330 Park View	29-Sept-2020	L1	L1
136 Memorial	29-Sept-2020	L1	L1
Wheeler, Top of Kingsley, 378 Kingsley Street	29-Sept-2020	L1	L1
851 Temple	29-Sept-2020	L1	L1
1247 Arbutus Rd	6-Oct-2020	L1	L1
Island Highway, by Temple	6-Oct-2020	L1	L1
770 Soriel	6-Oct-2020	L1	L1
271 Chestnut Street	6-Oct-2020	L1	L1
Works Yard, 1390 Herring Gull Way	13-Oct-2020	L1	L1
Top of Corfield, Parksville	13-Oct-2020	L1	L1
Despard & Moilliet, 401 S. Moiliet Street	13-Oct-2020	L1	L1
613 Chinook Avenue	13-Oct-2020	L1	L1
Community Park, 193 East Island Highway	20-Oct-2020	L1	L1
across from 450 Wisteria	20-Oct-2020	L1	L1
Daffodil at Camas	20-Oct-2020	L1	L1
River Pump Station, Englishman River Intake	20-Oct-2020	L1	L1
330 Park View	27-Oct-2020	L1	L1
136 Memorial	27-Oct-2020	L1	L1
Wheeler, Top of Kingsley, 378 Kingsley Street	27-Oct-2020	L1	L1
851 Temple	27-Oct-2020	L1	L1
1247 Arbutus Rd	3-Nov-2020	L1	L1
Island Highway, by Temple	3-Nov-2020	L1	L1
770 Soriel	3-Nov-2020	L1	L1
271 Chestnut Street	3-Nov-2020	L1	L1
Works Yard, 1390 Herring Gull Way	9-Nov-2020	L1	L1
Top of Corfield, Parksville	9-Nov-2020	L1	L1
Despard & Moilliet, 401 S. Moiliet Street	9-Nov-2020	L1	L1
613 Chinook Avenue	9-Nov-2020	L1	L1
Community Park, 193 East Island Highway	17-Nov-2020	L1	L1
across from 450 Wisteria	17-Nov-2020	L1	L1

2020 Bacteriological Results—Facility type 301-10000 (DWT)

Appendix D

Daffodil at Camas	17-Nov-2020	L1	L1
330 Park View	24-Nov-2020	L1	L1
136 Memorial	24-Nov-2020	L1	L1
Wheeler, Top of Kingsley, 378 Kingsley Street	24-Nov-2020	L1	L1
851 Temple	24-Nov-2020	L1	L1
1247 Arbutus Rd	1-Dec-2020	L1	L1
271 Chestnut Street	1-Dec-2020	L1	L1
770 Soriel	1-Dec-2020	L1	L1
Works Yard, 1390 Herring Gull Way	8-Dec-2020	L1	L1
Community Park, 193 East Island Highway	8-Dec-2020	L1	L1
Top of Corfield, Parksville	8-Dec-2020	L1	L1
613 Chinook Avenue	8-Dec-2020	L1	L1
Despard & Moilliet, 401 S. Moiliet Street	8-Dec-2020	L1	L1
330 Park View	16-Dec-2020	L1	L1
136 Memorial	16-Dec-2020	L1	L1
across from 450 Wisteria	16-Dec-2020	L1	L1
851 Temple	16-Dec-2020	L1	L1
Daffodil at Camas	16-Dec-2020	L1	L1
Wheeler, Top of Kingsley, 378 Kingsley Street	16-Dec-2020	L1	L1

Appendix E

Element
#104, 19575-55 A Ave.
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V3S 8P8, Canada

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Report Transmission Cover Page

Bill To: City of Parksville
1116 Herring Gull Way
Parksville, BC, Canada
V9P 1R2
Attn: Accounts Payable
Sampled By: Barbara Silenieks
Company: City of Parksville

Project ID:
Project Name: Full Spectrum
Project Location: City of Parksville
LSD:
P.O.: PO003842
Proj. Acct. code:

Lot ID: **1407562**
Control Number:
Date Received: Feb 12, 2020
Date Reported: Feb 19, 2020
Report Number: 2490727

Contact	Company	Address
Accounts Payable	**City of Parksville**	1116 Herring Gull Way Parksville, BC V9P 1R2 Phone: (250) 951-2489 Fax: Email: ap@parksville.ca

Delivery	Format	Deliverables
Email - Single Report	PDF	Invoice

Contact	Company	Address
Barbara Silenieks	**City of Parksville**	1116 Herring Gull Way Parksville, BC V9P 1R2 Phone: (250) 951-2489 Fax: Email: bsilenieks@parksville.ca

Delivery	Format	Deliverables
Email - Single Report	PDF	COA
Email - Single Report	PDF	COC / Test Report

Notes To Clients:

- Feb 18, 2020 - Reduction of analytical volume was necessary for chloride analysis to bring results within the analytical range for samples 1407562-2 and 3. Detection limits are adjusted accordingly.

Appendix E

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E: info.vancouver@element.com
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Analytical Report

Bill To: City of Parksville
1116 Herring Gull Way
Parksville, BC, Canada
V9P 1R2
Attn: Accounts Payable
Sampled By: Barbara Silenieks
Company: City of Parksville

Project ID:
Project Name: Full Spectrum
Project Location: City of Parksville
LSD:
P.O.: PO003842
Proj. Acct. code:

Lot ID: **1407562**
Control Number:
Date Received: Feb 12, 2020
Date Reported: Feb 19, 2020
Report Number: 2490727

Reference Number	1407562-1
Sample Date	February 11, 2020
Sample Time	11:20
Sample Location	
Sample Description	River / Raw Water / 4.5 °C
Sample Matrix	Water

Analyte		Units	Result	Nominal Detection Limit	Guideline Limit	Guideline Comments
Inorganic Nonmetallic Parameters						
Cyanide	Total	mg/L	<0.002	0.002	0.2	Below MAC
Metals Total						
Calcium	Total	mg/L	5.4	0.01		
Magnesium	Total	mg/L	0.96	0.02		
Potassium	Total	mg/L	0.19	0.04		
Silicon	Total	mg/L	3.0	0.005		
Sodium	Total	mg/L	2.6	0.1	200	Below AO
Digestion	Preparation		Field Pres, digest as total Hg			
Mercury	Total	mg/L	<0.00001	0.00005	0.001	Below MAC
Microbiological Analysis						
Total Coliforms	Enzyme Substrate Test	MPN/100 mL	165.2	1.0	0 per 100 mL	Above MAC
Escherichia coli	Enzyme Substrate Test	MPN/100 mL	7.5	1.0	0 per 100 mL	Above MAC
Physical and Aggregate Properties						
Colour	True	Colour units	17	5		
Turbidity		NTU	1.71	0.1	0.1	Above OG
Routine Water						
Digestion	Dissolved		Lab filtered & preserved			
pH - Holding Time			Exceeded			
pH	at 25 °C		6.96	0.01	7.0-10.5	Below Range
Electrical Conductivity		µS/cm at 25 °C	59	1		
T-Alkalinity	as CaCO3	mg/L	16	5		
Chloride	Dissolved	mg/L	5.08	0.05	250	Below AO
Fluoride	Dissolved	mg/L	<0.01	0.01	1.5	Below MAC
Nitrate - N	Dissolved	mg/L	0.14	0.01	10	Below MAC
Nitrite - N	Dissolved	mg/L	<0.01	0.01	1	Below MAC
Sulfate (SO4)	Dissolved	mg/L	1.9	0.1	500	Below AO
Hardness	as CaCO3 (dissolved)	mg/L	21	5		
Total Dissolved Solids	Calculated	mg/L	37	1	500	Below AO
Langelier Index			-2.3			
Trace Metals Total						
Aluminum	Total	mg/L	0.16	0.001	0.1	Above OG
Antimony	Total	mg/L	<0.00002	0.00002	0.006	Below MAC
Arsenic	Total	mg/L	0.0002	0.0001	0.010	Below MAC
Barium	Total	mg/L	0.0038	0.0001	1.0	Below MAC
Boron	Total	mg/L	0.006	0.002	5	Below MAC

Full Spectrum Analysis

Appendix E

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W: element.com

Analytical Report

Bill To: City of Parksville
1116 Herring Gull Way
Parksville, BC, Canada
V9P 1R2
Attn: Accounts Payable
Sampled By: Barbara Silenieks
Company: City of Parksville

Project ID:
Project Name: Full Spectrum
Project Location: City of Parksville
LSD:
P.O.: PO003842
Proj. Acct. code:

Lot ID: **1407562**
Control Number:
Date Received: Feb 12, 2020
Date Reported: Feb 19, 2020
Report Number: 2490727

Reference Number	1407562-1
Sample Date	February 11, 2020
Sample Time	11:20
Sample Location	
Sample Description	River / Raw Water / 4.5 °C
Sample Matrix	Water

Analyte		Units	Result	Nominal Detection Limit	Guideline Limit	Guideline Comments
Trace Metals Total - Continued						
Cadmium	Total	mg/L	0.00005	0.00001	0.005	Below MAC
Chromium	Total	mg/L	0.00042	0.00005	0.05	Below MAC
Copper	Total	mg/L	0.0011	0.0002	1 AO; 2 MAC	Below AO
Iron	Total	mg/L	0.15	0.002	0.3	Below AO
Lead	Total	mg/L	0.00002	0.00001	0.005	Below MAC
Manganese	Total	mg/L	0.004	0.001	0.02 AO; 0.12 MAC	Below AO
Selenium	Total	mg/L	<0.0002	0.0002	0.05	Below MAC
Strontium	Total	mg/L	0.021	0.0001	7.0	Below MAC
Uranium	Total	mg/L	0.00001	0.00001	0.02	Below MAC
Zinc	Total	mg/L	0.0016	0.0005	5.0	Below AO

Full Spectrum Analysis

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Company: City of Parksville

Project ID:
Project Name: Full Spectrum
Project Location: City of Parksville
LSD:
P.O.: PO003842
Proj. Acct. code:

Lot ID: **1407562**
Control Number:
Date Received: Feb 12, 2020
Date Reported: Feb 19, 2020
Report Number: 2490727

Reference Number	1407562-2
Sample Date	February 11, 2020
Sample Time	10:30
Sample Location	
Sample Description	Railway Well # 3 / Well Water / 4.5 °C
Sample Matrix	Water

Analyte		Units	Result	Nominal Detection Limit	Guideline Limit	Guideline Comments
Inorganic Nonmetallic Parameters						
Cyanide	Total	mg/L	<0.002	0.002	0.2	Below MAC
Metals Total						
Calcium	Total	mg/L	38	0.01		
Magnesium	Total	mg/L	17	0.02		
Potassium	Total	mg/L	0.79	0.04		
Silicon	Total	mg/L	10	0.005		
Sodium	Total	mg/L	9.8	0.1	200	Below AO
Digestion	Preparation		Field Pres, digest as total Hg			
Mercury	Total	mg/L	<0.00001	0.00005	0.001	Below MAC
Microbiological Analysis						
Total Coliforms	Enzyme Substrate Test	MPN/100 mL	<1.0	1.0	0 per 100 mL	Below MAC
Escherichia coli	Enzyme Substrate Test	MPN/100 mL	<1.0	1.0	0 per 100 mL	Below MAC
Physical and Aggregate Properties						
Colour	True	Colour units	<5	5		
Turbidity		NTU	0.14	0.1	0.1	Above OG
Routine Water						
Digestion	Dissolved		Lab filtered & preserved			
pH - Holding Time			Exceeded			
pH	at 25 °C		7.82	0.01	7.0-10.5	Within Range
Electrical Conductivity		µS/cm at 25 °C	419	1		
T-Alkalinity	as CaCO3	mg/L	120	5		
Chloride	Dissolved	mg/L	50.7	0.05	250	Below AO
Fluoride	Dissolved	mg/L	<0.01	0.01	1.5	Below MAC
Nitrate - N	Dissolved	mg/L	1.13	0.01	10	Below MAC
Nitrite - N	Dissolved	mg/L	<0.01	0.01	1	Below MAC
Sulfate (SO4)	Dissolved	mg/L	4.0	0.1	500	Below AO
Hardness	as CaCO3 (dissolved)	mg/L	190	5		
Total Dissolved Solids	Calculated	mg/L	237	1	500	Below AO
Langelier Index			0.1			
Trace Metals Total						
Aluminum	Total	mg/L	<0.001	0.001	0.1	Below OG
Antimony	Total	mg/L	<0.00002	0.00002	0.006	Below MAC
Arsenic	Total	mg/L	0.0003	0.0001	0.010	Below MAC
Barium	Total	mg/L	0.0078	0.0001	1.0	Below MAC
Boron	Total	mg/L	0.010	0.002	5	Below MAC

Full Spectrum Analysis

Appendix E

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W: element.com

Analytical Report

Bill To: City of Parksville
1116 Herring Gull Way
Parksville, BC, Canada
V9P 1R2
Attn: Accounts Payable
Sampled By: Barbara Silenieks
Company: City of Parksville

Project ID:
Project Name: Full Spectrum
Project Location: City of Parksville
LSD:
P.O.: PO003842
Proj. Acct. code:

Lot ID: **1407562**
Control Number:
Date Received: Feb 12, 2020
Date Reported: Feb 19, 2020
Report Number: 2490727

Reference Number	1407562-2
Sample Date	February 11, 2020
Sample Time	10:30
Sample Location	
Sample Description	Railway Well # 3 / Well Water / 4.5 °C
Sample Matrix	Water

Analyte		Units	Result	Nominal Detection Limit	Guideline Limit	Guideline Comments
Trace Metals Total - Continued						
Cadmium	Total	mg/L	<0.00001	0.00001	0.005	Below MAC
Chromium	Total	mg/L	0.00049	0.00005	0.05	Below MAC
Copper	Total	mg/L	0.0017	0.0002	1 AO; 2 MAC	Below AO
Iron	Total	mg/L	0.004	0.002	0.3	Below AO
Lead	Total	mg/L	0.00073	0.00001	0.005	Below MAC
Manganese	Total	mg/L	0.021	0.001	0.02 AO; 0.12 MAC	Above AO
Selenium	Total	mg/L	<0.0002	0.0002	0.05	Below MAC
Strontium	Total	mg/L	0.11	0.0001	7.0	Below MAC
Uranium	Total	mg/L	0.00024	0.00001	0.02	Below MAC
Zinc	Total	mg/L	0.026	0.0005	5.0	Below AO

Appendix E

element
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F: +1 (604) 514-3323
E: info.vancouver@element.com
W: element.com

Analytical Report

Bill To: City of Parksville
1116 Herring Gull Way
Parksville, BC, Canada
V9P 1R2
Attn: Accounts Payable
Sampled By: Barbara Silenieks
Company: City of Parksville

Project ID:
Project Name: Full Spectrum
Project Location: City of Parksville
LSD:
P.O.: PO003842
Proj. Acct. code:

Lot ID: **1407562**
Control Number:
Date Received: Feb 12, 2020
Date Reported: Feb 19, 2020
Report Number: 2490727

Reference Number	1407562-3
Sample Date	February 11, 2020
Sample Time	10:15
Sample Location	
Sample Description	Railway Well # 7 / Well Water / 4.5 °C
Sample Matrix	Water

Analyte		Units	Result	Nominal Detection Limit	Guideline Limit	Guideline Comments
Inorganic Nonmetallic Parameters						
Cyanide	Total	mg/L	<0.002	0.002	0.2	Below MAC
Metals Total						
Calcium	Total	mg/L	42	0.01		
Magnesium	Total	mg/L	20	0.02		
Potassium	Total	mg/L	0.89	0.04		
Silicon	Total	mg/L	11	0.005		
Sodium	Total	mg/L	11	0.1	200	Below AO
Digestion	Preparation		Field Pres, digest as total Hg			
Mercury	Total	mg/L	<0.00001	0.00005	0.001	Below MAC
Microbiological Analysis						
Total Coliforms	Enzyme Substrate Test	MPN/100 mL	<1.0	1.0	0 per 100 mL	Below MAC
Escherichia coli	Enzyme Substrate Test	MPN/100 mL	<1.0	1.0	0 per 100 mL	Below MAC
Physical and Aggregate Properties						
Colour	True	Colour units	<5	5		
Turbidity		NTU	<0.10	0.1	0.1	Below OG
Routine Water						
Digestion	Dissolved		Lab filtered & preserved			
pH - Holding Time			Exceeded			
pH	at 25 °C		7.76	0.01	7.0-10.5	Within Range
Electrical Conductivity		µS/cm at 25 °C	449	1		
T-Alkalinity	as CaCO3	mg/L	151	5		
Chloride	Dissolved	mg/L	44.1	0.05	250	Below AO
Fluoride	Dissolved	mg/L	<0.01	0.01	1.5	Below MAC
Nitrate - N	Dissolved	mg/L	1.65	0.01	10	Below MAC
Nitrite - N	Dissolved	mg/L	<0.01	0.01	1	Below MAC
Sulfate (SO4)	Dissolved	mg/L	5.9	0.1	500	Below AO
Hardness	as CaCO3 (dissolved)	mg/L	200	5		
Total Dissolved Solids	Calculated	mg/L	262	1	500	Below AO
Langelier Index			0.2			
Trace Metals Total						
Aluminum	Total	mg/L	<0.001	0.001	0.1	Below OG
Antimony	Total	mg/L	<0.00002	0.00002	0.006	Below MAC
Arsenic	Total	mg/L	0.0003	0.0001	0.010	Below MAC
Barium	Total	mg/L	0.015	0.0001	1.0	Below MAC
Boron	Total	mg/L	0.011	0.002	5	Below MAC

Full Spectrum Analysis

Appendix E

element

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E: info.vancouver@element.com
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Analytical Report

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1116 Herring Gull Way
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V9P 1R2
Attn: Accounts Payable
Sampled By: Barbara Silenieks
Company: City of Parksville

Project ID:
Project Name: Full Spectrum
Project Location: City of Parksville
LSD:
P.O.: PO003842
Proj. Acct. code:

Lot ID: **1407562**
Control Number:
Date Received: Feb 12, 2020
Date Reported: Feb 19, 2020
Report Number: 2490727

Reference Number	1407562-3
Sample Date	February 11, 2020
Sample Time	10:15
Sample Location	
Sample Description	Railway Well # 7 / Well Water / 4.5 °C
Sample Matrix	Water

Analyte		Units	Result	Nominal Detection Limit	Guideline Limit	Guideline Comments
Trace Metals Total - Continued						
Cadmium	Total	mg/L	<0.00001	0.00001	0.005	Below MAC
Chromium	Total	mg/L	0.00078	0.00005	0.05	Below MAC
Copper	Total	mg/L	0.0016	0.0002	1 AO; 2 MAC	Below AO
Iron	Total	mg/L	0.010	0.002	0.3	Below AO
Lead	Total	mg/L	0.00068	0.00001	0.005	Below MAC
Manganese	Total	mg/L	0.007	0.001	0.02 AO; 0.12 MAC	Below AO
Selenium	Total	mg/L	<0.0002	0.0002	0.05	Below MAC
Strontium	Total	mg/L	0.12	0.0001	7.0	Below MAC
Uranium	Total	mg/L	0.00030	0.00001	0.02	Below MAC
Zinc	Total	mg/L	0.013	0.0005	5.0	Below AO

Full Spectrum Analysis

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Parksville, BC, Canada
V9P 1R2
Attn: Accounts Payable
Sampled By: Barbara Silenieks
Company: City of Parksville

Project ID:
Project Name: Full Spectrum
Project Location: City of Parksville
LSD:
P.O.: PO003842
Proj. Acct. code:

Lot ID: **1407562**
Control Number:
Date Received: Feb 12, 2020
Date Reported: Feb 19, 2020
Report Number: 2490727

Reference Number	1407562-4
Sample Date	February 11, 2020
Sample Time	09:40
Sample Location	
Sample Description	Springwood Well # 3 / Well Water / 4.5 °C
Sample Matrix	Water

Analyte		Units	Result	Nominal Detection Limit	Guideline Limit	Guideline Comments
Inorganic Nonmetallic Parameters						
Cyanide	Total	mg/L	<0.002	0.002	0.2	Below MAC
Metals Total						
Calcium	Total	mg/L	28	0.01		
Magnesium	Total	mg/L	13	0.02		
Potassium	Total	mg/L	0.76	0.04		
Silicon	Total	mg/L	11	0.005		
Sodium	Total	mg/L	8.6	0.1	200	Below AO
Digestion	Preparation		Field Pres, digest as total Hg			
Mercury	Total	mg/L	<0.00001	0.00005	0.001	Below MAC
Microbiological Analysis						
Total Coliforms	Enzyme Substrate Test	MPN/100 mL	<1.0	1.0	0 per 100 mL	Below MAC
Escherichia coli	Enzyme Substrate Test	MPN/100 mL	<1.0	1.0	0 per 100 mL	Below MAC
Physical and Aggregate Properties						
Colour	True	Colour units	<5	5		
Turbidity		NTU	<0.10	0.1	0.1	Below OG
Routine Water						
Digestion	Dissolved		Lab filtered & preserved			
pH - Holding Time			Exceeded			
pH	at 25 °C		7.80	0.01	7.0-10.5	Within Range
Electrical Conductivity		µS/cm at 25 °C	308	1		
T-Alkalinity	as CaCO3	mg/L	120	5		
Chloride	Dissolved	mg/L	20.7	0.05	250	Below AO
Fluoride	Dissolved	mg/L	<0.01	0.01	1.5	Below MAC
Nitrate - N	Dissolved	mg/L	1.14	0.01	10	Below MAC
Nitrite - N	Dissolved	mg/L	<0.01	0.01	1	Below MAC
Sulfate (SO4)	Dissolved	mg/L	6.7	0.1	500	Below AO
Hardness	as CaCO3 (dissolved)	mg/L	142	5		
Total Dissolved Solids	Calculated	mg/L	195	1	500	Below AO
Langelier Index			-0.007			
Trace Metals Total						
Aluminum	Total	mg/L	<0.001	0.001	0.1	Below OG
Antimony	Total	mg/L	0.00002	0.00002	0.006	Below MAC
Arsenic	Total	mg/L	0.0004	0.0001	0.010	Below MAC
Barium	Total	mg/L	0.0058	0.0001	1.0	Below MAC
Boron	Total	mg/L	0.012	0.002	5	Below MAC

Full Spectrum Analysis

Appendix E

element

Element
#104, 19575-55 A Ave.
Surrey, British Columbia
V3S 8P8, Canada

T: +1 (604) 514-3322
F: +1 (604) 514-3323
E: info.vancouver@element.com
W: element.com

Analytical Report

Bill To: City of Parksville
1116 Herring Gull Way
Parksville, BC, Canada
V9P 1R2
Attn: Accounts Payable
Sampled By: Barbara Silenieks
Company: City of Parksville

Project ID:
Project Name: Full Spectrum
Project Location: City of Parksville
LSD:
P.O.: PO003842
Proj. Acct. code:

Lot ID: **1407562**
Control Number:
Date Received: Feb 12, 2020
Date Reported: Feb 19, 2020
Report Number: 2490727

Reference Number	1407562-4
Sample Date	February 11, 2020
Sample Time	09:40
Sample Location	
Sample Description	Springwood Well # 3 / Well Water / 4.5 °C
Sample Matrix	Water

Analyte		Units	Result	Nominal Detection Limit	Guideline Limit	Guideline Comments
Trace Metals Total - Continued						
Cadmium	Total	mg/L	<0.00001	0.00001	0.005	Below MAC
Chromium	Total	mg/L	0.00046	0.00005	0.05	Below MAC
Copper	Total	mg/L	0.0019	0.0002	1 AO; 2 MAC	Below AO
Iron	Total	mg/L	0.010	0.002	0.3	Below AO
Lead	Total	mg/L	0.00081	0.00001	0.005	Below MAC
Manganese	Total	mg/L	0.035	0.001	0.02 AO; 0.12 MAC	Above AO
Selenium	Total	mg/L	<0.0002	0.0002	0.05	Below MAC
Strontium	Total	mg/L	0.077	0.0001	7.0	Below MAC
Uranium	Total	mg/L	0.00013	0.00001	0.02	Below MAC
Zinc	Total	mg/L	0.0048	0.0005	5.0	Below AO

Appendix E

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Analytical Report

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Attn: Accounts Payable
Sampled By: Barbara Silenieks
Company: City of Parksville

Project ID:
Project Name: Full Spectrum
Project Location: City of Parksville
LSD:
P.O.: PO003842
Proj. Acct. code:

Lot ID: **1407562**
Control Number:
Date Received: Feb 12, 2020
Date Reported: Feb 19, 2020
Report Number: 2490727

Reference Number	1407562-5
Sample Date	February 11, 2020
Sample Time	09:55
Sample Location	
Sample Description	Springwood Well # 6 / Well Water / 4.5 °C
Sample Matrix	Water

Analyte		Units	Result	Nominal Detection Limit	Guideline Limit	Guideline Comments
Inorganic Nonmetallic Parameters						
Cyanide	Total	mg/L	<0.002	0.002	0.2	Below MAC
Metals Total						
Calcium	Total	mg/L	33	0.01		
Magnesium	Total	mg/L	14	0.02		
Potassium	Total	mg/L	0.78	0.04		
Silicon	Total	mg/L	12	0.005		
Sodium	Total	mg/L	8.9	0.1	200	Below AO
Digestion	Preparation		Field Pres, digest as total Hg			
Mercury	Total	mg/L	<0.00001	0.00005	0.001	Below MAC
Microbiological Analysis						
Total Coliforms	Enzyme Substrate Test	MPN/100 mL	<1.0	1.0	0 per 100 mL	Below MAC
Escherichia coli	Enzyme Substrate Test	MPN/100 mL	<1.0	1.0	0 per 100 mL	Below MAC
Physical and Aggregate Properties						
Colour	True	Colour units	<5	5		
Turbidity		NTU	0.50	0.1	0.1	Above OG
Routine Water						
Digestion	Dissolved		Lab filtered & preserved			
pH - Holding Time			Exceeded			
pH	at 25 °C		7.65	0.01	7.0-10.5	Within Range
Electrical Conductivity		µS/cm at 25 °C	336	1		
T-Alkalinity	as CaCO3	mg/L	135	5		
Chloride	Dissolved	mg/L	19.8	0.05	250	Below AO
Fluoride	Dissolved	mg/L	<0.01	0.01	1.5	Below MAC
Nitrate - N	Dissolved	mg/L	1.41	0.01	10	Below MAC
Nitrite - N	Dissolved	mg/L	<0.01	0.01	1	Below MAC
Sulfate (SO4)	Dissolved	mg/L	7.1	0.1	500	Below AO
Hardness	as CaCO3 (dissolved)	mg/L	157	5		
Total Dissolved Solids	Calculated	mg/L	214	1	500	Below AO
Langelier Index			-0.06			
Trace Metals Total						
Aluminum	Total	mg/L	0.001	0.001	0.1	Below OG
Antimony	Total	mg/L	<0.00002	0.00002	0.006	Below MAC
Arsenic	Total	mg/L	0.0003	0.0001	0.010	Below MAC
Barium	Total	mg/L	0.0060	0.0001	1.0	Below MAC
Boron	Total	mg/L	0.012	0.002	5	Below MAC

Full Spectrum Analysis

Appendix E

element

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V3S 6P8, Canada

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Analytical Report

Bill To: City of Parksville
1116 Herring Gull Way
Parksville, BC, Canada
V9P 1R2
Attn: Accounts Payable
Sampled By: Barbara Silenieks
Company: City of Parksville

Project ID:
Project Name: Full Spectrum
Project Location: City of Parksville
LSD:
P.O.: PO003842
Proj. Acct. code:

Lot ID: **1407562**
Control Number:
Date Received: Feb 12, 2020
Date Reported: Feb 19, 2020
Report Number: 2490727

Reference Number	1407562-5
Sample Date	February 11, 2020
Sample Time	09:55
Sample Location	
Sample Description	Springwood Well # 6 / Well Water / 4.5 °C
Sample Matrix	Water

Analyte		Units	Result	Nominal Detection Limit	Guideline Limit	Guideline Comments
Trace Metals Total - Continued						
Cadmium	Total	mg/L	<0.00001	0.00001	0.005	Below MAC
Chromium	Total	mg/L	0.00045	0.00005	0.05	Below MAC
Copper	Total	mg/L	0.0029	0.0002	1 AO; 2 MAC	Below AO
Iron	Total	mg/L	0.045	0.002	0.3	Below AO
Lead	Total	mg/L	0.00033	0.00001	0.005	Below MAC
Manganese	Total	mg/L	0.011	0.001	0.02 AO; 0.12 MAC	Below AO
Selenium	Total	mg/L	<0.0002	0.0002	0.05	Below MAC
Strontium	Total	mg/L	0.089	0.0001	7.0	Below MAC
Uranium	Total	mg/L	0.00011	0.00001	0.02	Below MAC
Zinc	Total	mg/L	0.033	0.0005	5.0	Below AO

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Parksville, BC, Canada
V9P 1R2
Attn: Accounts Payable
Sampled By: Barbara Silenieks
Company: City of Parksville

Project ID:
Project Name: Full Spectrum
Project Location: City of Parksville
LSD:
P.O.: PO003842
Proj. Acct. code:

Lot ID: **1407562**
Control Number:
Date Received: Feb 12, 2020
Date Reported: Feb 19, 2020
Report Number: 2490727

Reference Number	1407562-6
Sample Date	February 11, 2020
Sample Time	10:50
Sample Location	
Sample Description	Memorial / Distribution System Water / 4.5 °C
Sample Matrix	Water

Analyte		Units	Result	Nominal Detection Limit	Guideline Limit	Guideline Comments
Inorganic Nonmetallic Parameters						
Cyanide	Total	mg/L	<0.002	0.002	0.2	Below MAC
Metals Total						
Calcium	Total	mg/L	34	0.01		
Magnesium	Total	mg/L	15	0.02		
Potassium	Total	mg/L	0.75	0.04		
Silicon	Total	mg/L	11	0.005		
Sodium	Total	mg/L	9.4	0.1	200	Below AO
Digestion	Preparation		Field Pres, digest as total Hg			
Mercury	Total	mg/L	<0.00001	0.00005	0.001	Below MAC
Microbiological Analysis						
Total Coliforms	Enzyme Substrate Test	MPN/100 mL	<1.0	1.0	0 per 100 mL	Below MAC
Escherichia coli	Enzyme Substrate Test	MPN/100 mL	<1.0	1.0	0 per 100 mL	Below MAC
Physical and Aggregate Properties						
Colour	True	Colour units	<5	5		
Turbidity		NTU	<0.10	0.1	0.1	Below OG
Routine Water						
Digestion	Dissolved		Lab filtered & preserved			
pH - Holding Time			Exceeded			
pH	at 25 °C		7.76	0.01	7.0-10.5	Within Range
Electrical Conductivity		µS/cm at 25 °C	357	1		
T-Alkalinity	as CaCO3	mg/L	136	5		
Chloride	Dissolved	mg/L	26.6	0.05	250	Below AO
Fluoride	Dissolved	mg/L	<0.01	0.01	1.5	Below MAC
Nitrate - N	Dissolved	mg/L	1.30	0.01	10	Below MAC
Nitrite - N	Dissolved	mg/L	<0.01	0.01	1	Below MAC
Sulfate (SO4)	Dissolved	mg/L	6.7	0.1	500	Below AO
Hardness	as CaCO3 (dissolved)	mg/L	163	5		
Total Dissolved Solids	Calculated	mg/L	219	1	500	Below AO
Langelier Index			0.06			
Trace Metals Total						
Aluminum	Total	mg/L	<0.001	0.001	0.1	Below OG
Antimony	Total	mg/L	<0.00002	0.00002	0.006	Below MAC
Arsenic	Total	mg/L	0.0003	0.0001	0.010	Below MAC
Barium	Total	mg/L	0.0096	0.0001	1.0	Below MAC
Boron	Total	mg/L	0.009	0.002	5	Below MAC

Full Spectrum Analysis

Appendix E

element

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Analytical Report

Bill To: City of Parksville
1116 Herring Gull Way
Parksville, BC, Canada
V9P 1R2
Attn: Accounts Payable
Sampled By: Barbara Silenieks
Company: City of Parksville

Project ID:
Project Name: Full Spectrum
Project Location: City of Parksville
LSD:
P.O.: PO003842
Proj. Acct. code:

Lot ID: **1407562**
Control Number:
Date Received: Feb 12, 2020
Date Reported: Feb 19, 2020
Report Number: 2490727

Reference Number	1407562-6
Sample Date	February 11, 2020
Sample Time	10:50
Sample Location	
Sample Description	Memorial / Distribution System Water / 4.5 °C
Sample Matrix	Water

Analyte		Units	Result	Nominal Detection Limit	Guideline Limit	Guideline Comments
Trace Metals Total - Continued						
Cadmium	Total	mg/L	<0.00001	0.00001	0.005	Below MAC
Chromium	Total	mg/L	0.00068	0.00005	0.05	Below MAC
Copper	Total	mg/L	0.078	0.0002	1 AO; 2 MAC	Below AO
Iron	Total	mg/L	0.014	0.002	0.3	Below AO
Lead	Total	mg/L	0.00069	0.00001	0.005	Below MAC
Manganese	Total	mg/L	0.004	0.001	0.02 AO; 0.12 MAC	Below AO
Selenium	Total	mg/L	<0.0002	0.0002	0.05	Below MAC
Strontium	Total	mg/L	0.095	0.0001	7.0	Below MAC
Uranium	Total	mg/L	0.00019	0.00001	0.02	Below MAC
Zinc	Total	mg/L	0.010	0.0005	5.0	Below AO

Approved by:

Matthew Norman, BSc, PChem
Operations Chemist

Data have been validated by Analytical Quality Control and Element's Integrated Data Validation System (IDVS).
Generation and distribution of the report, and approval by the digitized signature above, are performed through a secure and controlled automatic process.

Appendix E

element

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Methodology and Notes

Bill To: City of Parksville
1116 Herring Gull Way
Parksville, BC, Canada
V9P 1R2
Attn: Accounts Payable
Sampled By: Barbara Silenieks
Company: City of Parksville

Project ID:
Project Name: Full Spectrum
Project Location: City of Parksville
LSD:
P.O.: PO003842
Proj. Acct. code:

Lot ID: **1407562**
Control Number:
Date Received: Feb 12, 2020
Date Reported: Feb 19, 2020
Report Number: 2490727

Method of Analysis

Method Name	Reference	Method	Date Analysis Started	Location
Alk, pH, EC, Turb in water (BC)	APHA	* Alkalinity - Titration Method, 2320 B	Feb 13, 2020	Element Vancouver
Alk, pH, EC, Turb in water (BC)	APHA	* Conductivity, 2510 B	Feb 13, 2020	Element Vancouver
Alk, pH, EC, Turb in water (BC)	APHA	* pH - Electrometric Method, 4500-H+ B	Feb 13, 2020	Element Vancouver
Anions by IEC in water (VAN)	APHA	* Ion Chromatography with Chemical Suppression of Eluent Cond., 4110 B	Feb 13, 2020	Element Vancouver
Cyanide (Total) in water	US EPA	* US EPA method, 335.3	Feb 19, 2020	Element Edmonton - Roper Road
Mercury Low Level (Total) in water (VAN)	EPA	* Mercury in Water by Cold Vapor Atomic Fluorescence Spectrometry, 245.7	Feb 18, 2020	Element Vancouver
Metals SemiTrace (Dissolved) in water (VAN)	US EPA	* Metals & Trace Elements by ICP-AES, 6010C	Feb 13, 2020	Element Vancouver
Metals SemiTrace (Total) in Water (VAN)	US EPA	* Metals & Trace Elements by ICP-AES, 6010C	Feb 13, 2020	Element Vancouver
Total and E-Coli - Colilert - DW (VAN)	APHA	Enzyme Substrate Test, APHA 9223 B	Feb 12, 2020	Element Vancouver
Trace Metals (Total) in Water (VAN)	US EPA	* Determination of Trace Elements in Waters and Wastes by ICP-MS, 200.8	Feb 13, 2020	Element Vancouver
True Color in water (VAN)	APHA	* Spectrophotometric - Single Wavelength Method, 2120 C	Feb 13, 2020	Element Vancouver
Turbidity - Water (VAN)	APHA	* Turbidity - Nephelometric Method, 2130 B	Feb 12, 2020	Element Vancouver

*Reference Method Modified

References

APHA	Standard Methods for the Examination of Water and Wastewater
EPA	Environmental Protection Agency Test Methods - US
US EPA	US Environmental Protection Agency Test Methods

Guidelines

Guideline Description	Health Canada GCDWQ
Guideline Source	Guidelines for Canadian Drinking Water Quality, Health Canada, June 2019
Guideline Comments	MAC = Maximum Acceptable Concentration AO = Aesthetic Objective OG = Operational Guideline for Water Treatment Plants (does not apply to private groundwater wells). Refer to Health Canada for complete guidelines at www.hc-sc.gc.ca

Comments:

- Feb 18, 2020 - Reduction of analytical volume was necessary for chloride analysis to bring results within the analytical range for samples 1407562-2 and 3. Detection limits are adjusted accordingly.

Appendix E

element

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Methodology and Notes

Bill To:	City of Parksville	Project ID:		Lot ID:	**1407562**
	1116 Herring Gull Way	Project Name:	Full Spectrum	Control Number:	
	Parksville, BC, Canada	Project Location:	City of Parksville	Date Received:	Feb 12, 2020
	V9P 1R2	LSD:		Date Reported:	Feb 19, 2020
Attn:	Accounts Payable	P.O.:	PO003842	Report Number:	2490727
Sampled By:	Barbara Silenieks	Proj. Acct. code:			
Company:	City of Parksville				

The comparison of test results to guideline limits is provided for information purposes only. This is not to be taken as a statement of conformance / nonconformance to any guideline, regulation or limit. The data user is responsible for all conclusions drawn with respect to the data and is advised to consult official regulatory references when evaluating compliance.

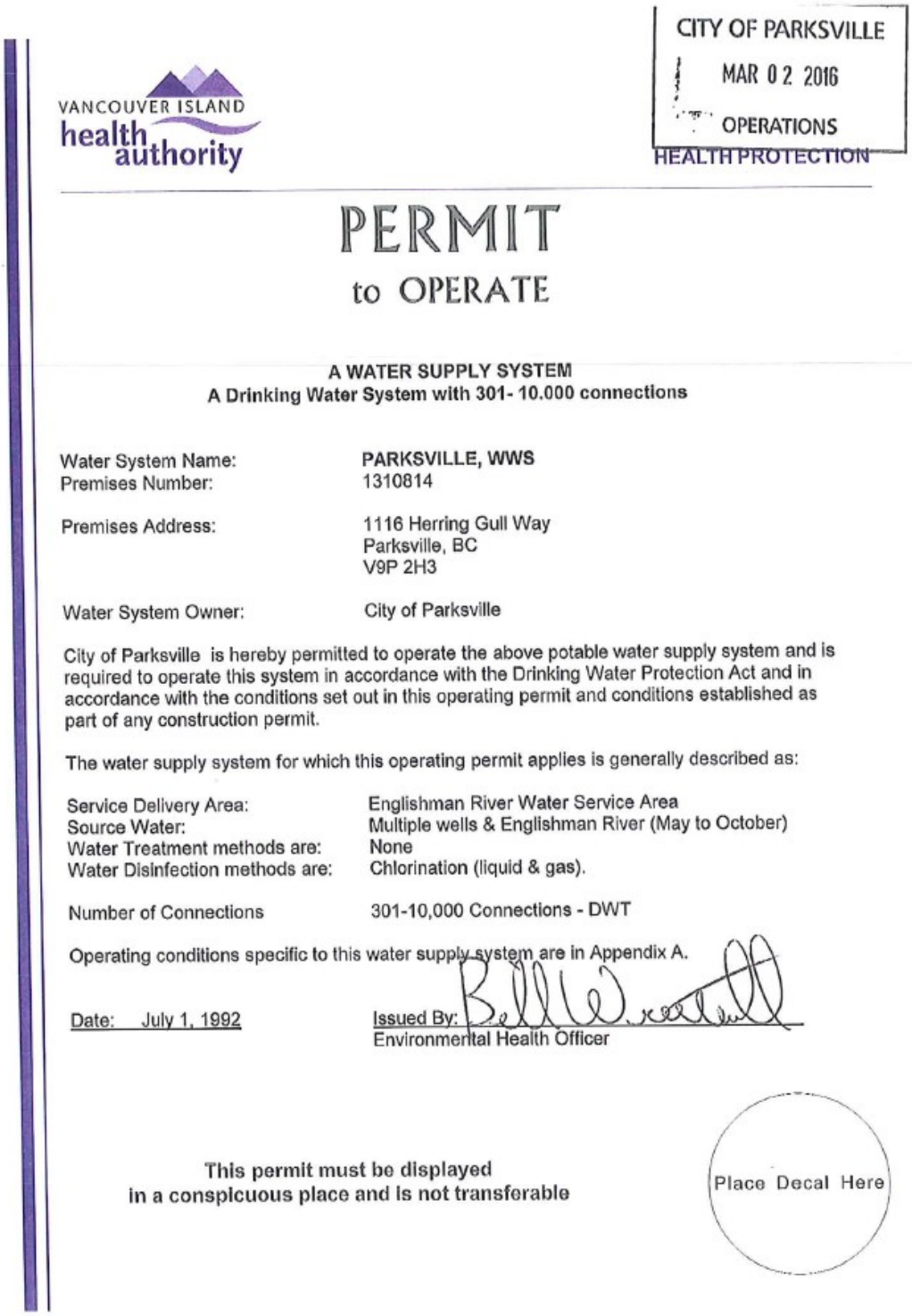
Please direct any inquiries regarding this report to our Client Services group.
Results relate only to samples as submitted.

Terms and Conditions: https://www.element.com/terms/terms-and-conditions

Appendix F

2020	Community Park			Temple		
	January	May	November	January	May	November
Total THM (mg/L)	0.045	0.042	0.054	0.012	0.03	0.034
Bromodichloromethanes (mg/L)	0.0061	0.004	0.006	0.003	0.005	0.005
Bromoform (mg/L)	<0.001	<0.001	<0.001	0.0015	<0.001	<0.001
Chloroform (mg/L)	0.0366	0.038	0.047	0.0033	0.023	0.027
Dibromochloromethane (mg/L)	0.0024	<0.001	0.001	0.0042	0.002	0.002
Toluene-d8 (%)	87	103	99	86	97	100
4-Bromoflurobenzene (%)	97	114	106	96	114	103
2020	Ermineskin			Public Works		
	January	May	November	January	May	November
Total THM (mg/L)	0.00797	0.026	0.029	0.0339	0.042	0.051
Bromodichloromethanes (mg/L)	0.0017	0.003	0.004	0.0035	0.003	0.004
Bromoform (mg/L)	0.0017	<0.001	<0.001	<0.001	<0.001	<0.001
Chloroform (mg/L)	0.0016	0.021	0.023	0.0276	0.039	0.047
Dibromochloromethane (mg/L)	0.003	0.002	0.002	0.0029	<0.001	<0.001
Toluene-d8 (%)	86	97	99	87	95	99
4-Bromoflurobenzene (%)	96	113	104	97	110	105

Appendix G



VANCOUVER ISLAND health authority

CITY OF PARKSVILLE
MAR 02 2016
OPERATIONS
HEALTH PROTECTION

PERMIT
to OPERATE

A WATER SUPPLY SYSTEM
A Drinking Water System with 301- 10.000 connections

Water System Name:	**PARKSVILLE, WWS**
Premises Number:	1310814
Premises Address:	1116 Herring Gull Way Parksville, BC V9P 2H3
Water System Owner:	City of Parksville

City of Parksville is hereby permitted to operate the above potable water supply system and is required to operate this system in accordance with the Drinking Water Protection Act and in accordance with the conditions set out in this operating permit and conditions established as part of any construction permit.

The water supply system for which this operating permit applies is generally described as:

Service Delivery Area:	Englishman River Water Service Area
Source Water:	Multiple wells & Englishman River (May to October)
Water Treatment methods are:	None
Water Disinfection methods are:	Chlorination (liquid & gas).
Number of Connections	301-10,000 Connections - DWT

Operating conditions specific to this water supply system are in Appendix A.

Date: July 1, 1992

Issued By:
Environmental Health Officer

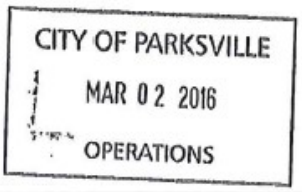
This permit must be displayed in a conspicuous place and is not transferable

Place Decal Here

Water System Operating Conditions

Appendix G

Excellent health and care for everyone, everywhere, everytime.



March 1, 2016

Mike Squire
Program Manager
Englishman River Water Service
1116 Herring Gull Way
PO Box 1390
Parksville, BC V9P 2H3

Dear Mike:

Re: Changes to Terms and Conditions of the City of Parksville Water System Operating Permit

Please find enclosed an amended operating permit issued under section 8(4) of the *Drinking Water Protection Act* (the "Act"). The terms and conditions are attached as Appendix A (Operational) and Appendix B (Surface Water Treatment Objectives) and are effective **March 1, 2016.**

The terms and conditions, Appendix A dated April, 2009 is hereby rescinded.

In accordance to section 8(1)(b) of the Act, the water supply system must be operated in accordance with these terms and conditions. It is understood that Appendix B timeframes are target dates. Large construction projects may encounter unforeseen delays which may prohibit the completion of the project by the listed dates.

Upon completion of the water treatment plant, this proposed permit will have to be amended to reflect the new works. At that time the City of Parksville will have to request an amendment to their Operating Permit. For example, performance standards for the selected filtration technology would be listed on the Operating Permit but are not reflected in this Permit.

Please also note that water suppliers have various responsibilities under the Act and the *Drinking Water Protection Regulation* (The "Regulation"), beyond those set out as terms and conditions of the operating permit. It is your responsibility to familiarize yourself with the Act and Regulations. See section 2.2 of part A of the *Drinking Water Officer's Guide* for a summary of responsibilities and references to some of the relevant provisions of the Act and Regulation. This is intended for basic information purposes only.

If you have any questions about this operating permit, please do not hesitate to contact me at (250) 947.8222 or by email at bill.wrathall@viha.ca

Health Protection and Environmental Services
489 Alberni Highway, Parksville, BC V9P 1J9

Phone: 250-947-8222
Fax: 250-951-9576

Appendix G

March 1, 2016

Appendix A - Operational

Water System Operating Permit Terms and Conditions For the Current City of Parksville Water System

The permit holder is advised the following Terms and Conditions are in addition to other legislated responsibilities and obligations such as:

- The *Drinking Water Protection Act*, ([SBC 2001] Chapter 9
- The *Drinking Water Protection Regulation* (B.C. Reg. 200/2003 O.C. 508/2003)

1. Adhere to monitoring requirements to ensure the efficacy of disinfection and/or treatment technology. Provide a minimum of 0.2 mg/L of residual disinfectant, measured as *free* chlorine for the water entering the system. The level of residual disinfectant at any point within the distribution system should be at least 0.05 mg/L, measured as *total* or *free* chlorine.

   If detectable levels of chlorine are not observed during routine residual analysis in the distribution system, the water supplier shall obtain water samples and have them analyzed for total coliform and *Escherichia coli*, and undertake any necessary steps to return a chlorine residual as *total* and *free* chlorine.

2. Provide continuous on-line turbidity monitoring of raw water for the Englishman River during drawing periods (May through October or as applicable) to ensure less than or equal to 1 NTU of turbidity in finished water. Ensure the Emergency Response Plan includes appropriate action for turbidity events as detailed in the *"Decision Tree for Responding to a Turbidity Event in Unfiltered Drinking Water"*.

3. Routine surveillance and evaluation of a source water protection program and emergency response plan to identify and respond to any activity that may impact or cause changes to the source water.

4. Adhere to a sampling program as approved by the Drinking Water Officer and according to BCWWA standards or equivalent. Maintain records of all monitoring conducted. The sampling program is to include, but is not necessarily limited to, the following:

   - Bacteriological testing at representative locations within the distribution system.
   - Chemical testing in accordance with the *Guidelines Canadian Drinking Water Quality* or parameters specified in the *VIHA Guidelines for Approval of Water Supply Systems.*
   - Chlorine disinfectant concentration testing at representative locations within the distribution system.

5. Adhere to maintenance and operating procedures as approved by the Drinking Water Officer and abide by BCWWA standards or equivalent. Maintenance and operating procedures shall address but is not necessarily limited to:

   - Source water and intake protection.

Appendix G

March 1, 2016

Appendix B – Surface Water Treatment Objectives

Water System Operating Permit Terms and Conditions For City of Parksville Water System

The permit holder is advised the following Terms and Conditions are in addition to other legislated responsibilities and obligations such as:

- The *Drinking Water Protection Act*, ([SBC 2001] Chapter 9
- The *Drinking Water Protection Regulation* (B.C. Reg. 200/2003 O.C. 508/2003)

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1. Englishman River water source must be treated in accordance with the *Drinking Water Treatment Objectives (Microbiological) for Surface Water Systems in British Columbia* to achieve the following performance standard:

    - 4-log reduction or inactivation of viruses.
    - 3-log reduction or inactivation of *Giardia* and *Cryptosporidium.*
    - Two treatment processes for surface water.
    - Less than or equal to one (1) nephelometric turbidity unit (NTU) of turbidity in finished water.

2. Establish an implementation strategy towards meeting the SWTO's with a projected water treatment plant operational date by September 30, 2018. The following timeframes and critical objectives are identified:

    - December 1, 2016 - Submission of construction permit application(s) for the water treatment plant, intake, pump station and transmission mains.
    - March 31, 2017- Construction commencement.
    - June 30, 2018 – Construction complete.
    - July 1, 2018 – Commissioning commences.
    - September 30, 2018 – Plant operational.

    If unforeseen and/or extenuating circumstances prevent completion of the water treatment plant by September 30, 2018 the water supplier must notify the Environmental Health Officer (EHO), a minimum of 90 days in advance of the deadline, and provide rationale for the delay. Any changes to the operating permit must be approved by the EHO in writing.

3. Provide formal project updates by the following dates:
    - July 29, 2016.
    - January 27, 2017.
    - July 28, 2017.
    - January 31, 2018.

    * Project updates may be written or in presentation format.