

City of
Parksville
Engineering & Operations Department

2009 ANNUAL WATER REPORT



June 2010

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1.0 Introduction:

All water suppliers are required to provide an annual report to their users with information such as explanation of water source, water test results, maintenance programs and improvements to the water system. The following document summarizes these requirements.

This report has been submitted to the Vancouver Island Health Authority and is posted on the City of Parksville Website. www.Parksville.ca.

2.0 Parksville Water System:

The City of Parksville has approximately 4500 water connections serving over 11,000 permanent and seasonal residents as well as supplying water to the Regional District of Nanaimo - Nanoose Bay Peninsula system in the summer months.

These users get their drinking water from 3 sources.

- Englishman River Intake
- Springwood Well Field
- Railway Well Field

The water is treated using either liquid or gaseous chlorine and stored in 4 reservoirs at either end of the City.



2.1 Groundwater Wells:

The City's groundwater is pumped from a confined quadra sands aquifer that runs underground alongside the railway tracks from Trill Drive to the City's boundary in the southwest. The City currently has 18 production wells ranging from 3.3 l/s (44 IGPM) to 9.0 l/s (118 IGPM).

See **Appendix A** for Well locations.

Well Name	Well Depth (m)	Production (l/s, Igpm)
Springwood Well #1	31.9	3.9 , 51
Springwood Well #2	10.4	Off Line
Springwood Well #3	25.3	5.2 , 69
Springwood Well #4	9.8	4.7 , 62
Springwood Well #5	31.0	6.5 , 87
Springwood Well #6	31.1	5.7 , 76
Springwood Well #7	40.2	5.7 , 76
Springwood Well #8	39.4	4.1 , 55
Springwood Well #10	25.6	9.0, 118
Springwood Well #11	30.6	7.0, 92
Railway Well#1	30.7	5.5 , 73
Railway Well#2	32.2	4.9 , 65
Railway Well#3	25.2	3.3 , 44
Railway Well#4	22.5	3.4 , 45
Railway Well#5	36.3	6.9 , 91
Railway Well#6	36.7	5.2 , 69
Railway Well#7	34.2	4.6 , 61
Railway Well #8	28.6	7.0, 92
Trill Well#8	25.1	Off Line

2.2 River Intake:

Between May and October the City pumps water from the Englishman River at a maximum rate of 159 l/s (2100 IGPM) to keep up with summer demands. The water in the Englishman river is partially supplied from the Arrowsmith Dam. 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 1st and October 31st. (See Appendix B)

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 dam is located at Arrowsmith Lake approximately 19km south of Parksville. It was commissioned in September 2000. The dam has a capacity of 9,000,000 m³ and is operated and maintained by City of Parksville staff. Water is released to the Englishman river through 2 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 2003 – 2010.

2.4 Reservoirs:

Water that has been pumped either from the ground or from the river is stored in 5 reservoirs. Reservoirs numbers 1, 2 and 4 are located in the Springwood Water Compound on Despard Rd. These 3 are concrete with 2 being partially below ground and one above. Storage capacities are:

- Reservoir #1 - 616 m³ (135,500 Imp. gal).
- Reservoir #2 - 2023 m³ (445,000 Imp. gal)
- Reservoir #4 - 4559 m³ (1,000,000 Imp. gal).

There are 2 additional reservoirs at 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:

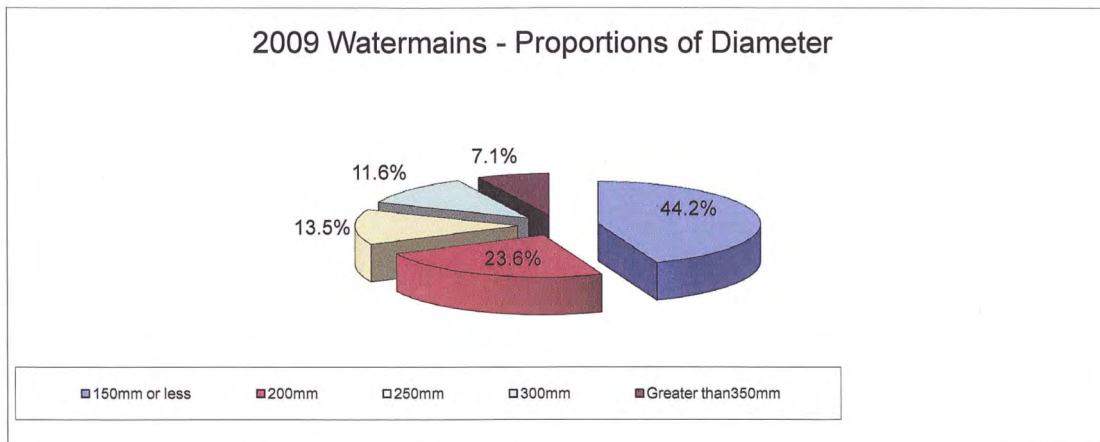
- Reservoir #3 - 671m³ (148,000 Imp. gal.)
- Reservoir #5 - 4300 m³ (950,000 Imp. gal).

3.0 Distribution System:

The distribution system consists of 54 km of PVC (plastic) pipe, 8.3 km of Ductile Iron pipe and 32 km of AC (Asbestos Cement) pipe. Sizes range from 4" to 14".

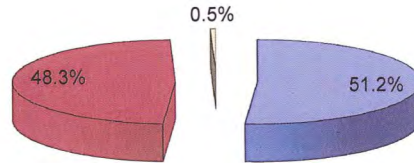
There are 468 fire hydrants and one Pressure Reducing Valve (PRV).

Like all municipalities, the infrastructure is aging and water mains are being replaced through capital improvements. The following shows the size, age and material of the mains in the Parksville Water System



2009 Watermains Proportions of Diameter				
Diameter	No Pipes	Distance (km)	Percentage	Type
150mm or less	559	41.960	44.2%	Distribution Mains 67.8%
200mm	336	22.467	23.6%	
250mm	166	12.830	13.5%	Supply Mains 32.2%
300mm	142	11.000	11.6%	
Greater than 350mm	80	6.757	7.1%	
Total:	1283	95.014	km	

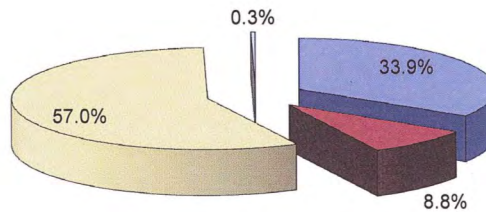
2009 Watermains - Proportions of Age



■ Under 25 Years (>1983) ■ 25 - 50 Years (1958 to 1982)
□ Over 50 Years (<1958 or = 0)

2009 Watermains Proportions of Age			
Age	No Pipes	Distance (km)	Percentage
Under 25 Years (>1983)	696	48.676	51.2%
25 - 50 Years (1958 to 1982)	559	45.862	48.3%
Over 50 Years (<1958 or = 0)	28	0.476	0.5%
Total:	1283	95.014	km

2009 Watermain Materials Proportions



■ Asbestos Cement ■ Ductile Iron □ PVC ■ Steel

2009 Watermains Proportions of Materials		
Material Types	Distance (km)	Percentage
Asbestos Cement	32.184	33.9%
Ductile Iron	8.318	8.8%
PVC	54.186	57.0%
Steel	0.327	0.3%
Total:	95.014	km

3.1 Pressure Zones:

The City is divided into 2 pressure zones. A low pressure and a 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 73.74m 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 initially was developed for higher elevation regions of the city that didn't have sufficient pressures or flows to meet fire fighting 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 80psi to 60psi.

The high pressure water in this zone is supplied from 4 pumps, a 25hp, 2-40hp and a 100 hp. These pumps are controlled through the SCADA system that automatically watches flows and switches on however many pumps it needs to meet the flow requirements.

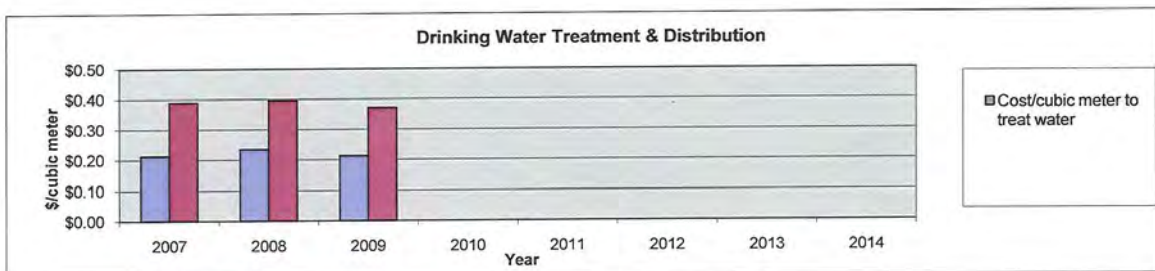
See **Appendix C** for Map of Pressure Zone Boundaries.



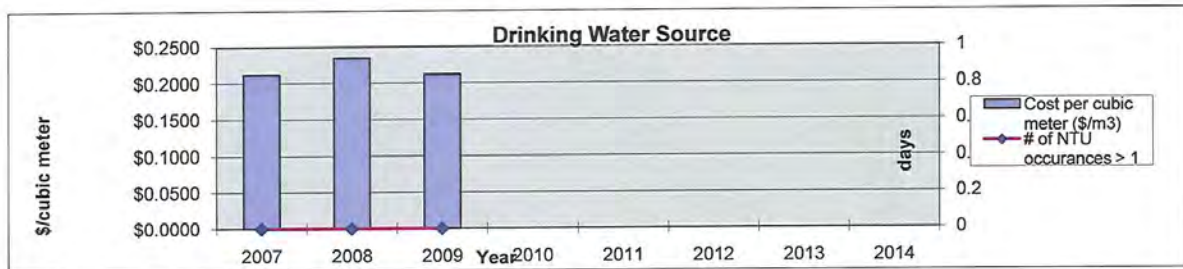
3.2 Drinking Water Costs

As the City continues to grow the cost of supplying and treating water grows as well. These cost increases push the City to review infrastructure and continuously make improvement to offset these costs. This can be done by replacing older pumps and motors with more energy efficient ones and adding Variable Frequency Drives (VFD) to level out the energy draw between high morning / evening power draws and lower early morning / afternoon draws.

1. Drinking Water Systems - Population of 12,000			
1.1 Drinking Water Source			
	2007	2008	2009
1.1.1 SYSTEM EFFICIENCY			
Annual operations and maintenance for withdrawal of drinking water.	\$400,260	\$493,497	\$488,631
Annual amount of water withdrawn from source.	1,887,627	2,107,868	2,303,124
Cost per cubic meter (\$/m3)	\$0.2120	\$0.2341	\$0.2122
Objective - Efficient municipal source water maintenance and withdrawal services.			
1.1.2 SYSTEM QUALITY			
Total number of days that raw water sample testing resulted in 1 NTU* or greater (* nephelometric turbidity units).	0	0	0
Objective - Source protection.			
1.2 Drinking Water Treatment			
	2007	2008	2009
1.2.1 SYSTEM EFFICIENCY			
Annual operations and maintenance for withdrawal of drinking water.	\$400,260	\$493,497	\$488,631
Annual amount of water treated (cubic meters) NOTE.	1,887,627	2,107,868	2,303,124
Cost per cubic meter	\$0.21	\$0.23	\$0.21
Objective - Efficient municipal water treatment services. NOTE a volume must be entered in order for the formula to work.			

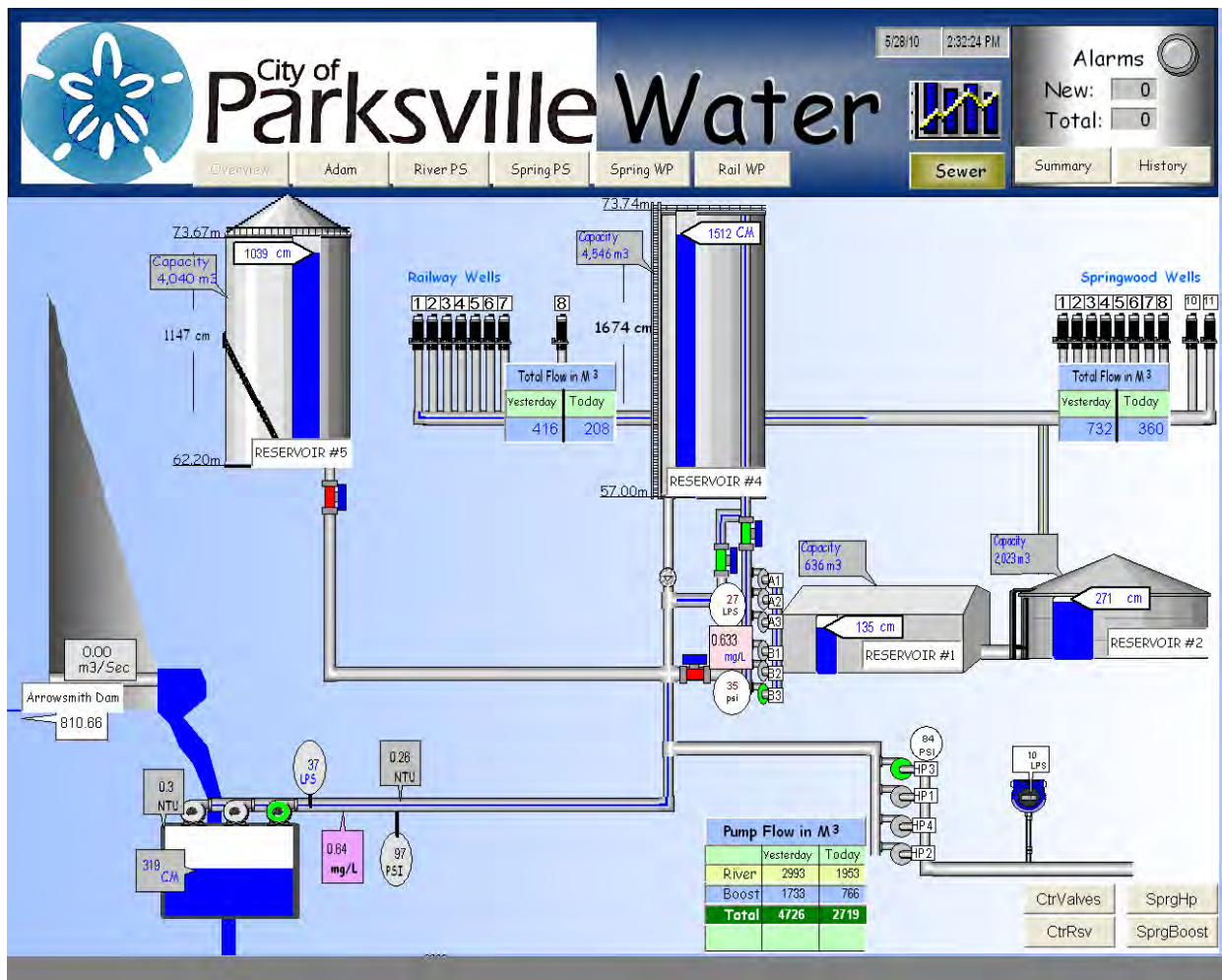


1.3 Drinking Water Distribution			
	2007	2008	2009
1.3.1 DISTRIBUTION NETWORK CONDITION			
Total number of water main breaks per kilometre of water main per year.	0.03	0.00	0.00
Objective - Improve system reliability and effectiveness.			
1.3.2 DISTRIBUTION EFFICIENCY			
Annual operating and maintenance costs for the distribution of drinking water.	\$334,102	\$341,001	\$365,405
Total length of distribution network (km).	95.01	96.25	97.50
Cost per kilometre of water distribution.	\$3,516	\$3,543	\$3,748
Objective - Efficient municipal water distribution services.			
1.3.3 SYSTEM QUALITY			
Total number of days of boil water advisories per year.	0	0	0
Objective - Drinking water is safe and meets local needs.			
1.4 Total System Efficiency & Quality			
	2007	2008	2009
1.4.1 TOTAL DRINKING WATER SYSTEM COSTS			
Total Drinking Water System costs	\$734,362	\$834,498	\$854,036
Annual operating costs for the withdrawal, treatment and distribution of drinking water per cubic meter treated - NOTE, in order to derive a total cost/cubic meter a volume must be entered in row 22.	\$0.39	\$0.40	\$0.37
Objective - Efficient integrated municipal water system.			
1.4.2 OPERATIONAL COMPLIANCE			
Total number of days of standard non-compliance per year.	0	0	0
Objective - Meeting operational compliance.			
1.4.3 ENERGY USAGE			
Annual Electrical Demand (Kilowatt Hours)	1,067,423	1,113,323	1,298,509
Electricity Source	Grid	Grid	Grid
Kilowatts per Cubic meter of water treated	0.565483941	0.528174914	0.563803338



4.0 SCADA (Supervisory Control and Data Acquisition):

The water system and sewer pump stations are controlled by a computerized control system called SCADA. This system allows the Operators to monitor reservoir levels, the on/off status and flows of pumps, and monitor chlorine residuals. The operator can change set points and monitor the system remotely. Alarms are automatically called out to City staff that monitor the system 24 hours a day, 7 days a week.



5.0 Water Sampling and Testing

5.1 Bacteriological

As required by the Vancouver Island Health Authority (VIHA), City staff take weekly bacteriological samples to be tested for Total Coliforms and e-Coli Bacteria. There are 16 dedicated sampling sites throughout the city.

See **Appendix D** for 2009 test results (L1 means Less than 1 - Acceptable)

5.2 Full Spectrum Analysis

In addition to weekly sampling throughout the distribution system, the City also sends samples from the source water once per year, in the Fall, for a full spectrum analysis. As seen below, 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".

All parameters meet the Canadian Drinking Water Guidelines.

See **Appendix E** for the 2009 Full Spectrum Analysis of the Parksville Water System Source Water.



6.0 Water Quality Complaints

The Engineering and Operations Department had very few water quality complaints throughout 2009. Most were related to a noticeable chlorine taste in the water. A majority of these complaints were from residences closest to the pump station where the chlorine is injected. We have the occasional complaint of residents' tea tasting funny. Chlorine seems to make tea taste a bit different at times.

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 "brown or dirty water" complaints that came from either water main breaks or flushing that causes an increase in turbidity from fast moving water.



7.0 Routine Maintenance Program

7.1 Distribution

- Water mains are flushed using a unidirectional flushing program
- Air relief valves are cleaned
- Fireline meters are cleaned
- Fire Hydrants are completely disassembled and inspected on a 2 year rotation
- Paint and brush out around hydrants as needed
- All irrigation backflow prevention devices tested and repaired if needed

7.2 Wells

- Daily security check of all wells
- Rehabilitation of 1-2 wells per year
- Pumps and motors replaced as necessary
- Filling chlorine tank on Springwood Well #1 as needed
- Annual water sampling

7.3 River Intake

- Winter maintenance of chlorination system while off line
- Weekly blowing of air lines through intake screens
- Daily checks of pump flows and chlorine levels
- Monthly calibration of turbidity analyzers

7.4 Reservoirs

- Daily security check of tanks and compounds
- Yearly cleaning of Reservoir #1 and 2.
- Clean Reservoir #4 and 5 using divers every 5 years.

7.5 Pump Stations

- Daily checks of pumps and chlorination system
- Security checks of compounds
- Annual calibration of chlorine analyzer

8.0 2009 Improvements:

- Installed new 100 HP Pump at River Pump Station
- Purchased 2 new chlorine analyzers for River Station and Springwood Pump Station
- Upgrading SCADA system to current technologies
- Installed a Variable Frequency Drive for River pump #3

9.0 2009 Capital Projects:

- Major upgrades to Springwood Pump Station including a control valve station to better distribute water to the reservoirs at opposite ends of the City.
- Reservoir #1 booster pump replacement now on line.
- Reservoir #4 retrofit. Dedicated inlet and outlet for better mixing.
- Many water main upgrades to upsize aging pipes and loop dead ends.
- Replaced 2 existing shallow wells with 2 deep wells. Springwood #10, #11. Now on line.
- 1 new production well (Railway #8) Now on line.

10.0 2010 Capital Projects and Improvements:

- Continue upgrading SCADA system
- Continue with Well Rehabilitation on aging wells
- Starting a water meter change out program
- Continue developing the cross connection program
- Develop a comprehensive water conservation program
- River intake gallery cleaning
- Continuing to replace aging water mains for better distribution.
- Rehabilitation of 5 groundwater wells to increase production lost to age and fouling of the screens.
- As per the Drinking Water Protection Act, the 4321 rule affecting surface water supplies is being addressed through the Arrowsmith Water Service with an engineering study looking at an updated river intake and water treatment plant.

11.0 Cross Connection Control Program

In May 2006 the City of Parksville developed a cross connection control program. An additional staff person was hired in September 2006 to review the program, and is currently working on the implementation of it. This staff member was also trained as a Certified Backflow Tester in 2008.

The cross connection program will be implemented in a manner that will address high and severe hazard water use processes first. These include Industrial, Commercial and Institutional (ICI) users. Each ICI user will be assessed as to the potential risk to the water system. An approved backflow device will have to be installed.

City Bylaw 1999 No. 1320 was amended outlining the program with a termination clause for non-compliance.

All City owner facilities were assessed and appropriate backflow installed. A tracking program called Backflow Prevention Maintenance Software was installed to track devices around the City and produce letters reminding businesses of when testing is due.

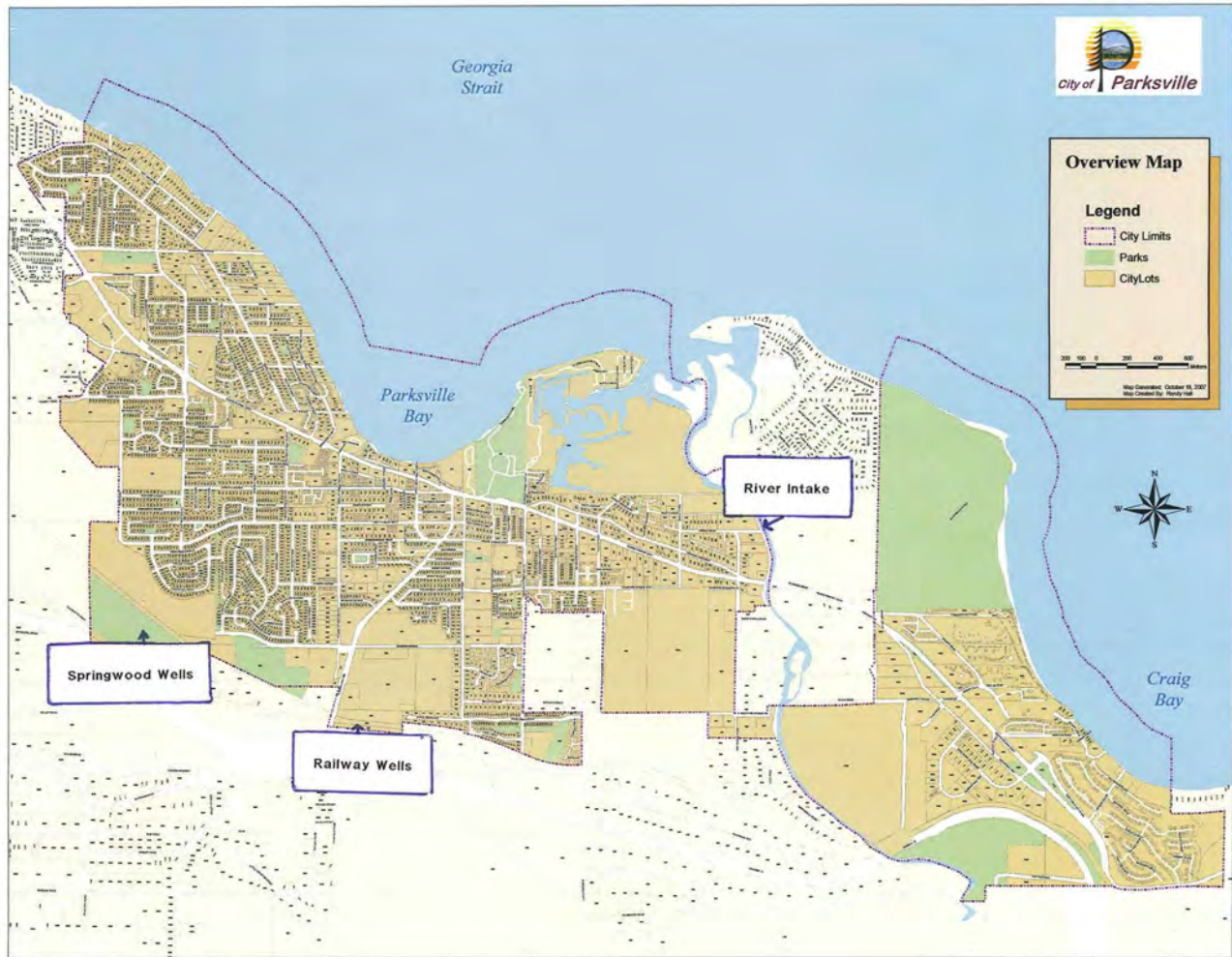


Double Check Valve Assembly

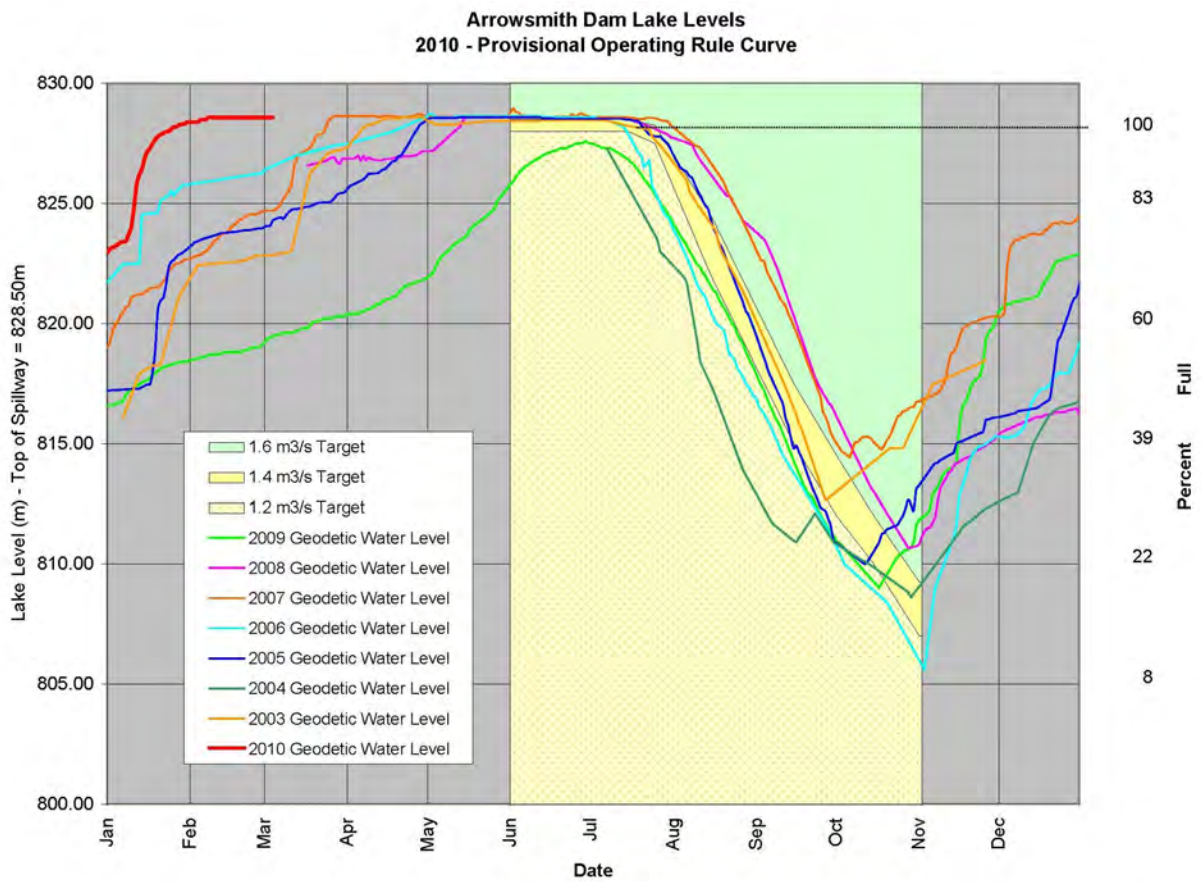
12.0 Emergency Response Plan

The City of Parksville has an Emergency Response Plan pertaining to the water system available for public viewing at the Engineering and Operations Department. This document outlines the strategies to deal with events such as contamination of water supply, pump failures and turbidity events.

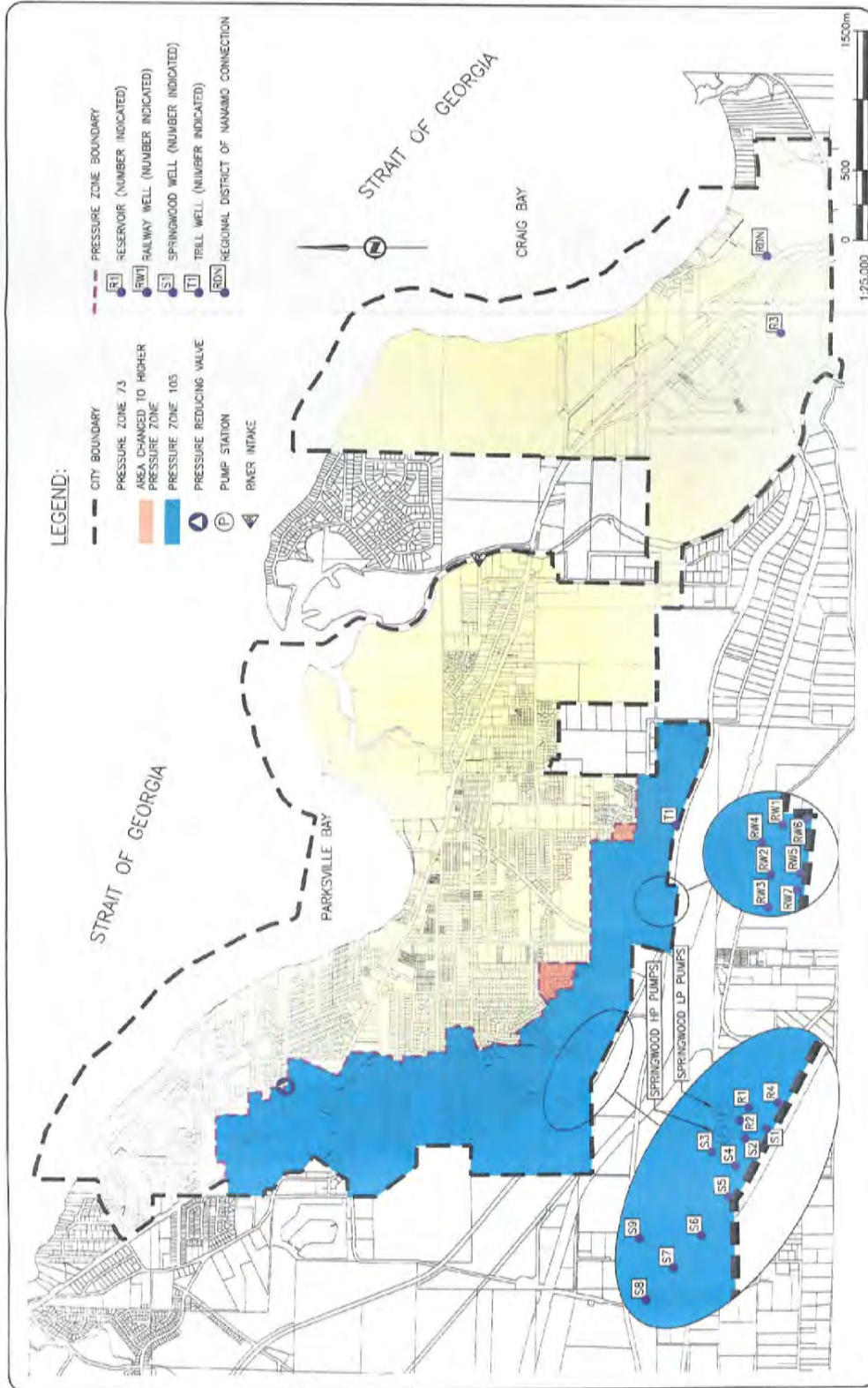
Well Locations Map



Arrowsmith Dam Lake Levels 2003 - 2010



Map of Pressure Zone Boundaries



TITLE	PROPOSED PRESSURE ZONE BOUNDARIES
APPROVED	SCALE 1:25,000
DATE MAY 2005	DWG No.
DWG No. 0212	FIGURE 10

CLIENT	CITY OF PARKSVILLE
PROJECT	WATER STUDY UPDATE

KOERS & ASSOCIATES ENGINEERING LTD.
Consulting Engineers

2009 Bacteriological Results

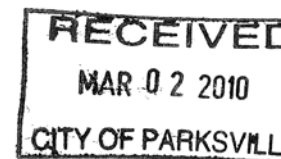
Water Sample Range Report for PARKSVILLE WWS

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Water Sample Range Report

Vancouver Island Health Authority
Central Island

Facility Name: PARKSVILLE, WWS
Facility Type: DWT
Date Range: Jan 1 2009 to Dec 31 2009
Date Created: Feb 03 2010



Sampling Site	Date Collected	Total Coliform	E. Coli	Fecal Coliform
<u>401 S. Moilliet Street,</u>				
<u>Parksville BC,</u>				
<u>Despard & Moilliet,</u>				
<u>Dist. site, Monthly</u>				
	01/06/09	L1	L1	
	02/18/09	L1	L1	
	03/11/09	L1	L1	
	04/29/09	L1	L1	
	05/20/09	L1	L1	
	06/23/09	L1	L1	
	07/22/09	L1	L1	
	08/26/09	L1	L1	
	09/22/09	L1	L1	
	10/28/09	L1	L1	
	11/17/09	L1	L1	
	12/15/09	<u>L1</u>	<u>L1</u>	
	Total Positive:	0	0	0
<u>Harbour Homes,</u>				
<u>Parksville BC, Top</u>				
<u>of Corfield,</u>				
<u>Parksville, Dist. site,</u>				
<u>Monthly</u>				
	01/20/09	L1	L1	
	02/11/09	L1	L1	
	03/24/09	L1	L1	
	04/22/09	L1	L1	
	05/05/09	L1	L1	
	06/17/09	L1	L1	
	07/14/09	L1	L1	
	08/18/09	EST 130	L1	
	09/29/09	L1	L1	
	10/28/09	L1	L1	
	11/24/09	L1	L1	
	12/08/09	<u>L1</u>	<u>L1</u>	
	Total Positive:	1	0	0
<u>1247 Arbutus Road,</u>				
<u>Parksville BC,</u>				
<u>Parksville</u>				
<u>MHP/Utility Building,</u>				
<u>Parksville, Dist. site,</u>				
<u>Monthly</u>				
	01/13/09	L1	L1	
	02/04/09	C		
	03/04/09	L1	L1	

2009 Bacteriological Results

<p>Water Sample Range Report for <u>04725769</u> PARKSVILLE, WWS</p>	L1	L1	Page 8 of 108
05/05/09	L1	L1	
06/10/09	L1	L1	
07/07/09	L1	L1	
08/26/09	L1	L1	
09/16/09	L1	L1	
10/06/09	L1	L1	
11/03/09	L1	L1	
12/08/09	<u>L1</u>	<u>L1</u>	
Total Positive:	0	0	0
<p><u>Craig Bay Heritage</u> <u>Museum, Parksville</u> <u>BC, Craig Bay</u> <u>Heritage Museum,</u> <u>Parksville, Dist. site,</u> <u>Monthly</u></p>	L1	L1	
01/28/09	L1	L1	
02/11/09	L1	L1	
03/24/09	L1	L1	
04/14/09	L1	L1	
05/20/09	L1	L1	
06/02/09	L1	L1	
07/14/09	L1	L1	
08/18/09	L1	L1	
09/01/09	L1	L1	
10/21/09	L1	L1	
11/17/09	L1	L1	
12/15/09	<u>L1</u>	<u>L1</u>	
Total Positive:	0	0	0
<p><u>330 Park View,</u> <u>Parksville BC, 330</u> <u>Park View,</u> <u>Parksville, Dist. site,</u> <u>Monthly</u></p>	L1	L1	
01/06/09	L1	L1	
02/04/09	L1	L1	
03/11/09	L1	L1	
04/07/09	L1	L1	
05/12/09	L1	L1	
06/10/09	L1	L1	
07/28/09	L1	L1	
09/22/09	L1	L1	
10/14/09	L1	L1	
11/09/09	L1	L1	
12/08/09	<u>L1</u>	<u>L1</u>	
Total Positive:	0	0	0
<p><u>1390 Herring Gull</u> <u>Way, Parksville BC,</u> <u>Works Yard,</u> <u>Parksville, Dist. site,</u> <u>Monthly</u></p>	L1	L1	
02/25/09	L1	L1	
03/17/09	L1	L1	
04/29/09	L1	L1	
05/12/09	L1	L1	

2009 Bacteriological Results

<p>Water Sample Range Report for PARKSVILLE, WWS</p>	<p>L1</p>	<p>L1</p>	<p>Page 9 of 108</p>
06/17/09	L1	L1	
07/22/09	L1	L1	
08/05/09	L1	L1	
08/18/09	L1	L1	
09/08/09	L1	L1	
10/14/09	L1	L1	
11/09/09	C		
11/17/09	L1	L1	
12/02/09	<u>L1</u>	<u>L1</u>	
Total Positive:	0	0	0
<p><u>613 Chinook Avenue, Parksville BC, 613 Chinook Avenue, Parksville Dist. site, Monthly</u></p>			
01/28/09	L1	L1	
02/11/09	L1	L1	
03/24/09	L1	L1	
04/29/09	L1	L1	
05/12/09	L1	L1	
06/10/09	L1	L1	
07/22/09	1	L1	
08/05/09	L1	L1	
08/18/09	L1	L1	
09/01/09	L1	L1	
10/06/09	L1	L1	
11/03/09	L1	L1	
12/02/09	<u>L1</u>	<u>L1</u>	
Total Positive:	1	0	0
<p><u>193 East Island Highway, Parksville BC, Community Park, Parksville BC, Dist. site, Monthly</u></p>			
01/13/09	L1	L1	
02/11/09	L1	L1	
03/11/09	L1	L1	
04/07/09	L1	L1	
05/05/09	L1	L1	
06/02/09	L1	L1	
07/07/09	L1	L1	
09/01/09	L1	L1	
10/21/09	L1	L1	
11/09/09	L1	L1	
12/02/09	<u>L1</u>	<u>L1</u>	
Total Positive:	0	0	0
<p><u>Daffodil at Camas, Parksville BC, Daffodil at Camas, Parksville, Dist. site, Monthly</u></p>			
01/13/09	L1	L1	
02/25/09	L1	L1	
03/04/09	L1	L1	
04/07/09	L1	L1	

2009 Bacteriological Results

Water Sample Range Report for <u>0570769</u> PARKSVILLE, WWS	L1	L1	Page 10 of 108
06/02/09	L1	L1	
07/14/09	L1	L1	
08/26/09	L1	L1	
09/01/09	L1	L1	
10/21/09	L1	L1	
11/03/09	L1	L1	
12/15/09	<u>L1</u>	<u>L1</u>	
Total Positive:	0	0	0

271 Chestnut Street,
Parksville BC, 271
Chestnut Street,
Parksville, Dist. site,
Monthly

01/28/09	L1	L1	
02/25/09	L1	L1	
04/01/09	L1	L1	
04/14/09	L1	L1	
05/20/09	L1	L1	
07/28/09	L1	L1	
08/05/09	L1	L1	
08/18/09	L1	L1	
09/08/09	L1	L1	
10/28/09	L1	L1	
11/17/09	L1	L1	
12/02/09	<u>L1</u>	<u>L1</u>	
Total Positive:	0	0	0

851 Temple, 851
TEMPLE (beside),
Dist. site, Monthly

01/13/09	L1	L1	
02/18/09	L1	L1	
03/04/09	L1	L1	
04/14/09	L1	L1	
05/20/09	L1	L1	
07/28/09	L1	L1	
08/18/09	L1	L1	
09/22/09	L1	L1	
10/21/09	L1	L1	
11/17/09	L1	L1	
12/15/09	<u>L1</u>	<u>L1</u>	
Total Positive:	0	0	0

378 Kingsley Street,
Wheeler, Top of
Kingsley, Dist. site,
Monthly

01/28/09	L1	L1	
02/04/09	L1	L1	
03/17/09	L1	L1	
04/14/09	L1	L1	
05/12/09	L1	L1	
06/10/09	L1	L1	
07/07/09	L1	L1	
08/18/09	L1	L1	
09/16/09	L1	L1	

2009 Bacteriological Results

Water Sample Range Report for <u>107608</u> <u>WISCONSIN</u> <u>VILLE, WWS</u>	L1	L1	Page 11 of 108
11/03/09	L1	L1	
12/08/09	<u>L1</u>	<u>L1</u>	
Total Positive:	0	0	0

Englishman River
Intake, River Pump
Station, Dist. site,
Monthly

01/20/09	L1	L1	
02/25/09	L1	L1	
03/04/09	L1	L1	
04/29/09	L1	L1	
05/26/09	L1	L1	
07/28/09	L1	L1	
09/08/09	1.0	L1	
10/28/09	L1	L1	
11/24/09	L1	L1	
12/15/09	<u>L1</u>	<u>L1</u>	
Total Positive:	1	0	0

450 Wisteria, across
from 450 Wisteria,
Dist. site, Monthly

01/06/09	L1	L1	
01/06/09	L1	L1	
02/18/09	L1	L1	
03/11/09	L1	L1	
04/07/09	L1	L1	
05/26/09	L1	L1	
06/17/09	L1	L1	
07/07/09	L1	L1	
08/26/09	L1	L1	
09/08/09	L1	L1	
10/14/09	L1	L1	
11/09/09	L1	L1	
12/08/09	<u>L1</u>	<u>L1</u>	
Total Positive:	0	0	0

.136 Memorial, Dist.
site, Monthly

01/20/09	L1	L1	
02/18/09	C		
04/01/09	L1	L1	
04/22/09	L1	L1	
05/26/09	L1	L1	
06/23/09	L1	L1	
07/22/09	L1	L1	
08/05/09	1	L1	
08/12/09	L1	L1	
08/18/09	L1	L1	
09/29/09	L1	L1	
10/28/09	L1	L1	
11/24/09	L1	L1	
12/15/09	<u>L1</u>	<u>L1</u>	
Total Positive:	1	0	0

2009 Bacteriological Results

Water Sample Range Report for PARKSVILLE, WWS

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Island Highway, by
Temple, Island
Highway, by Temple,
Dist. site, Monthly

01/20/09	L1	L1	
02/04/09	L1	L1	
03/17/09	L1	L1	
04/22/09	L1	L1	
05/26/09	L1	L1	
06/24/09	L1	L1	
07/14/09	L1	L1	
09/16/09	L1	L1	
10/06/09	1	L1	
11/24/09	L1	L1	
12/02/09	<u>L1</u>	<u>L1</u>	
Total Positive:	1	0	0

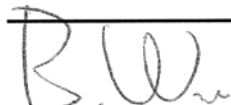
Result Values: E - estimated L - less than G - greater than

Water Sample Range Report for PARKSVILLE, WWS

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Samples that contain total coliform:	5	2.62% of total
Samples that contain e. coli:	0	0.00% of total
Samples that contain fecal coliform:	0	0.00% of total
Number of positive samples in last 30 days:	0/16	
Total number of samples:	191	

Comments:



Environmental Health Officer
 Feb 24 2010

FOR FURTHER INFORMATION PLEASE CALL: Wrathall, Bill (250) 248-2044 Parksville

Operator

City of Parksville
 1116 Herring Gull Way
 Parksville, BC
 V9P 2H3

(250) 248-5412

Full Spectrum Analysis

Analysis Report



REPORT ON: Analysis of Water Samples

REPORTED TO: City of Parksville
 Engineering and Operations Dpt
 PO Box 1390
 Parksville, BC
 V9P 2H3

Att'n: Scott Churko

CHAIN OF CUSTODY: 2181381
P.O. NUMBER: 6013

NUMBER OF SAMPLES: 5 **REPORT DATE:** November 4, 2009

DATE SUBMITTED: October 22, 2009 **GROUP NUMBER:** 101022038

SAMPLE TYPE: Water

NOTE: Results contained in this report refer only to the testing of samples as submitted. Other information is available on request.

Aesthetic Objective Summary:

Aesthetic Objectives as set by "Guidelines for Canadian Drinking Water Quality Summary Table" -May 2008. Aesthetic objectives apply to certain substances or characteristics of drinking water that can affect its acceptance by consumers or interfere with practices for supplying good quality water. For certain parameters, both aesthetic objectives and health-related guidelines have been derived. Where only aesthetic objectives are specified, these values are below those considered to constitute a health hazard

CLIENT SAMPLE ID	STATUS
River Station	Acceptable
Springwood Well #1	Acceptable
Springwood Well #8	Acceptable
Railway Well #1	Acceptable
Railway Well #7	Acceptable

Max. Acceptable Concentration Summary:

Maximum Acceptable Concentrations (MAC) for both chemical and microbiological parameters are put forth in the "Guidelines for Canadian Drinking Water Quality Summary Table" - May 2008. For the parameters tested, results are generally categorized by health concerns. Some parameters have no limit value denoted because: a) currently available data indicates no health risk, b) the compound is not permitted in Canada, or c) it refers to a family of compounds.

(Continued)

CANTEST LTD.

Anna Becalska, PhD
 Coordinator, Trace Metals

Full Spectrum Analysis

REPORTED TO: City of Parksville

REPORT DATE: November 4, 2009

GROUP NUMBER: 101022038



Max. Acceptable Concentration SUMMARY: (Continued)

CLIENT SAMPLE ID	HEALTH	HARDNESS
River Station	Acceptable	Soft
Springwood Well #1	Acceptable	Moderate
Springwood Well #8	Acceptable	Moderate
Railway Well #1	Acceptable	Moderate
Railway Well #7	Acceptable	Hard

TEST METHODS:

Anions in Water by Ion Chromatography - was determined based on Method 4110 in Standard Methods (21st Edition) and EPA Method 300.0 (Revision 2.1).

Alkalinity in Water - was performed based on Method 2320 in Standard Methods (21st Edition).

Alkalinity in Water - was performed based on Method 2320 in Standard Methods (21st Edition).

Colour (True) in Water - was determined based on Method 2120 in Standard Methods (21st Edition) and Method X321 in the BC Laboratory Manual (2005 Edition).

Conductivity in Water - was performed based on Method 2510 in Standard Methods (21st Edition) and Method X322 in the BC Laboratory Manual (2005 Edition).

Nitrate and Nitrite in Water - was performed using Flow Injection Analysis where Nitrate is reduced to Nitrite by passing the sample through a cadmium reduction column. The nitrite produced is then determined by diazotizing sulphanilamide and N-(1-naphthyl)-ethylenediamine dihydrochloride to form a reddish azo dye which is then measured colorimetrically at 540 nm.

Ammonia in Water - was performed using Flow Injection Analysis where the aqueous sample is injected into a carrier stream, which merges a sodium hydroxide stream. Gaseous ammonia is formed, which diffuses through a gas permeable membrane into an indicator stream. This indicator stream is comprised of a mixture of acid-base indicators, which will react with the ammonia gas; resulting in a colour shift which is measured photometrically @ 590 nm.

Nitrite in Water - was determined based on Method 4500-NO₂ B in Standard Methods for the examination of Water and Wastewater (21st Edition) and from the BC Laboratory Methods Manual (2005).

(Continued)

Full Spectrum Analysis

REPORTED TO: City of Parksville
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pH in Water - was determined based on Method 4500-H in Standard Methods (21st Edition) and Method X330 in the BC Laboratory Manual (2005).

Total Dissolved Solids in Water - was determined based on Method 2540 C in Standard Methods for the Examination of Water and Wastewater (21st Edition).

Total Kjeldahl Nitrogen in Water - was determined based on Method 4500-N in Standard Methods (21st Edition) and Method X325 in the BC Laboratory Manual (2005).

Total Organic Carbon in Water - was determined based on Method 5310 A and B in Standard Methods (21st Edition) and Method X314 in the BC Laboratory Manual (2005).

Turbidity in Water - was performed based on Method 2130 in Standard Methods (21st Edition) and Method X164 in the BC Laboratory Manual (2005 Edition).

Conventional Parameters - analyses were performed using procedures based on those described in the most current editions of "British Columbia Environmental Laboratory Manual for the Analysis of Water, Wastewater, Sediment and Biological Materials", (2005 edition) Province of British Columbia and "Standard Methods for the Examination of Water and Wastewater" (21st Edition), published by the American Public Health Association.

Mercury in Water - analysis was performed using procedures based on U. S. EPA Method 245.7, oxidative digestion using bromination, and analysis using Cold Vapour Atomic Fluorescence Spectroscopy.

Metals in Water - analysis was performed using Inductively Coupled Plasma Optical Emission Spectroscopy (ICP), Inductively Coupled Plasma-Mass Spectroscopy (ICP/MS). NOTE: If Sulphur is included in this report, only non-acid volatile sulphur is reported.

Microbiological Parameters - analyses were performed using procedures based on those described in "B. C. Environmental Laboratory Manual For the Analysis of Water, Wastewater, Sediment and Biological Materials" (2005 Edition) and "Standard Methods for the Examination of Water and Wastewater", 21st Edition (2005). Analysis was performed using Membrane Filtration (MF) Method (reported as "Colonies or CFU per unit volume").

Heterotrophic Plate Count - (also known as standard plate count) analysis was performed using procedures based on those described in "Standard Methods for the Examination of Water and Wastewater", 21st Edition (2005).

COMMENTS:

Samples for Bacteria analysis were received past the recommended holding time. Possible resulting changes may mean that the samples as analyzed does not reflect the samples at the time of collection. jvv Nov 4, 2009

TEST RESULTS:

(See following pages)

Full Spectrum Analysis

REPORTED TO: City of Parksville
 REPORT DATE: November 4, 2009
 GROUP NUMBER: 101022038



Potability (Aesthetic Criteria) in Water

CLIENT SAMPLE IDENTIFICATION:	River Station	Springwood Well #1	Springwood Well #8	Railway Well #1		
DATE SAMPLED:	Oct 20/09	Oct 20/09	Oct 20/09	Oct 20/09	Aesthetic Objective	UNITS
CANTEST ID:	910220065	910220074	910220075	910220078		
Conventional Parameters						
pH, Laboratory	7.46	7.95	8.00	8.06	6.5 - 8.5	pH units
True Color	< 5	< 5	< 5	< 5	15	CU
Turbidity	0.24	0.35	0.43	0.12	-	NTU
Total Dissolved Solids	90	159	191	185	500	mg/L
Total Alkalinity CaCO ₃	29.7	104	130	108	-	mg/L
Bicarbonate Alkalinity HCO ₃	36.3	127	159	132	-	mg/L
Carbonate Alkalinity CO ₃	< 0.5	< 0.5	< 0.5	< 0.5	-	mg/L
Hydroxide Alkalinity OH	< 0.5	< 0.5	< 0.5	< 0.5	-	mg/L
Dissolved Chloride Cl	11.1	13.3	20.0	23.2	250	mg/L
Dissolved Sulphate SO ₄	1.65	6.54	6.48	4.14	500	mg/L
Total Metals Analysis						
Copper Cu	0.011	< 0.0005	0.0009	< 0.0005	1.0	mg/L
Iron Fe	< 0.05	< 0.05	0.06	< 0.05	0.3	mg/L
Manganese Mn	0.0021	0.024	0.012	0.0069	0.05	mg/L
Sodium Na	4.22	7.25	6.66	6.63	200	mg/L
Zinc Zn	< 0.005	< 0.005	< 0.005	< 0.005	5	mg/L

CU = color units
 mg/L = milligrams per liter
 < = Less than reporting limit

NTU = nephelometric turbidity units

Full Spectrum Analysis

REPORTED TO: City of Parksville
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Potability (Aesthetic Criteria) in Water

CLIENT SAMPLE IDENTIFICATION:		Railway Well #7		
DATE SAMPLED:		Oct 20/09		
CANTEST ID:		910220079		
		Aesthetic Objective	UNITS	
Conventional Parameters				
pH, Laboratory		8.11	6.5 - 8.5	pH units
True Color		< 5	15	CU
Turbidity		0.10	-	NTU
Total Dissolved Solids		229	500	mg/L
Total Alkalinity	CaCO ₃	148	-	mg/L
Bicarbonate Alkalinity	HCO ₃	180	-	mg/L
Carbonate Alkalinity	CO ₃	< 0.5	-	mg/L
Hydroxide Alkalinity	OH	< 0.5	-	mg/L
Dissolved Chloride	Cl	33.5	250	mg/L
Dissolved Sulphate	SO ₄	5.36	500	mg/L
Total Metals Analysis				
Copper	Cu	0.0017	1.0	mg/L
Iron	Fe	< 0.05	0.3	mg/L
Manganese	Mn	0.0058	0.05	mg/L
Sodium	Na	8.34	200	mg/L
Zinc	Zn	< 0.005	5	mg/L

CU = color units
 mg/L = milligrams per liter
 < = Less than reporting limit

NTU = nephelometric turbidity units

Full Spectrum Analysis

REPORTED TO: City of Parksville

REPORT DATE: November 4, 2009

GROUP NUMBER: 101022038



Potability (Health Criteria at Point of Use) in Water

CLIENT SAMPLE IDENTIFICATION:	River Station	Springwood Well #1	Springwood Well #8	Railway Well #1		
DATE SAMPLED:	Oct 20/09	Oct 20/09	Oct 20/09	Oct 20/09		
CANTEST ID:	910220065	910220074	910220075	910220078	Max. Acceptable Concentration	UNITS
Conventional Parameters						
Conductivity	96.4	250	316	274	-	µS/cm
Hardness (Total) CaCO ₃	27	104	144	121	-	mg/L
Dissolved Fluoride F	< 0.05	0.07	< 0.05	0.08	1.5	mg/L
Nitrate and Nitrite N	0.05	0.96	0.90	0.56	10	mg/L
Nitrate N	0.05	0.96	0.90	0.56	10.0	mg/L
Nitrite N	< 0.002	< 0.002	< 0.002	< 0.002	1.0	mg/L
Dissolved Sulphate SO ₄	1.65	6.54	6.48	4.14	-	mg/L
Ammonia Nitrogen N	< 0.01	< 0.01	< 0.01	< 0.01	-	mg/L
Tannin and Lignin	0.31	< 0.1	< 0.1	< 0.1	-	mg/L
Total Metals Analysis						
Aluminum Al	0.025	0.013	0.014	0.018	-	mg/L
Antimony Sb	< 0.0005	< 0.0005	< 0.0005	< 0.0005	0.006	mg/L
Arsenic As	< 0.001	< 0.001	< 0.001	< 0.001	0.010	mg/L
Barium Ba	0.006	0.003	0.006	0.014	1.0	mg/L
Boron B	< 0.025	< 0.025	< 0.025	< 0.025	5	mg/L
Cadmium Cd	< 0.00005	< 0.00005	< 0.00005	< 0.00005	0.005	mg/L
Calcium Ca	9.07	23.1	31.7	26.5	-	mg/L
Chromium Cr	< 0.001	< 0.001	0.001	< 0.001	0.05	mg/L
Lead Pb	< 0.00025	< 0.00025	0.0004	< 0.00025	0.01	mg/L
Magnesium Mg	1.15	11.3	15.8	13.2	-	mg/L
Mercury Hg	< 0.02	< 0.02	< 0.02	< 0.02	1	µg/L
Potassium K	0.13	0.43	0.77	0.63	-	mg/L
Selenium Se	< 0.001	< 0.001	< 0.001	< 0.001	0.01	mg/L
Silver Ag	0.0019	< 0.0002	< 0.0002	< 0.0002	-	mg/L
Uranium U	< 0.00025	< 0.00025	< 0.00025	< 0.00025	0.02	mg/L
Microbiological Analysis						
Total Coliforms (Confirmed)	< 1	< 1	< 1	< 1	not detected	Col./100 mL
E. coli	< 1	< 1	< 1	< 1	not detected	Col./100 mL
Heterotrophic Plate Count	1	< 1	2	2	-	Col./1 mL

µS/cm = microsiemens per centimeter

µg/L = micrograms per liter

Col./1 mL = Colonies per 1 mL

< = Less than reporting limit

mg/L = milligrams per liter

Col./100 mL = Colonies per 100 mL

Full Spectrum Analysis

REPORTED TO: City of Parksville
 REPORT DATE: November 4, 2009
 GROUP NUMBER: 101022038



Potability (Health Criteria at Point of Use) in Water

CLIENT SAMPLE IDENTIFICATION:		Railway Well #7			
DATE SAMPLED:		Oct 20/09		Max. Acceptable Concentration	UNITS
CANTEST ID:		910220079			
Conventional Parameters					
Conductivity		378	-		µS/cm
Hardness (Total)	CaCO ₃	176	-		mg/L
Dissolved Fluoride	F	0.06	1.5		mg/L
Nitrate and Nitrite	N	1.14	10		mg/L
Nitrate	N	1.14	10.0		mg/L
Nitrite	N	< 0.002	1.0		mg/L
Dissolved Sulphate	SO ₄	5.36	-		mg/L
Ammonia Nitrogen	N	< 0.01	-		mg/L
Tannin and Lignin		< 0.1	-		mg/L
Total Metals Analysis					
Aluminum	Al	0.01	-		mg/L
Antimony	Sb	< 0.0005	0.006		mg/L
Arsenic	As	< 0.001	0.010		mg/L
Barium	Ba	0.015	1.0		mg/L
Boron	B	< 0.025	5		mg/L
Cadmium	Cd	< 0.00005	0.005		mg/L
Calcium	Ca	38.1	-		mg/L
Chromium	Cr	0.001	0.05		mg/L
Lead	Pb	< 0.00025	0.01		mg/L
Magnesium	Mg	19.6	-		mg/L
Mercury	Hg	< 0.02	1		µg/L
Potassium	K	0.71	-		mg/L
Selenium	Se	< 0.001	0.01		mg/L
Silver	Ag	< 0.0002	-		mg/L
Uranium	U	0.0003	0.02		mg/L
Microbiological Analysis					
Total Coliforms (Confirmed)		< 1	not detected		Col./100 mL
E. coli		< 1	not detected		Col./100 mL
Heterotrophic Plate Count		< 1	-		Col./1 mL

µS/cm = microsiemens per centimeter
 µg/L = micrograms per liter
 Col./1 mL = Colonies per 1 mL
 < = Less than reporting limit

mg/L = milligrams per liter
 Col./100 mL = Colonies per 100 mL

Full Spectrum Analysis

REPORTED TO: City of Parksville
 REPORT DATE: November 4, 2009
 GROUP NUMBER: 101022038



Conventional Parameters in Water

CLIENT SAMPLE IDENTIFICATION:	River Station	Springwood Well #1	Springwood Well #8	Railway Well #1	
DATE SAMPLED:	Oct 20/09	Oct 20/09	Oct 20/09	Oct 20/09	REPORTING LIMIT
CANTEST ID:	910220065	910220074	910220075	910220078	
Total Organic Carbon C	<	<	<	<	1
Total Kjeldahl Nitrogen N	<	<	<	<	0.2
Total Nitrogen N	<	1.0	0.9	0.6	0.2

Results expressed as milligrams per liter (mg/L)
 < = Less than reporting limit

REPORTED TO: City of Parksville
 REPORT DATE: November 4, 2009
 GROUP NUMBER: 101022038



Conventional Parameters in Water

CLIENT SAMPLE IDENTIFICATION:	Railway Well #7	
DATE SAMPLED:	Oct 20/09	REPORTING LIMIT
CANTEST ID:	910220079	
Total Organic Carbon C	<	1
Total Kjeldahl Nitrogen N	<	0.2
Total Nitrogen N	1.1	0.2

Results expressed as milligrams per liter (mg/L)
 < = Less than reporting limit

Full Spectrum Analysis

REPORTED TO: City of Parksville

REPORT DATE: November 4, 2009

GROUP NUMBER: 101022038



Metals Analysis in Water

CLIENT SAMPLE IDENTIFICATION:	River Station	Springwood Well #1	Springwood Well #8	Railway Well #1		
SAMPLE PREPARATION:	TOTAL	TOTAL	TOTAL	TOTAL		
DATE SAMPLED:	Oct 20/09	Oct 20/09	Oct 20/09	Oct 20/09		
CANTEST ID:	910220065	910220074	910220075	910220078	REPORTING LIMIT	
Beryllium	Be	<	<	<	<	0.0005
Bismuth	Bi	<	<	<	<	0.0005
Cesium	Cs	<	<	<	<	0.0005
Cobalt	Co	<	<	<	<	0.0005
Lanthanum	La	<	<	<	<	0.0005
Lithium	Li	0.0021	<	0.0007	0.0006	0.0005
Molybdenum	Mo	<	<	<	<	0.0005
Nickel	Ni	<	<	<	<	0.001
Phosphorus	P	<	<	<	<	0.075
Rhenium	Re	<	<	<	<	0.0005
Rubidium	Rb	<	<	<	<	0.0005
Silicon	Si	2.4	12.5	11.7	11.3	0.25
Strontium	Sr	0.042	0.07	0.088	0.09	0.0005
Sulphur	S	<	<	<	<	5
Tellurium	Te	<	<	<	<	0.001
Thallium	Tl	<	<	<	<	0.0001
Thorium	Th	<	<	<	<	0.00025
Tin	Sn	<	<	<	<	0.0005
Titanium	Ti	<	<	<	<	0.001
Tungsten	W	<	<	<	<	0.0005
Vanadium	V	<	0.0022	0.004	0.0038	0.0005
Zirconium	Zr	<	<	<	<	0.0005

Results expressed as milligrams per liter (mg/L)

< = Less than reporting limit

Full Spectrum Analysis

REPORTED TO: City of Parksville

REPORT DATE: November 4, 2009

GROUP NUMBER: 101022038



Metals Analysis in Water

CLIENT SAMPLE IDENTIFICATION:		Railway Well #7	
SAMPLE PREPARATION:		TOTAL	
DATE SAMPLED:		Oct 20/09	
CANTEST ID:		910220079	
			REPORTING LIMIT
Beryllium	Be	<	0.0005
Bismuth	Bi	<	0.0005
Cesium	Cs	<	0.0005
Cobalt	Co	<	0.0005
Lanthanum	La	<	0.0005
Lithium	Li	0.0007	0.0005
Molybdenum	Mo	<	0.0005
Nickel	Ni	<	0.001
Phosphorus	P	<	0.075
Rhenium	Re	<	0.0005
Rubidium	Rb	<	0.0005
Silicon	Si	11.4	0.25
Strontium	Sr	0.117	0.0005
Sulphur	S	<	5
Tellurium	Te	<	0.001
Thallium	Tl	<	0.0001
Thorium	Th	<	0.00025
Tin	Sn	<	0.0005
Titanium	Ti	<	0.001
Tungsten	W	<	0.0005
Vanadium	V	0.0036	0.0005
Zirconium	Zr	<	0.0005

Results expressed as milligrams per liter (mg/L)

< = Less than reporting limit