



City of
Parksville

2010 ANNUAL WATER REPORT



June 2011

Engineering and Operations Department

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1.0 Introduction:

All water suppliers, under their Operating Permit, 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:

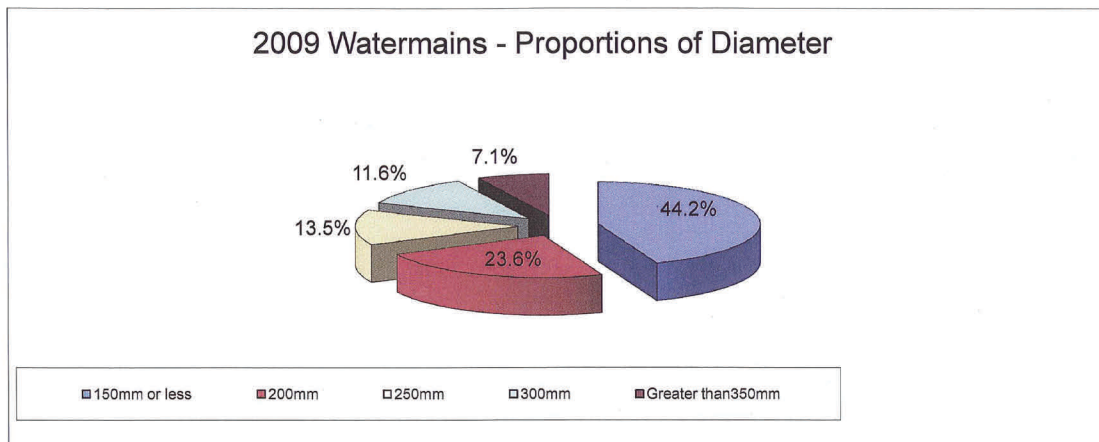
- Reservoir #3 - 671m³ (148,000 Imp. gal.)
- Reservoir #5 - 4300 m³ (950,000 Imp. gal).

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".

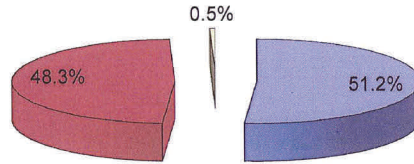
There are 468 fire hydrants and one Pressure Reducing Valve (PRV).

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 in 2009. 2010 Data has not yet been graphed.



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	

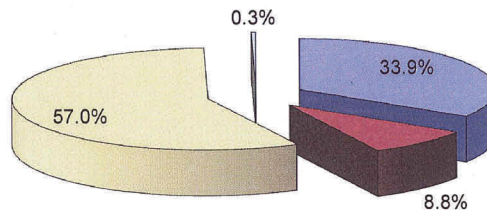
2009 Watermains - Proportions of Age



■ 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.

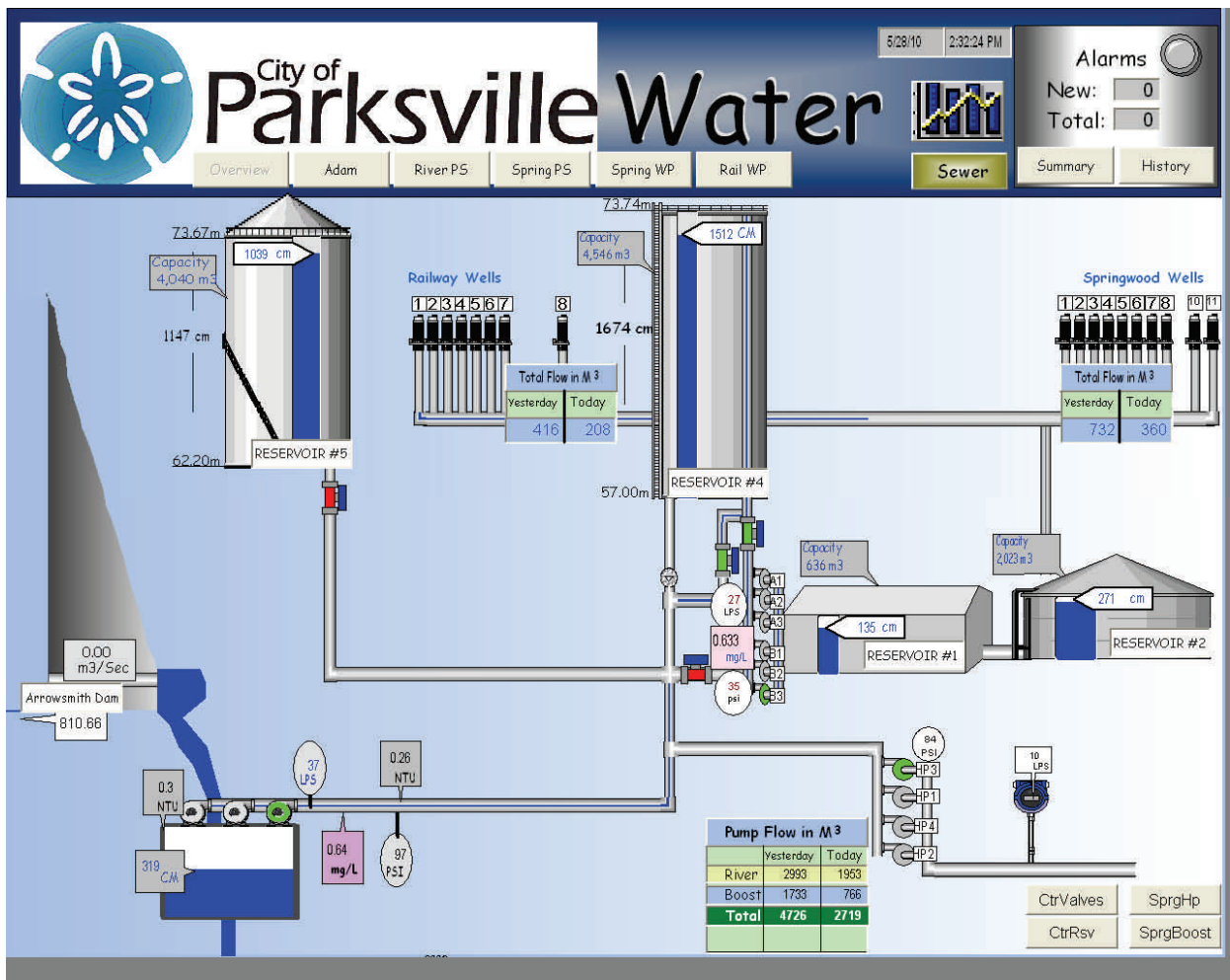
The high pressure water in this zone is supplied from 4 pumps, a 15hp, 2-40hp and a 100 hp. These pumps are controlled through the SCADA system that automatically watches flows and switches on however many pumps it needs to meet the flow requirements.

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



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 2010 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 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 the Canadian Drinking Water Guidelines.

See **Appendix E** for the 2010 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 2010. 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 flushing fire hydrants during maintenance or changes in flows with or without the river pump station on line.



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
- Bi-Annual calibration of chlorine analyzers and turbidimeters

8.0 2010 Improvements:

- Installed a new 15 HP vertical turbine pump with variable frequency drive motor at Springwood Pump Station
- Purchased a new chlorine analyzer for River Pump Station
- Replaced River Pump Station Pump #2
- Final upgrade of SCADA system to current technologies
- Continue to replace old style flush outs at dead ends to improve flows while flushing
- In consultation with Fisheries and Environment, a contractor was hired to rake the river intake gallery to remove the fine sands plugging up the intake

9.0 2010 Capital Projects:

- Moilliet Street: water, sewer, storm
- Arrowsmith Water Service hired consultants to do an engineering study on feasibility of a water treatment plant for the area

10.0 2011 Capital Projects and Improvements:

- Continue upgrading SCADA data historian
- 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.
- 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. Start piloting various treatment processes

11.0 Cross Connection Control Program

In May 2006 the City of Parksville developed a draft cross connection control program as is currently working on the implementation of it.

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.

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.

City staff remain watchful of potential cross connections in the fields and report problems back to Cross Connection Control Coordinator.



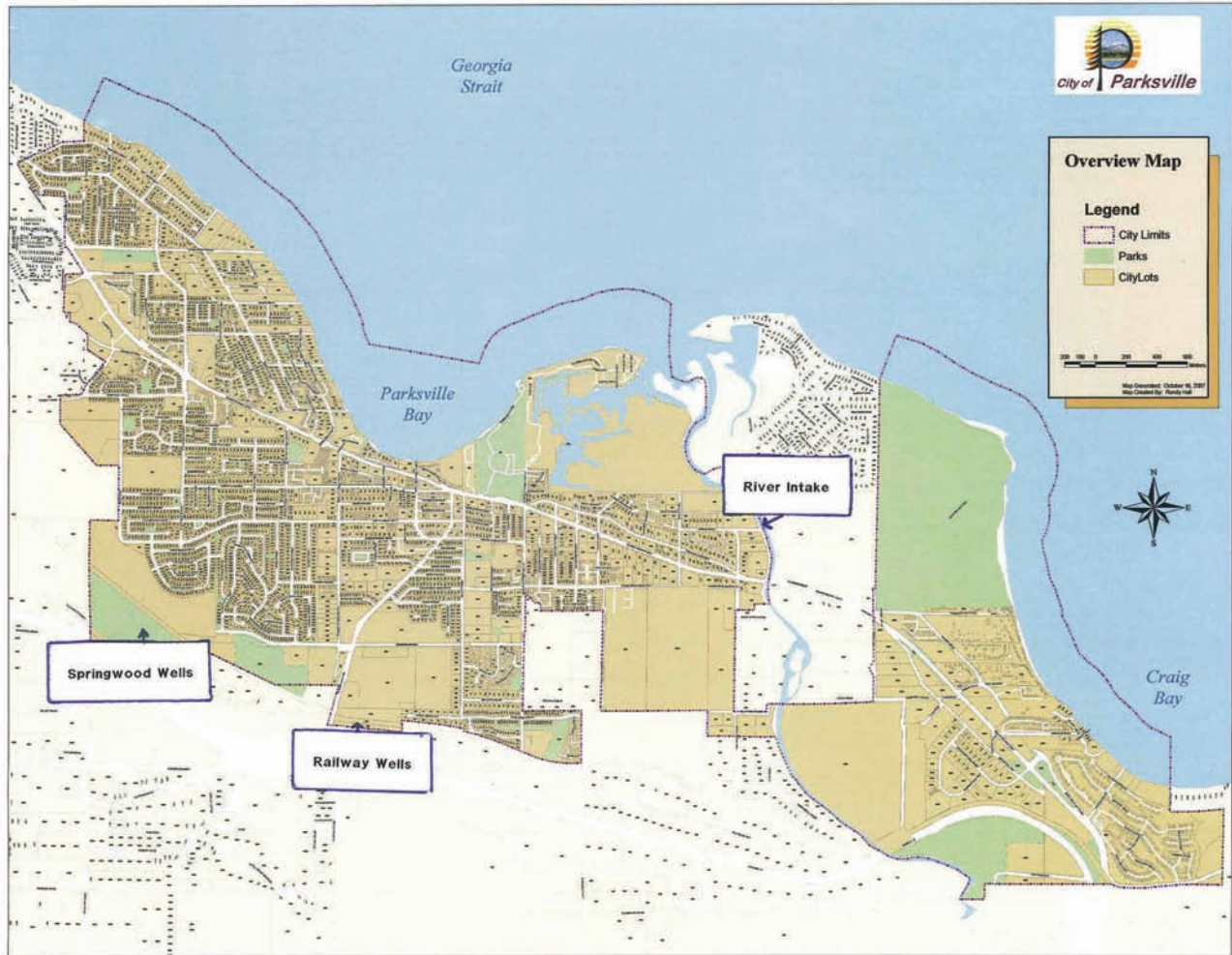
Double Check Valve Assembly

12.0

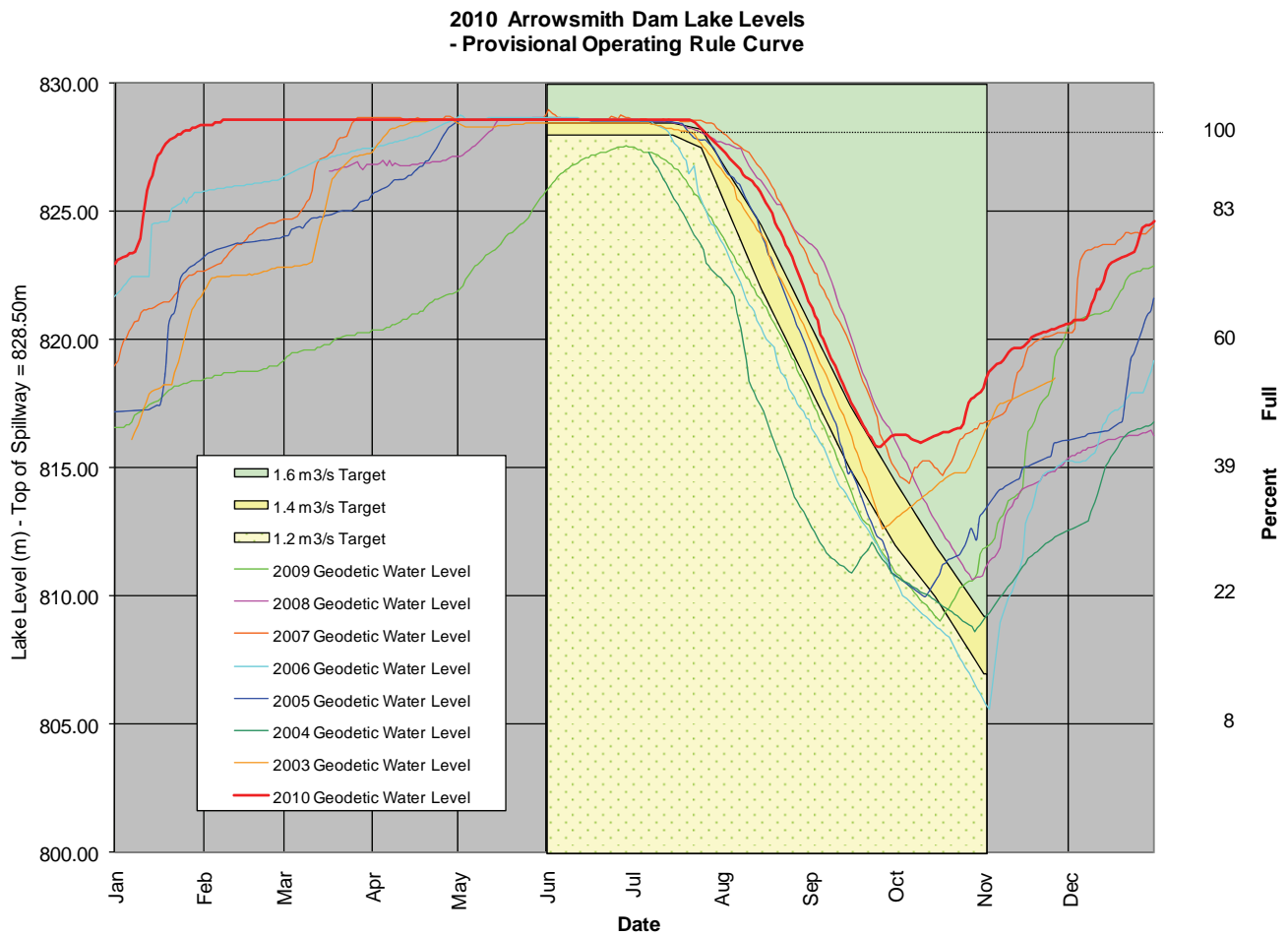
Emergency Response Plan

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. This plan continues to be updated.

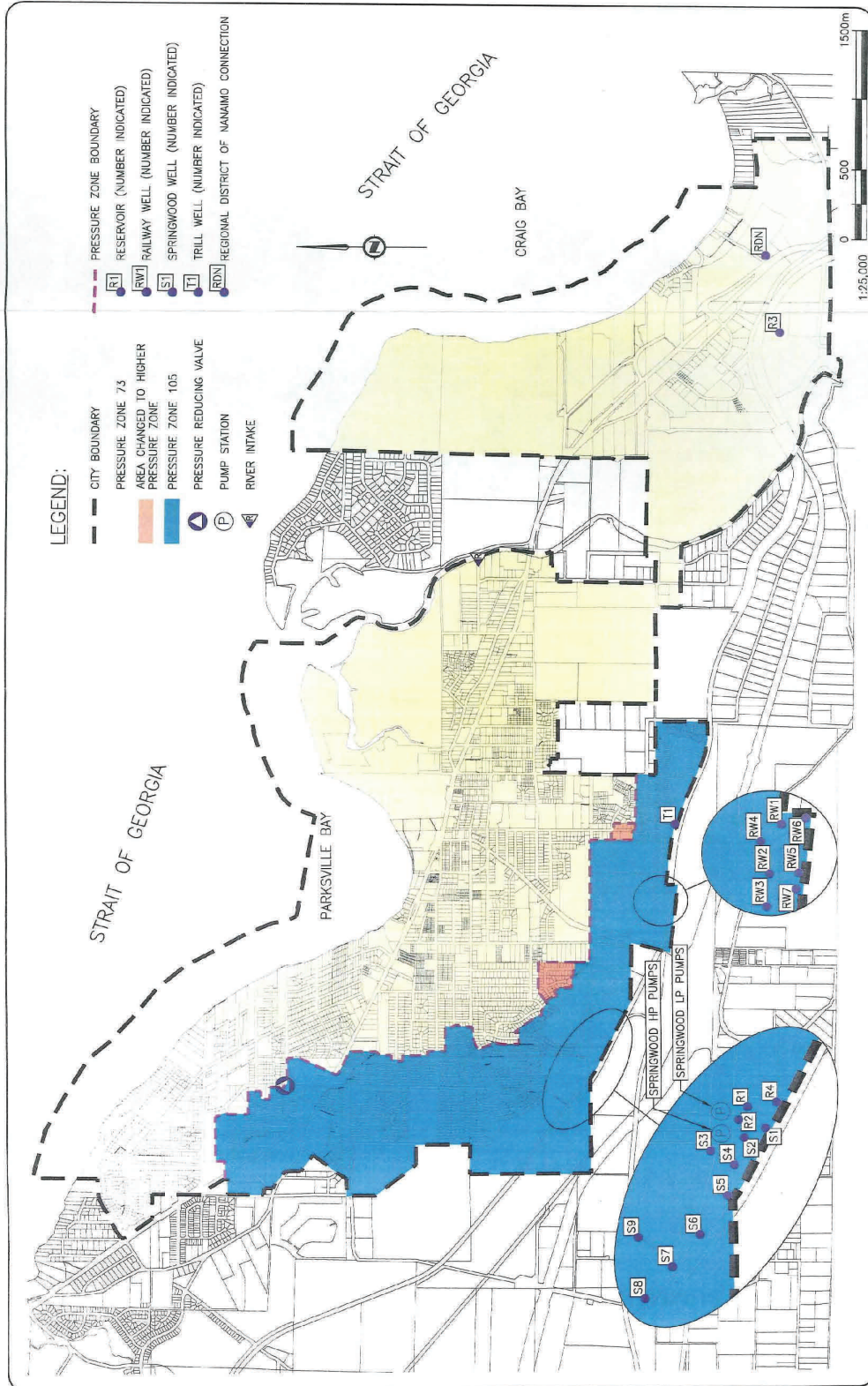
Well Locations Map



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.	0212
	FIGURE 10

CLIENT	CITY OF PARKSVILLE
PROJECT	WATER STUDY UPDATE

KOERS & ASSOCIATES ENGINEERING LTD.
Consulting Engineers

2010 Bacteriological Results

Water Sample Range Report

Vancouver Island Health Authority
Central Island

Facility Name: PARKSVILLE, WWS
Facility Type: DWT
Date Range: Jan 1 2010 to Dec 31 2010
Date Created: Jan 21 2011

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>				
	06/01/2010	L1	L1	
	23/02/2010	L1	L1	
	24/03/2010	L1	L1	
	20/04/2010	1	L1	
	26/05/2010	L1	L1	
	07/07/2010	L1	L1	
	17/08/2010	L1	L1	
	21/09/2010	L1	L1	
	19/10/2010	L1	L1	
	23/11/2010	L1	L1	
	07/12/2010	<u>L1</u>	<u>L1</u>	
	Total Positive:	1	0	0
<u>Harbour Homes,</u>				
<u>Parksville BC, Top</u>				
<u>of Corfield,</u>				
<u>Parksville , Dist. site,</u>				
<u>Monthly</u>				
	12/01/2010	L1	L1	
	03/02/2010	L1	L1	
	16/03/2010	L1	L1	
	20/04/2010	L1	L1	
	19/05/2010	L1	L1	
	09/06/2010	L1	L1	
	13/07/2010	L1	L1	
	04/08/2010	T		
	21/09/2010	L1	L1	
	13/10/2010	L1	L1	
	23/11/2010	L1	L1	
	07/12/2010	<u>L1</u>	<u>L1</u>	
	Total Positive:	0	0	0

2010 Bacteriological Results

1247 Arbutus Road,
Parksville BC,
Parksville
MHP/Utility Building,
Parksville, Dist. site,
Monthly

06/01/2010	L1	L1	
09/02/2010	L1	L1	
09/03/2010	L1	L1	
14/04/2010	L1	L1	
04/05/2010	L1	L1	
02/06/2010	L1	L1	
13/07/2010	L1	L1	
04/08/2010	L1	L1	
08/09/2010	L1	L1	
05/10/2010	L1	L1	
03/11/2010	L1	L1	
07/12/2010	<u>L1</u>	<u>L1</u>	
Total Positive:	0	0	0

Craig Bay Heritage
Museum, Parksville
BC, Craig Bay
Heritage Museum,
Parksville, Dist. site,
Monthly

12/01/2010	L1	L1	
23/02/2010	L1	L1	
24/03/2010	L1	L1	
20/04/2010	L1	L1	
19/05/2010	L1	L1	
16/06/2010	L1	L1	
28/07/2010	L1	L1	
10/08/2010	L1	L1	
21/09/2010	L1	L1	
26/10/2010	L1	L1	
16/11/2010	L1	L1	
14/12/2010	<u>L1</u>	<u>L1</u>	
Total Positive:	0	0	0

2010 Bacteriological Results

330 Park View,
Parksville BC, 330
Park View,
Parksville, Dist. site,
Monthly

12/01/2010	L1	L1	
09/02/2010	L1	L1	
03/03/2010	L1	L1	
14/04/2010	L1	L1	
11/05/2010	L1	L1	
02/06/2010	L1	L1	
20/07/2010	L1	L1	
04/08/2010	T		
08/09/2010	L1	L1	
05/10/2010	L1	L1	
30/11/2010	L1	L1	
14/12/2010	<u>L1</u>	<u>L1</u>	
Total Positive:	0	0	0

1390 Herring Gull
Way, Parksville BC,
Works Yard,
Parksville, Dist. site,
Monthly

26/01/2010	L1	L1	
17/02/2010	L1	L1	
03/03/2010	L1	L1	
07/04/2010	L1	L1	
11/05/2010	L1	L1	
09/06/2010	L1	L1	
20/07/2010	L1	L1	
24/08/2010	L1	L1	
14/09/2010	L1	L1	
13/10/2010	L1	L1	
09/11/2010	L1	L1	
07/12/2010	<u>L1</u>	<u>L1</u>	
Total Positive:	0	0	0

2010 Bacteriological Results

613 Chinook
Avenue, Parksville
BC, 613 Chinook
Avenue, Parksville,
Dist. site, Monthly

19/01/2010	L1	L1	
17/02/2010	L1	L1	
30/03/2010	L1	L1	
14/04/2010	L1	L1	
19/05/2010	L1	L1	
09/06/2010	L1	L1	
13/07/2010	L1	L1	
04/08/2010	L1	L1	
14/09/2010	L1	L1	
13/10/2010	L1	L1	
03/11/2010	L1	L1	
14/12/2010	<u>L1</u>	<u>L1</u>	
Total Positive:	0	0	0

193 East Island
Highway, Parksville
BC, Community
Park, Parksville BC,
Dist. site, Monthly

06/01/2010	L1	L1	
17/02/2010	L1	L1	
09/03/2010	L1	L1	
07/04/2010	L1	L1	
04/05/2010	L1	L1	
16/06/2010	L1	L1	
28/07/2010	L1	L1	
17/08/2010	L1	L1	
14/09/2010	L1	L1	
26/10/2010	L1	L1	
30/11/2010	L1	L1	
07/12/2010	<u>L1</u>	<u>L1</u>	
Total Positive:	0	0	0

2010 Bacteriological Results

Daffodil at Camas,
Parksville BC,
Daffodil at Camas,
Parksville, Dist. site,
Monthly

19/01/2010	L1	L1	
03/02/2010	L1	L1	
03/03/2010	L1	L1	
27/04/2010	L1	L1	
26/05/2010	L1	L1	
02/06/2010	L1	L1	
28/07/2010	74	L1	
04/08/2010	1	L1	Resampled
24/08/2010	L1	L1	
14/09/2010	L1	L1	
26/10/2010	L1	L1	
16/11/2010	L1	L1	
07/12/2010	<u>L1</u>	<u>L1</u>	
Total Positive:	2	0	0

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

19/01/2010	L1	L1	
23/02/2010	L1	L1	
09/03/2010	L1	L1	
07/04/2010	L1	L1	
26/05/2010	L1	L1	
23/06/2010	L1	L1	
13/07/2010	L1	L1	
17/08/2010	L1	L1	
21/09/2010	L1	L1	
13/10/2010	L1	L1	
09/11/2010	L1	L1	
07/12/2010	<u>L1</u>	<u>L1</u>	
Total Positive:	0	0	0

2010 Bacteriological Results

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

19/01/2010	L1	L1	
17/02/2010	L1	L1	
03/03/2010	L1	L1	
07/04/2010	L1	L1	
11/05/2010	L1	L1	
16/06/2010	L1	L1	
28/07/2010	L1	L1	
10/08/2010	L1	L1	
08/09/2010	L1	L1	
05/10/2010	L1	L1	
09/11/2010	L1	L1	
07/12/2010	<u>L1</u>	<u>L1</u>	
Total Positive:	0	0	0

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

26/01/2010	L1	L1	
09/02/2010	L1	L1	
09/03/2010	L1	L1	
27/04/2010	L1	L1	
04/05/2010	L1	L1	
23/06/2010	L1	L1	
20/07/2010	L1	L1	
10/08/2010	L1	L1	
08/09/2010	L1	L1	
05/10/2010	L1	L1	
03/11/2010	L1	L1	
14/12/2010	<u>L1</u>	<u>L1</u>	
Total Positive:	0	0	0

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

26/01/2010	L1	L1	
23/02/2010	L1	L1	
30/03/2010	L1	L1	
27/04/2010	L1	L1	
26/05/2010	L1	L1	
07/07/2010	L1	L1	
31/08/2010	L1	L1	
28/09/2010	L1	L1	
19/10/2010	L1	L1	
23/11/2010	3.0	L1	
14/12/2010	<u>L1</u>	<u>L1</u>	
Total Positive:	1	0	0

2010 Bacteriological Results

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

06/01/2010	L1	L1	
09/02/2010	L1	L1	
16/03/2010	L1	L1	
14/04/2010	L1	L1	
04/05/2010	L1	L1	
02/06/2010	L1	L1	
20/07/2010	L1	L1	
17/08/2010	L1	L1	
28/09/2010	L1	L1	
19/10/2010	L1	L1	
16/11/2010	L1	L1	
14/12/2010	<u>L1</u>	<u>L1</u>	
Total Positive:	0	0	0

, 136 Memorial, Dist.
site, Monthly

26/01/2010	L1	L1	
03/02/2010	L1	L1	
16/03/2010	L1	L1	
27/04/2010	L1	L1	
11/05/2010	L1	L1	
07/07/2010		L1	
31/08/2010	L1	L1	
28/09/2010	L1	L1	
26/10/2010	L1	L1	
30/11/2010	L1	L1	
14/12/2010	<u>L1</u>	<u>L1</u>	
Total Positive:	0	0	0

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

12/01/2010	L1	L1	
03/02/2010	L1	L1	
24/03/2010	L1	L1	
20/04/2010	L1	L1	
19/05/2010	L1	L1	
23/06/2010	L1	L1	
07/07/2010	L1	L1	
24/08/2010	L1	L1	
28/09/2010	L1	L1	
19/10/2010	L1	L1	
30/11/2010	L1	L1	
14/12/2010	<u>L1</u>	<u>L1</u>	
Total Positive:	0	0	0

Result Values:

E - estimated

L - less than

G - greater than

2010 Bacteriological Results

Samples that contain total coliform:	4	2.11% 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:	190	

Comments:

Environmental Health Officer
Jun 14 2011

FOR FURTHER INFORMATION PLEASE CALL: Wrathall, Bill (250) 947-8222 Parksville

Operator

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

(250) 248-5412



Maxxam Job #: B0A1862
Report Date: 2010/11/05

City of Parksville
Your P.O. #: 6573

Success Through Science

RESULTS OF CHEMICAL ANALYSES OF WATER

Maxxam ID	X85265	X85266	X85267	X85268	X85269	RDL	QC Batch
Sampling Date	2010/10/20 08:00	2010/10/20 09:45	2010/10/20 09:30	2010/10/20 08:30	2010/10/20 08:55		
Units	RIVER P/S	SPRINGWOOD WELL #3	SPRINGWOOD WELL #7	RAILWAY WELL #2	RAILWAY WELL #6		
Criteria A							
Criteria 2 A							
CONVENTIONALIS							
Transmittance at 254nm	%T/cm	89.9				N/A	4376032
ANIONS							
Nitrite (N)	mg/L	<0.002	<0.002	<0.002	<0.002	0.002	4363246
Calculated Parameters							
Nitrate (N)	mg/L	10	0.027	0.460	0.583	0.937	0.339
Misc. Inorganics	mg/L						4360565
Fluoride (F)	mg/L	1.5	0.02	0.05	0.05	0.04	0.05
Alkalinity (Total as CaCO3)	mg/L	26	98	92	116	106	2
Total Organic Carbon (C)	mg/L	1.2	<0.5	0.6	0.8	<0.5	0.5
Bicarbonate (HCO3)	mg/L	32	119	112	136	130	2
Carbonate (CO3)	mg/L	<2	<2	<2	<2	<2	2
Hydroxide (OH)	mg/L	<2	<2	<2	<2	<2	2
CATIONS							
Ammonia (N)	mg/L	<0.005	<0.005	<0.005	0.008	<0.005	0.005
Total Total Kjeldahl Nitrogen (Calc)	mg/L	0.12	<0.02	0.04	<0.02	0.05	0.02
Nitrate plus Nitrite (N)	mg/L	10	0.027	0.460	0.583	0.937	0.339
Total Nitrogen (N)	mg/L	0.14	0.45	0.62	0.90	0.38	0.02
PHYSICAL PROPERTIES							
Conductivity	uS/cm	96	265	239	390	319	1
pH	pH Units	6.5-8.5	7.0	7.2	7.3	7.2	7.3
PHYSICAL PROPERTIES							
Total Dissolved Solids	mg/L	500	69	153	145	204	177
Turbidity	NTU	0.2	0.2	0.2	0.4	0.4	0.4
MISCELLANEOUS							
True Colour	Col. Unit	15	8	<5	<5	<5	5
Tannins and Lignins	mg/L		0.2	<0.1	<0.1	<0.1	0.1
NUTRIENTS							
Ammonia (N)	mg/L	<0.005	<0.005	<0.005	0.008	<0.005	0.005
Total Total Kjeldahl Nitrogen (Calc)	mg/L	0.12	<0.02	0.04	<0.02	0.05	0.02
Nitrate plus Nitrite (N)	mg/L	10	0.027	0.460	0.583	0.937	0.339
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Conductivity	uS/cm	96	265	239	390	319	1
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PHYSICAL PROPERTIES							
Total Dissolved Solids	mg/L	500	69	153	145	204	177
Turbidity	NTU	0.2	0.2	0.2	0.4	0.4	0.4

N/A = Not Applicable
RDL = Reportable Detection Limit
Criteria A: CDWQG Potability (Health Criteria at Point of Use / Distribution) - for Victoria requirement for <1 micro RDLs
Criteria 2 A: Aesthetic Objective as set by "Guidelines for Canadian Drinking Water Quality."



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Success Thru

MICROBIOLOGY (WATER)

Maxxam ID	Units	Criteria A	X85265 2010/10/20 08:00 RIVER P/S	X85266 2010/10/20 09:45 SPRINGWOOD WELL #3	X85267 2010/10/20 09:30 SPRINGWOOD WELL #7	X85268 2010/10/20 08:30 RAILWAY WELL #2	X85269 2010/10/20 08:55 RAILWAY WELL #6	RDL	QC Batch
E. coli	MPN/100mL	0	11	<1	<1	<1	<1	1	4361110
Total Coliforms	MPN/100mL	0	250	<1	<1	<1	<1	1	4361110

Full Spectrum Analysis

RDL = Reportable Detection Limit
 Criteria A, Criteria B, Criteria C: CDWQG Potability (Health Criteria at Point of Use / Distribution) - for Victoria requirement for <1 micro RDLs



Maxxam Job #: B0A1862
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Success Thr

CSR TOTAL METALS IN WATER (WATER)

Maxxam ID	Units	Criteria A	Criteria B	Criteria C	Criteria 2 A	RIVER P/S	SPRINGWOOD WELL #3	SPRINGWOOD WELL #7	RDL	QC Batch
Maxxam ID						X85265	X85266	X85267		
Sampling Date						20/10/10/20 08:00	20/10/10/20 09:45	20/10/10/20 09:30		
Calculated Parameters										
Total Hardness (CaCO3)	mg/L	5	20	100		37.3	122	126	0.5	4357857
Total Metals by ICPMS										
Total Aluminum (Al)	ug/L					35	4	9	3	4389236
Total Antimony (Sb)	ug/L	6				<0.5	<0.5	<0.5	0.5	4389236
Total Arsenic (As)	ug/L	10				<0.1	0.5	0.3	0.1	4389236
Total Barium (Ba)	ug/L	1000				7	6	4	1	4389236
Total Beryllium (Be)	ug/L					<0.1	<0.1	<0.1	0.1	4389236
Total Bismuth (Bi)	ug/L					<1	<1	<1	1	4389236
Total Boron (B)	ug/L	5000				<50	<50	<50	50	4389236
Total Cadmium (Cd)	ug/L	5				<0.01	<0.01	0.02	0.01	4389236
Total Chromium (Cr)	ug/L	50				2	<1	1	1	4389236
Total Cobalt (Co)	ug/L					<0.5	<0.5	<0.5	0.5	4389236
Total Copper (Cu)	ug/L					33.1	0.6	3.8	0.2	4389236
Total Iron (Fe)	ug/L					59	34	24	5	4389236
Total Lead (Pb)	ug/L	10				0.2	0.2	0.4	0.2	4389236
Total Lithium (Li)	ug/L					<5	<5	<5	5	4389236
Total Manganese (Mn)	ug/L					2	56	15	1	4389236
Total Mercury (Hg)	ug/L	1				<0.02	<0.02	<0.02	0.02	4389236
Total Molybdenum (Mo)	ug/L					<1	<1	<1	1	4389236
Total Nickel (Ni)	ug/L					<1	<1	<1	1	4389236
Total Selenium (Se)	ug/L	10				<0.1	0.1	<0.1	0.1	4389236
Total Silicon (Si)	ug/L					330	12900	13900	100	4389236
Total Silver (Ag)	ug/L					<0.02	<0.02	<0.02	0.02	4389236
Total Strontium (Sr)	ug/L					50	69	63	1	4389236
Total Thallium (Tl)	ug/L					<0.05	<0.05	<0.05	0.05	4389236
Total Tin (Sn)	ug/L					<5	<5	<5	5	4389236
Total Titanium (Ti)	ug/L					<5	<5	<5	5	4389236
Total Uranium (U)	ug/L	20				<0.1	0.1	<0.1	0.1	4389236
Total Vanadium (V)	ug/L					<5	<5	6	5	4389236
Total Zinc (Zn)	ug/L					13	<5	11	5	4389236
Total Zirconium (Zr)	ug/L					<0.5	<0.5	<0.5	0.5	4389236
Total Calcium (Ca)	mg/L					12.0	26.1	25.3	0.05	4357858

RDL = Reportable Detection Limit
Criteria A, Criteria B, Criteria C: CDWQG Potability (Health Criteria at Point of Use / Distribution) - for Victoria requirement for <1 micro RDLs
Criteria 2 A: Aesthetic Objective as set by "Guidelines for Canadian Drinking Water Quality."



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Success Thru

MICROBIOLOGY (WATER)

Maxxam ID	X85265	X85266	X85267	X85268	X85269		
Sampling Date	2010/10/20 08:00	2010/10/20 09:45	2010/10/20 09:30	2010/10/20 08:30	2010/10/20 08:55		
Units	RIVER P/S	SPRINGWOOD WELL #3	SPRINGWOOD WELL #7	RAILWAY WELL #2	RAILWAY WELL #6	RDL	QC Batch
Microbiological Param.	MPN/100mL	0	<1	<1	<1	<1	1
E. coli	MPN/100mL	11	<1	<1	<1	<1	1
Total Coliforms	MPN/100mL	250	<1	<1	<1	<1	1
							4361110
							4361110

Full Spectrum Analysis

RDL = Reportable Detection Limit
 Criteria A, Criteria B, Criteria C: CDWQG Potability (Health Criteria at Point of Use / Distribution) - for Victoria requirement for <1 micro RDLs



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CSR TOTAL METALS IN WATER (WATER)

Maxxam ID	Units	Criteria A	Criteria B	Criteria C	Criteria 2 A	RAILWAY WELL #2	QC Batch	RAILWAY WELL #6	RDL	QC Batch
Sampling Date						2010/10/20 08:30		2010/10/20 08:55		
Calculated Parameters										
Total Hardness (CaCO3)	mg/L	5	20	100		166	4357857	121	0.5	4357857
Total Metals by ICPMS										
Total Aluminum (Al)	ug/L					4	4389236	8	3	4391394
Total Antimony (Sb)	ug/L	6				<0.5	4389236	<0.5	0.5	4391394
Total Arsenic (As)	ug/L	10				0.2	4389236	0.5	0.1	4391394
Total Barium (Ba)	ug/L	1000				15	4389236	18	1	4391394
Total Beryllium (Be)	ug/L					<0.1	4389236	<0.1	0.1	4391394
Total Bismuth (Bi)	ug/L					<1	4389236	<1	1	4391394
Total Boron (B)	ug/L	5000				<50	4389236	62	50	4391394
Total Cadmium (Cd)	ug/L	5				<0.01	4389236	0.01	0.01	4391394
Total Chromium (Cr)	ug/L	50				<1	4389236	<1	1	4391394
Total Cobalt (Co)	ug/L					<0.5	4389236	<0.5	0.5	4391394
Total Copper (Cu)	ug/L					1.2	4389236	1.0	0.2	4391394
Total Iron (Fe)	ug/L					55	4389236	25	5	4391394
Total Lead (Pb)	ug/L	10				<0.2	4389236	<0.2	0.2	4391394
Total Lithium (Li)	ug/L					<5	4389236	<5	5	4391394
Total Manganese (Mn)	ug/L					17	4389236	6	1	4391394
Total Mercury (Hg)	ug/L	1				<0.02	4389236	<0.02	0.02	4391394
Total Molybdenum (Mo)	ug/L					<1	4389236	<1	1	4391394
Total Nickel (Ni)	ug/L					<1	4389236	<1	1	4391394
Total Selenium (Se)	ug/L	10				<0.1	4389236	0.1	0.1	4391394
Total Silicon (Si)	ug/L					11900	4389236	10100	100	4391394
Total Silver (Ag)	ug/L					<0.02	4389236	<0.02	0.02	4391394
Total Strontium (Sr)	ug/L					103	4389236	82	1	4391394
Total Thallium (Tl)	ug/L					<0.05	4389236	<0.05	0.05	4391394
Total Tin (Sn)	ug/L					<5	4389236	<5	5	4391394
Total Titanium (Ti)	ug/L					<5	4389236	<5	5	4391394
Total Uranium (U)	ug/L	20				0.2	4389236	0.7	0.1	4391394
Total Vanadium (V)	ug/L					<5	4389236	<5	5	4391394
Total Zinc (Zn)	ug/L					11	4389236	<5	5	4391394
Total Zirconium (Zr)	ug/L					<0.5	4389236	<0.5	0.5	4391394
Total Calcium (Ca)	mg/L					35.1	4357858	27.4	0.05	4357858

RDL = Reportable Detection Limit
Criteria A, Criteria B, Criteria C: CDWQG Potability (Health Criteria at Point of Use / Distribution) - for Victoria requirement for <1 micro RDLs
Criteria 2 A: Aesthetic Objective as set by "Guidelines for Canadian Drinking Water Quality."



Maxxam Job #: B0A1862
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City of Parksville

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Your P. O. #: 6573

CSR TOTAL METALS IN WATER (WATER)

Maxxam ID	Units	Criteria A	Criteria B	Criteria C	Criteria 2 A	X85268 2010/10/20 08:30 RAILWAY WELL #2	QC Batch	X85269 2010/10/20 08:55 RAILWAY WELL #6	RDL	QC Batch
Total Magnesium (Mg)	mg/L					19.1	4357858	12.7	0.05	4357858
Total Potassium (K)	mg/L					0.86	4357858	0.71	0.05	4357858
Total Sodium (Na)	mg/L				200	8.96	4357858	7.22	0.05	4357858
Total Sulphur (S)	mg/L					<3	4357858	<3	3	4357858

Full Spectrum Analysis

RDL = Reportable Detection Limit
 Criteria A, Criteria B, Criteria C: CDWQG Potability (Health Criteria at Point of Use / Distribution) - for Victoria requirement for <1 micro RDLs
 Criteria 2 A: Aesthetic Objective as set by "Guidelines for Canadian Drinking Water Quality."