NANOOSE BAY PENINSULA

Water Service Area Annual Report 2011

Prepared by:

REGIONAL DISTRICT OF NANAIMO

Water Services Department

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1. Introduction

The following annual report describes the Nanoose Bay Peninsula (NBP) Water Service Area and summarizes the water quality and production data from 2011. This report also includes a summary of inquiries and complaints, completed and proposed maintenance activities, the Emergency Response Plan, and the Cross Connection Control Program.

This report is to be submitted to the Vancouver Island Health Authority by the Spring of 2012.

2. Nanoose Bay Peninsula Water System

The Nanoose Bay Peninsula Water System was established in 2005 by amalgamating the water service areas locally known as Madrona, Wall Beach, Driftwood, Nanoose (Beachcomber), Fairwinds, Arbutus Park, and West Bay. The previous service areas, if referred to in this report, are noted as neighbourhoods within the NBP service area. In 2011, the Nanoose Peninsula Water System was comprised of 2014 water service customers.

The water supply originates from 11 groundwater wells located in the area, and is supplemented seasonally (as required) with water from the Englishman River. The water supply is chlorinated and stored in several reservoirs throughout Nanoose Bay. A portable back-up generator is available in the event of a power outage. A map of the Nanoose Bay Peninsula Water Service Area is provided in Appendix A for reference.

2.1 Groundwater Wells

Eleven groundwater production wells are located in Nanoose Bay for water supply.

Well / Name	Well Depth	Wellhead Protection In Place	Treated/Untreated with Chlorine
Wallbrook #1	16.9 m	Yes	Treated
Madrona #4	52.1 m	Yes	Un-treated
Madrona #8	17.1m	Yes	Treated
Nanoose #2	53.3 m	Yes	Treated
Nanoose #3	52.7 m	Yes	Treated
Nanoose #4	59.1 m	Yes	Treated
Nanoose #6	107.0 m	Yes	Treated
Fairwinds #1	69.8 m	Yes	Treated
Fairwinds #2	75.3 m	Yes	Treated
Fairwinds #3	72.2 m	Yes	Treated
West Bay #3	75.6 m	Yes	Treated

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2.2 Reservoirs

Seven water storage reservoirs are present in the Nanoose Bay Peninsula Water System as follows;

- Madrona (concrete) - 485 m^3 (100,000 imperial gallons) capacity
- Beachcomber (steel) - 591 m^3 (130,000 imperial gallons) capacity
- Eagle Heights (concrete) - 341 m^3 (75,000 imperial gallons) capacity
- Dolphin (steel) - 455 m^3 (100,000 imperial gallons) capacity
- Fairwinds Res #1 (concrete) - 701 m^3 (154,000 imperial gallons) capacity
- Fairwinds Res #2 (concrete) - 701 m^3 (154,000 imperial gallons) capacity
- Arbutus Park (concrete) - 568 m^3 (125, 000 imperial gallons) capacity

2.3 Distribution System

The water distribution system in Nanoose Bay is summarized in the table below. Fire hydrants (287) are located throughout the water service area.

Watermain Material	Length of mains in NBP Water Service Area	Prevalence in Water Service Area
Asbestos-concrete:		
150mm or smaller	10.4 km	13.1%
200mm or larger	2.7 km	3.4%
PVC:		
150mm or smaller	22.4 km	28.2%
200mm or larger	33.5 km	42.1%
Ductile Iron:		
150mm or smaller	0.2 km	0.2%
200mm or larger	10.3 km	13.0%

Note: 'PVC' is poly-vinylchloride (plastic)

Photo of Madrona Well No.4 kiosk and fence.

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3. Water Sampling and Testing Program

Water sampling and testing is carried out weekly in the distribution system. The following table includes a summary of all testing:

Timing	Location	Tests
Weekly	RDN (in-house) Laboratory	Total coliforms, E.Coli Temperature, pH, Conductivity, Turbidity Chlorine residual, Salinity, TDS
Monthly (Health Dept.)	BC Centre for Disease Control	Total coliforms, E.Coli
Monthly	RDN (in-house) Laboratory	Total Iron and Manganese
Annual Source Water Testing (every Fall)	North Island Labs	Complete potability testing of all raw well water, including T-Ammonia
Annual System Water Testing (every Spring)	North Island Labs	Complete potability testing of distribution system, including T-Ammonia
Temporary Extra Testing Once per month	North Island Labs	True colour, Ammonia, Iron, Manganese, and Chloramines in distribution system

4. Water Quality - Source Water and Distribution System

Up-to-date water quality reports and lab data are posted monthly on the RDN website at www.rdn.bc.ca in the SERVICES section, under "Water Services" then "WaterSmart Communities". Tables of water quality testing results for both the source water and distribution system are provided at the end of this report under Appendix B.

In 2011, construction began on a water filtration plant, located at 2480 Nanoose Road. The water filtration plant was designed to filter and then chlorinate groundwater from Fairwinds Wells #1, #2, and #3, and the West Bay Well #3.

5. Water Quality Inquiries and Complaints

Numerous complaints and inquiries were received from the Nanoose Bay water service area in 2011 and were typically related to iron and manganese in the tap water (particularly the Fairwinds neighbourhood).

Tap water quality is expected to improve in 2012 with the completion of the water filtration plant. Filtered groundwater from the Fairwinds and West Bay wells will be mixed with raw well water from the other Nanoose wells, and stored in the same seven reservoirs throughout Nanoose Bay. The filtered groundwater, combined with the better quality well water is expected to greatly reduce the appearance of iron and manganese minerals (reddish-brown particulate) in the tap water.

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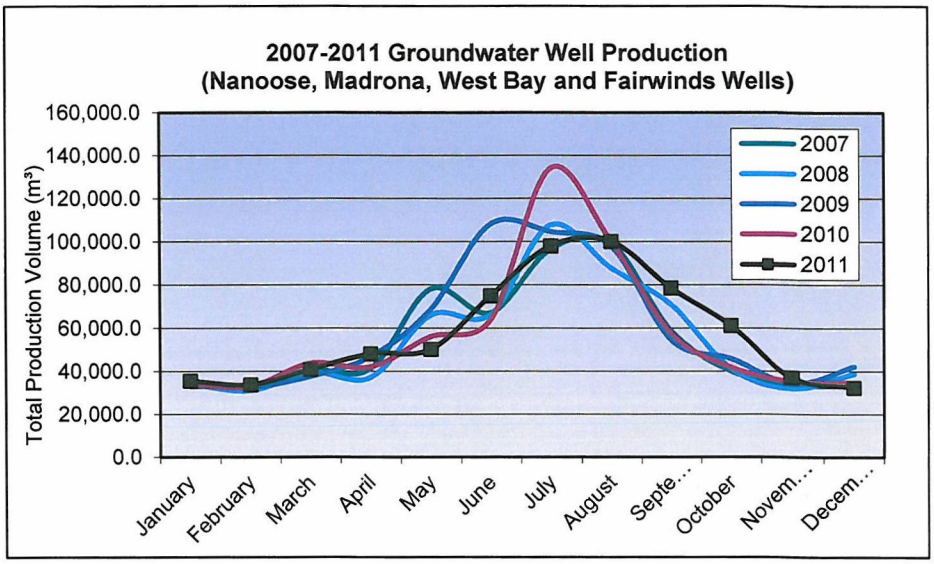
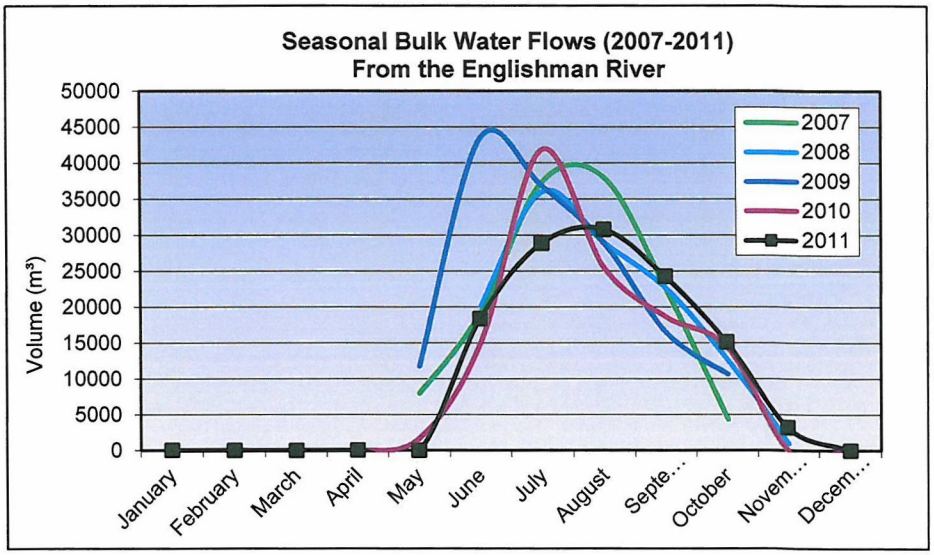
6. Groundwater Production and Consumption

The monthly groundwater well production and bulk water flows for the past 5 years are shown in the charts below. Groundwater production and bulk water flows in 2011 were average in comparison to previous years.





In the Fall/Winter of 2011, the average usage per home in Nanoose Bay was 0.41 cubic metres per day (90 imperial gallons). In the summer, the average water usage was 1.1 cubic metres per day (244 imperial gallons). Based on these figures, the annual consumption per capita is estimated to be 267 L/day (based on 2.4 people/household). This consumption is similar to the RDN system average of 269 L/day/capita in 2011.

7. Maintenance Program

Weekly pump station inspections are carried out to reduce or eliminate the risk of contamination and system failure, and to ensure the consistent application of chlorine for treatment purposes. Watermains are flushed once annually in the Spring. In the Fairwinds neighbourhood the watermains are flushed a second time in the Fall. Fire hydrants are serviced once per year (either 'A-level' or 'B-level' maintenance). Water storage reservoirs are drained and cleaned once every two years. Twenty-four hour on-call coverage is in place to respond to water system emergencies and alarms.

8. Water System Projects

8.1 2011 Completed Studies & Projects

- Negotiated a Statutory Right of Way agreement for three Fairwinds wells;
- Amalgamated RDN water systems' rates & regulations into one bylaw;
- Completed annual fire hydrant maintenance;
- Drained and cleaned the Madrona water storage reservoir;
- Replaced the well pump in West Bay Well No.3;
- Replaced the Dolphin Beach Reservoir Altitude Valve;
- Removed the Arbutus Park pumphouse since the Arbutus well was closed in 2005;
- Completed the connection piping of the new Claudet Road well to the water system (although well water is not yet in-use);
- Enforced the outdoor sprinkling regulations;
- Prepared a Draft Cross-Connection Control Bylaw;
- Carried out a comprehensive water conservation campaign (Team WaterSmart);
- Updated and improved the RDN website at www.rdn.bc.ca;
- Updated the Emergency Response Plan;
- Utilized the Auto E-message service to notify member residents of water service disruptions and upcoming maintenance activities;
- Applied a low-flush toilet incentive;
- Maintained excellent customer complaint and service request response times;
- Continued quality control through regular testing and monitoring of our water systems; and
- Completed additional educational programs.

8.2 2012 Proposed Projects & Upgrades

- Drain and clean the Beachcomber, Eagle Heights, Dolphin Beach, Fairwinds #1, Fairwinds #2, and Arbutus Park water storage reservoirs;
- Complete the Cross-Connection Control Bylaw and establish a procedure for reviewing commercial and industrial properties for water system risks;
- Complete construction of the Nanoose Bay Water Treatment (filtration) Plant; and
- Replace the Dolphin Beach reservoir access ladder;
- Replace several watermain flushouts;
- Paint the Beachcomber reservoir;
- Complete well automation and well upgrades associated with water filtration plant requirements;
- Flush watermains before water filtration plant startup;
- Update Standard Operating Procedures; and
- Apply a rainwater harvesting (rain barrel) incentive.

9. Emergency Response Plan

The Regional District has an Emergency Response Plan (ERP) that contains procedures and contact information to efficiently respond to water system emergencies such as contamination of water supply, loss of supply, and pump failure. The ERP was reviewed and updated in 2011, and copies are available on our website, at each RDN office, in each pumphouse, and in each Water Services vehicle. A copy of the ERP is also attached to this report in Appendix C.

10. Cross Connection Control

A formalized Cross Connection Control Program was initiated in 2007. Cross connection controls in-place include dual check valves at each service connection, fire hydrant use permits, and water supply bylaws noting discontinued service if a threat to the water supply is perceived by staff.

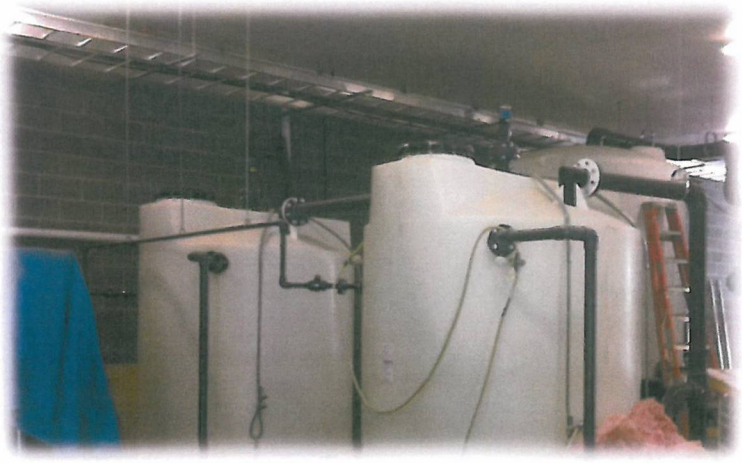
In 2008, a review and comparison of successful cross-connection control programs in other small water systems nearby was undertaken. A database of commercial customers was set-up in order to keep track of the maintenance history of testable backflow prevention assemblies at each site. Three RDN Operations staff achieved Backflow Prevention Tester's certification.

In 2010, a Draft Cross-Connection Control Bylaw was prepared, and is anticipated to be finalized in 2012. Additionally, the program in 2012 will include:

- A formal survey of existing and potential cross-connections, and
- An audit of RDN-owned facilities in each water service area.

11. Closing

An annual report for the year 2012 will be prepared and submitted to the Vancouver Island Health Authority in the Spring of 2013. Annual reports are also available on our website at www.rdn.bc.ca in the SERVICES section, under "Water Services" then "WaterSmart Communities".



Water Filtration Plant construction

Reaction chambers shown

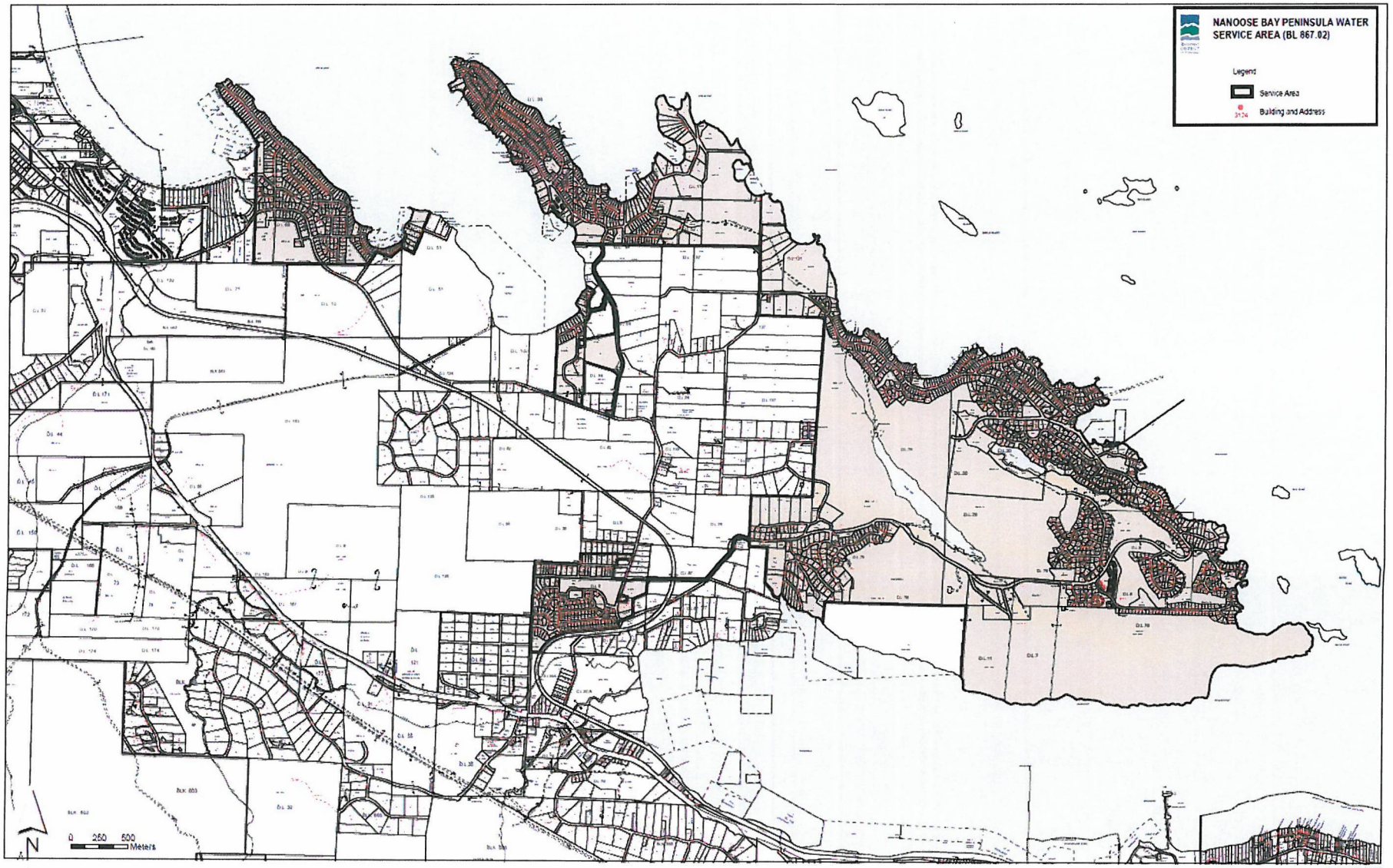
APPENIDX A

MAP OF NANOOSE BAY PENINSULA

WATER SERVICE AREA

NANOOSE BAY PENINSULA

WATER SERVICE AREA



APPENDIX B

WATER QUALITY TESTING RESULTS