REGIONAL DISTRICT OF NANAIMO

Water Service Area Annual Report 2020

Nanoose Bay Peninsula Water Service Area

June 2021

REGIONAL DISTRICT OF NANAIMO
Water & Utility 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 2020. This report also includes a summary of inquiries and complaints, completed and proposed maintenance activities, Operator Certification, the Emergency Response Plan, and the Cross Connection Control Program. This report is to be submitted to Island Health by the spring of 2021.

2. Nanoose Bay Peninsula Water System

The Nanoose Bay Peninsula Water System was established in 2005 by amalgamating the 7 small water service areas located within the Nanoose Bay Peninsula. The previous service areas, if referred to in this report, are noted as neighbourhoods within the NBP service area. In 2020, the Nanoose Peninsula Water System was comprised of 2231 residential and 67 commercial water service customers.

The water supply is a combination of groundwater wells and surface water from the Englishman River. The water supply is chlorinated and stored in several reservoirs throughout Nanoose Bay.

2.1 Groundwater Wells

Fourteen groundwater production wells are located within the Nanoose Bay Peninsula. Nanoose Wells #2, #3, and #4 are on standby for use during periods of high demand (if required). Nanoose Well #5 has not been in use since 2002, due to saltwater intrusion, and has been permanently converted to a provincial monitoring well. Nanoose Well #6 hasn't been used since 2010 due to operational challenges with chlorination. Nanoose Well #7 was drilled in 2008 but has not yet been approved for community drinking water supply. West Bay #3 experienced reduced production over time and was replaced by West Bay #4, which was drilled in 2019. Fairwinds Well #1 has also experienced reduced production and was replaced by Tippet Road Well #1, which was drilled in 2020.

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	(Not in use)
Nanoose #7	60.6 m	Yes	(Not in use)
Fairwinds #1	69.8 m	Yes	(Not in use)
Fairwinds #2	75.3 m	Yes	Treated
Fairwinds #3	72.2 m	Yes	Treated
West Bay #4	75.6 m	Yes	Treated
Tippet Rd #1	71.0 m	Yes	Treated
Parker Road	91.4 m	Yes	Treated

A drinking water filtration plant is located at 2480 Nanoose Road, and its purpose is to filter out iron, manganese, and ammonia from Fairwinds Wells #2 & 3, Tippet Road Well #1, and West Bay Well #4. A back-up generator is available in the event of a power outage. In the case of an extended power outage, drinking water will continue to be supplied but it will only be chlorinated, not filtered.

Nanoose Bay Water Treatment Plant

2.2 Reservoirs

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

- Madrona (concrete) - 485 m^3 (100,000 imperial gallons) capacity
- Eagle Heights (concrete) - 341 m^3 (75,000 imperial gallons) capacity
- Dolphin (concrete) - 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 (lined concrete, wooden roof) - 568 m^3 (125, 000 imp. gallons) capacity

The Beachcomber reservoir was demolished in 2015. The location of a new water storage reservoir is currently being considered.

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	9.7 km	12.2%
200mm or larger	2.7 km	3.4%
PVC:		
150mm or smaller	23.2 km	29.1%
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)

3. Water Sampling and Testing Program

Water sampling and testing is carried out weekly in the distribution system. Notably, the chlorine residual levels are tested weekly to ensure the absence of bacterial regrowth in the watermains. The following table includes a summary of all testing:

Timing	Location	Tests
Weekly	RDN (in-house) Laboratory	Total coliforms, E.Coli, pH, TDS, Temperature, Conductivity, Turbidity, Chlorine residual, Salinity
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)	Bureau Veritas	Complete potability testing of all raw well water, including T-Ammonia
Annual System Water Testing (every Spring)	Bureau Veritas	Complete potability testing of distribution system, including T-Ammonia
Filtration Plant Output Once per month	Bureau Veritas	True colour, Ammonia, Iron, Manganese, and Chloramines

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/nanoose-bay-peninsula. 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.

Stewart Road Pump Station (2020)

5. Water Quality Inquiries and Complaints

Tap water quality has improved over the years with the construction of the Nanoose Bay Peninsula water filtration plant and Englishman River Water Service. Filtered groundwater from the Fairwinds and West Bay wells is mixed with filtered water from the Englishman River (as required) and stored in the same six reservoirs throughout Nanoose Bay.

Several inquiries were received from the Nanoose Bay Peninsula Water Service Area in 2020. Iron and manganese water discolouration was present intermittently in the Fairwinds and Beachcomber areas, which were cleared up by flushing the watermains and water services in these areas. Complaints regarding high water bills were addressed through the RDN's Leak Adjustment Policy.

A few inquiries were received about subdivision in Nanoose Bay. Due to the increased water supply available from the Englishman River Water Service, additional water connections are now available. However, these connections are only designed to serve customers already located within the Nanoose Bay Peninsula Water Service (whose properties are large enough to subdivide). More information can be found at https://rdn.bc.ca/connect-rdn-water.

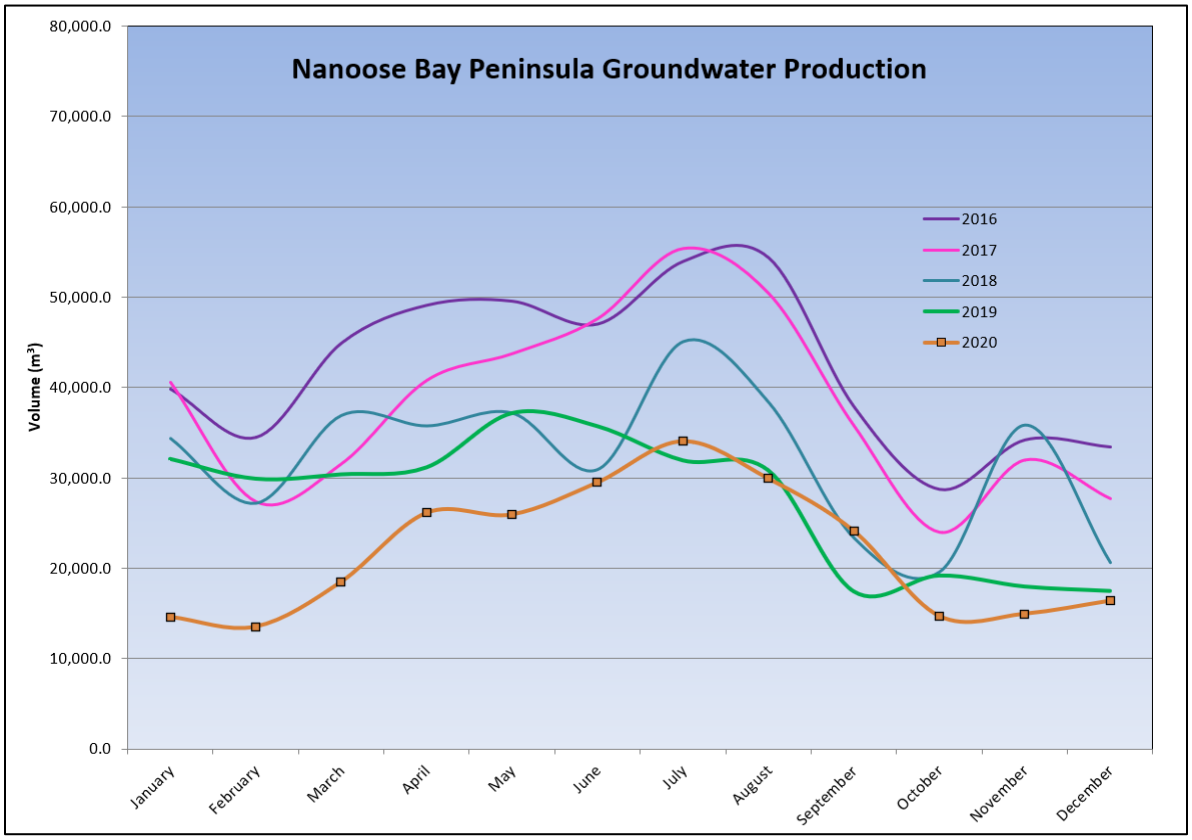
A summary of the water system incidents in 2020 is given in the table below.

Activity in 2020	Date(s)	History/Notes
Boil Water Advisories	None	None
High Turbidity Events	None	None
Equipment Malfunction	None	None
Water Main Breaks	None	None
Pump Failures	None	None

6. Groundwater Production and Consumption

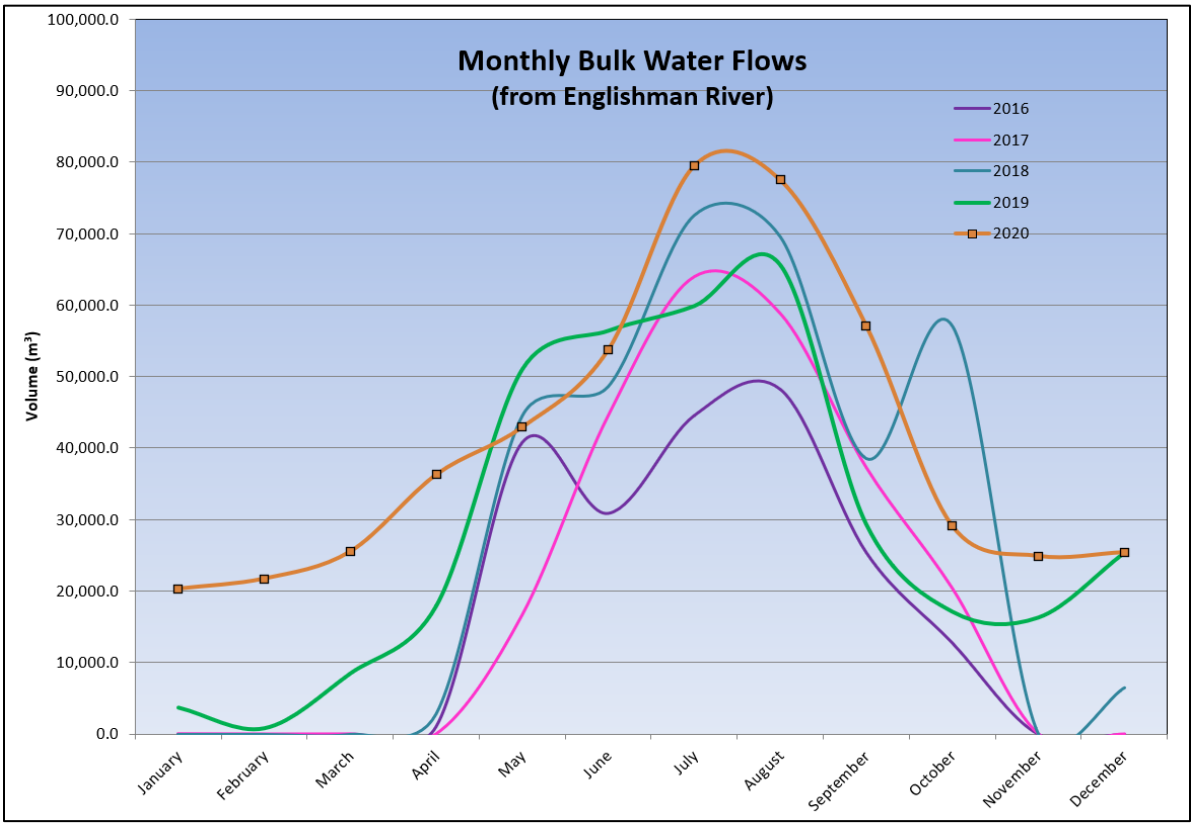
Groundwater Production

The monthly groundwater well production for the past 5 years is shown in the chart below. Groundwater production in 2020 was below average in comparison to previous years due to increased reliance on the surface water supply from the Englishman River.



Surface Water Production

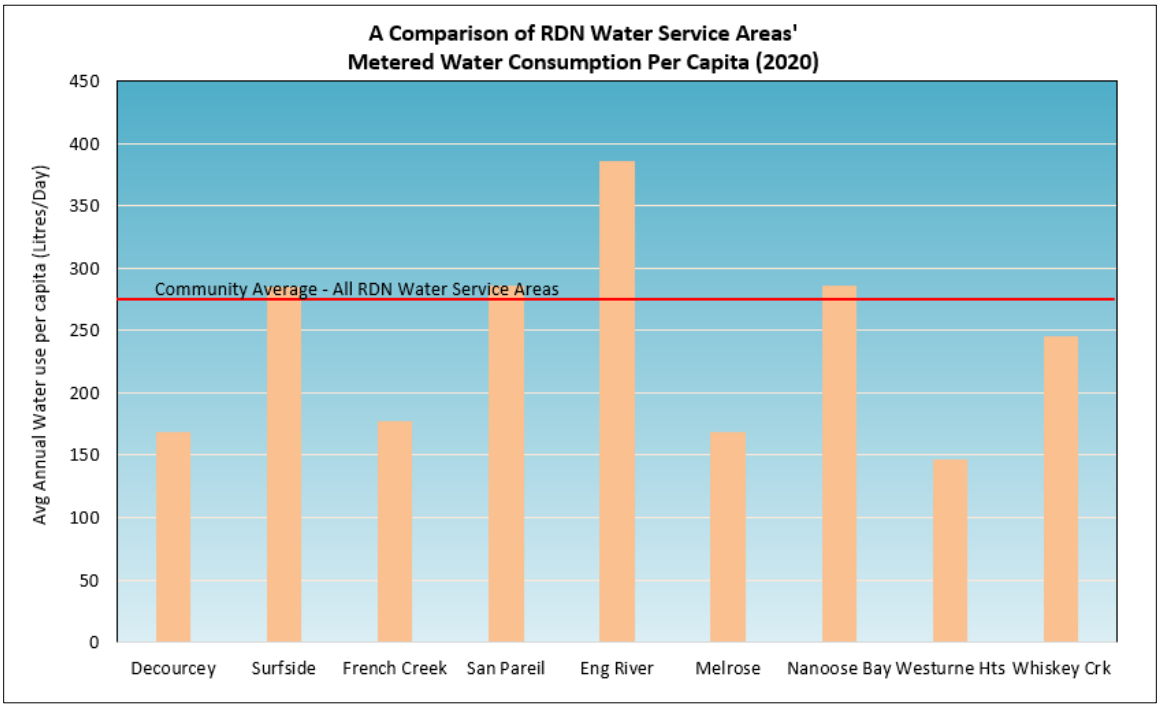
Surface water is supplied to the RDN through the Englishman River Water Service (ERWS), and is used to supplement the RDN's well water throughout the year. The bulk water comes from the Englishman River and is distributed through the Nanoose Bay Water Service Area via a 16-inch (400mm) water main located along Northwest Bay Road. A comparison of the surface water supplied to the Nanoose Bay Water Service Area for the past 5 years is shown in the chart below. Overall, surface water production in 2020 was typically higher than in previous years.



Water Consumption

In the Fall/Winter of 2020, water billing records indicate that the average water usage per home in Nanoose Bay was 0.49 cubic metres per day (107.8 imperial gallons). In the summer, the average water usage was 1.08 cubic metres per day (237.6 imperial gallons). Based on these figures, the annual consumption per capita is estimated to be 286 L/day (based on 2.4 people/household). This consumption is *3% more* than the RDN system average of 278 L/day/capita in 2020.

A large commercial and residential development is nearing completion on Dolphin Drive at the Schooner Cove Marina and Hotel. Once complete, this development will be comprised of 1 restaurant, 1 coffee shop, 5 office spaces, and 50 additional residential condos.



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. Fire hydrants are serviced once per year (either 'A-level' or 'B-level' maintenance). Water storage reservoirs are drained and cleaned once every 3-4 years, as required. Twenty-four hour on-call coverage is in place to respond to water system emergencies and alarms.

8. Operator Certification

The Regional District Water & Utility Services staff are comprised of one Manager, one Project Engineer, one Engineering Technologist, one Engineering Technician, one Chief Operator, and seven certified operators. The operators receive ongoing training and certification in:

- ✓ Water Treatment
- ✓ Water Distribution
- ✓ Wastewater Collection
- ✓ Cross Connection Control
- ✓ Asbestos Awareness
- ✓ Chlorine Handling
- ✓ WHMIS (Workplace Hazardous Material Information System)
- ✓ TDG (Transportation of Dangerous Goods)
- ✓ Confined Space Awareness
- ✓ Traffic Control
- ✓ Fall Protection
- ✓ First Aid
- ✓ Silica Awareness

Fairwinds
Reservoir No. 1

9. Water System Projects

9.1 2020 Completed Studies & Projects

- Replaced Fairwinds Well #1 with a new drilled well nearby, named Tippet Road Well #1;
- Completed well protection plans for Tippet Road Well #1 and West Bay Well #4;
- Cleaned Fairwinds Reservoir #2;
- Replaced 2 MicroChlor cells at water filtration plant, and ordered spare parts (level/ temperature sensors);
- Designed Dorcas Point Road watermain upgrades;
- Updated asset database with new assets;
- Calibrated and serviced all Hach spectrophotometer lab equipment;
- Prepared a Capital Cost Charge bylaw for those wishing to join the Nanoose Bay water system and Nanoose Bay Bulk Water system;
- Completed a Water System Condition Assessment report and Capital Plan;
- Corresponded with residents regarding water conservation;
- Enforced outdoor sprinkling regulations;
- Completed irrigation checks for high-water users;
- Advised residents regarding water leak repairs;
- Completed the 2020-2030 Water Conservation Plan;
- Implemented Phase 1 of the Water Systems SCADA Master Plan;
- Completed regular watermain flushing, reservoir cleaning, and hydrant maintenance;
- Maintained a high level of water quality; and
- Continued quality control through regular testing and monitoring of water system.

Tippet Road Well #1 Site (2020)

9.2 2021 Proposed Projects & Upgrades

- Design upgrades to asbestos-concrete watermains on Dolphin Drive and Outrigger Road;
- Update pump controls in West Bay pumphouse;
- Complete a reservoir replacement feasibility study;
- Continue implementing the Water Systems SCADA Master Plan;
- Implement the 2020-2030 DWWP Water Conservation Plan;
- Continue watermain flushing program and hydrant maintenance;
- Review well protection plans; and
- Continue to offer numerous water-saving incentives via rebates.

ERWS Bulk Water Transmission Line Construction near Hwy 19 (2017)

10. 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, pump failure, and drought management. The ERP was reviewed and updated in 2020, 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. A separate Emergency Response Plan has been developed exclusively for the water filtration plant at 2480 Nanoose Road. A copy of this ERP is located at the plant, at each RDN office and on the RDN website.

11. Cross Connection Control

The RDN's Cross Connection Control Program was put in place to protect the public health by reducing the risk of contaminants flowing back into the public water supply. The RDN Manager of Water Services is the designated Cross Connection Control Manager.

The RDN's Cross Connection Control Program addresses cross connection threats through operating policies and procedures, as well as assisting customers with backflow preventer selection, installation, testing, maintenance and reporting. The program receives its authority from *RDN Cross Connection Control Regulation Bylaw No. 1788*, and the *British Columbia Building Code, Part 7*, which requires that potable water be protected from contamination. Additionally, a webpage has been established at https://rdn.bc.ca/cross-connection-control-program to educate RDN water service customers about cross connection hazards, and lists the relevant links to current standards and resources.

Two of the RDN's water system operators received certification as backflow assembly testers through the British Columbia Water & Waste Association (BCWWA).

12. Cyber Security

The RDN uses a multi-level approach to cyber-security. Corporate network security is employed via a universal threat management gateway that implements various methods of data security, which includes daily definition updates to block known cyber threats. In addition, all RDN PC's are protected with anti-virus software. RDN water systems are connected to the corporate network via IP-Sec VPN's for remote management by information technology and equipment operators. Future infrastructure upgrades will see our water systems located on segregated networks to limit the vulnerability from cybersecurity threats.

13. Closing

An annual report for the year 2021 will be prepared and submitted to Island Health in the spring of 2022. Annual reports are also available on our website at: https://www.rdn.bc.ca/nanoose-bay-peninsula.

Arrowsmith Lake and Arrowsmith Dam (on headwaters of Englishman River)