

**TERMS OF REFERENCE FOR:
APPLICATION FOR AN ENVIRONMENTAL APPROVAL
CERTIFICATE AND COMPREHENSIVE STUDY
REPORT**

**THE CORPORATION OF THE DISTRICT OF NORTH
COWICHAN
CHEMAINUS WELL WATER SUPPLY PROJECT,
CHEMAINUS, B.C.**

Submitted to:

**British Columbia Environmental Assessment Office
2nd Floor 836 Yates St.
Victoria, BC
V8W 1L8**

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INTRODUCTION

The District of North Cowichan (DNC) is proposing to construct a groundwater supply system for the Community of Chemainus. The groundwater supply system will replace the Banon Creek Reservoir that currently supplies water for the community. Water quality has been an ongoing problem with the Banon Creek Reservoir. The construction and operation of the Chemainus Well Water Supply Project will provide a more reliable, safe and protected water supply source for the Community of Chemainus.

This project will require the construction of three production wells, a water main, a concrete reservoir and associated ancillary facilities. Together, these components are referred to as the Chemainus Well Water Supply Project.

The main components of this project include:

- Three groundwater wells located on the north shore of the Chemainus River approximately 60 m east of the Trans Canada Highway. Two of the wells will be operating at a maximum withdrawal rate of 131 L/s. One well will be standby;
- Approximately 3970 m of water main connecting the wells to an existing water main at the intersection of the Trans Canada Highway and Henry Road;
- A 4.54 M litre concrete reservoir constructed on River Road and connected to the other components via the existing water main.

The ancillary facilities associated with this project include:

- A pumphouse connected to the production wells;
- A chlorination addition facility within the pumphouse to initially disinfect the groundwater and to provide a chlorine residual throughout the distribution system;
- Hydroelectric connections from the pumphouse and reservoir to the nearest BC Hydro lines;
- An access road from the Trans Canada Highway east to the pumphouse facility;
- Four monitoring wells located around the production wells.

The purpose of this document is to provide a Terms of Reference in support of an Application for an Environmental Approval Certificate, and concurrently, a draft Comprehensive Study Report (CSR). The Terms of Reference outlines the general approach, assessment methodologies, organization and structure of the Application and Comprehensive Study reports. The assessment methodology will adhere to applicable provincial guidelines, specifically the British Columbia Ministry of Water, Land and Air Protection “Framework for a Hydrogeologic Study in support of an Application for an Environmental Assessment Certificate”.

The organization of the Application upon which this Terms of Reference is based, is designed to meet the requirements of the British Columbia *Environmental Assessment Act* and the *Canadian Environmental Assessment Act*. The Application and CSR will be submitted to the British Columbia Environmental Assessment Office and the Canadian Environmental Assessment Agency on behalf of the District of North Cowichan for the proposed Chemainus Well Water Supply Project.

Application Section	Section Description
PART I	INTRODUCTION AND PROJECT DESCRIPTION
1.	Introduction
1.1.	Project Overview Briefly introduce and describe the project
1.2.	Project Purpose Provide a rationale for the project in terms of environmental, social and/or economic significance
1.3.	Proponent Name and Contact
1.4.	Environmental Assessment and Regulatory Regime Provide a description of the purpose of the environmental assessment in terms of requirements under the BC <i>Environmental Assessment Act</i> and the <i>Canadian Environmental Assessment Act</i>
1.5.	Consultants <ul style="list-style-type: none"> • A tabular listing of consultants used for this project and their respective expertise.
1.6.	Application Structure Provide a tabled format of the Application including section description
2.	Project Description
2.1.	Project Area, including a description of: <ul style="list-style-type: none"> • Regional setting • Current land use and title • First Nations communities present And also includes a regional locator map
2.2.	Summarize feasible alternatives (i.e., list) to the project including: <ul style="list-style-type: none"> • Construction of a filtration plant at Banon Creek • Use of Silver Lake to supplement Banon Creek flows For each alternative, generally describe their anticipated environmental effects
2.3.	Provide a description and assessment of feasible alternatives means of conducting major elements of the project, including: <ul style="list-style-type: none"> • alternate sites for the wells • alternate sites for the reservoir • alternate alignments for the trunk main • chlorination vs. other options This section should provide a comparison of the feasible alternative means based on appropriate criteria, which must include the predicted environmental effects.

Application Section	Section Description
2.4.	<p>Project Components and Activities: A description of the project, including information on the following:</p> <ul style="list-style-type: none"> • identify and describe major components including production wells, pump station, disinfection/chlorination system, reservoir, water transmission lines, electrical power, access roads and monitoring wells • describe major activities of the project, including pilot testing and construction and operation of the major project components identified above in bullet 1 • describe production capacity of the proposed wells • briefly describe 2004 test well program and associated environmental management plans • describe river engineering with respect to flood levels for the well head, scour depths for the pipeline and the possible requirement for riprap protection • identify resource/material requirements • identify liquid and solid wastes associated with construction and waste disposal procedures • describe workforce requirements for construction and operation phases of the project • provide maps to identify and locate major elements of the project • provide an anticipated timeline for construction of the project • provide plans for abandonment and restoration
PART II	CONSULTATION PROGRAMS
3.	First Nations Consultation
3.1.	<p>First Nations Consultations, including:</p> <p><u>Pre-Application</u></p> <ul style="list-style-type: none"> • First Nations identification • Issue Identification and Response methodology <p><u>Post Application</u></p> <ul style="list-style-type: none"> • First Nations Application Review and Response methodology • Ongoing Consultation methodology

Application Section	Section Description
4.	Public Consultation
4.1.	<p>Public Consultations, including: <u>Pre-Application</u></p> <ul style="list-style-type: none"> • Stakeholder identification • Issue Identification and Response methodologies <p>The Section 11 Order stated that the pre-Application public consultation will be targeted at persons and businesses operating wells in the area potentially affected by the project. However, the District of North Cowichan has elected to conduct an Open House to the public.</p> <p><u>Application Review</u></p> <ul style="list-style-type: none"> • Project Application Review and Response <p>A single Open House will be conducted with major stakeholders and public to present the Application and to receive comments and address questions</p>
5.	<p>Regulatory Agency Consultation List all agencies contacted and issues raised.</p>
PART III	ENVIRONMENTAL SETTING
6.	Study Area Boundary
7.	<p>Climate Describe climate conditions, such as mean annual precipitation, etc.</p>
8.	<p>Hydrogeology Describe the hydrogeological characteristics of the Chemainus River Aquifer. This section should include:</p> <ul style="list-style-type: none"> • an outline of geological characteristics of the Chemainus River Aquifer, including topography, surficial and bedrock geology and soil characteristics • conceptual hydrogeological model • capture zone analysis and “time of travel” estimates • groundwater flow modelling • results of recent and ongoing hydrogeological investigations, including test well pump test results and refinement of capture zone analysis • hydraulic conductivity, transmissivity and yield based on pump test results • hydraulic gradient • recharge characteristics <p>This section will contain the information as required in “Framework for a Hydrogeologic Study in support of an Application for an Environmental Assessment Certificate under the Environmental Assessment Act and Regulations”.</p>

Application Section	Section Description
9.	<p>Groundwater Wells and Quality Identify location and status of active wells in the Chemainus River Aquifer that may affect or be affected by the proposed well Characterize groundwater quality in the Chemainus River Aquifer based on data from existing test wells Identify other groundwater users</p>
10.	<p>Hydrology Identify surface waters in the project area Describe hydrological characteristics of the Chemainus River, including average annual flows, peak, and low flows in the vicinity of the Trans Canada Highway, and average monthly river elevations in the Chemainus River adjacent the well site Identify and locate active water licenses downstream on the Chemainus River</p>
11.	<p>Vegetation Describe vegetation in the vicinity of the well site and the reservoir, including:</p> <ul style="list-style-type: none"> • Conservation Data Centre Rare Element Occurrence report for plant species and communities in the project area • Identify COSEWIC species in the project area • Brief field program to classify major ecosystems, identify site specific environmental issues, photographic documentation • If CDC/COSEWIC records indicate the presence of Red or Blue listed species, provide sufficient additional habitat information to support evaluation of potential effects and mitigation or compensation
12.	<p>Wildlife and Wildlife Habitat Describe wildlife and wildlife habitat in the vicinity of the well site, the reservoir and along the trunk main, including:</p> <ul style="list-style-type: none"> • Conservation Data Centre Rare Element Occurrence report for wildlife in the project area • Identify COSEWIC species in the project area • Brief field program to visually and auditory document wildlife, evidence of wildlife and wildlife habitat, identify site specific environmental issues, photographic documentation • If CDC/COSEWIC records indicate the presence of Red, Blue or COSEWIC listed species, provide sufficient additional habitat information to support evaluation of potential effects and mitigation or compensation
13.	<p>Fish and Fish Habitat Based on a review of existing information, provide information of fish species, presence, timing and distribution in the Chemainus River adjacent to and downstream of the well sites Based on a review of existing information and a brief field survey, provide information of fish habitat in the area of the well sites.</p>

Application Section	Section Description
14.	<p>Land Use Characterize historical and present land use at and adjacent to the well site Describe present land use zoning of the well site and reservoir</p>
15.	<p>Archaeological Setting Identify, describe and provide general location of archaeological sites in the study area. The assessment will follow <i>British Columbia Archaeological Impact Assessment Guidelines</i> (Archaeology Branch 1998) and in accordance with work that will be outlined in the <i>Heritage Conservation Act</i> permit.</p>
16.	<p>First Nations Identify First Nations Indian Reserves and Statements of Intent Based on discussions with First Nations, identify current use of project area for traditional purposes that could be affected</p>
PART IV	ENVIRONMENTAL EFFECTS AND MITIGATION OF THE PROJECT
17.	<p>Impact Assessment Methodology Describe the methodology and approach that will be used to assess effects Define what would constitute a significant adverse environmental effect for each project component-environmental component interaction Define the significance of residual adverse environmental effects Criteria for describing significance should include all of the following, where applicable:</p> <ul style="list-style-type: none"> • Duration • Frequency • Proximity of the disturbance to ecological components • Reversibility • Magnitude • Geographic extent

Application Section	Section Description
18.	<p>Hydrogeology Describe the anticipated effects of the project at maximum design (131 L/s) of two production wells on the quantity of water in the Chemainus River Aquifer. Describe the anticipated effects of the project at maximum design (131 L/s) of two production wells on the sustainability of the aquifer. Describe the anticipated effect of drawdown on adjacent wells in the aquifer. Provide an assessment of the potential for aquifer contamination resulting from previous and current land uses Describe anticipated recharge rates at maximum useage, particularly during periods of low flow in the Chemainus River. Describe means to detect and mitigate effects of the project on other wells using the aquifer or any effects of the project on groundwater quality Describe a program of long-term monitoring of the Chemainus River Aquifer to assess and identify potential long-term significant adverse effects on the sustainability of the aquifer due to the project. If significant adverse effects are identified, investigate the cause of the effects and implement Contingency Plans if required. Describe mitigation measures for identified effects during construction and operation phase, including completion of a Wellhead Protection Plan.</p>
19.	<p>Geology Assess the potential of project groundwater withdrawal to affect land stability or create land subsidence</p>
20.	<p>Water Quality Describe the anticipated effects associated with discharge of start-up and shut-down water during the development of the wells and during operation and maintenance of the wells Describe potential sediment and erosion effects during the construction of the wells Describe mitigation measures</p>
21.	<p>Hydrology Describe the anticipated effects of the project at maximum design on flows in the Chemainus River Describe the anticipated effects of the project on wetlands and creeks within the aquifer. Describe mitigation measures for identified effects during construction and operation of the project, making specific reference to sediment and erosion control Describe a program of long-term monitoring of the Chemainus River to assess and identify any long-term effects of the project on flows. If significant adverse effects are identified, investigate the cause of the effects and implement Contingency Plans if required.</p>

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22.	<p>Vegetation Describe the anticipated effect of the project on vegetation including:</p> <ul style="list-style-type: none"> • Vegetated area to be cleared for wells, trunk main, reservoir and access/staging areas • Value of cleared vegetation as a function of habitat values <p>Describe mitigation measures for identified effects during construction and operation phase</p>
23.	<p>Wildlife and Wildlife Habitat Describe the anticipated effect of the project on wildlife and wildlife habitat, keying on:</p> <ul style="list-style-type: none"> • Potential disturbance to wildlife effects of construction, operation, maintenance and decommissioning • Potential loss/disturbance of wildlife habitat <p>Describe mitigation measures for identified effects during construction and operation phase. Make specific reference to habitat protection.</p>
24.	<p>Fish and Fish Habitat Describe anticipated effects on riparian habitat along the Chemainus River during well construction. Describe anticipated effects on fish and fish habitat in the Chemainus River caused by drawdown during operation of the wells Describe mitigation measures for identified effects during construction and operation phase Make specific reference to habitat protection</p>
25.	<p>Archaeological Sites Identify and describe effects of the project to archaeological site protected under the <i>Heritage Conservation Act</i> Describe means to identify and protect or avoid archaeological resources during construction of the project The impact assessment will follow <i>British Columbia Archaeological Impact Assessment Guidelines</i> (Archaeology Branch 1998) and in accordance with work that will be outlined in the <i>Heritage Conservation Act</i> permit.</p>
26.	<p>Socio-economic Effects</p>
26.1.	<p>Predict the effects of the project on the current use of lands and resources for traditional purposes by Aboriginal persons, based on discussion with First Nations</p>
26.2.	<p>Describe the economic and employment effects of the project</p>
26.3.	<p>Describe the effects of the project on health values of using groundwater well source as opposed to continuing use of Banon Creek surface water source.</p>

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27.	<p>Renewable Resources Describe the effects of the project on renewable resources</p>
28.	<p>Effects of the Environment on the Project Characterize potential effects of flooding, drought, freezing conditions and earthquake on the project Describe the effect of climate change/fluctuations on the project</p>
29.	<p>Cumulative Effects Assessment This section will assess the cumulative effects of the residual effects of the project. The residual effects are those effects that remain after mitigation is implemented. The residual effects will be identified in Sections and a summary table provided.</p>
29.1.	<p>Cumulative Effects Assessment Methodology Describe the Cumulative Effects Assessment Methodology</p>
29.2.	<p>Cumulative Effects Assessment Identify and describe any consequential cumulative environmental effects that are likely to result from the Project in combination with other projects or activities that have been or are likely to be carried out Identify and evaluate the significance of any residual environmental effects, assuming mitigation, based on the criteria The Cumulative Effects Assessment will follow the guidelines provided in <i>Cumulative Effects Practitioners Guide</i> (Cumulative Effects Working Group, 1999).</p>
30.	<p>Environmental Effects of Accidents and Malfunctions Summarize the potential project-related environmental effects of accidents and malfunctions of the project, and propose measures to mitigate them this should consider:</p> <ul style="list-style-type: none"> • water main failure • chlorine spill • flooding from the project • pump failure • equipment failure during construction
31.	<p>Summary of Impact Management Measures Provide a summary listing, by issue, of impacts, mitigation measures and significance of project and cumulative effects Provide a summary of commitments.</p>

Application Section	Section Description
PART V	ENVIRONMENTAL MANAGEMENT PLAN
31.1	<p>Management Plans Provide a list and description of applicable management plans, guidelines and measures that will be implemented, including:</p> <ul style="list-style-type: none"> • Waste Management • Vegetation Management and Site Restoration • Wildlife and Terrestrial Habitat Management Plan • Fish and Aquatic Habitat Management Plan • Archaeological Resource Protection Plan • Sediment and Erosion Control Plan • Spill Prevention and Response Plan • Wellhead and Aquifer Protection Plan (commitment) • Well Closure Plan (commitment), consistent with the <i>Draft Code of Practice for Construction, Testing, Maintenance, Alternation and Closure of Wells, Province of BC</i> (Interim Water Well Drilling Advisory Committee, 1994) • Terms of Reference for an Environmental Monitoring • Contingency Plans keying on contingency items that may be required in the event of a significant adverse impact on the Chemainus River or the Chemainus River Aquifer due to long-term operation of the wells at maximum design of 131 l/s.
31.2	<p>Follow-up Monitoring Discuss the need for and the requirements of a follow-up program. The follow-up program is to confirm that validity of the environmental assessment predictions and the effectiveness of the mitigation measures. Follow-up monitoring will include:</p> <ul style="list-style-type: none"> • Long-term groundwater quality and quantity monitoring • Long-term monitoring of the Chemainus River • Site restoration
31.2	<p>Authorizations and Permits The application should be supported by correspondence from the Ministry of Transportation indicating support in principle for parts of the project that utilize the highway right-of-way Provide a list of authorizations required to construct and operate the project</p>
PART VI	References
PART VII	<p>Application Terms of Reference Provide a table of concordance that cross-references items in these Application Terms of Reference with information in the application for an environmental assessment certificate</p>