REQUEST FOR PROPOSALS No. 24-060

Cedar-Yellowpoint-Cassidy – Phase 3 Refined Water Budget Model

Issue Date: November 14, 2024

CLOSING DATE AND TIME:

Submissions must be received on or before:

3:00 PM (15:00 hrs) Local Time on December 6, 2024

Submissions and Questions are to be directed to:

Erica Forssman, RDN Drinking Water & Watershed Protection Program Coordinator
250-390-6586 | eforssman@rdn.bc.ca

Questions are requested at least five (5) business days before the closing date.

Proposals will not be opened in public.

REGIONAL DISTRICT OF NANAIMO

Instructions to Proponents

Closing Date/Time/Submission Method
Submissions must be received on or before 3:00 PM (15:00 hrs), Local Time, on December 6, 2024.

Submission Method:

By Email: In PDF format with "24-060 Cedar-Yellowpoint-Cassidy – Phase 3 Refined Water Budget Model" as the subject line at this electronic address:

eforssman@rdn.bc.ca

Please note: Maximum email file size limit is 20MB, or less. The RDN will not be liable for any technological delays of submissions.

Submissions received in any other manner will not be accepted.

Amendment to Proposals
Proposals may be amended in writing and sent via email to the RDN contact person identified on the cover page on or before the closing. Such amendments should be signed by the authorized signatory of the Proponent.

Addenda
If the RDN determines that an addendum or questions & answers are required for this RFP, the RDN will post the addendum on the RDN (www.rdn.bc.ca/current-bid-opportunities) and BC Bid (www.bcbid.gov.bc.ca/) websites. Each addendum will be incorporated into and become part of the RFP. No amendment of any kind to the RFP is effective unless it is contained in a written addendum issued by the RDN. It is the sole responsibility of the Proponent to check and ensure all amendments are included prior to submitting their final Proposal submission.

Withdrawal of Proposals
The Proponent may withdraw their Proposal at any time by submitting a written withdrawal email to the RDN contact person identified on the cover page on or before the closing.

Unsuccessful Vendors
The Regional District will offer debriefings to unsuccessful Proponents, on request, at a mutually agreeable time.

1. INTRODUCTION

The purpose of this Request for Proposal is to solicit submissions from qualified and experienced firms to develop a numerical water budget model for Cedar-Yellowpoint-Cassidy area to predict and simulate scenarios of increased water demand, climate change and land cover change to better quantify and understand water availability and constraints within the aquifers and surface waterbodies in this part of the RDN.

The RDN requires hydrogeological services to compile existing data and perform primary data collection as required to select, build, and calibrate a 3D numerical groundwater and surface water flow model (or integrated models). The model is to be used as a tool to assess stress on aquifers and watersheds by comparing water availability with water use and setting boundary conditions for sustainable water extraction in various scenarios. The consultants will report out on findings of this technical analysis and provide recommendations for water supply planning and land use decisions.

The desired work start date would be in January 2025 and the project should be complete by December 2025.

2. BACKGROUND

The Cedar-Yellowpoint-Cassidy area of the RDN is experiencing natural variability in water supply and quality, climate change impacts, agricultural use pressures, and saline intrusion risk. These impacts generate a need to better understand and estimate the water availability and dynamics in the area and identify where additional water storage infrastructure, natural asset preservation and demand management may be required to improve water resilience.

Observations and projections of climate change indicate that we can expect warmer winter weather resulting in compromised upper elevation snowpack, more extreme rain events, and decreased summer precipitation and higher summer temperatures causing longer drought periods. As the population grows and the climate changes, water conservation and protection of natural watershed assets that contribute to maintain the water balance (soils, wetlands, riparian areas, forests) will be a priority to ensure there is sufficient water to meet community needs and maintain healthy ecosystems. There is a need to meet the demand for growth in this area with a sustainable water supply, and to do that the RDN must better understand the water availability and constraints in the aquifers and surface waterbodies in this part of the RDN. This is not based on far-off speculation; it is based on current reality and contributes to a need to establish a timeline for growth and water demand, as related to current or future OCPs and Regional Growth Strategies.

As land managers and water managers, the RDN must balance competing water needs and land practices with finite water supplies, both surface water and groundwater. Sustainable service delivery sees a water

system that includes a robust drinking water supply managed through strategic and long-term planning goals. A refined numerical water budget model that can predict and simulate scenarios of increased water demand, climate change and land cover change will assist with managing this essential resource in a complex environment. The proposed spatial scale for this project includes the area within the Cedar-Yellowpoint-Cassidy Water Region which comprises:

- The extent of the mapped aquifers that intersect Cedar-Yellowpoint-Cassidy Water Region
    - Aquifers 162, 163, 165, 160, 161, 964, 962, 168
    - The Cassidy Aquifer (161) is unconfined and composed of sand and gravel.
    - The Lower Cassidy Aquifer (160) and the Cedar, North Holden Lake Aquifer (163). They are both confined and composed of sand and gravel;
    - Two large bedrock aquifers: The South Wellington Aquifer (165), and the Cedar, Yellowpoint, North Oyster Aquifer (162).
- The watercourses and lakes contained in Cedar-Yellowpoint-Cassidy Water Region
    - Holden lake, Quenell Lake, Haslam Creek, lower Nanaimo River, Holden Creek, Hokkanen Creek, Long Lake, Greenway Lake, and others.

The study area overlaps three local government jurisdictions: RDN Electoral Areas A and C, City of Nanaimo, Cowichan Valley Regional District Area H. It also includes reserve land and traditional territory of both the Snuneymuxw and Stz'uminus First Nations. Water users and providers operating in the area include the RDN Decourcey Water Service Area, the North Cedar Improvement District, industrial water user Harmac Pacific, as well as several other smaller privately operated water systems. It should be also noted that the study area has a wide distribution of domestic and agricultural groundwater well users.

The figure below presents the proposed area of interest. The study area is meant to be defined by hydrology/hydrogeology, not jurisdiction, and can be further defined during the project scoping stage based on closer review of updated aquifer mapping and inclusion of areas of interest to partners.

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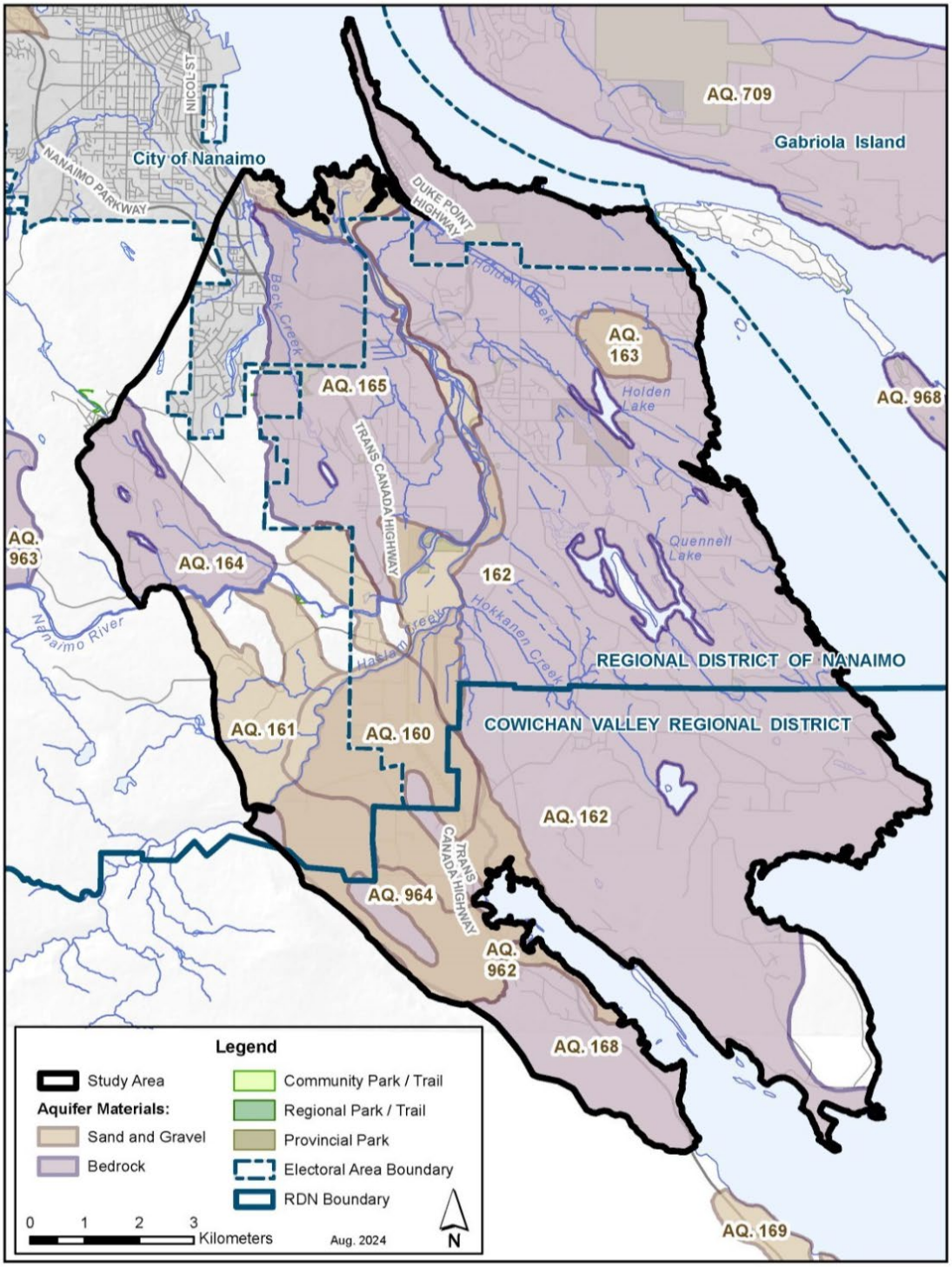

Figure 1: Proposed study area, to be refined through scoping with partners and project consultants.

Water Budget 'Phases'

The RDN Drinking Water and Watershed Protection program completed a regional water budget analysis for both the Vancouver Island and Gulf Island portion of the region (Electoral Area B) in 2013. This Phase 1 work included all available data into a conceptual model of water supply and demand for the aquifers and surface watercourses in the region. A relative stress ranking highlighted priority areas to advance the next phases of the water budget study.

Phase 2 rolled out between 2014 -2016 in the three priority areas that were identified in the first phase: Nanoose, French Creek, and Cedar-Yellowpoint-Cassidy. The focus of Phase 2 was on expanded data collection and monitoring, to fill gaps identified in the initial datasets used for the analysis. It included the instrumentation of additional volunteer observation wells, a new hydrometric station, and low flow monitoring. This was a key step in preparation for Phase 3, which is building a numerical model for surface and groundwater, to run scenarios to illustrate and quantify the potential impacts climate change projections, land use and development changes, and increased extraction, as a necessary tool for developing long term water supply strategies for those priority areas.

A Phase 3 numerical water budget model was completed in 2020 for Nanoose (Electoral Area E), as the first priority area and in 2023 for the French Creek Water Region. Now the RDN is looking to advance the development of a Phase 3 water budget model for the Cedar-Yellowpoint-Cassidy area, sometimes referred to as "Water Region 6b." It has been identified in previous studies and by ongoing monitoring that the surface water flows and the groundwater levels in portions of this water region are under stress. This reveals the need for a future-looking analysis that provides the technical basis for a long-term strategy for water supply, from both the community and ecological perspective.

3. SCOPE OF SERVICES FOR THIS PROJECT

- **Compile existing data** and **perform primary data collection as required,** including a review of background data and studies to build and calibrate a 3D numerical groundwater flow model (or integrated models).

- **Select a model** best fit for modelling the local conditions inclusive of surficial, confined, and bedrock aquifers and interaction with surface water flows. (Proposals should provide a rationale on model selection).

- Include a **sensitivity analysis** of the model using ranges of uncertainty and assumed values of parameters applied to the model.

- **Apply the numerical model** to assess, evaluate and predict: water quantities, water movement in the hydrologic cycle, influential landscape characteristics, environmental flow needs (as per provincial EFN policy), and how human activities modify the hydrologic cycle.

- Use the numerical model to **develop a water budget** to better understand current groundwater and surface water inputs and outputs, looking at current water use, as well as setting boundary conditions for sustainable extraction in **various scenarios** such as: climate change (droughts), pumping (increased demand), and land cover change. (Proposals can suggest relevant scenarios / combination of scenarios that would meet the project objectives that illustrate demand and supply analysis).

- **Assess "stress"** on aquifers and watersheds by comparing water availability with water use.

- **Report out on findings and provide recommendations** for water supply planning and land use decisions.

- **Identify data gaps and additional areas of study** so we can update / calibrate the model on an ongoing basis as more data and information becomes available.

- Include **meaningful collaboration with a project working group** that may include but is not limited to: First Nations, local and regional government partners, Provincial government partners, improvement districts, private industry, health authorities, agricultural interest groups, and community roundtables.

Due to potential budget constraints, it may be necessary to deliver this project in predefined stages. Proposals should include some discussion of how the work could be tasked out into discrete stages that build upon each other to complete the full scope.

4. OBJECTIVES & DELIVERABLES

Objectives:

The primary objective of this project is to develop a comprehensive understanding of water availability in the Cedar-Yellowpoint-Cassidy region, supporting sustainable water management and resilience planning. Through hydrologic modelling and scenario analysis, the project aims to quantify both current and future water resources, identify potential challenges, and provide decision support for regional water management. The following objectives outline the key tasks that will be undertaken to achieve these goals, ensuring that the region's water needs—across communities, agriculture, and ecosystems—are met in a sustainable and adaptive manner:

- Quantify water availability.

Develop a numerical model that represents the integrated hydrologic system in the Cedar-Yellowpoint-Cassidy region through characterizing groundwater and surface water dynamics at the watershed, aquifer, and site scale in terms of: baseflow, groundwater levels and recharge, outputs and inputs, and likelihood of hydraulic connection of groundwater to surface water. Propose how this will be quantified and calibrated based on available monitoring data.

Identify areas where climate risks (and land use change risks) may pose water supply challenges and where additional water storage infrastructure, heightened natural asset preservation and expanded demand management may be required to improve water resilience.

- Understand boundary and availability conditions.

Run scenarios, including climate change, pumping (water use), land cover change to better quantify and define sustainable groundwater extraction levels and yields.

Understand how much water is available for community needs (water system, domestic wells, agriculture, etc.) without causing harm to in-stream flow needs (aquatic life, recreation), while protecting existing water users and recognizing Indigenous water rights, include a defined timeline as proposed by consultants, as related to planning objectives; spatially understand groundwater recharge across the area.

- Provide decision support.

Provide the technical foundation for strategic decisions on regional water supply / water servicing; guide adaptive regional water supply management (including water storage) and water system operation; evaluate the cumulative effects of land and water uses within watersheds; identify areas and yields for potential aquifer storage and recovery.

Identify areas for heightened protections based on groundwater recharge potential.

Inform targets for water conservation (community) as well as water allocation targets and water objectives (Province); help make informed decisions about the design of environmental monitoring programs.

Provide a watershed scale context for site-scale assessments (proof of water).

Deliverables:

- ✓ Calibrated numerical model with all data files. Ideally would include a visualization dashboard for ongoing use by planners and water managers.
- ✓ Output files from multiple model runs / scenarios – includes GIS layers (i.e. recharge areas)
- ✓ Maps including orthographic imagery, and lineworks compatible with AutoCAD and ArcGIS software. Electronic copies of the lineworks files and imagery are to be submitted for file.
- ✓ Prepare and submit a draft technical report at the 50% and 90% complete stages. Allow 3 weeks for RDN to provide review comments at each review stage;
- ✓ Final technical report documenting methodology, model sensitivity, interpretation of results and recommendations for RDN and partners.
- ✓ Presentation to RDN committee and/or Board.

5. REFERENCE/BACKGROUND INFORMATION

Water Region 6 – Nanaimo/Cedar/Yellowpoint Water Budget Study

RDN Area A Groundwater Assessment and Vulnerability Study (2010)

Agricultural Water Demand Model (2013)

2016 Yellowpoint-Cedar Watershed Model (Cowichan Valley Regional District)

Also refer to the Province of BC Water Science Series:

- Modelling Tools for Estimating Effects of Groundwater Pumping on Surface Waters
- Mapping aquifer stress, groundwater recharge, groundwater use, and contribution of groundwater to environmental flows for unconfined aquifers across BC
- Analysis of Current Groundwater Use in the West Coast Region

6. PROPOSAL SUBMISSION AND EVALUATION

To assist in receiving similar and relevant information, and to ensure your Proposal receives fair evaluation, the RDN asks Proponents to provide the following information for evaluation purposes.

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Please include with your proposal:

a) Corporate background, history, similar project experience and areas of expertise;
b) Curriculum vitae of key project team members, reasons why they were selected for this project and demonstrate how they will add value to the project;
c) Lay out the plan to accomplish the project including timelines and key milestones;
d) What suggestions does your firm have to add value to the project?
e) Identify challenges, constraints and obstacles in the project and advise strategy to minimize;
f) Describe how your firm will monitor the project progression and provide regular status reports;
g) Describe your quality management process and any certifications;
h) Comprehensive, proposed fee, in Canadian Dollars, in a Schedule of Effort Table, identifying all project contributors, their per hour charge out rates, itemizing individual tasks, hours and all disbursements including travel.

Proposals should be concise and not exceed a 30-page limit (including cover page, letter of introduction, CVs, etc). A page is defined as Single sided, minimum 10-point font.

Proposals will be evaluated on the following basis 70% Technical, 30% Financial.

The lowest price proposal will receive full marks. Other proposals will receive reduced scores based on the proportion higher than the lowest price. i.e. Score = Min Cost/Cost x Fee Points.

Proposals submitted should be in enough detail to allow the RDN to determine the Proponent's qualifications and capabilities from the documents received. The selection committee, formed at the RDN's sole discretion, will score the Proposals in accordance with the criteria provided.

The RDN may evaluate proposals on a comparative basis by comparing one proponent's proposal to another proponent's proposal. The RDN reserves the right to not complete a detailed evaluation if the RDN concludes the proposal is materially incomplete or, irregular or contain any financial or commercial terms that are unacceptable to the RDN.

The selection committee may proceed with an award recommendation or the RDN may proceed to negotiate with the highest evaluated proponent with the intent of developing an agreement. If the parties after having bargained in good faith are unable to conclude a formal agreement, the RDN and the Proponent will be released without penalty or further obligations other than any surviving obligations regarding confidentiality and the RDN may, at its discretion, contact the Proponent of the next best rated Proposal and attempt to conclude a formal agreement with it, and so on until a contract is concluded or the proposal process is cancelled.

The RDN reserves the right to award the assignment in whole or in part or to add or delete any portion of the work. Throughout the evaluation process, the evaluation committee may seek additional clarification on any aspect of the Proposal to verify or clarify the information provided and conduct any background investigation and/or seek any additional information it considers necessary.

7. PROPOSED PURCHASE CONTRACT

The RDN's preferred form of Contract is attached herein. Proponents should carefully review this form of Contract. Should any vendors request that RDN consider revisions to the form of Contract, Proponents should include any clauses of concern in their proposal submission and suggest replacement language.

8. GENERAL CONDITIONS

8.1 No Contract

By submitting a Request for Proposal and participating in the process as outlined in this RFP, proponents expressly agree that no contract of any kind is formed until a fully executed contract is in place.

8.2 Privilege Clause

The lowest or any proposal may not necessarily be accepted.

8.3 Acceptance and Rejection of Submissions

This RFP does not commit the RDN, in any way to select a preferred Proponent, or to proceed to negotiate a contract, or to award any contract. The RDN reserves the right in its sole discretion cancel this RFP, up until award, for any reason whatsoever.

The RDN may accept or waive a minor and inconsequential irregularity, or where applicable to do so, the RDN may, as a condition of acceptance of the Submission, request a Proponent to correct a minor or inconsequential irregularity with no change in the Submission.

8.4 Conflict of Interest

Proponents shall disclose in their Proposals any actual or potential Conflict of Interest and existing business relationships it may have with the RDN, its elected officials, appointed officials or employees.

8.5 Solicitation of Board Members and RDN Staff

Proponents and their agents will not contact any member of the RDN Board or RDN Staff with respect to this RFP, other than the RDN Contact named in this document.

8.6 Litigation Clause

The RDN may, in its absolute discretion, reject a Proposal submitted by Proponent, if the Proponent, or any officer or director of the Proponent is or has been engaged either directly or indirectly through another corporation in legal action against the RDN, its elected or appointed officers and employees in relation to:

(1) any other contract for works or services; or

(2) any matter arising from the RDN's exercise of its powers, duties, or functions under the Local Government Act, Community Charter or another enactment within five years of the date of this Call for Proposals.

In determining whether to reject a Proposal under this clause, the RDN will consider whether the litigation is likely to affect the Proponent's ability to work with the RDN, its consultants and representatives and whether the RDN's experience with the Proponent indicates that the RDN is likely to incur increased staff and legal costs in the administration of this Contract if it is awarded to the Proponent.

8.7 Exclusion of Liability

Proponents are solely responsible for their own expenses in preparing and submitting a Proposal and for any meetings, negotiations, or discussions with the RDN. The RDN will not be liable to any Proponent for any claims, whether for costs, expense, losses or damages, or loss of anticipated profits, or for any other matter whatsoever, incurred by the Proponent in preparing and submitting a Proposal, or participating in negotiations for a Contract, or other activity related to or arising out of this RFP. Except as expressly and specifically permitted in these Instructions to Proponents, no Proponent shall have any claim for compensation of any kind whatsoever, as a result of participating in this RFP, and by submitting a Proposal each Proponent shall be deemed to have agreed that it has no claim.

8.8 Ownership of Proposals

All Proposals, including attachments and any documentation, submitted to and accepted by the RDN in response to this RFP become the property of the RDN.

8.9 Freedom of Information

All submissions will be held in confidence by the RDN. The RDN is bound by the Freedom of Information and Protection of Privacy Act (British Columbia) and all documents submitted to the RDN will be subject to provisions of this legislation. The successful vendor and value of the award is routinely released.