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# Phase 3: Groundwater Protection Study District of Highlands

District of Highlands  
Victoria, BC



Submitted to:

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## **Executive Summary**

This report presents the results of the third phase (Phase 3) of a three-phase Groundwater Protection Study conducted by Golder Associates Ltd. (Golder) on behalf of the District of Highlands.

## **BACKGROUND**

The District of Highlands (Highlands) is one of 13 member municipalities in the Capital Regional District (CRD) on southern Vancouver Island. As a rural community that obtains potable water from private, individual water wells, the Highlands recognizes the importance of protecting all water resources, including groundwater. The Highlands Official Community Plan (OCP) identifies groundwater availability as one of the major factors that will determine future land use development in the Highlands.

In 2007, the District of Highlands Local Government (the District) initiated a three-Phase Groundwater Protection Study (the Study) to assess groundwater conditions across the Highlands, to guide future land-use decisions and to develop groundwater protection measures to support stewardship and water conservation.

The scope of work for Phase 1 consisted of a compilation and detailed review of available information, including water well records, geological mapping, climate and precipitation data to develop a conceptual model of groundwater flow in the Highlands. Golder also conducted a stream flow monitoring program at key locations in the Highlands to assess baseflow at the end of the dry season to supplement the available background information. Golder assigned representative Hydrogeologic parameters to the bedrock units and developed and calibrated a District-wide numerical hydrogeological model (the model) to steady-state (i.e., average annual) conditions. The model was then used to conduct water balance analyses to assess the sustainability of current and future groundwater withdrawals, together with the potential impacts of climate change. At the time of model development, seasonal data were not available to calibrate the model to assess transient (i.e., seasonal) conditions. It was recommended that the model be considered as a “working tool” that would be refined to simulate transient conditions following the collection of seasonal water-level data. With consideration of the results from the water balance analyses, monitoring wells were established at strategic locations of the Highlands and a preliminary groundwater quality and water-level monitoring program was implemented to collect the data needed to assess baseline conditions and seasonal patterns.

Under Phase 2 of the Study, Golder compiled a regional contaminant inventory to identify potential sources of contamination in the Highlands. For the purposes of the contaminant inventory, the Highlands was categorized into three types of land use activities: Park and Rural Residential (P/RR); Commercial/Industrial (C/I); and Comprehensive Development (CD). For each land use category, existing and potential hazards to groundwater quality were identified and relative rankings were assigned to the identified hazards to provide the District with guidance on prioritizing groundwater protection efforts. Based on the results of the contaminant inventory, preliminary groundwater protection measures were developed to establish the framework for the groundwater protection measures that were developed during Phase 3 of the Study. During Phase 2 of the Study, the Highlands groundwater quality and water-level monitoring program was expanded based on the results of both the contaminant inventory and the water balance analyses (Phase 1).

