Application for Community Excellence Awards
Leadership and Innovation:
District of Highlands Groundwater Protection Program

The District of Highlands encompasses an area of approximately 40 square kilometres within the Capital Regional District. Its population of 2,130 is solely dependent upon groundwater for 90% of its domestic water supply from individual wells, with the balance served from surface water sources. It is critical that the District of Highlands establish, through a groundwater protection program, a comprehensive analysis and understanding of both water quantity availability and water quality standard of the existing aquifers. This knowledge will provide the community with a science-based planning tool that will address long-term water sustainability issues as well as guide for future land use decisions. The strategy is unique in that there is no centralized system hence the education and participation by individual homeowners is an important component to ensure protection of the groundwater resource. In that regard, the model being developed in the Highlands has application elsewhere in the province, in particular for small communities and unorganized areas. Throughout this process the District of Highlands has demonstrated the importance of collaboration between council and community, with ideas and information exchanged in both directions.

Both the Phase 1 and 2 Reports can be found at: http://www.highlands.ca/planning/ground_water/.

1. How does the program/project protect BC's environment?

Water is, of course, one of the basic elements required to sustain life. In the municipality of Highlands, there are no piped services, thus all residents depend on either groundwater or surface water. The ground water protection program seeks to ensure that Highlands groundwater remains sustainable and safe, that demand is limited to what is available, and that residents are aware of the importance of water conservation, monitoring and maintenance.

The program initiated by the Highlands plays its part in protecting BC's environment by seeking to establish both the quantity and quality of groundwater and the capacity of the aquifer to meet projected demands, taking into account the complexity of the fractured bedrock, projected consequences of climate change, and future development. In effect, by establishing a "sustainability road map" for the future, this ensures land use decisions are made within a context of living within the confines of the available water resource.

2. What steps are involved in the program/project and what is the status of each step?

This is a progressive process: first, develop the tools based upon existing information, i.e. a conceptual model and thereafter a numerical model, test the model, monitor, and with this information educate and inform and finally implement conservation practices based upon sound science.

Two phases of the program are now complete, with a third phase underway.

The scope of **Phase I** consisted of compiling and reviewing available data and information to develop a conceptual model of groundwater flow in the Highlands, compiling an inventory of unused water wells, developing a numerical model of groundwater flow in the Highlands, and developing a preliminary groundwater monitoring program for groundwater quality and water level measurements. The numerical groundwater model was used to conduct a water balance analysis for the bedrock aquifer within the District of Highlands and to assess the sustainability of current and future groundwater withdrawals. The model was also used to delineate capture zones for select communal/commercial wells within the Highlands, including those operated by the Bear Mountain Golf Course and the well that services the River's Crossing Retreat Centre and the Hanington Estates subdivision, all major groundwater users on the southern edge of the municipality.

The scope of work for **Phase 2** consisted of conducting a contaminant inventory to identify potential sources of contamination to regional groundwater resources, developing preliminary recommendations for the conservation of groundwater quantity and the protection of groundwater quality, developing recommendations for public education, and implementation of a groundwater monitoring program to obtain water level data and characterize groundwater quality related to general potability parameters.

Monitoring wells were established at 2 locations and a preliminary water level monitoring and groundwater quality testing program was initiated. An additional 8 locations were added by September 2009.

Phase 3 will include:

- implementation of preliminary measures for groundwater protection to encourage conservation of groundwater quantity and the protection of groundwater quality. Education initiatives will be coordinated with existing programs in the municipality.
- construction of a database of specific land uses and significant accidents, fires or spills
- a more complete contaminant inventory
- coordination of groundwater monitoring efforts with site operators at commercial/industrial properties
- detailed groundwater protection planning

In addition, further pressure transducers will be added, base flow monitoring will continue through a wet season, and further flow meters will be installed and monitored.

3. Tell us how your submission is relevant to current environmental issues.

At a time when very little provincial groundwater regulation exists and concern for the sustainability of our water supply increases with the threat of climate change, it is essential that we appreciate the importance of groundwater and our ability to protect and conserve. It is also essential in the Highlands (and in many municipalities) that groundwater play a central role in land use planning.

There are many examples of groundwater being exploited due to inadequate research, lack of regulation and excessive demand, resulting in accelerated depletion of the resource.The District of Highlands has shaped a water sustainability strategy that meets the future long-term needs of the community. This integrated approach addresses not only the domestic demand but also the requirements to replenish and sustain natural systems such as wetlands, streams and lakes.

4. Does the project reflect leadership and excellence in the advancement of community development?

Council undertook the project to take a leading role in response to community concern about groundwater. The educational component will most certainly bring residents together in their concern for the future of their water supply, and provide tools for conservation and well care and maintenance. The program will also seek to give residents a better understanding of the source for their water supply, so that they can play an active role in community water protection. Further, groundwater protection will be a major factor in future land use decisions.

Community stewardship has always been strongly supported by Council in the Highlands. This effective partnership has resulted in a raised awareness within the community on water-related issues.

5. How was the project a good use of budget and resources?

The Groundwater Task Force model is effective from an economic standpoint as well as demonstrating the efficient use of resources. The combination of an experienced consultant (Golder Associates Ltd.) working with staff, knowledgeable citizens in the community and an elected official, streamlines the

process. The Task Force recommendations are submitted to Council for consideration via a community town hall meeting process.

Funds for the project come entirely from federal gas tax innovations funds.

6. Does the project encourage economic sustainability? (e.g. life cycle analysis, internalizing costs and alternative financing, economic instruments)

Though a small corner of the municipality may be serviced by piped water in future, a substantial majority of Highlands households will continue to receive their domestic supply from individual wells. Asset management from the perspective of community systems is not an issue. Infrastructure remains the responsibility of the individual homeowner.

Greater Victoria's Regional Growth Strategy does not contemplate piped services within the district in the foreseeable future, (or for at least the next 25 years) with the exception of a small corner located in the southwest. Any crisis in quantity or quality of groundwater would have a tremendous economic impact on both the municipality and the region, as the cost of laying pipes for water in such difficult terrain to such a widespread and sparsely populated community would be very high. Thus planning for careful management and protection is crucial and exceptionally cost-effective.

Should Highlands not manage its groundwater resources effectively, the potential cost to the region to provide piped water for health and/or safety reasons would be prohibitive.

7. Does the project encourage social sustainability? (e.g. stakeholder engagement, public participation, equity and diversity, health and safety, knowledge sharing, capacity building, community identity and marketing)

Most certainly the project will require a large degree of community acceptance, buy-in, and participation.

There will be a significant internal communication and education initiative across the different community committees. The Highlands is well placed for such an initiative with community groups such as the Highlands District Community Association and the Highlands Stewardship Foundation, natural vehicles for the exchange of education and information. There will also be a significant outreach component, communicating with others outside the community.

8. What makes your program/project innovative?

Given that the Highlands will continue to receive its water supply from individual wells, any strategy must involve individual house owners at a personal level. Each owner will consider water and energy conservation within a "closed loop" household management model that will address water and energy-efficient fixtures, household assessments for energy efficiency, xeriscaping, and on-site sewage management. This model will also call for community commitment to groundwater management.

There are many communities that would be interested in the Highlands experience, particularly where centralized infrastructure is not available and groundwater is the source of supply.

9. Was teamwork/collaboration exhibited throughout the project or an end result?

The project began as common vision between Council and Highlands residents to better understand the groundwater system upon which we rely. Teamwork and collaboration has been the consistent factor throughout. An essential component of the strategy will be the development of partnerships and collaboration with other agencies and communities.

Council struck a Groundwater Task Force, consisting of citizen representatives, a Council liaison, district staffand a consultant to oversee the project. Many citizens volunteered their wells for monitoring, and municipal wells were included as well.

The end result will exhibit further citizen involvement with a plan for community collaboration and action to protect, conserve and maintain our common water supply in the face of new and continuing challenges, including climate change, pressures of development, human-introduced and natural contaminants, individual water use and care.