

Groundwater Monitoring

Groundwater is a precious resource, and monitoring is crucial to its reliable evaluation and management. With over 45 years of experience in the field and more than 180 projects under its belt, HCL provides groundwater monitoring services that perform key technical and administrative functions:

- Ensure adequate and uninterrupted supplies of groundwater, optimum utilization of groundwater resources, and detection of adverse effects on other groundwater users
- Meet the water well licensing requirements of the regulator, typically Alberta Environment and Parks or the Alberta Energy Regulator



Meeting Regulatory Requirements

Alberta has a variety of regulatory tools to protect groundwater resources. These include mandatory licensing and registration for groundwater users and water well drillers under the *Water Act*, and groundwater quality monitoring requirements for industrial operations approved under the *Environmental Protection and Enhancement Act*. Approvals are also issued to municipalities to ensure groundwater is safe to drink.

Providing Valuable Technical Expertise

In most cases, groundwater monitoring involves continuous monitoring of groundwater diversion and water levels in water source wells, and the monitoring of water levels in observation and/or domestic water wells. Monitoring is often a part of a program to track water quality trends over time and ensure that quality remains suitable for the intended use.

The Benefits of Long-Term Monitoring

Long-term monitoring provides a realistic assessment of the impact of groundwater diversion because it takes into account additional factors influencing water levels, including:

- Aquifer recharge and barrier boundaries
- Seasonal and annual recharge fluctuations
- Changes in water well efficiency over time
- Interference from other groundwater users

A Range of Effective Methods

Various methods exist to measure groundwater diversion and water levels, but the most effective are those that include data recording capabilities. Telemetry can also be added to any monitoring system to enable remote data downloads.

- **Diversion rates:** A flow turbine connected to a flow analyzer allows the measurement and recording of diversion rates, with an accuracy of $\pm 1.0\%$.
- **Water levels:** The most common technique uses a downhole pressure transducer connected to a data logger, with an accuracy of $\pm 0.1\%$ of full range.
- **Groundwater quality:** Lab-based chemical and physical analyses of water samples collected in the field are the most common monitoring techniques, but water quality probes can also be used for various parameters, with the information recorded on a data logger.

Groundwater and Surface Water Solutions for a Changing Environment