



## An Overview of Hydrogeological Studies

### How does the Water Flow?

It may seem daunting when you need this, but there are some *REAL* benefits.

#### The Basics

Hydrogeology involves the evaluation of the site watershed and water resources including services related to the identification, evaluation, remediation and protection of ground and surface water.

Hydrogeological studies may be conducted in support of:

1. Preliminary Screening (Baseline/Desktop Study)
2. Planning Applications
3. Well Design, Installation, Sampling and Abandonment
4. Permit To Take Water Applications

Hydrogeological studies must be prepared by a Qualified Person (QP). *A QP is a licensed Professional Geoscientist or exempted Professional Engineer as set out in the Professional Geoscientists Act of Ontario.*

#### The Details

##### 1. Preliminary Screening (Baseline/Desktop Study)

The first thing that needs to be established when developing a property, is whether the site has high or low risk impacts.

Where there is a *low risk* of negative impacts, it's pretty simple... a QP may be able to complete their report by qualitatively applying hydrogeological principles to existing information. This is usually in the form of what is called a *Desk-Top Study*.

Where there is a *high risk* of negative impacts, a detailed site investigation and monitoring program may be

recommended or required.

##### 2. Planning Applications

The general purpose of a hydrogeological study planning is to evaluate whether the proposed application is likely to result in *adverse/negative impacts to the a) aquifer, b) existing groundwater uses, or c) natural functions of the ecosystem relying on groundwater*. The following explains the typical approaches used:

- **Pre-Development Monitoring Program:**  
A monitoring program will need to be implemented prior to development in order to assess existing conditions and to undertake an impact assessment.
- **Development Monitoring Program:**  
In certain cases where an impact assessment indicates that potential impacts may arise during construction, the developer may be required by the Conservation Authority to monitor the impact of development during construction activities.  
The monitoring program would be designed to assess water levels and/or water quality impacts during development activities. Where the MECP has required a monitoring program as a condition of a Permit to Take Water (PTTW) application, the results may also be requested by the Conservation Authority.
- **Post-Development Monitoring Program:**  
In order to assess delayed impacts to the groundwater resources, in some circumstances the Conservation Authority may request that the development monitoring program mentioned above continue for a pre-determined amount of time following any development activities.
- **Water Balance Analysis:**  
A water balance analysis is required to estimate the

pre-development and post-development infiltration and runoff for most development applications.

Many Conservation Authorities have policies related to maintaining infiltration. The maintenance of *pre-development recharge* is a general requirement in the Oak Ridges Moraine Conservation Plan, Lake Simcoe Protection Plan and the Provincial Policy Statement that is often captured in municipal Official Plans.

### 3. Well Design, Installation, Sampling & Abandonment

Preliminary Hydrogeological studies may be conducted to assist with:

- licensing individuals and companies who construct a well
- choosing a location for a new well (i.e., siting)
- constructing a well
- maintaining a well
- abandoning a well (plugging and sealing it)
- reporting well activities (e.g., completing and submitting well records)

Typically for:

- private, residential and domestic wells
- agricultural, commercial, and industrial wells
- municipal, communal and public wells
- test holes and dewatering wells

### 4. Permit To Take Water Applications

Finally, a Hydrogeological Study may be conducted in support of a *Category 3 Permit to Take Water (PTTW) applications* (or for Category 2 applications, where applicable).

Applications for PTTW are classified within Category 3 based on risk management criteria. These criteria are intended to identify development proposals which have a greater potential risk to existing water uses or to the natural functions of the ecosystem.

*Applications in this category must be accompanied by a Hydrogeological Study that evaluates the potential for unacceptable impacts to occur as a result of the water taking.*

Therefore, the purpose of the Hydrogeological Study is to evaluate whether the proposed taking is likely to result in unacceptable impacts.

The ministry (MECP) will not issue a PTTW until it is satisfied that the proposed taking is unlikely to result in

unacceptable impacts. The study must also propose contingency and mitigative measures that will be implemented in the event that unforeseen unacceptable impacts occur.

### Benefits

It's about **early detection, combining services** as well as having a **sustainable stewardship approach** to our environment while developing. In today's landscape, sustainable development is one that is highly sought after by owners and can be capitalized through marketing.

Hydrogeological studies may be recommended or combined when engaging with Environmental Assessments, and is often needed in conjunction with Geotechnical Services.

*Fisher Engineering can save you time and precious dollars with these combined services.*

With our inhouse expertise in all these areas, we can very quickly assess what you might be up against, and/or get the ball rolling more quickly so that you can proceed with your endeavours.

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