

About Schlumberger Water Services

We offer innovative groundwater solutions through professional expertise to meet the advancing technological requirements of today's professionals.

Schlumberger's Water Services division specializes in assessing, developing, and managing groundwater resources using some of the finest, advanced and cost-effective technologies available today.

Whether you're looking for field-scale data collection, data management, modeling, or resource decision-making solutions, our teams of specialists are here to help you address all your groundwater projects safely and efficiently.

Applied Technologies:

- Visual MODFLOW groundwater flow modeling
- Visual MODFLOW 3D-Explorer
- ArcGIS

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Hydrogeologic Impact Analysis at Acton Quarry

Acton, Ontario



Aggregate recovery at the Acton Quarry

Highlights:

- Development and calibration of groundwater flow model to evaluate impact on the natural groundwater flow system
- Groundwater modeling predicted water table elevation
- Model development lead to tool creation for further groundwater flow assessment

Background

The quarry in this study is located in Acton, Ontario, just 50km northwest of the metropolitan area of Toronto. Established in 1962, it is considered to be the 6th largest quarry in Canada by production, reaching targets of 340,000 tones of crushed stone per month. Blue Circle Aggregates retained the services of Schlumberger Water Services to develop and apply a groundwater flow model for the evaluation of a variety of aggregate extraction scenarios and the potential impact these could have on the natural groundwater flow system surrounding the existing quarry.

Challenges

In this investigation, evaluating the level of drawdown that would occur during the various extraction scenarios and how it will impact groundwater conditions in the area can be challenging. Developing an understanding of the geologic and hydrogeologic conditions of the investigation site will reduce the uncertainty of future quarry developments.

Solution

Schlumberger Water Services developed and calibrated a Visual MODFLOW groundwater flow model, which reflected the hydrogeologic conditions at the site. Modeling in the area of the quarry is complicated by the Niagara Escarpment, located to the northeast of the site, and that the area surrounding the quarry is the headwaters for three watersheds.

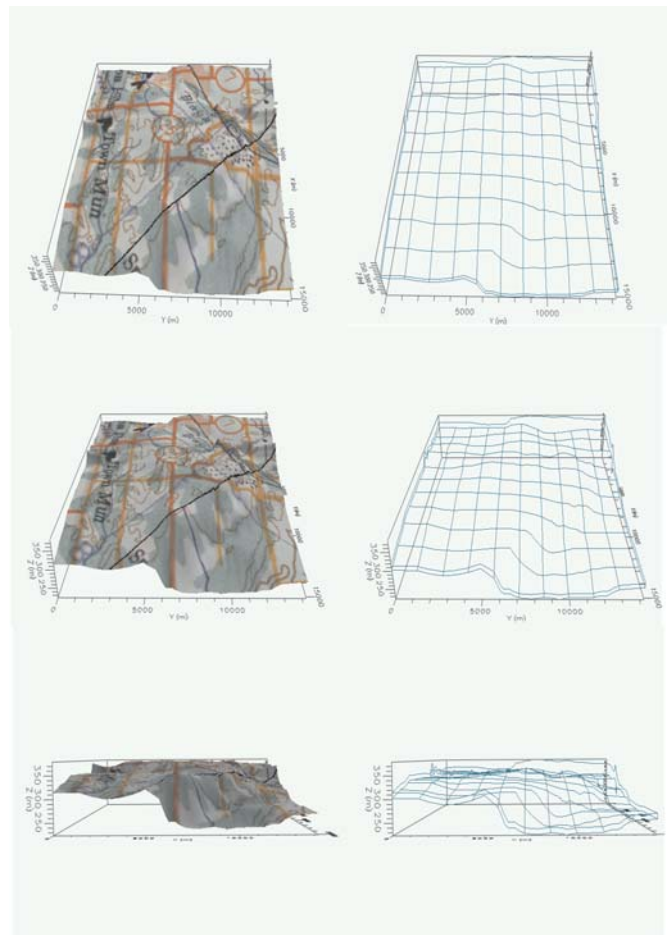
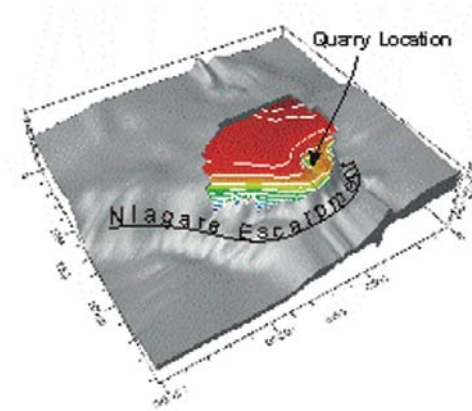
Case Study: Hydrogeologic Impact Analysis at Acton Quarry

Special consideration was taken to address groundwater seepage at the escarpment face. Understanding the importance of stakeholder buy-in, Schlumberger Water Services worked with Blue Circle to provide the many stakeholders (Credit Valley Conservation Authority, Town of Halton Hills, Region of Halton) with an opportunity to provide input into the study. Through active information exchange, meetings and discussion with the many project stakeholders, clear and agreed upon project objectives were established to address stakeholder concerns from the onset of the project.

Results

Schlumberger Water Services successfully calibrated the model to on-site and regional water level observations, quarry dewatering rates, and seepage rates along the Escarpment. The model predicted that the different scenarios would have a localized impact with drawdown less than 0.5m within 1km of the quarry.

The model development, calibration, and application culminated in the creation of a tool for Blue Circle to assess groundwater flow near the quarry.



Model layers reflect hydrogeological conditions at the Acton site