

## Hydrogeology Study Highlights

Hydrogeology studies are required in Ontario in all applications for pits and quarries, and Level 1 and Level 2 studies were conducted for the proposed Shantz Station Pit. A Level 1 investigation determines to what depth aggregates can be removed relative to the water table. A Level 2 investigation evaluates the way water moves around a site and any potential impacts of the proposed pit on surface and ground water in the area.

The terms of reference for the studies were developed in cooperation with the Grand River Conservation Authority, Township of Woolwich and Waterloo Region.

Field work on and around the site since the fall of 2017 included installing groundwater monitoring wells and gauges (mini-piezometers) to measure groundwater depths; monitoring the flow of Hopewell Creek; measuring groundwater and surface water over time; mapping groundwater flow direction; establishing the depth of the water table on the site; sampling and analysing groundwater and surface water quality; and assessing any potential impacts of a pit on local water features.

The study area included the proposed pit licence area and 500 metres outside it. Particular attention was paid to studying water features and determining potential impacts on nearby lands – including adjacent homeowners and farms, the Merry-Hill Golf Club, Hopewell Creek and five wetland parcels.

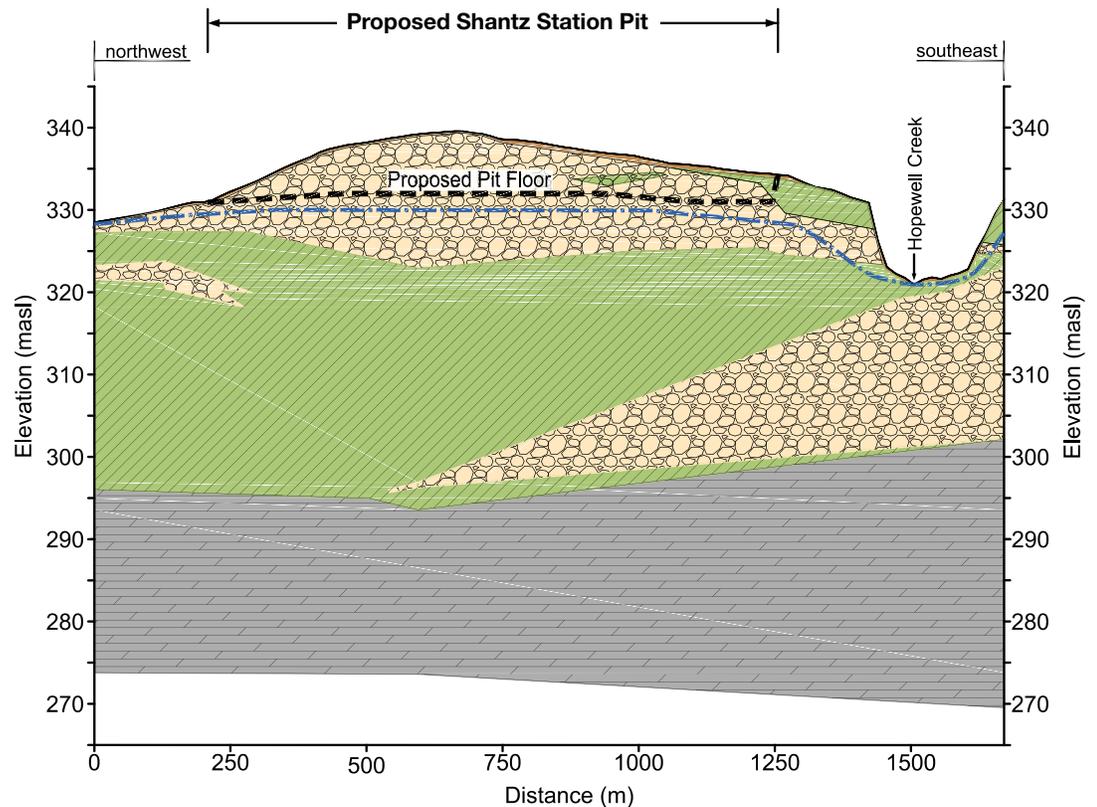
The proposed Shantz Station Pit will remove aggregate from above the water table, with a 1.5 metre buffer of material remaining above the water table once the sand and gravel has been extracted.

There are 29 wells in the study area. The hydrogeology investigation found that most of the private wells are drilled deep enough to be unaffected by a pit operation. Four shallower, dug wells will be buffered by the 1.5 metre buffer to decrease their susceptibility to any negative impacts.

Water monitoring and sampling was done on adjacent properties with the landowners given copies of reports detailing the levels and quality of water in their wells.

Under the Ontario Water Resources Act, any wells that experience a decline in water quality or quantity must be returned to their original condition by the company responsible for the decline.

The study concluded that Hopewell Creek and one of the wetlands will be affected to a very small degree by a pit operation. Both will receive slightly more water than in the past. While runoff into these areas will be reduced, infiltration of water into the groundwater system will increase. Flow in Hopewell Creek is expected to increase just over 1% on an annual basis. This increase will, if anything, enhance the coldwater fish habitat in Hopewell Creek. The increased water to the wetland will drain through the two culverts along Shantz Station Road, which prevent flooding of this water feature.



### LEGEND

- TOPSOIL
- SAND & GRAVEL
- CLAYEY SAND TILL
- BEDROCK
- WATER TABLE

**A simplified version of a cross-section of the proposed pit from the Hydrogeology Study Report shows the depth of sand and gravel to be extracted, relative to the water table.**