



24 Erb Street East
Waterloo, Ontario
N2J 1L6

Phone: 519-884-5549
Fax: 519-884-5996
blackport_hydrogeology@rogers.com

April 17, 2012

Ms. Sally Stull,
Town Planner,
Town of Erin,
5684 Trafalgar Road
R.R.2,
Hillsburgh, Ontario
N0B 1Z0

Dear Ms. Stull:

RE: REVIEW OF "HYDROGEOLOGICAL ASSESSMENT,
HILLSBURGH PIT EXTENSION AND AMENDMENT" BY CAMBIUM
ENVIRONMENTAL INC., ON BEHALF OF ST. MARY'S CEMENT.

As per your request, I have reviewed the above noted report and application for an expansion of the Hillsburgh Pit. The gravel pit, located north of Hillsburgh on Wellington Road 24, is currently operated by CBM Aggregates, a division of St. Mary's Cement Inc. (St. Mary's CBM). The existing gravel pit is currently licensed for above water extraction and is approximately 50 ha in size, with about 44 ha within the extraction area.

St. Mary's CBM is proposing to expand the site by licensing three additional separate parcels of land (62 ha) surrounding the current extraction area. Below water extraction is proposed for a small portion (0.8 ha) of one of the new parcels. It is my understanding that if the current application is approved and rezoned, an application to amend the existing site license will be made to allow below water extraction on about 12 ha of the entire site. The hydrogeological assessment report was based on the total area of the proposed below water extraction.

I am providing the following comments, based on my review of the information presented in the above noted report and general knowledge of the study area.

General Comments

- There is confusion in the introduction of the hydrogeological assessment report as to the extent and location of the area of below water extraction, as well as which parcels of the application will have below water extraction. The descriptions do not match the planning report prepared by MHBC. There is also confusion as to what category of application is being made under the Aggregate Resources Act. I have assumed the Planning Report by MHBC has the correct descriptions.
- The study was carried out in accordance with the requirements of a hydrogeologic assessment of a new licence application under the Aggregate Resources Act.

- The site is located in area of sand and gravel deposited by glaciation, and is described as ice-contact sand and gravel. The sand and gravel deposit is variable, and can contain fine sand, silt and till. Previous drilling on the site shows variability in geologic conditions across the site.
- The depth to the water table across the site is variable, ranging from approximately 15 to 30 m deep.
- The 12 ha area proposed for below water table extraction is in the south-southeast portion of the site. A drilling program conducted at the site, indicated that the southerly portion of the site has coarser geologic material (i.e. sand and gravel) below the water table, compared to the northern portion of the site (i.e. sandy silt at depth).
- A review of background data shows that there is a sandy/clayey silt till underlying the sand and gravel. The regional bedrock aquifer is below the till.
- There are several residential wells located near the existing pit and proposed expansion area. Most wells obtain water from the bedrock aquifer.
- The existing pit and proposed expansion area are within the 25-year capture zone (well head protection area) of the Hillsburgh municipal wells. The municipal wells are located in the bedrock aquifer. Aggregate extraction operations in well head protection areas are categorized as a moderate risk activity in the Wellington County Official Plan. Recent source water protection work by Credit Valley Conservation shows the 25-year capture zone of the Hillsburgh wells as having a low vulnerability to impacts from surface sources of contamination, under existing conditions.
- There are no surface water courses on or near the site.

Issues and Concerns

From a hydrogeological perspective the following concerns are noted:

- There is a 15 m slope in the water table elevation across the site. Although the water table elevation does not fluctuate significantly, in response to seasonal variations in recharge, there are limited data to accurately determine the depth to water across the area of the site that will remain above the established water table. There are currently only three monitoring locations on site, all located on the eastern portion of the site. A monitor was previously installed on the west side (BH05-02), but destroyed in 2007 and not replaced. A monitoring well (GLL-2) was previously installed in the currently proposed Phase 1 area (southwest portion of the site) but is not deep enough to encounter the water table. As a result, there are no water table monitors in the western portion of the site to establish appropriate depths of extraction above the water table, prior to extraction

occurring. Given that the final elevation of the pit floor is required to be 1.5 m above the established water table, there needs to be additional groundwater levels established in the western portion of the site.

- Water quality data collected at an observation well (GLL-1), on the down gradient side of the site, shows elevated concentrations of nitrate, at 11.0 and 12.6 mg/L for two sampling periods in 2007 and 2011, respectively. These values are above Ontario Drinking Water Quality Objectives (ODWO) of 10 mg/L. The well is located in the southeast corner of the site, in the overburden aquifer.

Although the elevated nitrate concentrations are not directly related to aggregate extraction, the nitrate is likely sourced from current or former agricultural activity up gradient of the monitoring well. The below water extraction near this area will result in an increased potential for nitrate impacted water migrating to the bedrock aquifer (i.e. the bottom of the open water pond will be closer to the bedrock aquifer). The ground surface of the extraction area will be sloped towards the pond in the future, increasing potential for nitrate loading to the pond from both surface water runoff and groundwater flow from future agricultural activities. The below water extraction is within the capture zone of the Hillsburgh municipal wells and there are several private wells down gradient of the site. The existing monitoring well (GLL-1) is not directly down gradient of the proposed below water extraction area and is in the overburden. A monitoring well located directly down gradient of the pond, in the bedrock, would be more appropriate.

Conclusions and Recommendations

Based on the available information and understanding of the proposed application for amendments to the Town of Erin's Official Plan and Zoning By-law, as well as the proposed amendment to the existing Hillsburgh Site Plans, the following are my conclusions:

- There is no anticipated impact on existing surface water features, if extraction proceeds in the expansion area as proposed, as there is no direct connection between the proposed expansion areas and surrounding surface water courses.
- There is no anticipated impact on water quantity in local wells or the municipal wells in Hillsburgh, as there will be little change to the water budget (e.g. recharge to the local aquifer system).
- The groundwater flow direction is generally established; however the water table elevation needs to be more accurately established in the western portion of the site, to better define the maximum depth of the excavation in the area where above water extraction is to occur.

- There is a small increase in risk to water quality in the bedrock aquifer as a result of below water extraction, given the elevated nitrate concentrations that currently exist in the shallow groundwater zone.

Based on the information presented in the hydrogeological assessment, and the accompanying Planning Report, the following additional recommendations, or modifications to recommendations made by Cambium Environmental, should be included:

- At least one additional water level monitor should be installed along the west side of the site (along Wellington Road 24) to provide a more accurate measurement of the depth to water prior to extraction.
- A bedrock monitoring well should be installed directly down gradient of the below water table extraction area. This monitoring well would replace GLL-1 as the groundwater quality monitoring well proposed by Cambium Environmental. The location would be more appropriate to assess the potential impact on water quality in the bedrock aquifer as a result of the below water extraction.
- Water quality monitoring should be conducted at the extraction pond, following the same program as the groundwater quality monitoring.
- The additional monitoring locations, and any potential changes to the estimated depth of extraction, should be reflected on the site plan.
- Annual monitoring reports should also be provided to the Town of Erin.

I trust these comments are sufficient at this time, however if you require clarification or more detail please do not hesitate to contact me.

Sincerely,
Blackport Hydrogeology Inc.



A handwritten signature in black ink that reads "Ray Blackport".

Ray Blackport, P. Geo
Hydrogeologist