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Groundwater Studies
Geochemistry
Phase I / II
Regional Flow Studies
Contaminant Investigations
OMB Hearings
Water Quality Sampling
Monitoring
Groundwater Protection
Studies
Groundwater Modelling
Groundwater Mapping

Our File: 9506

October 20, 2016

James Dick Construction Ltd.
Box 470
Bolton, Ontario
L7E 5T4

Attention: Greg Sweetnam, Vice President

Dear Mr. Sweetnam:

**Re: Hidden Quarry Planning Policies: Wellington County and
Provincial Policy Statement 2014**

In preparation of the resubmission of the Hidden Quarry application we have reviewed pertinent policies of the Wellington County Official Plan and the Provincial Policy Statement 2014. Our findings are as follows;

1.0 Wellington County Official Plan

There are two areas of the official plan that we were asked to review;

Section 4.9.5 *Source Water Protection* and Section 4.9.7 *Galt and Paris Moraine Policy*. Our comments on how the proposed development addresses these policies are as follows:

2.0 Section 4.9.5 Source Water Protection

4.9.5.1 Identified vulnerable areas within the County include:

- *Wellhead Protection Areas (WHPAs);*
- *Surface Water Intake Protection Zones (IPZs); and*
- *Issue Contributing Areas (ICAs)*

Schedule B of the Official Plan identifies vulnerable areas for each municipal water supply source and their associated vulnerability score, as mapped in the applicable Source Protection Plan. Schedule B also identifies policy areas to protect selected private communal wells in the County that were identified in the County of Wellington Groundwater Study, 2006.

Figure 1 based on Schedule B3 of the Official Plan shows that the Hidden Quarry is not found in an identified vulnerable groundwater area within the County of Wellington. Although the Well Head Protection Area – Quantity (WHPA-Q1) is not shown on Schedule B, it is our understanding from a review of draft Tier 3 Source Water Protection studies that the Hidden Quarry site does not fall within the WHPA-Q1 of any Rockwood municipal well.

4.9.5.9 To the extent that the aquifer vulnerability is changed as a result of a new or expanding extraction operation, the potential for overland flow of surface water originating from adjacent lands onto the excavated area must be minimized such that it does not pose additional risk to groundwater quality.

The existing vulnerability score for the proposed quarry is ‘high’ as determined in the Grand River Source Water Protection Plan (Grand River Source Protection Area Approved Assessment Report, November 25, 2015). There will be no overland flow from adjacent lands into the quarry; therefore, agricultural based contaminants cannot flow into the open excavation. Aggregate operations are not considered a ‘threat’ under Source Water Protection policies and spill prevention and mitigation policies will be adopted.

3.0 Section 4.9.7: Paris and Galt Moraine Policy

The Official Plan for the County of Wellington was updated on September 1, 2016. The Official Plan included a Paris and Galt Moraine Policy Area. The moraines support the following processes and features;

- groundwater recharge;
- groundwater storage;
- surface water detention;
- groundwater potential;
- baseflow to streams;
- springs; and
- watershed divides for groundwater and surface water

The Hidden Quarry site development is located within the Paris and Galt Moraine policy area and as such must protect these processes and features.

Our comments in regards to the pertinent sections associated with the Moraine Policy are as follows:

4.9.7.1 The Paris and Galt Moraine policies are intended to:

- *protect moraine processes and features in order to maintain and where possible restore and enhance groundwater and surface water resources; and*
- *promote stewardship activities on the moraines that maintain, restore or enhance groundwater and surface water resources.*

The development of the Hidden Quarry will result in the enhancement of groundwater and surface water resources through the increased storage of water. The gradual development of 17.4 hectares of ponds at the site results in the storage of several million litres of water available to the aquifer and a benefit to surface water features downgradient.

4.9.7.2 a) Large scale development proposals including intensive recreation, mineral aggregate operations, new rural employment area designations, and urban boundary expansions will be required to demonstrate that ground and surface water functions will be maintained, and where possible, restored and enhanced;

The groundwater and surface water functions associated with the moraine at this site include the following;

- Streamflow conveyance
- Groundwater recharge
- Groundwater storage
- Groundwater conveyance
- Groundwater Potential

The quarry development will maintain these functions as follows:

Groundwater Storage

One of the functions of the moraine is to act as a groundwater storage reservoir. Bedrock typically has 5% storage capacity for water whereas unconsolidated moraine sediments have between 15 and 20% porosity. Greater porosity means more groundwater storage capacity in the moraine sediments resulting in greater volume of stored water for springs and streams found on and adjacent to the moraine. The gradual process of quarrying will convert bedrock aquifer with low storage potential to a pond with 100% water storage potential. The volume of stored water within the moraine on the Hidden Quarry property will thus increase from approximately 200,000 m³ to 4,000,000 m³ of water.

Groundwater Conveyance

The aquifer beneath the site conveys water originating from lands to the northwest towards Brydson Spring, Brydson Creek and Blue Springs Creek. This function will be maintained and due to the increase in groundwater storage, will be enhanced to the

benefit of downgradient features including Brydson Spring and Creek. The function of the moraine of being a source water area for cold water fisheries will be maintained, if not enhanced through the increased storage of water.

An overall greater volume of groundwater will also be conveyed through the site as a result of the area of influence of the quarry ponds. Despite a temporary 'consumption' of water at the site due to dust control and aggregate washing operations, the volume of groundwater flow through the site will not be diminished.

There will be a permanent increase in evaporation from the site as a result of the creation of the quarry ponds. This increase in evaporation is small relative to the potential annual variation in precipitation and at no time will groundwater flow through the site be diminished. A robust monitoring program has been designed to ensure that groundwater flow through the site is never less than occurring under existing conditions.

Streamflow Conveyance

Tributary B flows through the site and is a losing stream throughout the on-site reach. There will be no greater loss of water from Tributary B than already is already occurring; therefore, the function of streamflow conveyance will be maintained.

Groundwater Recharge

The site will continue to be a recharge area and through the creation of the excavation, will capture runoff resulting in greater recharge at the site. In this way, the recharge function of the site will be maintained.

Groundwater Potential

Groundwater potential will be enhanced at this site as a result of the creation of two quarry ponds. Groundwater levels on the downgradient side of the quarry will increase, thereby maintaining and enhancing groundwater flow to nearby groundwater related features.

4.0 Provincial Policy Statement 2014

We have the following comments on how the quarry development protects water resources;

2.2.1 a) using the watershed as the ecologically meaningful scale for integrated and long-term planning, which can be a foundation for considering cumulative impacts of development;

There are no potential cumulative impacts in the Blue Springs Creek subwatershed.

2.2.1 b) minimizing potential negative impacts, including cross-jurisdictional and cross-watershed impacts;

Through the use of sub aqueous mining techniques and a robust groundwater and surface water monitoring program any potential negative impacts related to water have been minimized with respect to Wellington County and Halton Region features. There are no potential cross-watershed impacts.

2.2.1 c) identifying water resource systems consisting of ground water features, hydrologic functions, natural heritage features and areas, and surface water features including shoreline areas, which are necessary for the ecological and hydrological integrity of the watershed;

Extensive groundwater and surface water monitoring and investigation have been conducted to adequately identify water resource systems.

2.2.1 d) maintaining linkages and related functions among ground water features, hydrologic functions, natural heritage features and areas, and surface water features including shoreline areas;

Development of the Hidden Quarry will maintain linkages between groundwater related features such as the Brydson Spring. There will be no decrease in groundwater flow through the site. There will be no decrease in surface water flow through the site.

2.2.1 e) implementing necessary restrictions on development and site alteration to:

- 1. protect all municipal drinking water supplies and designated vulnerable areas; and*
- 2. protect, improve or restore vulnerable surface and ground water, sensitive surface water features and sensitive ground water features, and their hydrologic functions;*

There will be no impact to municipal drinking water supplies or designated vulnerable areas. The Hidden Quarry site is not in the well head protection area or the WHPA-Q1 for any municipal well.

The site has been evaluated with respect to potential impact to groundwater and surface water features including springs upgradient of the site (Allen and De Grandis properties), on-site wetlands and offsite wetlands (Allen Wetland) and downgradient features including Brydson Spring, Brydson Creek and Blue Springs Creek. Water level changes are limited as a result of the proposed sub aqueous mining technique and mitigation for the on-site wetland will prevent any significant change in hydroperiod of the wetland. A robust groundwater and surface water monitoring program will ensure that water level changes are not having an negative impact on nearby features.

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2.2.1 f) planning for efficient and sustainable use of water resources, through practices for water conservation and sustaining water quality;

The development of a quarry at this site results in a significant increase in water storage at the site. This stored water is a groundwater resource for surface water and groundwater features downgradient of the site.

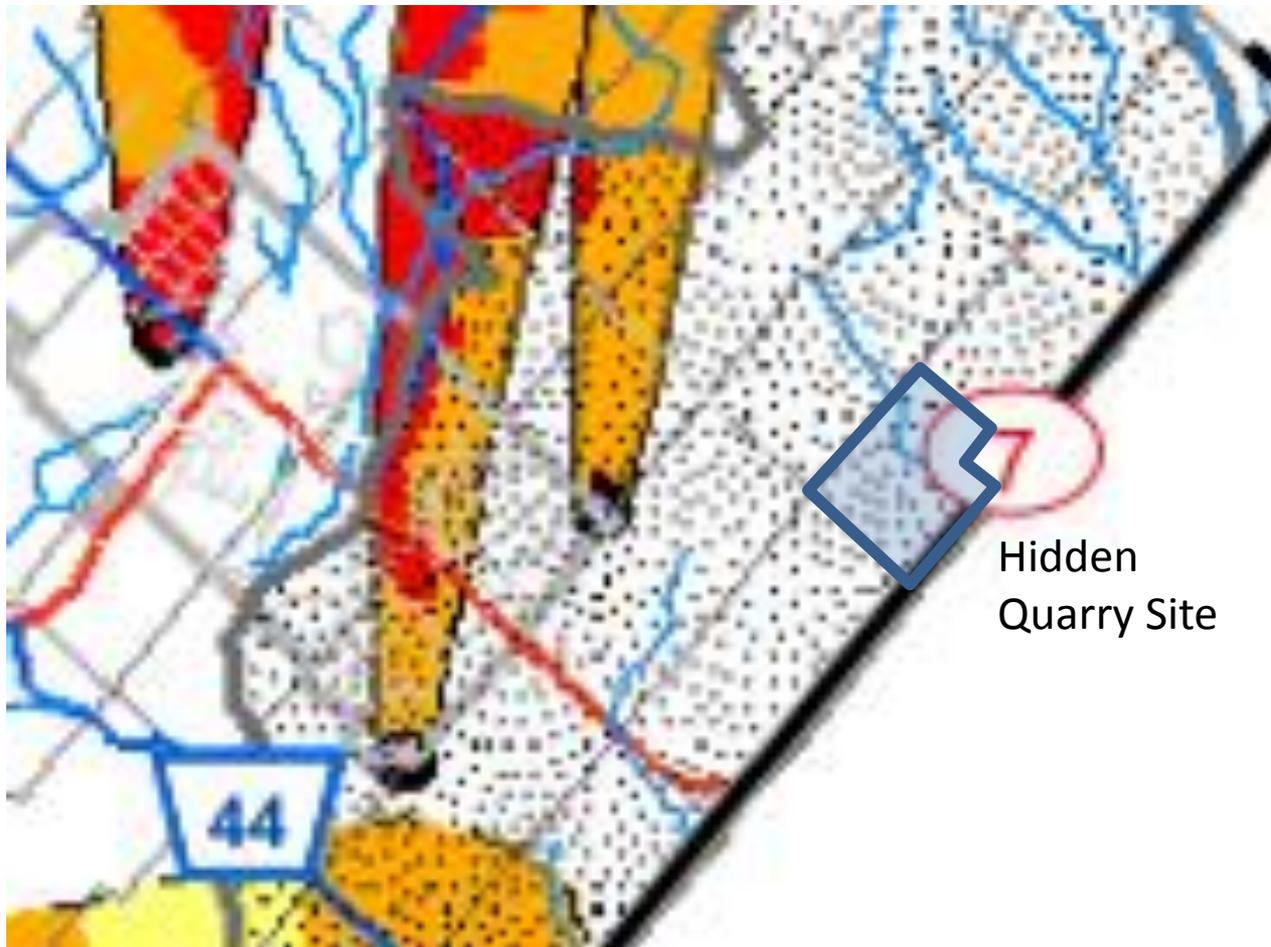
Sincerely,

Harden Environmental Services Ltd.

A handwritten signature in black ink, appearing to read 'S. Denhoed', followed by a long horizontal line extending to the right.

Stan Denhoed, P.Eng., M.Sc.

Senior Hydrogeologist



Source: Schedule B3 – Wellington County Official Plan

Figure 1: Well Head Protection Areas for Rockwood Wells

