



January 27, 2016

Via: Email

Ms. Kelsey Lang
Planning Associate
Township of Guelph/Eramosa
P.O. Box 700
Rockwood ON N0B 2K0

Dear Ms. Lang:

**Re: Tri City Lands Ltd. - Spencer Pit
Second Submission - Hydrogeologic Peer Review
Zoning By-Law Amendment Application ZBA 01/14 (Township File D14 TR)
6939 Wellington Road 124, Township of Guelph/Eramosa
Project No.: 300035544.0000**

We have completed our review of the Groundwater Science Corp. (WSC) letter dated January 13, 2016, and the Harrington McAvan Ltd. Letter dated January 18, 2016, received as part of the January 18, 2016 submission by Harrington McAvan Ltd.

Our current submission comments are listed in the table below (the "Re" refers to the number in previous submission. Comments on a drawing should be reflected on all drawings.

No.	Re	Comment
2.1	-	<p><i>Section 3.4</i></p> <p><i>The Quaternary geology mapping which is provided in Appendix A of the report suggests there is a small area of till found at surface at the southern portion of the site. A number of test pits in the south western portion of the site did not encounter sand and gravel, but found till from the surface to the bottom of the test pit. There are no monitoring wells completed in the overburden materials.</i></p> <p><i>Although observations during test pitting and borehole drilling indicated unsaturated conditions in the overburden, it would be prudent to install a number of monitoring wells in the areas of surficial till in order to confirm that there is not an overburden water table. In addition, additional investigations in areas of surficial till may guide the proponent in their plans for extraction and may also be a suitable area to construct a wash pond given the fine grained materials.</i></p> <p>The WSC response is satisfactory.</p>

No.	Re	Comment
2.2	-	<p>Section 3.7 Private Water Wells</p> <p><i>GSC provided a map showing the location of private water wells within 500 m of the site based on information obtained from the Ministry of Environment (MOE) on-line database. The information from the MOE well records indicates that the majority of the wells in the area obtain their supplies from the bedrock and that most of the wells are located up-gradient of the proposed pit.</i></p> <p><i>Although the documentation indicates that the wells are up-gradient of the proposed pit and the above water table extraction should not cause any issues, it is Burnside's recommendation that GSC conduct a door to door survey of wells in order to establish pre-extraction water quality and quantity. The door to door survey may also identify shallow dug wells that do not show up in the MOE water well record database. The door to door survey will provide protection for both the proponent and homeowners in the event that there is an issue with a well in the future. In addition, the information may prove useful in the event that a PTTW is required for washing operations at the site.</i></p> <p>It is our understanding that a note has been added to the site plan indicating that a door to door survey will be required as part of any Permit to Take Water application which will likely be required for the supply of water to the wash pond. R.J. Burnside & Associates Limited (Burnside) continues to recommend that the survey be completed prior to any significant site work taking place in order to document pre-extraction conditions that can be used in the resolution of any well interference complaint that may arise.</p>
2.3	-	<p>Section 3.8 Aggregate Resource Assessment</p> <p><i>GSC indicates that at 11 locations fine grained (e.g., Wentworth Tills) materials occurred at surface and extended to depth (or bedrock). It would be prudent to provide better definition of areas where there are no sand and gravel resources as these may be appropriate locations to construct a wash water pond. This would be preferable to constructing a pond directly on the bedrock surface where there will be limited protection provided to the underlying aquifer. Burnside recommends that the extent of the till be better defined by excavating additional test pits or advancing additional boreholes. The information should then be used to provide an updated bedrock topography map for the pit and a map showing the till thickness. This will assist the proponent in selecting the best area for establishing a wash pond and refueling area. Additionally, the till material may be suitable for use in pit rehabilitation and the additional information will assist in refining the volume of material present.</i></p> <p>We are satisfied with the WSC response.</p>
2.4	-	<p>Section 4.2 Water Level Monitoring</p> <p><i>GSC installed 3 monitoring wells on the site and also utilized an existing well (the barn well) to obtain water level measurements on six occasions. The measurements indicated that the water table was found at depths below the</i></p>

No.	Re	Comment
		<p><i>bedrock surface ranging from 2.82 m at BH1 to 6.3 m at BH3. As a result, it appears that the water table is found within the underlying bedrock. Burnside recommends that water level data collected during the spring of 2014 be used as water levels should be at their peak following the spring snowmelt. GSC indicates that all elevations are relative to an assumed ground elevation of 318.0 masl at BH3. Burnside recommends that a geodetic benchmark be established at the site since the ground surface may change as operations at the site proceed.</i></p> <p><i>As indicated previously, Burnside recommends that additional monitoring wells be installed in areas where there was till encountered from surface to the bedrock in order to see if these areas have a localized water table in the overburden and also whether they would be suitable for leaving in place to facilitate the construction of a wash water pond.</i></p> <p>A geodetic survey was completed and high water levels collected in May 2014 are within 1.5 m of the water table at BH1 and are 1.65 m above the water table at BH2. It is our understanding that appropriate adjustments to the proposed maximum extraction elevations have been made on the site plan. Burnside recommends that water level monitoring using data loggers continue to be used to revise the extraction depths should higher water levels be observed.</p>
2.5	-	<p><i>Proposed Extraction</i></p> <p><i>GSC indicates that the extraction plan is referenced on the site plan. However, since the water table is in the bedrock the general plan is to extract gravel to a maximum depth corresponding to the bedrock surface and remaining 1.5 m above the established groundwater table. Rehabilitation will include replacing topsoil once extraction is completed in order to return the site to agricultural use post extraction. Additionally, GSC indicates that the aggregate processing will include washing activities which is anticipated to require a separate application for a permit to take water from the MOE. GSC also indicates that fuel storage and equipment maintenance will occur on site.</i></p> <p><i>Burnside recommends that the area with till material between surface and the underlying bedrock be considered as the location for wash ponds in order to provide some protection to the underlying bedrock aquifer. In addition, since the land use will be returning from industrial to agricultural use (the most sensitive land use), a Record of Site Condition should be provided by the proponent prior to the surrendering of the license. Since extraction to the bedrock surface is proposed, the proponent will need to provide more detail on how much material will be required to provide a suitable thickness of overburden to support agricultural operations. Similarly, the extraction will result in exposed bedrock which will be susceptible to impacts from anthropogenic activities. As a result, Burnside recommends that equipment refueling should be done on a concrete pad which has provisions for spill collection.</i></p>

No.	Re	Comment
		<p>Given that the Harrington McAvan Ltd. Letter of January 13, 2016 recommends that a minimum depth of 500 m of overburden and 150 mm of topsoil be replaced at the final elevation of the base of the quarry, Burnside recommends that the proponent confirm that this volume of material is available on site. If not, the methodology to be used to confirm that the material meets the applicable soil quality (O.Reg. 153/04 as amended by O.Reg. 511/09) for agricultural use needs to be specified.</p>
2.6	-	<p><i>Section 7.1 Monitoring Plan</i></p> <p><i>GSC proposes that water level measurements shall be obtained at the existing on-site monitoring well locations BH1, BH2, BH3, and Barn Well on a monthly basis for one year with subsequent water level measurements obtained on a quarterly basis at existing on site well locations BH1, BH2, BH3 and Barn Well during the first 3 years of extraction operations. GSC also indicates that the barn well is within the proposed extraction area and should be abandoned in accordance with the applicable regulations if it is not to be utilized as a monitor or water supply well. At the end of the 3 years of monitoring the data should be summarized in a report provided to the MNR. The monitoring program should be discontinued if no groundwater impacts are observed after 3 years.</i></p> <p><i>Burnside concurs with the proposed monitoring plan, but recommends that some additional overburden wells be installed. Although no impacts to existing domestic wells are expected, Burnside recommends that a pre-extraction well survey be completed to establish baseline water quality/quantity.</i></p> <p>Burnside is in agreement with the current monitoring program proposed by WSC. It is our understanding that a wash pond will be required for the operation and that the required volumes of water will necessitate that the proponent obtain a permit to take water (PTTW) from the MOECC. The current monitoring program will need to be reviewed as part of the PTTW process.</p>

Yours truly,

R.J. Burnside & Associates Limited



Dave Hopkins, P.Geo.
Senior Hydrogeologist
DH:sd

cc: Ms. Meaghan Reid, Township of Guelph/Eramosa (enc.) (Via: Email)
Mr. Dan Currie, MHBC Planning (enc.) (Via: Email)
Ms. Emily Elliott, MHBC Planning (enc.) (Via: Email)