

## MEMORANDUM

File No. SI BR SB C1 190

TO: Kimberly Pietz, Senior Environmental Officer  
Owen Sound District Office

FROM: Bruce Harman, P.Geo.  
Southwestern Region

DATE: November 25, 2022

RE: Bury Road Quarry, Bruce Peninsula Stone Ltd.,  
ARA Class A Quarry (below water) Application,  
Technical Support Section: Groundwater Comments  
ECHO Ref. No. 1-134019926

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As per the *Memorandum of Understanding* (MOU) dated May 2008, between the Ministry of Natural Resources and Forestry (now Northern Development, Mines, Natural Resources and Forestry) and the Ministry of the Environment, Conservation and Parks (MECP), and the recent changes to *Ontario Regulation 244/97* and the *Aggregates Resource of Ontario Standards* (August 2020), our ministry has completed a review of the Aggregates Resources Act (ARA) application package for the following quarry:

The Bury Road Quarry  
Lot 4, Concession 1, EBR  
Township of South Bruce Peninsula (formerly Township of Albemarle)  
County of Bruce, Ontario

The application for The Bury Road Quarry is for a Class A dimension stone quarry with a proposed annual tonnage of 50,000 tonnes. The operator, Bruce Peninsula Stone Ltd., proposes to license 40.04 hectares of which 26.5 hectares are planned for extraction. Extraction is to occur below the maximum predicted water table to a depth of the permanent or "low" water table elevation. Future quarrying of the rock is reported to be dynamic in the unsaturated zone and will remain above the water table encountered. There is to be no dewatering or water diversion, as a part of site operations. For perspective, the depth of excavation is projected to range from 1.4 to 2.2 metres below the top of the target dimension stone across the site.

The rock to be mined is an ornamental dolostone of the Guelph Formation known as the Eramosa Member, that is located at or near ground surface on site. It has been reported that no blasting will occur at this quarry location. Mining reportedly will be by way of rock saw and or pneumatically. Excavations are not to proceed past any depth where water enters the excavation during any season. The report's operational plan states, should water enter an excavation the water level is to be noted and adjacent excavations stopped approximately 0.3 metres above the current water level.

Following all operating seasons (low water) the quarry floor is anticipated to naturally flood with seasonal high water. The site property has been geologically and hydrogeologically characterized by way of 5 borehole/monitoring wells and 3 shallow monitors.

The role of the MECP is to assess potential impacts from the proposed operations to drinking water resources and local domestic wells, as a part of the impact to the groundwater system in general. It is also the role of the MECP to assess potential impacts to nearby surface water features (i.e., wetlands, ponds, lakes, rivers). Potential impacts, if any, are assessed to ensure that adverse impacts to supplies and the quality and flow of receiving water bodies are mitigated.

As part of this review and as per the MOU, our ministry must ensure that appropriate geoscience principles were applied by the consultant to come to the presented conclusions, including:

- a reasonable geological model was used; proper and acceptable procedures and assumptions were employed;
- sufficient field work (including mapping, drilling, excavations, pump testing etc.) was conducted;
- proper use of numerical modeling (if applicable); and,
- that a comprehensive well survey was conducted in such a manner that a solid understanding of aquifer use, vulnerability, and connectivity to the site has been generated.

The following comments were generated from review of documents submitted to the MECP, as listed immediately below in support of the ARA application, as received by our ministry on September 29, 2022.

1. *Application for an Aggregate License, Aggregate Permit or Wayside Permit under the Aggregates Resources Act for a Class A quarry at Lot 4, Concession 1, EBR, Town of South Bruce Peninsula, signed by Eric Shouldice, and dated April 4, 2022.*
2. *Public Notice of Application made under the Aggregates Resources Act by Bruce Peninsula Stone Ltd.*
3. *Summary Statement and Planning Analysis under the Aggregates Resources Act for Proposed Quarry Below the Maximum Predicted Water Table (The Bury Road Quarry), Lot 4, Concession 1, EBR, Town of South Bruce Peninsula, Bruce County, prepared by Cuesta Planning Consultants Inc. and dated June 2022.*
4. *Aggregates Resources Act Site Plans dated June 29, 2022, as prepared by GM BluePlan Engineering Limited.*
5. *Water Report and Hydrogeological Study, Proposed Class "A" Quarry, Lot 4, Concession 1, Albemarle, Town of South Bruce Peninsula, Bruce Peninsula Stone Ltd. as prepared for Bruce Peninsula Stone Ltd. by GM BluePlan Engineering Limited and dated October 2021.*

The Bury Road Quarry proposal has been characterized as a Below Water quarry even though technically there will be no excavating activity below the groundwater table.

Quarries that are characterized as Above Water quarry operations must maintain a 2 metre buffer or excavation setback over the property's high groundwater table. Given the 2 metre buffer, Above Water quarries are not required by the ARA to submit detailed technical reports on hydrogeology due to less environmental concern.

Conversely, quarry applications characterized as a Below Water quarry are required to submit detailed technical hydrogeological assessment reports that address the potential for adverse effect to groundwater resources. A Below Water quarry is defined as any quarry that mines below the 2 metre buffer above the high groundwater level.

While the Bury Road Quarry proposal is reported not to excavate below the low seasonal groundwater table, it will excavate into the 2 metre buffer reserved for Above Water quarries, thereby elevating the level of scrutiny and required investigation to that of a Below Water quarry.

A quarry proposal such as the Bury Road Quarry is an indication of the value of the aggregate resource that exists on site. As noted, this is the ornamental dolostone of the Eramosa Member.

In fulfillment of the ARA technical reporting requirement for a Below Water Quarry, the Bury Road Quarry application has included as supporting documentation the report *Water Report and Hydrogeological Study, Proposed Class "A" Quarry, Lot 4, Concession 1, Albemarle, Town of South Bruce Peninsula, Bruce Peninsula Stone Ltd.*

It is my opinion this document is adequate in providing the necessary preliminary hydrogeological evaluation and geoscientific principles in the assessment of potential for adverse effects from quarry activity to groundwater and surface water resources and respective uses.

The primary focus of this review has been on the *Water Report and Hydrogeological Study*. The reported findings from the proposed below water operation are as follows.

- The site is reported to contain an area of glaciolacustrine deposits in the southwest portion of the property of between 0.5 m to 1.3 m in depth, with shallow or outcropping Paleozoic bedrock (Eramosa) across the balance of the property.
- A drainage ditch onsite extends from the northeast to the southwest towards the Ashcroft Drain located 250 m from the property, which in turn flows west to Sucker Creek. It is reported the

drainage ditch is only observed to flow during high water events and is dry the majority of the year.

- The property area in the vicinity of the drainage ditch and the central portion of the property have been classified as *Environmental Hazard Lands* under *Schedule A* of the *Bruce County Official Plan* and is therefore not included within the proposed quarrying area. The report has concluded the drainage ditch and downgradient water features are at low risk for adverse impact due to a 15 metre lateral quarry setback and that quarrying operations will only occur during periods of low groundwater in the summer and fall months, during the timeframe when the drainage ditch is typically dry.
- A portion of the central property has been identified as Karst topography under *Schedule C* of the *Bruce County Official Plan*. It is to be noted this Karst area is within the proposed area to be excavated. An assessment of the Karst features was reportedly conducted by the consultant. It was reported that none of the Karst features were observed to be hydraulically active during the site visit at the time of high groundwater elevations and therefore were not deemed to be an environmental concern due to future quarrying.
- Water level data loggers were installed in monitoring wells MW2, MW4 and MW5 on June 4, 2019. Water level monitoring has occurred, including manual recordings, since May 1, 2018, approximately 3 years. Based on the water level elevations measured, the groundwater flow direction within the bedrock is to the southwest. March 19, 2019 was deemed representative of a typical high water elevation. August 29, 2019 was deemed representative of a typical low water elevation. The maximum depth of the quarry during low water was estimated at 194.9 masl to the northeast and 192.8 masl to the southwest.
- It is important to note the data loggers recorded high water level spikes which were reportedly associated with brief periods of flooding after significant rainfall events. This phenomenon is discussed later as related to a possible point of concern during rock sawing activity.
- A review of the MECP Water Well Information System for water well records within 500 metres of the site was conducted. A door to door well survey was also conducted between February 26 and April 16, 2019. Six local water wells were located and assessed for well characteristics and the potential for quarry related impacts. Based on the proposed extraction plan within unsaturated bedrock, the report concluded it was reasonable to expect the proposed quarry operation would not negatively impact the groundwater resource supplying the local residences in the area.
- The proposed bottom contours of the quarry are reported to prevent alteration to the groundwater regime flowing to the southwest. As groundwater will not be dewatered, diverted or altered during the quarry process, the overall water budget before and after quarry development is reportedly not expected to change.

Based on the review of the supporting documentation for this Below Water ARA application, it is the opinion of the MECP that appropriate geoscience principles were applied, reasonable geological modeling, procedures and assumptions were employed for this property. Adequate field work was conducted from which to base the final conclusions and that a door-to-door water well survey was conducted from February 26 to April 16, 2019.

The undersigned concurs with the reported conclusion that no proposed on-site activities are recognized as threats to the drinking water of local water supply wells, provided extraction only extends to depths associated with the permanent (low) water table elevation, as proposed.

I further concur with the recommendations as presented for mitigations and monitoring, however, I submit the following points for consideration.

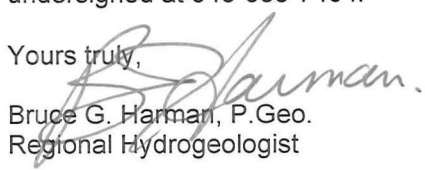
1. Standard ARA protocols and best management practices, related to spills prevention and contingencies should be employed.
2. No dewatering shall occur over 50,000 L/day without a PTTW and subsequent Category 3 scientific investigation, should quarry operations experience delays resulting from elevated seasonal water due to a late spring or early fall.
3. Karst openings have been shown to be present on site at ground surface. It is possible additional karst topography will be encountered once topsoil clearing occurs. Karst topography has very low self purification capabilities of a flow of water into and through a karstic environment. While quarrying is only proposed to occur during "low" water, it has been reported that recorded high water level spikes were associated with brief periods of flooding after significant rainfall events during this time.

As such, consideration should be given to the mitigation of the potential for isolated storm events flooding the quarry floor and mobilizing fine-grained silt/clay particles, and more specifically, accumulated rock saw dust and transporting such material rapidly into and throughout the karstic groundwater regime.

To summarize, the MECP accepts the conclusions and recommendations, as presented in the supporting documentation for the Bury Road Quarry, with the exceptions noted, and therefore does not object to this proposed below water quarry undertaking, as it has been described.

If you should have any questions pertaining to the comments above, please do not hesitate to contact the undersigned at 548-388-7404.

Yours truly,

  
Bruce G. Harman, P.Geo.  
Regional Hydrogeologist