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MEMORANDUM

Date: January 30, 2024

To: Christelle Broux
Senior Environmental Officer
Halton Peel District Office, MECP

NDACT Peer Reviewer Notes
Strada Jan 31, 2025 Application

From: Lisai Shen
Surface Water Specialist
Technical Support Section, Central Region, MECP

RE: **Surface Water Review: CBM Caledon Pit/Quarry ARA Application**
Aggregate Resources Act Application # 626600
St. Mary's Cement Inc. – CBM Caledon Pit/Quarry
Aggregate Licence for a Pit/Quarry Below the Ground Water Table
Lot 14, 15, 16, 17, 18, Concession 3, 4, Geographic Township of Caledon
Town of Caledon, Regional Municipality of Peel

5th Line to Provincial Fishing Area

The Ministry of Environment, Conservation and Parks (MECP) has completed a surface water review of the above noted application. Documents reviewed were downloaded from CBM Caledon Quarry website (cbmcaledonquarry.ca). It should be noted that the scope of this review and the comments provided below are associated with surface water features only. The Ministry will be providing a groundwater review for the proposed application under a separate memorandum.

Documents Reviewed

1. Caledon Pit and Quarry Site Plan, MHBC, August 2023
2. Water Report Level 1-2, Proposed Caledon Pit/Quarry, Golder, December 2022 (Revised July 2023)
3. Natural Environment Report, Proposed Caledon Pit/Quarry, Golder, December 2022 (Revised July 2023)

Purpose of MECP's Review

The purpose of the Ministry's review during the Aggregate Resources Act (ARA) application stage is to identify any potential impacts on surface water resources from the proposed application. When a below-the-groundwater-table license is required, the proponent may need to obtain a Permit to Take Water (PTTW) and an Environmental Compliance Approval (ECA) from the Ministry to facilitate dewatering and discharge. In these instances, a detailed and comprehensive evaluation of the proposed water taking and discharge will be undertaken by the Ministry.

Anticipate in Application

Given that a detailed review of the water management will be undertaken in the future, the focus of our current review is to identify to the extent possible, any issues which require further consideration at this stage. It should also be noted that these comments are in no way a rejection or acceptance of future PTTW or ECA applications, and additional information may be required under separate ministry permits and approvals.

The following comments refer to Water Report Level 1-2 (Golder, revised July 2023)

Comments:

Aug 16, 2024 to Feb 2025

1. According to Section 6, surface water monitoring data used in the analysis was from May 2020 to the end of 2021. This monitoring period is relatively short and may not fully reflect variabilities and extreme conditions with surface water features. It is recommended that baseline monitoring continue to ensure monitoring data is sufficiently representative of long-term variability in surface water.

No Water Balance

2. According to Section 7, surface water balance was assessed on an average annual basis. It is recommended to further explore this assessment by month/season. A seasonal analysis may better address any surface water concerns such as those associated with excess or low water.

Not undertaken

3. According to Section 8, modelling simulations indicate possible groundwater drawdown during phases 4 to 7, and potential impacts might extend offsite. For additional clarification, please provide this information without the use of proposed mitigation measures to understand worst case scenario.

Technical Description Required

4. According to Section 8.2 and Appendix S, proposed mitigation measures consist of an infiltration trench and slurry wall/grout zone. It is recommended to provide additional examples of how these mitigation measures have worked in similar situations. Any potential issues with these measures and how such issues will be addressed should also be included in the discussion.

Strada Issue

5. Section 9.1.1 predicted average flow changes at surface water stations based on modelling simulations presented in Section 8. Table 9-2 indicates differences between simulated flow and measured flow for a number of stations. For example, simulated flow at SW8 is ten times higher than measured flow. Improvements in the model as a predictive tool may be required.

Not Demonstrated

6. As part of the application process, the proponent is required to demonstrate that no negative impacts are expected to water quantity and quality in this area, and to existing approved water taking operations. Aquaterra (a permit holder in the area) has raised concerns with the proposed application. The Ministry requests that these concerns be addressed to ensure changes with groundwater level and water quality in this area do not impact existing water taking operations.

Fish Population Study Required 4th Line to Provincial Fishing Area

7. As part of the application process, the proponent is required to demonstrate that the proposed application will have no negative impacts on small streams and fish habitat near the escarpment face, to the south of the proposed pit/quarry. These tributaries of the Credit River are mainly fed by spring and groundwater and are known to host sensitive cold water fish (Brook Trout). It is recommended that seasonal changes and thermal impacts be included in the assessment.

Water Management Plan Required

8. The Water Management and Discharge Plan identifies that the main offsite discharge would be directed to the Osprey Valley Golf Course (OVGC) on the northeast side of the proposed site. Please note a detailed study of water movement on OVGC property, including capacity and connection of the ponds and a quantitative analysis will be required during the PTTW and/or ECA stage. This will ensure that any thermal and other impacts which require mitigation, will be addressed prior to additional water being discharged into the Credit River via the OVGC property. Please note this discharge proposal may also require an amendment to existing PTTW and/or ECA held by OVGC.

Please feel free to contact me should you have any question.

Lisai Shen
Surface Water Specialist,
Central Region, MECP

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M E M O R A N D U M

Date: February 21, 2024

To: Christelle Broux
Senior Environmental Officer
Halton Peel District Office, MECP

NDACT Peer Reviewer Notes
Strada Jan 31, 2025 Application

From: Maria Picotti
Hydrogeologist
Technical Support Section, MECP

RE: **Groundwater Review**: **CBM Caledon Pit/Quarry ARA Application**
Aggregate Resources Act Application # 626600
St. Mary's Cement Inc. – CBM Caledon Pit/Quarry
Aggregate Licence for a Pit/Quarry Below the Ground Water Table
Lot 14, 15, 16, 17, 18, Concession 3, 4, Geographic Township of Caledon
Town of Caledon, Regional Municipality of Peel
ECHO no. 1-234418384

Introduction

CBM Aggregates (CBM), a division of St. Marys Cement Inc. (Canada) has applied to the Ministry of Natural Resources and Forestry for a Class A Licence (**Pit and Quarry Below Water**) and to the Town of Caledon for an Official Plan and Zoning By-law Amendment to permit a new mineral aggregate operation. CBM holds approximately 323 ha of land in the vicinity of Regional Road 24 (Charleston Sideroad) and Regional Road 136 (Main Street) in the Town of Caledon. Approximately 261 ha of these lands are to be licensed and zoned as aggregate resource area. The licence would allow the removal of surficial aggregate followed by quarrying of the bedrock below the water table on approximately 200 ha of the 261 ha of licenced land. The proposed lands include Part of Lots 15 to 18, Concession 4 WSCR and Part of Lot 16, Concession 3 WSCR (former Geographic Township of Caledon), Regional Municipality of Peel

Documents Reviewed

1. Golder, 2023a. Water Report Level 1/2 Proposed Caledon Pit/Quarry. Golder Associates Ltd., signed by Craig DeVito, P.Eng., Paul Menkveld, MSc, EIT, Kevin Mackenzie, P.Eng. and George Schneider, P.Geo. and dated December 2020 (Revised July 2023)
2. MHBC, 2023. Aggregate Resources Act (ARA) Site Plans, Drawings 1 to 4. MacNaughton Hermsen Britton Clarkson Planning Limited and dated August 2023
3. Golder, 2023b. Natural Environment Report Proposed Caledon Pit/Quarry. Golder Associates Ltd., signed by Amber Sabourin, HBSc and Heather Melcher, MSc and dated December 16, 2022 (Revised July 2023)

The following documents were also considered as part of this review:

4. Letter "Comments in Opposition to the Proposed St. Marys Cement, Inc. Caledon Pit/Quarry Class A License Application #626600". Primo Water North America, signed by Louis Vittorio and dated November 20, 2023 (addressed to the applicant and copied to review agencies)
5. Letter "St. Marys Cement Inc. (Canada) – Proposed Caledon Pit/Quarry Aggregate Resources Act Licence Application – Class A Licence #626600 Part of Lots 14-18, Concessions 3 & 4, Town of Caledon". Niagara Escarpment Commission, signed by Sandy Dobbyn and dated November 20, 2023 (addressed to the applicant and copied to review agencies)
6. Letter "Aggregate Resources Act Application #626600 St. Mary's Cement Inc. – Caledon Pit/Quarry Aggregate Licence for a Pit/Quarry Below the Ground Water Table Maximum Annual Tonnage Limit 2,500,000 Tonnes Lot 14, 15, 16, 17, 18, Concession 3, 4 Geographic Township of Caledon, Regional Municipality of Peel". Ministry of Natural Resources and Forestry, signed by Carla Riche and dated November 20, 2023 (addressed to the applicant and copied to review agencies)

Purpose of MECP's Review

Horning's Mills Dolostone Shale Contact

The purpose of the Ministry's review during the Aggregate Resources Act (ARA) application stage is to identify, to the extent possible and based on the information provided, any potential impacts on groundwater resources from the proposed application that are within our mandated responsibility. This memorandum specifically focuses on water supply wells and groundwater resources. The ministry will also consider the level of detail provided by the proponent in their assessment of potential impacts. This will help ensure that adverse impacts to drinking water supplies, groundwater resources and the quality and flow of receiving water bodies are mitigated.

Anticipate now

Since detailed reviews of the water taking and discharge will be undertaken by this ministry in the future (should the aggregate licence approval be granted), the comments offered at this stage are not a rejection or acceptance of future applications for a Permit to Take Water (PTTW) or an Environmental Compliance Approval (ECA). Additional comments and/or concerns may be further addressed during the PTTW and ECA application and review process.

Background

The Site is located on mainly agricultural lands with rural residential, tree plantations, golf course and aggregate extraction uses in the surrounding area. The main topographic feature in the area is the Niagara Escarpment to the east of the Site and hilly terrain with a topographic high in the northwest to a low in the southeast. The Credit River located east of the Site follows the surficial topography and flows southerly.

Strada 70 m

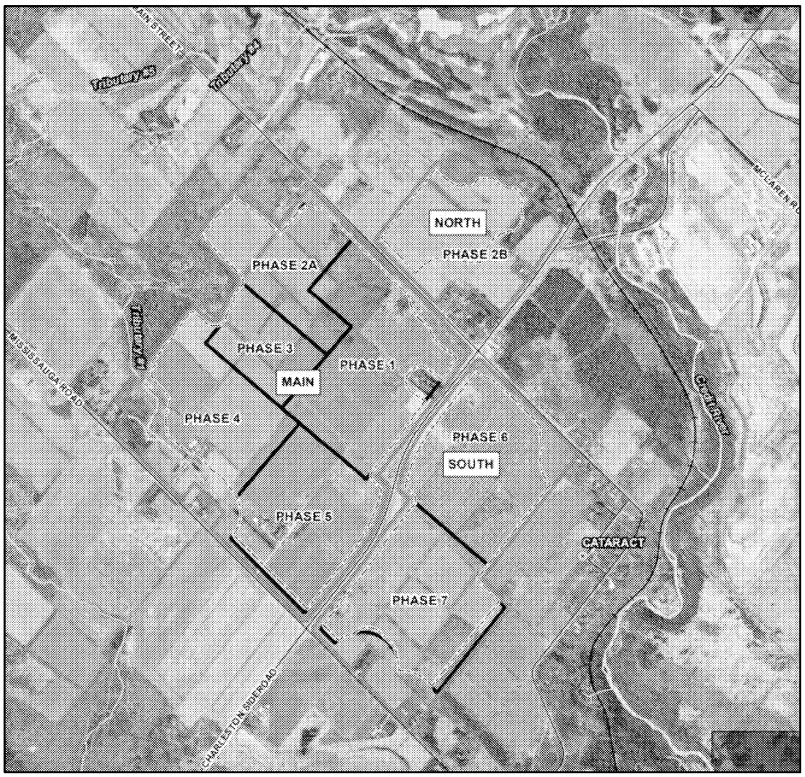
As shown in Figure 1 and noted in the Operational Plan (ARA Drawing No. 2 of 4), if approved, extraction of sand, gravel and bedrock below the water table would occur in three main areas over eight phases to depths of up to +30m. Aggregate extraction operations would begin in the Main Area, followed by the North Area and end

in the South Area. On-site operations would include a permanent processing plant (crushing, screening and wash plant) in the Main Area and an aggregate recycling area with access from Regional Road 24. A portable processing plant is proposed in the South Area. Extracted aggregate in the South Area would be moved to the Main Area through a proposed tunnel beneath Charleston Sideroad. See Figure 1.

Pressure Relief

Dewatering/depressurization will be required since below water table aggregate extraction is proposed. Lowering the quarry floor will influence the overburden and bedrock groundwater system. This will require a Permit to Take Water to permit dewatering from one or more sumps on the quarry floor. As a result, a groundwater mitigation system is proposed during Phases 4 to 7 to address the groundwater levels. The proposed mitigation system consists of several groundwater infiltration trenches and slurry wall/grout zone intended to sustain groundwater levels beyond the Site boundaries during operations. An Environmental Compliance Approval (ECA) would also be required for the proposed aggregate washing system and infiltration trenches.

Figure 1: Operational Phases



Source: Golder 2023a, Figure 2-1.

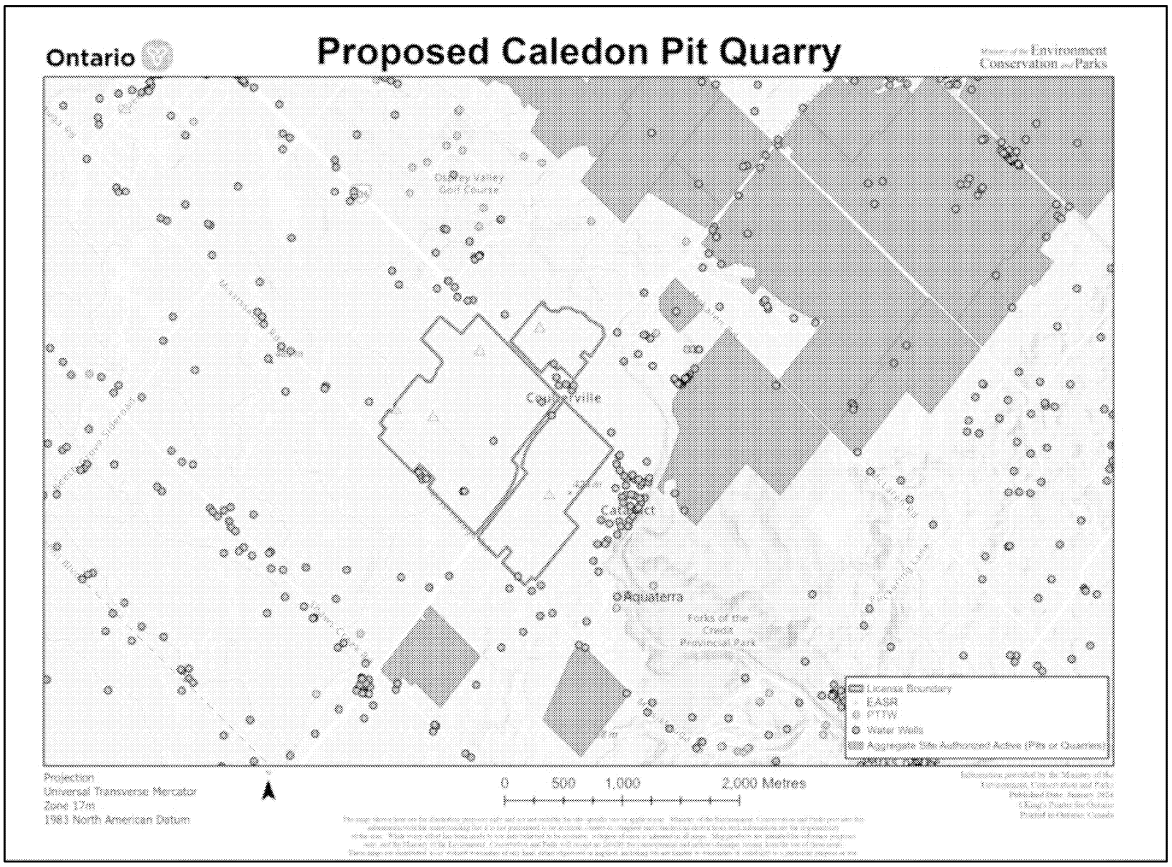
Groundwater Resources

Horning's Mills

Figure 2 shows the location of existing wells, large water takings and authorized aggregate extraction sites in the area. The area is not serviced with municipal water and residents rely on private water supply wells. There are many wells within the Hamlet of Cataract, Hamlet of Coulterville and along Mississauga Road and Regional Road 136. Large water takings in the area consist of Environmental Activity Sector Registers (EASRs) and Permits to Take Water (PTTW). Several EASRs were registered on the Site for temporary water takings as part of the field investigations. Although many PTTWs are shown in Figure 2, there are only two active water takers within approximately 1km of the Site. Osprey Valley Golf Course is located northeast of the Site and takes water from several sources including a bedrock well, the Credit River and two irrigation ponds. Aquaterra Corporation

located south of the Site takes water from one overburden well for bottled water. The locations of authorized aggregate operators in the area are also shown in Figure 2 which Golder (2023a) report noted that all are operating as pits.

Figure 2 Area Features



Comments

1. According to Section 3.8 (Golder, 2023a), most wells rely on the overburden aquifer and Gasport bedrock formations for their water supplies. These are the formations which have the greatest potential for significant groundwater quality and quantity impacts, based on the proposed depth of aggregate extractions. It is recommended that additional characterization of the upper weathered bedrock and overlying overburden along the South Area of the Site be undertaken to further assess the effect of dewatering at the Site on down-gradient water supplies.

Epikarst Identify these monitors

2. According to Section 3.8.2 (Golder 2023a), the completed water well surveys provide only minimal information. The Ministry strongly supports the proponents' intention to complete additional door-to-door well surveys. This would identify any additional older water supply wells within the study area which may not be registered in the Ministry's Water Well Information System. It is recommended the survey be completed as a door knocking campaign with the well owner interviewed. Water samples with the permission of the owner should also be collected to provide a baseline for water quality. Additionally, permission from selected well owners to install water level loggers in several private wells to assess baseline water levels and measure seasonal water level variations would be beneficial.

WELLness Survey

3. Section 4.3.3 (Golder 2023a) included two geological cross-sections through the Site. However, there is no north-south cross-section for the North Area and no east-west cross-section for the South Area. Limited characterization of overburden conditions on the Site, particularly the southern portion may impact the model results. It is recommended additional hydrostratigraphic cross-sections be prepared for each Phase of the Site and the five areas circled below in Map 2. As a minimum, the cross-sections should include well depths, proposed final quarry floor elevations, boreholes etc. Additional details regarding the flow characteristics through these areas are required to better assess potential impacts.

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Map 2 Additional cross-sections

Source: Golder (2023a), Figure 3-4.

4. Sections 5.1 and 5.5 (Golder 2023a) indicate five (5) overburden monitoring wells were used to characterize hydrogeologic conditions. This provides only a limited characterization of overburden conditions on the Site which potentially may impact the model results. It is recommended that additional characterization of overburden conditions be completed due to the thicker overburden conditions in the southern portion of the Site and down-gradient overburden water supply wells. The installation of additional monitoring wells in the South Area will better help assess groundwater flow conditions in this area.

Not Applicable?

5. According to Section 5.3 (Golder 2023a), groundwater level monitoring was completed from June 2020 to the end of 2021. There is a high degree of uncertainty with the quality and quantity of some of the data used in the model to predict the impacts. Some simulations appear to estimate or under-estimate water level and gradients (negative vs. positive values). As a result, conclusions presented in the modelled simulations and the overall effectiveness as a predictive tool are questionable. It is recommended additional data be incorporated into the modelling to improve the accuracy of the simulations and to better assess seasonal trends, potential impacts and to effectively evaluate the proposed mitigation measures.

Only 3 months monitoring available for Strada Deep Gasport Wells (Model?)

Incomplete

6. Section 5.7 (Golder 2023a) provided a general description of the groundwater quality on the Site and within the Study area. It is recommended that additional characterisation/description of existing groundwater quality within each of the aquifer formations (overburden, Gasport Bedrock Formation, Below the Gasport Bedrock Formation and the Gasport and Lower Bedrock Formations) be provided.

Pressure Relief Wells easier to defend?

7. According to Section 8.2 and Appendix S (Golder 2023a), the proposed groundwater mitigation measures consist of a slurry wall/grout zones and infiltration trenches. Given the complex geologic conditions, adjacent water wells, sensitive environmental setting of the subject lands and scale of project, additional examples of how these mitigation measures have worked in similar situations is recommended. Any potential issues with these measures and how such issues will be addressed should also be included in the discussion.

Not Applicable?

8. According to Section 8.2 (Golder 2023a), groundwater mitigation measures are proposed along a portion of the west and south boundaries of the Site. Based on the proposed depths of aggregate extraction, varying amounts of drawdown are expected to the north, east and south of the Site. Please provide additional information why mitigation measures were not proposed for these areas where existing well water supplies could be impacted and/or groundwater discharge areas have been identified.

Need to defend

9. According to Section 8.2 and Appendix S1 (Golder 2023a), the consultant provided details regarding the construction and operation of the proposed groundwater mitigation measures. It is unclear if the system could sustain the necessary hydraulic head for the mitigation measures to function properly over time. Please consider the possibility that the short-circuit inflow between the infiltration trenches and the pit/quarry could enlarge the fractures due to carbonate dissolution and decrease the necessary hydraulic head. Please provide additional details regarding the efficiency of the injection trenches over time.

No worst case scenario

Only partial in flawed model

10. According to Section 9 (Golder 2023a), modelling simulations indicate possible groundwater drawdown during Phases 4 to 7 and potential impacts might extend off-site. The extent and level of impacts were described in very general terms. Please provide the results of the simulations without the use of proposed mitigation measures to understand the worst-case scenario. As a minimum, additional modelling simulations should be prepared for each Phase which clearly show the lateral and vertical extent of drawdown within the aquifer formations (overburden, Gasport Bedrock Formation, Below the Gasport Bedrock Formation and the Gasport and Lower Bedrock Formations) both with and without mitigation measures. It is recommended that specific values regarding maximum drawdown (metres) and extent of the zone of influence (metres) should be clearly presented in a table format for both with and without mitigation measures. This data should also be clearly presented in a table format.

Horning's Mills Dolostone/ Cabot Head Shale

11. According to Section 9.3 (Golder 2023a), the water supplies of fifteen (15) private wells could be impacted even with the implementation of groundwater mitigation measures. It is possible this value is under-estimated i.e., if the predicted maximum drawdown is in addition to the seasonal fluctuation of 2 to 3 metres or limited efficiency of proposed mitigation measures. Please provide additional clarification of data presented in Table S-1 (i.e., negative values/artesian vs. positive values/drawdown, maximum drawdown of 5.85m).

12. Section 9.3.2 (Golder 2023a) outlined a Water Well Complaint Response Plan for responding to well interference complaints. It is recommended the Plan also incorporate timing within all response and contingency measures, such as notification of appropriate Regulatory authorities related to well

interference complaints. In addition, the proposed mitigation measures such as deepening a well, widening a well and relocating a well on a property must comply with the Ministry's applicable regulations such as Ontario Regulation 903: Wells. Please note, the Ministry will not accept the installation of a cistern as a long-term mitigative measure in the event the quality and/or quantity of an existing water supply well is impacted.

Anticipate

13. According to Section 9.4 (Golder 2023a), the entire Site and Study Area is mapped as a Significant Groundwater Recharge Area (SGRA) and parts are identified as Highly Vulnerable Aquifer (HVA). No specific mitigation measures were presented to protect groundwater quality. There is a potential risk to groundwater quality from the migration of contaminants via multiple pathways across the Site due to the complex geologic conditions and proposed extraction operations. It is recommended additional information (i.e., groundwater travel times, how removal of unsaturated sand and gravel may alter the groundwater chemistry, spills mitigation plan etc.) be provided to assess the potential for the migration of contaminants to down-gradient private water supply wells, seeps/springs and the Credit River system.

Not addressed in Strada Jan 31, 2025 Application

14. According to Section 9.8 (Golder 2023a), the groundwater monitoring program must be capable of demonstrating that the proposed mitigation measures are effective. There are no overburden monitoring wells located within the South Area and only one overburden monitor located along the southwest property boundary. In addition, both on-site and off-site monitoring programs should include groundwater quality sampling representative of the hydrostratigraphic units. It is recommended a more comprehensive on-site and off-site monitoring program be developed to demonstrate that the mitigation program/infrastructure is effective in maintaining groundwater levels and groundwater quality.

See Peer Review Proposals

15. Please update the conclusions regarding potential impacts on water supply wells and groundwater/surface water systems based on any new information provided.

Note

Please contact me at 437-788-6051 or by e-mail at maria.picotti@ontario.ca if you have any questions.

Statement of Limitations

The purpose of the preceding review is to provide advice to the Ministry of the Environment, Conservation and Parks regarding subsurface conditions based on a review of the information provided in the above referenced documents. The conclusions, opinions and recommendations of the reviewer are based on information provided by others, except where otherwise specifically noted. The Ministry cannot guarantee that the information that has been provided by others is accurate or complete. A lack of specific comment by the reviewer is not to be construed as endorsing the content or views expressed in the reviewed material.

Original signed by

Maria Picotti, P.Geo.
Hydrogeologist

Copy: Ted Belayneh, P.Geo., Supervisor, Water Unit, CRTS
Vincent Bulman, P.Geo., Supervisor, Halton Peel District Office