



**SENT BY MAIL AND FAX: (905) 521-7820**

November 30, 2006

Permit to Take Water Coordinator  
Ministry of the Environment, West Central Region  
119 King Street West, 12<sup>th</sup> Floor  
HAMILTON, Ontario  
L8P 4Y7

Dear PTTW Coordinator:

**Re: EBR # IA06E1293 – Permit to Take Water Application by  
St. Marys Cement Group  
Pilot Groundwater Recirculation System**

Conservation Halton staff have reviewed the Permit to Take Water Application as posted on the EBR registry (EBR # IA06E1293) and offer the following comments. In preparing this response staff have reviewed the following documents:

- PPTW application form
- “Revised Work plan for the Evaluation of Groundwater Recirculation System” (Gartner Lee Limited August 2006)
- Memo dated September 20, 2006 from David Charlton, Stantec Consulting Ltd. regarding the “Potential Effects Associated with Test Pit, Test Wells and Trench Establishment, Proposed St. Marys Flamborough Quarry”
- Memo dated September 27, 2006 from Stantec Consulting Ltd. regarding “Water Quality/Quantity Issues”
- Gartner Lee letter to MOE dated September 28, 2006
- Drawing #4 -Assumed Maximum Water Level in GRS Discharge Area
- Figure 1 - Trench Location  
[http://www.stopthequarry.ca/SMCGRS102006/Figure%201%20PTTW\\_Trench%20Location.pdf](http://www.stopthequarry.ca/SMCGRS102006/Figure%201%20PTTW_Trench%20Location.pdf)

Conservation Halton, pursuant to Ontario Regulation 162/06 (formerly Ontario Regulation 150/90), regulates development and infrastructure improvements within watercourses, valley systems, flood plains, wetlands and shorelines on a watershed basis. Ontario Regulation 162/06 requires that a permit be obtained from

Conservation Halton for any development within lands subject to flood and erosion hazards, interference with wetlands, and alterations to watercourses and shorelines. Staff note that portions of the St. Marys Cement property are regulated by Conservation Halton.

The Pilot Groundwater Recirculation System involves the creation of trenches/boreholes near the wetland limits, as well as a temporary discharge point (i.e. pipe discharging to plywood energy dissipation structure) placed adjacent to the wetland. These works will require approval from Conservation Halton as a result of the works' proximity to the regulation limit. Conservation Halton staff will need detailed plans of how the outlet will be designed and put in place (i.e. actual outlet details and details of access, sediment control, flow energy dissipation, and disturbance mitigation, etc.) in order to approve the proposed works.

Conservation Halton staff have serious concerns with respect to the proposed pilot project. The following areas of concern should be addressed prior to the issuance of a permit to take water and any construction or testing of the GRS system:

### **1. Downstream Flood and Erosion Concerns**

- a) The Stantec memo addresses this concern and concludes that:
  - The water levels in the creek will be approximately 5-7 cm higher than normal low flow rates.
  - They have also assessed the maximum water level that would be realized if all water were contained in the wetland to the north of the site, and have estimated that all flows (5.9 million litres/12.9 million gallons) would raise the wetland level by approximately 0.5 metres (assuming no outflow)
- b) Further, staff compared the maximum requested pumping rate (8,800 l/min) from the PTTW application to the typical low flow conditions in the stream and found that the peak discharge (147 l/s) is approximately 50% of the low flow discharge from the Mountsberg Reservoir (i.e. 10 cfs/ 283 l/s). Similarly, staff compared this discharge to the typical (monthly average) discharge at Carlisle, which ranges from 450 l/s in the mid summer to 2600 l/s in March and April. Therefore, staff conclude that the testing should not cause downstream flooding impacts.
- c) Notwithstanding this, staff understand that the quarry will be setting up a complaints protocol and will be monitoring the downstream conditions during the testing.
- d) It is questioned how the pumped water will be transferred to the creek? An overland flow pipe is mentioned on page 7 of the Gartner Lee report, however there is no mention of potential impacts to the vegetation in the area due to this movement of water? Mitigation measures must be in place to ensure that the discharge does not result in erosion of the creek banks or impact riparian vegetation, amphibians and birds in the area.

### **2. Potential Impact on Adjacent Wells and Water Users**

- a) The testing involves groundwater drawdown which may impact the quantity of water in adjacent wells. Water quality may also be affected by the recirculation of groundwater. This must be monitored during the testing program to ensure that adjacent wells and water users are not impacted by the testing.
- b) The tests also include some techniques, such as aquifer fracturing, that could result in permanent changes to the existing groundwater flow paths. It is uncertain how the existing water users will be protected from potential changes in water quantity and quality.
- c) It is staff's understanding that the quarry will be setting up a complaints protocol and will be monitoring the conditions during the testing and responding to any complaints of well interference.

### **3. Potential Impact on Fisheries**

- a) Resident brown trout and brook trout are known to occur in Mountsberg Creek. Spawning for these species occurs in the fall and their spawning redds are associated with groundwater upwellings. It is questioned what impact will the GRS testing have on the adjacent watercourse and its associated upwellings, and in turn fisheries.
- b) Will the discharge flow be of sufficient quality, temperature and discharge rate to match natural flows and not disrupt fall trout spawning?
- c) The timing of the testing should be reconsidered to ensure that it does not disrupt spawning and young-of-the-year fish survival as a result of unsuitable water quality and temperatures.
- d) It would also be important to determine the thermal effects of discharge at multiple times through the year (i.e. summer and winter/fall).
- e) During the testing, what monitoring will occur to ensure that the water quality, temperature and dissolved oxygen remain within an acceptable range to not impact fisheries? At what point will the testing be stopped if it moves outside of this acceptable range?

### **4. Potential Impact on Adjacent Wetlands**

- a) Conservation Halton staff question what the impacts will be to wetlands associated with the initial testing of the groundwater recirculation system, as this initial test does not provide any recharge to the wetland. Therefore, staff question the extent of the impact to the wetland through testing alone.
- b) In the August 2006 Gartner Lee report, it was indicated that pumping would continue for either 66 hours or until a steady state condition in the deep bedrock monitoring wells is approached. It is now proposed that the latter be the methodology that would be used; however, there is no indication of exactly how much time would be required to reach a steady state. It is further questioned whether there will be an impact to the surrounding wetlands if a steady state condition in the deep bedrock monitoring wells is approached? How will this be mitigated? This information has not been included in the report and it is assumed that at this time there are no plans to mitigate this impact.
- c) What impacts will be associated with the duration of the dewatering? Based on the estimates in the report, dewatering could potentially last over 200 hours, however, the impacts to the ecological features associated with this need to be addressed.

### **5. Trench and Borehole Location**

- a) There is no indication of the potential impacts to the vegetation located in the vicinity of the trench and boreholes. According to Figures 1 and 2, the trench is proposed to be built in a wooded area classified as a Dry-Fresh Sugar Maple – Ironwood Deciduous Forest (FOD5-1), with the boreholes located in the forest to the north of the trench. How will the trench and the boreholes be created? What type of equipment will be used? Will trees be destroyed as a result of this activity?
- b) In the memo to the City of Hamilton, dated September 20, 2006, from Stantec, it states that the trench will be located 16 metres or more away from the tree line, however, the figures included with the GRS report (specifically Figure 2) shows the trench located within the vegetated area. Clarification is needed to address this discrepancy and the proper location included on the site plan.

- c) Sufficient buffering is needed between the forested edge and the trench construction. It is recommended that a minimum buffer of 10 metres from the drip line of the forest edge be established and protected by fencing, installed at the outer limit of the buffer.

## **6. Blasting to Create the GRS Testing System and Potential Fracturing and Contamination of the Aquifer**

- a) The tests also include possible blasting or well drilling in the trench to achieve aquifer fracturing and connectivity. This could result in irreversible changes to the existing groundwater flow paths, and impact springs which are known to occur in the adjacent wetland and woodland. Further it could alter flow paths to the groundwater upwellings in Bronte Creek.

## **7. Appropriateness of the Testing**

- a) During the meeting with St. Marys' consultants (i.e. Gartner-Lee and Stantec) and MOE staff, Ray Guther advised that Conservation Halton has not nor will it be providing, in advance, any confirmation that the tests are an appropriate demonstration of the GRS function or validity as a mitigation tool. This was acknowledged by the St. Marys' consultants at the meeting.
- b) The proposed GRS is still unproven technology without any precedent example.
- c) Notwithstanding this, if the testing is approved, it is recommended that St. Marys may wish to include measurement of the volume of recirculation and delivery of water back to the groundwater system as it will be necessary for the ultimate evaluation of the requirements to operate the GRS in the longer term.

## **8. Site Restoration**

- a) Any disturbed areas resulting from the testing should be revegetated using native seed mixes that are free of invasives and weeds.

I trust these comments are of assistance to you. If you have any questions or require clarification, please contact the undersigned at ext. 222.

Yours truly,

Brenda Axon  
Manager Watershed Planning Services

cc: Stan Holiday, City of Hamilton  
David Charlton, Stantec Consulting Ltd.  
Tom Hilditch, Savanta Inc.  
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