

EXECUTIVE SUMMARY

Ontario Case Studies – Water Supply and Aggregate Extraction

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The *Ontario Case Studies – Water Supply and Aggregate Extraction*, was completed in response to recommendations from a review conducted by the Ontario Ministry of Natural Resources (MNR) on the role of the aggregate industry in the context of Source Water Protection programs in Ontario. The MNR study (Blackport and Golder, 2006) identified varying impacts on hydrogeologic and hydrologic systems in the vicinity of aggregate activities and recommended case studies of aggregate sites where extraction and processing occurs in the vicinity of drinking water supplies. SENES Consultants Ltd was retained by the Ontario Stone, Sand & Gravel Association to complete this study.

OBJECTIVES

To determine the possible effects of aggregate operations on public water quality and quantity, the major objectives for the study were:

- To identify and select aggregate site locations in Ontario where pits and quarries are, or have been, operating in close proximity to municipal water supplies.
- To review available evidence related to whether water supplies have been depleted or contaminated by aggregate activities.
- To develop “case studies” summarizing water quality and quantity impacts as the result of activities associated with aggregate extraction operations.

CASE STUDY SITE SELECTION

Identification of Aggregate Sites in Vulnerable Areas

Aggregate site boundaries and vulnerable areas around municipal drinking water supplies, namely the wellhead protection areas (around groundwater supplies) and intake protection zones (around surface water intakes), were mapped on an Ontario base map. The aggregate site boundaries data was provided by the MNR and the vulnerable areas data was provided by the Ontario Ministry of the Environment (MOE) and Conservation Authorities as part of the *Vulnerability Analysis* for Source Water Protection studies. From this mapping exercise it was determined how many of those sites were located in the most vulnerable areas. An area is

considered most vulnerable if the time it takes for water to travel from the aggregate site to the water supply system falls within two years.

Case Study Sites Selected

It was further determined that very few of those aggregate sites had the potential to impact municipal groundwater supplies. Of the 5951 aggregate sites recorded in Ontario, only 57 are located in vulnerable well head protection areas. To refine the site selection process from the maps produced, several site screening criteria were developed based on 1) vulnerability of municipal wells, and 2) proximity to municipal wells. Sites were then ranked through the developed priority criteria.

The final five case studies selected for this report were based on the developed screening criteria, municipal data and feedback from aggregate producer:

Case Study #	ALPS ID	Final Selected Aggregate Case Study Sites	Municipality
1	3796	Dufferin Aggregates Simcoe/Jaworski Pit	Haldimand-Norfolk
2	4391	Trudeau Tweed Pit	Tweed
3	5623	Rockway Woolner Pit	Kitchener
4	2081	Lafarge Talbot Pit	London
5	6506	Lafarge Caledon Pit	Caledon

CASE STUDY METHODOLOGY

The case studies presented in this report are based on a desktop data collection, the review and analysis of information and data made available by municipal agencies, regulatory sources, as well as aggregate sites. The study focuses on determining *significant drinking water quality threats* that could be posed by aggregate extraction operations and associated activities, as set out by Ontario Ministry of Environment’s (MOE) Source Water Protection regulations, pursuant to the *Clean Water Act, 2006*.

Two questionnaire surveys were also conducted to collect site specific information and data relevant to the 21 land-use activities by the MOE’s *Clean Water Act, 2006*, as *Drinking Water Threats* for Source Water Protection. The impact of any significant threats was assessed by comparing water quality data of *potential contaminants of concern* at municipal well water supplies (in accordance with Ontario Drinking Water Quality Standards). The assessment of the impact on water quantity was based on the volumes of regulated water taken by aggregate sites.

CONCLUSIONS

The following conclusions can be drawn from this review:

- Less than 1 percent of pits and quarries in Ontario lie within the two-year time of travel Wellhead Protection Area (WHPA) for municipal water well.
- Aggregate extraction and processing is not a prescribed drinking water threat as *per* MOE's Source Water Protection regulations. Aggregate production is chiefly a mechanical process that involves little or no use of chemicals aside from the fuel and lubricants in the machinery.
- Data from all municipal water supplies (2005 - 2010) near the case study sites indicates no adverse impact as the result of aggregate operations.
- Relevant Source Water Protection reports prepared by local conservation authorities and Source Protection Committees for all five case study sites identified no existing water quality or quantity conditions (i.e., no known instances of degradation or declining trend of water quality/quantity) within the WHPA or municipal drinking water associated with aggregate extraction operations.
- Aggregate sites extracting water for operations are regulated through Permits to Take Water issued by the MOE where pumping rates typically remain within a set maximum allowable limit and are therefore not expected to have adverse impact on municipal water supply quantities.
- Some pits and quarries can include ancillary land-use activities that would qualify as potential *significant drinking water threats* as per MOE regulations. In this review:
 - Four of the five sites reported a septic system or portable toilets that could be considered a potential source of pathogens.
 - Two of the five sites reported on-site fuel storage tanks which could be considered a potential source of petroleum hydrocarbons.
- There is no evidence that the presence of a septic system, portable toilets or fuel storage facilities at any of these aggregate sites has had any effect on the municipal water well quality, despite being in close proximity to the WHPA.
- The Provincial Standards regulating aggregate licences in Ontario prescribe that all fuel storage tanks must be maintained in accordance with the *Technical Standards and Safety Act*. A spills contingency plan must also be in place.

