# EXECUTIVE SUMMARY

Golder Associates Ltd. (Golder), in conjunction with MHBC Planning (MHBC), Altus Group (Altus) and Dionne Bacchus and Associates (DBA), prepared this Supply and Demand Study of Aggregate Resources Supplying the Greater Golden Horseshoe (GGH). The results from the components of the work program are summarized below. Each firm is responsible for the preparation of their own section.

## MATERIAL SUPPLY

A material supply analysis was completed that involved an estimation of remaining reserves in quarries with Class A licences that were licensed after the preparation of the 2009 State of the Aggregate Resource in Ontario Study (SAROS) Report; an estimation of remaining reserves in selected licensed pits; and an identification and evaluation of unconstrained and unlicensed Aggregate Resources Inventory Paper (ARIP) Selected Bedrock Resources and Primary Sand and Gravel Resources.

The results of the study indicate remaining reserves of 545 million tonnes (MT) of bedrock in quarries that have been licensed since the 2009 SAROS Study or added to the Greater Golder Horseshoe (GGH) study area. The gain in estimated reserves as a result of new licences issued is offset by ongoing production of limestone from GGH quarries.

The study reviews a number of limiting considerations that cast significant doubt on the usefulness of relying on site plan volumes as an indication of available supply. While the study estimates potential remaining reserves of 2,792 MT might be available in 123 selected licensed pits there is quite a high degree of uncertainty associated with this estimate and the results should not be taken as a very realistic indication of what resource may actually be proven and made available from these licenced sites.

While potential reserves exist in many parts of the Province there are concerns about scarcity of certain products in close to market locations that will lead to increased costs and environmental impacts associated with increased haul distance.

## CONSTRAINT ANALYSIS

Mineral aggregate deposits are fixed in location and must be extracted where they naturally occur in certain areas of the Province. While some areas have abundant geological deposits of aggregate resources, other areas do not have any. Geologically, the resource is plentiful but there are numerous factors that must be considered in licensing an area for extraction and various challenges may need to be addressed (e.g., competing land uses).

To determine the extent of overlap between identified aggregate resource deposits and known environmental, agricultural and social constraints a Geographic Information System-based (GIS) mapping analysis was completed for the GGH and 100 km surrounding the GGH.

The mapping analysis progressively overlaid 32 known constraints on selected bedrock, primary sand and gravel and secondary sand and gravel resource areas to determine the degree to which the availability of mineral aggregate resources may be affected by known environmental, agricultural and social constraints.

Based on the analysis, the following percent (%) of the aggregate resource areas had overlapping constraints within the GGH and 100 km surrounding the GGH:

- 96.0% of the selected bedrock area;
- 97.7% of the primary sand and gravel; and
- 92.1% of the secondary sand and gravel.

The Study Region was further divided in Study Areas based on their proximity to a central growth area in the GTA.
The following percent (%) of all of the aggregate resource areas had overlapping constraints within the following distances to the Vaughan Metropolitan Centre:

- 97.7% within 50 km
- 99.0% within 50 km to 100 km
- 96.7% within 100 km to 150 km
- 96.1% within 150 km to 200 km
- 87.4% within 200 km to the remainder of the study area

The results demonstrate that access to the aggregate resource areas within the Study Region (much of Southern Ontario) is severely affected by known environmental, agricultural and social constraints.

This is not to say that these resources are not available. The applied constraints are factors that have to be considered in assessing the availability of the resource; they are not all constraints that would necessarily or reasonably preclude access to the resource.

Nor should the results be interpreted to mean that the remaining resource areas (i.e., unconstrained) are available as there are numerous other site specific and unmapped factors that need to be considered before a resource can be licensed and extracted.

What the results do tell us is that the availability of aggregate resources in Ontario needs to be carefully planned for. Aggregates will not be available if it is assumed or taken for granted that there will be a plentiful supply after all other planning considerations are accounted for. Planning for aggregate availability will require an integrated and balanced approach that recognizes some compromises will be required. Without this recognition it is more likely that aggregate deposits are not protected or not made available due to the potential presence of on-site and adjacent constraints.

Unconstrained and unlicensed bedrock and sand and gravel resources were identified and estimates were provided for potential resource tonnages per hectare.

## DEMAND STUDY

A demand analysis for aggregates related to the GGH area was completed.

The demand analysis assesses the extent of use of aggregate in Ontario in general and the GGH specifically.

Highlights of the demand analysis include:

- Over the past 20 years, Ontario has consumed about 3.4 billion tonnes of aggregate - or about 170 MT per year on average.
- Given expected levels of economic and population growth, Ontario's consumption of aggregates is projected to average about 192 MT per year on average over the next 20 years, 13% higher than in the past 20 years.
- Despite lower per capita usage of aggregate, the GGH is expected to consume more than half of the provincial total, or about 111 MT per year over the next 20 years.
- On a per capita basis, aggregate consumption has been on a longer-term decline and this downward trend is expected to continue going forward.
- The aggregate that Ontario uses comes mainly from primary sources of material extracted from Ontario pits and quarries. Imports from other countries play only a very small role. Secondary sources of material (primarily recycled materials) have played an increasing role, and recycled material is expected to continue to gradual increase its contribution to total aggregate consumption over the next 20 years. However, the main source of aggregate supply is expected to continue to be primary aggregate from Ontario pits and quarries.

- The GTAH (Greater Toronto Area plus Hamilton) obtains approximately half of the aggregate it uses from neighbouring areas, largely from within the outer ring of the GGH.

- Aggregate is used in a wide range of applications, however the primary use is in construction work – either directly on construction sites, or in the manufacturing of concrete and other building products. Roads (provincial highways, as well as municipal and private roads), both new and repair work, account for the largest share of aggregate used in construction work.

- There are many major public infrastructure projects planned in the GGH, all of which will need aggregate:

- MTO projects are expected to need about 20 MT in total over the next five years.

- Transit projects are expected to need about 6 MT through completion (some of which is beyond the next five years).

- Larger municipal infrastructure projects are expected to need about 21 MT over the next five years.

## TRAFFIC ASSESSMENT

Based on the findings of the traffic assessment, it would be beneficial for individual jurisdictions without goods movement policies in place to proactively review their road networks and establish defined haul routes for the movement of aggregate through their regions. The establishment of appropriate truck routes will help ensure mobility for all road users and optimize freight capacity minimizing the impacts on sensitive areas by:

- Defining roadways that are suitable for heavy vehicle traffic;

- Ensure roadways have appropriate capacity and design to accommodate the heavy vehicles;

- Avoid residential and/or otherwise sensitive areas; and

- Reduce congestion throughout the region.