

REPORT

# ASSESSMENT OF DUST IMPACTS FROM AGGREGATE PITS ON MINTO COMMUNITIES CANADA AND MATTAMY HOMES PROPOSED DEVELOPMENTS

Minto and Mattamy Dust Study

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March 2018

# **Distribution List**

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# **Executive Summary**

Golder Associates Ltd. (Golder) was retained by Minto Communities Canada Inc. (Minto) and Mattamy Homes (Mattamy) to prepare a dust study (Dust Assessment) to assess potential impacts from aggregate pits located to the west and northwest of the proposed Minto and Mattamy residential subdivisions in the township of Nepean, Ottawa, Ontario.

The Dust Assessment supports a compatibility assessment under the Ontario Ministry of the Environment and Climate Change (MOECC) Publication D-6. The Dust Assessment was prepared based on the methodology and analysis procedure followed for a previous Dust Assessment completed for Mattamy (June 2013) for the same area. The Dust Assessment evaluates the impacts from the operation of the existing adjacent sand pits on the proposed Minto and Mattamy residential subdivision to the east, northeast and southeast of these sand pits.

The proposed Minto Subdivision will be located west of Greenbank Road on Lots 6 and 7 of Concession 3 in Ottawa, Ontario. The proposed Mattamy Subdivision will be located to the west of Greenbank Road on Lots 8 and 9 of Concession 3 in Ottawa, Ontario.

Both the Marcel Brazeau Pit and Scott Drummond Pit (the Pits) are located along the western boundary of the proposed Mattamy Subdivision and northwest of the proposed Minto Subdivision. The study is required in support of approval of the Subdivisions.

This Dust Assessment (March 2018) for the Minto and Mattamy Subdivisions includes the updated layout of the proposed residential subdivisions, grading for the proposed Subdivisions, and updated operating hours for the Brazeau Pit.

Based on the assessment conducted in accordance with the published MOECC guidance to obtain approval under the Environmental Protection Act (EPA) Section 9 for the operations of the Pits, there are no anticipated dust impacts on the proposed Minto and Mattamy Subdivisions.

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### **1.0 INTRODUCTION**

Golder Associates Ltd. (Golder) was retained by Minto Communities Canada Inc. (Minto) and Mattamy Homes (Mattamy) to prepare a dust study (Dust Assessment) to assess potential impacts from aggregate pits located to the west and northwest of the proposed Minto and Mattamy residential subdivisions in the township of Nepean, Ottawa, Ontario. The Dust Assessment evaluates the impacts from the operation of the existing open pits (Marcel Brazeau Pit – 3089 Borrisokane Road and Scott Drummond Pit – 3717 Borrisokane Road) (the Pits) on the proposed Minto and Mattamy residential subdivisions to the east, northeast and southeast of the Pits.

The Mattamy Subdivision is proposed to be located to the west of Greenbank Road on Lots 8 and 9, Concession 3 in Ottawa, Ontario. The Minto Subdivision is proposed to be located west of Greenbank Road on Lots 6 and 7, Concession 3 in Ottawa, Ontario. Both Pits are located along the western boundary of the Mattamy Subdivision and northeast and southeast of the Minto Subdivision. This study Dust Assessment was prepared in support of a site plan approval of the Subdivisions.

Golder's analysis is based on a previous Golder Report "Dust Assessment, Proposed Subdivision Development, Parts of Lots 8 and 9, Concession 3, Ottawa, Ontario" dated June 2013 completed for Mattamy. Since the issuance of the June 2013 report, there have been various changes in the project design, as well as operations at the Pits. Specifically, this Dust Assessment includes the following:

- addition of the new proposed Minto Subdivision (including the existing Minto development known as Quinn's Pointe Stage 1)
- revised and expanded proposed Mattamy Subdivision area
- review and update (as required) the Pits operations to reflect current operations, including updated hours of operations and height of portable screen at the Brazeau Pit (obtained from Marcel Brazeau by Golder during a phone conversation on March 6, 2018)

#### 2.0 OPERATIONS

The Pits are sand extraction pits, both of which operate under licenses from the Ontario Ministry of Natural Resources (MNR). The daily operations of the pits vary depending on the demand for specific products.

Both pits are licensed to extract below the water table; however, based on information provided by the operators, the costs associated with extraction below water would make this scenario unlikely.

Identification of potential air sources were originally completed during a site visit on June 22, 2010, and through subsequent information provided by the Pit operators in January 2013. Revisions to the dust emissions sources were completed based on the information obtained in March 2018 and are provided in the sections below.

Both Pits provided their current typical hours of operations as of March 2018; the Brazeau Pit operates 12 hours per day, whereas the Drummond Pit typically operates 10 hours per day.

### 2.1 Brazeau Pit – 3809 Borrisokane Road, Ottawa

The extraction and processing of the Brazeau Pit is proposed to move west, away from the proposed Mattamy and Minto Subdivisions towards Borrisokane Road. The current extraction is about 450 m east of the proposed Mattamy Subdivision property line at a depth down to the water table, which is approximately 10 to 11 m below existing grade. The Pit is permitted to extract below the water table; however, as per phone conversations with the Brazeau Pit, it is not anticipated that extraction will occur below the water table. This site typically operates between 6:00 AM and 6:00 PM. The following pieces of equipment are used onsite:

- Screen and conveyor system three (3) screens and one (1) conveyor system are used on site. This system was not operational at the time of site visit. Site personnel informed Golder that this system is operated a maximum of twice a week based on demand.
- Loaders four (4) 950 Caterpillar loaders are regularly used on site; however, occasionally a maximum of five
   (5) loaders are used.
- Shipping during an hour, up to six (6) trucks could cross the site.
- Portable crusher one (1) portable crusher may be used on site occasionally as required (on demand).
   There is no portable crusher on a regular day to day operation.

#### 2.2 Drummond Pit – 3717 Borrisokane Road, Ottawa

The extraction and processing of the Drummond Pit is also proposed to move west, away from the proposed Mattamy and Minto Subdivisions towards Borrisokane Road. The current extraction is about 300 m east of the proposed Mattamy Subdivision property line at a depth down to the water table, which is approximately 10 to 11 m below the current grade. As with the Brazeau Pit, extraction is permitted below the water table. This site typically operates between 7:00 AM and 5:00 PM. Site personnel also indicated that the Pit has approximately five (5) additional years of operational life remaining. The following pieces of equipment are used on site:

- Excavator one (1) Caterpillar excavator is used on site based on demand. Screen and Conveyor system one (1) 628 Trommel screener and conveyor system is used on site, along with 2 small screens. This system was not operational at the time of site visit. Site personnel informed Golder that this system is operated a maximum of twice a week based on demand.
- Loaders and graders one (1) CAT 966G loader, one (1) CAT 988 loader; one (1) CAT 950 loader, and one (1) CAT D6R grader could be used onsite.
- Shipping a maximum of 200 truck loads are shipped daily. During 1-hour a maximum of 20 to 25 trucks could cross the site.

### 3.0 CRITERIA AND GUIDELINES

The Ontario Ministry of the Environment and Climate Change (MOECC) Publication D-6 is a guideline that is intended to apply when a change in land use is proposed to minimize the encroachment of sensitive land use upon industrial land use and vice versa. This guideline categorizes industrial facilities into three Classes. As per the D-6 Guideline, quarry and pits can be categorized as a Class II facility. A Class II industrial facility can be described as follows:

A place of business for medium scale processing and manufacturing with outdoor storage of wastes or materials (i.e., it has an open process) and/or there are periodic outputs of minor annoyance. There are occasional outputs of either point source or fugitive emissions for any of the following: noise, odour, dust and/or vibration, and low probability of fugitive emissions. Shift operations are permitted and there is frequent movement of products and/or heavy trucks during daytime hours.

Specifically, the D-6 Guideline requires that fugitive air emission studies be carried out for sensitive development within 300 m of a Class II facility. The D-6 Guideline applies to all types of proposed, committed and/or existing industrial land uses which have the potential to produce point source and/or fugitive air emissions such as noise, vibration, odour, dust and others, either through normal operations, procedures, maintenance or storage activities, and/or from associated traffic/transportation.

Emissions of particulate matter are addressed through the *Environmental Protection Act* (EPA), in particular Section 9 and Regulation 419/05 (Air Pollution – Local Air Quality).

In addition, the MNR publication "*Mineral Aggregate Resource Reference Manual*", dated January 2001, suggests some mitigation options where potential conflicts are identified. These options include:

- Identification of development restriction in the zone of influence using compatibility analysis (i.e., as outlined in MOECC Publication D-6 above), specific building or activity restriction may be developed (e.g., no habitable buildings permitted within certain metres of a licensed site).
- 2) Lot relocation or redesign where a subdivision is involved, lots can sometimes be relocated or reconfigured to reduce potential conflict. In the case of Subdivisions, the majority of the proposed residential development includes a set back from the Pits. An allowance for a road, a school and a community park has been provided in the lands between the Pits and residential development area.
- 3) Avoidance of truck traffic in road design where options exist, access to public roads from a subdivision (or vice versa) should be directed to portions of the road system less likely to be used by trucks transporting aggregate materials. In the case of the Marcel Brazeau Pit and the Scott Drummond Pit, the products from both pits are shipped through Borrisokane Road, which is well away from the Subdivisions.
  - Working with owner of the mineral aggregate to reduce the impact, the owner could redesign the phase schedule such that material close to the proposed development is removed first; modify internal operations to reduce dust generation; establish landscape buffers or berm as necessary. In the case of the Marcel Brazeau Pit and the Scott Drummond Pit, the extraction moves away from the Subdivisions as the resource located closest to the Subdivisions has already been removed.
  - Removal of aggregate prior to development if conflicts exists, parties involved may discuss the possibility
    of removing aggregate at locations closer to development prior to development. In this case, the aggregate
    resource located closest to the Subdivisions has already been removed down to the water table.

The following sections discuss the relevant City of Ottawa and MOECC guidelines.

### 4.0 DUST ASSESSMENT

Golder conducted a general dust assessment to assess potential air quality impacts from the operations of the Brazeau and Drummond Pits on the proposed Minto and Mattamy Subdivisions. For the purposes of this report, dust is the collective term used for particulate matter. For air quality assessments in Ontario related to fugitive dust, particulate matter is typically categorized into the following three categories:

- total suspended particulate (TSP) particles nominally less than 44 μm in diameter
- particles nominally smaller than 10 μm in diameter (PM<sub>10</sub>)
- particles nominally smaller than 2.5 µm in diameter (PM<sub>2.5</sub>)

Particulate matter is typically associated with airborne dust from vehicles travelling on paved roads and unpaved roads/haul routes, as well as material loading and unloading activities, crushing, screening and wind erosion of storage piles.

In Ontario, under the guidelines to apply for a Section 9 approval, limits and guidelines for regulating air quality are established under O.Reg. 419/05 (Air Pollution – Local Air Quality). These include standards, guidelines and ambient air quality criteria (AAQC) for various compounds. The AAQC are commonly used in assessments of general air quality in a community, and the potential for causing an adverse effect, whereas the standards and guidelines are used to assess specific impacts of an individual facility for compliance and permitting requirements. The MOECC does not have limits for PM<sub>10</sub> and PM<sub>2.5</sub>, therefore these have been excluded from the evaluation. Fugitive dust from pit operations excluding combustion sources are primarily emitted as TSP.

This dust assessment included the following steps:

- development of air inventory for all relevant sources at each of the Pits
- prediction of air quality impacts of the combined emissions from the Pits on the proposed Minto and Mattamy Subdivisions
- comparison of predicted concentrations of particulate matter to its standard as outlined in O.Reg. 419/05

Respirable crystalline silica concentrations were not assessed as a part of this Dust Assessment as the percentage of silica in the dust is not available for the Pits. The Dust Assessment did not include the Pits' mobile or road traffic sources of emission as these are excluded from O.Reg. 419/05. In accordance with MOECC procedures, exclusion of the road sources is acceptable as long as the aggregate facilities have implemented a fugitive dust Best Management Practices (BMP) Plan that includes the road emissions. The operators of the Pits have confirmed that a BMP Plan is in place at each of the Pits. In the case of the Subdivisions, the extraction from both the Pits progresses away from the proposed Mattamy and Minto Subdivisions; therefore, the length of the haul routes is expected to decrease over time, which is expected to result in lower impact from road traffic on the Subdivisions. The air emission sources included in the assessment for each of the Pits are summarized in Table 1.

| Table 1: Summary | of Air | Emission | Sources | at the | Pits |
|------------------|--------|----------|---------|--------|------|
|                  |        |          |         |        |      |

| Equipment                    | Brazeau Pit | Drummond Pit |
|------------------------------|-------------|--------------|
| Storage Piles                | Yes         | Yes          |
| Screeners                    | Yes         | Yes          |
| Vehicle Movements – Shipping | N/A         | N/A          |
| Material Transfers           | Yes         | Yes          |

N/A – Not applicable, not subject to Section 9 permitting requirements.

## 5.0 METHODOLOGY

For the purpose of this assessment, information collected from pit operators on emission sources was used to estimate emissions from the site. Emission rates are based on maximum predicted production rates from the site. Operations vary by hour of day and month of year, thus the use of maximum production rates is a conservative approach in assessing the impact of the Pits. Table 2 lists the estimated daily emission rates for each of the Pits used for the Dust Assessment.

#### Table 2: Existing Daily Emissions at the Pits

| Pit      | Maximum Daily Emission Rate [g/s] | Percent of Total |  |
|----------|-----------------------------------|------------------|--|
| Brazeau  | 0.59                              | 52%              |  |
| Drummond | 0.55                              | 48%              |  |

The operation of the Pits will gradually move westward and, therefore, further away from the proposed Minto and Mattamy Subdivision. To maintain conservatism, the Pits operations were modelled based on current location and, therefore, are expected to overestimate impact on the proposed Minto and Mattamy Subdivisions. Further, the area where the Pits operations take place will become deeper which would reduce impact on the proposed Minto and Mattamy Subdivisions. The reduced grading is an increase to grade differential between the bottom of the existing Pits and the surrounding proposed Minto and Mattamy Subdivisions. This reduced grading was not included in the modelling to maintain conservatism.

The Dust Assessment was modelled using the AERMOD dispersion model using a five (5) year meteorological crops data set provided by the MOECC for the Eastern Region (Ottawa Regional Airport and Maniwaki). The dust sources associated with the Pits were modelled using a combination of area and volume sources. The model was run using uniform Cartesian grid encompassing the Pits and the proposed Minto and Mattamy Subdivisions.

## 6.0 RESULTS AND DISCUSSION

The proposed Minto and Mattamy Subdivisions plan indicates that the lands adjacent to the Scott Drummond Pit will be used for a secondary school and part of the lands adjacent to the Marcel Brazeau Pit will be used for residential and commercial land uses. Figure 1 presents the Minto and Mattamy Draft Subdivision Plan current as of March 2018.

The maximum predicted 24-hour concentration of TSP for the combined pit operations is provided in Table 3 and presented on Figure 2 as the Point of Impingement (POI). The predicted value is **below** the MOECC Schedule 3 standard of 120  $\mu$ g/m<sup>3</sup> at all receptor locations in the proposed Subdivisions, indicating that the Pits can operate within the limit for TSP as set by the MOECC.

| Pit                        | Maximum Predicted<br>TSP Concentration [µg/m³] | MOECC Limit<br>[µg/m³] | Percent of Limit | Location of<br>Maximum |  |
|----------------------------|------------------------------------------------|------------------------|------------------|------------------------|--|
| Combined Pit<br>Operations | 27.1                                           | 120                    | 22.6%            | North of the Pits      |  |

**Table 3: Maximum Predicted Concentrations for Dust** 

In addition to evaluating the impact of operations at the Pits, existing background air quality conditions were considered. There is no current ambient monitoring to determine background concentration levels for TSP in Ontario. All ambient monitoring is limited to the PM<sub>2.5</sub> size fraction. A conservative estimate of the background TSP concentration was evaluated from the PM<sub>2.5</sub> measurements. The closest air monitoring station to the site is Ottawa Central Station (45°22'57.1 N, 75°42'51.1 W). The maximum predicted impact of the Pits operations including background air quality is presented in Table 4.

#### Table 4: Fugitive Dust Levels (24-hr average concentrations) Including Background

| Pit                        | Maximum Predicted TSP<br>Concentration [µg/m³] | Background TSP<br>Concentration [µg/m³] | Operations +<br>Background<br>[µg/m³] | Percent of<br>Limit |
|----------------------------|------------------------------------------------|-----------------------------------------|---------------------------------------|---------------------|
| Combined Pit<br>Operations | 27.1                                           | 29.3*                                   | 56.4                                  | 47.0%               |

\* 90<sup>th</sup> percentile  $PM_{2.5}$  concentration was converted to TSP value by assuming that  $PM_{10}$  is 50% of TSP and  $PM_{2.5}$  is 50% of  $PM_{10}$ ; 90<sup>th</sup> percentile  $PM_{2.5}$  concentration for 2015 was obtained from the MOECC's publication Air Quality in Ontario – 2015 Report<sup>1</sup>.

## 7.0 CONCLUSIONS AND LIMITATIONS

### 7.1 Conclusions

Golder was retained by Minto and Mattamy to prepare a dust study (Dust Assessment) to assess potential impacts from aggregate pits located to the west and northwest of the proposed Minto and Mattamy residential subdivisions.

Based on the assessment of the Pits operation conducted in accordance with published MOECC guidance to obtain approval under the Section 9 of the EPA, the estimated dust emissions were below the Schedule 3 TSP limit at the proposed Subdivisions. Provided the Pits continue to operate in a similar manner and implement their BMP Plan to minimize dust migration off-site, the dust levels from future Pits operations are unlikely to reach the MOECC limit for TSP at the proposed residential subdivisions. The concentrations from the Pits will decrease as the Pits operations continue to move further away from the Minto and Mattamy residential subdivisions.

The proposed Minto and Mattamy Subdivisions would be considered as compatible land uses based on the guidance of MOECC Publication D-6, provided that the Pits continue to implement their fugitive dust BMP Plan.

<sup>&</sup>lt;sup>1</sup> MOECC. (2017). Air Quality in Ontario – 2015 Report. Obtained from: http://www.airqualityontario.com/downloads/AirQualityInOntarioReportAndAppendix2015.pdf



## 7.2 Limitations

As indicated in the report, the information related to the Pit operations were obtained from the Pit operators and their onsite personnel during a site visit on June 22, 2010, conversations and email confirmations from the pit owners in June 2013, and updated operations information obtained in March 2018 based on conversation or email confirmation from the pit owners. Golder has acted in good faith and used the information collected and accepts no responsibility for any deficiency, misstatements, or inaccuracies contained in this report as a result of omissions, misinterpretations or fraudulent acts of the persons involved.

Respirable crystalline silica concentrations were not assessed as a part of this study as the percentage of silica in the dust is not available for this site.

Golder prepared this dust study using its commercially reasonable best efforts consistent with the level and skill ordinarily exercised by members of the profession currently practicing under similar conditions, while ensuring that the study was prepared in general conformance with regulatory and guideline requirements.

This report was prepared for the exclusive use of Minto and Mattamy. Persons other than Minto and/or Mattamy using this report or observations, or conclusions stated within, may do so at their own discretion.

## Signature Page

We trust this report meets with your current requirements. If you have any questions regarding this report, please contact the undersigned.

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