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May 4, 2022

**Englobe File No.: 02105316.002**

**Regional Municipality of Niagara**

Planning and Development Services

1815 Sir Isaac Brock Way

Thorold, ON, L2V 4T7

Attention:      Sean Norman, PMP, MCIP, RPP – Senior Planner

**Re:**              **Peer Review of – Air Quality Assessment, First Iteration Comments  
Upper's Quarry Walker Aggregates Inc.**

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## **1 INTRODUCTION**

Englobe Consulting Engineers Inc. ("Englobe") was retained by the Regional Municipality of Niagara, Planning and Development Services ("Niagara Region"), to carry out a peer review of the air quality impact assessment pertaining to a proposed aggregate quarry project.

This report summarized the initial steps completed in the peer review of the Air Quality Assessment (AQA) aspects of the project. This report also provides Englobe's comments on the first iteration of the technical report reviewed.

## **2 REPORT REVIEWED**

The following report has been reviewed, with respect to aspects pertaining to the air quality impact assessment of the project by the proponent's consultants: "Walker Aggregates Inc., Niagara Falls, ON, Air Quality Assessment for the Proposed Upper's Quarry", prepared by RWDI, dated October 26, 2021 [RWDI AQA report].

## **3 PRE-CONSULTATION MEETING**

As part of the preparation for this technical peer review, Englobe's air quality specialist, David Lavoué, attended a virtual pre-consultation meeting with representatives of the proponent Walker Aggregates Inc., the proponent's technical consultants (RWDI), Niagara Region, and the City of Niagara Falls. The meeting was held on March 1, 2022. The purpose of this meeting was to allow for a discussion between

the authors of the Air Quality Assessment (RWDI) and Englobe's air quality specialist, David Lavoué, in advance of the comments being prepared.

## **4 SITE VISIT**

As part of the preparation for this peer review, the aforementioned representatives participated in a site visit on March 2, 2022. That was the opportunity for Englobe's air quality specialist, David Lavoué, to verify references made to the site conditions and surrounding properties in RWDI's air quality assessment report. The potential sensitive receptors described in RWDI's air quality assessment report were verified during the site visit.

## **5 COMMENTS FROM THE REVIEW OF THE REPORT**

The following clarifications should be made in the different sections of the AQA report.

### **5.1 INTRODUCTION**

- As the main purpose of the AQA report is to present dispersion modelling results, a short introduction to dispersion modelling would be welcome, including atmospheric processes, modeling objectives and options related to the project.
- The processes and limitations of selecting sensitive receptor locations should be described here based on the project requirements.
- Provide a list of references from the literature for the Best Management Practices Plan for dust. Practices include reducing the traffic, reducing the speed, improving road design, watering the road, covering the road with gravel, increasing the moisture content of the road surface, binding the road particles together, sealing unpaved roads, reducing exposed ground, and slowing the surface wind.

### **5.2 SITE DESCRIPTION & OPERATIONS**

- Provide the latitude and longitude of the site to help locate it with a GIS or a geo-browser (e.g., Google Earth): "Upper's Quarry site (43°5'41"N, 79°10'23"W) is located at Upper's Lane and Thorold Townline Road."
- Detail the surrounding lands and building types and explain the potential effect of the quarry operations on those areas.
- Provide a list of the main operations for phases 1A, 2A, 3B, and 5 with their respective potential emission sources.

### 5.3 HOURS OF OPERATION

Hours of operation are the key parameters to estimate emissions and conduct the dispersion modeling study:

- The use of a table would improve the readability of the information provided in this section.
- Provide a list of all the abbreviations given in this section, and more generally in the report.

### 5.4 OPERATING SCENARIO

This section is too vague and therefore requires clarification:

- The operating scenario should be detailed based on the future operations listed in section 2.
- Explain what “conservative” means in the context of the AQA study.
- Consider one scenario for the short-term activity to evaluate how much emissions would increase and to assess its impact on air pollution in the area surrounding the proposed quarry.

### 5.5 POTENTIAL IMPACT LOCATIONS

- Considering receptors farther from the domain is strongly recommended. Plumes emitted by activities at the site may move upward from the source area and then come downward far from the domain, which would increase air pollution at receptors further down.
- Because there are residential buildings on the southeast and west sides of the domain (highlighted in blue in the Figure below), receptors at these locations should be included in the dispersion modeling study.
- Detail the criteria to select receptors for this study. A good practice for locating receptors is to draw 1 and 1.5-km circles over the main activity area and check what potential receptors are inside these circles.



## 5.6 IDENTIFICATION OF CONTAMINANTS AND SOURCES

- List all the permanent/temporary and short-term/long-term emission sources in a table.
- A brief description of Figures 2 to 5 has to be included in this section.

## 5.7 CRITERIA

- Change the title of this section to “Air Quality Criteria and Standards”.
- It's common practice to include in the text a table listing the relevant criteria and standards for the air pollutants of concern.

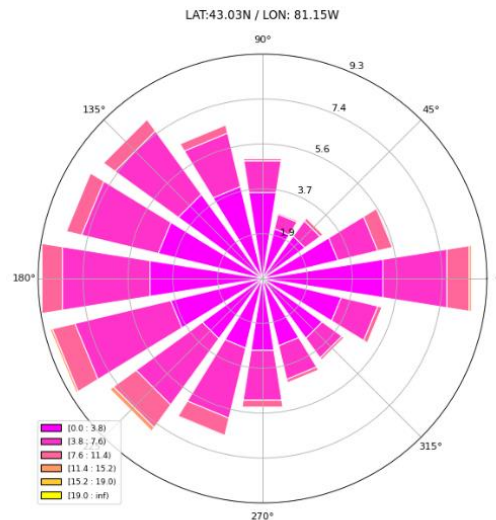
## 5.8 EMISSION ESTIMATION

- US Environmental Protection Agency's document “AP-42: Compilation of Air Emissions Factors” is the main reference to estimate emissions for this type of AQA study. Therefore, it should be cited in this section, such as (<https://www.epa.gov/air-emissions-factors-and-quantification/ap-42-compilation-air-emissions-factors>, date of access; US Environmental Protection Agency, year).
- Provide a reference for the silica content. Is a silica/PM<sub>10</sub> ratio of 10% used to estimate silica concentrations from the PM<sub>10</sub> concentrations modeled with AERMOD?
- Detail the mitigation measures included in the emission calculation. “Control efficiency” is an expression used in the Appendices and is the key parameter applied to raw emissions to decrease them. That expression should be explained in this section.
- Watering the unpaved road is an effective control method and is suggested to be used in the project. The “95% reduction control efficiency” as a result of watering could be considered as optimistic since an average efficiency of 75% is considered in the literature (US EPA 1993).

## 5.9 DISPERSION MODELLING

- Please indicate the date of the version for AERMOD such as “AERMOD version 19191 dispersion model (version date July 10, 2019)”.
- How many simulations were conducted? Did you conduct various simulations based on different “control efficiency” values applied to the raw emission inventories?
- Let's assume that the meteorological dataset was obtained from <https://www.ontario.ca/page/map-regional-meteorological-and-terrain-data-air-dispersion-modelling>. Based on the location and characteristics of the project site, the file “West\_Central\_Crops”, including the “London 1996-2000” dataset, seems to be the dataset required by MECP to run AERMOD. Is it the land use type used in the simulations with AERMOD?

- The wind rose shown below indicates that the prevailing wind direction is mostly between the southwest and the northwest, but it has also a strong component from the east.
- Since AERMOD is not a terrain-following coordinate system code, how was it applied to a domain



characterized by the non-flat terrain of a quarry? Was CALPUFF considered for this project as an alternative dispersion model?

- What are the receptor heights used in the model? It is suggested to use receptors at different heights to see how far air pollutants travel vertically. It has an impact on the horizontal transport of pollutants.

#### 5.10 LOCAL EMISSION SOURCES

- *“Due to this distance, impacts from this site are not expected to significantly influence the predicted impacts from the extension”.* The only way to know for sure would be to apply AERMOD with receptors located 2+ km away from the site.
- What is a *“suitable background air quality level”*?

#### 5.11 BACKGROUND AIR QUALITY

- *“Background values were estimated.”.* Confirm this is PM<sub>2.5</sub> background data.
- *“Nearest”* is too vague. It’s better to specify the distance between the project site and the closest MECP monitoring station, such as: *“St. Catharine’s ambient air monitoring station (43°9’36”N, 79°14’5”W) is located 9 km from the proposed Upper’s Quarry site”.* This AQ station is considered an urban site. In general, PM and NO<sub>2</sub> levels are expected to be higher at an urban site than in a rural area where Upper’s Quarry would be located.

## **5.12 CHEMICAL REACTIONS AMONG CONTAMINANTS**

OK.

## **5.13 UNCERTAINTIES**

- *"... as they are potentially influenced by many factors."* Identify which factors are considered here.
- *"... to estimate impacts under worst-case weather."* Explain what "worst-case" means here.
- Provide examples of a few *"assumed mitigation measures"*.

## **5.14 RESULTS**

- In this section, the main results extracted from the tables must be summarized quantitatively.
- *"With the addition of background concentrations to benzo(a)pyrene, this contaminant exceeds the AAQC. This is due to the ambient background levels throughout most of Ontario already being above the AAQC."* *"Most of Ontario"* means that the AAQC is shown to be exceeded at more than one air monitoring site.
- Using a receptor grid instead of discrete receptors would have helped present (i.e., concentration maps) and interpret (i.e., atmospheric dispersion processes) the results calculated with AERMOD.

## **5.15 RECOMMENDATIONS**

- Would there be a system on-site to alert the quarry's staff/management when fugitive dust events occur?
- How frequently a dust suppressant (e.g., water) has to be applied? The frequency can be linked to the "control efficiency" of the emissions.

## **5.16 RECOMMENDED MANAGEMENT PRACTICES**

- Are there recommendations to control benzo(a)pyrene emissions from the operations at the quarry site?

## **5.17 CONCLUSIONS**

- Replace *"Section 13"* by *"Section 15"*.

## **5.18 TABLES**

- Correct “Upper’s Quarry” in all table captions.

#### **5.19 FIGURES**

- A description of each figure is needed.

#### **5.20 REFERENCES**

- Create at the end of the report a section to list all references cited in the report.
- Add “EPA, 1993, Emission factor documentation for AP-42, section 13.2.2, unpaved roads. “

### **10. CLOSURE**

We trust the foregoing will satisfy your present requirements. Please contact the undersigned should you require further assistance.

Yours sincerely,



David Lavoué, Ph.D., M.Eng.  
Air Quality Specialist



Ahmad Kia, Ph.D., EIT  
Air Quality EIT