

August 24, 2015

Town of Caledon
6311 Old Church Road
Caledon, ON L7C 1J6

Attn: Brandon Ward

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**Re: Peer Review of an Air Quality Impact Assessment
OPA and Zoning By-Law Amendment Application
Lafarge Canada Inc., Limebeer Pit
Novus File No. 15-0108**

Novus Environmental Inc. (Novus) was retained by the Town of Caledon to conduct a peer review of the submission prepared on behalf of Lafarge Canada for the Limebeer Pit located at the southeast corner of Charleston Sideroad and McLaren Road, to the west of Green Lake in the Town of Caledon (18251 McLaren Road). Presented below is a summary of our findings.

1.0 Review of the Air Quality Impact Assessment

A review was performed of the Air Quality Impact Assessment for the proposed Limebeer Pit dated April 2014. Overall, the assessment was conducted in accordance with MOE and US EPA standard protocols for determination of emissions and dispersion modelling. The assessment focused on particulate matter, including TSP, PM₁₀ and PM_{2.5}, and nitrogen dioxide (NO₂). These pollutants pose the highest risk to exceed their respective air quality standards. The analysis focused on the nearby sensitive receptors just north of the property, at Green Lake.

Background concentrations were taken from the Brampton MOE monitoring station, which is the nearest monitoring station located approximately 24 km southeast of the site. This monitoring station is located in an urban area and therefore likely has higher background concentrations than the rural site. Furthermore, a comparison between the Brampton station and the next two nearest monitoring stations, Guelph and Newmarket, showed that Brampton has the highest worst-case measured concentrations for both NO₂ and PM_{2.5}. Therefore, the selection of the Brampton monitoring station for combined concentrations is conservative.

Furthermore, to account for the potential combined effects due to aggregate operations nearby, the background concentrations from the Brampton monitoring station were increased, based on experience. The additional values added to the background concentrations are reasonable for aggregate pit emissions, and will result in conservative combined impacts.

Model results were combined with the 90th percentile value from the Brampton monitoring station. This is consistent with MOE protocols, as they represent values that will only be exceeded 10% of the time during unlikely meteorological conditions. PM₁₀ and TSP are not monitored in Ontario, therefore, a factor of two was applied to the PM_{2.5} value to calculate PM₁₀ background concentrations. A factor of two was then applied to the PM₁₀ value to calculate background TSP concentrations. Lall et al in their study titled “Estimation of Historical Annual PM_{2.5} exposures for health effects assessment” published by *Atmospheric Environment* (2004) recommends a PM₁₀/PM_{2.5} ratio of 1.85 and a TSP/PM_{2.5} ratio of 3.33. The ratios used to calculate PM₁₀ and TSP from PM_{2.5} in the Air Quality Impact Assessment are more conservative than those recommended by Lall et al.

The model settings and assumptions used in AERMOD and CALROADS followed the MOE protocols, and were conservative where assumptions were made. AERMOD was used to model emissions within the proposed Limebeer Pit, and CAL3QHCR was used to model emissions from the haul road. The two phases resulting in worst-case emissions and impacts at the nearby sensitive receptors were modelled to capture the absolute worst-case results. Surface meteorological data was obtained from the Toronto Pearson International Airport and upper air data from the National Weather Service station at Buffalo, N.Y. These are the MOE recommended meteorological stations for the study area.

Emission rates were determined based on the calculations and assumptions provided in US EPA AP-42 Chapter 13.2.2 for Unpaved Roads and Chapter 13.2.3 for Aggregate Handling and Storage Piles. Tailpipe emissions were determined using the US EPA Mobile 6c model. AERMOD was modelled using the ‘OPENPIT’ source designation, which is applicable to aggregate pit operations.

The worst-case predicted concentrations from AERMOD and CALROADS were combined at each sensitive receptor, and then added to background concentrations. This results in conservative results, as it is unlikely that the worst-case concentrations would occur simultaneously from activities with the proposed Limebeer pit (AERMOD) and the haul roads (CAL3QHCR). The conservative results showed the applicable air quality criteria to be met at all identified sensitive receptors. It was noted that the PM₁₀ 24-hour Ontario interim standard was exceeded immediately adjacent to the property, to the east, during calm winds occurring late in the season.

2.0 Conclusions

Overall, the assessment was completed in a conservative manner and followed MOE modelling protocols. Applicable US EPA methods were used for determining emission rates and assumptions when necessary. The results showed the air quality criteria to be met at all sensitive receptors. Combined impacts considered the maximum predicted concentration from the AERMOD and CAL3QHCR models, which likely over-predict worst-case concentrations as it is unlikely that the maximum concentrations from each model would occur simultaneously. Exceedances of the PM₁₀ interim standard were exceeded adjacent to the property boundary line.

Recommendation: The recommended dust management plan should be implemented to minimize any potential impacts offsite and this management plan should be embedded or directly referred to in the operating/site plans to be submitted to the Ontario Ministry of Natural Resources as part of the permit application for Category 1, Class A Licence under the Aggregate Resources Act.

We have no further recommendations regarding the Air Quality Impact Assessment.

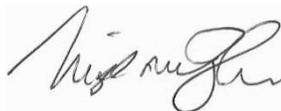
Please do not hesitate to contact us should have any questions regarding our review.

Sincerely,

Novus Environmental Inc.



Jenny Vesely, P.Eng.
Air Quality Engineer



Nigel Taylor, M.Sc., EP
Principal, Vice President