

## Proposed Burlington Quarry Expansion JART COMMENT SUMMARY TABLE – Air Quality

Please accept the following as feedback from the Burlington Quarry Joint Agency Review Team (JART). Fully addressing each comment below will help expedite the potential for resolutions of the consolidated JART objections and individual agency objections. **Additional, new comments may be provided once a response has been prepared to the comments raised below and additional information provided.**

	JART Comments (February 2021)	Reference	Source of Comment	Applicant Response (July 2021)	JART Response January 2022
<b>Report/Date: Air Quality Study, March 2020</b>		<b>Author: BCX Environmental Consulting</b>			
1.	Their analysis limited the computed air quality impacts by breaking the project up into smaller segments (phases) which were each evaluated separately. The BCX report should clearly indicate whether any of the phases will overlap.	General	Gray Sky Solutions	No, the phases will not overlap.	Comment addressed.
2.	The dispersion model receptors were restricted to areas immediately surrounding the facility and did not include any receptors at distances further away from the facility, including areas of larger population (and exposure). Most of the larger computed impacts were fairly close to the sources, however it would be useful to also have estimated impacts in a larger geographical area. The modelled receptors should include a broader geographic area, extending to at least 5.0 kilometres from the facility.	General	Gray Sky Solutions	<p>Typically the study area for an air quality study for an aggregate quarry is 1km because the highest concentrations fall close to the property line. For this study, BCX conservatively chose approximately a 3km study area to demonstrate to residents in the vicinity of the quarry that air quality criteria will be met.</p> <p>Within the 3km, the highest concentrations occur at the closer receptors to the quarry and are below the air quality criteria. At 5km the concentrations are lower and will still be below the air quality criteria. At 5km, the concentrations are close to background levels. (i.e. the quarry has little or no impact on air quality at 5km)</p> <p>The air quality study is not intended to be a risk assessment/population exposure study.</p>	Comment addressed.
3.	<p>The analysis appears to include a fairly thorough inventory of all the various emission-generating activities in each phase, however they relied almost entirely on US EPA AP-42 emission factors, many of which have very low data quality ratings, and some of which are not directly applicable to the source in question at the proposed facility. The AP-42 document makes it very clear that these lower rated emission factors should only be used as a last resort, and it is highly recommended that source-specific emission factors should be sought, either from source testing at the facility, or from directly applicable source tests from similar nearby sources. Although there may not be any better (textbook) or more recent data sources for some of these activities, many of the AP-42 emission factors were obtained from very old sources (over 40 years old) and are only marginally related to the activities at the proposed Burlington site. Using such low quality emission factors will likely result in significantly large uncertainties in the modeled air quality impacts. A range of potential emission levels (and exposures) should be developed based on lower and upper bound emissions factors (which generally exist in AP-42 and its supporting documents). A careful review of each of the emissions factors used in the BCX analysis should be conducted to determine those emission factors that are not representative of actual emission levels at the proposed site, and the potential errors (and possible underprediction) due to the use of the emission factors to estimate emission levels. Source testing of existing operations at the facility should also be conducted where applicable.</p> <p>The SO<sub>2</sub> emission factors that were used for diesel-fired engines are rated (in AP-42) as quality D (marginal), and the B(a)P emissions factors for diesel engines are rated E (marginal). The emission factors for Sand and Gravel processing were obtained from</p>	General	Gray Sky Solutions	<p>US EPA AP-42 emission factors are standardly accepted by the Ontario Ministry of the Environment, Conservation and Parks (Ministry) for air quality studies and Environmental Compliance Approvals (ECAs) for aggregate sites.</p> <p>The key to using these emission factors is to ensure that the emission scenarios assessed are conservative (i.e. they represent maximum emissions scenarios).</p> <p>For this study, the following conservative assumptions were made:</p> <ol style="list-style-type: none"> <li>1. All operations were assumed to occur simultaneously at their maximum rates unless specifically limited. In reality, this will not occur.</li> <li>2. Truck volumes used were very conservative.</li> <li>3. Assumed all NO<sub>x</sub> emissions are converted to NO<sub>2</sub> (i.e. the ozone limiting</li> </ol>	<p>The US EPA AP-42 emissions factors may, in fact, be accepted by the Ontario Ministry of the Environment, Conservation and Parks (Ministry), however that doesn't mean that the emission factors are applicable to this quarry, or even marginally accurate. Within the documentation (appendices) provided in AP-42 is important information regarding the sources of the data that were used to develop the emissions factors, including ranges of values that were obtained from source tests at various sources. These data could be used to evaluate the potential range of emission factors that may be appropriate for the quarry and could therefore be used to develop an analysis of the uncertainty of the emissions factors and the resulting uncertainty of the modeling results (which may be considerable) that were obtained using the AP-42 emissions factors. An uncertainty analysis would provide a range of potential air quality concentration impacts, rather than a single estimate of the impacts.</p> <p>AP-42 clearly states that those emissions factors that are rated as marginal in quality should only be</p>

	<p>AP-42, Section 11.19.2 (mistakenly quoted in BCX Appendix B as Section 11.9.2), where it is stated that “The emission factors for industrial sand storage and screening presented in Table 11.19.1-1 are not recommended as surrogates for construction sand and gravel processing, because they are based on emissions from dried sand and may result in overestimates of emissions from those sources. Construction sand and gravel are processed at much higher moisture contents.” PM emission factors for controlled tertiary crushing and controlled and uncontrolled screening were taken from AP-42, Section 11.19.2, and are all rated E (marginal). As stated in AP-42 (Section 11.19.2.2), “Factors affecting emissions from either source category [stone quarrying or processing] include the stone size distribution and the surface moisture content of the stone processed, the process throughput rate, the type of equipment and operating practices used, and topographical and climatic factors.” PM emission factors for conveyor transfers and rock truck unloading were also taken from AP-42 (Section 11.19.2) and are all rated E (marginal). Estimates of emission rates using emission factors from AP-42 that are rated D or E cannot be considered reliable for the Burlington Quarry facility.</p>			<p>methods (OLM) were not used).</p> <ol style="list-style-type: none"> <li>4. Wet/dry depletion options were not used in modelling.</li> <li>5. Met anomalies were not removed as is permitted by the Ministry.</li> <li>6. Conservative background concentrations were added to the maximum concentrations at sensitive receptors.</li> </ol> <p>Based on this, emission estimates are expected to be conservative.</p>	<p>used as a last resort, if no local or site-specific data are available. The quarry has been operating for a number of years, and site-specific source test data could have easily been obtained that would provide better emission factor estimates than those from AP-42.</p> <p>The list of reasons that were provided that purportedly provide evidence that the estimated air quality impacts were “conservative” do not include any consideration of the emission factors that are the most important component of the emissions estimates.</p>
4.	<p>Although the estimated (modeled) levels of particulate matter (PM) were below acceptable “air quality criteria”, there are still potential health effects (mortality and morbidity risk) associated with the emitted PM and these additional risks should be evaluated.</p>	General	Gray Sky Solutions	<p>This air quality study (AQS) relies on air quality standards set by the province or Environment Canada where provincial standards are not available.</p> <p>This AQS considers the health effects of PM by comparing PM2.5 modelled concentrations against the Canadian Ambient Air Quality Standards (CAAQS). The PM2.5 standards have been set by the Canadian Council of Ministers of the Environment (CCME) to be protective of health.</p> <p>The assessment very conservatively compares the maximum 24-hour and annual concentrations to the CAAQS which are in fact based on a 3-year average of the annual 98th percentile of the daily 24-hour average concentrations and 3-year average of the annual average of the daily 24-hour average concentrations, respectively.</p> <p>The maximum concentrations of PM2.5 at the property line and at all sensitive receptors are below the CAAQS.</p> <p>The AQS is not intended to be a risk assessment.</p>	Comment addressed.

5.	<p>The background level for B(a)P was obtained from monitoring data collected at Newmarket and Simcoe (Barrie), which are located 78.0 kilometres and 109.0 kilometres, respectively, from the Nelson quarry, and are likely not representative of the air quality in the vicinity of the quarry. Further analysis of these data needs to be performed to justify their use in establishing background B(a)P levels, including potentially collecting local B(a)P data to determine background B(a)P levels.</p>	General	Gray Sky Solutions	<p>The background level for B(a)P was obtained from the Simcoe National Air Pollution Surveillance (NAPS) ambient monitoring station located in the township of Simcoe (not Barrie) approximately 65km southwest of the Nelson Quarry. This station is located in a reasonably similar rural/suburban location to the site.</p> <p>Air quality studies (AQS) in Ontario rely on background data from ambient stations and this AQS follows the accepted approach in Ontario.</p> <p>B(a)P data is also available from one closer ambient monitoring station, the Toronto West MECP ambient monitoring station (approximately 50km away). This station is within the City of Toronto adjacent to a major highway.</p> <p>A comparison of the B(a)P data from both stations shows that the background levels are similar. The background chosen is, therefore, considered representative and fairly consistent across Ontario.</p>	Comment addressed.
6.	<p>The meteorological preprocessor for the AERMOD model (AERMET) has been updated (in 2011) to include a separate processing tool (AERMINUTE) that is recommended to be used to account for calm wind speeds when using hourly wind data from nearby airports. The BCX report should indicate where the meteorological data were obtained (and assess whether it is close enough to reliably represent conditions at the Burlington site), and whether one-minute (ASOS) wind data were used to reduce the number of calm winds (using AERMINUTE). The AERMOD computer files that were received do not include the AERMET processing files.</p>	General	Gray Sky Solutions	<p>The regulatory body, Ontario Ministry of the Environment, Conservation and Parks (Ministry) processed the surface and upper meteorological data using AERMET to develop an AERMOD ready site-specific met set to be used for this site. The Ministry has their own procedure to treat calm hours from the met data set. The Ministry does not include the AERMET processing files when they provide the AERMOD ready site-specific met set.</p>	Comment addressed.

7.	<p>The BCX modeling report indicates that the traffic was represented in the modeling using a “typical shipping” assumption. However the traffic report for the proposed quarry extension (Paradigm Transportation Solutions Limited, report dated February 2020) indicates that “the site’s the weekday AM peak hour truck generation is forecast to be 111 truck trips...”, which is significantly greater than the average daily truck traffic and would therefore generate much higher emissions during morning hours. The modeling therefore needs to include a non-uniform diurnal distribution of traffic emissions that includes the peak AM traffic density.</p>	General	Gray Sky Solutions	<p>Per the Traffic Study (Feb 2020), 111 truck trips means 56 inbound and 55 outbound trips (i.e. one-way trips). Trucks/day or trucks/hr in the Air Quality Study (AQS) means a two-way round trip of those trucks for the purposes of emission estimates. 111 truck trips will be equivalent to 56 trucks/hr in the AQS.</p> <p>Using a 24-hr average emission rate is an acceptable method per the Ministry guidance documents for contaminants with 24-hr average standards such as PM2.5. For this AQS, the daily truck emission rate (daily truck traffic emissions over 24 hrs is assumed to occur equally over 24 hrs. Since, dispersion is typically poor at night and truck traffic will be minimal at night, this approach will result in a similar or more conservative 24-hr average concentration than if a non-uniform diurnal distribution of traffic emissions was assumed.</p> <p>Furthermore, daily trucks entering the site assumed in the air quality study was 469 to 681(trucks/day depending on the month), which is very conservative compared to the approximate equivalent of 400 trucks per day in the traffic study.</p> <p>The AQS assumed for contaminants with 1-hr average standards (e.g. Nitrogen Dioxide (NO2)), an hourly truck rate of 67 to 84 trucks/hour (depending on month). The AQS 67 to 84 trucks/hour is equivalent to <math>67 \times 2 = 134</math> to <math>84 \times 2 = 168</math> truck trips in the Traffic Study. The hourly truck number used for the AQS is much higher than the 111 truck trips (peak hour) in the Traffic Study.</p> <p>The AQS did not use a “typical shipping” assumption and used a very conservative worst case shipping assumption.</p> <p>BCX worked in collaboration with Paradigm Transportation Solutions Limited and was aware of the conservative AQS truck assumptions compared to the traffic study. BCX purposely kept the theoretical worst case assumptions to be conservative.</p>	<p>It is a fairly simple task to include a diurnal profile of emissions in the AERMOD model to address the non-uniform distributions of hourly truck traffic. Although (as the MHBC response states) dispersion is typically poor at night (resulting in higher concentration impacts per truck trip for those hours), dispersion is also often poor in the early morning hours which would potentially increase the impacts significantly during those hours when peak traffic densities are expected to occur. The modeling needs to be revised to account for the peak hourly truck traffic (111 trips per hour).</p>
8.	<p>Does Nelson track or have any data on emissions or undertake monitoring related to air quality from their current operation?</p>	General	Halton Region	<p>Nelson has a detailed Dust Management Plan.</p> <p>Nelson completes monitoring checklists from their Dust Management Plan.</p> <p>With the DMP in place, dust from the site is expected to be minimized.</p>	<p>How do we know this is the case if no active monitoring is provided? (Point observation checklists only.) How does the proposal contribute to the overall improvement of air quality in Halton Region?</p> <p>Dust clouds were observed on the site visit</p>

						(November 24, 2021), and a delegation raised dust as an issue at the Region's statutory public meeting. Dust is to be mitigated on site (Provincial Standards, Category 2, section 3.1). This standard does not appear to be met by the current operation today. The application needs to demonstrate on the site plan the improvements to be made to contain dust on site.
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