HGC ENGINEERING

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VIA E-MAIL: krysta.paudyn@lafargeholcim.com

Ms. Krysta Paudyn
Lafarge Canada Inc.
6509 Airport Road
Mississauga, Ontario
L4V 1S7

Re: Noise Monitoring of the Lafarge Canada Inc. Oro Pit

Dear Ms. Paudyn,

As you are aware, HGC Engineering conducted acoustical measurements and monitoring in the vicinity of the Lafarge Oro Pit near Oro, Ontario, on several occasions between March 2013 and August 2016, to satisfy a condition in the pit plan that was approved by the Ministry of Natural Resources and Forestry ("MNRF"). Specifically, the condition required that sound monitoring be conducted before and after pit start-up, including one day of every two months during operations in the first year, to ensure that the applicable limits of the Ontario Ministry of the Environment and Climate Change ("MOECC") are satisfied.

This letter provides details of the sound level measurements undertaken to satisfy the above noted condition, the results of which indicate the sound levels of the Lafarge Oro Pit comply with the applicable MOECC limits at the surrounding points of reception.

1 DESCRIPTION OF SITE AND SURROUNDING AREA

The Lafarge Oro Pit is located at 2217 7th Line North, approximately ten kilometres northeast of Barrie. Activities at the site include aggregate extraction, processing (i.e. screening, crushing and washing) and shipping. The primary sources of noise at the site are the aggregate screening/crushing/washing equipment, supporting mobile equipment (e.g. front end loaders) and shipping trucks.

The surrounding non-Lafarge owned lands host several noise sensitive points of reception, including existing homes west, south and north of the site, labelled as locations M1 through M4 in Figure 1. During the various site visits by HGC Engineering personnel, the acoustic environment in the vicinity of the Oro Pit was observed to be comprised of natural sounds and occasional road traffic on 7th Line North, and is best categorized as a Class 3 acoustic environment under MOECC assessment guidelines.

2 SOUND LEVEL CRITERIA

The MOECC noise assessment guidelines draw a distinction between sound produced by traffic sources and that produced by industrial or commercial activities, which are classified as *stationary sources of sound*. In general, the acceptability limits for stationary sources are site dependent, and the sound from the stationary sources is evaluated against (i.e. compared to) the typical background sound at any potentially impacted, noise-sensitive points of reception (e.g., residences). Background sound is considered to include road traffic sound and other typical sounds, but excludes the sound of the facility under assessment. MOECC Publication NPC-300, "Stationary and Transportation Sources – Approval and Planning" is the relevant guideline for developing applicable sound level limits.

Publication NPC-300 stipulates that the sound level limits for a stationary source operating in a Class 3 acoustical environment are the greater of the minimum one-hour energy-equivalent (average) background sound level, or the exclusionary minimum limits of 45 dBA during daytime hours (07:00 to 19:00) and 40 dBA during evening/nighttime hours (19:00 to 07:00).

Observations and measurements conducted in the vicinity of the points of reception neighbouring the Oro Pit indicate that average background sound levels at these locations are likely to be as low as the exclusionary minimum limits outlined above during quieter hours of the day/evening/night, which are thus the applicable criteria.

3 MEASUREMENT METHODS & RESULTS

Sound level monitoring was conducted at locations M1 through M4 between March 25 and 31, 2013, prior to pit start-up, and for one day of every second month following start-up of the pit between August 2015 and June 2016, inclusive. Lafarge personnel confirmed that the pit was operating normally during each of the 2015/2016 measurement dates. All measurements were conducted using *Norsonic* model N140 and *Brüel & Kjær* model 2236 and 2238 sound level meters. Correct calibration was field verified before and after each measurement. Meteorological conditions during the measurement periods were suitable for outdoor acoustical measurements.

The key quantity recorded during the measurements was the L_{90}, which represents the sound level that is exceeded 90 percent of the time over the duration of the measurement, and is therefore useful in identifying the contribution of steady sources such as sound emissions from the Oro Pit to the overall sound level, and rejecting transient sounds such as road traffic. Although the sound from mobile equipment and onsite shipping trucks is also transient in nature, such sounds from the Oro Pit were generally observed to be inaudible over the steady sound emissions from the aggregate processing equipment, when the Oro Pit was audible at all. Much of the time, the measured L_{90} sound levels included some contribution of, or were entirely dominated by sound from other neighbouring pit operations and natural sounds, such that the measured L_{90} sound levels are a generous overestimate of sound from the Oro Pit alone.

The measurement results are summarized in Table 1, below.

Table 1: Summary of Measured Sound Levels, $L_{90\text{-}1\ hr}$ [dBA]

Date	Location											
	M1			M2			M3			M4		
	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg
Mar. 25-31/13*	<30	45	33	<30	40	33	<30	44	33	<30	46	34
Aug. 21/15	33	41	36	41	46	44	36	39	38	35	41	37
Oct. 23/15	<30	37	34	30	40	35	30	36	34	<30	40	35
Dec. 11/15	38	40	39	37	47	38	39	44	42	38	44	41
Feb. 18/16	<30	36	32	<30	39	36	<30	42	38	<30	32	33
Apr. 20/16	31	39	33	36	49	43	31	39	35	32	40	37
Jun. 14/16	35	39	37	32	37	33	<30	34	33	<30	33	31

* Prior to start-up of the Oro Pit.

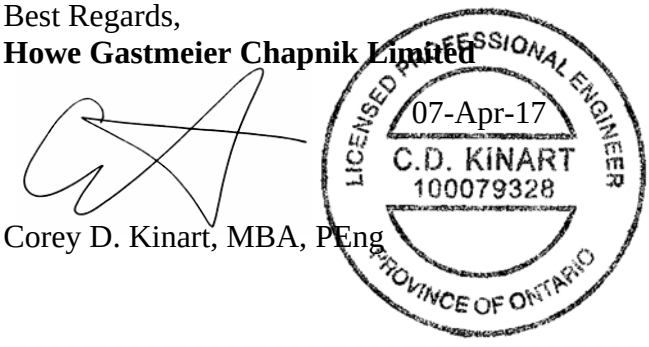
4 DISCUSSION & CONCLUSION

It is evident from the data presented in Table 1 that the majority of the sound level measurements conducted following start-up of the Oro Pit were within the applicable daytime and nighttime sound level limits of 45 and 40 dBA, respectively. Although the maximum and average sound levels were greater than the limits at some locations on some occasions, the Oro Pit was never audible at those locations, on those same occasions; thus, those sound levels are not representative of the Oro Pit, as they were comprised almost entirely of background sound. In fact, the Oro Pit was observed to be faintly audible only in October (M1/M4), February (M2), April (M1/M4) and June (M1/M4); the measured sound levels on those occasions/locations were all within the most stringent nighttime limit of 40 dBA.

Based on the sound level measurements and observations discussed above, the sound levels of the Lafarge Oro Pit comply with the applicable MOECC limits at the surrounding points of reception.

Trusting this satisfies your current requirements, if you have any questions or require anything additional, please do not hesitate to contact the undersigned.

Best Regards,
Howe Gastmeier Chapnik Limited



Corey D. Kinart, MBA, PEng

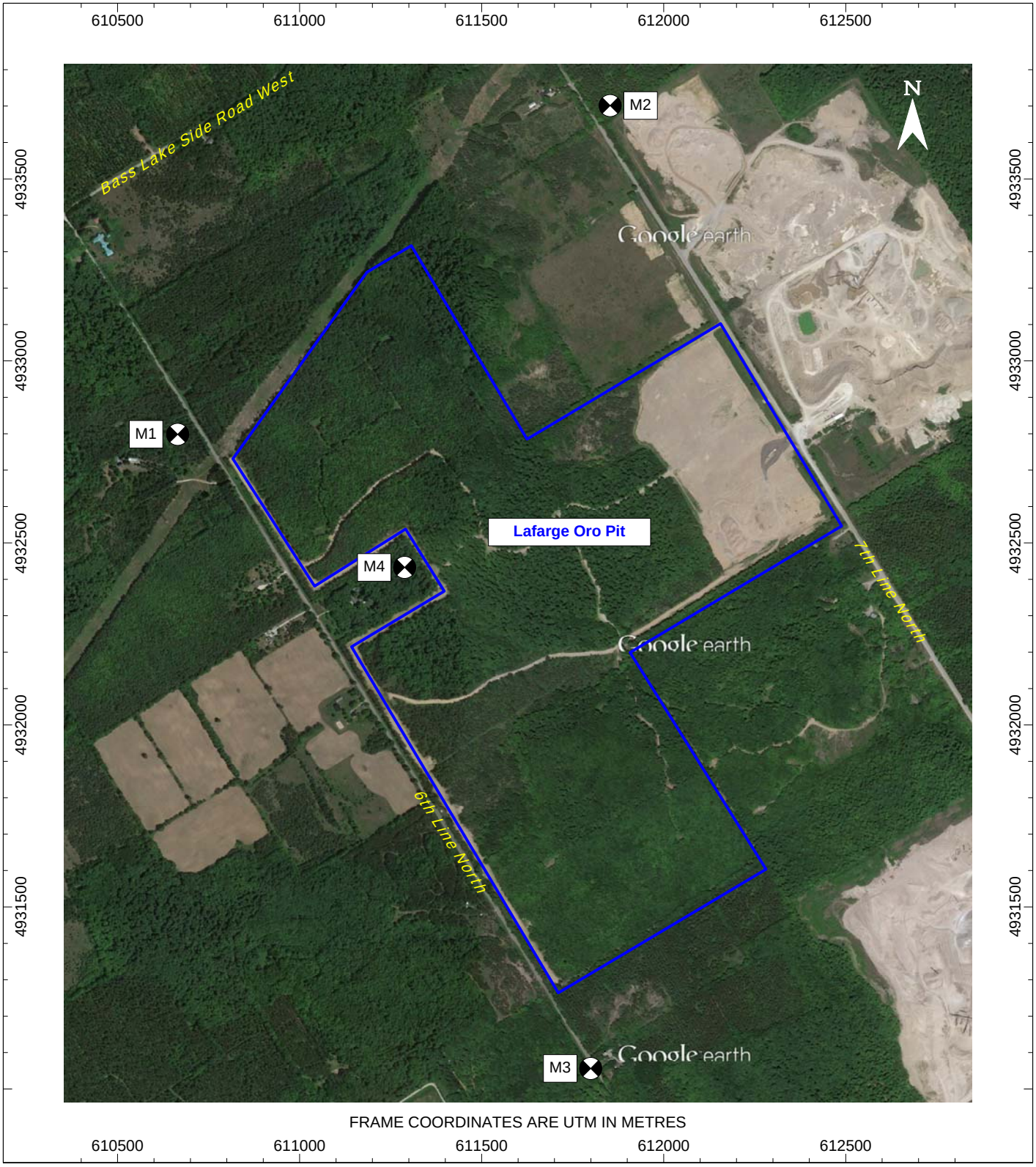


Figure 1: Satellite Image Showing Lafarge Oro Pit and Noise Measurement Locations