REPORT

Noise Impact Assessment

Port Colborne Quarries Inc. Pit 3 Extension

Submitted to:

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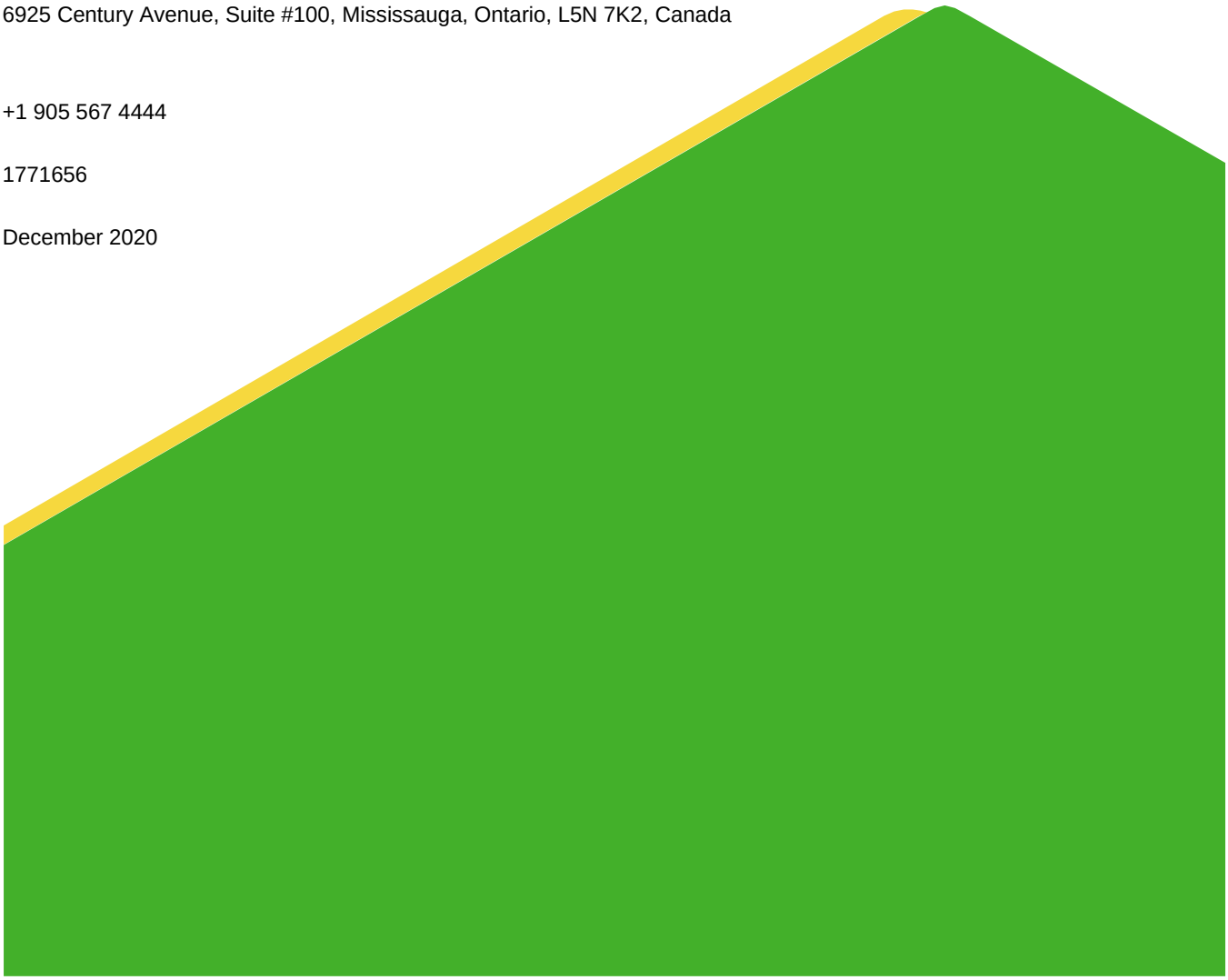

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1.0 INTRODUCTION

Golder Associates Ltd. (Golder) was retained by Port Colborne Quarries Inc. (PCQ) to prepare a Noise Impact Assessment (NIA) in support of a licence application under the *Aggregate Resources Act* (ARA) for a Category 2, Class A, Quarry Below the Water (MNRF License No. 17348) associated with the proposed Pit 3 Extension Part of Lot 17, 18 and Lot 19 Concession 2, Port Colborne, Ontario (the Site).

The Site will be an operational extension to the existing quarry owned and operated by PCQ – Pit 3 under licence 4444. The licence area for the proposed Pit 3 extension is approximately 106.3 hectares. A site location plan showing the proposed extent of extraction and licenced boundary for the Site is provided on Figure 1.

For the purpose of this assessment, forty eight (48) existing Point(s) of Reception (POR(s)) were selected as being representative of the most impacted sensitive receptors in all directions around the Site and identified as POR001 through POR048 (see Figure 2). The nearest POR (POR048) is located approximately 7.5 m east of the Proposed Extension Boundary of the Pit 3.

The Site and surrounding lands are utilized for residential, agricultural, and mineral extraction purposes. A zoning plan for the Site and surrounding land use is provided in Appendix A.

Sound level limits for the proposed Site operations on neighbouring receptors were established in accordance with the Ministry of the Environment, Conservation and Parks (MECP) guideline, NPC 300 “Environmental Noise Guideline, Stationary and Transportation Sources – Approval and Planning”. Noise predictions of the proposed Site operations onto neighbouring PORs were completed to determine the potential noise levels. To help understand the analysis and recommendations made in this report, a brief discussion of noise terminology is provided in Appendix B.

2.0 SITE OPERATIONS

Current operations at the existing PCQ quarry include: extraction, processing and offsite transport. The extracted material is processed using a permanent processing plant located in the western part of the Site. The processing plant includes the following major pieces of equipment: crushers, screens and a washplant. The extracted material is hauled from the quarry to the processing plant using Terex60 haul trucks (or equivalent). Based on available information, the equipment planned for the Pit 3 extension will include a loader typically operating within 30 m of the working quarry face and a drill used for blasting support. The drill is expected to operate concurrently with the extraction equipment. Extracted material will be hauled to the processing plant using existing; haul routes (i.e., through excavated areas west of the Pit 3 extension area) and haul trucks (or acoustically equivalent). The primary noise sources are summarized in Table 1.

Table 1: Facility Noise Source Summary

Source ID	Source Description	Overall Sound Power Level [dBA] (1)	Source Location	Sound Characteristics	Noise Control Measures
SC_W_UU	Screen 155E – upper deck west	127	O	S	U
SC_W_LU	Screen 155E – lower deck west	127	O	S	U
SC_E_UU	Screen 155E – upper deck east t	123	O	S	U
SC_E_LU	Screen 155E – lower deck east	123	O	S	U
IC2_METSO177W	Impact Crusher 177 West	104	O	S	U
IC3_METSO187E	Impact Crusher 187 East	104	O	S	U
JC_NOR	Jaw Crusher Norberg	110	O	S	U
IC4_METSO154	Impact Crusher 154	104	O	S	U
WP_S_W_T	Washplant 155E west screen top	111	O	S	U
WP_C_W	Washplant 155E west side walls	107	O	S	U
WP_S_E_T	Washplant 155E east screen top	111	O	S	U
WP_C_E	Washplant 155E east side walls	107	O	S	U
D	Drill	121	O	S / Q	U
Loader	Loader Extraction	107	O	S	U
HT_PP_EA_E	Haul truck empty(2)2)	112	O	S	U
HT_EA_PP_F	Haul truck full(2) (2)	116	O	S	U
HT	Highway truck(2) (2)	102	O	S	U

Notes:

1) Values presented in Table 1 do not include adjustments that may have been considered in the modelling (i.e. time weighting)
2) Up to 10 trips per hour assessed

Noise Source Summary Table Nomenclature

Source Location

O - located/installed outside the building, including on the roof
I - located/installed inside the building

Sound Characteristics

S – Steady
Q - Quasi Steady Impulsive
I – Impulsive
B – Buzzing
T – Tonal
C – Cyclic

Noise Control Measures

S - Silencer, Acoustic Louver, Muffler
A - Acoustic Lining, Plenum
B - Barrier, Berm, Screening
L – Lagging
E - Acoustic Enclosure
O – Other
U - Uncontrolled

Noise Control Barriers

The following berms (or acoustically equivalent measures/barrier) will be implemented prior to extraction taking place within the extension area:

- A 4 m high (above existing grade) berm along the south property line.
- A minimum 2 m high (above existing grade) berm along the east and north property lines of the extension area.

The location of the property line berms is shown in Figure 3. The berms will be required to protect respective PORs when extraction is occurring in certain locations. The extents of the berms are based on conservative assumptions regarding the setback distance between the drilling / blasting locations and the surrounding PORs and roadways. PCQ will be incorporating the above-mentioned perimeter berms as part of the design of the extension area, however the specific requirements, including timing for implementation and the ultimate height requirement, will be determined through monitoring of site activities as the area(s) of extraction move towards the identified PORs as blast monitoring data will help determine the setback distance between the drill and PORs.

In addition to the property line berms the following provides a description of additional operational controls that will be implemented.

Quarry Operation

The quarry will be extracted through multiple lifts, as the noise levels are expected to be the highest when the equipment is located at the highest grade (i.e. during the first lift), this assessment presented the expected levels associated with the extraction of the first lift. A quarry lift height of 8 m for the first lift was considered in the modelling. The extraction within the extension area will be competed in three phases: Phase 1 (including subphase 1A and 1B), Phase 2 and Phase 3 as presented in Figure 2. The area associated with Phase 1 consist of the majority of the south, center, and east areas of the extension area. It is considered that the extraction will begin in the northwestern area of Phase 1 of the extension area and will generally progress in the southeast direction. After completing extraction in the southern area, the extraction face will advance in a northerly direction. The subsequent phases (Phase 2 and Phase 3) will have a working face advancing in a north direction. The direction of the extraction was designed to try to maximize the noise screening by the working face between the equipment and the sensitive noise receptor(s). The extraction equipment will be located on the quarry floor of a given lift, whereas the drill will be located on the top of the lift. As discussed above, as the first lift is expected to result in the highest noise levels at the offsite POR(s) due to minimal shielding provided by the working face, the levels presented in this NIA represent the expected levels associated with the extraction of the first lift. The drill is expected to operate concurrently with the extraction equipment located within the quarry. No additional processing equipment is expected to operate within the quarry area as it is understood the processing equipment will remain at its current location within Pit 1. Should the decision be made to relocate the processing equipment to an alternative location in the future, the required updates to the existing noise assessment will be carried out at that time. Due to typical blasting safety setbacks, a conservative setback from the closest residences was assumed for drilling operations. The extraction equipment was conservatively assessed to operate within the entire footprint of the extension area, but generally operated within 30 m of the working face.

In addition, noise controls in the form of local barriers or equipment with reduced noise emissions will be required to reduce the expected noise levels from the equipment at the identified PORs. The MECP typically requires local barriers to have a minimum surface density of 20 kg/m^2. It is assumed local barriers will be constructed using sea containers, however acoustically equivalent controls, or construction materials can be considered.

The existing processing plant requires an overall noise attenuation of 14 dB to demonstrate compliance with the applicable noise limits at the PORs in closer proximity to the processing plant (i.e., PORs surrounding the west portion of the Site). However, the noise impact from the processing plant on the PORs in closer proximity to the Pit 3 extension (i.e., PORs surrounding the east portion of the Site) is predicted to be below the existing background noise level and, due to the relative setback distances, insignificant when compared to the noise sources operating within the Pit 3 extension.

Areas within the Pit 3 extension requiring specific equipment noise controls (i.e., local barriers or acoustically equivalent) and/or quieter type of equipment are shown in Figure 3. Table 2 presents the barrier height or alternative control (i.e. limiting the sound pressure level of the drill rig) required to achieve compliance with the applicable noise limits, however, acoustically equivalent measures could be considered.

Table 2: Proposed Equipment Noise Control Within Pit 3 Extension

Area Requiring Noise Control (1) for the Respective Extraction Phase	Equipment Specific Noise Control
	Required Noise Controls
1	Drill - local barrier extending 2 m above major noise source associated with the drill
2	Drill - local barrier extending 3 m above major noise source associated with the drill
3	Drill - attenuated equipment (i.e., reduced noise emissions or replace with quieter equipment)

Note 1: See Figure 3 for a representation of the location where mitigation is required.

3.0 POINTS OF RECEPTION

Forty-eight (48) noise sensitive receptors were identified as potentially being the most impacted from the operations of the Site and are located in all directions surrounding the Site. The location of the noise receptors is shown in Figure 2. The identified PORs are summarized below.

- POR001: 352 Chippawa Road: one-story residence located northwest of the Processing Plant;
- POR002: 316 Second Concession Road: two-storey residence located northwest of the Processing Plant;
- POR003: 386 Second Concession Road: one-story residence located northwest of the Processing Plant;
- POR004: 408 Second Concession Road: two-storey residence located north of the Processing Plant;
- POR005: 420 Second Concession Road: one and half storey residence located north of the Processing Plant;
- POR006: 448 Chippawa Road: one-story residence located north of the Processing Plant;
- POR007: 459 Chippawa Road: two-storey residence located north of the Processing Plant;
- POR008: 516 Second Concession Road: one and half storey residence located north of the Processing Plant;
- POR009: 530 Second Concession Road: one and half storey residence located northeast of the Processing Plant;
- POR010: 636 Second Concession Road: one-story residence located northeast of the Processing Plant;
- POR011: 640 Second Concession Road: one-story residence located northeast of the Processing Plant;
- POR012: 642 Second Concession Road: two-storey residence located northeast of the Processing Plant;
- POR013: 644 Second Concession Road: one-story residence located northeast of the Processing Plant;
- POR014: 662 Second Concession Road: one-story residence located northeast of the Processing Plant;
- POR015: 708 Second Concession Road: one-story residence located northeast of the Processing Plant;
- POR016: 874 Second Concession Road: one-story residence located northeast of the Processing Plant;
- POR017: 2199 Babion Road: one-story residence located northeast of the Processing Plant;
- POR018: 1246 Second Concession Road: one and half storey residence located east of the Processing Plant;
- POR019: 1740 Second Concession Road: one-story residence located east of the Processing Plant and north of the Phase 3 extraction area;
- POR020: 2024 Miller Road: one and half storey residence located east of the Processing Plant and east of the Phase 3 extraction area;
- POR021: 1903 Miller Road: two-storey residence located east of the Processing Plant and east of the Phase 3 extraction area;

- POR022: 1836 Miller Road: one-story residence located east of the Processing Plant and east of the Phase 3 extraction area;
- POR023: 1826 Miller Road: two-storey residence located east of the Processing Plant and east of the Phase 3 extraction area;
- POR024: 1778 Miller Road: one-story residence located east of the Processing Plant and east of the Phase 2 extraction area;
- POR025: 1732 Miller Road: one-story residence located east of the Processing Plant and east of the Phase 2 extraction area;
- POR026: 1682 Miller Road: two-storey residence located east of the Processing Plant and east of the Phase 2 extraction area;
- POR027: 1630 Miller Road: one-story residence located east of the Processing Plant and east of the Phase 1 extraction area;
- POR028: 1580 Miller Road: two-storey residence located east of the Processing Plant and east of the Phase 1 extraction area;
- POR029: 1498 Miller Road: one-story residence located east of the Processing Plant and east of the Phase 1 extraction area;
- POR030: 1359 Miller Road: two-storey residence located east of the Processing Plant and east of the Phase 1 extraction area;
- POR031: 1838 Main Street: one-story residence located southeast of the Processing Plant and east of the Phase 1 extraction area;
- POR032: 1751 Main Street: three-storey residence located southeast of the Processing Plant and south of the Phase 1 extraction area;
- POR033: 1695 Main Street: two-storey residence located southeast of the Processing Plant and south of the Phase 1 extraction area;
- POR034: 1627 Main Street: one-story residence located southeast of the Processing Plant and south of the Phase 1 extraction area;
- POR035: 1577 Main Street: three-storey residence located southeast of the Processing Plant and south of the Phase 1 extraction area;
- POR036: 1266 Weaver Road: two-storey residence located southeast of the Processing Plant and south of the Phase 1 extraction area;
- POR037: 1331 Main Street: two-storey residence located southeast of the Processing Plant and southwest of the Phase 1 extraction area;
- POR038: 1413 Lorraine Road: two-storey residence located southeast of the Processing Plant and west of the Phase 1 extraction area;
- POR039: 966 Main Street: two-storey residence located southeast of the Processing Plant;

- POR040: 1516 Babion Road: one and half storey residence located southeast of the Processing Plant;
- POR041: 1540 Babion Road: one-story residence located southeast of the Processing Plant;
- POR042: 831 Main Street: one-story residence located southeast of the Processing Plant;
- POR043: 1587 Snider Road: one and half storey residence located southeast of the Processing Plant;
- POR044: 1607 Snider Road: one and half storey residence located southeast of the Processing Plant;
- POR045: 667 Main Street: one and half storey residence located southeast of the Processing Plant;
- POR046: 548 Main Street: three-storey residence located south of the Processing Plant;
- POR047: 130 Berkley Avenue: one-story residence located south of the Processing Plant;
- POR048: 281 Chippawa Road: two and half storey residence located west of the Processing Plant.

PORs for which receptor building heights could not been identified either through available imagery or during onsite investigations were conservatively assessed at a height of 4.5 m.

4.0 ASSESSMENT CRITERIA (PERFORMANCE LIMITS)

Based on a review of the area, it is expected the PORs in the vicinity of the Site could reasonably be defined as a combination of Class 2 and Class 3 area as per MECP publication NPC-300. The receptors located to the west and south of the current operation and receptors located south of the proposed Phase 1 extraction area (i.e. receptors west and south of the Site) have a character of a Class 2 area. The receptors located to the north and east of the proposed Phase 2 and Phase 3 extraction areas are best described as a Class 3.

A Class 2 area can best be described as a combination of noise levels characteristic of typical urban areas including a contribution of road traffic and existing industry, and a rural area with an acoustical environment that is dominated by natural sounds, having little road traffic.

A Class 3 area is described as a rural area with an acoustical environment dominated by natural sounds, having little road traffic during both daytime, evening and night-time periods.

In assessing stationary noise sources, the MECP has established sound level limits for Class 2 and Class 3 areas.

- MECP Class 2 area exclusionary limit of 50 dBA in the daytime period of 07:00-19:00, 50 dBA in the evening period of 19:00-23:00 and 45 dBA in the night-time period of 23:00-07:00.
- MECP Class 3 area exclusionary limit of 45 dBA in the daytime period of 07:00-19:00, 40 dBA in the evening period of 19:00-23:00 and 40 dBA in the night-time period of 23:00-07:00.

As full Site activities (including processing plant and drilling activities) are generally limited to the daytime period only (i.e. 07:00-19:00), the noise levels from the Site's worst-case operations was assessed against the applicable daytime One Hour Equivalent Sound Level (L_{eq}) MECP exclusionary sound level limits.

5.0 IMPACT ASSESSMENT

5.1 Methodology

All relevant sound levels for sources were based on; site measurements of equipment operating at the Port Colborne Quarry completed on June 27, 2019 and September 22, 2020 using a Larson Davis 831 and NTI sound level meter/real-time analyzer, and data from Golder's database of similar sources. Data collected during the site visits is included in Appendix C. The weather conditions during the measurements are summarized in Appendix D. All measurement equipment used in this study meets the MECP requirements. The instrument was calibrated before and after all sound level measurements and the calibration verified. Instrument calibration certificates are attached in Appendix E. Sound levels have been documented in 1/1 octave band level format. Noise level predictions were generated using this data.

The predictive analysis was carried out using the commercially available software package Cadna/A V2020 MR1 (177.5010). The predicted levels take into consideration that the sound from a stationary point noise source spreads spherically and attenuates at a rate of 6 dB per doubling of distance. Further, attenuation from barriers, ground effect and air absorption may be included in the analysis as determined from ISO 9613 (part 2), which is the current standard used for outdoor sound propagation predictions. It should be noted that this standard makes provisions to include a correction to address for downwind or ground-based temperature inversion conditions. Noise predictions have been made assuming a downwind or moderate temperature inversion conditions for all PORs, a design condition consistent with the accepted practice of the MECP and MNRF.

As described in ISO 9613 (Part 2), ground factor values that represent the effect of ground on sound levels range between 0 and 1. Based on the specific site conditions, the ground factor value used in the modelling was a ground factor value of 0.2 within the Site, 0 for water bodies and a value of 1 for all other areas. Attenuation from intervening structures (i.e., stockpiles) and woodlots were conservatively not considered in the noise modelling.

5.2 Noise Impact Prediction Assumptions and Recommendations

Assumptions were made in calculating the potential noise levels of the proposed operations on the identified PORs near the Site. It is recommended that the following are implemented:

- Extraction and processing operations will occur during the daytime period only (i.e. 07:00-19:00 hours);
- General extraction progression, as outlined in Figure 3, will be followed;
- Assessment considers conservative drilling/blasting setback distances for the purposes of assessing noise emissions associated with the drill. However, the actual setback distance will be confirmed through blast monitoring;
- With the exception of any existing berms that are required to be removed to access the Pit 3 Extension, all existing on-site and perimeter berms were considered in the acoustic model and shall remain;
- The material will be extracted using two benches, with the first bench typically being 8 m high;
- For extraction within the extension area, the equipment will operate as specified in Section 2.0 and is expected to operate continuously unless noted;
- Equipment list and sound power emissions are consistent to those listed in Table 1 (or acoustically equivalent);

- Haul trucks, while onsite, will typically travel at 35 km/h;
- The property boundary berms will be installed as specified in Section 2.0; and
- Local barriers (i.e., sea containers or acoustically equivalent noise controls) will be used for the identified equipment operating within the areas indicated in Figure 3.

6.0 RESULTS

The proposed Site operational sequences, as indicated in Figure 3, were modelled to determine the predictable worst-case noise levels on the identified representative PORs.

Noise levels were determined for extraction, processing and drilling operations with equipment operating on the first lift (i.e., floor of the first lift for the extraction equipment and top of the first lift for the drill) for the respective activity.

Table 3 provides a summary of the predictable worst-case noise levels at each of the identified PORs associated with the daytime operations.

Table 3: Noise Impact Assessment Results

Receptor ID	Phase 1 Area 1 South Predicted Noise Level [dBA]	Phase 1 Area 1 East Predicted Noise Level [dBA]	Phase 1 Area 1 North Predicted Noise Level [dBA]	Phase 1 Area 2 Predicted Noise Level [dBA]	Phase 1 Area 3 Predicted Noise Level [dBA]	Phase 2 Area 1 Predicted Noise Level [dBA]	Phase 3 Area 1 Predicted Noise Level [dBA]	Overall Maximum Noise Level [dBA]	Daytime Noise Limit [dBA]
POR001	43	43	43	43	43	43	43	43	50
POR002	40	40	40	40	40	40	40	40	50
POR003	44	44	44	44	44	44	44	44	50
POR004	45	45	45	45	45	45	45	45	45
POR005	45	45	45	45	45	45	45	45	45
POR006	43	43	43	43	43	43	43	43	45
POR007	43	43	43	43	43	43	43	43	45
POR008	42	42	43	42	42	43	42	43	45
POR009	43	43	43	43	43	43	43	43	45
POR010	41	41	41	41	41	41	41	41	45
POR011	41	41	41	41	41	41	41	41	45
POR012	43	43	43	43	43	43	43	43	45
POR013	41	41	41	41	41	41	41	41	45
POR014	42	42	42	42	42	42	42	42	45
POR015	41	41	41	41	41	42	41	42	45
POR016	40	40	40	40	40	41	40	41	45
POR017	38	38	39	38	38	40	39	40	45
POR018	43	43	44	43	43	45	45	45	45
POR019	36	34	35	35	34	37	45	45	45
POR020	36	35	37	36	36	38	40	40	45

Receptor ID	Phase 1 Area 1 South Predicted Noise Level [dBA]	Phase 1 Area 1 East Predicted Noise Level [dBA]	Phase 1 Area 1 North Predicted Noise Level [dBA]	Phase 1 Area 2 Predicted Noise Level [dBA]	Phase 1 Area 3 Predicted Noise Level [dBA]	Phase 2 Area 1 Predicted Noise Level [dBA]	Phase 3 Area 1 Predicted Noise Level [dBA]	Overall Maximum Noise Level [dBA]	Daytime Noise Limit [dBA]
POR021	37	36	37	36	37	38	39	39	45
POR022	38	37	38	37	37	39	40	40	45
POR023	39	38	39	38	38	40	41	41	45
POR024	38	37	37	37	38	39	43	43	45
POR025	39	38	38	38	39	39	43	43	45
POR026	42	39	39	40	41	40	44	44	45
POR027	42	39	38	39	41	39	43	43	45
POR028	43	41	39	41	43	39	42	43	45
POR029	41	43	38	37	40	38	40	43	45
POR030	42	45	37	40	44	37	38	45	45
POR031	41	48	39	38	39	36	37	48	50
POR032	43	48	42	41	42	39	39	48	50
POR033	43	46	41	41	41	39	39	46	50
POR034	41	41	40	40	38	37	38	41	50
POR035	45	48	44	44	43	41	41	48	50
POR036	43	46	43	43	42	41	41	46	50
POR037	44	47	48	49	45	45	43	49	50
POR038	44	42	44	44	42	43	43	44	50
POR039	44	44	45	45	44	44	44	45	50
POR040	44	44	45	45	44	45	45	45	50
POR041	43	42	44	44	42	43	43	44	50
POR042	40	40	41	40	40	41	41	41	50
POR043	45	45	45	45	45	45	45	45	50
POR044	45	45	46	45	45	46	45	46	50
POR045	44	44	44	44	44	44	44	44	50
POR046	47	47	47	47	47	47	47	47	50
POR047	44	44	44	44	44	44	44	44	50
POR048	47	47	47	47	47	47	47	47	50

There are a number of PORs that are impacted by the noise emissions associated with the Processing Plant. These include POR001 – POR015, POR041, and POR043 to POR048. This is evident in Table 3 as the predicted maximum noise levels are expected to be consistent for the full extraction period of the quarry. PORs such as POR019 and POR037 are expected to be more impacted by the noise emissions associated with the extraction, haulage and drilling activities. The predicted noise levels are expected to fluctuate more at these PORs depending on the proximity and exposure to the extraction equipment.

The overall predicted noise levels, based on proposed site operations described above, are expected to be at or below the performance limits with the implementation of noise control measures as presented in Table 2 and those summarized in Section 7.0. This indicates that the Site can operate in compliance with MECP and MNRF noise limits. Sample calculations are also provided in Appendix F.

7.0 GENERAL SITE OPERATION NOISE CONTROLS

The following summarizes general Site operation noise controls that shall be followed during all of the operational sequences of the proposed extraction area:

- Equipment will be maintained in good condition.
- On-site roadways will be maintained to limit noise resulting from trucks driving over ruts and pot-holes.
- PCQ will be incorporating perimeter berms as part of the design of the extension area. As such, the south, east and north property line berms will be installed prior operations with the extension area. However, the specific berm requirements, including the required height, will be determined through monitoring as the area(s) of extraction move towards the identified PORs.

8.0 CONCLUSIONS

Golder was retained by Port Colborne Quarries Inc. to prepare a NIA in support of a licence application under the ARA to permit the operations of the Port Colborne Quarry Pit 3 extension. Golder established sound level limits according to MECP noise guidelines and compared the predicted noise levels at the identified representative PORs to the established limits. The results indicate that, after the implementation of the identified noise controls or acoustically equivalent measures, the noise levels predicted at representative off-site PORs are expected to be at or below the applicable noise limits. Based on the results presented in this report, it is expected the Site can operate in compliance with MECP and MNRF noise guidelines for all PORs.

9.0 STATEMENT OF QUALIFICATIONS

Refer to Appendix G for Curricula Vitae of the authors of this report.

10.0 LIMITATIONS

Standard of Care

Golder has prepared this report in a manner consistent with that level of care and skill ordinarily exercised by members of the engineering and science professions currently practicing under similar conditions in the jurisdiction in which the services are provided, subject to the time limits and physical constraints applicable to this report. No other warranty expressed or implied is made.

Basis and Use of the Report

This report was prepared for the exclusive use of Port Colborne Quarries Inc. (PCQ) and, once finalized, is intended to support the application of a Category 2, Class A, Quarry Below the Water Table under the ARA associated with the proposed Port Colborne Quarry Pit 3 extension. The draft application and supporting documents are based on observations of Site operations, discussions with PCQ. about current Site practices, review of documentation provided by PCQ and calculations made to predict sound levels at PORs. The report cannot account for changes in Site conditions and operational practices completed after it has been finalized and submitted to PCQ.

The information, recommendations and opinions expressed in this report are for the sole benefit of PCQ and the applicable regulatory authorities that are authorized to rely on the report as Authorized Users, subject to the limitations and purposes described herein. No other party may use or rely on this report or any portion thereof without Golder's express written consent. Any other use of this report by others is prohibited and is without responsibility to Golder. The report, all plans, data, drawings and other documents as well as all electronic media prepared by Golder are considered its professional work product and shall remain the copyright property of Golder, who authorizes only PCQ and Approved Users to make copies of the report, but only in such quantities as are reasonably necessary for the use of the report by those parties. PCQ and Approved Users may not give, lend, sell, or otherwise make available the report or any portion thereof to any other party without the express written permission of Golder. PCQ acknowledges that electronic media is susceptible to unauthorized modification, deterioration and incompatibility and therefore PCQ and any Authorized Users cannot rely upon the electronic media versions of Golder's report or other work products unless it was directly provided by Golder.

When evaluating the Site and developing this report, Golder has relied on information provided by PCQ, the regulatory authorities, and others. Golder has acted in good faith and accepts no responsibility for any deficiencies, misstatements, or inaccuracies contained in this report resulting from omissions, misinterpretations, or falsifications by those who provided Golder with information.

While ensuring that the documentation was prepared in general conformance with regulatory and guideline requirements, Golder cannot guarantee that the licence will be issued by regulator the once the final report has been submitted.

Signature Page

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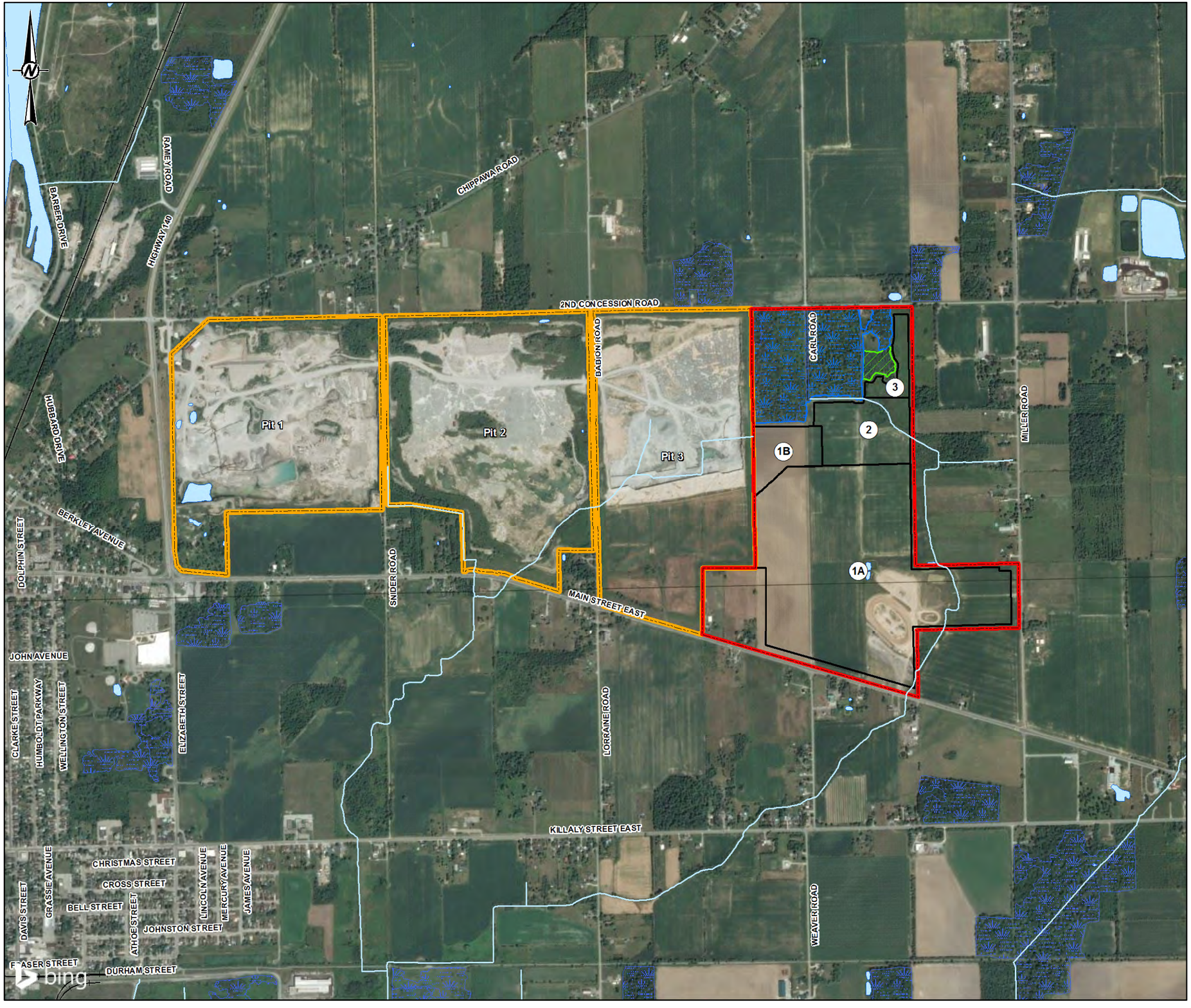
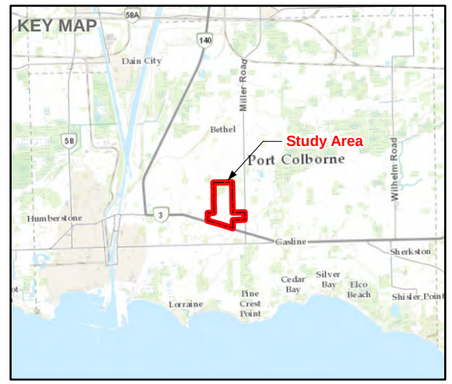
https://golderassociates.sharepoint.com/sites/32998g/deliverables/phase 6000 air and dust/noise/final/1771656-r-rev0 rankin port colborne noise impact assessment 18dec2020.docx

FIGURES



LEGEND

- (1) Excavation Phase
- Railway
- Watercourse
- Waterbody
- Wetland
- Woodland
- Proposed Quarry Extension
- Property Boundary
- Approximate Excavation Phasing Boundary



0 500 1,000

1:15,000 Meters

REFERENCE(S)

1. BASE DATA: MNRF LIO 2016
2. IMAGERY: SOURCES: ESRI, HERE, GARMIN, INTERMAP, INCREMENT P CORP., GEBCO, USGS, FAO, NPS, NRCAN, GEOBASE, IGN, KADASTER NL, ORDNANCE SURVEY, ESRI JAPAN, METI, ESRI CHINA (HONG KONG), (C) OPENSTREETMAP CONTRIBUTORS, AND THE GIS USER COMMUNITY
© 2020 MICROSOFT CORPORATION © 2020 MAXAR ©CNES (2020) DISTRIBUTION AIRBUS DS
3. PROJECTION: TRANSVERSE MERCATOR NAD 1983 UTM ZONE 17N

CLIENT
PORT COLBORNE QUARRIES INC.

PROJECT
PIT 3 EXTENSION

TITLE
SITE LOCATION PLAN

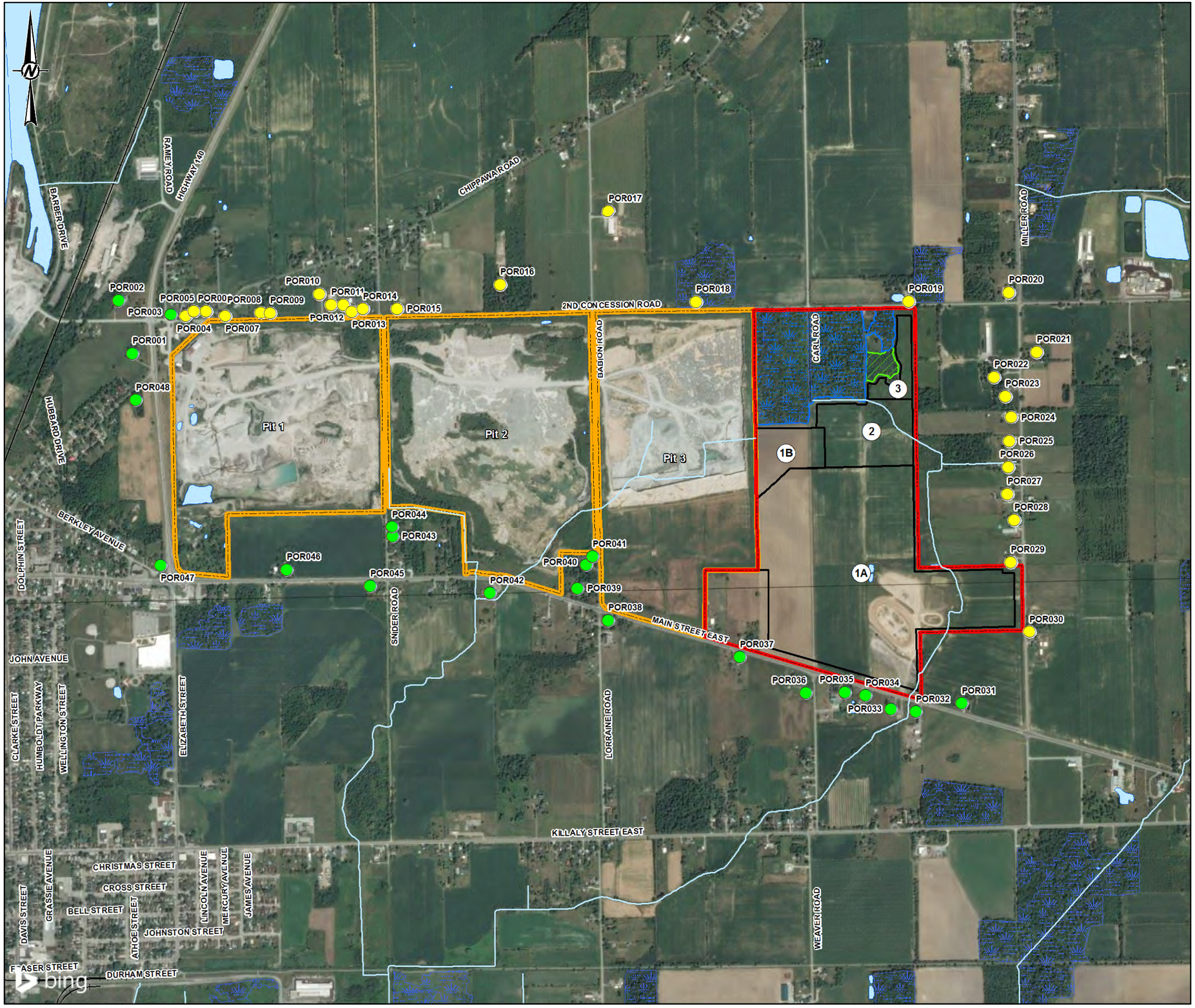
CONSULTANT
GOLDER

YYYY-MM-DD	2020-12-18
DESIGNED	PR
PREPARED	PR
REVIEWED	TN
APPROVED	TG

PROJECT NO.	CONTROL	REV.	FIGURE
1771656	0020		1

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: 25mm

PATH: S:\Clients\Rankin_Construction\Port_Colborne_Quarry\99_PROJ\1771656_1970065_Ontario_ESA\40_PROD\0020_Noise_Assessment\1771656-0020-RN-0001.mxd PRINTED ON: 2020-12-18 AT: 12:45:01 PM



LEGEND

- Excavation Phase
- Class 2 PORs
- Class 3 PORs
- Railway
- Watercourse
- Waterbody
- Wetland
- Woodland
- Proposed Quarry Extension
- Property Boundary
- Approximate Excavation Phasing Boundary

0 500 1,000

1:15,000 Meters

REFERENCE(S)

1. BASE DATA: MNRF LIO 2016
2. IMAGERY: © 2020 MICROSOFT CORPORATION © 2020 MAXAR ©CNES (2020) DISTRIBUTION AIRBUS DS
3. PROJECTION: TRANSVERSE MERCATOR NAD 1983 UTM ZONE 17N

CLIENT
PORT COLBORNE QUARRIES INC.

PROJECT
PIT 3 EXTENSION

TITLE
POINTS OF RECEPTION LOCATION PLAN

CONSULTANT
GOLDER

YYYY-MM-DD	2020-12-18
DESIGNED	PR
PREPARED	PR
REVIEWED	TN
APPROVED	TG

PROJECT NO.	CONTROL	REV.	FIGURE
1771656	0020		2

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: 25mm 0

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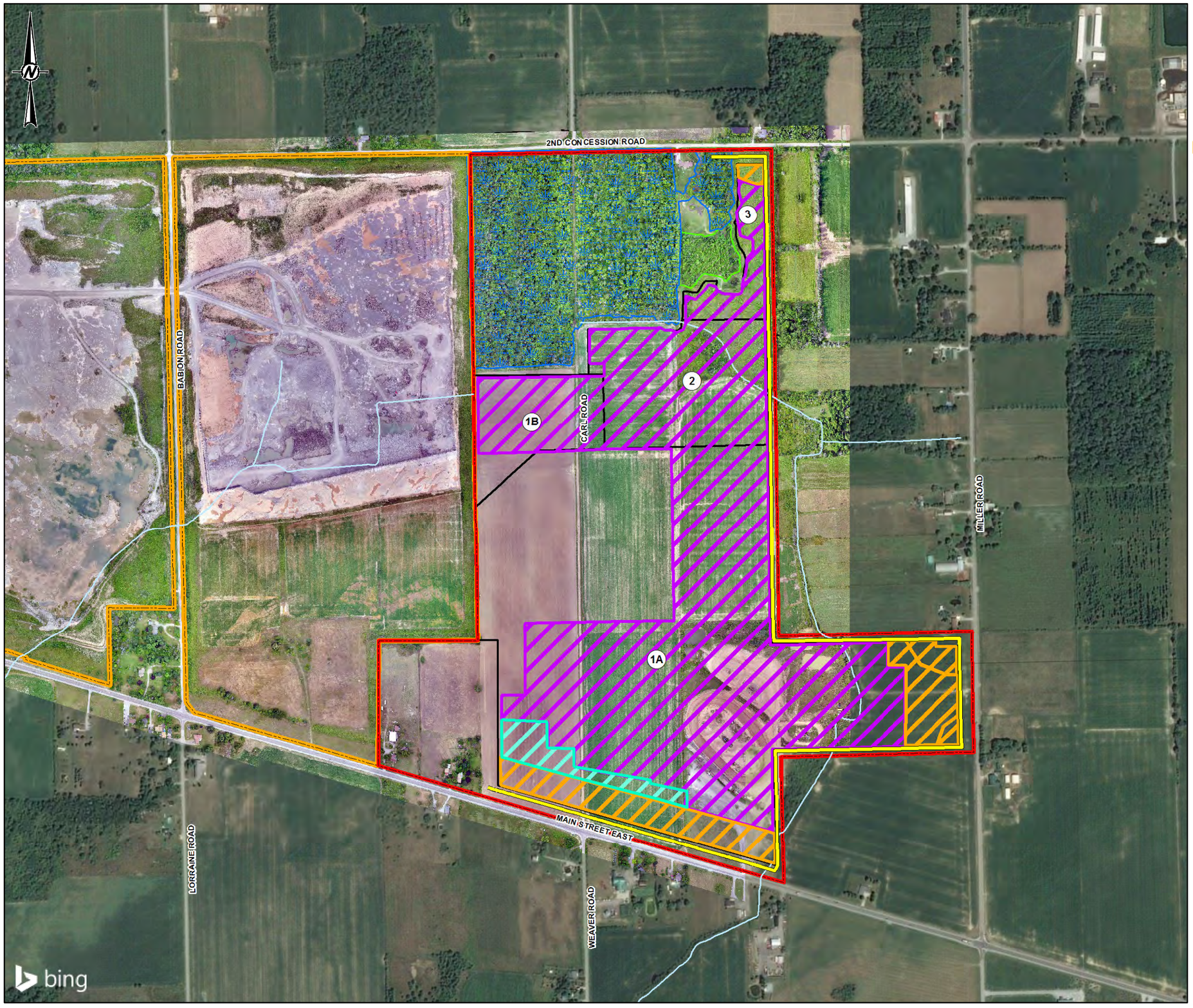


LEGEND

- (1) Excavation Phase
- Boundary Line Berm
- Watercourse
- Wetland
- Woodland
- Proposed Quarry Extension
- Property Boundary
- Approximate Excavation Phasing Boundary
- Noise Control Area 1
- Noise Control Area 2
- Noise Control Area 3

0 100 200 300 400
1:8,000 Meters

REFERENCE(S)
1.BASE DATA: MNRF LIO 2016
2. IMAGERY: ORTHOIMAGE PROVIDED BY IBI GROUP. SITE FLOWN JULY 29TH, 2018
3. ADDITIONAL IMAGERY FROM © 2020 MICROSOFT CORPORATION © 2020 MAXAR ©CNES (2020) DISTRIBUTION AIRBUS DS
4. PROJECTION: TRANSVERSE MERCATOR NAD 1983 UTM ZONE 17N

CLIENT
PORT COLBORNE QUARRIES INC.

PROJECT
PIT 3 EXTENSION

TITLE
OPERATIONAL NOISE CONTROL AND MITIGATION MEASURES

CONSULTANT
GOLDER

YYYY-MM-DD	2020-12-18
DESIGNED	PR
PREPARED	PR
REVIEWED	TN
APPROVED	TG

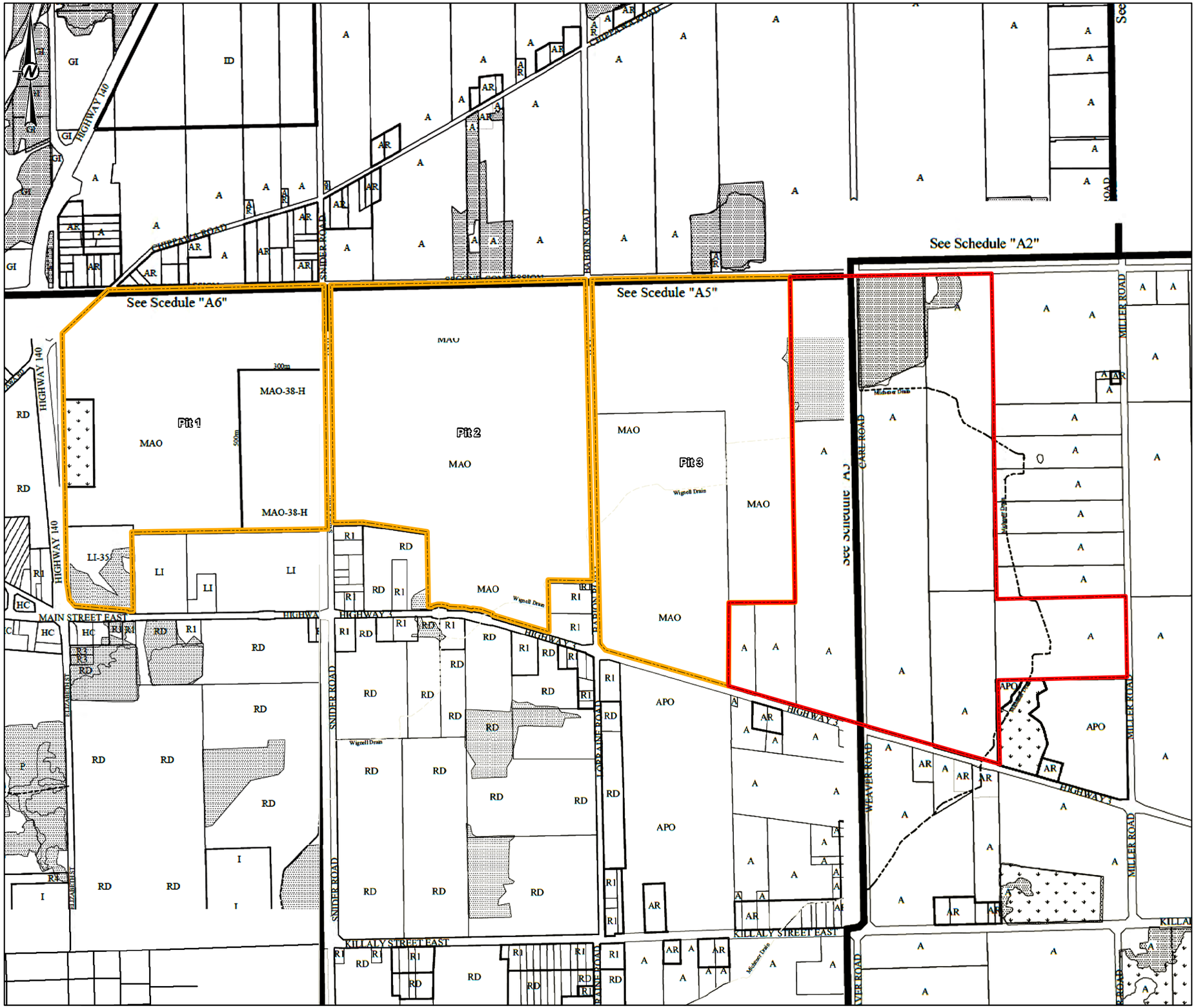
PROJECT NO.	CONTROL	REV.	FIGURE
1771656	0020		3

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: 25mm

PATH: S:\Clients\Rankin_Construction\Port_Colborne_Quarry\99_PROJ\1771656_1970965_Ontario_ESA\40_PROD\0020_Noise_Assessment\1771656-0020-RN-0003.mxd PRINTED ON: 2020-12-18 AT: 12:47:29 PM

APPENDIX A

Zoning



LEGEND

- Proposed Quarry Extension
- Property Boundary

Symbol	Zone
A	AGRICULTURAL
AR	AGRICULTURAL RESIDENTIAL
RR	RURAL RESIDENTIAL
LR	LAKESHORE RESIDENTIAL
R1	FIRST DENSITY RESIDENTIAL
R2	SECOND DENSITY RESIDENTIAL
R3	THIRD DENSITY RESIDENTIAL
R4	FOURTH DENSITY RESIDENTIL
RD	RESIDENTIAL DEVELOPMENT
MU	MIXED USE
NC	NEIGHBOURHOOD COMMERCIAL
DC	DOWNTOWN COMMERCIAL
HC	HIGHWAY COMMERCIAL
I	INSTITUTIONAL
P	PUBLIC AND PARK
LI	LIGHT INDUSTRIAL
HI	HEAVY INDUSTRIAL
MAO	MINERAL AGGREGATE OPERATIONS
GI	GATEWAY INDUSTRIAL
ID	INDUSTRIAL DEVELOPMENT
	ENVIRONMENTAL PROTECTION
	HAZARD
	ENVIRONMENTAL CONSERVATION

0 500 1,000

1:12,000 Meters

REFERENCE(S)

1. BASE DATA: MNRF LIO 2016
2. LAND USE ZONING: CITY OF PORT COLBORNE,ZONING BY-LAW 6575/30/18.
3. PROJECTION: TRANSVERSE MERCATOR NAD 1983 UTM ZONE 17N

CLIENT
PORT COLBORNE QUARRIES INC.

PROJECT
PIT 3 EXTENSION

TITLE
LAND USE ZONING

CONSULTANT
GOLDER

YYYY-MM-DD	2020-12-18
DESIGNED	PR
PREPARED	PR
REVIEWED	TN
APPROVED	TG

PROJECT NO.	CONTROL	REV.	FIGURE
1771656	0020		**A1**

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: 25mm 0

PATH: S:\Clients\Rankin_Construction\Port_Colborne_Quarry\99_PRO\1771656_1970065_Ontario_ESA\0_PRO\0-0020_Noise_Assessment\1771656-0020-RN-000A1.mxd PRINTED ON: 2020-12-18 AT: 12:42:54 PM

APPENDIX B

Description of Technical Terms

DESCRIPTION OF TECHNICAL TERMS

To help understand the analysis and recommendations made in this report, the following is a brief discussion of technical noise terms.

Sound pressure level is expressed on a logarithmic scale in units of decibels (dB). Since the scale is logarithmic, a sound that is twice the sound pressure level as another will be three decibels (3 dB) higher.

The noise data and analysis in this report have been given in terms of frequency distribution. The levels are grouped into octave bands. Typically, the centre frequencies for each octave band are 31.5, 63, 125, 250, 500, 1000, 2000, 4000 and 8000 Hertz (Hz.). The human ear responds to the pressure variations in the atmosphere that reach the ear drum. These pressure variations are composed of different frequencies that give each sound we hear its unique character.

It is common practice to sum sound levels over the entire audible spectrum (i.e., 20 Hz to 20 kHz) to give an overall sound level. However, to approximate the hearing response of humans, each octave band measured has a weighting applied to it. The resulting “A-weighted” sound level is often used as a criterion to indicate a maximum allowable sound level. In general, low frequencies are weighted higher, as human hearing is less sensitive to low frequency sound.

Environmental noise levels vary over time, and are described using an overall sound level known as the L_{eq}, or energy averaged sound level. The L_{eq} is the equivalent continuous sound level, which in a stated time, and at a stated location, has the same energy as the time varying noise level. It is common practice to measure Leq sound levels in order to obtain a representative average sound level. The L_{90} is defined as the sound level exceeded for 90% of the time and is used as an indicator of the “ambient” noise level.

APPENDIX C

Noise Data

Source Description	East Side of Wash Plant @ 70m	West Side of Wash Plant @ 70m	Scan of south end of upper screen (155E)	Scan of side of upper screen (155E)	Scan of Rock Dump Conveyor from upper screen	Scan of the exterior of the Impact Crusher (177)	Scan of the motor of the Impact Crusher (177)	Scan of the Impact Crusher (154)	Drill	Haul Truck drive by @ 25m (with load)	Haul Truck drive by @ 25m (without load)	Wash Plant Pump Motor
Source Name	Wash Plant Screens	Wash Plant Screens							Drill			
Library ID												
Correction Type (Distance/Area)	Hemispherical	Hemispherical	Area	Area	Area	Area	Area	Area	Hemispherical	Hemispherical	Hemispherical	Hemispherical
Distance/area of Measurement (m/m^2)	70	70	6.25	30	15	6.25	1.125	6.25	30	25	25	1
Frequency (Hz)												
25	76	72	83	82	78	84	82	81	63	68	65	91
31.5	80	77	83	82	82	86	85	83	66	68	68	97
40	73	73	96	90	90	105	97	96	60	65	74	79
50	75	76	89	88	85	103	95	87	64	69	67	87
63	72	75	91	93	88	90	92	91	62	68	68	88
80	67	68	90	89	88	96	91	96	66	73	74	84
100	64	68	95	101	90	94	90	94	83	79	70	84
125	63	64	99	99	90	97	93	92	76	81	71	77
160	60	67	93	93	88	90	91	91	72	85	76	76
200	58	63	96	96	89	88	88	91	72	78	73	77
250	59	61	95	94	88	86	88	93	70	71	69	77
315	59	60	107	101	95	85	93	96	73	74	73	77
400	57	58	100	98	92	83	89	92	70	78	72	80
500	58	57	101	99	94	83	88	92	69	71	72	79
630	59	60	100	98	94	83	87	93	71	70	64	79
800	59	60	99	97	95	83	90	93	75	66	62	79
1000	60	60	99	98	98	83	89	95	75	67	64	78
1250	60	61	99	99	99	83	87	95	72	68	66	78
1600	62	58	97	97	99	84	85	94	72	68	63	78
2000	61	59	95	96	99	84	85	93	73	67	62	74
2500	62	59	94	96	96	84	80	92	76	65	61	73
3150	62	57	93	95	94	84	83	91	76	63	58	70
4000	60	55	92	93	92	83	83	89	75	59	56	68
5000	59	53	90	92	89	83	80	87	76	58	54	68
6300	56	51	87	89	86	81	81	86	73	56	50	65
8000	52	50	84	87	82	79	82	83	73	55	46	64
10000	48	47	80	84	77	78	76	80	69	50	44	61
31.5	82	79	96	91	91	105	97	96	68	72	75	98
63	77	79	95	95	92	104	98	97	69	75	75	91
125	67	71	101	103	94	99	96	97	84	87	78	85
250	63	66	107	103	96	91	95	99	77	80	77	82
500	63	63	105	103	98	88	93	97	75	79	76	84
1000	64	65	104	103	102	87	94	99	79	72	69	83
2000	67	63	100	101	103	89	89	98	79	71	67	80
4000	65	60	96	98	97	88	87	94	80	66	61	74
8000	58	54	89	92	88	84	85	88	77	59	52	68
dBA	72	70	108	108	107	95	97	104	86	80	76	87

Source Description	Jaw Crusher Impact Norberg	Rotary impact crusher METSO #2 and #3 177 W 187 E	Jaw Crusher 3 m above	Crusher # 4 rotary METSO #154	1 m above METSO 154 Conveyor	Screen West # 155 top unit	1 m above drop plate of Screen 155 West	Screen East # 155 at 1 m	1 m above drop plate of Screen 155 East	1.5 m south from the screen	Screen surfac escan	Washplant scan of upper classifier screen east	2m north of top of classifier	1 m east of sluice	2 m south east of sluice	2 m east of derrick pump	at 2 m from water pump	Rock Truck Terrex TR 60 lifting to unload
Source Name	Impact crusher			Rotary crusher METSO 154	METSO 154 conveyor calibration	Screen 155 West	Drop Plate Screen 155 W	Screen 155 East	Drop Plate Screen 155 E							Derrick pump	Washplant water pump	
Librarv ID																		
Correction Type (Distance/Area)	Hemispherical	Hemispherical	Hemispherical	Hemispherical	Hemispherical	Spherical	Area	Spherical	Area	Hemispherical	Area	Area	Spherical	Spherical	Spherical	Hemispherical	Hemispherical	Hemispherical
Distance/area of Measurement (m/m^2)	2	1	3	1	0	1	14.4	1	14.4	1.5	5.5	11	2	1	2	2	2	12
Frequency (Hz)																		
25	80	80	78	77	80	85	82	85	81	80	87	89	87	93	90	89	67	73
31.5	94	83	88	82	86	81	79	83	81	80	84	92	91	96	94	94	74	74
40	93	98	83	87	105	88	85	92	85	94	93	92	90	89	87	75	68	78
50	93	98	90	85	84	87	86	87	85	89	98	89	89	92	83	82	65	76
63	91	89	92	85	93	97	94	92	93	93	97	91	92	95	88	88	79	79
80	89	88	87	89	96	90	88	87	88	85	88	84	85	88	82	80	69	84
100	88	89	90	87	89	98	91	88	89	89	92	85	79	84	79	78	73	80
125	92	92	91	86	93	99	92	90	90	92	95	87	77	87	75	78	77	79
160	91	90	89	85	84	91	89	92	88	90	93	81	75	80	73	79	73	83
200	89	88	88	85	84	92	89	93	89	91	95	80	76	79	73	78	75	79
250	87	87	86	85	84	98	91	90	90	92	97	79	76	79	75	80	86	78
315	88	86	88	84	85	97	94	91	91	95	100	80	76	80	76	83	81	82
400	88	87	87	85	86	96	96	92	92	93	100	81	77	79	77	88	78	77
500	88	86	86	86	87	98	99	92	97	94	101	82	77	82	75	81	76	75
630	87	86	85	85	87	96	96	92	97	92	99	84	77	81	75	79	80	77
800	88	86	85	86	87	97	102	92	98	94	99	84	79	80	74	80	78	75
1000	85	87	84	88	87	97	100	92	98	94	97	86	79	77	71	80	85	74
1250	84	86	82	88	87	99	104	94	98	92	97	86	80	73	70	79	79	74
1600	83	87	81	85	87	97	100	92	98	92	95	85	81	72	69	80	78	74
2000	82	85	79	85	87	96	101	91	97	90	94	83	82	73	69	76	76	72
2500	80	83	77	84	86	95	100	90	95	88	92	81	82	71	68	74	78	69
3150	78	82	75	82	84	94	98	88	93	86	90	80	82	70	68	72	74	68
4000	75	80	73	80	82	92	95	86	90	84	88	79	83	69	67	69	69	65
5000	72	78	70	77	79	89	91	83	87	81	86	77	84	68	66	68	68	63
6300	69	76	68	74	75	86	88	79	84	78	82	76	84	67	65	66	64	59
8000	66	74	64	71	71	83	84	76	80	74	79	76	84	66	63	65	61	57
10000	62	70	61	67	66	78	80	73	76	70	75	73	81	64	60	63	58	54
31.5	96	98	89	88	105	90	87	93	88	94	95	96	94	98	96	95	75	80
63	96	99	95	91	98	98	95	94	95	95	101	94	95	97	90	89	79	86
125	95	95	95	91	94	102	95	95	94	95	98	90	82	89	81	83	79	86
250	93	92	92	89	89	101	97	96	95	97	103	85	81	84	80	86	88	85
500	92	91	91	90	92	102	102	97	101	98	105	87	82	86	81	89	83	81
1000	91	91	89	92	92	102	107	97	103	98	102	90	84	82	77	84	87	79
2000	87	90	84	89	91	101	105	96	102	95	99	88	86	77	74	82	82	77
4000	80	85	78	85	87	97	100	91	96	89	93	83	88	74	72	75	76	70
8000	72	78	70	77	77	88	90	82	86	80	84	80	88	71	68	70	66	62
dBA	95	96	93	96	97	107	111	102	107	102	107	94	93	87	82	90	90	84

APPENDIX D

Weather Data

Station Name	PORT COLBORNE (AUT)
Province	ONTARIO
Latitude	42°52'00.000" N
Longitude	79°15'00.000" W
Elevation	183
Climate ID	613F606
WMO Identifier	71463
TC Identifier	WPC

All time are specfied in Local Standard Time (LST). Add 1 hour to adjust for Daylight Saving Time where and when it is observed

Date/Time	Time	Temp (°C)	Dew Point Temp (°C)	Rel Hum (%)	Wind Dir (10s deg)	Wind Spd (km/h)	Stn Press (kPa)
2018-10-26 9:00	9:00	6	0	62	15	20	100
2018-10-26 10:00	10:00	7	0	63	12	24	100
2018-10-26 11:00	11:00	7	1	62	11	24	99
2018-10-26 12:00	12:00	8	1	60	10	26	99
2018-10-26 13:00	13:00	8	0	57	9	22	99
2018-10-26 14:00	14:00	9	0	55	10	23	99
2018-10-26 15:00	15:00	9	1	57	9	20	99
2018-10-26 16:00	16:00	9	0	55	9	21	99

Station Name	PORT COLBORNE (AUT)
Province	ONTARIO
Latitude	42°52'00.000" N
Longitude	79°15'00.000" W
Elevation	183
Climate ID	613F606
WMO Identifier	71463
TC Identifier	WPC

All time are specfied in Local Standard Time (LST). Add 1 hour to adjust for Daylight Saving Time where and when it is observed

Date/Time	Time	Temp (°C)	Dew Point Temp (°C)	Rel Hum (%)	Wind Dir (10s deg)	Wind Spd (km/h)	Stn Press (kPa)
2020-09-22 9:00	9:00	15	10	69	35	3	100
2020-09-22 10:00	10:00	16	9	61	26	8	100
2020-09-22 11:00	11:00	17	8	58	24	16	100
2020-09-22 12:00	12:00	17	9	58	23	18	100
2020-09-22 13:00	13:00	17	8	56	23	20	100
2020-09-22 14:00	14:00	18	9	56	24	24	100
2020-09-22 15:00	15:00	17	9	60	25	28	100
2020-09-22 16:00	16:00	18	11	65	25	31	100

APPENDIX E

Calibration Certificates

Calibration Certificate

Certificate Number 2020000883

Customer:
Golder Associates
Suite 100
6925 Century Avenue
Mississauga, ON L5N 7K2, Canada

Model Number	CAL200	***Procedure Number***	D0001.8386		
Serial Number	8303	***Technician***	Scott Montgomery		
Test Results	**Pass**	***Calibration Date***	20 Jan 2020		
Initial Condition	Adjusted	***Calibration Due***	20 Jan 2021		
		Temperature	24	°C	± 0.3 °C
Description	Larson Davis CAL200 Acoustic Calibrator	***Humidity***	29	%RH	± 3 %RH
		Static Pressure	101.1	kPa	± 1 kPa

Evaluation Method The data is aquired by the insert voltage calibration method using the reference microphone's open circuit sensitivity. Data reported in dB re 20 µPa.

Compliance Standards Compliant to Manufacturer Specifications per D0001.8190 and the following standards:
IEC 60942:2017 ANSI S1.40-2006

Issuing lab certifies that the instrument described above meets or exceeds all specifications as stated in the referenced procedure (unless otherwise noted). It has been calibrated using measurement standards traceable to the SI through the National Institute of Standards and Technology (NIST), or other national measurement institutes, and meets the requirements of ISO/IEC 17025:2005.
Test points marked with a ‡ in the uncertainties column do not fall within this laboratory's scope of accreditation.

The quality system is registered to ISO 9001:2015.

This calibration is a direct comparison of the unit under test to the listed reference standards and did not involve any sampling plans to complete. No allowance has been made for the instability of the test device due to use, time, etc. Such allowances would be made by the customer as needed.

The uncertainties were computed in accordance with the ISO Guide to the Expression of Uncertainty in Measurement (GUM). A coverage factor of approximately 2 sigma (k=2) has been applied to the standard uncertainty to express the expanded uncertainty at approximately 95% confidence level.

Standards Used

Description	Cal Date	Cal Due	Cal Standard
Agilent 34401A DMM	08/15/2019	08/15/2020	001021
Larson Davis Model 2900 Real Time Analyzer	04/02/2019	04/02/2020	001051
Microphone Calibration System	03/04/2019	03/04/2020	005446
1/2" Preamplifier	09/17/2019	09/17/2020	006506
Larson Davis 1/2" Preamplifier 7-pin LEMO	08/06/2019	08/06/2020	006507
1/2 inch Microphone - RI - 200V	05/21/2019	05/21/2020	006510
Pressure Transducer	06/24/2019	06/24/2020	007310

West Caldwell Calibration Laboratories Inc.

Certificate of Calibration

for

AUDIO ANALYZER

Manufactured by:	NTI
Model No:	XL2
Serial No:	A2A-06532-E0
Calibration Recall No:	30748

Submitted By:

Customer:	Jeremy Schmidt
Company:	Golder Associates Ltd.
Address:	141 Adelaide Street West, Suite# 910
	Toronto, Ontario Canada M5H 3L5

The subject instrument was calibrated to the indicated specification using standards traceable to the National Institute of Standards and Technology or to accepted values of natural physical constants. This document certifies that the instrument met the following specification upon its return to the submitter.

West Caldwell Calibration Laboratories Procedure No. XL2 NTI

Upon receipt for Calibration, the instrument was found to be:

Within (X)

tolerance of the indicated specification. See attached Report of Calibration.
The information supplied relates to the calibrated item listed above.
West Caldwell Calibration Laboratories' calibration control system meets the following requirements, ISO 10012-1 MIL STD 45662A, ANSI/NCSL Z540-1, IEC Guide 25, ISO 9001:2015 and ISO 17025

Note: With this Certificate, Report of Calibration is included.

Approved by:

James Zhu

Quality Manager
ISO/IEC 17025:2005

Calibration Date: 27-Feb-20

Certificate No: 30748 - 1

West Caldwell Calibration Laboratories, Inc.
uncompromised calibration
1575 State Route 96, Victor, NY 14564, U.S.A.

ACCREDITED
Calibration Lab. Cert. # 1533.01

West Caldwell Calibration Laboratories Inc.

Certificate of Calibration

for

MICROPHONE

Manufactured by:	NTI
Model No:	MC230
Serial No:	6023
Calibration Recall No:	30748

Submitted By:

Customer:	Jeremy Schmidt
Company:	Golder Associates Ltd.
Address:	141 Adelaide Street West, Suite# 910
	Toronto, Ontario Canada M5H 3L5

The subject instrument was calibrated to the indicated specification using standards traceable to the National Institute of Standards and Technology or to accepted values of natural physical constants. This document certifies that the instrument met the following specification upon its return to the submitter.

West Caldwell Calibration Laboratories Procedure No. MC230 NTI

Upon receipt for Calibration, the instrument was found to be:

Within (X)

tolerance of the indicated specification. See attached Report of Calibration.
The information supplied relates to the calibrated item listed above.
West Caldwell Calibration Laboratories' calibration control system meets the following requirements, ISO 10012-1 MIL STD 45662A, ANSI/NCSL Z540-1, IEC Guide 25, ISO 9001:2015 and ISO 17025

Note: With this Certificate, Report of Calibration is included.

Calibration Date: 27-Feb-20

Certificate No: 30748 - 2

Approved by:

James Zhu

Quality Manager
ISO/IEC 17025:2005

ACCREDITED

Calibration Lab. Cert. # 1533.01

West Caldwell Calibration Laboratories, Inc.
uncompromised calibration
1575 State Route 96, Victor, NY 14564, U.S.A.

Calibration Certificate

Certificate Number 2018008820

Customer:

Golder Associates
Suite 100
6925 Century Avenue
Mississauga, ON L5N 7K2, Canada

Model Number	831	***Procedure Number***	D0001.8378	
Serial Number	0002825	***Technician***	Ron Harris	
Test Results	**Pass**	***Calibration Date***	4 Sep 2018	
Initial Condition	AS RECEIVED same as shipped	***Calibration Due***	4 Sep 2020	
Description	Larson Davis Model 831 Class 1 Sound Level Meter Firmware Revision: 2.314	***Temperature***	23.57 °C	± 0.25 °C
		Humidity	50.7 %RH	± 2.0 %RH
		Static Pressure	86.38 kPa	± 0.13 kPa

Evaluation Method Tested electrically using Larson Davis PRM831 S/N 021364 and a 12.0 pF capacitor to simulate microphone capacitance. Data reported in dB re 20 µPa assuming a microphone sensitivity of 50.0 mV/Pa.

Compliance Standards Compliant to Manufacturer Specifications and the following standards when combined with Calibration Certificate from procedure D0001.8384:

IEC 60651:2001 Type 1	ANSI S1.4-2014 Class 1
IEC 60804:2000 Type 1	ANSI S1.4 (R2006) Type 1
IEC 61252:2002	ANSI S1.11 (R2009) Class 1
IEC 61260:2001 Class 1	ANSI S1.25 (R2007)
IEC 61672:2013 Class 1	ANSI S1.43 (R2007) Type 1

Issuing lab certifies that the instrument described above meets or exceeds all specifications as stated in the referenced procedure (unless otherwise noted). It has been calibrated using measurement standards traceable to the International System of Units (SI) through the National Institute of Standards and Technology (NIST), or other national measurement institutes, and meets the requirements of ISO/IEC 17025:2005. **Test points marked with a ‡ in the uncertainties column do not fall within this laboratory's scope of accreditation.**

The quality system is registered to ISO 9001:2008.

This calibration is a direct comparison of the unit under test to the listed reference standards and did not involve any sampling plans to complete. No allowance has been made for the instability of the test device due to use, time, etc. Such allowances would be made by the customer as needed.

The uncertainties were computed in accordance with the ISO Guide to the Expression of Uncertainty in Measurement (GUM). A coverage factor of approximately 2 sigma (k=2) has been applied to the standard uncertainty to express the expanded uncertainty at approximately 95% confidence level.

Correction data from Larson Davis Model 831 Sound Level Meter Manual, I831.01 Rev O, 2016-09-19

Calibration Check Frequency: 1000 Hz; Reference Sound Pressure Level: 114 dB re 20 µPa; Reference Range: 0 dB gain

Periodic tests were performed in accordance with precedures from IEC 61672-3:2013 / ANSI/ASA S1.4-2014/Part3.

Calibration Certificate

Certificate Number 2018004567

Customer:
Golder Associates Inc
6925 Century Avenue
Mississauga, ON L5N 7K2, Canada

Model Number	CAL200	***Procedure Number***	D0001.8386		
Serial Number	8303	***Technician***	Scott Montgomery		
Test Results	**Pass**	***Calibration Date***	1 May 2018		
Initial Condition	AS RECEIVED same as shipped	***Calibration Due***	1 May 2019		
		Temperature	24	°C	± 0.3 °C
Description	Larson Davis CAL200 Acoustic Calibrator	***Humidity***	29	%RH	± 3 %RH
		Static Pressure	101.3	kPa	± 1 kPa

Evaluation Method The data is aquired by the insert voltage calibration method using the reference microphone's open circuit sensitivity. Data reported in dB re 20 µPa.

Compliance Standards Compliant to Manufacturer Specifications per D0001.8190 and the following standards:
IEC 60942:2017 ANSI S1.40-2006

Issuing lab certifies that the instrument described above meets or exceeds all specifications as stated in the referenced procedure (unless otherwise noted). It has been calibrated using measurement standards traceable to the SI through the National Institute of Standards and Technology (NIST), or other national measurement institutes, and meets the requirements of ISO/IEC 17025:2005. **Test points marked with a ‡ in the uncertainties column do not fall within this laboratory's scope of accreditation.**

The quality system is registered to ISO 9001:2008.

This calibration is a direct comparison of the unit under test to the listed reference standards and did not involve any sampling plans to complete. No allowance has been made for the instability of the test device due to use, time, etc. Such allowances would be made by the customer as needed.

The uncertainties were computed in accordance with the ISO Guide to the Expression of Uncertainty in Measurement (GUM). A coverage factor of approximately 2 sigma (k=2) has been applied to the standard uncertainty to express the expanded uncertainty at approximately 95% confidence level.

Standards Used

Description	Cal Date	Cal Due	Cal Standard
Agilent 34401A DMM	09/06/2017	09/06/2018	001021
Larson Davis Model 2900 Real Time Analyzer	04/10/2018	04/10/2019	001051
Microphone Calibration System	03/07/2018	03/07/2019	005446
1/2" Preamplifier	10/05/2017	10/05/2018	006506
Larson Davis 1/2" Preamplifier 7-pin LEMO	08/08/2017	08/08/2018	006507
1/2 inch Microphone - RI - 200V	10/23/2017	10/23/2018	006511
Pressure Transducer	06/01/2017	06/01/2018	007310

APPENDIX F

Sample Calculations

Receiver
Name: Three-storey Residence POR S 1577 HW3
ID: POR035
X: 646752.69 m
Y: 4750917.74 m
Z: 188.00 m

Area Source, ISO 9613, Name: "Screen 155 West Upper Unit Top ", ID: "!PP!SC_155_W_U_T"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
9744	644300.82	4751926.60	188.80	0	DEN	A	110.8	8.7	0.0	0.0	0.0	79.5	11.6	-1.0	0.0	0.0	6.7	0.0	0.0	22.6
9749	644299.06	4751928.37	187.73	0	DEN	A	110.8	8.7	0.0	0.0	0.0	79.5	11.6	-1.0	0.0	0.0	5.4	0.0	0.0	24.0

Area Source, ISO 9613, Name: "Screen 155 West Bottom UnitTop", ID: "!PP!SC_155_W_B_T"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
9753	644296.58	4751933.78	179.90	0	DEN	A	110.6	8.9	0.0	0.0	0.0	79.5	11.6	-1.1	0.0	0.0	5.8	0.0	0.0	23.6
9757	644294.82	4751935.56	178.50	0	DEN	A	110.6	8.9	0.0	0.0	0.0	79.5	11.6	-1.1	0.0	0.0	5.9	0.0	0.0	23.5

Area Source, ISO 9613, Name: "Loader extraction area ", ID: "!P1E!L_EA"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
9768	646715.17	4751128.99	176.50	0	D	A	88.4	-4.2	0.0	0.0	0.0	57.6	1.1	-1.8	0.0	0.0	9.8	0.0	0.0	17.4
9772	646715.62	4751129.44	176.50	0	D	A	88.4	1.2	0.0	0.0	0.0	57.7	1.1	-1.8	0.0	0.0	9.7	0.0	0.0	22.9
9776	646716.05	4751129.88	176.50	0	D	A	88.4	1.8	0.0	0.0	0.0	57.7	1.1	-1.8	0.0	0.0	9.7	0.0	0.0	23.5
9780	646716.37	4751130.20	176.50	0	D	A	88.4	1.2	0.0	0.0	0.0	57.7	1.1	-1.8	0.0	0.0	9.7	0.0	0.0	23.0
9785	646716.55	4751130.31	176.50	0	D	A	88.4	-3.7	0.0	0.0	0.0	57.7	1.1	-1.8	0.0	0.0	9.7	0.0	0.0	18.1
9790	646716.88	4751130.16	176.50	0	D	A	88.4	3.8	0.0	0.0	0.0	57.7	1.1	-1.8	0.0	0.0	9.7	0.0	0.0	25.5
9794	646717.25	4751129.99	176.50	0	D	A	88.4	-1.7	0.0	0.0	0.0	57.7	1.1	-1.8	0.0	0.0	9.7	0.0	0.0	20.1
9799	646717.60	4751129.82	176.50	0	D	A	88.4	3.4	0.0	0.0	0.0	57.7	1.1	-1.8	0.0	0.0	9.7	0.0	0.0	25.1
9804	646717.95	4751129.66	176.50	0	D	A	88.4	-2.4	0.0	0.0	0.0	57.7	1.1	-1.8	0.0	0.0	9.7	0.0	0.0	19.4
9810	646718.34	4751129.48	176.50	0	D	A	88.4	3.8	0.0	0.0	0.0	57.6	1.1	-1.8	0.0	0.0	9.7	0.0	0.0	25.5
9828	646719.18	4751129.09	176.50	0	D	A	88.4	4.5	0.0	0.0	0.0	57.6	1.1	-1.8	0.0	0.0	9.7	0.0	0.0	26.3
9835	646719.92	4751128.75	176.50	0	D	A	88.4	3.5	0.0	0.0	0.0	57.6	1.1	-1.8	0.0	0.0	9.8	0.0	0.0	25.3
9841	646720.45	4751128.50	176.50	0	D	A	88.4	0.9	0.0	0.0	0.0	57.6	1.1	-1.8	0.0	0.0	9.8	0.0	0.0	22.7
9845	646720.95	4751128.27	176.50	0	D	A	88.4	2.6	0.0	0.0	0.0	57.6	1.1	-1.8	0.0	0.0	9.8	0.0	0.0	24.4
9850	646721.48	4751128.03	176.50	0	D	A	88.4	1.1	0.0	0.0	0.0	57.6	1.1	-1.8	0.0	0.0	9.8	0.0	0.0	22.9
9855	646721.92	4751127.82	176.50	0	D	A	88.4	0.7	0.0	0.0	0.0	57.6	1.0	-1.8	0.0	0.0	9.8	0.0	0.0	22.5
9860	646722.41	4751127.59	176.50	0	D	A	88.4	1.7	0.0	0.0	0.0	57.5	1.0	-1.8	0.0	0.0	9.8	0.0	0.0	23.4
9864	646723.19	4751127.23	176.50	0	D	A	88.4	3.8	0.0	0.0	0.0	57.5	1.0	-1.8	0.0	0.0	9.8	0.0	0.0	25.6
9869	646724.15	4751126.79	176.50	0	D	A	88.4	2.9	0.0	0.0	0.0	57.5	1.0	-1.8	0.0	0.0	9.8	0.0	0.0	24.6
9875	646725.07	4751126.36	176.50	0	D	A	88.4	2.5	0.0	0.0	0.0	57.5	1.0	-1.8	0.0	0.0	9.9	0.0	0.0	24.2
9879	646725.65	4751126.09	176.50	0	D	A	88.4	-4.7	0.0	0.0	0.0	57.5	1.0	-1.8	0.0	0.0	9.9	0.0	0.0	17.0
9883	646725.88	4751125.99	176.50	0	D	A	88.4	-3.8	0.0	0.0	0.0	57.5	1.0	-1.8	0.0	0.0	9.9	0.0	0.0	18.0
9888	646726.38	4751125.76	176.50	0	D	A	88.4	0.6	0.0	0.0	0.0	57.4	1.0	-1.8	0.0	0.0	9.9	0.0	0.0	22.4
9892	646727.24	4751125.36	176.50	0	D	A	88.4	0.9	0.0	0.0	0.0	57.4	1.0	-1.8	0.0	0.0	9.9	0.0	0.0	22.7
9897	646729.05	4751124.52	176.50	0	D	A	88.4	3.4	0.0	0.0	0.0	57.4	1.0	-1.8	0.0	0.0	10.0	0.0	0.0	25.2
9902	646731.95	4751126.16	176.50	0	D	A	88.4	5.8	0.0	0.0	0.0	57.4	1.0	-1.8	0.0	0.0	9.8	0.0	0.0	27.7
9907	646729.56	4751126.46	176.50	0	D	A	88.4	11.8	0.0	0.0	0.0	57.5	1.0	-1.8	0.0	0.0	9.8	0.0	0.0	33.6
9912	646726.98	4751127.64	176.50	0	D	A	88.4	4.8	0.0	0.0	0.0	57.5	1.0	-1.8	0.0	0.0	9.8	0.0	0.0	26.6
9918	646726.10	4751128.05	176.50	0	D	A	88.4	3.4	0.0	0.0	0.0	57.5	1.0	-1.8	0.0	0.0	9.8	0.0	0.0	25.2
9923	646725.58	4751128.29	176.50	0	D	A	88.4	-1.6	0.0	0.0	0.0	57.6	1.0	-1.8	0.0	0.0	9.8	0.0	0.0	20.2
9928	646725.35	4751128.39	176.50	0	D	A	88.4	-2.8	0.0	0.0	0.0	57.6	1.1	-1.8	0.0	0.0	9.7	0.0	0.0	19.0
9933	646724.79	4751128.65	176.50	0	D	A	88.4	3.7	0.0	0.0	0.0	57.6	1.1	-1.8	0.0	0.0	9.7	0.0	0.0	25.5
9936	646723.85	4751129.08	176.50	0	D	A	88.4	3.0	0.0	0.0	0.0	57.6	1.1	-1.8	0.0	0.0	9.7	0.0	0.0	24.8
9941	646722.89	4751129.53	176.50	0	D	A	88.4	2.9	0.0	0.0	0.0	57.6	1.1	-1.8	0.0	0.0	9.7	0.0	0.0	24.7
9947	646722.09	4751129.90	176.50	0	D	A	88.4	-0.2	0.0	0.0	0.0	57.6	1.1	-1.8	0.0	0.0	9.7	0.0	0.0	21.6
9952	646721.58	4751130.13	176.50	0	D	A	88.4	-1.7	0.0	0.0	0.0	57.6	1.1	-1.8	0.0	0.0	9.7	0.0	0.0	20.1
9959	646721.14	4751130.33	176.50	0	D	A	88.4	-1.9	0.0	0.0	0.0	57.7	1.1	-1.8	0.0	0.0	9.7	0.0	0.0	19.9
9965	646720.61	4751130.57	176.50	0	D	A	88.4	-1.2	0.0	0.0	0.0	57.7	1.1	-1.8	0.0	0.0	9.6	0.0	0.0	20.6
9972	646720.11	4751130.81	176.50	0	D	A	88.4	-3.4	0.0	0.0	0.0	57.7	1.1	-1.8	0.0	0.0	9.6	0.0	0.0	18.4
9978	646719.57	4751131.05	176.50	0	D	A	88.4	-1.8	0.0	0.0	0.0	57.7	1.1	-1.8	0.0	0.0	9.6	0.0	0.0	20.1
9984	646718.84	4751131.39	176.50	0	D	A	88.4	-2.0	0.0	0.0	0.0	57.7	1.1	-1.8	0.0	0.0	9.6	0.0	0.0	19.7

Area Source, ISO 9613, Name: "Loader extraction area ", ID: "!P1E!L_EA"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
0006	646717.99	4751131.79	176.50	0	D	A	88.4	-4.7	0.0	0.0	0.0	57.7	1.1	-1.8	0.0	0.0	9.6	0.0	0.0	17.1

Point Source, ISO 9613, Name: "Screen E top unit ", ID: "!PP!SC_E_TU"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
0040	644302.43	4751928.96	191.00	0	D	A	125.5	0.0	0.0	0.0	0.0	79.5	9.3	-0.8	0.0	0.0	0.0	0.0	0.0	37.5

Area Source, ISO 9613, Name: "Screen 155 West Upper Unit Top bottom ", ID: "!PP!SC_155_W_U_T"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
0047	644300.82	4751926.60	186.30	0	D	A	110.2	8.7	0.0	0.0	0.0	79.5	9.6	-0.9	0.0	0.0	0.0	0.0	0.0	30.7
0055	644299.06	4751928.37	185.23	0	D	A	110.2	8.7	0.0	0.0	0.0	79.5	9.6	-1.0	0.0	0.0	0.0	0.0	0.0	30.7

Area Source, ISO 9613, Name: "Scereen 155 East Bottom Unit Top ", ID: "!PP!SC_155_E_B_T"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
0075	644297.17	4751936.93	178.50	0	DEN	A	106.3	8.9	0.0	0.0	0.0	79.5	10.9	-1.1	0.0	0.0	4.8	0.0	0.0	21.2
0081	644298.94	4751935.16	179.90	0	DEN	A	106.3	8.9	0.0	0.0	0.0	79.5	10.9	-1.0	0.0	0.0	4.8	0.0	0.0	21.1

vert. Area Source, ISO 9613, Name: "Screen 155 West Upper Unit Side ", ID: "!PP!SC_155_W_U_S"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
0087	644299.10	4751927.00	187.76	0	D	A	108.3	8.6	0.0	0.0	0.0	79.5	9.6	-0.9	0.0	0.0	10.5	0.0	0.0	18.2
0093	644299.10	4751927.00	186.76	0	D	A	108.3	8.6	0.0	0.0	0.0	79.5	9.6	-0.9	0.0	0.0	0.0	0.0	0.0	28.7
0156	644299.10	4751927.00	186.01	0	D	A	108.3	5.6	0.0	0.0	0.0	79.5	9.6	-1.0	0.0	0.0	0.0	0.0	0.0	25.7

vert. Area Source, ISO 9613, Name: "Screen 155 West Bottom Unit SIde ", ID: "!PP!SC_155_W_B_S"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
0099	644294.86	4751934.19	178.70	0	D	A	108.3	8.6	0.0	0.0	0.0	79.5	9.7	-0.9	0.0	0.0	11.1	0.0	0.0	17.5
0105	644294.86	4751934.19	177.70	0	D	A	108.3	8.6	0.0	0.0	0.0	79.5	9.7	-0.9	0.0	0.0	0.0	0.0	0.0	28.6

Point Source, ISO 9613, Name: "Screen 155E west top unit ", ID: "!PP!SC_W_TU"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
0111	644299.96	4751927.59	191.00	0	D	A	122.5	0.0	0.0	0.0	0.0	79.5	9.3	-0.8	0.0	0.0	0.0	0.0	0.0	34.5

Point Source, ISO 9613, Name: "Screen155E East Lower unit ", ID: "!PP!SC_E_LU"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
0117	644298.05	4751936.18	182.00	0	D	A	122.5	0.0	0.0	0.0	0.0	79.5	9.3	-0.9	0.0	0.0	0.0	0.0	0.0	34.6

Point Source, ISO 9613, Name: "Screen 155E west lower unit ", ID: "!PP!SC_W_LU"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
0124	644295.70	4751934.59	182.00	0	D	A	122.5	0.0	0.0	0.0	0.0	79.5	9.3	-0.9	0.0	0.0	0.0	0.0	0.0	34.6

vert. Area Source, ISO 9613, Name: "Screen 155 East Bottom Unit Side ", ID: "!PP!SC_155_B_S"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
0130	644298.89	4751936.55	174.70	0	D	A	104.3	8.6	0.0	3.0	0.0	79.5	9.6	-1.0	0.0	0.0	4.7	0.0	0.0	23.1
0136	644298.89	4751936.55	173.70	0	D	A	104.3	8.6	0.0	3.0	0.0	79.5	9.6	-0.9	0.0	0.0	4.7	0.0	0.0	23.1
0194	644298.89	4751936.55	172.95	0	D	A	104.3	5.6	0.0	3.0	0.0	79.5	9.6	-0.8	0.0	0.0	4.7	0.0	0.0	20.0

vert. Area Source, ISO 9613, Name: "Screen 155 East South Side Wall ", ID: "!PP!SC_155_E_U_S_SW"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
0142	644304.14	4751925.73	188.38	0	D	A	108.4	2.7	0.0	3.0	0.0	79.5	7.8	-1.0	0.0	0.0	0.0	0.0	0.0	27.8
0148	644304.14	4751925.73	189.38	0	D	A	108.4	2.7	0.0	3.0	0.0	79.5	7.8	-0.9	0.0	0.0	0.0	0.0	0.0	27.8
0315	644304.14	4751925.73	187.63	0	D	A	108.4	-0.3	0.0	3.0	0.0	79.5	7.8	-1.0	0.0	0.0	0.0	0.0	0.0	24.8

vert. Area Source, ISO 9613, Name: "Screen 155 East Upper Unit Side", ID: "!PP!SC_155_E_U_S"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
0169	644303.09	4751929.40	186.76	0	D	A	104.3	8.6	0.0	0.0	0.0	79.5	9.6	-1.0	0.0	0.0	0.0	0.0	0.0	24.9
0175	644303.09	4751929.40	187.76	0	D	A	104.3	8.6	0.0	0.0	0.0	79.5	9.6	-0.9	0.0	0.0	0.0	0.0	0.0	24.9
0408	644303.09	4751929.40	186.01	0	D	A	104.3	5.6	0.0	0.0	0.0	79.5	9.6	-1.0	0.0	0.0	0.0	0.0	0.0	21.9

Area Source, ISO 9613, Name: "Screen 155 East Upper Unit bottom ", ID: "!PP!SC_155_E_U_T_B"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
0181	644301.38	4751929.79	185.23	0	D	A	105.1	8.7	0.0	0.0	0.0	79.5	9.6	-1.0	0.0	0.0	0.0	0.0	0.0	25.7
0188	644303.15	4751928.02	186.30	0	D	A	105.1	8.6	0.0	0.0	0.0	79.5	9.6	-1.0	0.0	0.0	0.0	0.0	0.0	25.7

Point Source, ISO 9613, Name: "Impact crusher 154 ", ID: "!PP!IC_154"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
0201	644285.49	4751946.60	183.00	0	D	A	119.0	0.0	0.0	0.0	0.0	79.5	12.2	-1.0	0.0	0.0	0.0	0.0	0.0	28.3

Line Source, ISO 9613, Name: "Haul truck EA to PP full", ID: "!P1E!HT_EA_PP_F"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
0208	646691.72	4751229.62	176.00	0	D	A	80.8	8.3	0.0	0.0	0.0	61.0	1.1	-1.6	0.0	0.0	5.6	0.0	0.0	22.9
0216	646690.27	4751233.68	176.00	0	D	A	80.8	2.6	0.0	0.0	0.0	61.2	1.1	-1.7	0.0	0.0	5.6	0.0	0.0	17.2
0223	646689.02	4751237.19	176.00	0	D	A	80.8	7.5	0.0	0.0	0.0	61.3	1.2	-1.7	0.0	0.0	5.5	0.0	0.0	22.0
0229	646687.02	4751242.82	176.00	0	D	A	80.8	8.0	0.0	0.0	0.0	61.4	1.2	-1.7	0.0	0.0	5.4	0.0	0.0	22.4
0235	646683.79	4751251.88	176.00	0	D	A	80.8	11.1	0.0	0.0	0.0	61.7	1.2	-1.7	0.0	0.0	5.3	0.0	0.0	25.4
0240	646681.36	4751258.71	176.00	0	D	A	80.8	2.0	0.0	0.0	0.0	61.8	1.2	-1.8	0.0	0.0	5.3	0.0	0.0	16.2
0246	646679.24	4751264.67	176.00	0	D	A	80.8	10.4	0.0	0.0	0.0	62.0	1.2	-1.8	0.0	0.0	5.2	0.0	0.0	24.6
0252	646677.05	4751270.82	176.00	0	D	A	80.8	2.9	0.0	0.0	0.0	62.2	1.2	-1.8	0.0	0.0	5.2	0.0	0.0	17.0
0258	646675.91	4751274.02	176.00	0	D	A	80.8	6.8	0.0	0.0	0.0	62.2	1.3	-1.9	0.0	0.0	5.1	0.0	0.0	20.8
0265	646673.30	4751281.35	176.00	0	D	A	80.8	10.3	0.0	0.0	0.0	62.4	1.3	-1.9	0.0	0.0	5.1	0.0	0.0	24.2
0272	646670.55	4751289.06	176.00	0	D	A	80.8	7.5	0.0	0.0	0.0	62.6	1.3	-2.0	0.0	0.0	5.0	0.0	0.0	21.3
0278	646669.33	4751292.50	176.00	0	D	A	80.8	2.2	0.0	0.0	0.0	62.7	1.3	-2.0	0.0	0.0	5.0	0.0	0.0	15.9
0283	646666.60	4751300.16	176.00	0	D	A	80.8	11.6	0.0	0.0	0.0	62.9	1.3	-2.0	0.0	0.0	5.0	0.0	0.0	25.2
0288	646663.57	4751308.66	176.00	0	D	A	80.8	5.4	0.0	0.0	0.0	63.1	1.4	-2.0	0.0	0.0	4.9	0.0	0.0	18.8
0294	646662.50	4751311.67	176.00	0	D	A	80.8	4.7	0.0	0.0	0.0	63.1	1.4	-2.0	0.0	0.0	4.9	0.0	0.0	18.1
0322	646725.00	4751135.45	176.00	0	D	A	80.8	3.1	0.0	0.0	0.0	57.8	0.8	-1.4	0.0	0.0	8.1	0.0	0.0	18.6
0328	646724.46	4751136.99	176.00	0	D	A	80.8	0.8	0.0	0.0	0.0	57.9	0.8	-1.4	0.0	0.0	8.0	0.0	0.0	16.2
0334	646723.34	4751140.21	176.00	0	D	A	80.8	7.5	0.0	0.0	0.0	58.0	0.9	-1.4	0.0	0.0	7.9	0.0	0.0	22.9
0339	646721.67	4751145.02	176.00	0	D	A	80.8	6.6	0.0	0.0	0.0	58.2	0.9	-1.4	0.0	0.0	7.7	0.0	0.0	22.0
0344	646720.03	4751149.70	176.00	0	D	A	80.8	7.3	0.0	0.0	0.0	58.4	0.9	-1.4	0.0	0.0	7.5	0.0	0.0	22.7
0350	646718.65	4751153.67	176.00	0	D	A	80.8	4.9	0.0	0.0	0.0	58.6	0.9	-1.4	0.0	0.0	7.4	0.0	0.0	20.2
0356	646717.76	4751156.24	176.00	0	D	A	80.8	3.8	0.0	0.0	0.0	58.7	0.9	-1.4	0.0	0.0	7.3	0.0	0.0	19.1
0363	646716.94	4751158.57	176.00	0	D	A	80.8	4.1	0.0	0.0	0.0	58.7	0.9	-1.4	0.0	0.0	7.2	0.0	0.0	19.3
0368	646715.96	4751161.40	176.00	0	D	A	80.8	5.4	0.0	0.0	0.0	58.8	0.9	-1.4	0.0	0.0	7.1	0.0	0.0	20.6
0373	646715.01	4751164.12	176.00	0	D	A	80.8	3.7	0.0	0.0	0.0	58.9	0.9	-1.4	0.0	0.0	7.1	0.0	0.0	19.0
0379	646714.23	4751166.36	176.00	0	D	A	80.8	3.8	0.0	0.0	0.0	59.0	0.9	-1.4	0.0	0.0	7.0	0.0	0.0	19.0
0478	646708.97	4751181.17	176.00	0	D	A	80.8	2.7	0.0	0.0	0.0	59.5	1.0	-1.4	0.0	0.0	6.6	0.0	0.0	17.8
0483	646708.47	4751182.56	176.00	0	D	A	80.8	0.3	0.0	0.0	0.0	59.6	1.0	-1.4	0.0	0.0	6.5	0.0	0.0	15.3
0488	646707.67	4751184.82	176.00	0	D	A	80.8	5.7	0.0	0.0	0.0	59.7	1.0	-1.4	0.0	0.0	6.5	0.0	0.0	20.7
0494	646706.55	4751187.96	176.00	0	D	A	80.8	4.7	0.0	0.0	0.0	59.8	1.0	-1.4	0.0	0.0	6.4	0.0	0.0	19.7
0499	646705.50	4751190.91	176.00	0	D	A	80.8	5.2	0.0	0.0	0.0	59.9	1.0	-1.4	0.0	0.0	6.3	0.0	0.0	20.1
0504	646704.14	4751194.73	176.00	0	D	A	80.8	6.8	0.0	0.0	0.0	60.0	1.0	-1.4	0.0	0.0	6.3	0.0	0.0	21.6
0509	646702.72	4751198.71	176.00	0	D	A	80.8	5.6	0.0	0.0	0.0	60.1	1.0	-1.4	0.0	0.0	6.2	0.0	0.0	20.4
0514	646701.86	4751201.14	176.00	0	D	A	80.8	1.8	0.0	0.0	0.0	60.2	1.0	-1.4	0.0	0.0	6.1	0.0	0.0	16.6
0519	646655.91	4751329.95	176.00	0	D	A	80.8	6.7	0.0	0.0	0.0	63.5	1.4	-2.1	0.0	0.0	4.9	0.0	0.0	19.7
0524	646653.20	4751337.46	176.00	0	D	A	80.8	10.5	0.0	0.0	0.0	63.7	1.4	-2.1	0.0	0.0	4.9	0.0	0.0	23.4
0531	646648.82	4751349.61	176.00	0	D	A	80.8	11.6	0.0	0.0	0.0	64.0	1.5	-2.2	0.0	0.0	4.8	0.0	0.0	24.3
0537	646645.99	4751357.45	176.00	0	D	A	80.8	3.3	0.0	0.0	0.0	64.1	1.5	-2.2	0.0	0.0	4.8	0.0	0.0	15.8
0542	646642.29	4751367.71	176.00	0	D	A	80.8	12.9	0.0	0.0	0.0	64.3	1.5	-2.2	0.0	0.0	4.8	0.0	0.0	25.3
0547	646700.85	4751203.97	176.00	0	D	A	80.8	5.1	0.0	0.0	0.0	60.3	1.1	-1.4	0.0	0.0	6.1	0.0	0.0	19.9
0552	646699.30	4751208.31	176.00	0	D	A	80.8	7.8	0.0	0.0	0.0	60.4	1.1	-1.4	0.0	0.0	6.0	0.0	0.0	22.5
0557	646697.81	4751212.50	176.00	0	D	A	80.8	4.7	0.0	0.0	0.0	60.5	1.1	-1.5	0.0	0.0	5.9	0.0	0.0	19.4
0561	646696.88	4751215.12	176.00	0	D	A	80.8	4.2	0.0	0.0	0.0	60.6	1.1	-1.5	0.0	0.0	5.8	0.0	0.0	18.9
0567	646696.03	4751217.50	176.00	0	D	A	80.8	3.8	0.0	0.0	0.0	60.7	1.1	-1.5	0.0	0.0	5.8	0.0	0.0	18.6
0576	646614.11	4751393.65	176.00	0	D	A	80.8	4.2	0.0	0.0	0.0	64.9	1.6	-2.3	0.0	0.0	4.8	0.0	0.0	16.0

Line Source, ISO 9613, Name: "Haul truck EA to PP full", ID: "!P1E!HT_EA_PP_F"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
0580	646610.83	4751395.89	176.00	0	D	A	80.8	7.2	0.0	0.0	0.0	65.0	1.6	-2.3	0.0	0.0	4.8	0.0	0.0	19.0
0584	646606.75	4751398.67	176.00	0	D	A	80.8	6.6	0.0	0.0	0.0	65.0	1.6	-2.3	0.0	0.0	4.8	0.0	0.0	18.2
0588	646602.67	4751401.46	176.00	0	D	A	80.8	7.3	0.0	0.0	0.0	65.1	1.6	-2.3	0.0	0.0	4.8	0.0	0.0	18.9
0594	646599.35	4751403.72	176.00	0	D	A	80.8	4.3	0.0	0.0	0.0	65.1	1.6	-2.3	0.0	0.0	4.8	0.0	0.0	15.9
0598	646594.85	4751406.80	176.00	0	D	A	80.8	9.1	0.0	0.0	0.0	65.2	1.6	-2.3	0.0	0.0	4.8	0.0	0.0	20.6
0603	646590.20	4751409.97	176.00	0	D	A	80.8	4.8	0.0	0.0	0.0	65.3	1.6	-2.4	0.0	0.0	4.8	0.0	0.0	16.2
0620	646584.50	4751413.86	176.00	0	D	A	80.8	7.5	0.0	0.0	0.0	65.4	1.7	-2.3	0.0	0.0	4.8	0.0	0.0	18.8
0625	646581.07	4751416.20	176.00	0	D	A	80.8	4.2	0.0	0.0	0.0	65.4	1.7	-2.3	0.0	0.0	4.8	0.0	0.0	15.4
0665	646712.00	4751172.65	176.00	0	D	A	80.8	2.8	0.0	0.0	0.0	59.2	1.0	-1.4	0.0	0.0	6.8	0.0	0.0	17.9
0669	646710.91	4751175.72	176.00	0	D	A	80.8	6.6	0.0	0.0	0.0	59.4	1.0	-1.4	0.0	0.0	6.7	0.0	0.0	21.8
0674	646709.71	4751179.09	176.00	0	D	A	80.8	4.0	0.0	0.0	0.0	59.5	1.0	-1.4	0.0	0.0	6.6	0.0	0.0	19.1
0721	646635.74	4751379.12	176.00	0	D	A	80.8	6.5	0.0	0.0	0.0	64.6	1.5	-2.3	0.0	0.0	4.8	0.0	0.0	18.6
0727	646632.13	4751381.54	176.00	0	D	A	80.8	6.3	0.0	0.0	0.0	64.6	1.6	-2.3	0.0	0.0	4.8	0.0	0.0	18.3
0733	646629.01	4751383.63	176.00	0	D	A	80.8	5.2	0.0	0.0	0.0	64.7	1.6	-2.3	0.0	0.0	4.8	0.0	0.0	17.2
0739	646626.08	4751385.60	176.00	0	D	A	80.8	5.8	0.0	0.0	0.0	64.7	1.6	-2.3	0.0	0.0	4.8	0.0	0.0	17.7
0820	646622.56	4751387.97	176.00	0	D	A	80.8	6.7	0.0	0.0	0.0	64.8	1.6	-2.3	0.0	0.0	4.8	0.0	0.0	18.7
0838	646616.40	4751392.10	176.00	0	D	A	80.8	4.6	0.0	0.0	0.0	64.9	1.6	-2.3	0.0	0.0	4.8	0.0	0.0	16.5
0910	646543.98	4751439.87	176.00	0	D	A	80.8	6.5	0.0	0.0	0.0	66.0	1.8	-2.4	0.0	0.0	4.8	0.0	0.0	17.1
0915	646539.52	4751440.55	176.00	0	D	A	80.8	6.6	0.0	0.0	0.0	66.0	1.8	-2.4	0.0	0.0	4.8	0.0	0.0	17.2
0921	646535.02	4751441.25	176.00	0	D	A	80.8	6.6	0.0	0.0	0.0	66.1	1.8	-2.4	0.0	0.0	4.8	0.0	0.0	17.2
0928	646530.45	4751441.95	176.00	0	D	A	80.8	6.7	0.0	0.0	0.0	66.1	1.8	-2.4	0.0	0.0	4.8	0.0	0.0	17.3
0964	646694.68	4751221.31	176.00	0	D	A	80.8	7.5	0.0	0.0	0.0	60.8	1.1	-1.6	0.0	0.0	5.7	0.0	0.0	22.2
0970	646693.29	4751225.20	176.00	0	D	A	80.8	4.1	0.0	0.0	0.0	60.9	1.1	-1.6	0.0	0.0	5.7	0.0	0.0	18.8
1141	646324.01	4751771.85	174.00	0	D	A	80.8	15.8	0.0	0.0	0.0	70.6	2.6	-2.4	0.0	0.0	10.7	0.0	0.0	15.1
1195	646713.57	4751168.25	176.00	0	D	A	80.8	2.1	0.0	0.0	0.0	59.1	0.9	-1.4	0.0	0.0	6.9	0.0	0.0	17.3
1199	646712.81	4751170.38	176.00	0	D	A	80.8	4.7	0.0	0.0	0.0	59.2	1.0	-1.4	0.0	0.0	6.9	0.0	0.0	19.8
1253	646660.29	4751317.82	176.00	0	D	A	80.8	10.0	0.0	0.0	0.0	63.3	1.4	-2.1	0.0	0.0	4.9	0.0	0.0	23.3
1321	646346.27	4751543.17	185.03	0	D	A	80.8	9.5	0.0	0.0	0.0	68.5	2.2	1.2	0.0	0.0	3.3	0.0	0.0	15.1
1360	646564.36	4751429.03	176.00	0	D	A	80.8	7.9	0.0	0.0	0.0	65.7	1.7	-2.4	0.0	0.0	4.8	0.0	0.0	18.9
1366	646558.94	4751433.23	176.00	0	D	A	80.8	8.8	0.0	0.0	0.0	65.8	1.7	-2.4	0.0	0.0	4.8	0.0	0.0	19.6
1724	646574.66	4751421.06	176.00	0	D	A	80.8	8.1	0.0	0.0	0.0	65.6	1.7	-2.4	0.0	0.0	4.8	0.0	0.0	19.2
1815	646355.37	4751655.22	185.05	0	D	A	80.8	11.4	0.0	0.0	0.0	69.5	2.4	0.8	0.0	0.0	3.6	0.0	0.0	15.9
2029	646046.14	4751946.02	174.00	0	D	A	80.8	13.5	0.0	0.0	0.0	72.9	3.1	-1.8	0.0	0.0	4.8	0.0	0.0	15.3
2233	646311.33	4751845.00	174.00	0	D	A	80.8	11.9	0.0	0.0	0.0	71.2	2.7	-2.6	0.0	0.0	6.2	0.0	0.0	15.2
2289	646400.89	4751467.49	185.00	0	D	A	80.8	8.7	0.0	0.0	0.0	67.3	2.0	-0.0	0.0	0.0	4.3	0.0	0.0	16.0
2309	646309.69	4751874.91	174.00	0	D	A	80.8	12.7	0.0	0.0	0.0	71.5	2.8	-2.6	0.0	0.0	6.0	0.0	0.0	15.9
2485	646350.88	4751525.67	185.03	0	D	A	80.8	10.8	0.0	0.0	0.0	68.3	2.1	1.2	0.0	0.0	3.3	0.0	0.0	16.7
2567	645980.49	4752142.31	174.00	0	D	A	80.8	16.5	0.0	0.0	0.0	74.2	3.5	-2.1	0.0	0.0	4.8	0.0	0.0	16.9
2584	646366.42	4751493.02	185.01	0	D	A	80.8	10.1	0.0	0.0	0.0	67.8	2.0	1.2	0.0	0.0	3.3	0.0	0.0	16.5
2609	646093.69	4751908.75	174.00	0	D	A	80.8	14.7	0.0	0.0	0.0	72.5	3.0	-1.8	0.0	0.0	4.8	0.0	0.0	16.9
2897	646657.98	4751324.23	176.00	0	D	A	80.8	4.4	0.0	0.0	0.0	63.4	1.4	-2.1	0.0	0.0	4.9	0.0	0.0	17.6
2909	646000.87	4751985.17	174.00	0	D	A	80.8	14.1	0.0	0.0	0.0	73.3	3.2	-1.9	0.0	0.0	4.8	0.0	0.0	15.4
2943	646548.94	4751439.11	176.00	0	D	A	80.8	5.1	0.0	0.0	0.0	66.0	1.7	-2.4	0.0	0.0	4.8	0.0	0.0	15.8
3293	646500.77	4751446.28	176.00	0	D	A	80.8	4.9	0.0	0.0	0.0	66.4	1.8	-2.3	0.0	0.0	4.8	0.0	0.0	15.0

vert. Area Source, ISO 9613, Name: "Screen 155 West South Side Wall ", ID: "!PP!SC_155_W_U_S_SW"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
0300	644301.81	4751924.30	188.38	0	D	A	108.4	2.7	0.0	0.0	0.0	79.5	7.8	-1.0	0.0	0.0	0.0	0.0	0.0	24.8
0307	644301.81	4751924.30	189.38	0	D	A	108.4	2.7	0.0	0.0	0.0	79.5	7.8	-0.9	0.0	0.0	0.0	0.0	0.0	24.8
0413	644301.81	4751924.30	187.63	0	D	A	108.4	-0.3	0.0	0.0	0.0	79.5	7.8	-1.0	0.0	0.0	0.0	0.0	0.0	21.8

Line Source, ISO 9613, Name: "Haul truck PP to EA empty", ID: "!P1E!HT_PP_EA_E"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
0418	646687.61	4751232.83	176.00	0	D	A	76.8	10.6	0.0	0.0	0.0	61.2	1.2	-1.7	0.0	0.0	5.6	0.0	0.0	21.1
0430	646683.41	4751244.97	176.00	0	D	A	76.8	10.5	0.0	0.0	0.0	61.5	1.2	-1.8	0.0	0.0	5.5	0.0	0.0	20.9
0441	646680.13	4751254.42	176.00	0	D	A	76.8	6.9	0.0	0.0	0.0	61.7	1.2	-1.8	0.0	0.0	5.3	0.0	0.0	17.2
0446	646677.55	4751261.86	176.00	0	D	A	76.8	10.4	0.0	0.0	0.0	61.9	1.2	-1.9	0.0	0.0	5.3	0.0	0.0	20.6
0456	646674.67	4751270.19	176.00	0	D	A	76.8	6.7	0.0	0.0	0.0	62.2	1.3	-1.9	0.0	0.0	5.2	0.0	0.0	16.8
0465	646670.90	4751281.07	176.00	0	D	A	76.8	11.7	0.0	0.0	0.0	62.4	1.3	-2.0	0.0	0.0	5.1	0.0	0.0	21.7
0469	646667.88	4751289.79	176.00	0	D	A	76.8	5.5	0.0	0.0	0.0	62.6	1.3	-2.0	0.0	0.0	5.1	0.0	0.0	15.3
0474	646663.62	4751302.06	176.00	0	D	A	76.8	13.5	0.0	0.0	0.0	62.9	1.4	-2.1	0.0	0.0	5.0	0.0	0.0	23.1

Line Source, ISO 9613, Name: "Haul truck PP to EA empty", ID: "!P1E!HT_PP_EA_E"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
0630	646715.58	4751152.11	176.00	0	D	A	76.8	7.2	0.0	0.0	0.0	58.5	0.9	-1.5	0.0	0.0	7.7	0.0	0.0	18.4
0635	646713.98	4751156.73	176.00	0	D	A	76.8	6.5	0.0	0.0	0.0	58.7	0.9	-1.4	0.0	0.0	7.5	0.0	0.0	17.6
0640	646712.55	4751160.88	176.00	0	D	A	76.8	6.3	0.0	0.0	0.0	58.8	0.9	-1.4	0.0	0.0	7.4	0.0	0.0	17.4
0651	646710.90	4751165.61	176.00	0	D	A	76.8	5.6	0.0	0.0	0.0	59.0	0.9	-1.5	0.0	0.0	7.2	0.0	0.0	16.7
0655	646709.84	4751168.68	176.00	0	D	A	76.8	4.6	0.0	0.0	0.0	59.1	0.9	-1.4	0.0	0.0	7.1	0.0	0.0	15.6
0684	646721.01	4751137.31	176.00	0	D	A	76.8	4.1	0.0	0.0	0.0	57.9	0.8	-1.5	0.0	0.0	8.3	0.0	0.0	15.3
0699	646718.62	4751143.76	176.00	0	D	A	76.8	4.6	0.0	0.0	0.0	58.2	0.9	-1.5	0.0	0.0	8.0	0.0	0.0	15.8
0709	646716.94	4751148.28	176.00	0	D	A	76.8	4.5	0.0	0.0	0.0	58.4	0.9	-1.5	0.0	0.0	7.8	0.0	0.0	15.7
0850	646704.45	4751184.23	176.00	0	D	A	76.8	5.5	0.0	0.0	0.0	59.7	1.0	-1.4	0.0	0.0	6.6	0.0	0.0	16.4
0855	646702.91	4751188.69	176.00	0	D	A	76.8	7.7	0.0	0.0	0.0	59.8	1.0	-1.4	0.0	0.0	6.5	0.0	0.0	18.5
0860	646701.47	4751192.83	176.00	0	D	A	76.8	4.6	0.0	0.0	0.0	59.9	1.0	-1.4	0.0	0.0	6.4	0.0	0.0	15.4
0873	646698.96	4751200.07	176.00	0	D	A	76.8	8.6	0.0	0.0	0.0	60.2	1.0	-1.4	0.0	0.0	6.2	0.0	0.0	19.3
0880	646652.56	4751333.79	176.00	0	D	A	76.8	11.3	0.0	0.0	0.0	63.6	1.5	-2.2	0.0	0.0	4.9	0.0	0.0	20.3
0891	646644.41	4751356.75	176.00	0	D	A	76.8	14.9	0.0	0.0	0.0	64.1	1.5	-2.3	0.0	0.0	4.8	0.0	0.0	23.5
1089	646708.83	4751171.60	176.00	0	D	A	76.8	5.1	0.0	0.0	0.0	59.2	1.0	-1.5	0.0	0.0	7.0	0.0	0.0	16.1
1094	646707.54	4751175.33	176.00	0	D	A	76.8	6.7	0.0	0.0	0.0	59.4	1.0	-1.5	0.0	0.0	6.9	0.0	0.0	17.7
1100	646706.19	4751179.23	176.00	0	D	A	76.8	5.6	0.0	0.0	0.0	59.5	1.0	-1.5	0.0	0.0	6.8	0.0	0.0	16.6
1113	646696.02	4751208.55	176.00	0	D	A	76.8	9.7	0.0	0.0	0.0	60.4	1.1	-1.5	0.0	0.0	6.1	0.0	0.0	20.4
1126	646692.99	4751217.30	176.00	0	D	A	76.8	7.4	0.0	0.0	0.0	60.7	1.1	-1.6	0.0	0.0	5.9	0.0	0.0	18.1
1204	646611.82	4751392.79	176.00	0	D	A	76.8	7.4	0.0	0.0	0.0	64.9	1.6	-2.3	0.0	0.0	4.8	0.0	0.0	15.1
1222	646595.85	4751403.69	176.00	0	D	A	76.8	9.1	0.0	0.0	0.0	65.2	1.7	-2.4	0.0	0.0	4.8	0.0	0.0	16.7
1854	646691.04	4751222.93	176.00	0	D	A	76.8	8.1	0.0	0.0	0.0	60.9	1.1	-1.6	0.0	0.0	5.8	0.0	0.0	18.7
2445	646657.92	4751318.56	176.00	0	D	A	76.8	8.9	0.0	0.0	0.0	63.3	1.4	-2.1	0.0	0.0	4.9	0.0	0.0	18.2
2590	646576.07	4751417.44	176.00	0	D	A	76.8	8.4	0.0	0.0	0.0	65.5	1.7	-2.5	0.0	0.0	4.8	0.0	0.0	15.6
2812	646560.28	4751429.66	176.00	0	D	A	76.8	8.7	0.0	0.0	0.0	65.8	1.8	-2.5	0.0	0.0	4.8	0.0	0.0	15.7

Point Source, ISO 9613, Name: "Jaw Impact crusher Norberg ", ID: "!PP!JC_Nor"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
0844	644278.27	4751973.45	184.00	0	D	A	110.3	0.0	0.0	0.0	0.0	79.6	6.8	-1.0	0.0	0.0	0.0	0.0	0.0	24.9

Point Source, ISO 9613, Name: "Washplant screen 155E east", ID: "!PP!WP_E"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
1733	644328.15	4751781.78	186.45	0	D	A	105.2	0.0	0.0	0.0	0.0	79.2	10.0	-0.8	0.0	0.0	0.0	0.0	0.0	16.8

Point Source, ISO 9613, Name: "Washplant screen 155E west ", ID: "!PP!WP_W"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
1740	644323.80	4751781.09	186.45	0	D	A	105.2	0.0	0.0	0.0	0.0	79.2	10.0	-0.8	0.0	0.0	0.0	0.0	0.0	16.8

Point Source, ISO 9613, Name: "Rotary Impcte crusher #3 METSO 187 E", ID: "!PP!IC3_METSO187E"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
2136	644283.24	4751967.07	184.00	0	D	A	104.0	0.0	0.0	0.0	0.0	79.6	8.9	-1.2	0.0	0.0	0.0	0.0	0.0	16.7

Point Source, ISO 9613, Name: "Rotary Impcte crusher #2 METSO 177 W", ID: "!PP!IC2_METSO177W"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
2142	644279.48	4751965.10	184.00	0	D	A	104.0	0.0	0.0	0.0	0.0	79.6	8.9	-1.1	0.0	0.0	0.0	0.0	0.0	16.6

Point Source, ISO 9613, Name: "Rotary crusher #4 METSO 154 ", ID: "!PP!IC4_METSO154"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
2245	644284.98	4751946.34	183.00	0	D	A	103.7	0.0	0.0	0.0	0.0	79.5	9.6	-1.0	0.0	0.0	0.0	0.0	0.0	15.5

Point Source, ISO 9613, Name: "Truck unloading 10 trucks 30 s each ", ID: "!PP!T_U_JC"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
2450	644279.06	4751982.67	199.00	0	D	A	114.0	0.0	-10.8	0.0	0.0	79.6	6.8	-1.0	0.0	0.0	0.0	0.0	0.0	17.8

Point Source, ISO 9613, Name: "Impact crusher 177 ", ID: "!PP!IC_177"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
2455	644283.70	4751967.34	184.00	0	D	A	103.1	0.0	0.0	0.0	0.0	79.6	8.6	-1.6	0.0	0.0	0.0	0.0	0.0	16.5

Point Source, ISO 9613, Name: "Impact crusher 187 ", ID: "!PP!IC_187"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
2460	644279.94	4751965.19	184.00	0	D	A	103.1	0.0	0.0	0.0	0.0	79.6	8.6	-1.6	0.0	0.0	0.0	0.0	0.0	16.5

Report (Rankin model update V29 Nov2020 CadnaA calibrated.cna)

CALCULATION CONFIGURATION

Configuration	
Parameter	Value
General	
Country	(user defined)
Max. Error (dB)	0.00
Max. Search Radius (#(Unit,LEN))	3500.00
Min. Dist Src to Rcvr	0.00
Partition	
Raster Factor	0.50
Max. Length of Section (#(Unit,LEN))	1000.00
Min. Length of Section (#(Unit,LEN))	1.00
Min. Length of Section (%)	0.00
Proj. Line Sources	On
Proj. Area Sources	On
Ref. Time	
Reference Time Day (min)	960.00
Reference Time Night (min)	480.00
Daytime Penalty (dB)	0.00
Recr. Time Penalty (dB)	0.00
Night-time Penalty (dB)	0.00
DTM	
Standard Height (m)	0.00
Model of Terrain	Triangulation
Reflection	
max. Order of Reflection	2
Search Radius Src	100.00
Search Radius Rcvr	100.00
Max. Distance Source - Rcvr	1000.00 1000.00
Min. Distance Rvcr - Reflector	1.00 1.00
Min. Distance Source - Reflector	0.10
Industrial (ISO 9613)	
Lateral Diffraction	some Obj
Obst. within Area Src do not shield	On
Screening	Excl. Ground Att. over Barrier
	Dz with limit (20/25)
Barrier Coefficients C1,2,3	3.0 20.0 0.0
Temperature (#(Unit,TEMP))	10
rel. Humidity (%)	70
Ground Absorption G	1.00
Wind Speed for Dir. (#(Unit,SPEED))	3.0
Roads (RLS-90)	
Strictly acc. to RLS-90	
Railways (Schall 03 (1990))	
Strictly acc. to Schall 03 / Schall-Transrapid	
Aircraft (???)	
Strictly acc. to AzB	

NOISE SOURCES

Noise Source Library

Name	ID	Type	Oktave Spectrum (dB)											
			Weight.	31.5	63	125	250	500	1000	2000	4000	8000	A	lin	
6' x 24' Triple Deck Screen South Side	Screen155E_South	Lw		103.9	102.9	108.9	115.1	113.0	111.5	108.3	104.2	97.2	116.1	119.5	1771656 L
6' x 24' Triple Deck Screen Side	Screen155E_Side	Lw		106.0	110.3	118.2	117.6	117.8	117.6	116.0	112.9	106.4	122.5	125.0	1771656 L
Rock Dump Conveyor	Conveyor	Lw		102.4	103.7	106.1	108.2	109.8	114.2	114.6	108.6	99.7	119.0	119.4	1771656 L
Impact Crusher (177) Casing	Casing	Lw		113.4	112.0	107.1	98.9	95.7	95.3	96.7	96.1	92.4	103.1	116.6	1771656 L
Impact Crusher (177) Motor	Motor	Lw		97.9	98.4	96.5	95.6	93.1	94.2	89.1	87.3	85.5	98.0	104.4	1771656 L
Impact Crusher (154)	Imp	Lw		104.0	105.4	105.1	106.5	105.0	107.1	105.9	101.9	96.1	111.7	114.4	1771656 L
Haul Truck with Load	HaulTruck	Lw		107.9	111.4	122.7	116.0	115.4	107.8	107.2	101.6	95.0	116.2	124.7	1771656 L
Wash Plant Pump Motor	PumpMotor	Lw		105.9	99.1	93.1	90.1	92.0	91.2	88.4	81.6	76.5	95.3	107.3	1771656 L
Primary crusher	PC	Lw		119.0	119.0	119.0	116.0	115.0	113.0	111.0	106.0	96.0	118.1	125.4	Lafarge M
Secondary crusher	SC	Lw		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.0	9.5	
Primary screen	PSc	Lw		121.0	121.0	114.0	107.0	106.0	103.0	99.0	97.0	90.0	108.6	124.6	Lafarge m
Secondary screen	SSc	Lw		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.0	9.5	
Generator	Gen	Lw		106.0	109.0	108.0	105.0	106.0	104.0	101.0	93.0	83.0	108.4	114.7	Omya
Loader	L	Lw		116.7	126.3	121.4	112.6	112.5	112.7	112.8	106.7	97.3	118.2	128.4	CAT980 O

Name	ID	Type	Oktave Spectrum (dB)												
			Weight.	31.5	63	125	250	500	1000	2000	4000	8000	A	lin	
Highway truck	HWT	Lw		91.0	101.0	101.0	97.0	99.0	97.0	96.0	90.0	86.0	102.2	107.0	Golder dat
Drill	D	Lw		106.0	106.4	121.3	114.2	112.4	116.5	116.4	118.0	114.1	123.4	125.6	Site measu
		Li		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.0	9.5	
Lader	Loader	Lw		106.0	110.0	108.0	101.0	103.0	104.0	99.0	92.0	86.0	107.1	114.3	Golder dat
Washpalnt screen west	WP_W	Lw		124.0	121.0	111.0	107.0	107.0	107.0	107.0	105.0	99.0	113.0	126.2	Leq48
Haul truk extraction area to procesing plant full	HT_EA_PP_F	Lw		107.9	111.4	122.7	116.0	115.4	107.8	107.2	101.6	95.0	116.2	124.7	Golder me
Haul truck processing plant to extraction areaa empty	HT_PP_EA_E	Lw		111.4	111.3	114.2	112.8	111.5	105.1	103.1	97.0	88.0	112.2	119.7	Golder me
		Li		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.0	9.5	
Impact crusher #4 METSO 154	IC_METSO154	Lw		96.0	99.0	99.0	97.0	98.0	100.0	97.0	93.0	84.0	103.7	106.9	Golder me
Rotary impact crusher #2 and #3 METSO 177W and 187 E	IC_METSO177W_177E	Lw		106.0	107.0	103.0	100.0	99.0	99.0	98.0	93.0	86.0	104.0	111.6	Godler me
Jaw cruser Norberg	JC_NOR	Lw		107.0	112.0	112.0	109.0	108.0	106.0	101.0	95.0	88.0	110.3	117.5	Golder me
Screen 155 East Side Wall	SC_155_E	Lw		104.0	105.0	106.0	107.0	108.0	108.0	107.0	102.0	93.0	112.8	115.3	Golder me
Screen 155 East Top	SC_155_E_T	Lw		99.0	106.0	105.0	106.0	112.0	114.0	113.0	107.0	97.0	118.2	118.9	Golder me
Screen 155 West Side Wall	SC_155_W_S	Lw		101.0	109.0	113.0	112.0	113.0	113.0	112.0	108.0	99.0	117.9	120.3	Golder me
Screen 155 West Top	SC_155_W_T	Lw		99.0	107.0	107.0	108.0	113.0	119.0	117.0	112.0	101.0	122.5	122.6	Golder me
Wash plant top of screen	WP_S	Lw		106.0	104.0	100.0	95.0	98.0	100.0	98.0	94.0	90.0	104.2	110.2	Golder me
Screen 155 west and east unit south side wall	SC_155_WandE_S_SW	Lw		102.0	108.0	106.0	110.0	112.0	110.0	106.0	100.0	92.0	114.1	117.2	Golder me
Wash plant classifier side wall	WP_C_SW	Lw		106.0	104.0	100.0	95.0	98.0	100.0	98.0	94.0	90.0	104.2	110.2	Golder me
Wash palnt classifier top surface	WP_C_T	Lw		111.0	112.0	99.0	98.0	99.0	101.0	104.0	105.0	105.0	110.6	116.1	Golder me
Truck unloading	Truck_U	Lw		110.0	115.0	116.0	114.0	111.0	109.0	106.0	100.0	92.0	114.0	121.2	Golder me

Point Source(s)

Name	M.	ID	Result. PWL			Lw / Li			Correction			Sound Reduction		Attenuation	(
			Day	Evening	Night	Type	Value	norm.	Day	Evening	Night	R	Area		Da
			(dBA)	(dBA)	(dBA)			dB(A)	dB(A)	dB(A)	dB(A)		(m²)		(mi
Washplant screen 155E west		!PP!WP_W	105.2	104.2	104.2	Lw	WP_S		1.0	0.0	0.0				60.
Washplant screen 155E east		!PP!WP_E	105.2	104.2	105.2	Lw	WP_S		1.0	0.0	1.0				60.
Truck unloading 10 trucks 30 s each		!PP!T_U_JC	114.0	114.0	114.0	Lw	Truck_U		0.0	0.0	0.0				5.
Screen155E East Lower unit		!PP!SC_E_LU	122.5	122.5	122.5	Lw	Screen155E_Side		0.0	0.0	0.0				60.
Screen E top unit		!PP!SC_E_TU	125.5	122.5	122.5	Lw	Screen155E_Side		3.0	0.0	0.0				60.
Screen 155E west top unit		!PP!SC_W_TU	122.5	122.5	122.5	Lw	Screen155E_Side		0.0	0.0	0.0				60.
Screen 155E west lower unit		!PP!SC_W_LU	122.5	122.5	122.5	Lw	Screen155E_Side		0.0	0.0	0.0				60.
Rotary Impcte crusher #3 METSO 187 E		!PP!IC3_METSO187E	104.0	104.0	104.0	Lw	IC_METSO177W_177E		0.0	0.0	0.0				60.
Rotary Impcte crusher #2 METSO 177 W		!PP!IC2_METSO177W	104.0	104.0	104.0	Lw	IC_METSO177W_177E		0.0	0.0	0.0				60.
Rotary crusher #4 METSO 154		!PP!IC4_METSO154	103.7	103.7	103.7	Lw	IC_METSO154		0.0	0.0	0.0				60.
Jaw Impact crusher Norberg		!PP!JC_Nor	110.3	110.3	110.3	Lw	JC_NOR		0.0	0.0	0.0				60.
Impact crusher 187 motor		!PP!IC187_mot	98.0	98.0	98.0	Lw	Motor		0.0	0.0	0.0				60.
Impact crusher 187		!PP!IC_187	103.1	103.1	103.1	Lw	Casing		0.0	0.0	0.0				60.
Impact crusher 177 motor		!PP!IC177_mot	98.0	98.0	98.0	Lw	Motor		0.0	0.0	0.0				60.
Impact crusher 177		!PP!IC_177	103.1	103.1	103.1	Lw	Casing		0.0	0.0	0.0				60.
Impact crusher 154		!PP!IC_154	119.0	119.0	119.0	Lw	Conveyor		0.0	0.0	0.0				60.
Drill	-	!P1E!D_EA	109.0	123.4	123.4	Lw	D		-14.4	0.0	0.0				60.
Drill	-	!P2E!D_EA	121.0	123.4	123.4	Lw	D		-2.4	0.0	0.0				60.
Drill	-	!P3E!D_EA	121.0	123.4	123.4	Lw	D		-2.4	0.0	0.0				60.
Drill	-	!P1E!D_EA	121.0	123.4	123.4	Lw	D		-2.4	0.0	0.0				60.
Drill	-		121.0	123.4	123.4	Lw	D		-2.4	0.0	0.0				60.
Drill	-		121.0	123.4	123.4	Lw	D		-2.4	0.0	0.0				60.
Drill	-		121.0	123.4	123.4	Lw	D		-2.4	0.0	0.0				60.
Drill	-		121.0	123.4	123.4	Lw	D		-2.4	0.0	0.0				60.
Drill	-		121.0	123.4	123.4	Lw	D		-2.4	0.0	0.0				60.
Drill	-		121.0	123.4	123.4	Lw	D		-2.4	0.0	0.0				60.
Drill	-		121.0	123.4	123.4	Lw	D		-2.4	0.0	0.0				60.
Drill	-		121.0	123.4	123.4	Lw	D		-2.4	0.0	0.0				60.
Drill	-		121.0	123.4	123.4	Lw	D		-2.4	0.0	0.0				60.
Drill	-		121.0	123.4	123.4	Lw	D		-2.4	0.0	0.0				60.
Drill	-		121.0	123.4	123.4	Lw	D		-2.4	0.0	0.0				60.
Drill	-		121.0	123.4	123.4	Lw	D		-2.4	0.0	0.0				60.
Drill	-		109.0	123.4	123.4	Lw	D		-14.4	0.0	0.0				60.
Drill	-		121.0	123.4	123.4	Lw	D		-2.4	0.0	0.0				60.
Drill	-		121.0	123.4	123.4	Lw	D		-2.4	0.0	0.0				60.
Drill	-		121.0	123.4	123.4	Lw	D		-2.4	0.0	0.0				60.
Drill	-		121.0	123.4	123.4	Lw	D		-2.4	0.0	0.0				60.

Line Source(s)

Name	M.	ID	Result. PWL			Result. PWL'			Lw / Li			Correction			Sound Reduction		Attenuation	O
			Day	Evening	Night	Day	Evening	Night	Type	Value	norm.	Day	Evening	Night	R	Area		Day
			(dBA)	(dBA)	(dBA)	(dBA)	(dBA)	(dBA)			dB(A)	dB(A)	dB(A)	dB(A)		(m²)		(min)
Haul truck PP to Off site		!P1E!HW	93.9	-16.1	-16.1	66.8	-43.2	-43.2	PWL-Pt	HWT		0.0	0.0	0.0				60.0
Haul truck EA to PP full		!P1E!HT_EA_PP_F	116.0	6.0	6.0	80.8	-29.2	-29.2	PWL-Pt	HT_EA_PP_F		0.0	0.0	0.0				60.0
Haul truck PP to EA empty	~	!P3E!HT_PP_EA_E	112.8	2.8	2.8	76.8	-33.2	-33.2	PWL-Pt	HT_PP_EA_E		0.0	0.0	0.0				60.0
Haul truck EA to PP full	~	!P2E!HT_EA_PP_F	116.4	6.4	6.4	80.8	-29.2	-29.2	PWL-Pt	HT_EA_PP_F		0.0	0.0	0.0				60.0
Haul truck EA to PP full	~	!P3E!HT_EA_PP_F	116.8	6.8	6.8	80.8	-29.2	-29.2	PWL-Pt	HT_EA_PP_F		0.0	0.0	0.0				60.0
Haul truck PP to EA empty	~	!P6E!HT_PP_EA_E	112.0	2.0	2.0	76.8	-33.2	-33.2	PWL-Pt	HT_PP_EA_E		0.0	0.0	0.0				60.0
Haul truck PP to EA empty	~	!P2E!HT_PP_EA_E	112.4	2.4	2.4	76.8	-33.2	-33.2	PWL-Pt	HT_PP_EA_E		0.0	0.0	0.0				60.0
Haul truck EA to PP full	-	!P1E!HT_EA_PP_F	116.5	6.5	6.5	80.8	-29.2	-29.2	PWL-Pt	HT_EA_PP_F		0.0	0.0	0.0				60.0
Haul truck PP to EA empty	-	!P1E!HT_PP_EA_E	112.0	2.0	2.0	76.8	-33.2	-33.2	PWL-Pt	HT_PP_EA_E		0.0	0.0	0.0				60.0
Haul truck EA to PP full	-	!P1E!HT_EA_PP_F	116.0	6.0	6.0	80.8	-29.2	-29.2	PWL-Pt	HT_EA_PP_F		0.0	0.0	0.0				60.0
Haul truck PP to EA empty	-	!P1E!HT_PP_EA_E	112.5	2.5	2.5	76.8	-33.2	-33.2	PWL-Pt	HT_PP_EA_E		0.0	0.0	0.0				60.0
Haul truck EA to PP full	-	!P1E!HT_EA_PP_F	116.2	6.2	6.2	80.8	-29.2	-29.2	PWL-Pt	HT_EA_PP_F		0.0	0.0	0.0				60.0

Name	M.	ID	Result. PWL			Result. PWL'			Lw / Li			Correction			Sound Reduction		Attenuation	O
			Day	Evening	Night	Day	Evening	Night	Type	Value	norm.	Day	Evening	Night	R	Area		Day
			(dBA)	(dBA)	(dBA)	(dBA)	(dBA)	(dBA)			dB(A)	dB(A)	dB(A)	dB(A)		(m²)		(min)
Haul truck EA to PP full	~	!P6E!HT_EA_PP_F	116.0	6.0	6.0	80.8	-29.2	-29.2	PWL-Pt	HT_EA_PP_F		0.0	0.0	0.0				60.0
Haul truck PP to EA empty	-	!P1E!HT_PP_EA_E	112.2	2.2	2.2	76.8	-33.2	-33.2	PWL-Pt	HT_PP_EA_E		0.0	0.0	0.0				60.0
Haul truck PP to EA empty		!P1E!HT_PP_EA_E	112.0	2.0	2.0	76.8	-33.2	-33.2	PWL-Pt	HT_PP_EA_E		0.0	0.0	0.0				60.0
Haul truck EA to PP full	~	!P5E!HT_EA_PP_F	116.5	6.5	6.5	80.8	-29.2	-29.2	PWL-Pt	HT_EA_PP_F		0.0	0.0	0.0				60.0
Haul truck PP to EA empty	~	!P5E!HT_PP_EA_E	112.5	2.5	2.5	76.8	-33.2	-33.2	PWL-Pt	HT_PP_EA_E		0.0	0.0	0.0				60.0
Haul truck EA to PP full	~	!P7E!HT_EA_PP_F	116.6	6.6	6.6	80.8	-29.2	-29.2	PWL-Pt	HT_EA_PP_F		0.0	0.0	0.0				60.0
Haul truck PP to EA empty	~	!P7E!HT_PP_EA_E	112.6	2.6	2.6	76.8	-33.2	-33.2	PWL-Pt	HT_PP_EA_E		0.0	0.0	0.0				60.0
Haul truck EA to PP full	~	!P4E!HT_EA_PP_F	116.3	6.3	6.3	80.8	-29.2	-29.2	PWL-Pt	HT_EA_PP_F		0.0	0.0	0.0				60.0
Haul truck PP to EA empty	~	!P4E!HT_PP_EA_E	112.4	2.4	2.4	76.8	-33.2	-33.2	PWL-Pt	HT_PP_EA_E		0.0	0.0	0.0				60.0
Haul truck PP to Off site	+	HW	93.8	-16.2	-16.2	66.8	-43.2	-43.2	PWL-Pt	HWT		0.0	0.0	0.0				60.0
Haul truck PP to Off site		!P1E!HW	93.8	-16.2	-16.2	66.8	-43.2	-43.2	PWL-Pt	HWT		0.0	0.0	0.0				60.0
Haul truck PP to Off site	~	!P2E!HW	93.9	-16.1	-16.1	66.8	-43.2	-43.2	PWL-Pt	HWT		0.0	0.0	0.0				60.0
Haul truck PP to Off site	~	!P3E!HW	93.9	-16.1	-16.1	66.8	-43.2	-43.2	PWL-Pt	HWT		0.0	0.0	0.0				60.0
Haul truck PP to Off site	~	!P4E!HW	93.9	-16.1	-16.1	66.8	-43.2	-43.2	PWL-Pt	HWT		0.0	0.0	0.0				60.0
Haul truck PP to Off site	~	!P5E!HW	93.9	-16.1	-16.1	66.8	-43.2	-43.2	PWL-Pt	HWT		0.0	0.0	0.0				60.0
Haul truck PP to Off site	~	!P6E!HW	93.9	-16.1	-16.1	66.8	-43.2	-43.2	PWL-Pt	HWT		0.0	0.0	0.0				60.0
Haul truck PP to Off site	~	!P7E!HW	93.9	-16.1	-16.1	66.8	-43.2	-43.2	PWL-Pt	HWT		0.0	0.0	0.0				60.0

Area Source(s)

Name	M.	ID	Result. PWL			Result. PWL"			Lw / Li			Correction			Sound Reduction		A
			Day	Evening	Night	Day	Evening	Night	Type	Value	norm.	Day	Evening	Night	R	Area	
			(dBA)	(dBA)	(dBA)	(dBA)	(dBA)	(dBA)			dB(A)	dB(A)	dB(A)	dB(A)		(m²)	
Loader extraction area	~	!P4E!L_EA	107.1	107.1	107.1	88.4	88.4	88.4	Lw	Loader		0.0	0.0	0.0			
Loader extraction area	~	!P2E!L_EA	107.1	107.1	107.1	88.4	88.4	88.4	Lw	Loader		0.0	0.0	0.0			
Loader extraction area	~	!P3E!L_EA	107.1	107.1	107.1	88.4	88.4	88.4	Lw	Loader		0.0	0.0	0.0			
Loader extraction area	~	!P6E!L_EA	107.1	107.1	107.1	88.4	88.4	88.4	Lw	Loader		0.0	0.0	0.0			
Loader screen plant area		!PP!L_SP_A	107.1	107.1	107.1	73.9	73.9	73.9	Lw	Loader		0.0	0.0	0.0			
Loader washplant area		!PP!L_WP_A	107.1	107.1	107.1	73.5	73.5	73.5	Lw	Loader		0.0	0.0	0.0			
Screen 155 East Upper UnitTop		!PP!SC_155_E_U_T	118.2	118.2	118.2	106.5	106.5	106.5	Lw	SC_155_E_T		0.0	0.0	0.0			
Screen 155 West Upper Unit Top		!PP!SC_155_W_U_T	122.5	122.5	122.5	110.8	110.8	110.8	Lw	SC_155_W_T		0.0	0.0	0.0			
Scereen 155 East Bottom Unit Top		!PP!SC_155_E_B_T	118.2	118.2	118.2	106.3	106.3	106.3	Lw	SC_155_E_T		0.0	0.0	0.0			
Screen 155 West Bottom UnitTop		!PP!SC_155_W_B_T	122.5	122.5	122.5	110.6	110.6	110.6	Lw	SC_155_W_T		0.0	0.0	0.0			
Wash plant classifier east unit top surface		!PP!WP_S_E_T	110.6	110.6	110.6	104.1	104.1	104.1	Lw	WP_C_T		0.0	0.0	0.0			
Wash plant classifier west unit top surface		!PP!WP_S_W_T	110.6	110.6	110.6	104.1	104.1	104.1	Lw	WP_C_T		0.0	0.0	0.0			
Screen 155 East Upper Unit bottom		!PP!SC_155_E_U_T_B	116.8	112.8	112.8	105.1	101.1	101.1	Lw	SC_155_E		4.0	0.0	0.0			
Screen 155 West Upper Unit Top bottom		!PP!SC_155_W_U_T	121.9	117.9	117.9	110.2	106.2	106.2	Lw	SC_155_W_S		4.0	0.0	0.0			
Loader extraction area	-	!P1E!L_EA	107.1	107.1	107.1	88.4	88.4	88.4	Lw	Loader		0.0	0.0	0.0			
Loader extraction area		!P1E!L_EA	107.1	107.1	107.1	88.4	88.4	88.4	Lw	Loader		0.0	0.0	0.0			
Loader extraction area	-	!P1E!L_EA	107.1	107.1	107.1	88.4	88.4	88.4	Lw	Loader		0.0	0.0	0.0			
Loader extraction area	~	!P5E!L_EA	107.1	107.1	107.1	88.4	88.4	88.4	Lw	Loader		0.0	0.0	0.0			
Loader extraction area	-	!P1E!L_EA	107.1	107.1	107.1	87.1	87.1	87.1	Lw	Loader		0.0	0.0	0.0			
Loader extraction area	~	!P7E!L_EA	107.1	107.1	107.1	88.4	88.4	88.4	Lw	Loader		0.0	0.0	0.0			

Vertical Area Source(s)

Name	M.	ID	Result. PWL			Result. PWL"			Lw / Li			Correction			Sound Reduc	
			Day	Evening	Night	Day	Evening	Night	Type	Value	norm.	Day	Evening	Night	R	Area
			(dBA)	(dBA)	(dBA)	(dBA)	(dBA)	(dBA)			dB(A)	dB(A)	dB(A)	dB(A)		(m²)
Screen 155 West Upper Unit Side		!PP!SC_155_W_U_S	120.9	117.9	117.9	108.3	105.3	105.3	Lw	SC_155_W_S		3.0	0.0	0.0		
Screen 155 East Upper Unit Side		!PP!SC_155_E_U_S	117.0	114.0	114.0	104.3	101.3	101.3	Lw	SC_155_E		4.2	1.2	1.2		
Screen 155 East Bottom Unit Side		!PP!SC_155_B_S	117.0	112.8	112.8	104.3	100.1	100.1	Lw	SC_155_E		4.2	0.0	0.0		
Screen 155 West Bottom Unit SIde		!PP!SC_155_W_B_S	120.9	117.9	117.9	108.3	105.3	105.3	Lw	SC_155_W_S		3.0	0.0	0.0		
Screen 155 West South Side Wall		!PP!SC_155_W_U_S_SW	115.1	112.1	112.1	108.4	105.4	105.4	Lw	SC_155_WandE_S_SW		1.0	-2.0	-2.0		
Screen 155 East South Side Wall		!PP!SC_155_E_U_S_SW	115.1	112.1	112.1	108.4	105.4	105.4	Lw	SC_155_WandE_S_SW		1.0	-2.0	-2.0		
Wash plant classifier east		!PP!WP_C_E	107.2	104.2	104.2	96.6	93.6	93.6	Lw	WP_C_SW		3.0	0.0	0.0		
Wash plant classifier west		!PP!WP_C_W	107.2	104.2	104.2	96.6	93.6	93.6	Lw	WP_C_SW		3.0	0.0	0.0		

Barrier(s)

Name	M.	ID	Absorption		Z-Ext.	Cantilever		Height			
			left	right		horz.	vert.	Begin		End	
					(m)	(m)	(m)	(m)		(m)	
	-		0.21	0.21	3.50			18.00	r		
	-		0.21	0.21	3.50			8.00	r		
Screen 155 East					2.45	1.85	0.00				
Screen 155 East					2.55	1.85	0.00				
Screen 155 East					2.55	-1.00	0.00				
Screen 155 East					0.50	-1.85	0.00				
Screen 155 East					3.50	1.85	0.00				
Screen 155 East					3.50	-1.00	0.00				
Screen 155 East					3.50	1.85	0.00				
Screen 155 East					3.50	-1.00	0.00				
Screen 155 East South Side Wall		SC_155_E_U_S_SW			2.50	0.25	0.00				
Screen 155 West South Side Wall		SC_155_W_U_S_SW			2.55	0.25	0.00				
Screen 155 West South Side Wall		SC_155_W_U_S_SW			2.50	1.00	0.00				
Screen 155 West South Side Wall		SC_155_W_U_S_SW			2.50	1.00	0.00				
Screen 155 West South Side Wall		SC_155_W_U_S_SW			2.50	-0.25	0.00				

Name	M.	ID	Absorption		Z-Ext.	Cantilever		Height			
			left	right		horz.	vert.	Begin		End	
					(m)	(m)	(m)	(m)		(m)	
Screen 155 West South Side Wall		SC_155_W_U_S_SW			2.50	-0.25	0.00				
Screen 155 West South Side Wall		SC_155_W_U_S_SW			2.55	0.25	0.00				
Screen 155 West South Side Wall		SC_155_W_U_S_SW			2.55	0.25	0.00				
Screen 155 East					2.55	-1.00	0.00				
Screen 155 East					0.50	-1.85	0.00				
Screen 155 East					0.50	-1.85	0.00	17.00	r		
Top edge of west quarry		TEWQ	0.21	0.21							
processing plnt	+	!TE01!	0.21	0.21				189.00	a		
processing plnt	-	!TE01!	0.21	0.21				10.00	r	10.00	r
Drill local barrier	-	BB	0.37	0.37				4.00	r		
Drill local barrier	-	BB	0.37	0.37				4.00	r		
Drill local barrier	-	DLB	0.37	0.37				4.00	r		
Drill local barrier	-	DLB	0.37	0.37				6.00	r		
Drill local barrier	-	DLB	0.37	0.37				5.00	r		
Drill local barrier	-	DLB	0.37	0.37				4.00	r		
Drill local barrier	-	DLB	0.37	0.37				5.00	r		
Drill	-	DLB	0.37	0.37				4.00	r		
Drill	-	DLB	0.37	0.37				4.00	r		
Drill	-	DLB	0.37	0.37				5.00	r		
Drill	-	DLB	0.37	0.37				4.00	r		
Drill	-	DLB	0.37	0.37				4.00	r		
Drill	-	DLB	0.37	0.37				4.00	r		
Drill	-	DLB	0.37	0.37				4.00	r		
DRill	-	DLB	0.37	0.37				4.00	r		
working phase Area 3 phase 1	-	DLB	0.37	0.37				10.00	r		
working phase Area 1 phase 1	~	!P5E!DLB	0.37	0.37				8.00	r		
working phase Area 3 phase 1	-	DLB	0.37	0.37				8.00	r		
working phase Area 3 phase 1	~	!P3E!DLB	0.37	0.37				8.00	r		
working phase Area 4 phase 1	~	!P6E!DLB	0.37	0.37				8.00	r		
Drill	-	DLB	0.37	0.37				4.00	r		
extraction face area 5 phase 1	~	!P7E!DLB	0.37	0.37				8.00	r		
Drill	-	DLB	0.37	0.37				5.00	r		
Drill	-	DLB	0.37	0.37				4.00	r		
working face phase 1 area 0	-	DLB	0.37	0.37				10.00	r		
working face phase 1 area 0	-	DLB	0.37	0.37				4.00	r		
working face phase 1 area 0	~	!P4E!DLB	0.37	0.37				8.00	r		
working face phase 1 area 0	-	DLB	0.60	0.60				25.00	r		
working face phase 1 area 0	~	!P2E!DLB	0.37	0.37				8.00	r		

Building(s)

Name	M.	ID	RB	Residents	Absorption	Reflection		Height	
						Left	Right	Begin	
						dB	dB	(m)	
	-		x	0				0.00	r
	-		x	0				0.00	r
	-		x	0				0.00	r
	-		x	0				0.00	r
	-		x	0				0.00	r
	-		x	0				0.00	r
	-		x	0				0.00	r
	-		x	0				0.00	r
site	+		x	0	0.99	20		9.00	r

Ground Absorption Area(s)

Name	M.	ID	G
			0.5
Water			0.0
Water			0.0
Phase 3 bottom	~	!0G3!	0.2
phase 1 bottom		!0G1!	0.2
phase 1 and 2 bottom	~	!0G2!	0.2
EXCAVATION_AREAS		0	0.2
EXCAVATION_AREAS		0	0.2

Receptor Noise Impact Level(s)

Name	M.	ID	Level Lr			Limit. Value			Land Use			Height		Coordinates		
			Day	Evening	Night	Day	Evening	Night	Type	Auto	Noise Type			X	Y	Z
			(dBA)	(dBA)	(dBA)	(dBA)	(dBA)	(dBA)				(m)		(m)	(m)	(m)
One-storey Residence		POR001	60.6	53.4	53.4	0.0	0.0	0.0				1.50	r	643973.25	4752235.96	186.79
Two-storey Residence 316 Second Concession Rd		POR002	58.1	50.2	50.2	0.0	0.0	0.0				4.50	r	643918.86	4752443.69	186.50
One-storey Residence 386 Second Concession Rd		POR003	60.1	52.8	52.8	0.0	0.0	0.0				1.50	r	644123.65	4752388.09	188.50
Two-storey Residence 386 Second Concession Rd		POR004	58.3	52.5	52.5	0.0	0.0	0.0				4.50	r	644180.44	4752382.44	191.50
1.5-storey Residence 420 Secon Concession Rd		POR005	59.9	52.1	52.1	0.0	0.0	0.0				3.00	r	644213.28	4752400.30	190.00
One-storey Residence 448 Chippawa Rd		POR006	60.4	52.9	52.9	0.0	0.0	0.0				1.50	r	644260.58	4752400.32	188.50
Two-storey Residence 459 Chippawa Rd		POR007	57.4	50.7	50.7	0.0	0.0	0.0				4.50	r	644334.92	4752382.37	191.43

Name	M.	ID	Level Lr			Limit. Value			Land Use			Height		Coordinates		
			Day	Evening	Night	Day	Evening	Night	Type	Auto	Noise Type			X	Y	Z
			(dBA)	(dBA)	(dBA)	(dBA)	(dBA)	(dBA)				(m)		(m)	(m)	(m)
1.5-storey Residence 516 Second Concession Rd		POR008	56.3	49.8	49.8	0.0	0.0	0.0				3.00	r	644472.58	4752395.91	190.14
1.5-storey Residence 530 Second Concession Rd		POR009	56.1	49.4	49.4	0.0	0.0	0.0				3.00	r	644509.46	4752392.76	190.05
One-storey Residence 636 Second Concession Rd		POR010	53.8	48.1	48.1	0.0	0.0	0.0				1.50	r	644702.29	4752467.87	188.30
One-storey Residence 640 Second Concession Rd		POR011	53.5	47.2	47.2	0.0	0.0	0.0				1.50	r	644747.55	4752426.31	188.04
Two-storey Residence 642 Second Concession Rd		POR012	54.5	48.9	48.9	0.0	0.0	0.0				4.50	r	644795.78	4752426.27	191.19
One-storey Residence 644 Second Concession Rd		POR013	52.6	46.5	46.5	0.0	0.0	0.0				1.50	r	644828.25	4752399.22	188.23
One-storey Residence 662 Second Concession Rd		POR014	53.1	47.8	47.8	0.0	0.0	0.0				1.50	r	644871.19	4752409.64	188.67
One-storey Residence 708 Second Concession Rd		POR015	53.3	48.4	48.4	0.0	0.0	0.0				1.50	r	645004.27	4752411.33	187.31
One-storey Residence 874 Second Concession Rd		POR016	48.8	41.3	41.3	0.0	0.0	0.0				1.50	r	645406.13	4752503.33	186.50
One-storey Residence		POR017	45.0	38.2	38.2	0.0	0.0	0.0				1.50	r	645827.77	4752790.21	187.25
1.5-storey Residence 1246 Second Concession Rd		POR018	46.4	37.8	37.8	0.0	0.0	0.0				3.00	r	646172.10	4752437.58	187.13
One-storey Residence POR_N		POR019	41.2	34.2	34.2	0.0	0.0	0.0				1.50	r	647001.78	4752439.82	185.42
1.5-storey Residence 2024 Miler Rd		POR020	38.8	30.4	30.4	0.0	0.0	0.0				3.00	r	647391.74	4752472.68	187.00
Two-storey Residence 1903 Miler Rd		POR021	38.9	30.1	30.1	0.0	0.0	0.0				4.50	r	647500.14	4752240.19	188.33
One-storey Residence 1864 Miler Rd		POR022	38.8	29.5	29.5	0.0	0.0	0.0				1.50	r	647335.81	4752143.45	184.84
Two-storey Residence POR NE 1826 Miler Rd		POR023	39.9	30.6	30.6	0.0	0.0	0.0				4.50	r	647379.10	4752069.35	187.69
One-storey Residence 1778 Miler Rd		POR024	38.7	29.1	29.1	0.0	0.0	0.0				1.50	r	647402.38	4751988.83	184.48
One-storey Residence 1732 Miler Rd		POR025	39.0	29.2	29.2	0.0	0.0	0.0				1.50	r	647394.14	4751895.06	184.32
Two-storey Residence 1682 Miler Rd		POR026	40.4	30.5	30.5	0.0	0.0	0.0				4.50	r	647390.65	4751793.32	187.14
One-storey Residence 1630 Miler Rd		POR027	39.5	29.2	29.2	0.0	0.0	0.0				1.50	r	647386.64	4751689.41	183.96
Two-storey Residence 1580 Miler Rd		POR028	40.8	30.9	30.9	0.0	0.0	0.0				4.50	r	647412.26	4751587.53	186.75
One-storey Residence POR029 POW 1498		POR029	39.2	29.1	29.1	0.0	0.0	0.0				1.50	r	647400.51	4751422.14	183.50
Two-storey Residence		POR030	40.4	29.4	29.4	0.0	0.0	0.0				4.50	r	647472.04	4751152.21	185.76
One-storey Residence 1838 HW 3		POR031	40.4	28.6	28.6	0.0	0.0	0.0				1.50	r	647206.49	4750874.29	181.70
Three-storey Residence 1751 HW 3		POR032	43.4	31.0	31.0	0.0	0.0	0.0				7.50	r	647027.98	4750842.35	187.50
Two-storey Residence 1695 HW3		POR033	45.0	35.5	35.5	0.0	0.0	0.0				4.50	r	646930.76	4750853.00	184.58
One-storey Residence 1627 HW3		POR034	42.4	33.6	33.6	0.0	0.0	0.0				1.50	r	646831.78	4750905.55	181.89
Three-storey Residence POR S 1577 HW3		POR035	47.2	37.2	37.2	0.0	0.0	0.0				7.50	r	646752.69	4750917.74	188.00
Two-storey Residence 1266 Weaver Rd		POR036	46.4	37.3	37.3	0.0	0.0	0.0				4.50	r	646600.29	4750915.16	185.32
Two-storey Residence 1331 HW3		POR037	49.0	39.4	39.4	0.0	0.0	0.0				4.50	r	646342.03	4751054.44	186.37
Two-storey Residence 1413 Lorraine Rd		POR038	51.1	44.6	44.6	0.0	0.0	0.0				4.50	r	645828.83	4751197.60	186.50
Two-storey Residence 966 Main Street		POR039	52.4	46.1	46.1	0.0	0.0	0.0				4.50	r	645708.73	4751321.68	186.50
1.5-storey Residence 1516 Babylon Rd		POR040	52.5	46.0	46.0	0.0	0.0	0.0				3.00	r	645742.11	4751413.17	185.00
One-storey Residence 1540 Babylon Rd		POR041	50.4	43.7	43.7	0.0	0.0	0.0				1.50	r	645767.99	4751444.08	183.50
One-storey Residence 831 Main Street		POR042	52.2	46.3	46.3	0.0	0.0	0.0				1.50	r	645366.49	4751303.89	181.50
1.5-storey Residence 1587 Snider Rd		POR043	60.4	55.0	55.0	0.0	0.0	0.0				3.00	r	644987.51	4751523.69	184.33
1.5-storey Residence 1607 Snider Rd		POR044	60.7	55.3	55.3	0.0	0.0	0.0				3.00	r	644986.87	4751560.38	184.50
Two-storey Residence 667 Main Street		POR045	59.5	54.4	54.4	0.0	0.0	0.0				4.50	r	644899.73	4751329.44	184.50
Three-storey Residence 548 Main Street		POR046	63.7	58.8	58.8	0.0	0.0	0.0				7.50	r	644574.23	4751393.99	187.57
One-storey Residence 122 Berkley Ave		POR047	62.3	56.5	56.5	0.0	0.0	0.0				1.50	r	644082.78	4751410.11	181.84
2.5-storey Residence POR west 281 Chippawa Rd		POR048	65.3	57.1	57.1	0.0	0.0	0.0				6.00	r	643985.26	4752055.66	190.74

APPENDIX G

Curricula Vitae

Education

M.Eng. Mechanical Engineering, University of Toronto, 2004

B.A.Sc. Mechanical Engineering, Waterloo University, 2001

Mississauga

Employment History

Golder Associates – Mississauga, Ontario

Associate / Acoustics, Noise and Vibration Engineer (2005 to Present)

Responsible for the preparation of Ontario Ministry of the Environment (MOE) Environmental Compliance Approval applications, Noise and Vibration Impact Statements, Environmental Assessments and Peer Reviews. Duties include the measurement and prediction of noise and vibration sources, recommendation and design of noise and vibration control measures, maintaining project budgets and schedules, client liaison, conducting site visits, preparing reports and senior review. Recognized as an Expert Witness at OMB and ERT Proceedings. Permitting and EA support provided to many sectors including mining, power & energy, iron & steel, manufacturing, landfill & aggregate, oil & gas, urban, etc.

Aercoustics Engineering Limited – Toronto, Ontario

Acoustics Noise and Vibration Consultant (2001 to 2005)

Responsible for measuring, analyzing and predicting the noise / vibration impacts on sensitive receptor locations. Ensured compliance with client, MOE or other governing body guidelines by providing acoustical performance specifications for the recommended noise / vibration control measures. Performing seismic designs of mechanical, electrical and life safety systems to ensure compliance with applicable codes, including but not limited to; OBC, SMACNA and NFPA-13. Projects included noise impact assessments, EAs, noise control specification for performing arts schools and universities, baseline noise studies for landfills and pits and quarries, acoustic audits, ambient noise assessments, assessment of rail and road, noise impact statements for residential developments, mechanical noise / vibration control, structural vibration isolation, vibration monitoring, design of vibration isolated buildings and software development for; the prediction of noise impacts and the qualifications of seismic restraints.

PROJECT EXPERIENCE – REGULATORY

ACME Sample Application Package
Toronto, Ontario

Worked with the Ministry of the Environment and Climate Change (MOECC) in preparing a sample Acoustic Assessment Report, which forms part of the sample application package prepare in cooperation with the MOE that demonstrates the technical requirements for CofA (Air and Noise) applications.

Revised - ACME Sample Application Package
Toronto, Ontario

Worked with the MOECC in preparing a revised sample Acoustic Assessment Report, in support of the MOECC Modernization initiative, which forms part of the sample application package prepare in cooperation with the MOECC that demonstrates the technical requirements for Environmental Compliance Approval (ECA) applications.

ACME Aggregates Sample Application Package
Toronto, Ontario, Canada

Retained by OSSGA to prepare a sample Acoustic Assessment Report, which forms part of a sample application package for MOECC approval for an aggregate site in Ontario. The package demonstrated the technical requirements for ECA applications.

PROJECT EXPERIENCE – LANDFILL & AGGREGATE SECTOR

Environmental Impact Assessment
Niagara, Ontario

Noise task manager preparing a noise assessment for the Humberstone Landfill in, which involved site specific noise measurements and modelling in order to assess compliance with MOECC Guidelines.

Ontario Trap Rock
Sault Ste. Marie, Canada

Noise task manager responsible for completing a noise assessment for an active quarry, which involved baseline monitoring, site specific noise measurements, and modelling in order to assess compliance with applicable noise limits. The assessment include the consideration of noise emissions associated with a port facility. Conceptual noise mitigation was provided and designed to ensure compliance.

Environmental Impact Assessment
Ottawa, Ontario

Senior technical noise support for the noise assessment completed for the expansion of the Brighton Landfill providing support with the Environmental Assessment.

Environmental Permitting Assessments
Various, Ontario

Noise task manager responsible for ECA applications for various landfill sites operated by Simcoe County. These projects involved site-specific noise measurements and modelling in order to assess compliance with MOE Guidelines. Where required, noise mitigation was provided and designed to ensure compliance.

Environmental Permitting Support
Various, Ontario

Noise task manager responsible for supporting various landfill operations in meeting ECA requirements for sites in the Ottawa region. These projects involved annual or twice annual noise monitoring programs to document noise levels in the environment to allow the landfill operations to demonstrate compliance with EA and ECA conditions.

Environmental Permitting Assessment New York State, US	Noise task manager responsible for completing a noise assessment for a proposed expansion to a quarry in up-state New York, which involved baseline monitoring, site specific noise measurements, and modelling in order to assess compliance with applicable noise limits. Conceptual noise mitigation was provided and designed to ensure compliance.
Environmental Permitting Assessment Halifax, Nova Scotia	Noise task manager responsible for completing a noise assessment for a proposed quarry, which involved baseline monitoring, site specific noise measurements, and modelling in order to assess compliance with applicable noise limits. Conceptual noise mitigation was provided and designed to ensure compliance.
Environmental Permitting Assessments Various, Ontario	Noise task manager preparing acoustic assessments of various pits, quarries, asphalt and ready-mix facilities across Ontario for many clients including; Lafarge, CBM, Walker, Karson, Tomlinson, and Vicdom. Projects involved site specific noise measurements and modelling in order to assess compliance with MECP Guidelines. Where required, noise mitigation was provided and designed to ensure compliance
Environmental Noise Impact Assessment Watford, Ontario	Project manager involved in the EA process of the Waste Management Warwick Landfill Expansion. Noise predictions were carried out over a period of 25 years and included options for Reclamation and / or Land Filling. The noise assessment included haul route analysis, berm construction, leachate equipment and on-site landfill operations equipment. Project duties also involved presentation of results and reports at public open houses.
Environmental Noise Impact Assessment Napanee, Ontario	Involved in the noise modelling of the Richmond Landfill Expansion. Noise predictions were carried out over a period of 25 years and included options for Reclamation and / or Land Filling. The noise assessment included haul route analysis, berm construction, leachate equipment and on-site landfill operations equipment.
Noise/Vibration Impact Assessment Orillia, Ontario	Responsible for predicting the noise and vibration impact of a proposed quarry expansion. Designed noise controls and blast designs to ensure operations are within Ministry of Natural Resources (MNR) and Ministry of Environment (MOE) guidelines. Preparation of reports as part of MNR licensing requirements. Noise predictions included noise emissions from hydraulic drills, front-end loaders, portable crushers, dump trucks, conveying equipment and other associated equipment.
Noise Impact Assessment Cambridge, Ontario	Responsible for the prediction of the noise impact of a proposed expansion to an aggregate pit. Assisted in the design of extraction procedures to minimize noise impacts on residential receptors as part of a licensing application with the MNR.
Noise Impact Assessment Manitoulin Island, Ontario	Responsible for the prediction of the noise impact of a proposed expansion to an aggregate quarry, which had an associated port facility. Assisted in the design of extraction procedures to minimize noise impacts on residential receptors as part of a licensing application with the MNR.

Noise Impact Assessment Vaughan, Ontario	Responsible for the prediction and assessment of the noise impacts of an asphalt recycling facility. Assessed noise impact on neighbouring receptors. Designed required noise controls and assisted in the design of operations to minimize further impact.
Aggregate Pit and Waste Transfer Facility Operation Measurements Various, Ontario	Carried out noise measurements of on-site operations including specific equipment measurements. Measurements were used to ensure that operation of equipment at various locations on the site would remain in compliance with MOE Noise Guidelines, where the impact exceeds MOE Noise Guidelines noise controls were designed and recommended.
Environmental Permitting Assessments Ontario, Canada	Noise task manager preparing acoustic assessment for a quarry in Ontario that included a shipping port. The noise assessment involved site specific noise measurements and modelling in order to assess compliance with MOE Guidelines. Where required, noise mitigation was provided and designed to ensure compliance.

PROJECT EXPERIENCE – EXPERT WITNESS

Ontario Municipal Board Toronto, Ontario	Was retained by the City of Toronto to support the City at an OMB preceding, involving a proposed residential development directly exposed to noise levels from industry, road and rail activities.
LPAT Kawartha Lakes, Ontario	Was retained by an aggregate producer to support at an LPAT proceeding involving a proposed aggregate pit in Kawartha Lakes. Golder completed the noise assessment for the project which included the development of noise controls.
LPAT Ottawa, Ontario	Was retained by a producer to support at an LPAT proceeding involving a proposed Ready-Mix plant pit in Ottawa. Golder completed the noise assessment for the project which included the development of noise controls.
Environmental Review Tribunal Haldimand, Ontario	Appeared at an ERT for a proposed Windfarm in Haldimand County. Was recognized as an expert witness on the subject of environmental noise, specifically with respect to the Noise Study Report prepared in support of the Renewable Energy Approval issued by the MOE.
Planning Board Hearing Nova Scotia	Supported an application for an aggregate facility in Nova Scotia. Carried out the noise work in preparation for the hearings and was put forward as the Expert Witness on behalf of the proponent.
Ontario Municipal Board Lincoln, Ontario	Retained by the Town of Lincoln as their expert noise specialist, with respect to an application for site plan approval for a proposed waste management facility.
Quebec Hearing Board Salaberry-de-Valleyfield, Quebec	Retained by the City of Salaberry-de-Valleyfield as their expert noise specialist, with respect to noise concern associated with the recently expended Autoroute NA 30 and associated noise barriers.

PROFESSIONAL AFFILIATIONS

Professional Engineers of Ontario (P.Eng)

Canadian Council for Human Resources in the Environment Industry (CCHREI)

MTO – RAQs approved for the provision of Acoustic and Vibration Services

Air and Waste Management Association (AWMA)

National Fire Protection Agency (NFPA)

Ontario Sand Stone and Gravel Association - Environmental Committee

Ready Mix Concrete Association of Ontario - Environmental Committee

Tomasz Nowak M.Sc., M.Eng.

Acoustics, Noise and Vibration Specialist

Education

Master of Science Mechanical Engineering, AGH University of Science and Technology, Krakow, Poland, 2001

Master of Engineering Materials Engineering, McGill University, 2007

Certifications

PROFESSIONAL SUMMARY

Tomasz is an acoustics scientist with a background in mechanical engineering, acoustics and noise control. His technical background allows him to successfully solve noise-related issues by understanding the nature of the technological processes, operational parameters and design characteristics of the mechanical equipment used in various industrial installations.
Recent experience includes working on noise impact assessments for mining, energy and oil and gas developments. His responsibilities include identification of the noise sources, calculation of noise emissions, development of acoustical models, proposing noise mitigation solutions and reporting the results.

EMPLOYMENT HISTORY

Golder Associates Ltd. – Calgary, Edmonton, Montreal, Canada

Acoustic Scientist (2012 to Present)

Involved in preparation of noise impact assessments for the energy and resources sector. Responsible for calculation of noise emissions from industrial facilities and development of computer acoustical models. Developing of suitable noise mitigation and control measures. Conducting field noise measurement.

Independent contractor – Montreal, Canada

Service engineer (2009 to 2010)

Performed inspections and maintenance on LNG cargo control system, assisting in testing and calibration of the control system components including temperature, level and pressure sensors.

McGill University – Montreal, Canada

Graduate Student (2004 to 2007)

Development and testing of a system to protect building ventilation systems against toxic airborne substances. Responsible for conducting research regarding monitoring and removal of hazardous substances from airstream.

RELEVANT EXPERIENCE

Confidential Client

Nunavut

Performing blasting induced vibrations in support of research project at a gold mine. Data analysis and reporting.

Confidential Client

Quebec

Conducting noise impact assessment of a quarry operations in support of regulatory permitting process. Noise modelling and reporting.

Confidential Client
Ghana

Performing field baseline noise measurements in support of regulatory permitting process for a gold mine. Data analysis and reporting.

DeBeers – Victor Mine
Ontario

Performing field baseline noise measurements in support of regulatory permitting process for a diamond mine. Data analysis and reporting.

Suncor McKay River, Firebag
Alberta

Performing in-plant noise measurements to update and develop computer model of processing facilities. Data analysis and reporting.

Suncor McKay River, Firebag
Alberta

Performing in-plant noise measurements to update and develop computer model of processing facilities. Data analysis and reporting.

Confidential Client
Nunavut

Performing field baseline noise measurements in support of regulatory permitting process for a gold mine. Data analysis and reporting.

Confidential Client
Northwest Territories

Performing field baseline noise measurements in support of regulatory permitting process for a diamond mine. Data analysis and reporting.

Suncor Fort Hills
Alberta

Development of detailed indoor noise models for facility processing buildings. Performing model calculation and presenting the results.

BluEarth Bull Creek Wind Energy Project
Alberta

Performing field noise measurements of the third-party facilities located in the project area. Data analysis and reporting.

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