REPORT

Noise Impact Assessment

CBM Aggregates, a division of St. Marys Cement Inc. (Canada)

Proposed Lanci Pit Expansion

Submitted to:

CBM Aggregates a division of St. Marys Cement Inc.
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Submitted by:

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April 2020

Distribution List

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Table of Contents

TABLES

FIGURES

APPENDICES

APPENDIX A
Land Use Zoning Designation Plan

APPENDIX B
Description of Technical Terms and Alternative Barrier Designs

APPENDIX C
Sample Calculations

APPENDIX D
Statement of Qualifications

1.0 INTRODUCTION

CBM Aggregates (CBM), a division of St. Marys Cement Inc. (Canada) retained Golder Associates Ltd. (Golder) to prepare a Noise Impact Assessment (NIA) in support of a licence application for the proposed Lance Pit Expansion (the Site) under the *Aggregate Resources Act* (ARA) for a Category 3, Class A, Pit, Above and Below the Water Table. The Site is located on Lot 25, Concession 1, in the geographic Township of Puslinch in the County of Wellington, Ontario.

The licence area for the Site is approximately 14.8 hectares. A location plan for the Site, showing the proposed pit lands and proposed licensed boundary is provided in Figure 1. For the purpose of this assessment, fifteen (15) existing Points of Reception (PORs) were selected as being representative of the sensitive receptors in all directions around the Site and identified as POR001 through POR015, which are identified in Figure 2. The nearest POR (POR005) is adjacent to the north eastern property line of the proposed extraction area; however, it is currently only a foundation and not a constructed building/dwelling.

The surrounding lands are utilized for residential, agricultural, and aggregate extraction/processing purposes. The Site is composed of four separate residential lots, two of which are currently occupied by tenants. A zoning plan for the property and surrounding land use is provided in Appendix A.

Sound level limits for the proposed pit 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 pit operations onto neighbouring PORs were completed to determine the possible noise impact. 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

The proposed pit operations will take place during daytime hours between 07:00 - 19:00. The operations will include extraction above and below the water table, details of which are provided below.

Above water extraction

It is understood the extraction will start in the northwest corner of the Site and will progress in a generally southern direction. It is expected that the material will be extracted in a manner to optimize the screening provided by the working face.

Based on available information related to the ground and pit floor elevation within the proposed pit extraction area, it is expected the operations will require a single one 7.5 m high lift within the northern and center portions of the extraction area and on average a single one 9 m high lift in the southeast corner of the extraction area.

The extraction equipment considered for the above water table operations will be limited to:

- Two front end loaders, operating within 30 metres of the extraction face, used for excavation and loading the extracted material onto haul trucks. Both loaders will operate for the full 60 minutes during any given hour.
- Haul trucks used to transport the extracted material from the Site for further processing off-site. The trucks will use the existing route along the western edge of the property and access the Site from Concession Road 2.

Below water extraction

Upon completion of the material extraction through above the water operations, the extraction will continue as below water operations. It is expected the extraction will begin in the southeast corner of the extraction area and will progress generally in a northern direction.

The extraction equipment associated with the below water operations will be limited to:

- Dragline operating ‘under load’ for a maximum 45 minutes per hour and the engine will operate in low revolutions conditions (i.e., ‘low rev’) for the remaining 15 minutes per hour. Given the operational nature of dragline systems, this is considered conservative as the ‘under load’ and ‘low rev’ conditions would generally be more equalized, with approximately 30 minutes each per hour.
- One front end loader, operating within 30 metres of the dragline machine, used for loading the extracted material onto haul trucks. The loader will operate for the full 60 minutes during any given hour.
- Haul trucks used to transport the extracted material from the Site for further processing off-site. The trucks will use the existing route along the western edge of the property and access the Site from Concession Road 2.

Operational controls and shielding (i.e., berms, extraction face, stockpiles, other methods) will be required during extraction. Golder evaluated the operation noise levels and identified specific areas where noise controls were required. To allow for greater operational flexibility, multiple areas where identified with a corresponding minimum barrier height design requirement when equipment is operated within that given area. The requirements are presented in Figure 3 and Figure 4. The identified barriers are further described below.

Above water operations:

- North Barrier A – 2 m high and approximately 130 m long barrier located west and south of POR005;
- North Barrier B – 108 m long, western part of the North Barrier A increased to 3.5 m; and,

The North Barrier A and North Barrier B would only need to be installed if a house is built on the currently vacant lot (i.e., POR005), prior to extraction occurring within the areas identified in Figure 3.

Below water operations:

- North Barrier C – 3.5 m high North Barrier B extended to 170 m to be installed when operations are conducted within the area indicated in the Figure 4;
- North Barrier D – 130 m long, western part of the North Barrier C increased to height of 4.5 m during extraction in the area shown in Figure 4;
- North Barrier E – 130 m long, western part of the North Barrier D increased to height of 5.5 m during extraction in the area shown in Figure 4;
- North Barrier F – 108 m long, 3.5 m high west leg of the North Barrier C installed when extraction occurs in the area shown in Figure 4;
- South Barrier A – 2 m high, 142 m long located northwest of POR007;
- South Barrier B – South Barrier A height increased to 4.5 m during extraction occurring within the area shown in Figure 4; and,
- South Barrier C – South Barrier B increased to 5.5 m during occurring within the area shown in Figure 4.

Again, it should be noted that the North Barriers would only be required if a house is built on the currently vacant lot. Barriers indicated in Figure 3 and Figure 4 and described in this report can be considered earth berms, barriers or berm / barrier combinations, provided the height matches the indicated minimum height above existing grade. Barriers are to have a minimum surface density of 20 kg / m^2 and constructed without gaps. Appendix B includes potential alternative barrier design options, which can be more mobile than earth berms and typically require a smaller footprint.

Other options of berm/barrier based acoustically equivalent noise controls could include:

- Mobile barrier constructed of repurposed tractor trailers equipped with deployable top wall to increase the overall height.
- Barrier constructed of stacked shipping containers equipped with deployable top wall to increase the overall height.

In addition, acoustically equivalent noise controls could be implemented in place of the controls described above. These alternative controls could include local barriers around equipment, or source mitigation where the noise emissions of the equipment could be reduced. Any alternative controls that would be used on the site should be verified through an acoustic assessment.

3.0 NOISE SOURCE SUMMARY

The primary noise sources of concern are summarized in Table 1.

Table 1: Facility Source Summary

Source ID	Source Description	Overall Sound Power Level (dBA)	Source Location	Sound Characteristics	Noise Control Measures
SP01	Dragline	112	O	S	U
SL01	Haul Trucks	100	O	S	U
SL01 / SL02 [2]	Loader - Material Excavating/Loading	107	O	S	U

Notes:
1) Values presented in Table 1 do not include adjustments that were considered in the modelling (i.e. time weighting)
2) Average sound power level representing various loader activities

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
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

4.0 POINT(S) OF RECEPTION

Fifteen (15) residential receptors were identified as being representative of the most sensitive PORs within the vicinity of the Site as shown in Figure 2. The identified PORs are summarized below.

- POR001: A one-storey residence located northwest of the Site
- POR002: A one-storey residence located north of the Site
- POR003: A two-storey residence located north of the Site
- POR004: A one-storey residence located northeast of the Site
- POR005: A vacant lot – modelled as two-storey residence located northeast of the Site
- POR006: A one-storey residence located east of the Site
- POR007: A raised one -storey residence located southeast of the Site
- POR008: A one-storey residence located southeast of the Site
- POR009: A one-storey residence located southeast of the Site
- POR010: A one-storey residence located south of the Site
- POR011: A one-storey residence located southwest of the Site
- POR012: A two-storey residence located southwest of the Site
- POR013: A one-storey residence located southwest of the Site
- POR014: A two-storey residence located southwest of the Site
- POR015: A one-storey residence located southwest of the Site

A POR005 is considered as a vacant lot receptor. Based on the review of available information, some structure work, believed to be a building foundation, is present on the site. Golder included this receptor and conservatively considered it as a two storey building (i.e., 4.5 m high); however, this is not currently a receptor. Accordingly, the identified noise controls required for the Site to demonstrate compliance with applicable noise limits at this particular location would not be required until the home is built and occupied. Therefore, the timeline for the construction of the applicable noise control will be conditional to the completion of building construction (i.e., the construction of the berm/barrier will be completed once CBM can reasonably expect the home to be occupied).

5.0 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 being in a Class 2 area as per MECP publication NPC-300. 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.

In assessing stationary noise sources, the MECP has established exclusionary Plane of Window (POW) and Outdoor POR (Outdoor POR) sound level limits for Class 2 areas. The POW sound level limit for the noise sensitive receptors in a Class 2 area is described as follows:

> *The sound level limit at a POW POR is set as the higher of either the applicable 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, or the minimum background sound level that occurs or is likely to occur during the time period corresponding to the operation of the stationary source under impact assessment.*

The outdoor sound level limit for the noise sensitive receptors in a Class 2 area is described as follows:

> *The sound level limit at an Outdoor POR is set as the higher of either the applicable exclusionary limit of 50 dBA in the daytime period of 07:00-19:00 and 45 dBA in the evening period of 19:00-23:00, or the minimum background sound level that occurs or is likely to occur during the time period corresponding to the operation of the stationary source under impact assessment. In general, the Outdoor POR will be protected during the nighttime as a consequence of meeting the sound level limit at the adjacent POW.*

Since the operations are limited to daytime hours, the daytime One Hour Equivalent Sound Level (L_{eq}) MECP exclusionary sound level limits for a POR in a Class 2 area were used to assess compliance of the Site operations.

6.0 IMPACT ASSESSMENT

6.1 Methodology

All relevant sound levels for sources were based on similar equipment used in other pit operations. Sound levels have been documented in 1/1 octave band level format. Noise impact predictions were generated using this data.

The predictive analysis was carried out using the commercially available software package Cadna/A V2019 MR 1. 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 for areas associated with water, 0.5 within the pit 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.

6.2 Noise Impact Prediction Assumptions

Assumptions were made in calculating the potential noise levels of the proposed operations on the identified PORs near the Site. These are as follows:

- Extraction and processing operations are limited to daytime hours between 07:00 and 19:00;
- Extraction is expected as single phase with the above water extraction progressing generally from north to south and for the below water operations, the extraction will progress generally in a south to north direction;
- The pit will be accessed from CBM's adjacent property to the north along the western edge of the extraction area. A 15 m buffer will be included along the north edge of the proposed licensed boundary (adjacent to the vacant lot) and a 30 m buffer will be included along the east edge of the proposed licence area (adjacent to Sideroad 25 S) as shown in Figure 2;
- A 5 m buffer will be considered between the south extraction boundary and the adjacent woodlot;
- A single lift, will be considered for the above water table extraction;
- The pit floor will be extracted to an elevation of 306.5 m for the above water extraction;
- For the extraction associated with the above water operations, the equipment will operate as specified in Section 2.0 and is expected to operate continuously unless noted;
- For the extraction associated with the below water operations, the equipment will operate as specified in Section 2.0 and is expected to operate continuously except for the dragline which will operate 'under

load' up to 45 minutes in an hour and under 'low rev' conditions for the remaining 15 minutes in the hour;

- Equipment list and sound power emissions are consistent to those listed in Table 1;
- Haul trucks, while onsite, will typically travel at 20 km/h;
- The acoustic barriers, or other control measures, will be installed as specified above in Section 2.0 and as shown in Figure 3 and Figure 4; and
- POW PORs for which receptor heights could not been identified either through available imagery or during onsite investigations were conservatively assessed at 4.5 m.

7.0 RESULTS

7.1 Noise Assessment Summary

The proposed pit operational sequences, as indicated in Figure 3 and Figure 4, were modelled to determine the predictable worst-case noise levels on the identified representative PORs for the POW and Outdoor PORs. Outdoor POR sound levels (at a height of 1.5 m) were predicted by calculating sound levels using a 2 m by 2 m grid resolution within the POR property boundaries and within 30 m of the POW, consistent with NPC 300 requirements. The higher of the POW or Outdoor sound levels were reported for the respective POR.

Noise levels were determined for each of the identified areas shown in Figure 3 and Figure 4, based on the equipment expected to be used in those areas.

Table 2 provides a summary of the predictable worst-case noise levels at each of the identified PORs for the identified areas requiring noise control and associated with the above water operations. Table 3 provides a summary of the predictable worst-case noise levels at each of the identified PORs for the identified areas requiring noise control and associated with the below water operations.

The overall predicted noise levels, based on proposed site operations described above, were found to be at or below the MECP Performance Limits with the implementation of noise control measures (Section 8.0), indicating the Site can operate in compliance with MECP and MNRF noise limits. Sample calculations are also provided in Appendix C.

Table 2: Noise Impact Assessment Summary – Above Water Operations

POR ID	Area not Requiring Noise Control Noise Impact (dBA)	Area Requiring 2m North Barrier Noise Impact (dBA)(1)	Area Requiring 3.5m North Barrier Noise Impact (dBA)(1)	South East Part of the Extraction Area (dBA)	Overall Maximum Noise Impact (dBA)	Daytime Performance Limit (dBA)
POR001	37	33	33	34	37	50
POR002	46	44	44	43	46	50
POR003	46	44	44	43	46	50
POR004	29	27	29	26	29	50
POR005(1)	49	50	50	50	50	50
POR006	39	37	42	40	42	50
POR007	39	39	44	46	46	50
POR008	34	32	37	34	37	50
POR009	28	27	30	27	30	50
POR010	28	25	29	25	29	50
POR011	27	25	29	25	29	50
POR012	26	25	27	25	27	50
POR013	24	23	25	23	25	50
POR014	25	26	27	25	27	50
POR015	25	25	26	25	26	50

Note:

(1) North barriers are only required if a dwelling is constructed on the vacant lot represented by POR005

Table 3: Noise Impact Assessment Summary – Below Water Operations

POR ID	Area Requiring 2m South Barrier and 3.5m North Barrier Noise Impact (dBA)(1)	Area Requiring 4.5m South Barrier and 3.5m North Barrier Noise Impact (dBA) (1)	Area Requiring 5.5m South Barrier and 3.5m North Barrier Noise Impact (dBA) (1)	Area Requiring 5.5m North Barrier Noise Impact (dBA) (1)	Area Requiring 3.5m High and 108m long West Leg of North Barrier Noise Impact (dBA) (1)	Overall Maximum Noise Impact (dBA)	Daytime Performance Limit (dBA)
POR001	34	33	31	36	31	36	50
POR002	42	40	40	40	41	42	50
POR003	42	40	40	41	41	42	50
POR004	30	31	32	31	31	32	50
POR005(1)	47	48	49	49	50	50	50
POR006	47	47	47	44	41	47	50
POR007	50	49	50	48	46	50	50
POR008	39	40	42	41	39	42	50
POR009	32	34	36	35	34	36	50
POR010	29	30	33	34	34	34	50
POR011	29	31	33	33	32	33	50
POR012	28	29	29	30	29	30	50
POR013	26	27	28	28	27	28	50
POR014	28	29	29	29	29	29	50
POR015	26	28	28	28	28	28	50

Note:

(1) North barriers are only required if a dwelling is constructed on the vacant lot represented by POR005

8.0 GENERAL PIT OPERATION NOISE CONTROLS

The following summarizes general pit operation noise controls that shall be followed for the extraction of the Site:

- 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.
- The barriers will be installed as specified above in Section 2.0 and as shown in Figure 3 and Figure 4, and as follows:
  - Above Water Extraction
    1) If a residence is constructed and occupied on vacant lot POR005 prior to extraction taking place, a 3.5 m high acoustic barrier will need to be constructed along the southern boundary of POR005.
  - Below Water
    1) If a residence is constructed and occupied on vacant lot POR005 prior to extraction taking place, a 3.5 m and a 5.5 m high acoustic barrier will be required along western and southern boundaries of POR005, respectfully.
    2) Prior to below water extraction, construct a 5.5 m high acoustic barrier adjacent to the southeast corner of the extraction area.
- Acoustic barriers can be constructed as earth berms, or other suitable acoustic barriers such as trailers or containers as long as the height and density requirements are met.
- Acoustic barriers may be substituted through equipment modification, other control measures and/or local barriers if an acoustic audit indicates MECP Performance Limits can be met.

9.0 CONCLUSIONS

Golder was retained by CBM to prepare a NIA in support of a licence application under the ARA to permit the extraction of sand and gravel resources from the Site. 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 identified noise controls or 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, the Site can operate in compliance with MECP and MNRF noise guidelines for all PORs.

10.0 STATEMENT OF QUALIFICATIONS

Refer to Appendix D for CV of the authors of this report.

11.0 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 CBM and, once finalized, is intended to support the application of a Category 3, Class "A" license under the ARA associated with the proposed Lanci Pit. The draft application and supporting documents are based on observations of Site operations, discussions with CBM about current Site practices, review of documentation provided by CBM 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 by CBM.

The information, recommendations and opinions expressed in this report are for the sole benefit of CBM 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 CBM 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. CBM 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. CBM acknowledges that electronic media is susceptible to unauthorized modification, deterioration and incompatibility and therefore CBM and any Authorized Users cannot rely upon the electronic media versions of Golder's report or other work products.

When evaluating the Site and developing this report, Golder has relied on information provided by CBM, 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 license will be issued by regulator the once the final report has been submitted.

Signature Page

Golder Associates Ltd.

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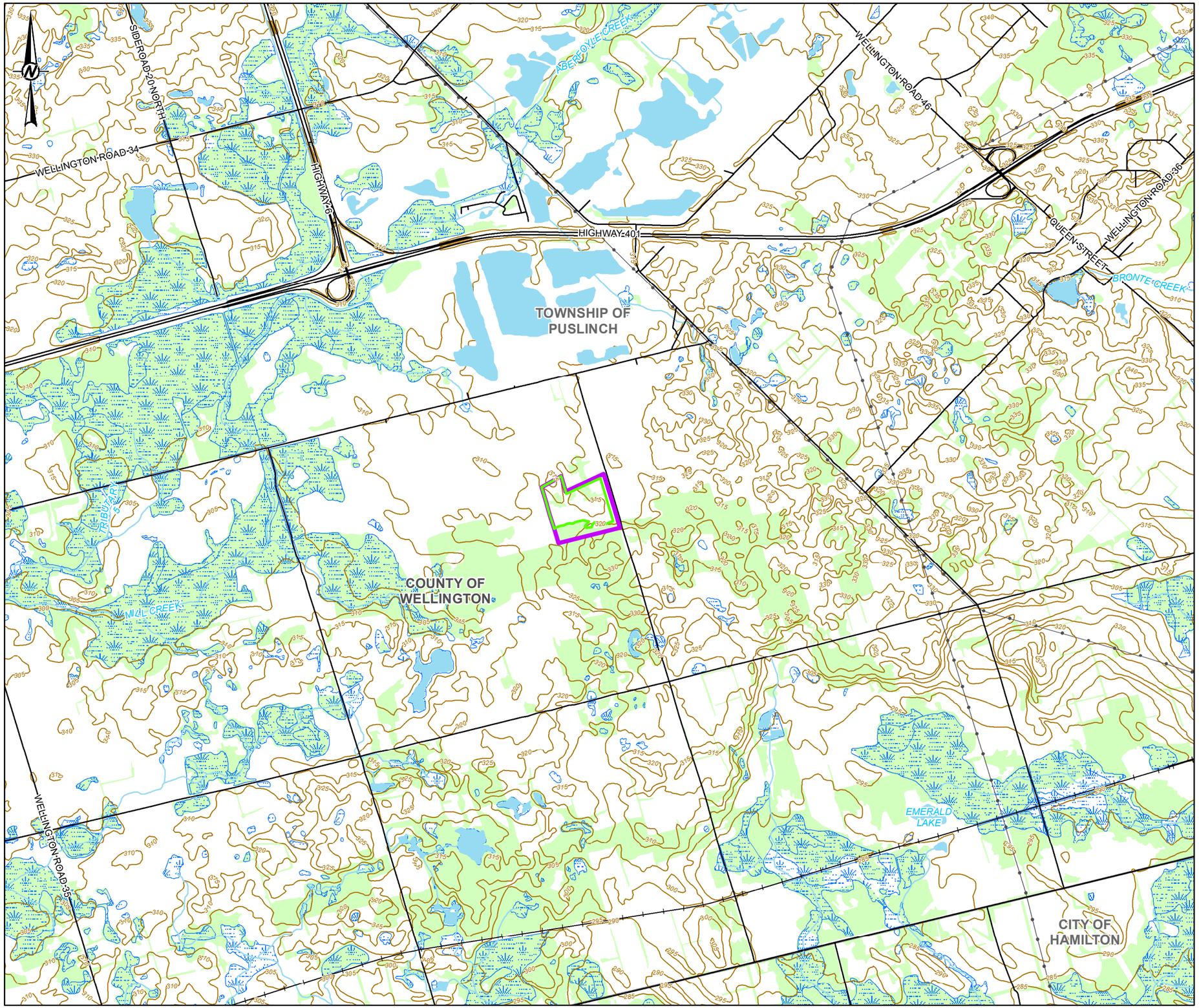
MAB/MA/TN/JT/ng/ly

https://golderassociates.sharepoint.com/sites/11897g/shared documents/07 deliverables/noise report/1774274-r-revc 17april2020 cbm lanci pit expansion nia.docx

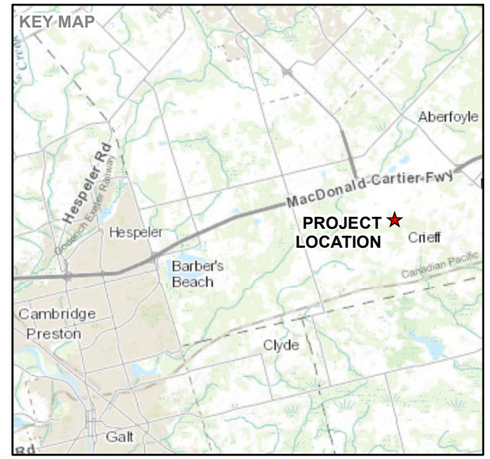
FIGURES



LEGEND

- ROAD
- RAILWAY
- UTILITY LINE
- WATERCOURSE
- CONTOURS (M)
- WATERBODY
- MUNICIPAL BOUNDARY
- WETLAND
- WOODED AREA
- LICENCE AREA BOUNDARY
- EXTRACTION AREA BOUNDARY

KEY MAP



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NOTE(S)

1. ALL LOCATIONS ARE APPROXIMATE

REFERENCE(S)

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PROJECTION: TRANSVERSE MERCATOR DATUM: NAD 83 COORDINATE SYSTEM: UTM ZONE 17N

CLIENT
ST. MARYS CEMENT INC. (CANADA)

PROJECT
LANCI PIT EXPANSION

TITLE
LOCATION PLAN

CONSULTANT
GOLDER

YYYY-MM-DD	2020-04-17
DESIGNED	SO
PREPARED	SO
REVIEWED	TN
APPROVED	JT

PROJECT NO.	CONTROL	REV.	FIGURE
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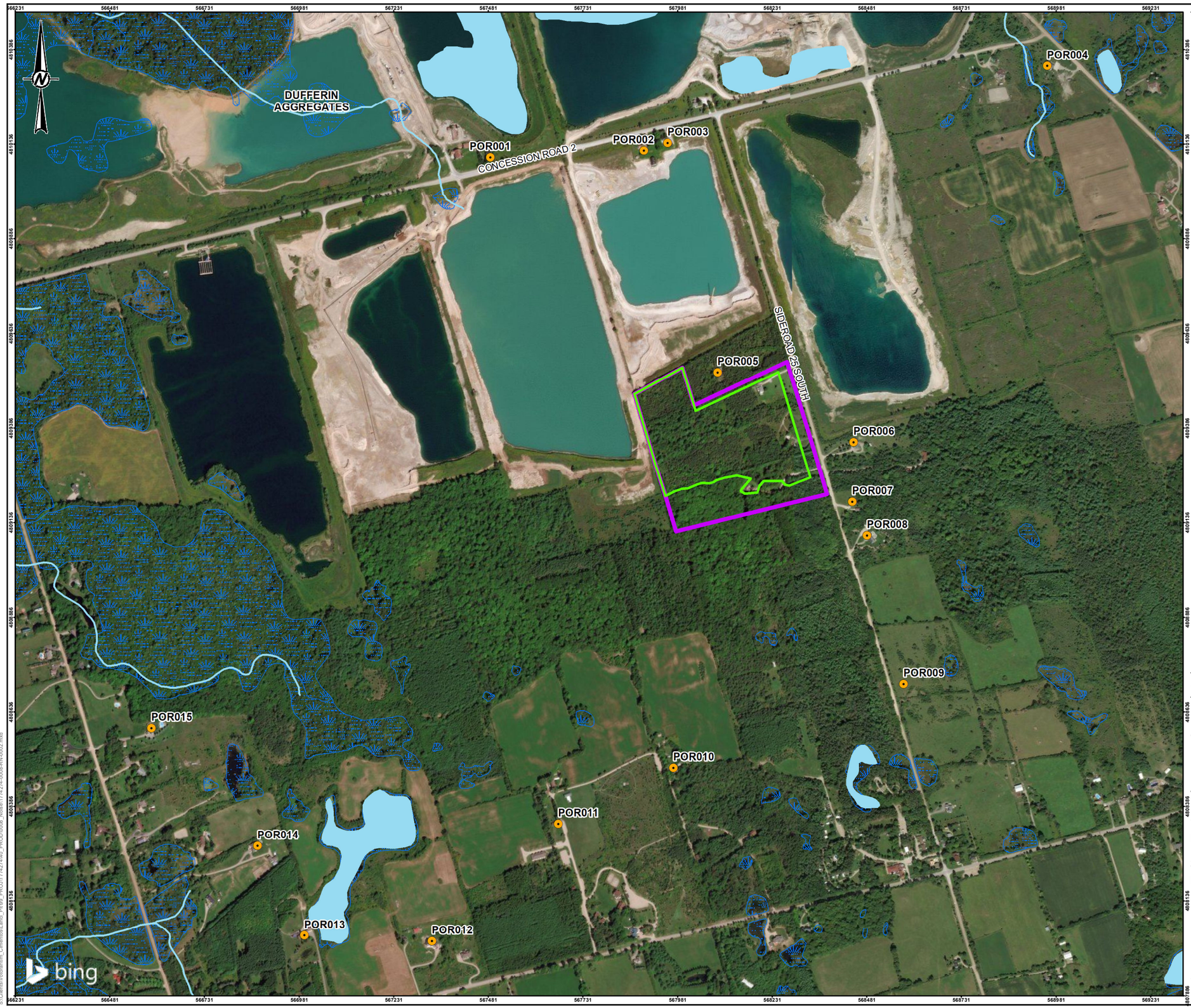

LEGEND

- POINT OF RECEPTION
- WATERCOURSE
- WETLAND
- WATERBODY
- LICENCE AREA BOUNDARY
- EXTRACTION AREA BOUNDARY

0 250 500 750

1:10,000 METRES

NOTE(S)

1. ALL LOCATIONS ARE APPROXIMATE

REFERENCE(S)

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DISTRIBUTION AIRBUS DS
PROJECTION: TRANSVERSE MERCATOR DATUM: NAD 83 COORDINATE SYSTEM: UTM ZONE 17N

CLIENT
ST. MARYS CEMENT INC. (CANADA)

PROJECT
LANCI PIT EXPANSION

TITLE
POINTS OF RECEPTION LOCATION PLAN

CONSULTANT
GOLDER

YYYY-MM-DD	2020-04-17
DESIGNED	SO
PREPARED	SO
REVIEWED	TN
APPROVED	JT

PROJECT NO.	CONTROL	REV.	MAP
1774274			2

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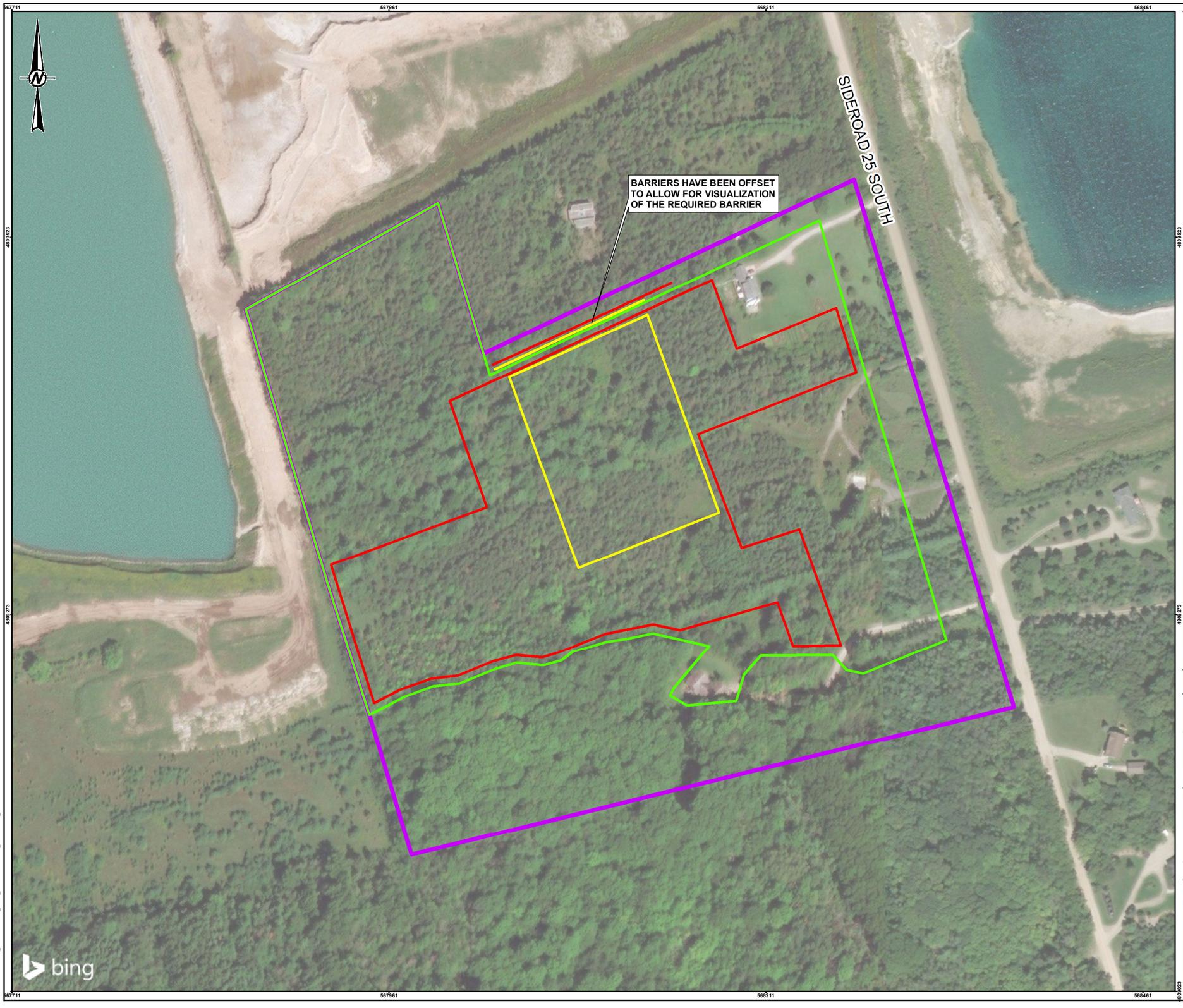

LEGEND

- WATERCOURSE
- WETLAND
- WATERBODY
- LICENCE AREA BOUNDARY
- EXTRACTION AREA BOUNDARY
- NORTH BARRIER A – 2M
- NORTH BARRIER B – 3.5M

AREAS REQUIRING MITIGATION

- AREA WHERE THE 2M NORTH BARRIER A IS REQUIRED
- AREA WHERE THE 3.5M NORTH BARRIER B IS REQUIRED

0 100 200

1:2,500 METRES

NOTE(S)

1. ALL LOCATIONS ARE APPROXIMATE

REFERENCE(S)

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PROJECTION: TRANSVERSE MERCATOR DATUM: NAD 83 COORDINATE SYSTEM: UTM ZONE 17N

CLIENT
ST. MARYS CEMENT INC. (CANADA)

PROJECT
LANCI PIT EXPANSION

TITLE
ABOVE WATER OPERATIONAL NOISE CONTROL AND MITIGATION MEASURES

CONSULTANT
GOLDER

YYYY-MM-DD	2020-04-17
DESIGNED	SO
PREPARED	SO
REVIEWED	TN
APPROVED	JT

PROJECT NO.	CONTROL	REV.	MAP
1774274			3

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

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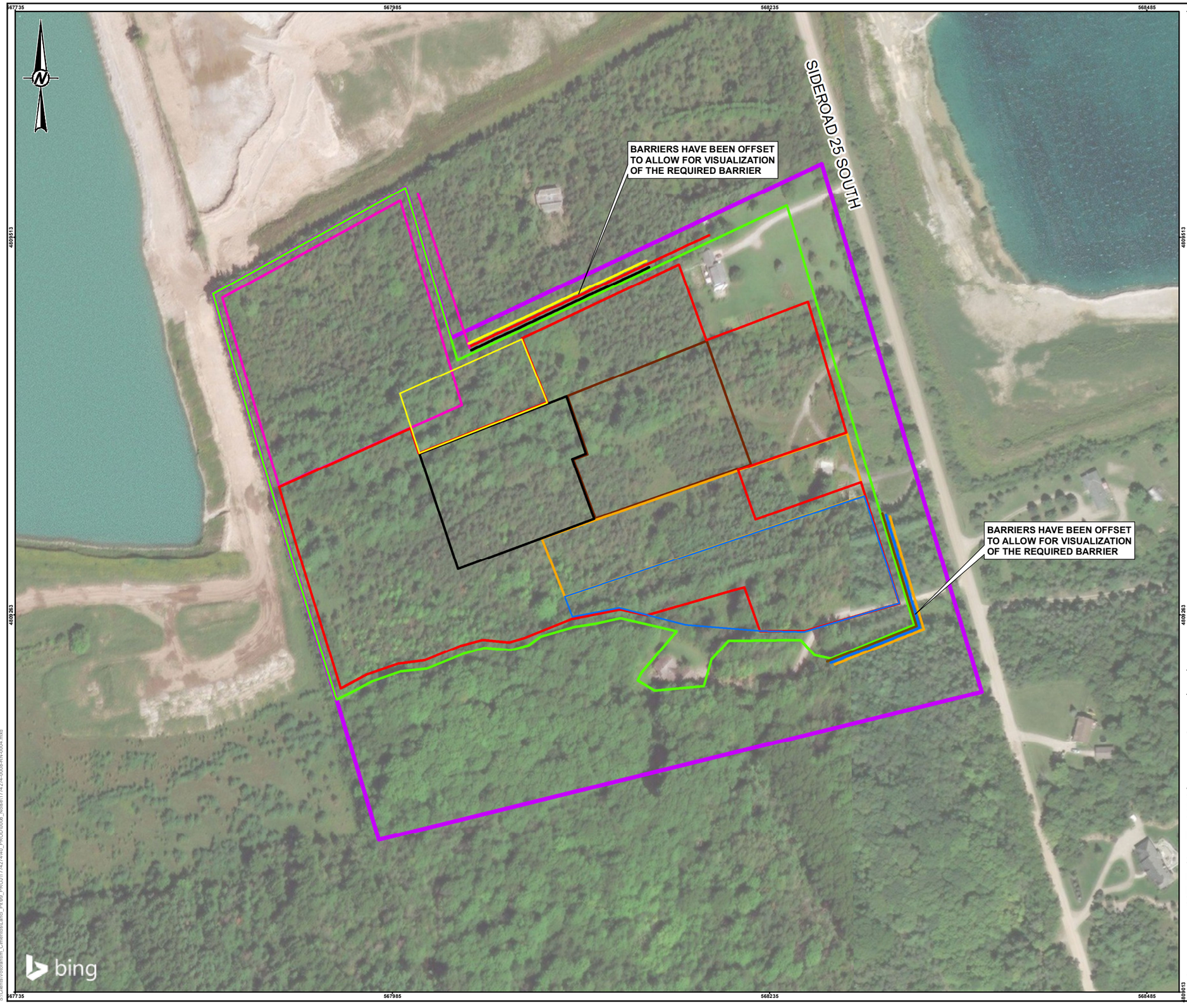

LEGEND

- WATERCOURSE
- WETLAND
- WATERBODY
- LICENCE AREA BOUNDARY
- EXTRACTION AREA BOUNDARY
- NORTH BARRIER C - 3.5M
- NORTH BARRIER D - 4.5M
- NORTH BARRIER E - 5.5M
- NORTH BARRIER F - 3.5M
- SOUTH BARRIER A - 2M
- SOUTH BARRIER B - 4.5M
- SOUTH BARRIER C - 5.5M

AREAS REQUIRING MITIGATION

- AREA WHERE THE 3.5M NORTH BARRIER C IS REQUIRED
- AREA WHERE THE 4.5M NORTH BARRIER D IS REQUIRED
- AREA WHERE THE 5.5M NORTH BARRIER E IS REQUIRED
- AREA WHERE THE 3.5M NORTH BARRIER F IS REQUIRED
- AREA WHERE THE 2M SOUTH BARRIER A IS REQUIRED
- AREA WHERE THE 4.5M SOUTH BARRIER B IS REQUIRED
- AREA WHERE THE 5.5M SOUTH BARRIER C IS REQUIRED

0 100 200

1:2,500 METRES

NOTE(S)

1. ALL LOCATIONS ARE APPROXIMATE

REFERENCE(S)

BASE DATA - MNR LIO, OBTAINED 2018
PRODUCED BY GOLDER ASSOCIATES LTD UNDER LICENCE FROM ONTARIO MINISTRY OF NATURAL RESOURCES, © QUEENS PRINTER 2017
CONTOURS - LIDAR DIGITAL TERRAIN MODEL (2016-18) - LIO. DOWNLOADED MAY 2019
BASE IMAGERY © 2020 MICROSOFT CORPORATION © 2020 DIGITALGLOBE ©CNES (2020) DISTRIBUTION AIRBUS DS
PROJECTION: TRANSVERSE MERCATOR DATUM: NAD 83 COORDINATE SYSTEM: UTM ZONE 17N

CLIENT
ST. MARYS CEMENT INC. (CANADA)

PROJECT
LANCI PIT EXPANSION

TITLE
BELOW WATER OPERATIONAL NOISE CONTROL AND MITIGATION MEASURES

CONSULTANT
GOLDER

YYYY-MM-DD	2020-04-17
DESIGNED	SO
PREPARED	SO
REVIEWED	TN
APPROVED	JT

PROJECT NO.	CONTROL	REV.	MAP
1774274			4

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

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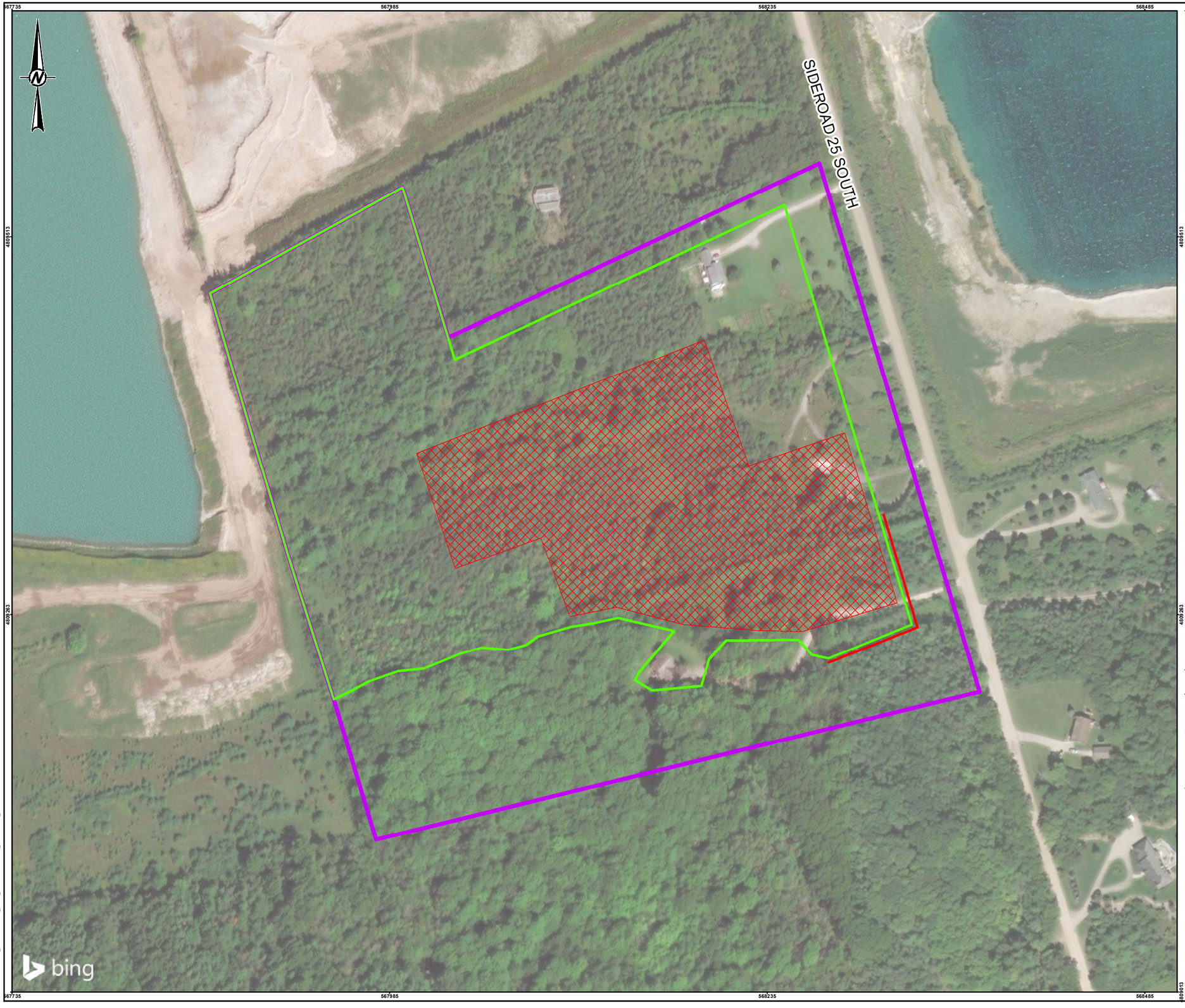

LEGEND

- WATERCOURSE
- WETLAND
- WATERBODY
- LICENCE AREA
- EXTRACTION AREA
- SOUTH BARRIER
- AREA WHERE SOUTH BARRIER IS REQUIRED

0 100 200

1:2,500 METRES

NOTE(S)

1. ALL LOCATIONS ARE APPROXIMATE

REFERENCE(S)

BASE DATA - MNR LIO, OBTAINED 2018
PRODUCED BY GOLDER ASSOCIATES LTD UNDER LICENCE FROM ONTARIO MINISTRY OF NATURAL RESOURCES, © QUEENS PRINTER 2017
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DISTRIBUTION AIRBUS DS
PROJECTION: TRANSVERSE MERCATOR DATUM: NAD 83 COORDINATE SYSTEM: UTM ZONE 17N

CLIENT
ST. MARYS CEMENT INC. (CANADA)

PROJECT
LANCI PIT EXPANSION

TITLE
BELOW WATER OPERATIONAL NOISE CONTROL AND MITIGATION MEASURES – SOUTH

CONSULTANT
GOLDER

YYYY-MM-DD	2020-04-17
DESIGNED	SO
PREPARED	SO
REVIEWED	TN
APPROVED	JT

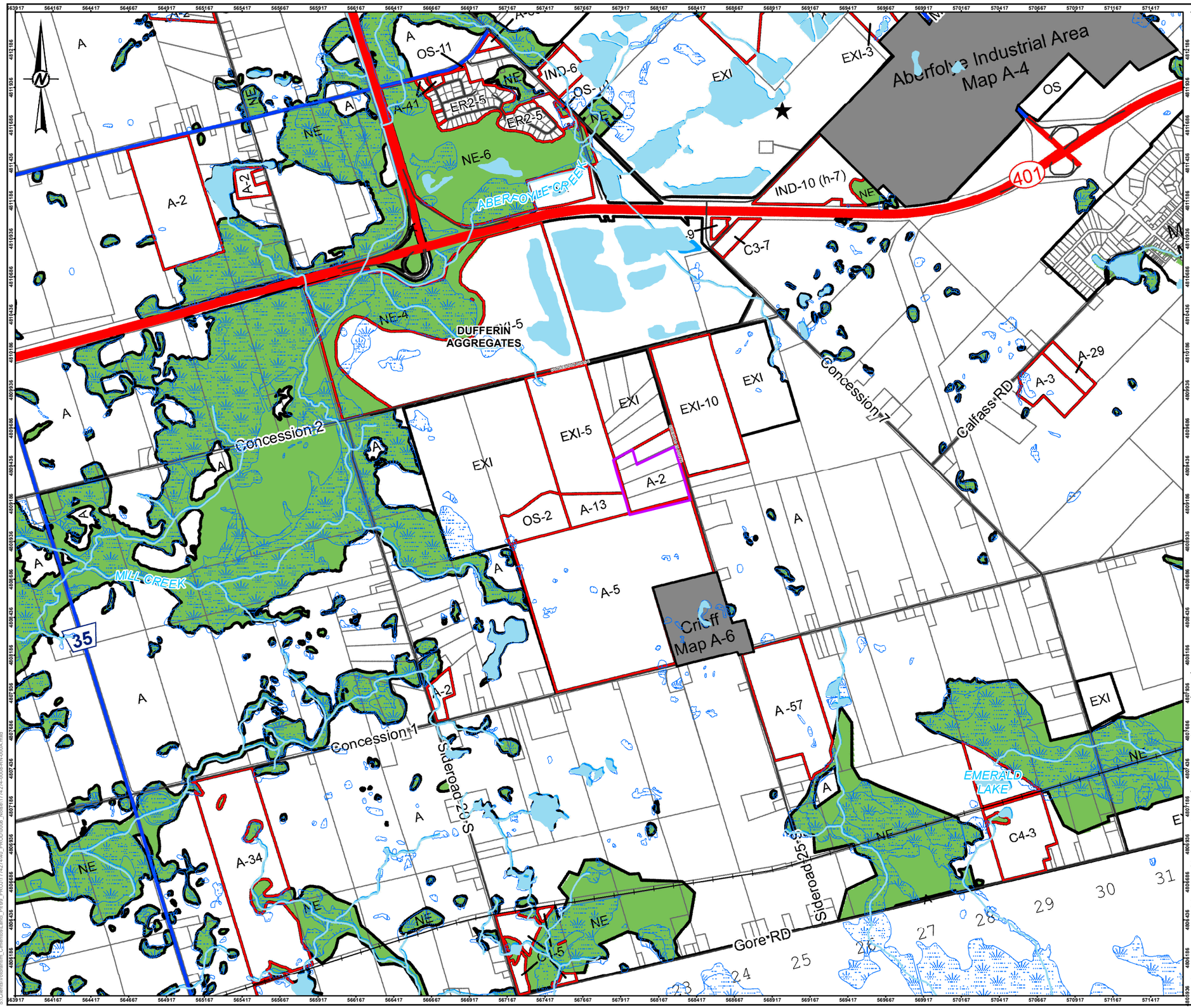
PROJECT NO.	CONTROL	REV.	MAP
1774274			5

S:\Clients\Votorantim_Cimentos\Lanci_Pit9b_PROJ\1774274\40_PROD\0008_Noise\1774274-0008-RN-0005.mxd

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

APPENDIX A

Land Use Zoning Designation Plan



LEGEND

- WATERCOURSE
- WETLAND
- WATERBODY
- LICENCE AREA BOUNDARY
- ★ Former Waste Disposal Site
- Flood Special Policy Area
- Site Specific Exemption
- Zoning
- Natural Environment

Zone Descriptions

A	AGRICULTURAL
HR	HAMLET RESIDENTIAL
RC	RESIDENTIAL COMMUNITY
RR	RESORT RESIDENTIAL
ML	MINI LAKES
ER1	ESTATE RESIDENTIAL TYPE 1
ER2	ESTATE RESIDENTIAL TYPE 2
RUR	RURAL RESIDENTIAL
MR	MILL CREEK RESIDENTIAL AREA
C1	HAMLET COMMERCIAL
C2	HIGHWAY COMMERCIAL
C3	AGRICULTURAL COMMERCIAL
C4	RESORT COMMERCIAL
IND	INDUSTRIAL
EXI	EXTRACTIVE
DI	DISPOSAL INDUSTRIAL
I	INSTITUTIONAL
OS	OPEN SPACE
NE	NATURAL ENVIRONMENT
(h)	HOLDING PROVISION

0 250 500 750

1:25,000 METRES

NOTE(S)

1. ALL LOCATIONS ARE APPROXIMATE

REFERENCE(S)

BASE DATA - MNR LIO, OBTAINED 2018
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CONTOURS - LIDAR DIGITAL TERRAIN MODEL (2016-18) - LIO. DOWNLOADED MAY 2019
BASE IMAGERY
PROJECTION: TRANSVERSE MERCATOR DATUM: NAD 83 COORDINATE SYSTEM: UTM ZONE 17N

CLIENT
ST. MARYS CEMENT INC. (CANADA)

PROJECT
LANCI PIT EXPANSION

TITLE
LAND USE ZONING DESIGNATION PLAN

CONSULTANT
GOLDER

YYYY-MM-DD	2020-04-17
DESIGNED	SO
PREPARED	SO
REVIEWED	TN
APPROVED	JT

PROJECT NO. 1774274 | CONTROL | REV. | MAP A

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

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APPENDIX B

Description of Technical Terms and Alternative Barrier Designs

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 center 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 L_{eq} 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.

This appendix presents two options of barrier designs:

- Option 1 – Mobile, trailer-based barrier with an additional top mounted extension wall;
- Option 2 – Shipping container-based barrier with an additional top mounted extension wall (if required);

Option 1

The barrier shown in the Figure 1 is based on a repurposed box trailer. The wall of the barrier closer to the source would need to be cladded with additional layers of acoustically absorbing material to address reflections and address surface mass requirements. The bottom part of the trailer would be fitted with a skirt blocking the noise path under the trailer. An additional wall installed on the top of the trailer would further extend the barrier overall height. Considering the trailer height of approximately 4 m, an additional barrier will be required on top of the trailer (i.e. approximately 1.5-2 m high). The structure will need to be designed to meet snow and wind loading requirements for the project area.

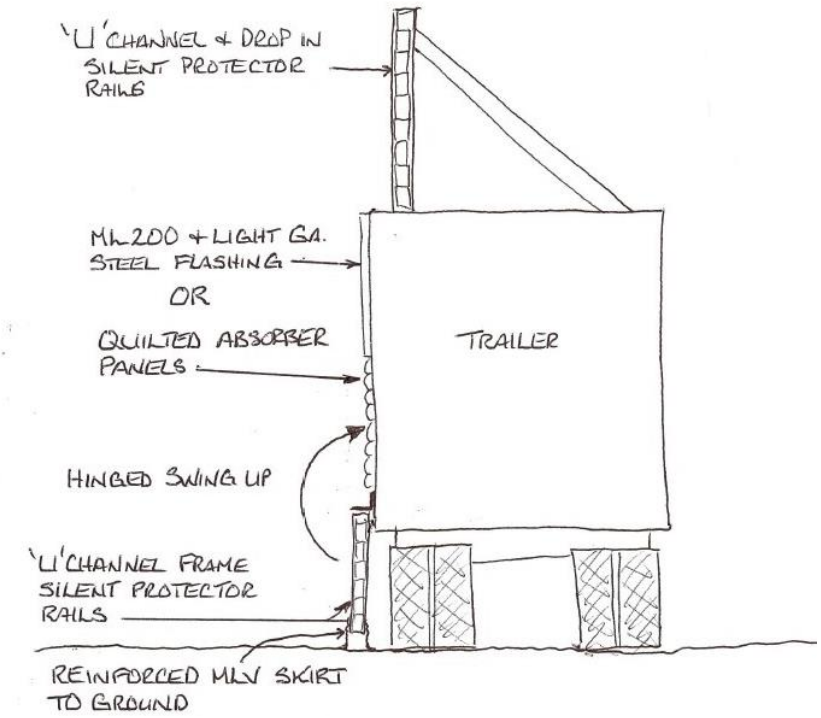

Figure 1 Trailer-Based Noise Barrier

Option 2

The barrier considered for Option 2 would be comprised of shipping containers stacked two high with an additional top wall used to extend the overall height of the barrier (if required). Figure 2 shows the front view of the constructed barrier and Figure 3 shows the back of the design with top wall support visible. With the height of a single container being approximately 2.6 m high, two stacked containers plus a top wall may be required to reach the considered height of 5.5 m to 6 m. However, in this case the additional top wall would not need to be as high as the one considered in the Option 1.

Figure 2 Shipping Container-Based Barrier – Front

Figure 3 Shipping Container-Based Barrier – Back

APPENDIX C

Sample Calculations

Receiver
Name: Gots Residence
ID: POR005
X: 568086.08 m
Y: 4809533.45 m
Z: 319.50 m

Area Source, ISO 9613, Name: "Loader", ID: "!02C!L_2_PC"																				
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)
539	568095.64	4809406.87	308.90	0	DEN	A	79.3	7.9	0.0	0.0	0.0	53.1	0.7	-0.6	0.0	0.0	9.5	0.0	0.0	24.5
543	568094.99	4809403.80	308.90	0	DEN	A	79.3	9.4	0.0	0.0	0.0	53.3	0.7	-0.7	0.0	0.0	9.2	0.0	0.0	26.2
544	568094.69	4809402.34	308.90	0	DEN	A	79.3	4.4	0.0	0.0	0.0	53.4	0.7	-0.7	0.0	0.0	9.0	0.0	0.0	21.3
547	568094.55	4809401.64	308.90	0	DEN	A	79.3	5.4	0.0	0.0	0.0	53.4	0.7	-0.7	0.0	0.0	8.9	0.0	0.0	22.3
548	568094.36	4809400.66	308.90	0	DEN	A	79.3	7.7	0.0	0.0	0.0	53.5	0.7	-0.7	0.0	0.0	8.8	0.0	0.0	24.7
550	568094.08	4809399.16	308.90	0	DEN	A	79.3	9.8	0.0	0.0	0.0	53.6	0.7	-0.8	0.0	0.0	8.6	0.0	0.0	26.9
552	568093.78	4809397.55	308.90	0	DEN	A	79.3	9.3	0.0	0.0	0.0	53.7	0.7	-0.8	0.0	0.0	8.5	0.0	0.0	26.5
553	568093.57	4809396.43	308.90	0	DEN	A	79.3	7.0	0.0	0.0	0.0	53.8	0.7	-0.8	0.0	0.0	8.3	0.0	0.0	24.2
555	568093.36	4809395.21	308.90	0	DEN	A	79.3	10.3	0.0	0.0	0.0	53.8	0.7	-0.8	0.0	0.0	8.2	0.0	0.0	27.6
556	568093.12	4809394.60	308.90	0	DEN	A	79.3	7.1	0.0	0.0	0.0	53.9	0.7	-0.8	0.0	0.0	8.1	0.0	0.0	24.4
557	568092.90	4809395.05	308.90	0	DEN	A	79.3	8.2	0.0	0.0	0.0	53.9	0.7	-0.8	0.0	0.0	8.2	0.0	0.0	25.5
573	568092.44	4809395.99	308.90	0	DEN	A	79.3	12.3	0.0	0.0	0.0	53.8	0.7	-0.8	0.0	0.0	8.3	0.0	0.0	29.5
575	568091.88	4809397.09	308.90	0	DEN	A	79.3	9.7	0.0	0.0	0.0	53.7	0.7	-0.8	0.0	0.0	8.4	0.0	0.0	26.8
576	568091.18	4809398.45	308.90	0	DEN	A	79.3	13.2	0.0	0.0	0.0	53.6	0.7	-0.8	0.0	0.0	8.6	0.0	0.0	30.2
577	568090.37	4809400.01	308.90	0	DEN	A	79.3	10.2	0.0	0.0	0.0	53.5	0.7	-0.7	0.0	0.0	8.8	0.0	0.0	27.2
579	568090.00	4809400.70	308.90	0	DEN	A	79.3	3.2	0.0	0.0	0.0	53.5	0.7	-0.7	0.0	0.0	8.9	0.0	0.0	20.1
586	568089.55	4809401.51	308.90	0	DEN	A	79.3	6.2	0.0	0.0	0.0	53.4	0.7	-0.7	0.0	0.0	9.0	0.0	0.0	23.0
587	568089.32	4809401.94	308.90	0	DEN	A	79.3	4.4	0.0	0.0	0.0	53.4	0.7	-0.7	0.0	0.0	9.1	0.0	0.0	21.2
591	568088.42	4809403.53	308.90	0	DEN	A	79.3	11.1	0.0	0.0	0.0	53.3	0.7	-0.7	0.0	0.0	9.3	0.0	0.0	27.7
1004	568084.13	4809391.18	308.90	0	DEN	A	79.3	5.0	0.0	0.0	0.0	54.1	0.7	-0.8	0.0	0.0	7.9	0.0	0.0	22.4
1006	568084.64	4809394.10	308.90	0	DEN	A	79.3	7.9	0.0	0.0	0.0	53.9	0.7	-0.8	0.0	0.0	8.2	0.0	0.0	25.1
1008	568085.07	4809396.41	308.90	0	DEN	A	79.3	8.4	0.0	0.0	0.0	53.8	0.7	-0.7	0.0	0.0	8.5	0.0	0.0	25.5
1013	568085.41	4809397.26	308.90	0	DEN	A	79.3	7.4	0.0	0.0	0.0	53.7	0.7	-0.7	0.0	0.0	8.6	0.0	0.0	24.4
1015	568085.60	4809396.90	308.90	0	DEN	A	79.3	4.1	0.0	0.0	0.0	53.7	0.7	-0.7	0.0	0.0	8.6	0.0	0.0	21.1
1017	568085.76	4809396.59	308.90	0	DEN	A	79.3	6.1	0.0	0.0	0.0	53.8	0.7	-0.7	0.0	0.0	8.5	0.0	0.0	23.2
1019	568086.09	4809395.94	308.90	0	DEN	A	79.3	9.7	0.0	0.0	0.0	53.8	0.7	-0.8	0.0	0.0	8.4	0.0	0.0	26.8
1023	568086.59	4809394.97	308.90	0	DEN	A	79.3	8.6	0.0	0.0	0.0	53.9	0.7	-0.8	0.0	0.0	8.3	0.0	0.0	25.8
1025	568086.90	4809394.37	308.90	0	DEN	A	79.3	5.9	0.0	0.0	0.0	53.9	0.7	-0.8	0.0	0.0	8.2	0.0	0.0	23.1
1027	568087.26	4809393.66	308.90	0	DEN	A	79.3	7.3	0.0	0.0	0.0	53.9	0.7	-0.8	0.0	0.0	8.2	0.0	0.0	24.6
1028	568087.57	4809393.04	308.90	0	DEN	A	79.3	6.8	0.0	0.0	0.0	54.0	0.7	-0.8	0.0	0.0	8.1	0.0	0.0	24.1
1029	568087.84	4809392.52	308.90	0	DEN	A	79.3	5.5	0.0	0.0	0.0	54.0	0.7	-0.8	0.0	0.0	8.0	0.0	0.0	22.8
1030	568088.58	4809391.03	308.90	0	DEN	A	79.3	12.5	0.0	0.0	0.0	54.1	0.7	-0.8	0.0	0.0	7.9	0.0	0.0	29.9
1031	568089.34	4809389.48	308.90	0	DEN	A	79.3	2.7	0.0	0.0	0.0	54.2	0.7	-0.8	0.0	0.0	7.7	0.0	0.0	20.1
1033	568089.78	4809388.58	308.90	0	DEN	A	79.3	7.4	0.0	0.0	0.0	54.2	0.8	-0.8	0.0	0.0	7.6	0.0	0.0	24.9
1036	568090.33	4809387.45	308.90	0	DEN	A	79.3	3.7	0.0	0.0	0.0	54.3	0.8	-0.8	0.0	0.0	7.5	0.0	0.0	21.3
1037	568090.78	4809386.52	308.90	0	DEN	A	79.3	7.2	0.0	0.0	0.0	54.4	0.8	-0.8	0.0	0.0	7.4	0.0	0.0	24.9
1038	568091.64	4809384.71	308.90	0	DEN	A	79.3	8.1	0.0	0.0	0.0	54.5	0.8	-0.8	0.0	0.0	7.2	0.0	0.0	25.8
1039	568092.47	4809382.96	308.90	0	DEN	A	79.3	2.3	0.0	0.0	0.0	54.6	0.8	-0.8	0.0	0.0	7.0	0.0	0.0	20.0
1040	568093.04	4809381.74	308.90	0	DEN	A	79.3	2.2	0.0	0.0	0.0	54.7	0.8	-0.8	0.0	0.0	6.9	0.0	0.0	20.0
1051	568088.03	4809392.04	308.90	1	DEN	A	79.3	12.2	0.0	0.0	0.0	56.3	0.9	-0.8	0.0	0.0	5.3	0.0	5.5	24.3
1052	568088.34	4809389.98	308.90	1	DEN	A	79.3	9.5	0.0	0.0	0.0	56.3	0.9	-0.8	0.0	0.0	5.3	0.0	5.5	21.7
1053	568088.66	4809387.86	308.90	1	DEN	A	79.3	13.2	0.0	0.0	0.0	56.2	0.9	-0.8	0.0	0.0	5.3	0.0	5.5	25.5
1063	568086.00	4809387.29	308.90	1	DEN	A	79.3	8.7	0.0	0.0	0.0	56.2	0.9	-0.8	0.0	0.0	5.2	0.0	5.5	21.1
1128	568094.89	4809385.81	308.90	0	DEN	A	79.3	4.3	0.0	0.0	0.0	54.4	0.8	-0.8	0.0	0.0	7.2	0.0	0.0	22.0
1129	568095.18	4809387.67	308.90	0	DEN	A	79.3	3.9	0.0	0.0	0.0	54.3	0.8	-0.8	0.0	0.0	7.4	0.0	0.0	21.5
1130	568095.37	4809388.92	308.90	0	DEN	A	79.3	2.6	0.0	0.0	0.0	54.2	0.8	-0.8	0.0	0.0	7.5	0.0	0.0	20.2
1132	568095.84	4809391.88	308.90	0	DEN	A	79.3	8.9	0.0	0.0	0.0	54.1	0.7	-0.8	0.0	0.0	7.8	0.0	0.0	26.4
1133	568096.15	4809393.78	308.90	0	DEN	A	79.3	3.6	0.0	0.0	0.0	53.9	0.7	-0.8	0.0	0.0	8.0	0.0	0.0	21.1
1134	568096.52	4809396.07	308.90	0	DEN	A	79.3	10.9	0.0	0.0	0.0	53.8	0.7	-0.8	0.0	0.0	8.2	0.0	0.0	28.2
1136	568096.92	4809398.53	308.90	0	DEN	A	79.3	6.8	0.0	0.0	0.0	53.7	0.7	-0.8	0.0	0.0	8.5	0.0	0.0	23.9
1137	568097.07	4809399.40	308.90	0	DEN	A	79.3	3.8	0.0	0.0	0.0	53.6	0.7	-0.8	0.0	0.0	8.6	0.0	0.0	20.9
1138	568097.27	4809400.60	308.90	0	DEN	A	79.3	9.0	0.0	0.0	0.0	53.5	0.7	-0.7	0.0	0.0	8.8	0.0	0.0	26.0

Area Source, ISO 9613, Name: "Loader", ID: "!02C!L_2_PC"																				
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)
1144	568097.93	4809401.55	308.90	0	DEN	A	79.3	11.9	0.0	0.0	0.0	53.5	0.7	-0.7	0.0	0.0	9.0	0.0	0.0	28.8
1149	568098.73	4809401.26	308.90	0	DEN	A	79.3	7.3	0.0	0.0	0.0	53.5	0.7	-0.7	0.0	0.0	9.0	0.0	0.0	24.1
1157	568099.44	4809400.91	308.90	0	DEN	A	79.3	8.2	0.0	0.0	0.0	53.5	0.7	-0.8	0.0	0.0	9.0	0.0	0.0	25.0
1349	568084.70	4809404.24	308.90	0	DEN	A	79.3	5.3	0.0	0.0	0.0	53.3	0.7	-0.6	0.0	0.0	9.5	0.0	0.0	21.8
1351	568084.13	4809400.19	308.90	0	DEN	A	79.3	9.6	0.0	0.0	0.0	53.5	0.7	-0.7	0.0	0.0	8.9	0.0	0.0	26.4
1352	568083.63	4809398.38	308.90	0	DEN	A	79.3	8.8	0.0	0.0	0.0	53.6	0.7	-0.7	0.0	0.0	8.7	0.0	0.0	25.8
1359	568083.19	4809399.37	308.90	0	DEN	A	79.3	7.4	0.0	0.0	0.0	53.6	0.7	-0.7	0.0	0.0	8.8	0.0	0.0	24.3
1362	568082.79	4809400.23	308.90	0	DEN	A	79.3	8.3	0.0	0.0	0.0	53.5	0.7	-0.7	0.0	0.0	8.8	0.0	0.0	25.3
1364	568082.35	4809401.19	308.90	0	DEN	A	79.3	7.8	0.0	0.0	0.0	53.5	0.7	-0.7	0.0	0.0	8.8	0.0	0.0	24.8
1371	568081.54	4809402.86	308.90	0	DEN	A	79.3	8.6	0.0	0.0	0.0	53.4	0.7	-0.6	0.0	0.0	8.8	0.0	0.0	25.7
1378	568080.63	4809404.65	308.90	0	DEN	A	79.3	6.3	0.0	0.0	0.0	53.2	0.7	-0.6	0.0	0.0	8.7	0.0	0.0	23.6
1537	568100.03	4809394.87	308.90	0	DEN	A	79.3	6.7	0.0	0.0	0.0	53.9	0.7	-0.8	0.0	0.0	8.4	0.0	0.0	23.8
1539	568099.64	4809391.69	308.90	0	DEN	A	79.3	6.1	0.0	0.0	0.0	54.1	0.7	-0.8	0.0	0.0	8.0	0.0	0.0	23.4
1541	568099.33	4809389.07	308.90	0	DEN	A	79.3	7.9	0.0	0.0	0.0	54.2	0.8	-0.9	0.0	0.0	7.7	0.0	0.0	25.4
1542	568098.94	4809387.41	308.90	0	DEN	A	79.3	7.9	0.0	0.0	0.0	54.3	0.8	-0.9	0.0	0.0	7.4	0.0	0.0	25.5
1545	568098.44	4809386.67	308.90	0	DEN	A	79.3	7.1	0.0	0.0	0.0	54.4	0.8	-0.9	0.0	0.0	7.3	0.0	0.0	24.8
1547	568097.94	4809385.92	308.90	0	DEN	A	79.3	4.7	0.0	0.0	0.0	54.4	0.8	-0.8	0.0	0.0	7.2	0.0	0.0	22.5
1550	568097.36	4809385.05	308.90	0	DEN	A	79.3	8.7	0.0	0.0	0.0	54.5	0.8	-0.8	0.0	0.0	7.1	0.0	0.0	26.5
1552	568096.42	4809383.60	308.90	0	DEN	A	79.3	6.4	0.0	0.0	0.0	54.6	0.8	-0.8	0.0	0.0	7.0	0.0	0.0	24.2
2168	568101.27	4809384.11	308.90	0	DEN	A	79.3	5.5	0.0	0.0	0.0	54.5	0.8	-0.9	0.0	0.0	7.3	0.0	0.0	23.0
2171	568102.18	4809385.41	308.90	0	DEN	A	79.3	5.3	0.0	0.0	0.0	54.5	0.8	-0.9	0.0	0.0	7.5	0.0	0.0	22.6
2172	568102.63	4809386.03	308.90	0	DEN	A	79.3	3.7	0.0	0.0	0.0	54.4	0.8	-0.9	0.0	0.0	7.6	0.0	0.0	21.0
2173	568102.99	4809386.54	308.90	0	DEN	A	79.3	4.8	0.0	0.0	0.0	54.4	0.8	-0.9	0.0	0.0	7.7	0.0	0.0	22.0
2174	568103.43	4809387.15	308.90	0	DEN	A	79.3	6.4	0.0	0.0	0.0	54.4	0.8	-0.9	0.0	0.0	7.8	0.0	0.0	23.6
2175	568103.87	4809387.76	308.90	0	DEN	A	79.3	5.8	0.0	0.0	0.0	54.4	0.8	-0.9	0.0	0.0	7.9	0.0	0.0	22.9
2176	568104.55	4809387.30	308.90	0	DEN	A	79.3	7.9	0.0	0.0	0.0	54.4	0.8	-0.9	0.0	0.0	7.9	0.0	0.0	24.9
2177	568105.55	4809385.81	308.90	0	DEN	A	79.3	3.9	0.0	0.0	0.0	54.5	0.8	-0.9	0.0	0.0	7.9	0.0	0.0	20.9
2501	568100.23	4809386.01	308.90	0	DEN	A	79.3	3.1	0.0	0.0	0.0	54.4	0.8	-0.9	0.0	0.0	7.4	0.0	0.0	20.6
2502	568100.70	4809389.66	308.90	0	DEN	A	79.3	8.8	0.0	0.0	0.0	54.2	0.7	-0.9	0.0	0.0	7.8	0.0	0.0	26.1
2506	568101.21	4809393.50	308.90	0	DEN	A	79.3	6.7	0.0	0.0	0.0	54.0	0.7	-0.8	0.0	0.0	8.3	0.0	0.0	23.7
2508	568101.70	4809394.18	308.90	0	DEN	A	79.3	5.2	0.0	0.0	0.0	54.0	0.7	-0.8	0.0	0.0	8.4	0.0	0.0	22.2
2510	568102.10	4809393.93	308.90	0	DEN	A	79.3	4.2	0.0	0.0	0.0	54.0	0.7	-0.8	0.0	0.0	8.4	0.0	0.0	21.1
2751	568078.59	4809404.25	308.90	0	DEN	A	79.3	3.5	0.0	0.0	0.0	53.3	0.7	-0.6	0.0	0.0	8.1	0.0	0.0	21.3
2753	568079.08	4809403.71	308.90	0	DEN	A	79.3	3.1	0.0	0.0	0.0	53.3	0.7	-0.6	0.0	0.0	8.2	0.0	0.0	20.9
2758	568080.05	4809400.86	308.90	0	DEN	A	79.3	8.7	0.0	0.0	0.0	53.5	0.7	-0.7	0.0	0.0	8.1	0.0	0.0	26.3
2909	568088.72	4809382.74	308.90	0	DEN	A	79.3	5.6	0.0	0.0	0.0	54.6	0.8	-0.8	0.0	0.0	7.0	0.0	0.0	23.3
2920	568086.11	4809384.23	308.90	0	DEN	A	79.3	2.9	0.0	0.0	0.0	54.5	0.8	-0.8	0.0	0.0	7.2	0.0	0.0	20.5
2945	568089.34	4809382.84	308.90	1	DEN	A	79.3	7.8	0.0	0.0	0.0	56.0	0.9	-0.8	0.0	0.0	5.4	0.0	4.4	21.3
4059	568088.76	4809379.30	308.90	0	DEN	A	79.3	6.0	0.0	0.0	0.0	54.8	0.8	-0.8	0.0	0.0	6.8	0.0	0.0	23.8
4444	568081.35	4809397.52	308.90	0	DEN	A	79.3	2.6	0.0	0.0	0.0	53.7	0.7	-0.7	0.0	0.0	8.1	0.0	0.0	20.1

Area Source, ISO 9613, Name: "Loader", ID: "!02C!L_1_PC"																				
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)
32	568081.69	4809378.65	308.90	0	DEN	A	79.3	2.8	0.0	0.0	0.0	54.8	0.8	-0.8	0.0	0.0	6.4	0.0	0.0	20.9
48	568080.66	4809379.37	308.90	0	DEN	A	79.3	6.5	0.0	0.0	0.0	54.8	0.8	-0.8	0.0	0.0	6.3	0.0	0.0	24.7
68	568079.45	4809380.21	308.90	0	DEN	A	79.3	8.6	0.0	0.0	0.0	54.7	0.8	-0.8	0.0	0.0	6.1	0.0	0.0	27.1
87	568078.46	4809380.89	308.90	0	DEN	A	79.3	7.3	0.0	0.0	0.0	54.7	0.8	-0.8	0.0	0.0	5.9	0.0	0.0	26.0
88	568077.86	4809381.30	308.90	0	DEN	A	79.3	5.4	0.0	0.0	0.0	54.7	0.8	-0.8	0.0	0.0	5.8	0.0	0.0	24.2
94	568077.25	4809381.71	308.90	0	DEN	A	79.3	7.5	0.0	0.0	0.0	54.7	0.8	-0.8	0.0	0.0	5.7	0.0	0.0	26.4
96	568076.72	4809382.07	308.90	0	DEN	A	79.3	5.2	0.0	0.0	0.0	54.6	0.8	-0.8	0.0	0.0	5.8	0.0	0.0	24.1
102	568076.28	4809382.37	308.90	0	DEN	A	79.3	5.7	0.0	0.0	0.0	54.6	0.8	-0.8	0.0	0.0	5.8	0.0	0.0	24.6
131	568075.88	4809382.64	308.90	0	DEN	A	79.3	1.7	0.0	0.0	0.0	54.6	0.8	-0.8	0.0	0.0	5.8	0.0	0.0	20.6
135	568075.24	4809383.06	308.90	0	DEN	A	79.3	10.7	0.0	0.0	0.0	54.6	0.8	-0.8	0.0	0.0	5.9	0.0	0.0	29.5
139	568074.46	4809383.58	308.90	0	DEN	A	79.3	7.2	0.0	0.0	0.0	54.6	0.8	-0.8	0.0	0.0	5.9	0.0	0.0	26.1
141	568074.02	4809383.87	308.90	0	DEN	A	79.3	6.9	0.0	0.0	0.0	54.5	0.8	-0.8	0.0	0.0	5.9	0.0	0.0	25.7
143	568073.56	4809384.17	308.90	0	DEN	A	79.3	7.9	0.0	0.0	0.0	54.5	0.8	-0.8	0.0	0.0	6.0	0.0	0.0	26.7
144	568073.15	4809384.44	308.90	0	DEN	A	79.3	6.2	0.0	0.0	0.0	54.5	0.8	-0.8	0.0	0.0	6.0	0.0	0.0	24.9
145	568072.76	4809384.70	308.90	0	DEN	A	79.3	7.8	0.0	0.0	0.0	54.5	0.8	-0.8	0.0	0.0	6.0	0.0	0.0	26.5
150	568072.33	4809384.98	308.90	0	DEN	A	79.3	5.9	0.0	0.0	0.0	54.5	0.8	-0.8	0.0	0.0	6.1	0.0	0.0	24.6
162	568072.05	4809385.16	308.90	0	DEN	A	79.3	5.9	0.0	0.0	0.0	54.5	0.8	-0.8	0.0	0.0	6.1	0.0	0.0	24.7
163	568071.60	4809385.46	308.90	0	DEN	A	79.3	9.6	0.0	0.0	0.0	54.5	0.8	-0.8	0.0	0.0	6.1	0.0	0.0	28.2
172	568071.06	4809385.81	308.90	0	DEN	A	79.3	7.0	0.0	0.0	0.0	54.5	0.8	-0.8	0.0	0.0	6.2	0.0	0.0	25.6

Area Source, ISO 9613, Name: "Loader", ID: "!02C!L_1_PC"																				
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)
173	568070.65	4809386.07	308.90	0	DEN	A	79.3	8.7	0.0	0.0	0.0	54.4	0.8	-0.8	0.0	0.0	6.2	0.0	0.0	27.3
176	568070.25	4809386.33	308.90	0	DEN	A	79.3	5.8	0.0	0.0	0.0	54.4	0.8	-0.8	0.0	0.0	6.3	0.0	0.0	24.4
184	568069.61	4809386.74	308.90	0	DEN	A	79.3	11.3	0.0	0.0	0.0	54.4	0.8	-0.8	0.0	0.0	6.3	0.0	0.0	29.9
190	568068.91	4809387.18	308.90	0	DEN	A	79.3	10.0	0.0	0.0	0.0	54.4	0.8	-0.8	0.0	0.0	6.4	0.0	0.0	28.6
195	568068.05	4809387.73	308.90	0	DEN	A	79.3	13.1	0.0	0.0	0.0	54.4	0.8	-0.8	0.0	0.0	6.4	0.0	0.0	31.6
197	568066.85	4809388.48	308.90	0	DEN	A	79.3	13.9	0.0	0.0	0.0	54.3	0.8	-0.8	0.0	0.0	6.5	0.0	0.0	32.3
201	568066.18	4809389.63	308.90	0	DEN	A	79.3	7.4	0.0	0.0	0.0	54.3	0.8	-0.7	0.0	0.0	6.7	0.0	0.0	25.7
202	568066.05	4809391.56	308.90	0	DEN	A	79.3	8.6	0.0	0.0	0.0	54.1	0.7	-0.7	0.0	0.0	6.9	0.0	0.0	26.8
218	568065.73	4809395.79	308.90	0	DEN	A	79.3	8.5	0.0	0.0	0.0	53.9	0.7	-0.7	0.0	0.0	7.4	0.0	0.0	26.4
261	568070.32	4809383.72	308.90	1	DEN	A	79.3	9.3	0.0	0.0	0.0	56.6	1.0	-0.8	0.0	0.0	5.0	0.0	5.5	21.4
274	568069.25	4809382.85	308.90	1	DEN	A	79.3	8.0	0.0	0.0	0.0	56.6	1.0	-0.8	0.0	0.0	5.0	0.0	5.5	20.1
281	568068.80	4809382.49	308.90	1	DEN	A	79.3	8.4	0.0	0.0	0.0	56.6	1.0	-0.8	0.0	0.0	5.0	0.0	5.5	20.6
282	568068.00	4809381.88	308.90	1	DEN	A	79.3	10.8	0.0	0.0	0.0	56.6	1.0	-0.8	0.0	0.0	5.0	0.0	5.4	22.9
307	568074.62	4809387.80	308.90	1	DEN	A	79.3	11.0	0.0	0.0	0.0	56.6	1.0	-0.8	0.0	0.0	5.0	0.0	5.4	23.2
334	568073.87	4809387.02	308.90	1	DEN	A	79.3	11.9	0.0	0.0	0.0	56.6	1.0	-0.8	0.0	0.0	5.0	0.0	5.4	24.0
352	568072.84	4809386.01	308.90	1	DEN	A	79.3	16.0	0.0	0.0	0.0	56.6	1.0	-0.8	0.0	0.0	5.0	0.0	5.5	28.1
354	568072.11	4809385.31	308.90	1	DEN	A	79.3	8.0	0.0	0.0	0.0	56.6	1.0	-0.8	0.0	0.0	5.0	0.0	5.5	20.1
356	568071.85	4809385.07	308.90	1	DEN	A	79.3	9.0	0.0	0.0	0.0	56.6	1.0	-0.8	0.0	0.0	5.0	0.0	5.5	21.2
358	568071.55	4809384.80	308.90	1	DEN	A	79.3	9.2	0.0	0.0	0.0	56.6	1.0	-0.8	0.0	0.0	5.0	0.0	5.5	21.3
375	568070.87	4809384.20	308.90	1	DEN	A	79.3	9.6	0.0	0.0	0.0	56.6	1.0	-0.8	0.0	0.0	5.0	0.0	5.5	21.8
822	568068.32	4809400.12	308.90	0	DEN	A	79.3	8.6	0.0	0.0	0.0	53.6	0.7	-0.6	0.0	0.0	7.9	0.0	0.0	26.3
825	568069.55	4809399.63	308.90	0	DEN	A	79.3	8.7	0.0	0.0	0.0	53.6	0.7	-0.6	0.0	0.0	7.8	0.0	0.0	26.5
837	568070.34	4809399.31	308.90	0	DEN	A	79.3	6.6	0.0	0.0	0.0	53.6	0.7	-0.6	0.0	0.0	7.7	0.0	0.0	24.4
839	568071.00	4809399.03	308.90	0	DEN	A	79.3	8.5	0.0	0.0	0.0	53.7	0.7	-0.7	0.0	0.0	7.6	0.0	0.0	26.4
843	568071.59	4809398.78	308.90	0	DEN	A	79.3	3.6	0.0	0.0	0.0	53.7	0.7	-0.7	0.0	0.0	7.6	0.0	0.0	21.6
845	568071.97	4809398.62	308.90	0	DEN	A	79.3	6.9	0.0	0.0	0.0	53.7	0.7	-0.7	0.0	0.0	7.6	0.0	0.0	24.9
846	568072.34	4809398.45	308.90	0	DEN	A	79.3	5.5	0.0	0.0	0.0	53.7	0.7	-0.7	0.0	0.0	7.5	0.0	0.0	23.6
850	568072.85	4809398.23	308.90	0	DEN	A	79.3	8.6	0.0	0.0	0.0	53.7	0.7	-0.7	0.0	0.0	7.5	0.0	0.0	26.7
852	568073.27	4809398.04	308.90	0	DEN	A	79.3	5.4	0.0	0.0	0.0	53.7	0.7	-0.7	0.0	0.0	7.4	0.0	0.0	23.5
853	568073.53	4809397.92	308.90	0	DEN	A	79.3	5.5	0.0	0.0	0.0	53.7	0.7	-0.7	0.0	0.0	7.4	0.0	0.0	23.7
856	568073.93	4809397.73	308.90	0	DEN	A	79.3	7.8	0.0	0.0	0.0	53.7	0.7	-0.7	0.0	0.0	7.4	0.0	0.0	25.9
857	568074.29	4809397.57	308.90	0	DEN	A	79.3	6.5	0.0	0.0	0.0	53.7	0.7	-0.7	0.0	0.0	7.3	0.0	0.0	24.7
859	568074.63	4809397.41	308.90	0	DEN	A	79.3	7.5	0.0	0.0	0.0	53.7	0.7	-0.7	0.0	0.0	7.3	0.0	0.0	25.7
863	568075.06	4809396.81	308.90	0	DEN	A	79.3	7.6	0.0	0.0	0.0	53.8	0.7	-0.7	0.0	0.0	7.2	0.0	0.0	25.9
865	568075.43	4809396.08	308.90	0	DEN	A	79.3	8.1	0.0	0.0	0.0	53.8	0.7	-0.7	0.0	0.0	7.1	0.0	0.0	26.4
867	568076.08	4809394.75	308.90	0	DEN	A	79.3	11.6	0.0	0.0	0.0	53.9	0.7	-0.7	0.0	0.0	6.9	0.0	0.0	30.0
870	568076.62	4809393.64	308.90	0	DEN	A	79.3	2.7	0.0	0.0	0.0	54.0	0.7	-0.7	0.0	0.0	6.8	0.0	0.0	21.3
872	568076.74	4809393.40	308.90	0	DEN	A	79.3	2.0	0.0	0.0	0.0	54.0	0.7	-0.7	0.0	0.0	6.8	0.0	0.0	20.6
874	568076.97	4809392.94	308.90	0	DEN	A	79.3	6.7	0.0	0.0	0.0	54.0	0.7	-0.8	0.0	0.0	6.7	0.0	0.0	25.3
877	568077.35	4809392.16	308.90	0	DEN	A	79.3	6.3	0.0	0.0	0.0	54.0	0.7	-0.8	0.0	0.0	6.6	0.0	0.0	24.9
879	568077.80	4809391.22	308.90	0	DEN	A	79.3	8.7	0.0	0.0	0.0	54.1	0.7	-0.8	0.0	0.0	6.6	0.0	0.0	27.3
885	568078.33	4809390.13	308.90	0	DEN	A	79.3	6.6	0.0	0.0	0.0	54.2	0.7	-0.8	0.0	0.0	6.6	0.0	0.0	25.1
887	568078.87	4809389.02	308.90	0	DEN	A	79.3	8.6	0.0	0.0	0.0	54.2	0.7	-0.8	0.0	0.0	6.6	0.0	0.0	27.0
889	568079.75	4809387.18	308.90	0	DEN	A	79.3	10.0	0.0	0.0	0.0	54.3	0.8	-0.8	0.0	0.0	6.7	0.0	0.0	28.3
893	568080.86	4809384.87	308.90	0	DEN	A	79.3	8.0	0.0	0.0	0.0	54.5	0.8	-0.8	0.0	0.0	6.7	0.0	0.0	26.1
895	568081.81	4809382.86	308.90	0	DEN	A	79.3	4.5	0.0	0.0	0.0	54.6	0.8	-0.8	0.0	0.0	6.8	0.0	0.0	22.4
900	568082.32	4809381.78	308.90	0	DEN	A	79.3	3.5	0.0	0.0	0.0	54.6	0.8	-0.8	0.0	0.0	6.8	0.0	0.0	21.3
912	568083.54	4809379.19	308.90	0	DEN	A	79.3	3.8	0.0	0.0	0.0	54.8	0.8	-0.8	0.0	0.0	6.7	0.0	0.0	21.6
938	568077.63	4809386.23	308.90	1	DEN	A	79.3	12.5	0.0	0.0	0.0	56.4	0.9	-0.8	0.0	0.0	5.1	0.0	5.5	24.7
1473	568061.29	4809393.13	308.90	0	DEN	A	79.3	4.1	0.0	0.0	0.0	54.1	0.7	-0.7	0.0	0.0	7.7	0.0	0.0	21.5
1479	568062.43	4809393.28	308.90	0	DEN	A	79.3	7.6	0.0	0.0	0.0	54.1	0.7	-0.7	0.0	0.0	7.6	0.0	0.0	25.2
1484	568063.18	4809393.33	308.90	0	DEN	A	79.3	8.0	0.0	0.0	0.0	54.1	0.7	-0.7	0.0	0.0	7.5	0.0	0.0	25.7
1486	568063.59	4809393.33	308.90	0	DEN	A	79.3	6.4	0.0	0.0	0.0	54.1	0.7	-0.7	0.0	0.0	7.4	0.0	0.0	24.1
1487	568063.88	4809393.33	308.90	0	DEN	A	79.3	6.0	0.0	0.0	0.0	54.1	0.7	-0.7	0.0	0.0	7.4	0.0	0.0	23.8
1488	568064.15	4809391.63	308.90	0	DEN	A	79.3	10.6	0.0	0.0	0.0	54.2	0.7	-0.7	0.0	0.0	7.1	0.0	0.0	28.5
1489	568064.44	4809387.77	308.90	0	DEN	A	79.3	9.5	0.0	0.0	0.0	54.4	0.8	-0.8	0.0	0.0	6.6	0.0	0.0	27.8
1492	568064.78	4809382.92	308.90	0	DEN	A	79.3	2.8	0.0	0.0	0.0	54.7	0.8	-0.8	0.0	0.0	6.1	0.0	0.0	21.3
1813	568079.76	4809393.64	308.90	0	DEN	A	79.3	7.7	0.0	0.0	0.0	53.9	0.7	-0.8	0.0	0.0	7.3	0.0	0.0	25.7
1816	568081.07	4809390.18	308.90	0	DEN	A	79.3	5.9	0.0	0.0	0.0	54.2	0.7	-0.8	0.0	0.0	7.3	0.0	0.0	23.8
1818	568081.96	4809387.82	308.90	0	DEN	A	79.3	4.2	0.0	0.0	0.0	54.3	0.8	-0.8	0.0	0.0	7.3	0.0	0.0	22.0
1819	568082.45	4809386.53	308.90	0	DEN	A	79.3	4.4	0.0	0.0	0.0	54.4	0.8	-0.8	0.0	0.0	7.3	0.0	0.0	22.1
1821	568082.91	4809385.31	308.90	0	DEN	A	79.3	3.8	0.0	0.0	0.0	54.4	0.8	-0.8	0.0	0.0	7.2	0.0	0.0	21.5
1823	568083.71	4809383.20	308.90	0	DEN	A	79.3	8.6	0.0	0.0	0.0	54.6	0.8	-0.8	0.0	0.0	7.1	0.0	0.0	26.3

Area Source, ISO 9613, Name: "Loader", ID: "!02C!L_1_PC"																				
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)
1824	568084.40	4809381.37	308.90	0	DEN	A	79.3	3.7	0.0	0.0	0.0	54.7	0.8	-0.8	0.0	0.0	6.9	0.0	0.0	21.4
1911	568080.53	4809375.76	308.90	0	DEN	A	79.3	2.8	0.0	0.0	0.0	55.0	0.8	-0.8	0.0	0.0	6.0	0.0	0.0	21.1
1918	568079.24	4809375.56	308.90	0	DEN	A	79.3	5.0	0.0	0.0	0.0	55.0	0.8	-0.8	0.0	0.0	5.8	0.0	0.0	23.5
1921	568078.18	4809375.39	308.90	0	DEN	A	79.3	3.7	0.0	0.0	0.0	55.0	0.8	-0.8	0.0	0.0	5.6	0.0	0.0	22.4
1923	568077.53	4809375.29	308.90	0	DEN	A	79.3	1.9	0.0	0.0	0.0	55.0	0.8	-0.8	0.0	0.0	5.5	0.0	0.0	20.7
1928	568076.87	4809375.18	308.90	0	DEN	A	79.3	4.1	0.0	0.0	0.0	55.0	0.8	-0.8	0.0	0.0	5.3	0.0	0.0	23.0
1930	568076.29	4809375.09	308.90	0	DEN	A	79.3	1.8	0.0	0.0	0.0	55.0	0.8	-0.8	0.0	0.0	5.3	0.0	0.0	20.7
1934	568075.80	4809375.01	308.90	0	DEN	A	79.3	2.2	0.0	0.0	0.0	55.0	0.8	-0.8	0.0	0.0	5.3	0.0	0.0	21.2
1942	568074.67	4809375.09	308.90	0	DEN	A	79.3	6.7	0.0	0.0	0.0	55.0	0.8	-0.8	0.0	0.0	5.4	0.0	0.0	25.6
1944	568073.82	4809375.33	308.90	0	DEN	A	79.3	2.6	0.0	0.0	0.0	55.0	0.8	-0.8	0.0	0.0	5.4	0.0	0.0	21.4
1947	568073.35	4809375.47	308.90	0	DEN	A	79.3	1.8	0.0	0.0	0.0	55.0	0.8	-0.8	0.0	0.0	5.4	0.0	0.0	20.6
1949	568072.85	4809375.61	308.90	0	DEN	A	79.3	2.4	0.0	0.0	0.0	55.0	0.8	-0.8	0.0	0.0	5.4	0.0	0.0	21.2
1953	568071.98	4809375.86	308.90	0	DEN	A	79.3	1.4	0.0	0.0	0.0	55.0	0.8	-0.8	0.0	0.0	5.4	0.0	0.0	20.2
1962	568070.70	4809376.22	308.90	0	DEN	A	79.3	1.8	0.0	0.0	0.0	55.0	0.8	-0.8	0.0	0.0	5.5	0.0	0.0	20.6
2013	568074.30	4809375.23	308.90	1	DEN	A	79.3	8.7	0.0	0.0	0.0	56.2	0.9	-0.8	0.0	0.0	5.2	0.0	4.4	22.1
2679	568062.08	4809397.77	308.90	0	DEN	A	79.3	4.4	0.0	0.0	0.0	53.8	0.7	-0.6	0.0	0.0	8.3	0.0	0.0	21.4
2680	568061.51	4809397.14	308.90	0	DEN	A	79.3	3.2	0.0	0.0	0.0	53.9	0.7	-0.6	0.0	0.0	8.3	0.0	0.0	20.2
2682	568061.03	4809396.61	308.90	0	DEN	A	79.3	4.1	0.0	0.0	0.0	53.9	0.7	-0.6	0.0	0.0	8.3	0.0	0.0	21.1
2686	568060.42	4809397.15	308.90	0	DEN	A	79.3	5.2	0.0	0.0	0.0	53.9	0.7	-0.6	0.0	0.0	8.5	0.0	0.0	22.1
3120	568068.66	4809378.28	308.90	0	DEN	A	79.3	2.0	0.0	0.0	0.0	54.9	0.8	-0.8	0.0	0.0	5.6	0.0	0.0	20.7
3123	568066.91	4809378.48	308.90	0	DEN	A	79.3	3.9	0.0	0.0	0.0	54.9	0.8	-0.8	0.0	0.0	5.7	0.0	0.0	22.6
3653	568079.70	4809397.25	308.90	0	DEN	A	79.3	2.9	0.0	0.0	0.0	53.7	0.7	-0.7	0.0	0.0	7.6	0.0	0.0	20.8
3705	568068.28	4809374.93	308.90	0	DEN	A	79.3	4.0	0.0	0.0	0.0	55.1	0.8	-0.8	0.0	0.0	5.4	0.0	0.0	22.7
3712	568066.77	4809376.13	308.90	0	DEN	A	79.3	3.2	0.0	0.0	0.0	55.0	0.8	-0.8	0.0	0.0	5.5	0.0	0.0	21.9
4211	568070.29	4809372.20	308.90	0	DEN	A	79.3	2.2	0.0	0.0	0.0	55.2	0.8	-0.8	0.0	0.0	5.3	0.0	0.0	21.0
4218	568069.18	4809372.05	308.90	0	DEN	A	79.3	2.0	0.0	0.0	0.0	55.2	0.8	-0.8	0.0	0.0	5.3	0.0	0.0	20.8
4228	568068.11	4809372.59	308.90	0	DEN	A	79.3	2.5	0.0	0.0	0.0	55.2	0.8	-0.8	0.0	0.0	5.3	0.0	0.0	21.2
4251	568070.06	4809372.46	308.90	1	DEN	A	79.3	6.5	0.0	0.0	0.0	56.2	0.9	-0.8	0.0	0.0	4.8	0.0	4.3	20.3
4888	568086.08	4809378.72	308.90	0	DEN	A	79.3	2.8	0.0	0.0	0.0	54.8	0.8	-0.8	0.0	0.0	6.7	0.0	0.0	20.6

Line Source, ISO 9613, Name: "Haul Trucks", ID: "!02C!HT_PC"																				
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)
6607	567875.39	4809511.50	308.20	0	DEN	A	72.3	9.3	0.0	0.0	0.0	57.5	1.1	0.0	0.0	0.0	0.0	0.0	0.0	22.9
6608	567876.10	4809502.67	308.20	0	DEN	A	72.3	9.7	0.0	0.0	0.0	57.5	1.1	-0.1	0.0	0.0	0.0	0.0	0.0	23.4
6796	567877.72	4809502.91	308.20	0	DEN	A	72.3	9.6	0.0	0.0	0.0	57.5	1.1	-0.1	0.0	0.0	0.0	0.0	0.0	23.5
6799	567877.03	4809511.03	308.20	0	DEN	A	72.3	8.5	0.0	0.0	0.0	57.5	1.1	0.0	0.0	0.0	0.0	0.0	0.0	22.2

Receiver
Name: Gots Residence
ID: POR005
X: 568086.08 m
Y: 4809533.45 m
Z: 319.50 m

Area Source, ISO 9613, Name: "Loader", ID: "!05B!L_PR"																				
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)
5	568122.16	4809374.53	308.90	0	DEN	A	79.3	0.6	0.0	0.0	0.0	55.3	0.8	-0.8	0.0	0.0	7.9	0.0	0.0	16.7
9	568122.55	4809375.34	308.90	0	DEN	A	79.3	0.4	0.0	0.0	0.0	55.2	0.8	-0.8	0.0	0.0	8.0	0.0	0.0	16.5
14	568122.70	4809375.66	308.90	0	DEN	A	79.3	-4.7	0.0	0.0	0.0	55.2	0.8	-0.8	0.0	0.0	8.0	0.0	0.0	11.4
20	568123.16	4809376.60	308.90	0	DEN	A	79.3	7.3	0.0	0.0	0.0	55.2	0.8	-0.8	0.0	0.0	8.1	0.0	0.0	23.3
22	568123.57	4809377.42	308.90	0	DEN	A	79.3	-0.7	0.0	0.0	0.0	55.1	0.8	-0.8	0.0	0.0	8.2	0.0	0.0	15.2
44	568123.68	4809377.64	308.90	0	DEN	A	79.3	0.6	0.0	0.0	0.0	55.1	0.8	-0.8	0.0	0.0	8.3	0.0	0.0	16.5
45	568123.95	4809378.17	308.90	0	DEN	A	79.3	6.0	0.0	0.0	0.0	55.1	0.8	-0.8	0.0	0.0	8.3	0.0	0.0	21.9
58	568124.17	4809378.61	308.90	0	DEN	A	79.3	-1.1	0.0	0.0	0.0	55.1	0.8	-0.8	0.0	0.0	8.4	0.0	0.0	14.8
69	568124.22	4809378.71	308.90	0	DEN	A	79.3	-5.3	0.0	0.0	0.0	55.1	0.8	-0.8	0.0	0.0	8.4	0.0	0.0	10.5
74	568124.29	4809378.84	308.90	0	DEN	A	79.3	1.2	0.0	0.0	0.0	55.1	0.8	-0.8	0.0	0.0	8.4	0.0	0.0	17.1
76	568124.39	4809379.03	308.90	0	DEN	A	79.3	-0.2	0.0	0.0	0.0	55.1	0.8	-0.8	0.0	0.0	8.4	0.0	0.0	15.7
78	568124.46	4809379.18	308.90	0	DEN	A	79.3	-0.5	0.0	0.0	0.0	55.0	0.8	-0.8	0.0	0.0	8.5	0.0	0.0	15.3
80	568124.61	4809379.47	308.90	0	DEN	A	79.3	4.7	0.0	0.0	0.0	55.0	0.8	-0.8	0.0	0.0	8.5	0.0	0.0	20.5
88	568124.84	4809379.90	308.90	0	DEN	A	79.3	4.9	0.0	0.0	0.0	55.0	0.8	-0.9	0.0	0.0	8.5	0.0	0.0	20.6
93	568124.97	4809380.17	308.90	0	DEN	A	79.3	-0.7	0.0	0.0	0.0	55.0	0.8	-0.9	0.0	0.0	8.6	0.0	0.0	15.0
95	568125.01	4809380.25	308.90	0	DEN	A	79.3	-4.4	0.0	0.0	0.0	55.0	0.8	-0.9	0.0	0.0	8.6	0.0	0.0	11.3
102	568125.11	4809380.44	308.90	0	DEN	A	79.3	4.2	0.0	0.0	0.0	55.0	0.8	-0.9	0.0	0.0	8.6	0.0	0.0	19.9
138	568125.23	4809380.66	308.90	0	DEN	A	79.3	-0.5	0.0	0.0	0.0	55.0	0.8	-0.9	0.0	0.0	8.6	0.0	0.0	15.2
139	568125.28	4809380.76	308.90	0	DEN	A	79.3	-1.3	0.0	0.0	0.0	55.0	0.8	-0.9	0.0	0.0	8.7	0.0	0.0	14.3
146	568125.41	4809381.00	308.90	0	DEN	A	79.3	5.1	0.0	0.0	0.0	55.0	0.8	-0.9	0.0	0.0	8.7	0.0	0.0	20.8
153	568125.54	4809381.25	308.90	0	DEN	A	79.3	0.5	0.0	0.0	0.0	55.0	0.8	-0.9	0.0	0.0	8.7	0.0	0.0	16.1
158	568125.61	4809381.39	308.90	0	DEN	A	79.3	1.6	0.0	0.0	0.0	54.9	0.8	-0.9	0.0	0.0	8.7	0.0	0.0	17.3
165	568125.79	4809381.72	308.90	0	DEN	A	79.3	6.7	0.0	0.0	0.0	54.9	0.8	-0.9	0.0	0.0	8.8	0.0	0.0	22.3
176	568125.95	4809382.02	308.90	0	DEN	A	79.3	0.2	0.0	0.0	0.0	54.9	0.8	-0.9	0.0	0.0	8.8	0.0	0.0	15.8
181	568126.03	4809382.18	308.90	0	DEN	A	79.3	3.1	0.0	0.0	0.0	54.9	0.8	-0.9	0.0	0.0	8.8	0.0	0.0	18.7
184	568126.18	4809382.46	308.90	0	DEN	A	79.3	5.8	0.0	0.0	0.0	54.9	0.8	-0.9	0.0	0.0	8.9	0.0	0.0	21.4
187	568126.32	4809382.71	308.90	0	DEN	A	79.3	1.6	0.0	0.0	0.0	54.9	0.8	-0.9	0.0	0.0	8.9	0.0	0.0	17.1
188	568126.36	4809382.80	308.90	0	DEN	A	79.3	-3.8	0.0	0.0	0.0	54.9	0.8	-0.9	0.0	0.0	8.9	0.0	0.0	11.7
190	568126.45	4809382.95	308.90	0	DEN	A	79.3	4.5	0.0	0.0	0.0	54.9	0.8	-0.9	0.0	0.0	8.9	0.0	0.0	20.1
192	568126.59	4809383.21	308.90	0	DEN	A	79.3	4.7	0.0	0.0	0.0	54.9	0.8	-0.9	0.0	0.0	9.0	0.0	0.0	20.2
194	568126.73	4809383.48	308.90	0	DEN	A	79.3	5.2	0.0	0.0	0.0	54.8	0.8	-0.9	0.0	0.0	9.0	0.0	0.0	20.7
196	568126.91	4809383.80	308.90	0	DEN	A	79.3	6.4	0.0	0.0	0.0	54.8	0.8	-0.9	0.0	0.0	9.0	0.0	0.0	21.8
199	568127.10	4809384.15	308.90	0	DEN	A	79.3	6.3	0.0	0.0	0.0	54.8	0.8	-0.9	0.0	0.0	9.1	0.0	0.0	21.7
205	568127.33	4809384.57	308.90	0	DEN	A	79.3	8.3	0.0	0.0	0.0	54.8	0.8	-0.9	0.0	0.0	9.1	0.0	0.0	23.7
207	568127.60	4809385.06	308.90	0	DEN	A	79.3	8.0	0.0	0.0	0.0	54.8	0.8	-0.9	0.0	0.0	9.2	0.0	0.0	23.4
208	568127.75	4809385.32	308.90	0	DEN	A	79.3	-0.7	0.0	0.0	0.0	54.8	0.8	-0.9	0.0	0.0	9.2	0.0	0.0	14.6
210	568127.82	4809385.45	308.90	0	DEN	A	79.3	4.9	0.0	0.0	0.0	54.8	0.8	-0.9	0.0	0.0	9.3	0.0	0.0	20.2
211	568128.01	4809385.78	308.90	0	DEN	A	79.3	8.1	0.0	0.0	0.0	54.7	0.8	-0.9	0.0	0.0	9.3	0.0	0.0	23.4
216	568128.32	4809386.33	308.90	0	DEN	A	79.3	10.2	0.0	0.0	0.0	54.7	0.8	-0.9	0.0	0.0	9.4	0.0	0.0	25.4
217	568128.55	4809386.73	308.90	0	DEN	A	79.3	3.2	0.0	0.0	0.0	54.7	0.8	-0.9	0.0	0.0	9.4	0.0	0.0	18.4
220	568128.60	4809386.82	308.90	0	DEN	A	79.3	-1.6	0.0	0.0	0.0	54.7	0.8	-0.9	0.0	0.0	9.4	0.0	0.0	13.5
225	568128.62	4809386.86	308.90	0	DEN	A	79.3	-1.9	0.0	0.0	0.0	54.7	0.8	-0.9	0.0	0.0	9.4	0.0	0.0	13.3
229	568128.72	4809387.04	308.90	0	DEN	A	79.3	7.2	0.0	0.0	0.0	54.7	0.8	-0.9	0.0	0.0	9.5	0.0	0.0	22.4
232	568128.94	4809387.42	308.90	0	DEN	A	79.3	8.9	0.0	0.0	0.0	54.7	0.8	-0.9	0.0	0.0	9.5	0.0	0.0	24.1
234	568129.15	4809387.78	308.90	0	DEN	A	79.3	6.8	0.0	0.0	0.0	54.7	0.8	-0.9	0.0	0.0	9.6	0.0	0.0	21.9
236	568129.37	4809388.16	308.90	0	DEN	A	79.3	9.5	0.0	0.0	0.0	54.6	0.8	-0.9	0.0	0.0	9.6	0.0	0.0	24.6
238	568129.56	4809388.48	308.90	0	DEN	A	79.3	4.4	0.0	0.0	0.0	54.6	0.8	-0.9	0.0	0.0	9.7	0.0	0.0	19.4
240	568129.62	4809388.58	308.90	0	DEN	A	79.3	0.4	0.0	0.0	0.0	54.6	0.8	-0.9	0.0	0.0	9.7	0.0	0.0	15.4
243	568129.68	4809388.69	308.90	0	DEN	A	79.3	4.8	0.0	0.0	0.0	54.6	0.8	-0.9	0.0	0.0	9.7	0.0	0.0	19.8
245	568129.73	4809388.77	308.90	0	DEN	A	79.3	-4.1	0.0	0.0	0.0	54.6	0.8	-0.9	0.0	0.0	9.7	0.0	0.0	11.0
247	568129.75	4809388.80	308.90	0	DEN	A	79.3	-1.2	0.0	0.0	0.0	54.6	0.8	-0.9	0.0	0.0	9.7	0.0	0.0	13.9
251	568129.79	4809388.88	308.90	0	DEN	A	79.3	3.0	0.0	0.0	0.0	54.6	0.8	-0.9	0.0	0.0	9.7	0.0	0.0	18.0

Area Source, ISO 9613, Name: "Loader", ID: "!05B!L_PR"																				
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)
253	568129.84	4809388.95	308.90	0	DEN	A	79.3	-0.2	0.0	0.0	0.0	54.6	0.8	-0.9	0.0	0.0	9.7	0.0	0.0	14.8
255	568129.87	4809389.01	308.90	0	DEN	A	79.3	1.4	0.0	0.0	0.0	54.6	0.8	-0.9	0.0	0.0	9.7	0.0	0.0	16.4
257	568129.97	4809389.17	308.90	0	DEN	A	79.3	6.8	0.0	0.0	0.0	54.6	0.8	-0.9	0.0	0.0	9.8	0.0	0.0	21.8
259	568130.09	4809389.38	308.90	0	DEN	A	79.3	5.6	0.0	0.0	0.0	54.6	0.8	-0.9	0.0	0.0	9.8	0.0	0.0	20.6
263	568130.18	4809389.53	308.90	0	DEN	A	79.3	3.9	0.0	0.0	0.0	54.6	0.8	-0.9	0.0	0.0	9.8	0.0	0.0	18.9
266	568130.25	4809389.65	308.90	0	DEN	A	79.3	3.6	0.0	0.0	0.0	54.6	0.8	-0.9	0.0	0.0	9.8	0.0	0.0	18.6
267	568130.46	4809389.99	308.90	0	DEN	A	79.3	10.8	0.0	0.0	0.0	54.6	0.8	-0.9	0.0	0.0	9.9	0.0	0.0	25.7
270	568130.69	4809390.38	308.90	0	DEN	A	79.3	6.7	0.0	0.0	0.0	54.5	0.8	-0.9	0.0	0.0	9.9	0.0	0.0	21.6
272	568130.85	4809390.64	308.90	0	DEN	A	79.3	8.4	0.0	0.0	0.0	54.5	0.8	-0.9	0.0	0.0	10.0	0.0	0.0	23.3
275	568130.95	4809390.81	308.90	0	DEN	A	79.3	-1.6	0.0	0.0	0.0	54.5	0.8	-0.9	0.0	0.0	10.0	0.0	0.0	13.2
278	568131.15	4809391.13	308.90	0	DEN	A	79.3	11.2	0.0	0.0	0.0	54.5	0.8	-0.9	0.0	0.0	10.0	0.0	0.0	26.0
280	568131.43	4809391.58	308.90	0	DEN	A	79.3	9.0	0.0	0.0	0.0	54.5	0.8	-0.9	0.0	0.0	10.1	0.0	0.0	23.8
282	568131.59	4809391.85	308.90	0	DEN	A	79.3	6.6	0.0	0.0	0.0	54.5	0.8	-0.9	0.0	0.0	10.1	0.0	0.0	21.4
284	568131.69	4809392.00	308.90	0	DEN	A	79.3	4.8	0.0	0.0	0.0	54.5	0.8	-0.9	0.0	0.0	10.1	0.0	0.0	19.5
286	568131.80	4809392.19	308.90	0	DEN	A	79.3	8.0	0.0	0.0	0.0	54.5	0.8	-0.9	0.0	0.0	10.2	0.0	0.0	22.7
288	568132.03	4809392.55	308.90	0	DEN	A	79.3	10.7	0.0	0.0	0.0	54.4	0.8	-0.9	0.0	0.0	10.2	0.0	0.0	25.4
290	568132.26	4809392.91	308.90	0	DEN	A	79.3	8.2	0.0	0.0	0.0	54.4	0.8	-0.9	0.0	0.0	10.3	0.0	0.0	22.9
291	568132.50	4809393.30	308.90	0	DEN	A	79.3	11.3	0.0	0.0	0.0	54.4	0.8	-0.9	0.0	0.0	10.3	0.0	0.0	26.0
293	568132.72	4809393.65	308.90	0	DEN	A	79.3	7.1	0.0	0.0	0.0	54.4	0.8	-0.9	0.0	0.0	10.3	0.0	0.0	21.7
300	568132.86	4809393.87	308.90	0	DEN	A	79.3	8.5	0.0	0.0	0.0	54.4	0.8	-0.9	0.0	0.0	10.4	0.0	0.0	23.2
301	568132.98	4809394.06	308.90	0	DEN	A	79.3	5.0	0.0	0.0	0.0	54.4	0.8	-0.9	0.0	0.0	10.4	0.0	0.0	19.6
307	568133.28	4809393.66	308.90	0	DEN	A	79.3	7.9	0.0	0.0	0.0	54.4	0.8	-0.9	0.0	0.0	10.4	0.0	0.0	22.5
308	568133.63	4809393.07	308.90	0	DEN	A	79.3	1.7	0.0	0.0	0.0	54.4	0.8	-0.9	0.0	0.0	10.3	0.0	0.0	16.3
310	568134.47	4809391.58	308.90	0	DEN	A	79.3	11.7	0.0	0.0	0.0	54.5	0.8	-0.9	0.0	0.0	10.2	0.0	0.0	26.3
313	568135.70	4809389.38	308.90	0	DEN	A	79.3	6.7	0.0	0.0	0.0	54.7	0.8	-0.9	0.0	0.0	10.0	0.0	0.0	21.4
315	568136.46	4809388.00	308.90	0	DEN	A	79.3	6.3	0.0	0.0	0.0	54.8	0.8	-0.9	0.0	0.0	9.9	0.0	0.0	21.0
317	568137.59	4809385.90	308.90	0	DEN	A	79.3	7.2	0.0	0.0	0.0	54.9	0.8	-0.9	0.0	0.0	9.7	0.0	0.0	22.0
319	568138.70	4809383.82	308.90	0	DEN	A	79.3	-1.3	0.0	0.0	0.0	55.0	0.8	-0.9	0.0	0.0	9.5	0.0	0.0	13.4
321	568139.12	4809383.03	308.90	0	DEN	A	79.3	-3.1	0.0	0.0	0.0	55.1	0.8	-0.9	0.0	0.0	9.5	0.0	0.0	11.7
347	568127.59	4809408.05	308.90	0	DEN	A	79.3	-3.1	0.0	0.0	0.0	53.4	0.7	-0.8	0.0	0.0	11.7	0.0	0.0	11.0
351	568127.21	4809407.31	308.90	0	DEN	A	79.3	-0.7	0.0	0.0	0.0	53.5	0.7	-0.8	0.0	0.0	11.6	0.0	0.0	13.5
353	568127.02	4809406.95	308.90	0	DEN	A	79.3	-2.4	0.0	0.0	0.0	53.5	0.7	-0.8	0.0	0.0	11.6	0.0	0.0	11.8
357	568126.84	4809406.60	308.90	0	DEN	A	79.3	-3.0	0.0	0.0	0.0	53.5	0.7	-0.8	0.0	0.0	11.5	0.0	0.0	11.2
359	568126.71	4809406.33	308.90	0	DEN	A	79.3	-0.1	0.0	0.0	0.0	53.5	0.7	-0.8	0.0	0.0	11.5	0.0	0.0	14.2
363	568126.47	4809405.87	308.90	0	DEN	A	79.3	2.9	0.0	0.0	0.0	53.6	0.7	-0.8	0.0	0.0	11.4	0.0	0.0	17.3
367	568126.23	4809405.38	308.90	0	DEN	A	79.3	0.9	0.0	0.0	0.0	53.6	0.7	-0.8	0.0	0.0	11.4	0.0	0.0	15.3
369	568126.09	4809405.12	308.90	0	DEN	A	79.3	-0.4	0.0	0.0	0.0	53.6	0.7	-0.8	0.0	0.0	11.3	0.0	0.0	14.0
371	568125.89	4809404.72	308.90	0	DEN	A	79.3	4.2	0.0	0.0	0.0	53.6	0.7	-0.8	0.0	0.0	11.3	0.0	0.0	18.6
373	568125.73	4809404.38	308.90	0	DEN	A	79.3	-2.5	0.0	0.0	0.0	53.6	0.7	-0.8	0.0	0.0	11.2	0.0	0.0	12.0
375	568125.67	4809404.26	308.90	0	DEN	A	79.3	-2.1	0.0	0.0	0.0	53.6	0.7	-0.8	0.0	0.0	11.2	0.0	0.0	12.4
378	568125.59	4809404.11	308.90	0	DEN	A	79.3	-0.2	0.0	0.0	0.0	53.6	0.7	-0.8	0.0	0.0	11.2	0.0	0.0	14.3
380	568125.49	4809403.89	308.90	0	DEN	A	79.3	1.2	0.0	0.0	0.0	53.7	0.7	-0.8	0.0	0.0	11.2	0.0	0.0	15.8
382	568125.41	4809403.73	308.90	0	DEN	A	79.3	-4.0	0.0	0.0	0.0	53.7	0.7	-0.8	0.0	0.0	11.1	0.0	0.0	10.6
386	568125.34	4809403.60	308.90	0	DEN	A	79.3	-2.3	0.0	0.0	0.0	53.7	0.7	-0.8	0.0	0.0	11.1	0.0	0.0	12.3
392	568125.25	4809403.40	308.90	0	DEN	A	79.3	-0.2	0.0	0.0	0.0	53.7	0.7	-0.8	0.0	0.0	11.1	0.0	0.0	14.3
393	568125.20	4809403.30	308.90	0	DEN	A	79.3	-4.6	0.0	0.0	0.0	53.7	0.7	-0.8	0.0	0.0	11.1	0.0	0.0	10.0
395	568125.15	4809403.19	308.90	0	DEN	A	79.3	-0.4	0.0	0.0	0.0	53.7	0.7	-0.8	0.0	0.0	11.1	0.0	0.0	14.2
397	568124.99	4809402.87	308.90	0	DEN	A	79.3	5.0	0.0	0.0	0.0	53.7	0.7	-0.8	0.0	0.0	11.0	0.0	0.0	19.7
399	568124.80	4809402.49	308.90	0	DEN	A	79.3	2.7	0.0	0.0	0.0	53.7	0.7	-0.8	0.0	0.0	11.0	0.0	0.0	17.4
401	568124.63	4809402.12	308.90	0	DEN	A	79.3	5.2	0.0	0.0	0.0	53.8	0.7	-0.8	0.0	0.0	10.9	0.0	0.0	19.9
403	568124.44	4809401.73	308.90	0	DEN	A	79.3	3.8	0.0	0.0	0.0	53.8	0.7	-0.8	0.0	0.0	10.9	0.0	0.0	18.6
411	568124.29	4809401.42	308.90	0	DEN	A	79.3	0.1	0.0	0.0	0.0	53.8	0.7	-0.8	0.0	0.0	10.8	0.0	0.0	14.9
413	568124.10	4809401.01	308.90	0	DEN	A	79.3	7.5	0.0	0.0	0.0	53.8	0.7	-0.8	0.0	0.0	10.7	0.0	0.0	22.3
417	568123.84	4809400.45	308.90	0	DEN	A	79.3	5.9	0.0	0.0	0.0	53.8	0.7	-0.8	0.0	0.0	10.7	0.0	0.0	20.7
419	568123.69	4809400.12	308.90	0	DEN	A	79.3	2.9	0.0	0.0	0.0	53.9	0.7	-0.8	0.0	0.0	10.6	0.0	0.0	17.8
421	568123.62	4809399.98	308.90	0	DEN	A	79.3	-2.6	0.0	0.0	0.0	53.9	0.7	-0.8	0.0	0.0	10.6	0.0	0.0	12.3
423	568123.50	4809399.72	308.90	0	DEN	A	79.3	6.4	0.0	0.0	0.0	53.9	0.7	-0.8	0.0	0.0	10.6	0.0	0.0	21.3
431	568123.27	4809399.22	308.90	0	DEN	A	79.3	7.1	0.0	0.0	0.0	53.9	0.7	-0.8	0.0	0.0	10.5	0.0	0.0	22.1
433	568123.08	4809398.79	308.90	0	DEN	A	79.3	5.4	0.0	0.0	0.0	53.9	0.7	-0.8	0.0	0.0	10.4	0.0	0.0	20.4
435	568122.91	4809398.44	308.90	0	DEN	A	79.3	5.8	0.0	0.0	0.0	53.9	0.7	-0.8	0.0	0.0	10.4	0.0	0.0	20.9
437	568122.77	4809398.11	308.90	0	DEN	A	79.3	4.9	0.0	0.0	0.0	54.0	0.7	-0.8	0.0	0.0	10.3	0.0	0.0	20.0
439	568122.64	4809397.84	308.90	0	DEN	A	79.3	4.7	0.0	0.0	0.0	54.0	0.7	-0.8	0.0	0.0	10.3	0.0	0.0	19.7
441	568122.52	4809397.57	308.90	0	DEN	A	79.3	4.7	0.0	0.0	0.0	54.0	0.7	-0.8	0.0	0.0	10.3	0.0	0.0	19.8

Area Source, ISO 9613, Name: "Loader", ID: "!05B!L_PR"																				
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)
442	568122.45	4809397.42	308.90	0	DEN	A	79.3	-3.5	0.0	0.0	0.0	54.0	0.7	-0.8	0.0	0.0	10.2	0.0	0.0	11.6
445	568122.42	4809397.33	308.90	0	DEN	A	79.3	1.9	0.0	0.0	0.0	54.0	0.7	-0.8	0.0	0.0	10.2	0.0	0.0	17.1
447	568122.30	4809397.08	308.90	0	DEN	A	79.3	6.4	0.0	0.0	0.0	54.0	0.7	-0.8	0.0	0.0	10.2	0.0	0.0	21.5
449	568122.17	4809396.79	308.90	0	DEN	A	79.3	3.9	0.0	0.0	0.0	54.0	0.7	-0.8	0.0	0.0	10.2	0.0	0.0	19.1
451	568122.10	4809396.63	308.90	0	DEN	A	79.3	1.2	0.0	0.0	0.0	54.0	0.7	-0.8	0.0	0.0	10.1	0.0	0.0	16.4
453	568121.97	4809396.32	308.90	0	DEN	A	79.3	7.9	0.0	0.0	0.0	54.1	0.7	-0.8	0.0	0.0	10.1	0.0	0.0	23.2
455	568121.82	4809395.99	308.90	0	DEN	A	79.3	3.1	0.0	0.0	0.0	54.1	0.7	-0.8	0.0	0.0	10.0	0.0	0.0	18.4
456	568121.75	4809395.84	308.90	0	DEN	A	79.3	2.1	0.0	0.0	0.0	54.1	0.7	-0.8	0.0	0.0	10.0	0.0	0.0	17.4
458	568121.64	4809395.58	308.90	0	DEN	A	79.3	6.9	0.0	0.0	0.0	54.1	0.7	-0.8	0.0	0.0	10.0	0.0	0.0	22.2
459	568121.54	4809395.35	308.90	0	DEN	A	79.3	0.7	0.0	0.0	0.0	54.1	0.7	-0.8	0.0	0.0	10.0	0.0	0.0	16.0
460	568121.49	4809395.25	308.90	0	DEN	A	79.3	1.7	0.0	0.0	0.0	54.1	0.7	-0.8	0.0	0.0	9.9	0.0	0.0	17.0
461	568121.39	4809395.02	308.90	0	DEN	A	79.3	6.6	0.0	0.0	0.0	54.1	0.7	-0.8	0.0	0.0	9.9	0.0	0.0	21.9
462	568121.31	4809394.82	308.90	0	DEN	A	79.3	-1.9	0.0	0.0	0.0	54.1	0.7	-0.8	0.0	0.0	9.9	0.0	0.0	13.5
463	568121.27	4809394.74	308.90	0	DEN	A	79.3	1.9	0.0	0.0	0.0	54.1	0.7	-0.8	0.0	0.0	9.9	0.0	0.0	17.2
465	568121.16	4809394.47	308.90	0	DEN	A	79.3	7.7	0.0	0.0	0.0	54.2	0.7	-0.8	0.0	0.0	9.8	0.0	0.0	23.1
466	568120.97	4809394.03	308.90	0	DEN	A	79.3	8.0	0.0	0.0	0.0	54.2	0.7	-0.8	0.0	0.0	9.8	0.0	0.0	23.4
467	568120.84	4809393.73	308.90	0	DEN	A	79.3	3.1	0.0	0.0	0.0	54.2	0.7	-0.8	0.0	0.0	9.7	0.0	0.0	18.6
469	568120.78	4809393.58	308.90	0	DEN	A	79.3	3.6	0.0	0.0	0.0	54.2	0.7	-0.8	0.0	0.0	9.7	0.0	0.0	19.1
470	568120.69	4809393.39	308.90	0	DEN	A	79.3	5.2	0.0	0.0	0.0	54.2	0.7	-0.8	0.0	0.0	9.7	0.0	0.0	20.7
471	568120.64	4809393.25	308.90	0	DEN	A	79.3	-1.2	0.0	0.0	0.0	54.2	0.7	-0.8	0.0	0.0	9.7	0.0	0.0	14.2
472	568120.59	4809393.15	308.90	0	DEN	A	79.3	3.1	0.0	0.0	0.0	54.2	0.7	-0.8	0.0	0.0	9.7	0.0	0.0	18.6
473	568120.40	4809392.69	308.90	0	DEN	A	79.3	10.8	0.0	0.0	0.0	54.2	0.8	-0.9	0.0	0.0	9.6	0.0	0.0	26.3
474	568120.18	4809392.16	308.90	0	DEN	A	79.3	5.9	0.0	0.0	0.0	54.3	0.8	-0.9	0.0	0.0	9.5	0.0	0.0	21.5
476	568120.08	4809391.94	308.90	0	DEN	A	79.3	4.9	0.0	0.0	0.0	54.3	0.8	-0.9	0.0	0.0	9.5	0.0	0.0	20.5
478	568119.70	4809391.02	308.90	0	DEN	A	79.3	14.2	0.0	0.0	0.0	54.3	0.8	-0.9	0.0	0.0	9.4	0.0	0.0	29.9
479	568119.34	4809390.14	308.90	0	DEN	A	79.3	3.9	0.0	0.0	0.0	54.4	0.8	-0.9	0.0	0.0	9.3	0.0	0.0	19.6
481	568119.20	4809389.80	308.90	0	DEN	A	79.3	9.7	0.0	0.0	0.0	54.4	0.8	-0.9	0.0	0.0	9.2	0.0	0.0	25.4
482	568119.07	4809389.47	308.90	0	DEN	A	79.3	2.7	0.0	0.0	0.0	54.4	0.8	-0.9	0.0	0.0	9.2	0.0	0.0	18.5
484	568118.84	4809388.91	308.90	0	DEN	A	79.3	12.6	0.0	0.0	0.0	54.4	0.8	-0.9	0.0	0.0	9.1	0.0	0.0	28.4
487	568118.51	4809388.09	308.90	0	DEN	A	79.3	10.6	0.0	0.0	0.0	54.5	0.8	-0.9	0.0	0.0	9.0	0.0	0.0	26.5
488	568118.20	4809388.08	308.90	0	DEN	A	79.3	8.5	0.0	0.0	0.0	54.5	0.8	-0.9	0.0	0.0	9.0	0.0	0.0	24.4
489	568117.93	4809388.53	308.90	0	DEN	A	79.3	4.7	0.0	0.0	0.0	54.4	0.8	-0.9	0.0	0.0	9.0	0.0	0.0	20.6
492	568117.74	4809388.84	308.90	0	DEN	A	79.3	5.8	0.0	0.0	0.0	54.4	0.8	-0.9	0.0	0.0	9.0	0.0	0.0	21.7
495	568117.43	4809389.33	308.90	0	DEN	A	79.3	8.3	0.0	0.0	0.0	54.4	0.8	-0.9	0.0	0.0	9.1	0.0	0.0	24.2
497	568117.12	4809389.83	308.90	0	DEN	A	79.3	5.6	0.0	0.0	0.0	54.4	0.8	-0.9	0.0	0.0	9.1	0.0	0.0	21.5
499	568116.22	4809391.26	308.90	0	DEN	A	79.3	13.8	0.0	0.0	0.0	54.3	0.8	-0.8	0.0	0.0	9.2	0.0	0.0	29.7
501	568115.35	4809392.63	308.90	0	DEN	A	79.3	-2.6	0.0	0.0	0.0	54.2	0.7	-0.8	0.0	0.0	9.3	0.0	0.0	13.3
503	568115.10	4809393.02	308.90	0	DEN	A	79.3	7.7	0.0	0.0	0.0	54.2	0.7	-0.8	0.0	0.0	9.3	0.0	0.0	23.5
505	568114.79	4809393.50	308.90	0	DEN	A	79.3	2.4	0.0	0.0	0.0	54.1	0.7	-0.8	0.0	0.0	9.4	0.0	0.0	18.3
507	568114.33	4809394.20	308.90	0	DEN	A	79.3	9.4	0.0	0.0	0.0	54.1	0.7	-0.8	0.0	0.0	9.4	0.0	0.0	25.2
512	568113.27	4809395.78	308.90	0	DEN	A	79.3	10.7	0.0	0.0	0.0	54.0	0.7	-0.8	0.0	0.0	9.6	0.0	0.0	26.5
514	568112.21	4809397.33	308.90	0	DEN	A	79.3	6.3	0.0	0.0	0.0	53.9	0.7	-0.8	0.0	0.0	9.7	0.0	0.0	22.1
517	568111.65	4809398.12	308.90	0	DEN	A	79.3	2.9	0.0	0.0	0.0	53.8	0.7	-0.8	0.0	0.0	9.7	0.0	0.0	18.7
519	568111.36	4809398.53	308.90	0	DEN	A	79.3	-1.3	0.0	0.0	0.0	53.8	0.7	-0.8	0.0	0.0	9.8	0.0	0.0	14.5
521	568111.06	4809398.95	308.90	0	DEN	A	79.3	2.0	0.0	0.0	0.0	53.7	0.7	-0.8	0.0	0.0	9.8	0.0	0.0	17.7
523	568110.55	4809399.66	308.90	0	DEN	A	79.3	1.5	0.0	0.0	0.0	53.7	0.7	-0.8	0.0	0.0	9.8	0.0	0.0	17.3

Point Source, ISO 9613, Name: "Dragline", ID: "!05B!DL_PR"																				
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)
611	568160.34	4809401.80	309.00	0	D	A	112.1	0.0	-1.2	0.0	0.0	54.6	0.8	-0.2	0.0	0.0	9.0	0.0	0.0	46.6

Line Source, ISO 9613, Name: "Haul Truck", ID: "!05B!HT_PR"																				
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)
692	568079.82	4809328.71	308.70	0	DEN	A	67.0	5.3	0.0	0.0	0.0	57.2	1.1	-1.0	0.0	0.0	4.7	0.0	0.0	10.2
735	568061.42	4809323.03	308.70	0	DEN	A	67.0	6.9	0.0	0.0	0.0	57.5	1.1	-1.1	0.0	0.0	4.7	0.0	0.0	11.6
785	568037.16	4809315.52	308.70	0	DEN	A	67.0	6.9	0.0	0.0	0.0	58.0	1.2	-1.1	0.0	0.0	4.7	0.0	0.0	11.0
813	568022.56	4809311.01	308.70	0	DEN	A	67.0	7.6	0.0	0.0	0.0	58.3	1.2	-1.1	0.0	0.0	4.7	0.0	0.0	11.5
838	568010.69	4809307.34	308.70	0	DEN	A	67.0	6.4	0.0	0.0	0.0	58.6	1.2	-1.1	0.0	0.0	4.6	0.0	0.0	10.1
930	567981.20	4809298.22	308.70	0	DEN	A	67.0	7.7	0.0	0.0	0.0	59.2	1.3	-1.1	0.0	0.0	4.4	0.0	0.0	10.9
1459	567973.39	4809290.80	308.70	0	DEN	A	67.0	6.8	0.0	0.0	0.0	59.6	1.4	-1.3	0.0	0.0	4.1	0.0	0.0	10.1
1462	567978.59	4809292.37	308.70	0	DEN	A	67.0	7.8	0.0	0.0	0.0	59.4	1.3	-1.3	0.0	0.0	4.3	0.0	0.0	11.0

Line Source, ISO 9613, Name: "Haul Truck", ID: "!05B!HT_PR"																				
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)
1515	568008.75	4809301.51	308.70	0	DEN	A	67.0	6.5	0.0	0.0	0.0	58.8	1.3	-1.2	0.0	0.0	4.7	0.0	0.0	10.1
1531	568020.47	4809305.06	308.70	0	DEN	A	67.0	8.3	0.0	0.0	0.0	58.5	1.2	-1.2	0.0	0.0	4.7	0.0	0.0	12.1
1551	568035.85	4809309.71	308.70	0	DEN	A	67.0	7.0	0.0	0.0	0.0	58.2	1.2	-1.2	0.0	0.0	4.7	0.0	0.0	11.0
1597	568060.43	4809317.16	308.70	0	DEN	A	67.0	6.4	0.0	0.0	0.0	57.8	1.1	-1.2	0.0	0.0	4.7	0.0	0.0	11.0
2294	567928.52	4809329.39	308.70	0	DEN	A	67.0	9.4	0.0	0.0	0.0	59.2	1.3	-0.7	0.0	0.0	4.5	0.0	0.0	12.0
2515	567930.64	4809331.90	308.70	0	DEN	A	67.0	9.2	0.0	0.0	0.0	59.1	1.3	-0.7	0.0	0.0	4.5	0.0	0.0	11.9
2642	567914.07	4809386.81	308.70	0	DEN	A	67.0	6.2	0.0	0.0	0.0	58.1	1.2	-0.6	0.0	0.0	4.5	0.0	0.0	10.0
2725	567904.39	4809416.71	308.70	0	DEN	A	67.0	9.1	0.0	0.0	0.0	57.7	1.1	-0.6	0.0	0.0	4.5	0.0	0.0	13.3
2759	567900.78	4809427.73	308.70	0	DEN	A	67.0	7.0	0.0	0.0	0.0	57.6	1.1	-0.6	0.0	0.0	4.5	0.0	0.0	11.3
2793	567896.33	4809441.34	308.70	0	DEN	A	67.0	7.7	0.0	0.0	0.0	57.5	1.1	-0.6	0.0	0.0	4.6	0.0	0.0	12.1
2810	567893.38	4809450.35	308.70	0	DEN	A	67.0	6.6	0.0	0.0	0.0	57.4	1.1	-0.6	0.0	0.0	4.6	0.0	0.0	11.0
2931	567891.21	4809449.41	308.70	0	DEN	A	67.0	6.6	0.0	0.0	0.0	57.5	1.1	-0.6	0.0	0.0	4.6	0.0	0.0	11.0
2951	567893.94	4809440.72	308.70	0	DEN	A	67.0	7.0	0.0	0.0	0.0	57.6	1.1	-0.6	0.0	0.0	4.6	0.0	0.0	11.3
2984	567898.44	4809426.40	308.70	0	DEN	A	67.0	7.1	0.0	0.0	0.0	57.7	1.1	-0.6	0.0	0.0	4.6	0.0	0.0	11.3
3003	567901.83	4809415.59	308.70	0	DEN	A	67.0	8.7	0.0	0.0	0.0	57.8	1.2	-0.6	0.0	0.0	4.6	0.0	0.0	12.7
3118	567872.69	4809510.29	308.20	0	DEN	A	67.0	8.2	0.0	0.0	0.0	57.6	1.1	0.1	0.0	0.0	5.5	0.0	0.0	10.8
3217	567876.71	4809510.73	308.20	0	DEN	A	67.0	8.2	0.0	0.0	0.0	57.5	1.1	0.1	0.0	0.0	5.9	0.0	0.0	10.6
3337	567882.82	4809476.12	308.70	0	DEN	A	67.0	1.3	0.0	0.0	0.0	57.5	1.1	-0.6	0.0	0.0	0.0	0.0	0.0	10.2
3381	567854.72	4809595.98	309.55	0	DEN	A	67.0	2.2	0.0	0.0	0.0	58.6	1.2	-1.2	0.0	0.0	0.0	0.0	0.0	10.6
3476	567859.80	4809594.28	308.75	0	DEN	A	67.0	1.8	0.0	0.0	0.0	58.4	1.2	-1.2	0.0	0.0	0.0	0.0	0.0	10.3
3481	567859.33	4809595.86	308.75	0	DEN	A	67.0	2.6	0.0	0.0	0.0	58.4	1.2	-1.2	0.0	0.0	0.0	0.0	0.0	11.1
3485	567858.87	4809597.39	308.76	0	DEN	A	67.0	1.4	0.0	0.0	0.0	58.5	1.2	-1.3	0.0	0.0	0.0	0.0	0.0	10.0
3491	567858.43	4809598.90	308.77	0	DEN	A	67.0	2.4	0.0	0.0	0.0	58.5	1.2	-1.3	0.0	0.0	0.0	0.0	0.0	11.0
3497	567857.94	4809600.55	308.78	0	DEN	A	67.0	2.3	0.0	0.0	0.0	58.5	1.2	-1.4	0.0	0.0	0.0	0.0	0.0	10.9
3687	567858.64	4809582.87	309.19	0	DEN	A	67.0	2.3	0.0	0.0	0.0	58.3	1.2	-0.7	0.0	0.0	0.0	0.0	0.0	10.5
3723	567880.03	4809485.00	313.14	0	DEN	A	67.0	4.3	0.0	0.0	0.0	57.5	1.1	-0.4	0.0	0.0	0.0	0.0	0.0	13.0
3727	567880.30	4809484.15	315.29	0	DEN	A	67.0	3.0	0.0	0.0	0.0	57.5	1.1	-0.4	0.0	0.0	0.0	0.0	0.0	11.7
3750	567856.97	4809588.48	309.43	0	DEN	A	67.0	2.2	0.0	0.0	0.0	58.5	1.2	-0.9	0.0	0.0	0.0	0.0	0.0	10.4
3760	567857.92	4809585.30	309.27	0	DEN	A	67.0	4.1	0.0	0.0	0.0	58.4	1.2	-0.8	0.0	0.0	0.0	0.0	0.0	12.3
3906	567866.51	4809556.08	309.30	0	DEN	A	67.0	2.6	0.0	0.0	0.0	57.9	1.2	0.2	0.0	0.0	0.0	0.0	0.0	10.3
4219	567861.72	4809572.59	309.13	0	DEN	A	67.0	3.1	0.0	0.0	0.0	58.2	1.2	-0.3	0.0	0.0	0.0	0.0	0.0	11.0
4254	567861.02	4809574.94	309.14	0	DEN	A	67.0	4.0	0.0	0.0	0.0	58.2	1.2	-0.4	0.0	0.0	0.0	0.0	0.0	12.0
4409	567881.74	4809485.93	313.03	0	DEN	A	67.0	4.6	0.0	0.0	0.0	57.4	1.1	-0.4	0.0	0.0	0.0	0.0	0.0	13.4
4536	567873.00	4809540.02	308.89	0	DEN	A	67.0	2.1	0.0	0.0	0.0	57.6	1.1	0.2	0.0	0.0	0.0	0.0	0.0	10.1
4680	567869.38	4809534.87	309.68	0	DEN	A	67.0	3.0	0.0	0.0	0.0	57.7	1.1	0.2	0.0	0.0	0.0	0.0	0.0	11.0
4709	567849.84	4809612.31	309.94	0	DEN	A	67.0	2.3	0.0	0.0	0.0	58.9	1.3	-1.4	0.0	0.0	0.0	0.0	0.0	10.5
4968	567866.57	4809571.47	308.55	0	DEN	A	67.0	1.9	0.0	0.0	0.0	58.0	1.2	-0.3	0.0	0.0	0.0	0.0	0.0	10.1
5054	567882.52	4809483.53	313.86	0	DEN	A	67.0	3.6	0.0	0.0	0.0	57.4	1.1	-0.4	0.0	0.0	0.0	0.0	0.0	12.5
5079	567883.05	4809481.93	310.89	0	DEN	A	67.0	3.7	0.0	0.0	0.0	57.4	1.1	-0.5	0.0	0.0	0.0	0.0	0.0	12.7
5098	567883.58	4809480.29	309.62	0	DEN	A	67.0	3.3	0.0	0.0	0.0	57.4	1.1	-0.6	0.0	0.0	0.0	0.0	0.0	12.3
5305	567882.19	4809478.12	308.70	0	DEN	A	67.0	1.4	0.0	0.0	0.0	57.5	1.1	-0.6	0.0	0.0	0.0	0.0	0.0	10.4
5390	567880.95	4809482.06	313.18	0	DEN	A	67.0	3.2	0.0	0.0	0.0	57.5	1.1	-0.5	0.0	0.0	0.0	0.0	0.0	12.0
5460	567847.07	4809621.55	309.93	0	DEN	A	67.0	2.3	0.0	0.0	0.0	59.1	1.3	-1.5	0.0	0.0	0.0	0.0	0.0	10.4
5556	567881.40	4809480.65	310.58	0	DEN	A	67.0	3.1	0.0	0.0	0.0	57.5	1.1	-0.5	0.0	0.0	0.0	0.0	0.0	11.9
5609	567881.83	4809479.28	309.56	0	DEN	A	67.0	3.0	0.0	0.0	0.0	57.5	1.1	-0.6	0.0	0.0	0.0	0.0	0.0	12.0
5711	567882.04	4809484.99	315.20	0	DEN	A	67.0	2.8	0.0	0.0	0.0	57.4	1.1	-0.4	0.0	0.0	0.0	0.0	0.0	11.6
5803	567861.05	4809590.06	308.75	0	DEN	A	67.0	3.3	0.0	0.0	0.0	58.3	1.2	-1.0	0.0	0.0	0.0	0.0	0.0	11.8
5956	567883.16	4809481.60	310.49	0	DEN	A	67.0	2.4	0.0	0.0	0.0	57.4	1.1	-0.5	0.0	0.0	0.0	0.0	0.0	11.3
6051	567871.15	4809554.67	308.79	0	DEN	A	67.0	2.6	0.0	0.0	0.0	57.7	1.1	0.2	0.0	0.0	0.0	0.0	0.0	10.4
6214	567856.53	4809605.27	308.93	0	DEN	A	67.0	1.6	0.0	0.0	0.0	58.6	1.2	-1.5	0.0	0.0	0.0	0.0	0.0	10.1
6354	567832.24	4809671.16	310.55	0	DEN	A	67.0	4.6	0.0	0.0	0.0	60.2	1.4	-2.0	0.0	0.0	0.0	0.0	0.0	11.9
6564	567883.35	4809481.00	310.04	0	DEN	A	67.0	1.7	0.0	0.0	0.0	57.4	1.1	-0.5	0.0	0.0	0.0	0.0	0.0	10.7
6687	567830.83	4809691.83	310.07	0	DEN	A	67.0	3.0	0.0	0.0	0.0	60.6	1.5	-2.3	0.0	0.0	0.0	0.0	0.0	10.2
6713	567881.49	4809480.37	310.24	0	DEN	A	67.0	1.7	0.0	0.0	0.0	57.5	1.1	-0.5	0.0	0.0	0.0	0.0	0.0	10.6
6814	567855.91	4809607.36	308.93	0	DEN	A	67.0	1.9	0.0	0.0	0.0	58.7	1.2	-1.5	0.0	0.0	0.0	0.0	0.0	10.4
6900	567880.71	4809482.85	314.72	0	DEN	A	67.0	1.5	0.0	0.0	0.0	57.5	1.1	-0.4	0.0	0.0	0.0	0.0	0.0	10.2
6921	567851.26	4809607.58	309.82	0	DEN	A	67.0	2.8	0.0	0.0	0.0	58.8	1.3	-1.4	0.0	0.0	0.0	0.0	0.0	11.0
6970	567848.31	4809617.43	309.95	0	DEN	A	67.0	2.9	0.0	0.0	0.0	59.0	1.3	-1.5	0.0	0.0	0.0	0.0	0.0	11.1
7039	567864.72	4809577.71	308.46	0	DEN	A	67.0	1.9	0.0	0.0	0.0	58.1	1.2	-0.6	0.0	0.0	0.0	0.0	0.0	10.2
7118	567852.62	4809603.01	309.66	0	DEN	A	67.0	2.5	0.0	0.0	0.0	58.7	1.3	-1.3	0.0	0.0	0.0	0.0	0.0	10.8
8868	567829.61	4809695.94	310.30	0	DEN	A	67.0	3.0	0.0	0.0	0.0	60.7	1.5	-2.3	0.0	0.0	0.0	0.0	0.0	10.1

APPENDIX D

Statement of Qualifications

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 – PROJECT WITH PORTS

Cement Plant
Picton, Ontario, Canada

Responsible for preparing and overseeing a noise study of a cement manufacturing plant in Picton, Ontario that included a port facility. Golder was responsible for source-specific noise measurements and short-term noise monitoring. The assessment included the quantification of noise emissions associated with a port. The assessment required the development of a multi-year, multi-phase, Noise Abatement Action Plan for the facility to be able to achieve MECP noise limits.

Meliadine
Nunavut, Canada

Retained to carry out a noise assessment in support local permitting and an Environmental Assessment for a proposed precious metals mine in Nunavut, Canada. The noise study included the assessment of the mining/processing operations, transportation (air and ground) and port facility in Rankin Inlet. Potential noise impacts were assessed against applicable limits, and noise controls (where required) and an environmental monitoring program were developed.

Noise Study - Peru
Melchorta, Peru

Retained by Compania Operadora de LNG del Peru (COLP) to carry out a noise assessment of the Melchrita Liquefaction Process Train, which included an export terminal port, to identify significant noise sources on-site and determine whether noise mitigation was feasible. A noise mitigation program was developed, which addressed significant noise sources and would reduce noise levels within the plant to a levels where the auditory emergency notification system could be perceived by operators.

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.

Noise Impact Assessment
Manitoulin, 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 MNRF.

Algoma Steel
Sault Ste. Marie, Ontario

Retained to perform a facility wide noise survey for Algoma Steel as required for their ECA application. Long-term noise monitoring was used to establish the appropriate ambient noise levels for the surrounding residential receptors. The assessment included the quantification of noise emissions associated with a port.

PROJECT EXPERIENCE – MINING

Morelos - Media Luna Cocula, Guerrero State, Mexico	The proposed project consists of a new underground gold, copper and silver mine development in Mexico. To date, Golder has completed a gap analysis to identify the necessary information needs and baseline data requirements that would support both the Mexican permitting and approvals (MIA), as well as any future Environmental and Social Impact Assessment in accordance with the International Finance Corporation's Performance Standards. Participated in the analysis of potential gaps, the identification of a planned course of action to address the gaps and the development of the report for the noise, vibration and light disciplines
Morelos - El Limon Cocula, Guerrero State, Mexico	Retained to carry out a noise, vibration and light assessment in support local permitting and an SEIA for a proposed precious metals mine in Mexico. The noise, vibration and light studies included the assessment of the mining/processing operations, and transportation facilities. Potential impacts were assessed against applicable limits, and controls (where required) and an environmental monitoring program were developed.
Glencore - Raglan Nunavik, Quebec, Canada	Retained by Glencore to complete a light assessment in support local permitting requirements. The assessment was completed in response to the regulators request to confirm light emissions onto the Pingualuit National Park (the Park) were within applicable limits. The assessment involved a field program, to quantify all on-site emissions and levels at the Park, and detailed modelling to confirm the source of the measured levels.
Matamec - Témiscamingue Témiscamingue, Québec, Canada	Retained to carry out a baseline noise assessment in support local permitting and an Environmental Assessment for a proposed mine in Témiscamingue, Québec, Canada. The noise study included areas potentially expected to be affected by the mining/processing operations, and transportation activities. Monitored noise levels were compared against applicable limits.
Meliadine Nunavut, Canada	Retained to carry out a noise assessment in support local permitting and an Environmental Assessment for a proposed precious metals mine in Nunavut, Canada. The noise study included the assessment of the mining/processing operations, transportation (air and ground) and port facility in Rankin Inlet. Potential noise impacts were assessed against applicable limits, and noise controls (where required) and an environmental monitoring program were developed.
Various Various, Peru	The projects consisted of various; expansion to existing mines and new mines throughout Peru. The project involved the completion of baseline studies (where appropriate) and an EIA for projects across Peru in accordance applicable regulating authorities. Was the Noise and Vibration Lead for assessments in support of the numerous EIAs. Projects ranged from power plants to resource and precious metal mines

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 – POWER AND ENERGY SECTOR

Environmental Assessment
Tiverton, Ontario

Preparing an environmental noise impact assessment for a proposed 4000 MW New Build Project at the Bruce Nuclear Power Facility. Noise predictions will be carried out to determine the noise impact over the life of the project. The noise assessment will include construction and operations. Acoustic Assessment Reports will be prepared in support of permitting with the Ministry of the Environment, which will include the design and recommendation of required noise controls to ensure noise impacts on neighbouring receptors during operations were within MOE guideline limits.

Environmental Assessment
Sarnia, Ontario

Prepared an environmental noise impact assessment for a proposed 570 MW Natural Gas Cogeneration facility. Noise predictions were carried out to determine the noise impact over the life project. The noise assessment included construction and operations. Acoustic Assessment Reports were prepared in support of permitting with the Ministry of the Environment, which included the design and recommendation of required noise controls to ensure noise impacts on neighbouring receptors during operations were within MOE guideline limits.

Environmental Assessment
York Region, Ontario

Preparing an environmental noise impact assessment for a proposed 400 MW Natural Gas Peaking Power Facility. Noise predictions were carried out to determine the noise impact over the life of the project. The noise assessment included construction and operations. Acoustic Assessment Reports will be prepared in support of permitting with the Ministry of the Environment, which included the design and recommendation of required noise controls to ensure noise impacts on neighbouring receptors during operations were within MOE guideline limits.

Renewable Energy Application - Noise Assessment Nanticoke, Ontario	Responsible for the preparation of a noise study report for a proposed Windfarm with a rated capacity of approximately 130 MW. Noise predictions were carried out to determine the noise impact over the life project. The Nosie Study Report was prepared in support of a Renewable Energy Application through the Ministry of the Environment, which included the assistance in optimizing the turbine layout to help lower project noise levels.
Noise Impact Assessment Adelaide, Ontario	Prepared a Noise Impact Assessment for a proposed wind farm in Adelaide Ontario, consisting of forty (40) 1.5 MW wind turbines. Noise predictions were carried out to determine the noise impact of the project at participating and non-participating receptors.
Environmental Assessment Bradford, Ontario	Prepared an environmental noise impact assessment for a proposed Natural Gas Peak Power facility. Noise predictions were carried out to determine the noise impact over the life project. The noise assessment included construction and operations. An Acoustic Assessment Report was prepared in support of permitting with the Ministry of the Environment, which included the design and recommendation of required noise controls to ensure noise impacts on neighbouring receptors during operations were within MOE guideline limits.
Boiler Tube Vibration Burlington, Ontario	Carried out vibration measurements and analysis for IST on boiler tube bundles to determine whether or not tube resonant frequencies excited by vortex shedding of steam passing over the tubes could be reduced with the installation of an agitator.
Monitoring and Calibration of Active Noise Cancellation Ottawa, Ontario	Monitored and re-calibrated an active noise cancellation system fitted at a Trans-Alta power generation facility in Ottawa, Ontario.
Noise Control Design Hartford, Connecticut	Designed noise controls to ensure a sub-megawatt stationary multi-fuel fuel cell unit meets designed noises limit for application in Japan.
Environmental Noise Impact and Site Selection Kitchener, Ontario	Carried out an Environmental Noise Impact Assessment for a proposed power generation and transformer station for Northland Power. The noise impact assessment involved establishing the ambient noise environment at various sites, which would be impacted with the installation of a proposed power generation and transformer station
Environmental Noise Impact Assessment Various, Ontario	Predicted the noise impact of proposed emergency back-up power generator. Designed and recommended required noise controls to ensure noise impacts on neighbouring receptors during periodic testing are within MOE guideline limits. These include projects across Ontario and one in Calgary Alberta
Noise and Vibration Impact Assessment Toronto, Ontario	Retained to assess and mitigate the impact of four (4) 1200 kW emergency diesel back-up generators on receptors outside the building, and receptors within the building, which included the CARLU center in Toronto. Noise and vibration controls were designed and recommended.

Heartland Generating Station Alberta, Canada	Retained by ATCO Power to carry out a Noise Impact Assessment for a proposed Combined Cycle Gas Turbine Generating Station facility within the Alberta Industrial Heartland. Potential noise impacts were assessed against the Alberta Utilities Commission Rule 012: 'Noise Control' regulation.
Fenix Power Plant Peru, Peru	Retained to carry out a noise assessment in support local permitting and an ESIA for a proposed single cycle natural gas power plant in Peru in close proximity to sensitive points of reception. Potential noise impacts were assessed against applicable limits and noise controls were developed.

PROJECT EXPERIENCE – OIL & GAS

TransCanada PipeLines - Vaughan Mainline Expansion Ontario, Canada	Retained to carry out a noise assessment in support of the preparation of a National Energy Board Section 58 application, related permitting and bylaw exemption support of TransCanada's proposed expansion of their Canadian Mainline in the Greater Toronto Area in Ontario, consisting of an approximately 12 km natural gas pipeline. Support also included carrying out vibration monitoring during construction
TransCanada PipeLines - King's North Connection Ontario, Canada	Retained to carry out a noise assessment in support of the preparation of a National Energy Board Section 58 application, related permitting and bylaw exemption support of TransCanada's proposed expansion of their Canadian Mainline in the Greater Toronto Area in Ontario, consisting of an approximately 11 km natural gas pipeline. Support also included carrying out noise and vibration monitoring during construction, and providing conceptual control design.
TransCanada PipeLines - Eastern Mainline Pipeline Ontario, Canada	Retained to carry out a noise and light assessment in support of the preparation of a National Energy Board Section 52 application in support of TransCanada's proposed expansion of their Canadian Mainline in the Eastern Triangle region of Ontario, consisting of an approximately 356 km natural gas pipeline and 6 compressor stations along an existing pipeline corridor paralleling the 401 Highway between the Cornwall area southwest to the Greater Toronto Area.
TransCanada PipeLines - Various Compressor Stations Ontario, Canada	Retained by TransCanada's compression design team (over a number of projects) to support them and/or their external design consultants to provide detailed noise design services for proposed compressor station upgrades. The support included providing complete noise engineering design services for a number of compressor stations within Ontario.
TransCanada PipeLines - Parkway West. Ontario, Canada	Retained to provide noise services in support of the preparation of a National Energy Board Section 58 application, related permitting and bylaw exemption support of TransCanada's proposed project to construct and operate a pipeline between Union Gas Limited's (Union Gas) neighbouring Parkway West Compressor Station and TransCanada's existing mainline

TransCanada PipeLines- Greater Golden Horseshoe Project. Ontario, Canada	Retained to provide noise services in support of the preparation of a National Energy Board Section 58 application, related permitting and bylaw exemption support of TransCanada's proposed project upgrade the Ancaster and Douglastown Compressor Stations, the Mainline Valve Regulating Station, and the Parkway Belt, Douglastown Border and Niagara Border Meter Stations all along TransCanada Mainline between Fort Erie and Mississauga.
TransCanada PipeLines - Cacunna – Energy East Project Quebec, Canada	Retained to complete a noise assessment of proposed construction activities associated with a proposed natural gas port. The noise assessment required the establishment of baseline conditions and prediction of expected noise levels from construction activities at off-site points of reception.
TransCanada PipeLines - Otter Lake Compressor Station Alberta , Canada	A noise assessment was carried out to assess the construction and operation of a compressor, which is located northeast of the Town of Peace River, Alberta, for a National Energy Board 58 Application
Noise Study Melchorita, Peru	Retained by Compania Operadora de LNG del Peru (COLP) to carry out a noise assessment of the Melchrita Liquefaction Process Train, which included an export terminal port, to identify significant noise sources on-site and determine whether noise mitigation was feasible. A noise mitigation program was developed, which addressed significant noise sources and would reduce noise levels within the plant to a levels where the auditory emergency notification system could be perceived by operators.
Noise Impact Assessment Bowmanville, Ontario	Retained by TransCanada PipeLines Limited to carry out a noise impact assessment as a technical report as part of TransCanada's application to the National Energy Board (NEB) for the proposed upgrade to the Bowmanville Compressor Station. The proposed equipment was assessed and noise mitigation was provided.
TransCanada PipeLines Carmon Creek Pipeline Alberta, Canada	A noise assessment was carried out to assess the construction and operation activities of a pipeline, which is located northeast of the Town of Peace River, Alberta, for a National Energy Board (NEB) 52 Application
Noise Impact Audits Various Sites, Ontario, Quebec	Retained by Trans-Canada Pipelines (TCPL) to perform site surveys of various remote pumping stations. To determine the noise impact on neighbouring receptors. The results of the Audits were compared to historical Audits to ensure that the acoustic emissions of the facility have not changed significantly.
Acoustic Assessment Paris, Ontario	Retained by Sun Canadian Pipelines (SCPL) to perform an Acoustic Assessment of an existing pumping facility for permitting applications with MOE. The Acoustic Assessment included an assessment of proposed equipment as part of an expansion project. A report was prepared in support of permitting with the Ministry of the Environment, which included the design and recommendation of required noise controls to ensure noise impacts on neighbouring receptors during operations were within MOE guideline limits. As the project design develops, will be taking an active role in the noise control designs to ensure MOE requirements are realized and SCPL's design criteria met.

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 – MANUFACTURING/DISTRIBUTION SECTOR

Colacem
L'Orignal, Ontario

Retained by Colacem Canada Inc. to be responsible for preparing an AAR for the proposed new Portland cement manufacturing facility. Was responsible for providing design input to help demonstrate the site could operate in compliance with MOECC noise limits.

Lehigh
Picton, Ontario

Responsible for preparing and overseeing a noise study of a cement manufacturing plant in Picton, Ontario that included a port facility. Golder was responsible for source-specific noise measurements and short-term noise monitoring. The assessment included the quantification of noise emissions associated with a port. The assessment required the development of a multi-year, multi-phase, Noise Abatement Action Plan for the facility to be able to achieve MECP noise limits.

Sanofi Pasteur
Toronto, Ontario

Retained by Sanofi Pasteur to be responsible for overseeing the site-wide MOECC ECA. Was responsible for preparing the AAR and overseeing the Noise Abatement implementation team to ensure the site was in compliance with MOE noise limits.

Acoustic Assessments
Various, Ontario

Responsible for preparing and overseeing acoustic assessments of numerous sites manufacturing facilities throughout Ontario, which 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. Liaison and negotiations with the MOE review engineers were carried out when required.

Acoustic Assessments
Various, Quebec

Responsible for preparing and overseeing noise studies of numerous sites manufacturing facilities throughout Quebec, which involved site specific noise measurements and modelling in order to assess compliance with MDDELCC Guidelines. Where required, noise mitigation was provided and designed to ensure compliance. Liaison and negotiations with the MDDELCC staff were carried out when required. Clients include Saputo, and Parmalat.

Acoustic Audit
Wingham, Ontario

Performed an acoustic audit of the Wescast Industries Auto Parts Machining Plant. Noise measurements were taken of all on-site noise sources in order to establish compliance with MOE Guidelines. Identified noise sources requiring mitigation and specified the appropriate noise control measures.

Acoustic Audit
Ingersoll, Ontario

Performed an acoustic audit of the Ingersoll Fasteners Plant. Noise measurements were taken of all on-site noise sources in order to establish compliance with MOE Guidelines. Identified noise sources requiring mitigation and specified the appropriate noise control measures.

Noise Survey & Acoustic Audit
Cambridge, Ontario

Retained to perform a noise survey and acoustic audit of the Loblaws Distribution Facility. Established the background noise levels at the nearest residential receptors and performed noise impact predictions based on source measurements.

Impulse Noise
Cambridge, Ontario

Responsible for the measurement of impulse noise generated by truck marshalling events for the Loblaws Distribution facility. Measurements were used to determine whether or not the Loblaws Distribution facility was within the MOE guidelines for impulse noise at the nearest residential receptor locations.

Acoustic Audit
Trent, Ontario

Performed an acoustic audit of the Quaker Trenton Plant for an application for a Certificate of Approval (CofA). Noise measurements were taken of all on-site noise sources in order to establish compliance with MOE Guidelines. Identified noise sources requiring mitigation and specified the appropriate noise control measures.

Acoustic/Vibration Audit
Port Robinson, Ontario

Performed an acoustic and vibration audit of Demshe Products stamping plant. Noise and vibration measurements were taken of all on-site noise sources and at residential receptors in the vicinity in order to establish compliance with MOE Guidelines. Identified noise sources requiring mitigation and specified the appropriate noise control measures.

Noise Survey & Acoustic Audit
Woodbridge, Ontario

Retained to perform a noise survey and acoustic audit of the Woodbridge Foam Facility. Established the background noise levels at the nearest residential receptors and performed noise impact predictions based on source measurements. Based on these predictions, offending noise sources were identified and noise control measures were specified accordingly.

Noise/Vibration Audit
Sarnia, Ontario

Performed an internal noise and vibration audit of a Woodbridge Foam manufacturing facility. The measured levels were compared to OSHA guidelines and various international (ISO) standards. Noise and vibration controls were recommended.

Noise Control Design
Toronto, Ontario

Measured emission noise levels on an air handling unit, and designed a silencer for the Air handling unit manufacturer. Performance of the installed silencer was verified.

Vibration Analysis
Shelburne, Ontario

Performed intensive vibration studies to qualify a state-of-the-art load and acceleration transducer setup for Johnson Controls for the active control of automotive airbag deployment.

PROJECT EXPERIENCE – IRON AND STEEL

Environmental Noise Studies
Ottawa area, Ontario

Responsible for preparing and overseeing acoustic assessments for a steel mill in eastern Ontario, which involved site specific noise measurements and modelling in order to assess compliance with MOE Guidelines. Noise mitigation support was provided and designed to ensure compliance. Liaison and negotiations with the MOE review engineers were carried out as part of the permitting efforts for the site

Environmental Noise Survey
Sault Ste. Marie, Ontario

Retained to perform a facility wide noise survey for Algoma Steel as required for their Certificate of Approval (Air) application. Long-term noise monitoring was used to establish the appropriate ambient noise levels for the surrounding residential receptors.

PROJECT EXPERIENCE – TRANSPORTATION

Noise Impact Study - Third Crossing - Cataraqui River Kingston, Ontario	Golder was retained by the City of Kingston, through JLR to assess the potential environmental noise impact of the proposed third crossing of the Cataraqui River to the atmosphere, specifically considering human receptors. Golder identified that noise mitigation is required for certain locations in the vicinity of the Project.
Environmental Noise Studies Brampton, Ontario	Retained to carry out a noise assessment in support of a Municipal Class Environmental Assessment for Airport Road (Braydon Blvd to Countryside Road) in Peel Region. Golder will support with the alternative assessment. The noise assessment will be carried out in general accordance with MOECC/MTO and the City's Noise Wall retrofit Policy guidelines which form the basis for the City's requirements.
Noise and Vibration Assessment Montreal, Quebec	Retained to carry out a noise and vibration assessment to identify the potential noise and vibration levels of a proposed LRT project in Montreal, Quebec. The study included the establishment of existing levels (without the LRT), and establish expected future levels (with the LRT) on sensitive receivers, which included a state of the art movie production studio.
On-Board Sound Intensity (OBSI Varios, Ontario	Retained to complete OBSI assessments for various road sections in central and eastern Ontario. Work was completed under the MTO Assignment No. 4013-E-0030. Sections included recently groved sections along Hwys 115, 417, 410 and 401.
Environmental Noise Studies York, Ontario	Retained to carry out a noise assessment in support of a Municipal Class Environmental Assessment for Teston Road (Pine Valley to Weston Road) in York Region. Golder supported with the alternative assessment. The noise assessment will be carried out in general accordance with MOECC/MTO guidelines which form the basis for the Region's requirements.
Environmental Noise Studies York, Ontario	Retained to carry out a noise assessment in support of a Municipal Class Environmental Assessment for Portage Road (Jane Street to Credit Stone) in York Region. The noise assessment was carried out in general accordance with MOECC/MTO guidelines which form the basis for the Region's requirements.
West Toronto Diamond (WTD) Toronto, Ontario, Canada	Retained on behalf of Go/Metrolinx to complete a noise and vibration assessment of the WTD Grade Separation Project. Golder was responsible to assess baseline conditions, monitor construction activities, support in the development of best practices and mitigation plans and provide expert advice in relation to noise and vibration.
Environmental Noise Studies Regina, Saskatchewan, Canada	Retained by City of Regina to undertake a noise study of significant roadways within the City of Regina limits to identify locations where noise mitigation is warranted. The studies will identify locations and will provide recommendations as to the appropriate mitigation methods.

Environmental Noise Studies
Innisfil, Ontario

Was the senior acoustics engineer for the noise assessment in support of a Municipal Class Environmental Assessment for 6th Line (County Road 27 to St. John's Road) in the Town of Innisfil. The noise assessment will be in general accordance with MOECC/MTO guidelines which form the basis for the Region's requirements.

Environmental Noise Studies
Durham, Ontario

Was the senior acoustics engineer for the noise assessment in support of a Class Environmental Assessment for Regional Road #57, from Baseline Road to Nash Road in the Municipality of Clarington in the Region of Durham, Ontario. In their Noise Policy, the Region of Durham adopted the MOECC/MTO guidelines. The noise assessment predicted future noise levels and identified noise barrier requirements for the entire corridor.

Environmental Noise Studies
Eastern Region, Ontario

Was the noise/vibration lead on a project for the MTO, which required the assessment of potential noise and vibration impacts from activities associated with the redesign of three (3) intersections in eastern Ontario. The studies were designed to; establish existing conditions and assess potential noise and vibration impacts from construction and operational activities associated with the proposed project.

Environmental Noise Studies
Eastern Region, Ontario

Retained by Ministry of Transportation (MTO) to undertake noise studies from various road re-surfacing techniques in the MTO's Eastern Region. The studies aimed to quantify and compare the noise levels from vehicle tire and road surface interaction for various road surfacing techniques.

In-Vehicle Noise Studies
Eastern Region, Ontario

Retained by Ministry of Transportation (MTO) to undertake noise studies from various road re-surfacing techniques in the MTO's Eastern Region. The studies aimed to quantify and compare the noise levels in the vehicle from vehicle tire and road surface interaction for various road surfacing techniques.

Road/Rail Noise Assessment
Various, Ontario

As part of the preparation of numerous noise impact statements required for proposed residential development projects, road and rail noise was assessed according to MOE protocol to ensure that the noise impacts met the MOE prescribed noise limits. Where noise limits were exceeded, noise mitigation was designed. Mitigation involved the design of noise barriers, selection for appropriate window glazings and design of wall constructions.

Road Noise Assessments
Niagara Region, Ontario

Part of a team contracted to the MTO to carry out an assessment of proposed rehabilitation to MTO roadways in the Niagara Region, Ontario. The studies were designed to; establish existing conditions and assess potential noise and vibration impacts from construction activities associated with the proposed project.

Noise/Vibration Assessments
Central Ontario

Was the noise/vibration lead on a project for the MTO, which required the assessment of potential noise and vibration impacts from activities associated with the redesign of eight (8) intersections throughout central Ontario. The studies were designed to; establish existing conditions and assess potential noise and vibration impacts from construction and operational activities associated with the proposed project.

Noise/Vibration Assessment
Central Ontario

Part of a team contracted to the MTO to carry out an assessment of proposed realignment of the Highway 401 interchange at Highway 8 in the Kitchener/Waterloo Region, Ontario. The studies were designed to; establish existing conditions and assess potential noise and vibration impacts from construction and operation activities associated with the proposed project.

Environmental Noise Studies
Various, Ontario

Was retained by a number of design firms to carryout noise studies for various roadways throughout Ontario. These studies involved the assessment on noise levels from both construction and motorway public use. Studies were carried out for both existing roadways undergoing rehabilitation, to roadways undergoing realignments.

Construction Noise Monitoring
Toronto, Ontario

Retained to carryout construction noise monitoring for the redevelopment of a rail corridor in Toronto. This support included providing construction noise management recommendations.

Road/Rail Noise Assessments
Various, Ontario

As part of the preparation of numerous noise impact statements required for proposed residential development projects, road and rail noise was assessed according to MOE protocol to ensure that the noise impacts met the MOE prescribed noise limits. Where noise limits were exceeded, noise mitigation was designed. Mitigation involved the design of noise barriers, selection for appropriate window glazings and design of wall constructions.

PROJECT EXPERIENCE – MEDICAL SECTOR

Pharmaceutical
Toronto, Ontario

Retained to support a vaccine production facility in Toronto to prepare a CofA (Air and Noise) Application package. Responsible for the preparation of the AAR, development of the NAAP, and providing on-going engineering support on capital expenditure projects.

Subway Vibration
Toronto, Ontario

Measured existing subway and building vibration levels at Mount Sinai Hospital and compared these levels with GE Medical's acceptable vibration levels for their MRIs. Based on these measurements and manufacturer's specifications, vibration isolated floors were designed and recommended to support these MRIs and ensure that subway induced vibration would not interfere with image quality.

Environmental Noise Assessment
Burlington, Ontario

Retained to conduct an environmental noise assessment for Burlington Long-term Care Facility. Predicted noise impact for all rooftop mechanical equipment and ground level noise sources. Background measurements were used as inputs for predicting the noise impact from the hospital equipment on neighbouring receptors. Identified sources requiring noise abatement and provided noise control design.

Environmental Noise Assessment
Thunder bay, Ontario

Retained to conduct a preliminary environmental noise assessment for Thunder Bay General Hospital. Predicted noise impact for all rooftop mechanical equipment and ground level noise sources. Used the MOE minimum noise limits as background for predicting the noise impact from the hospital equipment on neighbouring receptors.

Environmental Noise Assessment
Oakville, Ontario

Retained to conduct a preliminary environmental noise assessment for Grace Long-term Care Facility. Predicted noise impact for all rooftop mechanical equipment and ground level noise sources. Minimum MOE limits were used as background for predicting the noise impact from the hospital equipment on neighbouring receptors.

PROJECT EXPERIENCE – MUNICIPAL / URBAN SECTOR

Noise and Vibration Study
Toronto, Ontario

Retained by SmartReit to support with completing a noise and vibration assessment for a proposed construction project that would implement piling activities. The support included a preliminary assessment of expected noise and vibration levels of associated constructions activities, which included piling activities. Sensitive receptors were identified surrounding the proposed site. The support also included the monitoring of piling activities at a number of locations within the site. Golder was responsible for monitoring noise and vibration emissions and documenting them against piling progression. A noise and vibration management plan was developed to support the proposed construction plans

Noise Feasibility Study – Former CFB Rockcliffe Lands
Ottawa, Ontario

Golder was retained to prepare a noise feasibility study as supporting documentation for a draft plan of subdivision approval for the former Canadian Forces Base Rockcliffe Lands property, which encompasses approximately 140 hectares, in the City of Ottawa. Golder's study assessed the feasibility of the community design plan with respect to the expected noise impact on the Site from road traffic and other facilities, and outlines recommended mitigation measures for the proposed development.

Feasibility Noise Study – All Seniors Care
Kingston, Ontario

Golder was retained by the developer of a proposed retirement home development in the City of Kingston to assess the potential environmental noise impacts of existing transportation and stationary noise sources on the proposed development. In the scope of the noise work, Golder will consider the: impacts on the environment on the development; the potential impacts of the development on the environment; and the potential impacts of the development on itself. Where required, Golder will identify noise mitigation that will need to be designed into the development

Noise Impact Study - Various
Ottawa, Ontario

Retained to carry out an environmental noise impact study for a number of proposed residential developments of single family; attached, and detached homes in the vicinity of roadways identified as major collector roadways. The noise assessments were carried out in accordance with both; the City of Ottawa Environmental Noise Control Guidelines and MOE noise guideline NPC-300. Noise predictions were performed in order to determine whether or not additional, in addition to the minimum Ontario Building Code, noise control measures would be required. Construction wall, window and door types were provided.

Ville de Sept Ilse Sept Ilse, Quebec	Retained by the Ville de Sept Ilse to be responsible for preparing a noise study for their snow dump facility. Golder's scope of work included three phases; 1) establishment of noise levels during operations, 2) establishment of ambient conditions and 3) the preparation of a detailed noise model to predict current and future noise levels and assist in the development of noise controls if required
Noise Impact Study - Concord Adex - City Place Toronto, Ontario, Canada	Completed various noise and vibration impact studies for a number of proposed high rise residential buildings along the Queens Elizabeth Highway (the Gardiner), and adjacent to a major rail corridor rail right-of-way. As a result of the development's proximity to the rail lines, on-site vibration measurements were conducted to ensure that vibration levels at the proposed condominium locations, due to a nearby rail corridor, were below the Ministry of the Environment limits. Noise predictions were completed in order to determine whether or not additional, in addition to the minimum Ontario Building Code, noise and vibration controls measures would be required. Construction wall, window and door types were provided.
Noise Impact Study - Concord Adex Toronto, Ontario, Canada	Completed a noise impact study for a proposed highrise residential buildings along Highway 401 (one of the busiest highways in Canada). Noise predictions were completed in order to determine whether or not additional, in addition to the minimum Ontario Building Code, noise and vibration controls measures would be required. Construction wall, window and door types were provided.
Noise Impact Study Brampton, Ontario	Retained to perform an environmental noise impact study for a proposed residential development of single family attached, detached and town-homes in the vicinity of transformer yards in Brampton. Noise predictions were performed in order to determine whether or not additional, in addition to the minimum Ontario Building Code, noise control measures would be required. Construction wall, window and door types were provided.
Noise Impact Study Various, Ontario	Conducted a noise and vibration impact study for a proposed residential development of single family attached, detached and town-homes. All within 45m of CN rail right-of-way and in the vicinity of either; provincial, regional and/or local roadways. As a result of the development's proximity to the CN rail lines, on-site vibration measurements were conducted to ensure that vibration levels at the proposed condominium locations, due to a nearby rail corridor, were below the Ministry of the Environment limits. Noise predictions were performed in order to determine whether or not additional, in addition to the minimum Ontario Building Code, noise and vibration controls measures would be required. Construction wall, window and door types were provided. These include developments in; Toronto, Brampton, North-bay and Alliston.

Noise Impact Study
Various, Ontario

Retained to perform an environmental noise impact study for a proposed residential development of single family attached, detached and town-homes in the vicinity of; provincial, regional and/or local roadways. Noise predictions were performed in order to determine whether or not additional, in addition to the minimum Ontario Building Code, noise control measures would be required. Construction wall, window and door types were provided. These include developments in; Toronto, Mississauga, Brampton, Caledon, Gravenhurst and Wasaga Beach.

Vibration Impact Study
Toronto, Ontario

Conducted a noise and vibration impact study for a proposed residential condominium development located along TTC subway and streetcar lines. Predictions of the vibration impact were performed with documented and/or measured data. Building isolation systems were designed and proposed where appropriate.

Noise and Vibration Impact Study - Bayview Mansions
Toronto, Ontario, Canada

Completed a noise impact study for a proposed high density residential development along a major local roadway. The assessment required the predictions of the potential vibration impacts from a proposed TTC subway line were performed with documented and/or measured data. Predictions were completed in order to determine whether or not additional, in addition to the minimum Ontario Building Code, noise and vibration controls measures would be required. Construction wall, window and door types were provided.

Noise/Vibration Impact Study
Toronto, Ontario

Retained to perform a study reviewing the possible noise and vibration intrusion between suites for a proposed building conversion from commercial/industrial to residential lofts.

Noise/Vibration Investigation
Toronto, Ontario

Conducted a noise and/or vibration intrusion investigation to determine the source of the noise/vibration intrusion for numerous residential buildings in the City of Toronto.

PROJECT EXPERIENCE – MUSICAL/ARTS PERFORMANCE AND FILM VIEWING VENUES AND SCHOOLS

HVAC Noise Control
Ottawa, Ontario

Responsible for performing noise analysis of HVAC systems and proposing noise controls for HVAC noise from intruding into the sensitive technical spaces including Studios and booths in the CBC Ottawa building. Noise control recommendations included the use of duct liner, plenums and high performance silencers for the air handling units servicing these rooms.

Mechanical Equipment Noise Control
Toronto, Ontario

Reviewed noise control measures for the TVO voice over booths and control rooms. Noise controls for the HVAC system were proposed to mitigate noise levels to within the design criteria.

Vibration Intrusion Investigation
Toronto, Ontario

Investigation of the noise/vibration intrusion into the Glenn Gould studio within the CBC Toronto building.

Mechanical Equipment Noise Control and Architectural Acoustics
Toronto, Ontario

Performed noise and vibration analysis for the proposed mechanical equipment for the National Ballet School. Performed room acoustic analysis to design the dance studios and music rooms. Results of the various analysis were used to specify noise and vibration controls including, suspended ceilings, equipment vibration isolation and studio architectural designs.

Mechanical Equipment Noise Control
Various

Responsible for analyzing and proposing noise controls for HVAC noise to ensure that noise is prevented from intruding into the sensitive spaces including; classrooms and auditoria in various schools and universities. Noise control recommendations included the use of duct liner, plenums and high performance silencers for the air handling units servicing these rooms. Provided the silencer schedule for all air handling units servicing the buildings:

UBC Life Sciences Building	Vancouver, British Columbia
Ajax Multi-use School	Ajax, Ontario
Jean Vanier	Collingwood, Ontario
Toronto French School	Toronto, Ontario
Brock University	Brock, Ontario
Trent University	Trent, Ontario

PROJECT EXPERIENCE – FLOOR AND STRUCTURAL VIBRATION

Subway Induced Vibration
Toronto, Ontario

Responsible for the design of the structural isolation pads for 20 Gothic, a residential condominium in Toronto, Ontario. In order to ensure that vibration levels are not perceptible, the building structure needed to be isolated from the subway induced vibration.

Streetcar Induced Vibration
Toronto, Ontario

Retained to determine the intrusive vibration levels due to streetcar movement on a proposed office space. Unmitigated vibration and noise levels induced by streetcar pass-bys would have caused fixtures to rattle. In addition, the excessive noise levels would have made it unbearable to work in the office space.

Subway Induced Vibration
Toronto, Ontario

Designed the vibration isolation system for a residential condominium development along the TTC Sheppard subway transit line. Predictions were made before the Sheppard Line was commissioned. The isolation system design was limited to theoretical modelling, post construction measurements were performed and found to be as predicted.

Subway Vibration Monitoring Program
Toronto, Ontario

Responsible for performing measurements for the TTC at track level and ground level at receptors, before and after work was performed on either the tracks and/or wheels of the subway car. A comparison analysis was performed to assess the effectiveness of the efforts in reducing vibration levels perceived by receptors.

PROJECT EXPERIENCE – SEISMIC

Software Development
Toronto, Ontario

Responsible for the development of software which could incorporate many aspects of seismic restraint design.

Post Disaster Building
Various, Ontario

Responsible for the design and specification of seismic restraint systems and seismic restraint layouts of piping systems for fire protection systems under NFPA-13 and Factory Mutual, and piping/conduit and ducting systems under ASHRAE guidelines Including the design and specification of restraint systems for mechanical equipment, which includes but not limited to; back-up power generators, Chillers/cooling equipment, HVAC equipment, pumps and tanks for post disaster buildings, as required in the Ontario Building Code (OBC). A list of projects includes;

Toronto General Hospital, Toronto Ontario. Systems restrained included; fire protection, medical gas, mechanical piping, ducting and air-handling equipment, back-up diesel generators, and general mechanical and electrical equipment.

Children's Hospital of Eastern Ontario, Ottawa, Ontario. Mechanical equipment and layouts were seismically qualified.

Glebe Center Long-term Care Facility, Ottawa, Ontario. Seismically qualified the fire protection system, mechanical and electrical equipment and layouts

St Vincent Hospital, Ottawa, Ontario. Seismically qualified the mechanical and electrical equipment and layouts.

Queensway Carton Hospital, Ottawa, Ontario. Seismically qualified the fire protection system.

Royal Canadian Mounted Police (R.C.M.P) Ottawa, Ontario. Seismically qualified the installation of equipment, piping/conduit and ducting as part of an expansion of base building.

Etisalat, United Arab Emirates. Seismically qualified the installation of equipment, including diesel back-up generator systems, piping/conduit and ducting as part of the design and construction of their flag ship office tower.

Ottawa Airport, Ottawa, Ontario. Seismically qualified the installation of equipment, piping/conduit and ducting as part of the construction project.

MDS Nordion, Ottawa, Ontario. Seismically qualified the installation of equipment, piping/conduit and ducting as part of the construction project, which included hazardous material equipment.

School Building
Various, Ontario

Responsible for the design and specification of seismic restraint systems and seismic restraint layouts of piping systems for fire protection systems under NFPA-13 and Factory Mutual, and piping/conduit and ducting systems under ASHRAE guidelines. Including the design and specification of restraint systems for mechanical equipment, which includes but not limited to; back-up power generators, Chillers/cooling equipment, HVAC equipment, pumps and tanks for school buildings, as required in the Ontario Building Code (OBC). A list of projects include:

North Grenville, Ottawa, Ontario. Seismically qualified the fire protection system installed as part of the project.

For various schools and universities, in the Ottawa and Kingston areas, the mechanical equipment restraint system was designed and seismically qualified. These projects included; Bridlewood School, Cambridge Public School, Samuel Genest School, St Bernadette School, Ottawa University Bioscience Building, Terre Des Jeunes and College Catholique Samuel.

Joules Leger, Ottawa, Ontario – Seismically qualified the electrical equipment and conduit layout as part of the construction contract.

For various schools and universities, in the Ottawa area, the mechanical equipment restraint system, along with the fire protection system was designed and seismically qualified. These projects included; Cumberland High-school, Carlton University, Tory building & student residence and Russell Catholic High-school.

Not a Post Disaster Building
Various, Ontario

Responsible for the design and specification of seismic restraint systems and seismic restraint layouts of piping systems for fire protection systems under NFPA-13 and Factory Mutual, and piping/conduit and ducting systems under ASHRAE guidelines. Including the design and specification of restraint systems for mechanical equipment, which includes but not limited to; back-up power generators, Chillers/cooling equipment, HVAC equipment, pumps and tanks for non-post disaster buildings, as required in the Ontario Building Code (OBC). A list of projects include:

For various projects in the Ottawa area, the electrical and mechanical equipment restraint systems were designed and seismically qualified. These projects included; Canadian War Museum, Morrisburg Water Treatment/Pumping Station, East Market and Joules Leger.

For various projects in the Ottawa area, the mechanical equipment restraint system was designed and seismically qualified. These projects included; 269 Laurier, Metropole, Adelaide Preston Square, Louis Riel Dome, Bell Semplex, 181 Queen Street, West District Ice Rink and CBC Ottawa.

1600 Startop, Ottawa, Ontario. Seismically qualified the restraint of the mechanical equipment and fire protection systems.

For various projects in the Ottawa area, the fire protection restraint system was designed and seismically qualified. These projects included; Canadian Aviation Museum, Nortel, Loeb Center, and the Glebe Center.

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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