REPORT

Noise Assessment Report

Proposed Safarik Pit

Submitted to:

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

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Submitted by:

WSP Canada Inc.

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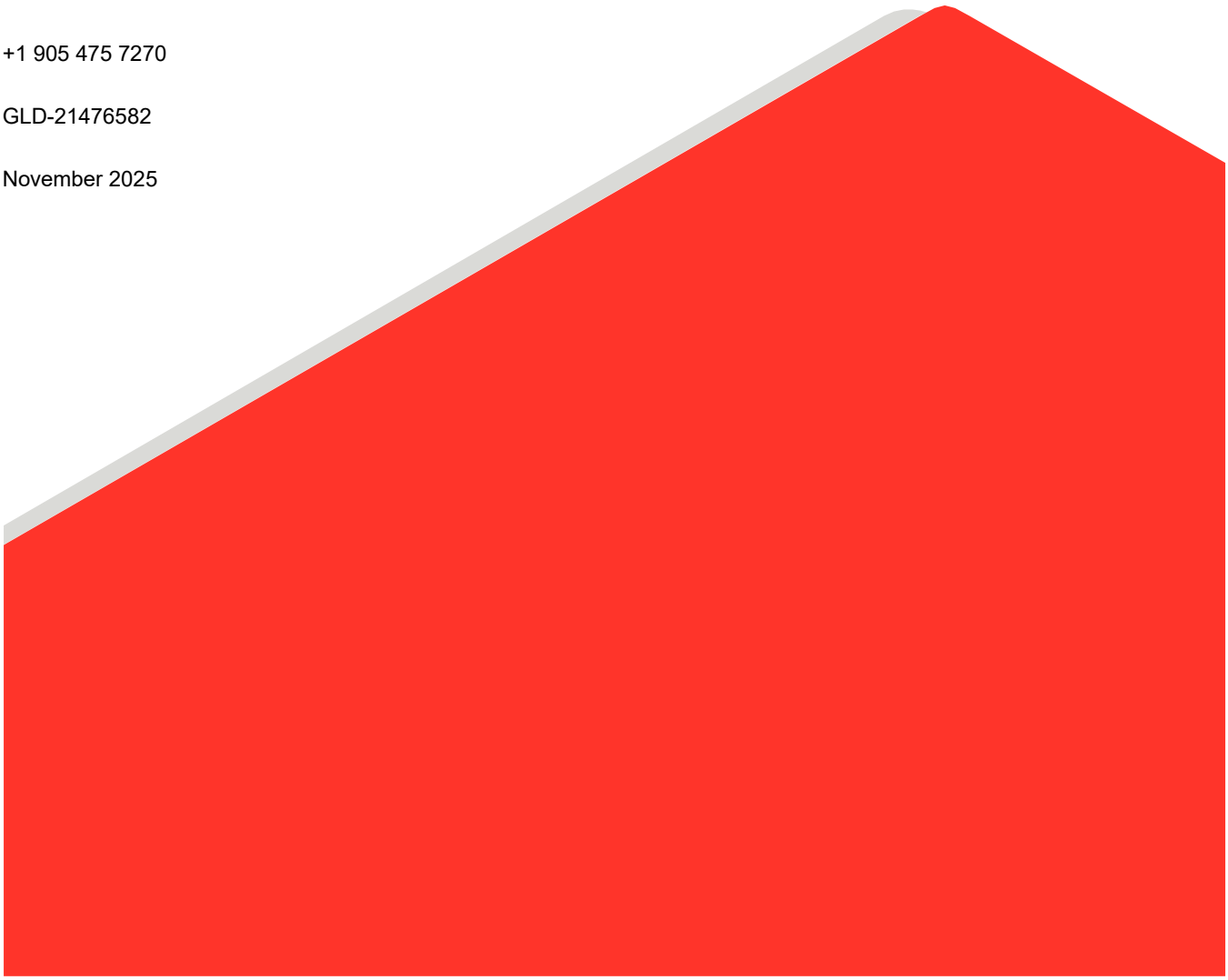
GLD-21476582

November 2025



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1.0 INTRODUCTION

CBM Aggregates (CBM), a division of St. Marys Cement Inc. (Canada) is applying to the Ministry of Natural Resources (MNR) for a Class A Licence (Pit Below Water) of the proposed Safarik Pit located at 4275 Concession Road 7, Township of Puslinch, Wellington County, Ontario (the Site). The proposed site is approximately 27.6 hectares (ha) in size and is currently agricultural fields bisected by a hydro corridor.

The proposed CBM Safarik Pit operations will include above and below water extraction, and CBM Safarik Pit operations are proposed to occur between 7:00 and 19:00, excluding statutory holidays. Site preparation and rehabilitation are proposed to be permitted from 7:00 to 19:00 Monday to Friday.

The overall goal of the final rehabilitation plan is to create a landform that represents an ecological and visual enhancement and provides future opportunities for conservation, recreation, tourism and water management. Overall, the progressive and final rehabilitation plan for the Site includes the creation of two (2) lakes, vegetated shorelines, wetlands, and nodal shrub and tree planting on upland areas.

The purpose of the noise assessment is to assess the potential impact of noise from the Site onto the noise sensitive points of reception (PORs) located in the area surrounding the Site. For the purpose of this assessment, twenty (20) existing PORs and four (4) vacant lots were selected as being representative of the sensitive receptors around the Site. The locations of PORs are shown in Figure 1. The nearest POR001 is located approximately 60 m northwest of the proposed extraction boundary. A zoning map for the property and surrounding land use is provided in Appendix B.

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

The noise study was completed for the proposed CBM Safarik Pit and based on the implementation of the recommendations found in Section 8 of this report, this assessment concluded the following:

- The Site, with the implementation of the noise controls detailed in Section 8 of this report, can operate in compliance with the applicable noise limits
- Noise controls will include:
  - Property line barrier
  - Usage of a windrows as supplemental noise screening
  - Equipment noise controls
  - Area-specific operational controls (e.g., limiting the number of equipment)

1.1 Site Description

The proposed extraction area is approximately 21.3 hectares, and the Site is composed of two extraction areas, Area A and Area B dissected by a hydro corridor (132 m wide right of way).

2.0 SITE OPERATIONS

The proposed Site operations are expected to begin in the eastern part – Area A as above water extraction with operations moving in a westerly direction. Once sufficient above water extraction is completed in the eastern part of the Area A, below water extraction will commence within the eastern area of Area A. The concurrent above water and below water operations will continue within the Area A. After reaching the west edge of the Area A the above water extraction will move into the Area B. The same sequence of operations (i.e., concurrent above and below water extraction) will occur in Area B until reaching western edge of the extraction area. Generally, it is expected that below water extraction will follow the above water operations once sufficient area is available to support below water extraction within Area A and Area B.

For this assessment, the noise emissions were assessed for all operational locations of the extraction equipment operating in proximity to the identified representative PORs. For the above water extraction, the assessed equipment included, where applicable, two extraction loaders and highway trucks used for shipment of the extracted material for offsite processing. A dragline was considered as additional equipment during the below water extraction. Based on the available information, the height of a single working face (above water extraction) is expected to be 10 m. The Site will be extracted to the depth of 309 m (above water) and 295 m (below water), within both Area A and Area B.

It is expected that extraction will be carried out between 7:00 and 19:00 with haulage occurring from 7:00 to 18:00 weekdays and 8:00 to 16:00 Saturdays. The operations will include material extraction from above and below the water table and shipment for offsite processing.

The equipment associated with operations will include:

- Two (2) Extraction loaders
- Product shipment truck (up to 28 trips in a given hour; 14 in and 14 out)
- One (1) Dragline for below water material extraction

3.0 NOISE SOURCE SUMMARY

The noise sources considered in the assessment are summarized in Table 1.

Table 1: Site Noise Source Summary

Source ID	Source Description	Quantity	Overall Sound Power Level [dBA](1)	Source Location	Sound Characteristics	Noise Control Measures
Loader	Above Water Extraction Loader	1	107	O	S	U
Loader	Below Water Extraction Loader	1	107	O	S	U
Shipping Truck	Highway Truck	28(2)	103	O	S	U
Dragline	Dragline operating only during below water extraction	1	112	O	S	U
Dragline	Mitigated Dragline operating only during below water extraction	1	107	O	S	U

Notes:

(1) Values presented in table do not include adjustments that were considered in the modelling (i.e., time weighting) where applicable

(2) Number of one-way trips in a given hour

Overall Sound Power Level presented in Table 1 does not include adjustments that was considered in the modelling (i.e., time weighting) where applicable.

Noise Source Summary Table Nomenclature

Source Location

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

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

Sound Characteristics

S – Steady
Q – Quasi Steady Impulsive
I – Impulsive
B – Buzzing
C – Cyclic

4.0 POINTS OF RECEPTION

Twenty (20) residential receptors and four (4) vacant lot receptors were identified as being representative of the most sensitive PORs within the vicinity of the Site as shown in Figure 1. The height of each POR identified in the assessment corresponds to the highest elevation of the noise receptor (i.e., two-storey dwelling – 4.5 m and one story dweling – 1.5 m). The PORs are summarized in Table 2.

Table 2: Points of Reception

POR ID	Noise Limit Daytime/ Nighttime [dBA](1)	Description
POR001	45	Residences to the west of the Site adjacent to Concession Rd 7.
POR002	45	Residences to the south of the Site adjacent to Concession Rd 7.
POR003	45	Residences to the south of the Site adjacent to Concession Rd 7.
POR004	45	Residences to the south of the Site adjacent to Concession Rd 7.
POR005	45	Residences to the south of the Site adjacent to Concession Rd 7
POR006	45	Residences to the south of the Site adjacent to Concession Rd 7
POR007_VL01	45	Vacant lot to the south of the Site adjacent to Concession Rd 7 and Calfass Rd
POR008_VL02	45	Vacant lot to the south of the Site adjacent to Concession Rd 7
POR009_VL03	45	Vacant lot to the south of the Site adjacent to Concession Rd 7 and Calfass Rd
POR010	45	Residence to the south of the site adjacent to Calfass Rd
POR011_VL04	45	Vacant lot to the south of the site adjacent to Calfass Rd
POR012	45	Residence to the southeast of the site adjacent to Calfass Rd
POR013	45	Residence to the east of the site adjacent to Calfass Rd
POR014	45	Residence to the east of the site adjacent to Calfass Rd
POR015	45	Residence to the east of the site adjacent to Calfass Rd

POR ID	Noise Limit Daytime/ Nighttime [dBA](1)	Description
POR016	45	Residence to the east of the site adjacent to Calfass Rd
POR017	45	Residence to the east of the site adjacent to Calfass Rd
POR018	45	Residence to the east of the site adjacent to Calfass Rd
POR019	45	Residence to the east of the site adjacent to Calfass Rd
POR020	45	Residence to the east of the site adjacent to Calfass Rd
POR021	45	Residence to the northeast of the Site and adjacent to Telfer Glen St
POR022	45	Residence to the northwest of the Site north of Concession 7 Rd
POR023	45	Residence to the west of the Site adjacent to Concession 7 Rd
POR024	45	Residence to the west of the Site adjacent to Concession 7 Rd

Notes:
(1) Refer to Section 5.0 below for information on the applicable criteria and associated noise limits.

Noise levels were predicted for all identified receptors and compared against applicable noise limits to assess compliance.

5.0 ASSESSMENT CRITERIA (PERFORMANCE LIMITS)

Although it is expected ambient sound levels in the vicinity of the PORs are expected to be influenced by anthropogenic noise, including road traffic noise from local roadways and traffic alone Highway 401 and from activities associated with existing aggregate activities in the area, the PORs in the vicinity of the Site were conservatively considered to be located in an area with a Class 3 noise environment as defined by Ministry of Environment, Conservation and Parks (MECP) in publication NPC-300.

A Class 3 area refers to a rural area with the acoustical environment is typically dominated by natural sounds having little or no road traffic.

In assessing stationary noise sources, the MECP has established exclusionary Plane of Window (POW) and Outdoor sound level limits.

The POW sound level limit for the noise sensitive receptors in a Class 3 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 45 dBA in the daytime period of 07:00-19:00, 40 dBA in the evening period of 19:00-23:00 and 40 dBA in the night-time period of 23:00-07:00, 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 3 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 45 dBA in the daytime period of 07:00-19:00 and 40 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 night-time as a consequence of meeting the sound level limit at the adjacent POW.*

Table 3 summarizes the applicable noise limits for a Class 3 area.

Table 3: Noise Limits

Time Period	POW MECP Exclusionary Sound Level Limit (dBA)	Outdoor MECP Exclusionary Sound Level Limit (dBA)
	Class 3	Class 3
Day (07:00-19:00)	45	45
Evening (19:00-23:00)	40	40
Night (23:00-07:00)	40	-

In the absence of specific noise guidelines applicable to the assessment of off-site truck traffic noise associated with aggregate sites, the MECP's Landfill Guidelines that set out the protocol for evaluating off-site vehicle traffic noise was used. Please note the MECP's Landfill Guidelines does not provide specific sound level limits, however, in accordance with the Landfill Guidelines, the potential noise impact of off-site vehicles on the existing noise environment is described qualitatively based on a quantitative assessment of the potential increase to the one-hour equivalent sound level ($L_{eq,1hr}$), as described in Table 4.

Table 4: Landfill Guidelines Qualitative Noise Impact Ratings for Off-site Vehicles

Sound Level Increase (dB)	Qualitative Rating
1 to 3 inclusive	Insignificant
3 to 5 inclusive	Noticeable
5 to 10 inclusive	Significant
10 and over	Very significant

6.0 IMPACT ASSESSMENT

6.1 Stationary Sources

6.1.1 Methodology

All relevant sound levels for sources were obtained from WSP's database of similar sources. Noise impact predictions were generated using this data. Noise data is provided in Appendix D.

The predictive analysis was carried out using the commercially available software package CadnaA 2025 MR1 (64 Bit build: 211.5558). 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 downwind or moderate temperature inversion conditions for all PORs, a design condition consistent with the accepted practice of the MECP and MNR.

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 water body and a value of 1 for all other areas (e.g., absorbing ground coverage including grass and trees). A ground factor value of 0.2 was conservatively considered for the pit floor for the above water extraction area. Attenuation from woodlots were conservatively not considered in the noise modelling.

6.1.2 Noise Impact Prediction Assumptions

Some of the assumptions made while calculating the potential noise levels of the proposed operations on the identified PORs near the Site are as follows:

- Site preparation and rehabilitation activities were not specifically assessed as they are considered as a part of construction, however, to limit the potential noise emissions from these activities, the equipment proposed for construction is expected to meet the sound level limits outlined in MECP NPC-115.
- Extraction will occur during the daytime period (i.e., between 7:00 and 19:00).
- Material shipment will occur during the daytime period from 7:00 to 18:00.
- In general, above water extraction is expected to commence along the east edge of the Area A with extraction moving westerly. After sufficient area is extracted within Area A, below water extraction will commence within the eastern portion of Area A and the extraction will move westerly as concurrent above and below water operations. The same sequence (i.e., above and below water operations) will occur within Area B. Assessed extraction areas (Subarea 1 through Subarea 8) are shown in Figure 1.
- Due to depth of resources, the above water extraction is expected to be completed using two benches (where needed) with a typical height of the single face equal to 10 m. Conservatively, the noise assessment was completed assuming the equipment was located on the bottom of the first lift within the extraction area for above water extraction and on the full depth of the pit for below water operations.
- Equipment list and sound power emissions are consistent to those listed in Table 1 (or acoustically equivalent).

- During the operations, the equipment will operate as specified in Section 2.0.
- The assessment was completed for the equipment indicated in Section 2, should acoustically significant changes be expected (e.g., increase the number of equipment) a supplemental study will be required to evaluate the potential changes in noise levels.
- The extraction loaders are expected to operate within 30 m from the working face.
- Within certain areas, a dragline will be equipped with additional noise controls (e.g., silencer) resulting in 5 dB reduction of dragline overall noise emissions.
- Although the height of the working face could vary throughout the Site it is expected that the height of the working face will be approximately 10 m.
- It is assumed that up to 14 inbound and 14 outbound shipment truck trips will occur during each 1-hour period.
- POW PORs for which receptor heights could not be identified either through available imagery or during onsite investigations were conservatively assessed at a height of 4.5 m.

6.1.3 Proposed Noise Controls

Based on the noise assessment, a local 7.5 m high and approximately 237 m long property line berm will be required along the western edge of the extraction area (i.e., Subarea 7 and Subarea 8) near the Site entry prior to operations beginning within Subarea 1. In addition, area and equipment specific operational noise controls will include the following, which is shown on Figure 2:

- Operation control Area 1 – above water extraction - one loader at full load for 60 min in given hour, below water extraction - one loader and mitigated dragline operation at full load for 45 min in given hour.
- Operation control Area 2 – above water extraction - one loader full load for 60 min in given hour, below water water extraction - one loader operating at full load for 45 min and located east of a 4.5 m high barrier, mitigated dragline operation at full load for 45 min in given hour.
- Operation control Area 3 – below water extraction - one loader and mitigated dragline operation at full load for 45 min in given hour, above water extraction - one loader full load for 60 min in given hour.

6.1.4 Haul Route Analysis

For applications for new aggregate sites in Ontario it is common practice to complete noise predictions to assess potential noise impacts associated with site trucking activities while on public roadways. The haul route noise analysis is typically completed using the MECP's Ontario Road Noise Analysis Method for Environment and Transportation (ORNAMENT), which is the basis of the DOS-based STAMSON modelling software provided by the MECP. Road traffic noise is typically assessed over a 1-hour period, corresponding to the time of the greatest predicted impact due to the Site activities.

Existing and anticipated noise levels due to road traffic are typically established using the information available from project-specific Traffic Impact Studies (TIS) prepared by traffic consultants.

Based on available information, it is understood the County of Wellington (the County) is in the process of applying an Official Plan Amendment that designates additional employment lands within the Township of Puslinch. An Employment Lands Study, titled Puslinch by Design, was initiated in January 2024 by the County to accommodate for an additional 30.0 hectares of employment lands, as a minimum, for the Township. The Puslinch by Design Study proposes that the front area of Safarik Pit and lands to the north up to Highway 401, be redesignated to a Rural Employment Area. According to the Phase 4 Land Options Report (February 2025) of the Puslinch by Design Study, part of the rationale for this proposal is related to the recent upgrades to the Concession Road 7 corridor to handle truck traffic related to the adjacent mineral aggregate operations. In addition, the connection of Concession Road 7 to McLean Road West and existing industrial and employment uses which is zoned to accommodate industrial uses, supporting a cluster of employment land uses is expected to result in increases in road traffic along Concession Road 7.

We note that due to the proposed future land uses in this immediate area, and recent upgrades to Concession Road 7 it is expected that current traffic volumes may not be an accurate reflection of the anticipated future traffic and associated noise along the haul route. It is expected that the future truck traffic (not related to the Site) will be higher than considered in current traffic counts, which would result a lower incremental change in traffic noise levels directly associated with the Project. Therefore, it is proposed that prior to commencement of extraction and shipping operations, noise measurements will be completed by a qualified acoustical specialist to determine the existing noise levels at the most impacted receptor along Concession Rd 7, which considers the potential impact before and after the introduction of the Site-related traffic to verify the potential change in noise levels.

7.0 RESULTS

7.1 Concurrent Above and Below Water extraction

Table 5 summarizes the results for above water operations in Area A and Area B.

Table 5: Predicted Noise Levels for Concurrent Above and Below Water Extraction

Receptor ID	Predicted Noise Level [dBA]								Maximum Noise Level	Noise Limit [dBA]	Compliance
	Subarea 1	Subarea 2	Subarea 3	Subarea 4	Subarea 5	Subarea 6	Subarea 7	Subarea 8			
POR001	44	44	44	44	45	45	45	45	45	45	Yes
POR002	41	42	42	41	42	42	44	45	45	45	Yes
POR003	37	38	38	37	39	39	42	40	42	45	Yes
POR004	34	35	35	34	36	36	36	37	37	45	Yes
POR005	35	37	38	36	39	40	42	39	42	45	Yes
POR006	29	33	34	32	33	33	36	32	36	45	Yes
POR007_VL01	28	31	32	31	32	34	35	36	36	45	Yes
POR008_VL02	24	27	27	26	26	26	27	26	27	45	Yes
POR009_VL03	25	27	28	27	27	29	28	29	29	45	Yes
POR010	29	31	35	34	34	36	36	35	36	45	Yes
POR011_VL04	30	35	38	38	36	37	37	35	38	45	Yes
POR012	30	33	35	36	32	34	33	32	36	45	Yes
POR013	30	33	32	31	28	32	34	33	34	45	Yes
POR014	38	41	40	40	35	37	37	35	41	45	Yes
POR015	35	37	33	33	29	30	30	29	37	45	Yes
POR016	36	38	38	33	28	31	31	31	38	45	Yes
POR017	39	41	41	36	31	34	33	32	41	45	Yes
POR018	36	39	38	33	30	32	31	31	39	45	Yes
POR019	35	37	37	33	29	31	30	30	37	45	Yes
POR020	38	41	40	38	31	33	32	32	41	45	Yes
POR021	32	34	38	37	31	32	31	31	38	45	Yes
POR022	33	36	36	36	35	35	36	34	36	45	Yes
POR023	33	36	35	35	36	36	40	36	40	45	Yes
POR024	38	38	39	38	39	39	39	40	40	45	Yes

8.0 SITE PLAN NOISE CONTROL NOTES

The results of the Noise Assessment provide the basis for the following technical recommendations of guidelines and procedures to be followed during the extraction at the proposed Safarik Pit:

- On-site equipment shall meet the limits as specified in Table 1 in Section 3.0 of this noise assessment report.
- Activities to prepare the Site, such as the stripping of topsoil, construction of the berms, or activities related to the rehabilitation of the Site after the extraction is completed are considered to be construction activities and are only permitted to occur during the daytime period (i.e., 7:00 to 19:00) Monday to Friday except statutory holidays.
- A 7.5 m high, 237 m long L-shaped noise berm/barrier, as specified on Figure 2, shall be installed west of the Area A near the Site entry. The berm shall be constructed prior to extraction within Area A.
- Windrows berms of minimum 4.5 m high shall be used during below water extraction within Operation control Area 2. The loader supporting below water extraction shall be positioned on the east side of the windrow.
- Proposed berm/barrier can be constructed of earth berms, product stockpiles or other suitable acoustic barriers such as trailers or shipping containers as long as the height and the density requirements of 20 kg/m^2, without gaps are maintained.
- Extraction loader(s) shall operate within 30 m of the active working face to maximize noise screening by the working face.
- The licensee shall utilize an alternative to narrow band back up alarms that meet Ministry of Labour safety requirements for on-site equipment.
- Prior to operations commencing, sound measurements of the equipment used on the Site shall be undertaken by a qualified professional to confirm maximum emission levels are not exceeded.
- To confirm that sound levels from the Site operations are in compliance with the MECP noise guideline limits, an acoustical audit shall be completed by a qualified professional once extraction commence in Area B below water extraction.
- For areas where mitigated dragline operations are required, the dragline shall be equipped with additional noise control (e.g. equipment mounted noise barrier or acoustically equivalent treatment) to reduce dragline noise emissions by a minimum 5 dB to target a sound power level as presented in Table 1.
- Proposed mitigation may be substituted through equipment modification, other control measures and/or local barriers if an assessment by qualified professional is completed in accordance with MECP requirements and demonstrates the modification complies with MECP noise limits at surrounding sensitive receptors. Prior to any modification, notification shall be given to MNR.

  Prior to commencement of operations, a noise assessment of Project-related trucks, while operating on public roadways (i.e., haul route noise analysis) shall be completed by a qualified professional and completed in accordance with relevant sections of the MECP Landfill Guidelines.

9.0 CONCLUSIONS

WSP Canada Inc. (WSP) has been retained by CBM Aggregates (CBM), a division of St. Marys Cement Inc. (Canada) to complete a noise assessment as part of application to the Ministry of Natural Resources (MNR) for a Class A Licence (Pit Below Water) of the proposed Safarik Pit located at 4275 Concession Road 7, Township of Puslinch, Wellington County, Ontario (the Site).

WSP established sound level limits according to MECP noise guidelines and compared the predicted noise levels at the identified representative PORs to the established noise limits. The results indicate that, after the implementation of identified noise controls or equivalent measures,

- The Site will operate in accordance with applicable noise limits as outlined in NPC 300 at all surrounding sensitive land uses.
- The Site has been designed to minimize and mitigate to acceptable levels any potential adverse effects from noise in accordance with provincial guidelines, standards and procedures.

Copies of CVs for the authors of this document are provided in Appendix F.

Signature Page

WSP Canada Inc.

[redacted]

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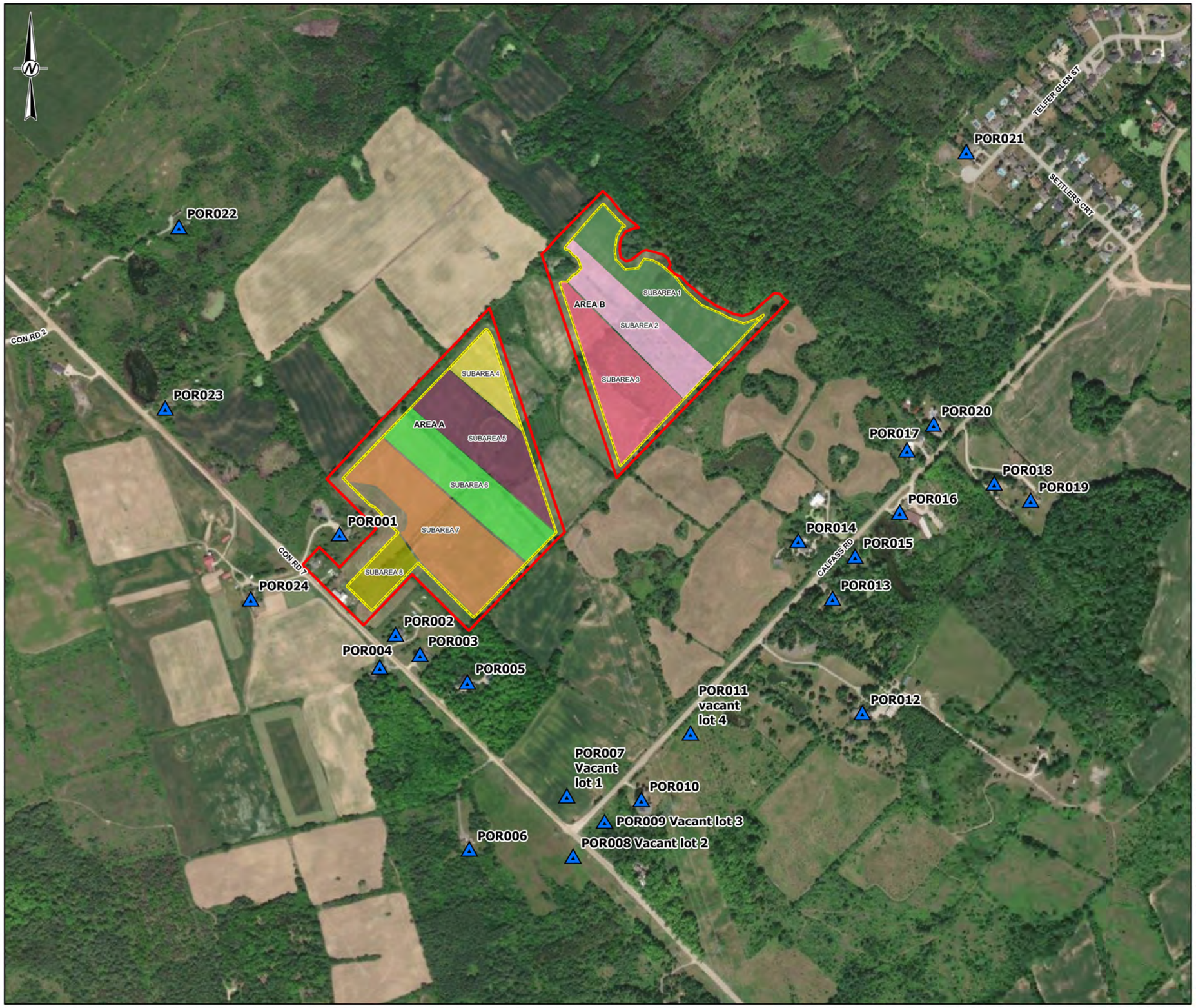
TN/JT/ng

https://wsponline.sharepoint.com/sites/gld-148930/project files/5 technical work/ph 5000 - noise/reporting/gld-21476582-r-rev0-cbm safarik noise study 6nov2025.docx

FIGURES



KEY MAP

SCALE 1:300,000

LEGEND

- POINT OF RECEPTION
- LICENCE BOUNDARY
- EXTRACTION LIMIT
- SUBAREA 1
- SUBAREA 2
- SUBAREA 3
- SUBAREA 4
- SUBAREA 5
- SUBAREA 6
- SUBAREA 7
- SUBAREA 8

0 75 150 300

1:7,500 METRES

NOTE(S)
1. ALL LOCATIONS ARE APPROXIMATE

REFERENCE(S)
1. CONTAINS INFORMATION LICENSED UNDER THE OPEN GOVERNMENT LICENCE - ONTARIO
2. IMAGERY CREDITS: WORLD IMAGERY: TOWN OF OAKVILLE, MAXAR
WORLD TOPOGRAPHIC MAP: CITY OF HAMILTON, TOWN OF MILTON, ONTARIO BASE MAP, PROVINCE OF ONTARIO, ONTARIO MNR, ESRI CANADA, ESRI, © OPENSTREETMAP CONTRIBUTORS, HERE, GARMIN, USGS, NGA, EPA, USDA, NPS, AAFC, NRCAN
3. LICENSE BOUNDARY PROVIDED BY MHBC MARCH 2025
4. EXTRACTION LIMIT PROVIDED BY MHBC JUNE 2025
5. COORDINATE SYSTEM: NAD 1983 UTM ZONE 17N

CLIENT
CBM AGGREGATES, A DIVISION OF ST. MARYS CEMENT INC. (CANADA)

PROJECT
SAFARIK PIT

TITLE
SITE LOCATION

CONSULTANT
wsp

YYYY-MM-DD	2025-08-14
DESIGNED	----
PREPARED	SO/MC
REVIEWED	TZ
APPROVED	JT

PROJECT NO.	CONTROL	REV.	FIGURE
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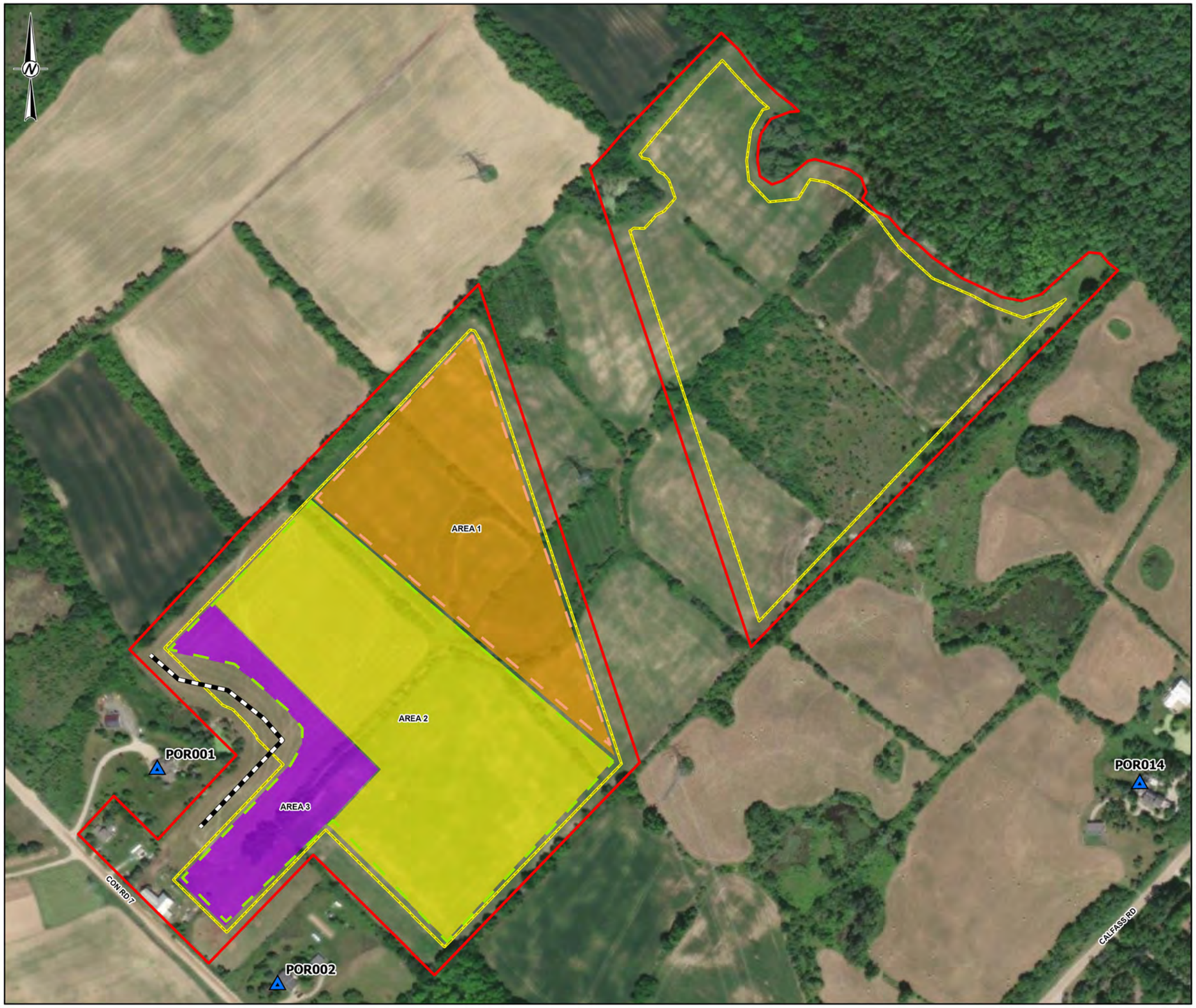

KEY MAP

SCALE 1:300,000

LEGEND

- POINT OF RECEPTION
- NOISE BERM
- LICENCE BOUNDARY
- EXTRACTION LIMIT
- MITIGATION AREA 1
- MITIGATION AREA 2

NOISE CONTROL AREAS

- AREA 1
- AREA 2
- AREA 3

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NOTE(S)
1. ALL LOCATIONS ARE APPROXIMATE

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3. LICENSE BOUNDARY PROVIDED BY MHBC MARCH 2025
4. EXTRACTION LIMIT PROVIDED BY MHBC JUNE 2025
5. COORDINATE SYSTEM: NAD 1983 UTM ZONE 17N

CLIENT
CBM AGGREGATES, A DIVISION OF ST. MARYS CEMENT INC. (CANADA)

PROJECT
SAFARIK PIT

TITLE
OPERATIONAL NOISE CONTROL AND MITIGATION MEASURES CONCURRENT ABOVE AND BELOW WATER EXTRACTION

CONSULTANT

wsp

YYYY-MM-DD	2025-10-16
DESIGNED	----
PREPARED	SO/MC
REVIEWED	TZ
APPROVED	JT

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25mm
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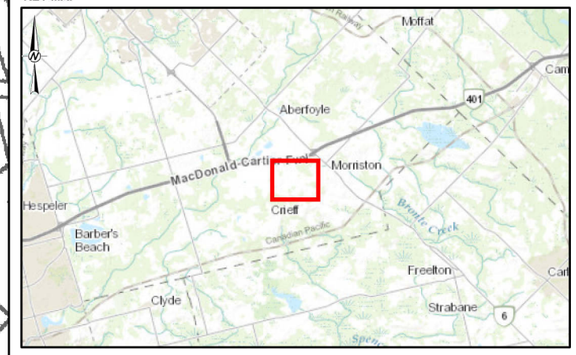
PATH: S:\Clients\Votorantim_Cement\ont\Mississauer_Pit\99_PROJ\21476582_Safarik_Pit_Expansion\40_PROD\0008_Noise\CAD\21476582-0008-R01-00000.aprx PRINTED ON: AT 3:47:12 PM

APPENDIX A

Zone Designation Plan

KEY MAP



SCALE 1:300,000

LEGEND

- LICENCE BOUNDARY
- EXTRACTION LIMIT

LAND ZONING DESIGNATION PLAN

- ENVIRONMENTAL PROTECTION OVERLAY
- SITE SPECIFIC EXEMPTIONS
- NATURAL ENVIRONMENT
- ZONING LIMIT

0 75 150 300

1:7,500 METRES

NOTE(S)

1. ALL LOCATIONS ARE APPROXIMATE

REFERENCE(S)

1. CONTAINS INFORMATION LICENSED UNDER THE OPEN GOVERNMENT LICENCE - ONTARIO
2. ZONING - PUSLINCH ZONING BY-LAW, COMPREHENSIVE ZONING BY-LAW NO. 023-18, COUNTY OF WELLINGTON PLANNING DEPARTMENT, MINISTRY OF NATURAL RESOURCES, GRAND RIVER CONSERVATION AUTHORITY, HAMILTON REGION CONSERVATION AUTHORITY AND CONSERVATION HALTON (MAY 2021)
3. LICENSE BOUNDARY PROVIDED BY MHBC MARCH 2025
4. EXTRACTION LIMIT PROVIDED BY MHBC JUNE 2025
5. COORDINATE SYSTEM: NAD 1983 UTM ZONE 17N

CLIENT

CBM AGGREGATES, A DIVISION OF ST. MARYS CEMENT INC. (CANADA)

PROJECT

SAFARIK PIT

TITLE

LAND ZONING DESIGNATION PLAN

CONSULTANT

wsp

YYYY-MM-DD	2025-11-10
DESIGNED	----
PREPARED	SO/MC
REVIEWED	TZ
APPROVED	JT

PROJECT NO.	CONTROL	REV.	FIGURE
21476582	0008	0	4

25mm

0

APPENDIX B

Noise Terms

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

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

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

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

Environmental noise levels vary over time, and are described using an overall sound level known as the L_{eq}, or energy averaged sound level. The L_{eq} is the equivalent continuous sound level, which in a stated time, and at a stated location, has the same energy as the time varying noise level. It is common practice to measure 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.

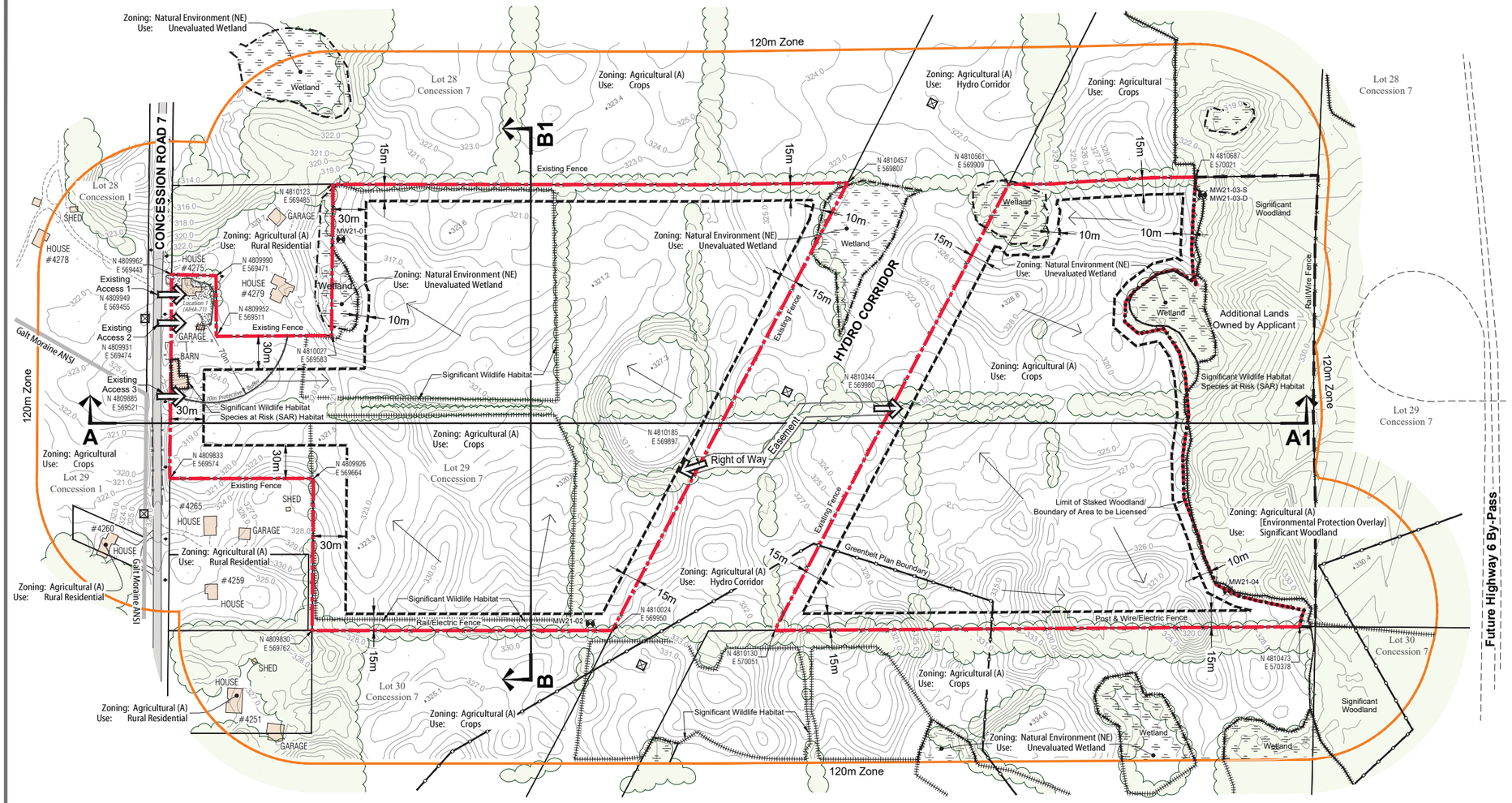
APPENDIX C

Noise Data

Name	ID	Type	Octave Spectrum (dB)											Source Data
			Weight.	31.5	63	125	250	500	1000	2000	4000	8000	A	lin	
Truck	Truck	Lw		109	110	108	102	101	97	94	89	86	103	115	WSP Database
Loader	CAT_980G	Lw		106	110	108	101	103	104	99	92	86	107	114	WSP Database
Dragline	Dragline	Lw		102	115	123	108	104	106	105	99	92	112	124	WSP Database

APPENDIX D

Site Plans



Notes

A. General

1. This site plan is prepared under the Aggregate Resources Act (ARA) for a Class A licence for a pit below the ground water table and follows the Aggregate Resources of Ontario: Site Plan Standards August 2020, specifically Existing Features for all sites (Numbers 1-26 in the standards).
2. Area Calculations:
   Licence Area: 27.6 hectares (68.2 acres)
   [0.9 ha or 0.3% of Licence Area is within the Greenbelt Area Protected Countryside]
   Limit of Extraction: 21.3 hectares (52.6 acres)
3. All measurements shown are in metres unless specified otherwise.

B. References

1. Topographic information compiled by GeoOptic (a division of Aeon Egmond Ltd.). Data from GeoOptic was produced from aerial photography that was flown on April 25, 2023. Mapping is produced in real world scale and coordinates (NAD83 UTM Zone 17N). Contour interval is 1m. All elevations are geodetic (HT2 2010v70).
2. Plan of Survey prepared by Delph & Jenkins North Ltd. December 8, 2022.
3. Adjacent parcel fabric from Wellington County GIS/Open data.
4. The subject lands are zoned Agricultural (A) and Natural Environment (NE) in the Township of Puslinch Comprehensive Zoning By-law No. 023-18 [Consolidation Date: May 2021].
5. Wetland boundaries provided by WSP Canada Inc.
6. Land use information compiled from 2023 imagery, site visits and client input.

C. Drainage

1. Surface drainage on and within 120 metres of the licence boundary is by overland flow in the directions shown by arrows on the plan view or by infiltration.

D. Groundwater

1. Based on the available groundwater elevation data, the maximum water table on the site is 306.99 masl in the western portion of the site [as measured at MW21-01(SAF)] to 308.52 masl in the east portion of the site [as measured at MW21-03-D (SAF)].

E. Site Access and Fencing

1. There are existing field accesses to the site from Concession Road 7 in the location shown on the plan view. Also, a right of way easement exists across the hydro corridor for access to the easternmost parcel.
2. Post and wire fencing (unless noted otherwise) exists in the locations shown on the plan view.

F. Aggregate Related Site Features

1. There are no existing aggregate operations or features on-site such as processing areas with stationary or portable equipment, stockpiles, recyclable materials, scrap, haul roads, fuel storage, berms or excavation faces.

G. Significant Natural Features

1. On-site: unevaluated wetlands, significant woodlands, significant wildlife habitat (barn swallow,grasshopper sparrow) and species at risk [SAR] habitat (eastern small-footed myotis, little brown myotis, Bobolink, Eastern meadowlark)
2. Off-site within 120m: Galt Moraine ANSI, unevaluated wetlands, significant woodlands, significant wildlife habitat (amphibian breeding, barn swallow, eastern wood peewee, grasshopper sparrow, Hairy Solomon's Seal) and species at risk [SAR] habitat (eastern red bat, hoary bat, silver-haired bat, eastern small-footed myotis, little brown myotis, Bobolink, Eastern meadowlark)

H. Human-made Features

1. On-site: House, Garage, Barn
2. Off-site within 120m: Hydro Corridor, Houses and other associated buildings, Roads

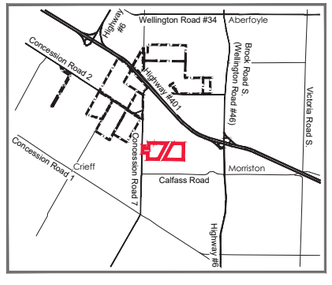
I. Cross Sections

1. As shown on this page. Detailed sections are shown on page 5 of 5.
2. Cross section locations are identified on the plan view for each drawing.

J. Report References

1. Noise: "Noise Assessment Report, Proposed Safarik Pit" November 2025 (Source: WSP Canada Inc.)
2. Natural Environment: "Natural Environment Report, Proposed Safarik Pit" September 26, 2025 (Source: WSP Canada Inc.)
3. Hydrogeology: "Safarik Pit Level One and Two Water Report" October 10, 2025 (Source: WSP Canada Inc.)
4. Maximum Predicted Water Table Report: "Safarik Pit Maximum Predicted Water Table Report" October 2, 2025 (Source: WSP Canada Inc.)
5. Archaeology: "Stage 1 and 2 Archaeological Assessment Safarik Pit" September 2025 (Source: WSP Canada Inc.)
6. Traffic: "Traffic Impact Study CBM Safarik Pit" August 2025 (Source: TYLin)
7. Dust: "Best Management Practices Plan for the Control of Fugitive Dust" October 2025 (Source: WSP Canada Inc.)
8. Heritage: "CBM Safarik Pit Heritage Impact Assessment" October 15, 2025 (Source:WSP Canada Inc.)

Key Plan



Subject Lands

Additional Lands Licensed by Applicant

north

SCALE
0 1.0 2.0 3.0
KILOMETRES

Legal Description

PART OF LOT 29
CONCESSION 7
(Geographic Township of Puslinch)
TOWNSHIP OF PUSLINCH
COUNTY OF WELLINGTON

Legend

- Boundary of Area to be Licensed
- Additional Lands Owned by Applicant
- Existing Fence — POST & WIRE FENCE UNLESS OTHERWISE NOTED
- Public Road - Paved
- Driveway - Gravel
- Driveway - Paved
- Existing Access
- Hydro Pole
- Hydro Tower
- 120m Zone
- Unevaluated Wetland — WSP (2022)
- Groundwater Monitor — WSP 2023 (MW21-04)
- Limit of Significant Woodland — STAKED BY WSP 2024
- Greenbelt Plan Boundary
- Limit of Extraction — ALL SETBACKS ARE DRAWN TO SCALE AND SHOW LABELLED DISTANCES
- Contour with Elevation — METRES ABOVE SEA LEVEL
- Existing Spot Height Elevation — METRES ABOVE SEA LEVEL
- Building/Structure — LOCATION AND USE FOR BUILDINGS ON-SITE AND WITHIN 120m ARE SHOWN
- Existing Vegetation
- Direction of Surface Drainage (IF ANY)
- Parcel Fabric — LOCATION APPROXIMATE
- Archaeological Site — SITE RECOMMENDED FOR FURTHER ARCHAEOLOGICAL FIELD WORK
- Significant Wildlife Habitat — WSP 2025
- Species at Risk Habitat — WSP 2025
- Cross Sections — SEE PAGE 5 OF 5 FOR EXISTING AND REHABILITATED CROSS SECTIONS

Site Plan Amendments

No.	Date	Description	By

MHBC PLANNING URBAN DESIGN & LANDSCAPE ARCHITECTURE
200-540 BINGEMANS CENTRE DR, KITCHENER, ON, N2B 3X9 | P: 519.576.3650 | WWW.MHBCPLAN.COM

MNR Approval Stamp

Stamp

north

Applicant

VOTORANTIM cimentos cbm

55 Industrial St. 4th Floor Toronto, Ontario M4G 3W9
Telephone: (416) 696-4411

Applicant's Signature

Andreanne Senecal
Director of Land, Resources and Environment
Votorantim Cimentos North America (VCNA)

Project

Safarik Pit

ARA Licence Reference No.

Pre-approval review:

For client review - November 2025

Plan Scale **1:2,000 (Arch D)**

SCALE
0 25 50 100
METRES

Plot Scale 1:2.0 [1mm = 2.0 units] MODEL

Drawn By D.G.S.

Checked By N.D.

File No. Y321AR

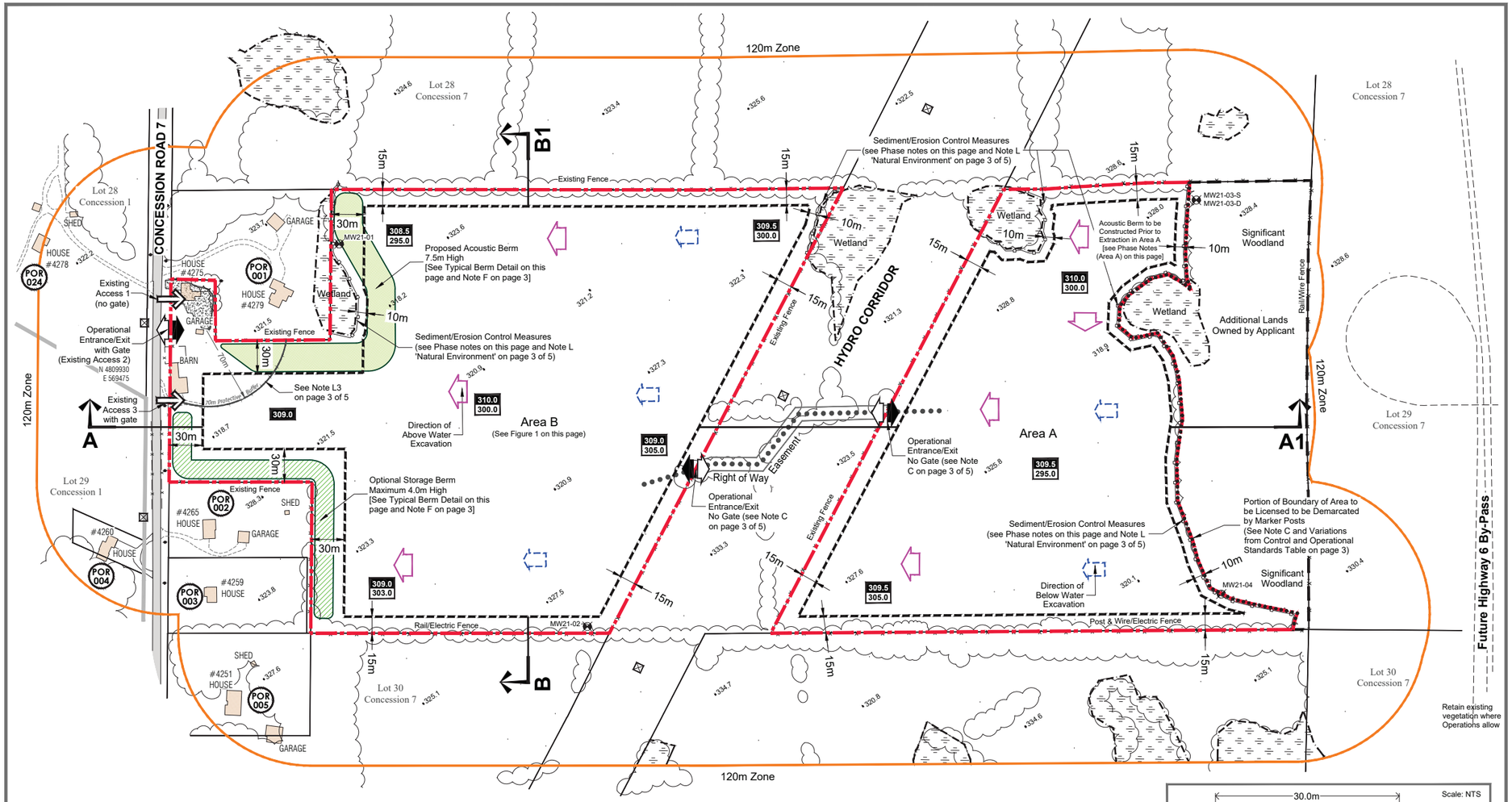
File Name

EXISTING FEATURES PLAN

Drawing No.

1 OF 5

K:\Y321AR-CBM-Safarik Pit\A\CBM Safarik Pit Exfeplan1of5 November2025.dwg



Phase Notes:

Area A

1. Establish 10m setback/limit of extraction from significant woodlands and wetlands as shown.
2. Prior to extraction, and where applicable, sediment/erosion control measures (eg. silt fencing) will be installed as shown.
3. The perimeter of the Boundary of Area to be Licensed is fenced with the exception of the east boundary of Area A. In this location, the boundary will be demarcated by 1.2m high marker posts that are visible from one to the other. All fencing will be confirmed to be in accordance with the Aggregate Resources Act prior to commencement of extraction on the site. Fencing is to be 1.2m high post and wire fence. A 1.2m gate will be installed prior to operations at the operational entrance/exit location on Concession 7 Road as shown and kept locked when the pit is not in operation (also see Sequence of Operations and Variations from Control and Operation Standards on this page and page 3 of 5). A gate will be required for Existing Access 3.
4. Remove vegetation within extraction area where applicable.
5. Establish internal haul route for shipping of product off site for processing at other CBM sites.
6. Strip topsoil/overburden and use it in the construction of acoustic berm. The berm shall be constructed prior to extraction in Area A. Any material not required for berm construction shall be temporarily stockpiled within the extraction area in accordance with the Sequence of Operations diagram and subject to Variations from Control and Operational Standards on page 3 of 5. See also Note L "Noise" on page 3 of 5.
7. Extraction (above and below water) will commence in the northeast portion of Area A and proceed southwesterly. Below water extraction may occur simultaneously with above water extraction in order to blend materials to meet market demand. The maximum depth of extraction is 30m below the existing ground surface.
8. Initiate progressive rehabilitation of above water side slopes as extraction proceeds and enough area is available without interfering with the operation of the site.
9. Initial tree planting will occur in north/northeast setback of Area A. Additional tree planting in the setback areas and will be completed prior to extraction in Area B.
10. Prepare Area B for above water extraction.

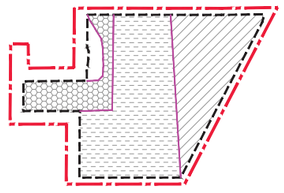
Area B

1. Establish 10m setback/limit of extraction from wetlands as shown.
2. Strip topsoil/overburden and store anywhere within the extraction area subject to Variations from Control and Operational Standards on page 3 of 5. An optional storage berm (as shown) may be constructed.
3. Extraction (above and below water) will commence along the eastern boundary of Area B and will proceed in an westerly direction. Below water extraction may occur simultaneously with above water extraction in order to blend materials to meet market demand. The maximum depth of extraction is 25m below the existing ground surface.
4. Initiate progressive rehabilitation of above water side slopes beginning in east half of Area B, (adjacent to Hydro One lands) and complete along north and south setback areas as extraction moves west and enough area is available without interfering with the operation of the site.
5. The creation of shallow shoreline areas in Area A shall be initiated as part of progressive rehabilitation (see Rehabilitation Plan, page 4 of 5).

Phases Not Shown

1. Remove any equipment and haul roads on site.
2. Complete all 3:1 above water side slopes and below water side slopes.
3. Complete nodal planting areas.
4. Final rehabilitation to be completed (see Rehabilitation Plan on page 4 of 5).

Figure 1
Operational Noise Control and Mitigation Measures (Area B)

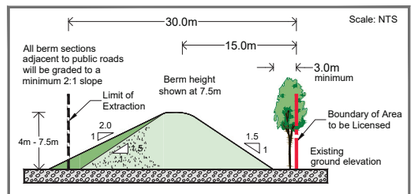


Operational Noise Control Area 1
- Above Water Extraction - One small loader
- Below Water Extraction - One (1) small loader and mitigated dragline operation at full load for 45 minutes

Operational Noise Control Area 2
- Above Water Extraction - One small loader
- Below Water Extraction - One (1) small loader operating at full load for 45 minutes, located east of a 4.5m high barrier, mitigated dragline operation at full load for 45 minutes.

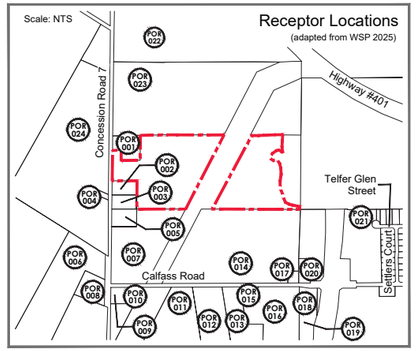
Operational Noise Control Area 3
- Above Water Extraction - One small loader
- Below Water Extraction - One (1) small loader mitigated dragline operation at full load for 45 minutes.

Scale: NTS
(adapted from WSP 2025)



Typical Berm Detail

ALL BERMS WILL BE VEGETATED AND MAINTAINED TO CONTROL EROSION



Legal Description

PART OF LOT 29
CONCESSION 7
(Geographic Township of Puslinch)
TOWNSHIP OF PUSLINCH
COUNTY OF WELLINGTON

Legend

- Boundary of Area to be Licensed
- Additional Lands Owned by Applicant
- Existing Spot Height Elevation — METRES ABOVE SEA LEVEL
- Existing Fence — POST & WIRE FENCE UNLESS OTHERWISE NOTED
- Building/Structure — LOCATION AND USE FOR BUILDINGS ON-SITE AND WITHIN 120m ARE SHOWN
- Existing Vegetation
- Existing Access
- Unevaluated Wetland — WSP (2022)
- Groundwater Monitor — WSP 2023
- Limit of Significant Woodland — STAKED BY WSP 2024
- Cross Sections — SEE PAGE 5 OF 5 FOR EXISTING AND REHABILITATED CROSS SECTIONS
- Limit of Extraction — ALL SETBACKS ARE DRAWN TO SCALE AND SHOW LABELLED DISTANCES
- Operational Entrance/Exit — MAINTAINED BY A GATE WHICH WILL BE CLOSED WHEN PIT IS NOT IN OPERATION
- Direction of Above Water Excavation — SEE NOTES ON THIS PAGE/PAGE 3 OF 5
- Direction of Below Water Excavation — SEE NOTES ON THIS PAGE/PAGE 3 OF 5
- Elevation — ABOVE WATER DEPTH OF EXTRACTION / MAXIMUM DEPTH OF BELOW WATER EXTRACTION/PIT FLOOR
- Internal Haul Road — INITIAL TYPICAL LOCATION, LOCATION TO VARY AS OPERATIONS PROGRESS
- Acoustic Berm — SEE "TYPICAL BERM DETAIL" ON THIS PAGE AND NOTES ON PAGE 3 OF 5
- Optional Storage Berm — SEE "TYPICAL BERM DETAIL" ON THIS PAGE AND NOTES ON PAGE 3 OF 5
- Receptor Locations
- Sediment/Erosion Control Measures

Site Plan Amendments

No.	Date	Description	By

MHBC PLANNING URBAN DESIGN & LANDSCAPE ARCHITECTURE
200-540 BINGEMANS CENTRE DR, KITCHENER, ON, N2B 3X9 | P: 519.576.3650 | WWW.MHBCPLAN.COM

MNR Approval Stamp

Stamp

north

Applicant

VOTORANTIM cimentos cbm
55 Industrial St. 4th Floor Toronto, Ontario M4G 3W9
Telephone: (416) 696-4411

Applicant's Signature

[redacted]
Director of Land, Resources and Environment
Votorantim Cimentos North America (VCNA)

Project

Safarik Pit

ARA Licence Reference No.

Pre-approval review:

For client review - November 2025

Plan Scale **1:2,000 (Arch D)**

SCALE
0 25 50 100
METRES

Plot Scale 1:2.0 [1mm = 2.0 units] MODEL

Drawn By D.G.S.

Checked By N.D.

File No. Y321AR

File Name

OPERATIONAL PLAN

Drawing No.

2 OF 5

K:\Y321AR-CBM-Safarik Pit\A\CBM Safarik Pit Operplan2of5 November2025.dwg

A. General

1. This site plan is prepared under the Aggregate Resources Act (ARA) for a Class A licence for a pit below the ground water table and follows the Aggregate Resources of Ontario: Site Plan Standards August 2020, specifically Operations for all sites (Numbers 33-56 in the standards).
2. Area Calculations:
   Licence Area: 27.6 hectares (68.2 acres)
   Limit of Extraction: 21.3 hectares (52.6 acres)
3. No more than 1,000,000 tonnes of aggregate shall be removed from this site in any calendar year.
4. Based on the available groundwater elevation data, the maximum predicted water table on the site is 306.99 masl in the western portion of the site (as measured at MW21-01) to 308.52 masl in the east portion of the site (as measured at MW21-03-D).
5. Agricultural use may continue in areas not under extraction.
6. Setbacks will be as shown and labelled on the Site Plans.
7. Source Water Protection: The site lies within the Grand River Source Protection Area which is part of the Lake Erie Source Protection Region (LESPR). The Site is not proximal to any Wellhead Protection Area (WHPA). The site is located within the Wellhead Water Quantity Zone and is classed as a Significant Groundwater Recharge Area (SGRA). No proposed on-site activities are considered to be significant drinking water threats (See also 'Hydrogeology' notes on this page).

B. Hours of Operation

1. Extraction (from above and below the water table) will be carried out between 07:00 and 19:00 with haulage occurring from 07:00 to 18:00 weekdays and 08:00 to 16:00 Saturdays, excluding statutory holidays.
2. Activities used to prepare the site for excavation, such as stripping of topsoil, construction of the berms, or activities related to the rehabilitation of the site after extraction is completed are considered to be construction activities and are only permitted to occur during the daytime from 07:00 to 19:00 Monday to Friday.

C. Site Access and Fencing

1. There are three existing accesses along Concession Road 7. Existing Access 1 shall be used for access to the residence at #4275 Concession Road and will not be gated. Existing Access 3 may be utilized for monitoring, setback maintenance and agricultural access and will be gated. The operational entrance/exit (Existing Access 2) along Concession 7 Road shall be gated, kept closed during hours of non-operation and shall be maintained throughout the life of the licence. Aggregate trucks shall only be permitted to access the site from Concession Road 7 at this location. Other operational entrance/exits shown (adjacent to Hydro One corridor) will not be gated [see also Variation to Control and Operational Standards Table on this page].
2. The Boundary of Area to be Licensed is currently fenced, except for the east boundary of Area A, as shown on pages 1 and 2 of 5. The property boundary further to the east (Additional Lands Owned by Applicant) is fenced. Where the fencing is not compliant, it will meet ARA requirements prior to commencement of extraction on site.
3. Sediment/erosion control measures (e.g. silt fencing) shall be installed along the portions of the licensed boundary as shown on the Sequence of Operations between the area to be disturbed and the wetlands/woodland limit prior to commencement of work (see Note L 'Natural Environment').

D. Drainage

1. Drainage of undisturbed areas will continue and be in the directions shown on the Existing Features drawing on page 1 of 5. During above water excavation, surface drainage from active pit areas will be detained within the pit area. For below water excavation, drainage will be directed toward the pond area. Drainage will also percolate naturally through the soil.

E. Site Preparation

1. Prior to site preparation, a Spills Contingency Plan shall be developed to address any potential spills from equipment on-site.
2. Timber resources will be salvaged for use as saw logs, fence posts and fuel wood where appropriate. Non-merchantable timber, stumps and brush may be used in for aquatic habitat enhancement or mulched for use in progressive rehabilitation. Excess material not required for uses mentioned above will be burned (with applicable permits).
3. Topsoil and overburden shall be stripped and stored separately in accordance with the Sequence of Operations diagram.
4. Excess topsoil and overburden not required for immediate use in the construction of acoustic berms or rehabilitation, may be temporarily stockpiled within the limit of extraction. Topsoil and overburden stockpiles shall be located within the limit of extraction (see Note M 'Variations from Control and Operational Standards').
5. Temporary topsoil and overburden stockpiles which remain for more than one year shall have their slopes vegetated to control erosion. Seeding shall not be required if these stockpiles have vegetated naturally in the first year.

F. Berms and Screening

1. Acoustic berms shall be constructed as shown in Area B (see Sequence of Operations diagram and Phase Notes on page 2 of 5 for details).
2. An optional visual/storage berm may be located in the western setback of Area B (see Sequence of Operations diagram on page 2 of 5).
3. See 'Typical Acoustic Berm Detail' on page 2 of 5 for details relating to berm construction and will be vegetated and maintained to control erosion using a low maintenance grass/legume seed mixture (e.g. MTO Seed Mix) composed of Creeping red Fescue, Perennial Ryegrass, Kentucky Bluegrass and White Clover. Temporary erosion control will be implemented as required.
4. Existing vegetation within the setbacks shall be maintained to extent possible where berms are to be located. Additional nodal plantings shall occur within setbacks as shown on the Rehabilitation Plan (page 4 of 5).

G. Extraction Sequence

1. The operational plan depicts a schematic operations sequence for this property. Phases do not represent any specific or equal time period. The direction of extraction will be in accordance with the Sequence of Operations diagram shown on page 2 of 5. All extraction and transportation equipment operating within these Phases shall comply with the restrictions identified in Note L 'Noise'.
2. Rehabilitation will be progressive and proceed as limits of extraction (area and depth) are reached. Any deviations from the operations sequence shown (extraction, stripping and rehabilitation areas) will require the approval of MNR.
3. Notwithstanding the operation and rehabilitation notes, demand for certain products or blending of materials may require minor deviations in the extraction and rehabilitation sequence. Any major deviations from the operations sequence shown will require approval from MNR.
4. See Phase Notes on page 2 of 5 for details.

H. Extraction Details

1. The maximum depth of extraction is as shown as spot elevations and extraction will occur in up to 3 lifts through the two (2) Extraction Areas as shown on the Sequence of Operations Diagram on page 2 of 5 and in accordance with the Ministry of Labour requirements. The maximum lift height shall be 20m, with a typical face height of 10m, but will not exceed Ministry of Labour guidelines. The proposed pit floor will range in elevation from 309.0 to 295.0 masl in both Area A and Area B (In Area B this is 15m to 25m below the existing ground surface and in Area A, this is 23m to 30m below the existing ground surface).
2. Aggregate stockpiles will move throughout the life of the operations of the pit. Stockpiles may be located anywhere within the limit of extraction, subject to Variations from Control and Operational Standards, and will be a maximum 20m in height.
3. There will be no aggregate processing or recycling at this pit.
4. Internal haul road locations will vary as extraction progresses through the site.

I. Equipment and Processing

1. The equipment used on site for extraction may include: Extraction Loaders (2), Product Shipment Truck and Dragline (1). Also, portable equipment will used for site preparation and rehabilitation including hydraulic shovels, dozers and scrapers.
2. There will be no aggregate processing on site. Processing will be carried out at other CBM licences.

J. Fuel Storage

1. Mobile fuel trucks will be used for fuelling of equipment. There will be no fuel storage on site.

K. Scrap and Recycling

1. No scrap will be stored on site.
2. No recycling activities will take place on site.

L. Report Recommendations

1. **Noise:** **"Noise Assessment Report - Proposed Safarik Pit" November 2025 (Source: WSP Canada Inc.)**
   a. On-site equipment shall meet the limits as specified in Table 1 in Section 3.0 of the noise assessment report.
   b. Activities to prepare the Site, such as the stripping of topsoil, construction of the berms, or activities related to the rehabilitation of the Site after the extraction is completed are considered to be construction activities and are only permitted to occur during the daytime period (i.e., 07:00 to 19:00) Monday to Friday except statutory holidays.
   c. A 7.5 m high, 237 m long L-shaped noise berm/barrier, as specified on Figure 2, shall be installed west of the Area B near the Site entry. The berm shall be constructed prior to extraction within Area A.
   d. Windrows berms of minimum 4.5 m high shall be used during below water extraction within indicated areas of the Area A. The loader supporting below water extraction shall be positioned on the east side of the windrow.
   e. Proposed berm/barrier can be constructed of earth berms, product stockpiles or other suitable acoustic barriers such as trailers or shipping containers as long as the height and the density requirements of 20 kg/m2, without gaps are maintained.
   f. Extraction loader(s) shall operate within 30 m of the active working face to maximize noise screening by the working face.
   g. The licensee shall utilize an alternative to narrow band back up alarms that meet Ministry of Labour safety requirements for on-site equipment.
   h. Prior to operations commencing, sound measurements of the equipment used on the Site shall be undertaken by a qualified professional to confirm maximum emission levels are not exceeded.
   i. To confirm that sound levels from the Site operations are in compliance with the MECP noise guideline limits, an acoustical audit shall be completed by a qualified professional once extraction commences in Area A below water extraction.
   j. Proposed mitigation may be substituted through equipment modification, other control measures and/or local barriers if an assessment by qualified professional is completed in accordance with MECP requirements and demonstrates the modification complies with MECP noise limits at surrounding sensitive receptors. Prior to any modification, notification shall be given to MNR.
   k. Prior to commencement of operations, noise from haulage operation shall be measured by a qualified professional and compared with existing noise from vehicles and heavy trucks along Concession Road 7.

2. **Natural Environment:** **"Natural Environment Report, Proposed Safarik Pit" September 26, 2025 (Source: WSP Canada Inc.)**
   a. Consult with MECP to map habitat for bobolink and eastern meadowlark on the Site as part of authorizations under the *Endangered Species Act;*
   b. Sediment and erosion control measures will be installed along the dripline of the significant woodland and wetland features;
   c. Extraction setbacks as identified on the Operational Plan are to be clearly demarcated and respected. Existing natural vegetation communities will be retained within the setbacks, except where berms are proposed;
   d. No clearing of vegetation shall occur within the core breeding bird season (April 1 - August 31) unless a nesting survey has been completed by a qualified biologist within 24 hours of the clearing, and no active nests were observed;
   e. No tree clearing or grubbing shall occur within the active season for bats (April 1 - November 30);
   f. Standard best management practices shall be implemented to reduce dust and noise during operations;
   g. Undertake rehabilitation as outlined in the Rehabilitation Plan;
   h. Implement a SAR Training Program and Encounter Protocol. The SAR Training Program is to be provided for all new on-Site staff as part of orientation training. The Training Program will include:
      i. Information / training on identifying SAR
      ii. What to do if a SAR is observed (Encounter Protocol)
      iii. How to protect a turtle or bird nest
      iv. Information on how to report a SAR sighting

3. **Archaeology:** **"Stage 1 and 2 Archaeological Assessment Safarik Pit" September 25, 2025 (Source: WSP Canada Inc.)**
   Based on the results of the Stage 1 and 2 Archaeological Assessment, the following recommendations are presented:
   a. The artifact assemblage recovered from Location 1 (AiHa-71) signifies that 80% or more of the site's occupation predates 1900 and is therefore considered to have cultural heritage value or interest (CHVI) according to the MCM (2021) 19th Century Rural Historical Farmstead Sites Standards for Consultant Archaeologists. A Stage 3 archaeological assessment following Section 3.2.2 Standards 1-12 of 19th Century Rural Historical Farmstead Sites Standards for Consultant Archaeologists is recommended:
      i. Following the Standards and Guidelines for Consultant Archaeologists (MCM 2011), Table 3.1, Standards 3-4, begin test unit excavation by excavating the 1 m2 test units in a 10 m grid across the site.
      ii. Place and excavate additional test units amounting to a minimum of 40% of the grid unit total, focusing on areas of interest within the site extent. The Stage 3 archaeological assessment should be conducted to define the site extent, gather a representative sample of artifacts, and aid in the determination of a Stage 4 mitigation strategy, if required;
   b. As per *Section 2.2, Standard 1* of the *Standards and Guidelines for Consultant Archaeologists* (MCM 2011), Locations 2, 3, and 4 are not considered to have further cultural heritage value or interest, and no further assessment is recommended;
   c. The remainder of the Study Area is considered to be sufficiently documented and no further assessment is recommended;

   The MCM is requested to review and provide a letter indicating their satisfaction with the results and recommendations presented herein, with regard to the 2011 *Standards and Guidelines for Consultant Archaeologists* and the terms and conditions for archaeological licences, and to enter this report into the Ontario Public Register of Archaeological Reports.

4. **Hydrogeology:** **"Safarik Pit Level One and Two Water Report" October 10, 2025**
   a. A proactive and long-term groundwater and surface water monitoring program will be completed during the pit operational and rehabilitation phases, until the license is surrendered;
   b. A well interference and mitigation plan will be implemented proactively prior to pit operation;
   c. A spill action plan will be developed and administered throughout all phases of pit operations;

   Maximum Predicted Water Table Report: **"Safarik Pit Maximum Predicted Water Table Report" October 2, 2025 (Source: WSP Canada Inc.)**
   d. The proposed pit will be developed below the natural groundwater table. The maximum depth of extraction below the water table is to an elevation of 295 metres above sea level (mASL);
   e. The maximum water table at the Site ranges from 306.99 mASL at MW21-01 (SAF) to 308.52 mASL at MW21-03-D (SAF). Groundwater flows across the Site in a west-southwest direction.

5. **Traffic:** **"Traffic Impact Study, CBM Safarik Pit" August 2025 (Source: TYLin)**
   The access is to be positioned closer to the southern limit of the identified northern access range.

6. **Dust:** **"Best Management Practices Plan for the Control of Fugitive Dust Safarik Pit" October 2025 (Source: WSP Canada Inc.)**
   The pit shall be operated in accordance with the Best Management Practices Plan for the Control of Fugitive Dust.

7. **Heritage:** **"CBM Safarik Pit Heritage Impact Assessment" October 15, 2025 (Source: WSP Canada Inc.)**
   a. The extant barn and farmhouse in the Study Area possess Cultural Heritage Value or Interest and should be retained in situ and avoided. Additionally, a structural assessment should be conducted on the barn and farmhouse to identify and address any deficiencies or deteriorations compromising the structural integrity of each structure. Yearly inspections should be conducted on the barn and farmhouse to prevent demolition by neglect;
   b. This HIA should be distributed to the Ministry of Citizenship and Multiculturalism, the Township of Puslinch, and Wellington County.

M. Variations from Control and Operation Standards

No.	O.Reg 244/97 Section 0.13	Variation	Rationale
1	(1)1	No gate at Operational entrance/exits along Hydro One corridor.	The location of the accesses may vary along the licensed boundary in this area on both sides of Hydro One corridor.
2	(1)1	No gate at Existing Access 1.	This access is for the on-site residence at #4275 Concession Road 7.
3	(1)13i	Stockpiling of aggregate, topsoil or overburden may be located within 30m of boundary of the site other than part of the boundary described in (1)13iiA below.	Stockpiling may occur within any portion of the extraction area. Some areas adjacent to agricultural fields and Hydro One corridor have a 15m setback.
4	(1)13iiA	Stockpiling of aggregate, topsoil or overburden may be located within 90m of boundary of the site coincident with properties along Concession Road 7.	Stockpiling may occur within any portion of the extraction area. There is a 30m extraction setback from the site coincident with properties along Concession Road 7.
5	(1)19i	Below water side slopes may vary from a slope that is at least three horizontal metres for every vertical metre (3:1). These will slope at minimum to the natural angle of repose.	Slopes will be no steeper than a 2:1 slope below water or the natural angle of repose.
6	(3)(a)	Fencing is not required where it is coincident with the staking of the woodlands along the east portion of the licence boundary. The property boundary further to the east (Additional Lands Owned by Applicant) is fenced.	These boundaries will be demarcated by 1.2m high marker posts that are visible from one to the other. Adjacent lands to the east are Additional Lands Owned by Applicant. If conditions in or around the licensed pit change or if licence is surrendered, a 1.2m high fence will be installed.

Legal Description

PART OF LOT 29
CONCESSION 7
(Geographic Township of Puslinch)
TOWNSHIP OF PUSLINCH
COUNTY OF WELLINGTON

Site Plan Amendments

No.	Date	Description	By

MHBC PLANNING URBAN DESIGN & LANDSCAPE ARCHITECTURE
200-540 BINGEMANS CENTRE DR, KITCHENER, ON, N2B 3X9 | P: 519.576.3650 | WWW.MHBCPLAN.COM

MNR Approval Stamp

Stamp

Applicant

VOTORANTIM cimentos | cbm

Applicant's Signature

Andreanne Stoddart
Director of Land, Resources and Environment
Votorantim Cimentos North America (VCNA)

Project

Safarik Pit

ARA Licence Reference No.

Pre-approval review:

For client review - November 2025

Plan Scale **1:2,000 (Arch D)**

Plot Scale 1:2.0 [1mm = 2.0 units] MODEL

Drawn By D.G.S.

Checked By N.D.

File No. Y321AR

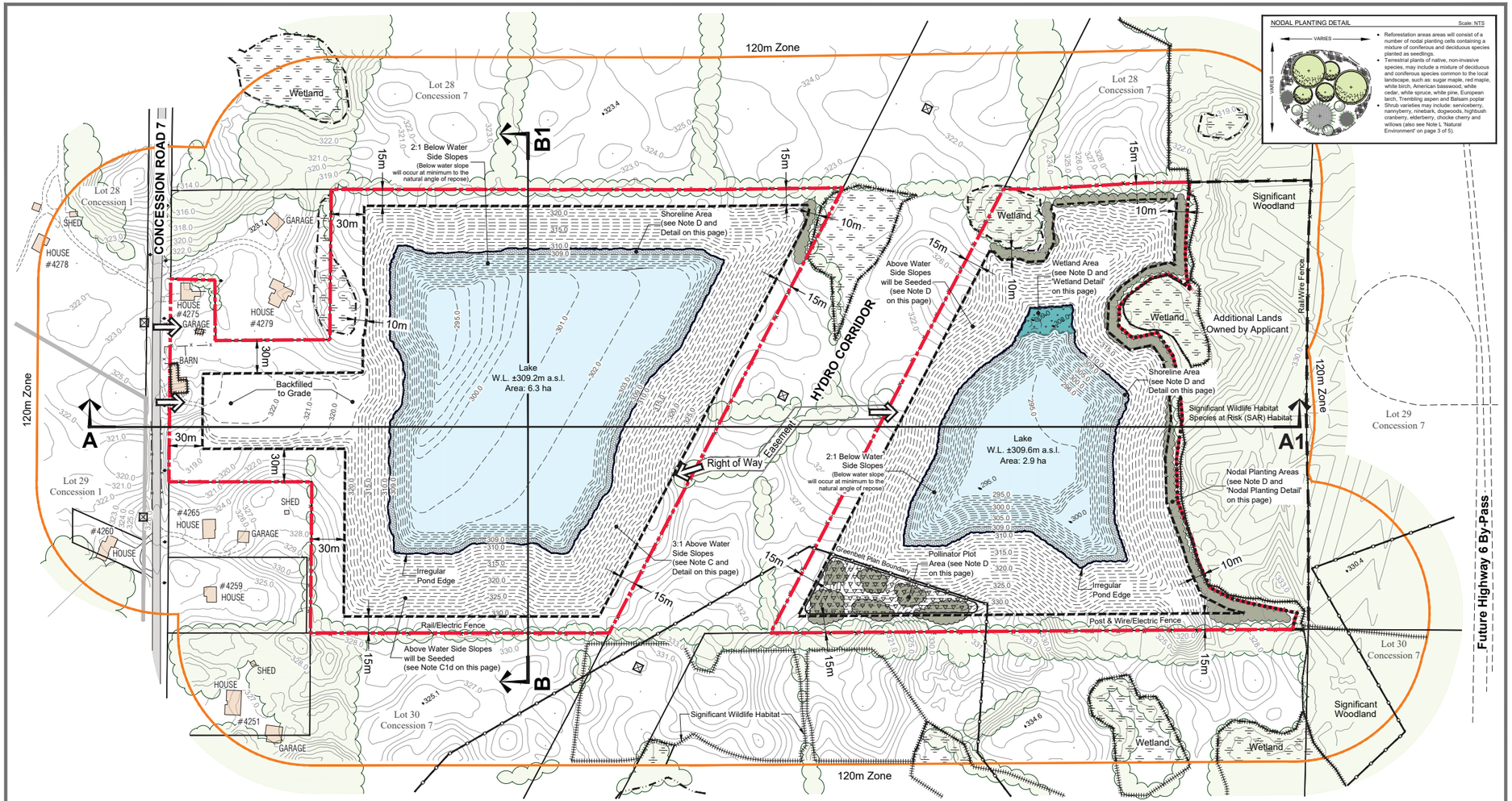
File Name

OPERATIONAL NOTES PLAN

Drawing No.

3 OF 5

K:\Y321AR-CBM-Safarik Pit\A\CBM Safarik Pit Notesplan3of5 November2025.dwg



Legal Description

PART OF LOT 29
CONCESSION 7
(Geographic Township of Puslinch)
TOWNSHIP OF PUSLINCH
COUNTY OF WELLINGTON

Legend

- Boundary of Area to be Licensed
- Additional Lands Owned by Applicant
- Contour with Elevation (METRES ABOVE SEA LEVEL)
- Existing Spot Height Elevation (METRES ABOVE SEA LEVEL)
- Building/Structure (LOCATION AND USE FOR BUILDINGS ON-SITE AND WITHIN 120m ARE SHOWN)
- Existing Vegetation
- Existing Fence (POST & WIRE FENCE UNLESS OTHERWISE NOTED)
- Existing Access
- Unevaluated Wetland (WSP (2022))
- Significant Woodland (STAKED BY WSP 2024)
- Greenbelt Plan Boundary
- Cross Sections (SEE PAGE 5 OF 5 FOR EXISTING AND REHABILITATED CROSS SECTIONS)
- Limit of Extraction (ALL SETBACKS ARE DRAWN TO SCALE AND SHOW LABELLED DISTANCES)
- Proposed Contour (METRES ABOVE SEA LEVEL)
- Proposed Elevation (REHABILITATED ELEVATION)
- Post Extraction Pond
- Proposed Wetland Area (SEE DETAIL ON THIS PAGE)
- Proposed Shoreline Area (SEE DETAIL ON THIS PAGE)
- Nodal Planting Areas (LOCATION APPROXIMATE)
- Pollinator Plot Area
- Significant Wildlife Habitat (WSP 2025)
- Species at Risk Habitat (WSP 2025)

Site Plan Amendments

No.	Date	Description	By

MHBC PLANNING URBAN DESIGN & LANDSCAPE ARCHITECTURE
200-540 BINGEMANS CENTRE DR, KITCHENER, ON, N2B 3X9 | P: 519.576.3650 | WWW.MHBCPLAN.COM

MNR Approval Stamp

Stamp

north

Applicant

VOTORANTIM cimentos | cbm

55 Industrial St. 4th Floor Toronto, Ontario M4G 3W9
Telephone: (416) 696-4411

Applicant's Signature

Andreanne Simard
Director of Lands, Resources and Environment
Votorantim Cimentos North America (VCNA)

Project

Safarik Pit

ARA Licence Reference No.

Pre-approval review:

For client review - November 2025

Plan Scale **1:2,000 (Arch D)**

SCALE
0 25 50 100
METRES

Plot Scale 1:2.0 [1mm = 2.0 units] MODEL

Drawn By D.G.S.

Checked By N.D.

File No. Y321AR

File Name

REHABILITATION PLAN

Drawing No.

4 OF 5

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This site plan is prepared under the Aggregate Resources Act (ARA) for a Class A licence for a pit below the ground water table and follows the Aggregate Resources of Ontario: Site Plan Standards August 2020, specifically Rehabilitation for all sites (Numbers 59-67 in the standards).

A. General

1. The rehabilitated landform of this site will include: lakes, shallow shoreline area, wetland area, planting areas and above water and below water side slope.
2. No buildings/structures or internal haul roads will remain on site upon completion of rehabilitation.

B. Phasing

1. The proposed Safarik Pit will be rehabilitated on a progressive basis, corresponding to the operational progression of the pit excavation, to form two lakes and above water table area with nodal plantings/reforestation at final rehabilitation.
2. As the pit is excavated to its maximum, or any other/lesser terminal limits, both horizontally and vertically on a lift-by-lift basis, progressive rehabilitation will follow provided the subject area is of an appropriate area to undergo rehabilitation (See Note G on page 3 of 5 for details).
3. The excavation perimeter will be fully side sloped at a maximum 2:1 below water (from original ground to floor), which is the natural angle of repose and a maximum of 3:1 for the above water portion. Sloping will occur as the limits of the pit excavation are reached. See Rehabilitation Plan drawing and Note C on this page.
4. Side slopes will be vegetated where located above the final water level of the pit lake and will include plantings in the setback areas and above water table final grades in order to enhance a diversity of native vegetation types and species that are anticipated to spread around the rehabilitated side slopes (see Note C and 'Nodal Planting Detail' on this page).

C. Slopes and Grading

1. Topsoil and overburden will be used in the progressive rehabilitation of the side slope areas. Side slopes above the water table will be established using a combination of backfill and/or cut and fill methods using on-site overburden, unmarketable material (till), and/or imported materials. Side slopes will be irregular with an average top to bottom grade not steeper than 3:1. Above water side slope areas that will be vegetated will be covered with a minimum 15 cm of topsoil/organic matter prior to planting.
2. Importation of fill/excess soil;
   a. Excess soil, as defined in Ontario Regulation 244/97 may be imported to this site to facilitate the following rehabilitation:
      i. Creation of 3:1 slopes (or sloping ratio otherwise described on this page)
      ii. Top dressing to establish vegetation
   b. Liquid soil, as defined in Ontario Regulation 406/19 under the Environmental Protection Act, is not authorized for importation to the site.
   c. The quality of excess soil imported to the site for final placement must be equivalent to or more stringent than the applicable excess soil quality standards as determined in accordance with Ontario Regulation 244/97 as amended from time to time and must be consistent with the site conditions and the end use identified in the approved rehabilitation plan.
   d. Where a qualified person is retained or required to be retained in accordance with Ontario Regulation 244/97, the quality, storage, and final placement of excess soils shall be done according to the advice of the qualified person.
   e. Excess soil imported to facilitate rehabilitation as described on this site plan shall be undertaken in accordance with Ontario Regulation 244/97 under the Aggregate Resources Act, as amended from time to time.
   f. The cumulative total amount of excess soil that may be imported to this site for rehabilitation purposes is 1,800,000 m³

D. Proposed Vegetation and Rehabilitated Features

1. Final Rehabilitation
   a. The proposed final rehabilitation plan includes the creation of two lakes and terrestrial habitats comprised of backfilled areas, overburden slopes, nodal plantings and pollinator area. Shoreline widths and depths will be varied to promote maximum diversity within the habitat for fish and wildlife. The natural influx of external organic matter (i.e., leaf litter) will be promoted along shoreline areas adjacent to existing woodlands through management of forest edges and minimization of cleared areas between the extraction area and woodlands.
   b. The tree planting areas will be planted in accordance with the applicable details on this plan and where indicated on the Rehabilitation Plan.

   c. Plantings (i.e. nodal plantings)
   These plantings included in the rehabilitation plan should focus on locally native, non-invasive species that create habitat in the short term and promote natural succession processes. Aquatic plants will include shrubs such as red-osier dogwood (*Cornus sericea*) and slender willow (*Salix petiolaris*), and herbaceous plants such as water plantain (*Alisma plantago-aquatica*), lake sedge (*Carex lacustris*), swamp milkweed (*Asclepias incarnata*), softstem bulrush (*Schoenoplectus tabernaemontani*), and common cattail (*Typha* spp.). Shallow emergent marsh vegetation (i.e., herbaceous species listed above) will be planted in water ±0.15 m deep and be interspersed with cover structures (e.g., boulders and root wads) in the shoreline areas. Basking logs, nesting platforms and boxes will be created for turtle, waterfowl, and swallows respectively.

   d. Plantings (i.e. pollinator plot area)
   These plantings shall include the following species: Common Milkweed (Asclepias syriaca), Showy tick-trefoil (Desmodium canadense), Wild bergamot (Monarda fistulosa), Foxglove beardtongue (Penstemon digitalis), Virginia Mountain-mint (Pycnanthemum virginianum), Black-eyed Susan (Rudbeckia hirta), Early goldenrod (Solidago juncea), Frost aster (Symphyotrichum pilosum), Smooth aster (Symphyotrichum laeve), Hoary vervain (Verbena stricta), White vervain (Verbena urticifolia) and other suitable native plant species of open habitats. Wildflowers will be established in pollinator plot area by planting plugs. Local seed collection may also be used to augment wildflower species composition. Plugs should be planted when the risk of frost is low. Minor variations in species selections may be necessary depending on availability.

   e. Above water side slopes and Setback Areas
   Side slopes will be rough graded to a 3:1 aspect to ensure stability. The slopes will be seeded with a mix of grasses and legumes consisting of native, non-invasive species. Woody species planted in the setback areas may include white cedar, white spruce (Picea glauca), sugar maple, red maple, white birch and American basswood, white pine, white cedar, Norway spruce (Picea abies), European larch (larix decidua), trembling aspen, and balsam poplar (see also 'Nodal Planting Detail' on this page). Shrubs such as serviceberry, nannyberry, ninebark (Physocarpus opulifolius), dogwoods, highbush cranberry (Viburnum opulus), elderberry, choke cherry (Prunus virginiana), willows and others may be used to add diversity and increase pollinator/wildlife diversity, particularly in the transition between wetland and upland areas (see also 'Nodal Planting Detail' on this page).

2. Progressive Rehabilitation
   a. Rehabilitation will be progressive following the direction of extraction and proceed as limits of extraction (area and depth) are reached. The sequence of rehabilitation will follow the "Sequence of Operations" diagram located on page 2 of 5. Minor deviations/variations in operational/rehabilitation sequence will be permitted in order to adjust for any variable resource and market conditions. Any major deviations from the operations sequence shown will require approval from MNR.
   b. Topsoil will be used in the progressive rehabilitation of the above water side slope areas. Side slope areas will be covered with a minimum 150mm of topsoil/organic matter. Overburden will be used to backfill pit faces to desired finished grades (i.e. 3:1 slope)
   c. Setback areas will be planted with nodal planting cells (see the site plan and 'Nodal Planting Detail' on this page).
   d. The new wetland area shall be created in accordance with the Wetland Area Detail. Wetlands shall be created as part of progressive rehabilitation while operations are taking place in Area B.

3. Vegetation
   Ground covers on above water side slopes will be established as part of the phased stripping operations that proceed extraction and will be maintained and replaced should it fail to establish itself to control erosion.

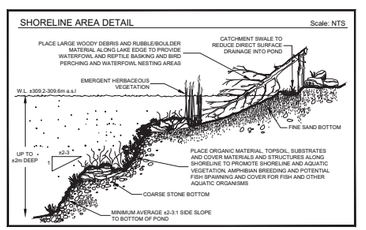
4. Establishment of Slopes/Rehabilitated Areas
   Rehabilitation of this site involves the creation of 9.2 ha of lake including shallow shoreline areas, 0.6 ha of pollinator plot area, 0.1 ha of wetland area, 0.8 ha of tree planting areas and 11.5 ha of terrestrial landform comprised of above water side slopes and backfilled to grade area. The final pit landform will be in accordance with the drawing as shown on this page. Shallow shoreline widths and depths will be varied to promote maximum diversity within this habitat for fish and wildlife.

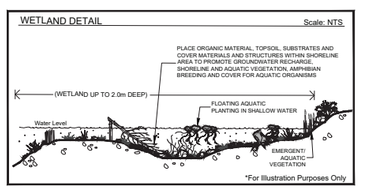
E. Drainage

1. Final surface drainage will follow the rehabilitated contours as shown.

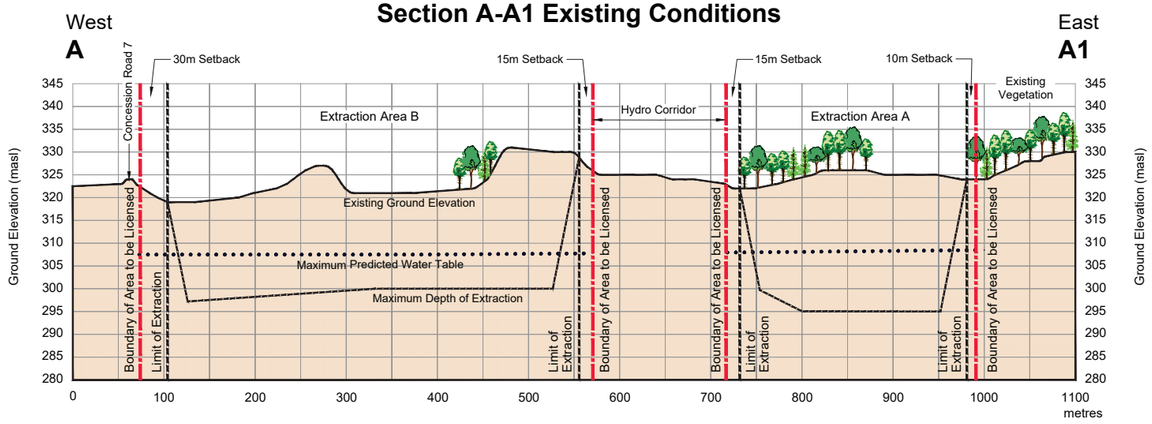
F. Final Rehabilitation

1. No buildings or structures associated with aggregate operations will remain on site.
2. The water level of the proposed lakes (±309.2 and ±309.6m a.s.l.) and the post-extraction ground water table, are as shown on pages 1, 4 and 5 of 5 as per hydrogeological/ hydrological assessment.

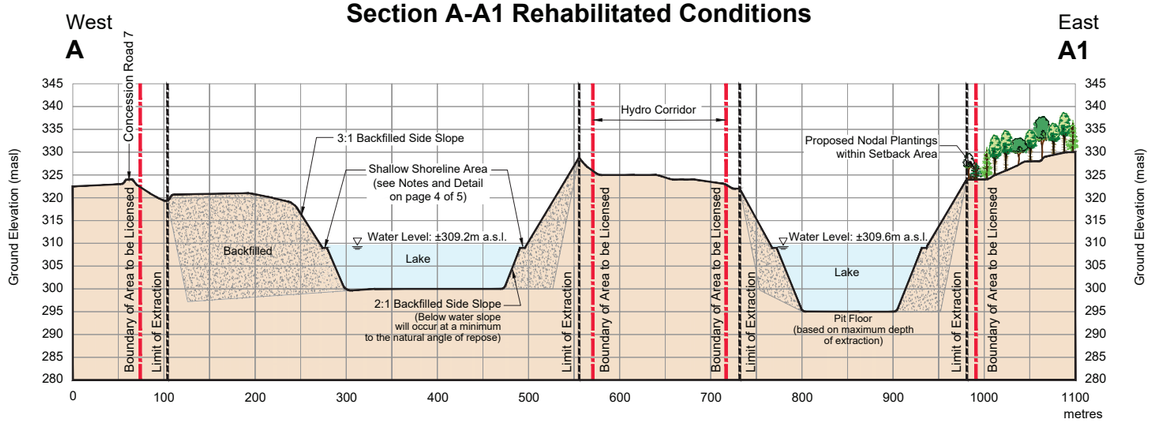




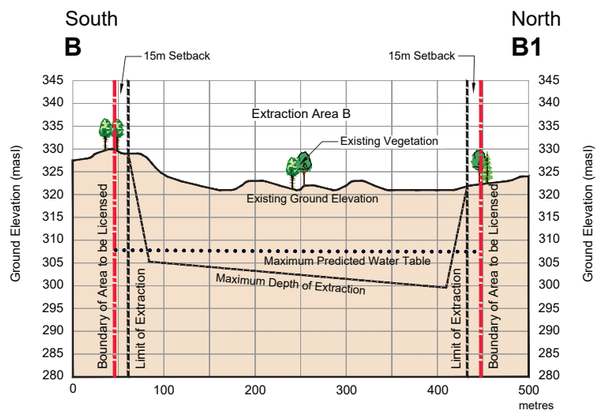
Section A-A1 Existing Conditions



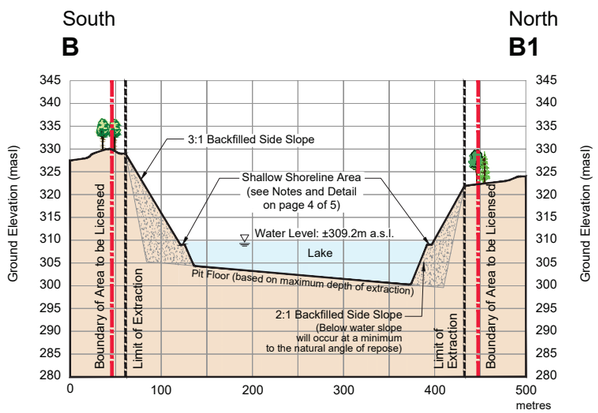
Section A-A1 Rehabilitated Conditions



Section B-B1 Existing Conditions



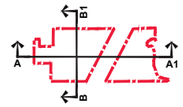
Section B-B1 Rehabilitated Conditions



PART OF LOT 29
CONCESSION 7
(Geographic Township of Puslinch)
TOWNSHIP OF PUSLINCH
COUNTY OF WELLINGTON

Legend

- Boundary of Area to be Licensed
- Limit of Extraction
- Maximum Depth of Extraction
- Vegetation/Trees
  EXISTING AND/OR PROPOSED AS INDICATED ON CROSS SECTIONS
- Proposed Nodal Plantings
- Maximum Predicted Water Table
  (SEE NOTE D1 ON PAGE 1 OF 5 AND NOTE L2 ON PAGE 3 OF 5)



Cross Sections
SEE PAGES 1, 2 & 4 OF 5 FOR PLAN VIEW LOCATION OF CROSS SECTIONS

Site Plan Amendments

No.	Date	Description	By

MHBC PLANNING URBAN DESIGN & LANDSCAPE ARCHITECTURE
200-540 BINGEMANS CENTRE DR, KITCHENER, ON, N2B 3X9 | P: 519.576.3650 | WWW.MHBCPLAN.COM

MNR Approval Stamp

Stamp

Applicant

VOTORANTIM cimentos | cbm

55 Industrial St. 4th Floor Toronto, Ontario M4G 3W9
Telephone: (416) 696-4411

Applicant's Signature

Director of Land, Resources and Environment
Votorantim Cimentos North America (VCNA)

Project

Safarik Pit

ARA Licence Reference No.

Pre-approval review:

For client review - November 2025

Plan Scale: **Horizontal 1:3,000 Vertical:5x Exaggeration**

HORIZONTAL SCALE
0 25 50 100
METRES

Plot Scale 1:3.0 [1mm = 3.0 units] MODEL

Drawn By D.G.S.

Checked By N.D.

File No. Y321AR

File Name

CROSS SECTIONS PLAN

Drawing No.

5 OF 5

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APPENDIX E

Sample Calculations

Receiver
Name: POR001
ID: POR001
X: 569510.69 m
Y: 4810026.02 m
Z: 327.12 m

Point Source, ISO 9613, Name: "SP032_Loader 2", ID: "!E07!SP032_Loader2"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	I/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)
155	569645.43	4810103.55	312.24	0	D	A	107.1	0.0	-1.2	0.0	0.0	54.9	0.8	-0.3	0.0	0.0	14.4	0.0	0.0	36.1

Point Source, ISO 9613, Name: "SP030_Loader 2", ID: "!E07!SP030_Loader2"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	I/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)
171	569685.87	4810143.98	311.50	0	D	A	107.1	0.0	-1.2	0.0	0.0	57.5	1.0	-1.2	0.0	0.0	9.2	0.0	0.0	39.2

Point Source, ISO 9613, Name: "SP029_Dragline ", ID: "!E07!SP029_Dragline"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	I/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)
175	569710.49	4810117.73	311.50	0	D	A	107.1	0.0	-1.2	0.0	0.0	57.9	1.1	-0.4	0.0	0.0	13.9	0.0	0.0	33.3

Line Source, ISO 9613, Name: "HW truck Area 1 ABW", ID: "!E07!HW"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	I/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)
200	569513.07	4809945.27	323.88	0	D	A	73.4	2.5	0.0	0.0	0.0	49.2	0.4	0.8	0.0	0.0	0.0	0.0	0.0	25.5
212	569511.78	4809944.70	323.89	0	D	A	73.4	0.1	0.0	0.0	0.0	49.2	0.4	0.8	0.0	0.0	0.0	0.0	0.0	23.1
214	569510.84	4809944.28	323.91	0	D	A	73.4	0.2	0.0	0.0	0.0	49.3	0.4	0.8	0.0	0.0	0.0	0.0	0.0	23.1
232	569509.86	4809943.85	323.92	0	D	A	73.4	0.4	0.0	0.0	0.0	49.3	0.4	0.8	0.0	0.0	0.0	0.0	0.0	23.2
234	569508.83	4809943.39	323.93	0	D	A	73.4	0.6	0.0	0.0	0.0	49.4	0.4	0.8	0.0	0.0	0.0	0.0	0.0	23.4
246	569507.79	4809942.93	323.95	0	D	A	73.4	0.5	0.0	0.0	0.0	49.4	0.4	0.8	0.0	0.0	0.0	0.0	0.0	23.3
258	569506.74	4809942.46	323.96	0	D	A	73.4	0.6	0.0	0.0	0.0	49.5	0.4	0.8	0.0	0.0	0.0	0.0	0.0	23.3
269	569505.75	4809942.02	323.97	0	D	A	73.4	0.1	0.0	0.0	0.0	49.5	0.5	0.8	0.0	0.0	0.0	0.0	0.0	22.7
301	569504.76	4809941.58	323.99	0	D	A	73.4	0.6	0.0	0.0	0.0	49.6	0.5	0.8	0.0	0.0	0.0	0.0	0.0	23.2
313	569503.76	4809941.14	324.00	0	D	A	73.4	0.2	0.0	0.0	0.0	49.6	0.5	0.8	0.0	0.0	0.0	0.0	0.0	22.7
346	569502.76	4809940.70	324.02	0	D	A	73.4	0.6	0.0	0.0	0.0	49.7	0.5	0.9	0.0	0.0	0.0	0.0	0.0	23.0
348	569501.76	4809940.25	324.03	0	D	A	73.4	0.2	0.0	0.0	0.0	49.7	0.5	0.9	0.0	0.0	0.0	0.0	0.0	22.6
350	569500.71	4809939.78	324.04	0	D	A	73.4	1.0	0.0	0.0	0.0	49.8	0.5	0.9	0.0	0.0	0.0	0.0	0.0	23.3
357	569499.46	4809939.23	324.06	0	D	A	73.4	1.7	0.0	0.0	0.0	49.8	0.5	0.9	0.0	0.0	0.0	0.0	0.0	24.0
359	569498.63	4809938.86	324.07	0	D	A	73.4	-4.7	0.0	0.0	0.0	49.9	0.5	0.9	0.0	0.0	0.0	0.0	0.0	17.5
483	569599.16	4809978.87	322.40	0	D	A	73.4	6.7	0.0	0.0	0.0	51.0	0.5	0.9	0.0	0.0	10.0	0.0	0.0	17.7
490	569596.20	4809975.59	322.40	0	D	A	73.4	6.2	0.0	0.0	0.0	50.9	0.5	0.9	0.0	0.0	9.9	0.0	0.0	17.3
498	569592.07	4809971.02	322.40	0	D	A	73.4	6.6	0.0	0.0	0.0	50.9	0.5	0.9	0.0	0.0	10.0	0.0	0.0	17.8
501	569589.66	4809968.36	322.40	0	D	A	73.4	4.2	0.0	0.0	0.0	50.8	0.5	0.9	0.0	0.0	10.2	0.0	0.0	15.2
605	569550.40	4809955.28	324.37	0	D	A	73.4	2.1	0.0	0.0	0.0	49.2	0.4	0.8	0.0	0.0	0.0	0.0	0.0	25.1
609	569549.00	4809955.38	324.31	0	D	A	73.4	0.7	0.0	0.0	0.0	49.1	0.4	0.8	0.0	0.0	0.0	0.0	0.0	23.8
611	569545.28	4809955.64	324.17	0	D	A	73.4	8.0	0.0	0.0	0.0	48.9	0.4	0.8	0.0	0.0	0.0	0.0	0.0	31.3
614	569540.58	4809955.97	323.99	0	D	A	73.4	4.9	0.0	0.0	0.0	48.6	0.4	0.8	0.0	0.0	0.0	0.0	0.0	28.5
656	569537.13	4809955.96	323.91	0	D	A	73.4	0.2	0.0	0.0	0.0	48.5	0.4	0.8	0.0	0.0	0.0	0.0	0.0	23.9
658	569536.13	4809955.52	323.90	0	D	A	73.4	0.5	0.0	0.0	0.0	48.5	0.4	0.8	0.0	0.0	0.0	0.0	0.0	24.2
660	569535.15	4809955.08	323.89	0	D	A	73.4	0.1	0.0	0.0	0.0	48.5	0.4	0.8	0.0	0.0	0.0	0.0	0.0	23.8
662	569534.22	4809954.67	323.88	0	D	A	73.4	0.0	0.0	0.0	0.0	48.5	0.4	0.8	0.0	0.0	0.0	0.0	0.0	23.7
666	569533.30	4809954.26	323.88	0	D	A	73.4	0.1	0.0	0.0	0.0	48.5	0.4	0.8	0.0	0.0	0.0	0.0	0.0	23.7
686	569532.38	4809953.85	323.87	0	D	A	73.4	0.0	0.0	0.0	0.0	48.6	0.4	0.8	0.0	0.0	0.0	0.0	0.0	23.7
688	569531.39	4809953.41	323.86	0	D	A	73.4	0.6	0.0	0.0	0.0	48.6	0.4	0.8	0.0	0.0	0.0	0.0	0.0	24.3
697	569530.38	4809952.97	323.85	0	D	A	73.4	0.2	0.0	0.0	0.0	48.6	0.4	0.8	0.0	0.0	0.0	0.0	0.0	23.8
705	569529.43	4809952.54	323.84	0	D	A	73.4	0.2	0.0	0.0	0.0	48.6	0.4	0.8	0.0	0.0	0.0	0.0	0.0	23.8
712	569528.44	4809952.10	323.83	0	D	A	73.4	0.5	0.0	0.0	0.0	48.6	0.4	0.8	0.0	0.0	0.0	0.0	0.0	24.1
715	569527.61	4809951.73	323.82	0	D	A	73.4	-1.5	0.0	0.0	0.0	48.6	0.4	0.8	0.0	0.0	0.0	0.0	0.0	22.1
1065	569497.90	4809938.53	324.09	0	D	A	73.4	1.0	0.0	0.0	0.0	49.9	0.5	0.9	0.0	0.0	0.0	0.0	0.0	23.2
1068	569496.82	4809938.06	324.13	0	D	A	73.4	0.4	0.0	0.0	0.0	50.0	0.5	0.9	0.0	0.0	0.0	0.0	0.0	22.5
1069	569495.80	4809937.60	324.17	0	D	A	73.4	0.6	0.0	0.0	0.0	50.1	0.5	0.9	0.0	0.0	0.0	0.0	0.0	22.6
1070	569494.74	4809937.13	324.20	0	D	A	73.4	0.6	0.0	0.0	0.0	50.1	0.5	0.9	0.0	0.0	0.0	0.0	0.0	22.6

Line Source, ISO 9613, Name: "HW truck Area 1 ABW", ID: "!E07!HW"																				
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)
1074	569493.54	4809936.60	324.24	0	D	A	73.4	1.7	0.0	0.0	0.0	50.2	0.5	0.9	0.0	0.0	0.0	0.0	0.0	23.6
1075	569492.28	4809936.04	324.29	0	D	A	73.4	1.0	0.0	0.0	0.0	50.3	0.5	0.9	0.0	0.0	0.0	0.0	0.0	22.8
1076	569491.24	4809935.58	324.32	0	D	A	73.4	0.1	0.0	0.0	0.0	50.3	0.5	0.9	0.0	0.0	0.0	0.0	0.0	21.8
1077	569490.22	4809935.12	324.36	0	D	A	73.4	0.9	0.0	0.0	0.0	50.4	0.5	0.9	0.0	0.0	0.0	0.0	0.0	22.6
1079	569489.31	4809934.72	324.39	0	D	A	73.4	-1.2	0.0	0.0	0.0	50.4	0.5	0.9	0.0	0.0	0.0	0.0	0.0	20.4
1104	569614.95	4809996.35	323.29	0	D	A	73.4	5.0	0.0	0.0	0.0	51.7	0.6	0.9	0.0	0.0	9.2	0.0	0.0	16.0
1106	569612.82	4809994.00	323.07	0	D	A	73.4	5.0	0.0	0.0	0.0	51.6	0.5	0.9	0.0	0.0	9.5	0.0	0.0	15.9
1110	569609.59	4809990.42	322.73	0	D	A	73.4	8.1	0.0	0.0	0.0	51.4	0.5	0.9	0.0	0.0	9.9	0.0	0.0	18.7
1312	569569.60	4809953.94	324.51	0	D	A	73.4	6.5	0.0	0.0	0.0	50.4	0.5	0.9	0.0	0.0	7.5	0.0	0.0	20.6
1321	569564.94	4809954.27	324.73	0	D	A	73.4	6.9	0.0	0.0	0.0	50.1	0.5	0.9	0.0	0.0	6.0	0.0	0.0	22.8
1356	569557.74	4809954.77	324.68	0	D	A	73.4	2.1	0.0	0.0	0.0	49.6	0.5	0.8	0.0	0.0	0.0	0.0	0.0	24.6
1367	569554.08	4809955.03	324.52	0	D	A	73.4	7.6	0.0	0.0	0.0	49.4	0.4	0.8	0.0	0.0	0.0	0.0	0.0	30.3
1399	569632.15	4810015.40	325.62	0	D	A	73.4	1.2	0.0	0.0	0.0	52.7	0.6	1.0	0.0	0.0	4.7	0.0	0.0	15.6
1415	569630.61	4810013.70	325.56	0	D	A	73.4	1.0	0.0	0.0	0.0	52.6	0.6	1.0	0.0	0.0	5.0	0.0	0.0	15.3
1425	569629.10	4810012.02	325.51	0	D	A	73.4	5.1	0.0	0.0	0.0	52.5	0.6	0.9	0.0	0.0	5.2	0.0	0.0	19.3
1434	569627.43	4810010.18	325.46	0	D	A	73.4	2.3	0.0	0.0	0.0	52.4	0.6	0.9	0.0	0.0	5.6	0.0	0.0	16.2
1443	569626.29	4810008.92	325.42	0	D	A	73.4	2.3	0.0	0.0	0.0	52.4	0.6	0.9	0.0	0.0	5.9	0.0	0.0	15.9
1508	569523.06	4809949.71	323.81	0	D	A	73.4	0.1	0.0	0.0	0.0	48.8	0.4	0.8	0.0	0.0	0.0	0.0	0.0	23.5
1519	569522.10	4809949.29	323.80	0	D	A	73.4	0.3	0.0	0.0	0.0	48.8	0.4	0.8	0.0	0.0	0.0	0.0	0.0	23.7
1527	569521.12	4809948.85	323.78	0	D	A	73.4	0.3	0.0	0.0	0.0	48.8	0.4	0.8	0.0	0.0	0.0	0.0	0.0	23.7
1534	569520.17	4809948.43	323.76	0	D	A	73.4	0.1	0.0	0.0	0.0	48.9	0.4	0.8	0.0	0.0	0.0	0.0	0.0	23.4
1546	569519.58	4809948.17	323.75	0	D	A	73.4	-5.8	0.0	0.0	0.0	48.9	0.4	0.8	0.0	0.0	0.0	0.0	0.0	17.5
1656	569686.21	4810112.47	313.74	0	D	A	73.4	10.8	0.0	0.0	0.0	56.8	0.9	-0.7	0.0	0.0	8.0	0.0	0.0	19.2
1697	569585.14	4809963.35	322.84	0	D	A	73.4	6.0	0.0	0.0	0.0	50.8	0.5	0.9	0.0	0.0	9.9	0.0	0.0	17.4
1707	569583.00	4809960.97	323.13	0	D	A	73.4	3.8	0.0	0.0	0.0	50.8	0.5	0.9	0.0	0.0	9.5	0.0	0.0	15.5
1760	569633.37	4810016.75	324.28	0	D	A	73.4	4.6	0.0	0.0	0.0	52.8	0.6	1.0	0.0	0.0	5.9	0.0	0.0	17.7
1783	569517.06	4809947.05	323.78	0	D	A	73.4	0.8	0.0	0.0	0.0	49.0	0.4	0.8	0.0	0.0	0.0	0.0	0.0	24.0
1788	569515.98	4809946.57	323.81	0	D	A	73.4	0.7	0.0	0.0	0.0	49.0	0.4	0.8	0.0	0.0	0.0	0.0	0.0	23.8
1791	569514.94	4809946.10	323.84	0	D	A	73.4	0.5	0.0	0.0	0.0	49.1	0.4	0.8	0.0	0.0	0.0	0.0	0.0	23.5
2098	569514.16	4809945.76	323.86	0	D	A	73.4	-2.2	0.0	0.0	0.0	49.1	0.4	0.8	0.0	0.0	0.0	0.0	0.0	20.8
2143	569625.09	4810007.59	325.28	0	D	A	73.4	2.8	0.0	0.0	0.0	52.3	0.6	0.9	0.0	0.0	6.4	0.0	0.0	16.0
2248	569526.81	4809951.38	323.82	0	D	A	73.4	0.2	0.0	0.0	0.0	48.7	0.4	0.8	0.0	0.0	0.0	0.0	0.0	23.7
2260	569525.85	4809950.95	323.83	0	D	A	73.4	0.3	0.0	0.0	0.0	48.7	0.4	0.8	0.0	0.0	0.0	0.0	0.0	23.8
2270	569525.14	4809950.63	323.83	0	D	A	73.4	-3.0	0.0	0.0	0.0	48.7	0.4	0.8	0.0	0.0	0.0	0.0	0.0	20.5
2371	569560.09	4809954.61	324.78	0	D	A	73.4	4.9	0.0	0.0	0.0	49.8	0.5	0.9	0.0	0.0	0.0	0.0	0.0	27.2
2392	569479.15	4809930.21	324.48	0	D	A	73.4	0.9	0.0	0.0	0.0	51.1	0.5	0.9	0.0	0.0	0.0	0.0	0.0	21.8
2400	569477.32	4809929.39	324.60	0	D	A	73.4	4.5	0.0	0.0	0.0	51.2	0.5	0.9	0.0	0.0	0.0	0.0	0.0	25.3
2414	569488.36	4809934.30	324.40	0	D	A	73.4	1.2	0.0	0.0	0.0	50.5	0.5	0.9	0.0	0.0	0.0	0.0	0.0	22.7
2424	569487.09	4809933.73	324.40	0	D	A	73.4	1.7	0.0	0.0	0.0	50.6	0.5	0.9	0.0	0.0	0.0	0.0	0.0	23.1
2433	569486.22	4809933.35	324.40	0	D	A	73.4	-3.8	0.0	0.0	0.0	50.6	0.5	0.9	0.0	0.0	0.0	0.0	0.0	17.6
2465	569618.90	4810000.73	324.01	0	D	A	73.4	4.4	0.0	0.0	0.0	51.9	0.6	0.9	0.0	0.0	8.4	0.0	0.0	16.1
2490	569519.00	4809947.91	323.76	0	D	A	73.4	0.0	0.0	0.0	0.0	48.9	0.4	0.8	0.0	0.0	0.0	0.0	0.0	23.3
2499	569518.08	4809947.50	323.76	0	D	A	73.4	0.1	0.0	0.0	0.0	48.9	0.4	0.8	0.0	0.0	0.0	0.0	0.0	23.3
2609	569483.42	4809932.10	324.40	0	D	A	73.4	0.3	0.0	0.0	0.0	50.8	0.5	0.9	0.0	0.0	0.0	0.0	0.0	21.6
2617	569482.00	4809931.47	324.40	0	D	A	73.4	3.1	0.0	0.0	0.0	50.9	0.5	0.9	0.0	0.0	0.0	0.0	0.0	24.2
2636	569575.11	4809953.56	323.99	0	D	A	73.4	3.6	0.0	0.0	0.0	50.7	0.5	0.9	0.0	0.0	8.2	0.0	0.0	16.7
2808	569579.34	4809956.93	323.47	0	D	A	73.4	4.0	0.0	0.0	0.0	50.8	0.5	0.9	0.0	0.0	9.0	0.0	0.0	16.2
2830	569524.45	4809950.33	323.83	0	D	A	73.4	0.0	0.0	0.0	0.0	48.7	0.4	0.8	0.0	0.0	0.0	0.0	0.0	23.5
2877	569523.76	4809950.02	323.82	0	D	A	73.4	-3.0	0.0	0.0	0.0	48.8	0.4	0.8	0.0	0.0	0.0	0.0	0.0	20.4
2893	569538.32	4809956.13	323.92	0	D	A	73.4	1.5	0.0	0.0	0.0	48.5	0.4	0.8	0.0	0.0	0.0	0.0	0.0	25.2
2922	569617.15	4809998.79	323.64	0	D	A	73.4	4.0	0.0	0.0	0.0	51.8	0.6	0.9	0.0	0.0	8.8	0.0	0.0	15.3
3181	569485.41	4809932.99	324.40	0	D	A	73.4	1.3	0.0	0.0	0.0	50.7	0.5	0.9	0.0	0.0	0.0	0.0	0.0	22.7
3446	569562.07	4809954.47	324.85	0	D	A	73.4	-0.5	0.0	0.0	0.0	49.9	0.5	0.9	0.0	0.0	3.7	0.0	0.0	18.0
3585	569480.69	4809930.89	324.40	0	D	A	73.4	-0.8	0.0	0.0	0.0	51.0	0.5	0.9	0.0	0.0	0.0	0.0	0.0	20.3
3798	569484.56	4809932.61	324.40	0	D	A	73.4	-3.0	0.0	0.0	0.0	50.7	0.5	0.9	0.0	0.0	0.0	0.0	0.0	18.3
3840	569484.12	4809932.41	324.40	0	D	A	73.4	-3.4	0.0	0.0	0.0	50.8	0.5	0.9	0.0	0.0	0.0	0.0	0.0	17.9
3887	569480.11	4809930.63	324.42	0	D	A	73.4	-3.7	0.0	0.0	0.0	51.0	0.5	0.9	0.0	0.0	0.0	0.0	0.0	17.3

APPENDIX F

Curricula Vitae

Education

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

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

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

ACGIH - American Conference of Governmental, Industrial Hygienists

Mississauga

Employment History

WSP – Mississauga, Ontario

Acoustics, Noise and Vibration Engineer (2005 to Present)

Team Lead of the Ontario Acoustics, Noise and Vibration Team. Responsible for the preparation of Ontario Ministry of the Environment, Conservation and Parks (MECP) Environmental Compliance Approval (ECA) 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 / LPAT and ERT Proceedings. Permitting and EA support provided to many sectors including mining, power & energy, iron & steel, manufacturing, landfill & aggregate, oil & gas, urban, etc. Substantial experience in; designing/completing field programs, assessing noise and vibration impacts from aggregate operations. He is currently the senior Noise and Vibration Engineer on a number of assessments being prepared for landuse planning and is a project manager and senior noise and vibration engineer for a multi-year assignment with the TTC.

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

PROJECT EXPERIENCE – REGULATORY

ACME Sample Application Package
Toronto, Ontario

Worked with the MECP in preparing a sample Acoustic Assessment Report, which forms part of the sample application package prepare in cooperation with the MECP that demonstrates the technical requirements for ECA applications.

Revised - ACME Sample Application Package
Toronto, Ontario

Worked with the MECP in preparing a revised sample Acoustic Assessment Report, in support of the MECP Modernization initiative, which forms part of the sample application package prepare in cooperation with the MECP that demonstrates the technical requirements for 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 MECP 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 MECP, which will include the design and recommendation of required noise controls to ensure noise impacts on neighbouring receptors during operations were within MECP 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 MECP 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 MECP guideline limits.

Environmental Assessment
Chalk River, Ontario

Oversaw the noise and vibration assessment in support of a proposed expansion to the CNL Chalk River facility where a quantitative assessment of construction traffic along local roadways was completed. Where required, supported with the development of an administrative mitigation plan.

Environmental Assessment
Pot Hope, Ontario

Provided on-going support, when required, with respect to noise and vibration impacts associated with construction activities related to the CNL Port Hope remediation initiative.

Environmental Assessment
Tiverton, Ontario

Supported with the baseline program and impact assessment for the DGR project on the Bruce Power Nanticoke site in Kincardine, Ontario.

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 MECP, 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 MECP 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 MECP 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 MECP. 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 MECP guideline limits. As the project design develops, will be taking an active role in the noise control designs to ensure MECP requirements are realized and SCPL's design criteria met.

PROJECT EXPERIENCE – LANDFILL & AGGREGATE SECTOR

ECA Application / Noise Study
Simcoe, Ontario

Senior noise lead for various projects with the County of Simcoe where WSP was retained to prepare noise studies, including Acoustic Assessment Reports for various sites owned/operated by the County of Simcoe. This included Site 16, 19 and other sites.

Acoustic Assessment
London, Ontario

Senior noise lead and project director for a project where WSP was retained to prepare an Acoustic Assessment Report for the London Landfill in support of an ECA Application

Environmental Impact Assessment
London, Ontario

Senior noise lead and task manager preparing a noise assessment for the London Landfill, which involved site-specific noise measurements and modelling in order to assess compliance with MECP Guidelines in support of an EA

Environmental Impact Assessment
Niagara, Ontario

Noise task manager preparing a noise assessment for the Humberstone Landfill in Niagara Region, which involved site specific noise measurements and modelling in order to assess compliance with MECP Guidelines in support of; an EA and permitting through an ECA.

Permitting Lead
Chatham-Kent

Was responsible for peer reviewing a noise assessment completed in support of an application for an ECA for the Ridge Landfill in Chatham-Kent. Provided technical senior support and direction on the AAR for the facility.

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 MECP 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 MECP Noise Guidelines, where the impact exceeds MECP 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 MECP 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 MECP 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. WSP 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 MECP ECA. Was responsible for preparing the AAR and overseeing the Noise Abatement implementation team to ensure the site was in compliance with MECP 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 MECP Guidelines. Where required, noise mitigation was provided and designed to ensure compliance. Liaison and negotiations with the MECP 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 MECP Guidelines. Identified noise sources requiring mitigation and specified the appropriate noise control measures.
Acoustic Audit Port Hope	Performed an acoustic audit of the Noise Controls installed at the Cameco Port Hope Facility in order to verify if noise controls installed help the facility comply with local requirements. Where upgrades were required to the mitigation, support the project team on developing appropriate controls.
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 MECP 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 MECP 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 an ECA. Noise measurements were taken of all on-site noise sources in order to establish compliance with MECP 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 MECP 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 MECP Guidelines. Noise mitigation support was provided and designed to ensure compliance. Liaison and negotiations with the MECP 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

Environmental Noise/Vibration Assessment and Construction Support
Toronto, Ontario

Part of the Union Station Enhancement Project team responsible for; overseeing the construction noise and vibration assessments, obtaining bylaw exemptions and developing and overseeing the construction noise and vibration monitoring levels against project criteria/thresholds

Environmental Noise/Vibration Assessment Support
Brampton, Ontario

Retained to complete a noise and vibration assessment of the proposed Brampton Light Rail Transit project through central Brampton. The proposed line will likely include both; above and below grade sections. The support includes completing the assessment, development of mitigation plans (where required) and the development of a construction complaint resolution program.

Environmental Construction Noise Study
Toronto, Ontario

Retained by TTC to complete a construction noise assessment to assess potential construction noise levels against applicable noise limits. The assessment included the development of; a mitigation plan, and complaint resolution program

Construction Noise Studies
Toronto, Ontario

Retained to support the owner's engineer of record to review noise studies and monitoring completed during the construction phase for upgrades at the TTC Lansdowne Station

Construction Noise Studies Toronto, Ontario	Retained by Metrolinx to provide noise assessment, monitoring and mitigation support to help address noise complaints during the construction phase of the Go - Guildwood Station Redevelopment Project
Construction Noise Studies Toronto, Ontario	Retained to support the owner's engineer of record to review noise studies and monitoring completed during the construction phase for upgrades at the TTC Wellsley Station
Environmental Noise Studies York, Ontario	Retained to carry out a noise assessment in support of a Municipal Class Environmental Assessment for Kennedy Road in York Region. WSP supported with the alternative assessment. The noise assessment was carried out in general accordance with York Region and MECP guidelines.
Environmental Noise Studies York, Ontario	Retained to carry out a noise assessment in support of a Municipal Class Environmental Assessment for McCowen Road in York Region. WSP supported with the alternative assessment. The noise assessment was carried out in general accordance with York Region and MECP guidelines. WSP also completed additional detailed studies to address specific stakeholder requests.
Environmental Noise Studies York, Ontario	Retained to carry out a noise assessment in support of a Municipal Class Environmental Assessment for 16th Ave in York Region. WSP supported with the alternative assessment. The noise assessment was carried out in general accordance with York Region and MECP guidelines. WSP also completed additional detailed studies to address specific stakeholder requests.
Noise Impact Study - Third Crossing - Cataraqui River Kingston, Ontario	WSP 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. WSP 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. WSP will support with the alternative assessment. The noise assessment will be carried out in general accordance with MECP/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 Various, 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. WSP supported with the alternative assessment. The noise assessment will be carried out in general accordance with MECP/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 MECP/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. WSP 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 MECP/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 MECP/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 MECP protocol to ensure that the noise impacts met the MECP 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 MECP protocol to ensure that the noise impacts met the MECP 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 an ECA 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 MECP 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 MECP limits were used as background for predicting the noise impact from the hospital equipment on neighbouring receptors.

PROJECT EXPERIENCE – MUNICIPAL / URBAN SECTOR

Peer Review
Mississauga, Ontario

Retained by the City of Mississauga to complete a peer review of; a noise and vibration feasibility study prepared for the redevelopment of the Lakeview Lands (formally OPG Lakeview Power Generating Facility)

Peer Review
Essa Township, Ontario

Retained by the Township of Essa to complete peer reviews of noise and vibration studies prepared for multiple development applications proposed within the Township of Essa

Peer Review
Lincoln Township, Ontario

Retained by the Township to complete a peer review of noise a study prepared in support of a proposed waste management facility adjacent to existing sensitive land uses

Peer Review
Town of Caledon, Ontario

Requested by the Town of Caledon to develop a work plan to complete peer reviews for multiple applications for proposed developments within the Town of Caledon boundaries

Environmental Noise Study Durham Region, Ontario	Retained by Durham Region through a Prime to complete an environmental noise assessment in support of the Class EA for new water storage and pumping facilities. The noise assessment assessed various project design alternatives for two proposed water storage and pumping facilities. Conceptual noise controls were developed and proposed to the project team
Environmental Noise Study Brock Township, Ontario	Retained to complete environmental noise assessments for additional sanitary capacity in Sunderland and Cannington in the Township of Brock. The detailed noise assessments will compare the project design against applicable MECP noise limits and, if required, WSP will develop noise controls to be incorporated into the project design.
Environmental Noise Study Niagara Region, Ontario	Retained by Niagara Region, through a prime, to complete an environmental noise assessment in support of a class EA for the Bridgeport sewage water pumping station in Niagara Region. The noise assessment compared the project design against applicable MECP noise limits and identified noise control requirements.
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. WSP 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 Study Toronto, Ontario	Retained so support by completing a noise study in support of an EA for the Highland Creek wastewater treatment plant in Toronto, Ontario. Was subsequently retained to complete a detailed noise assessment in support for an application for an ECA with the MECP.
Noise Feasibility Study – Former CFB Rockcliffe Lands Ottawa, Ontario	WSP 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. WSP'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.
Noise and Vibration Assessment Durham Region, Ontario	Retained to complete a noise and vibration assessment for the Durham-York Region Energy Center in support of an EA where project noise and vibration levels were compared against applicable MECP limits. Was subsequently retained to support with an application for an ECA for the facility

Feasibility Noise Study – All Seniors Care
Kingston, Ontario

WSP 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, WSP 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, WSP 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 MECP 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. WSP'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.

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.

TOMASZ NOWAK, M.Sc., M.Eng.,

Acoustics, Noise and Vibration Specialist

Areas of practice

Environmental acoustics

Noise Control Design

Data Analysis

Indoor Acoustics

Languages

Polish, English

PROFILE

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 aggregate resource, energy and oil and gas developments. His responsibilities include identification of the noise sources, field measurements, calculation of noise emissions, development of acoustical models, proposing noise mitigation solutions and reporting the results.

EDUCATION

Master of Engineering, Materials Engineering, McGill	2007
Master of Science, Vibroacoustic and Sound Engineering, AGH University of Science and Technology, Krakow	2001

CAREER

Acoustics, Noise and Vibration Specialist, WSP	2023 – Present
Acoustics, Noise and Vibration Specialist, Golder Associates, Calgary/Edmonton/ Montreal, Alberta/Quebec, Canada (WSP Acquisition)	2012 – 2023
Graduate Student, Materials Engineering, McGill University Montreal, Quebec, Canada	2004 – 2007

PROFESSIONAL EXPERIENCE

Mining and Aggregate Sector

- CBM Aggregates, Ontario Canada
  - 2020 (ongoing) Noise specialist responsible for completion of a Noise Impact Assessment, for the proposed extension of Lanci Pit to support a Category 3, Class “A” Pit Above and Below Water license application under the Aggregate Resources Act. Work on this project included development of noise model, development of noise controls, preparation of noise report. Client: CBM Aggregates.
  - 2022 (ongoing), Noise specialist responsible for completion of a Noise Impact Assessment, for the proposed expansion of Dance Pit to support a Category 3, Class “A” Pit Above Water license application under the Aggregate Resources Act. Work on this project included development of noise model, development of noise controls, preparation of noise report and support with responding to peer review comments regarding the assessment results and methodology. Client: CBM Aggregates.

  - 2022 (ongoing). Noise specialist responsible for completion of a Noise Impact Assessment, for the proposed Caledon Pit and Quarry to support a Class “A” Pit and Quarry Below Water license application. Work on this project included development of noise model, development of noise controls, preparation of noise report and support with responding to peer review comments regarding the assessment results and methodology Client: CBM Aggregates.

- Rankin License Application, Port Colborne, Ontario, Canada (2019): Noise specialist responsible for completion of a Noise Impact Assessment, for the proposed extension of the existing Port Colborne Quarry to support a Category 2, Class “A” Quarry Below Water license application under the Aggregate Resources Act. Work on this project included development of noise model, development of noise controls, preparation of noise report and support with responding to peer review comments regarding the assessment results and methodology. Client: Rankin Construction Inc.
- Victor Mine, Ontario Canada 2018: Noise field specialist responsible for collecting baseline noise data, data analysis and reporting for support with regulatory permitting process for a diamond mine. Client DeBeers.
- Ahafo North Project, Ghana 2018: Responsible for completion of Noise Impact Assessment for a proposed gold mine. Work on this project included gathering of field data, data analysis and reporting, development of the noise model for a proposed gold mine and preparation of noise assessment report as well as support with responding to peer review comments regarding the assessment results and methodology. Client Newmont Ghana Gold Limited
- Agnico Eagle Mine, Nunavut, Canada
  - 2015 Noise field specialist responsible for collection of baseline noise data, data analysis and reporting for support with regulatory permitting process for a gold mine. Client Agnico Eagle.
  - 2020/2021 Noise field specialist responsible for setup of vibration monitoring equipment and collection of vibration data in support of wildlife study. Client Agnico Eagle.

Manufacturing Sector

- Akzo Nobel, Quebec, Canada (since 2019) responsible for development and implementation of noise controls at a manufacturing facility. Noise measurements, data analysis and reporting to support noise reduction effort.
- BASF Canada, Ontario, Canada (since 2019) responsible for development and implementation of noise controls at a manufacturing facility. Noise measurements, data analysis and reporting to support noise reduction effort.

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