REPORT

Noise Impact Assessment

Aberfoyle South Pit Expansion

Submitted to:

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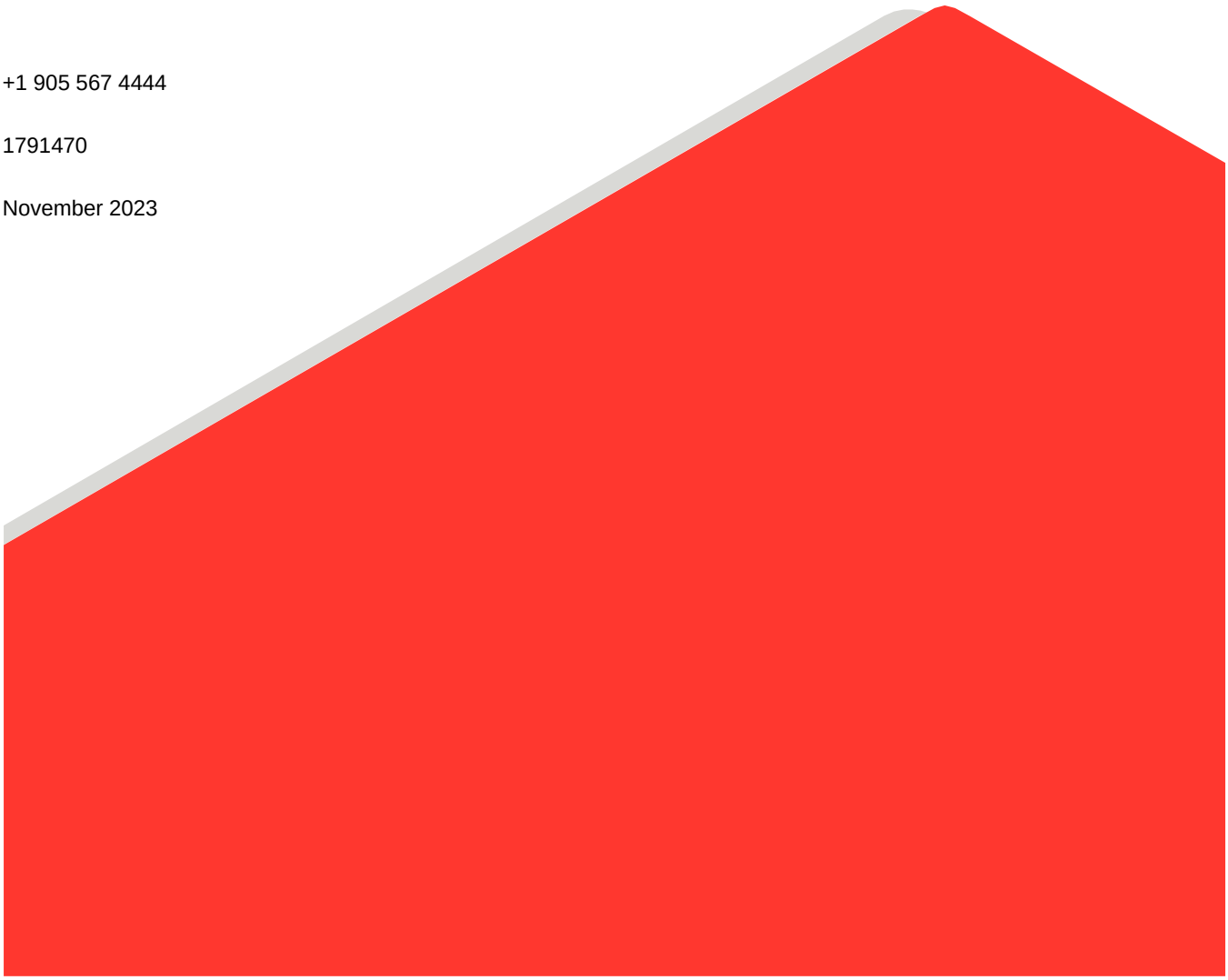

Distribution List

e-copy: CBM Aggregates, a division of St. Marys Cement Inc. (Canada)

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1.0 INTRODUCTION

CBM Aggregates (CBM), a division of St. Marys Cement Inc. (Canada) retained WSP Canada Inc. (WSP). to prepare a Noise Impact Assessment (NIA) in support of a licence application for the proposed Aberfoyle South Pit Expansion (the “Site”) under the Aggregate Resources Act (ARA) for a Class A, Pit, Below the Water Table. The Site is located at 6994 Concession Road 2, Township of Puslinch in the County of Wellington, Ontario.

The Site is approximately 85 hectares (ha) with proposed licence area of 44.8 ha and an extraction area approximately 27.5 ha. A location plan for the Site, showing the proposed pit lands and proposed licensed boundary is provided in Figure 1. For the purpose of this assessment, ten (10) existing Points of Reception (PORs) were selected as being representative of the sensitive receptors in all directions around the Site and identified as POR001 through POR010, which are identified in Figure 1. The nearest POR (POR005) is located approximately 170 m north of the proposed extraction boundary.

The surrounding lands are utilized for residential, agricultural, and aggregate extraction/processing purposes (existing extraction facilities east of the Site). The Site is composed of farmland with a house that is currently not occupied and a barn that is used to support the on-going farming of the land. A zoning plan for the property and surrounding land use is provided in Appendix A.

Sound level limits for the proposed pit operations on neighbouring receptors were established in accordance with the Ministry of the Environment, Conservation and Parks (MECP) guideline, NPC 300 “Environmental Noise Guideline, Stationary and Transportation Sources – Approval and Planning”. A haul route analysis was conducted in accordance with the MECP’s “Noise Guidelines for Landfill Sites” (Landfill Guidelines) as this guideline has been used for similar projects across the province. Noise predictions of the proposed pit operations onto neighbouring PORs were completed to determine the possible noise impact. To help understand the analysis and recommendations made in this report, a brief discussion of noise terminology is provided in Appendix B.

2.0 SITE OPERATIONS

The proposed pit operations will be limited to the daytime (07:00 to19:00) period. Shipping hours are restricted to 07:00 to 18:00 on weekdays and 08:00 to 16:00 on Saturdays. The operations will include primarily extraction below the water table, with some limited above water extraction, details of which are provided below. Due to relatively high elevation of the water table in the majority of the extraction area (excluding the most western part of the extraction area), operations will be conducted primarily as below water. Generally, the operations will start in the central region of the extraction area and will initially proceed towards the western edge of the Site. After completing the extraction within the western region of the Site, the operations will continue in an easterly direction. There will be no aggregate processing on the Site. All extracted material will be transported to the existing CBM Aberfoyle South Pit (Main Pit) for further processing. To minimize the potential noise impact from the offsite shipment of the extracted aggregate, the trucks will enter the Site through a gate located along the northern property line in the eastern region of the Site.

The equipment associated with operations will include: loaders, haul trucks and a dragline:

- A front-end loader, typically operating within 30 metres of the dragline and a second loader typically operating further away from the dragline will be used for handling material and/or loading the extracted material onto the haul trucks for the extraction within the central region of the extraction area. The loaders can operate for the full 60 minutes during any given 1-hour period.
- Two loaders were also considered in the assessment of operations within the western part of the central region of the extraction area. The loaders were assessed to operate for the full 60 minutes during any given 1-hour period. Generally, one loader will be operating near the dragline whereas the second will be operating further from the dragline (e.g., 200 m north).
- Two loaders were considered in the assessment of operations within the western region of the extraction area. The loaders were assessed to operate ‘under load’ for 45 minutes during any given 1-hour period. Generally, one loader will be operating near the dragline whereas the second will be operating further from the dragline (e.g., 200 m north or south depending on extraction pattern).
- Two loaders were considered in the assessment of operations within east part of the central region (including the northern part of the eastern region) of the extraction area. The loaders were assessed to operate ‘under load’ for 45 minutes during any given 1-hour period. Generally, one loader will be operating near the dragline whereas the second will be operating further from the dragline (e.g., 200 m east or west depending on extraction pattern). Once the berm (North Berm) is in-place, the loaders could operate for the full 60 minutes during any given 1-hour period.
- Two loaders were considered in the assessment of operations within the eastern region (i.e. north and south part) of the extraction area. The loaders were assessed to operate for the full 60 minutes during any given 1-hour period. Generally, one loader will be operating near the dragline whereas the second will be operating further from the dragline (e.g., 200 m south or north depending on extraction pattern).
- Dragline operating ‘under load’ for a maximum of 45 minutes per hour and the engine will generally operate in low revolutions conditions (i.e., ‘low rev’) for the remaining 15 minutes per hour. Given the operational nature of dragline systems, this is considered conservative as the ‘under load’ and ‘low rev’ conditions would generally be more equalized, with approximately 30 minutes each per hour. An excavator and/or backhoe could be used to support the extraction activities, but it will generally be limited to periods when the dragline

is not in use. This equipment was not explicitly assessed in a separate scenario as it is expected that the noise emissions from the excavator or backhoe will be less than the noise emissions associated with the dragline. During the operations within the western and eastern region of the extraction area, the dragline will require noise controls (e.g., equipment mounted noise barrier or acoustically equivalent treatment) to reduce its noise emissions by a minimum of 5dB to target a sound power level as presented in Table 1.

- Trucks will be used to transport the extracted material from the Site for further processing at the Main Pit. The trucks will access the Site through the gate located in the northeast corner of the extraction area. Upon leaving the Site the trucks will use Concession Rd 2.

3.0 NOISE SOURCE SUMMARY

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

Table 1: Facility Noise Source Summary

Source ID	Source Description	Overall Sound Power Level [dBA](1)	Source Location	Sound Characteristics	Noise Control Measures
Truck	Highway Truck	102	O	S	U
Loader 1	Loader	107(2)	O	S	U
Loader 2	Loader	107(2)	O	S	U
Dragline	Dragline	112	O	S	U
Dragline noise controlled or acoustically equivalent	Dragline NC	107	O	S	O(3)
Excavator / Backhoe	Excavator / Backhoe	<112	O	S	U

Notes:

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

(2) Average sound power level representing various loader activities

(3) Either a single form of mitigation (e.g., silencer, barrier) or combination of multiple types of noise mitigation

Noise Source Summary Table Nomenclature

Source Location

O – outdoor source
I – indoor source

Sound Characteristics

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

Noise Control Measures

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

4.0 POINTS OF RECEPTION

Ten (10) residential receptors were identified as being representative of the most sensitive PORs within the vicinity of the Site as shown in Figure 1. The identified PORs are summarized below.

- POR001: Residence – modelled as a two-storey building – located west of the Site.
- POR002: Residence – modelled as a two-storey building – along Concession Rd 2 – located northwest of the Site.
- POR003: Residence – modelled as a one and half-storey building – along Concession Rd 2 – located northwest of the Site.
- POR004: Residence – modelled as a two-storey building – along Concession Rd 2 – located north of the Site.
- POR005: Residence – modelled as a two-storey building – located north of the Site.
- POR006: Residence – modelled as a two-storey building – located north of the Site.
- POR007: Residence – modelled as a two-storey building – located north of the Site.
- POR008: Residence – modelled as a two-storey building – along Concession Rd 2 – located east of the Site
- POR009: Residence – modelled as a two-storey building – located east of the Site.
- POR010: Residence – modelled as a two-storey building – along Sideroad 20 S - located southeast of the Site.

5.0 ASSESSMENT CRITERIA (PERFORMANCE LIMITS)

The PORs located in the vicinity of the Site are located in the area defined as Class 2 (i.e., receptors along local roads and exposed to noise from traffic along Highway 401) and Class 3 receptors (i.e., receptors located further away from local roads and less exposed to noise from traffic along Highway 401, these include PORS to the west and south of the Site) as per MECP publication NPC-300. A Class 2 area refers to an area acoustically influenced by a combination of manmade sources and a rural environment where sounds of nature would dominate the acoustical environment, whereas a Class 3 area refers to a rural area with an acoustical environment that is 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 for Class 2. The POW sound level limit for the noise sensitive receptors in a Class 2 area is described as follows:

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

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

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

In assessing stationary noise sources, the MECP has also established exclusionary POW and Outdoor sound level limits for Class 3 areas. 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 2 summarizes the applicable noise limits for Class 2 and Class 3 areas.

Table 2: Noise Limits

Time Period	POW MECP Exclusionary Sound Level Limit (dBA)		Outdoor MECP Exclusionary Sound Level Limit (dBA)	
	Class 2	Class 3	Class 2	Class 3
Daytime	50	45	50	45

In the absence of specific noise guidelines applicable to the assessment of offsite 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 3.

Table 3: 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. Sound levels have been documented in 1/1 octave band level format and are summarized in Appendix C. Noise impact predictions were generated using this data.

The predictive analysis was carried out using the commercially available software package Cadna/A 2021 MR1. The predicted levels take into consideration that the sound from a stationary point noise source spreads spherically and attenuates at a rate of 6 dB per doubling of distance. Further, attenuation from barriers, ground effect and air absorption may be included in the analysis as determined from ISO 9613 (part 2), which is the current standard used for outdoor sound propagation predictions. It should be noted that this standard makes provisions to include a correction to address for downwind or ground-based temperature inversion conditions. Noise predictions have been made assuming a downwind or moderate temperature inversion conditions for all PORs, a design condition consistent with the accepted practice of the MECP and the Ministry of Natural Resources and Forestry (MNRF).

As described in ISO 9613 (Part 2), ground factor values that represent the effect of ground on sound levels range between 0 and 1. Based on the specific site conditions, the ground factor value used in the modelling was a ground factor value of 0 for water bodies (i.e., Ponds associated with below water table operations), 0.5 for the pit floor and a value of 1 for all other areas (e.g., absorbing ground coverage including grass and trees). Attenuation from intervening structures (i.e., stockpiles) and woodlots were conservatively not considered in the noise modelling.

6.1.2 Noise Impact Prediction Assumptions

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

- Extraction will occur during the daytime period (i.e., between 07:00 and 19:00).
- In general, extraction is expected to commence in the western part of the central region and progress westerly. Once reaching the western edge of the extraction area, the operations will continue easterly from the east edge of the central region of the extraction area.
- To limit the potential noise impact of the material shipping, the trucks will be accessing the Site via a gate located along the northern property line in the eastern region of the extraction area.
- For the extraction associated with the operations, the equipment will operate as specified in Section 2.0 and is expected to operate continuously except for the dragline or excavator/backhoe and loaders (i.e., within identified areas) expected to operate "under load' up to 45 minutes in a given 1-hour period and under 'low rev' condition for the remaining 15 minutes in the hour.
- Equipment list and sound power emissions are consistent to those listed in Table 1 (or acoustically equivalent).
- Trucks, while onsite, will typically travel at no greater than 25 km/h, and fourteen round trips are conservatively considered to occur every hour.

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

6.1.3 Proposed Noise Controls

Operational controls and shielding (i.e., berms, extraction face, stockpiles, other methods) will be required during the extraction operations. WSP evaluated the operation noise levels and identified specific areas where noise controls will be required. The requirements are presented on Figure 2. The identified berm is further described below, but it should be noted that acoustically equivalent controls could be considered.

North Berm – 4 m high and approximately 366 m long located along northern edge of the extraction area, west of the Site entry gate as shown in Figure 2. Dragline operating within the identified areas (as presented in Figure 2) will require noise mitigation to further reduce the equipment's noise emissions. The required noise control could include equipment mounted local barrier or acoustically equivalent (e.g., equipment substitution with a quieter model or add-on mitigation) treatment. The overall PWL of the mitigated dragline is indicated in the Table 1.

6.2 Haul Route Analysis

The noise predictions for the haul route analysis were carried out 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 was assessed over a 1-hour period, corresponding to the time of the greatest predicted impact due to the Site activities.

Existing and anticipated Site noise levels due to road traffic were established using the CBM Aberfoyle South Pit Expansion Traffic Impact Study (TMIG 2021). As the Site and identified PORs are acoustically impacted by traffic along Highway 401, which is within 1 kilometer of the identified PORs, Highway 401 traffic was considered in the noise assessment. Traffic data for Highway 401 was obtained from published Annual Average Daily Traffic (AADT) data from the Ontario Ministry of Transportation (MTO) (MTO 2016). The Traffic Impact Study provided counts of the; existing 1-hour traffic volume, existing medium and heavy truck percentages, speed limit, and Site-related peak hour truck volumes (14 trucks inbound and 14 trucks outbound) for Concession 2. The medium and heavy truck percentages for Highway 401 was based on the Ontario Ministry of Transportation (MTO) Environment Guide for Noise (MTO 2021) and the speed limit was determined from readily available public imagery. The hourly traffic breakdown of Highway 401 was estimated using data provided in the US Environmental Protection Agency (EPA) software Motor Vehicle Emissions Simulator (MOVES) to determine the minimum 1-hour daytime traffic volume.

In completing a conservative assessment, WSP assessed the conditions where; the Site is in full peak operations (i.e., 14 trucks inbound and 14 trucks outbound in a given hour) and existing traffic was a minimum (i.e., 07:00 am based on available information on hourly traffic distribution). In keeping with a conservative approach, the existing traffic volumes from the Traffic Impact Study (from 2018) and from the MTO (from 2016) were not corrected using a growth factor which is typically applied in traffic noise assessments.

The haul route analysis was conducted at POR008 as it is the only identified POR directly adjacent to and fronting the haul route and, as such, expected to be the most impacted by the proposed project due to its proximity to the future haulage route (i.e., approximately 50 m from the Concession Rd 2). In the case of the remaining PORs located along the Concession Rd 2, the distances to the sources associated with the material haulage will range from 240 m to 650 m. Considering only the increased propagation distance it is expected that the change in the

noise level due to operation of the haul route will be insignificant at these receptors. A summary of the road traffic data is provided in Table 4.

Table 4: Summary of Existing and Future (with the Site) Road Traffic Data

Parameter	Highway 401	Concession 2 (Existing)	Concession 2 (Future with the Site)
Speed Limit	100	60	60
One-Hour Traffic (Vehicles per Hour)	5166	58	86
% Car / Medium Truck / Heavy Truck	80% / 5% / 15%	98% / 2% / 0%	66% / 1% / 33%

7.0 RESULTS

7.1 Stationary Sources

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

Noise levels were determined for the equipment operating at the pit floor for the below water table operations which, for most of the extraction, area is generally consistent with the existing ground height.

Table 5 provides a summary of the predictable worst-case noise levels at each of the identified PORs during the daytime operations.

Table 5: Noise Impact Assessment Results for Extraction Operations

Receptor ID	Central Region [dBA]	Central Region, West Area [dBA]	West Region [dBA]	Central Region, East Area [dBA]	Central Region, North [dBA]	East Region, North Part [dBA]	East Region, South Part [dBA]	Overall Maximum Noise Impact [dBA]	Daytime Noise Limit [dBA]	Compliance with Applicable Noise Limits (Yes/No)
POR001	41	45	45	39	36	36	36	45	**45**	Yes
POR002	42	43	42	38	37	36	36	43	**50**	Yes
POR003	40	40	39	35	34	37	36	40	**50**	Yes
POR004	48	47	43	46	45	43	40	48	**50**	Yes
POR005	45	43	42	50	47	44	44	50	**50**	Yes
POR006	44	42	41	49	46	44	46	49	**50**	Yes
POR007	42	40	39	46	43	43	47	47	**50**	Yes
POR008	37	35	34	39	38	43	45	45	**50**	Yes
POR009	40	38	36	42	40	45	45	45	**45**	Yes
POR010	41	38	36	41	39	42	42	42	**45**	Yes

The overall predicted sound levels, based on proposed site operations described above, are expected to be at or below the performance limits with the implementation of noise control measures discussed in Section 2.0 and Section 6.1.2. Therefore, it is expected the Site can operate in compliance with MECP and MNRF noise limits. Sample calculations are provided in Appendix D.

7.2 Haul Route Analysis

As discussed in Section 5.0, the Landfill Guidelines outline the protocol for evaluating the noise impact due to off-site haul road vehicles, which is used in Ontario for haul route analysis for similar projects. Predicted future (i.e. with the project) daytime 1-hour traffic noise levels were conservatively compared to existing noise levels during the predictable worst case hour (i.e., the hour when the Site impacts are predicted to be the greatest of existing traffic levels). Table 6 summarizes the expected change between existing and future noise levels at POR008 as well as the associated qualitative ranking (as summarized in Table 3 in Section 5.0).

Table 6: Predicted One-Hour Change in Noise Levels along the Haul Route

Receptor ID	Existing Minimum One-Hour Noise Level (dBA)	Future (with the Site) One-Hour Noise Level (dBA)	Change in Noise Level (dB)	Qualitative Rating
POR008	55	59	4	Noticeable

The results in Table 6 indicate that the change in noise level along the haul route due to the Site may be noticeable at some PORs during peak hauling hours but is not expected to be significant. Changes in noise levels are expected to be lower during periods of either; lower truck traffic from the Site or higher background traffic (i.e., outside the minimum hour of 09:00 am when hourly volumes of existing traffic would be higher). It should be noted that POR008 is located south and west of existing licensed pits and it is expected that the noise environment in the vicinity of this POR is influenced by noise emissions from the operations of these sites. It is expected that the existing noise levels are likely higher than the value indicated in the Table 6 and therefore the predicted change of noise level due to haul route would likely be lower than the levels presented in Table 6.

8.0 SITE PLAN NOISE CONTROL NOTES

The following summarizes the general pit operation noise controls that shall be followed in all of the operational sequences of the proposed extraction area and noted on the Site Plan, a copy of which is provided in Appendix E:

- Equipment shall be operated as intended by manufacturer specifications;
- Equipment shall be maintained in and generally kept in good condition;
- Equipment shall be fitted with manufacturer specified and properly functioning noise control devices;
- On-site roadways shall be maintained to limit noise resulting from trucks driving over ruts and pot-holes;
- A berm shall be installed as specified above in Section 6.1.3 and as shown on Figure 2 before extraction commences in the identified areas;
- Alternative to narrow band back up alarms for on-site equipment shall be investigated and used at the site provided they are found to meet the licensee's safety requirements;
- Activities used to prepare the Site for excavation, such as the stripping of topsoil, construction of the berm, or activities related to the remediation of the Site after the extraction is completed are considered to be construction activities and are only permitted to occur during the daytime (i.e., 07:00 to 19:00) Monday to Friday except statutory holidays;
- Extraction operations shall be limited to the daytime (i.e., 07:00 to 19:00) period.
- Two loaders operating within the western region of the extraction area shall operate 'under load' for a maximum of 45 minutes during any given 1-hour period.
- Two loaders operating within the east part of the central region (including the northern part of the eastern region) of the extraction area shall operate 'under load' for a maximum of 45 minutes during any given 1-hour period until the North Berm is constructed.
- Dragline shall operate 'under load' for a maximum of 45 minutes per hour with the engine generally operating at low revolutions conditions (i.e., 'low rev') for the remaining 15 minutes per hour.
- During the dragline operations within the western and eastern region of the extraction area, an additional noise control (e.g., equipment mounted noise barrier or acoustically equivalent treatment) shall be installed on the dragline to reduce its noise emissions by a minimum of 5dB to target a sound power level as presented in Table 1.
- Highway truck while onsite shall travel at speed no greater than 25 km/h.
- Prior to operations commencing, sound measurements of the equipment used on the Site shall be undertaken to confirm maximum emission levels provided in the Table 1 are not exceeded; and,
- To confirm that sound levels from the Site operations are in compliance with the MECP noise guideline limits, an acoustical audit shall be completed within six months of the start of extraction activities on the Site.

9.0 CONCLUSIONS

WSP was retained by CBM to prepare a NIA in support of a licence application under the ARA to permit the operations of below water table extraction within the Aberfoyle South Pit Expansion. WSP established sound level limits according to MECP noise guidelines and compared the predicted noise levels at the identified representative PORs to the established limits. The results indicate that, after the implementation of identified noise controls or equivalent measures, the noise levels predicted at the representative off-site PORs are expected to be at or below the applicable noise limits.

A change in noise levels along the haul route, during peak hauling hours, may be noticeable at times at some PORs along the haul route but is not expected to be significant.

Based on the results presented in this report, it is expected the Site can operate in compliance with MECP and MNRF noise guidelines for all PORs.

Signature Page

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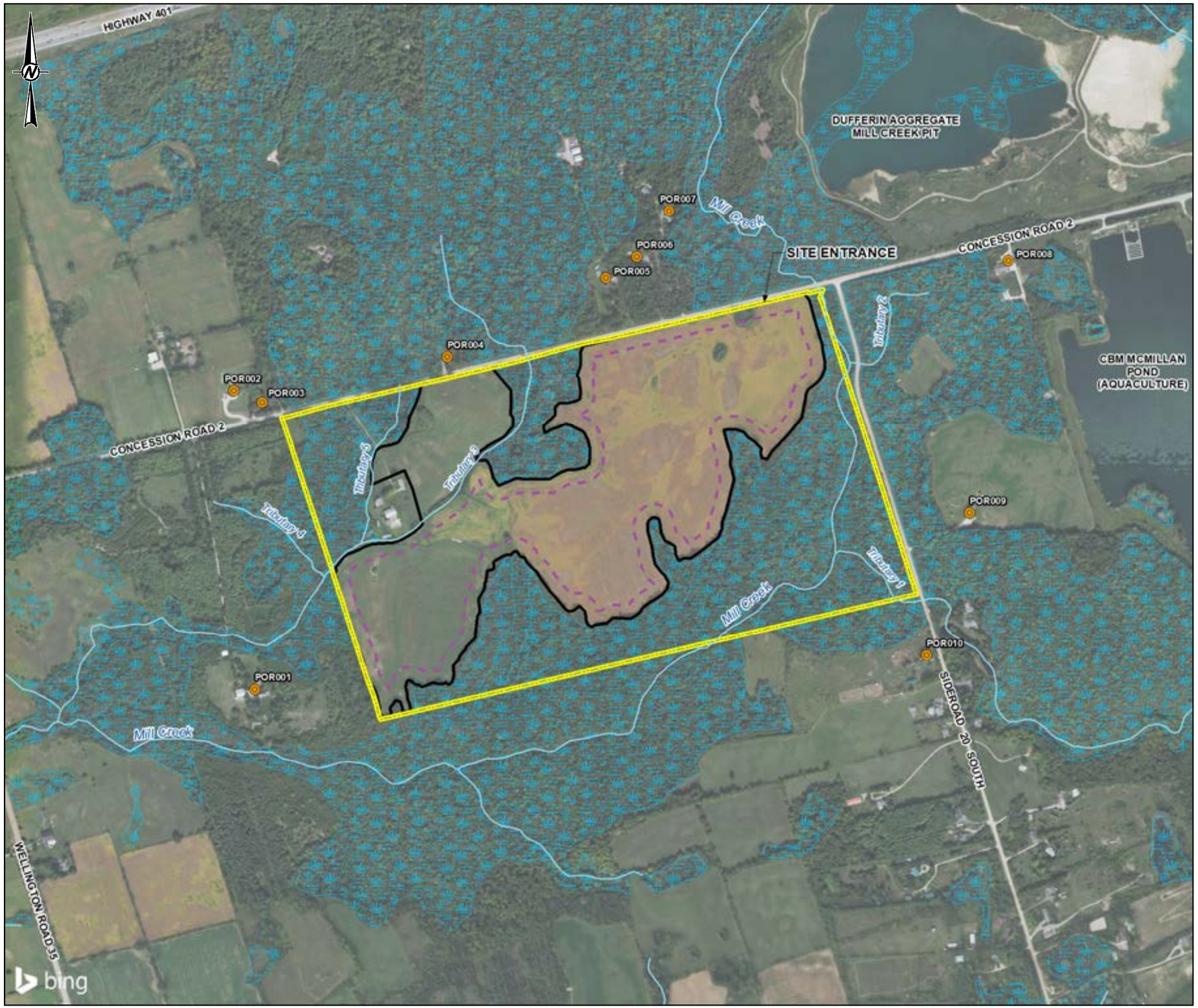
TN/SD/JT/ng/mp

https://golderassociates.sharepoint.com/sites/21291g/deliverables/noise/1791470-r-rev0-cbm aberfoyle nia-20nov2023.docx

FIGURES



KEY MAP

LEGEND

- Noise Receptor
- Watercourse
- Provincially Significant Wetland (Evaluated)
- Site Boundary
- License Boundary
- Proposed Extraction Area

0 100 200 300 400

1:8,500 METRES

REFERENCE(S)

1. BASEDATA: MNRF LIO, OBTAINED 2020
2. IMAGERY SOURCE: SOURCES: ESRI, HERE, GARMIN, INTERMAP, INCREMENT P CORP., GEBCO, USGS, FAO, NPS, NRCAN, GEOBASE, IGN, KADASTER NL, ORDNANCE SURVEY, ESRI JAPAN, METI, ESRI CHINA (HONG KONG), (C) OPENSTREETMAP CONTRIBUTORS, AND THE GIS USER COMMUNITY
© 2023 MICROSOFT CORPORATION © 2023 MAXAR ©CNES (2023) DISTRIBUTION AIRBUS DS IMAGE SEPTEMBER 2016
3. PROJECTION: TRANSVERSE MERCATOR DATUM: NAD 83 COORDINATE SYSTEM: UTM ZONE 17N

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

PROJECT
ABERFOYLE SOUTH PIT EXPANSION

TITLE
SITE LOCATION

CONSULTANT

wsp

YYYY-MM-DD	2023-11-01
DESIGNED	SO
PREPARED	SO
REVIEWED	TZ
APPROVED	---

PROJECT NO.	CONTROL	REV.	FIGURE
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IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: 25mm

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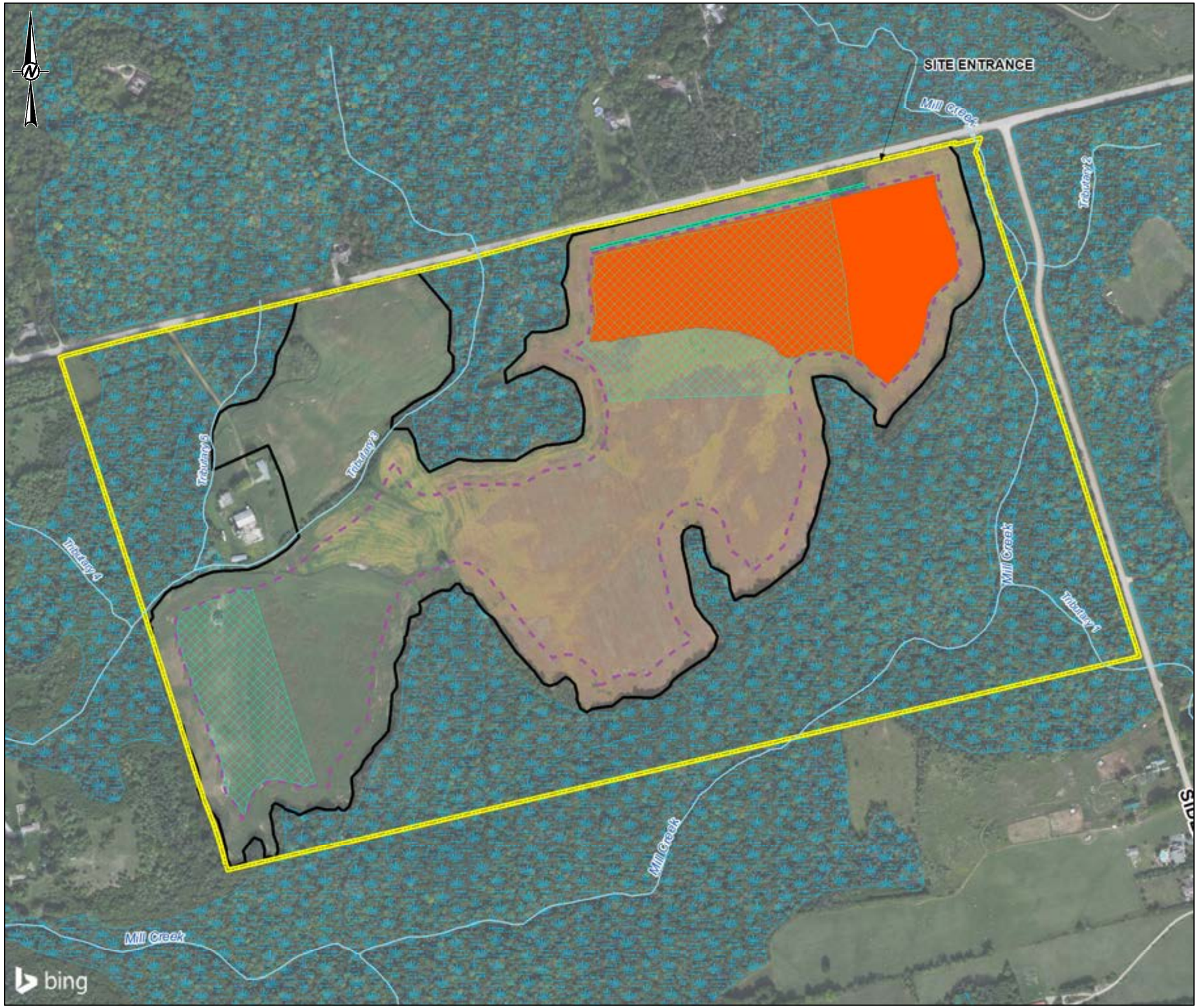

KEY MAP

LEGEND

- Watercourse
- Provincially Significant Wetland (Evaluated)
- Site Boundary
- License Boundary
- Proposed Extraction Area
- North Berm – 4 m high
- Area where North Berm will be Required
- Area where Loader Operations will be Reduced to 45 min per 1-hour Period

0 100 200 300 400

1:5,000 METRES

REFERENCE(S)

1. BASEDATA: MNRF LIO, OBTAINED 2020
2. IMAGERY SOURCE: SOURCES: ESRI, HERE, GARMIN, INTERMAP, INCREMENT P CORP., GEBCO, USGS, FAO, NPS, NRCAN, GEOBASE, IGN, KADASTER NL, ORDNANCE SURVEY, ESRI JAPAN, METI, ESRI CHINA (HONG KONG), (C) OPENSTREETMAP CONTRIBUTORS, AND THE GIS USER COMMUNITY
© 2023 MICROSOFT CORPORATION © 2023 MAXAR ©CNES (2023) DISTRIBUTION AIRBUS DS IMAGE SEPTEMBER 2016
3. PROJECTION: TRANSVERSE MERCATOR DATUM: NAD 83 COORDINATE SYSTEM: UTM ZONE 17N

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

PROJECT
ABERFOYLE SOUTH PIT EXPANSION

TITLE
OPERATIONAL NOISE CONTROL AND MITIGATION MEASURES

CONSULTANT

wsp

YYYY-MM-DD	2023-11-01
DESIGNED	SO
PREPARED	CGE
REVIEWED	TZ
APPROVED	---

PROJECT NO.	CONTROL	REV.	FIGURE
1791470	0014	0	**2**

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

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APPENDIX A

Land Use Zoning Designation Plan

KEY MAP

LEGEND

- Watercourse
- Site Boundary
- Proposed Extraction Area
- Parcels
- Environmental Protection Overlay
- Natural Environment
- Site Specific Exemptions
- Zoning Limits

ZONE DESCRIPTIONS

A	Agricultural
EXI	Extractive Industrial
NE	Natural Environment
(sp#)	Site Specific Exemption

0 100 200 300 400

1:8,500 METRES

REFERENCE(S)

1. BASEDATA: MNRF LIO, OBTAINED 2020
2. IMAGERY SOURCE: SOURCES: ESRI, HERE, GARMIN, INTERMAP, INCREMENT P CORP., GEBCO, USGS, FAO, NPS, NRCAN, GEOBASE, IGN, KADASTER NL, ORDNANCE SURVEY, ESRI JAPAN, METI, ESRI CHINA (HONG KONG), (C) OPENSTREETMAP CONTRIBUTORS, AND THE GIS USER COMMUNITY IMAGE SEPTEMBER 2016
3. 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)
4. PROJECTION: TRANSVERSE MERCATOR DATUM: NAD 83 COORDINATE SYSTEM: UTM ZONE 17N

CLIENT

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

PROJECT

ABERFOYLE SOUTH PIT EXPANSION

TITLE

LAND ZONING DESIGNATION PLAN

CONSULTANT

wsp

YYYY-MM-DD	2023-11-01
DESIGNED	SO
PREPARED	CGE
REVIEWED	TZ
APPROVED	---

PROJECT NO.	CONTROL	REV.	FIGURE
1791470	0014	0	A

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

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APPENDIX B

Description of Technical 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

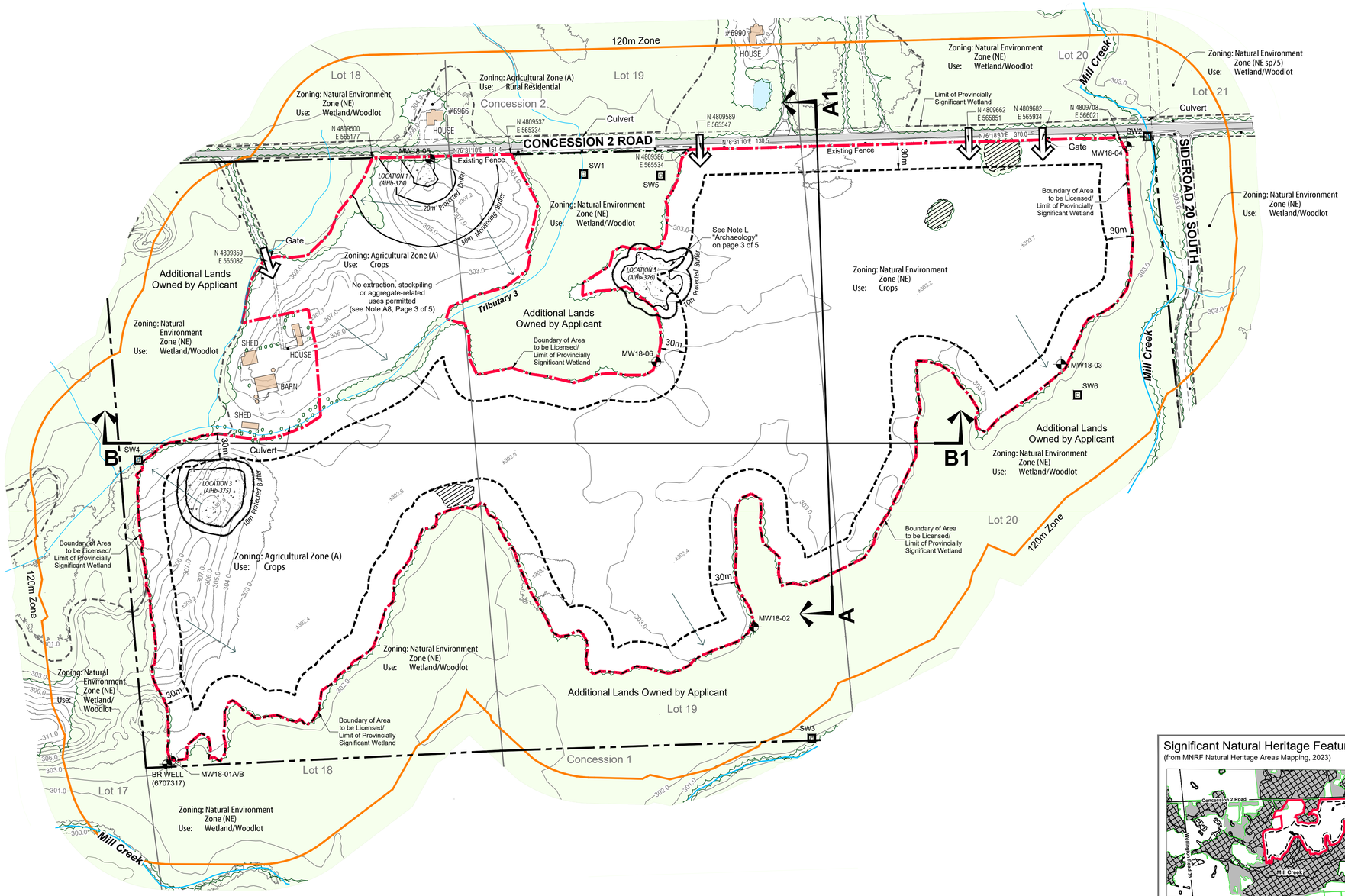
Noise Source Summary Table

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		91	101	101	97	99	97	96	90	86	102	107	Golder Database
Loader 1	CAT_980G	Lw		106	110	108	101	103	104	99	92	86	107	114	Golder Database
Loader 2	CAT_980M	Lw		111	115	113	106	108	109	104	97	91	112	119	Golder Database
Dragline	Dragline	Lw		102	115	123	108	104	106	105	99	92	112	124	Golder Database

APPENDIX D

Site Plan



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: 44.8 hectares (110 acres)
   Limit of Extraction: 27.5 hectares (67 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.) with supplementary information from the Ontario Digital Terrain Model (contains information licensed under the Open Government Licence - Ontario). Data from GeoOptic was produced from aerial photography that was flown on June 4, 2021. Mapping is produced in real world scale and coordinates (NAD83 UTM Zone 17N). Contour interval is 1m. All elevations are geodetic (CGVD2013 ht2).
2. Plan of Survey prepared by Delph & Jenkins North Ltd. (2018).
2. The subject lands are zoned Agricultural (A) and Natural Environment (NE) and subject to an Environmental Protection Overlay in the Township of Puslinch Comprehensive Zoning By-law 2018-023 [April 2018 and Revised January 2020].
3. Ontario GeoHub © King's Printer for Ontario, 2023.
4. Grand River Conservation Authority (GRCA)
5. Land use information compiled from 2021 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 predicted water table on the site is 301.91 metres asl in the western edge of the extraction area (as measured at SW4) to 303.95 masl in the northeastern portion of the site (as measured at MW18-04). The water table slopes downward moving from east to west across the site.

E. Site Access and Fencing
1. There are several existing field accesses to the site in the locations shown on the plan view.
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.

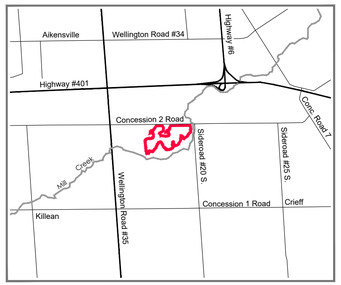
G. Significant Natural Features
1. On-site: fish habitat (Tributary 3), unevaluated wetlands
2. Off-site within 120m: Mill Creek-Puslinch Provincially Significant Wetland, significant woodlands, endangered and threatened species habitat (little brown myotis, northern myotis, eastern small-footed myotis, tri-coloured bat and black ash), fish habitat and significant wildlife habitat.

H. 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.

I. Report References
1. Noise: "Noise Impact Assessment, Aberfoyle Pit Expansion" November 2023 (Source: WSP)
2. Natural Environment: "Natural Environment Report, Proposed Aberfoyle South Pit Expansion" November 2023 (Source: WSP)
3. Hydrogeology: "Water Report Level 1/2 Aberfoyle South Pit Expansion" November 2023 (Source: WSP)
4. Maximum Predicted Water Table Report: "Maximum Predicted Water Table Report" November 2023 (Source: WSP)
5. Archaeology: "Stage 1 and 2 Archaeological Assessment, Revised Report" August 28, 2023 and "Stage 3 Archaeological Assessment (Locations 3 & 5)" June 1, 2023 (Source: WSP)
6. Traffic: "Transportation Impact Study, CBM Aberfoyle South Pit Expansion" November 2023 (Source: TYLin)
7. Agricultural Review: "Proposed Aberfoyle South Pit Expansion: Agricultural Considerations" September 2023 (Source: MHBC Planning)
8. Dust: "Best Management Practices Plan for the Control of Fugitive Dust at Aberfoyle South Pit Expansion" October 2023 (Source: WSP)

Significant Natural Heritage Features
(from MNRF Natural Heritage Areas Mapping, 2023)

Key Plan



Subject Lands

North

SCALE
0 1.0 2.0 3.0
KILOMETRES

Legal Description

PART OF LOTS 18, 19 and 20
CONCESSION 1
(Geographic Township of Puslinch)
TOWNSHIP OF PUSLINCH
COUNTY OF WELLINGTON

Legend

- Boundary of Area to be Licensed
- Additional Lands Owned by Applicant — POST & WIRE FENCE UNLESS OTHERWISE NOTED
- Existing Fence — POST & WIRE FENCE UNLESS OTHERWISE NOTED
- Public Road - Paved / Public Road - Gravel
- Private Laneway
- Existing Access
- Hydro Pole
- Provincially Significant Wetland — ON-SITE VERIFIED IN FIELD BY WSP 2021 AND OFF-SITE FROM ONTARIO GEOHUB AND GRCA OPEN DATA
- Unevaluated Wetland — GRCA OPEN DATA AND WSP
- MW19-02 / SW1 — Groundwater Monitor / Surface Water Monitor — WSP 2021
- A1 — Cross Sections — SEE PAGE 5 OF 5 FOR EXISTING AND REHABILITATED CROSS SECTIONS
- Limit of Excavation — 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 ON THIS PAGE
- Existing Vegetation
- Direction of Surface Drainage (IF ANY)
- Drainage Feature — AS INDICATED
- Parcel Fabric — LOCATION APPROXIMATE
- LOCATION 5 (AlHb-376) — Archaeological Site — SITE RECOMMENDED FOR FURTHER ARCHAEOLOGICAL FIELD WORK

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 F: 519.576.0121 | WWW.MHBCPLAN.COM

MNRF Approval Stamp

Stamp

DRAFT

north

Applicant

VOTORANTIM cimentos / cbm

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

Applicant's Signature

DRAFT

David Hanratty
Votorantim Cimentos - North American Aggregates
Director of Land & Resources

Project

Aberfoyle South Pit Expansion

MNRF Licence Reference No.

Pre-approval review:

For application submission - November 2023

Plan Scale **1:2,500 (Arch D)**

SCALE
0 25 50 100
METRES

Plot Scale 1:2.5 [1mm = 2.5 units] MODEL

Drawn By D.G.S.

Checked By N.D.

File No.

File Name

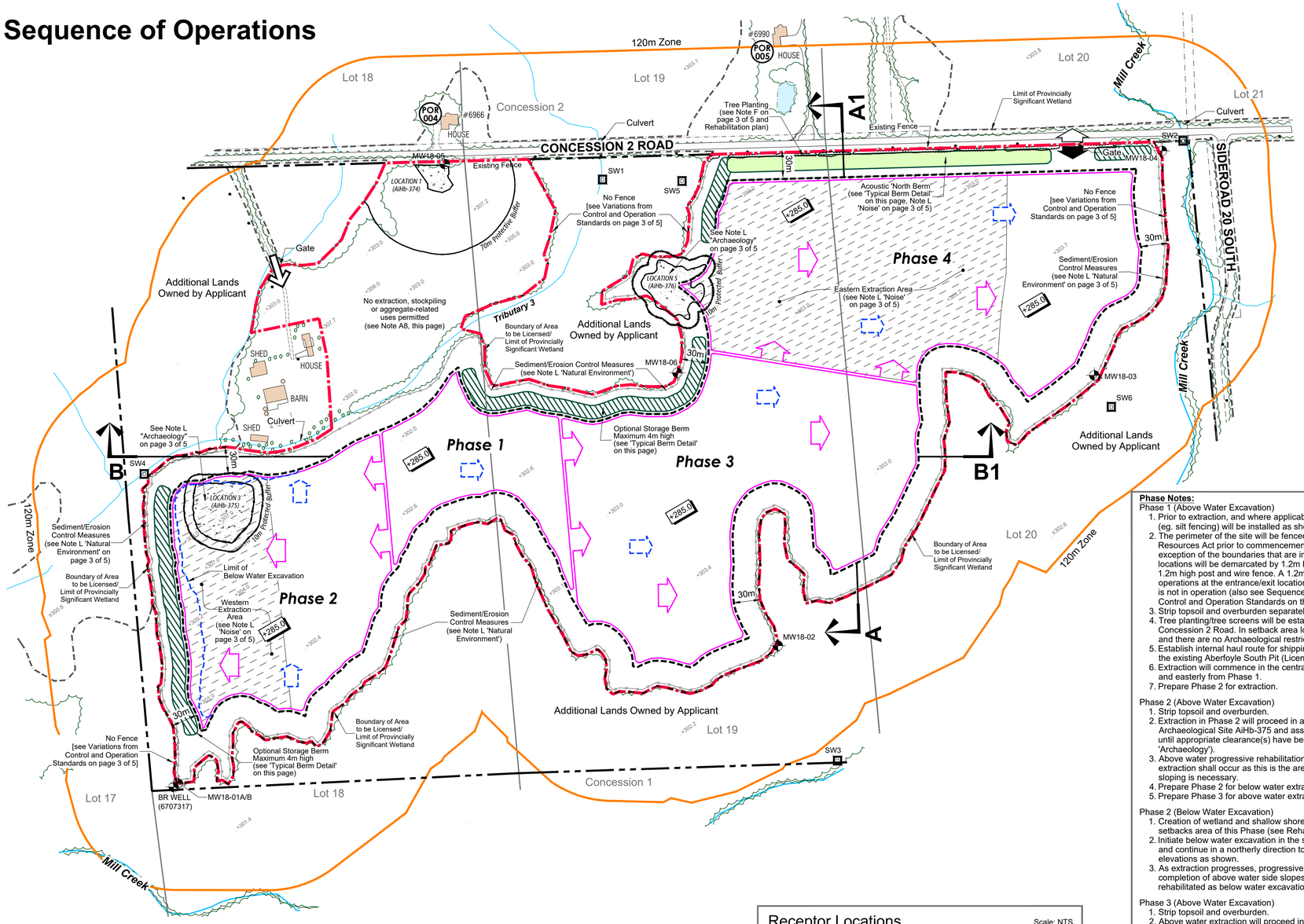
EXISTING FEATURES PLAN

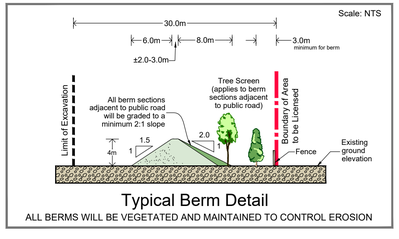
Drawing No.

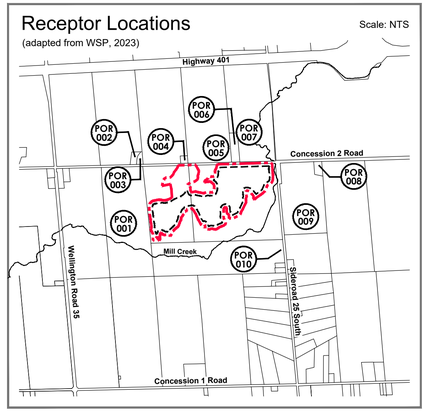
1 OF 5

K:\Y321AB- CBM Aberfoyle South Pit Expansion\A\Aberfoyle South Pit Expansion Exfeplan 1of5 November2023.dwg

Sequence of Operations







Phase Notes:

Phase 1 (Above Water Excavation)
1. Prior to extraction, and where applicable, sediment/erosion control measures (eg. silt fencing) will be installed as shown on Sequence of Operations.
2. The perimeter of the site will be fenced in accordance with the Aggregate Resources Act prior to commencement of extraction on the site, with the exception of the boundaries that are in the woodlot/wetland areas. These locations will be demarcated by 1.2m high marker posts. Fencing is to be 1.2m high post and wire fence. A 1.2m gate will be installed prior to operations at the entrance/exit location 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).
3. Strip topsoil and overburden separately and store in optional berms.
4. Tree planting/tree screens will be established along the frontage of Concession 2 Road. In setback area locations where no berms are proposed, and there are no Archaeological restrictions, tree planting will commence.
5. Establish internal haul route for shipping of product off site for processing in the existing Aberfoyle South Pit (Licence #5497).
6. Extraction will commence in the central area of the site and proceed westerly and easterly from Phase 1.
7. Prepare Phase 2 for extraction.

Phase 2 (Above Water Excavation)
1. Strip topsoil and overburden.
2. Extraction in Phase 2 will proceed in a westerly direction and will exclude Archaeological Site AiHb-375 and associated protected ('no go') buffer area until appropriate clearance(s) have been obtained (see Note L5 'Archaeology').
3. Above water progressive rehabilitation of the westerly limit of above water extraction shall occur as this is the area of a former knoll feature and side sloping is necessary.
4. Prepare Phase 2 for below water extraction.
5. Prepare Phase 3 for above water extraction.

Phase 2 (Below Water Excavation)
1. Creation of wetland and shallow shoreline areas in the southern and western setbacks area of this Phase (see Rehabilitation Plan, page 4 of 5).
2. Initiate below water excavation in the south portion of the excavation area and continue in a northerly direction to the limit of excavation and to the elevations as shown.
3. As extraction progresses, progressive rehabilitation will follow with the completion of above water side slopes and below water side slopes will be rehabilitated as below water excavation proceeds.

Phase 3 (Above Water Excavation)
1. Strip topsoil and overburden.
2. Above water extraction will proceed in an easterly direction.
3. Prepare Phase 1 for below water extraction.

Phase 1 (Below Water Excavation)
1. Creation of wetland and shallow shoreline areas in the northern setback area of this Phase (see Rehabilitation Plan, page 4 of 5).
2. Below water extraction will follow the same direction as above water extraction and proceed in an easterly direction to the depths (pit floor) shown on the Sequence of Operations.
3. Initiate progressive rehabilitation of below water side slopes from a west to east direction as operations progress.
4. Prepare Phase 3 for below water extraction.

Phase 3 (Below Water Excavation)
1. Creation of shallow shoreline areas in the southern setback area of this Phase (See Rehabilitation Plan, page 4 of 5).
2. Below water extraction will follow the same direction as above water extraction and proceed in an easterly direction to the depths (pit floor) shown on the Sequence of Operations.
3. Initiate progressive rehabilitation of below water side slopes from a west to east direction as operations progress.
4. Prepare Phase 4 for above water extraction.

Phase 4 (Above Water Excavation)
1. Prior to extraction in Phase 4, the acoustic berm ('North Berm') must be completed to the requirements outlined in Note L "Noise" on page 3 of 5.
2. Strip topsoil/overburden.
3. Above water extraction will proceed in an easterly direction.
4. Creation of shallow shoreline areas in the southern setback area of this Phase (see Rehabilitation Plan, page 4 of 5).
5. Prepare Phase 4 for below water extraction.

Phase 5 (Not Shown)
1. Remove any equipment, haul roads and buildings on site.
2. Final rehabilitation to be completed (see Rehabilitation Plan on page 4 of 5).

Legal Description

PART OF LOTS 18, 19 and 20
CONCESSION 1
(Geographic Township of Puslinch)
TOWNSHIP OF PUSLINCH
COUNTY OF WELLINGTON

Legend

- Boundary of Area to be Licensed
- Additional Lands Owned by Applicant — POST & WIRE FENCE UNLESS OTHERWISE NOTED
- Field Access
- Existing Spot Height Elevation — METRES ABOVE SEA LEVEL
- Existing Fence — POST & WIRE FENCE UNLESS OTHERWISE NOTED
- Existing Vegetation
- Drainage Feature — AS INDICATED
- Parcel Fabric — LOCATION APPROXIMATE
- Archaeological Site — SITE RECOMMENDED FOR FURTHER ARCHAEOLOGICAL FIELD WORK
- Provincially Significant Wetland — ON-SITE VERIFIED IN FIELD BY WSP 2021 AND OFF-SITE FROM ONTARIO GEOHUB AND GRCA OPEN DATA
- Groundwater Monitor / Surface Water Monitor — WSP 2021
- Cross Sections — SEE PAGE 5 OF 5 FOR EXISTING AND REHABILITATED CROSS SECTIONS
- Limit of Excavation — 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
- General Direction of Above Water Excavation — (SEE NOTES ON PAGE 3 OF 5)
- Below Water Excavation Limit — (SEE NOTES ON THIS PAGE)
- Direction of Below Water Excavation — (SEE NOTES ON PAGE 3 OF 5)
- Acoustic Berm — SEE "TYPICAL BERM DETAIL" AND NOTES ON THIS PAGE AND PAGE 3 OF 5
- Optional Storage Berm — SEE "TYPICAL BERM DETAIL" AND NOTES ON THIS PAGE AND PAGE 3 OF 5
- Proposed Spot Elevation — PIT FLOOR (MAXIMUM DEPTH OF EXCAVATION)
- Receptor Locations — WITHIN 120m OF THE SITE
- Loader and Dragline Restrictions — SEE NOTE L "NOISE" ON PAGE 3 OF 5
- Sediment/Erosion Control Measures
- Tree Screen/Planting — SEE NOTE F ON PAGE 3 OF 5

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 F: 519.576.0121 | WWW.MHBCPLAN.COM

MNRF Approval Stamp

Stamp

DRAFT

north

Applicant

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

Applicant's Signature

DRAFT
David Hanratty
Votorantim Cimentos - North American Aggregates
Director of Land & Resources

Project

Aberfoyle South Pit Expansion

MNRF Licence Reference No.

Pre-approval review:

For application submission - November 2023

Plan Scale **1:2,500 (Arch D)**

SCALE
0 25 50 100
METRES

Plot Scale 1:2.5 [1mm = 2.5 units] MODEL

Drawn By D.G.S.

Checked By N.D.

File No.

File Name

OPERATIONAL PLAN

Drawing No.

2 OF 5

K:\Y321AB- CBM Aberfoyle South Pit Expansion\A\Aberfoyle South Pit Expansion Operplan 2of5 November2023.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 33-55 in the standards).
2. Area Calculations: Licence Area: 44.8 hectares (110 acres)
   Limit of Excavation: 27.5 hectares (67 acres)
3. The maximum number of tonnes of aggregate to be removed from this property is 1,000,000 tonnes in any calendar year.
4. Based on the available groundwater elevation data, the maximum predicted water table on the site is 301.91 metres asl in the western edge of the extraction area (as measured at SW4) to 303.95 masl in the northeastern portion of the site (as measured at MW18-04). The water table slopes downward moving from east to west across the site. The existing water table elevations are shown on each cross section on page 5 of 5.
5. Setbacks will be as shown and labelled on the Sequence of Operations Diagram (page 2 of 5) and on the Existing Features Plan (page 1 of 5).
6. Agricultural use may continue in areas not under extraction.
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) and is located outside the Wellhead Water Quantity Zone. The Site is currently 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).
8. Aggregate extraction, stockpiling and aggregate-related uses are not permitted on the licensed lands between Tributary 3 and Concession Road 2. This area shall be retained in its current condition or used for natural restoration / enhancement, if required.

B. Hours of Operation

1. Extraction will occur during the daytime period (i.e. between 07:00 and 19:00).
2. Shipping hours are restricted to 07:00 to 18:00 on weekdays and 08:00 to 16:00 on Saturdays.
3. 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 (i.e 07:00 to 19:00) Monday to Friday except statutory holidays.

C. Site Access and Fencing

1. The existing field accesses may be utilized for monitoring, setback maintenance and agricultural access. The accesses shall be gated, kept closed during hours of non-operation and shall be maintained throughout the life of the licence. Aggregate trucks shall not be permitted to access the site at these locations.
2. The site shall be accessed through the operational entrance/exit as shown and it will be gated.
3. There is existing fencing along the Concession 2 Road frontage. This fencing will meet ARA requirements.
4. Portions of the licence boundary within the existing wetland/woodlot will not be fenced (see Note M 'Variations from Control and Operation Standards'). Where there is no fencing, 1.2m marker posts will be installed that are visible from one to the other.
5. 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 prior to commencement of work (see Note L 'Natural Environment').

D. Drainage

1. 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 inside the licensed area. Topsoil and overburden stockpiles shall be located within the limit of excavation and remain a minimum of 30 metres from the licence boundary and 90 metres from a property with residential use (see Note M 'Variations').
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. Berms shall be constructed as specified in the location shown on the Sequence of Operations. The height shown is the minimum required for acoustic berms.
2. Berm side slopes shall not exceed 1.5:1 on the interior (extraction) side and 2:1 on the exterior side facing Concession 2 Road. See 'Typical Berm Detail' on page 2 of 5.
3. Berms shall not be located within three (3.0) metres of the licence boundary.
4. The proposed berm will be constructed in accordance with the 'Typical Berm Detail' on page 2 of 5 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.
5. Berms shall be maintained (vegetated to prevent erosion) throughout the operational life of the pit.
6. Optional storage berms may be constructed in the locations as shown.
7. Trees will be planted along the Concession 2 Road frontage (east side of site). These two rows of trees will be planted in front of the berm required for noise attenuation during operations, to provide additional screening to the site.
8. Existing vegetation within the setbacks shall be maintained except where noise attenuation berms are required or for the operational entrance/exit.

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, processing and transportation equipment operating within these Phases shall comply with the restrictions identified in Note L 'Noise'.
2. Progressive and final rehabilitation will be completed in direct correlation to the development of the pit as the extraction limits in each Phase are reached and enough area is available to ensure that rehabilitation activities will not interfere with the production and stockpiling of aggregate materials (see also Phase Notes on page 2 of 5). 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 MNRF.
3. 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 2 lifts through the four phases as shown on the Sequence of Operations Diagram on page 2 of 5 and in accordance with the Ministry of Labour requirements. The proposed pit floor will be located at an elevation of 285 masl or 22 m to 24 m below the existing ground surface.
2. For the majority of the site, the groundwater table is near the ground surface. While some above water excavation may occur across the site, this excavation will take place in one lift of a maximum height of 5m in the western portion of Phase 1. Below water excavation will take place in one lift of a maximum height of 20m, which would be the maximum depth of extraction. See Rehabilitation Plan (page 3 of 5) and Cross Sections Plan (page 5 of 5) for excavation depths and final rehabilitation contours.
3. Aggregate stockpiles will move throughout the life of the operations of the pit. Stockpiles will not be located within 30m of the Licensed boundary.
4. There will be no aggregate processing or recycling at this pit.
5. Internal haul road locations will vary as extraction progresses through the site.

I. Equipment and Processing

1. The equipment used on site for aggregate operations may include: Highway Trucks, Loaders (2), Dragline, Excavator/Backhoe.
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 (See also 'Hydrogeology' notes on this page).

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 Impact Assessment, Aberfoyle Pit Expansion" November 2023 (Source: WSP)

a. Prior to extraction in Phase 4 a 4m high berm shall be installed (North Berm).

b. Within the area identified on the Sequence of Operations [*western and eastern extraction areas]*, the loader operations will be reduced to 45 minutes per 1-hour period. Once the North Berm is in place, the loaders could operate for the full 60 minutes during any given 1-hour period in Phase 4 *[eastern extraction area]*.

c. Dragline operating 'under load' for a maximum of 45 minutes per hour and the engine will generally operate in low revolutions conditions (i.e. 'low rev') for the remaining 15 minutes per hour.

d. During the operations within the area identified on the Sequence of Operations [*western and eastern extraction areas]*, the dragline will require noise controls (e.g. equipment mounted noise barrier or acoustically equivalent treatment) to reduce its noise emissions by a minimum of 5dB to target a sound power level as presented in Table 1 of the Noise Impact Assessment.

e. Extraction will occur during the daytime period (i.e. between 07:00 and 19:00).

f. For the extraction associated with the operations, the equipment will operate as specified above and in Section 2.0 of the Noise Impact Assessment and is expected to operate continuously except for the dragline or excavator/backhoe and loaders (i.e. within identified areas) expected to operate "under load" up to 45 minutes in a given 1-hour period and under 'low-rev' condition for the remaining 15 minutes in the hour.

g. Equipment list and sound power emissions are consistent to those listed in Table 1 of the Noise Impact Assessment (or acoustically equivalent).Trucks, while onsite, shall travel at no greater than 25 km/h.

h. Equipment shall be operated as intended by manufacturer specifications.

i. Equipment shall be maintained and kept in good condition.

j. Equipment shall be fitted with manufacturer specified and properly functioning noise control devices.

k. On-site roadways shall be maintained to limit noise resulting from trucks driving over ruts and potholes.

l. Alternative to narrow band back up alarms shall be investigated and used at the site provided they are found to meet the licensee's safety requirements.

m. Activities used to prepare the site for excavation, such as the stripping of topsoil, construction of the berm, or activities related to the remediation of the site after the extraction is completed as considered to be construction activities and are only permitted to occur during the daytime (i.e. 07:00 to 19:00) Monday to Friday except statutory holidays.

n. Prior to operations commencing, sound measurements of the equipment used on the site shall be undertaken to confirm maximum emission levels provided in Table 1 of the Noise Impact Assessment are not exceeded.

o. To confirm that sound levels from the site operations are in compliance with the MECP noise guideline limits, an acoustical audit shall be completed within six months of the start of extraction activities on the site.

2. Natural Environment: "Natural Environment Report, Proposed Aberfoyle South Pit Expansion" November 2023 (Source: WSP)

a. General Best Management Practices

Standard Best Management Practices to be followed during site preparation and operations to mitigate damage to the adjacent natural features include the following:

i. Clearly demarcate and maintain recommended setbacks on the site plan.

ii. To comply with the Migratory Birds Convention Act (MBCA), avoid removal of vegetation during the active season for breeding birds (April 15 - August 15), unless construction disturbance is preceded by a nesting survey conducted by a qualified biologist. If any active nests are found during the nesting survey, a buffer will be installed around the nest to protect against disturbance. Vegetation within the protection buffer cannot be removed until the young have fledged the nest.

b. Significant Wetland and Woodland

The following mitigation measures are recommended to minimize adverse indirect impacts on the adjacent significant wetland and significant woodland (i.e., Mill Creek-Puslinch PSW):

i. Implement a 30 m setback from Mill Creek-Puslinch PSW / significant woodland

ii. If gradients indicate there is potential for runoff to enter Mill Creek-Puslinch PSW, implementation of sediment and erosion controls will occur prior to commencement of operations to prevent the runoff of suspended solids into Mill Creek-Puslinch PSW. In particular, in such areas where potential runoff exists, silt fencing (or similar) will be installed along the dripline of Mill Creek-Puslinch PSW in those areas prior to commencement of activities within 30 m of Mill Creek-Puslinch PSW, including site preparation and vegetation clearing. The sediment and erosion control measures will be actively monitored and maintained for the duration of the proposed operations. Following rehabilitation of the areas adjacent to the PSW, the control measures will be removed.

iii. Where installed, silt fencing will be maintained for the duration of the operations phase adjacent to Mill Creek-Puslinch PSW and will include regular inspections for signs of damage or deterioration.

iv. Following rehabilitation adjacent to Mill Creek-Puslinch PSW, any silt fencing or other erosion/sediment controls that had been installed, will be removed from the site.

v. To avoid compacting the soil in the setback area (which can negatively impact tree roots) the use of heavy machinery should be minimized within 5 m of the dripline (where potential for root damage is most likely), particularly during wet periods (e.g., spring) when soil may already be saturated.

vi. Any berms located within the 30 m setback area must be located a minimum of 5 m from the dripline of the woodland to protect the critical root zone for the woodland.

vii. A minimum 35% (6.7 ha) of the non-aquatic portion of the licensed area will be rehabilitated to forest cover.

c. Fish Habitat

i. A DFO Request for Review will be submitted for Tributary #3.

ii. All requirements identified by DFO will be implemented.

d. Non-significant Wetlands

i. Replace 0.3 ha of wetland habitat as part of progressive rehabilitation. See Rehabilitation Plan on page 4 of 5.

e. Monitoring

i. Monitoring as recommended in the Water Report Level 1/2 (WSP 2023) will be implemented for the proposed extraction.

L. Report Recommendations (cont'd)

3. Hydrogeology: "Water Report Level 1/2 Aberfoyle South Pit Expansion" November 2023 (Source: WSP)

a. A door-to-door survey of private wells for properties within 500 m of the Site shall be carried out upon licence approval and prior to the initiation of aggregate extraction, to supplement and help verify the MECP WWIS information and confirm neighbouring water users, noting that participation by neighbouring property owners would be entirely voluntary.

b. Site-specific groundwater and surface water monitoring recommendations have been developed to measure and evaluate the actual effects on potential receptors associated with the development of the pit, and to allow for comparison of the actual effects measured during the monitoring program and those predicted as part of the impact assessment. Monitoring shall be carried out upon licence approval and prior to the initiation of aggregate extraction, and continue through the Operational Period and one year beyond the completion of Site Rehabilitation. The monitoring program shall include the following:

i. Groundwater Monitoring: The groundwater level monitoring program will include overburden wells MW18-01 to MW18-06 and the bedrock well TW11-16 within the setback area of the Site, as shown on the Operational Plan. Groundwater level monitoring will consist of recording groundwater level data at 15 minute intervals using data loggers, along with quarterly logger downloads and manual water level measurements.

ii. Surface Water Monitoring: The surface level monitoring program will include the monitoring stations SW-1 to SW-6 and their associated shallow standpipes SP18-01 to SP-22-02 within the setback area of the Site, as shown on the Operational Plan. Surface water level monitoring will consist of recording water level data at 15 minute intervals using data loggers, along with quarterly logger downloads and manual water level measurements.

iii. Data Review and Reporting: Groundwater and surface water levels shall be reviewed by CBM quarterly, and reported to the MNRF annually as part of the licence requirements. Water level trends during Operations and Post-Rehabilitation shall be compared to Pre-Operational conditions. If the results of the monitoring program indicate the potential for adverse impact to groundwater users (private wells) or surface water features (Mill Creek and its tributaries), then appropriate enhanced monitoring and/or mitigative actions would be developed and implemented.

c. Any water well interference complaint received by CBM will be responded to in light of the collected monitoring data and under the Complaints Response Protocol described in Section 8.5 of the Water Report.

d. All fuel handling on site shall be done in accordance with applicable TSSA Standards and CBM's Best Management Practices.

4. Archaeology: "Stage 1 and 2 Archaeological Assessment, Revised Report" August 28, 2023 and "Stage 3 Archaeological Assessment (Locations 3 & 5)" June 1, 2023 (Source: WSP)

a. Location 1 has been registered with the MCM under Borden AiHb-374. The AiHb-374 site is recommended for long term protection and avoidance under Stage 3 PIF P468-0087-2022 using the following measures:

i. The protected site area corresponds to Figure B-2 of the supplemental documentation.

ii. The AiHb-374 site is present as shown on the site plan.

iii. No extraction, alterations or soil disturbance may be carried out within the limits of the protected area of the AiHb-374 site.

iv. Post and wire fencing will be erected along the limits of the AiHb-374 site under the direction of the licensed consultant archaeologist

v. If the AiHb-374 site is still present when the ARA license is surrendered a restrictive covenant will be placed on title to continue the protection of the archaeological site.

vi. A letter is provided by the licensee stating that they are aware of the presence of the archaeological site within the limits of the licence and that they are aware of the restrictions on alteration of an archaeological site of further cultural heritage value or interest as per the condition on their licence and as per Section 48 of the Ontario Heritage Act.

b. Location 3 has been registered with the MCM under Borden (AiHb-375). The Stage 3 Archaeological Assessment recommends the following:

i. Based on the CHVI documented within the artifact assemblage and the Euro-Canadian historical context for Location 3 (AiHb-375), the site will be subjected to Stage 4 mitigation by excavation be conducted as per Section 4.2 of the *Standards and Guidelines for Consultant Archaeologists* (MCM 2011). As the artifact assemblage postdates 1830, Section 4.2.7 Standard 2 applies, which requires all midden areas to be hand excavated, followed by mechanical topsoil removal of the remainder of the site. As the site is located within plough zone which has resulted in the artifacts being disturbed and redistributed and therefore are not in situ, as well as the high counts of artifacts in multiple units no potential midden areas were identified during the Stage 3 Archaeological Assessment. Based on these conditions, mechanical topsoil removal of the site can proceed immediately. Mechanical topsoil removal should be undertaken with a backhoe or gradall-type excavator with a flat-edged bucket and should stop at subsoil interface, at which time the subsoil should be assessed for cultural features as per Section 4.2.3., Standard 2 and 3, and must be completed 10 m beyond any identified archaeologically significant features, up to the limits of the proposed area of impact.

ii. Excavation will only be conducted when weather and lighting conditions meet the requirements of the *Standards and Guidelines for Consultant Archaeologists*. Following mechanical topsoil removal, all identified cultural features will be documented with photographs and drawings, and subsequently hand excavated. All architectural remains must be documented with scale drawing and photographs, and all structural features must be excavated according to the requirements for complex stratified sites. All excavated feature soil will be screened through 6 mm wire mesh to facilitate artifact recovery. A thorough photographic record of the Stage 4 mitigation must be maintained.

iii. A report documenting the methods and results of the Stage 4 mitigation and laboratory analysis of the artifacts, together with an artifact inventory, and all necessary cartographic and photographic documentation must be produced in accordance with the *Standards and Guidelines for Consultant Archaeologists*.

iv. Until such time that Location 3 (AiHb-375) can undergo the recommended Stage 4 excavation, the site should be avoided and protected by establishing a "no-go" zone consisting of the site and a 10 m protective buffer. The proposed protected area must be shown on all contract drawings, when applicable, and be labelled as a "no-go" zone. Instructions should be provided to all construction staff to stay outside of this area. Any ground alterations to Location 3 (AiHb-375) and its protective buffer area should be avoided. This includes but is not necessarily limited to impacts from aggregate extraction, aggregate processing, vegetation clearance, and the construction of access roads or berms over the site. It also includes minor forms of soil disturbance, such as tree removal, minor landscaping, and utilities installation. If grading or other soil disturbing activities are anticipated to extend to the edge of the area to be avoided, then a temporary barrier must be erected around Location 3 (AiHb-375) and its 10 m protective buffer. No-go instructions must be given to all on site extraction crew and others involved in the day-to-day decisions on site, and a licensed archaeologist should be contracted to inspect and monitor the effectiveness of the avoidance strategy. After completion of these activities, a report will be prepared on the effectiveness of the strategy.

c. Location 5 has been registered with the MCM under Borden (AiHb-376). The Stage 3 Archaeological Assessment recommends the following:

i. Based on the CHVI documented within the artifact assemblage and the Euro-Canadian historical context for Location 5 (AiHb-376), the site will be subjected to Stage 4 mitigation by excavation be conducted as per Section 4.2 of the *Standards and Guidelines for Consultant Archaeologists* (MCM 2011). As the artifact assemblage postdates 1830, Section 4.2.7 Standard 2 applies, which requires all midden areas to be hand excavated, followed by mechanical topsoil removal of the remainder of the site. Based on the location of Location 5 (AiHb-376) within ploughzone, and the relatively low counts of artifacts in each unit, no potential midden areas were identified during the Stage 3 Archaeological Assessment, therefore, topsoil removal of the site can proceed immediately. Mechanical topsoil removal should be undertaken with a backhoe or gradall-type excavator with a flat-edged bucket and should stop at subsoil interface, at which time the subsoil should be assessed for cultural features as per Section 4.2.3., Standard 2 and 3, and must be completed 10 m beyond any identified features, up to the limits of the proposed area of impact.

ii. Excavation will only be conducted when weather and lighting conditions meet the conditions of the *Standards and Guidelines for Consultant Archaeologists*. Following mechanical topsoil removal, all identified cultural features will be documented with photographs and drawings, and subsequently hand excavated. All architectural remains must be documented with scale drawing and photographs, and all structural features must be excavated according to the requirements for complex stratified sites. All excavated feature soil will be screened through 6 mm wire mesh to facilitate artifact recovery. A thorough photographic record of the Stage 4 mitigation must be maintained.

iii. A report documenting the methods and results of the Stage 4 mitigation and laboratory analysis of the artifacts, together with an artifact inventory, and all necessary cartographic and photographic documentation must be produced in accordance with the *Standards and Guidelines for Consultant Archaeologists*.

iv. Until such time that Location 5 (AiHb-376) can undergo the recommended Stage 4 excavation the site should be avoided and protected by establishing a "no-go" zone consisting of the site and a 10 m protective buffer. The proposed protected area must be shown on all contract drawings, when applicable, and be labelled as a "no-go" zone. Instructions should be provided to all construction staff to stay outside of this area. Any ground alterations to Location 5 (AiHb-376) and its protective buffer area should be avoided. This includes but is not necessarily limited to impacts from aggregate extraction, aggregate processing, vegetation clearance, and the construction of access roads or berms over the site. It also includes minor forms of soil disturbance, such as tree removal, minor landscaping, and utilities installation. If grading or other soil disturbing activities are anticipated to extend to the edge of the area to be avoided, then a temporary barrier must be erected around Location 5 (AiHb-376) and its 10 m protective buffer. No-go instructions must be given to all on site extraction crew and others involved in the day-to-day decisions on site, and a licensed archaeologist should be contracted to inspect and monitor the effectiveness of the avoidance strategy. After completion of these activities, a report will be prepared on the effectiveness of the strategy.

d. Should deeply buried archaeological resources be identified during ground disturbance activity associated with future development of the study area, ground disturbance activities should be immediately halted and the Archaeology Division of the Culture Programs Unit of the MCM notified.

Legal Description

PART OF LOTS 18, 19 and 20
CONCESSION 1
(Geographic Township of Puslinch)
TOWNSHIP OF PUSLINCH
COUNTY OF WELLINGTON

L. Report Recommendations (cont'd)

5. Traffic: "Transportation Impact Study, CBM Aberfoyle South Pit Expansion" November 2023 (Source: TYLin)

A comprehensive test of the structural condition of the Mill Creek culvert (structure ID 2012) and the road along Concession 2, along with bore hole analysis of the subject section of Concession 2 roadway, be undertaken to confirm the overall haul route's load bearing capacity. Results from these tests should then be reviewed in the context of the Township's capital works plan and forecasted rehabilitation schedule for the subject section of Concession 2, including the Mill Creek culvert.

6. Agriculture: "Agriculture Considerations, Aberfoyle South Expansion" September 2023 (Source: MHBC Planning)

Implement all recommended mitigation measures pertaining to water quality and quantity, noise, dust, and traffic in the ARA site plans.

7. Dust: "Best Management Practices Plan for the Control of Fugitive Dust at Aberfoyle South Pit Expansion" October 2023 (Source: WSP)

The purpose of this plan is to document the Best Management Practices for the control of fugitive dust emissions from activities taking place at the pit. The licensee shall follow these Best management Practices. The BMPP shall be reviewed periodically and updated if required.

M. Variations from Control and Operation Standards

Number	O.Reg 244/97 Section 0.13	Variation	Rationale
1	(1)19.i	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 to the natural angle of repose.	Below water slopes will stabilize at the natural angle of repose, which is estimated to range from 2-3:1.
2	(1)13.i	Stockpiles may be placed within 90m of adjacent residential lands.	Adjacent lands are owned by CBM.
3	(3)(a)	Fencing is not required along the boundaries that run through a woodlot and/or a wetland.	These boundaries will be demarcated by 1.2m high marker posts that are visible from one to the other. To limit disturbance to significant wetland and woodland, silt fencing will be installed along the Limit of Extraction so fencing will be in place.

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 F: 519.576.0121 | WWW.MHBCPLAN.COM

MNRF Approval Stamp

Stamp

DRAFT
MINISTRY OF NORTHERN DEVELOPMENT AND FORESTRY
DAL DeHUTTER
RPF

Applicant

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

Applicant's Signature

DRAFT
David Hanratty
Votorantim Cimentos - North American Aggregates
Director of Land & Resources

Project

Aberfoyle South Pit Expansion

MNRF Licence Reference No.

Pre-approval review:

For application submission - November 2023

Plot Scale 1:2.5 [1mm = 2.5 units] MODEL
Drawn By D.G.S.
Checked By N.D.
File No. **Y321AB**

File Name

OPERATIONAL NOTES PLAN

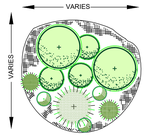
Drawing No.

3 OF 5

K:\Y321AB- CBM Aberfoyle South Pit Expansion\A\Aberfoyle South Pit Expansion Notesplan 3of5 November2023.dwg

Nodal Planting Detail

Scale: NTS



- PLANTING AREAS WILL CONSIST OF A NUMBER OF NODAL PLANTING CELLS CONTAINING A MIXTURE OF CONIFEROUS AND DECIDUOUS SPECIES PLANTED AS SEEDLINGS. A MINIMUM OF 70% OF THE PLANTED TREES CONSIST OF CONIFEROUS SPECIES. SPECIES MAY INCLUDE WHITE CEDAR, WHITE SPRUCE (*PICEA GLAUCA*), SUGAR MAPLE, RED MAPLE, WHITE BIRCH, AND AMERICAN BASSWOOD ON THE NORTH-FACING SLOPE (WHICH IS EXPECTED TO BE COOLER AND MORE MOIST), AND WHITE PINE, WHITE CEDAR, NORWAY SPRUCE (*PICEA ABIES*), EUROPEAN LARCH (*LARIX DECIDUA*), TREMBLING ASPEN, AND BALSAM POPLAR ON THE SOUTH, EAST AND WEST-FACING SLOPES.
- SHRUBS SUCH AS SERVICEBERRY, NANNYBERRY, NINEBARK (*PHYSOCARPUS OPULIFOLIUS*), DOGWOODS, HIGHBUSH CRANBERRY (*VIBURNUM OPULUS*), ELDERBERRY, CHOKE CHERRY (*PRUNUS VIRGINIANA*), CHOKEBERRY, WILLOWS AND OTHERS MAY BE USED TO ADD DIVERSITY AND INCREASE POLLINATOR/ WILDLIFE DIVERSITY, PARTICULARLY IN THE TRANSITION BETWEEN WETLAND AND UPLAND AREAS.

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: pond, shallow shoreline and wetland areas, reforestation and various side slope treatments.
2. The existing wetland within the southern setback area is located outside of the Limit of Extraction and is not expected to be directly impacted.
3. No buildings/structures or internal haul roads will remain on site upon completion of rehabilitation.

B. Phasing

1. The proposed Aberfoyle South Pit Expansion will be rehabilitated on a progressive basis, corresponding to the operational progression of the pit excavation, to form a pond 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) and a maximum of 3:1 for the above water portion on the west side of the excavation area. Sloping will occur as the limits of the pit excavation are reached. See Rehabilitation Plan drawing and Note D on this page.
4. Side slopes will be vegetated where located above the final water level of the pit pond and will include reforestation in setback areas in order to enhance a diversity of native vegetation types and species that are anticipated to spread around the rehabilitated side slopes (see Note D 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. Overburden and/or unmarketable material will be used to backfill pit faces to create the topography of the side slopes (i.e. 3/2:1 slope). 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 the final rehabilitation 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 50,000 m³

C. Proposed Vegetation and Rehabilitated Features

1. Final Rehabilitation
   a. The proposed final rehabilitation plan includes the creation of a pond, and terrestrial habitats comprised of backfilled areas, overburden slopes, and terrestrial nodal plantings. 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 through management of forest edges and minimization of cleared areas between the extraction area and Mill Creek-Puslinch PSW to the south.
   b. In accordance with the Growth Plan, 35% (6.7 ha) of the non-aquatic area of the licence will be rehabilitated to forest cover at time of final rehabilitation. 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) 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 extend ±5 m from the shore 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. Above-water 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. The setback area and slope of the above-ground extraction area will be planted with a higher density of trees to achieve the 35% minimum forest cover in accordance with the Growth Plan and create a transitional zone between the adjacent Mill Creek-Puslinch PSW and the rehabilitated pit. This transitional zone will also increase overall woodland cover, improve the buffer to Mill Creek-Puslinch PSW and Mill Creek and enhance the existing wildlife movement corridor. To facilitate a natural connection with the existing wetland, plantings should include species characteristic of the Mill Creek-Puslinch PSW as well as a transitional upland / wetland interface, and that are suited to the planting conditions (i.e., soil texture and moisture). It is further recommended that a minimum of 70% of the planted trees consist of coniferous species. Species may include white cedar, white spruce (*Picea glauca*), sugar maple, red maple, white birch, and American basswood on the north-facing slope (which is expected to be cooler and more moist), and white pine, white cedar, Norway spruce (*Picea abies*), European larch (*Larix decidua*), trembling aspen, and balsam poplar on the south, east and west-facing slopes (see also 'Nodal Planting Detail' on this page).
   e. Shrubs such as serviceberry, nannyberry, ninebark (*Physocarpus opulifolius*), dogwoods, highbush cranberry (*Viburnum opulus*), elderberry, choke cherry (*Prunus virginiana*), chokeberry, willows and others may be used to add diversity and increase pollinator/wildlife diversity, particularly in the transition between wetland and upland areas.

2. Progressive Rehabilitation
   a. Rehabilitation will be progressive following the general 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.
   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). Also, two rows of trees will be planted along the Concession 2 Road frontage, in front of the berm required for noise attenuation during operations, to provide additional screening to the site.
   d. The new wetland areas shall be created in accordance with the Wetland Area Detail. Wetlands shall be created prior to the removal of the non-PSW in Phase 4 associated with extraction and berm construction.

3. Vegetation
   Ground covers on 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 26 ha of pond including shallow shoreline areas, 0.3 ha of wetland areas, 6.7 ha of tree planting areas (35% of non-aquatic areas) and 11 ha of terrestrial landform comprised of above water overburden side slopes and an agricultural area in the northwest part of the site where extraction did not occur. 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

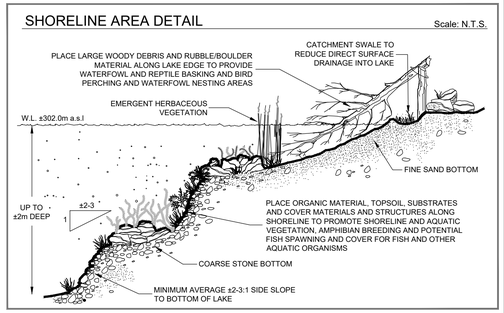
1. No buildings or structures associated with aggregate operations will remain on site.
2. The water level of the proposed pond (±302.0m a.s.l.) and the post-extraction ground water table, are as shown on pages 1, 4 and 5 of 5 as per hydrogeological/ hydrological assessment.

WETLAND AREA DETAIL

Scale: N.T.S.

SHORELINE AREA DETAIL

Scale: N.T.S.



Legal Description

PART OF LOTS 18, 19 and 20
CONCESSION 1
(Geographic Township of Puslinch)
TOWNSHIP OF PUSLINCH
COUNTY OF WELLINGTON

Legend

- Boundary of Area to be Licensed
- Additional Lands Owned by Applicant — POST & WIRE FENCE UNLESS OTHERWISE NOTED
- Contour with Elevation — METRES ABOVE SEA LEVEL
- Existing Fence — POST & WIRE FENCE UNLESS OTHERWISE NOTED
- Existing Vegetation
- Private Laneway
- Access
- Provincially Significant Wetland — ON-SITE VERIFIED IN FIELD BY WSP 2021 AND OFF-SITE FROM ONTARIO GEOHUB
- Unevaluated Wetland — GRCA OPEN DATA
- Archaeological Site — SITE RECOMMENDED FOR FURTHER ARCHAEOLOGICAL FIELD WORK
- Cross Sections — SEE PAGE 5 OF 5 FOR EXISTING AND REHABILITATED CROSS SECTIONS
- Limit of Excavation — ALL SETBACKS ARE DRAWN TO SCALE AND SHOW LABELLED DISTANCES
- Proposed Contour — METRES ABOVE SEA LEVEL (m A.S.L.)
- Proposed Elevation — REHABILITATED ELEVATION
- Proposed Tree Planting Areas — LOCATION APPROXIMATE
- Post Extraction Pond
- Proposed Shoreline Area — (SEE DETAIL ON THIS PAGE)
- Proposed Wetland Area — (SEE DETAIL ON THIS PAGE)

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 F: 519.576.0121 | WWW.MHBCPLAN.COM

MNRF Approval Stamp

Stamp

DRAFT

north

Applicant

VOTORANTIM cimentos | cbm

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

Applicant's Signature

DRAFT

David Hannah
Votorantim Cimentos - North American Aggregates
Director of Land & Resources

Project

Aberfoyle South Pit Expansion

MNRF Licence Reference No.

Pre-approval review:

For application submission - November 2023

Plan Scale **1:2,500 (Arch D)**

SCALE
0 25 50 100
METRES

Plot Scale 1:2.5 [1mm = 2.5 units] MODEL

Drawn By D.G.S.

Checked By N.D.

File No. **Y321AB**

File Name

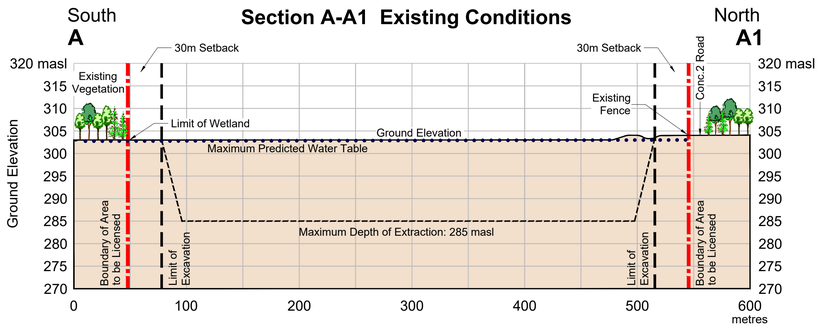
REHABILITATION PLAN

Drawing No.

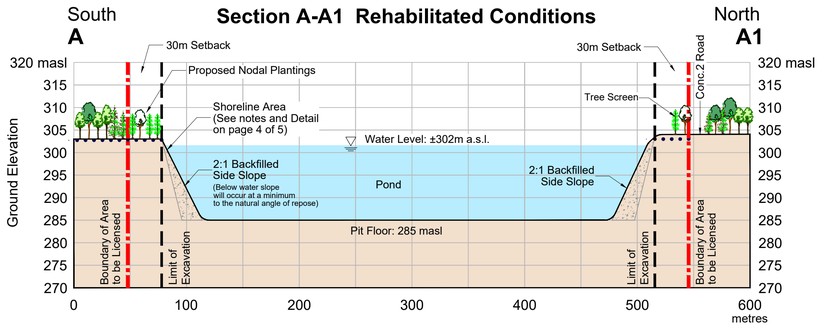
4 OF 5

K:\Y321AB- CBM Aberfoyle South Pit Expansion\A\Aberfoyle South Pit Expansion Rehaplan 4of5 November2023.dwg

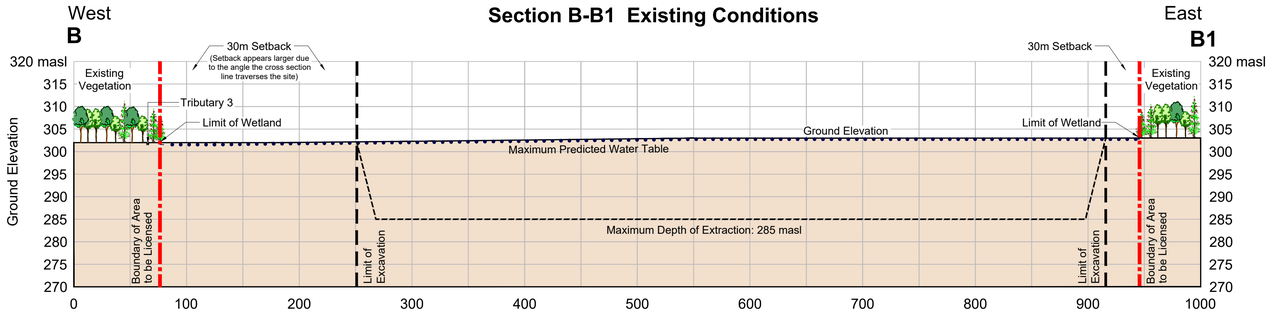
Section A-A1 Existing Conditions



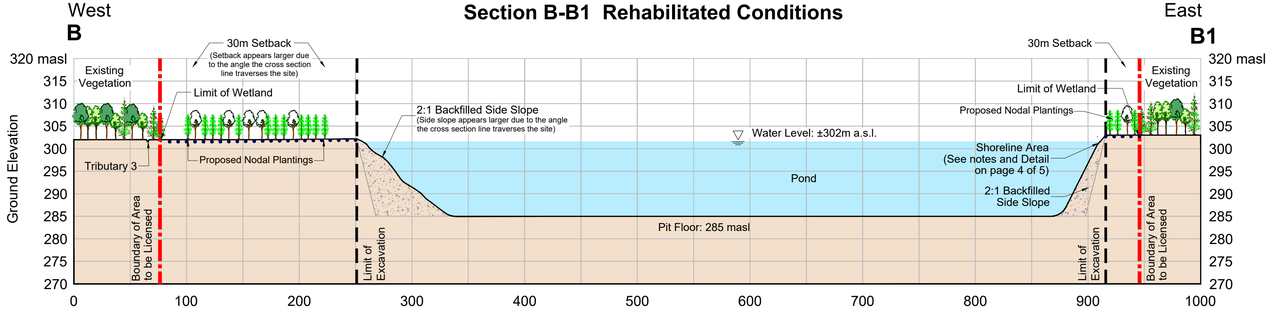
Section A-A1 Rehabilitated Conditions



Section B-B1 Existing Conditions



Section B-B1 Rehabilitated Conditions



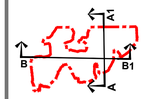
For all Cross Sections
Horizontal Scale - 1:2,500
Vertical Scale - 4x Exaggeration (1:625)

Legal Description

PART OF LOTS 18, 19 and 20
CONCESSION 1
(Geographic Township of Puslinch)
TOWNSHIP OF PUSLINCH
COUNTY OF WELLINGTON

Legend

- Licensed Boundary
- Limit of Excavation
- Maximum Depth of Extraction
- Existing Vegetation/Trees
- Proposed Nodal Plantings
- Maximum Predicted Water Table (SEE NOTE D ON PAGE 1 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
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MNRF Approval Stamp

Stamp

DRAFT

Applicant

VOTORANTIM cimentos cbm

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

Applicant's Signature

DRAFT

David Hanratty
Votorantim Cimentos - North American Aggregates
Director of Land & Resources

Project

Aberfoyle South Pit Expansion

MNRF Licence Reference No.

Pre-approval review:

For application submission - November 2023

Plan Scale: 1:2,500 (Horizontal) / 4x Exaggeration (Vertical)

Horizontal Scale
50 0 METRES 50 100

Plot Scale 1:2.5 [1mm = 2.5 units] MODEL

Drawn By D.G.S.

Checked By N.D.

File No. **Y321AB**

File Name

CROSS SECTIONS PLAN

Drawing No.

5 OF 5

K:\Y321AB- CBM Aberfoyle South Pit Expansion\A\Aberfoyle South Pit Expansion Xsecplan 5of5 November2023.dwg

APPENDIX E

Sample Calculations

Report (1791470 CBM Lake Above V16 AAR.cna)

CALCULATION CONFIGURATION

Configuration	
Parameter	Value
General	
Country	(user defined)
Max. Error (dB)	0.00
Max. Search Radius (#(Unit,LEN))	2000.00
Min. Dist Src to Rcvr	0.00
Partition	
Raster Factor	0.50
Max. Length of Section (#(Unit,LEN))	1000.00
Min. Length of Section (#(Unit,LEN))	1.00
Min. Length of Section (%)	0.00
Proj. Line Sources	On
Proj. Area Sources	On
Ref. Time	
Reference Time Day (min)	960.00
Reference Time Night (min)	480.00
Daytime Penalty (dB)	0.00
Recr. Time Penalty (dB)	0.00
Night-time Penalty (dB)	0.00
DTM	
Standard Height (m)	297.00
Model of Terrain	Triangulation
Reflection	
max. Order of Reflection	2
Search Radius Src	100.00
Search Radius Rcvr	100.00
Max. Distance Source - Rcvr	1000.00 1000.00
Min. Distance Rvcr - Reflector	1.00 1.00
Min. Distance Source - Reflector	0.10
Industrial (ISO 9613)	
Lateral Diffraction	some Obj
Obst. within Area Src do not shield	On
Screening	Excl. Ground Att. over Barrier
	Dz with limit (20/25)
Barrier Coefficients C1,2,3	3.0 20.0 0.0
Temperature (#(Unit,TEMP))	10
rel. Humidity (%)	70
Ground Absorption G	1.00
Wind Speed for Dir. (#(Unit,SPEED))	3.0
Roads (RLS-90)	
Strictly acc. to RLS-90	
Railways (Schall 03 (1990))	
Strictly acc. to Schall 03 / Schall-Transrapid	
Aircraft (???)	
Strictly acc. to AzB	

NOISE SOURCES

Noise Source Library

Name	ID	Type	1/3 Oktave Spectrum (dB)											Source
			Weight.	31.5	63	125	250	500	1000	2000	4000	8000	A	lin	
Heavy Trucks	HeavyTruck	Lw		91.0	101.0	101.0	97.0	99.0	97.0	96.0	90.0	86.0	102.2	107.0	
CAT 980M Loader	CAT_980M	Lw		111.0	115.0	113.0	106.0	108.0	109.0	104.0	97.0	91.0	112.1	119.3	
CAT 980G Loader	CAT_980G	Lw		106.0	110.0	108.0	101.0	103.0	104.0	99.0	92.0	86.0	107.1	114.3	
Dragline HS895 Liebherr	Dragline	Lw		101.5	115.3	122.6	107.8	104.1	106.2	104.9	99.4	91.6	112.1	123.7	

Point Source(s)

Name	M.	ID	Result. PWL			Lw / Li			Correction			Sound Reduction		Attenuation	Operating Time			K0	Freq.	Direct.	Height		Coordinates		
			Day	Evening	Night	Type	Value	norm.	Day	Evening	Night	R	Area		Day	Special	Night						X	Y	Z
			(dBA)	(dBA)	(dBA)			dB(A)	dB(A)	dB(A)	dB(A)		(m²)		(min)	(min)	(min)	(dB)	(Hz)		(m)		(m)	(m)	(m)
Dragline north		!E06!D	112.1	112.1	112.1	Lw	Dragline		0.0	0.0	0.0				45.00	0.00	0.00	0.0		(none)	4.00	r	565603.14	4809537.72	306.00
Dragline east	~	!F01!D	112.1	112.1	112.1	Lw	Dragline		0.0	0.0	0.0				45.00	0.00	0.00	0.0		(none)	4.00	r	565998.63	4809651.92	306.00
Dragline center	~	!E05!D	112.1	112.1	112.1	Lw	Dragline		0.0	0.0	0.0				45.00	0.00	0.00	0.0		(none)	4.00	r	565465.45	4809232.12	306.00
Dragline west	~	!E08!D	112.1	112.1	112.1	Lw	Dragline		0.0	0.0	0.0				45.00	0.00	0.00	0.0		(none)	4.00	r	565129.19	4809012.98	306.00
Dragline east	~	!E07!D	112.1	112.1	112.1	Lw	Dragline		0.0	0.0	0.0				45.00	0.00	0.00	0.0		(none)	4.00	r	565895.88	4809519.90	306.00
Dragline north	~	!W02!D	112.1	112.1	112.1	Lw	Dragline		0.0	0.0	0.0				45.00	0.00	0.00	0.0		(none)	4.00	r	565674.88	4809326.36	306.00

Line Source(s)

Name	M.	ID	Result. PWL			Result. PWL'			Lw / Li			Correction			Sound Reduction		Attenuation	Operating Time			K0	Freq.	Direct.	Moving Pt. Src			
			Day	Evening	Night	Day	Evening	Night	Type	Value	norm.	Day	Evening	Night	R	Area		Day	Special	Night				Number			Speed
			(dBA)	(dBA)	(dBA)	(dBA)	(dBA)	(dBA)			dB(A)	dB(A)	dB(A)	dB(A)		(m²)		(min)	(min)	(min)	(dB)	(Hz)		Day	Evening	Night	(km/h)
Truck	-	!E01!	99.1	-18.2	-18.2	73.5	-43.8	-43.8	PWL-Pt	HeavyTruck		20.0	0.0	0.0							0.0		(none)	54.0	0.0	0.0	40.0
Truck	~	!E07!T	95.7	-21.7	-21.7	73.5	-43.8	-43.8	PWL-Pt	HeavyTruck		20.0	0.0	0.0							0.0		(none)	54.0	0.0	0.0	40.0
Truck	~	!W01!T_W	104.2	-13.2	-13.2	73.5	-43.8	-43.8	PWL-Pt	HeavyTruck		20.0	0.0	0.0							0.0		(none)	54.0	0.0	0.0	40.0
Truck	~	!E05!T_C	101.7	-15.6	-15.6	73.5	-43.8	-43.8	PWL-Pt	HeavyTruck		20.0	0.0	0.0							0.0		(none)	54.0	0.0	0.0	40.0
Truck		!E06!T	99.0	-18.3	-18.3	73.5	-43.8	-43.8	PWL-Pt	HeavyTruck		20.0	0.0	0.0							0.0		(none)	54.0	0.0	0.0	40.0
Truck	~	!E02!	99.7	-17.6	-17.6	73.5	-43.8	-43.8	PWL-Pt	HeavyTruck		20.0	0.0	0.0							0.0		(none)	54.0	0.0	0.0	40.0
Truck	~	!F01!T_C	96.4	-20.9	-20.9	73.5	-43.8	-43.8	PWL-Pt	HeavyTruck		20.0	0.0	0.0							0.0		(none)	54.0	0.0	0.0	40.0
Truck	~	!E03!T_W	103.6	-13.7	-13.7	73.5	-43.8	-43.8	PWL-Pt	HeavyTruck		20.0	0.0	0.0							0.0		(none)	54.0	0.0	0.0	40.0
Truck	~	!E08!T_W	103.8	-13.5	-13.5	73.5	-43.8	-43.8	PWL-Pt	HeavyTruck		20.0	0.0	0.0							0.0		(none)	54.0	0.0	0.0	40.0
Truck	~	!E04!T_C	102.5	-14.8	-14.8	73.5	-43.8	-43.8	PWL-Pt	HeavyTruck		20.0	0.0	0.0							0.0		(none)	54.0	0.0	0.0	40.0
Truck	~	!W02!T_C	99.8	-17.5	-17.5	73.5	-43.8	-43.8	PWL-Pt	HeavyTruck		20.0	0.0	0.0							0.0		(none)	54.0	0.0	0.0	40.0
Truck	~	!E09!T_C	106.0	-11.3	-11.3	73.5	-43.8	-43.8	PWL-Pt	HeavyTruck		20.0	0.0	0.0							0.0		(none)	54.0	0.0	0.0	40.0

Area Source(s)

Name	M.	ID	Result. PWL			Result. PWL"			Lw / Li			Correction			Sound Reduction		Attenuation	Operating Time			K0	Freq.	Direct.	Moving Pt. Src		
			Day	Evening	Night	Day	Evening	Night	Type	Value	norm.	Day	Evening	Night	R	Area		Day	Special	Night				Number		
			(dBA)	(dBA)	(dBA)	(dBA)	(dBA)	(dBA)			dB(A)	dB(A)	dB(A)	dB(A)		(m²)		(min)	(min)	(min)	(dB)	(Hz)		Day	Evening	Night
Loader	~	!E04!L2	112.1	112.1	112.1	84.3	84.3	84.3	Lw	CAT_980M		0.0	0.0	0.0							0.0		(none)			
Loader	-	!E08!L2	112.1	112.1	112.1	84.3	84.3	84.3	Lw	CAT_980M		0.0	0.0	0.0							0.0		(none)			
Loader	-	!E07!L2	112.1	112.1	112.1	84.3	84.3	84.3	Lw	CAT_980M		0.0	0.0	0.0							0.0		(none)			
Loader	~	!E03!L2	112.1	112.1	112.1	84.3	84.3	84.3	Lw	CAT_980M		0.0	0.0	0.0							0.0		(none)			
Loader	~	!F01!L1	112.1	112.1	112.1	84.3	84.3	84.3	Lw	CAT_980M		0.0	0.0	0.0							0.0		(none)			
Loader	~	!W01!L1	107.1	107.1	107.1	79.3	79.3	79.3	Lw	CAT_980G		0.0	0.0	0.0							0.0		(none)			
Loader	-	!E06!L2	112.1	112.1	112.1	84.3	84.3	84.3	Lw	CAT_980M		0.0	0.0	0.0							0.0		(none)			
Loader		!E06!L1	112.1	112.1	112.1	84.3	84.3	84.3	Lw	CAT_980M		0.0	0.0	0.0							0.0		(none)			
Loader	~	!E05!L1	112.1	112.1	112.1	84.3	84.3	84.3	Lw	CAT_980M		0.0	0.0	0.0							0.0		(none)			
Loader	~	!E08!L1	107.1	107.1	107.1	79.3	79.3	79.3	Lw	CAT_980G		0.0	0.0	0.0							0.0		(none)			
Loader	-	!E01!	107.1	107.1	107.1	79.3	79.3	79.3	Lw	CAT_980G		0.0	0.0	0.0							0.0		(none)			
Loader	-	!E01!	112.1	112.1	112.1	84.3	84.3	84.3	Lw	CAT_980M		0.0	0.0	0.0							0.0		(none)			
Loader	~	!E07!L1	112.1	112.1	112.1	84.3	84.3	84.3	Lw	CAT_980M		0.0	0.0	0.0							0.0		(none)			
Loader	~	!E02!	112.1	112.1	112.1	84.3	84.3	84.3	Lw	CAT_980M		0.0	0.0	0.0							0.0		(none)			
Loader	-	!E02!	107.1	107.1	107.1	79.3	79.3	79.3	Lw	CAT_980G		0.0	0.0	0.0							0.0		(none)			
Loader	-	!E02!	112.1	112.1	112.1	84.3	84.3	84.3	Lw	CAT_980M		0.0	0.0	0.0							0.0		(none)			
Loader	-	!E02!	112.1	112.1	112.1	84.3	84.3	84.3	Lw	CAT_980M		0.0	0.0	0.0							0.0		(none)			
Loader	~	!E03!L1	107.1	107.1	107.1	79.3	79.3	79.3	Lw	CAT_980G		0.0	0.0	0.0							0.0		(none)			
Loader	-	!W03!L	112.1	112.1	112.1	84.3	84.3	84.3	Lw	CAT_980M		0.0	0.0	0.0							0.0		(none)			
Loader	~	!W02!L1	112.1	112.1	112.1	84.3	84.3	84.3	Lw	CAT_980M		0.0	0.0	0.0							0.0		(none)			
Loader	-	!E05!L2	112.1	112.1	112.1	84.3	84.3	84.3	Lw	CAT_980M		0.0	0.0	0.0							0.0		(none)			
Loader	~	!E02!	107.1	107.1	107.1	79.3	79.3	79.3	Lw	CAT_980G		0.0	0.0	0.0							0.0		(none)			
Loader	~	!W01!L2	112.1	112.1	112.1	84.3	84.3	84.3	Lw	CAT_980M		0.0	0.0	0.0							0.0		(none)			
Loader	-	!W02!L2	112.1	112.1	112.1	84.3	84.3	84.3	Lw	CAT_980M		0.0	0.0	0.0							0.0		(none)			
Loader	-	!W03!L	107.1	107.1	107.1	79.3	79.3	79.3	Lw	CAT_980G		0.0	0.0	0.0							0.0		(none)			
Loader	-	!E04!L2	112.1	112.1	112.1	84.3	84.3	84.3	Lw	CAT_980M		0.0	0.0	0.0							0.0		(none)			
Loader	~	!E04!L1	107.1	107.1	107.1	79.3	79.3	79.3	Lw	CAT_980G		0.0	0.0	0.0							0.0		(none)			
Loader	-	!E04!L1	107.1	107.1	107.1	79.3	79.3	79.3	Lw	CAT_980G		0.0	0.0	0.0							0.0		(none)			
Loader	-	!F01!L2	112.1	112.1	112.1	84.3	84.3	84.3	Lw	CAT_980M		0.0	0.0	0.0							0.0		(none)			
Loader	-	!E02!L2	112.1	112.1	112.1	84.3	84.3	84.3	Lw	CAT_980M		0.0	0.0	0.0							0.0		(none)			

Barrier(s)

Name	M.	ID	Absorption		Z-Ext.	Cantilever		Height			
			left	right		horz.	vert.	Begin		End	
					(m)	(m)	(m)	(m)		(m)	
Berm North		!F02!B4	0.60	0.60				6.00	r		
Berm West		!M04!B3	0.60	0.60				4.00	r		
Berm South	~	!M07!B4	0.60	0.60				4.00	r		

Ground Absorption Area(s)

Name	M.	ID	G	
LAKE_30MBUFFER_FIELDVERIFIED	-	Pit_bottom	0.4	301
LAKE_30MBUFFER_FIELDVERIFIED	-	Pit_bottom	1.0	301
pit bottom	~	!A01!	0.5	301
P2	~	!A02!	0.5	301
pit bottom P4	~	!B02!	0.5	301
pit bottom	~	!A05!	0.5	301
water West west	~	!WA01!	0.0	301
water West west	~	!WA02!	0.0	301
Phase 8 water	~	!WA04!	0.0	301
pit bottom P5	~	!A07!	0.5	301
water West west		!WA03!	0.0	301
pit bottom	-	!W02!	0.5	301
pit bottom P6 water	~	!B01!	0.0	301
pit bottom water P9	~	!A06!	0.0	301
pit bottom P3	~	!A03!	0.5	301

Name	M.	ID	G	
pit bottom P6 above water	~	!A09!	0.5	301
P6 above		!WA03!	0.5	301
Phase 8 above water	~	!WA04!	0.5	301
Truck haul road	~	!E04!T_C	0.0	2
Truck	~	!E03!T_W	0.0	2
Truck	~	!W01!T_W	0.0	0
Truck	~	!E08!T_W	0.0	2
Truck	~	!E05!T_C	0.0	2
Truck	~	!W02!T_C	0.0	2
Truck		!E06!T	0.0	2
Truck	~	!E07!T	0.0	2
Truck	~	!F01!T_C	0.2	2
pit bottom above water P9	~	!A06!	0.5	301

Receptor Noise Impact Level(s)

Name	M.	ID	Level Lr			Limit. Value			Land Use			Height		Coordinates		
			Day	Evening	Night	Day	Evening	Night	Type	Auto	Noise Type			X	Y	Z
			(dBA)	(dBA)	(dBA)	(dBA)	(dBA)	(dBA)				(m)		(m)	(m)	(m)
POR001		POR001	39.6	37.8	37.8	45.4	0.0	0.0				4.50	r	564811.00	4808829.00	311.22
OPOR001		OPOR001	35.1	32.8	32.8	45.4	0.0	0.0				1.50	r	564839.95	4808836.81	307.50
POR002		POR002	41.3	39.5	39.5	50.4	0.0	0.0				4.50	r	564765.00	4809488.00	319.50
OPOR002		OPOR002	39.9	38.0	38.0	45.4	0.0	0.0				1.50	r	564769.77	4809459.10	315.55
POR003		POR003	39.6	35.7	35.7	50.4	0.0	0.0				3.00	r	564828.00	4809462.00	309.12
OPOR003		OPOR003	37.9	35.5	35.5	45.4	0.0	0.0				1.50	r	564856.19	4809454.54	306.74
POR004		POR004	50.0	47.9	47.9	50.4	0.0	0.0				4.50	r	565236.00	4809563.00	310.13
OPOR004		OPOR004	49.8	47.5	47.5	50.4	0.0	0.0				1.50	r	565263.68	4809553.77	306.22
POR005		POR005	49.3	46.2	46.2	50.4	0.0	0.0				4.50	r	565585.41	4809737.20	310.28
OPOR005		OPOR005	49.0	45.3	45.3	50.4	0.0	0.0				1.50	r	565590.80	4809707.98	306.69
POR006		POR006	47.8	44.9	44.9	50.4	0.0	0.0				4.50	r	565653.00	4809784.00	310.32
OPOR006		OPOR006	47.2	43.7	43.7	50.4	0.0	0.0				1.50	r	565660.15	4809753.80	305.87
POR007		POR007	44.8	42.1	42.1	50.4	0.0	0.0				4.50	r	565724.34	4809885.07	309.27
OPOR007		OPOR007	45.2	42.2	42.2	50.4	0.0	0.0				1.50	r	565728.18	4809848.96	307.47
POR008		POR008	41.7	39.5	39.5	50.4	0.0	0.0				4.50	r	566472.70	4809775.04	310.87
OPOR008		OPOR008	37.3	34.7	34.7	50.4	0.0	0.0				1.50	r	566443.88	4809767.40	307.84
POR009		POR009	42.2	40.2	40.2	45.4	0.0	0.0				4.50	r	566388.00	4809219.00	310.50
OPOR009		OPOR009	41.2	39.1	39.1	45.4	0.0	0.0				1.50	r	566356.90	4809214.08	306.50
POR010		POR010	41.3	39.1	39.1	45.4	0.0	0.0				4.50	r	566293.00	4808904.00	310.50
OPOR010		OPOR010	40.3	38.0	38.0	50.4	0.0	0.0				1.50	r	566273.24	4808926.54	306.44

Receiver
Name: POR004
ID: POR004
X: 565236.00 m
Y: 4809563.00 m
Z: 310.13 m

Area Source, ISO 9613, Name: "Loader", ID: "!E06!L1"																				
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)
112	565630.86	4809509.32	304.40	0	DEN	A	84.3	0.6	0.0	0.0	0.0	63.0	1.8	-0.7	0.0	0.0	0.0	0.0	0.0	20.8
126	565630.98	4809510.75	304.40	0	DEN	A	84.3	0.4	0.0	0.0	0.0	63.0	1.8	-0.7	0.0	0.0	0.0	0.0	0.0	20.5
134	565631.05	4809511.59	304.40	0	DEN	A	84.3	-0.0	0.0	0.0	0.0	63.0	1.8	-0.7	0.0	0.0	0.0	0.0	0.0	20.1
215	565631.20	4809513.33	304.40	0	DEN	A	84.3	4.3	0.0	0.0	0.0	63.0	1.8	-0.6	0.0	0.0	0.0	0.0	0.0	24.4
248	565631.30	4809514.51	304.40	0	DEN	A	84.3	2.2	0.0	0.0	0.0	63.0	1.8	-0.6	0.0	0.0	0.0	0.0	0.0	22.3
257	565631.40	4809515.62	304.40	0	DEN	A	84.3	6.4	0.0	0.0	0.0	63.0	1.8	-0.6	0.0	0.0	0.0	0.0	0.0	26.5
266	565631.52	4809517.02	304.40	0	DEN	A	84.3	6.1	0.0	0.0	0.0	63.0	1.8	-0.6	0.0	0.0	0.0	0.0	0.0	26.2
277	565631.59	4809517.86	304.40	0	DEN	A	84.3	1.7	0.0	0.0	0.0	63.0	1.8	-0.6	0.0	0.0	0.0	0.0	0.0	21.8
279	565631.74	4809519.66	304.40	0	DEN	A	84.3	10.8	0.0	0.0	0.0	63.0	1.8	-0.6	0.0	0.0	0.0	0.0	0.0	30.9
287	565631.88	4809521.26	304.40	0	DEN	A	84.3	0.4	0.0	0.0	0.0	63.0	1.8	-0.6	0.0	0.0	0.0	0.0	0.0	20.5
290	565631.91	4809521.61	304.40	0	DEN	A	84.3	3.2	0.0	0.0	0.0	63.0	1.8	-0.6	0.0	0.0	0.0	0.0	0.0	23.3
308	565631.96	4809522.12	304.40	0	DEN	A	84.3	1.4	0.0	0.0	0.0	63.0	1.8	-0.6	0.0	0.0	0.0	0.0	0.0	21.5
329	565632.01	4809522.78	304.40	0	DEN	A	84.3	0.9	0.0	0.0	0.0	63.0	1.8	-0.6	0.0	0.0	0.0	0.0	0.0	21.0
344	565632.04	4809523.14	304.40	0	DEN	A	84.3	0.7	0.0	0.0	0.0	63.0	1.8	-0.7	0.0	0.0	0.0	0.0	0.0	20.8
374	565632.12	4809523.97	304.40	0	DEN	A	84.3	4.8	0.0	0.0	0.0	63.0	1.8	-0.6	0.0	0.0	0.0	0.0	0.0	24.9
393	565632.17	4809524.63	304.40	0	DEN	A	84.3	3.6	0.0	0.0	0.0	63.0	1.8	-0.6	0.0	0.0	0.0	0.0	0.0	23.7
401	565632.22	4809525.21	304.40	0	DEN	A	84.3	6.0	0.0	0.0	0.0	63.0	1.8	-0.6	0.0	0.0	0.0	0.0	0.0	26.1
412	565632.27	4809525.68	304.40	0	DEN	A	84.3	0.9	0.0	0.0	0.0	63.0	1.8	-0.6	0.0	0.0	0.0	0.0	0.0	20.9
437	565632.29	4809525.97	304.40	0	DEN	A	84.3	2.5	0.0	0.0	0.0	63.0	1.8	-0.6	0.0	0.0	0.0	0.0	0.0	22.6
452	565632.33	4809526.46	304.40	0	DEN	A	84.3	3.4	0.0	0.0	0.0	63.0	1.8	-0.6	0.0	0.0	0.0	0.0	0.0	23.4
469	565632.38	4809527.03	304.40	0	DEN	A	84.3	4.1	0.0	0.0	0.0	63.0	1.8	-0.6	0.0	0.0	0.0	0.0	0.0	24.2
479	565632.43	4809527.57	304.40	0	DEN	A	84.3	5.0	0.0	0.0	0.0	63.0	1.8	-0.6	0.0	0.0	0.0	0.0	0.0	25.1
485	565632.46	4809527.91	304.40	0	DEN	A	84.3	0.0	0.0	0.0	0.0	63.0	1.8	-0.6	0.0	0.0	0.0	0.0	0.0	20.1
500	565632.48	4809528.17	304.40	0	DEN	A	84.3	3.3	0.0	0.0	0.0	63.0	1.8	-0.6	0.0	0.0	0.0	0.0	0.0	23.4
509	565632.52	4809528.62	304.40	0	DEN	A	84.3	5.5	0.0	0.0	0.0	63.0	1.8	-0.6	0.0	0.0	0.0	0.0	0.0	25.6
517	565632.57	4809529.19	304.40	0	DEN	A	84.3	5.9	0.0	0.0	0.0	63.0	1.8	-0.6	0.0	0.0	0.0	0.0	0.0	25.9
524	565632.61	4809529.59	304.40	0	DEN	A	84.3	1.6	0.0	0.0	0.0	63.0	1.8	-0.6	0.0	0.0	0.0	0.0	0.0	21.6
534	565632.63	4809529.85	304.40	0	DEN	A	84.3	3.2	0.0	0.0	0.0	63.0	1.8	-0.6	0.0	0.0	0.0	0.0	0.0	23.2
542	565632.67	4809530.28	304.40	0	DEN	A	84.3	5.8	0.0	0.0	0.0	63.0	1.8	-0.6	0.0	0.0	0.0	0.0	0.0	25.8
557	565632.72	4809530.85	304.40	0	DEN	A	84.3	4.2	0.0	0.0	0.0	63.0	1.8	-0.6	0.0	0.0	0.0	0.0	0.0	24.3
567	565632.75	4809531.21	304.40	0	DEN	A	84.3	3.7	0.0	0.0	0.0	63.0	1.8	-0.6	0.0	0.0	0.0	0.0	0.0	23.8
569	565632.80	4809531.82	304.40	0	DEN	A	84.3	8.2	0.0	0.0	0.0	63.0	1.8	-0.6	0.0	0.0	0.0	0.0	0.0	28.3
571	565632.85	4809532.37	304.40	0	DEN	A	84.3	1.7	0.0	0.0	0.0	63.0	1.8	-0.6	0.0	0.0	0.0	0.0	0.0	21.8
577	565632.87	4809532.63	304.40	0	DEN	A	84.3	3.9	0.0	0.0	0.0	63.0	1.8	-0.6	0.0	0.0	0.0	0.0	0.0	23.9
587	565632.90	4809532.98	304.40	0	DEN	A	84.3	3.9	0.0	0.0	0.0	63.0	1.8	-0.6	0.0	0.0	0.0	0.0	0.0	23.9
646	565632.95	4809533.47	304.40	0	DEN	A	84.3	2.4	0.0	0.0	0.0	63.0	1.8	-0.6	0.0	0.0	0.0	0.0	0.0	22.4
652	565632.99	4809534.00	304.40	0	DEN	A	84.3	8.2	0.0	0.0	0.0	63.0	1.8	-0.5	0.0	0.0	0.0	0.0	0.0	28.2
658	565633.05	4809534.58	304.40	0	DEN	A	84.3	4.3	0.0	0.0	0.0	63.0	1.8	-0.5	0.0	0.0	0.0	0.0	0.0	24.3
670	565633.07	4809534.87	304.40	0	DEN	A	84.3	2.9	0.0	0.0	0.0	63.0	1.8	-0.5	0.0	0.0	0.0	0.0	0.0	22.9
685	565633.10	4809535.22	304.40	0	DEN	A	84.3	5.8	0.0	0.0	0.0	63.0	1.8	-0.5	0.0	0.0	0.0	0.0	0.0	25.8
691	565634.52	4809535.51	304.40	0	DEN	A	84.3	3.0	0.0	0.0	0.0	63.0	1.8	-0.5	0.0	0.0	0.0	0.0	0.0	23.0
786	565628.36	4809508.05	304.40	0	DEN	A	84.3	2.2	0.0	0.0	0.0	63.0	1.8	-0.6	0.0	0.0	0.0	0.0	0.0	22.4
793	565628.06	4809508.43	304.40	0	DEN	A	84.3	1.1	0.0	0.0	0.0	63.0	1.8	-0.6	0.0	0.0	0.0	0.0	0.0	21.3
811	565627.78	4809508.79	304.40	0	DEN	A	84.3	0.4	0.0	0.0	0.0	62.9	1.8	-0.6	0.0	0.0	0.0	0.0	0.0	20.6
815	565627.51	4809509.13	304.40	0	DEN	A	84.3	0.2	0.0	0.0	0.0	62.9	1.8	-0.6	0.0	0.0	0.0	0.0	0.0	20.4
820	565626.95	4809509.85	304.40	0	DEN	A	84.3	8.5	0.0	0.0	0.0	62.9	1.8	-0.6	0.0	0.0	0.0	0.0	0.0	28.7
831	565626.34	4809510.63	304.40	0	DEN	A	84.3	4.7	0.0	0.0	0.0	62.9	1.8	-0.6	0.0	0.0	0.0	0.0	0.0	24.9
833	565626.19	4809510.92	304.40	0	DEN	A	84.3	1.6	0.0	0.0	0.0	62.9	1.8	-0.6	0.0	0.0	0.0	0.0	0.0	21.8
843	565626.24	4809511.37	304.40	0	DEN	A	84.3	7.7	0.0	0.0	0.0	62.9	1.8	-0.6	0.0	0.0	0.0	0.0	0.0	27.9
850	565626.29	4809511.82	304.40	0	DEN	A	84.3	1.8	0.0	0.0	0.0	62.9	1.8	-0.6	0.0	0.0	0.0	0.0	0.0	22.0
852	565626.33	4809512.20	304.40	0	DEN	A	84.3	6.5	0.0	0.0	0.0	62.9	1.8	-0.6	0.0	0.0	0.0	0.0	0.0	26.6
866	565626.38	4809512.67	304.40	0	DEN	A	84.3	4.6	0.0	0.0	0.0	62.9	1.8	-0.6	0.0	0.0	0.0	0.0	0.0	24.8

Area Source, ISO 9613, Name: "Loader", ID: "!E06!L1"																				
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)
885	565626.43	4809513.14	304.40	0	DEN	A	84.3	3.9	0.0	0.0	0.0	62.9	1.8	-0.6	0.0	0.0	0.0	0.0	0.0	24.1
887	565626.52	4809513.90	304.40	0	DEN	A	84.3	9.4	0.0	0.0	0.0	62.9	1.8	-0.6	0.0	0.0	0.0	0.0	0.0	29.6
928	565626.65	4809515.08	304.40	0	DEN	A	84.3	6.4	0.0	0.0	0.0	62.9	1.8	-0.6	0.0	0.0	0.0	0.0	0.0	26.6
935	565626.76	4809516.15	304.40	0	DEN	A	84.3	10.0	0.0	0.0	0.0	62.9	1.8	-0.6	0.0	0.0	0.0	0.0	0.0	30.2
947	565626.92	4809517.54	304.40	0	DEN	A	84.3	8.8	0.0	0.0	0.0	62.9	1.8	-0.6	0.0	0.0	0.0	0.0	0.0	29.0
952	565627.01	4809518.38	304.40	0	DEN	A	84.3	3.9	0.0	0.0	0.0	62.9	1.8	-0.6	0.0	0.0	0.0	0.0	0.0	24.1
955	565627.20	4809520.05	304.40	0	DEN	A	84.3	12.0	0.0	0.0	0.0	62.9	1.8	-0.6	0.0	0.0	0.0	0.0	0.0	32.2
960	565627.38	4809521.73	304.40	0	DEN	A	84.3	0.6	0.0	0.0	0.0	62.9	1.8	-0.6	0.0	0.0	0.0	0.0	0.0	20.8
965	565627.42	4809522.08	304.40	0	DEN	A	84.3	3.2	0.0	0.0	0.0	62.9	1.8	-0.6	0.0	0.0	0.0	0.0	0.0	23.3
980	565627.48	4809522.58	304.40	0	DEN	A	84.3	1.1	0.0	0.0	0.0	62.9	1.8	-0.6	0.0	0.0	0.0	0.0	0.0	21.3
1006	565627.55	4809523.24	304.40	0	DEN	A	84.3	0.2	0.0	0.0	0.0	62.9	1.8	-0.6	0.0	0.0	0.0	0.0	0.0	20.4
1033	565627.68	4809524.40	304.40	0	DEN	A	84.3	3.4	0.0	0.0	0.0	62.9	1.8	-0.6	0.0	0.0	0.0	0.0	0.0	23.6
1036	565627.76	4809525.06	304.40	0	DEN	A	84.3	1.8	0.0	0.0	0.0	62.9	1.8	-0.6	0.0	0.0	0.0	0.0	0.0	22.0
1037	565627.82	4809525.63	304.40	0	DEN	A	84.3	3.8	0.0	0.0	0.0	62.9	1.8	-0.6	0.0	0.0	0.0	0.0	0.0	24.0
1044	565627.96	4809526.86	304.40	0	DEN	A	84.3	0.3	0.0	0.0	0.0	62.9	1.8	-0.6	0.0	0.0	0.0	0.0	0.0	20.5
1048	565628.02	4809527.43	304.40	0	DEN	A	84.3	0.6	0.0	0.0	0.0	62.9	1.8	-0.6	0.0	0.0	0.0	0.0	0.0	20.8
1051	565628.08	4809527.96	304.40	0	DEN	A	84.3	1.2	0.0	0.0	0.0	62.9	1.8	-0.6	0.0	0.0	0.0	0.0	0.0	21.3
1070	565628.20	4809528.99	304.40	0	DEN	A	84.3	0.9	0.0	0.0	0.0	62.9	1.8	-0.6	0.0	0.0	0.0	0.0	0.0	21.1
1073	565628.26	4809529.55	304.40	0	DEN	A	84.3	0.8	0.0	0.0	0.0	62.9	1.8	-0.6	0.0	0.0	0.0	0.0	0.0	20.9
1089	565628.55	4809532.14	304.40	0	DEN	A	84.3	0.3	0.0	0.0	0.0	62.9	1.8	-0.5	0.0	0.0	0.0	0.0	0.0	20.4
1348	565638.13	4809527.06	304.40	0	DEN	A	84.3	0.7	0.0	0.0	0.0	63.1	1.8	-0.7	0.0	0.0	0.0	0.0	0.0	20.7
1356	565638.11	4809526.51	304.40	0	DEN	A	84.3	0.3	0.0	0.0	0.0	63.1	1.8	-0.7	0.0	0.0	0.0	0.0	0.0	20.3
1368	565638.09	4809525.92	304.40	0	DEN	A	84.3	0.3	0.0	0.0	0.0	63.1	1.8	-0.7	0.0	0.0	0.0	0.0	0.0	20.3
1389	565638.05	4809524.65	304.40	0	DEN	A	84.3	4.1	0.0	0.0	0.0	63.1	1.8	-0.7	0.0	0.0	0.0	0.0	0.0	24.1
1393	565638.03	4809524.07	304.40	0	DEN	A	84.3	2.1	0.0	0.0	0.0	63.1	1.8	-0.7	0.0	0.0	0.0	0.0	0.0	22.2
1401	565638.01	4809523.38	304.40	0	DEN	A	84.3	3.9	0.0	0.0	0.0	63.1	1.8	-0.8	0.0	0.0	0.0	0.0	0.0	24.0
1418	565637.98	4809522.55	304.40	0	DEN	A	84.3	0.4	0.0	0.0	0.0	63.1	1.8	-0.7	0.0	0.0	0.0	0.0	0.0	20.5
1428	565637.97	4809522.18	304.40	0	DEN	A	84.3	1.0	0.0	0.0	0.0	63.1	1.8	-0.7	0.0	0.0	0.0	0.0	0.0	21.0
1443	565637.95	4809521.51	304.40	0	DEN	A	84.3	1.8	0.0	0.0	0.0	63.1	1.8	-0.7	0.0	0.0	0.0	0.0	0.0	21.8
1464	565637.93	4809520.98	304.40	0	DEN	A	84.3	4.0	0.0	0.0	0.0	63.1	1.8	-0.7	0.0	0.0	0.0	0.0	0.0	24.0
1469	565637.92	4809520.62	304.40	0	DEN	A	84.3	1.5	0.0	0.0	0.0	63.1	1.8	-0.7	0.0	0.0	0.0	0.0	0.0	21.5
1475	565637.87	4809518.86	304.40	0	DEN	A	84.3	13.0	0.0	0.0	0.0	63.1	1.8	-0.7	0.0	0.0	0.0	0.0	0.0	33.1
1480	565637.81	4809517.14	304.40	0	DEN	A	84.3	5.0	0.0	0.0	0.0	63.1	1.8	-0.7	0.0	0.0	0.0	0.0	0.0	25.1
1485	565637.79	4809516.35	304.40	0	DEN	A	84.3	9.4	0.0	0.0	0.0	63.1	1.8	-0.7	0.0	0.0	0.0	0.0	0.0	29.4
1490	565637.72	4809515.72	304.40	0	DEN	A	84.3	1.2	0.0	0.0	0.0	63.1	1.8	-0.7	0.0	0.0	0.0	0.0	0.0	21.2
1494	565637.17	4809514.93	304.40	0	DEN	A	84.3	10.6	0.0	0.0	0.0	63.1	1.8	-0.7	0.0	0.0	0.0	0.0	0.0	30.7
1499	565636.44	4809513.88	304.40	0	DEN	A	84.3	6.3	0.0	0.0	0.0	63.1	1.8	-0.7	0.0	0.0	0.0	0.0	0.0	26.4
1521	565635.67	4809512.77	304.40	0	DEN	A	84.3	8.4	0.0	0.0	0.0	63.1	1.8	-0.7	0.0	0.0	0.0	0.0	0.0	28.5
1526	565635.15	4809512.03	304.40	0	DEN	A	84.3	2.4	0.0	0.0	0.0	63.1	1.8	-0.7	0.0	0.0	0.0	0.0	0.0	22.4
1536	565634.84	4809511.58	304.40	0	DEN	A	84.3	2.6	0.0	0.0	0.0	63.1	1.8	-0.7	0.0	0.0	0.0	0.0	0.0	22.7
1541	565634.53	4809511.14	304.40	0	DEN	A	84.3	4.1	0.0	0.0	0.0	63.1	1.8	-0.7	0.0	0.0	0.0	0.0	0.0	24.2
1550	565633.99	4809510.35	304.40	0	DEN	A	84.3	4.5	0.0	0.0	0.0	63.1	1.8	-0.7	0.0	0.0	0.0	0.0	0.0	24.6
1555	565633.57	4809509.75	304.40	0	DEN	A	84.3	2.7	0.0	0.0	0.0	63.1	1.8	-0.7	0.0	0.0	0.0	0.0	0.0	22.8
1560	565633.07	4809509.02	304.40	0	DEN	A	84.3	4.7	0.0	0.0	0.0	63.1	1.8	-0.7	0.0	0.0	0.0	0.0	0.0	24.8
1717	565622.10	4809514.50	304.40	0	DEN	A	84.3	2.3	0.0	0.0	0.0	62.8	1.8	-0.5	0.0	0.0	0.0	0.0	0.0	22.5
1733	565622.11	4809515.64	304.40	0	DEN	A	84.3	1.0	0.0	0.0	0.0	62.8	1.8	-0.6	0.0	0.0	0.0	0.0	0.0	21.3
1742	565622.12	4809516.75	304.40	0	DEN	A	84.3	5.7	0.0	0.0	0.0	62.8	1.8	-0.5	0.0	0.0	0.0	0.0	0.0	26.0
1748	565622.13	4809518.12	304.40	0	DEN	A	84.3	5.9	0.0	0.0	0.0	62.8	1.8	-0.5	0.0	0.0	0.0	0.0	0.0	26.1
1754	565622.14	4809518.94	304.40	0	DEN	A	84.3	1.7	0.0	0.0	0.0	62.8	1.8	-0.5	0.0	0.0	0.0	0.0	0.0	21.9
1759	565622.16	4809520.60	304.40	0	DEN	A	84.3	10.7	0.0	0.0	0.0	62.8	1.8	-0.5	0.0	0.0	0.0	0.0	0.0	30.9
1764	565622.22	4809522.03	304.40	0	DEN	A	84.3	0.7	0.0	0.0	0.0	62.8	1.8	-0.5	0.0	0.0	0.0	0.0	0.0	20.9
1768	565622.32	4809522.26	304.40	0	DEN	A	84.3	0.6	0.0	0.0	0.0	62.8	1.8	-0.5	0.0	0.0	0.0	0.0	0.0	20.9
1775	565622.47	4809522.60	304.40	0	DEN	A	84.3	3.2	0.0	0.0	0.0	62.8	1.8	-0.5	0.0	0.0	0.0	0.0	0.0	23.4
1797	565622.67	4809523.08	304.40	0	DEN	A	84.3	1.2	0.0	0.0	0.0	62.8	1.8	-0.5	0.0	0.0	0.0	0.0	0.0	21.4
1822	565622.94	4809523.70	304.40	0	DEN	A	84.3	0.2	0.0	0.0	0.0	62.8	1.8	-0.5	0.0	0.0	0.0	0.0	0.0	20.5
1832	565623.09	4809524.05	304.40	0	DEN	A	84.3	-0.2	0.0	0.0	0.0	62.8	1.8	-0.6	0.0	0.0	0.0	0.0	0.0	20.1
1858	565623.42	4809524.82	304.40	0	DEN	A	84.3	3.5	0.0	0.0	0.0	62.8	1.8	-0.6	0.0	0.0	0.0	0.0	0.0	23.7
1871	565623.69	4809525.45	304.40	0	DEN	A	84.3	1.9	0.0	0.0	0.0	62.8	1.8	-0.6	0.0	0.0	0.0	0.0	0.0	22.1
1878	565623.93	4809526.00	304.40	0	DEN	A	84.3	3.9	0.0	0.0	0.0	62.8	1.8	-0.6	0.0	0.0	0.0	0.0	0.0	24.2
1898	565624.23	4809526.72	304.40	0	DEN	A	84.3	-0.1	0.0	0.0	0.0	62.8	1.8	-0.5	0.0	0.0	0.0	0.0	0.0	20.0
1912	565624.43	4809527.18	304.40	0	DEN	A	84.3	0.4	0.0	0.0	0.0	62.8	1.8	-0.5	0.0	0.0	0.0	0.0	0.0	20.6
1930	565624.67	4809527.73	304.40	0	DEN	A	84.3	0.7	0.0	0.0	0.0	62.8	1.8	-0.5	0.0	0.0	0.0	0.0	0.0	20.9
1945	565624.89	4809528.24	304.40	0	DEN	A	84.3	1.2	0.0	0.0	0.0	62.8	1.8	-0.5	0.0	0.0	0.0	0.0	0.0	21.4

Area Source, ISO 9613, Name: "Loader", ID: "!E06!L1"																				
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)
1968	565625.32	4809529.24	304.40	0	DEN	A	84.3	0.9	0.0	0.0	0.0	62.8	1.8	-0.5	0.0	0.0	0.0	0.0	0.0	21.1
1973	565625.55	4809529.78	304.40	0	DEN	A	84.3	0.8	0.0	0.0	0.0	62.8	1.8	-0.5	0.0	0.0	0.0	0.0	0.0	21.0
2010	565626.63	4809532.29	304.40	0	DEN	A	84.3	0.2	0.0	0.0	0.0	62.9	1.8	-0.5	0.0	0.0	0.0	0.0	0.0	20.3
2209	565621.29	4809526.26	304.40	0	DEN	A	84.3	1.2	0.0	0.0	0.0	62.8	1.8	-0.5	0.0	0.0	0.0	0.0	0.0	21.5
2540	565621.95	4809527.98	304.40	0	DEN	A	84.3	0.4	0.0	0.0	0.0	62.8	1.8	-0.5	0.0	0.0	0.0	0.0	0.0	20.6
2547	565622.14	4809528.50	304.40	0	DEN	A	84.3	1.6	0.0	0.0	0.0	62.8	1.8	-0.5	0.0	0.0	0.0	0.0	0.0	21.8
2565	565622.36	4809529.06	304.40	0	DEN	A	84.3	0.2	0.0	0.0	0.0	62.8	1.8	-0.5	0.0	0.0	0.0	0.0	0.0	20.4
2571	565622.52	4809529.49	304.40	0	DEN	A	84.3	2.6	0.0	0.0	0.0	62.8	1.8	-0.5	0.0	0.0	0.0	0.0	0.0	22.8
2576	565622.73	4809530.03	304.40	0	DEN	A	84.3	3.2	0.0	0.0	0.0	62.8	1.8	-0.5	0.0	0.0	0.0	0.0	0.0	23.4
2589	565622.97	4809530.66	304.40	0	DEN	A	84.3	0.7	0.0	0.0	0.0	62.8	1.8	-0.5	0.0	0.0	0.0	0.0	0.0	20.9
2594	565623.13	4809531.07	304.40	0	DEN	A	84.3	3.4	0.0	0.0	0.0	62.8	1.8	-0.5	0.0	0.0	0.0	0.0	0.0	23.6
2603	565623.34	4809531.61	304.40	0	DEN	A	84.3	2.0	0.0	0.0	0.0	62.8	1.8	-0.5	0.0	0.0	0.0	0.0	0.0	22.2
2608	565623.47	4809531.95	304.40	0	DEN	A	84.3	1.6	0.0	0.0	0.0	62.8	1.8	-0.5	0.0	0.0	0.0	0.0	0.0	21.8
2615	565623.69	4809532.54	304.40	0	DEN	A	84.3	6.2	0.0	0.0	0.0	62.8	1.8	-0.5	0.0	0.0	0.0	0.0	0.0	26.4
2620	565623.89	4809533.06	304.40	0	DEN	A	84.3	-0.1	0.0	0.0	0.0	62.8	1.8	-0.5	0.0	0.0	0.0	0.0	0.0	20.0
2625	565623.99	4809533.31	304.40	0	DEN	A	84.3	2.1	0.0	0.0	0.0	62.8	1.8	-0.5	0.0	0.0	0.0	0.0	0.0	22.3
2636	565624.12	4809533.65	304.40	0	DEN	A	84.3	2.1	0.0	0.0	0.0	62.8	1.8	-0.5	0.0	0.0	0.0	0.0	0.0	22.3
2667	565624.60	4809534.09	304.40	0	DEN	A	84.3	0.2	0.0	0.0	0.0	62.8	1.8	-0.5	0.0	0.0	0.0	0.0	0.0	20.4
2675	565625.56	4809534.49	304.40	0	DEN	A	84.3	4.4	0.0	0.0	0.0	62.8	1.8	-0.5	0.0	0.0	0.0	0.0	0.0	24.6
2716	565641.10	4809514.22	304.40	0	DEN	A	84.3	1.3	0.0	0.0	0.0	63.2	1.8	-0.7	0.0	0.0	0.0	0.0	0.0	21.2
2722	565640.58	4809513.35	304.40	0	DEN	A	84.3	0.9	0.0	0.0	0.0	63.2	1.8	-0.7	0.0	0.0	0.0	0.0	0.0	20.8
2740	565639.90	4809512.18	304.40	0	DEN	A	84.3	5.6	0.0	0.0	0.0	63.2	1.8	-0.7	0.0	0.0	0.0	0.0	0.0	25.5
2744	565639.48	4809511.47	304.40	0	DEN	A	84.3	0.9	0.0	0.0	0.0	63.2	1.8	-0.7	0.0	0.0	0.0	0.0	0.0	20.8
2754	565639.21	4809511.01	304.40	0	DEN	A	84.3	2.0	0.0	0.0	0.0	63.2	1.8	-0.7	0.0	0.0	0.0	0.0	0.0	21.9
2758	565638.94	4809510.55	304.40	0	DEN	A	84.3	4.2	0.0	0.0	0.0	63.2	1.8	-0.7	0.0	0.0	0.0	0.0	0.0	24.1
2766	565638.47	4809509.74	304.40	0	DEN	A	84.3	5.9	0.0	0.0	0.0	63.2	1.8	-0.7	0.0	0.0	0.0	0.0	0.0	25.9
2770	565638.11	4809509.13	304.40	0	DEN	A	84.3	5.2	0.0	0.0	0.0	63.2	1.8	-0.7	0.0	0.0	0.0	0.0	0.0	25.1
2773	565637.71	4809508.43	304.40	0	DEN	A	84.3	7.7	0.0	0.0	0.0	63.2	1.8	-0.7	0.0	0.0	0.0	0.0	0.0	27.7
2777	565637.31	4809507.96	304.40	0	DEN	A	84.3	0.3	0.0	0.0	0.0	63.2	1.8	-0.7	0.0	0.0	0.0	0.0	0.0	20.3
2783	565636.98	4809507.83	304.40	0	DEN	A	84.3	0.8	0.0	0.0	0.0	63.1	1.8	-0.7	0.0	0.0	0.0	0.0	0.0	20.8
2790	565636.38	4809507.60	304.40	0	DEN	A	84.3	0.9	0.0	0.0	0.0	63.1	1.8	-0.7	0.0	0.0	0.0	0.0	0.0	21.0
2798	565635.76	4809507.36	304.40	0	DEN	A	84.3	1.6	0.0	0.0	0.0	63.1	1.8	-0.7	0.0	0.0	0.0	0.0	0.0	21.7
2857	565635.10	4809507.10	304.40	0	DEN	A	84.3	2.7	0.0	0.0	0.0	63.1	1.8	-0.7	0.0	0.0	0.0	0.0	0.0	22.7
3333	565635.63	4809524.89	304.40	0	DEN	A	84.3	0.1	0.0	0.0	0.0	63.1	1.8	-0.7	0.0	0.0	0.0	0.0	0.0	20.1
3426	565634.20	4809519.39	304.40	0	DEN	A	84.3	4.8	0.0	0.0	0.0	63.1	1.8	-0.7	0.0	0.0	0.0	0.0	0.0	24.9
3436	565633.52	4809516.79	304.40	0	DEN	A	84.3	0.1	0.0	0.0	0.0	63.0	1.8	-0.7	0.0	0.0	0.0	0.0	0.0	20.2
3440	565633.16	4809515.41	304.40	0	DEN	A	84.3	0.4	0.0	0.0	0.0	63.0	1.8	-0.7	0.0	0.0	0.0	0.0	0.0	20.5
3754	565619.02	4809529.80	304.40	0	DEN	A	84.3	0.1	0.0	0.0	0.0	62.7	1.7	-0.5	0.0	0.0	0.0	0.0	0.0	20.4
3760	565619.06	4809530.35	304.40	0	DEN	A	84.3	1.0	0.0	0.0	0.0	62.7	1.7	-0.5	0.0	0.0	0.0	0.0	0.0	21.3
3777	565619.12	4809531.40	304.40	0	DEN	A	84.3	1.7	0.0	0.0	0.0	62.7	1.7	-0.4	0.0	0.0	0.0	0.0	0.0	22.0
3785	565619.16	4809531.95	304.40	0	DEN	A	84.3	0.6	0.0	0.0	0.0	62.7	1.7	-0.4	0.0	0.0	0.0	0.0	0.0	20.8
3789	565619.18	4809532.29	304.40	0	DEN	A	84.3	0.2	0.0	0.0	0.0	62.7	1.7	-0.4	0.0	0.0	0.0	0.0	0.0	20.5
3793	565619.21	4809532.77	304.40	0	DEN	A	84.3	3.5	0.0	0.0	0.0	62.7	1.7	-0.4	0.0	0.0	0.0	0.0	0.0	23.8
3883	565627.63	4809506.22	304.40	0	DEN	A	84.3	3.5	0.0	0.0	0.0	62.9	1.8	-0.6	0.0	0.0	0.0	0.0	0.0	23.6
3898	565625.84	4809507.01	304.40	0	DEN	A	84.3	4.0	0.0	0.0	0.0	62.9	1.8	-0.6	0.0	0.0	0.0	0.0	0.0	24.1
3907	565625.35	4809507.57	304.40	0	DEN	A	84.3	2.8	0.0	0.0	0.0	62.9	1.8	-0.6	0.0	0.0	0.0	0.0	0.0	22.9
3926	565624.48	4809508.58	304.40	0	DEN	A	84.3	1.8	0.0	0.0	0.0	62.9	1.8	-0.6	0.0	0.0	0.0	0.0	0.0	21.9
3930	565624.01	4809509.12	304.40	0	DEN	A	84.3	2.2	0.0	0.0	0.0	62.9	1.8	-0.6	0.0	0.0	0.0	0.0	0.0	22.4
3984	565623.11	4809510.18	304.40	0	DEN	A	84.3	2.8	0.0	0.0	0.0	62.8	1.8	-0.6	0.0	0.0	0.0	0.0	0.0	23.0
4099	565624.48	4809520.48	304.40	0	DEN	A	84.3	-0.1	0.0	0.0	0.0	62.8	1.8	-0.5	0.0	0.0	0.0	0.0	0.0	20.1
4802	565641.93	4809511.93	304.40	0	DEN	A	84.3	1.5	0.0	0.0	0.0	63.2	1.8	-0.7	0.0	0.0	0.0	0.0	0.0	21.4
4863	565626.73	4809505.26	304.40	0	DEN	A	84.3	6.7	0.0	0.0	0.0	62.9	1.8	-0.6	0.0	0.0	0.0	0.0	0.0	26.8
4885	565625.55	4809506.29	304.40	0	DEN	A	84.3	4.3	0.0	0.0	0.0	62.9	1.8	-0.6	0.0	0.0	0.0	0.0	0.0	24.5
4888	565625.63	4809505.91	304.40	0	DEN	A	84.3	1.3	0.0	0.0	0.0	62.9	1.8	-0.6	0.0	0.0	0.0	0.0	0.0	21.5
4906	565636.17	4809536.35	304.40	0	DEN	A	84.3	1.8	0.0	0.0	0.0	63.1	1.8	-0.6	0.0	0.0	0.0	0.0	0.0	21.8
4942	565642.57	4809508.79	304.40	0	DEN	A	84.3	2.2	0.0	0.0	0.0	63.3	1.8	-0.7	0.0	0.0	0.0	0.0	0.0	22.1
4963	565634.38	4809536.27	304.40	0	DEN	A	84.3	3.2	0.0	0.0	0.0	63.0	1.8	-0.5	0.0	0.0	0.0	0.0	0.0	23.2
4974	565632.98	4809535.96	304.40	0	DEN	A	84.3	2.8	0.0	0.0	0.0	63.0	1.8	-0.5	0.0	0.0	0.0	0.0	0.0	22.8
5005	565624.38	4809505.12	304.40	0	DEN	A	84.3	2.0	0.0	0.0	0.0	62.9	1.8	-0.6	0.0	0.0	0.0	0.0	0.0	22.2
5057	565624.54	4809504.40	304.40	0	DEN	A	84.3	1.8	0.0	0.0	0.0	62.9	1.8	-0.6	0.0	0.0	0.0	0.0	0.0	22.0

Point Source, ISO 9613, Name: "Dragline north", ID: "!E06!D"																				
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)
1146	565603.14	4809537.72	306.00	0	D	A	112.1	0.0	-1.2	0.0	0.0	62.3	1.6	1.3	0.0	0.0	0.0	0.0	0.0	45.6

APPENDIX F

Resumes

Education

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

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

Mississauga

Employment History

Golder Associates – Mississauga, Ontario
Associate / Acoustics, Noise and Vibration Engineer (2005 to Present)

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

Aercoustics Engineering Limited – Toronto, Ontario
Acoustics Noise and Vibration Consultant (2001 to 2005)

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

PROJECT EXPERIENCE – PROJECT WITH PORTS

Cement Plant
Picton, Ontario, Canada

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

Meliadine
Nunavut, Canada

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

Noise Study - Peru
Melchorta, Peru

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

Ontario Trap Rock
Sault Ste. Marie, Canada

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

Noise Impact Assessment
Manitoulin, Ontario

Responsible for the prediction of the noise impact of a proposed expansion to an aggregate quarry, which had an associated port facility. Assisted in the design of extraction procedures to minimize noise impacts on residential receptors as part of a licensing application with the MNRF.

Algoma Steel
Sault Ste. Marie, Ontario

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

PROJECT EXPERIENCE – MINING

Morelos - Media Luna
Cocula, Guerrero State, Mexico

The proposed project consists of a new underground gold, copper and silver mine development in Mexico. To date, Golder has completed a gap analysis to identify the necessary information needs and baseline data requirements that would support both the Mexican permitting and approvals (MIA), as well as any future Environmental and Social Impact Assessment in accordance with the International Finance Corporation's Performance Standards. Participated in the analysis of potential gaps, the identification of a planned course of action to address the gaps and the development of the report for the noise, vibration and light disciplines

Morelos - El Limon
Cocula, Guerrero State, Mexico

Retained to carry out a noise, vibration and light assessment in support local permitting and an SEIA for a proposed precious metals mine in Mexico. The noise, vibration and light studies included the assessment of the mining/processing operations, and transportation facilities. Potential impacts were assessed against applicable limits, and controls (where required) and an environmental monitoring program were developed.

Glencore - Raglan
Nunavik, Quebec, Canada

Retained by Glencore to complete a light assessment in support local permitting requirements. The assessment was completed in response to the regulators request to confirm light emissions onto the Pingualuit National Park (the Park) were within applicable limits. The assessment involved a field program, to quantify all on-site emissions and levels at the Park, and detailed modelling to confirm the source of the measured levels.

Matamec-Témiscamingue
Témiscamingue, Québec, Canada

Retained to carry out a baseline noise assessment in support local permitting and an Environmental Assessment for a proposed mine in Témiscamingue, Québec, Canada. The noise study included areas potentially expected to be affected by the mining/processing operations, and transportation activities. Monitored noise levels were compared against applicable limits.

Meliadine
Nunavut, Canada

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

Various
Various, Peru

The projects consisted of various; expansion to existing mines and new mines throughout Peru. The project involved the completion of baseline studies (where appropriate) and an EIA for projects across Peru in accordance applicable regulating authorities. Was the Noise and Vibration Lead for assessments in support of the numerous EIAs. Projects ranged from power plants to resource and precious metal mines

PROJECT EXPERIENCE – REGULATORY

ACME Sample Application Package
Toronto, Ontario

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

Revised - ACME Sample Application Package
Toronto, Ontario

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

ACME Aggregates Sample Application Package
Toronto, Ontario, Canada

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

PROJECT EXPERIENCE – POWER AND ENERGY SECTOR

Environmental Assessment
Tiverton, Ontario

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

Environmental Assessment
Sarnia, Ontario

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

Environmental Assessment
York Region, Ontario

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

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

Heartland Generating Station
Alberta, Canada

Retained by ATCO Power to carry out a Noise Impact Assessment for a proposed Combined Cycle Gas Turbine Generating Station facility within the Alberta Industrial Heartland. Potential noise impacts were assessed against the Alberta Utilities Commission Rule 012: 'Noise Control' regulation.

Fenix Power Plant
Peru, Peru

Retained to carry out a noise assessment in support local permitting and an ESIA for a proposed single cycle natural gas power plant in Peru in close proximity to sensitive points of reception. Potential noise impacts were assessed against applicable limits and noise controls were developed.

PROJECT EXPERIENCE – OIL & GAS

TransCanada PipeLines - Vaughan Mainline Expansion
Ontario, Canada

Retained to carry out a noise assessment in support of the preparation of a National Energy Board Section 58 application, related permitting and bylaw exemption support of TransCanada's proposed expansion of their Canadian Mainline in the Greater Toronto Area in Ontario, consisting of an approximately 12 km natural gas pipeline. Support also included carrying out vibration monitoring during construction

TransCanada PipeLines - King's North Connection
Ontario, Canada

Retained to carry out a noise assessment in support of the preparation of a National Energy Board Section 58 application, related permitting and bylaw exemption support of TransCanada's proposed expansion of their Canadian Mainline in the Greater Toronto Area in Ontario, consisting of an approximately 11 km natural gas pipeline. Support also included carrying out noise and vibration monitoring during construction, and providing conceptual control design.

TransCanada PipeLines - Eastern Mainline Pipeline
Ontario, Canada

Retained to carry out a noise and light assessment in support of the preparation of a National Energy Board Section 52 application in support of TransCanada's proposed expansion of their Canadian Mainline in the Eastern Triangle region of Ontario, consisting of an approximately 356 km natural gas pipeline and 6 compressor stations along an existing pipeline corridor paralleling the 401 Highway between the Cornwall area southwest to the Greater Toronto Area.

TransCanada PipeLines - Various Compressor Stations
Ontario, Canada

Retained by TransCanada's compression design team (over a number of projects) to support them and/or their external design consultants to provide detailed noise design services for proposed compressor station upgrades. The support included providing complete noise engineering design services for a number of compressor stations within Ontario.

TransCanada PipeLines - Parkway West.
Ontario, Canada

Retained to provide noise services in support of the preparation of a National Energy Board Section 58 application, related permitting and bylaw exemption support of TransCanada's proposed project to construct and operate a pipeline between Union Gas Limited's (Union Gas) neighbouring Parkway West Compressor Station and TransCanada's existing mainline

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

PROJECT EXPERIENCE – LANDFILL & AGGREGATE SECTOR

Environmental Impact Assessment Niagara, Ontario	Noise task manager preparing a noise assessment for the Humberstone Landfill in, which involved site specific noise measurements and modelling in order to assess compliance with MOECC Guidelines.
Ontario Trap Rock Sault Ste. Marie, Canada	Noise task manager responsible for completing a noise assessment for an active quarry, which involved baseline monitoring, site specific noise measurements, and modelling in order to assess compliance with applicable noise limits. The assessment include the consideration of noise emissions associated with a port facility. Conceptual noise mitigation was provided and designed to ensure compliance.
Environmental Impact Assessment Ottawa, Ontario	Senior technical noise support for the noise assessment completed for the expansion of the Brighton Landfill providing support with the Environmental Assessment.
Environmental Permitting Assessments Various, Ontario	Noise task manager responsible for ECA applications for various landfill sites operated by Simcoe County. These projects involved site-specific noise measurements and modelling in order to assess compliance with MOE Guidelines. Where required, noise mitigation was provided and designed to ensure compliance.
Environmental Permitting Support Various, Ontario	Noise task manager responsible for supporting various landfill operations in meeting ECA requirements for sites in the Ottawa region. These projects involved annual or twice annual noise monitoring programs to document noise levels in the environment to allow the landfill operations to demonstrate compliance with EA and ECA conditions.
Environmental Permitting Assessment New York State, US	Noise task manager responsible for completing a noise assessment for a proposed expansion to a quarry in up-state New York, which involved baseline monitoring, site specific noise measurements, and modelling in order to assess compliance with applicable noise limits. Conceptual noise mitigation was provided and designed to ensure compliance.
Environmental Permitting Assessment Halifax, Nova Scotia	Noise task manager responsible for completing a noise assessment for a proposed quarry, which involved baseline monitoring, site specific noise measurements, and modelling in order to assess compliance with applicable noise limits. Conceptual noise mitigation was provided and designed to ensure compliance.
Environmental Permitting Assessments Various, Ontario	Noise task manager preparing acoustic assessments of various pits, quarries, asphalt and ready-mix facilities across Ontario for many clients including; Lafarge, CBM, Walker, Karson, Tomlinson, and Vicdom. Projects involved site specific noise measurements and modelling in order to assess compliance with MECP Guidelines. Where required, noise mitigation was provided and designed to ensure compliance

Environmental Noise Impact Assessment Watford, Ontario	Project manager involved in the EA process of the Waste Management Warwick Landfill Expansion. Noise predictions were carried out over a period of 25 years and included options for Reclamation and / or Land Filling. The noise assessment included haul route analysis, berm construction, leachate equipment and on-site landfill operations equipment. Project duties also involved presentation of results and reports at public open houses.
Environmental Noise Impact Assessment Napanee, Ontario	Involved in the noise modelling of the Richmond Landfill Expansion. Noise predictions were carried out over a period of 25 years and included options for Reclamation and / or Land Filling. The noise assessment included haul route analysis, berm construction, leachate equipment and on-site landfill operations equipment.
Noise/Vibration Impact Assessment Orillia, Ontario	Responsible for predicting the noise and vibration impact of a proposed quarry expansion. Designed noise controls and blast designs to ensure operations are within Ministry of Natural Resources (MNR) and Ministry of Environment (MOE) guidelines. Preparation of reports as part of MNR licensing requirements. Noise predictions included noise emissions from hydraulic drills, front-end loaders, portable crushers, dump trucks, conveying equipment and other associated equipment.
Noise Impact Assessment Cambridge, Ontario	Responsible for the prediction of the noise impact of a proposed expansion to an aggregate pit. Assisted in the design of extraction procedures to minimize noise impacts on residential receptors as part of a licensing application with the MNR.
Noise Impact Assessment Manitoulin Island, Ontario	Responsible for the prediction of the noise impact of a proposed expansion to an aggregate quarry, which had an associated port facility. Assisted in the design of extraction procedures to minimize noise impacts on residential receptors as part of a licensing application with the MNR.
Noise Impact Assessment Vaughan, Ontario	Responsible for the prediction and assessment of the noise impacts of an asphalt recycling facility. Assessed noise impact on neighbouring receptors. Designed required noise controls and assisted in the design of operations to minimize further impact.
Aggregate Pit and Waste Transfer Facility Operation Measurements Various, Ontario	Carried out noise measurements of on-site operations including specific equipment measurements. Measurements were used to ensure that operation of equipment at various locations on the site would remain in compliance with MOE Noise Guidelines, where the impact exceeds MOE Noise Guidelines noise controls were designed and recommended.
Environmental Permitting Assessments Ontario, Canada	Noise task manager preparing acoustic assessment for a quarry in Ontario that included a shipping port. The noise assessment involved site specific noise measurements and modelling in order to assess compliance with MOE Guidelines. Where required, noise mitigation was provided and designed to ensure compliance.

PROJECT EXPERIENCE – MANUFACTURING/DISTRIBUTION SECTOR

Colacem
L'Orignal, Ontario

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

Lehigh
Picton, Ontario

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

Sanofi Pasteur
Toronto, Ontario

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

Acoustic Assessments
Various, Ontario

Responsible for preparing and overseeing acoustic assessments of numerous sites manufacturing facilities throughout Ontario, which involved site specific noise measurements and modelling in order to assess compliance with MOE Guidelines. Where required, noise mitigation was provided and designed to ensure compliance. Liaison and negotiations with the MOE review engineers were carried out when required.

Acoustic Assessments
Various, Quebec

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

Acoustic Audit
Wingham, Ontario

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

Acoustic Audit
Ingersoll, Ontario

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

Noise Survey & Acoustic Audit
Cambridge, Ontario

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

Impulse Noise
Cambridge, Ontario

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

Acoustic Audit
Trent, Ontario

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

Acoustic/Vibration Audit
Port Robinson, Ontario

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

Noise Survey & Acoustic Audit
Woodbridge, Ontario

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

Noise/Vibration Audit
Sarnia, Ontario

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

Noise Control Design
Toronto, Ontario

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

Vibration Analysis
Shelburne, Ontario

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

PROJECT EXPERIENCE – IRON AND STEEL

Environmental Noise Studies
Ottawa area, Ontario

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

Environmental Noise Survey
Sault Ste. Marie, Ontario

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

PROJECT EXPERIENCE – TRANSPORTATION

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

Environmental Noise Studies
Innisfil, Ontario

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

Environmental Noise Studies
Durham, Ontario

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

Environmental Noise Studies
Eastern Region, Ontario

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

Environmental Noise Studies
Eastern Region, Ontario

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

In-Vehicle Noise Studies
Eastern Region, Ontario

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

Road/Rail Noise Assessment
Various, Ontario

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

Road Noise Assessments
Niagara Region, Ontario

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

Noise/Vibration Assessments
Central Ontario

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

Noise/Vibration Assessment
Central Ontario

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

Environmental Noise Studies
Various, Ontario

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

Construction Noise Monitoring
Toronto, Ontario

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

Road/Rail Noise Assessments
Various, Ontario

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

PROJECT EXPERIENCE – MEDICAL SECTOR

Pharmaceutical
Toronto, Ontario

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

Subway Vibration
Toronto, Ontario

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

Environmental Noise Assessment
Burlington, Ontario

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

Environmental Noise Assessment
Thunder bay, Ontario

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

Environmental Noise Assessment
Oakville, Ontario

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

PROJECT EXPERIENCE – MUNICIPAL / URBAN SECTOR

Noise and Vibration Study
Toronto, Ontario

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

Noise Feasibility Study – Former CFB Rockcliffe Lands
Ottawa, Ontario

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

Feasibility Noise Study – All Seniors Care
Kingston, Ontario

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

Noise Impact Study - Various
Ottawa, Ontario

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

Ville de Sept Ilse
Sept Ilse, Quebec

Retained by the Ville de Sept Ilse to be responsible for preparing a noise study for their snow dump facility. Golder's scope of work included three phases; 1) establishment of noise levels during operations, 2) establishment of ambient conditions and 3) the preparation of a detailed noise model to predict current and future noise levels and assist in the development of noise controls if required

Noise Impact Study - Concord Adex - City Place
Toronto, Ontario, Canada

Completed various noise and vibration impact studies for a number of proposed high rise residential buildings along the Queens Elizabeth Highway (the Gardiner), and adjacent to a major rail corridor rail right-of-way. As a result of the development's proximity to the rail lines, on-site vibration measurements were conducted to ensure that vibration levels at the proposed condominium locations, due to a nearby rail corridor, were below the Ministry of the Environment limits. Noise predictions were completed in order to determine whether or not additional, in addition to the minimum Ontario Building Code, noise and vibration controls measures would be required. Construction wall, window and door types were provided.

Noise Impact Study - Concord Adex
Toronto, Ontario, Canada

Completed a noise impact study for a proposed highrise residential buildings along Highway 401 (one of the busiest highways in Canada). Noise predictions were completed in order to determine whether or not additional, in addition to the minimum Ontario Building Code, noise and vibration controls measures would be required. Construction wall, window and door types were provided.

Noise Impact Study
Brampton, Ontario

Retained to perform an environmental noise impact study for a proposed residential development of single family attached, detached and town-homes in the vicinity of transformer yards in Brampton. Noise predictions were performed in order to determine whether or not additional, in addition to the minimum Ontario Building Code, noise control measures would be required. Construction wall, window and door types were provided.

Noise Impact Study
Various, Ontario

Conducted a noise and vibration impact study for a proposed residential development of single family attached, detached and town-homes. All within 45m of CN rail right-of-way and in the vicinity of either; provincial, regional and/or local roadways. As a result of the development's proximity to the CN rail lines, on-site vibration measurements were conducted to ensure that vibration levels at the proposed condominium locations, due to a nearby rail corridor, were below the Ministry of the Environment limits. Noise predictions were performed in order to determine whether or not additional, in addition to the minimum Ontario Building Code, noise and vibration controls measures would be required. Construction wall, window and door types were provided. These include developments in; Toronto, Brampton, North-bay and Alliston.

Noise Impact Study
Various, Ontario

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

Vibration Impact Study
Toronto, Ontario

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

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

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

Noise/Vibration Impact Study
Toronto, Ontario

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

Noise/Vibration Investigation
Toronto, Ontario

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

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

HVAC Noise Control
Ottawa, Ontario

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

Mechanical Equipment Noise Control
Toronto, Ontario

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

Vibration Intrusion Investigation
Toronto, Ontario

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

Mechanical Equipment Noise Control and Architectural Acoustics
Toronto, Ontario

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

Mechanical Equipment Noise Control
Various

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

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

PROJECT EXPERIENCE – FLOOR AND STRUCTURAL VIBRATION

Subway Induced Vibration
Toronto, Ontario

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

Streetcar Induced Vibration
Toronto, Ontario

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

Subway Induced Vibration
Toronto, Ontario

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

Subway Vibration Monitoring Program
Toronto, Ontario

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

PROJECT EXPERIENCE – SEISMIC

Software Development
Toronto, Ontario

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

Post Disaster Building
Various, Ontario

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

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

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

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

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

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

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

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

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

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

School Building
Various, Ontario

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

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

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

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

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

Not a Post Disaster Building
Various, Ontario

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

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

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

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

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

PROJECT EXPERIENCE – EXPERT WITNESS

Ontario Municipal Board
Toronto, Ontario

Was retained by the City of Toronto to support the City at an OMB preceding, involving a proposed residential development directly exposed to noise levels from industry, road and rail activities.

LPAT
Kawartha Lakes, Ontario

Was retained by an aggregate producer to support at an LPAT proceeding involving a proposed aggregate pit in Kawartha Lakes. Golder completed the noise assessment for the project which included the development of noise controls.

LPAT
Ottawa, Ontario

Was retained by a producer to support at an LPAT proceeding involving a proposed Ready-Mix plant pit in Ottawa. Golder completed the noise assessment for the project which included the development of noise controls.

Environmental Review Tribunal
Haldimand, Ontario

Appeared at an ERT for a proposed Windfarm in Haldimand County. Was recognized as an expert witness on the subject of environmental noise, specifically with respect to the Noise Study Report prepared in support of the Renewable Energy Approval issued by the MOE.

Planning Board Hearing Nova Scotia	Supported an application for an aggregate facility in Nova Scotia. Carried out the noise work in preparation for the hearings and was put forward as the Expert Witness on behalf of the proponent.
Ontario Municipal Board Lincoln, Ontario	Retained by the Town of Lincoln as their expert noise specialist, with respect to an application for site plan approval for a proposed waste management facility.
Quebec Hearing Board Salaberry-de-Valleyfield, Quebec	Retained by the City of Salaberry-de-Valleyfield as their expert noise specialist, with respect to noise concern associated with the recently expended Autoroute NA 30 and associated noise barriers.

PROFESSIONAL AFFILIATIONS

Professional Engineers of Ontario (P.Eng)

Canadian Council for Human Resources in the Environment Industry

(CCHREI) MTO – RAQs approved for the provision of Acoustic and Vibration

Services Air and Waste Management Association (AWMA)

National Fire Protection Agency (NFPA)

Ontario Sand Stone and Gravel Association - Environmental Committee Ready

Mix Concrete Association of Ontario - Environmental Committee

TOMASZ NOWAK

Education

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

Master of Engineering Materials Engineering, McGill University, 2007

PROFESSIONAL SUMMARY

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

EMPLOYMENT HISTORY

Golder Associates Ltd. – Calgary, Edmonton, Montreal, Canada
Acoustic Scientist (2012 to Present)

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

Independent contractor – Montreal, Canada
Service engineer (2009 to 2010)

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

McGill University – Montreal, Canada
Graduate Student (2004 to 2007)

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

RELEVANT EXPERIENCE

Confidential Client
Nunavut

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

Confidential Client
Quebec

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

Confidential Client
Ghana

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

DeBeers – Victor Mine
Ontario

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

Suncor McKay River, Firebag
Alberta

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

Suncor McKay River, Firebag
Alberta

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

Confidential Client
Nunavut

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

Confidential Client
Northwest Territories

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

Suncor Fort Hills
Alberta

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

BluEarth Bull Creek Wind Energy Project
Alberta

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

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