

# **Appendix D**

# Noise Assessment Report

HGC Engineering Limited

Howe Gastmeier Chapnik Limited 2000 Argentia Road, Plaza One, Suite 203 Mississauga, Ontario, Canada L5N 1P7 t: 905.826.4044



# Noise Feasibility Study for a Class "A" Pit below Water MacPherson Pit Expansion

# Part Lot 6, Concession 12 Municipality of Central Elgin County of Elgin, Ontario

Prepared for:

TALBOT SAND AND GRAVEL RR 6 , St. Thomas, ON N5P 3T1



Reviewed by:

Bill **G**astmeier, MA

April 1, 2022

Project No. 01900720







#### Limitations

This document was prepared solely for the addressed party and titled project or named part thereof, and should not be relied upon or used for any other project without obtaining prior written authorization from HGC Engineering. HGC Engineering accepts no responsibility or liability for any consequence of this document being used for a purpose other than for which it was commissioned. Any person or party using or relying on the document for such other purpose agrees, and will by such use or reliance be taken to confirm their agreement to indemnify HGC Engineering for all loss or damage resulting therefrom. HGC Engineering accepts no responsibility or liability or liability or liability or liability for this document to any person or party other than the party by whom it was commissioned.

Any conclusions and/or recommendations herein reflect the judgment of HGC Engineering based on information available at the time of preparation, and were developed in good faith on information provided by others, as noted in the report, which has been assumed to be factual and accurate. Changed conditions or information occurring or becoming known after the date of this report could affect the results and conclusions presented.







## **Table of Contents**

1	IN	NTRODUCTION AND SUMMARY	1
2	SI	ITE DESCRIPTION	1
3	C	RITERIA	2
	3.1	Receptors	2
	3.2	Noise Criteria	2
4	N	OISE ASSESSMENT	3
	4.1	Description of Noise Sources and Aggregate Operations	3
	4.2	Acoustical Modelling	4
5	R	ECOMMENDATIONS	5
6	C	ONCLUSIONS	7
7	R	EFERENCES	7

Figure 1 – Existing Features Plan
Figure 2 – Aerial Plan
Figures 3a & 3b – Operational Plans Showing Noise Control Measures

Appendix A – Modelling Parameters & Sample Calculations Appendix B – Curriculum Vitae







## **1** INTRODUCTION AND SUMMARY

HGC Engineering was retained by Talbot Sand & Gravel to undertake an analysis of the potential impact of noise from a proposed expansion of the McPherson Pit at neighbouring noise sensitive receptors (residential dwellings) in accordance with the Ministry of Natural Resources and Forestry (MNRF) and the Ministry of the Environment, Conservation and Park (MECP) Guidelines. The proposed gravel pit expansion is located on the south side of Truman Line, east of Dalewood Road in the Municipality of Central Elgin of the County of Elgin.

This assessment was conducted in accordance with MNRF and MECP guidelines and considered the potential effects of noise from extraction, processing and on-site transportation sources in the expansion area with regard to neighbouring noise sensitive receptors.

This assessment is also based on a review of the operational plans prepared by Harrington McAvan Ltd. dated March 2022 and sound levels taken from our files based on measurements of similar aggregate processing equipment to be used in the pit.

There are noise sensitive receptors located to the northwest and north of the proposed pit. The equipment and activities which are potential sound sources are outlined in Section 4. This assessment is based on a scenario representing the worst-case operations located closest to each of the receptors.

The results of our analysis indicate that sound levels produced by worst case scenario operations are expected to comply with MECP Guideline limits with the implementation of noise control measures.

## 2 SITE DESCRIPTION

The existing features plan attached as Figure 1 and aerial plan attached as Figure 2 show the location of the proposed expansion area, the existing McPherson Pit to the west, the neighbouring residences to the north and northwest and agricultural lands to the east and south. The proposed pit expansion is located on the south side of Truman line, east of Dalewood Road in the Municipality of Central Elgin. The proposed licenced area is  $\pm 23.4$  hectares with a maximum annual excavation limit of 250,000 tonnes.







# 3 CRITERIA

#### 3.1 Receptors

The Provincial Standards – Aggregate Resources of Ontario (Category 1 – Class "A" Pit below Water) state: "If extraction and / or processing facilities are located within 150 meters of a sensitive receptor, a noise assessment report is required to determine whether or not provincial guidelines can be satisfied" and "Sensitive receptors include residences or facilities where people sleep (nursing homes, hospitals, trailer parks, camping grounds, etc); schools; day-care centres."

There are three residential properties located within 150 m of the site to north. R1 is located to the northeast and is a 1-storey dwelling. R2 is located to the northwest, north of Truman Line, and is a 2-storey building. The landowners of the pit own and reside in the residence located north of the existing McPherson Pit, northwest of the expansion area and is considered as receptor R3 in the assessment. It is understood that the owners of R3 have granted the pit operators relief from implementing noise control measures with respect to their residence.

Any useable outdoor locations on residential properties within 30 m of the building, and also locations immediately outside the plane of the residential windows are considered to be points of reception. For aggregate facilities, the worst-case points of reception are considered to be outside the upper story windows due to potentially increased exposure to the pit operations. The receptor locations are shown on the Figures.

#### 3.2 Noise Criteria

Appropriate sound level limits used in the assessment of sound from aggregate operations are provided in MECP publication NPC-300, "Environmental Noise Guideline Stationary and Transportation Sources – Approval and Planning", Part C release date October 21, 2013". Under MECP guidelines, the acoustical environment at the receptors is classified as rural (Class 3). The collective sound from equipment and activities in the expansion area are considered to be a stationary source of sound which will operate during daytime hours only. NPC-300 specifies that the sound level limit at any receptors due to the operation of a stationary source is the higher of the background one hour energy equivalent sound level (L<sub>EQ-1Hr</sub>) or the minimum exclusionary limit of 45 dBA for rural areas during the daytime hours.





VIBRATION

To ensure a conservative analysis, since road traffic sound levels may be relatively low during some daytime hours, the minimum daytime exclusionary limit sound level of 45 dBA is used in the following sections of this report as the criterion by which the potential noise impact of the proposed aggregate extraction and processing operations are assessed.

Compliance with MECP criteria generally results in acceptable levels of sound at residential receptors, although there may be residual audibility during periods of low background sound. The guidelines of NPC-300 apply to sound from the ongoing day-to-day operations of the subject site. They do not apply to the temporary sound produced during the preparation and rehabilitation of extraction sites, or to the sound produced by road trucks on public roadways. The initial operations of building access roadways, stripping top soil, and building localized shielding structures and perimeter berms, as well as the final operations of rehabilitation and removal of localized shielding structures and perimeter berms) are defined as construction activity. In order to satisfy Provincial Standards, the sound levels emitted by the equipment involved in those construction activities must comply with MECP Guideline NPC-115, "Sound Levels due to Construction Equipment" [3].

### 4 NOISE ASSESSMENT

#### 4.1 Description of Noise Sources and Aggregate Operations

The following items detail the future above and below water extraction and processing operations in the pit as indicated on the Operational Plan.

- 1. The gravel pit will typically operate from 07:00 to 19:00 on Monday to Friday, and from 07:00 to 12:00 on Saturday. No other evening or nighttime operations are anticipated.
- 2. Operations will continue southwards from the existing pit into Area 1 and proceed in an easterly direction into Areas 1b and 2 and northerly into Area 3. Extraction is not expected to occur in the northeast corner of Area 3 due to limited resources.
- 3. The aggregate excavation, processing and loading equipment consists of a crushing plant with an associated loader, a screening plant with an associated loader and an excavator/dragline for below water extraction.





VIBRATION

- 4. Processing (crushing and screening) and loading will occur on the final floor of the expansion area at an elevation of approximately 243 mASL (metre above sea level) accessed from the existing pit. The excavator/dragline will operate on the final floor to extract material from below the water table. Loaders/excavator will operate on the floor of the first lift approximately 8 m below grade as well as on the final floor to extract material from the working face as mining progresses through the phases.
- Processing equipment will not be located within 90 m of any boundary of the site that abuts residential land uses as per "The Provincial Standards – Aggregate Resources of Ontario", Operational Standards for Licences, Section 5.13.
- 6. The peak number of trucks expected to arrive and depart in the busiest hour is 12.

MECP guidelines require that a worst-case hourly scenario be used in the evaluation. This scenario is discussed below.

#### 4.2 Acoustical Modelling

Predictive modeling was used to assess the potential sound emissions of the worst case hourly operational scenario. The prediction model is based on established engineering methods from the MECP and ISO Standard 9613 for the prediction of outdoor sound propagation. The calculations consider the acoustical effects of distance, foliage, topography and shielding by the excavation face where applicable.

To consider a worst-case operational scenario, the following assumptions were made:

- All extraction, processing, and loading could occur simultaneously at the closest possible location to each receptor;
- All processing equipment (3 m high) will be located on the pit floor at an elevation of approximately 243 mASL.
- Extraction equipment (2 m high) will be located on the floor of the first lift, approximately 8 m below grade or on the pit floor.
- 12 haul trucks (2.5 m high) arrive and depart.





The sound levels at each receptor were predicted using the source sound level data in Table 2 below, and the assumptions and the details contained in the operational plan outlined above.

### 5 **RECOMMENDATIONS**

Using the predictive model and assumptions described in the previous section, the following noise control requirements were developed and should be included as notes on the Operational Plans:

 The following table presents the reference sound levels used for the acoustic modeling presented herein. These sound levels were based on site measurements of similar processing equipment to be used in this pit.

Equipment	Sound Power Level dBA re: 10 <sup>-12</sup> W
A Crushing Plant with an associated loader	115
A Screening Plant with an associated loader	108
Excavator/Dragline	107
Trucks	101

#### Table 2 – Reference Sound Power Levels of Processing Equipment

If other equipment is proposed for operation in the gravel pit, it shall be confirmed through measurement to produce sound levels consistent with the above referenced sound levels or additional mitigation measures may be required.

- 2. A minimum 7.0 m high local acoustical barrier shall be constructed and maintained on the pit floor beside the crushing plant in the direction of R1 and R2 when operating within 500 m of R1 and R2 in Area 2.
- A minimum 5.5 m high perimeter berm (above existing grade) shall be constructed along the northern boundary adjacent to Area 3, prior to the commencement of extraction or processing activities in Area 3.
- 4. A minimum 7.0 m high local acoustical barrier shall be constructed and maintained on





the pit floor beside the screening plant in the direction of R1 and R2 once extraction in Area 3 has commenced.

- The crushing plant shall not operate within 350 m of R1 and R2 once extraction in Area 3 has commenced.
- 6. It is understood that the owners of R3 also own the lands of the existing pit and the expansion lands to be licensed for aggregate extraction. We understand that they have signed an agreement that grants the pit operator relief from implementing any noise mitigation measures with regard to R3.

Should the ownership or occupancy of R3 change, a similar agreement shall be reached with the new owners/occupants or mitigation measures shall be implemented with respect to R3. Those mitigation measures include:

- The construction of a minimum 6.0 m high perimeter berm to the south and east of R3 prior to commencement of processing activities in Area 1A.
- The construction of the minimum 7.0 m high local acoustical barrier on the pit floor beside the crushing plant in the direction of R3.
- 7. The acoustical local acoustical barriers mentioned above could be the pit face when the equipment is located less than 100 m from the pit face; or could be comprised of an earth berm, a noise wall, aggregate stockpiles or any other construction with a minimum surface density of 20 kg/m<sup>2</sup>.
- Activities used to prepare the site for excavation, such as the stripping of topsoil, construction of berms, or activities related to the remediation of the site are considered to be construction activities. They are regulated under municipal bylaws and NPC-115 "Sound Level Limits for Motorized Construction Equipment".







# 6 CONCLUSIONS

HGC Engineering has reviewed the operational plan, prepared an acoustical model of the proposed activities in the pit and conducted an analysis of those operations based on worst-case operational scenarios near each receptor. Using the modeling assumptions detailed in Section 4 incorporating the noise control recommendations detailed in Section 5 and Figure 3, sound levels were predicted at each of the receptors as summarized in Table 3. Sample calculations are provided in Appendix A.

# Table 3: Predicted Sound Levels at the Residential Receptors [dBA] During theWorst-Case Operational Scenarios (With Noise Mitigation)

Receptor	Daytime Criteria (dBA)	Predicted Sound Level (dBA)
R1	45	45
R2	45	45
R3	45	45

These results indicate that the sound emissions from the proposed pit operations, with the recommended noise control measures in place, are expected to comply with MECP guideline limits at all the neighbouring noise sensitive receptors under the worst-case operating scenarios.

## 7 **REFERENCES**

- 1. Ontario Ministry of the Natural Resources and Forestry, *Aggregate Resources of Ontario Provincial Standards*, 1997.
- Ontario Ministry of the Environment and Climate Change Publication NPC-300, Environmental Noise Guideline – Stationary and Transportation Sources – Approval and Planning, August 2013.
- 3. Ontario Ministry of the Environment and Climate Change Publication NPC-115, *Sound Level Limits for Motorized Construction Equipment*".
- 4. International Organization for Standardization, *Acoustics Attenuation of Sound during Propagation Outdoors – Part 2: General Method of Calculation*, ISO-9613-2, Switzerland, 1996.
- 5. Google Maps Aerial Imagery, Internet application: maps.google.com.















Drawing Number

OF 5





**FEATURES** PLAN



Figure 2: Aerial Plan











**OPERATIONAL** 

PLAN

20-03

Drawing Number

5



#### PHASE B PHASE B NOTES

- 1. COMPLETE ABOVE WATER EXTRACTION IN AREA 1.
- BEGIN BELOW WATER EXTRACTION IN AREA 1 IN DIRECTION SHOW MATERIAL EXTRACTED FROM BELOW WATER WILL BE PLACED IN WINDROWS ON THE PT FLOOR TO DRAIN BEFORE BEING TRANSPC FOR PROCESSING. SHIP MATERIAL TO TEMPORARY PLANT STE (N SHOWN, PORTABLE PROCESSING GOLUPMENT TO BE USED).
- PRIOR TO EXTRACTION IN AREA 1b, STRIP TOPSOIL AND OVERBURDEN SEPARATELY AND USE MATERIALS TO BEGIN REHABILITATION OF TH/SOUTHEAST SHORELINE IN AREA 1A. EXCESS MATERIAL MAY BE RED IN TEMPORARY STORAGE BERM ALONG EAST BOUNDARY.
- 4. COMPLETE BELOW WATER EXTRACTION IN AREA 1a
- 5. COMPLETE REHABILITATION OF SHORELINE IN AREA 1a USING MATERIAL STORED IN STORAGE BERMS.
- 6. BEGIN ABOVE WATER EXTRACTION OF AREA 1b IN DIRECTION SHOWN. PORTABLE PROCESSING PLANT AND STOCKPILING AREA MAY BE TEMPORARILY LOCATED NEAR THE PIT FACE.
- UNDISTURBED PORTIONS OF AREA 2 AND 3 REMAIN IN AGRICULTURAL



#### **TECHNICAL RECOMMENDATIONS**

THE FOLLOWING ARE THE TECHNICAL RECOMMENDATIONS FROM ALL OF THE EXPERTS' REPORTS AS OF JANUARY 2021, ADDITIONAL RECOMMENDATIONS MAY BE INCLUDED AS A RESULT OF THE LICENCE REVIEW

ARCHAEOLOGCAL ASSESSMENT - IMMINE MARTELLE VENTAGE CONSULTANTS INC, DATED JANUARY 2021 BOULD PREVIOUSLY UNBOCIMENTED ALE, UNKNOWN OR DEPUY USINEED ARCHAEOLOGICAL RESOURCES BE DISCOVERED, THEY MAY BE A NEW ARCHAEOLOGICAL SITE AND THEREFORE SUBJECT TO SECTION 48(1) OF THE ONTRAD INERTIMAE C.T. THE PROPONENT OR PERSON DISCOVERING THA EARCHAEOLOGICAL RESOURCES MUST CEASE ALTERATION OF THE SITE IMMEDIATELY AND DROADE A LICENSED CONSULTANT ARCHAEOLOGIST TO CARRY OUT ARCHAEOLOGICAL FIELDWORK, IN COMPLIANCE WITH SECTION 48(1) OF TH HERITAGE ACT

THE FUNERAL BURNL AND CREMATION GERVICES ACT 2002, S.O. 2002, C.J. SEGURES THAT ANY PERSON DECOVERING YUMAN REAMING SHOT YOTTY HE POLICE OF CORORER AND THE REGISTRAN OF BURNL DECOVERING THAT AND A REAMING SHOT YOTTY HE POLICE OF CORORER AND THE REGISTRAN OF BURNL OWNER WAR DRAVES, REMOVEND C EMPIREMENT OF COROLEGY AND THE REGISTRAN SHOT WAR AND AND CONSUMER SERVICES. AS OF DECEMBER 2020, CAVISLA, FORST AL FOREST IS SERVING AS AREGISTRAR, BURNL STES, REFLACING NANCY WATTING IN THIS ROLE. THE NEW REGISTRAR'S CONTACT INFORMATION S 145127-749, CHYSTLL-DORREST GONTARIOLG.

NOISE ASSESSMENT - HGC ENGINEERING DATED JANUARY 10, 2022 1. THE FOLLOWING TABLE PRESENTS THE REFERENCE SOUND LEVELS USED FOR THE ACOUSTIC MEASUREMENTS OF SIMILAR

ESENTED HEREIN.	THESE SOUND	LEVELS WERE	BASED ON	SITE MI
DCESSING EQUIPM	ENT TO BE US	ED IN THIS PIT.		

EQUIPMENT	SOUND POWER LEVEL dBA re: 10 <sup>-12</sup> W
CRUSHING PLANT WITH AND ASSOCIATED LOADER	115
SCREENING PLANT WITH AND ASSOCIATED LOADER	108
EXCAVATOR/DRAGLINE	107
TRUCKS	101

IF OTHER EQUIPMENT IS PROPOSED FOR OPERATION IN THE GRAVEL PIT, IT SHALL BE CONFIRMED THROUGH MEASUREMENT TO PRODUCE SOUND LEVELS CONSISTENT WITH THE ABOVE REFERENCE SOUND LEVELS OR ADDITIONAL MITIGATION MEASURES MAY BE REQUIRED.

- A MINIMUM 7.0 M HIGH LOCAL ACOUSTICAL BARRIER SHALL BE CONSTRUCTED AND MAINTAINED THE PIF FLOOR BESIDE THE CRUSHING PLANT IN THE DIRECTION OF R1 AND R2 WHEN OPERATING WITHIN 500 M OF R1 AND R2 IN AREA 2.
- A MINIMUM 5.5 M HIGH PERIMETER BERM (ABOVE EXISTING GRADE) SHALL BE CONSTRUCTED ALONG THE NORTHERN BOUNDARY ADJACENT TO AREA 3, PRIOR TO THE COMMENCEMENT OF EXTRACTION O PROCESSING ACTIVITES IN AREA 3.
- A MINIMUM 7.0 M HIGH LOCAL ACOUSTICAL BARRIER SHALL BE CONSTRUCTED AND MAINTAINED ON THE PIT FLOOR BESIDE THE SCREENING PLANT IN THE DIRECTION OF R1 AND R2 ONCE EXTRACTION IN
- THE CRUSHING PLANT SHALL NOT OPERATE WITHIN 350 M OF R1 AND R2 ONCE EXTRACTION IN AREA 3 HAS COMMENCED,
- IT IS UNDERSTOOD THAT THE OWNERS OF R3 ALSO OWN THE LANDS OF THE EXISTING PIT AND THE EXPANSION LANDS TO BE LICENSED FOR AGGREGATE EXTRACTION. WE UNDERSTAND THAT THEY H SIGNED AN AGREEMENT THAT GRANTS THE PIT OPERATOR RELIEF FROM IMPLEMENTING ANY NOISE TIGATION MEASURES WITH REGARD TO R3.

SHOULD THE OWNERSHIP OR OCCUPANCY OF R3 CHANGE, A SIMILAR AGREEMENT SHALL BE REACHED WITH THE NEW OWNERSIOCCUPANTS OR MITIGATION MEASURES SHALL BE IMPLEMENTED WITH RESPECT TO R3. THOSE MITIGATION MEASURES INCLUDE:

- THE CONSTRUCTION OF A MINIMUM 6.0 M HIGH PERIMETER BERM TO THE SOUTH AND EAST OF R3 PRIOR TO COMMENCEMENT OF PROCESSING ACTIVITIES IN AREA 1A.
- THE CONSTRUCTION OF THE MINIMUM 7.0 M HIGH LOCAL ACOUSTICAL BARRIER ON THE PIT FLOOR BESIDE THE CRUSHING PLANT IN THE DIRECTION OF R3.
- THE LOCAL ACOUSTICAL BARRIERS MENTIONED ABOVE COULD BE THE PIT FACE WHEN THE EQUIPMENT IS LOCATED LESS THAN 100 M FROM THE PIT FACE: OR COULD BE COMPRISED OF AN EARTH BERM, A NOISE WALL, AGGREGATE STOCKPILES OR ANY OTHER CONSTRUCTION WITH A MINIMUM SURFACE DENSITY OF 20 KG/M2.
- ACTIVITIES USED TO PREPARE THE SITE FOR EXCAVATION, SUCH AS THE STRIPPING OF TOPSOIL, CONSTRUCTION OF BERMS, OR ACTIVITIES RELATED TO THE REMEDIATION OF THE SITE ARE CONSIDERED TO BE CONSTRUCTION ACTIVITIES. THEY ARE REGULATED UNDER MUNICIPAL BYLAWS AND NPC-115 "SOUND LEVEL LIMITS FOR MOTORIZED CONSTRUCTION EQUIPMENT".

A HOUSE EXISTING GATED-ENTRANCE/EXIT HOUSE 5.5m ACOUSTIC BERM (FAVED) 1.2m FENCE AREA 3 256.5 (3) 256.5 -HYDRO TOWER AREA 1b AREA 2 Ę2> SIGNIFICANT WETLAND SETRAC 254,5 HYDRO ----254 15m 🖌 AREA 1 1.2m FENCE antes BH3-21 SIGNIFICANT WOODLANDS · friend and - antaria 1.2m FENCE

#### PHASE D PHASE D NOTES

- 1. COMPLETE ABOVE WATER EXTRACTION IN AREA 2.
- BEGIN BELOW WATER EXTRACTION OF AREA 2 IN DIRECTION SHOWN, MATERIAL EXTRACTED FROM BELOW WATER WILL BE PLACED IN WINDROWS ON THE PIT FLOOR TO DRAIN BEFORE BE TRANSPORTED FOR PROCESSING, SHIP MATERIAL TO TEMPORA PLANT SITE (NOT SHOWN, PORTABLE PRO
- 3. BEGIN REHABILITATION OF SOUTH/SOUTHEAST SHORELINE OF AREA 2 USING MATERIAL STORED IN EAST STORAGE BERM.
- PRIOR TO EXTRACTION IN AREA 3, STRIP TOPSOIL AND OVERBURDEN SEPARATELY AND USE MATERIALS TO CONSTRUC NORTH ACOUSTIC BERM. EXCESS MATERIALS MAY BE USED TO COMPLETE REHABILITATION OF AREA 2 SHORELINE.
- BEGIN ABOVE WATER EXTRACTION OF AREA 3 IN DIRECTION SHOWN, PORTABLE PROCESSING PLANT AND STOCKPILING AREA MAY BE TEMPORARILY LOCATED NEAR THE PIT FACE,

#### PHASE E (NOT SHOWN) PHASE E NOTES

. COMPLETE ABOVE WATER EXTRACTION IN AREA 3.

- BEGIN BELOW WATER EXTRACTION OF AREA 3 IN DIRECTION BEGIN BELOW WATER EXTRACTION OF AREA 3 IN DIRECTION SHO MATERIAL EXTRACTED FROM BELOW WATER WILL BE PLACED IN WINDROWS ON THE PIT FLOOR TO DRAIN BEFORE BEING TRANSPC FOR PROCESSING. SHIP MATERIAL TO TEMPORARY PLANT SITE (N SHOWN, PORTABLE PROCESSING EQUIPMENT TO BE USED).
- . COMPLETE BELOW WATER EXTRACTION OF AREA 3 AND BEGIN REHABILITATION OF AREA 3 SHORELINE USING MATERIAL STORED IN ACOUSTIC BERM.
- 4. REMOVE ALL SCRAP AND EQUIPMENT. 5. COMPLETE REHABILITATION OF ALL REMAINING AREAS (INCLUDING
- ALL INTERNAL HAUL ROADS) USING TOPSOIL AND OVERBURDE STOCKPILED IN BERMS.
- 6. REHABILITATION WILL BE TO POND AND NATURAL AREAS.

Figure 3b: Operational Plan Showing Noise Control Measures

- HYDROGEOLOGICAL ASSESSMENT GROUNDWATER SCIENCE CORP. DATED FEBRUARY 2022 MONITORING, MITIGATION AND CONTINGENCY PLAN
- WATER LEVEL MEASUREMENTS SHALL BE OBTAINED ON A QUARTERLY (SEASONAL) BASIS AT MW1, MW2 AND MW3, AS ACCESSIBLE,
- ANNUAL WATER QUALITY SAMPLES FOR GENERAL PARAMETERS (ANIONS AND METALS) AND PETROLEUM HYDROCARBONS SHALL BE OBTAINED AT MW1 AND MW3 (AS ACCESSIBLE) ON
- THE MONITORING RESULTS WILL BE SUMMARIZED AND SUBMITTED IN AN ANNUAL REPORT TO THE MINISTRY OF NORTHERN DEVELOPMENT, MINES, NATURAL RESOURCES AND FORESTRY.



1. COMPLETE ABOVE WATER EXTRACTION IN AREA 1h

PHASE C

PHASE C NOTES

BEGIN BELOW WATER EXTRACTION OF AREA 1b. BEGIN BELOW WATER EXTRACTION OF AREA 1b N DRECTION SHOWN. MATERIAL EXTRACTED FROM BELOW WATER WILL BE PLACED IN WINDROWS ON THE PIT FLOOR TO DRAIN BEFORE BEIND TRANSPORTED FOR PROCESSING, SHIP MATERIAL TO TEMPORARY PLANT SITE (NOT SHOWN, PORTABLE PROCESSING EQUIPMENT TO BE USED).

3. BEGIN REHABILITATION OF SHORELINE IN AREA 1b USING MATERIA STORED IN STORAGE BERM.

4. PRIOR TO EXTRACTION IN AREA 2, STRIP TOPSOIL AND OVERBURDEN SEPARATELY AND USE MATERIALS TO COMPLETE REHABILITATION OF SOUTH SHORELINE IN AREA 1b AND BEGIN CONSTRUCTION OF ACOUSTIC BERM.

BEGIN ABOVE WATER EXTRACTION OF AREA 2 IN DIRECTION

SHOWN. PORTABLE PROCESSING PLANT AND STOCKP MAY BE TEMPORARILY LOCATED NEAR THE PIT FACE.

6. UNDISTURBED PORTIONS OF AREA 3 REMAIN IN AGRICULTURAL

APPENDIX A Modeling Parameters & Sample Calculations







The computational acoustical model used for this Assessment (*Cadna/A*, version 2021 MR 2, build 187.5163) is based on the methods from ISO Standard 9613-2.2 "Acoustics - Attenuation of Sound During Propagation Outdoors" [4], which accounts for reduction in sound level with distance due to geometrical spreading, air absorption, ground attenuation and acoustical shielding by intervening structures (or by topography and foliage where applicable). This modelling technique is acceptable to the MECP.

Ground attenuation was assumed to be spectral for all sources, with the ground factor (G) assumed to be 0.5 in all extraction areas and in the processing area (chosen to yield the best agreement between predictions and onsite measurements based on HGC Engineering experience); the ground factor was assumed to be 1.0 in all other areas, representative of grassy fields and forest areas. The temperature and relative humidity were assumed to be 10° C and 70%, respectively.

The modelling considered one order of reflection, the sufficiency of which was confirmed using an iterative convergence analysis with increasing orders of reflection.

Onsite movement of trucks are modelled as line sources (shown as thin green lines in Appendix A), with time weighting factors based 15 km/hr for trucks travelling within the pit. Processing and extraction equipment is shown as green crosses on the Figures in Appendix A.









Figure A1: Predicted Sound Levels and Noise Source Locations during Extraction in Area 1b







R1	486507	4744025	261.5												
Src ID	Х	Y	Z	LxD	Adiv	KO	Dc	Agnd	Abar	Aatm	Afol	Ahous	CmetD	ReflD	LrD
1b_Trucks	486261	4743459	245.9	98	67.1	0	0.0	-1.1	4.8	1.2	0.0	0.0	0.0	0.0	26
A1b_Crusher	486261	4743643	246.0	115	64.1	0	0.0	1.3	2.9	2.6	0.0	0.0	0.0	0.0	44
A1b_Excavator	486297	4743752	250.0	107	61.8	0	0.0	2.3	4.5	1.1	0.0	0.0	0.0	0.0	37
A1b_Screener	486294	4743642	245.5	108	63.8	0	0.0	-0.2	4.9	1.9	0.0	0.0	0.0	0.0	37

R2	486213	4744063	261.1												
Src ID	Х	Y	Z	LxD	Adiv	KO	Dc	Agnd	Abar	Aatm	Afol	Ahous	CmetD	RefID	LrD
1b_Trucks	486261	4743459	245.9	98	66.7	0	0.0	-1.4	3.3	1.1	0.0	0.0	0.0	0.0	25
A1b_Crusher	486261	4743643	246.0	115	63.5	0	0.0	1.1	3.8	1.5	4.8	0.0	0.0	0.0	40
A1b_Excavator	486297	4743752	250.0	107	61.2	0	0.0	1.8	5.9	0.7	1.8	0.0	0.0	0.0	36
A1b_Screener	486294	4743642	245.5	108	63.6	0	0.0	-0.8	5.1	1.6	2.4	0.0	0.0	0.0	36



Figure A2: Predicted Sound Levels and Noise Source and Barrier Locations during Extraction in Area 3 (with Mitigation)







R1	486507	4744025	261.5												
Src ID	Х	Y	Z	LxD	Adiv	KO	Dc	Agnd	Abar	Aatm	Afol	Ahous	CmetD	RefID	LrD
A2_Crusher	486370	4743665	246.0	115	62.7	0	0.0	1.7	10.2	0.9	0.0	0.0	0.0	0.0	40
A2_Screener	486464	4743672	246.0	108	62.0	0	0.0	-1.0	11.8	0.7	0.0	0.0	0.0	0.0	34
A3_Excavator	486356	4743870	251.0	107	57.8	0	0.0	2.5	8.9	0.4	0.0	0.0	0.0	0.0	37
A3_Trucks	486352	4743564	246.8	101	66.9	0	0.0	-1.8	4.9	1.4	0.0	0.0	0.0	0.0	30

R2	486213	4744063	261.1												
Src ID	Х	Y	Z	LxD	Adiv	KO	Dc	Agnd	Abar	Aatm	Afol	Ahous	CmetD	RefID	LrD
A2_Crusher	486370	4743665	246.0	115	63.6	0	0.0	1.4	7.2	1.1	1.1	0.0	0.0	0.0	40
A2_Screener	486464	4743672	246.0	108	64.3	0	0.0	-1.1	5.9	1.9	0.0	0.0	0.0	0.0	36
A3_Excavator	486356	4743870	251.0	107	58.6	0	0.0	1.1	5.5	0.8	0.0	0.0	0.0	0.0	41
A3_Trucks	486352	4743563	246.8	101	66.5	0	0.0	-1.3	4.5	0.8	0.0	0.0	0.0	0.0	31

Where: Lr = Lx - Adiv + K0 + Dc - Agnd - Abar - Aatm - Afol - Ahous + Cmet + Refl







www.hgcengineering.com

# **APPENDIX B**

**Consultant Curriculum Vitae** 









### Mandy Chan, Senior Engineer PEng.

Education	University of Waterloo, Bachelor of Applied Science, 2006								
Professional Memberships	Professional Engineers of Ontario (PEO) Canadian Acoustical Association (CAA) Ontario Society of Professional Engineers (OSPE)								
Professional History	<ul> <li>2014 to Present</li> <li>2010 to 2014</li> <li>2006 to 2010</li> <li>Senior Engineer, Associate, HGC Engineering, Mississauga</li> <li>Project Engineer, HGC Engineering, Mississauga</li> <li>Project Consultant, HGC Engineering, Mississauga</li> </ul>								
Experience	Ms. Chan has been involved in a wide variety of projects related to acoustics, noise and vibration. She has experience with the measurement and analysis of traffic noise and stationary noise sources, architectural acoustic design of learning spaces, office spaces and churches. She has a broad familiarity with Ministry of Environment guidelines regarding noise and vibration and an understanding of Ministry criteria and methods for prediction of noise due to roadway, railway, aircraft traffic, industrial and aggregate facilities. Additionally, Ms. Chan has analysis experience using computer aided modelling and prediction software.								
Selected Projects	Banner Pit, <i>Thamesford, Ontario</i> Block 5 Developments, <i>Brampton, Ontario</i> Bremont Homes, <i>Mississauga, Ontario</i> City Centre Condominiums, <i>Mississauga, Ontario</i> Edmonton Clinic, <i>Edmonton, Alberta</i> Greensborough Subdivision, <i>Markham, Ontario</i> Gurney Sands and Gravel, <i>Brantford, Ontario</i> Knox Presbyterian Church, <i>Waterloo, Ontario</i> Inland West Pit, <i>Warwick, Ontario</i> Johnson Bros. Gravel Pits, <i>Southern Ontario</i> Mattamy Homes, <i>Milton, Ontario</i> Liberty Village Condominiums, <i>Toronto, Ontario</i> Linamar Tech Centre, <i>Guelph, Ontario</i> Nelson Granite Quarries, <i>Kenora, Ontario</i> St. Leonard's Boys' Secondary School, <i>Bermuda</i> Tisdale Mining Lands, <i>Timmins, Ontario</i> Waterloo Christian Reformed Church, <i>Waterloo, Ontario</i> Warren Stewart Limestone Quarry, <i>Cockburn Island, Ontario</i> West Village at Stratford, <i>Stratford, Ontario</i>								









#### William J. Gastmeier, Principal, MASc, PEng

Education	University of Waterloo, Master of Applied Science, 1976 University of Waterloo, Bachelor of Science, 1974								
Professional Memberships	Professional Engineers of Ontario (PEO)								
Memberships	Acoustical Society of Audio Engineering S	America (ASA)							
	Canadian Acoustical	Association (CAA)							
Professional	1994 to Present	Principal HGC Engineering Mississauga							
History	1998 to Present	Lecturer Dalhousie University Halifax NS							
-	1998 to Present	Adjunct Professor, University of Waterloo, <i>Waterloo</i>							
	1988 to 1994	Project Coordinator, Vibron Limited, Mississauga							
	1978 to 1988	Electroacoustics Manager, Unitron Industries, Kitchener							
	1976 to 1978	Microphone Engineer, Turner Company, Cedar Rapids, IA							
Experience	Mr Gastmeier's areas	of expertise include the acoustical design of buildings, and mechanical poise control. He has assessed environmental poise							
	and vibration from transportation and industrial sources mining operations race tracks								
	and gun ranges. He specialises in architectural acoustics for lecture, workplace,								
	performance and multi-use spaces and is expert in the design of acoustical test facilities,								
	residential developments and community noise issues. He has also provided third party								
Selected	expert peer review an	nd certification services for clients across North America.							
Projects									
	De Beers Diamond Mine, Attawapiskat, Gold Mines in Red Lake, Timmins and								
	Matheson ON								
	Vale Inco, Sudbury a	nd Port Colborne							
	Johnson Bros. Grave	Pits, Southern Ontario							
	Humber Arts & Med	ia Studio, Toronto							
	Bergeron Centre for	Engineering Excellence, York University							
	The Maitland Recrea	tion Centre, Goderich Ontario							
	Centennial Centre for	r Integrated Sciences, University of Alberta, Edmonton							
	Piqqusilirivvik Gathe	ring Place Iqualuit, Nunavit							
	University of Waterl	oo School of Architecture, Waterloo							
	Fanshawe College Ce	entre for Digital & Performance Arts, London							
	University of Toront	o's Student Commons, St. George Campus							
	Mitchel Hall, Queens	University, Kingston							
	University of Windso	or School of Creative Arts, Windsor							
	Lancer Sport and Rec	reation Centre (LSRC), University of Windsor, Windsor							
	L.R. Wilson Hall, Mc	Master University, London							
	Research in Motion	Laboratories, Office Space and Test Facilities, Waterloo							





