Noise Impact Study

Bentinck Gravel Pit

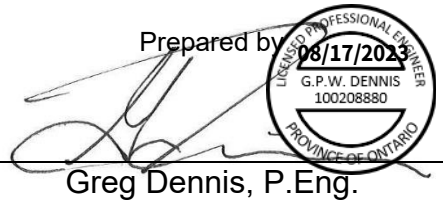
382063 Concession 4 NDR
West Grey, Ontario

August 17, 2023
Project: 123-0064

Prepared for

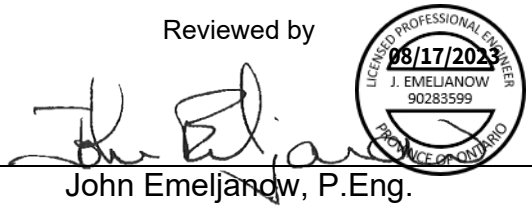
J.T. Excavating Ltd.

Prepared by



Greg Dennis, P.Eng.

Reviewed by



John Emeljanow, P.Eng.

VALCOUSTICS
Canada Ltd.

Version History

Version #	Date	Comments
1.0	August 17, 2023	Final – Issued for use

TABLE OF CONTENTS

1.0 INTRODUCTION 1
1.1 PURPOSE 1
1.2 SITE 1
1.3 NOISE SENSITIVE RECEPTORS 2
2.0 PROGRAMME OF OPERATION 2
3.0 ENVIRONMENTAL NOISE GUIDELINES 3
3.1 TYPICAL OPERATIONS 3
3.1.1 APPLICABLE NOISE LIMITS 4
3.2 CONSTRUCTION 4
4.0 ASSESSMENT 4
4.1 ANALYSIS 5
5.0 RESULTS 6
5.1.1 Mitigation Recommendations 6
6.0 RECOMMENDATIONS 9
7.0 CONCLUSIONS 9
8.0 REFERENCES 10
GLOSSARY OF TERMS 11

LIST OF TABLES

TABLE 1 NPC-300 MINIMUM EXCLUSION LIMITS 3
TABLE 2 EQUIPMENT SOUND LEVEL SUMMARY 5
TABLE 3 PREDICTED SOUND LEVELS – UNMITIGATED 6
TABLE 4 PREDICTED SOUND LEVELS – MITIGATED 8
TABLE 5 EQUIPMENT LIMITS 9

LIST OF FIGURES

FIGURE 1 CONTEXT PLAN
FIGURE 2 RECEPTOR LOCATIONS
FIGURE 3A PREDICTED UNMITIGATED SOUND LEVELS – PHASE 2

…/cont'd

TABLE OF CONTENTS (continued)

LIST OF FIGURES (continued)

FIGURE 3B PREDICTED UNMITIGATED SOUND LEVELS – PHASE 4

FIGURE 3C PREDICTED UNMITIGATED SOUND LEVELS – PHASE 5

FIGURE 4A PREDICTED MITIGATED SOUND LEVELS – PHASE 2 (NO VACANT NOISE SENSITIVE LOTS)

FIGURE 4B PREDICTED MITIGATED SOUND LEVELS – PHASE 4 (NO VACANT NOISE SENSITIVE LOTS)

FIGURE 4C PREDICTED MITIGATED SOUND LEVELS – PHASE 5 (NO VACANT NOISE SENSITIVE LOTS)

FIGURE 5A PREDICTED MITIGATED SOUND LEVELS – PHASE 2 (WITH VACANT NOISE SENSITIVE LOTS)

FIGURE 5B PREDICTED MITIGATED SOUND LEVELS – PHASE 4 (WITH VACANT NOISE SENSITIVE LOTS)

FIGURE 5C PREDICTED MITIGATED SOUND LEVELS – PHASE 5 (WITH VACANT NOISE SENSITIVE LOTS)

LIST OF APPENDICES

APPENDIX A OPERATIONS PLAN

APPENDIX B STATIONARY NOISE CALCULATION DETAILS

APPENDIX C SAMPLE PRODUCT INFORMATION

APPENDIX D CURRICULUM VITAE

Noise Impact Study

Bentinck Gravel Pit

382063 Concession 4 NDR
West Grey, Ontario

1.0 INTRODUCTION

1.1 PURPOSE

Valcoustics Canada Ltd. (VCL) was retained to prepare a Noise Impact Study for the proposed gravel pit located at 382063 Concession 4 NDR in the Municipality of West Grey, Ontario. The purpose of the noise impact analysis is to:

- Identify the potential noise sources;
- Predict the resulting sound levels at noise sensitive receptors due to the operation of the pit; and
- Recommend mitigation measures to meet the Ministry of the Environment, Conservation and Parks (MECP) environmental noise guideline limits, where required.

1.2 SITE

The proposed gravel pit is located at 382063 Concession 4 NDR, approximately 1.2 km west of Mulock Road in the Municipality of West Grey, Ontario.

The site is surrounded by:

- Vacant wooded land, with the Saugeen River and Camp McGovern beyond, to the north;
- Agricultural land, with single-family dwellings and the Saugeen Springs RV Park beyond, to the east;
- Concession 4 NDR, with agricultural land and single-family dwellings beyond, to the south; and
- Agricultural land, with single-family dwellings and Allan Park Road beyond, to the west.

The site is currently being used for agricultural purposes. There is a vacant building on the property that will be removed as part of this project.

A Context Plan is provided as Figure 1. The Operations Plan is included as Appendix A.

1.3 NOISE SENSITIVE RECEPTORS

A noise sensitive land use is defined as the property of a person that accommodates a dwelling (including a campsite), a building used for a noise-sensitive commercial purpose or a building used for a noise-sensitive institutional purpose. A noise sensitive commercial purpose building is used for commercial purposes and includes one or more habitable rooms used as sleeping facilities such as a hotel or motel. A noise sensitive institutional purpose building means a building used for an institutional purpose, including an educational facility, a day nursery, a hospital, a health care facility, a shelter for emergency housing, a community centre, a place of worship, a detention centre, etc.

A noise sensitive zoned vacant lot is defined as a property that has been zoned to permit a noise sensitive land use, which is currently vacant or has an existing land use that is not noise sensitive.

The noise study has assessed the noise impacts at the closest noise sensitive receptors surrounding the proposed aggregate pit. This includes the existing single-family dwellings to the east, south and west, Camp McGovern to the north (which operates on both sides of the Saugeen River and includes overnight campsites/cabins) and the vacant noise sensitive lands to the east and west of the site that are zoned Agricultural (which permit a single-family dwelling).

See Figure 2 for the noise sensitive receptor locations that were analysed in detail. Other existing noise sensitive land uses and vacant noise sensitive lots are further from the site and benefit from the acoustical screening provided by the intervening woods and will receive lower sound levels from the proposed pit operations. Thus, compliance with the MECP noise guideline limits at the closest noise sensitive receptors should inherently result in compliance with the MECP noise guideline limits at all the noise sensitive receptors.

2.0 PROGRAMME OF OPERATION

Initially, trees, overburden and topsoil will be removed to expose the material for extraction. Tree, overburden and topsoil removal should be a relatively short-lived activity that will be done progressively on an as needed basis. The overburden and topsoil will be stored on site and later used for rehabilitation.

Aggregate extraction will occur in 5 phases. It will commence in the north half of the site, proceeding northward in Phases 1 and 2. A portion of Phase 1 (Phase 1a) will be used as a processing area. Extraction will then proceed southward in Phases 3 to 5. The site is bisected by a ponding area that will remain unexcavated.

The equipment to be used on the site as part of the aggregate extraction and processing operation is a processing plant (crusher, screen and stacker(s)), front end loader and shipping trucks.

The truck traffic generated from the aggregate pit was obtained from the traffic study prepared for the project (Reference 9). During the worst-case (busiest) hour, 5 loads of aggregate could be shipped. This means 5 trucks would enter the site, be loaded with aggregate, and then leave the site in the same hour for a total of 10 truck pass bys.

All extraction, processing and shipping activities will occur at the bottom elevation of the extraction face, with a lift height of 5 m.

3.0 ENVIRONMENTAL NOISE GUIDELINES

The applicable noise guideline limits for the proposed pit operation are in MECP Publication NPC-300, *"Environmental Noise Guideline, Stationary and Transportation Sources - Approval and Planning"*.

As per NPC-300, an aggregate extraction facility is a stationary noise source. Note that the MECP terminology "stationary source" refers to the site as a whole, including the composite effect of all of the individual sound sources, even if they can actually move around the site. Source, as referred to above, means the site (operation) as a whole.

The MECP noise guidelines require that the noise assessment determine the "predictable worst case" impacts. Thus, the assessment needs to evaluate and recommend mitigation for the largest possible excess over the noise guideline limits based on the proposed operations in any operating hour.

3.1 TYPICAL OPERATIONS

Noise sensitive receptors in this case are existing residential uses to the east, south and west, Camp McGovern to the north and the vacant noise sensitive zoned lots to the east and west. All receptors were modelled at a 4.5 m height, representing the upper floor of a two-storey dwelling/cabin. The receptors are considered to be in a Class 3 area. A Class 3 area has a low background noise level during the daytime, evening and nighttime, defined by the natural environment and infrequent human activities. See Glossary of Terms for Definitions of Class 1, Class 2 and Class 3 areas.

MECP Publication NPC-300 states that the guideline limits are the higher of the ambient sound level, due to road traffic noise, or the minimum exclusion limits listed in Table 1. Sound levels are assessed using one-hour L_{eq} (dBA), the energy equivalent continuous sound level. The sound level limits apply at the exterior of a noise sensitive Plane of Window (POW) at all times or at an Outdoor Point of Reception (OPOR) in the daytime and evening only. There are no sound level limits for OPORs at night. An OPOR is any point within 30 m of a residential dwelling or campsite provided it is on the same property and is amenable for use.

TABLE 1 NPC-300 MINIMUM EXCLUSION LIMITS

Time of Day	Class 3 Area	
	Plane of Window	Outdoor Point of Reception
Daytime (0700 - 1900 hours)	45	45
Evening (1900 - 2300 hours)	40	40
Nighttime (2300 - 0700 hours)	40	-

3.1.1 APPLICABLE NOISE LIMITS

The Class 3 exclusion limits were used as the guideline limits for all receptors.

Tables 3 and 4 and Figures 3A, 3B, 3C, 4A, 4B, 4C, 5A, 5B and 5C show the applicable guideline limits at each receptor.

3.2 CONSTRUCTION

The MECP defines construction as "*a temporary activity which includes erection, alteration, repair, dismantling, demolition, structural maintenance, painting, moving, land clearing, earth moving, grading, excavating, the laying of pipe and conduit whether above or below ground level, street and highway building, concreting, equipment installation and alteration and the structural installation of construction components and materials in any form or for any purpose, and includes any work in connection therewith*". As stated in section (5) of the stationary source definition in MECP Publication NPC-300, temporary construction activities are not considered stationary sources where MECP approvals are required (Part B of NPC-300), such as an ECA or EASR, and where land use approvals are required (Part C of NPC-300).

Temporary construction activities at the pit include site preparation (clearing of trees and removal of topsoil/overburden, construction of access roads and infrastructure such as scale and offices, construction of noise mitigation features such as perimeter berms, etc.) and rehabilitation (removal of buildings constructed on site, dismantling of noise mitigation features, earth moving, etc.). These activities are not chronic and are excluded from the stationary noise source assessment as outlined above. However, equipment used for construction must comply with the sound emission limits outlined in MECP Publication NPC-115, *"Construction Equipment".*

4.0 ASSESSMENT

The aggregate pit operation is a dynamic, continually changing process that moves across the site. The site operations consist of various components:

- site preparation, including the removal of trees and the stripping of topsoil and overburden;
- aggregate extraction;
- the transporting and processing of aggregate;
- rehabilitation; and
- other miscellaneous construction activities.

It is not possible to determine the duration of the construction activities. This will depend on several factors including the amount of equipment that is used, the conditions encountered on-site such as the depth of overburden, the market demand which will determine the area of site preparation required, how often site preparation is to be done (i.e., annually, every other year, etc.) and the area that is ready for rehabilitation. However, it is expected that construction will be done on an as needed basis over the life of the pit. Thus, the assessment outlined below excludes construction (which includes site preparation and rehabilitation) in accordance with the MECP noise guidelines.

The aggregate pit is proposed to operate from 0700 to 1900 hours, Monday to Friday, and 0900 to 1400 hours on Saturdays.

Worst-case operations at the pit are:

- 1 front-end loader operating at the bottom of the working face, loading haul trucks to bring material to the processing area. Up to 5 loads of aggregate could be hauled to the processing area in an hour;
- 1 front end loader operating at the processing area, loading the shipping trucks from stockpiles created by the processing plant. Up to 5 loads of aggregate could be shipped off site in an hour.
- Crushing and screening plants and associated equipment (i.e., conveyors, stacker, etc.) operating continuously in the processing area.

The equipment sound emission levels used in our analysis are listed in Table 2. The sound levels for the front-end loader and processing plant were determined from measurements done at other similar operating facilities. The sound level data for the shipping trucks was obtained from Reference 9.

TABLE 2 EQUIPMENT SOUND LEVEL SUMMARY

Type	Sound Emission Level @ 15 m (dBA)
Front End Loader	76
Processing Plant	90
Shipping Trucks	75

To ensure the off-site sound levels do not exceed those predicted herein, sound emission levels from equipment to be used on site should be measured to ensure they do not exceed the levels outlined in Table 2 or they have appropriate portable Certificates of Approval (C's of A) or Environmental Compliance Approvals (ECA's).

4.1 ANALYSIS

To assess the noise impact at the noise sensitive receptor locations, a 3-D acoustical model of the proposed operations was developed using the CadnaA V2023 MR 1 environmental noise modelling software. The model uses the prediction algorithms outlined in International Standards Organization (ISO) Standard 9613-2:1996*, "Acoustics – Attenuation of sound during propagation outdoors – Part 2: General method of calculation"*. The modelling technique is an approach that is acceptable to the MECP.

- Grading for the site was obtained from the Operations Plan (Appendix A). Grading for the surrounding area was obtained from the Grey County interactive map.
- Wooded lots were modelled as foliage with a height of 12 m.
- Hard ground (G=0) was used for the pit floor, river and paved areas/roadways. Soft ground (G=1) was used elsewhere.

5.0 RESULTS

The predicted unmitigated sound levels for each receptor are shown in Table 3 for the worst-case operations at the pit. The table shows the highest sound levels predicted at each receptor. Detailed analyses were done to determine the extraction location where the highest sound levels would occur for each receptor.

Figures 3A, 3B and 3C show the predicted sound levels at each receptor during the worst-case operations, which occur during Phases 2, 4 and 5, respectively. As shown, excess sound levels are predicted at the existing single-family dwelling to the west (R5 to R7), Camp McGovern to the north (R8) and the vacant noise sensitive zoned lots to the east and west (R10 and R11). Thus, mitigation is required for the site.

Appendix C contains additional calculation details.

TABLE 3 PREDICTED SOUND LEVELS – UNMITIGATED

Receptor	Description	Daytime (0700-1900 hours)	
		Predicted Sound Level Worst-case Operations (dBA)	Guideline Limit(dBA)(4)
R1	Existing Single-Family Dwelling	35(1)	45
R2	Existing Single-Family Dwelling	41(2)	45
R3	Existing Single-Family Dwelling	44(2)	45
R4	Existing Single-Family Dwelling	45(2)	45
R5	Existing Single-Family Dwelling	52(3)	45
R6	Existing Single-Family Dwelling	49(3)	45
R7	Existing Single-Family Dwelling	47(3)	45
R8	Camp McGovern	46(3)	45
R9	Camp McGovern	43(3)	45
R10	Vacant Noise Sensitive Zoned Lot	61(1)	45
R11	Vacant Noise Sensitive Zoned Lot	53(2)	45

Notes:

(1) See Figure 3A.
(2) See Figure 3B.
(3) See Figure 3C.
(4) Class 3 exclusion limits

5.1.1 Mitigation Recommendations

The largest excess above the MECP noise guideline limit at an existing dwelling is 7 dBA and occurs at receptor R5.

The largest excess above the limits at a vacant noise sensitive zoned lot is 16 dBA and occurs at R10, the agricultural land directly west of the subject site.

To mitigate the noise impact from the gravel pit at existing noise sensitive uses:

- A 2.0 m high sound barrier is recommended at the north end of Phases 1 and 2. This barrier is required prior to the start of any work in Phases 1 or 2.
- A 4.0 m high sound barrier is recommended along the west side of Phase 2, returning east along the south extent. This barrier is required prior to the start of any work in Phases 1 or 2.
- A 4.0 m high sound barrier is recommended along the west side of Phase 5, extending east approximately 30 m at the north end. This barrier is required prior to the start of any work in Phases 3 to 5.

Figures 4A to 4C show the sound barriers.

Mitigating the noise levels at the vacant noise sensitive lots is only required if a noise sensitive use (such as a residential dwelling) is built on the lots. To mitigate the sound levels at the vacant noise sensitive lots:

- A localized sound barrier up to 10 m in height would be required around the west side of the processing area;
- A sound barrier up to 17 m in height would be required along the east side of Phases 3 and 4; and
- The 4.0 m high sound barrier along the west and south sides of Phase 2 (as noted above) would need to increase to 5.0 m in height.

Figures 5A to 5C show the sound barriers. The barriers would be required prior to the start of any work occurring on the site, provided a noise sensitive use has been built at the adjacent lots.

Table 4 shows the predicted mitigated sound levels during the worst-case operations at the pit.

TABLE 4 PREDICTED SOUND LEVELS – MITIGATED

Receptor	Description	Daytime (0700-1900 hours)	
		Predicted Mitigated Sound Level Worst-case (dBA)	Guideline Limit (dBA)(3)
R1	Existing Single-Family Dwelling	35(1)	45
R2	Existing Single-Family Dwelling	41(2)	45
R3	Existing Single-Family Dwelling	44(2)	45
R4	Existing Single-Family Dwelling	45(2)	45
R5	Existing Single-Family Dwelling	45(3)	45
R6	Existing Single-Family Dwelling	42(3)	45
R7	Existing Single-Family Dwelling	42(1)	45
R8	Camp McGovern	40(1)	45
R9	Camp McGovern	43(1)	45
R10	Noise Sensitive Vacant Lot	45(4)	45
R11	Noise Sensitive Vacant Lot	45(4)	45

Notes:

(1) See Figure 4A.
(2) See Figure 4B.
(3) See Figure 4C.
(4) See Figure 5A.
(5) Class 3 exclusion limits

Sound barriers must have a minimum surface density of 20 kg/m^2 and be of solid construction. Earth berms, wood, concrete, masonry, composites or other material meeting the above specification (such as fence atop a berm) can be used.

The following are also suggested as best management practices:

- Back-up beepers are often a source of complaint even though their short duration does not contribute to the hourly sound level from the site operations. To reduce off-site noise impacts, where possible, alternative technologies (such as broadband alarms) should be used on the equipment operating at the site provided they meet the safety requirements of the operator. Typical product information is included as Appendix C; and
- Internal haul routes should be designed to minimize the need for reversing to minimize the use of back-up alarms.

Any changes to the noise mitigation and/or equipment should be reviewed by a qualified acoustical consultant to ensure sound emissions from the facility will remain in compliance with the MECP noise guideline limits.

6.0 RECOMMENDATIONS

These noise mitigation measures are recommended for the gravel pit and should be included on the Site Plans:

- All operations at the pit should only be done during the daytime (i.e., 0700 to 1900 hours) period.
- The sound emission level for all pieces of equipment used for construction activities including site preparation and rehabilitation must comply with the limits outlined in MECP Publication NPC-115, “Construction Equipment”.
- Construction activities should only be done during the daytime (0700 to 1900 hours) Monday to Friday and should not be done on weekends or statutory holidays.
- Alternative technologies to back-up beepers (such as broadband alarms) should be used on the equipment operating at the site. Internal haul routes should be designed to minimize the need for reversing to reduce the use of back-up alarms.
- The amount and sound emission levels from the equipment operating on site must not exceed those outlined in Table 5.

TABLE 5 EQUIPMENT LIMITS

Type	Maximum Number	Maximum Sound Emission Level (dBA)
Front End Loader	1	76 @ 15 m
Processing Plant	1	90 @ 15 m
Shipping Trucks	10 per hour	75 @ 15 m

- To ensure noise emissions comply with the recommendations of this report, sound emission levels from equipment to be used on site should be measured to ensure they do not exceed the levels outlined herein (Table 5). For equipment brought to the site on an as-needed basis, they may have appropriate C of A’s or ECA’s implying that measurements would have been completed prior to approval.
- An off-site noise audit should be completed within 6 months of the start of extraction while processing operations are being done on the site to confirm the MECP noise guideline limits are not exceeded. The audit must be done by a qualified acoustical engineer.
- If alternate noise mitigation measures are to be implemented, they be reviewed and approved by a qualified acoustical consultant to ensure the MECP noise guideline limits will not be exceeded.

7.0 CONCLUSIONS

With the appropriate implementation of the mitigation measures outlined herein, the sound levels from the worst-case operations on the site will be in compliance with MECP noise guideline limits.

As the operation moves over the site, sound levels at the off-site receptors will vary. The noise analysis has been approached on the basis of determining worst case conditions to ensure that the data presented does not under-predict the potential off-site sound levels.

8.0 REFERENCES

1. "Model Municipal Noise Control By-Law", Final Report, Ontario Ministry of the Environment, August 1978.

2. "Noise Emission Levels for Vehicles in Ontario", Ontario Ministry of Transportation and Communications, November 1985, H05-85-02.

3. “Stationary and Transportation Sources - Approval and Planning”, Ontario Ministry of the Environment, Publication NPC-300, October 2013.

4. PC STAMSON 5.04, “Computer Program for Road Traffic Noise Assessment”, Ontario Ministry of the Environment.

5. “Acoustics – Attenuation of Sound During Propagation Outdoors – Part 2: General Method of Calculation”, ISO 9613-2, December 15, 1996.

6. CadnaA, version 2022 MR 2, DataKustik GmbH.

7. “Publication NPC-115 Construction Equipment”, Ontario Ministry of the Environment, 1981.

8. “FHWA Traffic Noise Model Technical Manual”, U.S. Department of Transportation, Federal Highway Administration, February 1998

9. “Transportation Study: Proposed Burnstead Pit, Concession 4 NDR, Grey County” prepared by Paradigm Transportation Solutions, dated December 16, 2021.

GD\JE\mv
J:\2023\1230064\000\Reports\Bentinck Gravel Pit - Noise V1_0.docx

VALCOUSTICS Canada Ltd. consulting acoustical engineers	Title: **Context Plan**	Date: **June 22, 2023**	Figure: **1**
	Project Name: **Bentick Gravel Pit**	Project No.: **123-0064.000**	

J:\2023\1230064\000\Analysis\Cadna\2023-06-09\bentick Gravel Pit 2023-06-21.cna

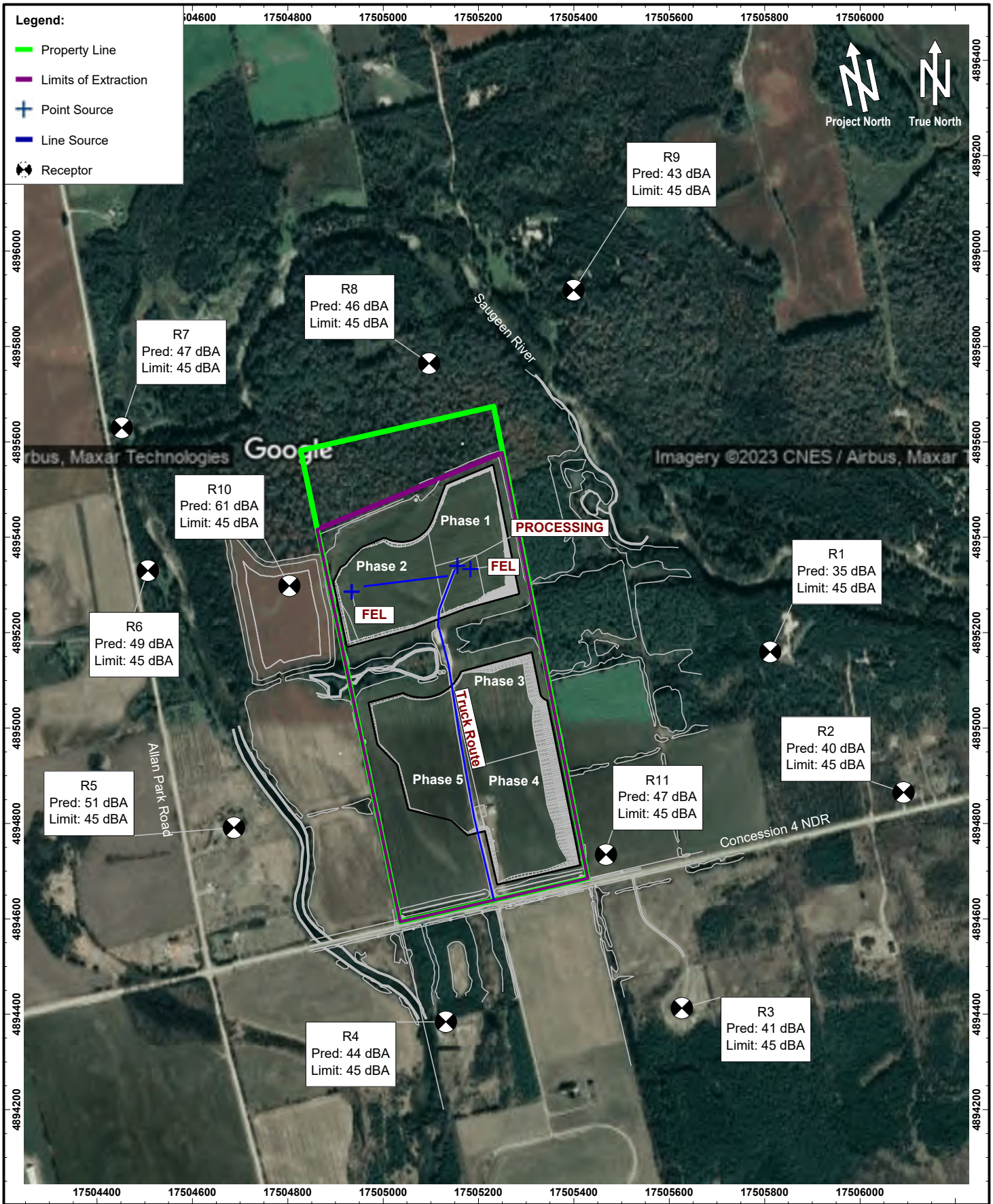
Date Plotted: 28.06.23

VALCOUSTICS Canada Ltd.
consulting acoustical engineers

Title	Date	Figure
Receptor Locations	**June 22, 2023**	**2**
Project Name: **Bentick Gravel Pit**	Project No.: **123-0064.000**	

J:\2023\1230064\000\Analysis\Cadna\2023-06-09\bentick Gravel Pit 2023-06-21.cna

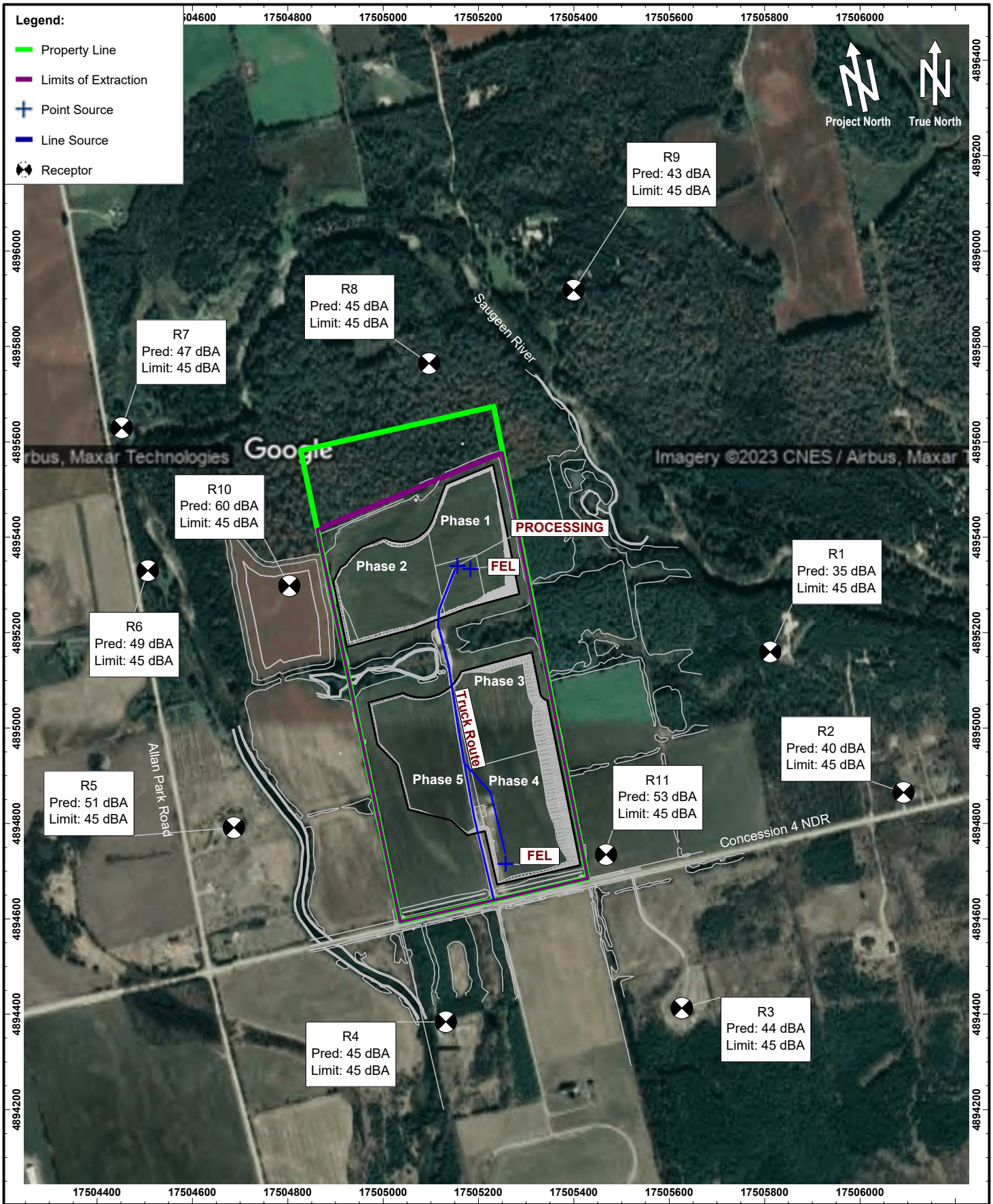
Date Plotted: 23.06.23



VALCOUSTICS Canada Ltd. consulting acoustical engineers	Title: **Predicted Unmitigated Sound Levels - Phase 2 (dBA)**	Date: **June 22, 2023**	Figure: **3A**
	Project Name: **Bentick Gravel Pit**	Project No.: **123-0064.000**	

J:\2023\1230064\000\Analysis\Cadna\2023-06-09\bentick Gravel Pit 2023-06-21.cna

Date Plotted: 15.08.23

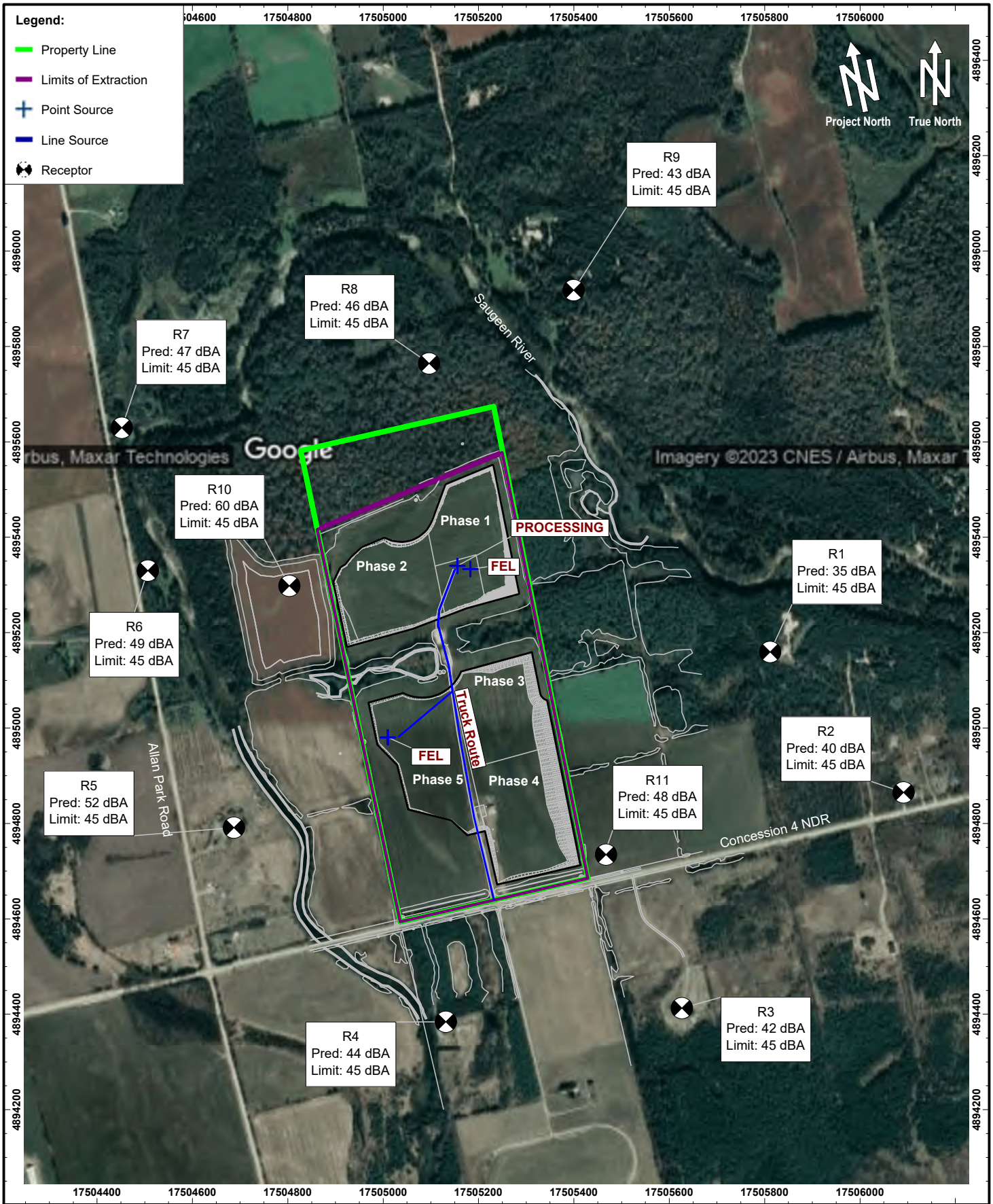


VALCOUSTICS Canada Ltd.
consulting acoustical engineers

Title	Date	Figure
Predicted Unmitigated Sound Levels - Phase 4 (dBA)	**June 22, 2023**	**3B**
Project Name: **Bentick Gravel Pit**	Project No.: **123-0064.000**	

J:\2023\1230064\000\Analysis\Cadna\2023-06-09\bentick Gravel Pit 2023-06-21.cna

Date Plotted: 15.08.23

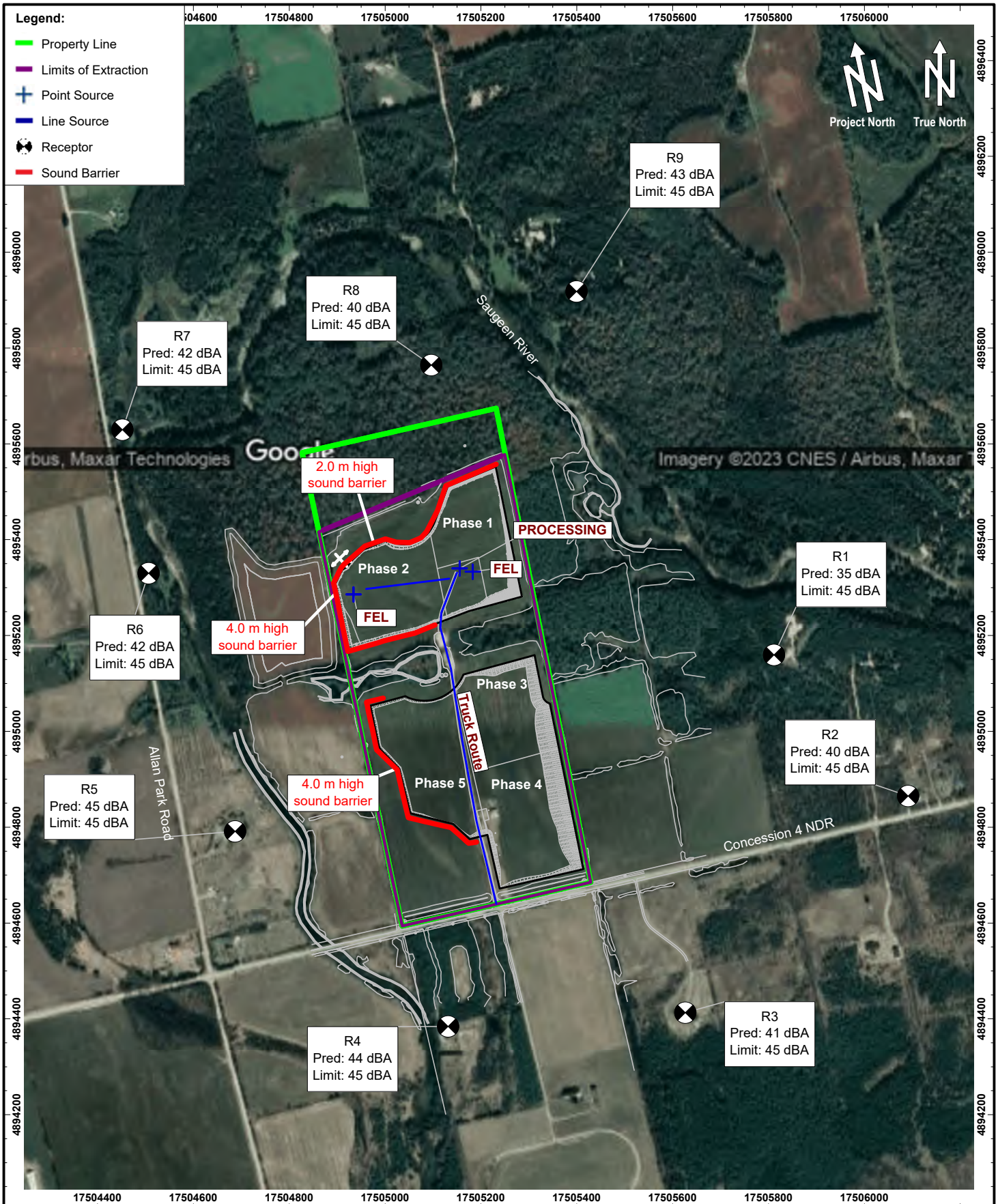


VALCOUSTICS Canada Ltd.
consulting acoustical engineers

Title	Date	Figure
Predicted Unmitigated Sound Levels - Phase 5 (dBA)	**June 22, 2023**	**3C**
Project Name: **Bentick Gravel Pit**	Project No.: **123-0064.000**	

J:\2023\1230064\000\Analysis\Cadna\2023-06-09\bentick Gravel Pit 2023-06-21.cna

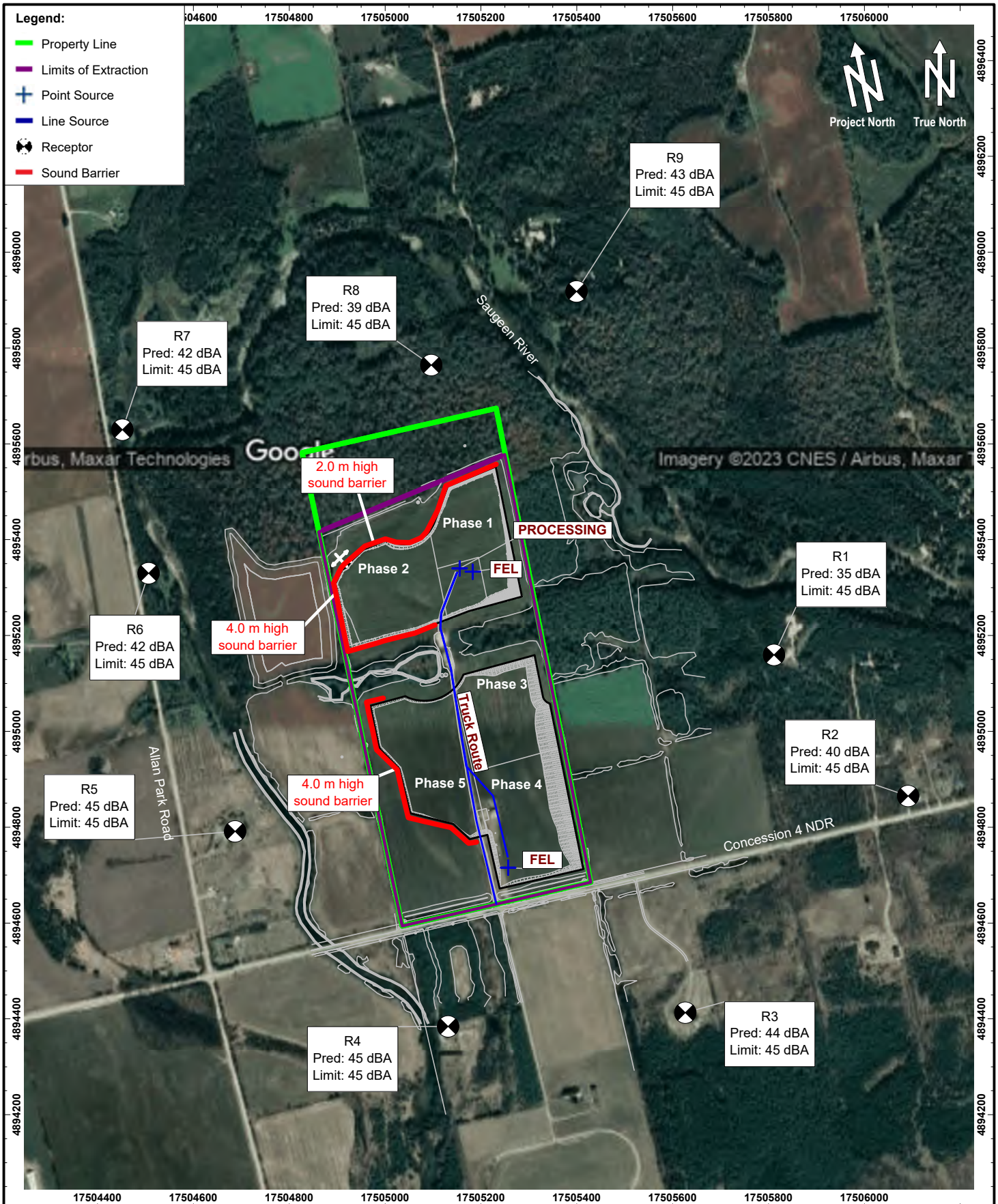
Date Plotted: 15.08.23



VALCOUSTICS Canada Ltd. consulting acoustical engineers	Title: **Predicted Mitigated Sound Levels - Phase 2 (No Vacant Noise Sensitive Lots) (dBA)**	Date: **June 22, 2023**	Figure: **4A**
	Project Name: **Bentick Gravel Pit**	Project No.: **123-0064.000**	

J:\2023\1230064\000\Analysis\Cadna\2023-06-09\bentick Gravel Pit 2023-06-21.cna

Date Plotted: 15.08.23

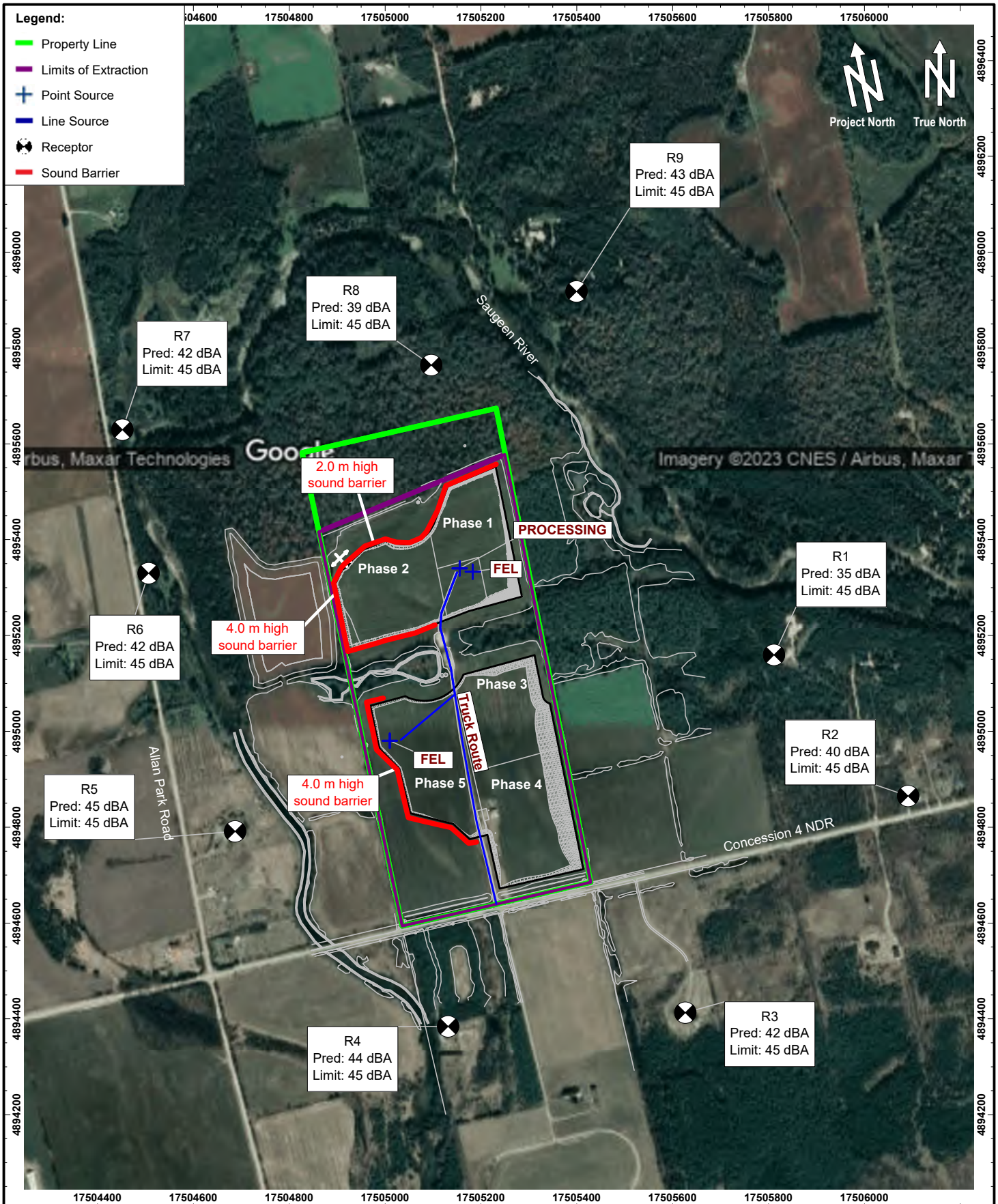


VALCOUSTICS Canada Ltd.
consulting acoustical engineers

Title: **Predicted Mitigated Sound Levels - Phase 4 (No Vacant Noise Sensitive Lots) (dBA)**	Date: **June 22, 2023**	Figure: **4B**
Project Name: **Bentick Gravel Pit**	Project No.: **123-0064.000**	

J:\2023\1230064\000\Analysis\Cadna\2023-06-09\bentick Gravel Pit 2023-06-21.cna

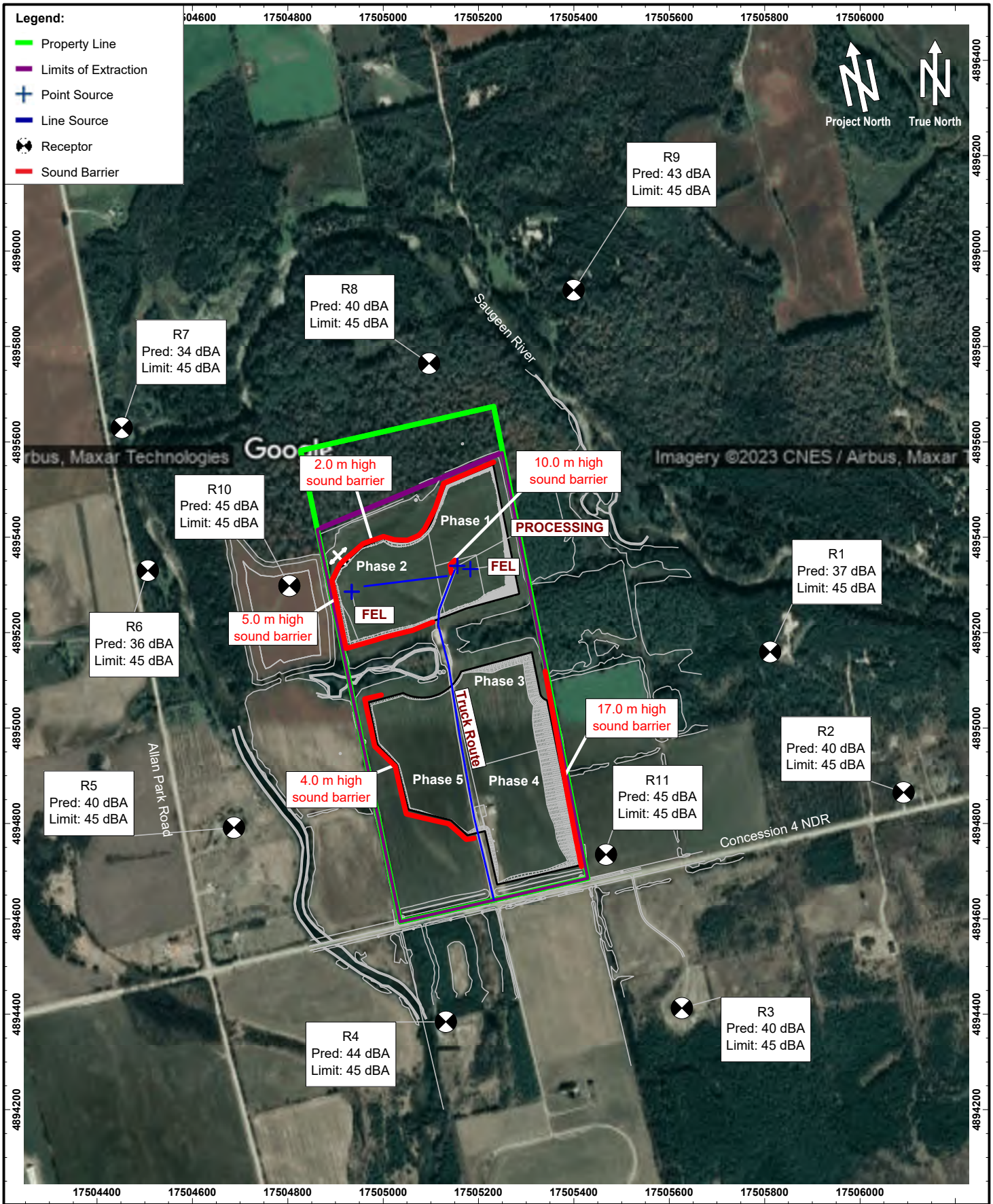
Date Plotted: 15.08.23



VALCOUSTICS Canada Ltd. consulting acoustical engineers	Title: **Predicted Mitigated Sound Levels - Phase 5 (No Vacant Noise Sensitive Lots) (dBA)**	Date: **June 22, 2023**	Figure: **4C**
	Project Name: **Bentick Gravel Pit**	Project No.: **123-0064.000**	

J:\2023\1230064\000\Analysis\Cadna\2023-06-09\bentick Gravel Pit 2023-06-21.cna

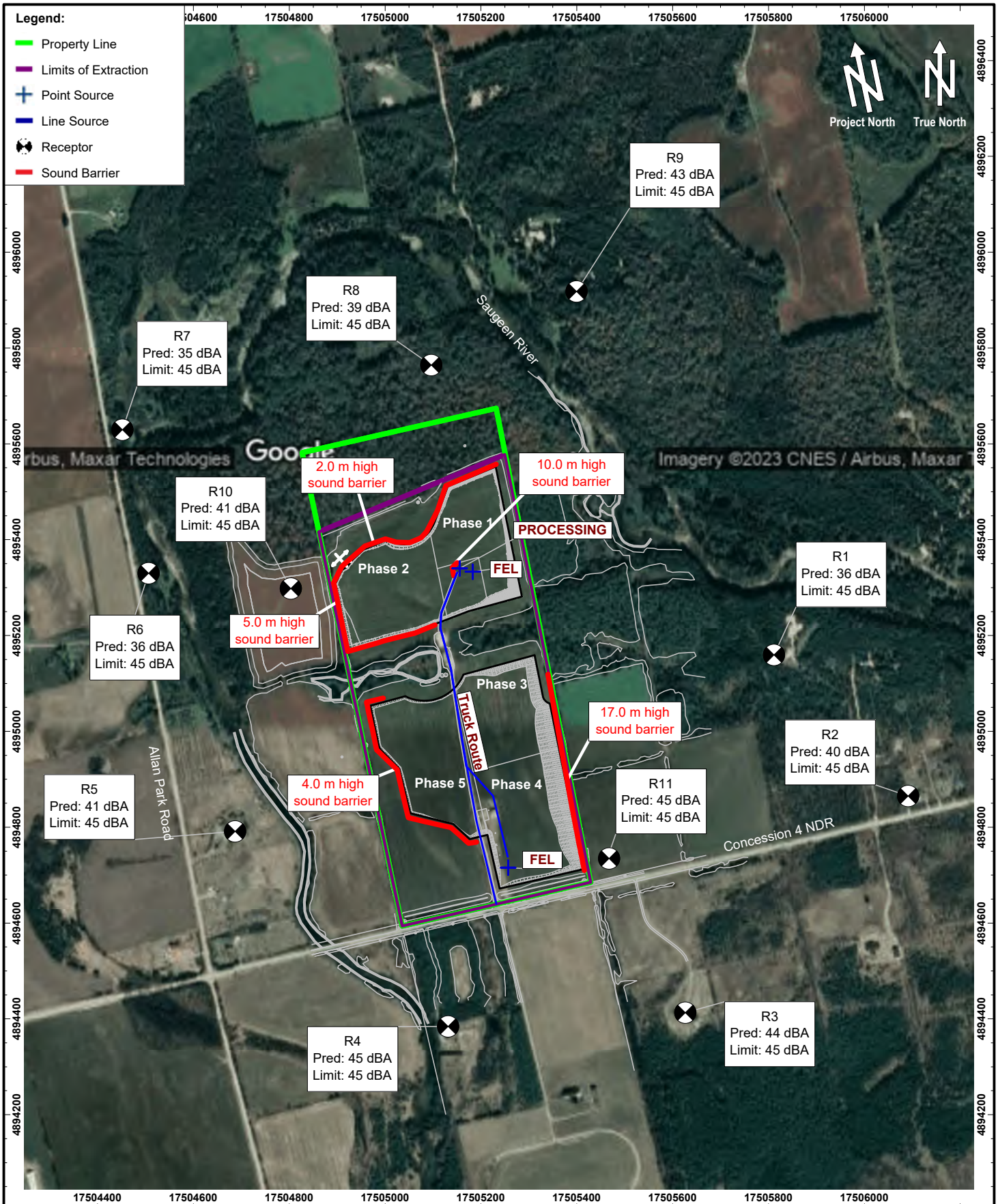
Date Plotted: 15.08.23



VALCOUSTICS Canada Ltd. consulting acoustical engineers	Title: **Predicted Mitigated Sound Levels - Phase 2 (With Vacant Noise Sensitive Lots) (dBA)**	Date: **June 22, 2023**	Figure: **5A**
	Project Name: **Bentick Gravel Pit**	Project No.: **123-0064.000**	

J:\2023\1230064\000\Analysis\Cadna\2023-06-09\bentick Gravel Pit 2023-06-21.cna

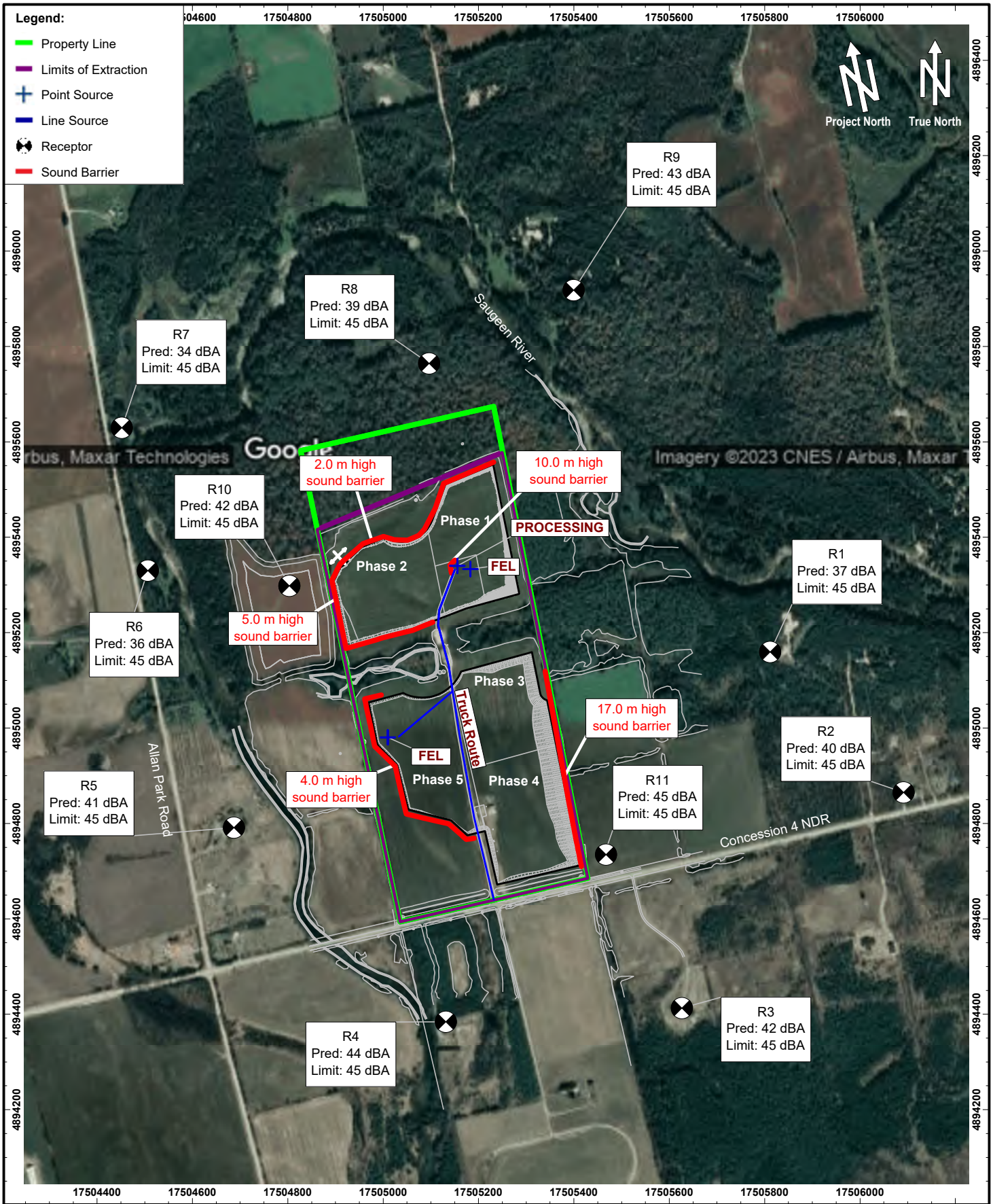
Date Plotted: 15.08.23



VALCOUSTICS Canada Ltd. consulting acoustical engineers	Title: **Predicted Mitigated Sound Levels - Phase 4 (With Vacant Noise Sensitive Lots) (dBA)**	Date: **June 22, 2023**	Figure: **5B**
	Project Name: **Bentick Gravel Pit**	Project No.: **123-0064.000**	

J:\2023\1230064\000\Analysis\Cadna\2023-06-09\bentick Gravel Pit 2023-06-21.cna

Date Plotted: 15.08.23



VALCOUSTICS Canada Ltd. consulting acoustical engineers	Title: **Predicted Mitigated Sound Levels - Phase 5 (With Vacant Noise Sensitive Lots) (dBA)**	Date: **June 22, 2023**	Figure: **5C**
	Project Name: **Bentick Gravel Pit**	Project No.: **123-0064.000**	

J:\2023\1230064\000\Analysis\Cadna\2023-06-09\bentick Gravel Pit 2023-06-21.cna

Date Plotted: 15.08.23

GLOSSARY OF TERMS

Class 1 Area (MECP definition):

- means an area with an acoustical environment typical of a major population centre, where the background sound level is dominated by the urban hum.

Class 2 Area (MECP definition):

- means an area with an acoustical environment that has qualities representative of both Class 1 and Class 3 Areas, and in which a low ambient sound level, normally occurring only between 2300 and 0700 hours in Class 1 Areas, will typically be realized as early as 1900 hours.
- Other characteristics which may indicate the presence of a Class 2 Area include:
  - absence of urban hum between 1900 and 2300 hours;
  - evening background sound level defined by natural environment and infrequency human activity; and
  - no clearly audible sound from stationary sources other than from those under impact assessment.

Class 3 Area (MECP definition):

- means a rural area with an acoustical environment that is dominated by natural sounds having little or no road traffic, such as the following:
  - a small community with less than 1000 population;
  - agricultural area;
  - a rural recreational area such as a cottage or a resort area; or
  - a wilderness area.

Construction (MECP definition):

- "Construction" includes erection, alteration, repair, dismantling, demolition, structural maintenance, painting, moving, land clearing, earthmoving, grading, excavating, the laying of pipe and conduit whether above or below ground level, street and highway building, concreting, equipment installation and alteration and the structural installation of construction components and materials in any form or for any purpose, and includes any work in connection therewith.

Construction Equipment (MECP definition):

- "Construction equipment" means any equipment or device designed and intended for use in construction, or material handling, including but not limited to, air compressors, pile drivers, pneumatic or hydraulic tools, bulldozers, tractors, excavators, trenchers, cranes, derricks, loaders, scrapers, pavers, generators, off-highway haulers or trucks, ditchers, compactors and rollers, pumps, concrete mixers, graders, or other material handling equipment.

Conveyance (MECP definition):

- "Conveyance" includes a vehicle and any other device employed to transport a person or persons or goods from place to place but does not include any such device or vehicle if operated only within the premises of a person.

dB - Decibel:

- See Sound (Pressure) Level.

dBA - A weighted decibel:

- A nationally and internationally standardized frequency weighting applied to the sound level spectrum to approximate the sensitivity of the human hearing mechanism as a function of frequency (pitch).

L_{eq} - The energy equivalent continuous sound level:

- The constant sound level over the time period in question, that results in the same total sound energy as the actually varying sound. Must be associated with a time period.

L_x - Statistical Sound Level Descriptor:

- The sound level exceeded for x% of the time. For all practical purposes, L90 is the residual (lowest) ambient sound level.

Sound (Pressure) Level:

- Measured in decibels (dB) it is the logarithmic ratio of the instantaneous energy of a sound to the energy at the threshold of hearing. Mathematically:

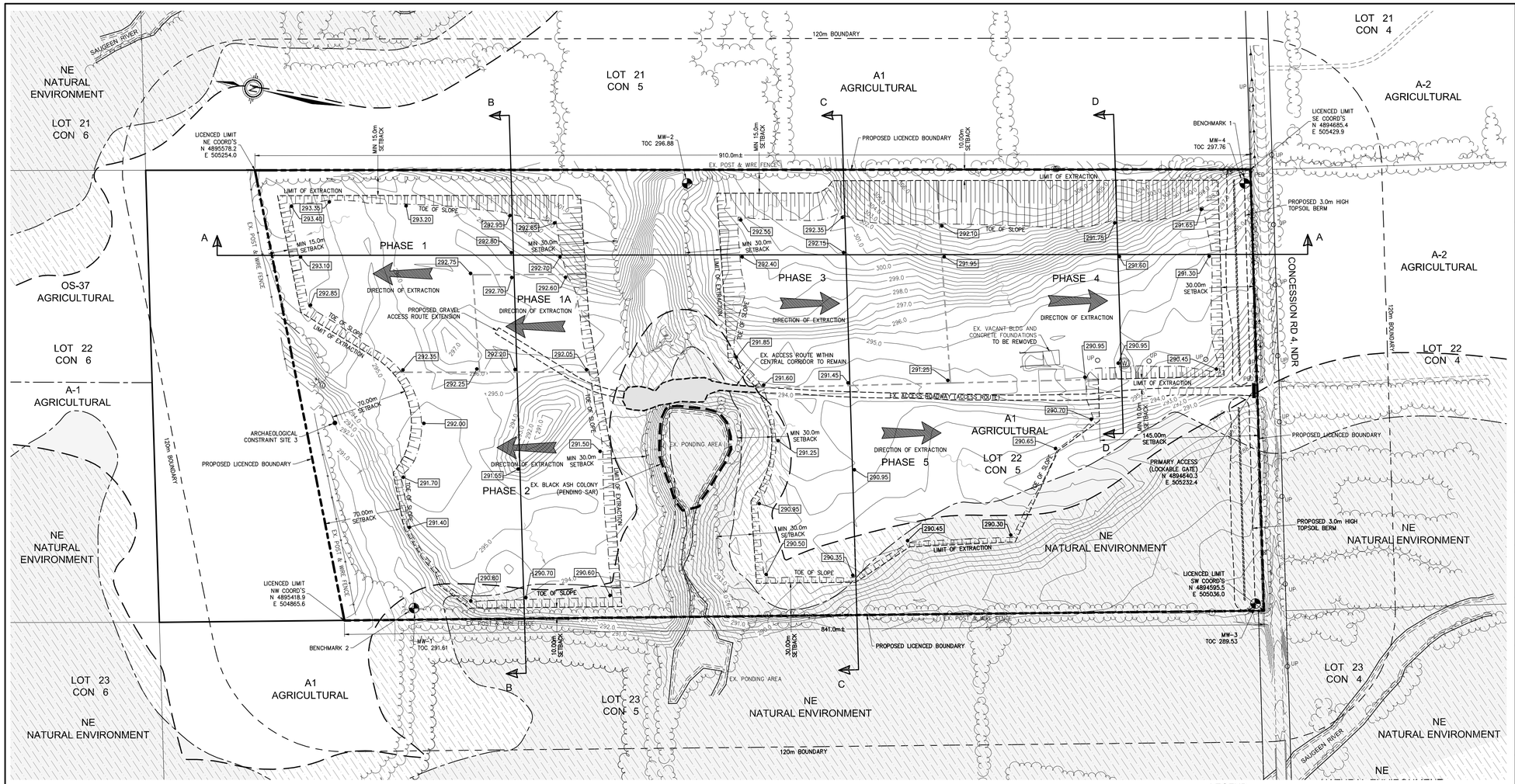
$$SPL \ \ (dB) \ \ = \ \ 20 \ \ \log \ \ (\frac{p}{p_0})$$

- where p is the pressure due to the sound and p_0 is the pressure at the threshold of hearing, taken as 20 micro Pascals.

Stationary Source (MECP definition):

- "Stationary source" means a source of sound which does not normally move from place to place and includes the premises of a person as one stationary source, unless the dominant source of sound on those premises is construction or a conveyance.

APPENDIX A
OPERATIONS PLAN



NOTES :

APPLICANT:

JT EXCAVATING LTD.
BOX 665
615 ASPEN STREET
DURHAM, ON
N0G 1R0

APPLICANT'S SIGNATURE

DATE

BENCHMARK 1 ELEV. - 297.76m

TOP OF CASING FOR MONITORING WELL MW-4, LOCATED AT THE SOUTH EAST CORNER OF THE SITE.

BENCHMARK 2 ELEV. - 291.61m

TOP OF CASING FOR MONITORING WELL MW-1, LOCATED AT THE NORTH WEST CORNER OF THE SITE.

THE POSITION OF POLE LINES, CONDUITS, WATERMAINS, SEWERS AND OTHER UNDERGROUND AND OVERGROUND UTILITIES AND STRUCTURES IS NOT NECESSARILY SHOWN ON THE CONTRACT DRAWINGS, AND, WHERE SHOWN, THE ACCURACY OF THE POSITION OF SUCH UTILITIES AND STRUCTURES IS NOT GUARANTEED.

BEFORE STARTING WORK, THE CONTRACTOR SHALL INFORM HIMSELF OF THE EXACT LOCATION OF ALL SUCH UTILITIES AND STRUCTURES, AND SHALL ASSUME ALL LIABILITY FOR ANY DAMAGE TO THEM.

PROFESSIONAL GEOSCIENTISTS ONTARIO
CORBIN SWEET
PRACTISING MEMBER
3365

NO.	DATE	REVISION DESCRIPTION	CHKD
3	SEP 7/22	REVISED PER MECP COMMENTS	M.D.N.
2	JUL 4/22	REVISED LIMIT OF EXTRACTION	M.D.N.
1	APR 8/22	REVISED PER AWS COMMENTS	M.D.N.

BluePlan ENGINEERING

GUELPH | OWEN SOUND | LISTOWEL | KITCHENER | LONDON | HAMILTON | GTA
1260 - 2ND AVENUE EAST, UNIT 1, OWEN SOUND, ON N4K 2J3
TEL 519-376-1805 www.gmblueplan.ca

JT EXCAVATING LTD.

PROPOSED AGGREGATE PIT

LOT 22, CONCESSION 5

GEOGRAPHIC TOWNSHIP OF BENTINCK

MUNICIPALITY OF WEST GREY

COUNTY OF GREY

DRAWN BY :	APPROVED BY :	PROJECT NO. :	DRAWING NO. :
E.J.T.	C.S.	220135	2
DESIGNED BY :	DATE :	SCALE :	
E.J.T.	MAR 28, 2022	1:2,000	

NOTES:

1. THIS SITE PLAN IS PREPARED UNDER THE AGGREGATE RESOURCES ACT FOR A CLASS "A", CATEGORY 3 LICENCE.
2. TOPOGRAPHIC SURVEY CONDUCTED BY GM BLUEPLAN ENGINEERING LIMITED ON MARCH 22, 2021.
3. PROPERTY BOUNDARIES ARE APPROXIMATE, AND ARE DERIVED FROM GREY COUNTY GIS MAPPING.
4. AREA TO BE LICENCED: 35.72 ha
5. AREA OF EXTRACTION: 20.70 ha
6. THE "HIGH" GROUNDWATER ELEVATION DESCENDS FROM APPROXIMATELY 291.9 m IN THE NORTH EASTERLY PORTION TO APPROXIMATELY 288.8 m IN THE SOUTH WESTERLY PORTION OF THE PROPOSED EXTRACTION AREA, AS RECORDED MARCH, 2022.
7. NO WATER DIVERSION OR EXTRACTION BELOW THE WATER TABLE IS PROPOSED. THE MAXIMUM DEPTH OF EXTRACTION IS TO BE FROM 290.30 m TO 293.40 m (MINIMUM 1.5 m ABOVE THE "HIGH" GROUNDWATER ELEVATION).
8. SURFACE WATER DRAINAGE WILL BE BY PERCOLATION OR EVAPORATION.
9. POTENTIAL EQUIPMENT TO BE USED ON-SITE FOR DAILY OPERATIONS MAY INCLUDE; HYDRAULIC EXCAVATORS, HYDRAULIC HAMMER, DOZERS, LOADERS, SKID STEERS, GRADER, CRUSHER, SCREENER, GENERATORS, AIR COMPRESSORS, AND TRUCKS. ALL EQUIPMENT USED ON-SITE WILL BE PORTABLE.
10. NO ON-SITE FUEL STORAGE IS EXPECTED TO BE PRESENT DURING OPERATIONS.
11. NO SCRAP MATERIALS OR REFUSE SHALL BE STORED ON-SITE.
12. NO ADDITIONAL TREE SCREENING IS PROPOSED.
13. POST & WIRE FENCE, AT LEAST 1.2 m IN HEIGHT, COMPLETE WITH SIGNAGE SHALL BE ERECTED AROUND THE PERIMETER OF THE LICENCED AREA/PROPERTY PRIOR TO THE COMMENCEMENT OF EXTRACTION.
14. PIT OPERATIONS SHALL BE LIMITED TO THE HOURS OF 7:00 AM TO 7:00 PM, MONDAY TO FRIDAY AND 9:00 AM TO 2:00 PM, SATURDAY WITH NO SUNDAY OPERATIONS.
15. ANY WOOD OF VALUE TAKEN DURING CLEARING OPERATIONS SHALL BE USED AS FIRE WOOD. OTHER WOOD AND STUMPS SHALL BE CHIPPED AND USED IN THE REHABILITATION OF THE SITE OR DISPOSED OF OFF-SITE IN ACCORDANCE WITH APPLICABLE MECP GUIDELINES.
16. TOPSOIL AND OVERBURDEN:
    - •• TOPSOIL MUST BE STRIPPED SEQUENTIALLY PRIOR TO PIT EXTRACTION.
    - •• ALL TREES WITHIN 5 METRES OF THE LIMITS OF EXTRACTION MUST BE REMOVED.
    - •• ALL TOPSOIL OR OVERBURDEN STRIPPED DURING OPERATIONS SHALL BE USED TO CREATE BERMS AS SHOWN ON THE PLAN. ANY REMAINING MATERIAL SHALL BE PLACED IN STOCKPILES ON-SITE WITH STABLE VEGETATED SIDE SLOPES FOR FUTURE SITE REHABILITATION.
    - •• TOPSOIL BERMS TO BE VEGETATED MANUALLY WITH PRAIRIE GRASS NATIVE SEED MIXTURE #8130 OR SIMILAR MIX. THE BERM SHOULD BE SEEDED AS THE BERM IS CONSTRUCTED IN ORDER TO PREVENT EROSION AND RUNOFF.
17. PHASING:
    - •• THE TOPSOIL AND OVERBURDEN FROM PHASE 1 SHALL BE USED TO CREATE BERMS AS SHOWN ON THE PLAN. ANY REMAINING MATERIAL SHALL BE PLACED IN STOCKPILES AWAY FROM THE LIMITS OF EXTRACTION AND USED FOR PHASE 1 REHABILITATION.
    - •• AS PHASE 1 EXTRACTION NEARS COMPLETION, STRIPPING OF TOPSOIL AND OVERBURDEN IN PHASE 2 MAY COMMENCE. TOPSOIL AND OVERBURDEN STRIPPED FROM PHASE 2 SHALL BE USED TO CREATE BERMS OR PLACED IN STOCKPILES IN A SUITABLE LOCATION OR USED FOR REHABILITATION OF PHASE 1.
    - •• PHASE 1A IS TO REMAIN AS A PROCESSING AND EQUIPMENT STORAGE AREA.
    - •• AS PHASE 2 EXTRACTION NEARS COMPLETION, STRIPPING OF TOPSOIL AND OVERBURDEN IN PHASE 3 MAY COMMENCE. TOPSOIL AND OVERBURDEN STRIPPED FROM PHASE 3 SHALL BE PLACED IN STOCKPILES IN A SUITABLE LOCATION OR USED FOR THE REHABILITATION OF PHASES 1 & 2.
    - •• AS PHASE 3 EXTRACTION NEARS COMPLETION, STRIPPING OF TOPSOIL AND OVERBURDEN IN PHASE 4 MAY COMMENCE. TOPSOIL AND OVERBURDEN STRIPPED FROM PHASE 4 SHALL BE PLACED IN STOCKPILES IN A SUITABLE LOCATION OR USED FOR THE REHABILITATION OF PHASES 1 THROUGH 3.
    - •• AS PHASE 4 EXTRACTION NEARS COMPLETION, STRIPPING OF TOPSOIL AND OVERBURDEN IN PHASE 5 MAY COMMENCE. TOPSOIL AND OVERBURDEN STRIPPED FROM PHASE 5 SHALL BE PLACED IN STOCKPILES IN A SUITABLE LOCATION OR USED FOR THE REHABILITATION OF PHASES 1 THROUGH 4.
    - •• AFTER PHASE 5 EXTRACTION IS COMPLETE, TOPSOIL AND OVERBURDEN IN BERMS AND STOCKPILES MAY BE RELOCATED TO THE PIT FLOOR IN PHASE 5 AND PHASE 1A, OR OTHER PHASES THAT MAY REQUIRE IT TO FINALIZE REHABILITATION MEASURES.
    - •• STOCKPILES WILL BE LOCATED IN THE ACTIVE PHASE PROXIMAL TO THE WORKING FACE OR IN PHASE 1A (PROCESSING AREA) GREATER THAN 30 m FROM THE LICENCED BOUNDARY.
    - •• REGARDLESS OF THE PHASING SEQUENCE, MULTIPLE PHASES MAY BE OPEN AT ONE TIME IN ORDER TO ACHIEVE EXTRACTION OF DIFFERING MATERIALS THAT MEET BLENDING REQUIREMENTS FOR AGGREGATE PRODUCT. NO MORE THAN 50% OF THE PREVIOUS PHASE SHALL REMAIN OPEN WHILE EXTRACTION PROCEEDS TO SUBSEQUENT PHASES.
18. THE INTERNAL HAUL ROUTE SHALL CONSIST OF THE EXISTING ACCESS ROADWAY WITH AN EXTENSION INTO THE PHASE 1A AREA.
19. THE MAXIMUM TONNAGE TO BE EXTRACTED IN ANY YEAR IS 200,000 TONNES.
20. PRIOR TO EXTRACTION WITHIN EACH PHASE, THE LIMIT OF EXTRACTION IS TO BE CLEARLY STAKED/DEMARCATED. SETBACKS ARE TO BE CLEARLY STAKED AND VISIBLE AT ALL TIMES.
21. DUST IS TO BE MITIGATED ON-SITE WHEN REQUIRED USING WATER OR A PROVINCIALLY APPROVED DUST SUPPRESSANT.
22. ON-SITE VACANT BUILDINGS ARE PROPOSED TO BE REMOVED PRIOR TO THE COMMENCEMENT OF EXTRACTION IN PHASE 4.
23. SPILLS RESPONSE PLAN:
    - •• ALL EMPLOYEES AND CONTRACTORS HANDLING FUEL AND/OR OTHER POTENTIAL CONTAMINANTS WILL BE INSTRUCTED AS TO THE PROPER USE AND SAFE HANDLING OF THESE SUBSTANCES.
    - •• ALL SPILLS OR RELEASES OF CONTAMINANTS ARE TO BE REPORTED IMMEDIATELY TO THE MECP SPILLS ACTION CENTRE: 1-800-268-6060.
    - •• ALL SPILLS OR CONTAMINANT RELEASES ARE TO BE REMEDIATED TO MEET THE REQUIREMENTS OF THE ENVIRONMENTAL PROTECTION ACT AND ASSOCIATED REGULATIONS.
    - •• IN CASE OF SPILL, THE FOLLOWING ACTIONS ARE TO BE TAKEN:
        - ••• CHECK FOR HAZARDOUS CONDITIONS – CALL 911 WHERE HAZARDOUS CONDITIONS EXIST.
        - ••• CALL THE SUPERVISOR/OWNER AND REPORT THE SPILL.
        - ••• WHERE SAFE TO DO SO; STOP THE SOURCE OF THE SPILL (THIS MAY INCLUDE UP-RIGHTING CONTAINERS, TURNING OFF PUMPS, CLOSING VALVES OR PLUGGING LEAKS), CONTAIN THE RELEASE (USE AVAILABLE MATERIALS TO PREVENT THE SPREAD OF THE CONTAMINANTS AND PLACE CONTAMINATED MEDIA IN STORAGE CONTAINERS).
        - ••• THE SUPERVISOR/OWNER AND QUALIFIED PERSONNEL SHALL DEVELOP AND IMPLEMENT A REMEDIAL PLAN AND REQUIREMENTS OF THE MECP (AS APPLICABLE).
    - •• THE SPILLS RESPONSE PLAN IS TO BE POSTED ON-SITE AT ALL TIMES.
24. A SPILL CONTAINMENT AND CLEAN-UP KIT IS TO BE KEPT ON-SITE.
25. HYDROGEOLOGICAL STUDY NOTES:
    - •• TO MAINTAIN SURFACE WATER FLOWS TO THE SAME LOW-LYING LOCATIONS, SLOPING OF THE RESTORED GRADES TO MAINTAIN SIMILAR CATCHMENT AREAS (PRE AND POST DEVELOPMENT) SHALL BE CONDUCTED.
26. EXTRACTION IS TO BE COMPLETED IN ONE LIFT, EXCEPT WHERE EXCAVATION DEPTHS EXCEED 5.0 METRES. THESE AREAS ARE TO BE COMPLETED IN TWO LIFTS, ENSURING THE OPEN FACE IS ADEQUATELY SLOPED FOR SAFE OPERATIONS. FACE HEIGHTS ARE TO MEET MINISTRY OF LABOUR REGULATIONS.
27. NO NEW BUILDINGS OR OTHER STRUCTURES ARE PROPOSED ON THE SITE AS PART OF AGGREGATE OPERATIONS. THE EXISTING VACANT AGRICULTURAL BUILDINGS SHALL BE REMOVED PRIOR TO COMMENCEMENT OF EXTRACTIONS.
28. A GATE SHALL BE ERECTED AND MAINTAINED AT EACH ENTRANCE TO, AND EXIT FROM, THE SITE. EACH GATE IS TO BE KEPT CLOSED WHEN THE SITE IS NOT IN OPERATION.
29. NO AGGREGATE RECYCLING WILL BE CONDUCTED ON THE SITE.
30. NATURAL ENVIRONMENT TECHNICAL REPORT NOTES:
    - •• THE LIMIT OF EXTRACTION SHALL MAINTAIN A MINIMUM SEPARATION WIDTH, TO IDENTIFIED NATURAL ENVIRONMENT FEATURES AS OUTLINED ON FIGURE 9 OF THE NETR, WITH NO DISTURBANCES WITHIN THE NATURAL ENVIRONMENT SETBACKS OTHER THAN THAT FOR THE INTERNAL HAUL ROUTE CROSSING THE CENTRAL RAVINE FEATURE:
        - ••• 30m FROM THE WOODLAND EDGE OF THE CENTRAL RAVINE AND WETLAND FEATURE BEING VEGETATION COMMUNITY NUMBERS 2, 3, 4, 5 AND 6.
        - ••• 15m FROM THE SIGNIFICANT WOODLAND ALONG THE NORTH BOUNDARY AND NORTHEAST PROPERTY CORNER, BEING VEGETATION COMMUNITY NUMBERS 1 AND 2.
    - •• ANY ACCESS ROUTE UPGRADES OR WIDTH EXPANSIONS THAT MAY BE REQUIRED SHALL BE FOCUSED AWAY FROM THE WEST SIDE OF THE ROUTE, ADJACENT TO THE BLACK ASH COLONY AND WETLAND ENVIRONMENT.
    - •• THE DEPTH OF EXTRACTION SHALL DEMONSTRATE NO NEGATIVE HYDROGEOLOGICAL OR DRAW-DOWN INFLUENCES THAT COULD NEGATIVELY IMPACT THE WETLAND FEATURE OR IT'S IDENTIFIED ECOLOGICAL FUNCTIONS OR THE HEADWATER AREA OF THE WATERCOURSE FEATURE.
31. THIS SITE IS NOT SITUATED IN A DESIGNATED SOURCE WATER PROTECTION AREA. THEREFORE, SOURCE WATER PROTECTION POLICIES DO NOT APPLY TO THIS SITE.

VARIATIONS TO OPERATIONAL STANDARDS

NONE AT THIS TIME.

OPERATIONS PLAN

0 25 50 100 200

SCALE 1:2,000

LEGEND

- EXISTING DITCH / WATERCOURSE
- EXISTING FENCELINE
- 240.0 EXISTING GROUND CONTOUR
- EXISTING TREELINE
- 120m BOUNDARY LIMIT
- BOUNDARY OF AREA TO BE LICENCED
- PROPOSED PHASING LIMIT
- PROPOSED FENCED AREA OF LICENSE LIMIT
- ZONING BOUNDARY
- PROPOSED LIMIT OF EXTRACTION
- PROPOSED BOTTOM OF SLOPE
- PROPOSED SILT FENCE
- LIMIT OF SIGNIFICANT WILDLIFE CONSTRAINT ZONE
- 235.00 PROPOSED EXCAVATION ELEVATION
- DIRECTION OF SURFACE FLOW
- TH TESTHOLE LOCATION
- MW/PZ MONITORING WELL / PIEZOMETER LOCATION
- A1 AGRICULTURAL CURRENT ZONING
- CURRENT LAND USE
- W PRIVATE SUPPLY WELL (APPROXIMATE LOCATION)
- SAUGEEN VALLEY CONSERVATION AUTHORITY REGULATED AREA (O.REG. 169/06 SCREENING AREA)
- PRIMARY ENTRANCE / EXIT FROM THE SITE
- INTERNAL ACCESS ROUTE

FILE:C:\Drawings\220135\gpa3.dwg LAYOUT:OP
LAST SAVED BY:Ebreking, 11/15/2022 2:55:09 PM PLOTTED BY:Ed Twining - GM BluePlan 11/18/2022 8:50:09 AM

APPENDIX B

STATIONARY NOISE CALCULATION DETAILS

Bentinck Gravel Pit

Point Sources

Name	Sel.	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)
PROCESSING			PRCSG_ALL	121.9	121.9	121.9	Lw	PRCSG		0.0	0.0	0.0							0.0		(none)	3.50	r	17505155.60	4895340.05	295.96
FEL			FEL_ALL	107.4	107.4	107.4	Lw	FEL		0.0	0.0	0.0							0.0		(none)	2.50	r	17505182.91	4895333.19	295.09
FEL		~	FEL_P1	107.4	107.4	107.4	Lw	FEL		0.0	0.0	0.0							0.0		(none)	2.50	r	17505198.40	4895489.87	295.70
FEL			FEL_P2	107.4	107.4	107.4	Lw	FEL		0.0	0.0	0.0							0.0		(none)	2.50	r	17504934.18	4895285.70	293.43
FEL		~	FEL_P4	107.4	107.4	107.4	Lw	FEL		0.0	0.0	0.0							0.0		(none)	2.50	r	17505256.99	4894715.73	293.27
FEL		~	FEL_P5	107.4	107.4	107.4	Lw	FEL		0.0	0.0	0.0							0.0		(none)	2.50	r	17505009.84	4894980.54	292.98

Line Sources

Name	Sel.	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)
			TRKS_ALL	101.6	-8.4	-8.4	73.1	-36.9	-36.9	PWL-Pt	Heavy_20kph		0.0	0.0	0.0							0.0		(none)	10.0	0.0	0.0	20.0
		~	TRKS_P5	99.2	-10.8	-10.8	73.1	-36.9	-36.9	PWL-Pt	Heavy_20kph		0.0	0.0	0.0							0.0		(none)	10.0	0.0	0.0	20.0
		~	TRKS_P4	104.1	-8.9	-8.9	76.1	-36.9	-36.9	PWL-Pt	Heavy_20kph		0.0	0.0	0.0							0.0		(none)	20.0	0.0	0.0	20.0
			TRKS_P2	98.5	-14.5	-14.5	76.1	-36.9	-36.9	PWL-Pt	Heavy_20kph		0.0	0.0	0.0							0.0		(none)	20.0	0.0	0.0	20.0
		~	TRKS_P1	96.8	-16.2	-16.2	76.1	-36.9	-36.9	PWL-Pt	Heavy_20kph		0.0	0.0	0.0							0.0		(none)	20.0	0.0	0.0	20.0

Sound Level Library

Name	ID	Type	Octave Spectrum (dB)												Source
			Weight.	31.5	63	125	250	500	1000	2000	4000	8000	A	lin	
CAT 380 front end loader	FEL	Lw		0.0	115.0	110.0	108.0	101.0	102.0	101.0	94.0	93.0	107.4	117.2	Manufacturer's data
Processing Plant	PRCSG	Lw			119.0	122.0	114.0	116.0	116.0	115.0	115.0	109.0	121.9	126.2	VCL Database
Heavy truck movement - 20 kph	Heavy_20kph	Lw		0.0	111.8	110.3	106.4	102.6	99.7	97.7	95.6	92.1	106.1	115.3	VCL Database

Receiver
Name: (untitled)
ID: R1
X: 17505811.60 m
Y: 4895159.53 m
Z: 309.50 m

Point Source, ISO 9613, Name: "PROCESSING", ID: "PRCSG_ALL"																				
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)
3	17505155.60	4895340.05	295.96	0	DEN	A	121.9	0.0	0.0	0.0	0.0	67.7	4.7	-1.4	10.7	0.0	6.1	0.0	0.0	34.1

Point Source, ISO 9613, Name: "FEL", ID: "FEL_ALL"																				
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)
7	17505182.91	4895333.19	295.09	0	DEN	A	107.4	0.0	0.0	0.0	0.0	67.3	2.9	-1.2	9.4	0.0	6.0	0.0	0.0	22.9

Point Source, ISO 9613, Name: "FEL", ID: "FEL_P2"																				
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)
10	17504934.18	4895285.70	293.43	0	DEN	A	107.4	0.0	0.0	0.0	0.0	70.0	3.6	-1.7	4.5	0.0	6.4	0.0	0.0	24.6

Line Source, ISO 9613, Name: "", ID: "TRKS_P2"																				
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)
14	17505046.99	4895308.04	294.21	0	D	A	76.1	22.4	0.0	0.0	0.0	68.8	3.0	-1.5	7.0	0.0	6.2	0.0	0.0	14.9
14	17505046.99	4895308.04	294.21	0	N	A	-36.9	22.4	0.0	0.0	0.0	68.8	3.0	-1.5	7.0	0.0	6.2	0.0	0.0	-98.2
14	17505046.99	4895308.04	294.21	0	E	A	-36.9	22.4	0.0	0.0	0.0	68.8	3.0	-1.5	7.0	0.0	6.2	0.0	0.0	-98.2

Line Source, ISO 9613, Name: "", ID: "TRKS_ALL"																				
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)
17	17505176.11	4894895.35	293.60	0	D	A	73.1	22.2	0.0	0.0	0.0	67.8	2.8	-1.5	6.2	0.0	6.3	0.0	0.0	13.7
17	17505176.11	4894895.35	293.60	0	N	A	-36.9	22.2	0.0	0.0	0.0	67.8	2.8	-1.5	6.2	0.0	6.3	0.0	0.0	-96.3
17	17505176.11	4894895.35	293.60	0	E	A	-36.9	22.2	0.0	0.0	0.0	67.8	2.8	-1.5	6.2	0.0	6.3	0.0	0.0	-96.3
24	17505211.57	4894726.59	293.07	0	D	A	73.1	22.5	0.0	0.0	0.0	68.4	2.9	-1.0	6.1	0.0	10.4	0.0	0.0	8.7
24	17505211.57	4894726.59	293.07	0	N	A	-36.9	22.5	0.0	0.0	0.0	68.4	2.9	-1.0	6.1	0.0	10.4	0.0	0.0	-101.3
24	17505211.57	4894726.59	293.07	0	E	A	-36.9	22.5	0.0	0.0	0.0	68.4	2.9	-1.0	6.1	0.0	10.4	0.0	0.0	-101.3
27	17505149.38	4895054.26	294.15	0	D	A	73.1	21.9	0.0	0.0	0.0	67.5	2.8	-1.5	6.1	0.0	6.2	0.0	0.0	13.8
27	17505149.38	4895054.26	294.15	0	N	A	-36.9	21.9	0.0	0.0	0.0	67.5	2.8	-1.5	6.1	0.0	6.2	0.0	0.0	-96.2
27	17505149.38	4895054.26	294.15	0	E	A	-36.9	21.9	0.0	0.0	0.0	67.5	2.8	-1.5	6.1	0.0	6.2	0.0	0.0	-96.2
48	17505133.86	4895289.13	294.69	0	D	A	73.1	19.5	0.0	0.0	0.0	67.8	2.8	-1.2	9.1	0.0	5.9	0.0	0.0	8.1
48	17505133.86	4895289.13	294.69	0	N	A	-36.9	19.5	0.0	0.0	0.0	67.8	2.8	-1.2	9.1	0.0	5.9	0.0	0.0	-101.9
48	17505133.86	4895289.13	294.69	0	E	A	-36.9	19.5	0.0	0.0	0.0	67.8	2.8	-1.2	9.1	0.0	5.9	0.0	0.0	-101.9
71	17505126.31	4895173.21	295.74	0	D	A	73.1	19.4	0.0	0.0	0.0	67.7	2.8	1.1	9.4	0.0	3.9	0.0	0.0	7.6
71	17505126.31	4895173.21	295.74	0	N	A	-36.9	19.4	0.0	0.0	0.0	67.7	2.8	1.1	9.4	0.0	3.9	0.0	0.0	-102.4
71	17505126.31	4895173.21	295.74	0	E	A	-36.9	19.4	0.0	0.0	0.0	67.7	2.8	1.1	9.4	0.0	3.9	0.0	0.0	-102.4
74	17505116.40	4895231.43	295.73	0	D	A	73.1	15.0	0.0	0.0	0.0	67.9	2.8	1.1	9.3	0.0	3.9	0.0	0.0	3.1
74	17505116.40	4895231.43	295.73	0	N	A	-36.9	15.0	0.0	0.0	0.0	67.9	2.8	1.1	9.3	0.0	3.9	0.0	0.0	-106.9
74	17505116.40	4895231.43	295.73	0	E	A	-36.9	15.0	0.0	0.0	0.0	67.9	2.8	1.1	9.3	0.0	3.9	0.0	0.0	-106.9

APPENDIX C

SAMPLE PRODUCT INFORMATION

bbs-tek BACKALARM® Back-up Alarms

BBS-107
BBS-102

Heavy Duty

Ideal for dump trucks, bulldozers, loading shovels and all heavy earthmoving machinery.

- Conform to SAE J994 environmental standards
- Tough, durable, guaranteed waterproof (IP68)
- Solid-state, spark-free electronics, epoxy-sealed against mud, water and vibration
- Can be steam-cleaned and pressure-hosed
- CE and 'e' marked (EMC)

STOCK CODE	MODEL	VOLTS DC	SOUND LEVEL dB(A)@1m	FREQUENCY KHZ	CURRENT AMPS	SOUNDER UNIT	SIZE mm (WxHxD)	HOLE CENTRES (mm)
A0899	BBS-107	24	107	Multi	1.0	Driver	173x80x95	152
A0898	BBS-102	24	102	Multi	1.0	Driver	173x80x95	152

BBS-97
BBS-92

Medium Duty

Ideal for trucks, buses and coaches, light mobile plant, forklift trucks and industrial vehicles.

- Conform to SAE J994 environmental standards
- Tough, durable, guaranteed waterproof (IP68)
- Solid-state, spark-free electronics, epoxy-sealed against mud, water and vibration
- Can be steam-cleaned and pressure-hosed
- CE and 'e' marked (EMC)

STOCK CODE	MODEL	VOLTS DC	SOUND LEVEL dB(A)@1m	FREQUENCY KHZ	CURRENT AMPS	SOUNDER UNIT	SIZE mm (WxHxD)	HOLE CENTRES (mm)
A0935	BBS-97	12-24	97	Multi	0.5	Speaker	127x65x76	98-108
A0934	BBS-92	12-24	92	Multi	0.5	Speaker	127x65x76	98-108

BBS-87
BBS-82
BBS-77

Light Duty

Ideal for forklift trucks, light commercial vehicles, MPVs and cars.

- Conform to SAE J994 environmental standards
- Tough, durable, guaranteed waterproof (IP68)
- Solid-state, spark-free electronics, epoxy-sealed against mud, water and vibration
- Can be steam-cleaned and pressure-hosed
- CE and 'e' marked (EMC)

STOCK CODE	MODEL	VOLTS DC	SOUND LEVEL dB(A)@1m	FREQUENCY KHZ	CURRENT AMPS	SOUNDER UNIT	SIZE mm (WxHxD)	HOLE CENTRES (mm)
A0897	BBS-87	12-24	87	Multi	0.5	Speaker	90x49x39	76
A0896	BBS-82	12-24	82	Multi	0.5	Speaker	90x49x39	76
A1397	BBS-77	12-24	77	Multi	0.5	Speaker	90x49x39	76

Electric Forklift Truck

BBS-87HV
BBS-82HV

Medium Duty

- Conform to SAE J994 environmental standards
- Tough, durable, guaranteed waterproof (IP68)
- Solid-state, spark-free electronics, epoxy-sealed against mud, water and vibration
- Can be steam-cleaned and pressure-hosed
- CE and 'e' marked (EMC)

STOCK CODE	MODEL	VOLTS DC	SOUND LEVEL dB(A)@1m	FREQUENCY KHZ	CURRENT AMPS	SOUNDER UNIT	SIZE mm (WxHxD)	HOLE CENTRES (mm)
A1323	BBS-87HV	36-80	87	Multi	0.15	Speaker	127x65x76	98-108
A1322	BBS-82HV	36-80	82	Multi	0.15	Speaker	127x65x76	98-108

APPENDIX D
CURRICULUM VITAE

GREG DENNIS, M.Eng., P.Eng.

Acoustical Engineer

Since joining Valcoustics in 2013, Mr. Dennis' (Greg's) responsibilities have included field measurements, analysis, computations, report preparation and project management. Greg has extensive experience in preparing environmental noise and vibration studies to support the land use approvals process to determine the impact from road, rail, and stationary noise sources onto adjacent land uses, both existing and proposed, as well as selection and analysis of noise mitigation measures, including sound barriers, architectural elements, and operation techniques. Projects are prepared for private and government sectors, involving residential, industrial, and commercial development. He is also regularly involved with architectural acoustic building design for aspects such as sound isolation, mechanical noise and vibration control and environmental noise impact. Representative projects include King West Submarket/64-86 Bathurst Street, Toronto; 4845 Walker Road, Windsor; 258-270 Sheppard Avenue West, Toronto; 1 Milburn Street, Barrie; County Road 1 (8th Line), Beeton; 21 Old Kingston Road, Toronto; 416 Dundas Street East, Whitby; 4005 Hickory Drive, Mississauga; Holland Christian Homes/New Faith Manor, Brampton; 227 Harding Boulevard West, Richmond Hill; 11 & 19 Donna Mae Crescent, Thornhill; and many others.

EDUCATION:

- **M.Eng.**, Penn State University, August 2020, Masters in Acoustics.
- **B.Eng.,** Queen's University, April 2013, Engineering Physics with concentration in Electrical Engineering.

PROFESSIONAL AFFILIATION:

- Registered Professional Engineer, Professional Engineers of Ontario

RELEVANT EXPERIENCE:

Project Name: Southwest Queensville
Location: East Gwillimbury, Ontario, Canada
Duration: 2017-current
Client: Tercot Development Group
Project Description: Valcoustics was retained to complete an environmental noise study for a proposed residential development consisting of 82 lots/blocks. The largest noise source of concern is road traffic. Valcoustics/Greg is recommending noise mitigation measures to ensure noise levels from road traffic are within the applicable guideline limits.

Project Name: Holland Christian Homes – New Faith Manor
Location: Brampton, Ontario, Canada
Duration: 2017
Client: sub-consultant to OCA Architects Inc.
Project Description: Valcoustics was retained to complete an environmental noise study to support the Site Plan Approval (SPA) application for a new Long-Term-Care (LTC) facility. The facility will consist of a 4-storey LTC building with towers on each side as well as the re-purposing of Bethany Manor to the northeast of the proposed new building from LTC to assisted living. Valcoustics/Greg recommended mitigation measures to ensure noise levels from and onto the proposed development were both within the applicable guideline limits.

Project Name: 4785 Walker Road
Location: Windsor, Ontario, Canada
Duration: 2017-current
Client: sub-consultant to Lassaline Planning Consultants
Project Description: Valcoustics was retained to complete an environmental noise and vibration study for a proposed mixed-use development consisting of 37 townhouses and a 3-storey residential building with ground floor commercial. The proposed development is located adjacent to the Canadian National Railway (CN) as well as in close proximity to an industrial/commercial facility. Valcoustics/Greg is recommending mitigation measures to ensure noise and vibration from the transportation and stationary noise sources are within the applicable guideline limits.

JOHN EMELJANOW, P.Eng.

Principal Acoustical Engineer

Mr. Emeljanow (John) has been employed with Valcoustics Canada Ltd. for over 30 years. He is a Principal Engineer, a Designated Consulting Engineer with the Professional Engineers of Ontario, a graduate of the Ministry of the Environment's Acoustics Technology in Land Use Planning Course and has given evidence as an expert witness before the Ontario Municipal Board and Local Planning Appeals Tribunal, dealing with environmental acoustics issues in land use planning. John has acted as project manager on a number of major architectural and environmental projects. His responsibilities include noise/vibration measurement, analysis, design computations, and report preparation. In addition, John was an active contributor to the acoustics section of the Architectural Design Standards for Ontario Courthouses prepared for the Ministry of the Attorney General. As an expert witness in acoustics, he has appeared multiple times before the Supreme Court of Ontario, the Ontario Municipal Board/Local Planning Appeal Tribunal, and the Ontario Environmental Assessment Board. He regularly assists with negotiating settlements and wording agreements, to avoid costly hearings and to reduce delays, in the land use approvals process.

EXPERIENCE:

Architectural acoustics involving the interaction of sound and architectural elements within a space to obtain the desired acoustical environment. This involves control of reverberation, ambient sound level, location of sound absorbing and sound reflecting surfaces as well as isolation of sound to and from adjacent spaces. Representative projects are: Niagara Convention Centre; Durham Consolidated Courthouse; Brampton Consolidated Courthouse; Upper Canada College Expansion, Toronto; Toronto Stock Exchange Renovations (The Design Exchange); Sunnybrook Health Science Centre Expansion and Renovation, Toronto; Metro Convention Centre Expansion, Toronto; Canary Wharf (DS5), London; Sudbury Regional Hospital; and GTAA Infield Development, Mississauga.

Environmental noise and vibration studies to determine impact of ground and air transportation and stationary sources of sound on adjacent land use, both existing and proposed, as well as selection and analysis of noise mitigation measures, including sound barriers, architectural elements, and operational techniques. Projects are prepared for private and government sectors, involving residential, industrial and commercial development. Representative projects include: Walker Brothers Quarry, Thorold; Keele Valley Landfill Vertical Expansion, Maple; Canadian National Railway Lands Redevelopment, Toronto; The Woodbridge Expansion Area, Vaughan; Rimply Manufacturing Plant, Newmarket; Honda Canada Manufacturing Minivan Plant, Alliston; Sheppard Subway, Toronto; and Highway 11, Burk's Falls to Powassin.

Mechanical system noise and vibration analyses to control the impact of air-borne and structure-borne sound from mechanical equipment on adjacent spaces through the design of demising surfaces, as well as the control of noise generated and transmitted through HVAC systems. Representative projects include: the New Princess Margaret Hospital, Toronto; National Trade Centre, Toronto; IBM Facility for Software Development, Markham; Niagara College – Glendale Campus, Niagara Falls; The American School, Shanghai; Guelph General Hospital; and Xiamen Conference Centre, China.

EDUCATION:

- **B.Eng.,** Mechanical Engineering, McMaster University, 1989
- Course on Noise Control in Land Use Planning, Ministry of the Environment and Climate Change, Toronto, 1989

PROFESSIONAL AFFILIATION:

- Registered Professional Engineer, Professional Engineers of Ontario
- Designated Consulting Engineer, Professional Engineers of Ontario
- Registered Professional Engineer, with the Engineers and Geoscientists of British Columbia

PUBLICATIONS & PRESENTATIONS:

- "A Technique for Comparing Alternative Transportation Corridor Alignments Based on Noise Impact", presented at Inter-Noise 92, Toronto, Ontario, July 1992.
- "Environmental Noise Aspects of Landfill Site Selection", Canadian Acoustics, Vol. 21, No. 3, September 1993.
- "Acoustical Challenge of Quarry Design", Canadian Acoustics, Vol. 22, No. 3, September 1994.
- "NPC-300 Environmental Noise Guideline – Stationary and Transportation Sources – Approval and Planning", Seminar for Municipalities, December 9, 2013 (co-presenter).
- "Environmental Acoustics in Land Use Planning", Seminar in Acoustics for the City of Mississauga, June 24-26, 2014 (co-presenter).
- "Environmental Acoustics in Land Use Planning", Seminar in Acoustics for the City of London, July 9-11, 2014 (co-presenter).
- "Workshop: Noise and Vibration for New Development in Proximity to Railway Operations", Prepared for the FCM-RAC Proximity Steering Committee, June 26, 2015 (co-presenter).
- "Environmental Acoustics in Land Use Planning", Seminar in Acoustics for the City of Hamilton, January 23-25, 2018 (co-presenter).
- "Environmental Acoustics in Land Use Planning", Seminar in Acoustics for the City of London, March 23-25, 2021 (co-presenter).