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December 13, 2018 Aercoustics Project #: 18367.00

Elora Ridge Developments
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ATTN: Steven Wright

CC: Astrid J. Clos, Planning Consultants
Bob Rimrott, Aercoustics Engineering Limited

Subject: Inverhaugh Pasture Edge Subdivision - Noise Impact Study

1 Introduction

Aercoustics Engineering Limited (Aercoustics) has been retained by Elora Ridge Developments to prepare an Environmental Noise Impact Study for a proposed residential development in the Township of Centre Wellington. The development is located at the corner of Inverhaugh Road and Sideroad 4 and will consist of single-family dwellings.

A portion of the land on which the proposed development is proposed is currently an active licensed pit operation (Devin Pit). Furthermore, a second licensed pit operation (Cole Pit) also exists approximately 375 m northwest of the development, but currently remains inactive.

The purpose of this study is to assess the noise impact of the existing and proposed noise sources associated with the nearby aggregate operations on the proposed development. This letter will further outline the noise mitigation measures as required to satisfy the MECP sound level limits. These limits are described in the MECP publication entitled “Environmental Noise Guideline – Stationary and Transportation Sources – Approval and Planning”, dated August 2013 (NPC-300).

This study was conducted in accordance with the development site plan provided to the Aercoustics, dated October 2018.

The proposed development introduces changes to the noise controls which form the current pit operational requirements. As such, all noise control measures outlined in this study should be approved by the pit operators, as they represent a change to the operational plans of the existing licences.

2 Site Description

The site of the proposed development is located northeast of the intersection of Inverhaugh Road and Sideroad 4, in Inverhaugh, Ontario. Figure 1 shows a map of the area surrounding the proposed site location, as well as the current location of the nearby aggregate operations.

The proposed site plan for the development is provided as Appendix A. The development is understood to consist of 40 detached single-family dwellings, in which two-storey construction is intended.

As outlined above, the Devin Pit currently occupies the northern region of the proposed development area and extends approximately 850 m north. The area of the pit which is intended for the proposed development (identified as 'Part D' in the pit operating licence) is depleted and no longer active and no future extraction operations are planned to take place in this area. Aggregate operations will continue as outlined in the licence for the remainder of the land and are included in the following analysis.

The Cole Pit is located to the north-west and is currently inactive, as extraction has not begun on the site.

The noise controls required for both operations have been considered by Aercoustics in the current assessment.

3 Noise Source Summary

The noise sources pertaining to the nearby aggregate operations and considered in the current assessment are outlined in Table 1.

Table 1 - Summary of Noise Sources Considered

Noise Source	Description	Sound Power Level (dBA)
Trucks	Shipment trucks used to transport aggregate material	105
Loaders	Front-end loaders used for the extraction and loading of aggregate material	112
Enclosed Processing Plant	Aggregate processing plant, in an enclosure constructed from ISO containers	112 – on axis 112 – 45^{o} off axis 105 – 90^{o} off axis

As per the operating requirements of the aggregate pits, the number of equipment considered in the current analysis is outlined in Table 2.

Table 2 - Number of Equipment Considered

Noise Source	Devin Pit		Cole Pit	
	Morning (06:00 – 07:00)	Day (07:00 – 19:00)	Morning (06:00 – 07:00)	Day (07:00 – 19:00)
Trucks	20 trucks/hour	20 trucks/hour	20 trucks/hour	20 trucks/hour
Loaders	1	2	1	2
Enclosed Processing Plant	0	1	0	1

Furthermore, the pits have coordinated operating requirements, such that when one pit is operating, the following restrictions apply to the other pit.

- Morning (06:00 - 07:00): No operations
- Day (07:00 - 19:00): One loader and 20 trucks/hour (No aggregate processing)

3.1 Site Preparation and Rehabilitation

The operating licence of each pit exempts construction activities pertaining to the site preparation and rehabilitation from noise impact assessments. This is considered typical for pit operations.

As such, it should be noted that the site preparation and rehabilitation activities are not included in the current noise impact study.

Site preparation and rehabilitation activities for the purpose of this noise impact study may include the construction of the perimeter berms/barriers, initial sinking cuts and rehabilitation.

4 Points of Reception

Three points of reception were included in the analysis, representative of different areas within the development with varying exposure to each aggregate operation.

The receptor height and setback distance from the aggregate pit operations for each of the receptors are shown in Table 3. The noise sensitive receptors were determined in accordance with NPC-300.

Table 3 - Summary of Points of Reception

Receptor ID	Description	Height	Distance to Devin Pit	Distance to Cole Pit
R01	One-Storey Detached House	1.5 m	155 m [S]	255 m [E]
R02	Two-Storey Detached House	4.5 m	50 m [S]	410 m [E]

Receptor ID	Description	Height	Distance to Devin Pit	Distance to Cole Pit
R03	Two-Storey Detached House	4.5 m	50 m [S]	495 m [E]

An area location map is provided in Figure 1, indicating the location of the receptors within the development.

5 Noise Criteria

5.1 Acoustical Classification

The area in which the proposed development is to be located has an ambient acoustical environment consistent with a Class 2 designation, as defined by the MECP publication, NPC-300. In a Class 2 area, the background sound level is dominated by human-related activities, in this case traffic, during the daytime hours only. During evening and nighttime hours, the sound levels from human-related activities are typically lower.

5.2 Applicable Sound Level Limits

The MECP exclusion limits for each receptor are summarized in Table 4 below.

Table 4: Noise Exclusion Limits – Class 2

Time of Day	Sound Level Exclusion Limit* Plane of Window	Sound Level Exclusion Limit* Outdoors
07:00 to 19:00	50 dBA	50 dBA
19:00 to 23:00	50 dBA	45 dBA
23:00 to 07:00	45 dBA	- -

*or the minimum existing hourly background sound level Leq, whichever is higher

The MECP sound level limit is determined by the exclusion limit listed above or the minimum hourly equivalent background sound level, whichever is higher. The background sound level may increase the sound level limit for some of the receptors in this study, particularly those near busy roads such as Highway 21. For conservatism and simplicity, the exclusion limit was used for all receptors in this study.

5.3 Predictable Worst Case

The assessment of noise impact requires the determination of the “predictable worst case”. Therefore, the worst case one-hour equivalent sound level (1 Leq) has been predicted based on all equipment operating simultaneously and continuously during the hour with the lowest ambient noise.

6 Noise Control Recommendations

The noise impact calculations were performed using DataKustik's CadnaA environmental noise prediction software. The calculations are based on established prediction methods including the standard ISO 9613-2: "A Standard for Outdoor Noise Propagation".

Based on the noise impact assessment of the neighbouring pit operations on the proposed development, the following noise control recommendations are provided to meet the applicable noise criteria.

These noise control measures are in addition to the current noise control measures outlined in the pits' operating licences and should be implemented prior to occupancy of any houses located in the proposed development.

6.1 Proposed Development

Based on the site plan and ground elevations provided to Aercoustics, dated October 2018, all residential buildings constructed on lots 18, 19, 20, 21, 22, 23 and 24 should be single-storey dwellings. Alternatively, two-storey dwellings may be permitted on these lots, however no second-storey windows to noise sensitive spaces may be located on any facades with full or partial exposure to pit operations. Examples of noise sensitive spaces include but are not limited to bedrooms, living areas, dens, dining rooms, kitchens and lounges. If this alternative option is pursued, the architectural drawings should be reviewed by an acoustical consultant to confirm the requirements.

Furthermore, residential buildings constructed on all lots should have a maximum of two storeys.

6.2 Devin Pit

As a result of the proposed subdivision being constructed on the area of Devin Pit indicated as 'Part D' in the pit operating licence, it is assumed that the berms located along the west, south and east sides of the Part D lands will no longer be present.

As such, the following noise control measures should be implemented in additional to the noise controls outlined in the operating licence.

1) No aggregate operations will occur on the lands defined as Part D in the Devin Pit operating licence.
2) Construction of a berm along the southeast perimeter of the pit, shown in Figure 2 as 'Proposed Berm 1'. The height of the berm should be a minimum of 364 m above sea level along the entire span shown. The barrier should be constructed prior to occupancy of the proposed subdivision and may be removed once all operations of the Devin Pit are terminated.

6.3 Cole Pit

The following noise control measure is required for the Cole Pit, in addition to the noise controls outlined in the operating licence.

3) An 8 m berm should be constructed to block line-of-sight between the enclosed processing plant and the proposed development, as indicated in Figure 2 as 'Proposed Berm 2'. The berm should be present any time the enclosed processing plant is operating. The barrier should be constructed prior to occupancy of the proposed subdivision and may be removed once all operations of the Cole Pit are terminated. This is an existing noise control but updated to address shielding for the proposed dwellings.

7 Noise Impact Assessment

With the incorporation of the noise controls outlined above, it was determined that the combined sound level resulting from sound discharged from the nearby pit operations at each point of reception, as determined using an acoustic assessment, is less than or equal to the applicable sound level limit set out in the MECP Publication NPC-300.

With the additional noise controls in place, the predicted noise levels at each point of reception within the proposed development during the worst-case operating conditions of the nearby aggregate pits are outlined in Table 5. Furthermore, contour plots showing the noise levels, during the morning and daytime, are provided as Figures 3A and 3B, respectively.

Table 5 - Worst-case one-hour equivalent sound pressure level with additional noise controls

Receptor ID	Time of Day	Sound Level at Receptor (dBA)	Sound Level Limit (dBA)	Compliance with Sound Level Limit?	Verified by Acoustic Audit
R01	Morning	42	45	Yes	No
	Daytime	48	50	Yes	No
R02	Morning	40	45	Yes	No
	Daytime	48	50	Yes	No
R03	Morning	41	45	Yes	No
	Daytime	49	50	Yes	No

8 Conclusion

Aercoustics has been retained by Elora Ridge Developments to assess the noise impact of the nearby aggregate operations on a proposed development located in Inverhaugh, Ontario. The noise control measures required for the pit operations have been considered and additional noise controls to address the proposed development have been outlined.

With the additional noise controls in place, the noise levels at the proposed development are expected to be at or below the applicable sound level limits.

Sincerely,

AERCOUSTICS ENGINEERING LIMITED

Eric Salt, B.EngM., Ph.D.

Derek Flake, M.Sc., P.Eng.

LICENSED PROFESSIONAL ENGINEER
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Project ID: 18367.00

Scale: NTS
Drawn by: ES
Reviewed by: DF
Date: December 7, 2018
Revision: 1

Project Name

Inverhaugh Pasture Edge Subdivision NIS

Figure Title

Site Plan Showing Nearby Aggregate Pit Operations

Figure 1

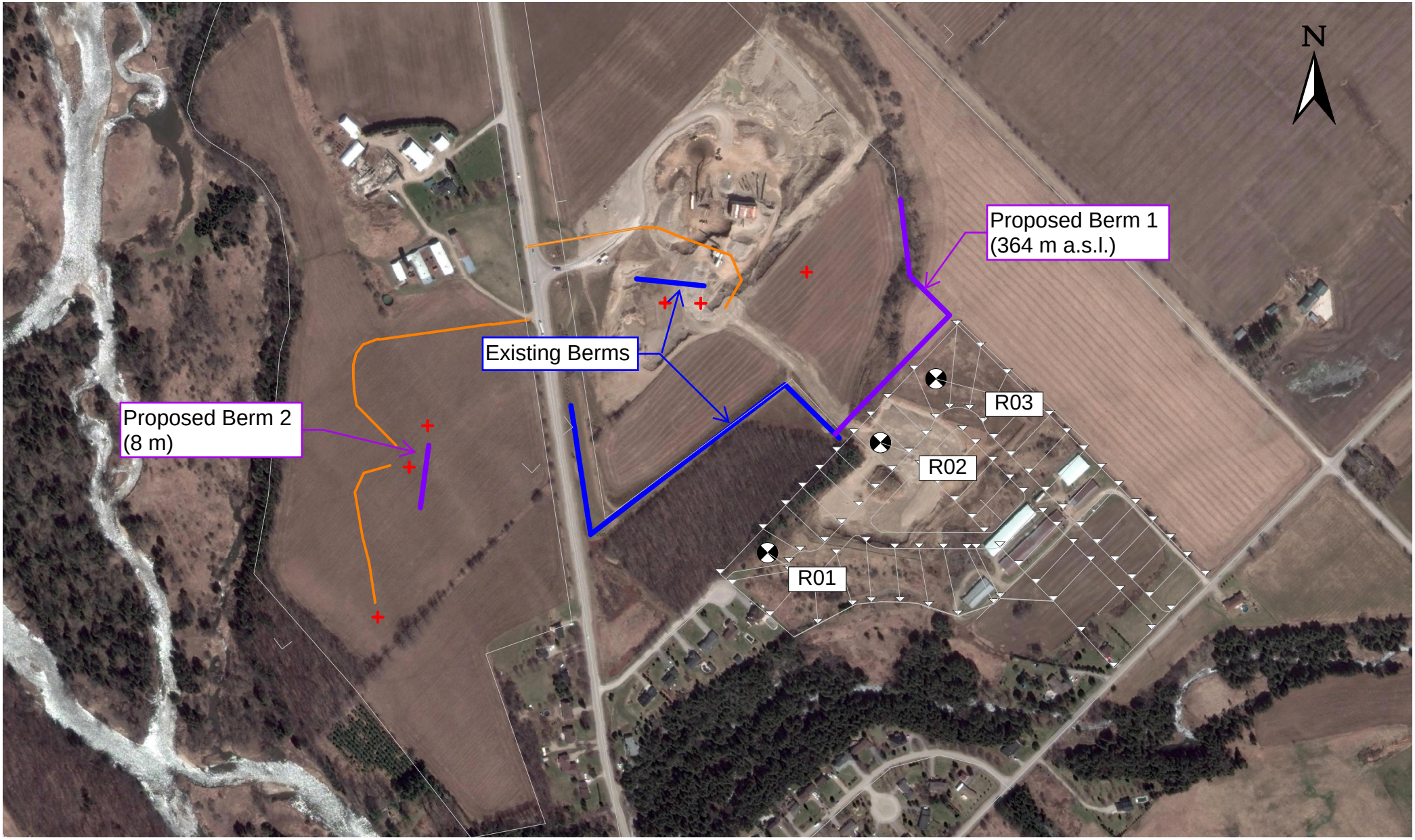

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Figure Title

Location of Proposed Berms

Figure 2

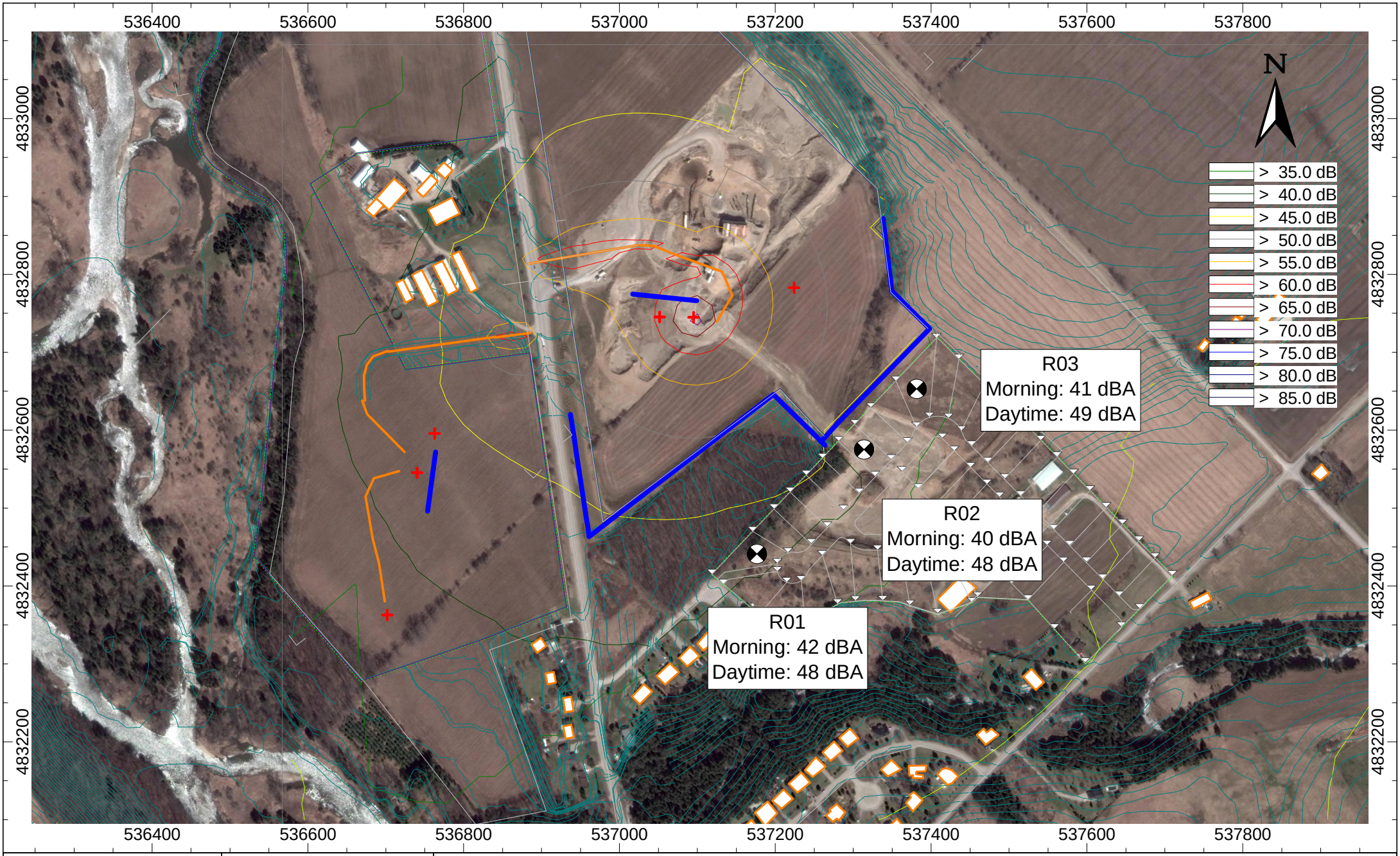

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Figure Title

Noise Impact Predictions - Morning
Contour Lines at 363 m a.s.l.

Figure 3A

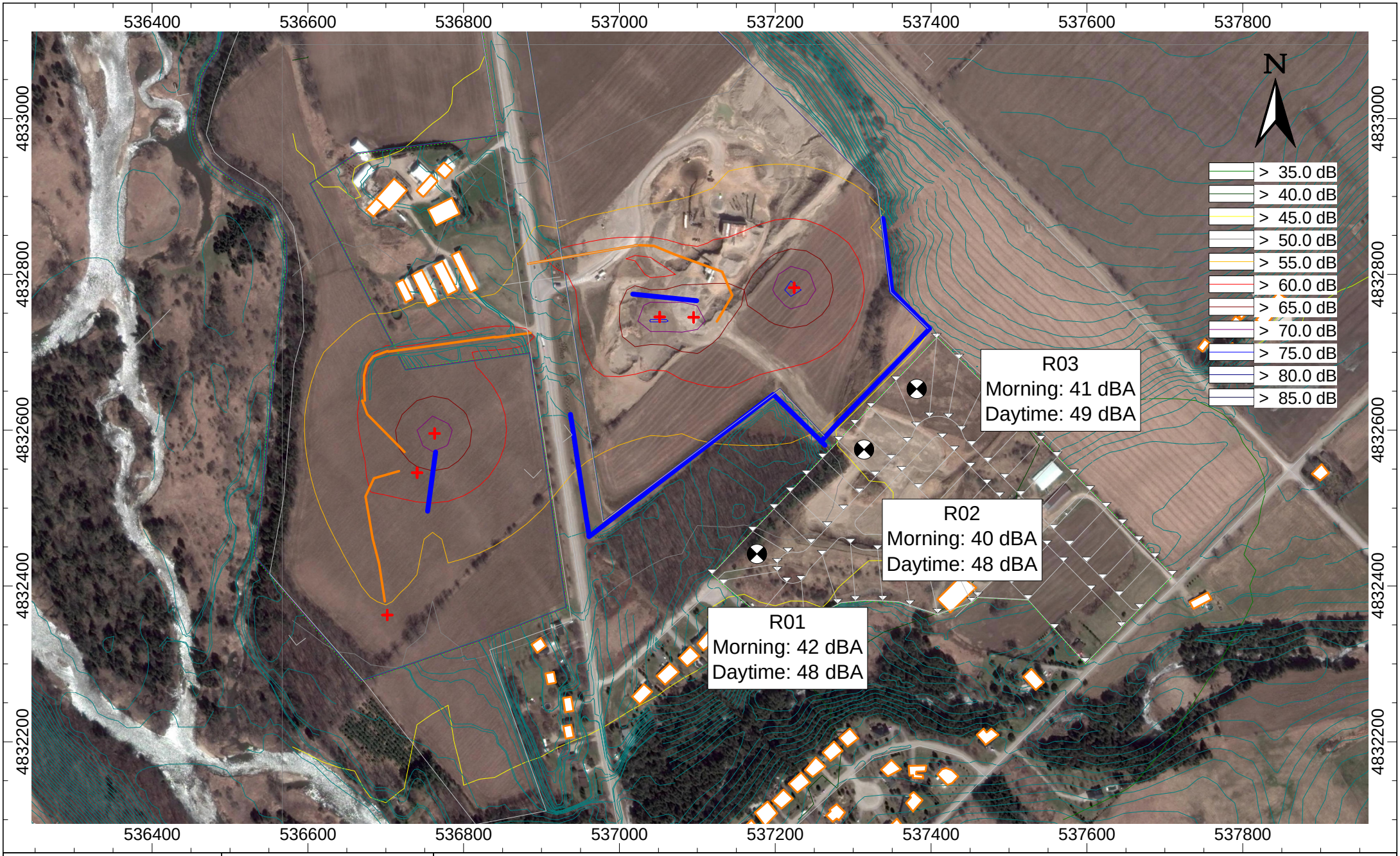

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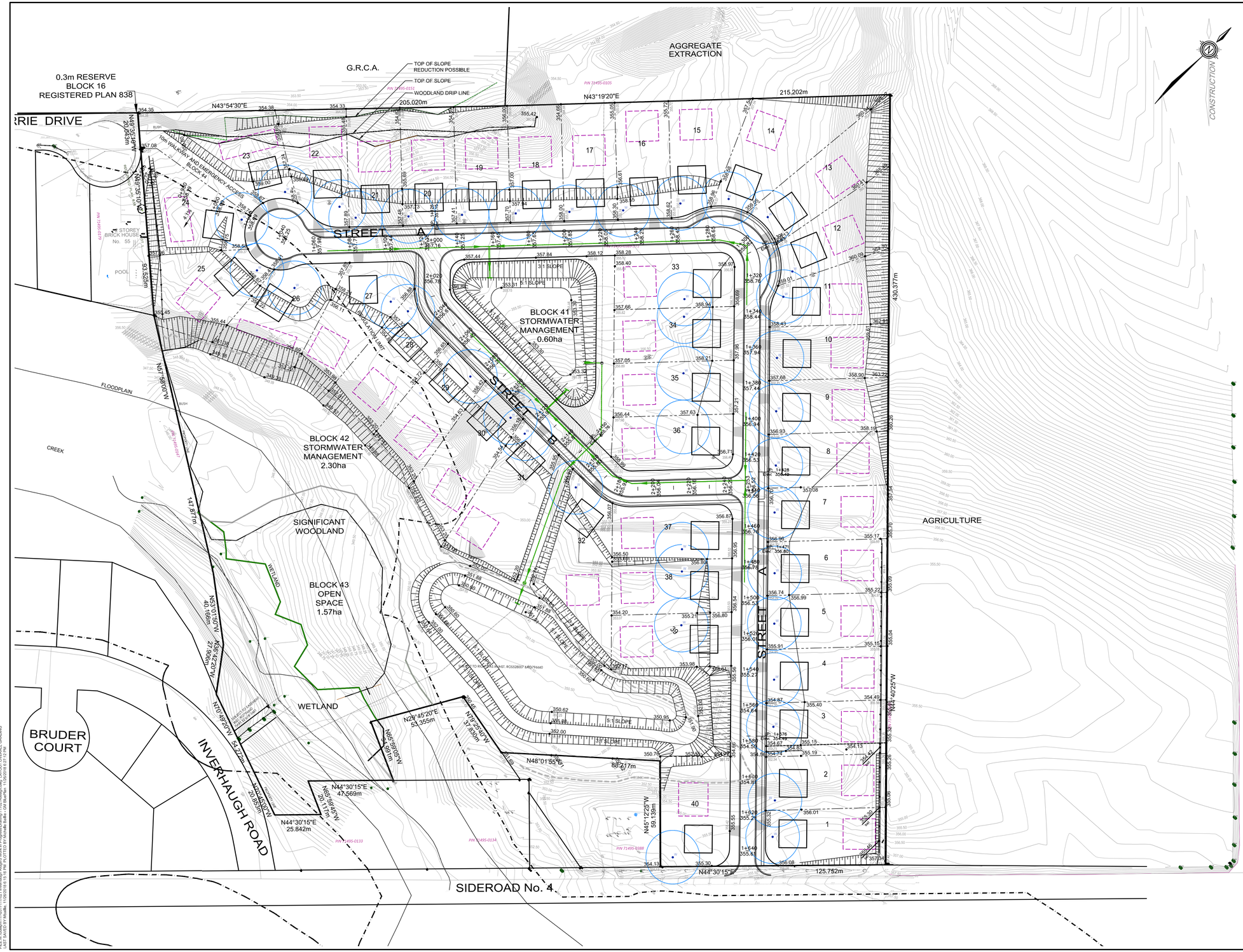
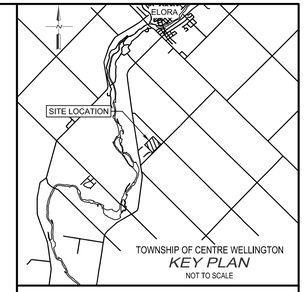
Figure Title

Noise Impact Predictions - Daytime
Contour Lines at 363 m a.s.l.

Figure 3B





NOTES :

1. TOPOGRAPHIC INFORMATION AND EXISTING FEATURES SURVEY PROVIDED BY VAN HARTEN SURVEYING INC. DATED 2017-12-20 & 2018-03-04.
2. PROPOSED DRAFT PLAN SUBDIVISION PREPARED BY ASTRID J CLOS PLANNING DATED AUGUST 28, 2018.

BENCH MARKS :

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.

NO.	DATE	REVISION DESCRIPTION	CHKD
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1.	2018-08-01	FOR REVIEW	---

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PRELIMINARY OVERALL GRADING & SERVICING PLAN

DRAWN BY :	APPROVED BY :	PROJECT NO. :	DRAWING NO. :
MJB	BJF	117021	02
DESIGNED BY :	DATE :	SCALE :	
MJB	OCTOBER 2018	1:1000	

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