

Golden Grove

Code Amendment

Environmental Noise Assessment

S6227C19

March 2025

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Document Title : Golden Grove Code Amendment – One Tree Hill Road
Environmental Noise Assessment

Client : YAS Australia PTY LTD

Document Reference : S6227C19

Date : March 2025

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INTRODUCTION

Two Code Amendments (Stage 1 and Stage 2) are proposed for an area at Golden Grove. The majority of the land is proposed to be rezoned from a Rural Living Zone to a Master Planned Neighbourhood Zone. The extent of proposed Master Planned Neighbourhood Zone to be included in the Code Amendments (the **Affected Area**) is shown in Figure 1, with a red outline.

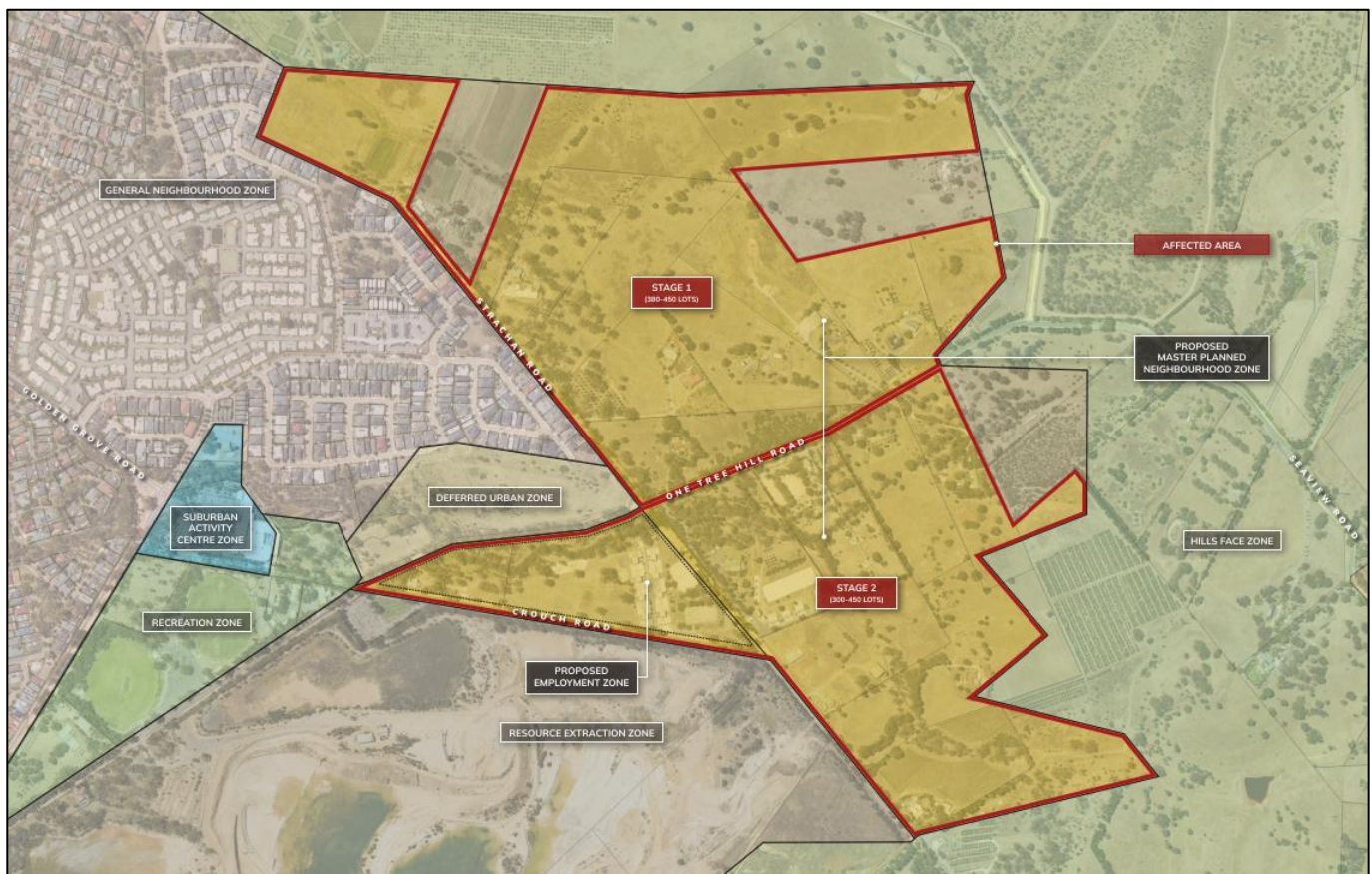


Figure 1: Proposed Code Amendment Area

There are three noise related issues to address as part of the proposed Code Amendment, relating to the existing noise sources in the vicinity. Traffic noise, the Tea Tree Gully Motocross Club and the adjacent Resource Extraction Zone were addressed in previous acoustic reports. Of these issues, it is the Resource Extraction Zone, which has been the subject of concern from the EPA and the Resource Extraction Operators (the **Operators**).

The EPA requested noise monitoring on the site to confirm predictions and made the following comments:

- *the Noise and Air Emissions Overlay and MBS010 cannot apply to the affected area as industrial/extractive noise sources are not 'designated sound sources' for the purposes of MBS010 (i.e. MBS010 cannot be applied at the Building Rules stage)*
- *the noise report does not satisfactorily address outdoor acoustic amenity for residential development in the vicinity of the GGEIZ, and*
- *the proposed rezoning (in its current iteration) would unreasonably encroach on the strategic mineral resource area known as the GGEIZ.*

In addition, the Operators raised concern that noise modelling conducted did not properly represent current or future operations. The Operators also stated that each operator currently complies with the noise goals of the *Environment Protection (Commercial and Industrial Noise) Policy 2023* (the **Policy**) but is concerned that the cumulative noise from all operators may impact future residences, who might not be aware of the multiple operators.

To respond to the concerns raised:

- noise monitoring has been conducted
- the Resource Extraction zone has been visited to gain a better understanding of the operation
- inputs to an updated noise model have been confirmed by the Operators
- the assessment no longer relies on the Noise and Air Emissions overlay
- the World Health Organisation Guidelines have been used to objectively assess outdoor acoustic amenity

CRITERIA

To provide an objective assessment of the noise from the extractive industries, reference is made to the Policy. Achievement of the Policy goal levels provides protection for the extractive industries and also results in a suitable level of amenity for residences in the vicinity as described below:

- The General Environmental Duty under the *Environment Protection Act 1993* is achieved where the goal noise levels of the Policy are achieved, thereby protecting the extractive industries from constraint.
- The Policy is based on the recommendations of the World Health Organisation (**WHO**) Guidelines to protect sleep at night and to avoid annoyance during the day. The WHO Guidelines recommend outdoor an outdoor noise level (L_{Aeq}) of 50-55 dB(A) during the day to avoid annoyance in outdoor areas. The Guidelines also recommend an indoor noise level (L_{Aeq}) of 30 dB(A) indoors to protect against sleep disturbance.

Existing Dwellings

There are several existing residences in the vicinity of the Resource Extraction Zone. These are shown in Figure 2 below:



Figure 2: Closest existing residences

Residences A and B are within the General Neighbourhood Zone with an intervening zone between this zone and the resource extraction zone and therefore have outdoor criteria of 52 dB(A) during the day and 45 dB(A) at night.

Residences C to H (inclusive) are located in the Rural Living Zone and therefore have outdoor criteria of 56 dB(A) during the day and 48 dB(A) at night.

Future Dwellings

The implementation of the Code Amendment will result in additional residences in the vicinity of the extractive industry. It is therefore important that an appropriate level of amenity is achieved for future residents and that the operation of the extractive industries is not curtailed by any future noise complaints.

For the residences closest to the Resource Extraction Zone, the outdoor goal noise levels would be 59 dB(A) during the day and 50 dB(A) at night. For more distant residences to the north, there would be an intervening zone between the Resource Extraction Zone and the proposed Master Planned Neighbourhood Zone. In these circumstances, the outdoor goal noise levels of the Policy are 52 dB(A) during the day period (7:00am to 10:00pm) and 45 dB(A) during the night period (10:00pm to 7:00am).

Where acoustic treatment is applied to dwellings, the relevant measurement location in accordance with the Policy becomes indoors and the goal noise level at night is 30 dB(A).

NOISE MONITORING

At the request of the EPA, noise monitoring was undertaken within the Affected Area to determine the contribution of noise from the extractive industries. Noise levels were measured continuously from 3 May 2023 to 15 May 2023, capturing noise on weekdays and weekends. The noise monitoring results are provided in Appendix A.

The results were typical of other suburban fringe environments, with low noise levels measured during the night period and higher noise levels during the day. Audio recordings collected at times when the highest noise levels occurred during the monitoring period have been analysed. The recordings indicated that the measured noise levels were controlled by noise from vehicles passing on the public road network, birds and aircraft. None of the analysed time periods were found to have noise identifiable as originating from the mine.

The noise criteria are included on the noise logging graph in Appendix A. For each period when the criteria were exceeded, the recorded digital audio has been reviewed. In every case, the noise was from a source other than the extractive industries. Most of these higher levels were the result of noise from road traffic, birds and aircraft. The identified noise sources for the highest measured levels are tabulated in Appendix B and Appendix C. Based on this analysis, the activity from the extractive industry achieved the goal noise levels of the Policy at all times.

UPDATED NOISE MODEL

Based on the site visit conducted on 9 May 2024, a summary of the understanding of the existing operations and future operational scenarios were provided to the operators on 2 June 2024. Based on the feedback from the operators, noise predictions have been made with activity in the areas shown in Figure 3.



Figure 3: Extraction Areas and Corresponding Operators

The machinery included in the predictions for each of the operators is shown in Table 1.

Table 1: Assumed Equipment/Machinery

Operator	Equipment/Machinery
PGH/ Austral	Dozer
	Truck
	Grader
	Loader
	Scraper
	Excavator
	Jaw Crusher
CMS	Excavator
	Dozer
	Truck
	Wheel Loader
	Mobile Screen
Hanson	Trucks
	Excavator
	Wheel Loader
	Grader
	Scraper
Rehabilitation	Trucks

Predictions have been made for the existing situation, as well as the future situation, if the Code Amendment were to be approved.

Existing Situation

For the existing situation, the scenario results in the predictions summarised in Table 2. A comparison is also made with the goal noise levels of the Policy. When predicting noise levels for comparison with the Policy, adjustments may be made to the average noise levels for each “annoying” characteristic of tonality, impulsiveness, intermittency, low frequency, and modulation of the noise source. The characteristic must be dominant in the acoustic environment and therefore the application of penalties can vary depending on the assessment location, time of day, the noise source being assessed, and the predicted noise level. Given the potential presence of reversing alarms, the predicted noise levels with a 5 dB(A) penalty are also shown in Table 2.

Table 2: Existing Noise Levels

Operator	Receiver	Criteria [dB(A)]		Predicted Noise Level [dB(A)]	
		Day	Night	Without Penalty	With Penalty
CMS	A	52	45	33	38
	B			38	43
	C	56	48	30	35
	D			26	31
	E			35	40
	F			30	35
	G			41	46
	H			36	41
PGH/ Austral	A	52	45	37	42
	B			43	48
	C	56	48	41	46
	D			37	42
	E			42	46
	F			38	43
	G			49	54
	H			38	43
Hanson	A	52	45	39	44
	B			38	43
	C	56	48	40	45
	D			35	40
	E			27	32
	F			37	42
	G			36	41
	H			28	33
Rehabilitation	A	52	45	31	36
	B			36	41
	C	56	48	36	41
	D			38	43
	E			28	33
	F			31	36
	G			33	38
	H			31	36
Combined	A	52	45	42	47
	B			46	51
	C	56	48	44	49
	D			42	47
	E			43	48
	F			41	46
	G			50	55
	H			41	46

The predictions indicate that the scenario results in the existing Policy goal noise levels being exceeded for some activities. That is, the predictions result in higher noise levels than the Operators currently emit.

Future Situation

As part of the Code Amendment, the following measures are proposed for the extent shown below in Figure 4 and Figure 5:

- Earth mound and fence, as detailed in the *Hatch* drawing set, dated 11 March 2025, Rev: G (option 1 or option 2¹) prior to the occupation of dwellings in Stage 2.
- upgraded building facades by either:
 - Ministerial Building Standard MBS 010 being amended by the State to apply to industrial/extractive noise sources; or
 - a land management agreement to require that future dwellings incorporate glazing to habitable rooms that is sealed when closed and incorporates a minimum of 6.38mm thick laminated glass, or any other similar acoustic mitigation treatment that achieves the equivalent outcome.



Figure 4: Proposed Treatment (option 1)

¹ Both options achieve the same noise levels, provided that the top of the barrier height is as detailed in page 2 of the *Hatch* drawing set attached in Appendix D.



Figure 5: Proposed Treatment (option 2)

Predictions of outdoor noise for the same equipment operation and locations have been made and are summarised in Figure 6.

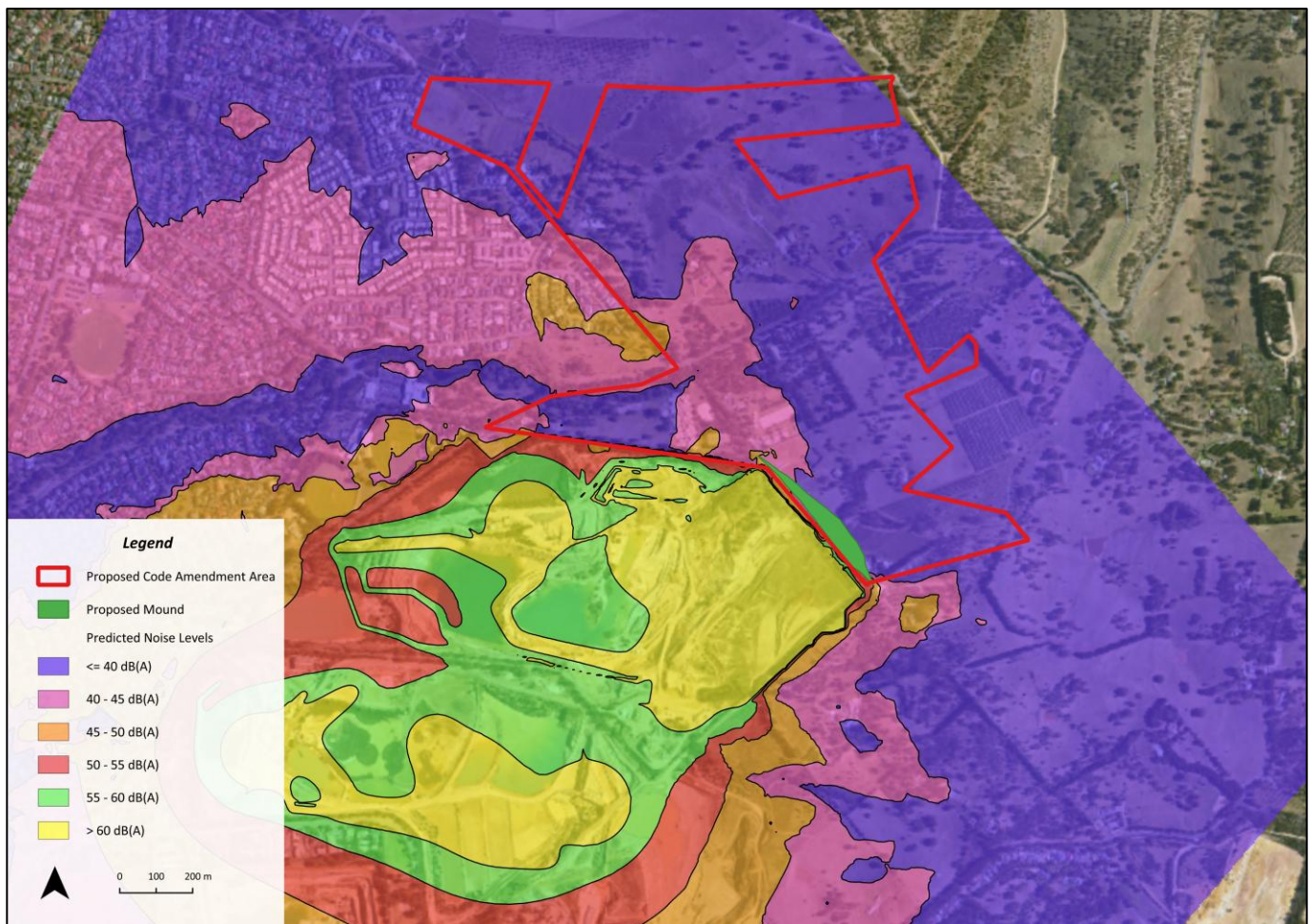


Figure 6: Predicted Noise Levels (including the proposed mound)

The figure shows that the highest predicted noise level, from all Operators operating simultaneously, at any outdoor location within the Affected Area is 46 dB(A). This level achieves the WHO Guidelines to prevent annoyance in outdoor areas and achieves the most onerous day time criterion of the policy, even if a 5 dB(A) penalty for noise character were to be applied.

In the area where the land management agreement is proposed and the windows upgraded, the highest predicted noise level indoors is 24 dB(A). In the unlikely event that a penalty were to apply for noise character, the adjusted level of 29 dB(A) achieves the Policy level of 30 dB(A) at all locations. It also achieves the WHO Guidelines to prevent sleep disturbance. In other areas, the outdoor level is no greater than 40 dB(A), achieving the Policy and the WHO Guidelines to prevent sleep disturbance.

With the Policy achieved, the Operators achieve the General Environmental Duty and are protected from later action under the *Environment Protection Act 1993*. With the WHO Guidelines achieved, a suitable level of amenity is achieved for future residents.

SUMMARY

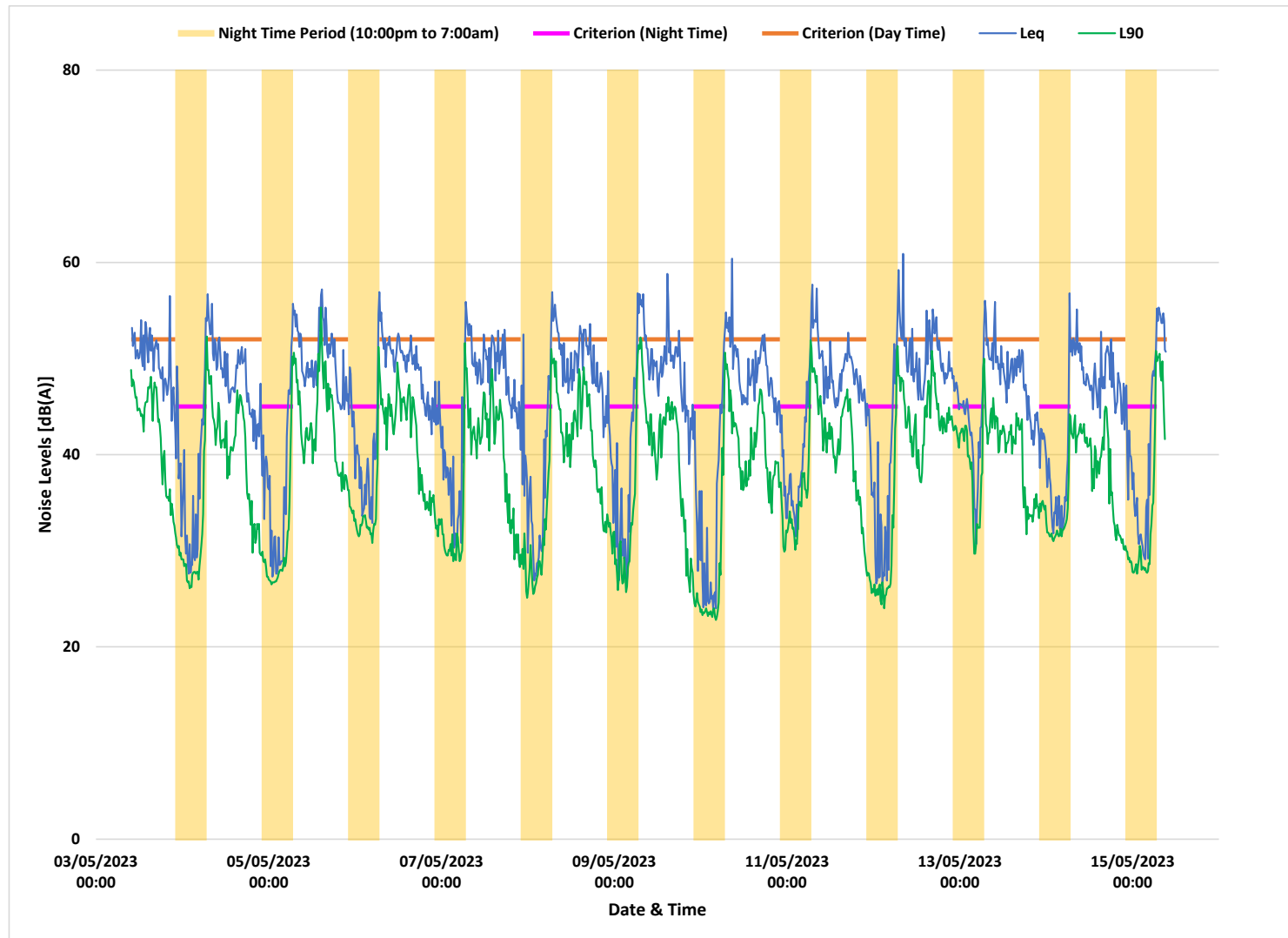
Two Code Amendments at Golden Grove are proposed to change the zone of the Affected Area from a zone which currently promotes Rural Living to a Master Planned Neighbourhood Zone, which promotes residential development.

Previous environmental noise assessments have been made of the proposed Code Amendment and the EPA and Extractive Industry Operators (the **Operators**) have raised concern about the noise from the Resource Extraction Zone.

In response to concerns raised by the EPA and the Operators:

- Noise monitoring has been conducted, which showed no significant noise from the Resource Extraction Zone.
- The noise model has been updated based on a visit to the Resource Extraction Zone as well as confirmed inputs from the Operators.
- The current assessment does not rely on the Noise and Air Emissions Overlay but instead proposes an alternate land management agreement for windows of future dwellings to be upgraded in certain areas.
- The predicted noise levels achieve the *Environment Protection (Commercial and Industrial Noise) Policy 2023*, resulting in the Operators achieving the General Environmental Duty and therefore providing protection to the Operators.
- The predicted outdoor noise levels achieve the World Health Organisation Guidelines to prevent annoyance during the day and the indoor levels achieve the recommendations to prevent sleep disturbance at night.

APPENDIX A: Noise Logging Results



Appendix B: Identified Noise Source for The Highest Measured Levels [Day Time (7:00am to 10:00pm)]

Date & Time	Leq [dB(A)]	Main Noise Sources
03/05/2023 10:00	53	Birds
03/05/2023 10:45	53	Birds
03/05/2023 12:30	54	Birds
03/05/2023 13:45	54	Birds
03/05/2023 14:00	53	Traffic
03/05/2023 15:00	53	Birds
03/05/2023 20:30	57	Traffic
04/05/2023 07:00	57	Traffic
04/05/2023 07:15	55	Traffic
04/05/2023 07:30	54	Traffic
04/05/2023 07:45	53	Traffic
04/05/2023 08:00	53	Traffic
04/05/2023 08:15	56	Traffic
05/05/2023 07:00	55	Traffic
05/05/2023 07:15	55	Traffic
05/05/2023 07:30	53	Traffic
05/05/2023 07:45	55	Traffic
05/05/2023 08:00	53	Traffic
05/05/2023 08:15	53	Traffic
05/05/2023 08:45	53	Traffic
05/05/2023 14:00	55	Traffic
05/05/2023 14:15	53	Traffic
05/05/2023 14:30	57	Traffic
05/05/2023 14:45	57	Traffic
05/05/2023 15:00	54	Traffic
05/05/2023 15:15	54	Traffic
05/05/2023 15:45	55	Traffic
05/05/2023 16:00	53	Traffic
05/05/2023 17:30	53	Traffic
06/05/2023 07:00	54	Traffic
06/05/2023 07:15	55	Traffic
06/05/2023 07:30	53	Traffic
06/05/2023 12:00	53	Traffic
07/05/2023 07:00	55	Birds
07/05/2023 07:15	53	Birds
07/05/2023 07:45	54	Birds
07/05/2023 08:15	53	Birds
07/05/2023 11:45	53	Traffic
07/05/2023 15:45	53	Birds

Date & Time	Leq [dB(A)]	Main Noise Sources
07/05/2023 17:00	53	Traffic
07/05/2023 17:30	53	Traffic
08/05/2023 07:00	54	Traffic
08/05/2023 07:15	54	Traffic
08/05/2023 07:30	56	Traffic
08/05/2023 07:45	54	Traffic
08/05/2023 08:00	54	Traffic
08/05/2023 08:15	53	Traffic
08/05/2023 08:30	53	Traffic
08/05/2023 14:30	53	Traffic
08/05/2023 14:45	53	Traffic
08/05/2023 15:00	53	Traffic
08/05/2023 15:30	53	Traffic
08/05/2023 15:45	53	Traffic
08/05/2023 16:00	53	Traffic
08/05/2023 17:15	54	Traffic
09/05/2023 07:00	57	Traffic
09/05/2023 07:15	56	Traffic
09/05/2023 07:30	56	Traffic
09/05/2023 07:45	55	Traffic
09/05/2023 08:00	57	Traffic
09/05/2023 08:15	54	Traffic
09/05/2023 14:45	59	Traffic
09/05/2023 15:00	56	Traffic
09/05/2023 18:00	53	Traffic
10/05/2023 07:00	55	Traffic
10/05/2023 07:15	53	Traffic
10/05/2023 07:30	54	Traffic
10/05/2023 07:45	53	Traffic
10/05/2023 08:00	54	Traffic
10/05/2023 08:45	60	Traffic
10/05/2023 17:45	53	Birds
11/05/2023 07:00	58	Traffic
11/05/2023 07:15	53	Traffic
11/05/2023 07:30	54	Traffic
11/05/2023 07:45	54	Traffic
11/05/2023 08:00	54	Traffic
11/05/2023 08:15	57	Traffic
11/05/2023 08:30	53	Traffic

Date & Time	Leq [dB(A)]	Main Noise Sources
11/05/2023 17:00	53	Traffic
12/05/2023 07:00	59	Traffic
12/05/2023 07:15	55	Traffic
12/05/2023 07:30	53	Traffic
12/05/2023 08:15	61	Traffic
12/05/2023 10:45	53	Birds
12/05/2023 14:45	55	Traffic
12/05/2023 15:30	54	Traffic
12/05/2023 16:30	55	Traffic
12/05/2023 16:45	54	Traffic
12/05/2023 17:00	53	Traffic
12/05/2023 17:15	53	Traffic
12/05/2023 17:30	54	Traffic
13/05/2023 07:00	56	Birds

Date & Time	Leq [dB(A)]	Main Noise Sources
13/05/2023 07:15	55	Birds
13/05/2023 09:30	53	Birds
13/05/2023 09:45	56	Traffic
14/05/2023 08:30	55	Traffic
14/05/2023 15:15	53	Traffic
15/05/2023 07:00	54	Traffic
15/05/2023 07:15	55	Traffic
15/05/2023 07:30	55	Traffic
15/05/2023 07:45	54	Traffic
15/05/2023 08:00	54	Traffic
15/05/2023 08:15	54	Traffic
15/05/2023 08:30	55	Traffic
15/05/2023 08:45	54	Traffic

Appendix C: Identified Noise Source for The Highest Measured Levels [Night Time (10:00pm to 7:00am)]

Date & Time	Leq [dB(A)]	Main Noise Sources
03/05/2023 22:30	49	Traffic
03/05/2023 22:45	47	Aircraft
04/05/2023 06:00	46	Birds
04/05/2023 06:15	49	Birds
04/05/2023 06:30	54	Aircraft
04/05/2023 06:45	54	Birds
05/05/2023 05:30	47	Traffic
05/05/2023 05:45	46	Traffic
05/05/2023 06:00	47	Birds
05/05/2023 06:15	51	Traffic
05/05/2023 06:30	53	Traffic
05/05/2023 06:45	56	Traffic
05/05/2023 22:00	46	Traffic
05/05/2023 22:30	49	Traffic
05/05/2023 22:45	48	Traffic
06/05/2023 06:15	46	Birds
06/05/2023 06:30	55	Traffic
06/05/2023 06:45	57	Traffic
06/05/2023 22:15	48	Traffic
06/05/2023 23:15	48	Traffic
07/05/2023 05:45	46	Birds
07/05/2023 06:30	51	Birds
07/05/2023 06:45	56	Birds
07/05/2023 22:15	47	Traffic
07/05/2023 22:45	53	Aircraft
08/05/2023 05:45	48	Traffic
08/05/2023 06:00	47	Birds
08/05/2023 06:15	48	Birds
08/05/2023 06:30	54	Birds
08/05/2023 06:45	57	Traffic
08/05/2023 22:15	49	Traffic
09/05/2023 05:30	48	Traffic
09/05/2023 05:45	47	Traffic
09/05/2023 06:00	47	Birds
09/05/2023 06:15	49	Birds
09/05/2023 06:30	57	Aircraft
09/05/2023 06:45	55	Traffic
10/05/2023 06:00	46	Birds

Date & Time	Leq [dB(A)]	Main Noise Sources
10/05/2023 06:15	49	Birds
10/05/2023 06:30	52	Birds
10/05/2023 06:45	53	Traffic
11/05/2023 05:30	48	Traffic
11/05/2023 06:00	48	Birds
11/05/2023 06:15	49	Traffic
11/05/2023 06:30	51	Birds
11/05/2023 06:45	56	Birds
12/05/2023 05:30	48	Traffic
12/05/2023 05:45	52	Traffic
12/05/2023 06:00	47	Birds
12/05/2023 06:15	51	Traffic
12/05/2023 06:30	51	Traffic
12/05/2023 06:45	55	Traffic
12/05/2023 22:00	48	Traffic
12/05/2023 22:15	48	Traffic
12/05/2023 22:30	47	Traffic
12/05/2023 22:45	47	Traffic
12/05/2023 23:00	48	Traffic
12/05/2023 23:15	47	Traffic
12/05/2023 23:30	46	Traffic
13/05/2023 01:00	46	Traffic
13/05/2023 02:00	46	Traffic
13/05/2023 06:15	46	Birds
13/05/2023 06:30	48	Birds
13/05/2023 06:45	53	Birds
14/05/2023 06:15	45	Birds
14/05/2023 06:30	57	Birds
14/05/2023 06:45	51	Birds
14/05/2023 22:00	47	Traffic
14/05/2023 22:15	47	Traffic
15/05/2023 05:15	46	Traffic
15/05/2023 05:30	48	Traffic
15/05/2023 05:45	49	Traffic
15/05/2023 06:00	48	Birds
15/05/2023 06:15	50	Birds
15/05/2023 06:30	51	Birds
15/05/2023 06:45	55	Traffic

Appendix D: Hatch Drawing Set