21st December 2020   **Report No.**
                                                                   20082.1

Title: **Environmental noise assessment for a development of a breeding facility for dogs at 64 Boundary Road, Woodend North**

Brief: **Undertake Environmental noise assessment for a proposed breeding facility for dogs at 64 Boundary Road, Woodend North. Assess compliance with NIRV Noise Limits for an application for a Planning Permit from the Macedon Ranges Shire Council**

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Executive Summary

Audiometric & Acoustic Services has performed an environmental noise assessment by noise modelling to determine compliance with the specified noise limits set by the EPA's Noise in Regional Victoria (NIRV) with the expectation that it is required by the Macedon Ranges Shire Council's Planning Conditions.

The results of noise modelling, which is based on a more critical boarding establishment rather than a breeding facility, identifies compliance with the guideline noise limits of the EPA's Noise in Regional Victoria. In fact the modelling shows that the worst modelled scenario shows the facility to be compliant with the Night Period Guideline Noise Limits during the Day. In short this is due to a combination of factors but especially distance combined with the modest number of dogs and the smaller size of dog.

Contents

1 Introduction

Audiometric and Acoustic Services (A&AS) has been commissioned by Stephen Ariss of 64 Boundary Road, Woodend North to undertake an acoustic assessment in expectation of satisfying possible requirements of the Macedon Ranges Shire Council Planning Permit conditions. The application is for use of the land for breeding of dogs. This is a new application for the site. The site is located at 64 Boundary Road, Woodend North.

The scope of the assessment includes:

▪ Calculation of potential noise emissions from the site.

▪ Assessment of noise emissions in relation to the requirements of Noise from Industry in Regional Victoria (NIRV) and Limits set by the Planning Permit.

A glossary of the acoustic terminology used in this report is presented in Appendix A.

1.1 Reference Documentation

The Report is based on the following reference documentation:

Reference Documentation

Document	Author	Issue
Email	Stephen Ariss	22/12/2020
Drawings of Facility AF – 20 - 300 to 304	Stephen Ariss	Revision – 20/11/2020

1.2 Town Planning

It is anticipated that the Macedon Ranges Shire Council will require a report of this nature as part of the Planning Permit Application.

The acoustic component of that is fully expected to request compliance with the noise limits of the NIRV.

The EPA's publication State Environmental Protection Policy No. N-1 (Control of Noise from Industry, Commerce and Trade) or SEPP N-1 is used to assess noise from Dog Kennels as per the recommendations in EPA publication 1254 and therefore applies to noise from dogs barking when considering planning permits that involve dog related noise.

SEPP N-1 applies in the Melbourne area and country towns with more than 7,000 inhabitants.

In this particular situation the Noise from Industry in Regional Victoria (NIRV) Legislation applies as the Woodend area has less than 7000 inhabitants.

The relevant NIRV limits for Monday to Friday are to apply to all days of the week including Saturday afternoon, Sunday and Public Holidays.

1.3   Site Assessment

Audiometric and Acoustic Services undertook a site visit on Tuesday 24th November and set up a noise logger on the land owned by the client but adjacent to the property of the nearest neighbour at 67 Boundary Road. This ran from 11.00am until picked up on Saturday the 27th November at 11am. This visit confirmed the alignment of the proposed kennels relative to the neighbour's property. The neighbour's dwelling is situated some 310m from the nearest point of the proposed kennels.

1.4   Proposed Operations

It is proposed to run the facility with a total of 4 King Charles Spaniel and Poodle dogs and 18 King Charles Spaniel and Poodle bitches as it will be a breeding operation of which only 2 to 3 will be in gestation at any time. Litters are expected to be in the order of 5 per time.

Council is well aware of the difference between breeding and boarding facilities. Poorly run boarding kennels have made Councils very aware of the noise potential, though the current Code has caused major improvements. Breeding facilities are much less risk, primarily due to the dogs being family and strangers are not being introduced on an almost daily basis. Beyond that, good animal husbandry remains an essential component of a well run establishment.

Daily exercise is also important but work undertaken by this firm and known to the MRSC has not been able to identify any noise from this activity with Labrador dogs. Overall our experience is that the dogs are concentrating on the aspect of the exercise and have no reason to bark.

2   Site Description and Operational Arrangements

The project site is located at 64 Boundary Road, Woodend North, Victoria as shown below in Figure 1. The topography in the immediate area of the site and nearby area is relatively flat. The grass ground cover between the project site and the neighbouring dwellings would be described as primarily open and moderately lush at present. There is reasonable tree cover at the neighbouring property at 67 Boundary Road.

Project Site for kennels

Figure 1   Location of Project Site (Image Source: Google Maps)

2.1   Noise from Operations

When we attended the site the layout was clarified by the client. As the facility is still proposed it was not possible to log any noise from the facility. Accordingly this assessment has been undertaken purely by acoustic modelling.

It will assess the noise levels and the design for the kennels against the design criterion set by the Planning Permit which is derived from the NIRV Limits for the day, evening and night periods.

2.2   Proposed Future Operations

The dogs will all be held in under the same roof of the facility. The building will house the kennels and the day runs. It is of corrugated sheet steel construction. No lining is specified.

Exercise is expected to be undertaken twice a day for a minimum of 10 minutes. Dogs are usually exercised individually unless in a family group.

Based on the orientation of the facility we determined that there is only one likely affected site, at 67 Boundary Road, Woodend North, though there are several properties further distant. #67 is some 300m from the facility. Therefore, our calculations are based on determining the 'Effective Noise Level' at this property, though the noise modelling does take into account the effects of the more distant properties.

The position of the prime Noise Sensitive Area is shown in section 4 of this report as Figure 2.

3   Legislation and Guidelines

The following legislation applies to the project site. It should be noted that noise from livestock is not normally assessed by EPA Policies as animal noise is considered to be a normal part of a rural environment.

It is however appropriate to set a limit to acceptable noise levels for dog noise specific to kennels. Council is fully expected to set the noise limits based on NIRV in the Planning Permit. However the MRSC has a history of allowing weekday Day Period noise limits to apply on Saturday afternoons and all Sundays as animals do not follow the concept of a weekend break. Therefore, we have used NIRV as a platform for comparison purposes as much as a tool for compliance.

3.1   Noise from Industry in Regional Victoria (NIRV)

EPA Publication 1411 - Noise from Industry in Regional Victoria (NIRV) is a non-statutory guideline that provides guidance on industry noise levels and limits for regional Victoria.

The Guidelines provides recommended maximum noise levels ('recommended levels') for noise emissions from commercial, industrial and trade premises to defined noise sensitive areas (NSA) such as residential dwellings. NIRV's recommended levels are intended to provide a balance between protecting community wellbeing and amenity near industrial premises and supporting the social and economic value of industry in regional Victoria.

The 'zone levels' are calculated by a combination of alignment of the respective planning zoning of the land that the source and the receiver are located within. The prevailing natural background noise is also taken into account. The greater of the background plus a margin or the zone levels is to be the recommended maximum noise levels.

The applicable times for the recommended levels of day, evening and night are specified by the NIRV and align with the same in the EPA State Environmental Protection Policy No. N-1 (Control of Noise from Industry, Commerce and Trade) or SEPP N-1 as per Table 1 overleaf.

SEPP N-1 applies in the Melbourne area and country towns with more than 7,000 inhabitants. At the 2011 census Woodend had a population of 5413.

NIRV refers to State Environment Protection Policy (Control of Noise from Commerce, Industry and Trade) No. N-1 (SEPP N-1) for noise measurement procedures. In accordance with SEPP N-1, noise emissions from the source under consideration are measured so as to obtain an L_{Aeq} sound pressure level that is representative of the audible noise at the Noise Sensitive Area over any continuous 30-minute period.

The method of assessing the source noise level involves an L_{Aeq} sound pressure level that is representative of the audible noise at the nearest noise sensitive area over a continuous 30 min period. In layman's terms the L_{Aeq} can be described as the "average" noise level. The effective noise level is the result of the L_{Aeq} having been adjusted for characteristics such as

duration, indoor measurements, intermittency, reflections, tonality and impulsiveness as per the following formula:

$$\text{Effective noise level} = L_{Aeq} + A_{tone} + A_{dur} + A_{int} + A_{ref} + A_{ind} + A_{imp}.$$

Note: Impulse adjustment A_{imp} of 2 dB only applies to minor premises.

NIRV Method

Table 1 NIRV Zone Levels

Table 1: Zone Levels – must only be applied in conjunction with steps 2 to 5

Planning zone for noise-receiving location

Receiving zone → / Generating Zone ↓	Green Wedge A GWAZ; Rural Conservation RCZ; Rural Living RLZ	Low Density Residential LDRZ; Public Conservation and Resource PCRZ; Public Park and Recreation PPRZ; Public Use 2,5 PUZ; Urban Floodway UFZ	Farming FZ†; Green Wedge GWZ; Residential 1 R1Z; Residential 2 R2Z; Residential 3 R3Z; Rural Activity RAZ; Township TZ; Urban Growth UGZ‡	Business 1 B1Z; Business 2 B2Z; Business 5 B5Z; Comprehensive Development CDZ‡; Mixed Use MUZ; Priority Development PDZ‡; Public Use 1,3,4,6,7 PUZ; Road RDZ	Industrial 3 IN3Z; Special Use SUZ‡	Business 3 B3Z; Business 4 B4Z	Industrial 1 IN1Z; Industrial 2 IN2Z
► Low Density Residential LDRZ ► Public Conservation and Resource PCRZ ► Public Park and Recreation PPRZ ► Residential 1 R1Z ► Residential 2 R2Z ► Residential 3 R3Z ► Urban Floodway UFZ	Day: 45 Evening: 37 Night: 32	Day: 45 Evening: 39 Night: 34	Day: 45 Evening: 40 Night: 35	Day: 47 Evening: 42 Night: 37	Day: 48 Evening: 43 Night: 38	Day: 50 Evening: 45 Night: 40	Day: 53 Evening: 48 Night: 43
► Business 5 B5Z ► Farming FZ† ► Green Wedge GWZ ► Green Wedge A GWAZ ► Public Use 2,5 PUZ ► Rural Activity RAZ ► Rural Conservation RCZ ► Rural Living RLZ ► Urban Growth UGZ‡	Day: 45 Evening: 38 Night: 33	Day: 45 Evening: 40 Night: 35	Day: 46 Evening: 41 Night: 36	Day: 48 Evening: 43 Night: 38	Day: 50 Evening: 45 Night: 40	Day: 52 Evening: 47 Night: 42	Day: 54 Evening: 49 Night: 44
► Business 1 B1Z ► Business 2 B2Z ► Comprehensive Development CDZ‡ ► Mixed Use MUZ ► Priority Development PDZ‡ ► Public Use 1,3,4,6,7 PUZ ► Road RDZ ► Township TZ	Day: 45 Evening: 40 Night: 35	Day: 47 Evening: 42 Night: 37	Day: 48 Evening: 43 Night: 38	Day: 50 Evening: 45 Night: 40	Day: 52 Evening: 47 Night: 42	Day: 53 Evening: 48 Night: 43	Day: 55 Evening: 50 Night: 45
► Industrial 3 IN3Z ► Special Use SUZ‡	Day: 46 Evening: 41 Night: 36	Day: 49 Evening: 44 Night: 39	Day: 50 Evening: 45 Night: 40	Day: 52 Evening: 47 Night: 42	Day: 53 Evening: 48 Night: 43	Day: 55 Evening: 50 Night: 45	Day: 56 Evening: 51 Night: 46
► Business 3 B3Z ► Business 4 B4Z	Day: 48 Evening: 43 Night: 38	Day: 50 Evening: 45 Night: 40	Day: 52 Evening: 47 Night: 42	Day: 54 Evening: 49 Night: 44	Day: 55 Evening: 50 Night: 45	Day: 56 Evening: 51 Night: 46	Day: 57 Evening: 52 Night: 47
► Industrial 1 IN1Z ► Industrial 2 IN2Z	Day: 50 Evening: 45 Night: 40	Day: 52 Evening: 47 Night: 42	Day: 53 Evening: 48 Night: 43	Day: 55 Evening: 50 Night: 45	Day: 56 Evening: 51 Night: 46	Day: 57 Evening: 52 Night: 47	Day: 58 Evening: 53 Night: 48

Planning zone for noise-generating use (left axis)

Based on the Table 1 criteria the guideline noise limit is set by the zoning of Farming FZ source to Farming FZ receiver. Under this criterion the guideline noise limits would be as follows overleaf, prior to adjustment for distance in most cases.

However as the generator and the receiver are in the same contiguous zone no distance adjustment to the limits above applies.

Table 2 NIRV Zone Limits applicable

Day	Evening	Night
46dB(A)	**41dB(A)**	**36dB(A)**

Table 3 Background Noise Measurements

The following background noise levels (L_{90} in dB(A)) were obtained from the noise logger.

Date	Day	Evening	Night
24/11	41	35	31
25/11	34	34	31
26/11	42	35	32
27/11	35	33	32

Based on a conservative reading of the above we arrive at the following:

Table 4 Minimum Background Noise Data L_{A90}

Day	Evening	Night
34dB(A)	**3dB(A)**	**31dB(A)**

The NIRV specifies the Noise limit is set at follows:

The greater of the Zoning Limit +8dB(A) for the Day Period

The greater of the Zoning Limit +5dB(A) for the Evening Period

The greater of the Zoning Limit +5dB(A) for the Night Period

Based on the above we have:

Day: 34 + 8dB(A) = 42dB(A).

Evening: 33 + 5dB(A) = 38dB(A)

Night: 31 + 5dB(A) = 36dB(A)

As the Zoning Method is the greater in all cases the NIRV Limits are as per the Zoning Table:

Table 5 NIRV Noise Limits applicable

Day	Evening	Night
46dB(A)	41dB(A)	36dB(A)

4   Noise Sensitive Areas

The nearest and potentially most affected property has been identified as per Section 2 and illustrated in Figure 2 below. It is taken that if the one near residence is compliant then any residences at a further distance will also be compliant.

Noise Sensitive Areas

Table 2 Location of nearest NSA

Location Reference	Address	Comment
NSA 1	67 Boundary Road, Woodend North	Single storey residence.

Figure 2   Noise Sensitive Areas (Source – Google Earth)

5   Operational Criteria

5.1   Advice on Operational Methods

The following details have been provided by the client demonstrating the operational methods for the proposed facility.

The operation will at all times be run in accordance with the Code of Practice for the Operation of Breeding and Rearing Businesses (2014) and any updates that may be introduced in the future.

The proprietors will be living on the site and fully expect to be aware of any excessive barking and the need to investigate before any neighbours based on their proximity to the kennels.

Staffing will be adequate for the welfare of the dogs.

Any excessive barking that cannot be resolved by a kennel attendant will result in the dog being placed in the dog's kennel and the doors closed.

Note that the EPA's guidelines specify that attenuated kennels are required in the ratio of 1:15, which in this case would be 2 attenuated kennels. This is based on the EPA's experience with boarding kennels and not breeding kennels. However in this case the building design in conjunction with the distance involved to the neighbours provides adequate attenuation from all kennels so a special upgrade for 2 kennels in unnecessary. This is verified by the noise modelling.

6 Assessment by Noise Modelling

iNoise version V2020 environmental noise modelling software was used to model the environmental noise emissions from the site to establish noise levels due to a potential worst-case scenario, and to calculate relative noise contributions of each kennel / dog to establish any noise mitigation requirements.

6.1 Modelling Criteria

Key modelling parameters include:

- Site layout and locations of key operational noise sources have been modelled according to the latest Google Maps satellite image and the locations of all relevant properties in the vicinity.

- iNoise version V2020 environmental noise modelling software conforms to ISO 9613-2:1996 Acoustics -- Attenuation of sound during propagation outdoors -- Part 2: General method of calculation.

- Each of the key noise sources have been modelled as per in-house noise data for barking dogs and aligned with library data from Arup Strutt (2020).

- Noise barriers materials have not been modelled as the results of the modelling show the proposed construction will be adequate.

The iNoise model provides a sound power figure of 108dB for dog kennels, which is sourced in the Strutt program produced by Arup. We have calculated that back to be the equivalent of 10 medium sized dogs, such as Cocker Spaniels or Labradors. Our understanding is that the use of this data will produce a conservative result with respect to the projected noise received by the neighbours.

The spread of dogs has been set as follows:

Table 3   Number of Dogs Barking

Complex	Total # dogs	Number of dogs barking
# 1 (In kennels)	22	6
# 2 (In runs)	22	6

The above number of dogs barking has been selected on the basis of this being more than a quarter of the dogs in the complex are barking. One comment used for a previous MRSC report states that 1:6 is a suitable ratio. In the interests of extreme conservatism we have raised the number to more than 1: 4. To have 6 dogs barking in a facility that has a capacity of 22 dogs and a permanent attendant is viewed as an extreme event. Our experience, and that of the EPA, is that poor animal husbandry is normally at the root of noise related problems with kennels, though when the EPA undertook their assessments and advice we are not aware of any kennels having any attenuated areas for noisy dogs.

6.2   Modelling Criteria re Barking Duration

Duration of barking used is 6 minutes per 30 minutes for the evening and night periods when it is assumed that it may take longer for an attendant to settle the dogs having to come from the house. A possible disturbance, such as a possum running over a roof will not take that long for the dogs to settle from so we believe that this duration adjustment is satisfactory, if not conservative.

As the dogs are put away by 6pm which is prior to the evening period which starts at 6pm (Saturdays post 1pm and Sundays 7am to 6pm excepted) the modelling shows that the noise limits are not breeched for either the night or the evening period.

Day time compliance has been modelled on the following basis of all dogs being outside unless the attendant has reason to put a dog back inside its complex. Unnecessary barking would be one reason to be put inside.

Dogs/sources are set at 0.5m height. Receivers are at 1.5m at 10 m from the façade.

6.3   Kennel Construction

The construction is based on cement sheet weatherboard lined with an internal lining. Wall infill is fibrous insulation. The roof is steel corrugated sheet for with an internal lining of min R2.0 fibrous insulation.

7   Acoustic Modelling Results

The results of the modelling show full compliance during the 3 time periods specified in the Planning Permit, with the dogs only potentially outside for the period from 7am to 6pm.

7.1   Modelling Criteria

Modelled with
- Cocker Spaniel dog barking data with -6 Duration Adjustment. These are larger than the proposed dogs and but is data we have confirmed for previous modelling.
- 3 x Cocker Spaniels in pens / 1 each pen of 3 pens all barking at same time with above duration adjustment.
- Exercise pens are day time only. Not night.*
- Emitting facades are based Cocker Spaniel barking with -6 duration. All periods day, evening and night.
  *Dogs are housed by 6pm but the EPA considers Saturday from 1pm to 6pm and Sunday from 7am to 6pm to be classified as evening

7.2   Day, Evening and Night Period Results

Table 4 below presents the calculated results for the day, evening and night periods.

Table 4

**Results for all potential NSAs for Day Evening and Night with Dogs inside Kennels in L_{Aeq} dB(A)**

Name	Description	Day	Evening	Night
NSA 1	97 BOUNDARY ROAD WOODEND NORTH	35	35	13
NSA 2	166 ANDERSON RD, NEWHAM	19	19	3
NSA 3	90 KIRBYS LANE, WOODEND NORTH	17	17	-5
NSA 4	527 BOUNDARY RD, WOODEND NORTH	28	28	1
NSA 5	294 ANDERSON RD, WOODEND NORTH	22	22	0

Modelling images overleaf.

**Table 5 Tabulated contributions for noise sources at NSA 1 as L~Aeq~ dB(A)**

Name	Description	Day	Evening	Night
NSA 1	97 Boundary Road	35	35	13
East	East Facade	2	2	2
North	North Facade	9	9	9
Play pen 1	Play pen 1	23	23	--
Play Pen 2	Play Pen 2	27	27	--
Play Pen 3	Play Pen 3	33	33	--
Roof	Roof	6	6	6
South	South Crn Facade	1	1	1
South	South Facade	0	0	0
South West	South West Facade	-3	-3	-3
West	West Facade	7	7	7

Day and Evening is really day but inc Saturday after 1pm & Sunday day as the evening
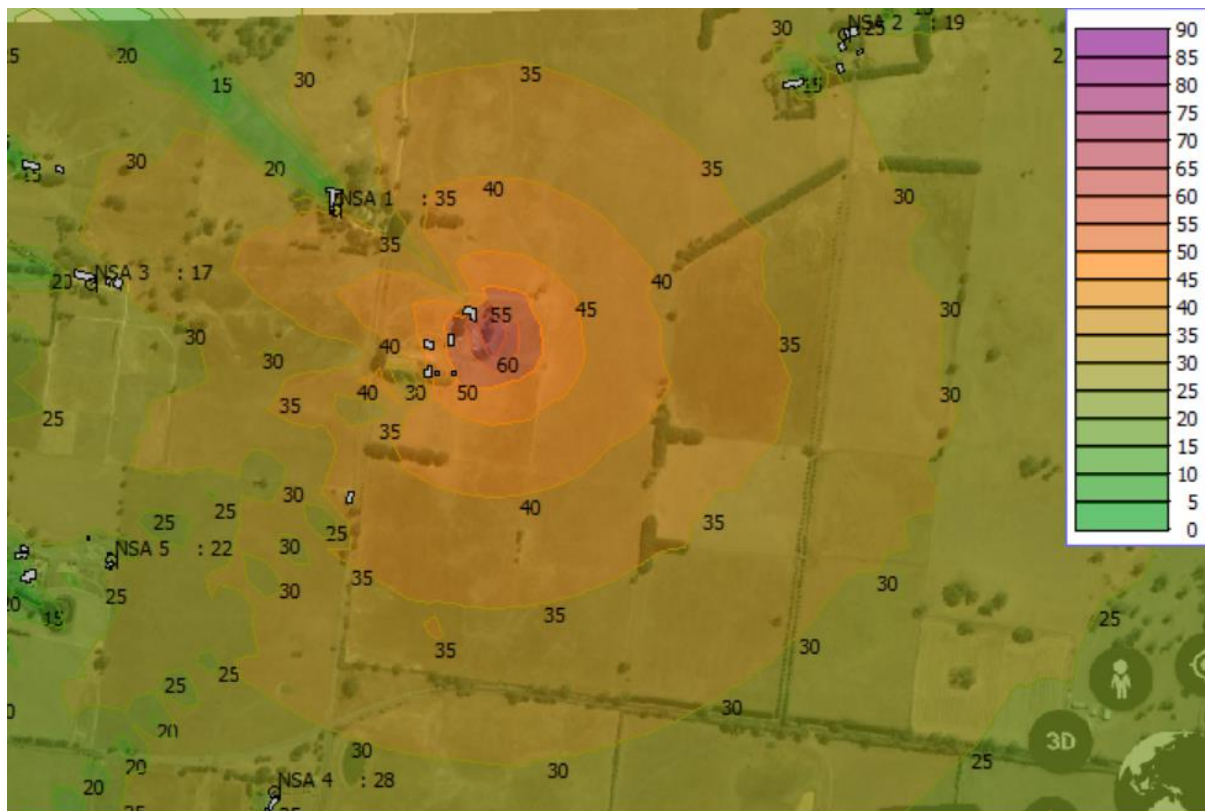
Figure 3   Image for Day and Evening noise spread for all NSA's

(Image source Google Earth)
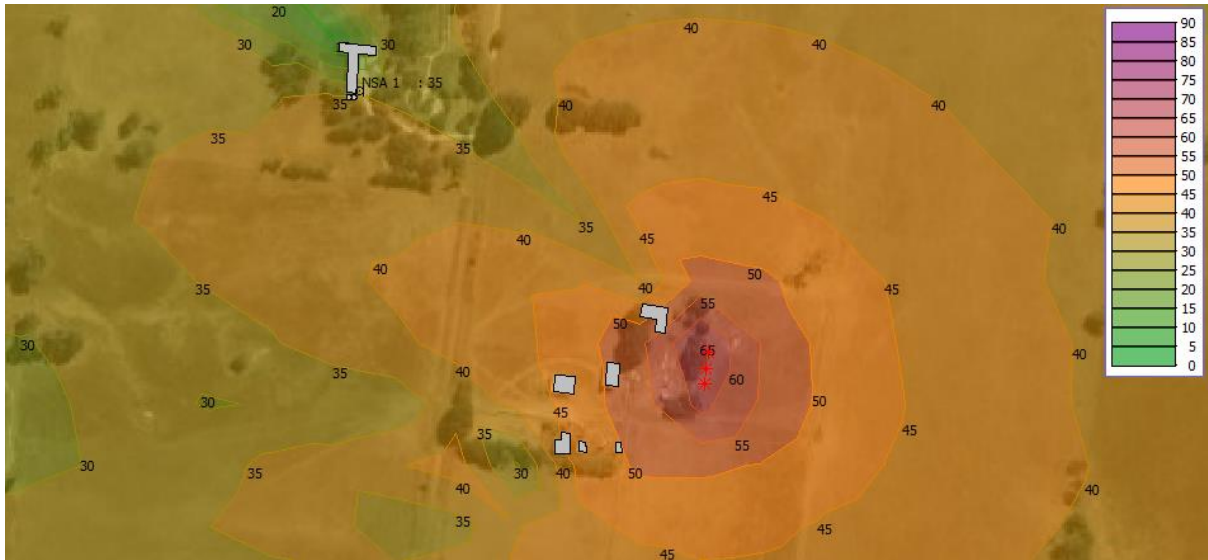
Figure 4   **Day Period - Source including exercise yards and NSA 1**

(Image source Google Earth)

Additional Note: The modelling for the situation of dogs being inside has been undertaken on a conservative basis. This is due to the reading of the preliminary drawings as being of unlined corrugated sheet, whereas the actual construction is of lined cement sheet weatherboard with a fibrous insulation that has a higher attenuation. The results provided are for the assumption of the lesser construction in terms of attenuation. As the results identify compliance with a significant margin to spare the modelling is left as undertaken, though the margin is technically greater than that specified.

8   Summary

Audiometric & Acoustic Services has performed an environmental noise assessment to determine if the proposed new breeding kennels will be compliant with the EPA's NIRV guideline noise limits set by the Macedon Ranges Shire Council.

We have undertaken acoustic modelling of the modern complex when operating at full capacity of 22 dogs. Modelling was undertaken on the basis of the facility actually being a boarding kennel rather than a breeding establishment. The difference is that group activated barking is not a distinct feature of breeding kennels as the group are all "family" and no strangers are introduced on a regular basis.

The modelling provides an Effective Noise Level when the dogs are out of the kennels of an L_{Aeq} 35dB(A). This is 1dB(A) less than the noise limit for the Night Period when the dogs are inside. As the Night noise limit is the lower than the Day and Evening periods we foresee no acoustic related problem with the proposed facility.

The modelling shows that we expect the facility to be fully compliant with the noise limits for the Day, Evening and Night periods under the conditions specified, which we have set as quite conservative. In short the modelling shows the facility meeting the Night Period Noise Limits during the Day.

Regardless of the modelling results, the operation does require good animal husbandry practices, in conjunction with the relevant Code for the Industry, namely the Code of Practice for the Operation of Breeding and Rearing Businesses (2014) developed by the Victorian Government's Department of Agriculture.

Please feel free to contact the undersigned with any queries. This applies to any parties that have legitimate access to this report.

Respectfully,

Richard Unkles

Engineer M.A.A.S.

Version 20082 proofread by Svetimir Ristic, Acoustic Consultant date: 15th December 2020

Appendix A   Definitions of Terminology

Sound Pressure Level:
> The root-mean-square values of the pressure fluctuations above and below atmospheric pressure caused by the passage of a sound wave, usually expressed in deci Bels (re 20 µ Pa)

Decibel:
> Unit usually used to define sound pressure level relative to a reference pressure.

$$dB = 20 \log_{10} \left(\frac{P}{Pref} \right)$$

(A):
> Reference to particular weighting network within a Sound Level Meter which modifies the linear response. 'A' weighting is designed to approximate the response of the human ear.

(C):
> Reference to a weighting network within a Sound Level Meter. Modifies the Linear response only slightly on the lower frequency range.

R_w
> Weighted Sound Reduction Index. A single figure rating of the acoustic attenuation of materials either singly or as multiples.

L_{10}
> The noise level exceeded for 10% of a measurement period. Often used as a measurement of occasional interruptive noise, such as traffic.

$L_{A1018hr}$
> The 18 hour Traffic Noise average. Arithmetic average of the A weighted L_{10} sound levels from 0600hrs to 0000hrs.

L_{90}
> The noise level exceeded for 90% of a measurement period. Commonly accepted as the natural Background Noise Level.

L_{eq}:
> Equivalent Continuous Sound Level. This is calculated on the basis of average of the Sound Pressure Level (acoustic energy) over a period of time and is expressed in deci Bels.

L_{Aeq}:
> The 'A' weighted Equivalent Continuous Sound Level.

L_{Aeq8h}r
> The equivalent of 8 hours exposure to an LAeq of 85dB. The actual exposure period may be longer or shorter than 8 hours.

Slow - S:
> Dynamic characteristics of a Sound Level Meter which employs a time saving averaging constant of 1 second.

Fast - F:
> Dynamic characteristic - time averaging constant is 125m sec.

Impulse - Imp:
> Dynamic characteristic - time averaging constant is 33m sec.

Peak - Pk:
> Dynamic characteristic - time averaging constant is 1m sec.

Appendix B   Equipment Used

Convergence Instruments NSRT Mk 3

               Serial Number: CFt2jF24030fiplwS6jxnD

Quest CA22   Acoustic Calibrator
                       Serial No. J1060008

NATA Laboratory calibration due 5th September 2021

The noise logger was check calibrated before and after the measurements. No significant change was found to have occurred.