



Proposed Animal Shelter  
92-102 Lundberg Drive  
South Murwillumbah

## ACOUSTIC REPORT



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Tweed Shire Council

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## 1. Introduction

This report is in response to a request by Tweed Shire Council for an environmental noise assessment of a proposed animal shelter located at 92-102 Lundberg Drive, South Murwillumbah. This environmental noise assessment was conducted in accordance with Tweed Shire Council planning policies and the NSW EPA Noise Policy for Industry 2017. To facilitate the assessment unattended noise monitoring was conducted to determine the criteria and assess impacts to sensitive receivers in proximity to the development. Attended measurements of the nearby shooting range were also utilised to assess potential noise impacts to the proposed development. Based on the outcomes of the assessment recommendations for acoustic treatments are specified.

The previous revision (2021272 R01E) was issued in August 2022 in response to updated site plans. As a result of the relocation of the outdoor animal exercise yards, the noise barrier that was recommended in this area has been removed. Changes to internal acoustic recommendations have also been made due to the updated layout.

This revision (2021272 R01I) has been updated in response to an information request issued by Tweed Shire Council on 3 April 2023 and further general correspondence and meetings with Council since that time. The revised works include additional measurements of the pistol club to determine noise impacts from larger calibre firearms, and calibration of the noise emissions from the proposed facility against measured animal shelter data using Soundplan modelling. Analysis of these has been conducted and updated recommendations are included in this report.

## 2. Site Description

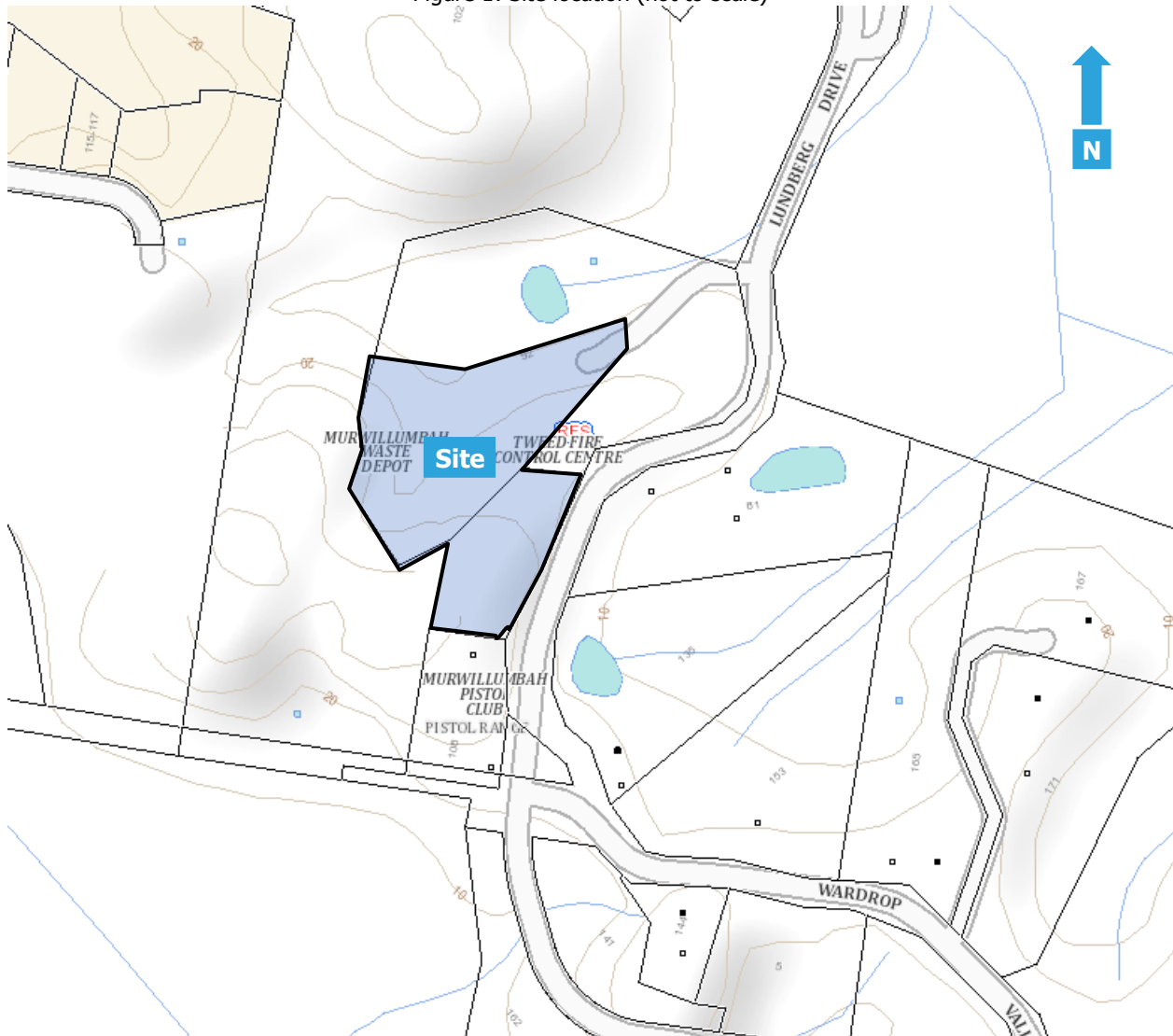
### 2.1 Site Location

The site is described by the following:

92-102 Lundberg Drive, South Murwillumbah  
Part of Lot 1 on DP232745 and part of Lot 2 on DP1139059

Refer to Figure 1 for site location.

Figure 1: Site location (not to scale)



Site surveys were conducted between the 25<sup>th</sup> of June and 31<sup>st</sup> of July 2021 and identified the following:

- a) The site is currently vacant and is located in an IN1 General Industrial zone as defined in the Tweed Local Environmental Plan 2014.
- b) A fire station is located adjacent the northern site boundary.
- c) An industrial premises is located on the eastern side of Lundberg Drive.
- d) A pistol club is located adjacent the southern site boundary.
- e) A quarry is located adjacent the western site boundary.

## 2.2 Proposal

The proposal is to construct an animal shelter with combined animal adoption centre and a Council Pound area, comprised of the following:

- Capacity of 42 dogs, which includes:
  - 24 rehoming partner dog adoption bays
  - 10 dog quarantine bays
  - 2 isolation dog holds
  - 2 dangerous dog holds
- Capacity of approximately 35 cats, which includes:
  - 28 cats in 2 rehoming adoption areas
  - 5 cats in QT room
  - 2 cats in a cat isolation room
- Office spaces and staff rooms.
- Food prep rooms, impound store, grooming room, veterinarian, interview room, community room and euthanasia room.
- 28 car spaces altogether, located in 2 areas on the northern and southern sides of the proposed building.

## 2.3 Acoustic Environment

The surrounding area is primarily affected by noise from the neighbouring pistol club, quarry and other nearby commercial uses, as well as traffic along Lundberg Drive.

## 3. Equipment

The following equipment was used to record noise levels:

- Rion NL42 Environmental Noise Monitor
- Norsonic Nor140 Sound Level Meter
- Pulsar Model 105 Ltd Sound Calibrator

The environmental Noise Monitor and Sound Level Meter hold current NATA Laboratory Certification and were field calibrated before and after the monitoring period, with no significant drift from the reference signal recorded.

## 4. Offsite Receivers, Noise Sources and Monitoring

### 4.1 Receiver locations

The nearest residential receiver locations were identified as follows;

1. A single storey residential dwelling located to the southeast of the site at 135 Wardrop Valley Road.
2. A single storey residential dwelling located to the east of the site on Wardrop Valley Road.

Refer to Figure 2 for these locations.

Figure 2: Receivers and noise monitoring locations



### 4.2 Offsite Sources

To ensure a reasonable acoustic amenity is maintained for the proposed development, the nearest offsite activities were considered as shown in Figure 2. The nearest offsite source with the potential to negatively impact the development was identified as follows:

- A. Murwillumbah Pistol Club, generally operating on Saturday mornings and afternoons for booked competitions. This is located to the south of the development.
- B. Potential Future Low-Impact Industry. The area assessed is the closest potential industrial use that would be located to the site.



### 4.3 Unattended ambient noise measurement procedure

A Rion NL42 environmental noise monitor was placed at 135 Wardrop Valley Road to measure ambient noise levels. This monitoring location is on the property of one of the nominated sensitive receivers and was considered representative of the ambient noise levels at the other receiver location as well. The monitor was located in a free field position with the microphone approximately 1.4 metres above ground surface level. The noise monitor was set to record noise levels between 22<sup>nd</sup> and 31<sup>st</sup> of July 2021.

The environmental noise monitor was set to record noise levels in "A" Weighting, Fast response using 15-minute statistical intervals. Ambient noise monitoring was conducted generally in accordance with Australian Standard AS1055:2018 *Acoustics – Description and measurement of environmental noise*.

For the unattended noise monitoring location refer to Figure 2.

### 4.4 Attended Noise Measurements

To ensure a reasonable acoustic amenity is maintained for the proposed development attended noise measurements were conducted on 26 June 2021. The results of the assessment are presented in Section 7.3.2.

Attended noise measurements were conducted in accordance with Australian Standard *AS1055:2018 Acoustics – Description and measurement of environmental noise*.

## 5. Existing Ambient Noise Levels

The following tables present the measured existing ambient noise levels from the unattended noise survey. Any periods of inclement weather or extraneous noise are omitted from the measured data prior to determining the overall results.

### 5.1 Meteorological conditions

Meteorological observations during the unattended noise monitoring survey were obtained from the Bureau of Meteorology website (<http://www.bom.gov.au/climate/data>), shown in Table 1 below.

Table 1: Meteorological conditions – Coolangatta Weather Station

Day	Date	Rainfall (mm)	Wind			
			9am		3pm	
			Speed (km/h)	Direction	Speed (km/h)	Direction
Thursday	22/07/21	0	0	-	0	-
Friday	23/07/21	0	0	-	11	WSW
Saturday	24/07/21	1.6	2	E	0	-
Sunday	25/07/21	0	0	-	0	-
Monday	26/07/21	0	4	NNW	11	NE
Tuesday	27/07/21	0	2	SW	19	N
Wednesday	28/07/21	0	2	NW	0	-
Thursday	29/07/21	0	2	SE	7	SW
Friday	30/07/21	0	0	-	7	SW
Saturday	31/07/21	0	0	-	11	NE

During the attended measurements conducted on 26 June 2021, southwesterly wind speeds were measured at between 0-3m/s.

### 5.2 Ambient background noise level

The measured rating background noise levels (RBL) in accordance with the NSW Noise Policy for Industry, are as follows;

Table 2: Measured L90 noise levels

Day	Date	Background RBL (L90 dBA)		
		Day	Evening	Night
Thursday	22/07/21	-	35	33
Friday	23/07/21	41	32	26
Saturday	24/07/21	37	30	25
Sunday	25/07/21	37	24	25
Monday	26/07/21	35	29	31
Tuesday	27/07/21	-	30	29
Wednesday	28/07/21	43	30	29
Thursday	29/07/21	40	30	25
Friday	30/07/21	41	36	27
Overall Value		39	31	30*

\*Note the measured L90 noise levels for the night-time period were found to be below the minimum RBL level as specified in Section A1.2 of the NSW Noise Policy for Industry 2017, therefore an RBL of 30 for the night period was applied.

Data recorded during the daytime period on Tuesday 27/07/21 was disregarded due to high wind speeds. Graphical presentation of the measured noise levels is presented in the Appendices.

## 6. Noise Criteria

To determine the appropriate noise criteria to be applied, a review of Tweed Shire Council planning policies and the NSW Noise Policy for Industry was conducted.

### 6.1 Tweed Shire Council

The site is located within Tweed Shire Council local government area, however there is no specific criteria for environmental noise impacts contained within the Tweed Shire Development Control Plan (DCP) 2008 and Local Environmental Plan (LEP) documents. Therefore, further reference was made to the NSW Noise Policy for Industry (2017).

### 6.2 Noise Policy for Industry

Assessment of noise in accordance with NSW EPA Noise Policy for Industry (2017) has two main components: intrusiveness and amenity criteria. These are compared to each other (after conversion of amenity noise level to LAeq,15min equivalent level) to determine the overall project noise trigger level.

#### 6.2.1 Intrusiveness noise level

The intrusiveness noise level is based on the  $L_{Aeq(15\text{ min})}$  associated with commercial activity being less than or equal to the measured  $L_{A90}$  Rating Background Level + 5dB as per section 2.3 of the policy. A modifying factor should also be added where appropriate to allow for tonality, impulsiveness, and intermittency or low frequency effects.

#### 6.2.2 Amenity noise level

The amenity noise level is determined in accordance with Section 2.4 of the policy based on the land use and relevant noise criteria specified in Tables 2.2 and 2.3.

The Noise Policy for Industry sets out acceptable noise levels for various locations. Determination of which residential receiver category applies is described in Table 2.3 of the policy.

Table 3: Receiver category (Table 2.3 of the Noise Policy for Industry)

Receiver category	Typical planning zoning – standard instrument	Typical existing background noise levels	Description
Rural residential	RU1 – primary production RU2 – rural landscape RU4 – primary production small lots R5 – large lot residential E4 – environmental living	Daytime RBL <40 dB(A) Evening RBL <35 dB(A) Night RBL <30 dB(A)	<b>Rural</b> – an area with an acoustical environment that is dominated by natural sounds, having little or no road traffic noise and generally characterised by low background noise levels. Settlement patterns would be typically sparse. Note: Where background noise levels are higher than those presented in column 3 due to existing industry or intensive agricultural activities, the selection of a higher noise amenity area should be considered.

Receiver category	Typical planning zoning – standard instrument	Typical existing background noise levels	Description
Suburban residential	RU5 – village RU6 – transition R2 – low density residential R3 – medium density residential E2 – environmental conservation E3 – environmental management	Daytime RBL < 45 dB(A) Evening RBL < 40 dB(A) Night RBL < 35 dB(A)	<b>Suburban</b> – an area that has local traffic with characteristically intermittent traffic flows or with some limited commerce or industry. This area often has the following characteristic: evening ambient noise levels defined by the natural environment and human activity.
Urban residential	R1 – general residential R4 – high density residential B1 – neighbourhood centre (boarding houses and shop-top housing) B2 – local centre (boarding houses) B4 – mixed use	Daytime RBL > 45 dB(A) Evening RBL > 40 dB(A) Night RBL > 35 dB(A)	<b>Urban</b> – an area with an acoustical environment that: <ul style="list-style-type: none"> <li>• is dominated by 'urban hum' or industrial source noise, where urban hum means the aggregate sound of many unidentifiable, mostly traffic and/or industrial related sound sources</li> <li>• has through-traffic with characteristically heavy and continuous traffic flows during peak periods</li> <li>• is near commercial districts or industrial districts</li> <li>• has any combination of the above.</li> </ul>

Project amenity noise level for industrial developments = recommended amenity noise level minus 5dB(A).

To determine the appropriate receiver category, the following observations were made:

- The nearby residential receivers to the east are zoned RU2 – Rural landscape which corresponds with typical planning zoning of the rural category.
- The measured RBL values presented in Section 5.2 corresponds with the typical existing background noise levels of the rural category.
- The acoustic environment of the surrounding area to the east is affected by natural sounds with little or no road traffic noise which corresponds with the description of the rural category. The development is within an industrial zone, with nearby commercial/industrial uses to the south, west and north. Therefore, industrial/commercial uses nearby dominate noise during their relevant operating hours.

Therefore, the nearest residential receivers and the development site would be assessed against the 'industrial rural interface' criteria.

### 6.2.3 Modifying factors

The Noise Policy for Industry includes correction factors such as tonal noise, low-frequency noise, intermittent noise and duration. Where two or more modifying factors are present, the maximum adjustment to a noise source level is 10dBA (excluding duration correction).

### 6.3 Project noise trigger level

To determine the project trigger noise level, the amenity noise level must first be standardised to an equivalent LAeq 15min in order to compare to the intrusiveness noise level. This is done in accordance with section 2.2 of the policy as follows;

$$L_{Aeq,15min} = L_{Aeq, period} + 3dB$$

To ensure that industrial noise levels (existing plus new) remain within the recommended amenity noise levels for an area, a project amenity noise level applies for each new source of industrial noise.

Therefore, based on the measured data presented in Section 5.2, the project specific noise limits are determined. It should be noted that compliance with the criteria does not mean that the noise will be inaudible.

#### 6.3.1 Sleep disturbance noise level

Sleep disturbance is based on the maximum noise level of events from premises during the night-time period. The Noise Policy for Industry defines sleep disturbance as a noise from a premise at a residential location that exceeds:

- LAeq,15min 40 dB(A) or the prevailing RBL plus 5 dB, whichever is the greater, and/or
- LAFmax 52 dB(A) or the prevailing RBL plus 15 dB, whichever is the greater.

#### 6.3.2 Intrusiveness noise criteria

The intrusiveness noise levels are as follows;

Table 4: Intrusiveness noise levels

Time period	Criteria L <sub>eq</sub> (15min) dBA
Day (7am-6pm Mon-Sat; 8am-6pm Sun)	44
Evening (6pm-10pm)	36
Night (10pm-7am Sun-Fri, 10pm-8am Sat)	35

#### 6.3.3 Amenity criteria

Given that the development and nearest receivers are in an industrial rural interface, 5dB(A) has been added to the rural criteria to provide the recommended amenity noise level. Based on Section 2.2 and 2.4 of the policy, the amenity noise levels are as follows;

Table 5: Amenity noise levels

Time period	Criteria L <sub>eq</sub> (15min) dBA
Day	53
Evening	48
Night	43

#### 6.3.4 Project specific noise criteria

The project noise trigger level is the lower (that is, the most stringent) value of the intrusiveness and amenity noise levels. Therefore, the project noise trigger levels are as follows:

Table 6: Project criteria

Time period	Criteria $L_{eq}$ (15min) dBA
Day	44
Evening	36
Night	35

### 6.3.5 Sleep disturbance

The sleep disturbance noise levels are as follows;

Table 7: Sleep disturbance noise levels

Time period	Criteria $L_{eq}(15min)$ dBA	Criteria $L_{AFmax}$ dBA
Night	40	52

The  $L_{eq}(15min)$  sleep disturbance criteria is not included in the assessment as it is more lenient than the project specific noise criteria for the night time. The  $L_{AFmax}$  component of the criteria is assessed.

### 6.3.6 AS2107 Criteria

Noise impacts from the offsite gun club may also be analysed in regard to the internal criteria listed in AS2107:2016 "*Acoustics-Recommended design sound levels and reverberation times for building interiors*". There are no specific criteria listed for animal shelter buildings; however, given the veterinary uses onsite, the 'health buildings' designation may be most relevant to the development. The applicable internal noise limits from Australian Standard are provided in Table 8.

Table 8: Internal Noise Limits – AS2107

Location	Design Sound Level ( $L_{Aeq,t}$ ) Range
Health Buildings	
Consulting Rooms	40 to 45
Corridors and Lobby Spaces	< 50
Kitchen, sterilizing and service areas	<55
Office Areas	35-45
Staff Rooms	40-45
Surgeries/Treatment/Procedure Rooms	40-45

These criteria are compared with measured noise levels from the operating Pistol Club in Section 7.3.3.

## 7. Environmental Assessment

### 7.1 Onsite Activities to Offsite Receivers

Noise associated with the development was assessed based on previous measurements of similar activities as described in Section 7.1.3. The calculations assume that the nominated activities are located at a representative distance within the development site to each receiver location. Any relevant shielding or building transmission loss is taken into account for these activities.

#### 7.1.1 Predicted noise impacts – No wind

The noise source levels at the receiver locations are shown in Table 9. LAeq results are not shown where the calculated total is less than 0dBA.

To provide a conservative assessment, the LAeq noise level of dogs inside the kennels have been increased to represent all dogs barking simultaneously.

Table 9: Predicted noise levels

Receiver	Description	Source Leq@1m dB(A)	Correction dB(A)*	Corrected Leq@1m dB(A)	Topography/terrain dB	Building TL or shield dB	Dist atten. @-6dB/dd	LAeq adj, T ext. dB(A) Day	LAeq adj, T ext. dB(A) Eve	LAeq adj, T ext. dB(A) Night	LAeq 15 min Compliance		
											Day	Eve	Night
1	1. 135 Wardrop Valley Road (SE) 2. Wardrop Valley Road (E)												
	Criteria										44	36	35
	Car start	74	2	76			-43	18	16	13	Yes	Yes	Yes
	Car door closure	75	2	77			-43	19	17	14	Yes	Yes	Yes
	Car passby	74		74			-43	25	23	20	Yes	Yes	Yes
	42 dogs (kennels)	90	5	95	-3.7	-16.1	-44		31	31	n/a	Yes	Yes
	42 dogs (yard)	90	5	95	-3.1	-12.7	-47	32			Yes	n/a	n/a
	Total							33	32	32	Yes	Yes	Yes
2	Criteria										44	36	35
	Car start	74	2	76			-44	17	15	12	Yes	Yes	Yes
	Car door closure	75	2	77			-43	19	17	14	Yes	Yes	Yes
	Car passby	74		74			-43	24	23	20	Yes	Yes	Yes
	42 dogs (kennels)	90	5	95	-4.6	-17.5	-44		29	29	n/a	Yes	Yes
	42 dogs (yard)	90	5	95	-4.1	-13.2	-45	33			Yes	n/a	n/a
	Total							34	30	30	Yes	Yes	Yes

\*Note a 5dB intermittency correction factor for dogs barking was applied for the night period in accordance with the NSW Noise Policy for Industry 2017.

Compliance is predicted for onsite activities on the condition the recommendations detailed in Section 8 are implemented.

### 7.1.2 Predicted noise impacts – 3m/s Downwind conditions

The noise source levels at the receiver locations with 3m/s wind speeds towards each receiver direction are shown in Table 10. Correction factors due to wind were calculated from ISO 9613-2:1996, "Attenuation of sound during propagation outdoors". LAeq results are not shown where the calculated total is less than 0dBA.

To provide a conservative assessment, the LAeq noise level of dogs inside the kennels have been increased to represent all dogs barking simultaneously.

Table 10: Predicted noise levels – 3m/s Wind towards receivers

Receiver	Description	Source Leq@1m dB(A)	Correction dB(A)*	Corrected Leq@1m dB(A)	Topography/terrain dB	Building TL or shield dB	ISO Cent Wind Correction	Dist atten. @-6dB/dd	LAeq adj, T ext. dB(A) Day	LAeq adj, T ext. dB(A) Eve	LAeq adj, T ext. dB(A) Night	LAeq 15 min Compliance		
												Day	Eve	Night
1	1. 135 Wardrop Valley Road (SE) 2. Wardrop Valley Road (E)													
	Criteria											44	36	35
	Car start	74	2	76			1.7	-43	20	18	15	Yes	Yes	Yes
	Car door closure	75	2	77			1.7	-43	21	19	16	Yes	Yes	Yes
	Car passby	74		74			1.7	-43	26	24	21	Yes	Yes	Yes
	42 dogs (kennels)	90	5	95	-3.7	-16.1	1.8	-44		33	33	n/a	Yes	Yes
	42 dogs (yard)	90	5	95	-3.1	-12.7	1.8	-47	34			Yes	n/a	n/a
	Total								35	34	33	Yes	Yes	Yes
2	Criteria											44	36	35
	Car start	74	2	76			1.7	-44	19	17	14	Yes	Yes	Yes
	Car door closure	75	2	77			1.7	-43	21	19	16	Yes	Yes	Yes
	Car passby	74		74			1.7	-43	26	24	21	Yes	Yes	Yes
	42 dogs (kennels)	90	5	95	-4.6	-17.5	1.7	-44		31	31	n/a	Yes	Yes
	42 dogs (yard)	90	5	95	-4.1	-13.2	1.7	-45	34			Yes	n/a	n/a
	Total								35	32	31	Yes	Yes	Yes

\*Note a 5dB intermittency correction factor for dogs barking was applied for the night period in accordance with the NSW Noise Policy for Industry 2017.

Compliance is predicted for onsite activities on the condition the recommendations detailed in Section 8 are implemented.



### 7.1.3 Soundplan modelling

In order to provide further detailed analysis of noise emissions from the proposed facility, a Soundplan model has been compiled using various scenarios.

The model has been setup and calibrated based on previous noise measurements of a similar operational animal shelter. Acoustic Works Director Mark Enersen was involved in the assessment of noise from the Animal Welfare League facility at West Hoxton NSW and assisted with the measurements while working at PKA Acoustic Consulting. The reference to outcomes from the study as described below, and used for calibration of the model, has been reproduced with permission of PKA Acoustic Consulting. The characteristics of the assessment were as follows;

- Solid masonry wall partitions between adjacent kennels
- Open mesh at front and rear of kennels
- 60 dogs present
- Mixed variety of dogs (large, medium, small)
- Noise levels measured using noise data logger for a period of 6 days
- Logger located at a distance of 20m from the open mesh side of the kennels
- Average maximum LAeq 15minute used
- Measured result of 65dBA LAeq,15 minutes.
- During the assessment a typical average maximum LMax source sound pressure level of 105dBA at 1m distance was also determined for dogs barking (for assessment against sleep disturbance criteria in Section 7.1.4).

The measured continuous level of 65dBA LAeq,15 minute was used to calibrate the Soundplan model at a distance of 20m from the open side of the proposed kennels. Three modelling scenarios were assessed;

- 1) 42 dogs in the kennels, no dogs in the exercise yard (night time scenario)
- 2) 21 dogs in the kennels and 21 dogs in the exercise yard (daytime scenario)
- 3) 42 dogs in the exercise yard (daytime scenario)

The construction assumptions used for the model are as follows;

- Solid walls between adjacent kennels and at the end of each block
- Walls 2400mm high
- Open mesh gap of 300mm between top of partition wall and underside of roof
- Solid roof structure over the kennel blocks
- Acoustic absorptive lining (NRC 0.8 or greater) to the underside of roof and to the upper walls

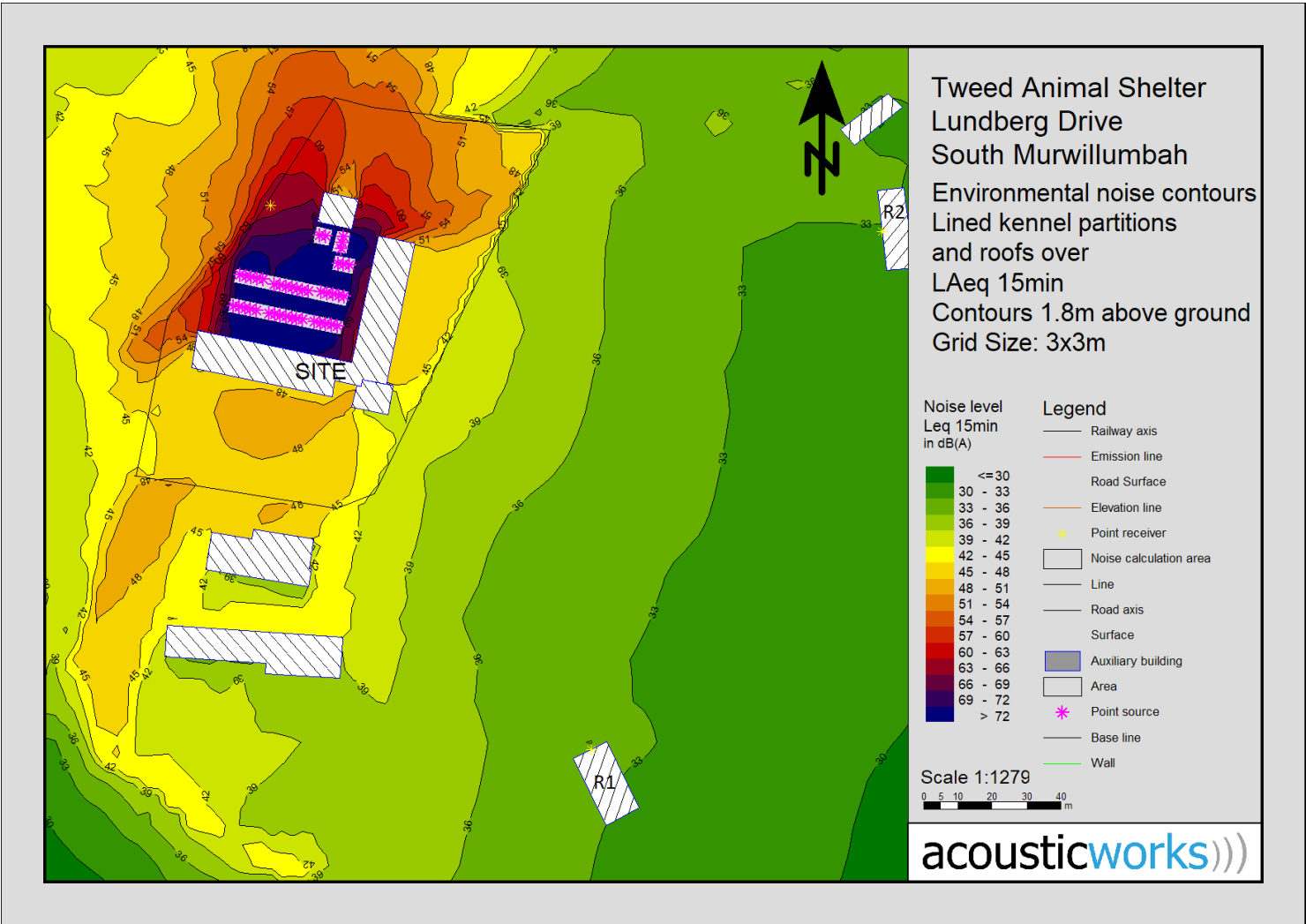
The results of the Soundplan assessment are shown on the following pages.

Note that the model was setup and calibrated based on the measured result for 60 dogs, whereas the proposed kennel will house a maximum of 42 dogs. Therefore the noise emissions for 42 dogs would be lower and hence the model would be described as being conservative.

It is also expected that if the facility is only partially occupied a further reduction in noise emissions would occur. This appears to be justified by review of Section 10.2 Table B on page 12 of the Animal Pound Needs analysis and Functional Brief by Therian dated 5 March 2021. The report states a required minimum design capacity of 19 dog kennel pens and 16 cat pens/cages, indicating that a 42 kennel facility is likely to operate at 50% capacity in general. For the purposes of conservatism, the models do not take these factors into account.

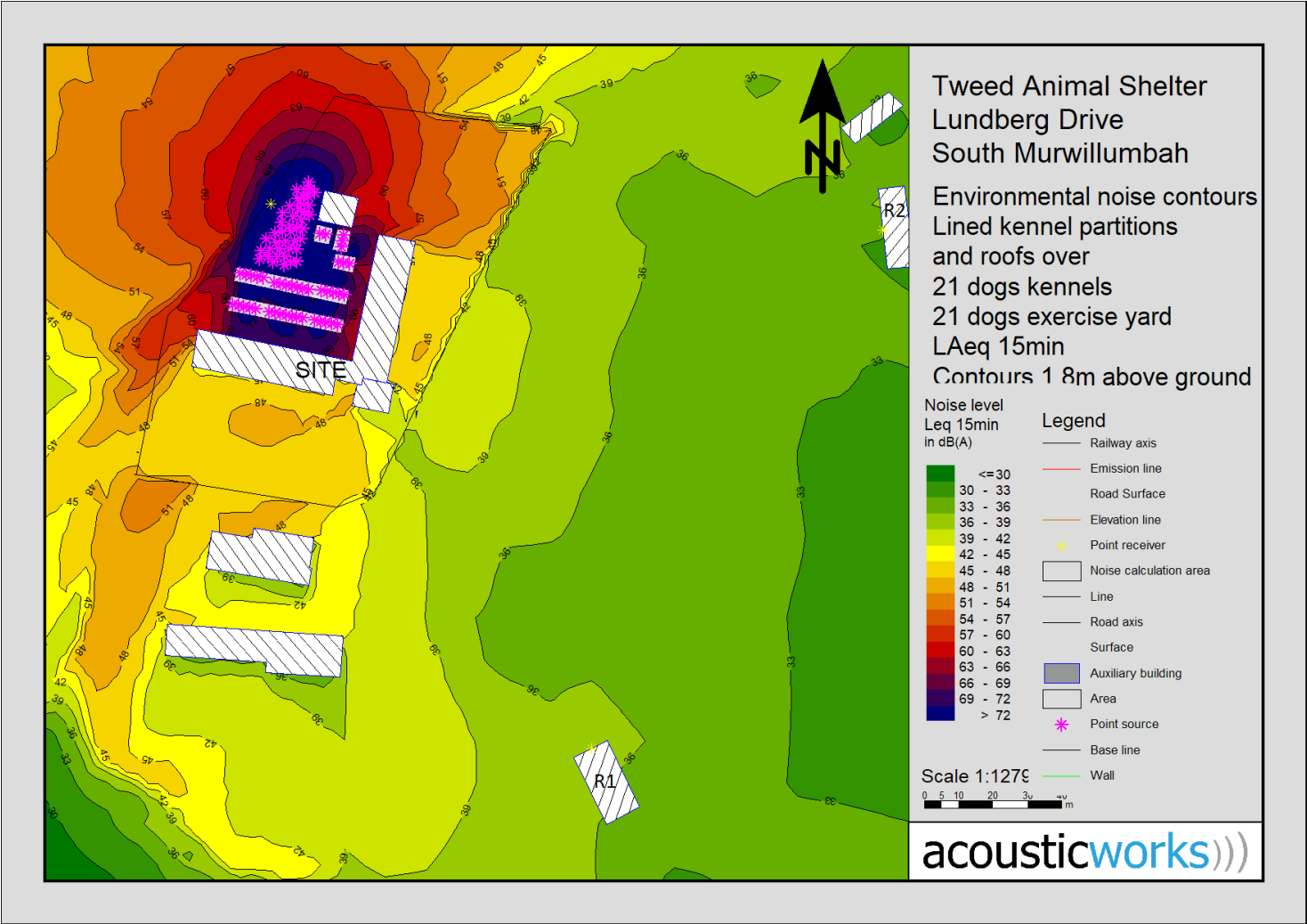
7.1.3.1 Soundplan - 42 dogs in the kennels (night time)

Figure 3: Soundplan – 42 dogs in kennels



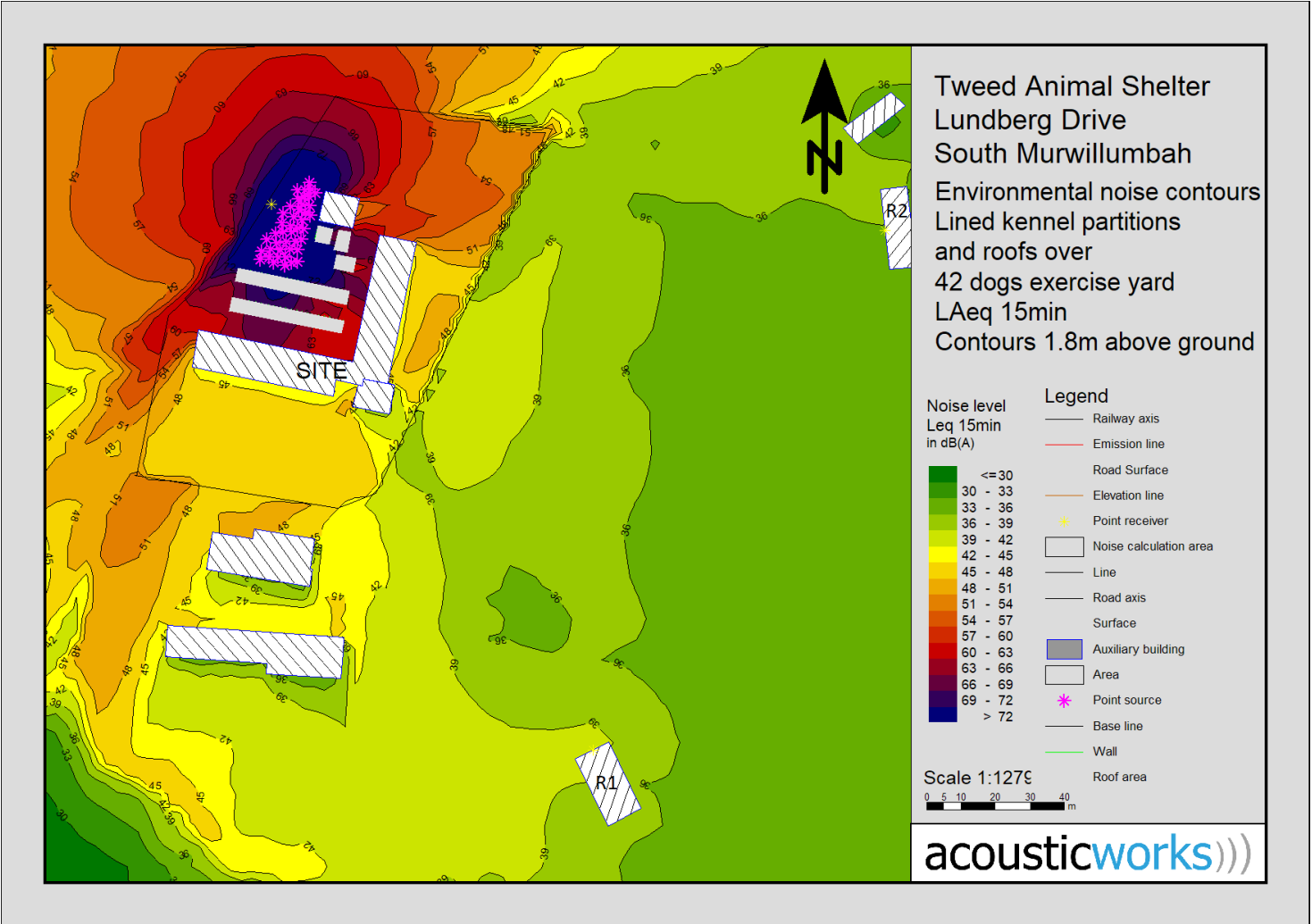
7.1.3.2 Soundplan - 21 dogs in kennels 21 dogs in exercise yard (day time)

Figure 4: Soundplan – 21 dogs in kennels, 21 dogs in yard



7.1.3.3 Soundplan - 42 dogs in the exercise yard (day time)

Figure 5: Soundplan – 42 dogs in exercise yard



### 7.1.4 Predicted sleep disturbance noise impacts

The noise source levels and predicted levels of noise at the receiver locations are shown in Table 11. A wind correction, simulating 3m/s towards the receivers, was calculated using ISO 9613-2:1996, "Attenuation of sound during propagation outdoors" was applied to the assessment. The calculations are based on a typical measured L<sub>Amax</sub> source level of 105dBA sound pressure.

Table 11: Predicted noise impacts – Sleep disturbance

Receiver	Description	Source @1m dB(A)	Correction dB(A)*	Corrected dB(A)	Distance (m)	Barrier (height (m))	Topographic terrain dB(A)	Building TL or shield dB	ISO Cmet wind correction	Dist atten. @ -6dB/dd	L <sub>Amax</sub> adj. Text.. dB(A)	Complies L <sub>max</sub> dB(A)
						No						
1	1. 135 Wardrop Valley Road (SE) 2. Wardrop Valley Road (E)											
	Criteria											52
	Car start	72	2	74	93				1.7	-39	36	Yes
	Car door closure	78	2	80	115				1.7	-41	40	Yes
	Car passby	78		78	115				1.7	-41	38	Yes
	42 dogs (night) kennels	105	5	110	156		-3.7	-16.1	1.8	-44	48	Yes
2	Criteria											52
	Car passby	72	0	72	144				1.7	-43	31	Yes
	Car door closure	78	2	80	144				1.7	-43	39	Yes
	Car start	78	2	80	144				1.7	-43	39	Yes
	42 dogs (night) kennels	105	5	110	148		-4.6	-17.5	1.8	-43	46	Yes

Compliance is predicted for onsite activities on the condition the recommendations detailed in Section 8 are implemented.

## 7.2 Onsite Noise Impacts to Onsite Receivers

Dog barking from both indoor areas has the potential to impact upon onsite receivers, including staff/office rooms and other animal areas. The impacts from the dog areas to adjacent/nearby rooms is detailed in Table 12. AS2107 criteria as detailed in Section 6.3.6, is also presented to determine the required reduction for relevant partitions.

Table 12: Noise impacts from Dog Areas to Onsite Receivers

Dog Area	Number of Dogs	Sound Pressure Level within Dog Area (Leq dBA)	Adjacent Sensitive Room	AS2107 Recommended Sound Level in Adjacent Room (Leq dBA)	Recommended Reduction in Noise Level (dBA)
Feature Dog	1	78	Hallway	<50	28
			Meet & Greet and Interview Room	40-45	33-38
Quarantine & Rehoming Dogs	34	93	38 Food & Prep Store	<55	14
			Vet	40-45	26-31
			10 Food Prep/Store	<55	16
			Meet & Greet and Interview Room	40-45	26-31
			Retail	<50	19

The desired internal sound level of all cat areas detailed in Table 12 should be determined by an animal expert. This level will affect the required construction of relevant partitions.



7.3 Offsite Noise Impacts to Onsite Receivers

7.3.1 Offsite noise sources

The nearest offsite source was identified as follows:

- A. Murwillumbah Pistol Club - Range 1 Police Officer Training
- B. Murwillumbah Pistol Club - Range 3 Shooting Competitions
- C. Potential Future Low-Impact Industry Uses

The location of the development site, pistol club and measurement locations are shown in Figure 6.

Figure 6: Noise sources and measurement locations



- |   |   |  |
|---|---|--|
| 1 | 2 | Measurement Locations                                  |
| A |   | Offsite Noise Source – Range 1 Police Officer Training |
| B |   | Offsite Noise Source – Range 3 Shooting Competitions   |
| C |   | Offsite Noise Source – Potential Industrial Uses       |

### 7.3.2 Measured Noise Levels

#### 7.3.2.1 Initial Measurements 26 June 2021

Acoustic Works conducted attended measurements onsite on Saturday 26 June 2021 between the hours of 11:30am and 1pm to assess noise impacts from the Murwillumbah Pistol Club to the proposed development. During the assessment, a standard shooting competition was taking place at location A, as is held weekly at the premises.

Table 13 presents the measured noise levels, and the measurement location is shown in Figure 6. During the measurements, pistol shots were clearly audible, and the noise level of each shot was noted.

Table 13: Attended measurements – 26 June 2021

Time	Duration (mins)	Description	Measurement Location	Number of gunshots measured	Measured activity noise dB(A)				Comments
					Leq,T	LAMax	LZPeak	LA90	
11:37am	5:47	Range 3 Competition	1	16	44	56	71	33	Gunshots clearly audible
11:47am	2:59	Range 3 Competition	1	15	42	55	77	32	Gunshots clearly audible
11:51am	3:29	Range 3 Competition	1	22	47	66	87	33	Gunshots clearly audible
11:55am	1:37	Range 3 Competition	1	21	46	64	83	32	Gunshots clearly audible
11:57am	3:02	Range 3 Competition	1	5	46	65	86	31	Gunshots clearly audible
12:04pm	1:51	Range 3 Competition	1	14	42	55	70	30	Gunshots clearly audible
12:16pm	1:27	Range 3 Competition	1	15	40	54	70	31	Gunshots clearly audible
12:38pm	5:00	Background	1	None	33	40	65	31	Mostly bird noise with distant traffic and aircraft barely audible. No shooting audible during measurement.

During the measurements, wind levels fluctuated between calm conditions and a 3m/s southwesterly.

#### 7.3.2.2 Updated Measurements for Information Request 22 April 2023

Acoustic Works conducted additional measurements of the pistol club on Saturday 22 April 2023 between the hours of 8:30am and 10am. The measurements were conducted in an attempt to compare higher calibre police weapons with existing measurements, in accordance with Tweed Shire Council's information request issued via email on 3 April 2023.

During the measurements, a shooting competition was held in range 3 (location B), in which 17 of the 18 shooting bays were being used. Throughout the morning, there was more sporadic firing periods from range 3 (location A), where 2-3 people were firing 9mm pistols. This shooting was designed to mimic police training periods, which occur at the same location with the same calibre pistols. All competitors in range 1 used .22 calibre pistols (equivalent to approximately 5.6mm).

During the measurements, wind levels fluctuated between calm conditions and a 2m/s westerly.



Table 14: Attended measurements – 22 April 2023

Time	Duration (mins)	Description	Measurement Location	Number of gunshots measured	Measured activity noise dB(A)				Comments
					Leq,T	LAMax	LZPeak	LA90	
9:02am	0:22	Range 3 Competition	1	85	66	74	91*	41	5 rounds fired by each person, 20 second time limit. Gunshots clearly audible
9:23am	0:04	Range 1 Competition	2	6	65	73	90	49	2 people firing 9mm in range 3. Gunshots clearly audible
9:25am	0:07	Range 1 Competition	2	10	64	72	94	44	2 people firing 9mm in range 3. Gunshots clearly audible

\*The LZPeak was affected by wind in this measurement – therefore an appropriate correction from the LApeak was used to determine the expected LZPeak from the gunshots.

### 7.3.3 Discussion

No criteria appear to be relevant to the development in regard to offsite shooting range noise. The NSW EPA (1994) Noise Control Guideline, Target Shooting Ranges, Chapter 164 Environmental Noise Control Manual provides criteria from shooting ranges to residential boundaries. Although the development is not residential, these criteria have been included as a guide only.

Noise from the Pistol Club was found to be clearly audible and measurable at the subject site. It was determined that the Murwillumbah Pistol Club operates daytime competitions on Wednesdays and Saturdays. As the standard operation comprises of only 2 days per week during the daytime, according to the NSW EPA (1994) criteria, a linear peak hold of 105dBZ is allowable at residential boundaries. The highest LZPeak value measured was 94dBZ at the proposed Animal Shelter site – note that this is not usually applicable as it is not a residential boundary, but has been used as a guide.

This noise assessment does not deal with impacts of gunshot noise with respect to psychological effects on humans or animals. Specialised advice should be sought from appropriately qualified experts if these aspects are to be addressed.

The highest measured Leq,T from gunshots was 66dBA, although this was in only a 22 second time period. Based on this, a minimum 20dBA reduction would be predicted to comply with AS2107 criteria stated in Section 6.3.6 for office areas on the southern façade of the proposed building. Rooms on the southern façade would comply with internal AS2107 criteria with standard construction and open windows (based on a 10dBA reduction with partially opened windows).

The highest LZPeak value measured from gunshots at the Murwillumbah Pistol Club was 94dBZ; after correcting for distance this would be equivalent to approximately 92dBZ at the southern façade of the proposed building, and 81 dBZ at the eastern facade. Specialised façade construction may be implemented in order to reduce impacts inside the development. The building is expected to provide a 15dB reduction to the rehoming, quarantine and dog evaluation yards adjacent to the proposed building; if including the additional distance from the measurement location, noise impacts in these yards would be approximately 76dBZ LPeak.

### 7.3.4 Future Industrial Noise Impacts

Existing industrial uses in the area were not observed to be audible at the time site during the assessment, however noise impacts from potential future industrial sites were also assessed to the subject development. The exact nature of future industrial uses in the nominated area is not yet known, and therefore assessment and all relevant recommendations are preliminary only.

Noise associated with the offsite industrial uses was assessed based on previous measurements of similar activities. The calculations assume that the nominated activities are located at a representative distance within the development site to each receiver location. Any relevant shielding or building transmission loss is taken into account for these activities.

### 7.3.5 Predicted noise impacts – No wind

The noise source levels at the receiver locations are shown in Table 15. LAeq results are not shown where the calculated total is less than 0dBA.

Table 15: Predicted noise levels

Receivers											
Receiver	1. Onsite Exercise Yards 2. Onsite Building		Source Leq@1m dB(A)	Correction dB(A) *	Corrected Leq@1m dB(A)	LAeq adj, T ext. dB(A) Day	LAeq adj, T ext. dB(A) Eve	LAeq adj, T ext. dB(A) Night	LAeq 15 min Compliance		
	Description	Day							Eve	Night	
	Criteria							44	36	35	
	Car start	74	2	76	28	26	23	Yes	Yes	Yes	
	Car door closure	75	2	77	30	28	25	Yes	Yes	Yes	
1	Car passby	74		74	35	33	30	Yes	Yes	Yes	
	Air ratchet	96		96	15	15	15	Yes	Yes	Yes	
	Belt sander	86		86	25	25	25	Yes	Yes	Yes	
	Saw (cutoff)	92		92	15	15	15	Yes	Yes	Yes	
	Drill hand held battery	83		83	6	6	6	Yes	Yes	Yes	
	Compressor medium	87		87	18	18	18	Yes	Yes	Yes	
	Grinder	86		86	17	17	17	Yes	Yes	Yes	
	Total				37	35	33	Yes	Yes	Yes	
	Criteria							44	36	35	
	Car start	74	2	76	22	20	17	Yes	Yes	Yes	
	Car door closure	75	2	77	24	22	19	Yes	Yes	Yes	
2	Car passby	74		74	29	27	24	Yes	Yes	Yes	
	Air ratchet	96		96	21	21	21	Yes	Yes	Yes	
	Belt sander	86		86	31	31	31	Yes	Yes	Yes	
	Saw (cutoff)	92		92	21	21	21	Yes	Yes	Yes	
	Drill hand held battery	83		83	12	12	12	Yes	Yes	Yes	
	Compressor medium	87		87	24	24	24	Yes	Yes	Yes	
	Grinder	86		86	23	23	23	Yes	Yes	Yes	
	Total				35	34	34	Yes	Yes	Yes	

Compliance is predicted for onsite activities on the condition the recommendations detailed in Section 8 are implemented.

### 7.3.6 Predicted noise impacts – 3m/s Downwind conditions

The noise source levels at the receiver locations with 3m/s wind speeds towards each receiver direction are shown in Table 16. Correction factors due to wind were calculated from ISO 9613-2:1996, "Attenuation of sound during propagation outdoors". LAeq results are not shown where the calculated total is less than 0dBA.

Table 16: Predicted noise levels – 3m/s wind towards receivers

Receiver	Receivers											
	1. Onsite Exercise Yards 2. Onsite Building	Description	Source Leq@1m dB(A)	Correction dB(A) *	Corrected Leq@1m dB(A)	LAeq adj,T ext. dB(A) Day	LAeq adj,T ext. dB(A) Eve	LAeq adj,T int. dB(A) Eve	LAeq adj,T ext. dB(A) Night	LAeq 15 min Compliance		
										Day	Eve	Night
	Criteria									44	36	35
	Car start		74	2	76	29	27	17	24	Yes	Yes	Yes
	Car door closure		75	2	77	31	29	19	26	Yes	Yes	Yes
1	Car passby		74		74	35	34	24	31	Yes	Yes	Yes
	Air ratchet		96		96	16	16	6	16	Yes	Yes	Yes
	Belt sander		86		86	26	26	16	26	Yes	Yes	Yes
	Saw (cutoff)		92		92	16	16	6	16	Yes	Yes	Yes
	Drill hand held battery		83		83	7	7		7	Yes	Yes	Yes
	Compressor medium		87		87	19	19	9	19	Yes	Yes	Yes
	Grinder		86		86	18	18	8	18	Yes	Yes	Yes
	Total					38	36	26	34	Yes	Yes	Yes
	Criteria									44	36	35
	Car start		74	2	76	22	20	10	17	Yes	Yes	Yes
	Car door closure		75	2	77	24	22	12	19	Yes	Yes	Yes
2	Car passby		74		74	29	27	17	24	Yes	Yes	Yes
	Air ratchet		96		96	21	21	11	21	Yes	Yes	Yes
	Belt sander		86		86	31	31	21	31	Yes	Yes	Yes
	Saw (cutoff)		92		92	21	21	11	21	Yes	Yes	Yes
	Drill hand held battery		83		83	12	12	2	12	Yes	Yes	Yes
	Compressor medium		87		87	24	24	14	24	Yes	Yes	Yes
	Grinder		86		86	23	23	13	23	Yes	Yes	Yes
	Total					35	34	24	34	Yes	Yes	Yes

Compliance is predicted for onsite activities on the condition the recommendations detailed in Section 8 are implemented.

## 8. Recommendations

Based on the predicted noise levels and Soundplan modelling, noise impacts at the residential receiver locations are predicted to comply with the assessment criteria on the condition the following management plan and acoustic treatment are implemented:

### 8.1 Management Controls

The following management controls should be implemented:

- The dog and cat exercise yards are to only be used in the daytime (7am-6pm Monday-Saturday and 8am-6pm Sunday).
- Allocate a number of kennels which are additionally upgraded to provide a higher degree of acoustic attenuation than standard kennels, for animals identified as having a heightened awareness to noise. It is likely that these kennels would also need to be mechanically ventilated.
- Attempt to separate or otherwise calm dogs during drop-off and collection times, when they are likely to be most agitated.
- Provide alternative means to distract dogs from barking, and when possible, avoid contact between dogs and people, or between particularly rowdy dogs, etc. where there may be excessive unnecessary barking.

### 8.2 Kennel Construction Requirements

The kennels are recommended to be installed with acoustic absorptive panels. The minimum treatment area per kennel is recommended to be 8m<sup>2</sup> with an NRC rating of 0.7 or higher.

The partition walls between kennels should be constructed of a solid material with at least Rw30 acoustic rating. This can easily be achieved by solid or hollow blockwork constructions.

The acoustic rating of the kennel roofs is required to be a minimum of Rw28. Examples of roof constructions are as follows;

Table 17: Typical roof construction

Description	R <sub>w</sub> rating	NRC
Colorbond or other sheet metal roof with 50mm Anticon insulation under, 150mm timber or steel joists or purlins, one layer 10mm standard plasterboard, cavity insulation 165mm R3.0 fibreglass batts	41	0.9
Flexshield Sonic V50 acoustic panels	31	1.0

The systems listed above are not the only systems that could be used. Other roof systems may be used providing they achieve the acoustic ratings or greater.

### 8.3 Internal Construction Requirements

Recommended construction for internal areas is based on the assessed noise levels in Section 7.2. A markup of construction recommendations is illustrated in Figure 7.

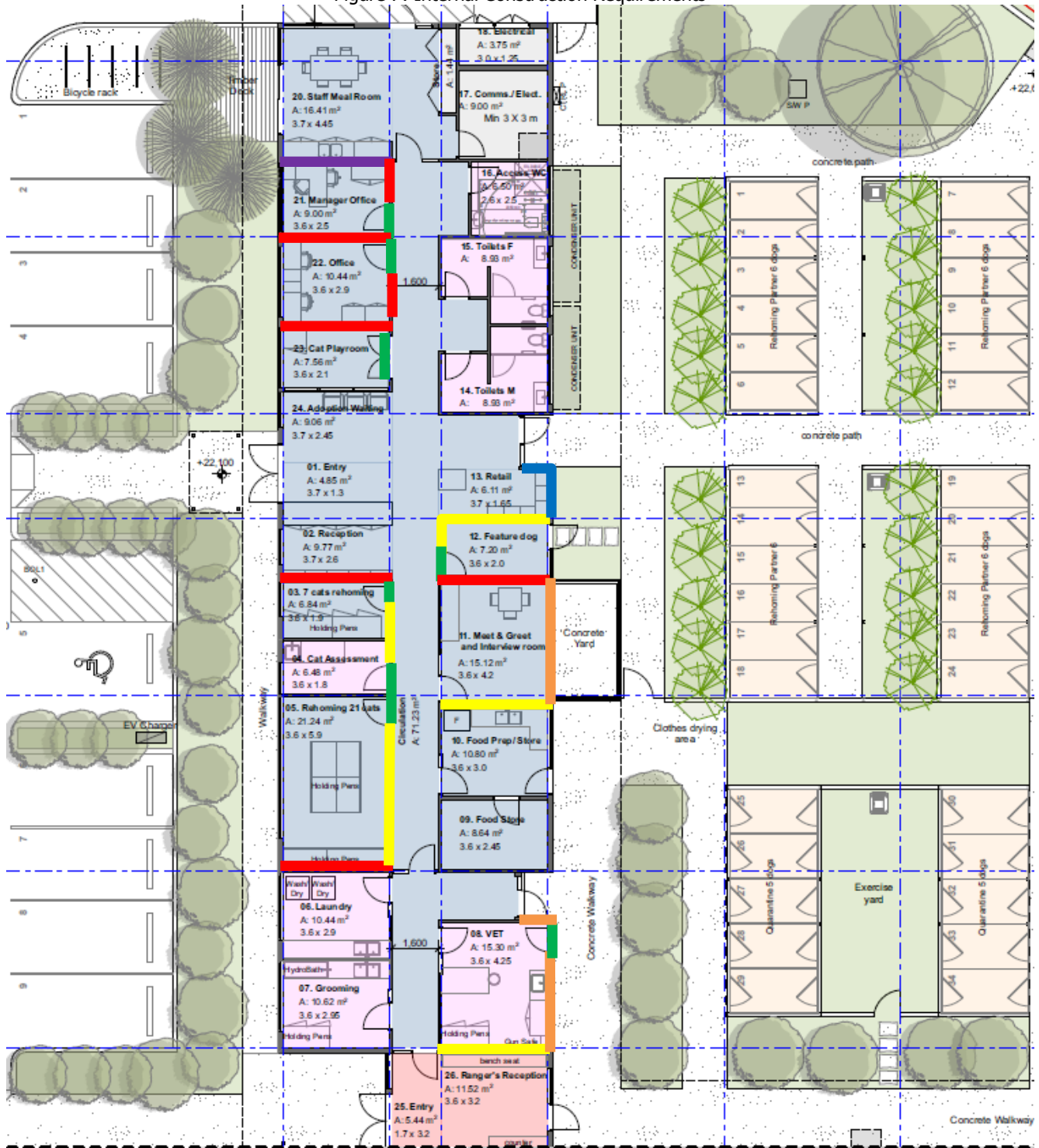
This includes recommendations for speech privacy in the Team Manager's Office. Australian Standard 2822 - 1985 gives guidelines and recommendations for partitioned and open planned offices. This Standard defines Speech Privacy as either normal or confidential.

1. "Normal speech privacy is taken to mean that speech, although partly intelligible, is not intrusive."
2. "Confidential speech privacy is taken to mean that speech will not be intelligible, except when a person concentrates on hearing."

There is a rule-of-thumb which states for normal privacy the sum of the partition  $R_w$  rating and the background noise level  $LA_{90}$  should equal or exceed 75. For confidential privacy, the sum should equal or exceed 80.

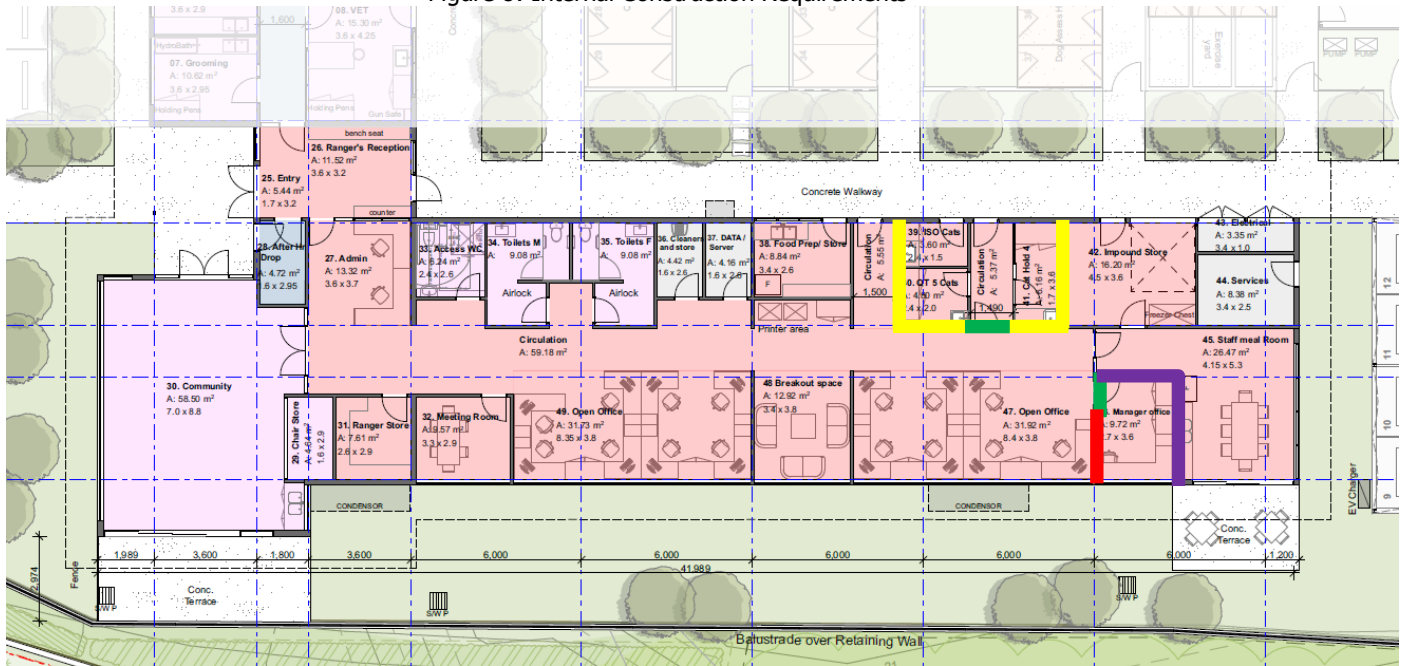
The overall recommendations for internal areas, including indoor dog areas and office spaces are shown in Figure 7.

Figure 7: Internal Construction Requirements



- Rw30 Door Construction
- Rw27 Glazing (4mm with acoustic seals)
- Rw31 Glazing (6.38mm with acoustic seals)
- Rw40 Wall or Rw35 Glazing Construction
- Rw45 Wall Construction
- Rw50 Discontinuous Wall Construction

Figure 8: Internal Construction Requirements



- Rw30 Door Construction
- Rw27 Glazing (4mm with acoustic seals)
- Rw31 Glazing (6.38mm with acoustic seals)
- Rw40 Wall or Rw35 Glazing Construction
- Rw45 Wall Construction
- Rw50 Discontinuous Wall Construction

Allowable methods of construction are detailed below. Other forms of construction may also be implemented provided they achieve the relevant Rw rating.

### Door Systems:

- $R_w$  30: Minimum 40mm thick solid core door with perimeter and base seals, e.g., Raven RP120 perimeter seals and Raven RP99 drop seals.

### Internal Walls:

- $R_w$  40: 10mm standard plasterboard on both sides with minimum 76mm metal stud, 50mm 11kg/m<sup>3</sup> insulation in the cavity.
- $R_w$  45: 16mm fire-rated plasterboard on one side, minimum 76mm metal stud, 50mm 11kg/m<sup>3</sup> insulation in the cavity, 13mm standard plasterboard on the other side.
- $R_w$  50 Discontinuous: 10mm standard plasterboard on both sides, two rows of 76mm metal studs, 50mm 11kg/m<sup>3</sup> insulation in the cavity.



## Glazing

- $R_w$  27: 4mm Floating glass with acoustic seals.
- $R_w$  31: 6.38mm Laminated glass with acoustic seals.
- $R_w$  35: 10.38mm Laminated glass with acoustic seals.

Factors which can compromise and limit the acoustic performance of office partitions include the following;

- Height of the partition wall relative to ceiling level
- Terminations at the façade
- Terminations at internal walls
- Electrical and data outlets
- Ducted skirtings
- Linear diffusers
- Doors
- Mechanical ducts and return air grilles

Any areas requiring acoustic performance of  $D_{w40}$  ( $R_{w45}$ ) or greater will require the partitions to be constructed full height to the underside of the roof above. Limitations caused by the ceiling should also be considered in partitions of lower ratings, which may also need ceiling insulation depending on other factors.

If this is not possible and the ceiling space above the partition is not adequately treated, the required performance rating between rooms would be affected and speech privacy between rooms would be significantly reduced.

Additionally, the installation of soft/absorptive materials on the inside of rooms will reduce the noise level in that room.

### 8.3.1 Waste collection

We recommend that waste collection be conducted in accordance with the surrounding residential properties.

### 8.3.2 Onsite mechanical plant

No information regarding mechanical services was available at the time of the assessment. We recommend that any new mechanical plant is designed to comply with the criteria stated in Section 6.3.4 with an assessment undertaken by qualified acoustic consultant to be conducted prior to installation.



## 8.4 Offsite Shooting Range

Noise from the pistol club has been assessed against AS2107 criteria, although this standard generally provides assessment of LAeq noise levels and not the linear peak of each gunshot. The peak noise levels may have impacts on persons and animals within the development, and therefore should be assessed by suitably qualified person to determine an acceptable noise limit. This noise limit may be different for different breeds of dog or different individual dogs depending on sensitivity.

However, with the inclusion of acoustic absorptive treatments to the kennels, this will assist in reducing some of the reverberant level of external noise sources.

Further preliminary information regarding façade construction for is provided in subsequent sections within this report.

### 8.4.1 Limited Audibility of Gunshots

Assuming the internal levels (as stated in AS2107) of approximately 40-45dBA LAeq,T around office areas, a reduction of the peak noise levels from gunshots would limit their audibility to people (although not make them completely inaudible). Approximately a 47dBA reduction would be necessary to achieve a reduced audibility to people within rooms on the southern façade of the proposed building. Considering the amount of glazing on the western facade, this may require special glazing treatments such as double glazing or secondary glazing. It may not be feasible to design the southern façade of the proposed building to this level, therefore it is expected that gunshots will likely be clearly audible. However, to mitigate noise impacts to the southern façade, construction recommendations have been provided in Table 18, façade system 5.

Approximately a 36dBA reduction would be necessary for rooms on the eastern façade (rooms 32 and 45-49), and a 20dBA reduction on the western facade (rooms 38-42) in order to achieve a limited audibility in these areas. Some examples of construction methods are detailed in Section 8.4.2.

### 8.4.2 Other External Attenuation Measures

If desired, other construction methods may be implemented as shown in Table 18.

Table 18: Façade Construction Alternative Systems

Façade System	Approximate Noise Reduction	Façade Aspect	Approximate Rw Rating Required	Recommended Construction
1	20dB	Wall	32	6mm FC externally, 64mm metal stud, no insulation, 10mm standard plasterboard internally
		Roof	32	Tile or metal sheet roof with sarking and 10mm standard plasterboard
		Glazing	27	4mm Float with Acoustic Seals
2	30dB	Wall	42	6mm FC externally, 64mm metal stud, 50mm 11kg/m <sup>3</sup> insulation in the cavity, 13mm standard plasterboard internally
		Roof	42	Pitched metal sheet roof with Anticon 60 MD, 215mm R4.1 batts in the cavity, and 1 layer of 10mm standard plasterboard
		Glazing	35	10.38mm Lam with Acoustic Seals, or 5mm/44mm air gap/6mm with Acoustic Seals
3	36dBA	Wall	47	9mm FC externally, 76mm metal stud, 50mm 11kg/m <sup>3</sup> insulation in the cavity, 16mm fire-rated plasterboard
		Roof	47	Pitched metal sheet roof with Anticon 60 MD, 165mm R3.0 batts in the cavity, and 1 layer of 13mm sound-rated plasterboard
		Glazing	40	5mm/50mm air gap/6mm with Acoustic Seals
4	40dB	Wall	55	16mm fire-rated plasterboard internally on 90mm timber stud and brick veneer externally
		Roof	55	Pitched metal sheet roof with Anticon 60 MD, 215mm R4.1 batts in the cavity, and 2 layers of 13mm fire-rated plasterboard fixed to Rondo furring channel clipped to resilient mounts
		Glazing	43	5mm/100mm air gap/5mm with Acoustic Seals
5	45dB	Wall	59	Fire rated brick veneer externally, 76mm stud, 75mm insulation R1.5 with 16mm fire rated plasterboard internally
		Roof	59	Pitched tile roof with Anticon 60 MD, 215mm 4.1 batts in the cavity and 3 layers of 13mm fire-rated plasterboard fixed to Rondo furring channel clipped to resilient mounts
		Glazing	49	10mm/200mm air gap/6mm with Acoustic seals

Note that these are not the only allowable methods of construction; other construction aspects may be implemented for the desired Rw ratings. Alternative ventilation may be required in the relevant rooms to allow doors and windows to remain closed.

Façade construction location recommendations are provided in the figures below.

Figure 9: External Construction Location Recommendations

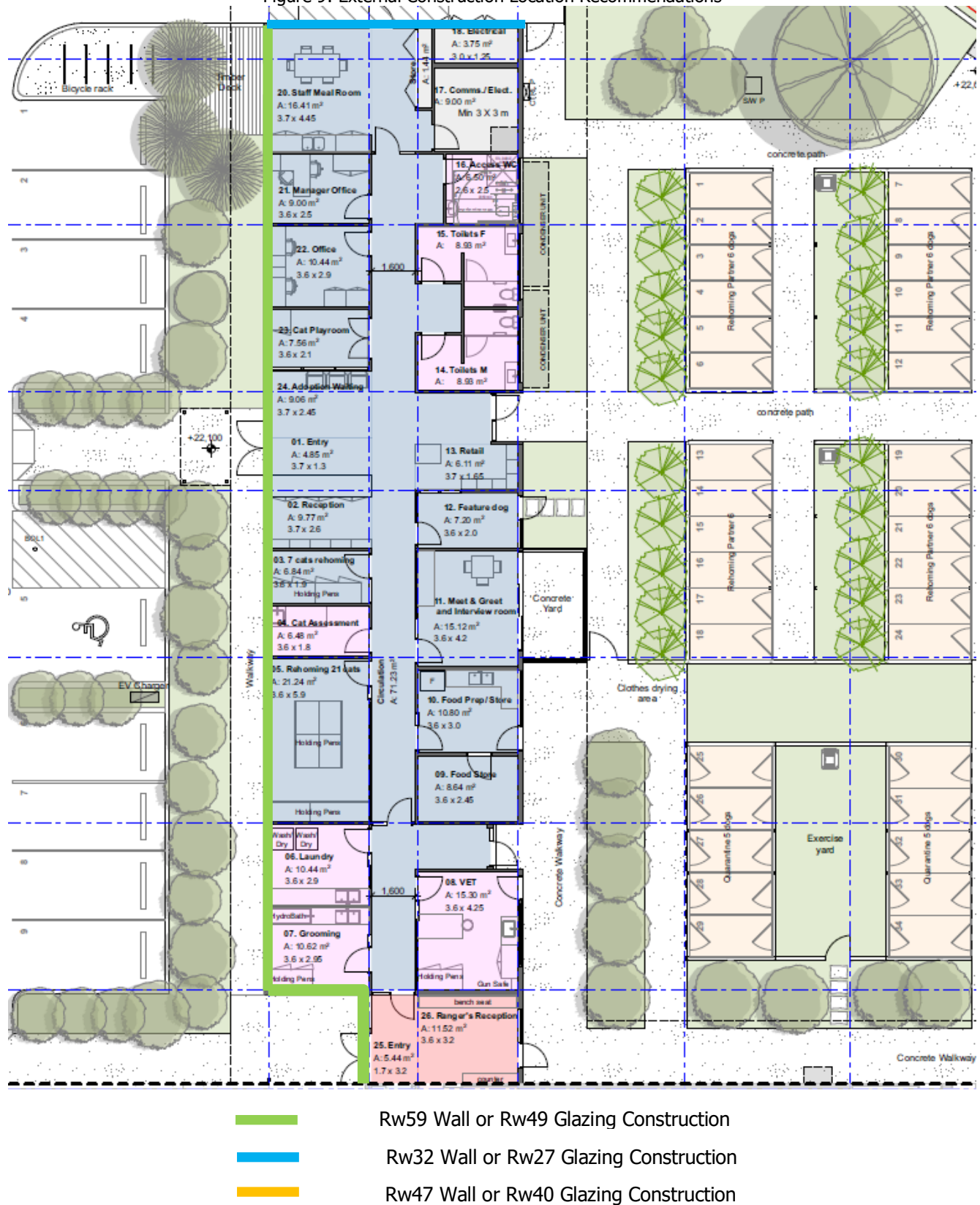
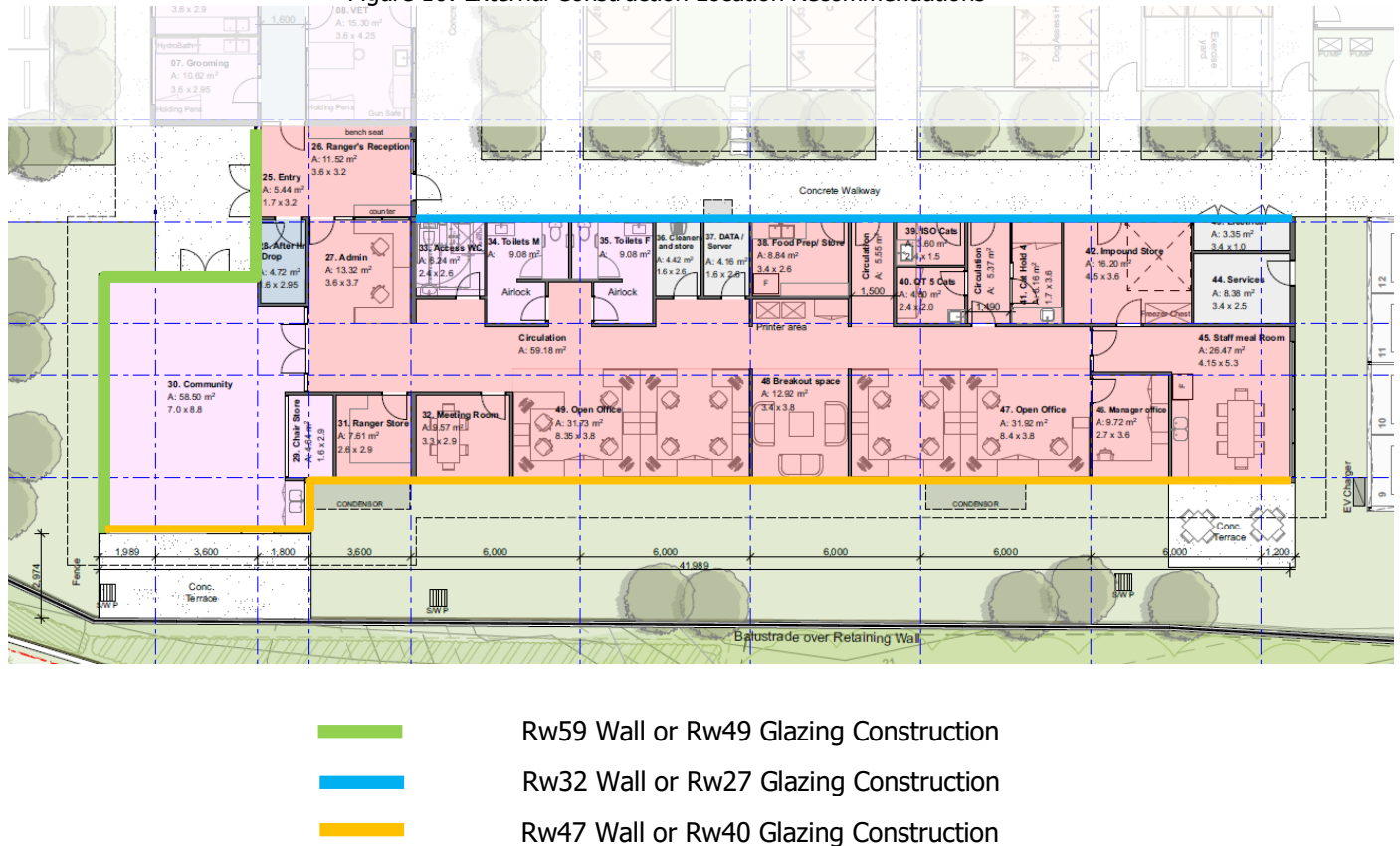


Figure 10: External Construction Location Recommendations



Allowable methods of construction are detailed below. Other forms of construction may also be implemented provided they achieve the relevant Rw rating.

## 8.5 Additional future upgrades

If for any reason it is desired to further reduce noise impacts from the facility at a future stage, the general recommendations may be (but not limited to) one, or a combination of, the following;

- Install additional absorptive areas of lining to the kennels.
- Construct overall continuous roof coverage over the kennel area.
- Install continuous walls to the kennels.
- Fully enclose the kennels and mechanically ventilate.
- Construct acoustic fencing at or near the receiver locations to provide additional screening attenuation.
- Upgrade of receiver glazing by either replacing existing windows with acoustic rated windows, or adding secondary glazing systems to the existing windows.
- Upgrade of receiver roof/ceiling by installation of ceiling insulation (if not already present).
- Upgrade of receiver entry doors by addition of acoustic seals.
- Providing mechanical ventilation (air conditioning) to the receiver dwellings such that façade doors and windows can be closed to exclude noise.

Note that this list is not comprehensive and other options may also be available.

## 9. Conclusion

An environmental noise assessment was conducted for the proposed animal shelter located at Lundberg Drive, South Murwillumbah. Based on the available information and the results of the analysis, the proposed facility has been assessed against NSW Noise Policy for Industry and Tweed Shire Council's assessment requirements and recommendations detailed accordingly in Section 8.

Should you have any queries please do not hesitate to contact us.

Report Prepared By



**Kaitlyn Meldrum**

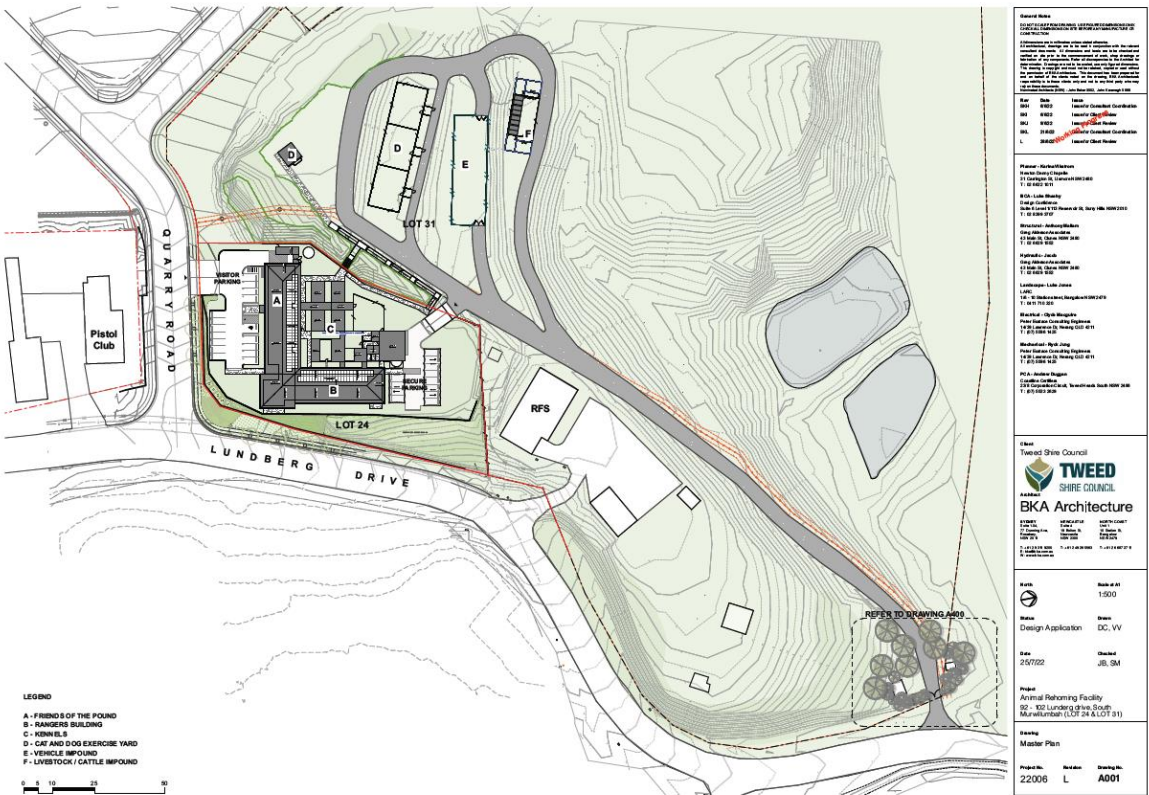
Acoustic Consultant

acousticworks)))

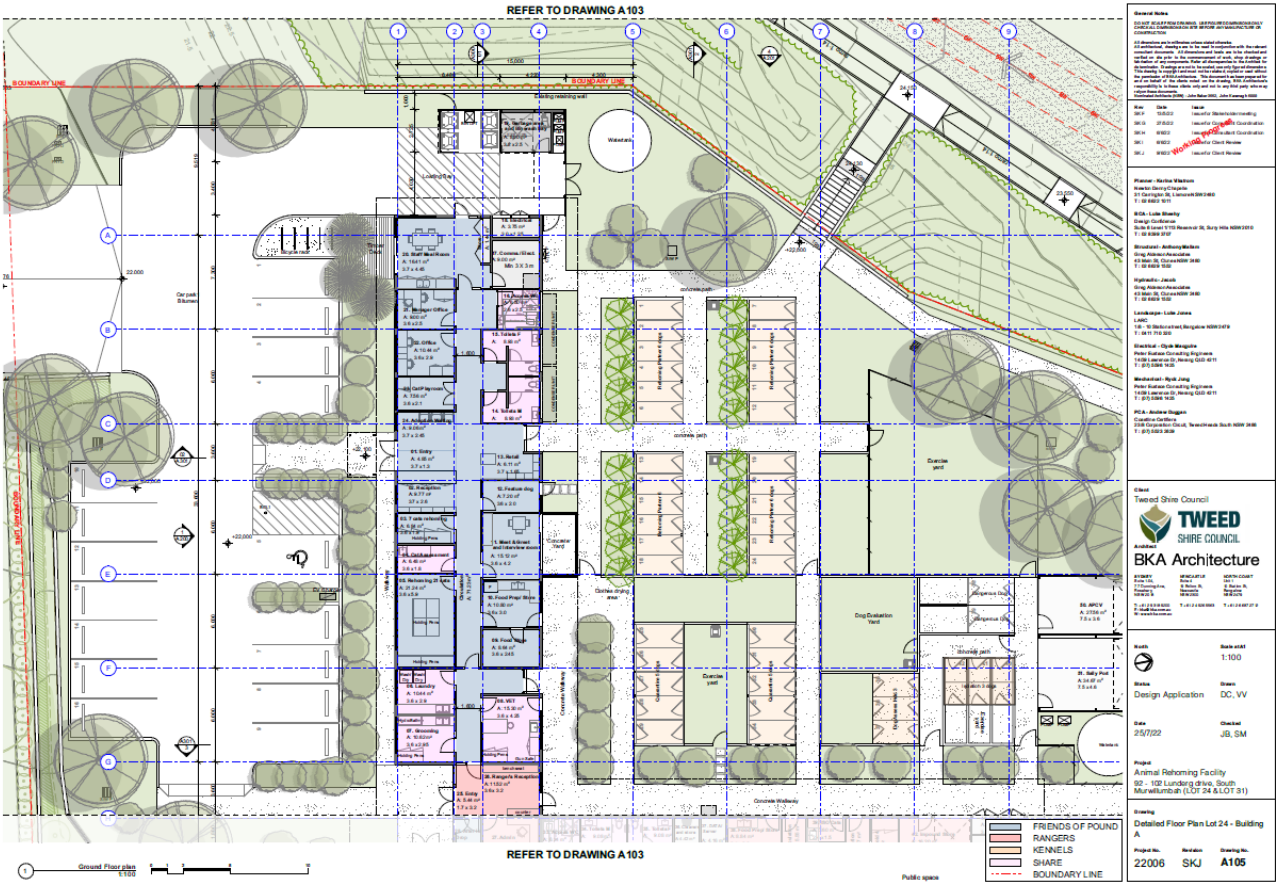
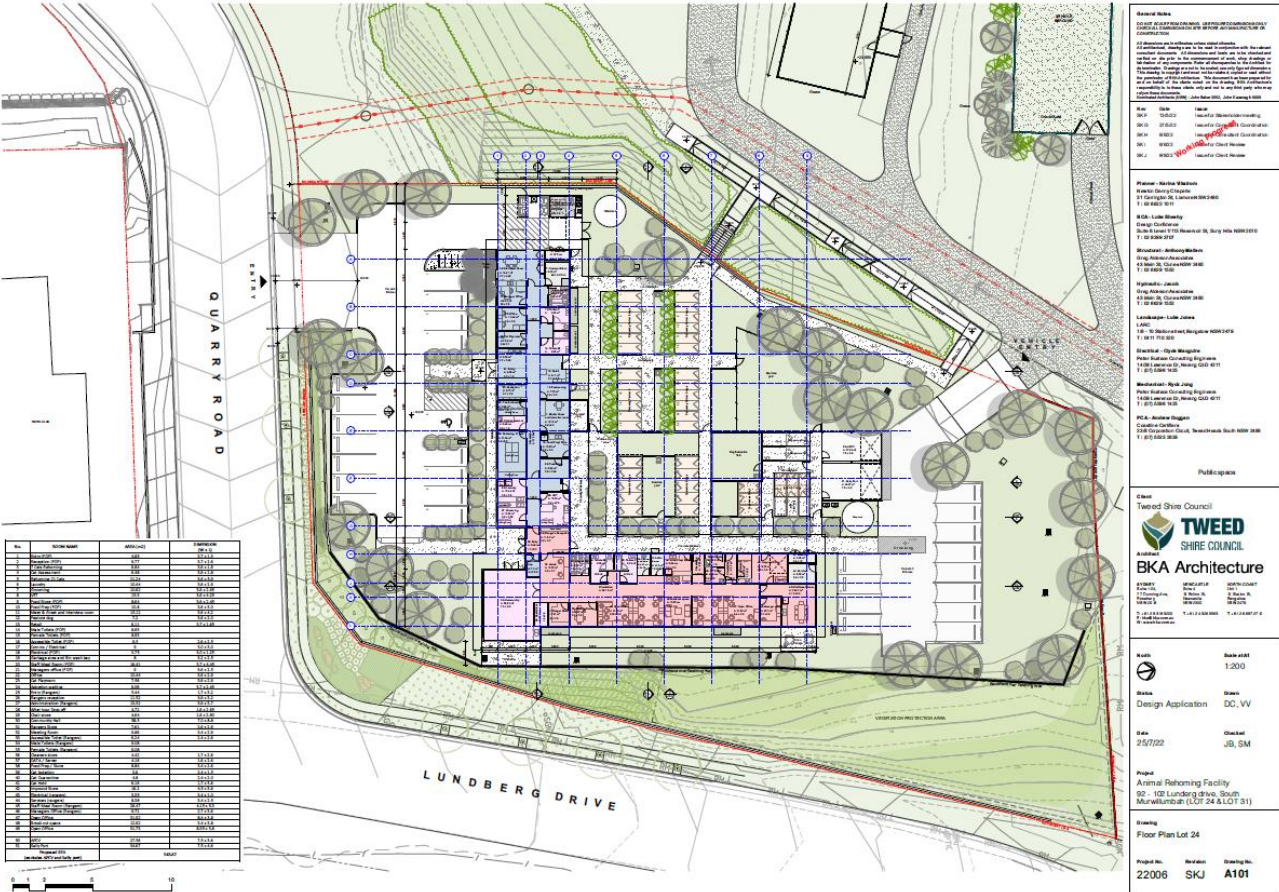


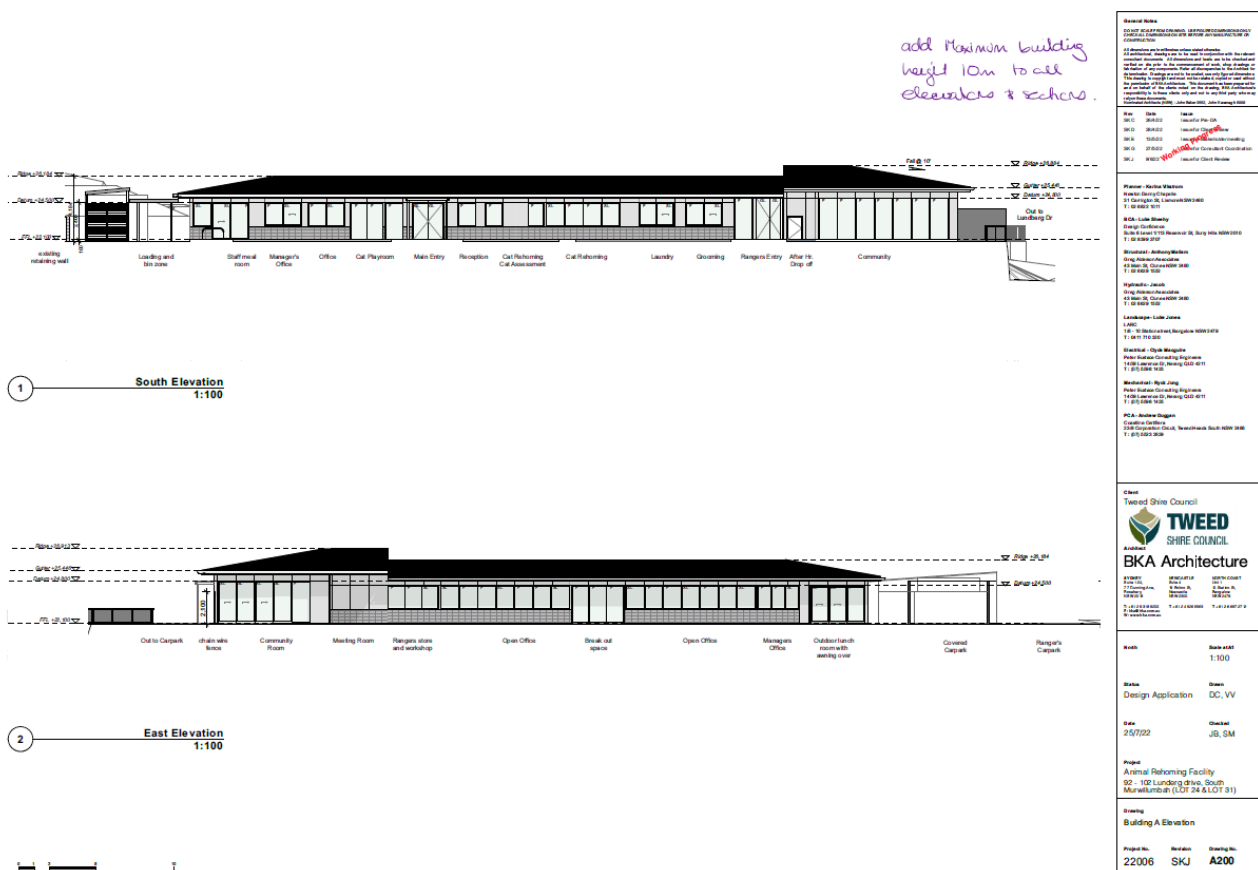
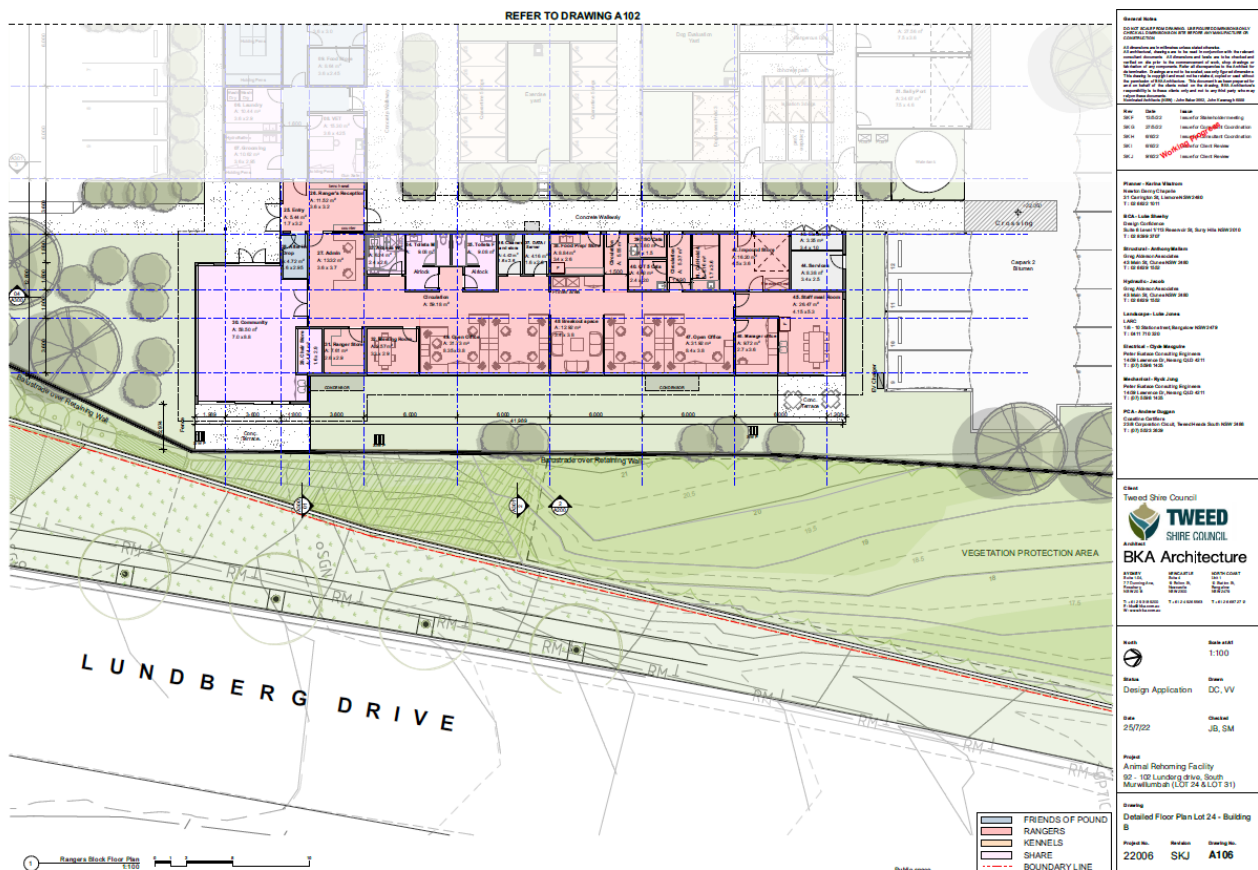
10. Appendices

10.1 Development Plans

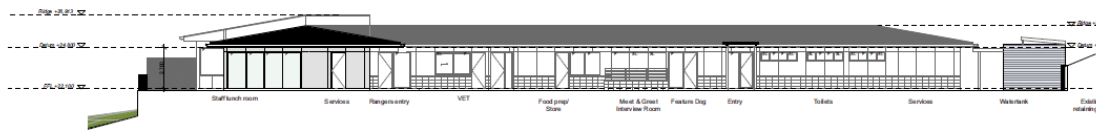












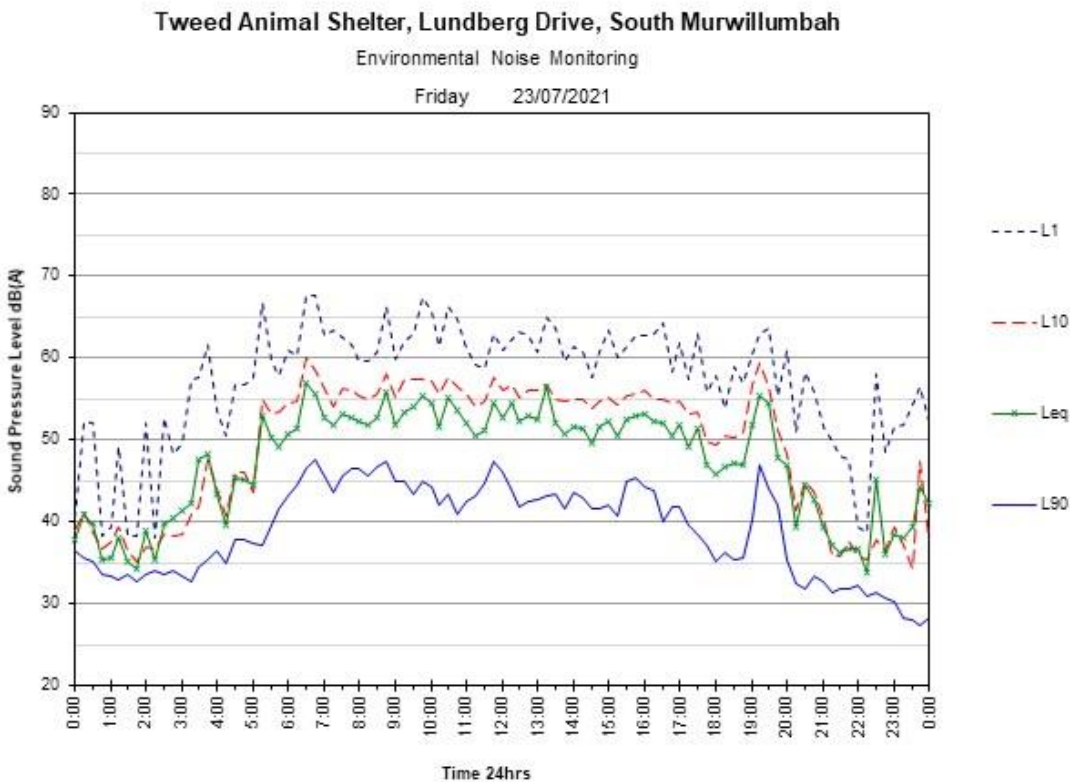
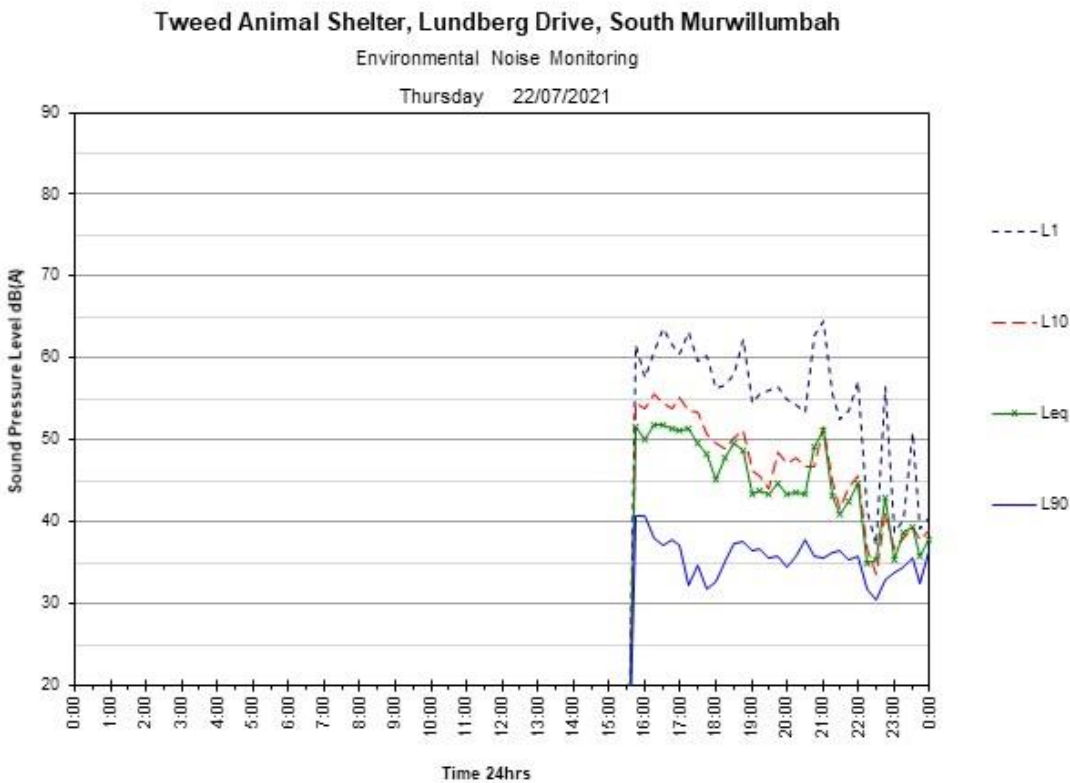
1 North Elevation  
1:100



2 **West Elevation**  
1:100

[illegible]

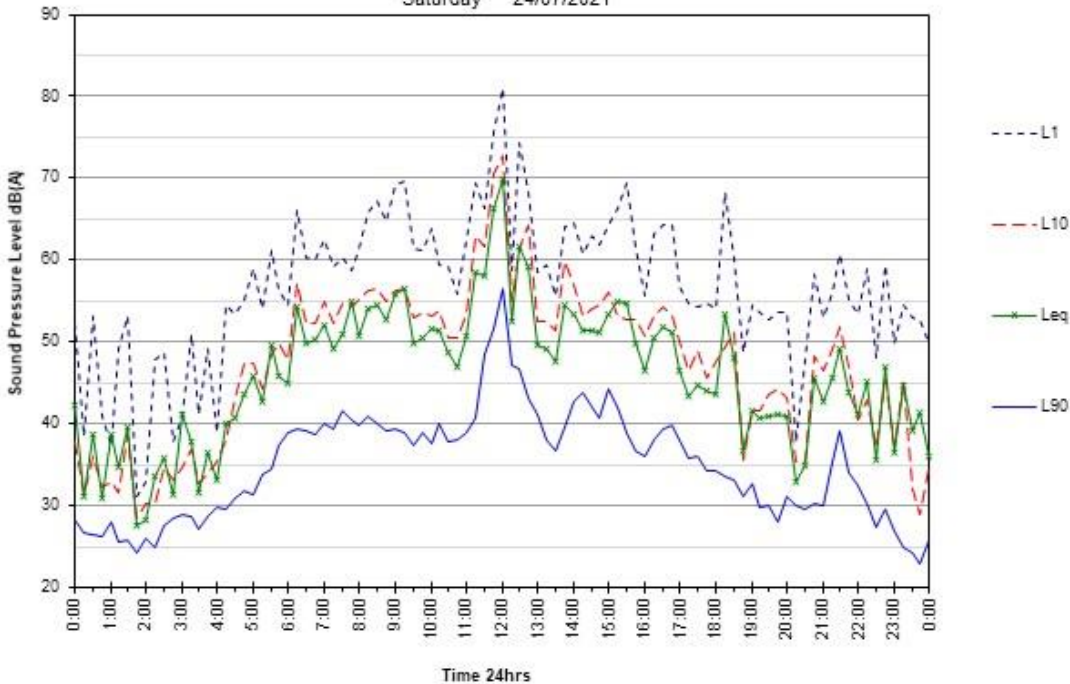
10.2 Noise Monitoring Charts



Tweed Animal Shelter, Lundberg Drive, South Murwillumbah

Environmental Noise Monitoring

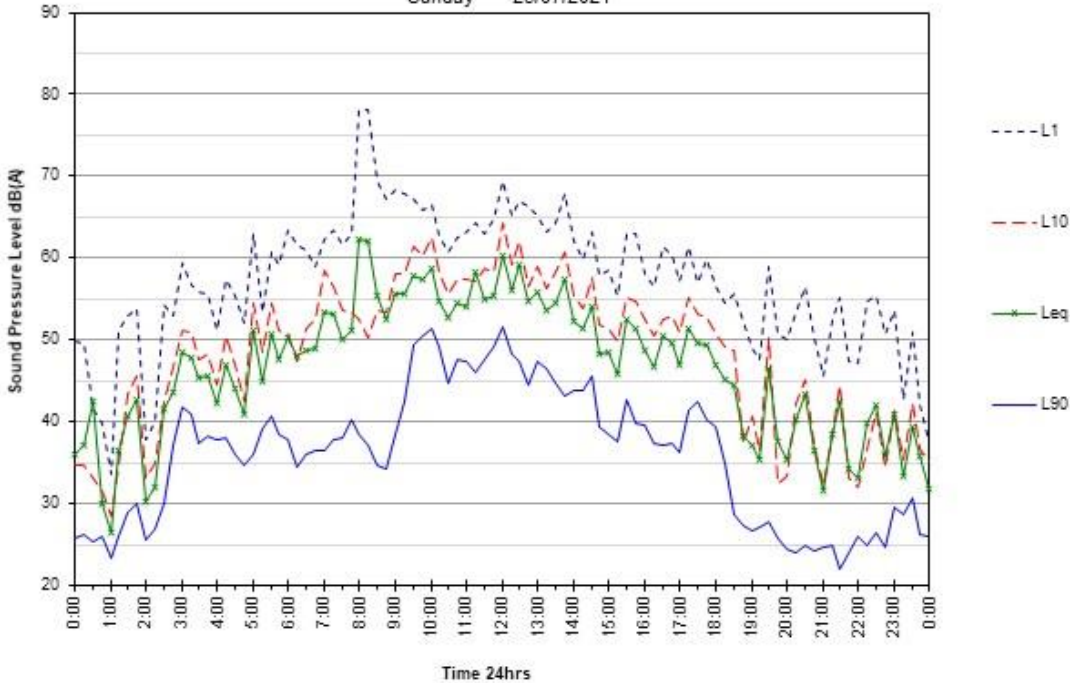
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Tweed Animal Shelter, Lundberg Drive, South Murwillumbah

Environmental Noise Monitoring

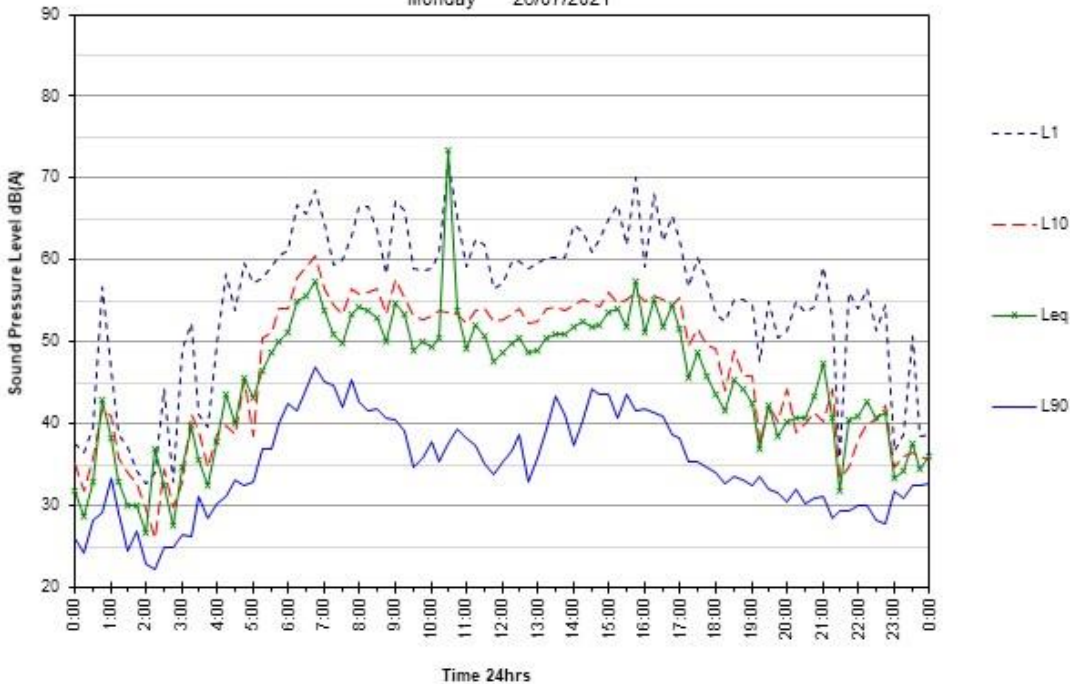
Sunday 25/07/2021



Tweed Animal Shelter, Lundberg Drive, South Murwillumbah

Environmental Noise Monitoring

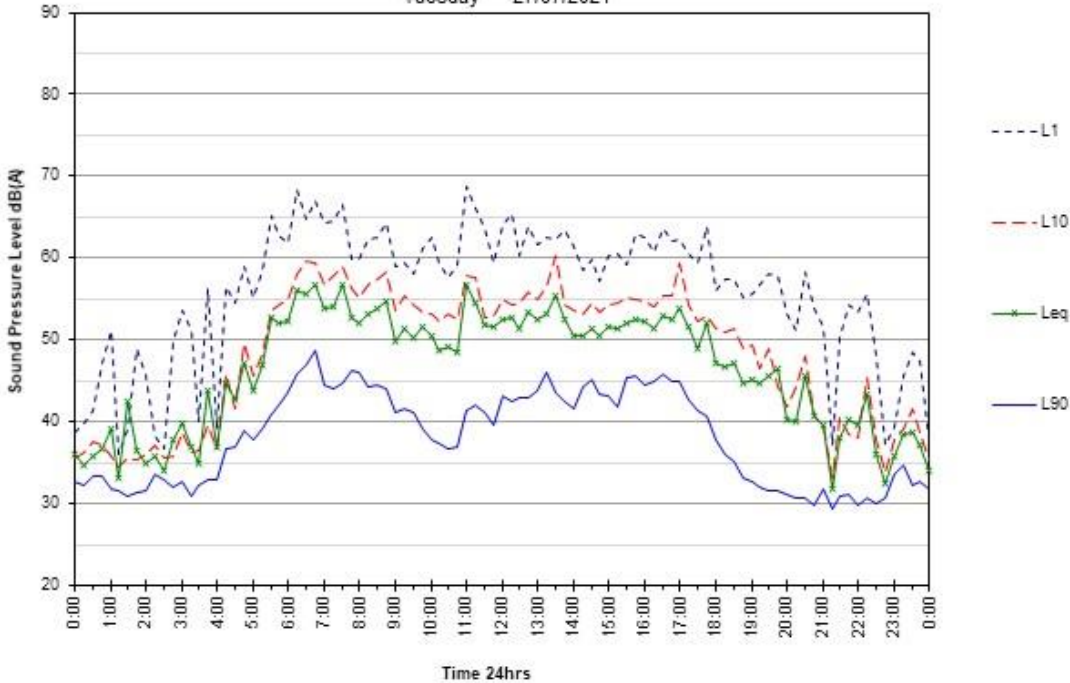
Monday 26/07/2021



Tweed Animal Shelter, Lundberg Drive, South Murwillumbah

Environmental Noise Monitoring

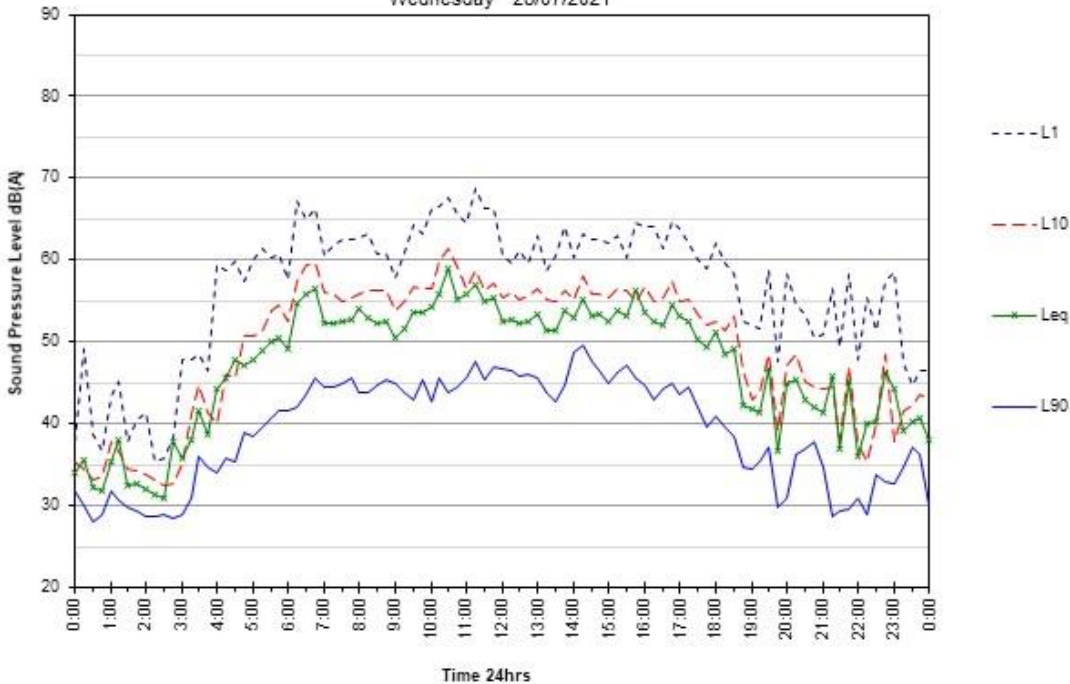
Tuesday 27/07/2021



Tweed Animal Shelter, Lundberg Drive, South Murwillumbah

Environmental Noise Monitoring

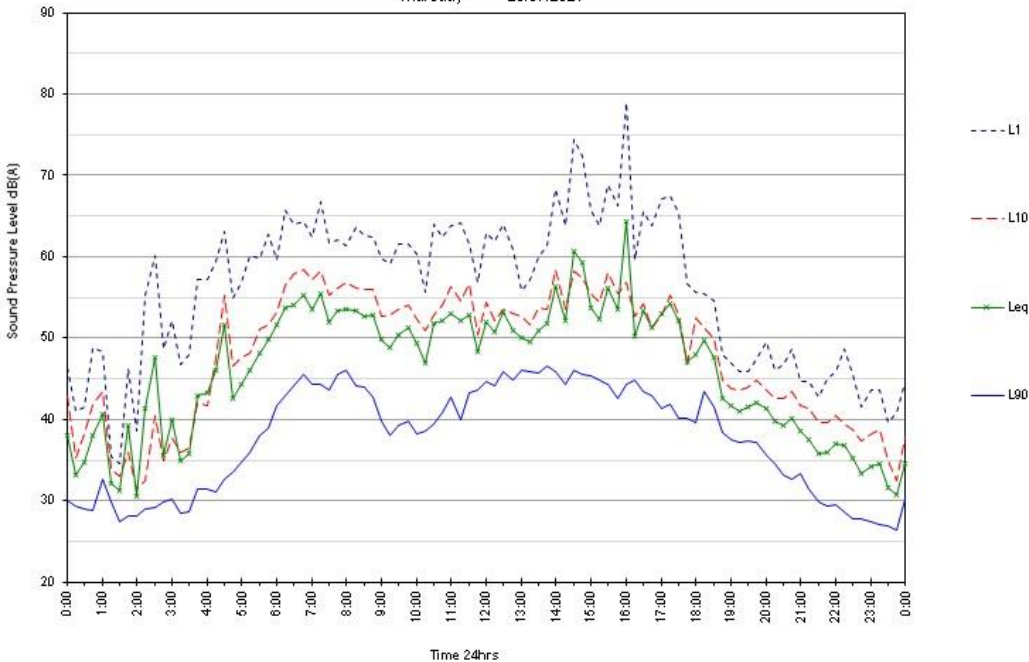
Wednesday 28/07/2021



Tweed Animal Shelter, Lundberg Drive, South Murwillumbah

Environmental Noise Monitoring

Thursday 29/07/2021

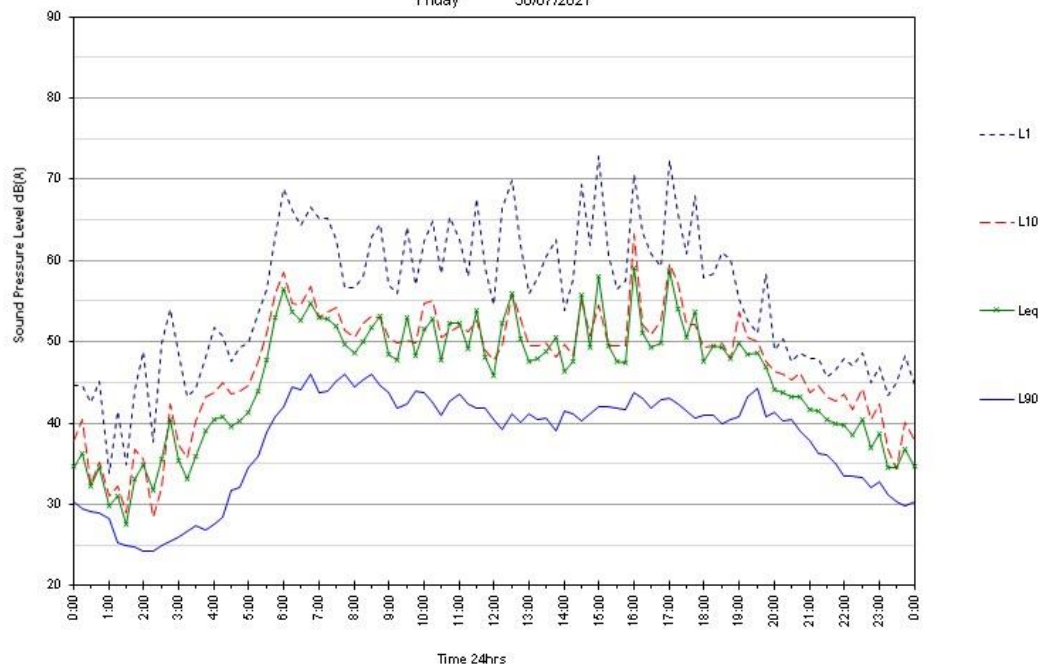




Tweed Animal Shelter, Lundberg Drive, South Murwillumbah

Environmental Noise Monitoring

Friday 30/07/2021



Tweed Animal Shelter, Lundberg Drive, South Murwillumbah

Environmental Noise Monitoring

Saturday 31/07/2021

