



**ANAVS-ACOUSTIC NOISE & VIBRATION SOLUTIONS P/L**

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# ***Acoustic & Vibration Impact Report***

**For**

## **Proposed Gym at No. 3-5 Davies Rd, Padstow**

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**Date: May 9, 2023**

**Reference No.: 2023-123**



**Australian  
Acoustical  
Society**

**#1032**

**Membership Type**  
Member

**Member Since**  
19 May, 2008

## **Document Control**

<i>Date</i>	<i>Revision History</i>	<i>Prepared By:</i>	<i>Reviewed and Authorised by:</i>
09/05/2023	Initial Report	Domeniki Tsagaris	Moussa Zaioor
10/05/2023	Final Report	Moussa Zaioor	Moussa Zaioor

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## **1.0 SCOPE OF WORK**

ANAVS- Acoustic, Noise & Vibration Solutions Pty Ltd was engaged to investigate the environmental noise & vibration impact of the proposed change of use of a smash repairs workshop to an indoor recreational facility (gym) at No. 3-5 Davies Rd, Padstow (Figure 1 – Site Location) on the surrounding environment, as per City of Canterbury Bankstown Council requirements.

This report is carried out in accordance with the NSW Noise Policy for Industry (2017), Noise Guide for Local Government, DEC 2006 document titled Assessing Vibration : a technical guideline and other related City of Canterbury Bankstown Council requirements.

This commission involves the following:

- Inspect the site and environs.
- Measure the background noise levels at critical locations and times.
- Prepare an Environmental Noise Impact Report.
- Establish acceptable noise level criterion.
- Quantify noise emissions from the proposed gym
- Calculate the level of noise emissions at most critical receivers
- Provide in principle noise control recommendations (if necessary).

The following report has been prepared in conjunction with the Statement of Environmental Effects and Plan of Management by City Planning Works dated 11<sup>th</sup> April, 2023 and 19<sup>th</sup> April, 2023 respectively.

## **2.0 SITE & OPERATIONS DESCRIPTION**

The proposed gym will occupy an existing factory unit located in a commercial lot at 3-5 Davies St, Padstow (Figure 2 – Site Plan).

The site is located within a mixed-use environment with commercial properties located north and east of the site and residential buildings located south and west of the site (Figure 3 – Surrounding Environment).

The nearest residential and commercial receivers that have the potential to be impacted by the proposed gym are located as per Table 2.1 below (Figure 4 – Nearest Residential and Commercial Receivers).

**Table 2.1 – Nearest Residential Receivers**

<b>Receiver</b>	<b>Address</b>	<b>Type of Dwelling</b>
<b>R1</b>	No. 44 Iberia St (South of the Site)	Two-Storey Residential Building
<b>R2</b>	No. 33B Arab Rd (West of the Site)	Two-Storey Residential Building

There are eighteen (18) existing on-site car parking spaces provided for this proposal.

The proposed gym will have the following operational details:

<b>Hours of Operation</b>	<b>Max No. of Patrons/Staff at any one time</b>	<b>Operational Description</b>
Monday – Friday: 5:00am – 10:30am and 4:30pm – 7:30pm  Saturday: 6:00am – 8:00am	Three (3) Staff members with Twenty-Seven (27) Patrons	<ul style="list-style-type: none"><li>- Free-weight and machinery training</li><li>- Group workout circuits involving cardio + weight training</li><li>- Yoga/pilates area</li></ul>

Commercial properties located adjacent to the proposed gym and their associated operating hours are located as below:

- **T&D Auto Care – C1 (7 Davies Rd)**
  - o Monday – Friday: 9:00am – 5:00pm
  - o Saturday: 9:00am – 2:00pm
- **Beaumont Tiles – C2 (1 Davies Rd)**
  - o Monday – Friday: 8:30am – 5:00pm
  - o Saturday: 9:00am – 4:00pm

The existing background noise is dominated by noise generated by the adjacent commercial environment (including all associated mechanical plant & equipment) and traffic noise generated by Davies Rd.

The noise & vibration emissions from the operation of the gym must not exceed the acceptable levels at the nearby receptor locations. Noise control will be required for the proposed gym to comply with the noise criteria set out in Section 4 of this report. The noise controls in Section 6 of this report are reasonable and feasible in reducing the noise from the proposed premises to an acceptable level.

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### **3.0 EXISTING NOISE ASSESSMENT, INSTRUMENTATION & RESULTS**

On the 29<sup>th</sup> of April 2023, unattended noise measurements were carried out on-site in order to determine existing background noise levels. The unattended noise survey was carried out for a period of seven (7) days between the 29<sup>th</sup> April, 2023 and the 6<sup>th</sup> May, 2023 adjacent to the nearest residential receiver at 44 Iberia St (Figure 5 – Noise Reading location).

The unattended noise survey was conducted to determine a conservative reading of the existing acoustic environment during the day [7:00 – 18:00], evening [18:00 – 22:00] and night [22:00 – 7:00] and to determine the  $L_{(A90, 15 \text{ minutes})}$  and RBL.

All sound pressure levels are rounded to the nearest whole decibel. All measurements were taken in accordance with the Australian Standards AS 1055:2018 “*Acoustics- Description and Measurements of Environmental Noise*”.

All sound level measurements and analysis performed throughout this project are carried out with a NSRTW\_MK3 wireless sound level data loggers (Serial No. AFHWJvUS8X0VCBNwx+D5ND- Office tag machine 2) . The sound logger specification is as follows:

- Type 1 digital MEMS microphone
- Non-volatile 128 Mb recording memory
- Records L-max, L-min and Leq levels
- Log interval adjustable from 125 ms (8 points per second) up to hours
- A, C and Z weighting curves
- Oscilloscope and spectrum analyser features
- Observes and records 100% of the acoustic signal
- Software calculates global Leq according to ISO and OSHA methods
- WIFI connectivity to report measured levels remotely
- Weatherproof casing designed for indoor/outdoor applications
- Activity detection and logging.
- Long-term measurement and recording of acoustic levels for environmental impact studies.

The logger is factory calibrated and manufacturer's calibration certificate dated 04/05/2021 is presented in Figure 6 – Calibration Certificate.

The microphone of the noise reading machine was positioned 1.5m above ground level. The factory-calibrated noise reading machine was calibrated prior to and after reading with our Svantek SV 33A S/N: 90200 Class 1 Calibrator with no significant drift recorded. Any readings affected by strong wind or rain have been disregarded.

The Full Average Statistical Noise Parameters  $L_{(Aeq, 15 \text{ minutes})}$ ,  $L_{(A90, 15 \text{ minutes})}$ ,  $L_{(A10, 15 \text{ minutes})}$ ,  $L_{(A1, 15 \text{ minutes})}$  are presented in Figure 7 – Noise Survey – Point A. A Summary of those readings is presented in the table below.

Table 3.1 - Existing Noise Survey Results at Point A  
29<sup>th</sup> April, 2023 – 6<sup>th</sup> May, 2023

<i>Location</i>	<i>Time Period</i>	<i>Arithmetic Mean LAeq dB(A)</i>	<i>Arithmetic Mean LA90 dB(A)</i>	<i>RBL dB(A)</i>
Point A	Day Time (7:00am-6:00pm)	67	59	57
	Evening Time (6:00pm-10:00pm)	65	55	51
	Night/Early Morning (10:00pm – 7:00am)	61	44	35

**L<sub>90</sub>** – the level of noise that is exceeded for 90% of the time over which a given sound is measured. This is considered to represent the background noise level.

**RBL**- Rated background noise levels as determined in accordance with Fact Sheet B as per the Noise Policy for Industry 2017.

## **4.0 ACCEPTABLE NOISE LEVELS**

### **4.1 NOISE GUIDE FOR LOCAL GOVERNMENT**

The Department of Environment and Conservation (NSW) published the amended *Noise Guide for Local Government* in October 2010. The policy is specifically aimed at assessing noise from light industry, shops, entertainment, public buildings, air conditioners, pool pumps and other noise sources in residential areas.

Section 2.2.3 of the Noise Guide for Local Government recommends noise measurements and an intrusive noise level when attempting to achieve acceptable and achievable noise limits.

Section 2.2.1 of the Noise Guide for Local Government states that a noise source is generally considered to be intrusive if the noise from the source when measured over a 15-minute period exceeds the background noise by more than 5 dB(A). Therefore, the noise criteria are as follows:

- **Day period:**  $59 + 5 = 64 \text{ dB(A)}$
- **Evening period:**  $55 + 5 = 60 \text{ dB(A)}$
- **Night period:**  $44 + 5 = 49 \text{ dB(A)}$

The appropriate regulatory authority (Local Council) may, by notice in writing given to such a person, prohibit the person from causing, permitting or allowing:

1. any specified activity to be carried on at the premises, or
  2. any specified article to be used or operated at the premises.
- or both, in such a manner as to cause the emission from the premises, at all times or on specified days, or between specified times on all days or on specified days, of noise that, when measured at any specified point (whether within or outside the premises,) is in excess of a specified level.

It is an offence to contravene a noise control notice. Prior to being issued with a noise control notice, no offence has been committed.

#### **4.1.1 SLEEP DISTURBANCE**

In order to minimize the potential of sleep disturbance due to transient noises from the gym during night hours (10:00pm – 7:00am), Section 2.2.4 of the Noise Guide For Local Government recommends that  $L_{A1,1\text{-minute}}$  level of any noise outside a bedroom should not exceed the background noise level by more than 15dB.

**$L_{A1, 1 \text{ minute}} \leq 44 + 15 = 59 \text{ dB(A)}$  outside bedroom window of nearest residential receiver.**

Similar text about sleep arousal is adopted in the Noise Policy for Industry 2017 as below:

**Where the subject development/premises night-time noise levels at a residential location exceed:**

- **$L_{Aeq,15\text{min}}$  40 dB(A) or the prevailing RBL plus 5 dB, whichever is the greater, and/or**
- **$L_{AFmax}$  52 dB(A) or the prevailing RBL plus 15 dB, whichever is the greater,**

**a detailed maximum noise level event assessment should be undertaken.**

Further studies by the enHealth Council (2004) and the guidelines published by the World Health Organisation (1999) were reviewed and analysed in terms of the guidance on noise exposure and sleep disturbance. The enHealth report states that:

*‘as a rule for planning for short-term or transient noise events, for good sleep over 8 hours the indoor sound pressure level measured as a maximum instantaneous value should not exceed approximately 45 dB(A)  $L_{A, (Max)}$  more than 10 or 15 times per night’.*

## **4.2 NSW NOISE POLICY FOR INDUSTRY (2017)**

The noise from the proposed gym is governed under Section 2 of the Noise Policy for Industry 2017. The above policy seeks to promote environmental well-being through preventing and minimizing noise by providing a framework and process for deriving noise limits conditions for consent and licenses.

The Noise Policy for Industry 2017 recommends two separate noise criteria to be considered, the Intrusive Noise Criteria and the Amenity Noise Criteria. A project noise trigger level being the lowest of the amenity and the intrusiveness noise level is then determined.

If the predicted noise level  $L_{Aeq}$  from the proposed project exceeds the noise trigger level, then noise mitigation is required. The extent of any ‘reasonable and feasible’ noise mitigation required whether at the source or along the noise path is to ensure that the predicted noise level  $L_{Aeq}$  from the project at the boundary of most affected residential receiver above is not greater than the noise trigger level.

### **4.2.1 AMENITY NOISE CRITERIA**

The amenity noise levels presented for different residential categories are presented in Table 2.2 of the Noise Policy for Industry 2017. These levels are introduced as guidance for appropriate noise levels in residential areas surrounding industrial areas.

For the proposed gym at No. 3-5 Davies Rd, Padstow, the recommended amenity noise levels are presented in table 4.2.1.1 below:

Table 4.2.1.1- Recommended Amenity Noise levels

Type of Receiver	Noise Amenity Area	Time of Day	Recommended Leq Noise Level, dB(A)
Residence	Urban	Day	60
		Evening	50
		Night	45
Commercial	All	When in Use	65
Industrial	All	When in Use	70

Where a noise source contains certain characteristics such as tonality, impulsiveness, intermittency, irregularity or dominant low-frequency content, a correction is to be applied which is to be added to the measured or predicted noise levels at the receiver, before comparison with the criteria. Shown below are the correction factors that are to be applied:

Table 4.2.1.2 – Modifying Factor Corrections as per Fact Sheet C (Noise Policy for Industry 2017)

FACTOR	CORRECTION
Tonal Noise	+ 5 dB
Low Frequency Noise	+ 5 dB
Impulsive Noise	Apply difference in measured fast and impulse response levels, as the correction, up to a maximum of 5 dB.
Intermittent Noise	+ 5 dB

According to Section 2.4 of the above policy, the project amenity noise level is determined as follows:

**Project amenity noise level for industrial developments = recommended amenity noise level (Table 2.2) minus 5 dB(A)**

To convert from a period level to a 15-minute level, a plus 3 is added as per section 2.2 of the policy.

Therefore, the project amenity noise levels for the proposed gym are as follows:

**Day Time:**  $60 - 5 + 3 = 58 \text{ dB(A)}$   
**Evening Time:**  $50 - 5 + 3 = 48 \text{ dB(A)}$   
**Night-time:**  $45 - 5 + 3 = 43 \text{ dB(A)}$

#### **4.2.2 INTRUSIVE NOISE CRITERIA**

Section 2.3 of the Noise Policy for Industry summarizes the intrusive criteria as below:

$$L_{Aeq, 15 \text{ minute}} \leq \text{rating background level plus 5}$$

While the background noise level known as  $L_{A90,15 \text{ minutes}}$  is the Noise exceeded 90% percent of a time period over which annoyance reactions may occur (taken to be 15 minutes). The RBL is defined as the overall single-figure  $L_{A90,15 \text{ minutes}}$  background level representing each assessment period (day/evening/night) over the whole monitoring period.

For the short-term method, the rating background noise level is simply the lowest measured  $L_{A90,15\text{min}}$  level.

For the long-term method, the rating background noise levels are defined as the median value of the daily, evening and night lowest tenth percentile of  $L_{90}$  background noise levels and calculated in accordance with Fact Sheet B of the NPfI 2017.

Therefore, the acceptable  $L_{Aeq}$  noise intrusiveness criteria for the day, evening and night is as follows:

- **57 + 5 = 62 dB (A)** during the day
- **51 + 5 = 56 dB (A)** during the evening
- **35 + 5 = 40 dB (A)** during the night

#### **4.2.3 PROJECT NOISE TRIGGER LEVEL**

A summary of intrusiveness and amenity noise levels as determined in sections 4.2.1 & 4.2.2 are shown in table 4.2.3.1 below:

**Table 4.2.3.1 - Summary of Intrusive and Amenity noise levels**

<b>Period</b>	<b>Intrusiveness Noise Level</b>	<b>Project Amenity Noise level</b>
<b>Day Time (7:00am – 6:00pm)</b>	62	58
<b>Evening Time (6:00pm – 10:00pm)</b>	56	48
<b>Night-Time (10:00pm – 7:00am)</b>	40	43

The project noise trigger level is the lower (that is, the most stringent) value of the amenity and intrusiveness noise levels for the day and evening. Therefore, the project noise trigger levels for the proposed development are as shown below:

- **Daytime:**  $L_{Aeq,15 \text{ min}}$  **58 dB(A)**
- **Evening-time:**  $L_{Aeq,15 \text{ min}}$  **48 dB(A)**
- **Night-Time:**  $L_{Aeq,15 \text{ min}}$  **40 dB(A)**

### 4.3 TRAFFIC NOISE GENERATION CRITERIA

The Road Noise Policy in table 3, page 11 states that the  $L_{eq}$  (1 hour) level of noise intrusion from land use developments with potential to create additional traffic on existing subaerial roads should not exceed 60 dB(A) during the day time (7am to 10pm) and 55 dB(A) during night time (10pm to 7am).

### 4.4 DEPARTMENT OF ENVIRONMENT & CONSERVATION NSW ‘ASSESSING VIBRATION: A TECHNICAL GUIDELINE’

In addition to noise limits, floor vibration levels in habitable rooms should comply with the Department of Environment & Conservation NSW document titled ‘*Assessing Vibration: A Technical Guideline*’. Most of these vibration limits stated in the document above are adopted from the British Standard BS 6472-1:2008 ‘*Evaluation of Human Exposure to Vibration in Buildings (1Hz to 80 Hz)*’ criteria.

The Acceptable Vibration Limit Values as detailed in the NSW EPA Assessing Vibration: A Technical Guideline are presented in Table 4.4.1 below

**Table 4.4.1- Acceptable Vibration Dose Value for Intermittent Vibration ( $m/s^{1.75}$ )**

Location	Daytime <sup>1</sup>		Night-time <sup>1</sup>	
	Preferred value	Maximum value	Preferred value	Maximum value
Critical areas <sup>2</sup>	0.10	0.20	0.10	0.20
Residences	0.20	0.40	0.13	0.26
Offices, schools, educational institutions and places of worship	0.40	0.80	0.40	0.80
Workshops	0.80	1.60	0.80	1.60

## **5.0 NOISE BREAK OUT FROM THE GYM**

The main sources of noise from the proposed gym may include but are not limited to:

- Noise emission from Mechanical Plant & Equipment.
- Noise from Patrons' cars accessing the site.
- Noise and vibration impact from Indoor Gym Operations (weights and patrons including background music/TV).

### **5.1 MECHANICAL PLANT & EQUIPMENT**

The proposed gym will operate in the evening and in the early morning hours, therefore the air-conditioning units are expected to operate throughout these times.

Provided recommendations in Section 6 of this report are adhered to, the mechanical plant will not produce any additional offensive noise for the nearest potential receiver as background noise levels are dominated by existing mechanical plant & equipment from the adjacent commercial properties and traffic noise from Davies Rd.

### **5.2 TRAFFIC & PARKING NOISE EMISSIONS**

Eighteen (18) existing parking spaces are currently available on site at the gym with access from Davies Rd. No changes will be made to the number of spaces.

Patrons are expected to live or work in the surrounding area and therefore the majority will access the proposed site by foot, bicycle or public transport.

The predicted noise levels due to vehicles arriving and departing the site will be governed by existing background noise levels from Davies Rd and surrounding commercial/industrial operations.

As shown in sections 5.2.1 & 5.2.2 below, the noise break-out from additional traffic generation and the predicted noise levels at the nearest residential receiver due to vehicles entering/exiting the carpark will comply with Table 3 of the Road Noise Policy and the Noise Policy for Industry 2017 provided the recommendations in Section 6 of this report are adhered to.

## **5.2.1 NOISE BREAK-OUT FROM ADDITIONAL TRAFFIC GENERATION**

Predicted noise levels at 1.0m from the façade due to additional traffic generation on Davies Rd are presented in Table 5.2.1.1

**Table 5.2.1.1 – Predicted Noise from Traffic Generation on Davies Rd at 1.0m from facade of Nearest residential Receivers**

Activity	Period	Expected Leq 1hr dB(A) from Additional Traffic Noise on Davies Rd	Complies with Traffic Noise Criteria- as per section 4.4
Noise from Additional Traffic Generation on Davies Rd	AM Peak Hour Period	37 dB(A)	Yes <60 dB(A) – Day
	PM Peak Hour Period	37 dB(A)	<55 dB(A) – Night

## **5.2.2 NOISE BREAK-OUT FROM CARS ENTERING/EXITING THE CARPARK**

Access to the existing on-site carpark will be from the front of the site on Davies St. The nearest residential receivers affected by vehicles entering and exiting the carpark will be No. 44 Iberia St and No. 33B Arab Rd.

Car Park noises typically may comprise of people talking, car radios, cars starting, car doors closing and cars moving. The following table summarises the noise from typical car activities (Sound Power Levels -Swl-).

**Table 5.2.2.1 – Swl Levels for Different Car Activities Expected to Occur in the Garage**

<i>Garage Noise Source</i>	<i>Sound Power Level, dB(A)</i>
Car Door Closing	95
Car Starting	91
Car Accelerating	91
Car Moving at 10 km/hr	81

Predicted noise levels at the boundary of the nearest residential receiver due to cars entering and exiting the carpark, are presented in Table 5.2.2.2 below.

**Table 5.2.2.2 – Predicted noise from vehicles entering and exiting the carpark at boundary of Nearest Residential Receiver**

Activity	Period	Expected Leq dB(A) at No. 44 Iberia St <sup>*,**</sup>	Expected Leq dB(A) at No. 33B Arab Rd <sup>*,**</sup>	<i>Compliance with Noise Trigger level (Noise Policy For Industry 2017).</i>
Noise impact from vehicles entering/exiting the on-ground carpark	7.00am - 6.00pm (Day)	33 dB(A)	33 dB(A)	Yes < 58 dB(A)
	6:00pm – 10:00pm (Evening)	33 dB(A)	33 dB(A)	Yes < 48 dB(A)
	10:00pm – 7:00am (Night)	33 dB(A)***	33 dB(A)***	Yes < 40 dB(A)

\* Assuming all recommendations in section 6 of this report are adhered to.

\*\*Calculated at upper floor boundary.

\*\*\*Based on Max. (5) Vehicles arriving/departing the carpark per 15 mins.

Table 5.2.2.3 below presents the predicted LA<sub>1,1min</sub> noise level from the Carpark operations at the external façade of the nearest residential receiver and its compliance with the Sleep Disturbance Criteria.

**Table 5.2.2.3– Predicted Maximum Noise Level - LA<sub>1,1min</sub> at Façade of Nearest Residential Receiver<sup>\*,\*\*</sup>**

Activity	Period	Expected LA <sub>1,1min</sub> at Façade of No. 44 Iberia St	Expected LA <sub>1,1min</sub> at Façade of No. 33B Arab Rd	Compliance with Sleep Disturbance Criteria
Maximum Noise Generated from Carpark Operation*	Early morning 5:00-a.m. 7:00 a.m.	44 dB(A)	44 dB(A)	<b>Yes ✓</b> LA <sub>1, 1 minute</sub> <59 dB(A), [L90+15] L Aeq , 15 mins ( 33 dBA< 40) LAFmax <52.

\*Based on Max. (3) Vehicles arriving/departing the carpark per minute in the early mornings.

\*\*Calculated at upper floor windows.

### **5.3 PREDICTED NOISE LEVELS AT NEAREST RESIDENTIAL RECEIVERS FROM PATRON INSIDE THE GYM (AIRBORNE)**

The proposed gym will offer cardio and free-weight training available for patrons to use. A maximum of twenty-seven (27) patrons are expected at any one time with three (3) staff members with amplified music/TV being played.

The sound power level of male and female vocal levels (at any octave band centre frequency) is shown in Table 5.3.1 below:

**Table 5.3.1 – Different Male & Female Vocal Levels (at any octave band centre frequency) \*Average Speech Levels - Pearson, Bennet, & Fidell (1977) Report.**

Vocal Effort	No. of Talkers	Sound Power Levels [dB] at Octave Band Centre Frequencies [Hz] *,**							
		125	250	500	1000	2000	4000	8000	dB(A)
<b>Females</b>									
Casual	1	37.0	55.0	56.0	47.0	46.0	41.0	44.0	<b>55.7</b>
Normal	1	37.0	58.0	61.0	53.0	49.0	51.0	45.0	<b>60.8</b>
Raised	1	36.0	64.0	68.0	63.0	58.0	56.0	50.0	<b>68.4</b>
Loud	1	31.0	66.0	70.0	72.0	68.0	64.0	56.0	<b>75.2</b>
Shouted	1	31.0	61.0	75.0	83.0	81.0	75.0	66.0	<b>86.2</b>
<b>Males</b>									
Casual	1	55.0	57.0	59.0	48.0	46.0	46.0	43.0	<b>58.1</b>
Normal	1	59.0	63.0	65.0	56.0	51.0	49.0	43.0	<b>64.0</b>
Raised	1	62.0	67.0	71.0	64.0	58.0	55.0	49.0	<b>70.3</b>
Loud	1	61.0	71.0	79.0	76.0	70.0	66.0	57.0	<b>80.0</b>
Shouted	1	53.0	77.0	85.0	89.0	84.0	79.0	70.0	<b>91.4</b>

Internal noise from the gym is expected to peak [worst case scenario] when the gym is at capacity (maximum 27 patrons) with amplified music/TV playing. Table 5.3.2 presents the maximum airborne noise level anticipated from the operation of the gym at maximum capacity (max. 27) including staff, amplified music and weights being used.

**Table 5.3.2 - Noise Level of gym Operating at Maximum Capacity Including Amplified Music + Patrons+ Machines & Weights used**

Description	Sound Pressure Levels (dB) at Octave Band Centre Frequencies (Hz) at centre of gym								
	63	125	250	500	1k	2k	4k	8k	dB(A)
<b>Total Cumulative Noise from Operational Activities at Maximum Capacity at Centre of Gym</b>	-	<b>84</b>	<b>87</b>	<b>89</b>	<b>85</b>	<b>81</b>	<b>76</b>	<b>63</b>	<b>91</b>

**\*\*Maximum noise levels produced in the gym are expected during max capacity of 2 patrons + amplified music/TV**

All operational activities for the proposed gym will occur inside the premises. Sound loss will be experienced through the existing building envelope and distance mitigation between the gym and the nearest residential receivers.

Using the maximum noise levels anticipated from the gym as per Table 5.3.2 above, the predicted noise levels at the nearest residential receivers as presented in Table 5.3.3 below are based on the methods and Standards as per **AS ISO 9613- :1996** Acoustics - Attenuation of sound during propagation outdoors -- : General method of calculation & Lord -Templeton 1986 Inside/Outside transmission loss method of calculations.

**Table 5.3.3 – Sound Pressure Levels LAeq from Maximum Noise Generated from Gym**

Activity	Period	Expected Leq dB(A) at No. 44 Iberia St *	Expected Leq dB(A) at No. 33B Arab Rd	<i>Compliance with Noise Trigger level (Noise Policy For Industry 2017).</i>
<b>LAeq 27 Patrons + 3 Personal Trainers + Amplified Music/Tv</b>	7.00am - 6.00pm (Day)	21 dB(A)	21 dB(A)	Yes < 52 dB(A)
	6:00pm – 10:00pm (Evening)	21 dB(A)	21 dB(A)	Yes < 48 dB(A)
	10:00pm – 7:00am (Night)	21 dB(A)	21 dB(A)	Yes < 40 dB(A)

\*Calculated at upper floor boundary line

Similarly, Table 5.3.4 presents the predicted LA<sub>1,1min</sub> noise levels from the gym operations at the external façade of the nearest residential receivers and their compliance with the Sleep Disturbance Criteria.

**Table 5.3.4– Predicted Maximum Noise Levels- LA1 1min at Façade of Residential Receivers**

Activity	Period	Expected LA <sub>1,1min</sub> at Façade of No. 44 Iberia St	Expected LA <sub>1,1min</sub> at Façade of No. 33B Arab Rd	<b>Compliance with Sleep Disturbance Criteria LA<sub>1,1min</sub> &lt; L<sub>90</sub> + 15</b>
<b>LAeq 27 Patrons + 3 Personal Trainers + Amplified Music/Tv (All screaming at the same time)</b>	Early morning 5:00 a.m. - 7:00 a.m.	30 dB(A)	30 dB(A)	<b>Yes ✓*</b>  < 44 + 15 = 59 dB(A)

\*Calculated at upper floor window

As shown above, provided the recommendations in Section 6 of this report are adhered to, the noise emissions from the proposed gym will comply with the NSW Noise Policy for Industry 2017 and the Noise Guide for Local Government including the Sleep Disturbance Criteria presented in both documents.

#### **5.4 SOUND & VIBRATION LEVELS AT NEAREST RESIDENTIAL RECEIVERS (STRUCTURE BORNE NOISE & VIBRATION).**

There are no easy- to- use modelling procedures to calculate the structure borne noise and vibration resulting from dropping weights onto floors.

The nearest residential receivers are located approximately 45 metres away from the gym and are separated from the gym by concrete slabs and asphalt. Noise and vibration testing were carried out on similar sites with similar configurations.

Provided the recommendations in section 6.2 are adhered to, then weights being dropped, and other vibration-producing activities conducted by patrons will not produce any noticeable vibration noise at the nearest residential receiver and will fully comply with the requirements of AS 2670.2-1990 Evaluation of human exposure to whole-body vibration - Continuous and shock-induced vibration in buildings (1 to 80 Hz).

### **6.0 NOISE CONTROL RECOMMENDATIONS**

#### **6.1 MECHANICAL PLANT**

We recommend any air supply fan/ New Ac units (if any) to be facing the carpark and placed away from any receiver.

#### **6.2 VIBRATION IMPACT**

We recommend 83mm A1 Rubber Flooring (or similar) to be installed through the whole free-weight area (not including office & reception). The use of vibration dampers on machine weights (if provided) adjacent to building columns is recommended but not necessary.

#### **6.3 NOISE VOLUME CONTROL**

Amplified music is to be inaudible outdoors at the boundary of any residential receiver. This can be easily achieved and can be confirmed by standing at the boundary listening and adjusting until the music/Tv played is inaudible.

#### **6.4 WINDOWS AND DOORS OF PROPOSED TRAINING GYM**

All operable windows & sliding doors are to be closed during evening hours and early mornings as to not allow any noise propagation.

#### **6.5 MANAGEMENT OF PROPOSED CENTRE & SIGNS**

Patrons of the gym must be informed of the nearest residential receivers and the importance of minimising noise produced especially during the evening and night hours. Management is to ensure that patrons enter and leave the site in an orderly fashion and not congregate outside.

Signs are to be placed inside the gym near any weights advising patrons to not heavily drop weights on the floor, rather place them gently when possible, to minimise any vibration impact.

#### **6.6 PEOPLE CONGREGATING OUTSIDE THE GYM AREA**

Patrons not to congregate outside the Training Centre on the footpath or the carpark and be aware of the residential receivers during the early morning hours by keeping noise to a minimum.

We recommend that signs are installed in the carpark and at the entry reminding patrons not to congregate outside and be aware of the residential receivers during the evening and night hours by keeping noise to a minimum.

#### **6.7 NOISE MANAGEMENT PLAN**

A Noise Management Plan should be implemented and should include the following:

- Install a contact number at the front of the gym so that complaints regarding the operation can be made.
- Implement a complaint handling procedure. If a noise complaint is received the complaint should be recorded on a Complaint Form. The Complaint Form should contain the following:
  - Name and Address of the Complainant
  - Time and Date the Complaint was received
  - The nature of the complaint and the time/date the noise was heard
  - The name of the employee that received the complaint
  - Actions taken to investigate the complaint and the summary of the results of the investigation

- Indication of what was occurring at the time the noise was happening (if applicable)
- Required remedial action (if applicable)
- Validation of the remedial action
- Summary of feedback to the complaint

Also, a permanent register of complaints should be held on the premises, which shall be reviewed monthly by staff to ensure all complaints are being responded to. All complaints received shall be reported to management with initial action/investigation commencing within 7 days. The complaint should also be notified of the results and actions arising from the investigation.

## **7 CONCLUSION**

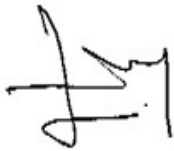
Measurements and computations presented in this report show that the noise & vibration emissions from the proposed gym; will not exceed the noise criteria set out in Section 4 of this report. Additional noise controls recommendations are outlined in Section 6 to ensure compliance through the operation of the development.

The operation of the proposed gym is expected to be minimal due to the nature of the operations and will comply with the requirements of City of Canterbury Bankstown Council.

The proposed gym complies with the relative sections of the EPA and City of Canterbury Bankstown Council Requirements and will not create any offensive noise or excessive vibration to the surrounding receivers.

Should you require further explanations, please do not hesitate to contact us.

Yours sincerely,



M. Zaioor.  
M.S. Eng'g Sci. (UNSW).  
M.I.E.(Aust), CPEng.  
Australian Acoustical Society (Member).

8 **APPENDIX**

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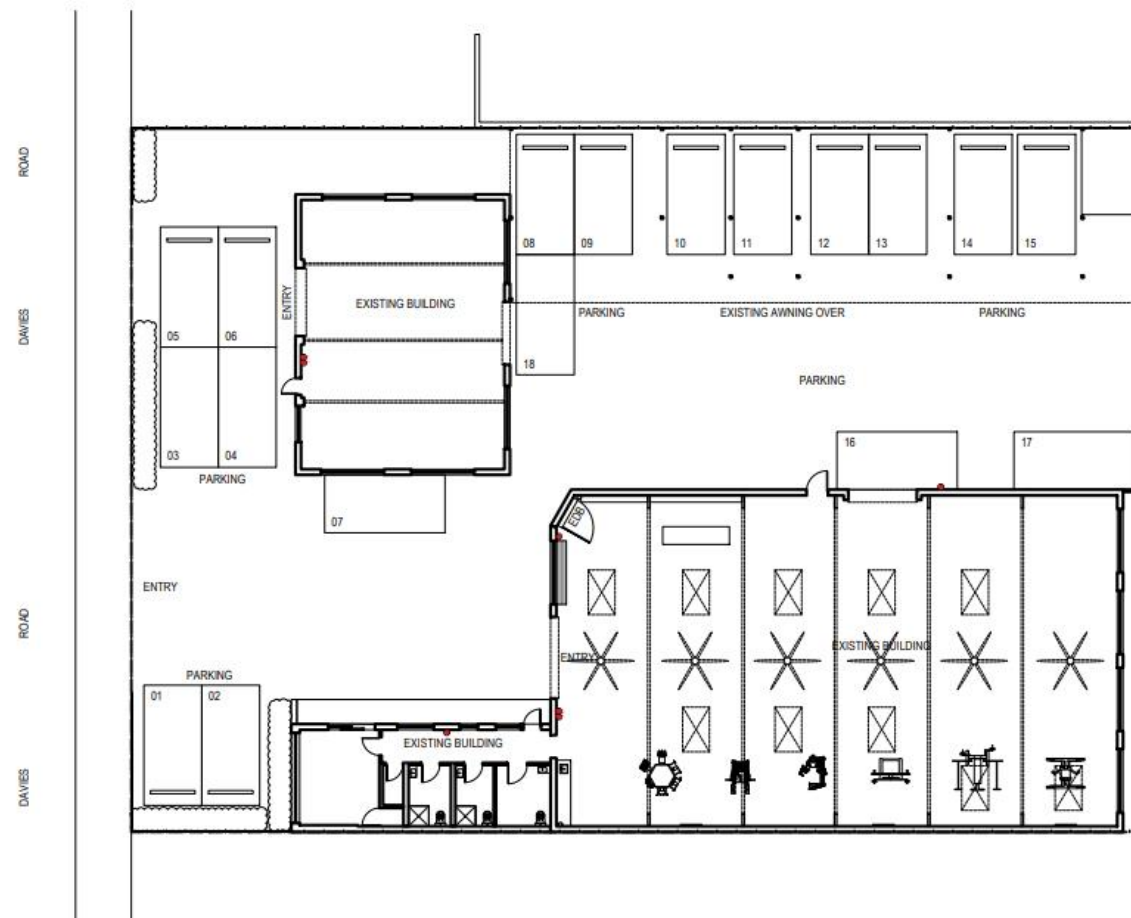
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Figure 1 - Site Location



★ ★ EXISTING OVER ALL GND FLOOR PLAN  
SCALE 1:200

Figure 2 – Site Plan

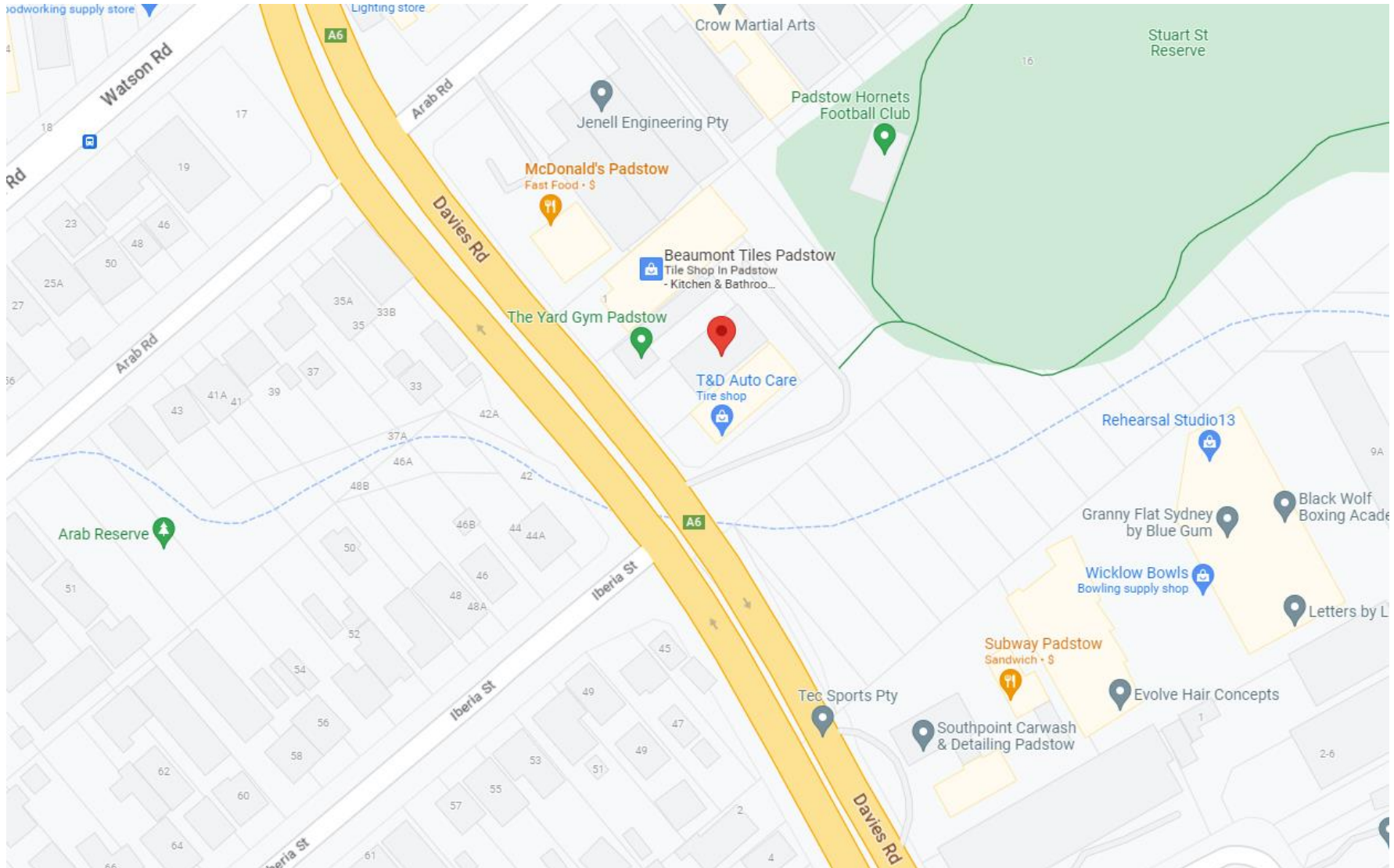


Figure 3 - Surrounding Environment

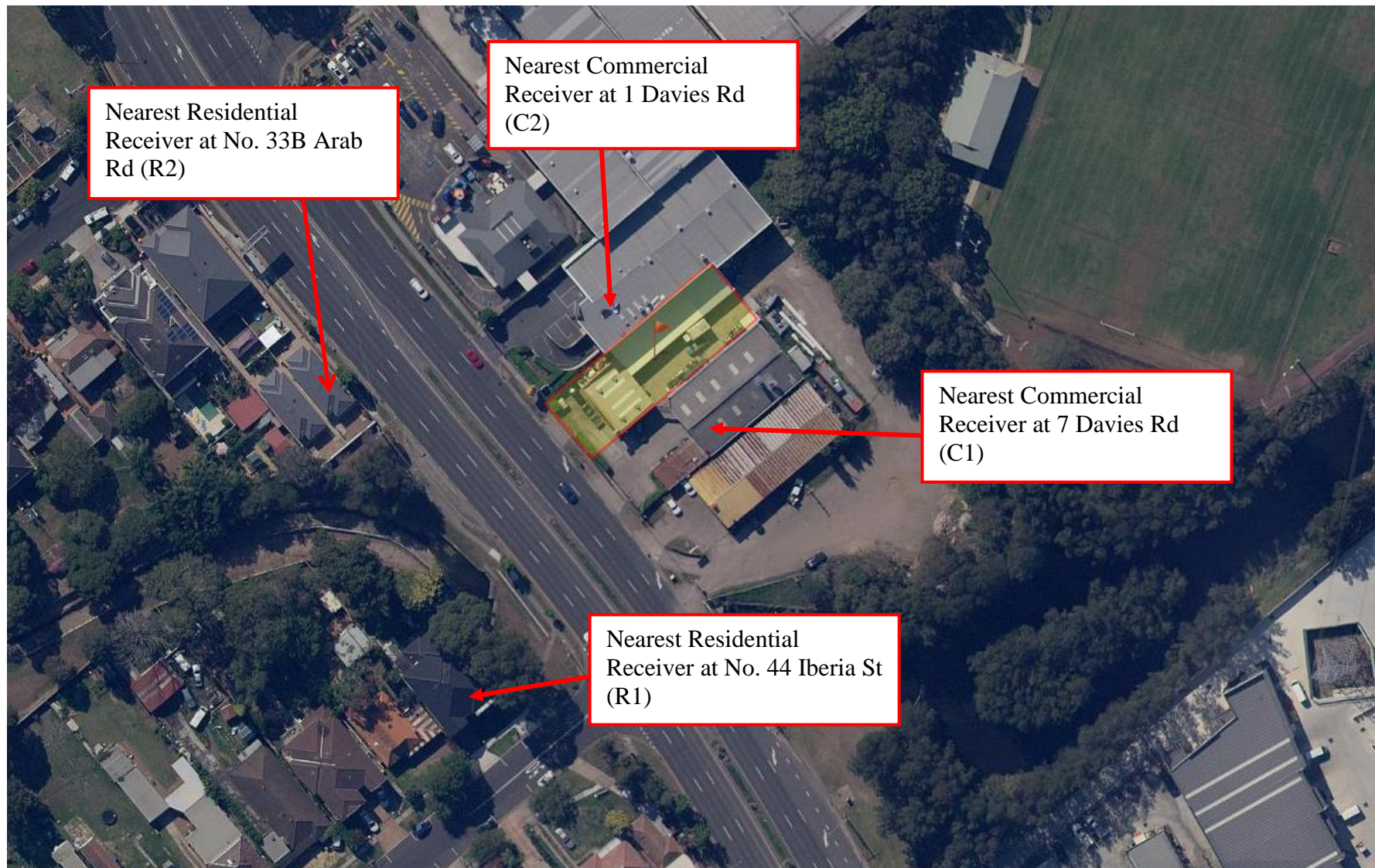


Figure 4 – Nearest Residential and Commercial Receivers

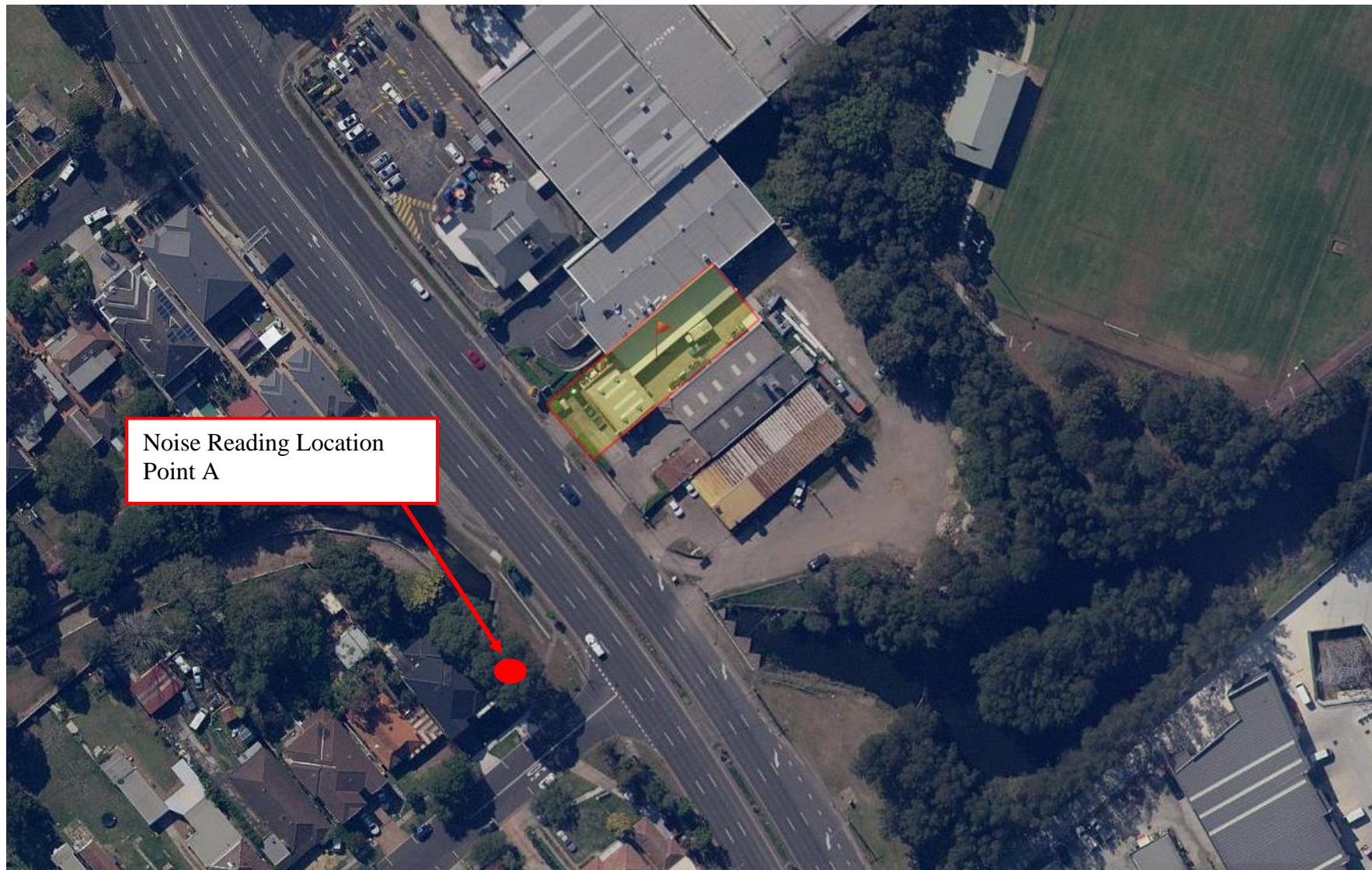


Figure 5 - Noise Reading Location (Point A)

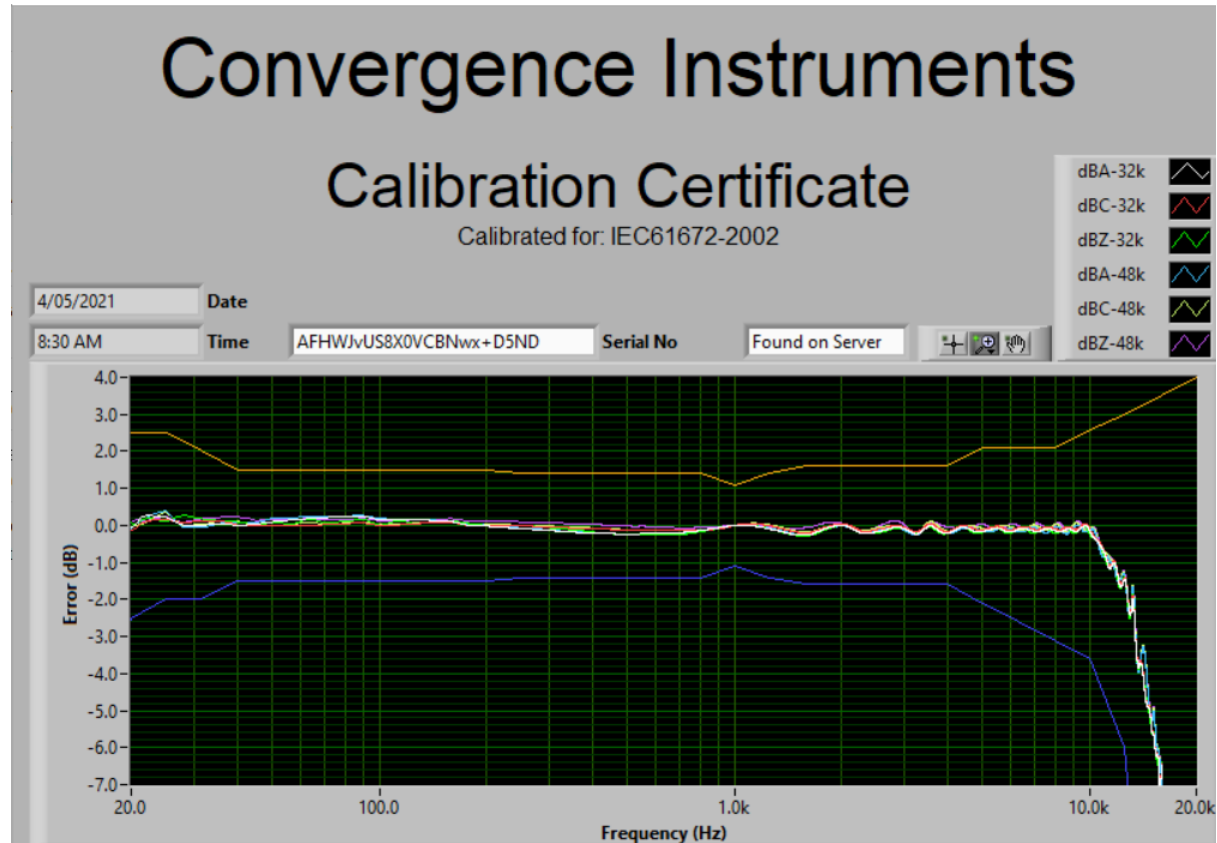


Figure 6 - Calibration Certificate

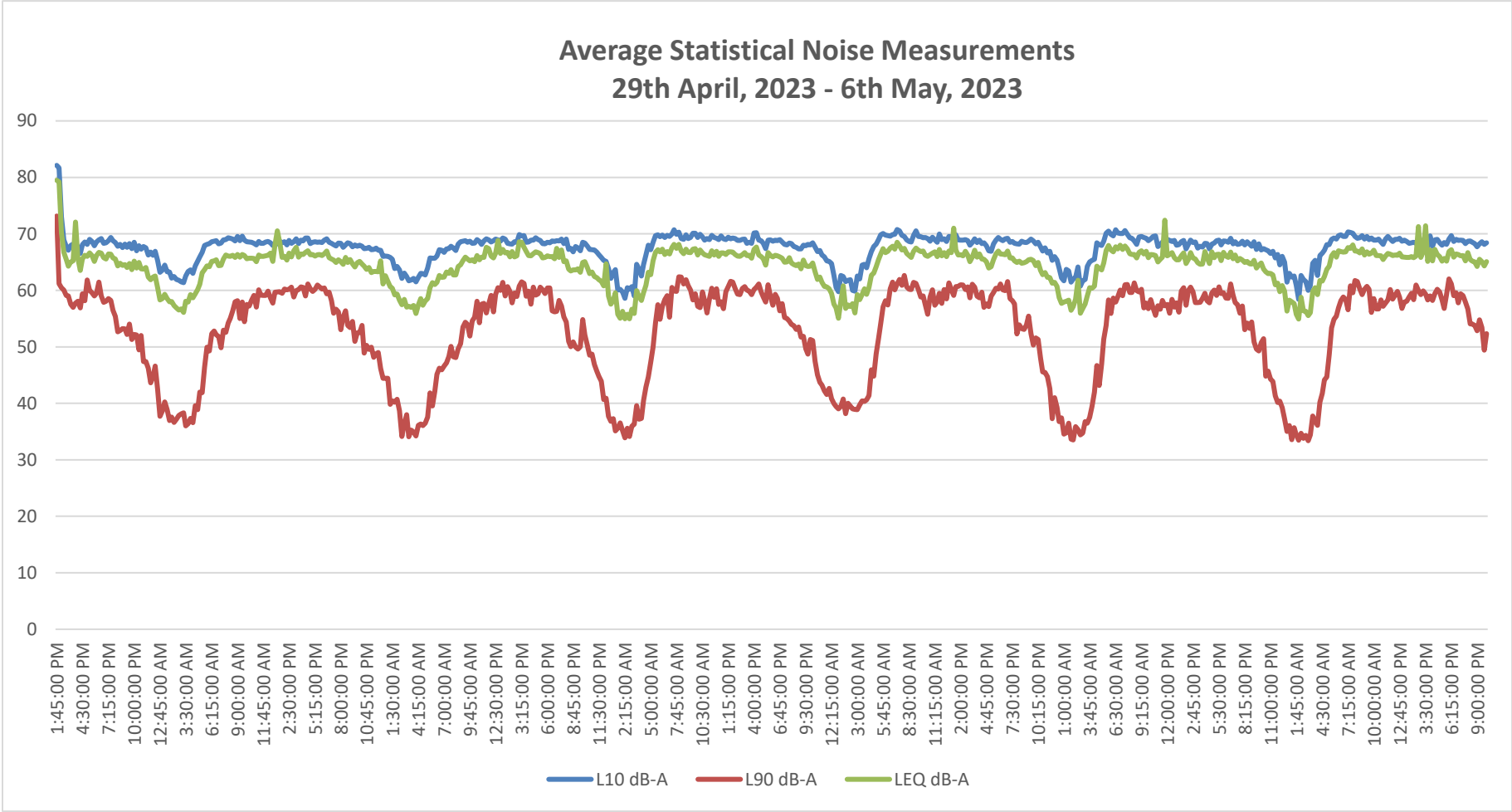


Figure 7 - Noise Survey – Point A