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Acoustic Report

For Proposed Change of Use of existing Industrial Premises

No. 102 Benaroon Rd, Lakemba

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Date	*Revision History*	*Prepared By*	*Reviewed and Authorised by*
19/09/2023	Initial Report	Domeniki Tsagaris	Moussa Zaioor
27/09/2023	Final Report	Domeniki Tsagaris	Moussa Zaioor

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1.0 SCOPE OF WORK & INTRODUCTION

We refer to the proposed development located at No. 102 Benaroon Rd, Lakemba (Figure 1 – Site Location). Architectural plans prepared by Ergo Design P/L are for the proposed change of use of existing industrial premises to a vehicle body repair workshop, vehicle repair station and vehicle hire premises at No. 102 Benaroon Rd, Lakemba.

The proposed work will consist of the conversion of a previous concrete and structures contractor premises into a two-storey vehicle workshop including an auto smash repairs workshop area, an auto mechanical repairs workshop area, a spray-painting booth, a ground floor office area and a first-floor office area (Figures 2 & 3).

The existing industrial premises is located in a predominately commercial & industrial area with large retail and commercial precincts located north, south and west of the site (Figure 4 – Surrounding Environment).

Residential properties are located directly north and south of the site, with the nearest receivers being located at No. 104 Benaroon Rd, Lakemba and No. 100 Benaroon Rd, Lakemba (Figure 5 – Nearest Residential Receivers). The proposed operating hours of the workshop will be as follows:

- Monday – Saturday: 9:00am – 6:00pm

Existing background noise levels are dominated by Benaroon Rd and the surrounding industrial/commercial premises and their associated equipment.

2.0 NOISE SURVEY & INSTRUMENTATION

On the 14th of June, 2023 an engineer from this office visited the site to inspect the surroundings and carry out background noise measurements for the site. Unattended noise readings were carried out away from the workshop site near the northern boundary of No. 96 Benaroon Rd (Figure 6 – Noise Reading Location - Point A).

The unattended environmental noise monitoring was carried out for a period of seven (7) days from June 14th, 2023, to June 21st, 2023. All sound pressure levels are rounded to the nearest whole decibel. All measurements were taken in accordance with the Australian Standards AS 1055 "*Acoustics- Description and Measurements of Environmental Noise*".
The noise survey was conducted to determine a conservative reading of the existing $L_{(A90,\ 15\ minutes)}$ and $L_{(Aeq,\ 15\ minutes)}$ for the day (7:00 – 18:00), evening (18:00 – 22:00) and night (22:00 – 7:00) periods.

All sound level measurements and analysis performed throughout this project are carried out with a NSRTW_MK3 wireless sound level data logger (Serial No. CPp0Dd04c1c9iLtiSwBRPD- Office Tag -Machine 1-). 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 noise reading machine Microphone was positioned above the existing fence line in order to minimize the influence of reflection. The noise reading machine was calibrated prior to and after reading, using our Svantek SV 33A S/N: 90200 Class 1 Calibrator with no significant drift encountered. Any readings affected by strong wind or rain have been disregarded. https://www.weatherzone.com.au/station/SITE/66194/observations/2023-06-14 to https://www.weatherzone.com.au/station/SITE/66194/observations/2023-06-21.

The Full Average Statistical Noise Parameters $\mathbf{L_{(Aeq,\ 15\ minutes)}}$, $\mathbf{L_{(A90,\ 15\ minutes)}}$, $\mathbf{L_{(A10,\ 15\ minutes)}}$, $\mathbf{L_{(A1,\ 15\ minutes)}}$ are presented in Figure 7 – Noise Survey. A summary of those readings is presented in Table 3.1 below:

Table 3.1 - Summary of Existing Noise Survey between 14th June, 2023 – 21st June, 2023 (Point A)*

Location	***Time Period***	***Arithmetic Mean LAeq dB(A)***	***Arithmetic Mean LA90 dB(A)***	***RBL dB(A)****
Point A	Day Time (7:00am-6:00pm)	48	45	42
	Evening Time (6:00pm-10:00pm)	46*	44*	43*
	Nighttime (10:00pm-7:00am)	45*	43*	40*

*** Site will not be operational during Evening and Night Hours**
**** RBL is calculated in accordance with the Noise Policy for Industry 2017 (Fact Sheet B).**

3.0 NOISE BREAK OUT LIMITS- NSW NOISE POLICY FOR INDUSTRY (2017)

The noise emitted by any proposed plant & equipment from the workshop is governed under Section 2 of the NSW Environmental Protection Authority Noise Policy for Industry 2017.

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 is not greater than the noise trigger level.

3.1 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 development at No. 102 Benaroon Rd, Lakemba the recommended amenity noise levels are presented in Table 3.1.1 below:

Table 3.1.1- Recommended Amenity Noise levels

TYPE OF RECIEVER	AREA	TIME PERIOD	RECOMMENDED Leq NOISE LEVEL, dB(A)
Residence	Urban	Day	60
		Evening	50
		Night	45
Industrial Interface	All	All	Add 5 dB(A) to recommended noise amenity area

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 3.1.2 – 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 development are as follows:

- **Day period:** **(60+5)– 5 + 3 = 63 dB(A)**
- **Evening period:** **N/A**
- **Night period:** **N/A**

3.2 INTRUSIVENESS NOISE CRITERIA

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). Similarly, The Noise Policy for Industry in Section 2.3 summarizes the intrusive criteria as below:

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

The background noise level known as $L_{A90,15\ minutes}$ is the Noise exceeded 90% percent of a time period over which annoyance reactions may occur (taken to be 15 minutes),

For the short-term method, the rating background noise level is simply the lowest measured LAF90,15min level.

For the long-term method, the rating background noise level is defined as the median value of the daily/evening/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_{eq} noise intrusiveness criterion for broadband noise during the day is as follows:

- **Day period:** **42 + 5 = 47 dB(A)**
- **Evening period:** **N/A**
- **Night period:** **N/A**

3.3 PROJECT NOISE TRIGGER LEVEL

A summary of intrusiveness and amenity noise levels as determined in sections 3.1 & 3.2 are shown in Table 3.3.1 below:

Table 3.3.1 - Summary of Intrusiveness and project amenity noise levels

Period	Intrusiveness Noise Level	Project Amenity Noise level
Day Time (7:00am-6:00pm)	47	63

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

- **Day period:** $L_{Aeq,15\ min}$ **47 dB(A)**
- **Evening period:** **N/A**
- **Night period:** **N/A**

3.4 NSW ROAD NOISE POLICY

For the potential impact of additional traffic that may be generated by the development on nearby residential developments, the operation of the proposed vehicle workshop also needs to comply with the NSW Road Noise Policy criteria.

Table 3 in Section 2.3.1 of the NSW Road Noise Policy sets out traffic noise assessment criteria as follows:

Table 3.4.1 – NSW Road Noise Policy Traffic Noise Criteria

Road Category	Type of Project/Land Use	Assessment Criteria – dB(A)	
		Day (7am – 10pm)	Night (10pm – 7am)
Local Roads	Existing Residences Affected by Additional Traffic on Existing Local Roads Generated by Land Use Developments	$L_{Aeq\ (1\ hour)}$ 55 (external)	$L_{Aeq\ (1\ hour)}$ 50 (external)

4.0 PREDICTED NOISE FOR VEHICLE WORKSHOP

Noise levels from the vehicle workshop are classified into four main noise sources:

- Noise on surrounding streets from additional volume of vehicles approaching the development
- Noise from Vehicles and Trucks Entering & Exiting the Car Park
- Noise from Indoor repair activities,
- Noise from mechanical plant & air-conditioning.

4.1 NOISE ON SURROUNDING STREETS FROM ADDITIONAL TRAFFIC GENERATION

Peak hour traffic generation has been estimated to be 15 vehicle trips per peak hour.

The nearest residential receivers that will be affected by vehicles entering/exiting the proposed car park will be the residential properties along Benaroon Rd. Predicted noise levels at the building line of Benaroon Rd due to additional traffic generation are presented in Table 4.1.1 below:

Table 4.1.1 – Predicted Noise from Traffic Generation at 1.0m from Facade

Activity	Period	Expected Leq 1hr dB(A) from Additional Traffic Noise	Complies with Traffic Noise Criteria- as per section 5.4
Noise from Additional Traffic Generation on Benaroon Rd	AM Peak Hour	47 dB(A)	Yes ✓ <55 dB(A) - Day ~~<50 dB(A) - Night*~~ (N/A)

***Site will not operate during the Evening or Nighttime.**

4.2 NOISE LEVELS & PREDICTED NOISE FROM CARS IN CARPARK, TRUCKS & LOADING DOCK

A total of thirty (30) on-site car parking spaces will be included as part of the development. Access to the car park is from Benaroon Rd. The nearest residential receivers affected by vehicles entering and leaving the car park will be neighbouring residences situated at No. 104 & 100 Benaroon Rd, Lakemba

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

Table 4.2.1 – Car Park Noise Source Levels

Car Park Noise Source	Average Sound Power Level, dB(A)
Car Door Closing	95
Car Starting	91
Car Accelerating	91
Car Moving	81

The proposed development has one (1) temporary loading dock in the mechanical repairs workshop area. The noise affiliated with the use of the loading bay in the proposed development will be the combination of all the following major noise activities:

Two trucks entering and exiting the loading dock,

- Loading & Unloading of cars,
- People talking, and
- Garbage collection.

The following table is a summary of noise levels associated with the above activities.

Table 4.2.2– Expected Sound Power Levels from different Noise Sources- Loading Bay Activities-

Noise Sources Servicing Proposed Development	Sound Power Level Leq dB(A)
Trucks	**100**
Small trucks	**87**
Garbage trucks	**114**
10 people talking loudly	**85**

Typical power levels for trucks operating in the loading bay driveways are presented below.

Table 4.2.3 - Loading Dock Noise Levels

Source	***Loading dock and vehicle movement sound power levels, dB Leq Octave band centre frequency (Hz)***						
	63	**125**	**250**	**500**	**1K**	**2K**	**4K**
Garbage truck/semi-trailer movement	114	116	111	106	104	103	102
5-10 tonne truck air brake	100	94	91	99	106	107	105
5-10 tonne truck movement	97	96	90	91	94	95	88
Van or small truck movement	95	90	89	88	89	91	83
Unloading of vehicles and bin/skip emptying	109	109	109	108	108	110	110

The noise power level arising from a typical towing and car drop-off at various octave band center frequencies is presented in Table 4.2.4 below.

Table 4.2.4 –Measured Sound Power Level of Typical On-site Tow Truck and Car Drop-off - L_{Aeq}

Description		**Octave Band Centre Frequencies (Hz)**								
	dB(A)	**31.5**	**63**	**125**	**250**	**500**	**1k**	**2k**	**4k**	**8k**
L_{Aeq} Sound Power Level	**96***	**-**	**42**	**53**	**74**	**84**	**87**	**90**	**93**	**87**

*Matches Average Sound Power level calculated using all individual noise over time instances as per Table 4.2.3 and ISO 1996 formula $L_{Aeq,LT} = 10\log\left[\frac{1}{N}\sum_{i=1}^{N} 10^{(L_{Aeq,T})/10}\right]$

The Predicted noise levels at the boundary of the nearest residential receivers due to cars and trucks in the carpark are presented in Table 4.2.5 below.

Table 4.2.5 – Predicted noise from vehicles in the carpark and loading dock at the Nearest Residential Receivers

Activity	Period	Expected Leq dB(A) at No. 104 Benaroon Rd	Expected Leq dB(A) at No. 100 Benaroon Rd	*Compliance with Noise Trigger level (Noise Policy For Industry 2017).*
Noise impact from vehicles and trucks in the carpark	7.00am - 6.00pm (Day)	36 dB(A)	42 dB(A)	Yes < 47 dB(A)
	6:00pm – 10:00pm (Evening)*	N/A	N/A	~~Yes * < 49 dB(A)~~
	10:00pm – 7:00am (Night)*	N/A	N/A	~~Yes * < 41 dB(A)~~

***Site will not operate during the Evening or Nighttime.**

4.3 NOISE FROM INDOOR REPAIR ACTIVITIES

As per the Statement of Environmental effects by Ergo Designs P/L the proposed Vehicle Workshop will include the following plant & equipment on site:

- Air Compressor, Spray Painting Booth, Oil Separator equipment, five (5) Mechanical Repair Hoists, Forklift, two (2) tyre fixing compressors

All vehicle repair operations are carried out **inside** the workshop. The major noise producing activities generated by the existing and proposed activities and their corresponding sound power levels have been considered as below:

- Indoor Activities (Rattle Gun 106 dB (A), Air compressor 95-65 dB (A) [Old & Noisy- New and Quiet], , Grinding machines 100 dB (A), Metal beating 100 dB(A), brushing & Cleaning 102 dB(A)).
- Mechanical Plant

SoundPLAN 8.2 and its geo-database module were utilised to calculate the noise levels and noise contours along the nearest residential receivers, R1 to R2. **SoundPLAN 8.2** allows for predicted noise levels and contours to be generated whilst accounting for ground elevation, distance and barrier attenuations, reflections and reverberation (Figure 8 – SoundPLAN Noise Contours)

Table 4.3.1 below presents the predicted $LA_{eq,\ 15min}$ noise level from the smash repair workshop operations at the boundary of the nearest residential receivers and their compliance with the Noise Policy for Industry (2017).

Table 4.3.1 – Sound Pressure Level LAeq from operation of all equipment and machinery at Vehicle Workshop

Activity	Period	Expected $L_{Aeq,\ 15min}$ at boundary of No. 104 Benaroon Rd, Lakemba (R1)	Expected $L_{Aeq,\ 15min}$ at boundary of No. 100 Benaroon Rd, Lakemba (R2)	Complies with the Project Noise Trigger Level NPfI 2017*
All major noise producing machinery/ equipment on	9:00am – 6:00pm	31 dB(A)	43 dB(A)	**Yes ✓** < 47 dB(A)

*Ensure all recommendation in section 5.0 are adhered to.

4.4 NOISE FROM MECHANICAL PLANT

The noise from the mechanical plant and equipment for this project are already included in the calculations presented in section 4.3 above. These is No New proposed mechanical plant associated with the proposal.

4.5 CUMULATIVE NOISE FROM CARPARK & LOADING BAY, INDOOR WORKSHOP ACTIVITIES, & MECHANICAL PLANT.

Based on the noise predictions for the carpark and loading bay, indoor workshop activities, and operation of mechanical plant listed as listed in Sections 4.2-4.4 above, the predicted cumulative noise from the above listed activities complies at all nearest residential receivers with the NSW NPfI 2017.

5.0 RECOMMENDATIONS

In order for the operations of the workshop to comply with the criteria set out in Section 3.0 of this report, we recommend the following:

- Vehicle Workshop is to operate during Day Time hours only as follows:
  - Monday – Saturday: 9:00am – 6:00pm

- All workshop operations are to be carried out inside the workshop area. No work to be carried out in external areas.

- A 1.8m/1.8-1.2 high gap-free fence is to be installed above the boundary wall on the northern boundary of the site as per Figure 9 – Sound Barrier Location. The fence can be of lapped and capped timber, colorbond steel or masonry construction.

- Towed cars in and out of the workshop in addition to all waste removals to be carried out between the operating hours of 7:00 a.m till 6:00 p.m.

6.0 DISCUSSION AND CONCLUSION

The proposed change of use of existing industrial premises to a vehicle body repair workshop, vehicle repair station and vehicle hire premises at No. 102 Benaroon Rd, Lakemba will comply with the NSW Noise Policy for Industry (2017) and City of Canterbury Bankstown Council Condition, provided recommendations in Section 5 of this report are adhered to.

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)

7.0 APPENDIX

Figure 1 - Site Location

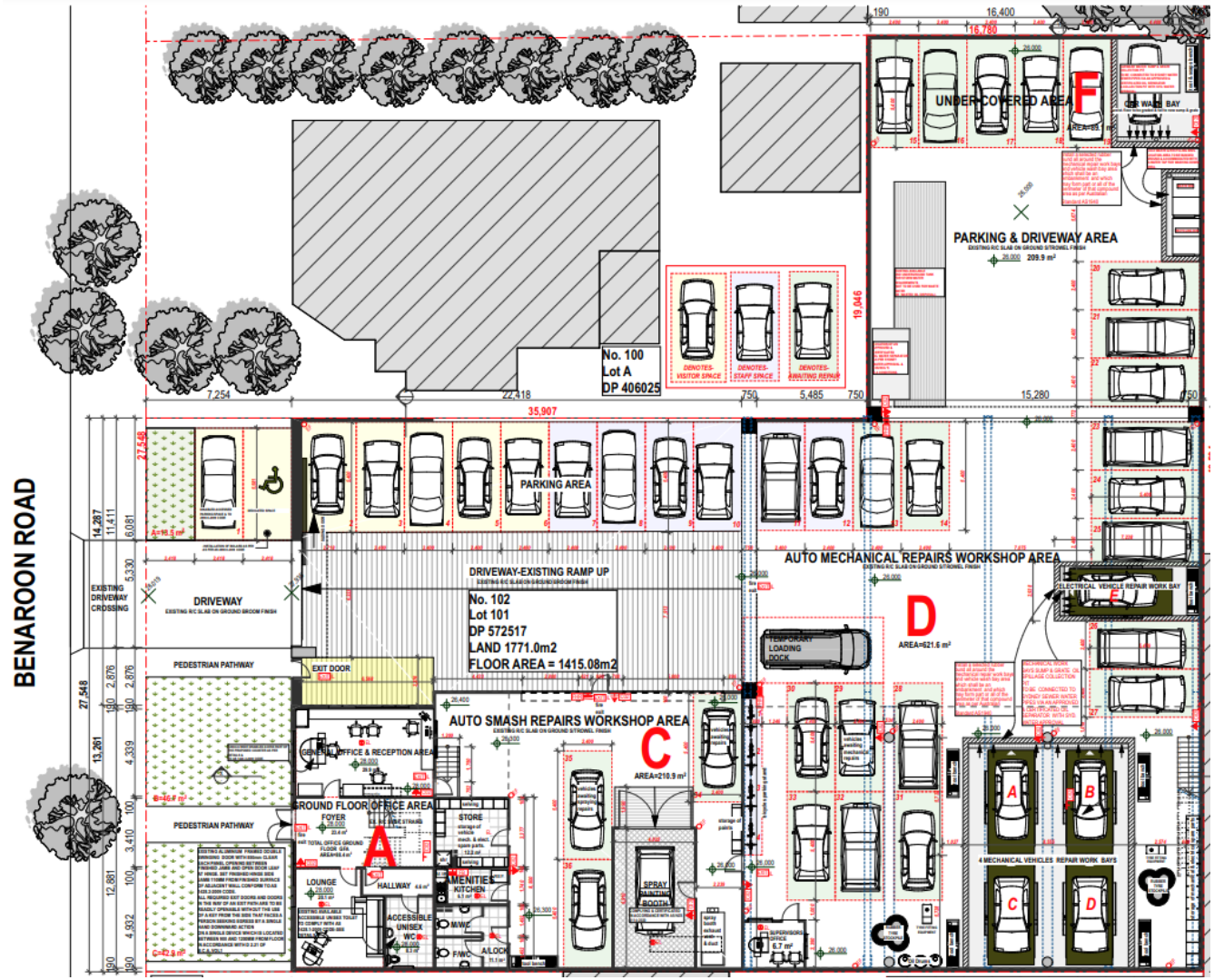

Figure 2 – Proposed Ground Floor Site Plan

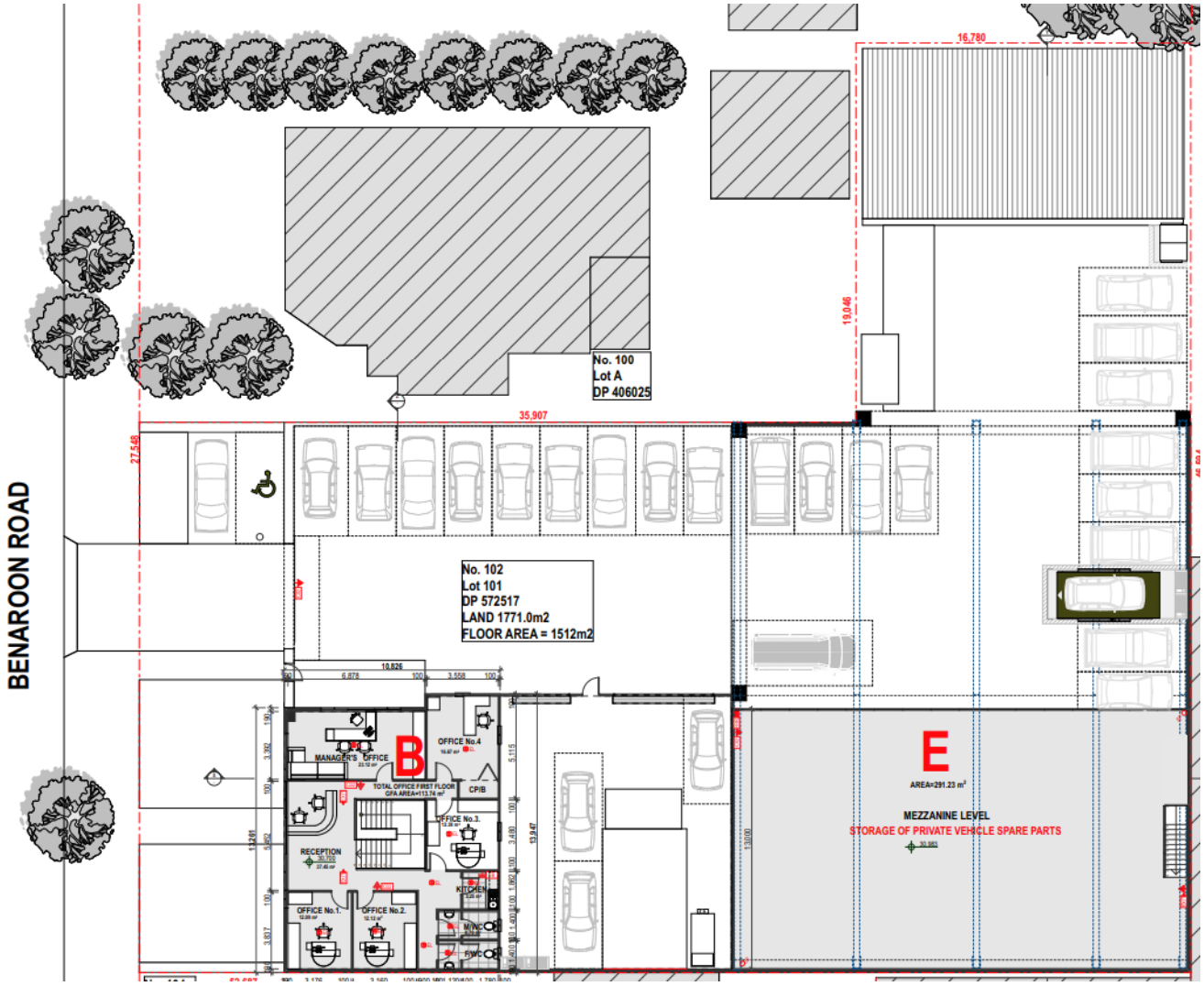

Figure 3 – Proposed First Floor Site Plan

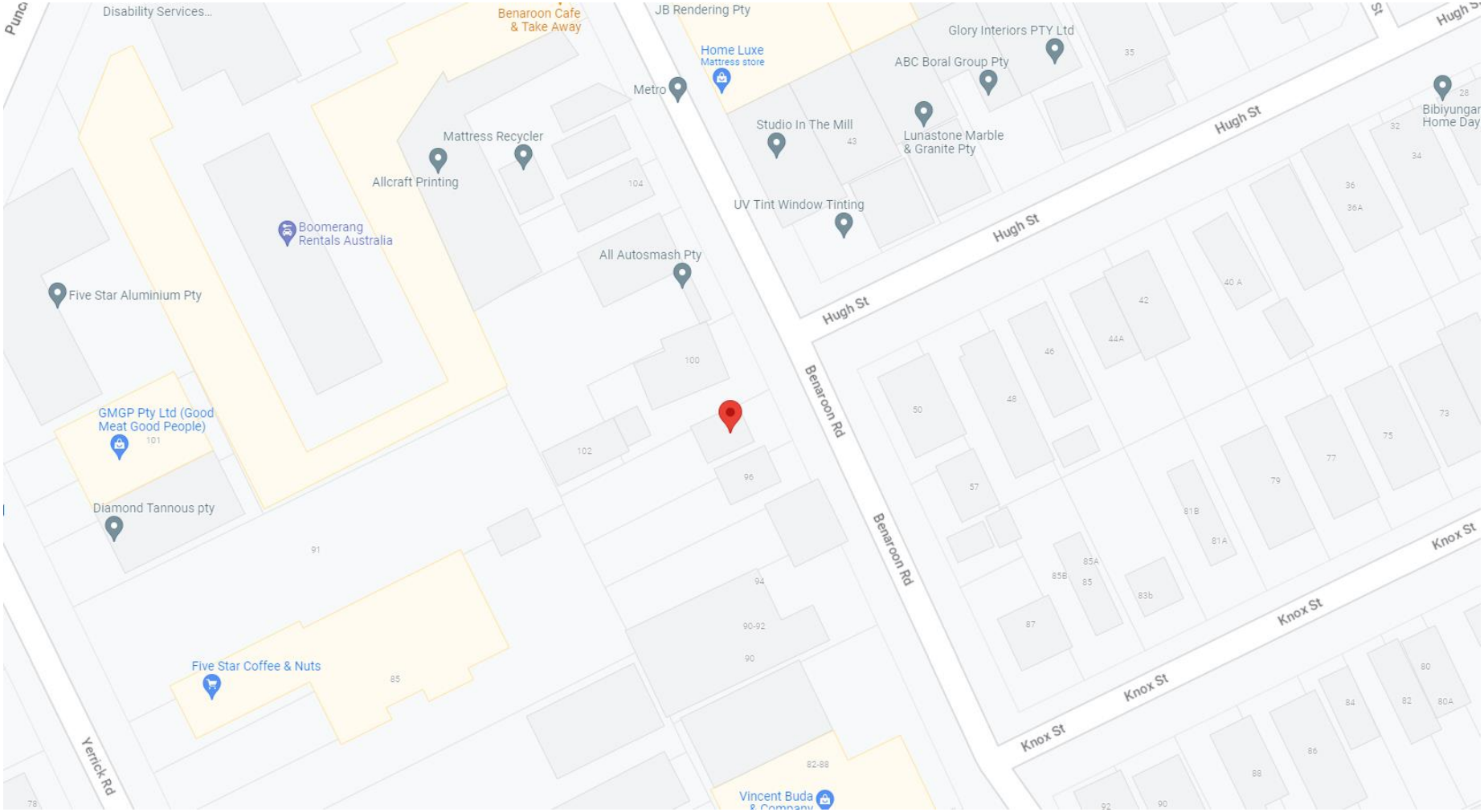

Figure 4 - Surrounding Environment

Figure 5 – Nearest Residential Receivers

Figure 6 – Noise Reading Location – Point A

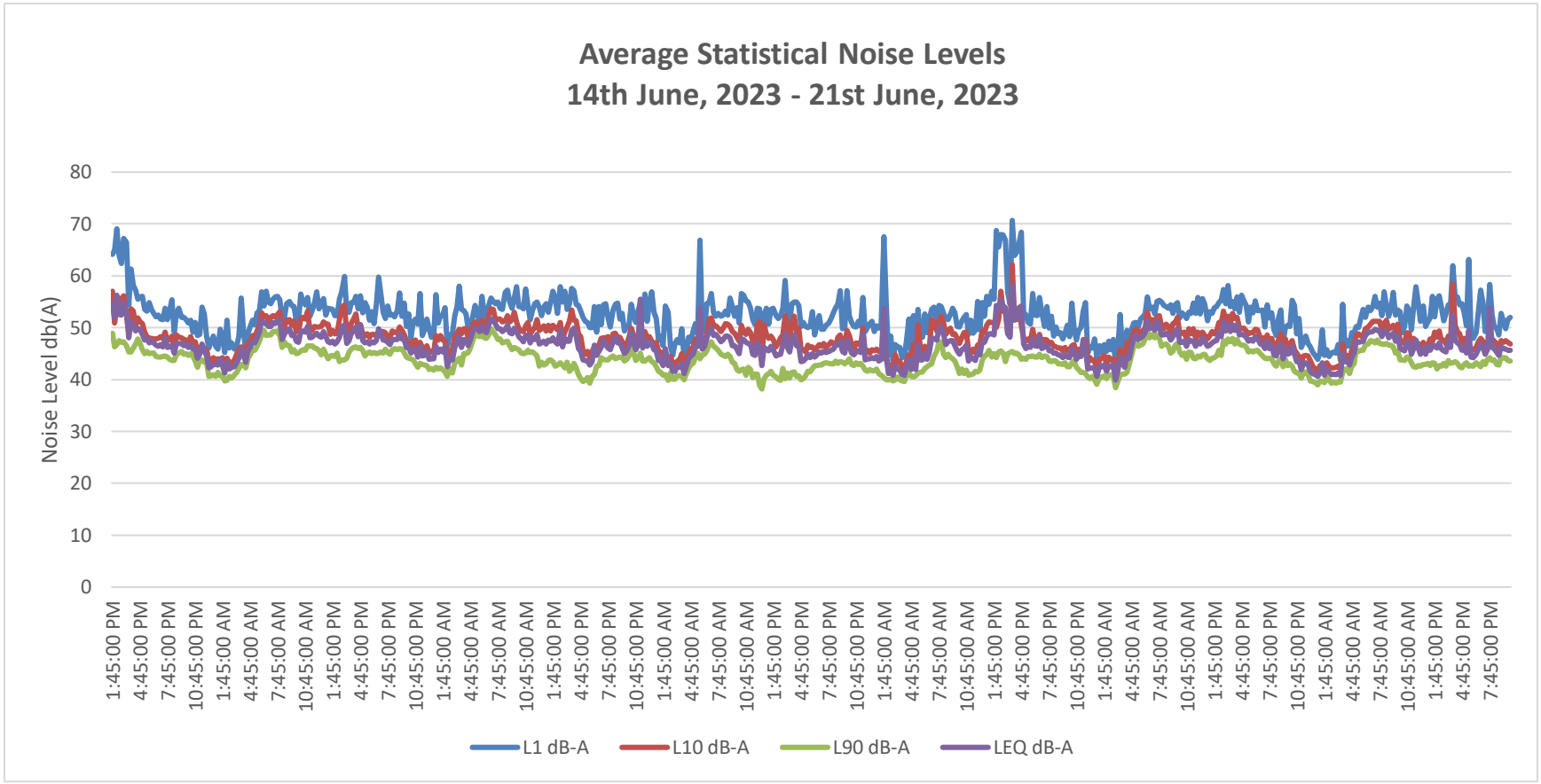

Figure 7 – Noise Survey

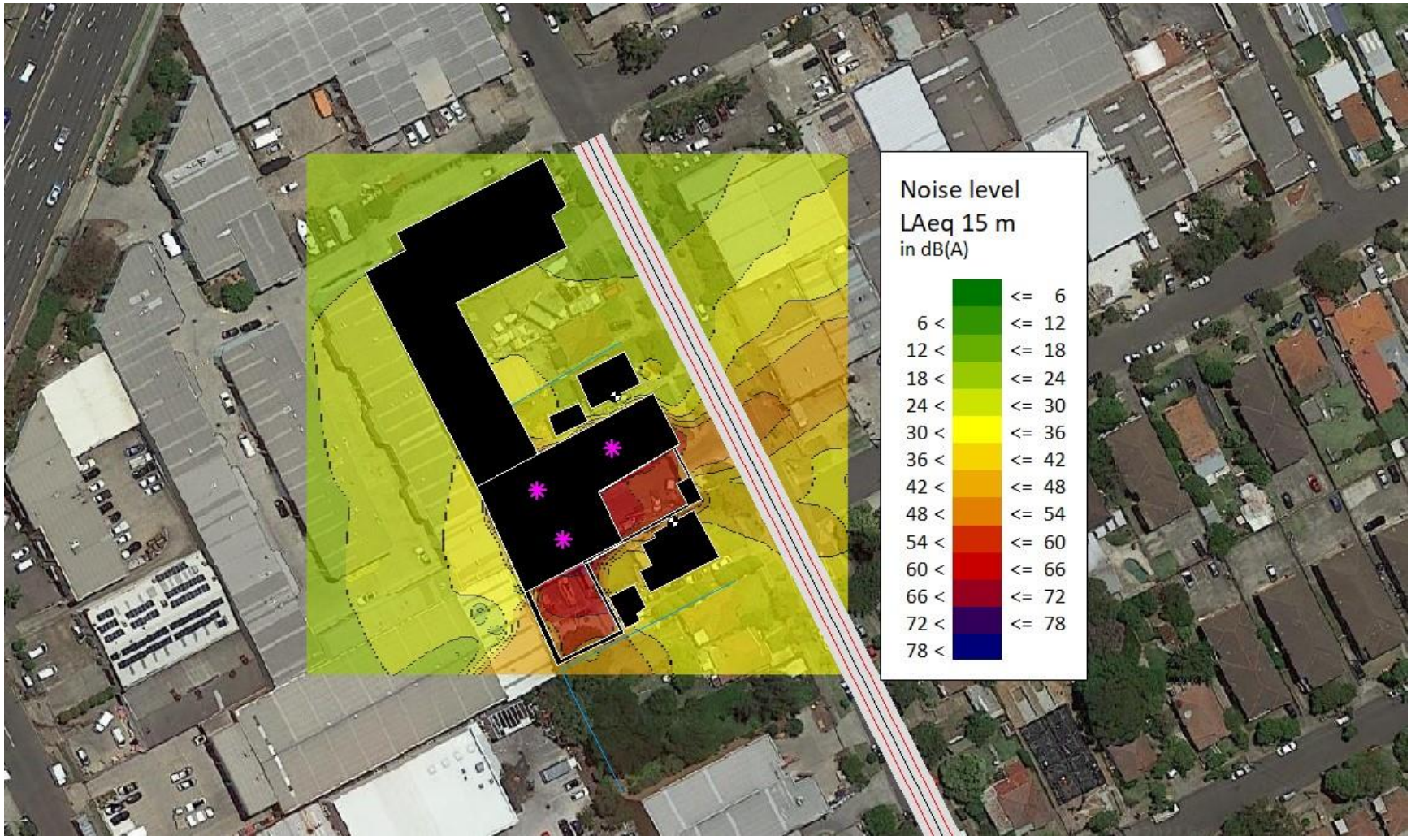

Figure 8 – SoundPLAN Noise Contours

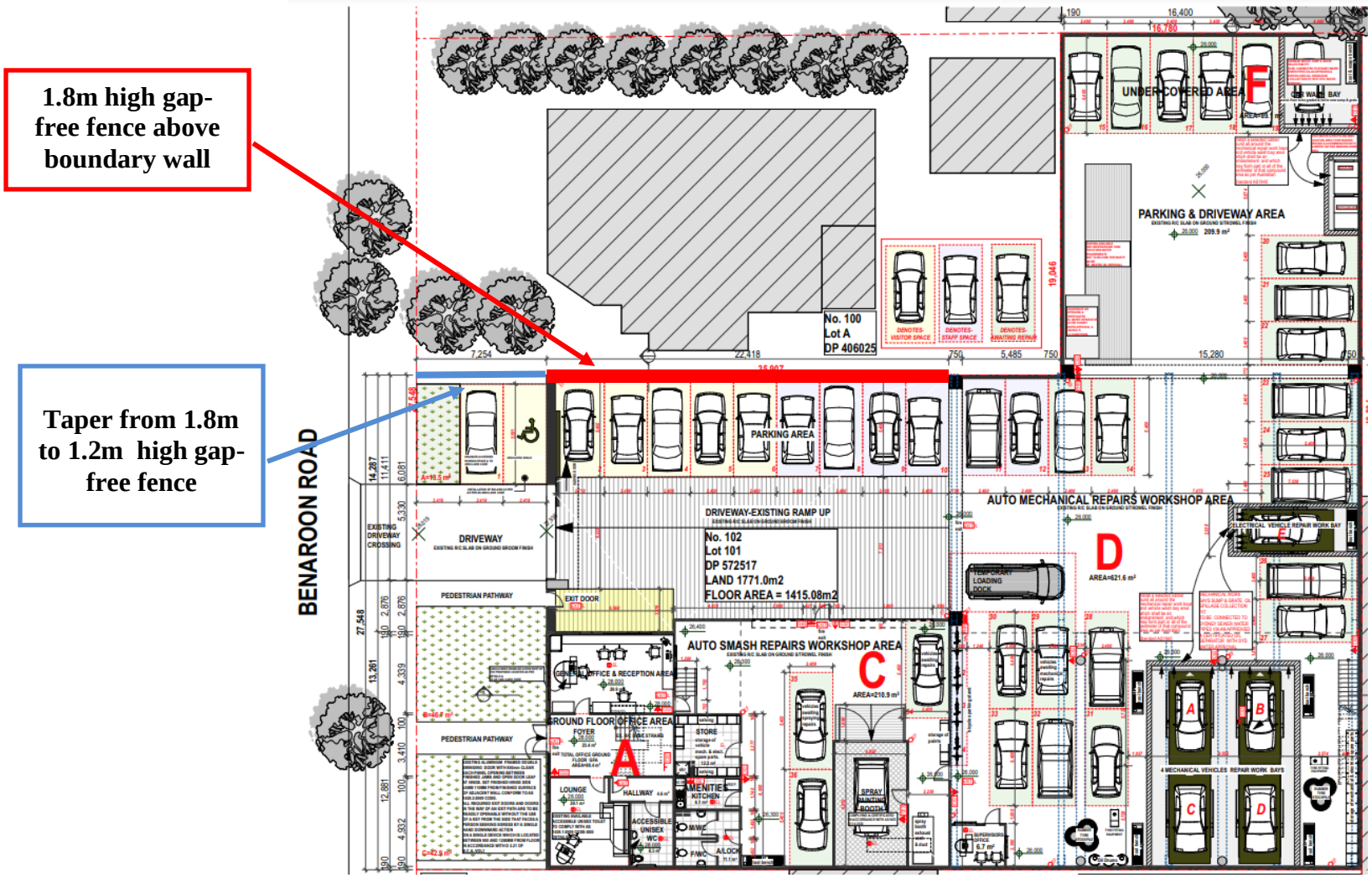

Figure 9 – Sound Barrier Location