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Acoustic Report

Part 1 – Traffic Noise Assessment (Noise Break In)

Part 2 – Assessment of Environmental Noise Impact (Noise Break Out)

For the proposed development at

No. 221-235 & 241-247A Homer Street & No. 208 Wardell Road, Earlwood

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1.0 SCOPE OF WORK

The aim of this report is to determine the building materials to be used and the construction methods to be adopted such that the proposed development at No. 221-235 & 241-247A Homer Street & No. 208 Wardell Road, Earlwood is built to achieve compliance with Canterbury Bankstown Council requirements.

The site is located on the corner of Homer Street and Wardell Road in the suburb of Earlwood (Figure 1 – Site Location). The architectural plans by Loucas Architects dated the 26th of September, 2024 are for the proposed construction of a seven (7) storey mixed used development comprising of the following:

- Three (3) Levels of Basement Parking
- Ground Floor with
    - Supermarket
    - Retail Premises
    - Restaurant/Café
    - Commercial Premises
    - Loading Dock/Turntable
- Residential Units on First – Sixth Floor with Communal Open Spaces on the 1st & 2nd Floor

The site is located in a mixed-use district with predominately retail/commercial premises located along Homer St and residential properties located along Wardell Rd (Figure 2 – Surrounding Environment). The proposed development is affected by the traffic noise from Homer St and Wardell Rd. Additionally, the site is affected by the operational activities from the surrounding commercial/retail tenancies and their associated mechanical plant/equipment.

Noise intrusion levels (Noise Break In) are to be within the limits adopted by AS 2107 'Acoustics – Recommended Design Sound Levels and Reverberation Times', Clause 102 of the Statement Environment Planning Policy (SEPP) and Canterbury Bankstown Council requirements, such that all habitable rooms in the proposed development are designed to limit internal noise levels.

Noise breakout from the use of the proposed building, including all proposed mechanical plant & equipment, vehicles accessing the basement carpark/loading dock and use of the communal areas; are to comply with the NSW Noise Guide for Local Government, NSW Noise Policy for Industry (2017), NSW Road Noise Policy and Canterbury Bankstown Council requirements.

Figure 1 - Site Location

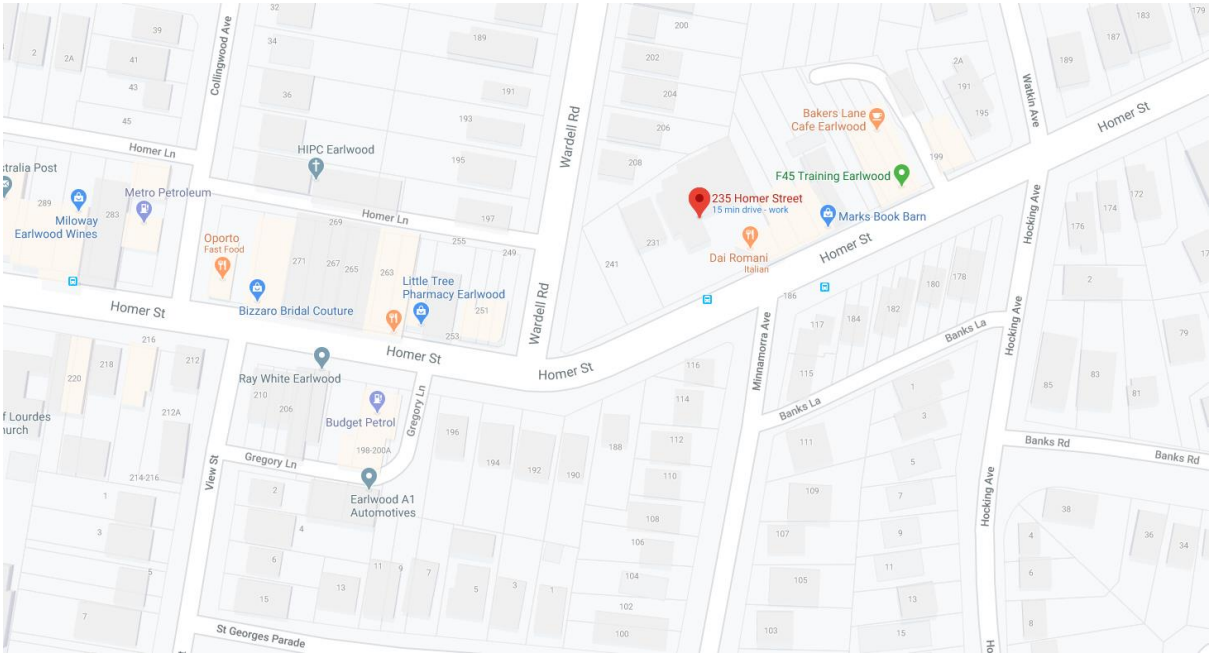

Figure 2 - Surrounding Environment

2.0 NOISE SURVEY & INSTRUMENTATION

On March 30th, 2020, an engineer from this office visited the site to carry out attended and unattended measurements for the proposed development (Figure 3 – Noise Reading Locations Points A, B & C).

Unattended noise measurements were carried out for a period of seven (7) days between March 30th, 2020 and April 6th, 2020, at Point A (Southern Boundary facing Homer St) to determine a conservative reading of the existing noise related to Traffic on Homer Street.

Unattended noise readings were carried out on the 30th March, 2020 at Point B (north boundary adjacent to the residential receiver at No. 206 Wardell Rd) in order to determine existing background noise levels.

Additional attended noise readings were taken at the proposed building line on the southern boundary (Point C) between 8:30am and 9:30am on Monday 30th March 2020, to anticipate the greatest noise levels generated from the retail tenants and traffic on Homer Street.

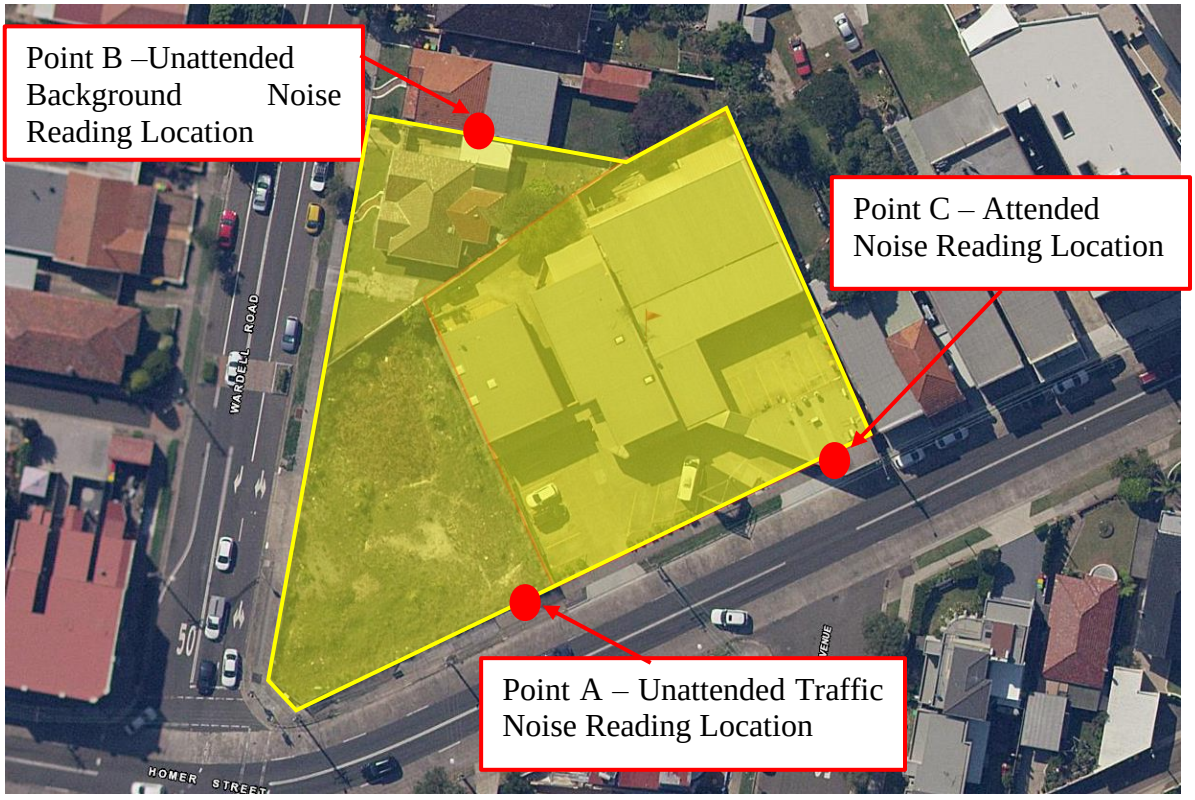

Figure 3 - Noise Reading Locations Points A, B & C

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 carried throughout this report are carried out with our factory calibrated Svantek 977 Noise and vibration level meter SN:92626 which has the following features:

- Type 1 sound level measurements meeting IEC 61672:2002
- General vibration measurements (acceleration, velocity and displacement) and HVM meeting ISO 8041:2005 standard
- Three parallel independent profiles
- 1/1 and 1/3 octave real time analysis
- Acoustic dose meter function
- FFT real time analysis (1920 lines in up to 22.4 kHz band)
- Reverberation Time measurements (RT 60)
- Advanced Data Logger including spectra logging
- USB Memory Stick providing almost unlimited logging capacity
- Time domain signal recording
- Advanced trigger and alarm functions
- USB 1.1 Host & Client interfaces (real time PC "front end" application supported)
- RS 232 and IrDA interfaces
- Modbus protocol

The noise logger was positioned at a maximum height of 1.5m from the ground. The machine was calibrated prior and after reading using our Svantek SV 33A S/N: 90200 class 1 Calibrator. Any readings affected by strong wind or rain have been disregarded.

The Full Average Statistical Noise Parameters $\mathbf{L_{(Aeq,\ 15\ minutes)}}$, $\mathbf{L_{(A90,\ 15\ minutes)}}$, $\mathbf{L_{(A10,\ 15\ minutes)}}$, $\mathbf{L_{(A1,\ 15\ minutes)}}$ at Point A are presented in Figure 4 – Noise Survey Point A. Summary of the unattended traffic noise readings at Point A is presented in the Table 2.1.

Table 2.1- Summary of Unattended Traffic Noise Readings at Point A between March 30th, 2020 and April 6th, 2020

Location	***Period***	***Arithmetic Mean LAeq dB(A)***	***Arithmetic Mean LA90 dB(A)***	***RBL dB(A)***
Point A – Southern Boundary facing Homer St	**Day Time – 7:00am-6:00pm**	60	52	45
	Evening Time – 6:00pm-10:00pm	58	50	44
	Night/Early Morning Time – 10:00pm-7:00am	54	43	38

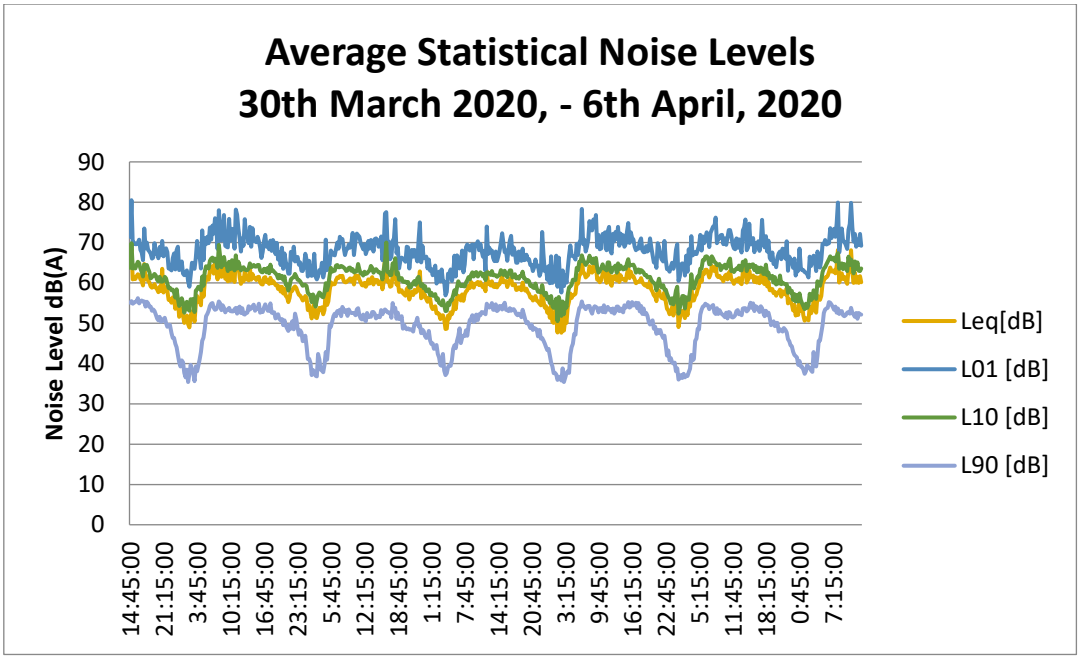

Figure 4 - Noise Survey at Point A

Summary of the unattended background noise readings at Point B is presented in the Table 2.2 below:

Table 2.2- Summary of 24-hour Unattended Noise Readings on March 30th, 2020 at Location B

Noise Reading Location	***Time Period***	***Arithmetic Mean LAeq dB(A)***	***Arithmetic Mean LA90 dB(A)***
Point B – Northern Boundary	Day Time – 7:00am-6:00pm	*49*	*44*
	Evening Time – 6:00pm-10:00pm	*46*	*43*
	Night/Early Morning Time – 10:00pm-7:00am	*44*	*38*

A Summary of the attended noise readings carried out at the site boundary adjacent the retail tenants on Homer Street to determine a conservative representation of the traffic noise generated on Homer Street and Wardell Road (Point C) are presented in the Table 2.3 below.

Table 2.3- Summary of Attended Noise Readings on April 1, 2020 at Location C

Noise Reading Location	***Time Period***	***Arithmetic Average LAeq dB(A)***	***Arithmetic Average LA90 dB(A)***
Point C – Southern Boundary	8:30am-9:00am	65	52

3.0 TRAFFIC NOISE ASSESSMENT (NOISE BREAK IN)

3.1 ACOUSTIC STUDY (AS/NZS 2107:2016 & Clause 102 of the SEPP)

The above standard has formulated the criteria for developments situated in urban areas. The levels have been derived from relevant Australian Standards, the measurements and analysis of noise conditions in other similar developments and standards established in completed projects.

As noise levels from the surrounding environment are not constant, a Leq noise level descriptor is used when assessing this type of noise source. The Leq is the mean energy level of noise being measured and has been found to accurately describe the level of annoyance caused by commercial and traffic noise.

It is usual practice, when we find it necessary to recommend internal sound levels in buildings to refer to Australian/New Zealand Standard AS/NZS 2107:2016 "Acoustics – Recommended Design Sound Levels and Reverberations times for Building Interiors".

This standard provides recommended noise levels for steady state such as noise from building services and quasi-steady state sounds, such as traffic and industrial noise. The noise levels recommended in AS/NZS 2107:2016 take into account the function of the area and apply to the sound level measured within the space unoccupied although ready for occupancy. The standard recommends the following noise levels for residential buildings.

Type of occupancy/activity	Design sound level ($L_{Aeq,t}$) range	Design reverberation time (T) range, s
RESIDENTIAL BUILDINGS (see Note 5 and Clause 5.2)		
Houses and apartments in inner city areas or entertainment districts or near major roads—		
Apartment common areas (e.g. foyer, lift lobby)	45 to 50	—
Living areas	35 to 45	—
Sleeping areas (night time)	35 to 40	—
Work areas	35 to 45	—
Houses and apartments in suburban areas or near minor roads—		
Apartment common areas (e.g. foyer, lift lobby)	45 to 50	—
Living areas	30 to 40	
Sleeping areas (night time)	30 to 35	
Work areas	35 to 40	—

Clause 102 of the SEPP applies to developments on land in or adjacent to road corridor for a freeway, a tollway or a transitway or any other road with annual average traffic volume of more than 20,000 vehicles, a consent authority considers likely to be adversely affected by road noise or vibration to residential accommodation.

Homer Street is not classified to have an annual average traffic volume of greater than 20,000 vehicles, as shown in Figure 5 – Traffic Volume Maps for Noise Assessment for Building on Land Adjacent to Busy Roads, thus this development is not governed by Clause 102 of the SEPP.

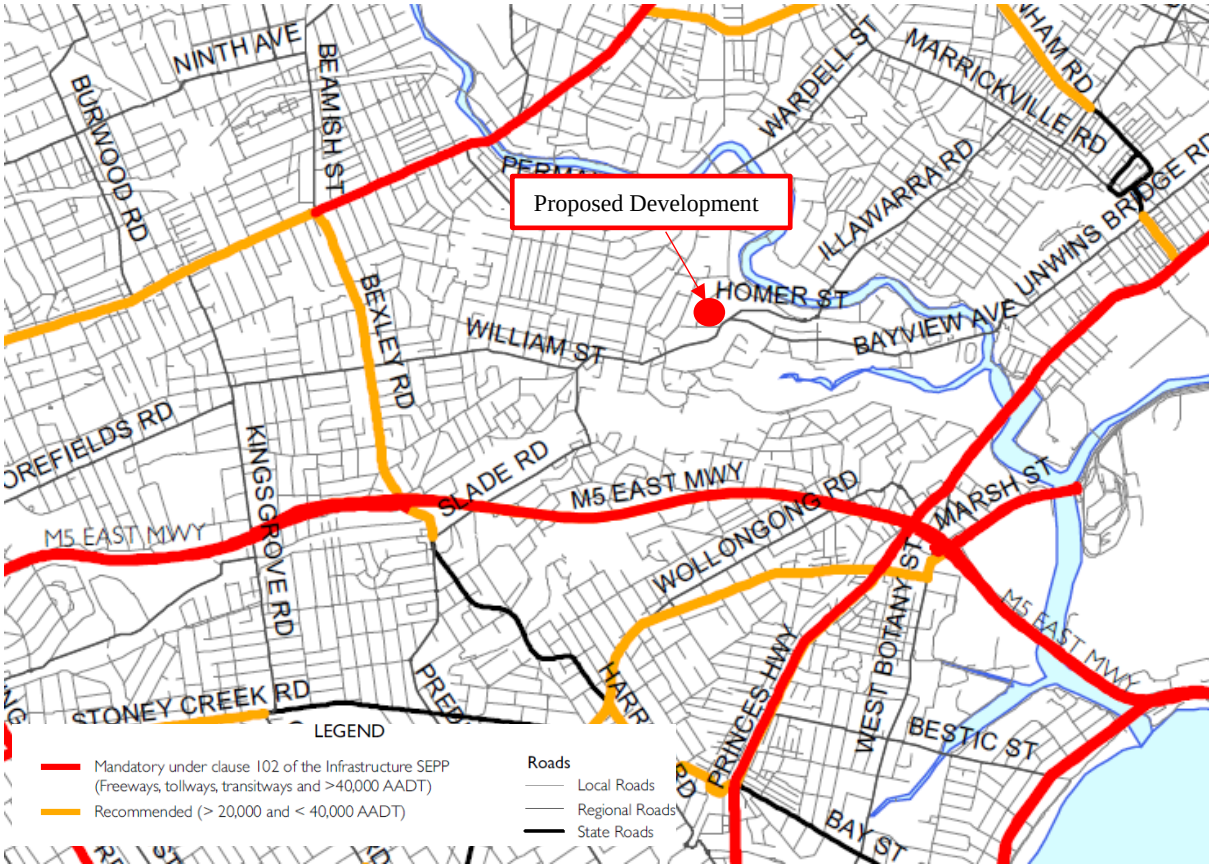

Figure 5 - Traffic Volume Maps for Noise Assessment for Building on Land Adjacent to Busy Roads

4.0 EXTERNAL BUILDING RECOMMENDATIONS

4.1 WINDOWS/SLIDERS, WALLS, DOORS AND ROOFS

Building Component	Rw Rating to be Achieved
Windows & Sliding Doors in the proposed Retail & Commercial Premises on the Ground Floor are to be 10.38 mm laminated with full perimeter Schlegel Q-Lon acoustic seals (1). (2). (3).	35
Windows & Sliding Doors in Living/Dining/Kitchen Area and all Bedroom Areas are to be as follows: *{Please see Figures 6-11 – Window Specifications/Locations}* (1). (2). (3). - 10.38mm laminated with full perimeter Schlegel Q-Lon acoustic seals - 6.38 mm laminated with full perimeter Schlegel Q-Lon acoustic seals	 35 32
Windows in all other Non-Habitable Areas (Bathrooms/Ensuites/Laundries/Staircases etc) are to be unrestricted and to be in accordance with AS 2047 (Windows in Buildings). (1). (2). (3).	-
External Walls are to be 270/250 mm double brick, brick veneer construction or any other method of wall construction with an Rw of 44. (2). (3).	40-44
Roof of all Units is to be Minimum 150mm Concrete Roof.(3)	39-41

NB: This report is to be read in conjunction with the BASIX certificate and any other related building specification. (1). No through weep holes in windows/sliders. (2). All gaps between window & door frames and the masonry walls are to be sealed using acoustic foam Hilti CP620 or similar. Glass wool batts can be applied prior to the application of the foam to seal larger gaps. (3). All gaps are to be acoustically sealed.

*****Glazing Notes -Leaks & Glazing Attenuation-**

- The Acoustic performance of a glazing system highly depends on the leaks around and within the glazing frame and façade. A double-glazing system with Rw of 40 will have its acoustic performance dropped to Rw of 30 (less than that of 6.38 mm glass) at a leak of 0.1 %. Moreover, a double-glazing system with Rw of 40 will have its acoustic performance dropped to Rw of 20 (less than that of 3.0 mm float glass) at a leak of 1 % of the glazing area.
- A 10.38mm laminated glazing system with Rw of 35 will have its acoustic performance dropped to Rw of 29 (less than that of 6.38 mm glass) at a leak of 0.1 %. Moreover, 10.38m mm laminated glazing system with Rw of 35 will have its acoustic performance dropped to Rw of 20 (less than that of 3.0 mm float glass) at a leak of 1 % of the glazing area.
- A double-glazing system with Rw of 40, a 10.38m mm laminated glazing system with Rw of 35, and a 6.38 mm laminated glazing system with Rw of 32 will all attain almost the same Rw of around 20 (less than that of 3.0 mm float glass) at a leak of 1 % in the façade or a within/around the glazing system.

The graph below shows the actual transmission loss achieved inside a room with different glazing thicknesses relative to small leaks occurring along the window frame and façade.

A test report is to be provided from a recognized acoustic laboratory, verifying that the glazing system (glass, frame and seals) will meet the nominated sound rating required.

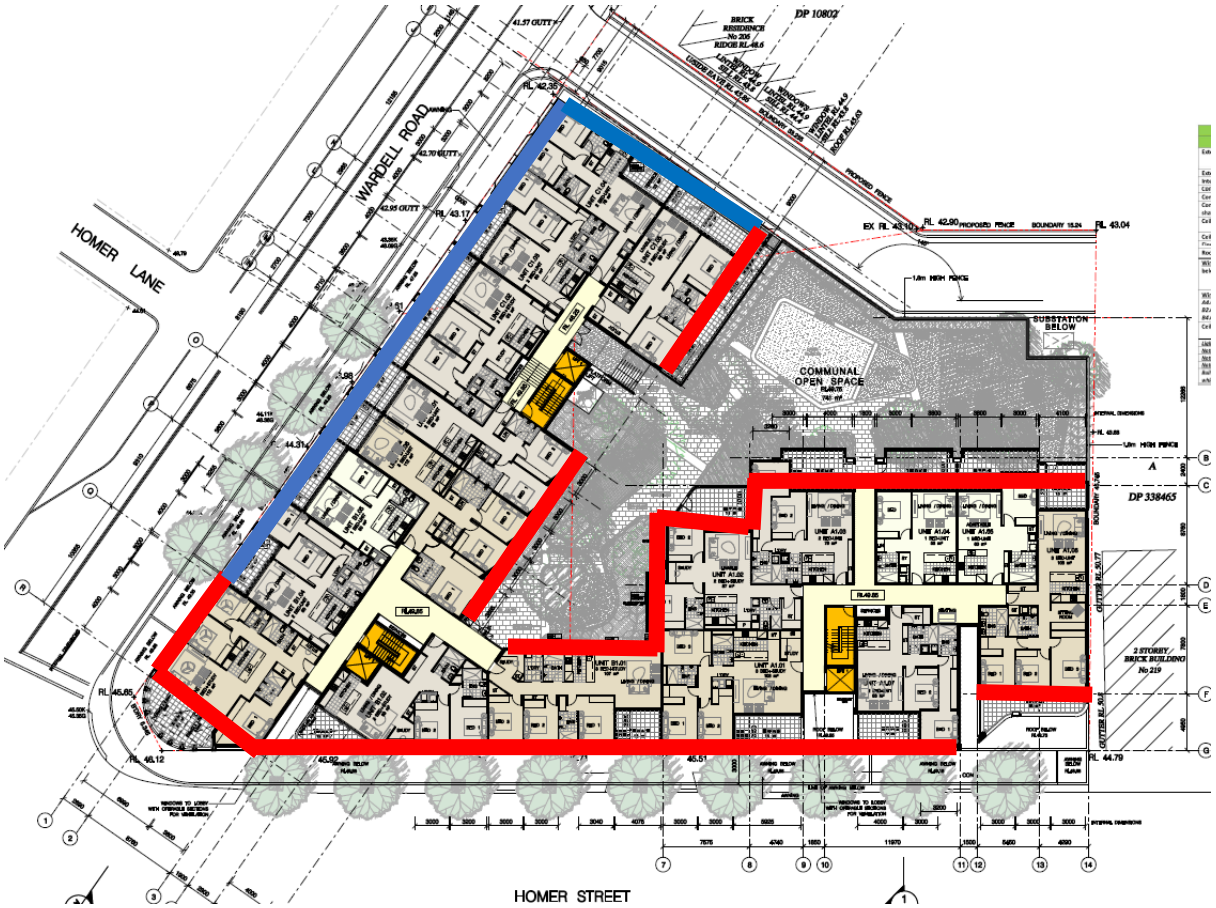

Figure 6 - First Floor Windows and Sliding Door Specifications

All Windows & Sliding Doors of Bedrooms and Living rooms to be 10.38mm Laminated Glazing

All Windows & Sliding Doors of Bedrooms and Living rooms to be 6.38mm Laminated Glazing

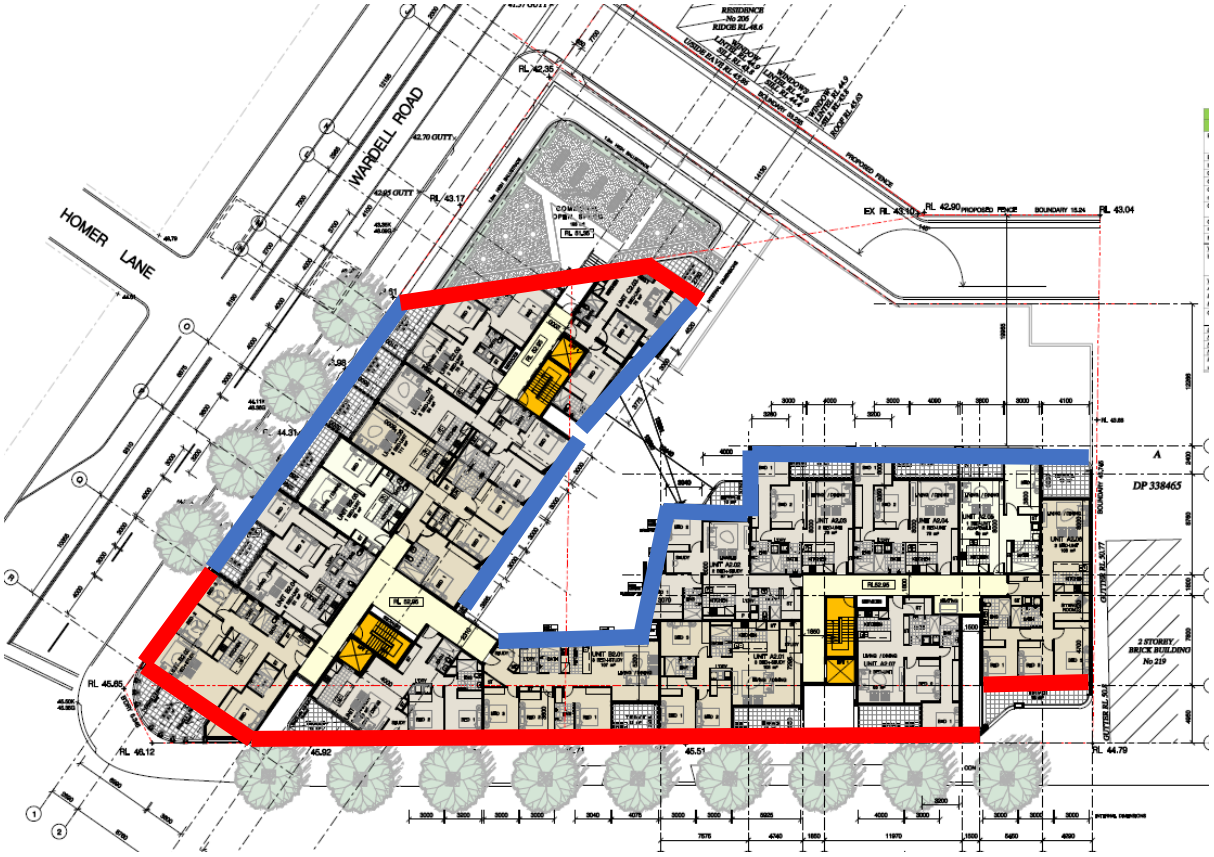

Figure 7- Second Floor Windows and Sliding Door Specifications

All Windows & Sliding Doors of Bedrooms and Living rooms to be 10.38mm Laminated Glazing

All Windows & Sliding Doors of Bedrooms and Living rooms to be 6.38mm Laminated Glazing

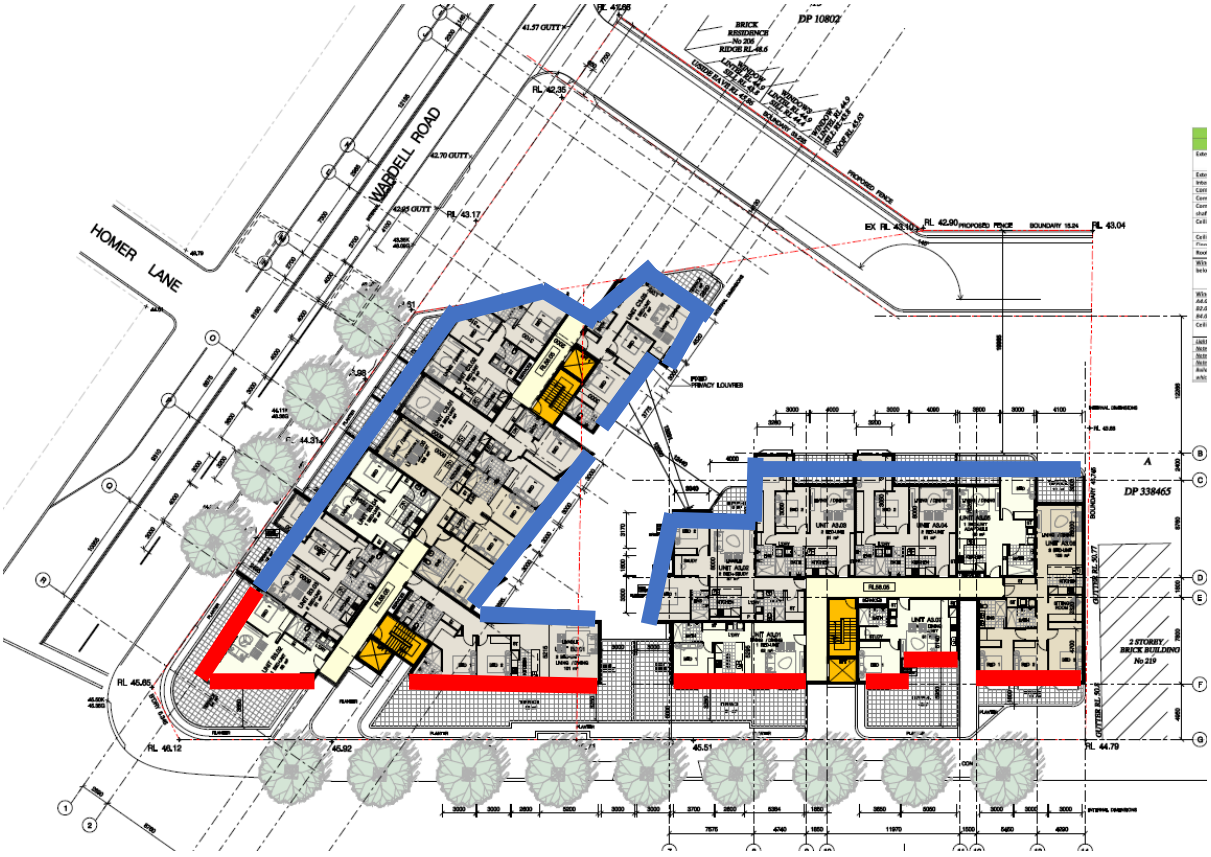

Figure 8 - Third Floor Windows and Sliding Door Specifications

All Windows & Sliding Doors of Bedrooms and Living rooms to be 10.38mm Laminated Glazing

All Windows & Sliding Doors of Bedrooms and Living rooms to be 6.38mm Laminated Glazing

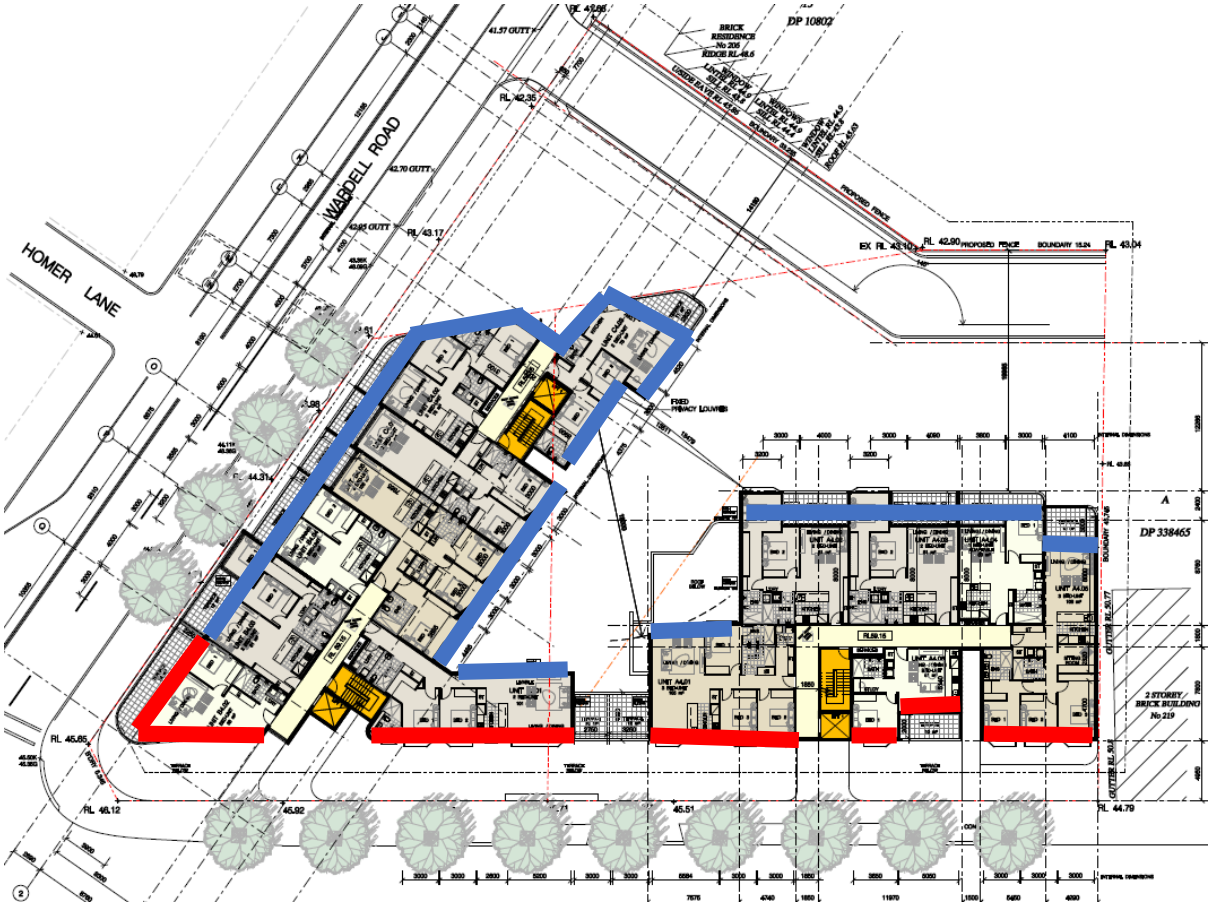

Figure 9 - Fourth Floor Windows and Sliding Door Specifications

All Windows & Sliding Doors of Bedrooms and Living rooms to be 10.38mm Laminated Glazing

All Windows & Sliding Doors of Bedrooms and Living rooms to be 6.38mm Laminated Glazing

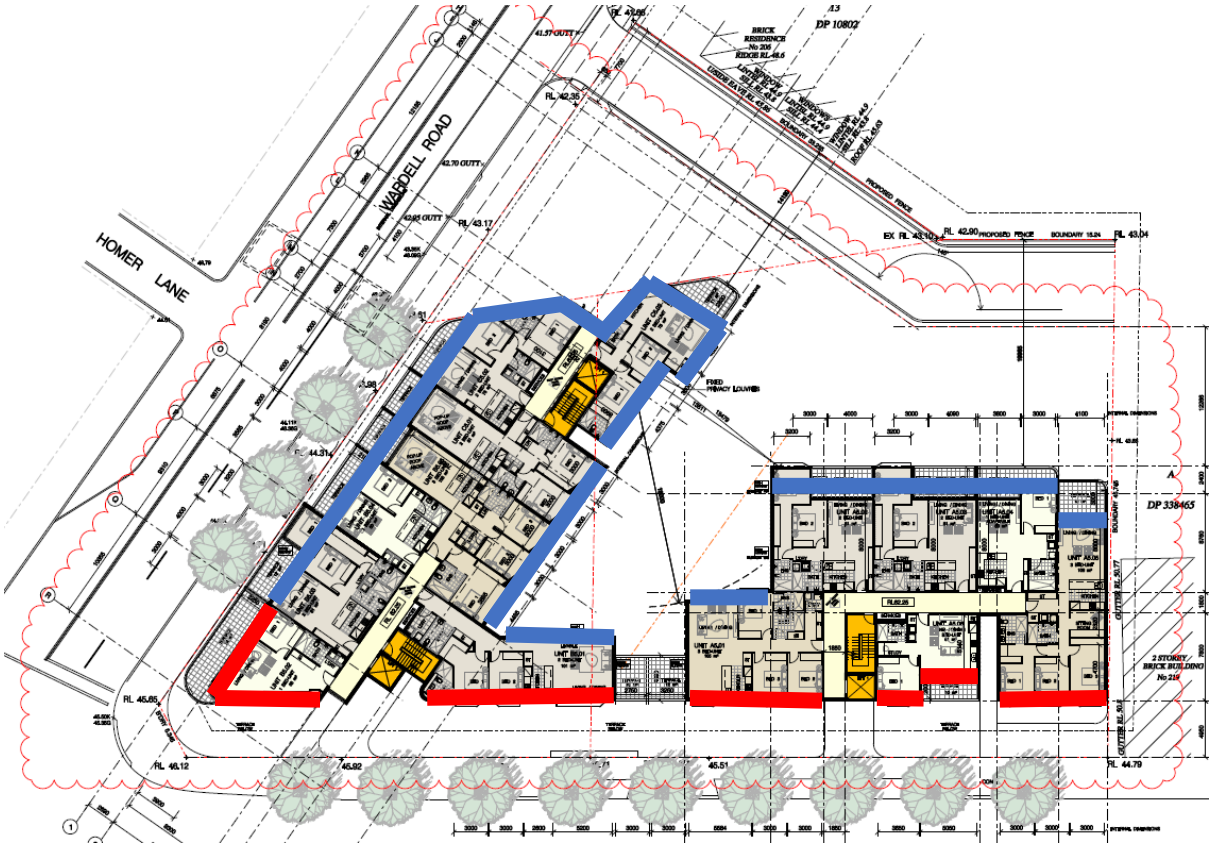

Figure 10 - Fifth Floor Windows and Sliding Door Specifications

All Windows & Sliding Doors of Bedrooms and Living rooms to be 10.38mm Laminated Glazing

All Windows & Sliding Doors of Bedrooms and Living rooms to be 6.38mm Laminated Glazing

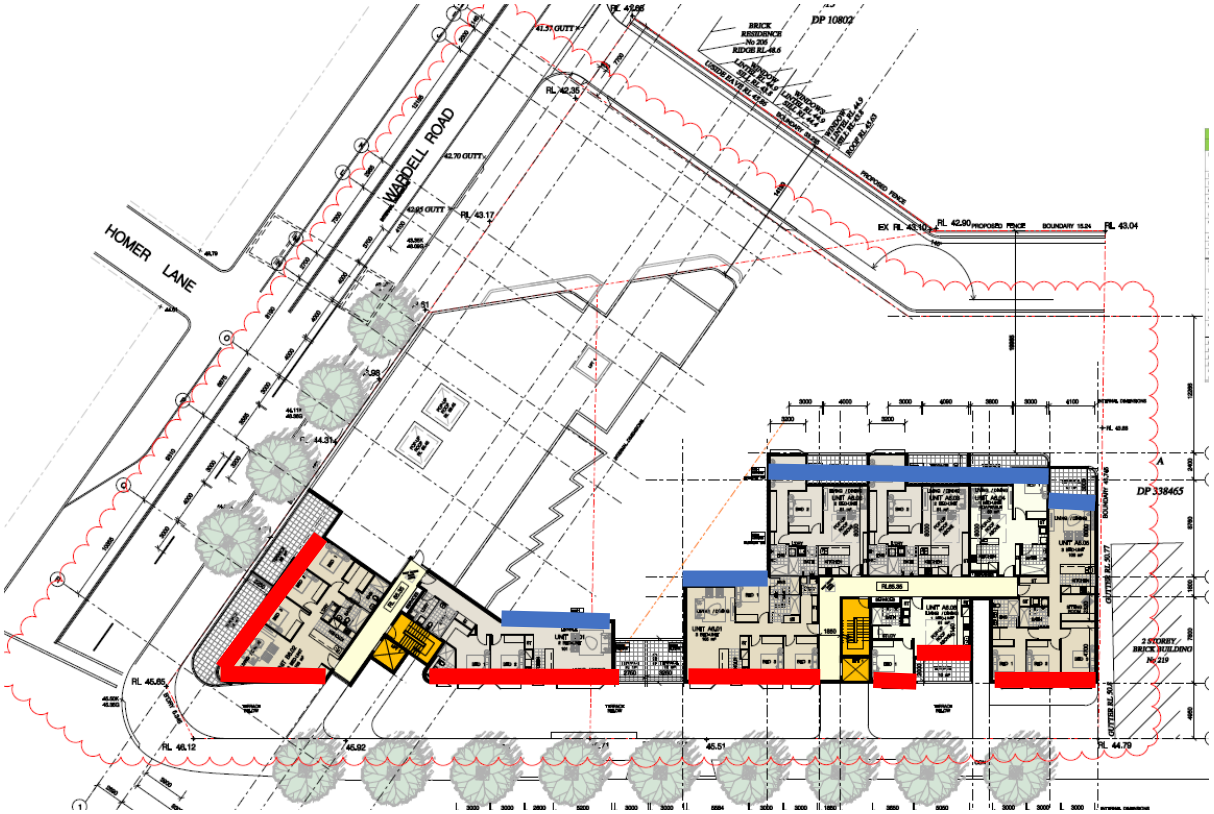

Figure 11 - Sixth Floor Windows and Sliding Door Specifications

All Windows & Sliding Doors of Bedrooms and Living rooms to be 10.38mm Laminated Glazing

All Windows & Sliding Doors of Bedrooms and Living rooms to be 6.38mm Laminated Glazing

5.0 ACCEPTABLE NOISE LEVELS FROM PROPOSED DEVELOPMENT – NOISE BREAK OUT

Potential Noise Break Out from the proposed development at No. 221-235 & 241-247A Homer St & 208 Wardell Rd, Earlwood is listed as follows

- Noise from proposed mechanical plant & equipment
- Traffic noise from vehicles accessing the basement carpark/loading dock
- Use of the communal areas on First & Second Floor;

The above is to comply with the criteria of the NSW Noise Guide for Local Government, NSW Noise Policy for Industry (2017), NSW Road Noise Policy and Canterbury Bankstown Council requirements.

6.1 NSW 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 is not greater than the noise trigger level.

6.1.1 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.

The recommended amenity noise levels for the proposed development No. 221-235 & 241-247A Homer Street & No. 208 Wardell Road, Earlwood are presented in Table 6.1.1.1 below.

Table 6.1.1.1- Recommended Amenity Noise levels

Type of Receiver	*Area*	*Time Period*	*Recommended Leq Noise Level, dB(A)*
Residence	Urban	Day	60
		Evening	50
		Night	45

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

Factor	***Correction***
Tonal Noise	+ 5 dB [1,2]
Low-Frequency Noise	+ 2 or 5 dB [1]
Intermittent Noise	+ 5 dB
Duration	+ 0 to 2 dB(A)
Maximum Adjustment	Maximum correction of 10 dB(A)[1](excluding duration correction)

1. Where a source emits tonal and low-frequency noise, only one 5-dB correction should be applied if the tone is in the low-frequency range, that is, at or below 160 Hz.
2. Where narrow-band analysis using the reference method is required, as outlined in column 5, the correction will be determined by the ISO1996-2:2007 standard.

Correction for duration is to be applied where a single-event noise is continuous for a period of less than two and a half hours in any assessment period. The allowable exceedance of the $L_{Aequ,15min}$ equivalent noise criterion is depicted in Table 6.1.1.3 for the duration of the event. This adjustment accounts for unusual and one-off events and does not apply to regular and/or routine high-noise level events.

Table 6.1.1.3 – Adjustment for Duration as per Fact Sheet C (Noise Policy for Industry 2017)

Allowable duration of noise (one event in any 24-hour period)	***Allowable exceedance of LAeq,15min equivalent project noise trigger level at receptor for the period of the noise event, dB(A)***	
	Daytime & evening (7 am–10 pm)	***Night-time (10 pm–7 am)***
1 to 2.5 hours	2	Nil
15 minutes to 1 hour	5	Nil
6 minutes to 15 minutes	7	2
1.5 minutes to 6 minutes	15	5
less than 1.5 minutes	20	10

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 level for the proposed development at No. 221-235 & 241-247A Homer Street & No. 208 Wardell Road, Earlwood is as follows:

- **Day period:** **60 – 5 + 3 = 58 dB(A)**
- **Evening period:** **50 – 5 + 3 = 48 dB(A)**
- **Night period:** **45 – 5 + 3 = 43 dB(A)**

6.1.2 INTRUSIVENESS NOISE CRITERIA

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

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

While the background noise level known as $LA_{90,15\ minutes}$ 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 $L_{A90,15\ minutes}$ 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 LAF90,15min level.

For the long-term method, the rating background noise level is defined as the median value of:

- all the day assessment background levels over the monitoring period for the day
- all the evening assessment background levels over the monitoring period for the evening, or
- all the night assessment background levels over the monitoring period for the night.

The predicted noise from the source $L_{Aeq,15\ min}$ is measured as at the most affected point within the most affected residential at the point where the most impact occurs. Therefore, the acceptable L_{eq} noise intrusiveness criterion for the proposal during the day, evening and night is as follows:

- **Day period:** **45 + 5 = 50 dB(A)**
- **Evening period:** **44 + 5 = 49 dB(A)**
- **Night period:** **38 + 5 = 43 dB(A)**

6.1.3 PROJECT NOISE TRIGGER LEVEL

A summary of intrusiveness and amenity noise levels as determined in sections 6.1.1 & 6.1.2 are shown in Table 6.1.3 below:

Table 6.1.3 - Summary of Intrusiveness and project amenity noise levels

Period	*Intrusiveness Noise Level dB(A)*	*Project Amenity Noise level dB(A)*
Day Time (7:00am-6:00pm)	50	58
Evening Time (6:00pm-10:00pm)	49	48
Night & Early Morning (10:00pm – 7:00am)	43	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, evening and night-time. Therefore, the project noise trigger levels for the proposed development are as shown below:

- Day period $L_{Aeq,15\ min}$: **50 dB(A)**
- Evening period $L_{Aeq,15\ min}$: **48 dB(A)**
- Night period $L_{Aeq,15\ min}$: **43 dB(A)**

The proposed developments and its activities including all mechanical plant will not exceed the project noise trigger level at the most sensitive location, provided all noise control recommendations in Section 8.0 are adhered to.

6.2 NOISE GUIDE FOR LOCAL GOVERNMENT & POEO

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 2.2.1 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:** **52 + 5 = 57 dB(A)**
- **Evening period:** **50 + 5 = 55 dB(A)**
- **Night period:** **43 + 5 = 48 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 out on the premises, or
2. any specified article to be used or operated on 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.

The Protection of the Environment Operations Act 1997 (POEO) defines "Offensive Noise" as noise:

(a) that, by reason of its level, nature, character or quality, or the time at which it is made, or any other circumstances:

(i) is harmful to (or is likely to be harmful to) a person who is outside the premises from which it is emitted, or

(ii) interferes unreasonably with (or is likely to interfere unreasonably with) the comfort or repose of a person who is outside the premises from which it is emitted, or

(b) that is of a level, nature, character or quality prescribed by the regulations or that is made at a time, or in other circumstances prescribed by the regulation.

In order to minimize the potential of sleep disturbance due to transient noises from truck movements during the early morning hours (3:00am – 6:00am), 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. Therefore, the following criteria will apply at the outside window of the nearest residential receivers:

- **$L_{A1,\ 1\ minute}$ =< 38 + 15= 53 dB(A) at external window of No. 206 Wardell Rd**

Section 2.5 of the NPfI 2017 address sleep disturbance as follows :

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

• 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, a detailed maximum noise level event assessment should be undertaken

Additionally, Section 5.4 of the NSW Road Noise Policy states the following:
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'.

6.3 TRAFFIC NOISE GENERATION CRITERIA

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

Table 6.3 – 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 general by land use developments	$L_{Aeq\ (1\ hour)}$ 55 (external)	$L_{Aeq\ (1\ hour)}$ 50 (external)

7.0 PREDICTED NOISE FROM PROPOSED DEVELOPMENT & IMPACT ON RECEIVERS

7.1 IMPACT OF MECHANICAL PLANT & EQUIPMENT & USE OF LOADING DOCK AREA

A range of mechanical plant, equipment and ventilation will be included in the proposed development at No. 221-235 & 241-247A Homer Street & No. 208 Wardell Road, Earlwood. Noise emitted by the use of the proposed mechanical plant is assessed by the Noise Policy for Industry 2017 and Canterbury-Bankstown Council requirements.

The proposed levels of basement parking are located below ground level and that makes providing natural ventilation not possible and a mechanical extract system should be used.
The mechanical ventilation system needs to achieve all required air changes for exhaust fume and extract smoke clearance in accordance with Australian Standard AS 1668.2 *"The use of ventilation and air-conditioning in buildings Mechanical ventilation in buildings"*.

The proposed development will include a Loading Dock with Turn Table, Scissor Lift & Compactor (Figure 12 – Basement entry & Loading Dock). The Loading Dock will allow for Waste Collection maneuvering out of the site and in addition to deliveries into the commercial premises . The proposed loading dock can accommodate a maximum of (1) truck at a time, up to 12.5 metres (Heavy Rigid Vehicle).

Typical sound power levels from typical mechanical plant & equipment and use of the loading dock area presented in table 7.1.1 below.

Table 7.1.1 – Expected Sound Power Levels from Loading Dock Operations

Expected Noise Emitted from Aldi	Sound Power Level Leq dB(A)
Trucks	**100**
Refrigeration trucks	**105**
Small trucks	**87**
Garbage trucks	**114**
Cars entering and existing the basement	**85**
Scissor Lift	**95**
Compactor – with tonality added-	**95**
Refrigeration condensers & Compressors	**84**
Unloading from trucks	**78**
Roller door - Noisy-	**85**
Car park Exhaust fan	**89**
Car park air supply fan	**83**
Other fans - combined	**70**

The Predicted noise levels at the boundary of the nearest residential receiver No. 206 Wardell Rd due to the operation of mechanical plant & equipment and use of the loading dock/turn, are presented in Table 7.1.2 below.

Table 7.1.2 – Predicted noise from operation of mechanical plant & use of loading dock at external facade of No. 206 Wardell Rd *, **

Activity	Period	Expected Leq dB(A) at No. 206 Wardell Rd	*Compliance with Noise Trigger level (Noise Policy For Industry 2017).*
Noise impact from operation of mechanical plant/equipment and use of loading dock/turntable	7.00am - 6.00pm (Day)	45.0 dB(A)	Yes < 50 dB(A)
	6:00pm – 10:00pm (Evening)	45.0 dB(A)	Yes < 48 dB(A)
	10:00pm – 7:00am (Night)	39.0 dB(A)	YES <43 dB(A)

***Assuming all recommendations in section 8 of this report are adhered to.**

7.2 TRAFFIC GENERATION & CARPARK NOISE FROM PROPOSED DEVELOPMENT

The proposed three (3) levels of basement parking for the proposed development will accommodate a total of one hundred and ninety-nine (199) car spaces. Access to the basement parking will be from Wardell Rd through a proposed laneway (Figure 12 – Basement Entry & Loading Dock Area).

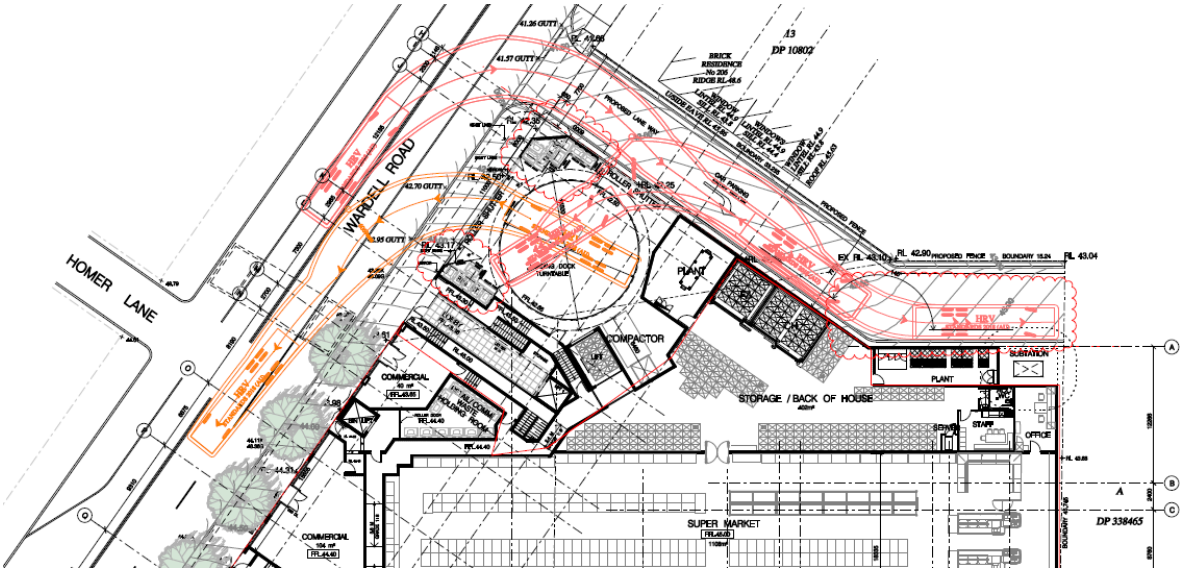

Figure 10 – Basement Entry & Loading Dock

As per the Traffic & Parking Impact Assessment by Motion Traffic Engineers dated October 2024, the proposed development use will generate a net increase of sixty-four (64) vehicle trips in the AM peak hour and two hundred and twenty-three (223) in the PM peak hour.

The predicted noise levels due to vehicles arriving and departing the site will be governed by existing background noise levels from Homer St, Wardell Rd and surrounding commercial/retail premises.

As shown in sections 7.2.1 & 7.2.2 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 basement carpark will comply with the NSW Road Noise Policy and the Noise Policy for Industry 2017, provided the recommendations given in section 8 are adhered to.

7.2.1 NOISE BREAK-OUT FROM ADDITIONAL TRAFFIC GENERATION

As per the Traffic & Parking Impact Assessment by Motion Traffic Engineers dated October 2024, the proposed development use will generate a net increase of sixty-four (64) vehicle trips in the AM peak hour and two hundred and twenty-three (223) in the PM peak hour.

The nearest residential receivers that will be affected by vehicles entering/exiting the proposed basement car park will be the residential property at No. 206 Wardell Rd. Predicted noise levels at 1.0m from the nearest receivers due to additional traffic generation on Wardell Rd are presented in Table 7.2.1 below

Table 7.2.1 – Predicted Noise from Additional Traffic Generation on Wardell Rd at 1.0m from facade of Receivers on High Street

Activity	Period	Expected Leq 1hr dB(A) from Additional Traffic Noise	Complies with Traffic Noise Criteria- as per section 6.3
Noise on Wardell Rd from Additional Traffic Generation	AM Peak Hour Period	35 dB(A) at No. 206 Wardell Rd	Yes <55 dB(A) – Day <50 dB(A) – Night
	PM Peak Hour Period	49 dB(A) at No. 206 Wardell Rd	

7.2.2 NOISE BREAK-OUT FROM CARS ENTERING/EXITING THE BASEMENT CARPARK

Access to the basement carpark is from Wardell Rd, with the driveway adjacent to the northern boundary and proposed laneway. The nearest residential receiver affected by vehicles entering and exiting the basement parking will be the property at No. 206 Wardell Rd.

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 7.2.2.1 – Swl Levels for Different Car Activities Expected to Occur in the Garage

Garage Noise Source	*Sound Power Level, dB(A)*
Car Door Closing	91*
Car Starting	88*
Car Moving at 10 km/hr	81

N/A Noise occurs inside enclosed carpark

The Predicted noise levels at the boundary of the nearest residential receiver No. 206 Wardell Rd due to cars entering and exiting the carpark, are presented in Table 7.2.2.2 below.

Table 7.2.2.2 – Predicted noise from vehicles entering and exiting the basement parking at external facade of No. 206 Wardell Rd *, **

Activity	**Period**	**Expected Leq dB(A) at No. 206 Wardell Rd**	***Compliance with Noise Trigger level (Noise Policy For Industry 2017).***
Noise impact from vehicles entering/exiting the basement carpark	7.00am - 6.00pm (Day)	39.0 dB(A)	Yes < 50 dB(A)
	6:00pm – 10:00pm (Evening)	39.0 dB(A)	Yes < 48 dB(A)
	10:00pm – 7:00am (Night)	33.0 dB(A)	Yes <43 dB(A)

***Based on Max. (8) Vehicles per 15 minutes (Peak hours). Max. (2) Vehicles per 15 minutes (after 10: 00p.m). ** Assuming all recommendations in section 8 of this report are adhered to.**

7.3 NOISE BREAK-OUT FROM COMMUNAL AREA

As per architectural plans by Loucas Architects dated 26th September, 2024, the proposed development at No. 221-235 & 241-247A Homer Street & No. 208 Wardell Road, Earlwood will have two (2) communal area, located on the First Floor & Second Floor (Figures 13 & 14 Proposed Communal Areas).

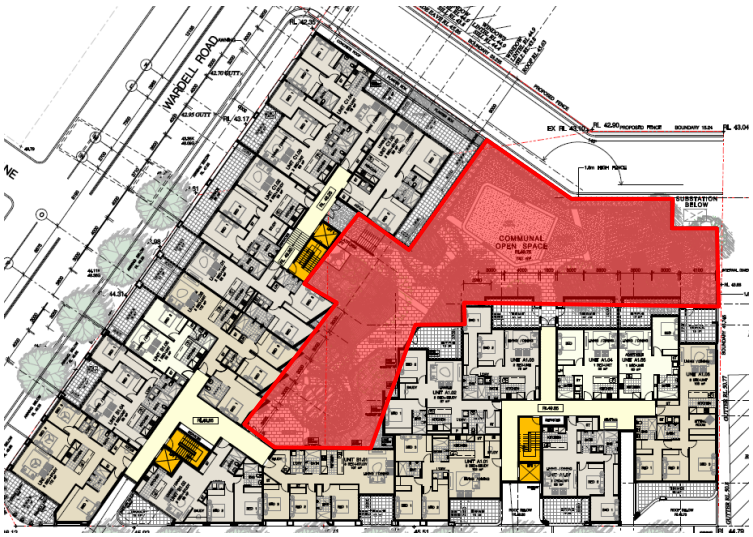

Figure 11 - Proposed First Floor Communal Area

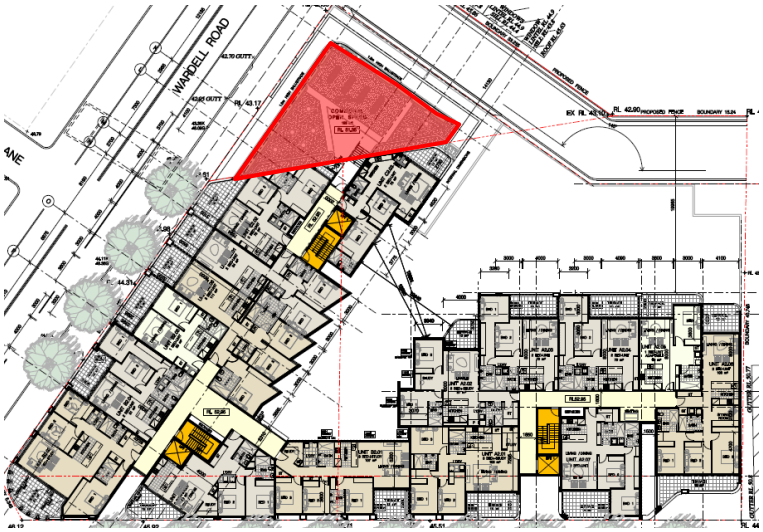

Figure 12 - Proposed Second Floor Communal Area

As per Pearson, Bennet, & Fidell (1977) report, the sound power level of one (1) person talking is as per Table 7.3.1 below.

Table 7.3.1 Typical Vocal Sound Power Level Reference Sheet

Vocal Effort	No. of Talkers	Sound Power Levels [dB] at Octave Band Centre Frequencies [Hz]*,**,***							
		125	250	500	1000	2000	4000	8000	dB(A)
Females									
Casual	1	48.0	61.0	61.0	54.0	51.0	47.0	48.0	**61.0**
Normal	1	49.0	63.0	66.0	61.0	56.0	44.0	50.0	**66.0**
Raised	1	47.0	67.0	72.0	70.0	66.0	61.0	54.0	**74.0**
Loud	1	47.0	62.0	77.0	79.0	76.0	70.0	62.0	**82.0**
Shouted	1	48.0	68.0	82.0	89.0	88.0	81.0	71.0	**93.0**
Males									
Casual	1	58.0	62.0	63.0	55.0	53.0	51.0	48.0	**63.0**
Normal	1	60.0	66.0	69.0	62.0	58.0	54.0	48.0	**69.0**
Raised	1	65.0	71.0	76.0	70.0	66.0	61.0	55.0	**76.0**
Loud	1	69.0	78.0	85.0	84.0	79.0	73.0	63.0	**87.0**
Shouted	1	58.0	83.0	93.0	97.0	93.0	85.0	76.0	**100.0**

For a number of people (n) in the outdoor communal area in any vocal category the increase in noise level at any octave band centre frequency is $\Delta L = 10\log_{10}(n)$.

The total noise level from all groups is determined using the equation

$$L = 10\,Log_{10}\left(\sum_{i=1}^{n} 10^{(L_i/10)}\right)$$ Where L_i is the noise level from each group.

The noise levels from people congregating in the outdoor communal areas is calculated in accordance with ISO 9613.2 – *Acoustics – Attenuation of sound during propagation outdoors — Part 2: General method of calculation.*

The nearest receivers that have the potential to be impacted by the use of the communal areas are the proposed residential units located adjacent to the communal areas on Level 1 & Level 2, as well as the residential property north of the site at No. 206 Wardell Rd.

The predicted noise levels at the most affected residential receivers, including residents of the proposed development, are presented in Table 7.3.2 below:

Table 7.3.2 - Predicted Noise from Outdoor Communal Open Spaces at External Façade of Receivers*-

Activity	***Period***	***Expected. Leq dB(A) at Façade of Receiver****	***Complies with Background level + 5 *****
****Residents Congregating in ***First Floor*** Outdoor Communal open space (50% talking)**	7.00am - 6.00pm (Day)	41 dB(A) @ No. 206 Wardell Rd	Yes ✓ Day Time (< 57 dB(A))*** Evening Time (<55 dB(A))***
	6.00pm-10:00pm (Evening)	44 dB(A) @ Proposed Residential Units critical façade - within strata of proposed building-	
****Residents Congregating in ***Second Floor*** Outdoor Communal open space (50% talking)**	7.00am - 6.00pm (Day)	41 dB(A) @ No. 206 Wardell Rd	Yes ✓ Day Time (< 57 dB(A))*** Evening Time (<55 dB(A))***
	6.00pm-10:00pm (Evening)	45 dB(A) @ Proposed Residential Units critical façade - within strata of proposed building-	

Assuming all recommendation in Section 8 are adhered to. ** NSW Noise Policy for Industry does not apply to Lodger/Patron noise (Section 1.5 exclusions). Noise Guide for Local Government, Background noise level + 5 applies. Outdoor communal area is closed between 10:00 pm and 7:00 am.**

7.4 NOISE BREAK-OUT FROM GARBAGE COLLECTION

A truck will enter and exit the site from the laneway adjacent to the driveway between the hours of 3am and 6am to collect the garbage. The pathway of the truck through the site is presented in the architectural plans by Loucas Architects (Figure 15 – Garbage truck Pathway through Site)

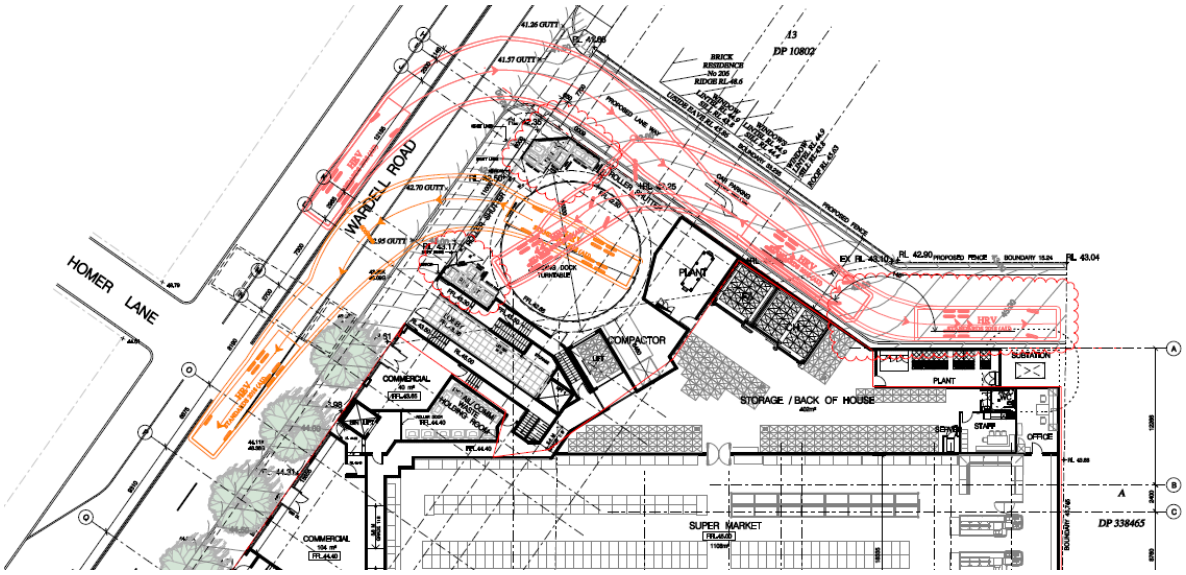

Figure 13 – Garbage truck pathway through site

A truck's typical noise-producing activities include the following:

- truck door closing/slamming
- truck starting up/ignition
- truck idling/warming up
- truck driving at 5km/h
- truck accelerating
- trucks reversing with alarm

The sound power level from one (1) on-site truck, including the activities listed above, will be conservatively assumed as 105 dB(A). The octave band centre frequencies characteristics are presented in Table 7.4.1 below.

Table 7.4.1 – Sound Power Level of One Truck - 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	105	-	81	92	89	91	96	95	91	86

SoundPLAN 8.2 and its geo-database module were utilised to calculate the noise levels and noise contours along the nearest residential receiver (Figure 16 – 3D SoundPLAN Model with Swept Truck Path). **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 17 – Noise Contour for Garbage Truck Driving through Site).

Assuming all noise control measurements recommended in Section 8.0 of this report have been fully implemented, the predicted maximum noise levels at the window of the nearest residential receiver when various noise-producing activities by the truck are in occurrence have been calculated and tabulated below.

Table 7.4.2 – Predicted Noise from One Truck Movement On-Site at window of 206 Wardell Rd

Activity	Period	Expected $L_{A1,\ 1\ minute}$ dB(A) at No. 206 Wardell Rd:	Complies with Sleep Disturbance Criteria - as per Section 6.2	Complies with Sleep Disturbance Criteria - as per Section 2.5 of the NPfI
Truck Movement On-Site	Night	53 dB(A)	<= 53 Yes ✓*,**	LAFmax exceeds 52 by 1 dB***

*Assumed maximum 1 truck during the Night period
**Assumed all recommendations of Section 8 are adhered to
***Increase in noise level of 1 dB(A) in not perceivable. The following table lists sound perception relative to dB sound level change

Sound Pressure Level change	Subjective perception	Sound energy change
0 - 3 dB	Barely perceivable	50%
4 - 5 dB	Perceivable and significant	69%
6 dB	Resultant sound 1/4 lower than initial level	75%
7 - 9 dB	Major perceived reduction	87%
10 dB	Resultant sound 1/2 lower than initial level	90%

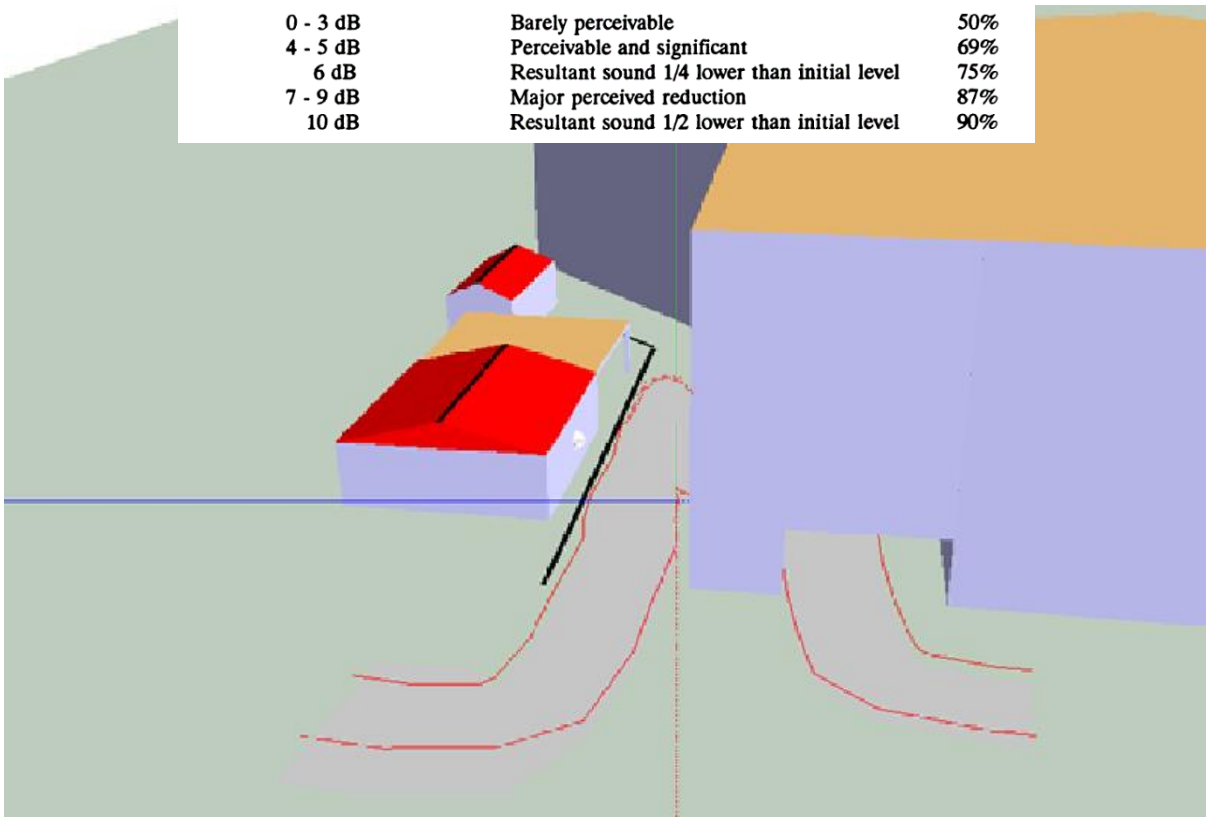

Figure 14 – 3D SoundPLAN Model with Swept Truck Path

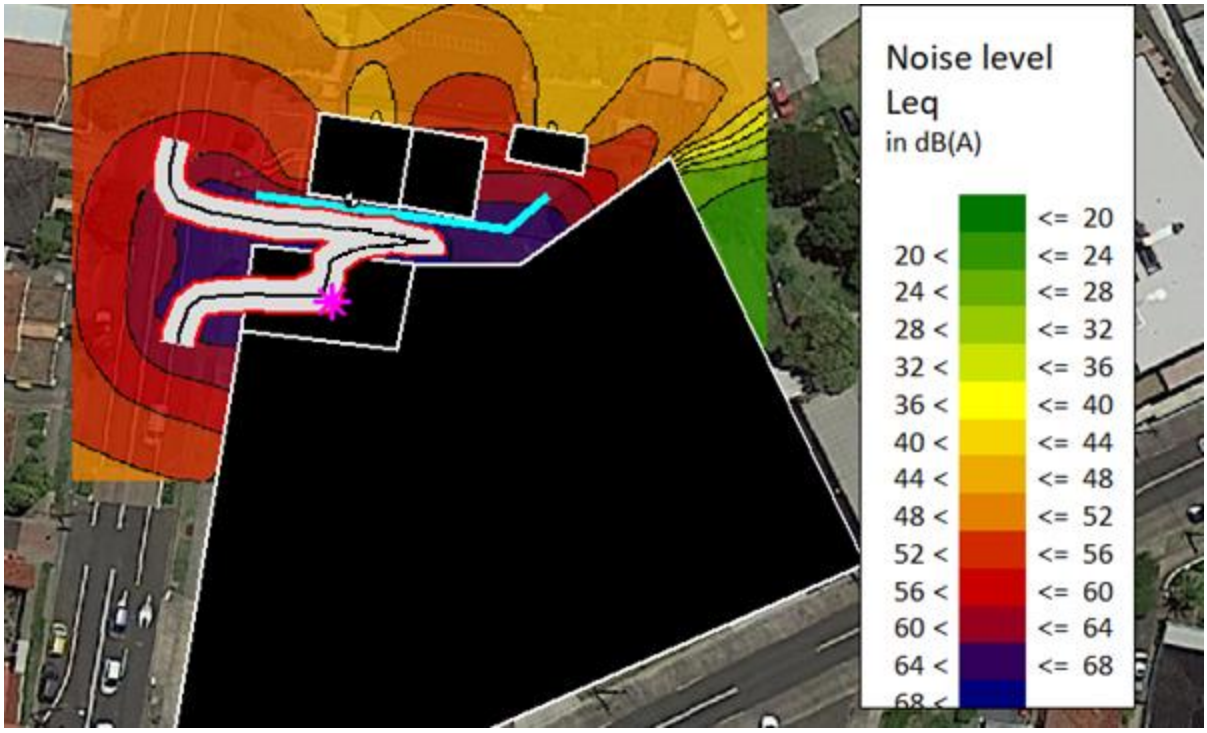

Figure 15 – Noise Contour for Garbage Truck Driving through Site

7.5 CUMULATIVE NOISE IMPACT FROM PROPOSED DEVELOPMENT

Based on noise predictions for the operation of mechanical plant & equipment, use of loading dock/turntable, use of outdoor communal areas and traffic noise/traffic generation, listed in Sections 7.1-7.4 above, Table 7.5 below lists the predicted cumulative noise from the above listed activities at the façade of the nearest residential receiver No. 206 Wardell Rd.

Table 7.5 – Predicted Cumulative Noise Impact from Noise Break Out at façade of Nearest Receiver at No. 206 Wardell Rd*

Activity	Period	Expected Leq dB(A) at No. 206 Wardell Rd	Complies with Relevant Criteria listed in Section 6
Cumulative Noise Impact from mechanical plant & equipment, use of loading dock/turntable, use of outdoor communal areas and traffic noise/traffic generation at Nearest Receiver**	7:00am – 6:00pm	49 < 50	Yes ✓
	6:00pm – 10:00pm	47 =<48	Yes ✓
	10:00pm – 7:00am	43 =<43	Yes ✓

*Assumed all recommendations of Section 8 are adhered to
**Mechanical Plant noise & Noise mitigation to be addressed when application is approved & mechanical plans area ready

8.0 RECOMMENDATIONS

The recommendations listed in table 8.1 below are essential for the Noise break-out from the proposed development to comply with section 6.0 of this report.

Table 8.1 – Typical Noise Break Out Recommendations

Item	RECOMMENDATIONS
Basement Roller Door	• Ensure maintenance and lubrication of motor bearings, door tracks and joints. • The proposed security door fitted to the car parking area entrance must be independently mounted on rubber pads to prevent vibration noise transmission through the concrete walls and/or columns.
AC Condenser Units	• We recommend that all outdoor air-conditioning units to be acoustically enclosed or set away by more than 3.0m from any boundary with a sound power level of each unit no more than 65 dB(A).
General Mechanical Plant	• We recommend acoustic assessment at CC stage of all proposed mechanical plants and equipment once the development has been approved and full Mechanical Services Plans have been prepared. In the mean time we recommend the following: • Procurement of quiet plant (when required) and the maintenance of existing plant; • Strategic positioning of plant away from potential sensitive receivers; • Commercially available silencers or acoustic attenuators for air discharge and air intakes of plant; • Acoustically lined and lagged ductwork; • Acoustic screens and barriers between plant and sensitive neighbouring premises; and/or, • Partially enclosed or fully enclosed acoustic enclosures around plant.
Ground Floor Sound Barrier Fencing	• We recommend a 2.4m high Hebel Panel Barrier lined with Martini Absorb MD50 from the inside to be installed along the northern boundary of the development, adjacent to the nearest receiver at No. 206 Wardell Rd (Figures 18 & 19).

Loading Dock Recommendations	• Loading docks is not to be used between 10:00pm and 7:00am; • **No Commercial Garbage Collection** between the hours and 6:00 pm and 7:00am; • Loading dock is to be roofed with a minimum 200 mm thick slab; • Roller door to loading dock is to be closed when loading dock is in use; • A 2.4 m gap free barrier is to be installed along the perimeter of the proposed lane way (Figure 18 – Ground Floor Sound Barrier Location). • Loading dock slab is to be separated from main structural slab by a minimum 25mm anti-vibration pads/springs; and, • Columns/walls to be separated from floor finishes using 25mm tubular foam and approved sealant (isolation joint).
First Floor Outdoor Communal Open Space Recommendations	• A 1.8m gap free barrier is to be installed along the perimeter of the Communal areas on the First Floor (Figure 20 – Communal Areas Sound Barrier – Level 1). The barriers are to be of lapped & capped timber, colourbond or masonry construction. Or 600mm high planter box with 1.2m glass/Perspex on top. • Access to the Communal areas is to be restricted to Day Time (7:00am – 6:00pm) and Evening Time (6:00pm – 10:00pm) only. No night time access permitted (10:00pm – 7:00am). Signs are to be installed at entry to advise residents of this restriction. • All windows in Habitable Areas facing the Communal Area are to be 10.38mm laminated type with full perimeter acoustic seals as per Figure 6 – First Floor Windows and Sliding Door Specifications • NO music to be played in the outdoor communal areas at any time
***Second Floor* Outdoor Communal Open Space Recommendations**	• A 1.8m gap free glass balustrade is to be installed along the perimeter of the Communal area on the Second Floor (Figure 21 – Communal Areas Sound Barrier – Level 2). • Access to the Communal areas is to be restricted to Day Time (7:00am – 6:00pm) only. No evening or night time

	access permitted (6:00pm – 7:00am). Signs are to be installed at entry to advise residents of this restriction. • All windows in Habitable Areas facing the Communal Area are to be 10.38mm laminated type with full perimeter acoustic seals as per Figure 7 – Second Floor Windows and Sliding Door Specifications • NO music to be played in the outdoor communal areas at any time

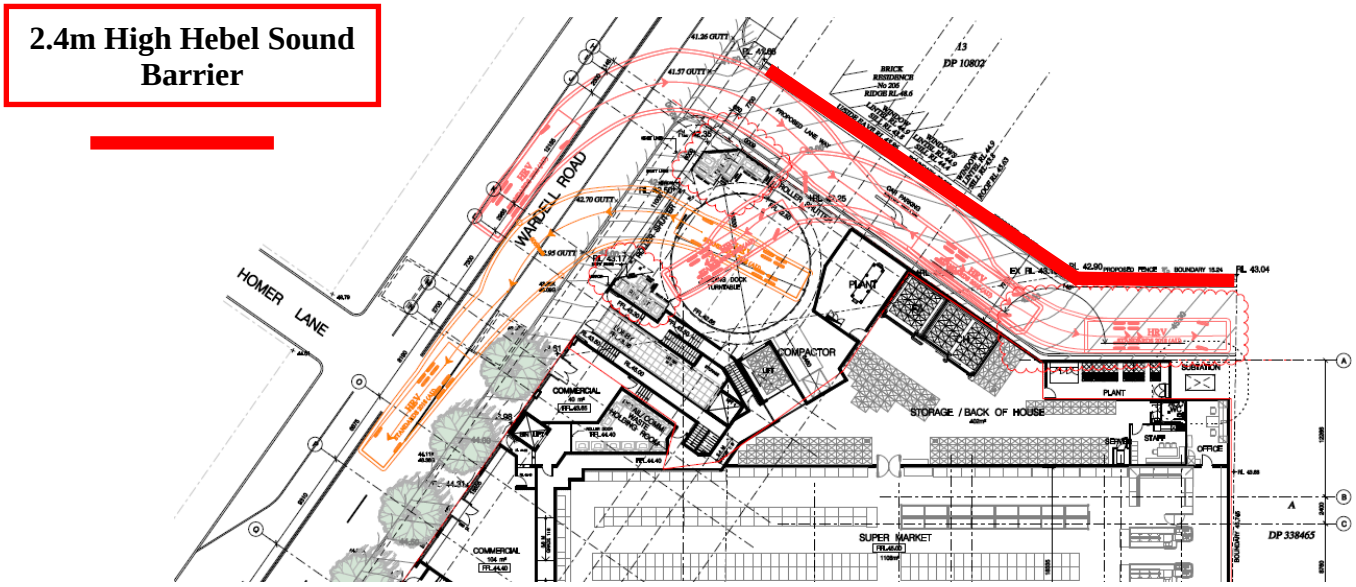

Figure 16 - Ground Floor Sound Barrier Location

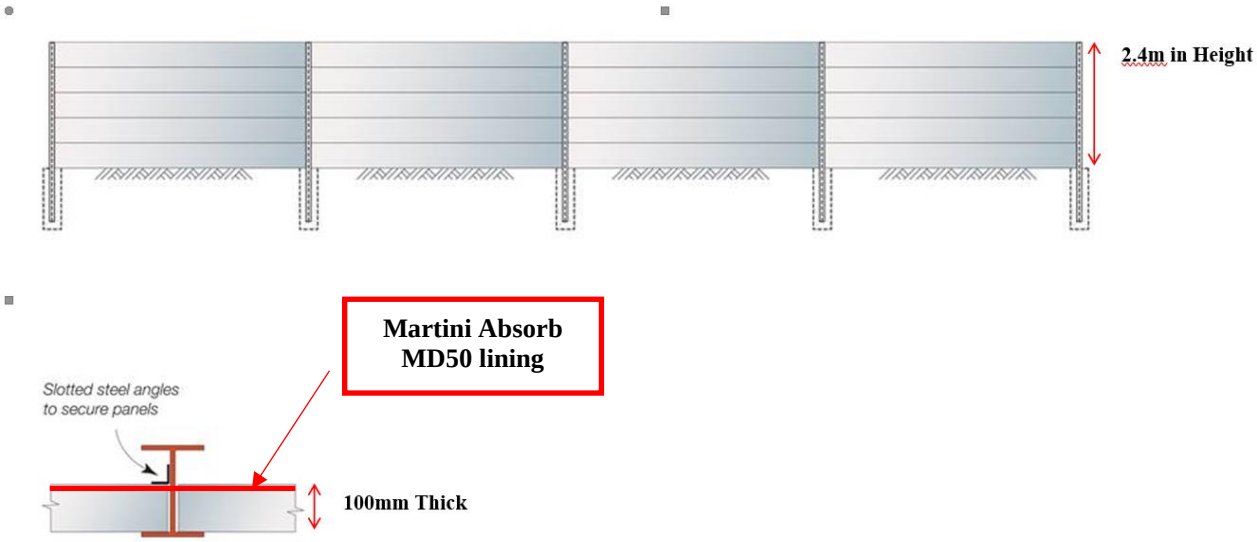

Figure 19 – Hebel Sound Barrier Detail

1.8m High Gap-free Sound Barrier

Figure 20 – Communal Areas Sound Barrier – Level 1

1.8m High Gap-free Glass Balustrade

Figure 21 – Communal Areas Sound Barrier – Level 2

9.0 NOISE FROM PROPOSED COMMERCIAL PREMISES

The acoustic design for the proposed development is only for the base building design. Noise from the proposed Supermarket, retail & commercial premises, is not covered in this report as it will be subject to a separate DA once the base building is approved. Future Reports/Plans accompanying the DA for these commercial spaces should ensure that the combined noise levels from these facilities including their mechanical plant is below the noise trigger level described in section 6.1.3 of this report.

10.0 DISCUSSION & CONCLUSION

The construction of the proposed development at No. 221-235 & 241-247A Homer Street & No. 208 Wardell Road, Earlwood, if carried out as recommended in the plans and specifications and including the acoustic recommendations in this report, will meet the required noise reduction levels as required in AS 2107 'Acoustics – Recommended Design Sound Levels and Reverberation Times', Clause 102 of the Statement Environment Planning Policy (SEPP), and Canterbury Bankstown Council requirements.

Noise breakout from the use of the proposed building, including all proposed mechanical plant & equipment, vehicles accessing the basement carpark/loading dock and use of the communal areas; will comply with the NSW Noise Guide for Local Government, NSW Noise Policy for Industry (2017), NSW Road Noise Policy and Canterbury Bankstown Council requirements, provided recommendations in Section 8 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)