

ABA Estate Pty Ltd

95-145 Hoxton Park Road, Hoxton Park

Acoustic Assessment for Planning Proposal

Author	Fu Siong Hie, B.Eng, MAAS Principal Consultant
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1 Introduction

The following report has been prepared by Acouras Consultancy on behalf of ABA Estate Pty Ltd to undertake a noise impact assessment for the proposed development located at 95-145 Hoxton Park Road, Hoxton Park. The proposed development will include:

- Two (2) levels of basement carpark.
- Retail and commercial tenancies on ground level.
- Six (6) residential buildings (Block A to F) with apartments on ground to level 5.

The proposed development is surrounded by existing residential buildings. Traffic noise along the Hoxton Park Road dominates the surrounding ambient noise levels. The site location is shown in Figure 1.



Figure 1 – Site Location, Nearest Residents and Noise Logger Position

2 Noise Criteria

The following standards and guidelines are applicable to this project:

- Liverpool City Council DCP (2008) Part 4 “Development in the Liverpool City Centre”.
- NSW Department of Planning “Development Near Rail Corridors and Busy Roads”.
- State Environmental Planning Policy (Infrastructure) 2007.
- NCC/BCA Part F5.
- NSW EPA “Noise Guide for Local Government” (NGLG).
- Australian standard AS/NZS 2107-2016: Acoustics – Recommended design sound levels and reverberation times for building interiors.
- Australian standard AS 1055.1-1997: Acoustics – Description and measurement of environmental noise - General procedures.

2.1 Internal Noise Levels

For the residential development, the Liverpool City Council DCP (2008) has no specific acoustic requirements. Therefore, the Department of Planning and the State Environmental Planning Policy (Infrastructure) 2007, Clause 87 (rail) and 102 (road) requires that if the development is for the purpose of a building for residential use, the consent authority must be satisfied that appropriate measures will be taken to ensure that the following L_{Aeq} levels are not exceeded.

Table 1— Development near Rail Corridors and Busy Roads – Interim Guideline

Residential Space	Internal Noise Criteria
in any bedroom in the building	35dB(A) at any time 10pm–7am
anywhere else in the building (other than a garage, kitchen, bathroom or hallway)	40dB(A) at any time

Mitigation measures are based on having windows and external doors closed. If internal noise levels with windows or doors open exceed the criteria by more than 10dBA, the design of the ventilation for these rooms should be such that occupants can leave windows closed, if they so desire, and also to meet the ventilation requirements of the Building Code of Australia.

For the residential development, the AS/NZS 2107–2016 outlines the acceptable internal noise levels such that a satisfactory acoustic environment within residential and non-residential spaces in new and existing buildings.

The Australian Standard AS 3671-1989 'Acoustics - Road traffic noise intrusion -building siting and construction' provides guidance on the design but is limited as it refers to the Australian Standard AS 2107. Australian Standard AS 2107 – 2016 'Acoustic – Recommended Design Sound Levels and Reverberation Times for Building Interiors' to provide the recommended design sound levels for different areas of occupancy in buildings.

Table 2 presents the recommended internal design noise levels in accordance with AS 2107 – 2016.

Table 2— Recommended Internal Design Noise Levels (AS/NZS 2107)

Type of occupancy/activity	Design sound level (L _{Aeq,t}) range
Apartment common areas, corridors, lobbies (e.g. foyer, lift lobby)	45 to 50
Small retail stores (general)	< 50
Enclosed Carparks	< 65

2.2 Traffic Noise Generation

The development has the potential to generate increased traffic noise along Memorial and Maryvale Ave will be assessed in accordance with the NSW EPA Road Noise Policy (RNP). Table 3 sets out the assessment criteria for residences to be applied to particular types of project, road category and land use.

Table 3— Road traffic noise assessment criteria for residential land uses

Road Category	Type of project/land use	Assessment Criteria - dBA	
		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)

For existing residences and other sensitive land uses affected by additional traffic on existing roads generated by land use developments, any increase in the total traffic noise level should be limited to 2 dB above that of the corresponding 'no build option'.

2.3 Sound Insulation Requirement (Part F5 NCC/BCA)

For sound transmission and insulation between sole occupancy units (SOU) within the same development, walls and floors to be constructed in accordance with requirements of Part F5 of the Building Code of Australia (BCA). Sound insulation requirements are summarised in Table 4.

Table 4 - NCC Part F5 Requirements (Class 2 or 3)

Building Element	Minimum NCC Part F5 Requirements
Sound Insulation Rating of Walls (Class 2 or 3)	
Walls between separate sole occupancy units.	Rw + Ctr 50 (airborne)
Walls between wet areas (bathrooms, sanitary compartment, laundry or kitchen) and a habitable room (other than kitchen) in adjoining apartments.	Rw + Ctr 50 (airborne) & of discontinuous construction
Walls between sole occupancy unit and stairway, public corridors, public lobby or the like or parts of a different classification.	Rw 50 (airborne)
Walls between a plant room or lift shaft and a sole occupancy unit.	Rw 50 (airborne) & of discontinuous construction
Sound Insulation Rating of Floors (Class 2 or 3)	
Floors between sole occupancy units or between a sole occupancy unit and plant room, lift shaft, stairway, public corridor, public lobby or the like.	Rw + Ctr 50 (airborne) & Ln,w + CI < 62 (impact)
Apartment Entry Doors (Class 2 or 3)	
A door incorporated in a wall that separates a sole-occupancy unit from a stairway, public corridor, public lobby or the like.	Rw 30 (airborne)
Services (Class 2, 3 or 9c)	
If a storm water pipe, a duct, soil, waste or water supply pipe including a duct or pipe that is located in a wall or floor cavity serves or passes through more than one sole occupancy unit must be separated:	
if the adjacent room is a habitable room (other than a kitchen); or	Rw + Ctr 40
if the room is a kitchen or non-habitable room	Rw + Ctr 25

Construction Deemed to Satisfy

The forms of construction must be installed as follows:

- (a) Masonry—Units must be laid with all joints filled solid, including those between the masonry and any adjoining construction.
- (b) Concrete slabs—Joints between concrete slabs or panels and any adjoining construction must be filled solid.
- (c) Sheeting materials—
 - (i) if one layer is required on both sides of a wall, it must be fastened to the studs with joints staggered on opposite sides; and
 - (ii) if two layers are required, the second layer must be fastened over the first layer so that the joints do not coincide with those of the first layer; and
 - (iii) joints between sheets or between sheets and any adjoining construction must be taped and filled solid.
- (d) Timber or steel-framed construction—perimeter framing members must be securely fixed to the adjoining structure and—
 - (i) bedded in resilient compound; or
 - (ii) the joints must be caulked so that there are no voids between the framing members and the adjoining structure.
- (e) Services—
 - (i) Services must not be chased into concrete or masonry elements.
 - (ii) A door or panel required to have a certain $R_w + C_{tr}$ that provides access to a duct, pipe or other service must—
 - (A) not open into any habitable room (other than a kitchen); and
 - (B) be firmly fixed so as to overlap the frame or rebate of the frame by not less than 10 mm, be fitted with a sealing gasket along all edges and be constructed of—
 - (aa) wood, particleboard or blockboard not less than 33 mm thick; or
 - (bb) compressed fibre reinforced cement sheeting not less than 9 mm thick; or
 - (cc) other suitable material with a mass per unit area not less than 24.4 kg/m²
 - (iii) A water supply pipe must—
 - (A) only be installed in the cavity of discontinuous construction; and
 - (B) in the case of a pipe that serves only one sole-occupancy unit, not be fixed to the wall leaf on the side adjoining any other sole-occupancy unit and have a clearance not less than 10 mm to the other wall leaf.
 - (iv) Electrical outlets must be offset from each other—
 - (A) in masonry walling, not less than 100 mm; and
 - (B) in timber or steel framed walling, not less than 300 mm.

2.4 Noise Survey and Project Specific Limits

An unattended noise survey was carried out at the site to measure the background and ambient noise levels. Noise monitoring was conducted between Monday 4th to Monday 11th April 2022. The monitor was positioned as shown in Figure 1:

- Location 1 (L1) – Unattended noise monitor located on the vacant land.
- Location 2 (L2) – Attended traffic noise measurement at the corner of Hoxton Park Road and Maryvale Ave.
- Location 3 (L3) – Attended traffic noise measurement on Hoxton Park Road, near the intersection of Webster Road.
- Location 4 (L4) – Attended traffic noise measurement at the corner of Hoxton Park Road and Memorial Ave.

Measurements were conducted using the following equipment:

- SVAN 977 Type 1 Real time Analyser/Noise Logger. Serial No. 34892.
- SVAN 977C Type 1 Real time Analyser/Noise Logger. Serial No. 97497.
- SVAN SV30A Type 1 Sound Level Calibrator. Serial No. 31830.

Noise monitoring was conducted in general accordance with Australian standard AS 1055.1-1997: Acoustics-Description and measurement of environmental noise-General procedures. The noise analyser was calibrated immediately before and after measurements were taken with no discernible differences between these two recorded levels. The sound analyser is Type 1 and complies with Australian standard AS1259.2: 1990.

During the monitoring period any adverse weather condition have been excluded. The noise logger results are presented in Appendix C.

2.4.1 Traffic Noise Levels

Table 5 presents a summary of the measured traffic noise impacting the development.

Table 5 – Measured Ambient and Traffic Noise and Levels, dBA

Location	Period	Average Leq(15min)
L2	AM Peak: 08:15-08:30	72
L3	AM Peak: 08:30-08:45	72
L4	AM Peak: 08:45-09:00	72

The following Figure 2 and Figure 3 shows the current impact of traffic noise from the Hoxton Valley Way during the daytime and night time periods respectively.

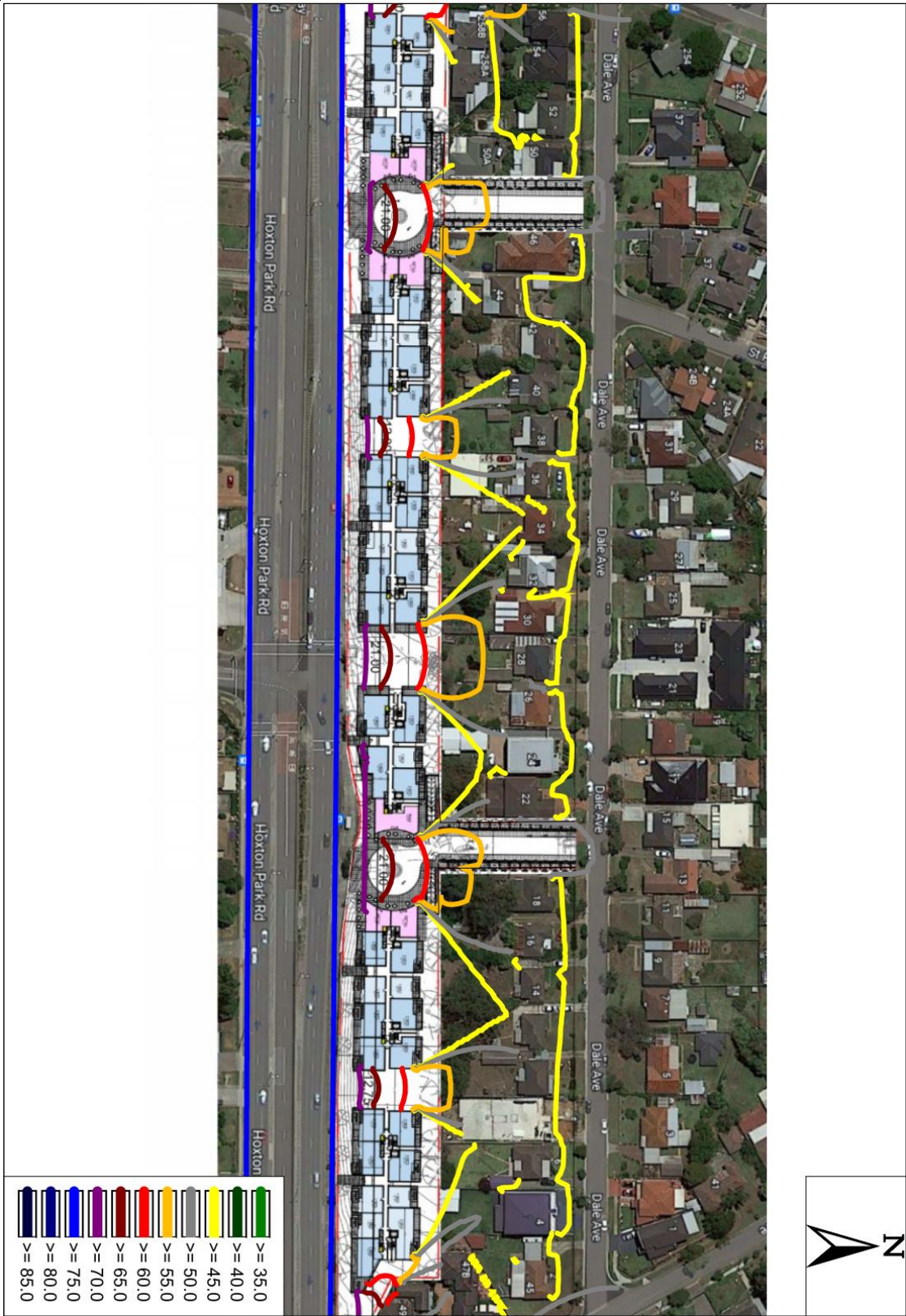


Figure 2 –Traffic Noise Contour (Day-time)

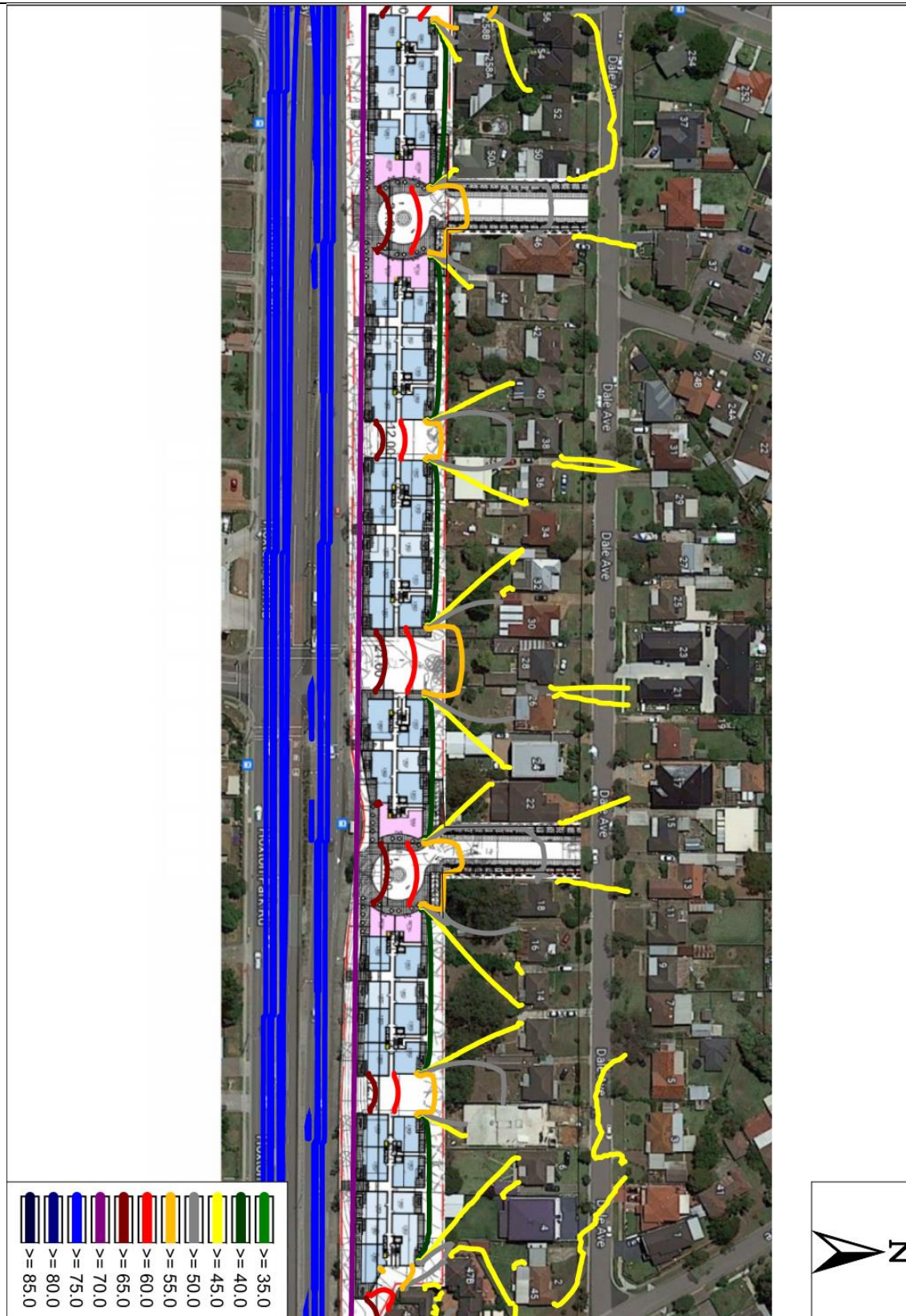


Figure 3 –Traffic Noise Contour (Night-time)

2.4.2 EPA Noise Policy for Industry

Liverpool DCP does not recommend an objective method to assess noise from the development, therefore the procedures as set out in the NSW Noise Policy for Industry (NPfI) has been applied.

Table 6 presents a summary of the measured background noise level and the allowable intrusive noise limit for this project based on the requirements of the EPA's policy. The amenity criteria are based on a suburban receiver.

Table 6—Noise Survey Summary and Project Limits, dBA

Receiver	Time Period	Existing Noise Levels			NSW EPA NPfI		Project Noise Trigger Level Leq(15min)
		Leq (period)	RBL	ANL	Project ANL ¹ Leq(15min)	Intrusiveness Criteria, Leq(15min)	
Residential	Day	59	50	55	53	55	53
	Evening	60	53	45	43	58	43
	Night	57	43	40	38	48	38
Commercial	All	-	-	-	-	-	65

During detailed design stage, the design and selection of the mechanical equipment required to service the proposed development will be required to achieve the EPA noise limits as presented in the table above.

¹ Project ANL is recommended ANL minus 5 dB(A) and plus 3 dB(A), to convert from a period level to a 15-minute level.

3 Assessment and Recommendations

3.1 Façade Glazing Requirements

Acoustic glazing for the apartments are given in Table 7 are required to reduce noise impact on the internal occupants and should result in noise levels within such units in accordance with the Department of Planning Noise Guidelines (SEPP).

Table 7 – Schedule of Window and Glazing (R_w)

Building	Façade	Space	Glazing Thickness	Minimum R_w (Glazing+Frame)
A to F	North	Living & Beds	6.38mm laminated	30
	South	Living & Beds	12.5mm laminated (Viridian)	37
	East	Living & Beds	10.38mm laminated	32
	West	Living & Beds	10.38mm laminated	32

All other non-habitable spaces, such as bathrooms and laundries require minimum 6mm monolithic glass (R_w 28).

All Windows/doors should be well sealed (air tight) when closed with good acoustic seals around the top and bottom sliders. Mohair seals are not considered to be acoustic seals.

3.2 Building Façade Construction

To provide sufficient acoustic attention of noise, the general external construction of the proposed building would need to be constructed as detailed in Table 8.

Table 8 – External Façade Construction (R_w)

Building Element	Proposed Construction	Minimum R_w
External Wall	Masonry or cavity brick	45
Roof and ceiling	Concrete with a plasterboard cavity ceiling	45

3.3 Assessment of Traffic Noise Generation

This section details a review of the expected increase in traffic noise generation from this development. Based on the “Traffic Impact Assessment” prepared by Traffix (Job:22.076r01v03, dated 10/06/2022).

Based on the current and future traffic flows along Memorial and Maryvale Ave, the following Table 9 summaries the predicted change in traffic noise levels.

Table 9 – Predicted Change Traffic Noise Levels during Peak Periods

Road	Period	Existing Peak Traffic Flow	Total Increase Peak Traffic Flow	Change in Traffic Noise, dBA
Memorial Ave	AM Peak	54	80	+1.7
	PM Peak	101	129	+1.1
Maryvale Ave (North of Dale Ave)	AM Peak	23	45	+2.9
	PM Peak	40	64	+2.0
Maryvale Ave (South of Dale Ave)	AM Peak	23	46	+3.0
	PM Peak	40	44	+0.4

The change in traffic noise levels on Maryvale Ave during the morning AM peak period is predicted to exceed the EPA RNP guidelines by +1dB.

Subjectively, the overall increase of up to +3dB would be consider only “Just Perceptible”² to the average observer. Therefore in our opinion, the predicted increase of in traffic noise level during the AM peak period would be a negligible change to existing traffic noise levels.

² Table 2.1 “Engineering Noise Control-Theory and Practice” Bies & Hansen

3.4 Assessment of Vehicle Noise

For the assessment of noise from vehicle movement, the traffic report prepared by Traffix, indicates the following expected increase in vehicle trips (including heavy vehicles) during the AM and PM peak periods:

- Residential:
 - Morning Peak (7am to 9am) = 62 vehicle trips (12 in, 50 out).
 - Afternoon Peak (4pm to 6pm) = 49 vehicle trips (39 in, 10 out).
- Retail:
 - Morning Peak (7am to 9am) = 9 vehicle trips (7 in, 2 out).
 - Afternoon Peak (4pm to 6pm) = 7 vehicle trips (1 in, 6 out).
- Combined:
 - Morning Peak (7am to 9am) = 71 vehicle trips (19 in, 52 out).
 - Afternoon Peak (4pm to 6pm) = 56 vehicle trips (40 in, 16 out).

The assessment of vehicle activity noise in the carpark have been predicted based on the following parameters:

- Source is taken at an average height is taken a 1m from the ground level.
- Receiver taken location taken as 1.5m above ground.
- Calculations have been conducted based on ISO9613 using CadnaA (version 4.5.149).
- Calculations include attention of distance and shielding from buildings and the 1.8m high acoustic barriers along the driveway. Refer to Figure 4.
- The acoustic barrier is to be constructed of a solid material, such as:
 - lapped and capped timber fence (30-50mm thick).
 - Hebel Powerpanel, masonry or brick.
- Typical sound pressure levels of vehicle noise are listed in Table 10 below and have been used for the calculations.

Table 10 – Typical Noise Level of Vehicles, L_{max} dBA

Type	Sound Pressure Level Range
General passenger vehicle	67-88 @ 0.5m, L_{max} dBA ³
3 to 6 tonne Truck (heavy rigid truck)	84-90@ 0.5m, L_{max} dBA ³

³ Based on ADR83/00 external noise test.

Based on the predictions, vehicle activity noise levels are expected to comply with the EPA noise limits as shown in Table 11. The proposed industrial development is to be located in an existing light industrial zone the nearest residential property is to the north opposite Turner Road.

Table 11 – Predicted Cumulative Noise from Vehicles and Trucks

Receiver	Predicted Receiver Noise Level, Leq15min dBA		EPA Noise Limits, Leq(15min) (Day/Evening)	Complies (Y/N)
	Without Barrier	With Barrier		
Residential – Along driveway	AM Peak – 48 PM Peak - 47	AM Peak – 43 PM Peak - 42	53/43	Y

3.5 Mechanical Services

At the DA stage, the design and selection of mechanical equipment has not been finalised. Following the DA approval of the proposed development, during the Construction Certification Stage a detail assessment of all mechanical plant and equipment will be conducted to ensure compliance with the EPA noise criteria. Typical acoustic measures may include the construction of acoustic barriers, enclosures, attenuators and/or acoustic louvres.

3.6 Delivery and Waste Collection Vehicles

For all commercial delivery vehicles and privately operated waste collection vehicles used for the retail, and tenancies, Part 4.3.3 of EPA Noise Guide for Local Government it is recommends the following time restrictions:

- Before 8.00 am or after 8.00 pm on any Saturday, Sunday or public holiday.
- Before 7.00 am or after 8.00 pm on any other day.

This excludes residential motor vehicles entering of existing the premises.

Additional management controls of the delivery and rubbish collection vehicles to minimise noise impact to the units on ground floor could include:

- Using up-to-date equipment that uses ‘quieter’ technology such as low-noise bin lifters.
- Maintaining rubbish trucks and braking materials to minimise or eliminate noise such as squeaky brakes.
- Educating drivers and collectors to be careful and to implement quiet work practices.
- Setting more appropriate times for the rubbish collection.

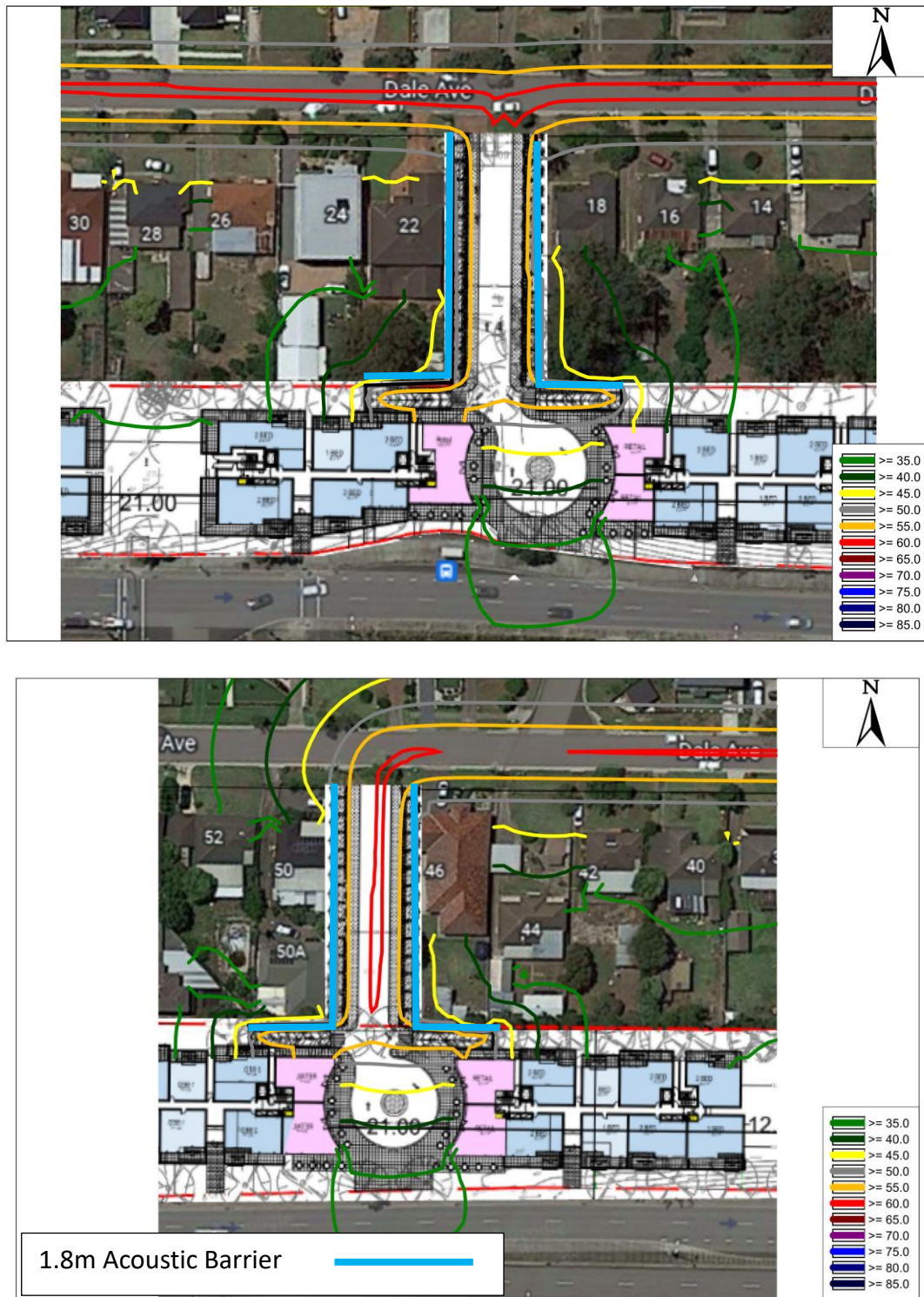


Figure 4 –Driveway Vehicle Noise Contour (Day-time)

4 Conclusion

An acoustic assessment of the proposed development has been carried out in accordance with the requirements of Liverpool City Council DCP and the Department of Planning.

An environmental noise survey of the site has been conducted and the noise limiting criteria for mechanical plant/equipment noise emission has been determined based on the EPA NPfI noise policy. The limits are presented in Table 6.

Construction for glazing, external walls and the roof/ceiling systems have been provided to achieve the internal noise criteria and are detailed in Section 3.1 and Section 3.2 based on the impact of road traffic noise.

The assessment of increased traffic generation has been assessed according to EPA RNP noise guidelines. Based on the expected traffic for the centre, the increase in traffic would more than 2dB and therefore exceed the EPA RNP guideline. Following DA approval, the client in consultation with the affected residents identify feasible and reasonable options for acoustic mitigation.

Section 3.4 details our predicted noise from vehicle movements in the new driveways. Based on the traffic report, the vehicle noise levels in the driveway and entering the basement carpark are expected to comply with the EPA noise limits with the installation of a 1.8m barrier.

Providing the recommendations in this report are implemented, the noise from the proposed development is predicted to comply with acoustic requirements of the Liverpool City Council DCP, EPA noise limits, Department of Planning (SEPP), BCA Part F5 and relevant Australian standards.

Appendix A – Acoustic Terminology

Decibel, dB: A dimensionless unit which denotes the ratio between two quantities that are proportional to power, energy or intensity. One of these quantities is a designated reference by which all other quantities of identical units are divided. The sound pressure level in decibels is equal to 10 times the logarithm (to the base 10) of the ratio between the pressure squared divided by the reference pressure squared. The reference pressure used in acoustics is 20 micro Pascals.

A-WEIGHTING: A measure of sound pressure level designed to reflect the response of the human ear, which does not respond equally to all frequencies. To describe sound in a manner representative of the human ear's response it is necessary to reduce the effects of the low and high frequencies with respect to medium frequencies. The resultant sound level is said to be A-weighted, and the units are in decibels (dBA). The A-weighted sound level is also called the noise level.

Sound Pressure Level, L_p (dB), of a sound: 20 times the logarithm to the base 10 of the ratio of the r.m.s. sound pressure to the reference sound pressure of 20 micro Pascals. Sound pressure level is measured using a microphone and a sound level meter, and varies with distance from the source and the environment.

Ambient Noise/Sound: All noise level present in a given environment, usually being a composite of sounds from many sources far and near. Traffic, HVAC, masking sound or even low-level background music can contribute to ambient level of noise or sound.

Percentile Level - L_{90} , L_{10} , etc: A statistical measurement giving the sound pressure level which is exceeded for the given percentile of an observation period, e.g. L_{90} is the level which is exceeded for 90% of a measurement period. L_{90} is commonly referred to as the "background" sound level.

Background Noise (L_{90}): The sum total of all unwanted residual noise generated from all direct and reflected sound sources in a space that can represent an interface to, or interfere with good listening and speech intelligibility.

Rating Background Level – RBL: Method for determining the existing background noise level which involves calculating the tenth percentile from the L_{A90} measurements. This value gives the Assessment Background Noise Level (ABL). Rating Background Level is the median of the overall ABL.

$L_{AEQ,T}$: Equivalent continuous A-weighted sound pressure level. The value of the A-weighted sound pressure level of a continuous steady sound that, within a measurement time interval T, has the same A-weighted sound energy as the actual time-varying sound.

Appendix B – Architectural Drawings

This assessment was based on the following architectural drawings provided by Tony Owen Partners.

Drawing	Issue	Date	Description
A002	A	March 2021	Concept Plan
A002	A	March 2021	Basement Level 3
A002	A	March 2021	Basement Level 2
A002	A	March 2021	Basement Level 1
A002	A	March 2021	Ground Floor
A002	A	March 2021	Level 1 - L3
A002	A	March 2021	Level 4
A002	A	March 2021	Level 5

Appendix C – Noise Logger Results

