DIRECTORS
MATTHEW PALAVIDIS
VICTOR FATTORETTO
MATTHEW SHIELDS

34 Yarrunga Road, Prestons

Warehouse 5 Expansion

SYDNEY
A: 9 Sarah St
MASCOT 2020
T: (02) 8339 8000

SYDNEY MELBOURNE BRISBANE CANBERRA
LONDON DUBAI SINGAPORE GREECE

ABN: 11 068 954 343

DOCUMENT CONTROL REGISTER

Project Number	20151316.4
Project Name	34 Yarrunga Road, Prestons
Document Title	Warehouse 5 Expansion
Document Reference	20151316.4/1908A/R1/TT
Issue Type	Email
Attention To	Logos Australian Logistics Venture Prestons Trust Craig Thomas

Revision	Date	Document Reference	Prepared By	Checked By	Approved By
0	19/08/2018	20151316.4/1908A/R0/TT	TT		
1	21/08/2018	20151316.4/1908A/R0/TT	TT		

TABLE OF CONTENTS

1 INTRODUCTION

Acoustic Logic Consultancy has been engaged to undertake a noise emission assessment as part of a modification application to the industrial subdivision at 34 Yarrunga Road, Prestons.

The proposed change involves a modification of design of Warehouse 5 (41B Kurrajong Road).

This report will:

- Identify nearby noise sensitive receivers and operational noise sources with the potential to adversely impact nearby developments.
- Identify relevant noise emission criteria from the conditions of consent applicable to the site (condition C29).
- Predict typical operational noise emissions as a result of the proposed changes and assess them against acoustic criteria. Where appropriate, consider the cumulative impact of existing operational noise from the site.
- If necessary, identify potential building and/or management controls necessary to ensure ongoing compliance with noise emission goals.

2 SITE DESCRIPTION

The Yarrunga Street industrial subdivision consists of 5 industrial lots, bounded by Kookaburra Road North, Yarrunga Street, Bernera Road and Kurrajong Road.

The proposed modification consists of the expansion of Warehouse 5, loaded on the southern boundary of the subdivision.

The proposed expansion consists of at 14,000m^2 warehouse with 800m^2 of office area.

The site will contain a loading dock along its western side, consisting of three docks which are perpendicular to the warehouse, and a “side loading” area. The loading docks are access via an internal roadway within the subdivision (“Estate Road”).

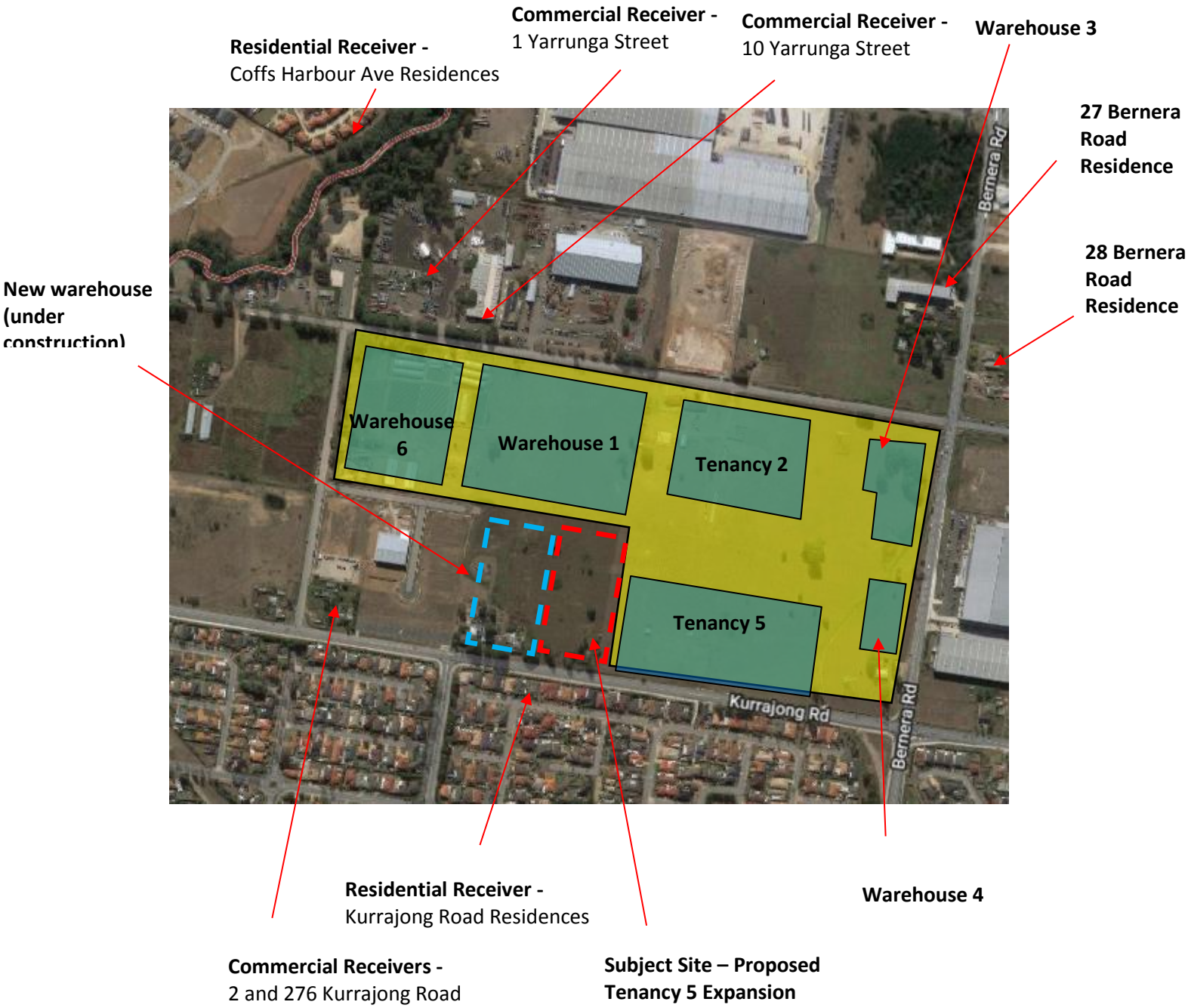
The warehouse expansion is proposed to be used as a distribution centre. Consent is sought for 24 hour use of the site.

The site will have a passenger car park with approximately 71 parking spaces.

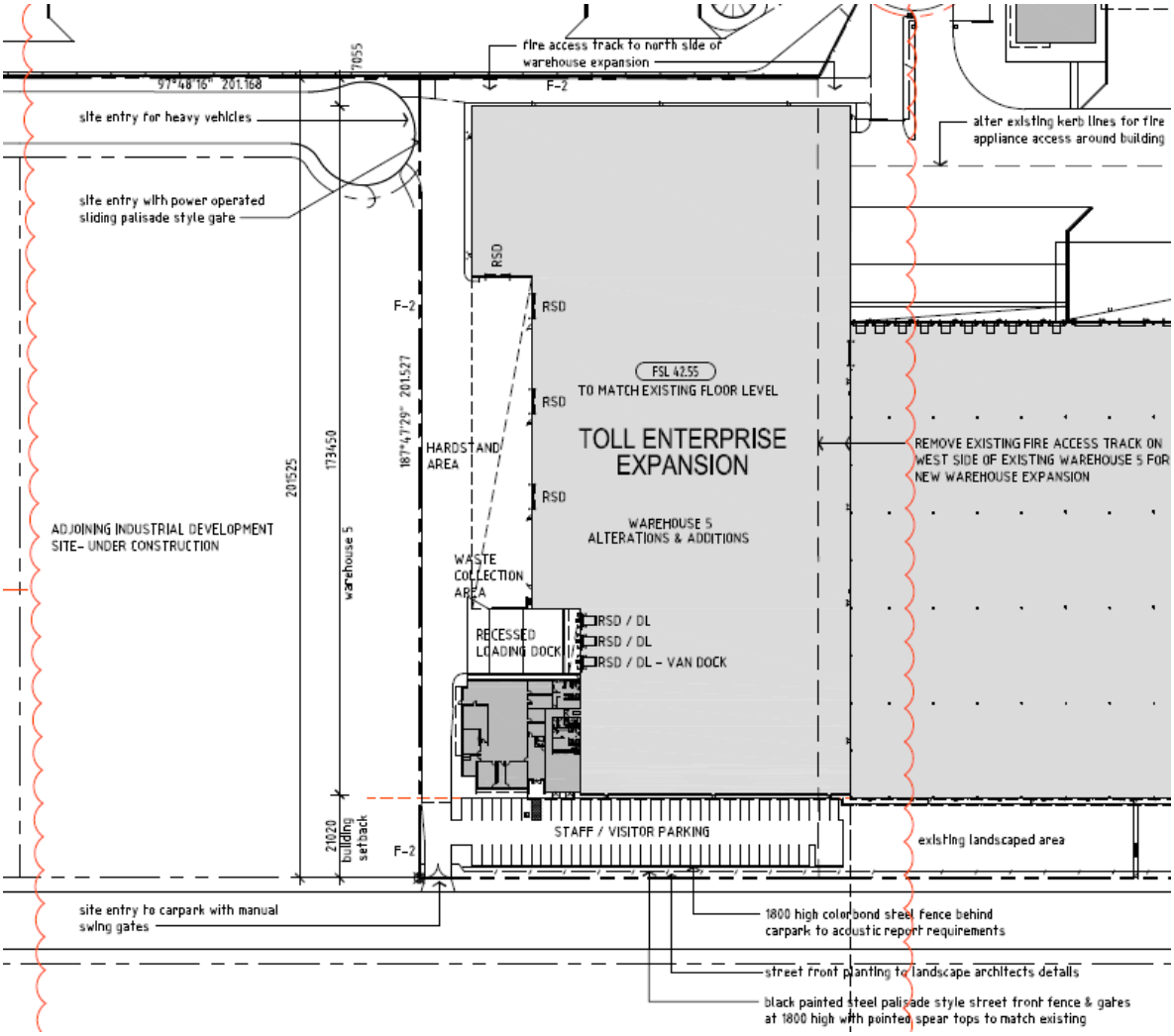
The nearest noise sensitive developments to the site are the residences to the south, on Kurrajong Road. We note that there is lapped and capped boundary fencing along the northern boundary of these properties (facing Kurrajong Road). This fencing provides noise screening to the ground floor and outdoor open space areas of the developments, however we note that one of these dwellings (15 Huskisson Street) is double storey and the first floor windows overlook the boundary fencing.

We note that there is a warehouse currently under construction to the immediate west of the site which will break the line of sight (and therefore provide a degree of noise screening) between the loading docks and the residences on Kurrajong Road.

See aerial photograph below.



The site layout is as follows:



3 NOISE DESCRIPTORS

Environmental noise constantly varies. Accordingly, it is not possible to accurately determine prevailing environmental noise conditions by measuring a single, instantaneous noise level.

To accurately determine the environmental noise a 15 minute measurement interval is utilised. Over this period, noise levels are monitored on a continuous basis and statistical and integrating techniques are used to determine noise description parameters.

In analysing environmental noise, three-principle measurement parameters are used, namely L_1, L_{90} and L_{eq}.

The L_{90} level (which is commonly referred to as the background noise level) represents the noise level heard in the quieter periods during a measurement interval. The L_{90} parameter is used to set the allowable noise level for new, potentially intrusive noise sources since the disturbance caused by the new source will depend on how audible it is above the pre-existing noise environment, particularly during quiet periods, as represented by the L_{90} level.

The L_{eq} parameter represents the average noise energy during a measurement period. This parameter is derived by integrating the noise levels measured over the 15 minute period. L_{eq} is important in the assessment of traffic noise impact as it closely corresponds with human perception of a changing noise environment; such is the character of environmental noise.

L_1 levels represent is the loudest 1% noise event during a measurement period.

4 NOISE EMISSION GOALS

4.1 OPERATIONAL NOISE

Noise emission limits for the site are set in condition of consent C29 to SSD 7155 and are as follows:

Table 1 – Condition of Consent C29

Location	Time of Day		
	Daytime (7am-6pm)	**Evening (6pm-10pm)**	**Night (10pm-7am)**
All Residential Receivers	48dB(A)$L_{eq(15min)}$	48dB(A)$L_{eq(15min)}$	42dB(A)$L_{eq(15min)}$ 52dB(A)$L_{1(1min)}$

4.2 CONSTRUCTION NOISE AND VIBRATION CRITERIA

4.2.1 EPA Interim Construction Noise Guidelines

EPA guidelines adopt differing strategies for noise control depending on the predicted noise level at the nearest residences:

- *"Noise affected" level*. Where construction noise is predicted to exceed the "noise effected" level at a nearby residence, the proponent should take reasonable/feasible work practices to ensure compliance with the "noise effected level". For residential properties, the "noise effected" level occurs when construction noise exceeds ambient levels by more than:
    - 10dB(A)$L_{eq(15min)}$for work during standard construction hours (7am-6pm Monday to Friday and 8am to 1pm on Saturdays) and
    - 5dB(A)$L_{eq(15min)}$for work outside of standard construction hours.
- *Highly noise affected level".* Where noise emissions are such that nearby properties are "highly noise effected", noise controls such as respite periods should be considered. For residential properties, the "highly noise effected" level occurs when construction noise exceeds 75dB(A)$L_{eq(15min)}$ at nearby residences.

A summary of noise emission goals for both standard hours of construction and outside standard hours are presented.

Table 2 – Construction Noise Emission Goals

Location	"Noise Affected" Level - dB(A)$L_{eq(15min)}$	"Highly Noise Affected" Level - dB(A)$L_{eq(15min)}$
Residences	53 (Standard Construction Hours)	75
Commercial	70	N/A
Industrial	75	N/A

4.2.2 Construction Vibration Criteria

Vibration goals for the amenity of nearby land users are those recommended by the EPA document *Assessing Vibration: A technical guideline.* These levels are presented below:

Table 3 – Construction Vibration Goals

Location	Time	Peak velocity (mm/s)	
		Preferred	Maximum
Continuous Vibration			
Residences	Daytime	0.28	0.56
Commercial/Industrial	When in use	0.56	1.12
Impulsive Vibration			
Residences	Daytime	8.6	17
Commercial/Industrial	When in use	18	36

5 NOISE EMISSION ASSESSMENT

An assessment of typical operational and construction noise is presented below in order to demonstrate that the site is capable of meeting noise emission requirements.

The following noise sources are assessed:

- Vehicular noise on site - trucks driving on site, noise from use of forklifts, and use of the car-park.
- Noise from internal areas internal operations (use of forklifts).
- An assessment of noise from mechanical plant.
- A preliminary assessment of construction noise and vibration.

In addition, to ensure that the proposed use of the site does not results in cumulative noise impact, a survey of existing operational noise was conducted.

5.1 SURVEY OF EXISTING OPERATIONAL NOISE

The proposed development is an expansion of Warehouse 5. It is the residences to the south of the industrial subdivision (on Kurrajong Road) that are closest to Warehouse 5. There are no other Warehouses within the industrial subdivision in close proximity.

With respect to warehouse 5:

- Warehouse 5 has its loading docks inbound from Kurrajong Road. As such, the loading docks are completely shielded from the residences on Kurrajong road by Warehouse 5 itself. In fact, the propose expanded warehouse will actually provide acoustic benefit with respect to the existing Warehouse 5 loading dock, as it will partially close of the dock along its western edge (see figure 2).
- The on-grade passenger parking area is located at the eastern end of the industrial subdivision. This is located more than 200m away from the site, and any noise generated by the on grade car park will not impact these residences in close proximity to the proposed Warehouse Expansion.
- The only noise source associated with current operation that has the potential to cause a cumulative noise impact would be noise emission from the warehouse itself. In this regard we note:
    - A survey of warehouse noise was conducted on 10 August 2018. Measurements were made using a Norsonic 140 Type 1 sound analyser set on A-weighted fast response mode.
    - The survey was conducted during the daytime (between 10am and 12pm) as Warehouse 5 does not currently operate 24 hours per day.
    - Noise measurements were made on the warehouse shop floor during a typical peak period of operation (with conveyer belts, forklifts and ancillary machinery being the primary noise sources. The sound pressure level measured as a spatial average on the shop floor was approximately 65dB(A)$L_{eq(15min)}$.

- Additional measurements were then made on at the Kurrajong Road residences (5-11 Huskisson Road). Noise emanating from the Warehouse 5 was inaudible at the Huskisson Road boundary in a 45dB(A)L90 noise environment. This indicates that noise emanating from Warehouse 5 must be below 35dB(A)L_{eq} at Kurrajong Road, as easily compliant with the noise emission goals identified in table 1.

- Being comfortably below the current noise emission limit, provided that the warehouse expansion is compliant with the noise limits in Table 1, then there is no risk that cumulative noise impacts will result in an exceedance of the guidelines.

5.2 NEW OPERATIONAL NOISE

Noise from this warehouse potentially impacts the residence to the north-west of the site (on Coffs Harbour Ave) and to the south of the site (on Kurrajong Road).

The following noise emissions are considered:

- On site vehicle and operational noise – Assessment is made of the cumulative noise impact of noise from vehicle ingress/egress, hardstand area noise (truck manoeuvring and forklifts), noise from internal activities (forklifts and pneumatic tools for vehicle maintenance in Warehouse 6). These noise events are assessed with reference to the EPA Industrial Noise Policy.

- Noise from additional on road traffic created by the site (assessed with reference to the EPA Road Noise Policy).

- An assessment of potential sleep disturbance, in the event that the site is used after 10pm.

5.2.1 On Site Vehicle and Activity Noise

Assessment is made based on the following assumptions/data:

- Vehicles have an assumed sound power level (based on measurements made by this office) of:

  - An articulated truck sound power of 100dB(A) typically, and 105dB(A) when reversing (taking into account a 5dB(A) penalty for the reversing beacon) and an airbrake noise level of 114dB(A)$L_{1(1min)}$.

  - A forklift (electric) sound power of 90dB(A).

  - Passenger vehicle noise level of 84dB(A)L_{eq} from the car engine when manoeuvring in the car park and 90dB(A)$L_{1(1min)}$ from a car start/door close.

- Four articulated truck movements associated with the site in any given 15 minute period (a conservatively high assumption, effectively an inbound and out bound movement for each warehouse every 15 minutes).

- Continuous operation of a forklift in both the external hard stand areas and the internal area of each warehouse (and assuming that warehouse doors are left open).

The critical residences to consider from an acoustic viewpoint are those on Kurrajong Road, just to the west site (25-35 Huskisson Street). This is because those directly south of the site will be screened from the loading docks by the proposed warehouse itself, however those at 25-35 Huskisson Street will potentially have a line of site to the loading docks on the western boundary of the site.

Predictions take into account:

- Distance correction (hemispherical noise propagation and air attenuation).
- The noise screening provided by boundary fencing to the site (see recommendations in section 7).

Noise emissions are assessed with reference to the night time acoustic criteria (the most stringent). The cumulative noise emissions from the site are presented below.

Both the 15 minute average and the peak ($L_{1(1min)}$) noise levels are assessed.

Table 4 – Operational Noise Assessment t Residences to the South (25-35 Huskisson Street)

Noise Source	**Predicted Noise Level dB(A)$L_{eq(15min)}$**	**Permissible Noise Level**	**Complies?**
Truck Ingress/egress/ manoeuvring	39dB(A)	42dB(A)$L_{eq(15min)}$	Yes
Hardstand Area – forklifts	33dB(A)		Yes
Internal Activities (forklift and pneumatic tools)	30dB(A)		Yes
Combined Noise Level	**40dB(A)**		**Yes**

Table 5 – Operational Noise Assessment t Residences to the South (25-35 Huskisson Street)

Noise Source/ Location	Predicted Noise Level	Permissible Noise Level	Complies?
Truck Ingress/egress/ manoeuvring	42dB(A)$L_{1(1min)}$	52dB(A)$L_{1(1min)}$	Yes
Car start/Door Close (Passenger Vehicle Car Park)	50dB(A)$L_{1(1min)}$	52dB(A)$L_{1(1min)}$	Yes

The site is capable of complying with noise emission requirements.

In the event that 24 hour use of the loading docks is proposed, the noise mitigation measures in section 6 are recommended.

5.3 MECHANICAL PLANT ASSESSMENT

Detailed review of all external mechanical plant should be undertaken at construction certificate stage (once plant selections and locations are finalised). Acoustic treatments should be determined in order to control plant noise emissions to the levels required by Consent Condition of C29.

Compliance with noise emission requirements will be achievable with appropriate acoustic treatment. It is unlikely that any large externally located equipment (even if used at night) will require acoustic treatment.

We note:

- Primary external mechanical plant is likely to consist of air-conditioner condensers serving office areas and smoke exhaust fans.

- Condensers serving office areas will typically have a sound pressure level of no more than 65dB(A) at 1m distance, and will not require any form of acoustic treatment to ensure compliant noise emissions.

- Smoke exhaust fans used for the purpose of ventilation (relief air mode) will not require any form of acoustic treatment provided that they have a sound pressure level of no more than 70 dB(A) at 3m distance. In the event that fans exceed this noise level, acoustic treatment to the fan discharge (internally lined ducting or acoustic attenuator) will be required.

- Any externally located back up diesel generator is to have a noise level of no more than 75dB(A) at 7m distance (this will necessitate a proprietary enclosure), and is to be located such that the building shell acts as a noise screen to the nearest dwelling to the immediate south.

- If an occupant of the warehouse expansion were to install large external equipment which is operated at night time (such as refrigeration plant), in the event that the sound power of the plant exceeds 85dB(A), it is likely that a noise screen around the equipment item will be required (such that the line of sight between the equipment item and any residence is broken).

5.4 CONSTRUCTION NOISE AND VIBRATION

We note that a review of construction noise from the industrial subdivision as a whole was included in the DA stage reporting (*Acoustic Environmental Impact Assessment* by Acoustic Logic dated 22/2/2016 Revision 5). Additional analysis, specific to the proposed expansion is presented below:

- The loudest typical construction works (bulk excavation in rock, using pneumatic hammers) is not required.

- As such, the loudest typical construction activities are likely to be from the use of dozers (bucket attachment), concrete pumps, compaction works and in asphalting. The sound power levels of these equipment types is typically approximately 105dB(A).

- Given the distance from site the nearest residences, it would be expected that construction noise levels will generally comply with the Noise Management Levels identified in table 2.

- A potential exception to this would be intermittent exceedances y occurring during civil works ad asphalting in the passenger vehicle car park (the southern boundary of the site, closest to the residences. Noise levels from these works is likely to be between 60-65dB(A)$L_{eq(15min)}$. Although an exceedance of the Nosie Management Level, this is comfortably below the "Highly Noise Affected" trigger level (refer to table 2). It is also consistent with the typical daytime road traffic noise levels on Kurrajong Road in any event.

- In addition, given the distance between the site and the residences, all vibration will be comfortably compliant with the vibration criteria in table 7.

In light of the above, we recommend:

- On completion of a construction program, acoustic review of proposed construction activities and plant/methods should be undertaken to identify the extent and duration of potential exceedances (if any) of EPA Noise Affected levels (ie – "background+10dB(A)").

- Identify feasible acoustic controls or management techniques (for example, selection of plant, use of screens around static plant, notification of adjoining land users) when exceedance of Noise Management Levels may occur.

6 RECOMMENDATIONS

Acoustic analysis indicates that the proposed modification works (Warehouse 5 expansion) is capable of meeting noise emission requirements in condition of consent C29.

However to ensure compliance, we recommend:

- In the event that use of the loading docks is proposed in the 10pm-7am period - a solid noise screen (minimum surface density of 15kg/m^2), and minimum 2.1m high, is recommended along the western boundary of the loading dock (from the office area to the site entry at Estate Road.

- In the event that warehouses to the west of the site are constructed prior to the commencement of operation of the site such that there line of sight from the loading docks to the Kurrajong Road residences is broken, this screen is not required.

- Forklifts used in external areas should consist of electric and gas. In the event that a prospective tenant proposes to use diesel forklifts, a detailed noise emission assessment to justify this use should be included in any development application for use of the site.

In addition:

- Conduct a detailed mechanical plant noise emission assessment at construction certificate stage (once plant selections and locations are finalised). All plant should be acoustically reviewed (and designed) such that the noise emission goals in tables 2, 3 and 4 of this report are achieved.

- On completion of a construction program for any given warehouse, acoustic review of proposed construction activities and plant/methods should be undertaken to identify the extent and duration of potential exceedances (if any) of EPA Noise Affected levels (ie – “background+10dB(A)”).

7 CONCLUSION

Operational noise emissions associated with the proposed s96 modification of Warehouse 5 at 41B Kurrajong Road, Prestons has been assessed with reference to condition of consent C29.

An analysis of typical operational noise (vehicle, mechanical equipment noise) indicates that the site is capable of complying with relevant noise emission criteria.

Acoustic treatments for control of noise emissions have been presented in Section 6 of this report.

Provided that these recommendations are followed, compliant noise levels will be achieved at surrounding receivers, satisfying the requirements of the condition C29.

Please contact us if you have any queries.

Yours faithfully,

Acoustic Logic Consultancy Pty Ltd
Thomas Taylor