MATTHEW PALAVIDIS
VICTOR FATTORETTO
MATTHEW SHIELDS

Little National Hotel, 42 Honeysuckle Drive, Newcastle

DA Acoustic Assessment - Revised Proposal May 2019

SYDNEY
9 Sarah St
MASCOT NSW 2020
(02) 8339 8000

ABN 11 068 954 343
www.acousticlogic.com.au

Project ID	20190435.1
Document Title	DA Acoustic Assessment - Revised Proposal May
Attention To	BLOC Constructions (NSW) Pty. Ltd

Revision	Date	Document Reference	Prepared By	Checked By	Approved By
0	8/05/2019	20190435.1/0805A/R0/MF	MF		
1	15/05/2019	20190435.1/1505A/R1/MF	MF		MF

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1 INTRODUCTION

Acoustic Logic has been engaged to undertake an acoustic review of the proposed alterations to the approved mixed-use development located at 42 Honeysuckle Drive Newcastle.

In this report, we will:

- Undertake a detailed review of the proposed façade fabric to ensure internal noise levels are achieved for the future occupants;
- Formulate the noise emission goals for the site for the assessment of all noise emitted from the operation of the site;
- Conduct a review of construction noise and vibration. This will identify relevant EPA and Australian Standard criteria for noise and vibration impacts on nearby developments arising during the construction period; and
- If necessary, determine building and/or management controls necessary to ensure ongoing compliance with noise goals.

ALC have utilised the following documents and regulations in the assessment of noise and vibration associated with the development proposal:

- New South Wales (NSW) Department of Planning & Environment (DoPE) document – '*Secretary's Environmental Assessment Requirements (SSD-10251)';*
- Newcastle City Council document – *'Newcastle Development Control Plan (DCP) 2012';*
- New South Wales Department of Planning and Environment (DoPE) document – *'State Environmental Planning Policy Infrastructure (SEPPI) 2007';*
- New South Wales (NSW) Environmental Protection Authority (EPA) document – *'Noise Policy for Industry (NPfI) 2017'*; *and*
- New South Wales (NSW) Environmental Protection Authority (EPA) document – *'Interim Construction Noise Guideline (ICNG) 2009.*

This assessment has been conducted using the Bates Smart Architects architectural drawings for D.A Submission, see details below.

Table 1 – Architectural Drawing List

Architect	Drawing Number	Drawing Title	Date	Revision
Bates Smart Architects	AD.03.1001	General Arrangement Plan Ground Floor	05/03/2019	A
	AD.03.1002	General Arrangement Plan Level 01		
	AD.03.1003	General Arrangement Plan Level 02		
	AD.03.1004	General Arrangement Plan Level 03		
	AD.03.1005	General Arrangement Plan Level 04		
	AD.03.1006	General Arrangement Plan Level 05 Parking		
	AD.03.1007	General Arrangement Plan Level 05		
	AD.03.1008	General Arrangement Plan Level 06		
	AD.03.1009	General Arrangement Plan Level 07		
	AD.03.10010	General Arrangement Plan Level 08		
	AD.03.10011	General Arrangement Plan Level 09		

1.1 SECRETARY ENVIRONMENTAL ASSESSMENT REQUIREMENTS (SEARS) SSD-10251

Item 7 of the SEAR's state the following:

7. *The EIS shall:*
    - *identify any sensitive receivers to noise in the vicinity of the site*
    - *identify the main noise generating sources and activities at all stages of construction, and any noise sources during operation*
    - *outline measures to minimise and mitigate the potential noise impacts on surrounding occupiers of land*
    - *identify the likely noise impacts and acoustic measures required to ensure acceptable internal amenity, noting the proximity to the operational areas of the Port of Newcastle.*

2 SITE DESCRIPTION

Onsite acoustic investigation has been carried out by this office regarding the surrounding acoustic environment around the project site, which has been detailed below:

- Honeysuckle Drive along the northern boundary of the site, with existing parking/commercial facilities further north of Honeysuckle Drive with the Port of Newcastle further this;
- Existing multi-storey commercial building located along the eastern boundary with the associated on-grade carpark located between the proposed building and the adjacent commercial building;
- Newcastle Light Rail system located along the southern boundary of the site with existing multi-storey residential/commercial buildings located further south; and
- Newcastle Light Rail stabling yard located to the west of the site separated by a water canal connecting to Port of Newcastle.

Honeysuckle Drive carries a low to medium volume of traffic, Newcastle Light Rail network has a light rail movement approximately every eight to twelve minutes.

The nearest noise receivers around the project site include:

- Receiver 1 – Residential apartment building located at 25 Bellevue Street, Newcastle, situated to the south west of the site separated by the Newcastle Light Rail network;
- Receiver 2 – Commercial building located at 713 Hunter Street, Newcastle, situated to the south of the site separated by the Newcastle Light Rail network;
- Receiver 3 – Commercial building located at 36 Honeysuckle Drive, Newcastle, situated along the eastern boundary of the site;
- Receiver 4 – Commercial building located at 50 Honeysuckle Drive, Newcastle, situated to the north of the site across Honeysuckle Drive; and
- Receiver 5 – Newcastle Light Rail stabling yards located to the west of the site, separated by a water canal serving the Port of Newcastle.

A site map, measurement location and surrounding receivers are presented in Figure 1 below.

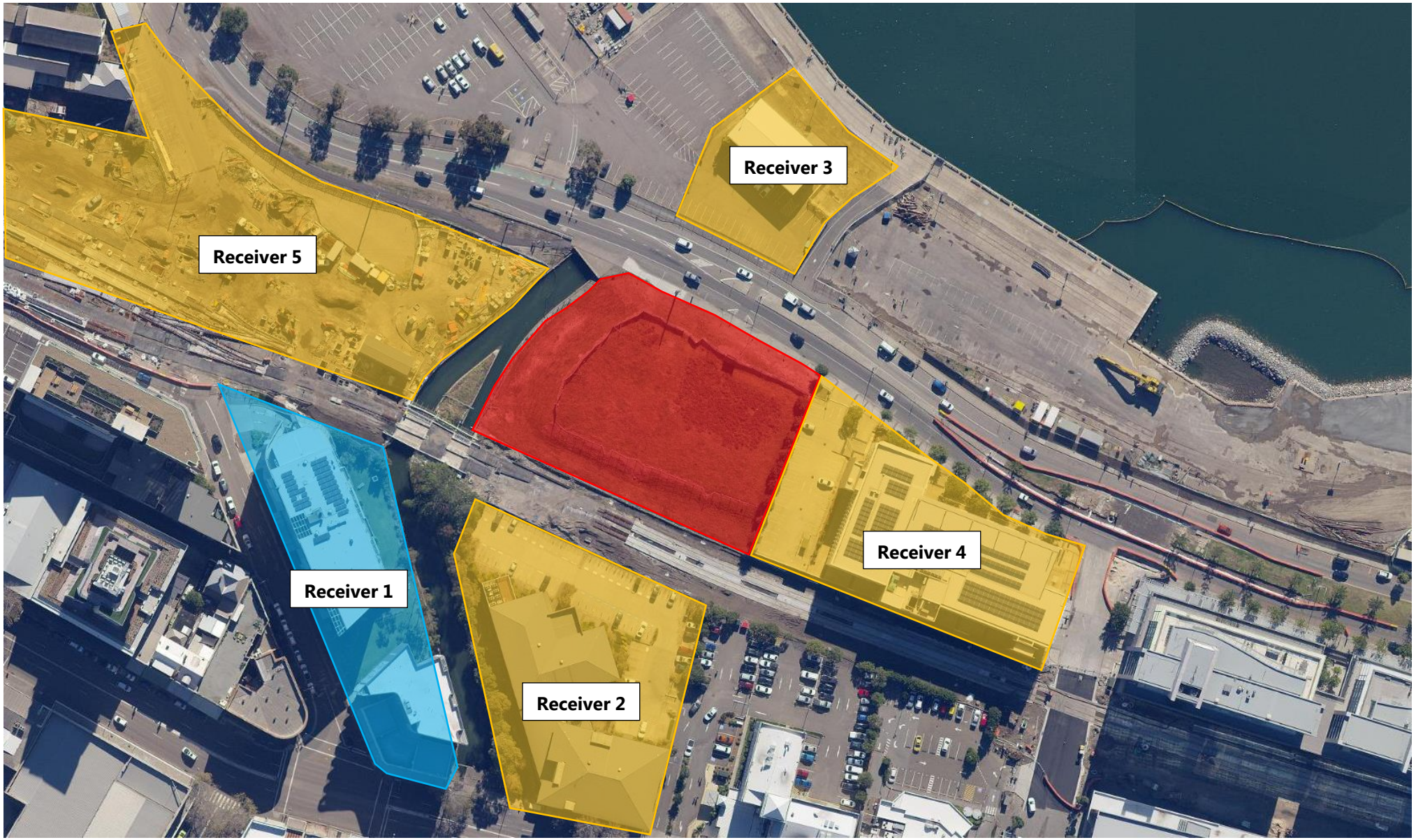

Figure 1 – Site Map and Receiver Locations
Sourced from SixMaps NSW

3 EXISTING ACOUSTIC ENVIRONMENT

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_{10}, L_{90} and L_{eq}.

The L_{10} and L_{90} measurement parameters are statistical levels that represent the average maximum and average minimum noise levels respectively, over the measurement intervals.

The L_{10} parameter is commonly used to measure noise produced by a particular intrusive noise source since it represents the average of the loudest noise levels produced by the source.

Conversely, 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 environmental noise impact as it closely corresponds with human perception of a changing noise environment; such is the character of environmental noise.

3.1 BACKGROUND NOISE LEVELS

Background noise levels which will be used as a basis for this assessment are detailed in the following sections.

Unattended noise monitoring was previously undertaken by Renzo Tonin and Associates for the original Development Application in 2017. For the purpose of consistency, we propose to adopt the same background noise levels used in the original assessment for the revised assessment (i.e. this report). Report reference *TJ962-01D02 Acoustic Assessment for Development Application (r0),* dated 9th November 2017

3.1.1 Measurement Location

As part of the Acoustic Assessment for the site, Renzo Tonin installed one (1) unattended noise monitor along the building awning of 18 Honeysuckle Drive, Newcastle.

3.1.2 Measurement Period

Unattended noise monitoring was conducted by Renzo Tonin in the original assessment between Friday 10th Mark 2017 to Thursday 16th March 2017.

3.1.3 Measured Background Noise Levels

Results of the unattended noise monitoring conducted in 2017 are outlined below.

Table 2 – Renzo Tonin and Associates Measured Rating Background Level

Location	Measured Rating Background Noise Level dB(A)$L_{90(Period)}$		
	Day (7:00am-6:00pm)	**Evening (6:00pm-10:00pm)**	**Night (10:00pm-7:00am)**
18 Honeysuckle Drive, Newcastle (Previous Development Application Acoustic Report)	52	52	46

4 NOISE INTRUSION ASSESSMENT

4.1 NOISE INTRUSION CRITERIA

A traffic, rail and harbour noise intrusion assessment has been conducted based off the requirements of the following acoustic noise criteria/standards:

- Newcastle City Council document – *'Newcastle Development Control Plan (DCP) 2012'; and*
- New South Wales Department of Planning and Environment (DoPE) document – *'State Environmental Planning Policy Infrastructure (SEPPI) 2007'*.

4.1.1 Newcastle City Council document – *'Newcastle Development Control Plan (DCP) 2012*

Section J *Noise and pollution* of the DCP states the following:

Acceptable Solutions

The following controls apply to all forms of residential development

1. *Dwellings that are within 100m of a road corridor with an annual daily traffic (AADT) volume of more than 40 000 vehicles (based on traffic volume data published on the website of the RMS) or 80m from a rail corridor have LAeq measures not exceeding:*

    a. *in any bedroom: 35dB(A) between 10pm - 7am*

    b. *anywhere else in the building (other than a kitchen, garage, bathroom or hallway): 40dB(A) at any time.*

4.1.2 New South Wales Department of Planning and Environment (DoPE) document – *'State Environmental Planning Policy Infrastructure (SEPPI) 2007'*

Clause 87 of the SEPPI 2007 states the following:

87 Impact of rail noise or vibration on non-rail development

(1) This clause applies to development for any of the following purposes that is on land in or adjacent to a rail corridor and that the consent authority considers is likely to be adversely affected by rail noise or vibration:

(a) a building for residential use,

(b) a place of public worship,

(c) a hospital,

(d) an educational establishment or child care centre.

(2) Before determining a development application for development to which this clause applies, the consent authority must take into consideration any guidelines that are issued by the Director-General for the purposes of this clause and published in the Gazette.

(3) If the development is for the purposes of a building for residential use, the consent authority must not grant consent to the development unless it is satisfied that appropriate measures will be taken to ensure that the following LAeq levels are not exceeded:

(a) in any bedroom in the building--35 dB(A) at any time between 10.00 pm and 7.00 am,

(b) anywhere else in the building (other than a garage, kitchen, bathroom or hallway)--40 dB(A) at any time.

4.2 EXTERNAL NOISE MEASUREMENTS

This section of the report details noise measurements conducted at the site to establish surrounding environmental noise levels impacting into the development.

As part of the Acoustic Assessment for the site, Renzo Tonin installed one (1) unattended noise monitor along the building awning of 18 Honeysuckle Drive, Newcastle.

4.2.1 Measurement Period

Unattended noise monitoring was conducted by Renzo Tonin in the original assessment between Friday 10th March 2017 to Thursday 16th March 2017.

4.2.2 Measured Environmental Noise Levels

Results of the unattended noise monitoring conducted in 2017 are outlined below.

Table 3 – Renzo Tonin and Associates Measured Environmental Noise Level

Location	Measured Environmental Noise Level dB(A)$L_{eq(Period)}$	
	Day (7:00am-10:00pm)	**Night (10:00pm-7:00am)**
18 Honeysuckle Drive, Newcastle (Previous Development Application Acoustic Report)	65	59

4.3 NOISE INTRUSION ANALYSIS

Calculations were undertaken taking into account the orientation of windows, barrier effects *(where applicable)*, the total area of glazing, facade transmission loss and room sound absorption characteristics. In this way the likely interior noise levels can be predicted.

4.4 RECOMMENDED CONSTRUCTIONS

4.4.1 Glazed Windows and Doors

The following constructions are recommended to comply with the project noise objectives. Aluminium framed/sliding glass doors and windows will be satisfactory provided they meet the following criteria. All external windows and doors (Swing, Awning and Sliding) listed are required to be fitted with Q-Lon type acoustic seals. (**Mohair Seals <u>or</u> Mohair + Fin Seals are unacceptable**).

Thicker glazing may be required for structural, safety or other purposes. Where it is required to use thicker glazing than scheduled, this will also be acoustically acceptable.

The recommended constructions based on the existing measured noise levels are listed in the table below.

Table 4 – Recommended Glazing Constructions

Façade	Space	Recommended Construction	Acoustic Seals
Northern Façade (Honeysuckle Drive)	Bedrooms	10.38mm Laminate	Q-Lon type Acoustic Seals
	Living Rooms	10.38mm Laminate	
Eastern Façade	Bedrooms	6.38mm Laminate	
	Living Room	6.38mm Laminate	
Southern Façade (Rail Corridor)	Bedrooms	10mm Float	
	Living Rooms	10mm Float	
Western Façade	Bedrooms	6.38mm Laminate	
	Living Rooms	6.38mm Laminate	
Internal Courtyard	Bedrooms	6.38mm Laminate	
	Living Rooms	6mm Float	

It is recommended that only window systems having test results indicating compliance with the required ratings obtained in a certified laboratory be used where windows with acoustic seals have been recommended.

In addition to complying with the minimum scheduled glazing thickness, the R_w rating of the glazing fitted into open-able frames and fixed into the building opening should not be lower than the values listed in Table 5 for all rooms. Where nominated, this will require the use of acoustic seals around the full perimeter of open-able frames and the frame will need to be sealed into the building opening using a flexible sealant.

Table 5 - Minimum R_w of Glazing (with Acoustic Seals)

Glazing Assembly	Minimum R_w of Installed Window	Acoustic Seals
6mm Float	29	Q-Lon type Acoustic Seals
6.38mm Laminate	31	
10mm Float	33	
10.38mm Laminate	35	

4.4.2 External Roof/Ceiling Constructions

External roof construction will be constructed from a combination of concrete and light weight systems (similar to Colorbond). Roofs which are constructed from concrete will not require any further acoustic upgrading.

For external roof systems which are composed from light weight systems should adopt the following construction.

Table 6 – External Light Weight Roof Construction

Spaces	External Lining	Truss Systems	Internal Lining
Bedrooms	Sheet Metal (Colorbond or similar)	Minimum 250mm Airgap with 75mm thick 11kg/m^3 glasswool insulation in cavity	1 x 13mm Plasterboard
Living Areas			
Bathrooms, Ensuites or Laundries			1 x 13mm Plasterboard **OR** 9mm Fibre Cement Sheeting

In the event that any penetrations are required thru the external skin (concrete or sheet metal), an acoustic grade sealant should be used to minimise all gaps.

4.4.3 External Wall Constructions

External walls which will be constructed from concrete or masonry elements, this proposed structure will not require any further acoustic upgrading.

External walls which are constructed from a light weight cladding system will require the following acoustic upgrading.

Table 7 – Recommended Light Weight External Wall Construction

Façade	Space	External Lining	Stud System	Internal Lining
All	All	Cladding system as per architect's drawings	Minimum 92mm Steel Stud with 75mm thick 11kg/m^3 glasswool insulation	1 x 13mm Standard Plasterboard **OR** 1 x 9mm Fibre Cement Sheeting

In the event that any penetrations are required thru the external skin, an acoustic grade sealant should be used to minimise all gaps.

4.4.4 Mechanical Ventilation

With respect to natural ventilation of the dwelling, the NSW Department of Planning document "Development near Busy Roads and Rail Corridors - Interim Guideline" dictates that:

- *"If internal noise levels with windows or doors open exceed the criteria by more than 10dB(A), 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."*

With windows open, the allowable internal noise goal is permitted to be 10dB(A) higher than when the windows are closed (i.e. – allowable level in bedrooms becomes 45dB(A), and 50dB(A) in living rooms).

For habitable spaces along Honeysuckle Drive, when windows of the façade are closed internal noise levels will exceed the requirements listed in section 4.1 of this report.

5 NOISE EMISSIONS

A noise emission has been carried out to ensure noise emitting from the use of the site is in accordance with the requirements listed below.

5.1 NOISE EMISSION CRITERIA

5.1.1 Newcastle City Council document – *'Newcastle Development Control Plan (DCP) 2012*

Section I, 3.03.03 Amenity of the *Residential Development* DCP from Newcastle Council states the following:

3.03.03 Amenity

I. Acoustic privacy

Acceptable Solutions

1. *All noise generating equipment such as air conditioning units, swimming pool filters, fixed vacuum systems and driveway entry shutters are designed to protect the acoustic privacy of residents and neighbours. All such noise generating equipment must be acoustically screened. The noise level generated by any equipment does not exceed an LAeq (15 min) of 5dB(A) above background noise at the property boundary*

5.1.2 NSW Environmental Protection Authority (EPA) document – *'Noise Policy for Industry (NPfI) 2017'*

The NPfI provides guidelines for assessing noise impacts from developments. The recommended assessment objectives vary depending on the potentially affected receivers, the time of day, and the type of noise source. The NPfI has two requirements which both have to be complied with, namely an amenity criterion and an intrusiveness criterion.

5.1.2.1 Intrusiveness Criterion

The guideline is intended to limit the audibility of noise emissions at residential receivers and requires that noise emissions measured using the L_{eq} descriptor not exceed the background noise level by more than 5 dB(A).

Table 5-1 – NPfI Intrusiveness Criteria

Receiver	Time of day	Background Noise Level dB(A)$L_{90(Period)}$	Intrusiveness Criteria (Background + 5dB(A)$L_{eq(15\text{-}minute)}$)
Residential Receivers	Day (7:00am-6:00pm)	52	57
	Evening (6:00pm-10:00pm)	52	57
	Night (10:00pm-7:00am)	46	51

5.1.2.2 Amenity Criterion

The guideline is intended to limit the absolute noise level from all noise sources to a level that is consistent with the general environment.

The *Noise Policy for Industry (NPfI)* sets out acceptable noise levels for various land uses. Table 2.2 on page 11 of the policy has four categories to distinguish different residential areas. They are rural, suburban, urban and urban/industrial interface.

For the purposes of a conservative assessment, ALC will assess noise emissions in accordance with the 'Urban' category.

Table 5-2 – NPfI Project Amenity Criteria

Type of Receiver	Time of day	Project Amenity Noise Level dB(A)$L_{eq(15\text{-}minute)}$
Residential (Urban)	Day (7:00am-6:00pm)	58
	Evening (6:00pm-10:00pm)	48
	Night (10:00pm-7:00am)	43

5.2 MECHANICAL PLANT NOISE

Detailed plant selection has not been undertaken at this stage, as plant selections have not been determined. Detailed acoustic review should be undertaken at CC stage to determine acoustic treatments to control noise emissions to satisfactory levels. Satisfactory levels will be achievable through appropriate plant selection and location and, if necessary, standard acoustic treatments such as duct lining, acoustic silencers and enclosures.

Noise emissions from all mechanical services plant to the closest residential receiver must comply with the noise emission criteria in Section 5.1

5.3 LOADING DOCK AND CARPARK

A detailed acoustic review has been undertaken regarding the proposed changes to the loading dock and basement carpark. We can confirm that the proposed changes to the loading dock and carpark are more than capable of comply with the noise emission requirements as outlined in section 5.1.

It is not recommended that the loading dock is in operation between 10:00pm and 7:00am.

5.4 GROUND FLOOR RESTAURANT

A preliminary review of the proposed ground floor restaurant has been undertaken, in principle the proposed restaurant is more than capable of complying the requirements outlined in section 5.1.

However, a detailed acoustic review should be undertaken as during the fit-out phase of the tenancy once detailed layouts, operational hours, number of patrons are known. All mechanical plant must comply externally with the requirements as outlined in section 5.1.

6 CONSTRUCTION NOISE

6.1 NOISE MANAGEMENT LEVEL

The noise emission from the construction of project site shall satisfy the requirements of the following:

- NSW Environmental Protection Authority (EPA) document – *"Interim Construction Noise Guideline (ICNG) 2009"*; and
- Australian Standard AS2436:2010 – *"Guide to noise and vibration control on construction, demolition and maintenance sites"*.

6.1.1 NSW Environmental Protection Authority (EPA) document – *"Interim Construction Noise Guideline (ICNG) 2009"*

The following sections present the construction noise criteria for residential and commercial receivers.

6.1.1.1 Residential Receivers

Section 4.1.1 of the ICNG establishes the following management levels for residents in a quantitative assessment

Time of day	Management level $L_{Aeq\ (15\ min)}$ *	
Recommended standard hours: Monday to Friday 7 am to 6 pm Saturday 8 am to 1 pm No work on Sundays or public holidays	Noise affected RBL + 10 dB	The noise affected level represents the point above which there may be some community reaction to noise. • Where the predicted or measured $L_{Aeq\ (15\ min)}$ is greater than the noise affected level, the proponent should apply all feasible and reasonable work practices to meet the noise affected level. • The proponent should also inform all potentially impacted residents of the nature of works to be carried out, the expected noise levels and duration, as well as contact details.
	Highly noise affected 75 dB(A)	The highly noise affected level represents the point above which there may be strong community reaction to noise. • Where noise is above this level, the relevant authority (consent, determining or regulatory) may require respite periods by restricting the hours that the very noisy activities can occur, taking into account: 1. times identified by the community when they are less sensitive to noise (such as before and after school for works near schools, or mid-morning or mid-afternoon for works near residences 2. if the community is prepared to accept a longer period of construction in exchange for restrictions on construction times.

6.1.1.2 Commercial Receivers

Section 4.1.3 of the ICNG states construction noise impacts to commercial receivers shall not exceed 70dB(A)$L_{eq(15\text{-}minutes)}$.

6.1.2 Australian Standard 2436-1981 *"Guide to Noise Control on Construction Maintenance and Demolition Site"*

Section 3 of AS 2436 states that care shall be taken in applying criteria that normally would be used to regulate noise emitted from industrial, commercial and residential premises to construction, particularly for those activities which are transitory and of short duration. For the control and regulation of noise from construction sites AS2436 nominates the following:

- That a reasonable suitable noise criterion is established.
- That all practicable measures be taken on the treatment site to regulate noise emissions, including, the siting of potentially noisy static processes on parts of the site where they can be shielded, selecting less noisy processes, and if required regulating construction hours if required.
- The undertaking of noise monitoring where non-compliance occurs to assist in the management and control of noise emission from the building site.

Based on these the following procedure will be used to assess noise emissions:

- Predict noise levels produced by typical construction activities at the sensitive receivers.
- If noise levels exceed noise goal at sensitive receiver locations, investigate and implement all practical and cost-effective techniques to limit noise emissions.
- If the noise goal is still exceeded after applying all practical engineering controls to limit noise emissions, investigate management and other techniques to mitigate noise emissions.

6.1.3 Summarised Construction Nosie Goal

Noise emission goal have been summarised below based on the requirements above and background noise data collected on site.

Table 3 – Construction Noise Management Levels

Noise Receivers	**Noise Management Level (NML)**	
	Noise Affected Level dB(A)$L_{eq(15\ minute)}$	**Highly Noise Affected Level dB(A)$L_{eq(15\ minute)}$**
Surrounding Residential Receivers (See Figure 1)	62 (BG+10dB(A))	75
Surrounding Commercial Receivers (See Figure 1)	70	

*If the noise goal is still exceeded after applying all practical engineering controls to limit noise emissions, investigate management and other techniques to mitigate noise emissions.

All construction activities shall be undertaken to ensure the NML outlined above are not exceeded. Exceedances may occur from time to time, in this event all management techniques as outlined in the NSW EPA ICNG or AS2436:2010 shall be explored/implemented if feasible and reasonable.

7 CONCLUSION

This report presents an acoustic assessment of noise impacts associated with the proposed residential development located at 42 Honeysuckle Drive Newcastle. Based on the information provided above we conclude the following;

Provided that the treatments set out in section 4 of this report are employed, internal noise levels shall comply with the requirements below:

- New South Wales (NSW) Department of Planning & Environment (DoPE) document – '*Secretary's Environmental Assessment Requirements (SSD-10251)';*
- Newcastle City Council document – *'Newcastle Development Control Plan (DCP) 2012'; and*
- New South Wales Department of Planning and Environment (DoPE) document – *'State Environmental Planning Policy Infrastructure (SEPPI) 2007'*.

External noise emissions criteria have been setup in this report to satisfy the requirements from the following documents;

- New South Wales (NSW) Department of Planning & Environment (DoPE) document – '*Secretary's Environmental Assessment Requirements (SSD-10251)';*
- Newcastle City Council document – *'Newcastle Development Control Plan (DCP) 2012'; and*
- New South Wales (NSW) Environmental Protection Authority (EPA) document – *'Noise Policy for Industry (NPfI) 2017'*.

It is recommended that a detailed acoustic review should be undertaken for the proposed mechanical services once detailed plans and plant items are selected. In addition, once further details are known with regard to the operation of the restaurant a detailed acoustic review shall be undertaken.

We trust this information is satisfactory. Please contact us should you have any further queries.

Yours faithfully,

Acoustic Logic Consultancy Pty Ltd
Matthew Furlong