

Full Tilt Constructions Pty Ltd

84 Links Road, St Marys

## Acoustic DA Assessment

Author	Fu Siong Hie, B.Eng, MAAS Principal Consultant
Document Reference:	SYD2018-1091-R001B
Date	28/08/2018
Comments:	Final

## Table of Contents

1	Introduction .....	3
2	Noise Criteria .....	4
2.1	Internal Noise Levels .....	4
2.2	Noise Survey and Project Specific Limits.....	4
2.2.1	Traffic Noise Levels .....	5
2.2.2	EPA Noise Limits.....	5
2.3	Traffic Noise Generation.....	6
3	Assessment and Recommendations.....	7
3.1	Façade Glazing Requirements .....	7
3.2	Building Façade Construction .....	7
3.3	Mechanical Services .....	8
3.4	Assessment of Traffic Noise Generation .....	8
4	Conclusion .....	9
	Appendix A – Acoustic Terminology.....	10
	Appendix B – Architectural Drawings.....	11
	Appendix C – Noise Logger Results.....	12

## Index of Figures

Figure 1 – Site Location, Nearest Residents and Noise Logger Position .....	3
---	---

## Index of Tables

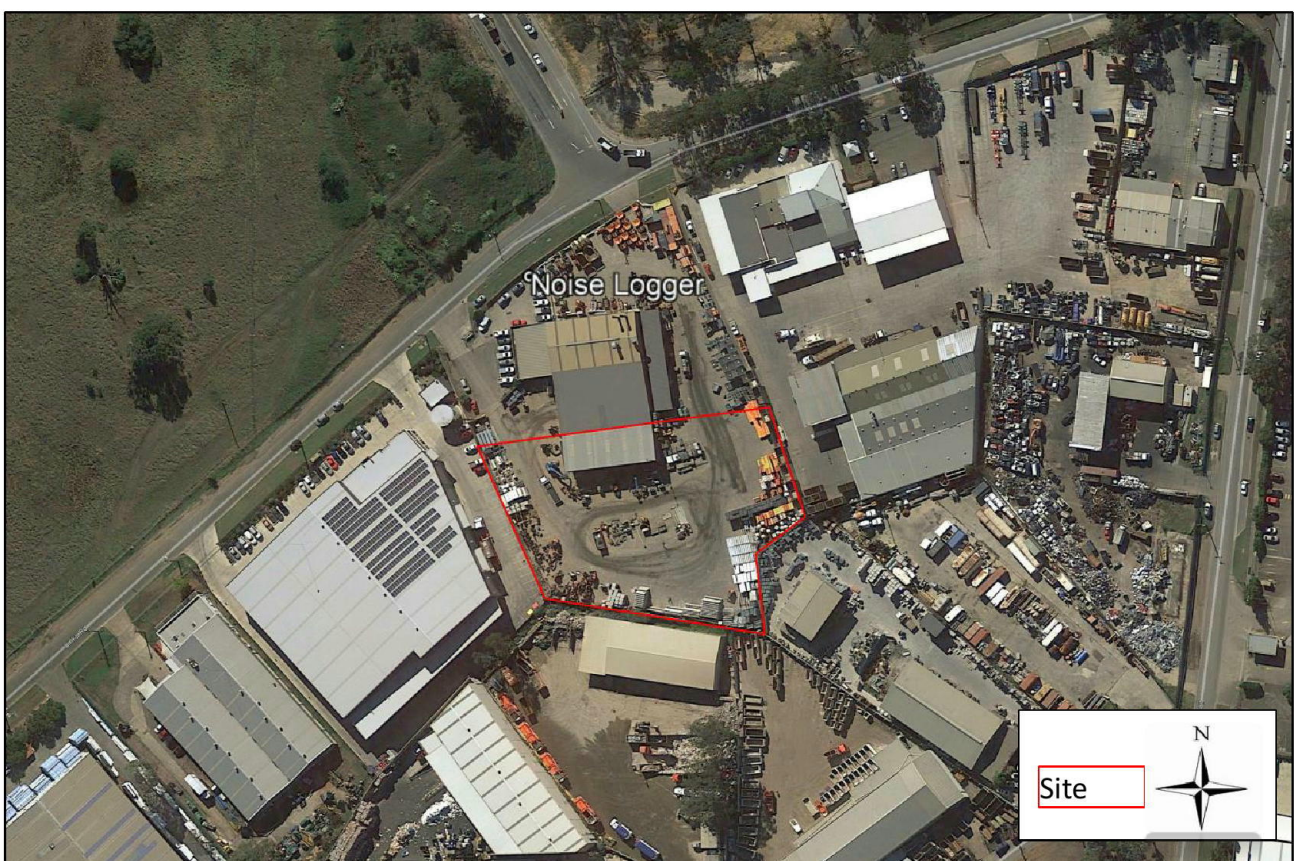
Table 1— Recommended Internal Design Noise Levels (AS/NZS 2107) .....	4
Table 2 – Measured Ambient and Traffic Noise and Levels, dBA .....	5
Table 3— Noise Survey Summary and Project Limits, dBA.....	5
Table 4— Road Traffic Noise Assessment Criteria for Land Use Developments .....	6
Table 5 – Schedule of Window and Glazing ( $R_w$ ).....	7
Table 6 – External Façade Construction ( $R_w$ ).....	7

## 1 Introduction

The following report has been prepared by Acouras Consultancy on behalf of Full Tilt Constructions Pty Ltd to assess the potential for noise impact associated with the 84 Links Road, St Marys. The commercial development will include:

- Open carpark on ground.
- Warehouse with office and amenities.

The proposed commercial development would be located on an existing commercial site with an existing warehouse building. Traffic noise along the Links Road and the commercial activity from surrounding sites contributes to the ambient noise levels. The site location is shown in Figure 1.



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

The nearest residential receivers that may potentially be impacted by the operation of the development are located more than 1200m at to the west in Werrington and to the north-east at Ropes Crossing.

## 2 Noise Criteria

The following standards and guidelines are applicable to this project:

- Penrith Development Control Plan 2014.
- NSW EPA “Noise Policy for Industry” (NPI).
- 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

The AS/NZS 2107–2016 outlines the acceptable internal noise levels such that a satisfactory acoustic environment within non-residential spaces in new and existing buildings can be achieved. Table 1 presents the recommended internal design noise levels.

**Table 1— Recommended Internal Design Noise Levels (AS/NZS 2107)**

Type of occupancy/activity	Design sound level ( $L_{Aeq,t}$ ) range
General office areas (commercial)	40 to 45
Corridors & Lobbies	45 to 50
Toilets	45 to 55
Warehouse (Packaging and delivery)	< 60

### 2.2 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 Tuesday 21<sup>st</sup> to Monday 27<sup>th</sup> August 2018. The monitor was positioned as shown in Figure 1. Measurements were conducted using the following equipment:

- SVAN 977 Type 1 Real time Analyser/Noise Logger. Serial No. 34892.
- 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.

### 2.2.1 Traffic Noise Levels

Table 2 presents a summary of the measured ambient noise level and traffic noise impacting the development.

**Table 2 – Measured Ambient and Traffic Noise and Levels, dBA**

Location	Period	Average $L_{eq}$	Highest $L_{eq}$ 1hr
Links Road	Day (07:00-22:00)	59	67
	Night (22:00-07:00)	52	60

### 2.2.2 EPA Noise Limits

The Penrith DCP Part C12 recommends that any new industrial or commercial development be assessed in accordance with relevant EPA and Australian Standards.

Noise Policy for Industry (NSW EPA, 2017, referred to as ‘the policy’) has recently replaced the NSW Industrial Noise Policy (NSW EPA, 2000). Table 3 presents a summary of the measured background noise level and the allowable intrusive noise limit for this project in accordance with the EPA NPI. The amenity criteria are based on an urban receiver.

**Table 3—Noise Survey Summary and Project Limits, dBA**

Time Period	Existing Noise Levels		NSW EPA NPI			Project Noise Trigger Level $L_{eq}(15min)$
	$L_{eq}$ (period)	RBL	Recommended ANL	Project ANL <sup>1</sup> $L_{eq}(15min)$	Intrusiveness Criteria, $L_{eq}(15min)$	
Day	60	40	60	58	45	45
Evening	52	38	50	48	43	43
Night	52	36	45	43	41	41

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.

<sup>1</sup> 2. 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.

### 2.3 Traffic Noise Generation

The commercial development has the potential to generate increased traffic noise along Links Road will be assessed in accordance with the NSW EPA Road Noise Policy (RNP). Table 4 sets out the assessment criteria for residences to be applied to particular types of project, road category and land use.

**Table 4— Road Traffic Noise Assessment Criteria for Land Use Developments**

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 <sub>Aeq</sub> , (1 hour) 55 (external)	L <sub>Aeq</sub> , (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’.

### 3 Assessment and Recommendations

#### 3.1 Façade Glazing Requirements

Acoustic glazing for the commercial developments are given in Table 5 are required to reduce noise impact on the internal occupants and should result in noise levels within such units in accordance with the and AS/NZS 2107:2016.

**Table 5 – Schedule of Window and Glazing ( $R_w$ )**

Façade	Space	Glazing Thickness	Minimum $R_w$ (Glazing+Frame)
All	Office	6.38mm laminated	30

All other non-habitable spaces, such as the amenities 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 6.

**Table 6 – External Façade Construction ( $R_w$ )**

Building Element	Proposed Construction	Minimum $R_w$
External Wall	Office and amenities- Masonry or cavity brick with internal plasterboard lining. Insulation as per thermal requirements	45
	Warehouse – External metal cladding with internal thermal insulation	35
Roof and ceiling	Office and amenities: Colorbond roof with a plasterboard cavity ceiling. Thermal insulation in ceiling cavity	45
	Warehouse: Colorbond roof with internal thermal insulation	35

### **3.3 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.

### **3.4 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" report prepared by TRAFFIX (ref: 18.320r01v02 TRAFFIX TIA Report, August 2018), Section 6 indicates the predicted increase in traffic of 14 vehicle trips per hours during the AM and PM peak periods.

The traffic report does not indicate the current traffic volumes along Links Road, however Links Road provides access to other commercial sites in the area and carries predominantly commercial and industrial traffic. In our opinion, it is unlikely that the change in traffic noise levels along Links Road would cause an impact to any noise sensitive receivers and not exceed the EPA RNP guidelines.

## **4 Conclusion**

An acoustic assessment of the proposed development has been carried out in accordance with the requirements of Penrith Council DCP and EPA NPI guidelines.

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 NPI. The limits are presented in Table 3.

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 and surround commercial activity noise.

The assessment of increased traffic generation in Section 3.4 has been assessed according to EPA RNP noise guidelines. Based on the expected increase in traffic for the development, the increase in traffic is expected not expected to impact any of the sensitive receivers and therefore comply with the EPA RNP guideline.

Providing the recommendations in this report are implemented, the noise from the proposed development is predicted to comply with acoustic requirements of the Penrith Council DCP, EPA NPI 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<sub>p</sub> (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<sub>90</sub> , L<sub>10</sub> , etc:** A statistical measurement giving the sound pressure level which is exceeded for the given percentile of an observation period, e.g. L<sub>90</sub> is the level which is exceeded for 90% of a measurement period. L<sub>90</sub> is commonly referred to as the "background" sound level.

**Background Noise (L<sub>90</sub>):** 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<sub>A90</sub> measurements. This value gives the Assessment Background Noise Level (ABL). Rating Background Level is the median of the overall ABL.

**L<sub>AEQ,T</sub>:** 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 SBA Architects.

<b>Drawing</b>	<b>Issue</b>	<b>Date</b>	<b>Description</b>
DA100	P5	01.08.2018	Site/Roof & Site Analysis Plan
DA101	P6	02.08.2018	Warehouse Plan

### Appendix C – Noise Logger Results

