

**MANAGING DIRECTORS**

MATTHEW PALAVIDIS  
VICTOR FATTORETTO

**DIRECTORS**

MATTHEW SHIELDS  
BEN WHITE



**Block 4 North / Mixed use Building -  
Central Park JV Number 2**

**Noise Impact Assessment**

---

SYDNEY

A: 9 Sarah St Mascot NSW 2020

T: (02) 8339 8000

F: (02) 8338 8399

SYDNEY MELBOURNE BRISBANE CANBERRA

LONDON DUBAI SINGAPORE GREECE

[www.acousticlogic.com.au](http://www.acousticlogic.com.au)

ABN: 11 068 954 343

The information in this document is the property of Acoustic Logic Consultancy Pty Ltd ABN 11 068 954 343 and shall be returned on demand. It is issued on the condition that, except with our written permission, it must not be reproduced, copied or communicated to any other party nor be used for any purpose other than that stated in particular enquiry, order or contract with which it is issued.



## TABLE OF CONTENTS

<b>1</b>	<b>INTRODUCTION</b>	<b>5</b>
<b>2</b>	<b>SITE DESCRIPTION</b>	<b>5</b>
<b>3</b>	<b>NOISE DESCRIPTORS</b>	<b>8</b>
<b>4</b>	<b>ASSESSMENT OF TRAFFIC NOISE INTRUSION</b>	<b>9</b>
<b>4.1</b>	<b>TRAFFIC NOISE CRITERIA</b>	<b>9</b>
4.1.1	City of Sydney Council DCP - Sydney Development Control Plan 2012	9
4.1.2	Australian Standards AS2107:2000	9
4.1.3	State Environmental Planning Policy	10
4.1.4	Summary of Internal Traffic Noise Criteria	10
<b>4.2</b>	<b>MEASUREMENTS PROCEDURE</b>	<b>11</b>
4.2.1	Unattended Noise Monitoring	11
4.2.2	Attended Monitoring	11
4.2.3	Resultant Noise Levels	11
<b>4.3</b>	<b>RECOMMENDED CONSTRUCTIONS</b>	<b>12</b>
4.3.1	Glazed Windows and Doors	12
<b>4.4</b>	<b>ROOF CONSTRUCTION</b>	<b>14</b>
<b>4.5</b>	<b>EXTERNAL CONCRETE WALLS</b>	<b>14</b>
<b>4.6</b>	<b>VENTILATION REQUIREMENTS</b>	<b>14</b>
<b>5</b>	<b>EXTERNAL NOISE EMISSION ASSESSMENT</b>	<b>15</b>
<b>5.1</b>	<b>BACKGROUND NOISE MONITORING</b>	<b>15</b>
<b>5.2</b>	<b>NOISE EMISSION OBJECTIVES</b>	<b>16</b>
5.2.1	City of Sydney Standard Conditions	16
5.2.2	NSW EPA Industrial Noise Policy	18
5.2.2.1	Intrusiveness Criterion	18
5.2.2.2	Amenity Criterion	19
<b>5.3</b>	<b>NOISE EMISSION ASSESSMENT - MECHANICAL PLANT</b>	<b>19</b>
<b>6</b>	<b>CHILDCARE CENTRE</b>	<b>20</b>
<b>6.1</b>	<b>INTERNAL NOISE CRITERIA</b>	<b>20</b>
6.1.1	City of Sydney DCP 2012	20
6.1.2	Australian Standard 2107:2000	20
<b>6.2</b>	<b>NOISE EMISSION PREDICTIONS</b>	<b>21</b>
6.2.1	Noise Source Data	21
6.2.1.1	Outdoor Play Area Noise Measurements	21
6.2.1.2	Measurement Equipment	21
6.2.1.3	Measured Noise Levels	22
6.2.2	Predicted Noise Levels	22
6.2.2.1	Outdoor Noise	22
6.2.3	Indoor Noise Impact to Future Residence Above	23
<b>6.3</b>	<b>RECOMMENDED CHILDCARE CENTRE TREATMENTS AND CONTROL</b>	<b>24</b>
<b>7</b>	<b>CONSTRUCTION NOISE AND VIBRATION MANAGEMENT</b>	<b>25</b>
<b>7.1</b>	<b>MANAGEMENT PLAN OBJECTIVES</b>	<b>25</b>
<b>7.2</b>	<b>CONSTRUCTION NOISE AND VIBRATION CRITERIA</b>	<b>25</b>
7.2.1	Sydney City Council's "Code of Practice for Construction Hours/Noise within the Central Business District"	26
7.2.2	Australian Standard AS2436:1981 "Guide to noise control on construction, maintenance and demolition sites"	26

7.2.3	Construction Noise Objectives	27
<b>7.3</b>	<b>VIBRATION CRITERIA</b>	<b>27</b>
7.3.1	Structure Borne Vibrations	27
7.3.2	Human Comfort	29
<b>7.4</b>	<b>AMELIORATIVE MEASURES</b>	<b>30</b>
7.4.1	Site specific recommendations	30
<b>7.5</b>	<b>CONTROL OF CONSTRUCTION NOISE AND VIBRATION</b>	<b>30</b>
<b>7.6</b>	<b>NOISE AND VIBRATION CONTROL METHODS</b>	<b>32</b>
7.6.1	Selection of alternate appliance or process	32
7.6.2	Acoustic Barriers	32
7.6.3	Silencing devices	32
7.6.4	Material handling	32
7.6.5	Treatment of specific equipment	33
7.6.6	Establishment of Site Practices	33
7.6.7	Noise Monitoring	33
7.6.8	Combination of methods	33
<b>7.7</b>	<b>COMMUNITY INTERACTION AND COMPLAINTS HANDLING</b>	<b>33</b>
7.7.1	ESTABLISHMENT of direct communication with affected parties	33
<b>7.8</b>	<b>DEALING WITH COMPLAINTS</b>	<b>34</b>
7.8.1	reporting REQUIREMENTS	35
7.8.2	Contingency Plans	35
<b>8</b>	<b>CONCLUSION</b>	<b>36</b>
	<b>APPENDIX 1 UNATTENDED NOISE MONITORING DATA</b>	<b>37</b>

## 1 INTRODUCTION

This report presents an analysis of acoustic impacts associated with the proposed mixed use development located at Block 4N with the Frasers Broadway site.

In this report we will:

- Conduct an external noise impact assessment and recommend acoustic treatments to ensure that internal noise levels comply with the requirements of AS 2107 “Recommended Design Sound Levels and Reverberation Times for Building Interiors”, The State Environmental Planning Policy including SEPP and Sydney City Council DCP.
- Identify potential noise sources generated by the site, and determine noise emission goals for the development to meet acoustic requirements of the City of Sydney Council and those of the NSW EPA Industrial Noise Policy.

This report has been prepared based on architectural drawings forwarded to this office from Frasers Broadway.

## 2 SITE DESCRIPTION

Block 4N – State Significant Development.

The State Significant Development Application seeks approval for the redevelopment of Block 4N as a mixed use building, with associated non-residential/retail uses located on ground floor, consistent with the Concept Plan. Specifically, the proposal includes the following uses (as shown on the Architectural Drawing at Attachment B):

- Residential – 3,518 m<sup>2</sup> located on levels 11 to 16 consisting of 48 permanent residential apartments
- Retail – 236 m<sup>2</sup> located on the ground level with frontage to Central Park Ave
- Hotel – 13,986 m<sup>2</sup> located from ground to level 18 – approximately 283 hotel rooms
- Commercial – 6,146 m<sup>2</sup> located on levels 5 to 10
- Childcare Centre (shell space) – 1,080m<sup>2</sup> located on level 3 and 4.
- Existing Australia Hotel and Terraces (Heritage Pub and Terraces) – 789 m<sup>2</sup>

The proposal has a total GFA of 25,755 m<sup>2</sup> of which 22,237 m<sup>2</sup> is to be used for non-residential purposes and 3,518 m<sup>2</sup> is to be used for residential purposes in accordance with the Concept Plan (MP 06\_0171 MOD9).

Hotel facilities, including concierge, storage, swimming pool, spa, gym, conference facilities, will be located within the building. The hotel swimming pool, spa and gym will also be made available to permanent residents. Separate entries and lobbies are proposed to the commercial office, childcare, hotel and permanent residential.

The existing Australia Hotel and adjoining Abercrombie Street terraces will be retained, with the design creating a publicly accessible courtyard behind the terraces, accessible from Broadway and Abercrombie Street.

A combined basement below Block 1 and 4N is proposed, that will accommodate all car parking, bicycle parking, residential and commercial storage, waste handling, back of house facilities, building plant and services. The basement will have a connection into Block 4S and Central Park's Central Thermal Plant. Service Vehicle loading is provided via the Abercrombie Street access ramp, and car park access for residents, hotel guests, office, retail and childcare drop off carspaces provided via Central Park Avenue. The basement will accommodate a total of 130 car parking spaces for the proposed Block 4N use. Additional spaces are provided within the basement that will service Block 1 and the Brewery Yard building as shown on the Architectural Plans.

The following noise sources are potentially impact on the project site:

- Traffic Noise within the surrounding vicinity of the site.

Noise potentially generated by the site will primarily consist of noise from the mechanical plant and equipment.

The nearest potentially affected noise receivers are:

- Residential properties on Kensington Street to the east of the site;
- Residential properties on Wellington Street to the south of the site;
- Future and existing residential properties within other buildings with the Central Park present to the north of the site.

Refer to Figure 1 below, which is an aerial photo of the subject site.



Figure 1 - Site and Measurement Locations

- Subject Site
- Unattended Noise Measurement Location
- Attended Noise Measurement Location
- Residential Receivers
- Commercial Receivers

### 3 NOISE DESCRIPTORS

Traffic noise constantly varies in level, due to fluctuations in traffic speed, vehicle types, road conditions and traffic densities. Accordingly, it is not possible to accurately determine prevailing traffic noise conditions by measuring a single, instantaneous noise level. To accurately determine the effects of traffic noise a 15-20 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. These parameters are used to measure how much annoyance would be caused by a particular noise source.

In the case of 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 interval.

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 measurement 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 traffic noise.

Current practice favours the  $L_{eq}$  parameter as a means of measuring traffic noise, whereas the  $L_{10}$  parameter has been used in the past and is still incorporated in some codes. For the reasons outlined above, the  $L_{90}$  parameter is not used to assess traffic noise intrusion.

## 4 ASSESSMENT OF TRAFFIC NOISE INTRUSION

The Significant traffic noise sources in the vicinity of the site are as follows:

- Abercrombie Street, on the east of the site and Broadway to the north, both carry medium to high traffic volumes of greater than 40,000 vehicles as AADT and is required to be assessed on conjunction with NSW State Environmental Planning Policy (Infrastructure) 2007 criteria.

Traffic noise impacts should comply with the requirements of the City of Sydney Council DCP, the SEPP (including Development Near Rail Corridors And Busy Roads) and the Australian Standard AS2107:2000.

### 4.1 TRAFFIC NOISE CRITERIA

#### 4.1.1 City of Sydney Council DCP - Sydney Development Control Plan 2012

The Draft Sydney DCP 2012 states the following with regards to the control of traffic noise intrusion:

*“Dwellings are to be constructed so that in a naturally ventilated situation the repeatable maximum LAeq (1 hour) level does not exceed:*

- |     |  |                           |
|-----|--|---------------------------|
| i)  | <i>for closed windows and doors::<br/>bedrooms (10pm-7am),<br/>main living area (24 hours)</i>               | <i>35dB; and<br/>45dB</i> |
| ii) | <i>for open windows and doors:<br/>bedrooms (10pm-7am), 45dB; and<br/>main living area (24 hours), 55dB.</i> | <i>45dB<br/>55dB</i>      |

*Where natural ventilation of a room cannot be achieved, the repeatable maximum LAeq (1hour) level when doors are windows are shut and mechanical ventilation/ air conditioning is operating in a dwelling is not to exceed, within:*

- |     |                                    |                  |
|-----|------------------------------------|------------------|
| i)  | <i>bedrooms (10pm-7am),</i>        | <i>38dB; and</i> |
| ii) | <i>main living area (24 hours)</i> | <i>48dB</i>      |

*These levels are to include the combined measured level of noise from both external sources and the ventilation system operating normally.”*

#### 4.1.2 Australian Standards AS2107:2000

The Australian Standard AS2107-2000 “Recommended Design Sound Levels and Reverberation Times for Building Interiors” recommends maximum design sound levels for different areas of occupancy in the residential development while AS 3671 -1989 “Road Traffic Noise Intrusion - Building Siting and Construction” recommends that an appropriate  $L_{eq}$  or  $L_{10}$  traffic noise descriptor be used for the occupancy being assessed. Traffic noise criteria for AS2107-2000 is presented in the table below, based on developments near major roadways.

### 4.1.3 State Environmental Planning Policy

The NSW Department of Planning’s policy, Development Near Rail Corridors And Busy Roads – Interim Guideline, sets out internal noise level criteria adapted from the State Environmental Planning Policy (Infrastructure) 2007 (the ‘Infrastructure SEPP’) for developments with the potential to be impacted by traffic or rail noise and vibration.

The Infrastructure SEPP defines busy roads that are subject to an acoustic assessment as:

*“Clause 102: development for any of the following purposes that is on land in or adjacent to a road corridor for a freeway, a tollway or a transit way or any other road with an annual average daily traffic volume of more than 40,000 vehicles (based on the traffic volume data available on the website of the RTA) and that the consent authority considers is likely to be adversely affected by road noise or vibration:*

- *building for residential use*
- *a place of public worship*
- *a hospital*
- *an educational establishment or childcare.”*

The Infrastructure SEPP sets out the following criteria for internal noise levels from airborne traffic noise:

*“For Clauses 87 (Rail) and 102 (Road):*

*“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:*

*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.”*

Internal requirements are for residential spaces and are measured internally with windows closed.

### 4.1.4 Summary of Internal Traffic Noise Criteria

Based on the requirements of Sydney City Council DCP, SEPP and AS2107-2000 the following assessment criteria would apply to the proposed development.

**Table 1 - Traffic Noise Criteria for All Spaces**

LOCATION	CRITERIA
Bedrooms	35dB(A) $L_{eq}$ (Worst 1 hr 10pm to 7am) (City of Sydney)
	35dB(A) <sub>Mean Logarithmic</sub> $L_{eq}$ (Night 9 hr) (SEPP)
Living areas	45dB(A) $L_{eq}$ (Worst 1 Hour 24hr) (City of Sydney)
	40dB(A) <sub>Mean Logarithmic</sub> $L_{eq}$ (24 hr) (SEPP)
Commercial Areas	45dB(A) $L_{eq}$ (15hr) (AS2107:2000)
Retail Areas	45dB(A) $L_{eq}$ (15hr) (AS2107:2000)

## 4.2 MEASUREMENTS PROCEDURE

As part of this investigation, traffic noise from the surrounding perimeter roadways has been measured. The results of this measurement will be used to determine the treatments required to reduce noise levels to within the project acoustic objectives.

Measurements included attended and unattended noise levels measurements conducted at the locations as detailed in Figure 1 above.

### 4.2.1 Unattended Noise Monitoring

Unattended noise monitoring was conducted using an Acoustic Research Laboratories Pty Ltd series 315 noise monitor. The monitor was programmed to store 15-minute statistical noise levels throughout the unmanned monitoring period. Equipment was calibrated at the beginning and the end of the measurement using a Rion NC-74 calibrator; no significant drift was detected. All measurements were taken on A-weighted fast response mode. The unattended noise monitor was installed from 28<sup>th</sup> August to 10 September, 2014.

### 4.2.2 Attended Monitoring

Attended monitoring was conducted on Abercrombie Street and Broadway at the boundary of the site were obtained using a Norsonics type 140 Precision Sound Analyser. The analyser was set to fast response and calibrated before and after the measurements using a Norsonics Sound Calibrator type 1251. No significant drift was noted. Measurements were conducted on 10<sup>th</sup> October 2014 during the morning traffic peak time of 8am to 9.30am.

### 4.2.3 Resultant Noise Levels

The following table presents the resultant noise levels at the proposed façade of the development. The noise levels are based on both the attended and unattended noise measurement results conducted by this office. The noise levels are based on the manned background noise measurement results adjusted by the difference with the noise monitor results of similar time periods and distance attenuation.

**Table 2 – Measured Traffic Noise Levels**

Locations	Traffic Noise Levels	
	Daytime (7am-10pm)	Night-time (10pm- 7am)
Broadway	73 dB(A) $L_{eq}(1 \text{ Hour})$	70 dB(A) $L_{eq}(1 \text{ Hour})$
Abercrombie Street	72 dB(A) $L_{eq}(1 \text{ Hour})$	69 dB(A) $L_{eq}(1 \text{ Hour})$

### **4.3 RECOMMENDED CONSTRUCTIONS**

Traffic noise intrusion into the proposed development was assessed using the measured external noise levels reported above as a basis.

Calculations were performed taking into account the orientation of windows, the total area of glazing, facade transmission loss and room sound absorption characteristics. In this way the likely interior noise levels can be predicted. Acoustic treatment required to ensure compliance with the assessment criteria are detailed in this section.

Internal noise levels will primarily be as a result of noise transfer through the windows and doors as these are relatively light building elements that offer less resistance to the transmission of sound. Noise transfer through the masonry elements will not be significant and need not be considered further.

The constructions necessary to achieve the noise levels are detailed below. The predicted noise levels have been based on the expected level and spectral characteristics of the external noise, the area of building elements exposed to traffic noise, the absorption characteristics of the rooms and the noise reduction performance of the building elements.

Details of glazing are indicative of the proposed acoustic treatments required to comply with the relevant internal noise levels presented in this report. Details of external glazing to be provided to the project will be provided at the CC stage of the project.

#### **4.3.1 Glazed Windows and Doors**

The following constructions are recommended to comply with the traffic noise objectives stated in this report and are the typical selections to ensure the internal noise level criteria presented in this report are achieved.

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 are listed in the table below.

**Table 3 – Glazing Construction – Residential/Hotel Areas**

Façade	Level	Room	Glazing	Acoustic Seals
Broadway	All Levels	Living Areas	12.38mm Laminated	Yes
		Bedrooms	12.38mm Laminated	Yes
Eastern Façade	All Levels	Living Areas	10.38mm Laminated	Yes
		Bedrooms	10.38mm Laminated	Yes
Western Façade	All Levels	Living Areas	12.38mm Laminated	Yes
		Bedrooms	12.38mm Laminated	Yes
Southern Façade	All Levels	Living Areas	10.38mm laminated	Yes
		Bedrooms	10.38mm laminated	Yes

**Table 4 – Glazing Construction – Retail/Commercial Areas**

Façade	Level	Room	Glazing	Acoustic Seals
All Facades	All Levels	Living Areas	10.38mm Laminated	Yes
		Bedrooms	10.38mm Laminated	Yes

The proposed glazing thickness will satisfy all acoustic requirements of Section 4.1. 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.

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 STC rating of the glazing fitted into open-able frames and fixed into the building opening should not be lower than the values listed in the table below 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 STC of Glazing (with Acoustic Seals)**

<b>Glazing Assembly</b>	<b>Minimum STC of Installed Window</b>
6.38mm laminated	30
10.38mm laminated	35
12.38mm laminated	36

#### **4.4 ROOF CONSTRUCTION**

Concrete roof will not require any acoustic treatment.

#### **4.5 EXTERNAL CONCRETE WALLS**

External walls of concrete construction are acoustically acceptable for traffic noise intrusion. There should not be vents on the internal skin of external walls. All penetrations in the internal skin of external walls should be acoustically sealed.

#### **4.6 VENTILATION REQUIREMENTS**

As the recommended internal noise levels cannot be achieved with windows open within the development, an alternative outside air supply system or air conditioning will be required to be installed in accordance with the Sydney City Council DCP.

All proposed tenancies are required to be provided with an alternative ventilation or air conditioning system to maintain adequate ventilation with the windows closed.

Any alternative ventilation system that is installed should be acoustically designed to ensure that the acoustic performance of the recommended constructions is not reduced and does not exceed Council criteria for noise emission to nearby properties.

## 5 EXTERNAL NOISE EMISSION ASSESSMENT

Noise emissions from the site should be assessed to ensure that the amenity of nearby land users is not adversely affected.

Potential noise sources which should be assessed are:

- Noise generated by mechanical plant.

The nearest potentially affected noise receivers are:

- Residential properties within the adjacent sites of the Frasers Broadway precinct;
- Existing commercial receivers to the west and north of the site on Abercrombie Street and Broadway.

Noise emissions noise will be assessed to the following criteria:

- City of Sydney Standard Conditions
- The NSW EPA Industrial Noise Policy

### 5.1 BACKGROUND NOISE MONITORING

Unattended noise monitoring was conducted using an Acoustic Research Laboratories Pty Ltd series 315 noise monitor. The monitor was programmed to store 15-minute statistical noise levels throughout the unmanned monitoring period. Equipment was calibrated at the beginning and the end of the measurement using a Rion NC-74 calibrator; no significant drift was detected. All measurements were taken on A-weighted fast response mode. The unattended noise monitor was installed from 28<sup>th</sup> August to 10 September, 2014..

Measured background noise levels are presented below. Refer to Appendix 1 for unmanned noise monitoring data.

**Table 6 - Measured Background Noise Levels**

<b>Description</b>	<b>Day Noise Level 7am to 6pm (dB(A))</b>	<b>Evening Noise Level 6pm to 10pm (dB(A))</b>	<b>Night Noise Level 10pm to 7am (dB(A))</b>
Minimum Repeatable Background L <sub>90,15min</sub>	56	53	50

## 5.2 NOISE EMISSION OBJECTIVES

Noise emissions from the development will have to achieve the following requirements.

### 5.2.1 City of Sydney Standard Conditions

#### **(62) NOISE - MECHANICAL PLANT AND EQUIPMENT**

Noise associated with the use of mechanical plant and equipment must not give rise to any one or more of the following:

- a) Transmission of "offensive noise" as defined in the Protection of the Environment Operations Act 1997 to any affected receiver.
- b) A sound pressure level at the boundary of any affected receiver that exceeds the background (LA90, 15minutes) noise level by more than 5dB. The background noise level must be measured in the absence of noise emitted from the use in accordance with Australian Standard AS1055.

Note: The method of measurement of vibration being carried out in accordance with "assessing Vibration; Technical Guidelines" – DEC (EPA) AS1055 for sound level measurements.

**Table 7 – Day (7am-6pm) Noise Emission Limit Background + 5dB(A) Leq (15min)**

Location	31.5Hz	63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz	A-wt
Subject Site	66	66	56	58	57	57	53	46	41	61

**Table 8 –Evening (6pm-10pm) Noise Emission Limit Background + 5dB(A) Leq (15min)**

Location	31.5Hz	63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz	A-wt
Subject Site	63	64	59	55	54	54	50	43	38	58

**Table 9 – Night-time (10pm-7am) Noise Emission Limit Background +5dB(A) Leq (15min)**

Location	31.5Hz	63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz	A-wt
Subject Site	60	60	56	52	51	51	47	41	35	55

**(63) AIR CONDITIONERS IN RESIDENTIAL BUILDINGS**

The air conditioner/s must not:

- a) emit noise that is audible within a habitable room in any other residential property (regardless of whether any door or window to that room is open):
  - (i) before 8.00am and after 10.00pm on any Saturday, Sunday or public holiday; or
  - (ii) before 7.00am and after 10.00pm on any other day; or
- b) emit a sound pressure level when measured at the boundary of any other residential property, at a time other than those specified in (i) and (ii) above, which exceeds the background (LA90, 15minutes) by more than 5dB(A). The source noise level must be measured as a LAeq 15 minute.

**Table 10 – Noise Emission Limits from Air Conditioners**

<b>Description</b>	<b>Day 7am to 6pm</b>	<b>Evening 6pm to 10pm</b>	<b>Night 10pm to 7am</b>
Noise Emission Limit dB(A) Leq,15min	61	58	55 (inaudible internally)

## 5.2.2 NSW EPA Industrial Noise Policy

The NSW EPA Industrial Noise Policy, has two criteria which need to be satisfied namely Intrusiveness and Amenity. These are described below:

- *Intrusiveness Criteria* - This 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). Where applicable, the intrusive noise level should be penalised (increased) to account for any annoying characteristics such as tonality.
- *Amenity Criteria* - This guideline is intended to limit the absolute noise level from all “industrial” noise sources such as mechanical plant to a level that is consistent with the general environment.

The EPA’s Industrial Noise Policy sets out acceptable noise levels for various localities. Table 2.1 on page 16 of the policy indicates 4 categories to distinguish different residential areas. They are rural, suburban, urban and urban/industrial interface.

Noise levels are to be assessed at the property boundary or nearby dwelling, or at the balcony or façade of an apartment.

### 5.2.2.1 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 do not exceed the background noise level by more than 5dB(A). Where applicable, the intrusive noise level should be penalised (increased) to account for any annoying characteristics such as tonality.

Background noise levels adopted are presented in Section 5.1. Noise emissions from the site should comply with the noise levels presented below when measured at nearby property boundary.

**Table 11 – Intrusiveness Noise Emission Goals**

<b>Location</b>	<b>Period/Time</b>	<b>Intrusiveness Noise Emission Goal dB(A) <math>L_{eq}(15min)</math></b>
Nearby Residences	Day (7am-6pm)	61
	Evening(6pm-10pm)	58
	Night(10pm-7am)	55

### 5.2.2.2 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 EPA Industrial noise policy sets out acceptable noise levels for various localities. Table 2.1 on page 16 of the policy indicates 4 categories to distinguish different areas. They are rural, suburban, urban and urban/industrial interface. This site is categorised by suburban receivers.

For the purposes of this condition:

- Day is defined as the period from 7am to 6pm Monday to Saturday and 8am to 6pm Sundays and Public Holidays;
- Evening is defined as the period from 6pm to 10pm.
- Night is defined as the period from 10pm to 7am Monday to Saturday and 10pm to 8am Sunday and public holidays.

**Table 12 – Amenity Noise Emission Goals**

Location	Period/Time	Amenity Noise Emission Goal dB(A) $L_{eq}(\text{Period})$
Nearby Residences	Day (7am-6pm)	55
	Evening(6pm-10pm)	45
	Night(10pm-7am)	40
Commercial premises	When in use	70

### 5.3 NOISE EMISSION ASSESSMENT - MECHANICAL PLANT

Mechanical plant items are not typically selected at DA stage.

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 set out in section 5.2 of this report.

All plant can be satisfactorily attenuated to levels complying with noise emission criteria through appropriate location and (if necessary) standard acoustic treatments such as noise screens, enclosures, in-duct treatments (silencers/lined ducting) or similar.

## 6 CHILDCARE CENTRE

As part of the proposed there is a childcare centre to be installed on the ground floor of the proposal which have been assessed in this section of the report, with external children's areas to the north and south of the proposed building.

This section of the report details the assessment of environmental noise impact into the proposed child care centre.

### 6.1 INTERNAL NOISE CRITERIA

#### 6.1.1 City of Sydney DCP 2012

*"Section 4.4.4.5 Control of noise impacts to child care centres*

*(2) The repeatable maximum LAeq(1hour) must not exceed 40 dBA (Leq1hr) within the internal spaces of the child care centre."*

#### 6.1.2 Australian Standard 2107:2000

Australian Standard 2107:2000 details the following control for external noise intrusion to childcare facility. The applicable criteria from that standard are as follows:

**Table 13 – Recommended Design Sound Level**

Type of Occupancy/Activity	Recommended Design Sound Level dB(A) $L_{eq, 1hour}$
Sleeping Rooms	35
Indoor Play Areas	40

The recommended acoustic treatments to the building façade to ensure internal noise levels comply with the criteria above is 6.38mm laminated glass to the perimeter of the proposed childcare centre.

## **6.2 NOISE EMISSION PREDICTIONS**

The assessment of noise emissions from the proposed child care centre has been assessed in conjunction with the proposed development conditions including the following:

1. The centre will cater for upto 90 children within the centre.
2. Internal areas as detailed in the architectural plan of the development.
3. Details of the proposed centre are including in Appendix B.

### **6.2.1 Noise Source Data**

This section of the report details the source noise data which has been used as the basis of this report and the recommended treatments are those required to comply with the noise level criteria detailed in the Sections above.

#### **6.2.1.1 Outdoor Play Area Noise Measurements**

Outdoor play area noise measurements were undertaken at a typical Child Care Centre for the purpose of using a source noise level in this assessment. Noise measurements were taken of the 3 to 6 year age group with 8 kids at play which have then been corrected to the sound power level for 1 child and used as the basis of the noise source in this assessment. This group represents the most active of the age groups and hence are likely to generate the maximum noise levels. Although noise measurements have not been conducted for the 0-2 year age group, it would be expected that they would be likely to generate lower levels of sound than the older age group.

The noise level recorded by this play group has been corrected for the sound power level of 1 child at play and then corrected for the assessment of the proposed number of children with the Green Square development of 90 children within the centre total.

#### **6.2.1.2 Measurement Equipment**

Noise measurements were obtained using a CEL-593 Type 1 Sound Level Analyser, set to A-weighted fast response. The sound level meter was calibrated at the beginning and the end of the measurement using a Rion NC-73 calibrator; no significant drift was detected. All measurements were taken on A-weighted fast response mode.

### 6.2.1.3 Measured Noise Levels

The measured activity noise levels from the 8 children playing are listed below in table below.

**Table 14 - Measured Children Activity Noise Levels dB(A) L<sub>A10</sub>**

<b>LOCATION</b>	<b>Activity</b>	<b>Distance</b>	<b>NOISE LEVEL dB(A) SPL</b>
Outdoor Play Area	Bikes + Sandpit play	3m	66
	Blocks + Sandpit play	4m	64
	Stepping Blocks + Sandpit play	4m	57
	Play gym + Sand pit play	3-4m	65

The noise levels detailed above will be used as the basis of noise emissions from the proposed site.

### 6.2.2 Predicted Noise Levels

#### 6.2.2.1 Outdoor Noise

Noise emissions from the play areas are predicted based on the following assumptions:

- The measured typical kids' play noise data above
- Play areas are assumed to be operating at the nominated capacity, and the children are distributed evenly across the outdoor play area.
- Outdoor playing time will be restricted to between 8am and 6pm
- The recommended constructions and management controls presented in Section 6 of this report have been implemented in the building.

The noise level at the nearest residents was predicted using the above data and by taking into account any expected noise reduction provided by the building fabric, distance losses, directivity, barrier effects, number of children playing etc.

Table below shows the predicted noise levels from the children in outdoor play area.

**Table 15 - Predicted Noise Levels from Outdoor Play (Day time only as this is when external play area will be used)**

Receptor	Predicted Noise Level $L_{eq, 15min}$ dB(A)	Criteria $L_{eq, 15min}$ dB(A)	Complies
Future residence within the development	55 External	61 External	Yes
Residential development to the east of the site	44 External	61 External	Yes
Future Residential development to the south of the site	53 External	61 External	Yes

### 6.2.3 Indoor Noise Impact to Future Residence Above

Noise Levels generated from indoor structured activities (i.e. lessons) are based on a raised speech sound power level of 78dB(A) for the teacher.

The noise level at the nearest residents was predicted using the above data and by taking into account any expected noise reduction provided by the building fabric, distance losses, directivity, barrier effects, etc. Table below shows the predicted noise levels from lessons.

The assessment has been conducted assuming a minimum concrete construction of the floor slab above of 200mm.

**Table 16 - Predicted Noise Levels from Indoor Play**

Receptor	Predicted Noise Level $L_{eq, 15min}$ dB(A)*	Criteria $L_{eq, 15min}$ dB(A)	Complies
Future residential receivers above the child care centre	< 30 External	30 (internally)	Yes

\*Note: Predicted noise levels assume windows are fitted with 6.38mm laminated glazing with acoustic seals and a concrete slab of 200mm.

### 6.3 RECOMMENDED CHILDCARE CENTRE TREATMENTS AND CONTROL

The following building and management controls are required to control noise impact from the proposed child care centre on Level 1 of the proposed development to the surrounding receivers, including the future residential receivers within the Block 11 development.

- Children's outdoor play area to be operational between 8am and 6pm on any given day.
- Minimum 10.38mm laminated glazing with acoustic seals around perimeter is required, with minimum Rw of 35.
- Signs reminding staff and visitors to minimise noise at all times shall be installed at ingress/egress points from the child care centre.
- Management is to ensure children are supervised at all times to minimise noise generated by the children whenever practical and possible.
- Install a contact phone number at the front of the centre so that any complaints regarding centre operation can be made.

## 7 CONSTRUCTION NOISE AND VIBRATION MANAGEMENT

This document presents a discussion of the processes which will be followed in order to manage noise and vibration from the construction of Block 4N of the Frasers Broadway development, Chippendale.

The principal objective of this study is to undertake an evaluation of work to be performed during the construction of the project and forecast the potential impact of noise and. The evaluation will be used to formulate and streamline effective regulation and mitigation measures.

The principal issues, which will be addressed in this report, are:

- Identification of the noise and vibration standards which will be applicable to this project.
- Formulation of a strategy for construction to comply with the standards identified in the above point.
- Establishment of direct communication networks between affected.

### 7.1 MANAGEMENT PLAN OBJECTIVES

The objective of this management plan is to minimise noise and vibration emissions from the proposed construction activities associated with this project and assist in maintaining a satisfactory acoustic environment around the site.

### 7.2 CONSTRUCTION NOISE AND VIBRATION CRITERIA

The Council of the City of Sydney details specific construction noise and vibration criteria applicable construction sites within the CBD in the *Construction Hours/Noise within the Central Business District*. The proposed development sits outside of the area applicable to this code of practice, however the objective of this plan is to adhere to the intent of the code as to the reduce the potential for noise impact as practically possible.

Where feasible and practical measures may be applied the construction site should endeavour to comply with the criteria outlined in the Council of the City of Sydney's Code of Practice for Construction Hours/Noise within the Central Business District". A summary of the code is detailed below.

### 7.2.1 Sydney City Council’s “Code of Practice for Construction Hours/Noise within the Central Business District”

The noise goals for the construction activities on this project are aimed at minimising adverse impacts within the commercial or residential/hotel buildings. The noise goals adopted by the code of practice are outlined below.

**Table 17 – Construction Noise Criteria**

Day	Time Zone	Noise Criteria L <sub>10</sub> (15 minute)
Monday to Saturday	7am to 8am	Background Noise + 5
Monday to Friday	8am to 7pm	Background Noise + 10
Saturday	8am to 5pm	Background Noise + 10

The Code also mentions that the guidelines for control of construction noise as outlined in AS2436 shall be applied, where appropriate.

### 7.2.2 Australian Standard AS2436:1981 “Guide to noise control on construction, maintenance and demolition sites

The Australian Standard AS2436 states that where all reasonable and available measures have been taken to reduce construction noise, mitigation strategies may be put in place to reduce levels noise levels to within a reasonable and acceptable level.

For the control and regulation of noise from construction sites AS2436:1981 “*Guide to noise control on construction, maintenance and demolition sites*” nominates the following:

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

The guideline reflects on feasible and reasonable mitigation strategies, management controls and public liaising in the effort to reach realistic compromises between construction sites and potential noise affected receivers.

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

- Predict noise levels produced by typical construction activities at the sensitive receivers.
- Adopt management conditions as per AS 2436 in the event of a non-compliance.

### 7.2.3 Construction Noise Objectives

Construction noise objectives applicable to the development have been determined based on the minimum background noise level recorded and the construction noise criteria detailed in this report. Noise level objectives for the construction period of the site are detailed in Table 18.

**Table 18 – Construction Noise Objectives**

Category	Time of Day	Background Noise Level dB(A) L <sub>90</sub>	Construction Noise Objective dB(A) L <sub>Av max</sub>
Monday to Saturday	0700 - 0800	53	58
Monday to Friday	0800 - 1900	53	63
Saturday	0800 - 1700	53	63

### 7.3 VIBRATION CRITERIA

Vibration caused by construction at any residence or structure outside the subject site must be limited to:

- For structural damage vibration, German Standard DIN 4150-3 *Structural Vibration: Effects of Vibration on Structures*; and
- For human exposure to vibration, British Standard BS 6472 – ‘Guide to Evaluate Human Exposure to Vibration Buildings (1Hz to 80Hz).

The criteria and the application of this standard are discussed in separate sections below.

#### 7.3.1 Structure Borne Vibrations

German Standard DIN 4150-3 (1999-02) provides vibration velocity guideline levels for use in evaluating the effects of vibration on structures. The criteria presented in DIN 4150-3 (1999-02) are presented in Table 2.

It is noted that the peak velocity is the absolute value of the maximum of any of the three orthogonal component particle velocities as measured at the foundation, and the maximum levels measured in the x- and y-horizontal directions in the plane of the floor of the uppermost storey.

**Table 19 – DIN 4150-3 (1999-02) Safe Limits for Building Vibration**

Type of Structure		Peak Particle Velocity ( $\text{mms}^{-1}$ )			
		At Foundation at a Frequency of			Plane of Floor of Uppermost Storey
		< 10Hz	10Hz to 50Hz	50Hz to 100Hz	All Frequencies
1	Buildings used in commercial purposes, industrial buildings and buildings of similar design	20	20 to 40	40 to 50	40
2	Dwellings and buildings of similar design and/or use	5	5 to 15	15 to 20	15
3	Structures that because of their particular sensitivity to vibration, do not correspond to those listed in Lines 1 or 2 and have intrinsic value (e.g. buildings that are under a preservation order)	3	3 to 8	8 to 10	8

### 7.3.2 Human Comfort

The British Standard BS 6472 – ‘Guide to Evaluate Human Exposure to Vibration Buildings (1Hz to 80Hz)’ will be used to assess construction vibration for human comfort.

This guideline provides procedures for assessing tactile vibration and regenerated noise within potentially affected buildings. The recommendations of this guideline should be adopted to assess and manage vibration from the site. Where vibration exceeds, or is likely to exceed, the recommended levels then an assessment of reasonable and feasible methods for the management of vibration should be undertaken.

**Table 20 – BS 6472 Vibration Criteria**

		RMS acceleration (m/s <sup>2</sup> )		RMS velocity (mm/s)		Peak velocity (mm/s)	
Place	Time	Preferred	Maximum	Preferred	Maximum	Preferred	Maximum
Continuous Vibration							
Residences	Daytime	0.01	0.02	0.2	0.4	0.28	0.56
Offices		0.02	0.04	0.4	0.8	0.56	1.1
Workshops		0.04	0.08	0.8	1.6	1.1	2.2
Impulsive Vibration							
Residences	Daytime	0.3	0.6	6.0	12.0	8.6	17.0
Offices		0.64	1.28	13.0	26.0	18.0	36.0
Workshops		0.64	1.28	13.0	26.0	18.0	36.0

Note 1: Continuous vibration relates to vibration that continues uninterrupted for a defined period (usually throughout the daytime or night-time), e.g. continuous construction or maintenance activity. (DECC, 2006)

Note 2: Impulsive vibration relate to vibration that builds up rapidly to a peak followed by a damped decay and that may or may not involve several cycles of vibration (depending on frequency and damping), with up to three occurrences in an assessment period, e.g. occasional loading and unloading, or dropping of heavy equipment. (DECC, 2006)

## 7.4 AMELIORATIVE MEASURES

### 7.4.1 Site specific recommendations

Site specific recommendations as follows:

- Concrete sawing
  - Noise from concrete sawing is likely to result in an exceedances of allowable noise levels at all surrounding receivers. It should be noted however that this activity will be only be used sporadically. It should also be noted that noise impacts for receivers to the West of the site will be masked by high traffic noise levels associated with Abercrombie Street.
  - Any significant acoustic treatment of concrete sawing is not feasible – surrounding developments are multi-storey, negating any benefit that could be provided by noise screens. Accordingly, these activities should be managed so as to reduce noise impacts, as is consistent with AS2436 when strict compliance with noise emission goals is not achievable.
  - We therefore recommend that concrete sawing works are scheduled to times which will minimize impacts on surrounding sensitive receivers.

- Vehicle Noise:

Access to the site will primarily occur from within the One Central Park precinct and will not typically result in a significant noise impact to residents to the South of the site. Noise associated with traffic along Abercrombie Street will mask noise associated with trucks on site.

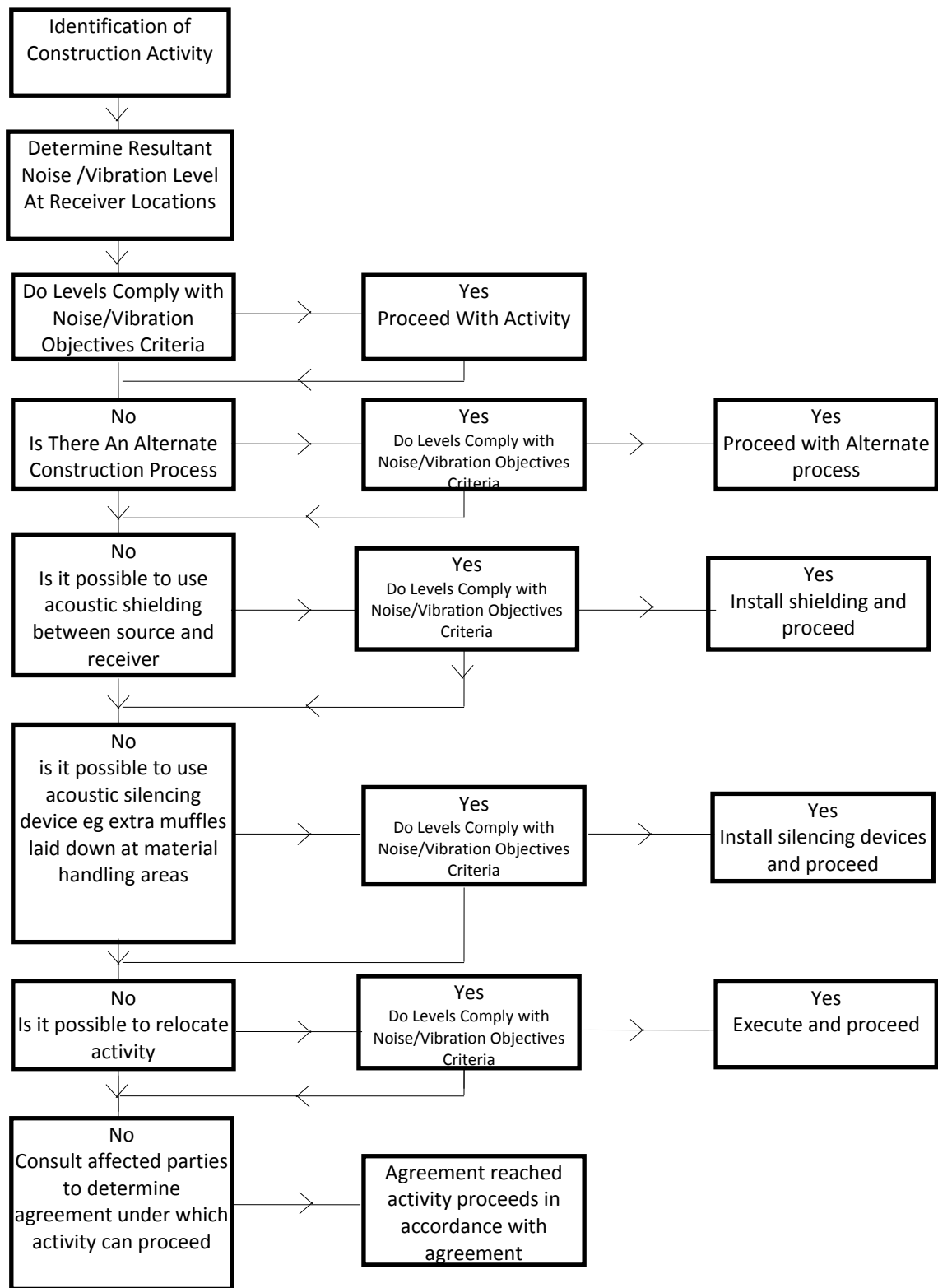
To minimise the impacts from vehicles on all receivers, it is recommended that;

- Truck movements should not commence prior to 7:00am.
  - Trucks, trailers and concrete trucks must turn off their engines when on site to reduce impacts on adjacent land uses and receivers to the South (unless truck ignition needs to remain on during concrete pumping).
- Other activities:
    - Typically, noise from most construction activities will comply with the construction noise objectives at surrounding receiver locations. The receivers to the West will typically have more acoustic impact from Abercrombie Street in any event.
    - In the event of complaint, noise management techniques identified in this report should be employed to minimise the level of noise impact. This may include community consultation and scheduling of loud construction processes.

## 7.5 CONTROL OF CONSTRUCTION NOISE AND VIBRATION

The execution of this work will facilitate the formulation of noise control strategies for this project.

The flow chart presented in Figure 2 illustrates the process that will be followed in assessing construction activities.



**Figure 2 – Process Flowchart**

## **7.6 NOISE AND VIBRATION CONTROL METHODS**

The determination of appropriate noise control measures will be dependant on the particular activities and construction appliances. This section provides an outline of available methods.

### **7.6.1 Selection of alternate appliance or process**

Where a particular activity or construction appliance is found to generate excessive noise levels, it may be possible to select an alternative approach or appliance. For example; the use of a hydraulic hammer on certain areas of the site may potentially generate high levels of noise. By carrying this activity by use of pneumatic hammers, bulldozers ripping and/or milling machines lower levels of noise will result.

### **7.6.2 Acoustic Barriers**

Barriers or screens can be an effective means of reducing noise. Barriers can be located either at the source or receiver.

- The placement of barriers at the source is generally only effective for static plant (tower cranes). Equipment which is on the move or working in rough or undulating terrain cannot be effectively attenuated by placing barriers at the source.
- Barriers can also be placed between the source and the receiver however this will not be beneficial in this instance due to receivers overlooking the site.

The degree of noise reduction provided by barriers is dependant on the amount by which line of sight can be blocked by the barrier. If the receiver is totally shielded from the noise source reductions of up to 15dB(A) can be effected. Where only partial obstruction of line of sight occurs, noise reductions of 5 to 8dB(A) may be achieved. Where no line of sight is obstructed by the barrier, generally no noise reduction will occur.

As barriers are used to provide shielding and do not act as an enclosure, the material they are constructed from should have a noise reduction performance that is approximately 10dB(A) greater than the maximum reduction provided by the barrier. In this case the use of a material such as 10mm or 15mm thick plywood (radiata plywood) would be acceptable for the barriers.

### **7.6.3 Silencing devices**

Where construction process or appliances are noisy, the use of silencing devices may be possible. These may take the form of engine shrouding, or special industrial silencers fitted to exhausts.

### **7.6.4 Material handling**

The installation of rubber matting over material handling areas can reduce the sound of impacts due to material being dropped by up to 20dB(A).

### **7.6.5 Treatment of specific equipment**

In certain cases it may be possible to specially treat a piece of equipment to dramatically reduce the sound levels emitted.

### **7.6.6 Establishment of Site Practices**

This involves the formulation of work practices to reduce noise generation. It is recommended that all available and reasonable treatments and mitigation strategies presented in this report be adopted to minimise noise emissions from construction activities on site.

### **7.6.7 Noise Monitoring**

Noise monitoring can be undertaken to determine the effectiveness of measures which are been implemented. The results of monitoring can be used to devise further control measures.

### **7.6.8 Combination of methods**

In some cases it may be necessary that two or more control measures be implemented to minimise noise.

## **7.7 COMMUNITY INTERACTION AND COMPLAINTS HANDLING**

### **7.7.1 ESTABLISHMENT of direct communication with affected parties**

In order for any construction noise management programme to work effectively, continuous communication is required between all parties, which may be potentially impacted upon, the builder and the regulatory authority. This establishes a dynamic response process which allows for the adjustment of control methods and criteria for the benefit of all parties.

The objective in undertaking a consultation processes is to:

- Inform and educate the groups about the project and the noise controls being implemented;
- Increase understanding of all acoustic issues related to the project and options available;
- Identify group concerns generated by the project, so that they can be addressed; and
- Ensure that concerned individuals or groups are aware of and have access to a Constructions Complaints Register which will be used to address any construction noise related problems should they arise.

## 7.8 DEALING WITH COMPLAINTS

Should ongoing complaints of excessive noise or vibration criteria occur immediate measures shall be undertaken to investigate the complaint, the cause of the exceedances and identify the required changes to work practices. In the case of exceedances of the vibration limits all work potentially producing vibration shall cease until the exceedance is investigated.

The effectiveness of any changes shall be verified before continuing. Documentation and training of site staff shall occur to ensure the practices that produced the exceedances are not repeated.

If a noise complaint is received the complaint should be recorded on a Noise Complaint Form. The complaint form should list:

- The name and address of the complainant (if provided);
- The time and date the complaint was received;
- The nature of the complaint and the time and date the noise was heard;
- The name of the employee who received the complaint;
- Actions taken to investigate the complaint, and a summary of the results of the investigation;
- Required remedial action, if required;
- Validation of the remedial action; and
- Summary of feedback to the complainant.

A permanent register of complaints should be held. All complaints received should be fully investigated and reported to management. The complainant should also be notified of the results and actions arising from the investigation.

The investigation of a complaint shall involve where applicable;

- Noise measurements at the affected receiver;
- An investigation of the activities occurring at the time of the incident;
- Inspection of the activity to determine whether any undue noise is being emitted by equipment; and
- Whether work practices were being carried out either within established guidelines or outside these guidelines.

Where an item of plant is found to be emitting excessive noise, the cause is to be rectified as soon as possible. Where work practices within established guidelines are found to result in excessive noise being generated then the guidelines should be modified so as to reduce noise emissions to acceptable levels. Where guidelines are not being followed, the additional training and counselling of employees should be carried out.

Measurement or other methods shall validate the results of any corrective actions arising from a complaint where applicable.

### **7.8.1 reporting REQUIREMENTS**

The following shall be kept on site:

1. A register of complaints received/communication with the local community shall be maintained and kept on site with information as detailed in section 9.2.
2. Where noise/vibration complaints require noise/vibration monitoring, results from monitoring shall be retained on site at all times.
3. Any noise exceedences occurring including, the actions taken and results of follow up monitoring.
4. A report detailing complaints received and actions taken shall be presented to the construction liaison committee.

### **7.8.2 Contingency Plans**

Where non-compliances or noise complaints are raised the following methodology will be implemented.

1. Determine the offending plant/equipment/process
2. Locate the plant/equipment/process further away from the affected receiver(s) if possible.
3. Implement additional acoustic treatment in the form of localised barriers, silencers etc where practical.
4. Selecting alternative equipment/processes where practical

## 8 CONCLUSION

This report presents the results from the acoustic assessment of noise impacts associated with the proposed residential project at Block 4N within the Frasers Broadway precinct.

Noise intrusion from traffic associated with surrounding roadways will comply with the Sydney City Council, Australian Standards and The State Environmental Planning Policy including SEPP noise criteria on the proviso that the acoustic treatments detailed in this report are adopted.

External noise emission criteria have been setup in Section 5 of this report based on the requirements of the NSW EPA Industrial Noise Policy and the Sydney City Council DCP for the operation of the building and the use of the childcare centre on Level 1 of the project. Detailed plant noise emission shall be designed to comply with this criterion during CC stage.

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

Yours faithfully,

A handwritten signature in black ink that reads "B.G. White." The signature is written in a cursive, slightly slanted style.

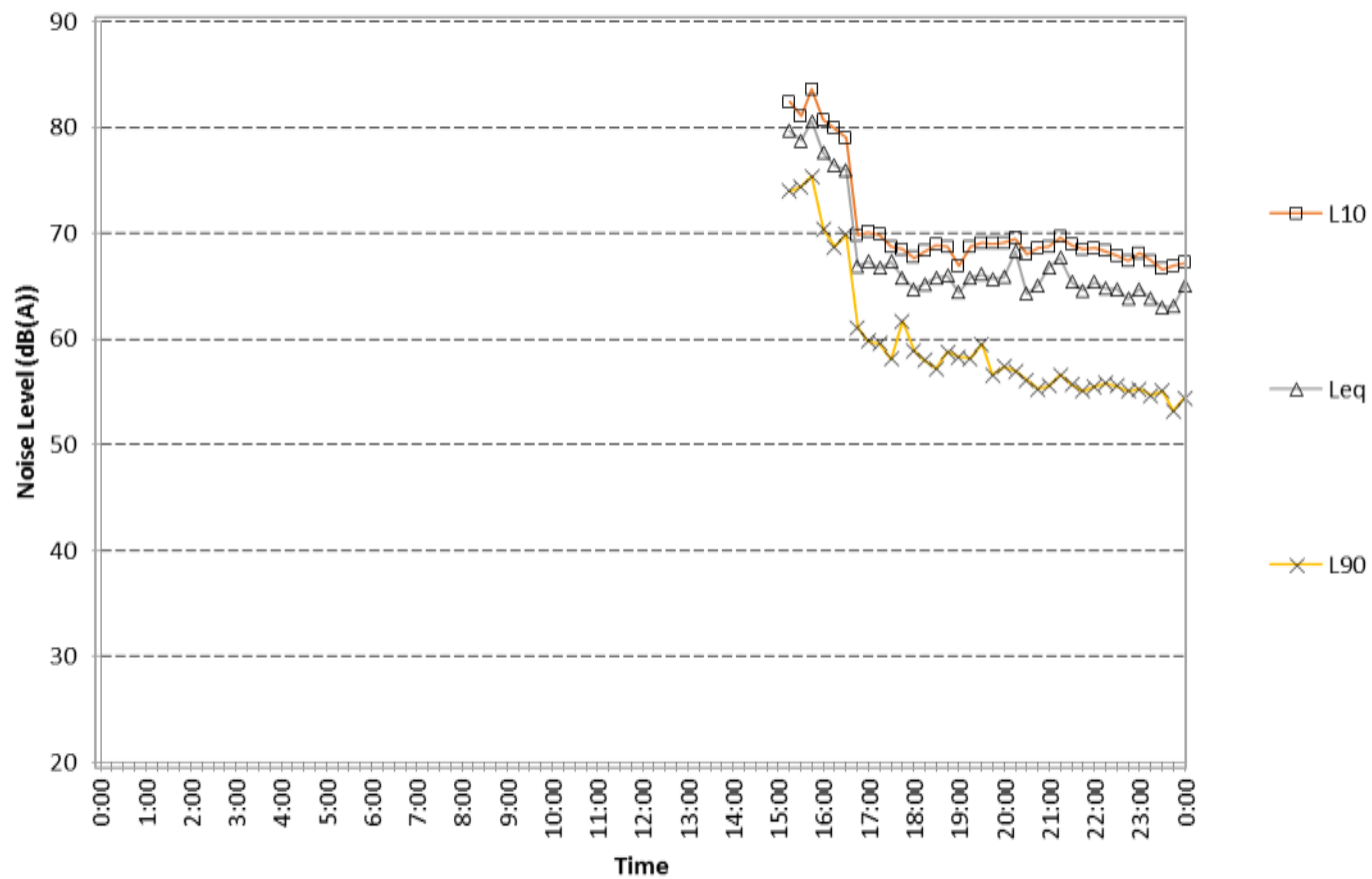
Acoustic Logic Consultancy Pty Ltd  
Ben White

## **APPENDIX 1**

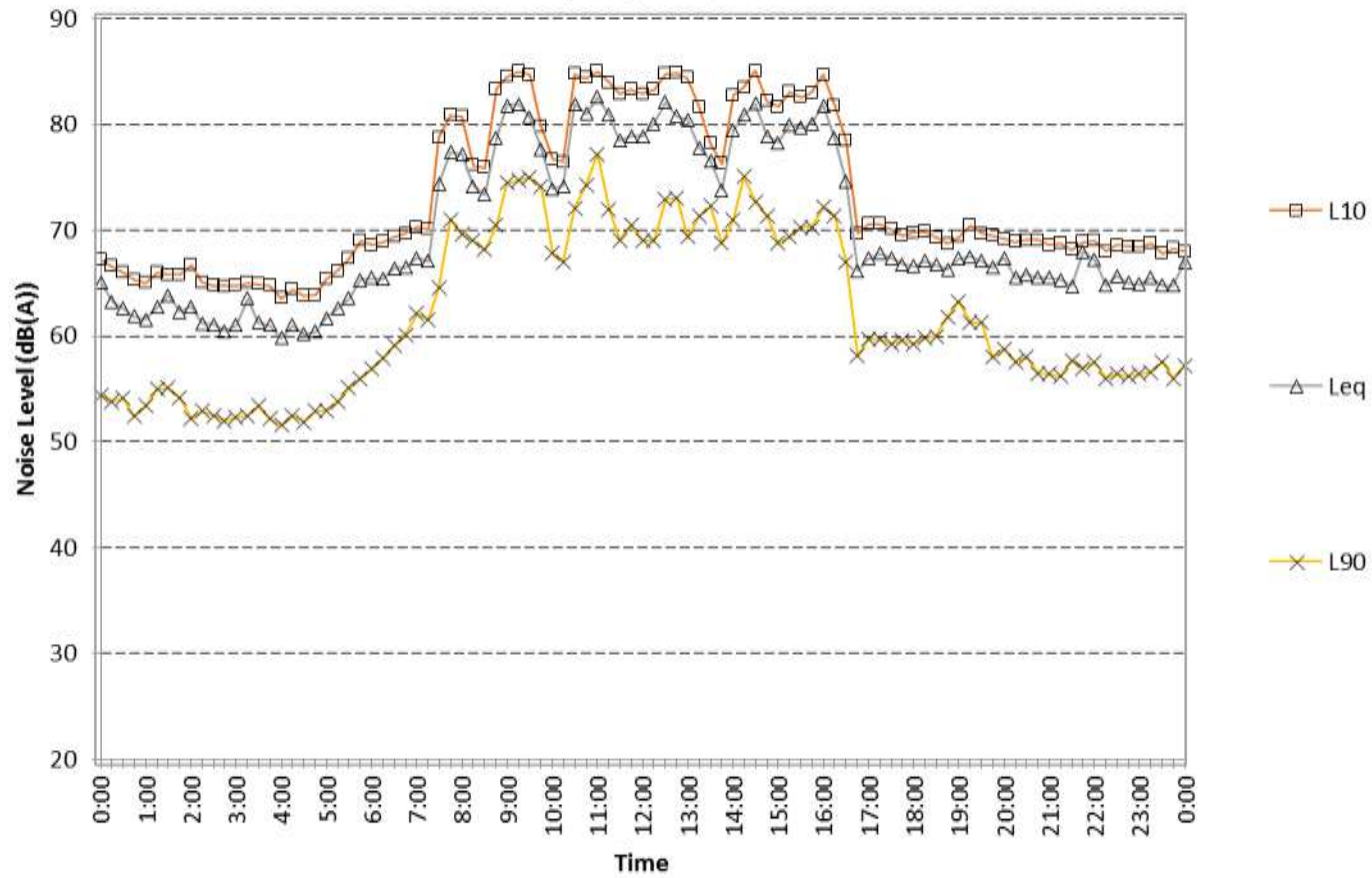
---

# **UNATTENDED NOISE MONITORING DATA**

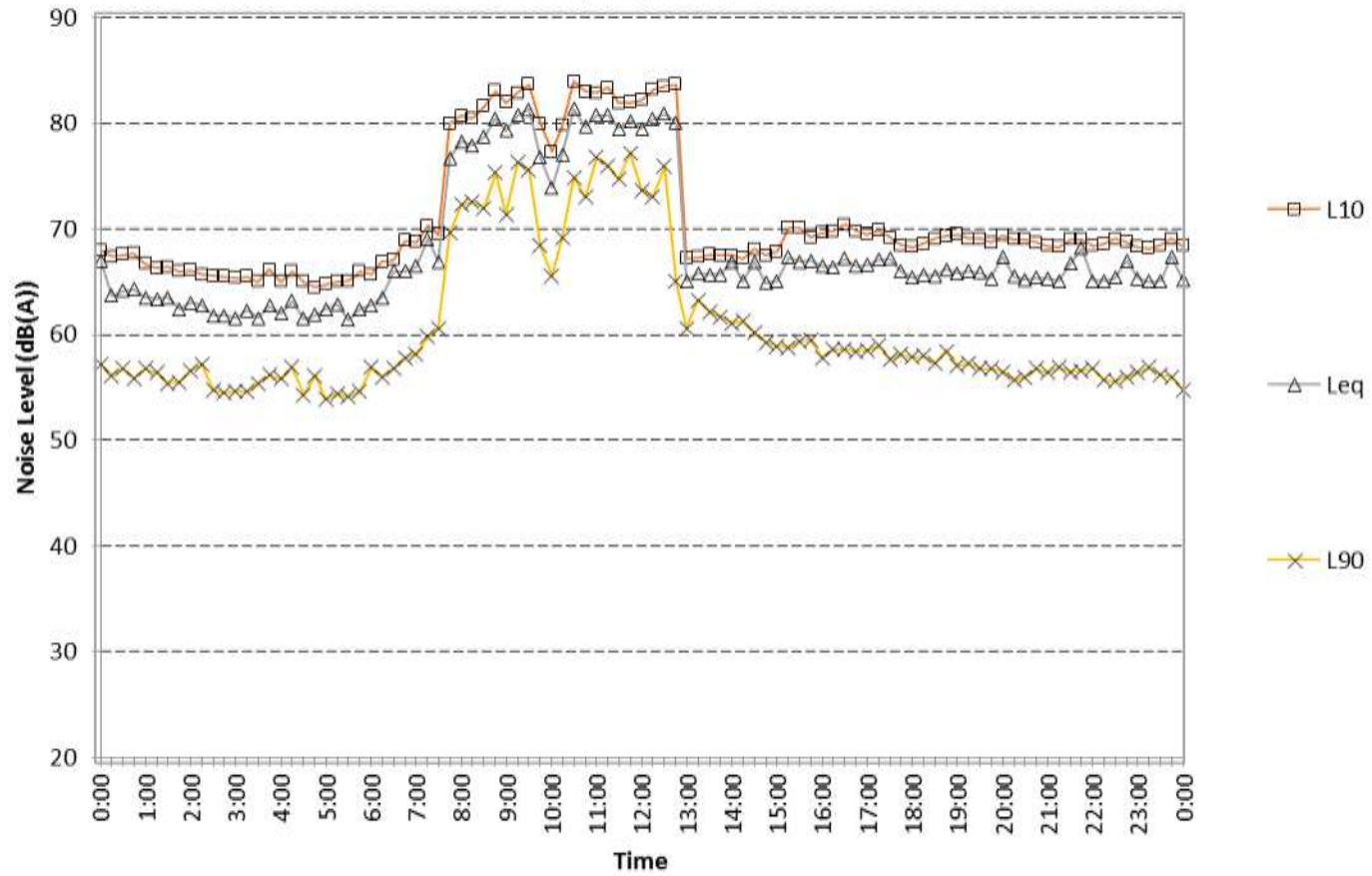
**Block 4N**  
Thursday August 28, 2014



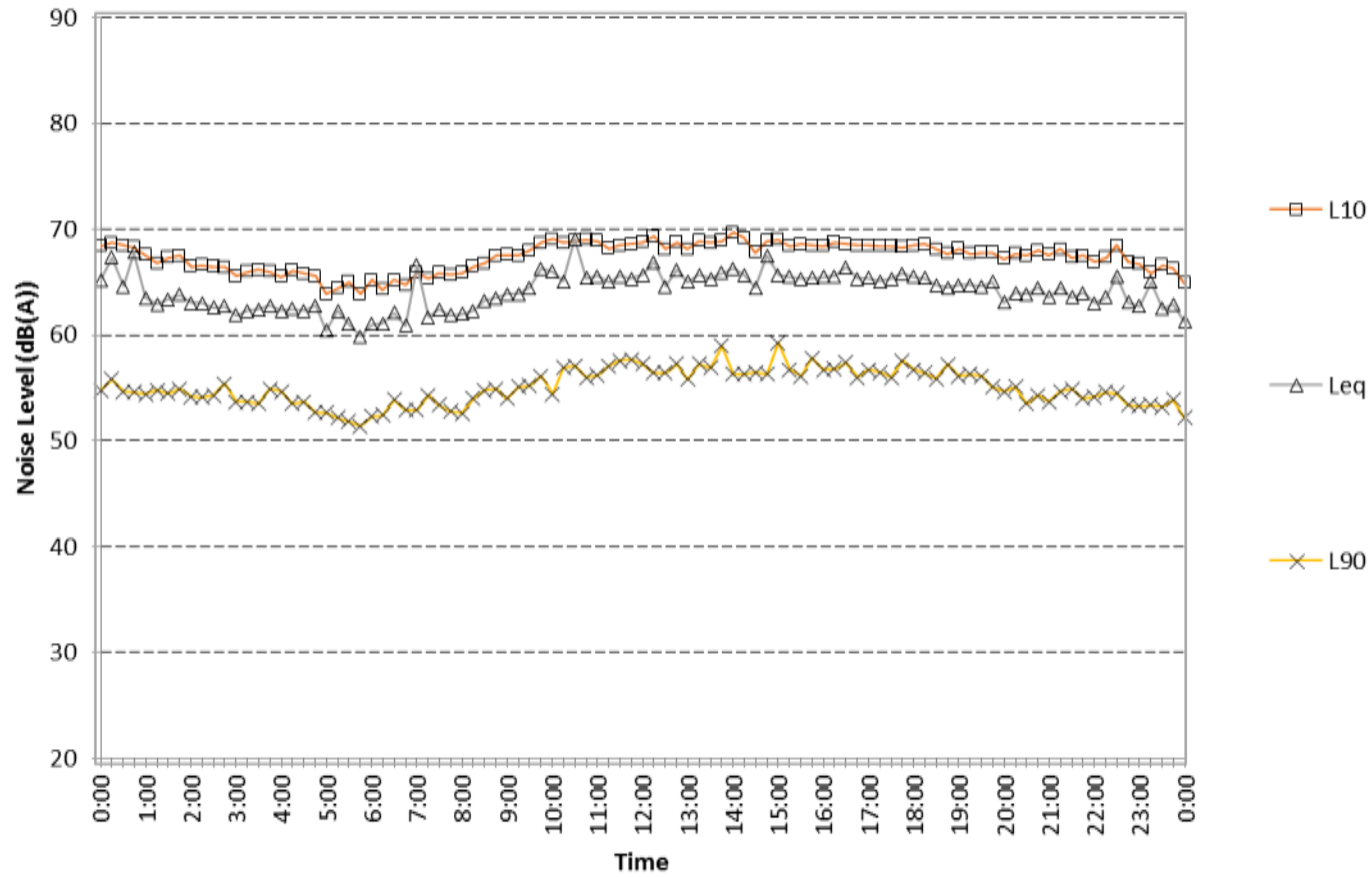
**Block 4N**  
Friday August 29, 2014



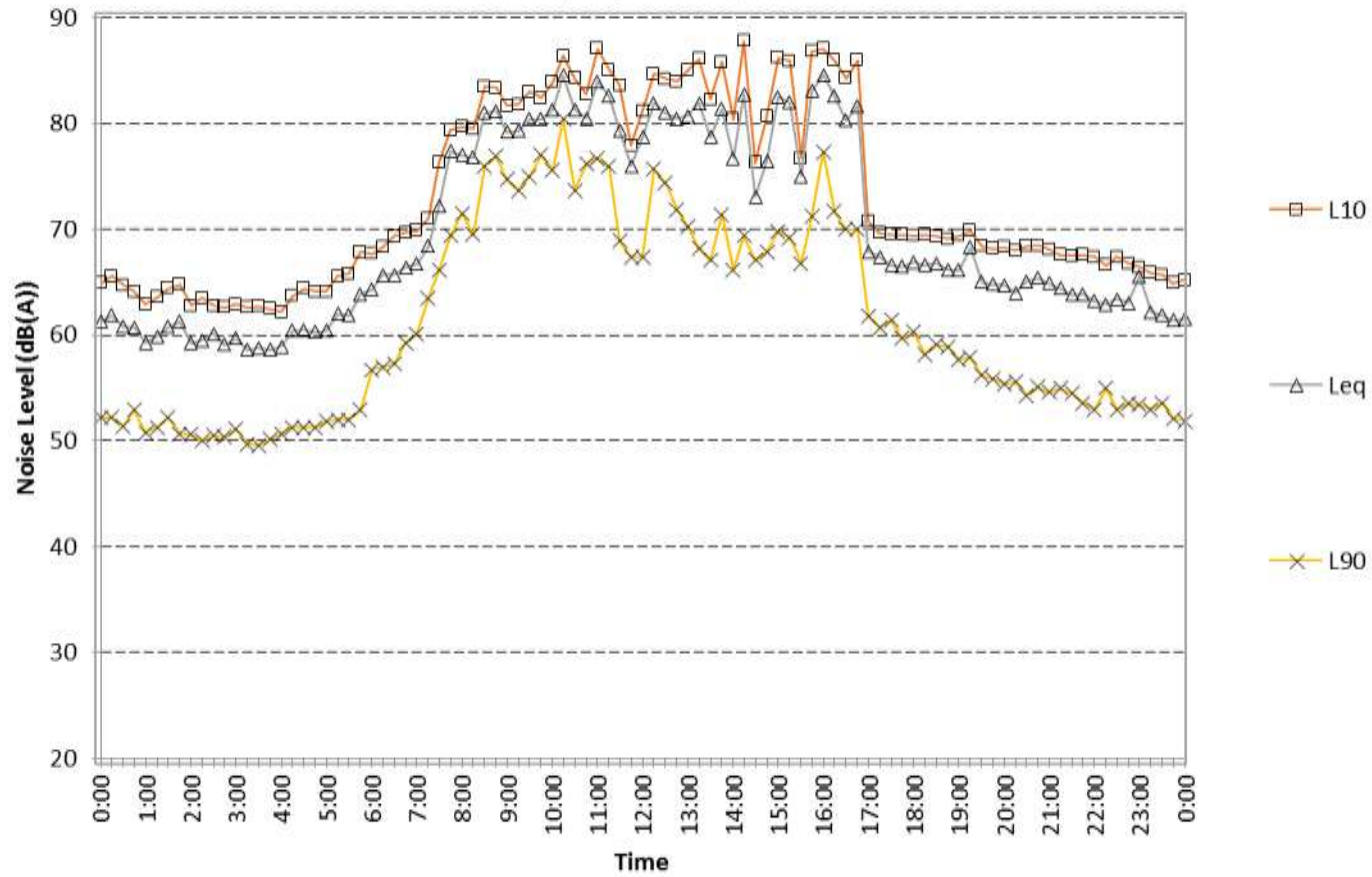
**Block 4N**  
Saturday August 30, 2014



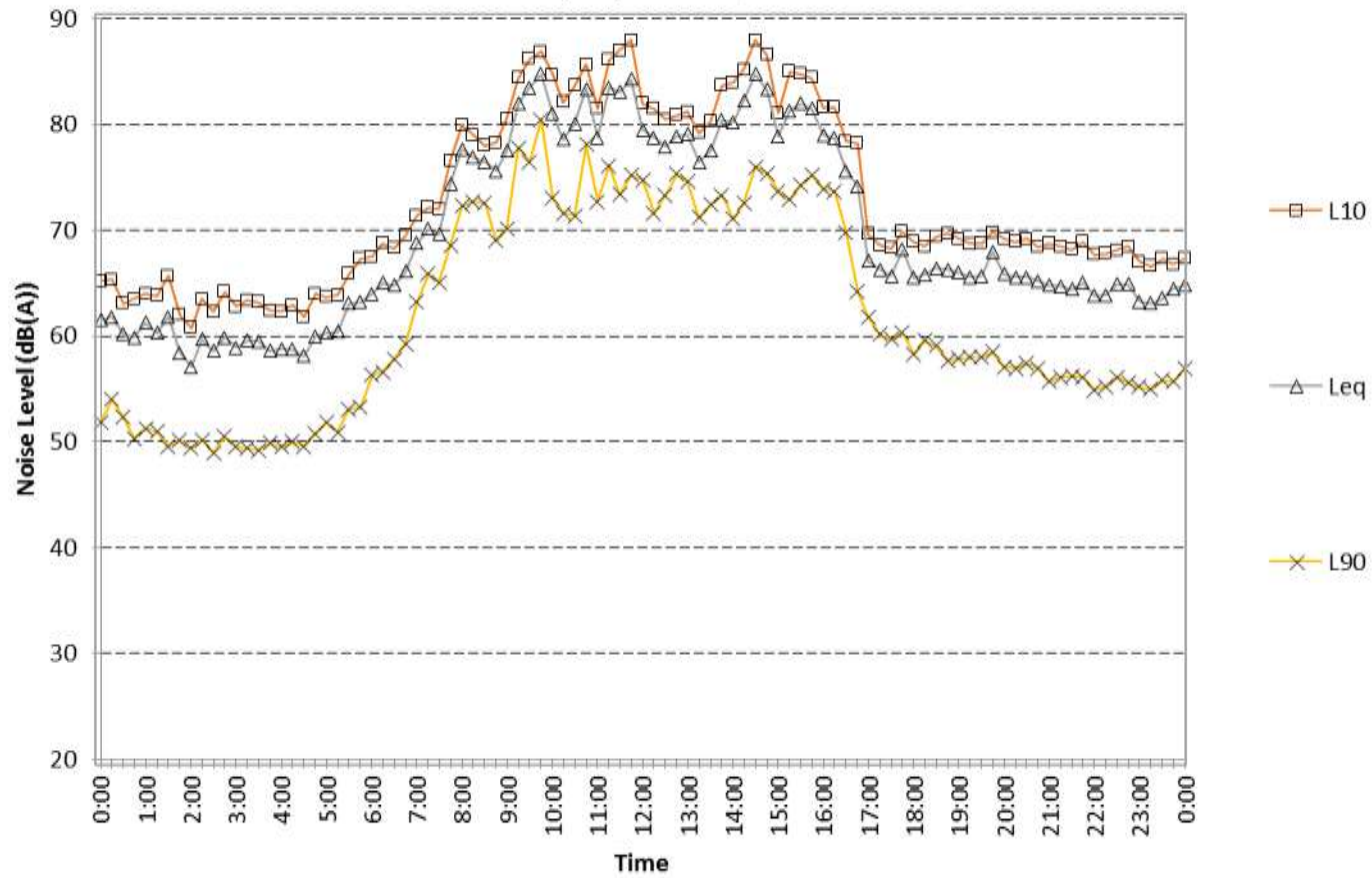
**Block 4N**  
Sunday August 31, 2014



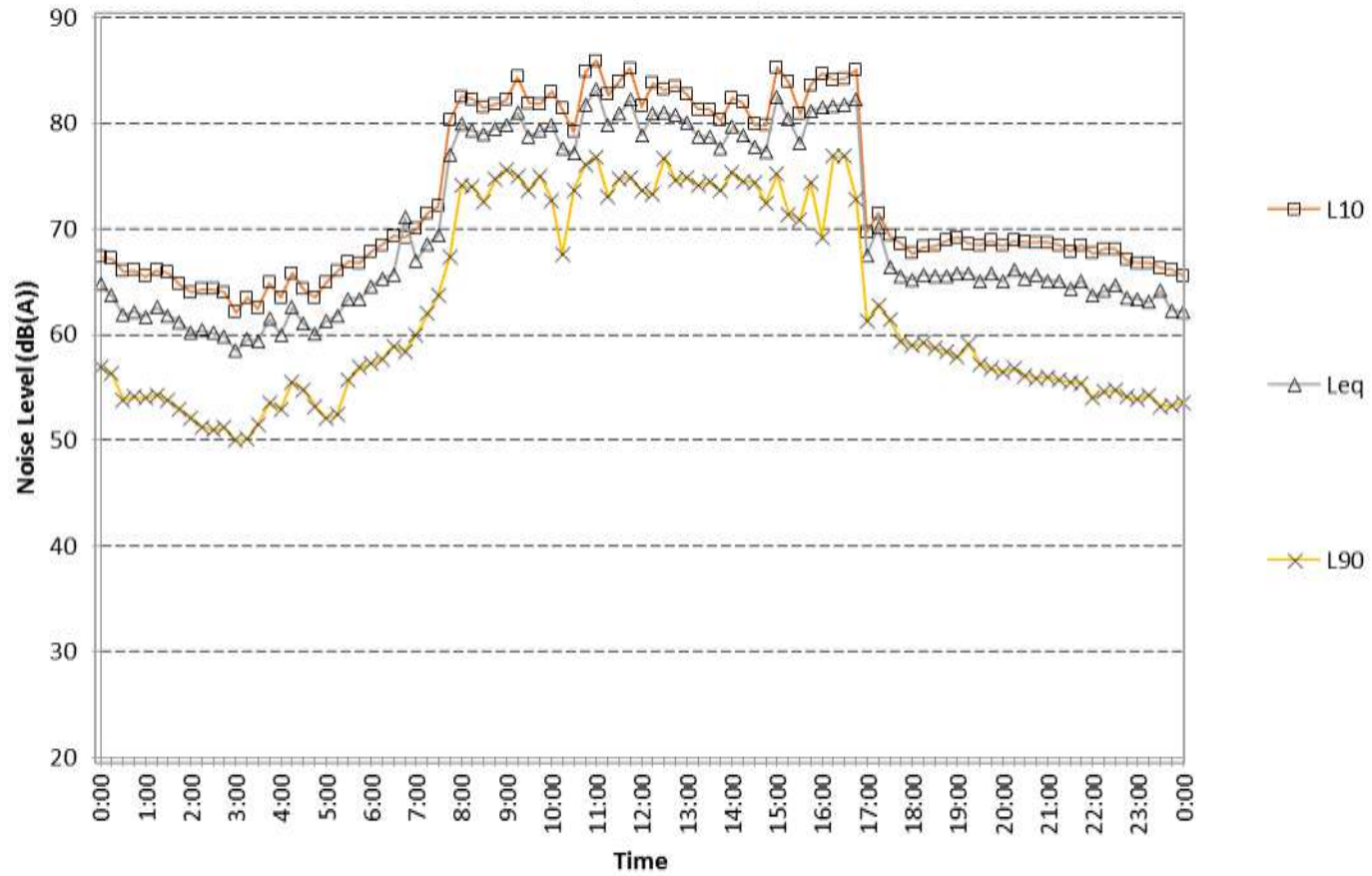
**Block 4N**  
Monday September 1, 2014



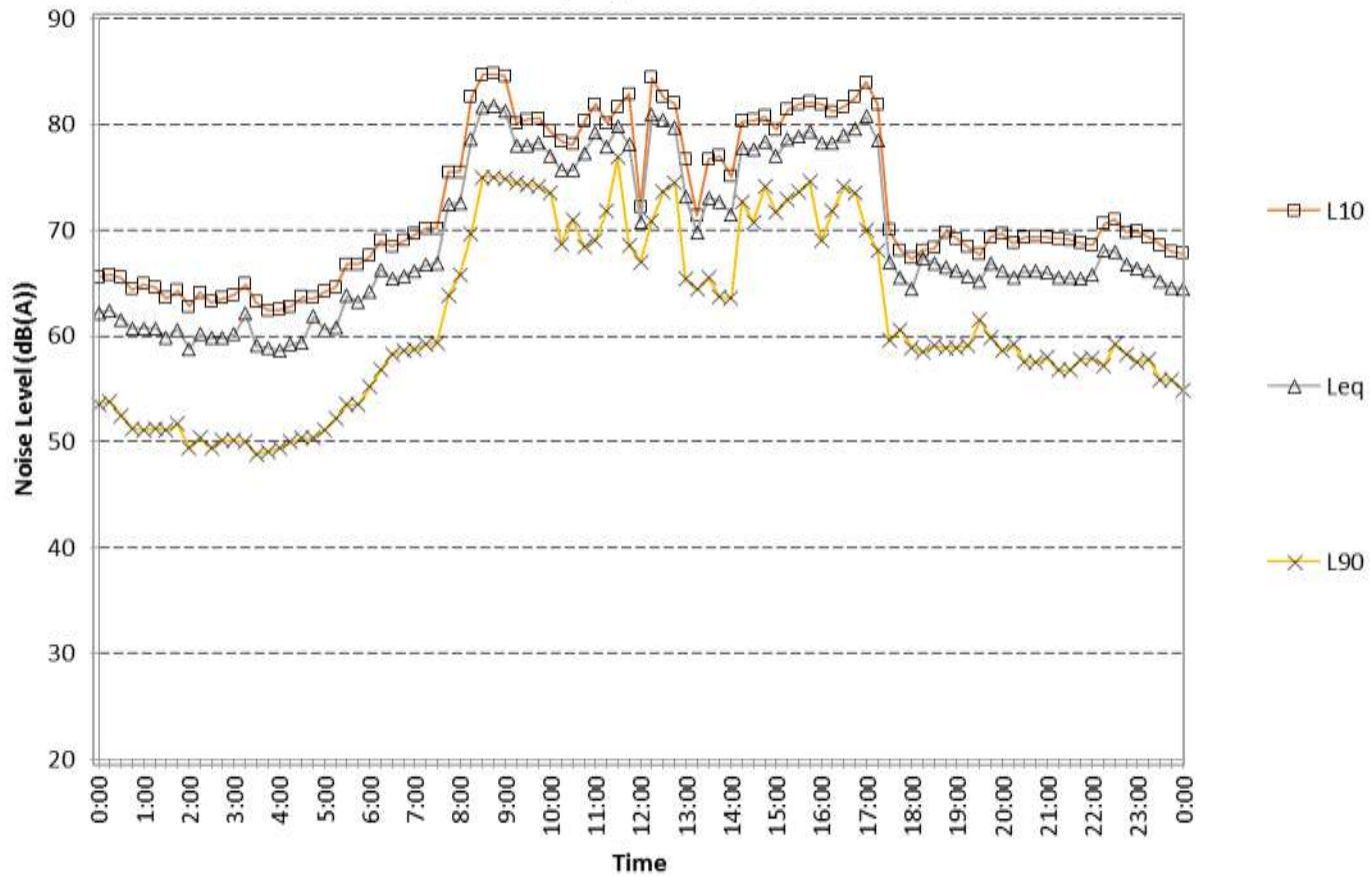
**Block 4N**  
Tuesday September 2, 2014



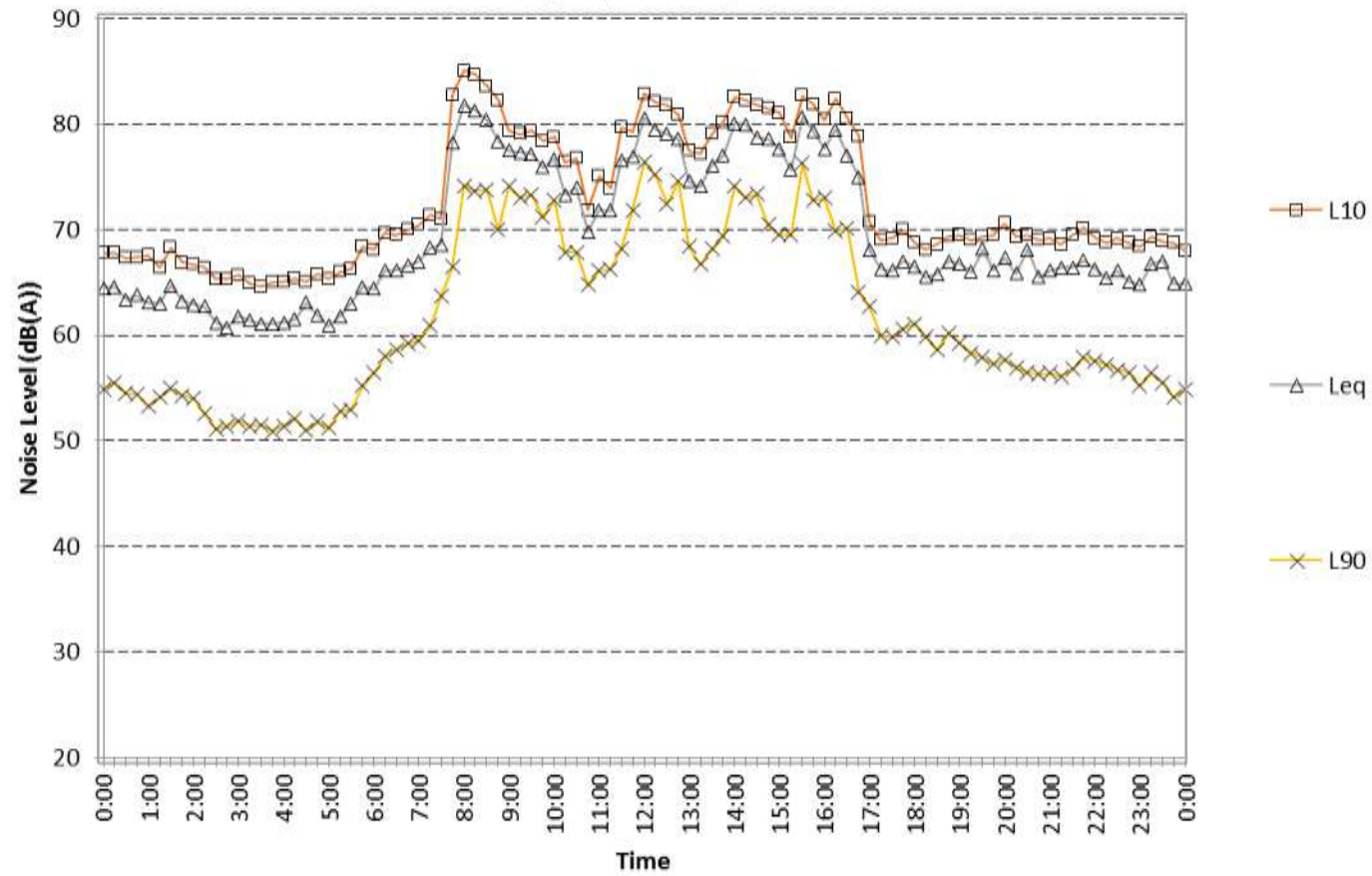
**Block 4N**  
Wednesday September 3, 2014



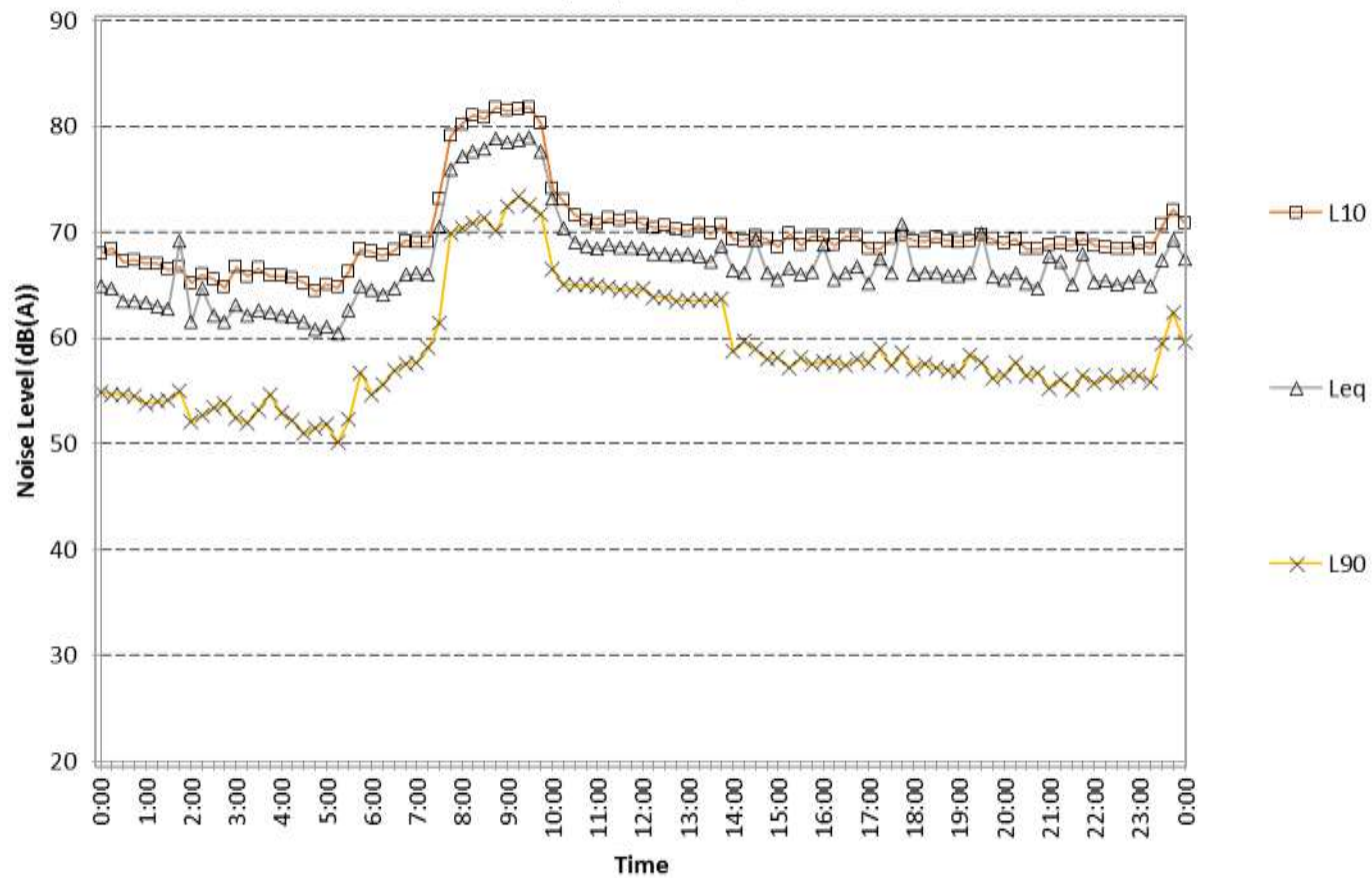
**Block 4N**  
Thursday September 4, 2014



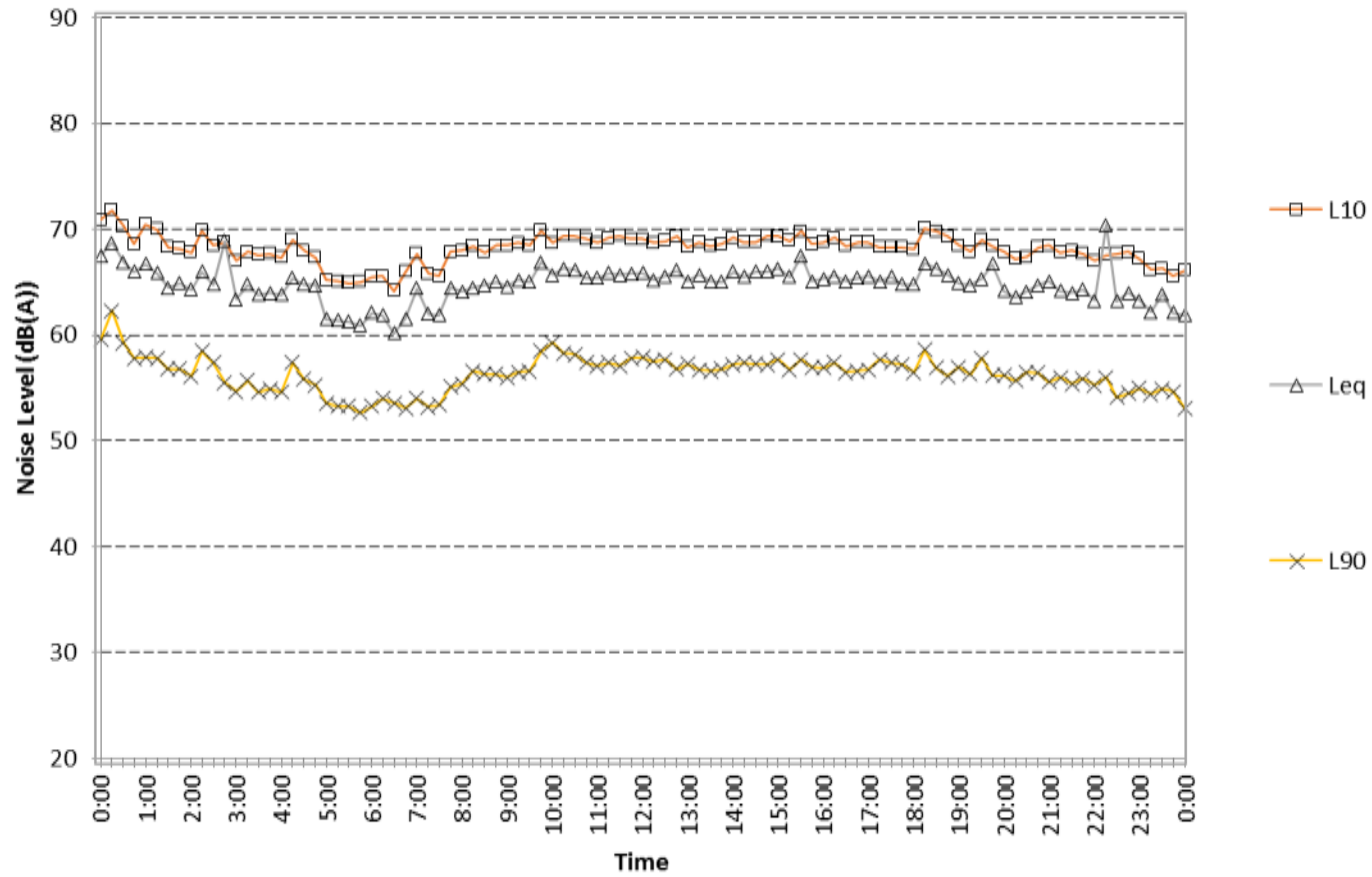
**Block 4N**  
Friday September 5, 2014



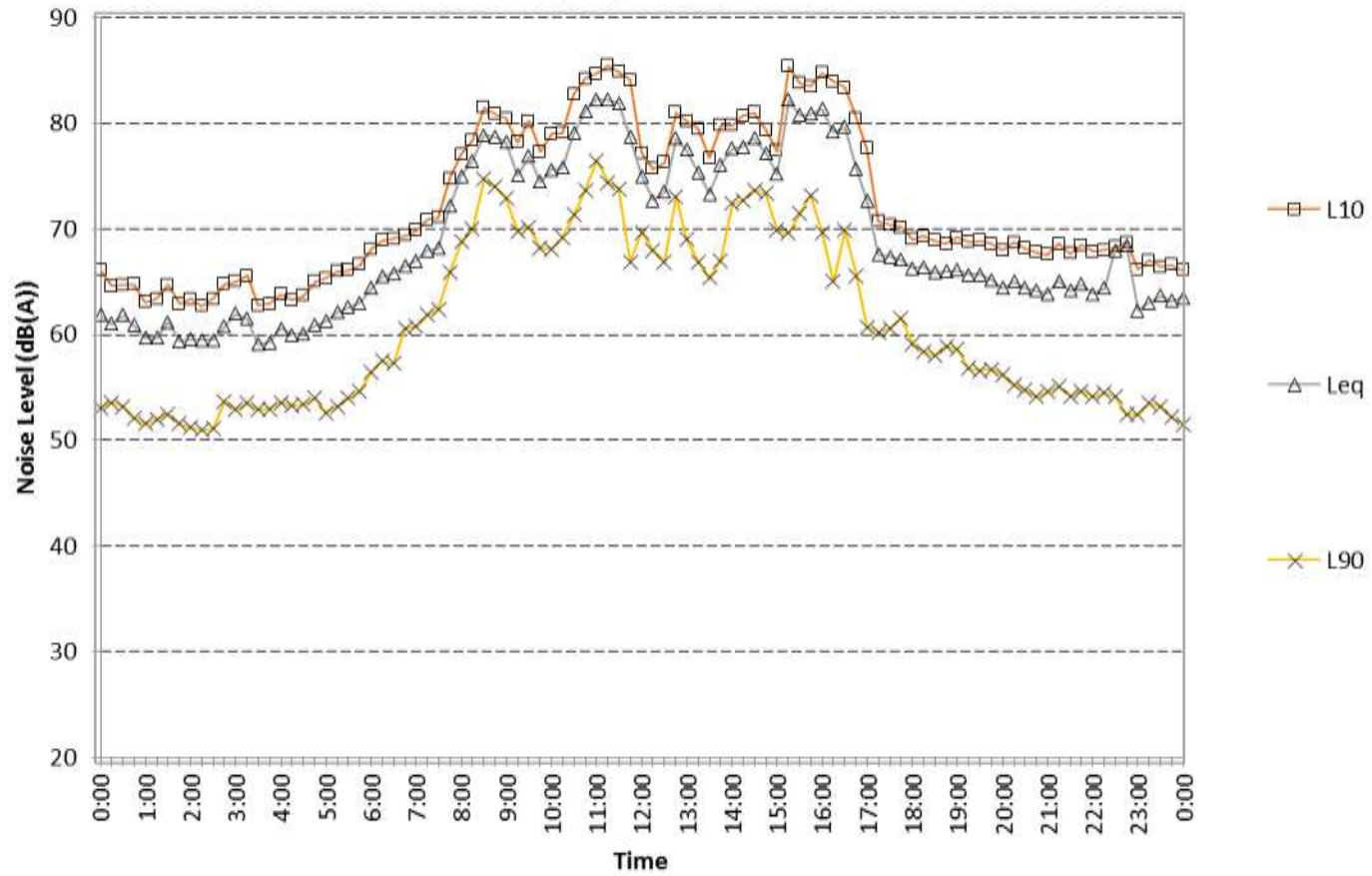
Block 4N  
Saturday September 6, 2014



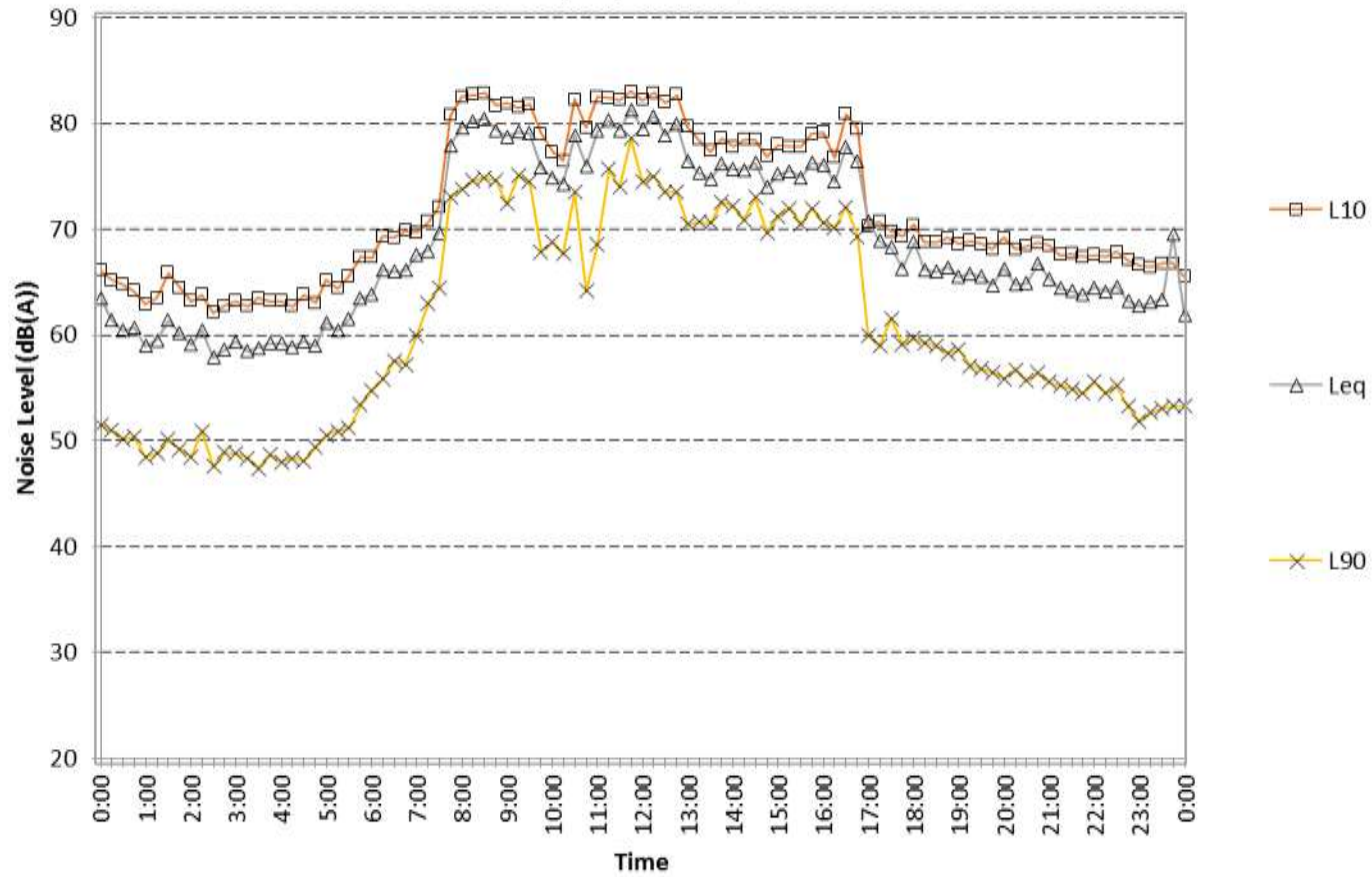
**Block 4N**  
Sunday September 7, 2014



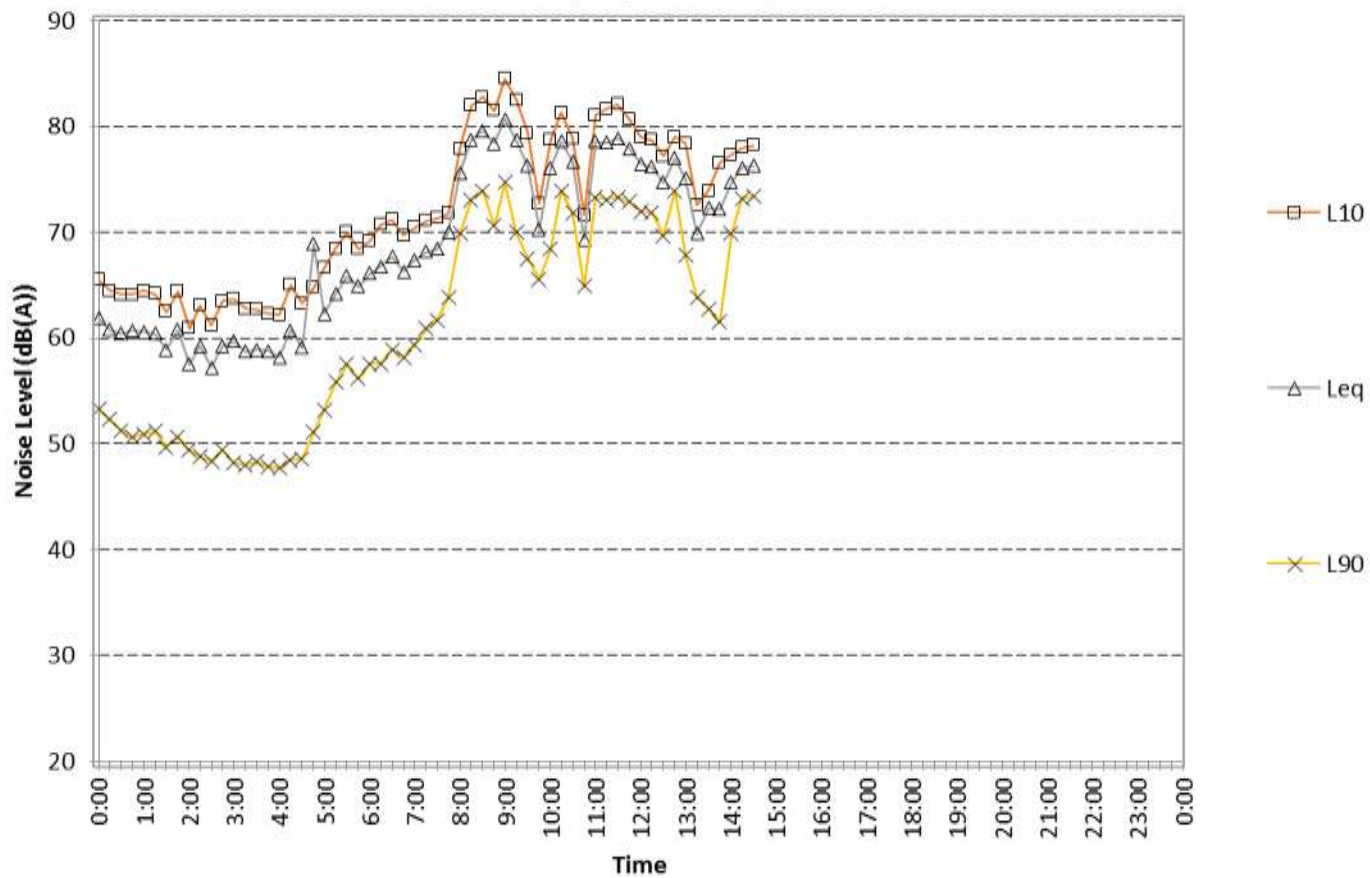
**Block 4N**  
Monday September 8, 2014



**Block 4N**  
Tuesday September 9, 2014



**Block 4N**  
Wednesday September 10, 2014



## Appendix 2 – Proposed Childcare Location

