MARSHALL DAY Acoustics

SICTL NOISE COMPLIANCE ASSESSMENT

JULY 2020 SURVEY

Rp 005 20180441

Project: **SICTL NOISE COMPLIANCE ASSESSMENT**

Prepared for: **Hutchinson Ports Australia**
Level 2, Operations Building SICTL Terminal, Gates B150-153 Sirius Rd
off Foreshore Rd
Botany NSW 2019

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1.0 INTRODUCTION

Sydney International Container Terminals Pty Ltd (SICTL) located on Sirius Road, Botany was given development consent in October 2005 by the NSW Department of Planning and Environment to construct and operate the Hayes Dock site. The current facility commenced operations in November 2013 under a development consent as well as under Environment Protection Licence number 20322. The Environment Protection Licence (EPL) requires that noise monitoring and a compliance assessment is to be undertaken every 6 months. Marshall Day Acoustics Pty Ltd (MDA) has been engaged to conduct noise monitoring and verify compliance (or otherwise) with the noise limits specified in the EPL.

This report provides the results of our noise monitoring undertaken in July 2020. Also detailed is the methodology and results of the noise modelling undertaken to verify compliance with the EPL noise limits (these noise limits are identical to those specified in the development consent document).

Acoustic terminology used in this report is provided in Appendix A. Supporting evidence concerning the port operations and detailed monitoring results are provided in Appendices B-F.

2.0 NOISE LIMITS

The noise limits applicable to the site as required by the NSW EPA Environment Protection Licence (Licence #20322) are detailed in Section L3 of the licence and reproduced below.

L3.1 Noise from the premises must not exceed the sound pressure level (noise) limits presented in the Table below. Note the limits represent the sound pressure level (noise) contribution, at the nominated receiver locations in the table.

Most affected residential location	*Day*	*Evening*	*Night*	
	$L_{Aeq\,(15\,minute)}$	$L_{Aeq\,(15\,minute)}$	$L_{Aeq\,(15\,minute)}$	$L_{Aeq,\,9hrs}$
Chelmsford Avenues	*40*	*40*	*40*	*38*
Dent Street	*45*	*45*	*45*	*43*
Jennings Street	*36*	*36*	*36*	*35*
Botany Road (north of Golf Club)	*47*	*47*	*47*	*45*
Australia Avenue	*35*	*35*	*35*	*35*
Military Road	*42*	*42*	*42*	*40*

L3.2 Noise from the premises must not exceed the noise limits presented in the Table below. Note the limits represent the noise contribution at the nominated receiver locations in the table.

Most affected residential location	*Night*
	$L_{A1,(1\,minute)}$
Chelmsford Avenues	*53*
Dent Street	*59*
Jennings Street	*55*
Botany Road (north of Golf Club)	*59*
Australia Avenue	*57*
Military Road	*60*

L3.3 For the purpose of Condition L3.1 and Condition L3.2:

- *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 Sundays and Public Holidays*

L3.4 For the purpose of Conditions L3.1 and L3.2, noise from the premises is to be measured or computed at the most affected point within the residential boundary, or at the most affected point within 30 metres of the dwelling where the dwelling is more than 30 metres from the boundary, to determine compliance with the noise level limits in Conditions L3.1 and L3.2 unless otherwise stated.

L3.5 Noise from the premises is to be measured at 1m from the dwelling facade to determine compliance with the $L_{A1\ (1minute)}$ noise limits at Condition L3.2

L3.6 Where it can be demonstrated that direct measurement of noise from the premises is impractical, the EPA may accept alternative means of determining compliance (see Chapter 11 of the NSW Industrial Noise Policy (INP)).

L3.7 The modification factors presented in Section 4 of the NSW Industrial Noise Policy shall also be applied to the measured noise level from the premises where applicable.

L3.8 The noise limits specified at Conditions L3.1 and L3.2 apply under the following meteorological conditions:

(a) wind speeds up to 3 m/s at 10 metres above ground level; and

(b) temperature inversion conditions of up to 1.5 C/100m

3.0 ADHERANCE TO PRESCRIBED METHODOLOGY

- In accordance with Conditions L3.1 and L3.2 (and Condition C2.7 of the development consent), both unattended and attended measurements were conducted at the most affected point within the residential boundaries of the nominated residential receivers. The receiver locations for this assessment have been nominated by Hutchinson Ports.
- With reference to Condition L3.5 (and Condition C2.8), L_{A1} noise levels were measured at the boundaries of the residences, not at 1m from the facade, as it was not possible to access the facade of the dwellings at all times of the day.
- Direct measurement of noise from the operation of the premises at the receiver locations is impractical due to the complex noise environment in the vicinity of the site and receivers. Therefore, in accordance with Condition L3.6 (and Condition C2.9), the unattended and attended noise monitoring was supplemented with an alternative means of determining compliance via the use of a 3-D noise model. This is in accordance with *Chapter 11* of the NSW *Industrial Noise Policy* which allows for measurements to be taken close to the source and then calculated out to the specified receiver locations. Determination of compliance via the use of a 3-D noise model was approved by the NSW EPA on 11 July 2014 (Appendix E) and the NSW EPA requirements were provided to MDA prior to the commencement of the project.
- The assessment receiver locations considered in the noise model are in accordance with the requirements specified in Conditions L3.4 and L3.5 (and Conditions C2.7 and C2.8).
- In accordance with Condition L3.7 (and Condition C2.10), the modification factors from Chapter 4 of the NSW *Industrial Noise Policy* are also applied to the measured or calculated noise level from the operation of the premises (where applicable).
- Noise limits used to verify compliance (or otherwise) have been applied under the following meteorological conditions specified in Condition L3.8 (and Condition 2.11) of the EPA Licence:

  (a) wind speeds up to 3m/s at 10m above the ground level; or

  (b) temperature inversion conditions of up to 1.5C/100m.

4.0 COMPLIANCE VERIFICATION METHODOLOGY

The noise environment around the site is complex, comprising influences from a range of variable factors. Key complicating variables in this respect are:

- The presence of other existing noise generating industries in the area including the Patrick container terminal and DP World container terminal which also influence the noise environment in the vicinity of the SICTL.
- Frequent traffic movements on Foreshore Road and Botany Road which influence both the underlying background and total ambient noise environment in the surrounding area.
- Frequent air traffic movements due to the proximity of the site to the Sydney Airport.

The noise environment in the vicinity of the residential receivers is also complex, and comprises influence from a range of noise sources which include the industrial noise sources associated with the port, industrial noise sources associated with other industries in the area and road and air traffic noise.

Given the complexity of environmental noise conditions and the large distances between operational noise sources on the SICTL site and the receiver locations, isolating the contribution of different noise sources is problematic in practice. In recognition of these factors, the following methodology was used to verify compliance with the noise limits detailed in Section 2.0:

- Attended measurements of plant noise were conducted at specific points in the vicinity of the plant. Measurements were undertaken under typical operating conditions. The sound pressure levels measured in the vicinity of each plant item were then used to estimate the sound power level of each plant item.
- A 3-D noise model of site and its receivers was developed and the estimated sound power levels were input into the noise model to calculate the noise contribution from the site at the nearest receivers. Where possible long-term measurements of noise from the premises were used to calibrate the noise model.
- The calculated noise levels were compared to the measured noise levels and to the noise limits detailed in Section 2.0.

5.0 COMPLIANCE SURVEY

5.1 Unattended noise monitoring

It should be noted that the original EPA planning consent nominated six off-site residential locations. The EPA subsequently accepted a proposal from SLR Consulting Australia Pty Ltd to reduce the number of residential receivers to two only as part of an accepted methodology of assessment through computer modelling. As such only two residential locations have been used for assessment.

The receiver locations used for assessment in this report as instructed by Hutchison Ports are as follows:

- 74 Australia Ave, Matraville
- 34 Dent Street, Botany

In order to measure noise levels at the selected receivers, noise loggers were installed from 13 July 2020 to 29 July 2020.

In the INP, the background noise level is termed the Rating Background Level (RBL). The methodologies used to determine the long-term RBL and L_{Aeq} noise levels are from Tables 3.1 and 3.2 of the INP. The RBL and L_{Aeq} noise levels for Day, Evening and Night-time periods at each monitoring location are summarised below. The survey details and noise level results for the entire survey period are summarised in Appendix B.

In determining the noise levels at the monitoring locations, any data affected by rainfall and high wind speed has been excluded in accordance with the provisions of Appendix B of the EPA Industrial Noise Policy.

Table 1: Summary of unattended measurements

Period	L_{Aeq} dB	RBL L_{A90} dB	Comments
74 Australia Avenue, Matraville			
Day	56	41	Analysis of the measured data has determined that noise impacts from the SICTL site at this location cannot be isolated due to the presence of other noise sources including traffic and aircraft.
Evening	48	42	
Night	49	42	
34 Dent Street, Botany			
Day	58	49	Analysis of the measured data has determined that noise impacts from the SICTL site at this location cannot be isolated due to the presence of other noise sources including traffic and aircraft.
Evening	54	51	
Night	55	45	

5.2 Attended measurements at residential receivers

In order to quantify the nature of the noise environment at the residential receivers a series of measurements were conducted during the Day, Evening and Night periods in the vicinity of the two residential receivers. Evening and Night period measurements were carried out on 23 July 2020 and Day measurements were carried out on 24 July 2020.

Results of the attended noise level measurements conducted at each receiver location are summarised in Table 2 below along with the subjective impression of the engineer who conducted these measurements.

Table 2: Attended 15-minute measurements at receiver locations

Period	dB L_{Aeq}	dB L_{A90}	Subjective impression
74 Australia Ave, Matraville			
Day 1325-1340hrs 24 July 2020	56	44	Ambient noise was controlled by clear road traffic noise from Bunnerong Rd and Botany Rd including trucks accelerating and braking at traffic lights. The ambient noise included noise from occasional helicopter and aircraft fly-bys and birds throughout measurement. Background noise included noise from nearby industry (potentially Orora Group) was also noticed. Construction activity occurring throughout measurement No audible industrial noise from port.
Evening 2139-2154hrs 23 July 2020	53	41	The noise environment included intermittent local traffic along Australia Avenue as well as, insects and birds. Distant road traffic noise from Bunnerong Rd and Botany Rd controlled background level. Ambient and background noise was also controlled by general industrial activity from Orora Group. No audible industrial noise from port.
Night 2201-2216hrs 23 July 2020	52	42	Noise from intermittent local traffic including, insects throughout measurement. Distant road traffic noise from Bunnerong Rd and Botany Rd, including trucks accelerating and braking at traffic lights, controlled background level. Ambient and background noise was also controlled by general industrial activity from Orora Group. No audible industrial noise from port.
34 Dent Street, Botany			
Day 1301-1316hrs 24 July 2020	51	48	The noise environment was dominated by traffic noise from Foreshore Road and Botany Road including trucks accelerating and braking at traffic lights. The ambient noise included noise from birds in park. Aircraft activity including helicopter overhead flying in circle clearly audible. No audible industrial noise from port.
Evening 2058-2113hrs 23 July 2020	52	48	The noise environment was dominated by aircraft over head and traffic noise from Foreshore Road and Botany Road including trucks accelerating and braking at traffic lights Insects noise was audible during measurement. No audible industrial noise from port.

Period	dB L_{Aeq}	dB L_{A90}	Subjective impression
Night 2224-2239hrs 23 July 2020	54	50	The noise environment was dominated by traffic noise from Foreshore Road and Botany Road including trucks accelerating and decelerating at traffic lights and constant road traffic noise. Minimal amount of local traffic along Dent Street. Occasional distance aircraft activity overhead audible No audible industrial noise from port.

5.3 Discussion of results

A review of the unattended monitoring data indicates that the ambient noise levels are significantly above the EPL and Development Consent noise limits at each of the receiver locations. The contribution from the SICTL site at these locations cannot accurately be determined directly due to the influence of other noise sources in the vicinity of the receivers. Furthermore, the results of the attended monitoring conducted at the two receiver locations as well as the subjective impressions of the engineer conducting the measurements indicate that noise from the SICTL site could not be perceived at these locations. We note that even if port related noise was audible that due to the presence of two other container terminals in the vicinity of the receivers, any audible port related noise at these locations could have been generated at any one of the container terminals.

As compliance cannot be directly verified based on the unattended and attended monitoring results, noise modelling in accordance with the requirements of the EPA was carried out to determine the noise contribution from the SICTL site the nearest receivers. This noise modelling is discussed in the following sections of this report.

6.0 ATTENDED ON-SITE NOISE SURVEY

A series of attended measurements were conducted at the SICTL site on 13 July, 22 July, 23 July and 24 July 2020, while the site was operating under typical conditions.

This measurement data was then used to calculate the estimated noise level contribution from each individual plant item/process at the nearest receiver.

6.1 Estimation of operational noise levels

Using the sound pressure level measured in the vicinity of each plant item and the reference distance, at which the measurement was undertaken, the approximate sound power level of each plant item has been calculated and used to model noise emissions from the site. A table of derived sound power levels is provided in Appendix C.

6.2 Noise prediction model configuration

An environmental noise model for the site has been developed by MDA using SoundPLAN 7.4, a commercially available computer modelling package. For this project, our noise model for predication of sound levels has used ISO 9613-2 Acoustics - *Attenuation of sound during propagation outdoors* as the propagation algorithm methodology.

Calculations are based on commonly adopted geometric divergence of noise sources in addition to a range of factors affecting the attenuation of sound, including:

- The magnitude of the noise source in terms of sound power
- The distance between the source and receiver

- The presence of obstacles such as screens or barriers in the propagation path including any buildings on site, and terrain data
- The presence of reflecting surfaces such as building facades
- The ground absorption, defined by hardness of the ground between the source and receiver
- Attenuation due to atmospheric absorption.
- Meteorological effects such as wind gradient, temperature gradient, humidity. These generally have significant impact at distances greater than approximately 400m. The ISO-9613 method deals with the meteorological conditions favourable to propagation of sound. Over large distances (>400m), meteorological conditions can have a significant influence on noise level propagation. The environmental noise model has assumed worst case meteorological conditions for non-arid areas i.e. moderate (F-class stability category) temperature inversion or downwind conditions with wind speeds less than 3m/s. It is assumed that drainage airflow does not occur at this site, as the source level is not elevated relative to the residential receiver level.

6.3 Noise model calibration

For the purpose of calibrating the noise model results, two noise loggers were placed on site concurrent with the off-site monitoring. The locations of the calibration loggers are shown in Figure 1 below. The on-site calibration loggers were 01dB Duo smart monitors which have the capability to record audio. Noise levels were measured during the entire survey period in one second intervals and the loggers were also used to make audio recordings at both locations. The measurements obtained were used to determine the noise levels experienced at each calibration position for comparison to the noise level predicted via the use of calculations.

Figure 1: Location of calibration loggers (Image courtesy NearMaps)

6.4 Calibration results

The noise levels measured at both calibration locations were heavily impacted by extraneous noise sources, predominantly aircraft due to the proximity of the site to the Sydney Airport, but also operations from adjacent sites. Direct examination of the calibration logger results therefore does not immediately identify the noise generated by the site. The audio recordings taken at this location were analysed, with a representative sample chosen and all 1 second measurements affected by aircraft noise and some road traffic noise eliminated as far as practicable in order to determine the L_{Aeq} noise level contribution from the site operations only.

The noise levels derived at the calibration points (with extraneous data eliminated) are compared to the predicted noise levels in Table 3 below. The period chosen for analysis, 0245-0315hrs on 20 July 2020, contained a vessel being unloaded at the wharf and trucks conducting deliveries/pickups in the ASC area to ensure that noise sources close to each of the calibration points were included in analysis.

Table 3: Noise model calibration results

Location	Time period	Derived levels from measurements	Predicted noise level[1]
Calibration Point 1	0245-0315hrs	57dB $L_{Aeq\ (15min)}$	57-58dB $L_{Aeq\ (15min)}$
Calibration Point 2	0245-0315hrs	67dB $L_{Aeq\ (15min)}$	68-69dB $L_{Aeq\ (15min)}$

Note 1: Range from typical to worst case predicted noise level.

For both Calibration Point 1 and Calibration Point 2, the derived noise levels appear to be in close correlation with the predicted noise levels with the derived levels matching the predicted noise levels in the order of +/- 1dB. Given the accurate correlation of derived and predicted noise levels we consider our predictions to be representative of the site operations.

6.5 Noise modelling results

Noise emissions from the site have been estimated via calculation at the nearest receivers and are presented in Table 4. Details of the operating scenarios considered and assumptions regarding typical and worst-case plant operation are based on information provided by SICTL and detailed in Appendix D.

Table 4: Calculated noise contribution from SICTL site at nearest receivers – dB

	Day		Evening		Night			
	Calculated noise level L_{Aeq} (15min)	Noise limit, $L_{Aeq\ (15min)}$	Calculated noise level L_{Aeq} (15min)	Noise limit, L_{Aeq} (15min)	Calculated noise level L_{Aeq} (15min)	Noise limit, L_{Aeq} (15min)	Calculated noise level L_{Aeq} (9 hours)	Noise limit, $L_{Aeq\ (9\ hours)}$
74 Australia Avenue								
Typical operation	30	35	31	35	31	35	30	35
Worst case operation	33	35	32	35	32	35	31	35
34 Dent Street								
Typical operation	43	45	43	45	42	45	41	43
Worst case operation	45	45	45	45	44	45	43	43

Calculated noise levels for both typical and worst case operation of the site comply with the noise limits at the nominated sensitive receivers. Note that for the Night period we have assumed that the operations during the busiest 15 minute period are repeated constantly over the entire 9 hour Night period, except for 85 min of break (toolbox talks, meal times and wash up time), although we would expect this is unlikely in practice.

Based on the above the current operations on site comply with the EPL and Development Consent L_{Aeq} noise criteria.

Summarised in Table 5 are the contributions from high noise generating sources that are impulsive in nature and generate noise levels closest to the Night time $L_{A1(60sec)}$ noise limits.

Table 5: Calculated $L_{A1(60sec)}$ noise level contribution from SICTL site

Source description	74 Australia Ave	Noise limit, dB $L_{A1,(1min)}$	Compliance?	34 Dent Street	Noise limit, dB $L_{A1,(1min)}$	Compliance ?
Spreader engaging with ship's hatch cover	36	57	✓	50	57	✓
Hatch cover being landed within Quay Apron	34	57	✓	51	57	✓
Container landing within Quay Apron	28	57	✓	48	57	✓

During our site surveys we did observe hatch cover plates being landed and the spreader engaging with these plates landside but did not observe these activities occurring shipside due to limitations on measuring aboard the ship. As there were no measurements taken aboard the ship we have also incorporated the landside hatch cover impact measurements into our noise model at the shipside location.

Calculated maximum noise levels associated with impulsive noise generating activities on the site comply with the noise limits at the nominated sensitive receivers. Based on the above the current operations on site comply with the EPL and Development Consent noise criteria for sleep arousal.

In accordance with the Section L3.7 of the NSW EPA Environment Protection Licence (Licence #20322) we have assessed the site against Section 4 of the NSW Industrial Noise Policy for modifying factors of tonality, low-frequency noise, impulsive noise and intermittent noise.

Due to the large number of sources operating on site at one time the overall levels at the receiver do not fluctuate significantly above the background level. As such the intermittency modifying factor does not apply. From our observations on site, measurements at the receiver locations and modelling results we confirm that none of the modifying factors from Section 4 of the NSW INP apply to the overall noise levels at the receivers.

7.0 SUMMARY

- To satisfy the requirements of the EPL for the operation of the SICTL site, Marshall Day Acoustics conducted short term attended and long-term unattended noise monitoring at 34 Dent Street and 74 Australia Ave.
- Assessment of the SICTL site noise compliance is complicated by a range of variables affecting the derivation of the noise contribution from activities conducted on the site.
- As compliance could not be accurately determined on the basis of monitoring conducted at the receiver locations, MDA developed a 3D noise model to determine the noise contribution from the site at the nearest receivers via calculation. In order to develop the noise model, attended measurements were conducted on site in the vicinity of operational noise sources. These measurements were used to establish sound power levels for all equipment which were then incorporated into the noise model and the noise contribution of each plant item was calculated back to the receiver locations.
- The results of the noise model have been compared with the noise levels measured at two on-site calibration points. The predicted noise levels correlate closely with the measured

noise levels and therefore we consider the noise model to be representative of the site operations.

- The results of the noise model indicate the noise emissions from the site comply with the noise limits at 34 Dent Street and 74 Australia Ave.

APPENDIX A GLOSSARY OF TERMINOLOGY

Ambient	The ambient noise level is the noise level measured in the absence of the intrusive noise or the noise requiring control. Ambient noise levels are frequently measured to determine the situation prior to the addition of a new noise source.
SPL or L_P	Sound Pressure Level A logarithmic ratio of a sound pressure measured at distance, relative to the threshold of hearing (20 µPa RMS) and expressed in decibels.
SWL or L_W	Sound Power Level A logarithmic ratio of the acoustic power output of a source relative to 10^{-12} watts and expressed in decibels. Sound power level is calculated from measured sound pressure levels and represents the level of total sound power radiated by a sound source.
dB	Decibel The unit of sound level. Expressed as a logarithmic ratio of sound pressure P relative to a reference pressure of Pr=20 µPa i.e. dB = 20 x log(P/Pr)
dBA	The unit of sound level which has its frequency characteristics modified by a filter (A-weighted) so as to more closely approximate the frequency bias of the human ear.
A-weighting	The process by which noise levels are corrected to account for the non-linear frequency response of the human ear.
$L_{Aeq\,(t)}$	The equivalent continuous (time-averaged) A-weighted sound level. This is commonly referred to as the average noise level. The suffix "t" represents the time period to which the noise level relates, e.g. (8 h) would represent a period of 8 hours, (15 min) would represent a period of 15 minutes and (2200-0700) would represent a measurement time between 10 pm and 7 am.
L_{A90}	The A-weighted noise level equalled or exceeded for 90% of the measurement period. This is commonly referred to as the background noise level.
L_{Amax}	The A-weighted maximum noise level. The highest noise level which occurs during the measurement period.
L_{A01}	The A-weighted noise level which is equalled or exceeded for 1% of the measurement period. This is sometimes referred to as the typical maximum noise level.

APPENDIX B UNATTENDED MONITORING DATA

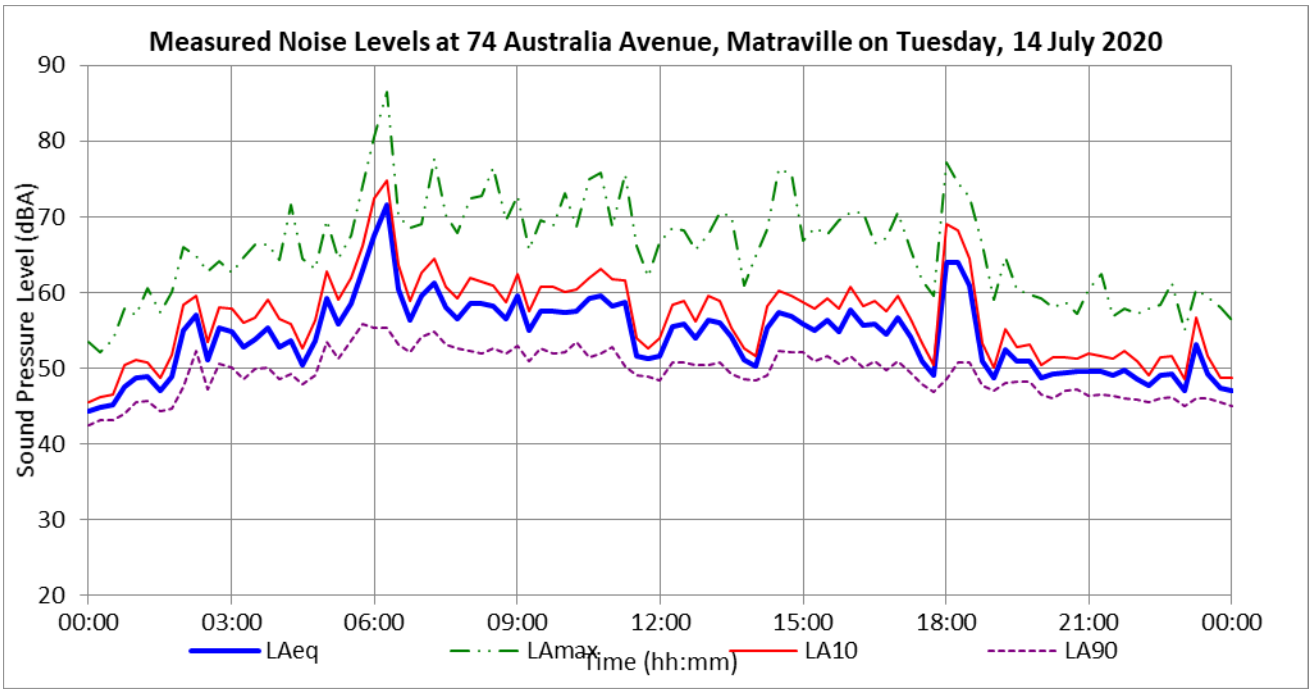
B1 74 Australia Avenue, Matraville

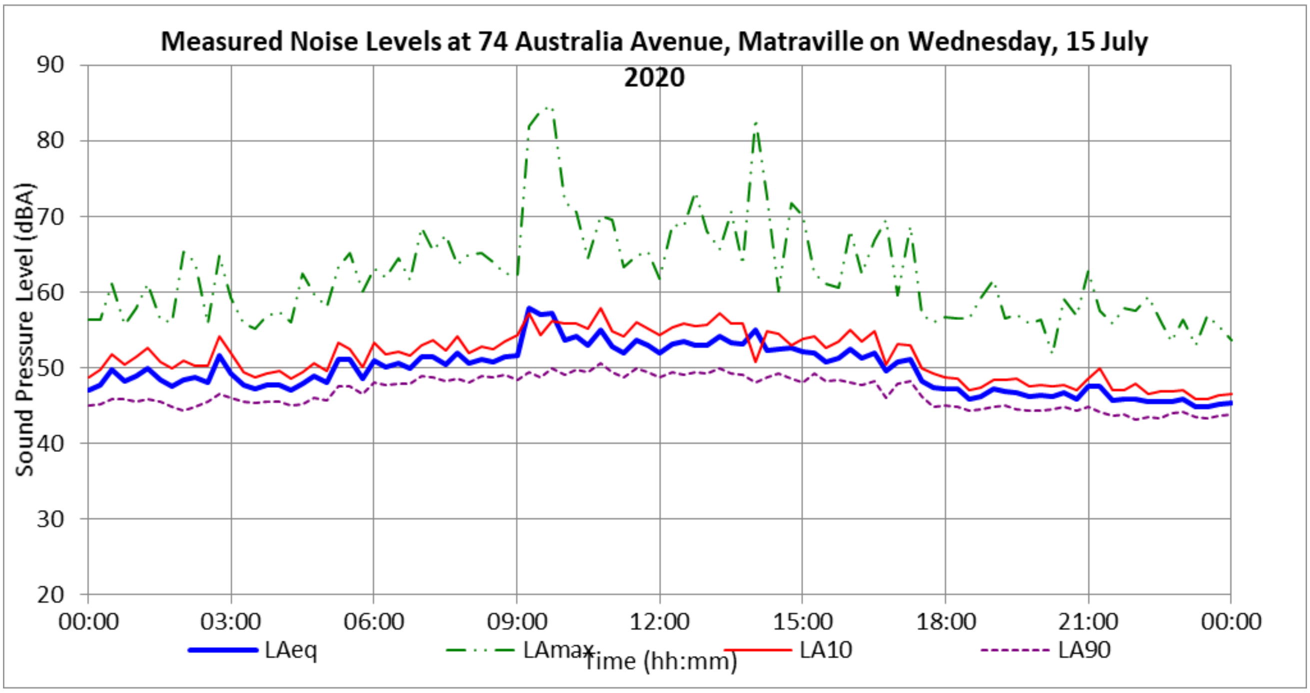
A noise logger was setup in the back yard of the residential receiver located at 74 Australia Ave, Matraville.

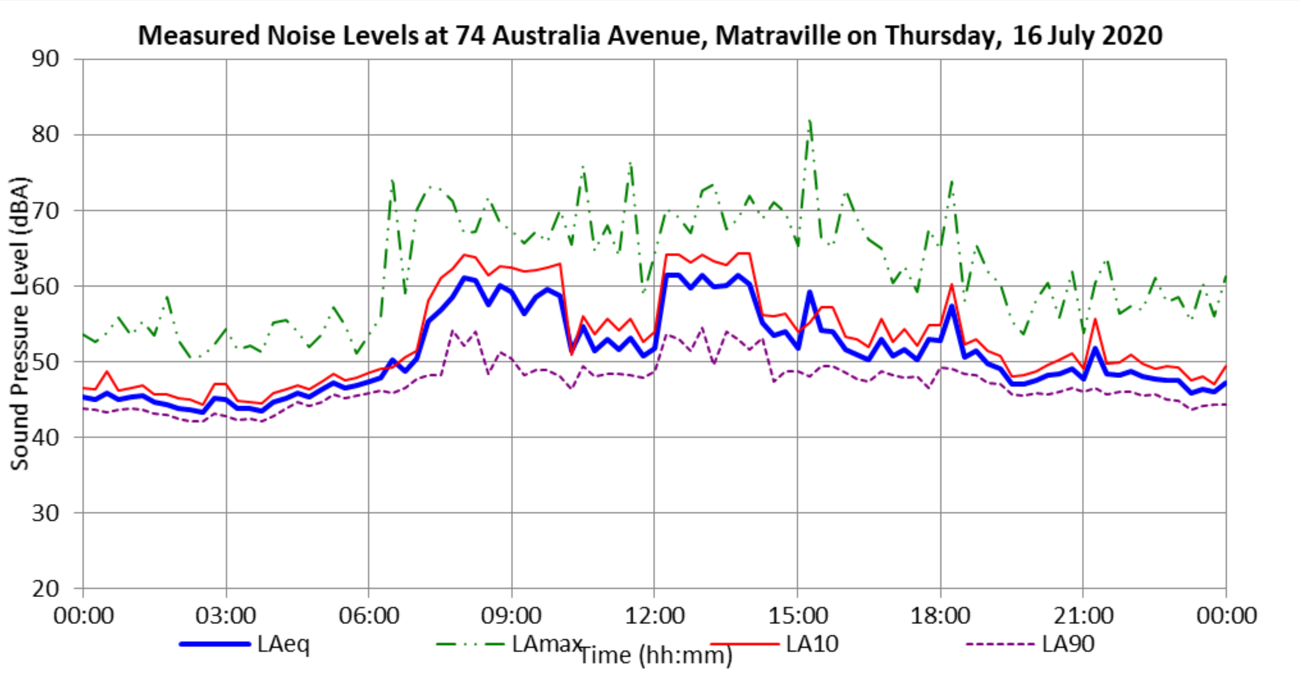
Figure 2: Noise logger installed at 74 Australia Ave, Matraville

Noise levels were continuously logged in 15 minute intervals at this location using a 01dB Duo noise logger (Serial number 10194) between 13 July 2020 to 29 July 2020. The noise logger was calibrated before and after conducting the measurements and no significant drift was observed.

The noise survey results are presented graphically overleaf:


Measured Noise Levels at 74 Australia Avenue, Matraville on Tuesday, 14 July 2020
Sound Pressure Level (dBA)
90
80
70
60
50
40
30
20
00:00
03:00
06:00
09:00
12:00
15:00
18:00
21:00
00:00
Time (hh:mm)
LAeq
LAmax
LA10
LA90


Measured Noise Levels at 74 Australia Avenue, Matraville on Wednesday, 15 July 2020
Sound Pressure Level (dBA)
90
80
70
60
50
40
30
20
00:00
03:00
06:00
09:00
12:00
15:00
18:00
21:00
00:00
Time (hh:mm)
LAeq
LAmax
LA10
LA90



Measured Noise Levels at 74 Australia Avenue, Matraville on Thursday, 16 July 2020
Sound Pressure Level (dBA)
90
80
70
60
50
40
30
20
00:00
03:00
06:00
09:00
12:00
15:00
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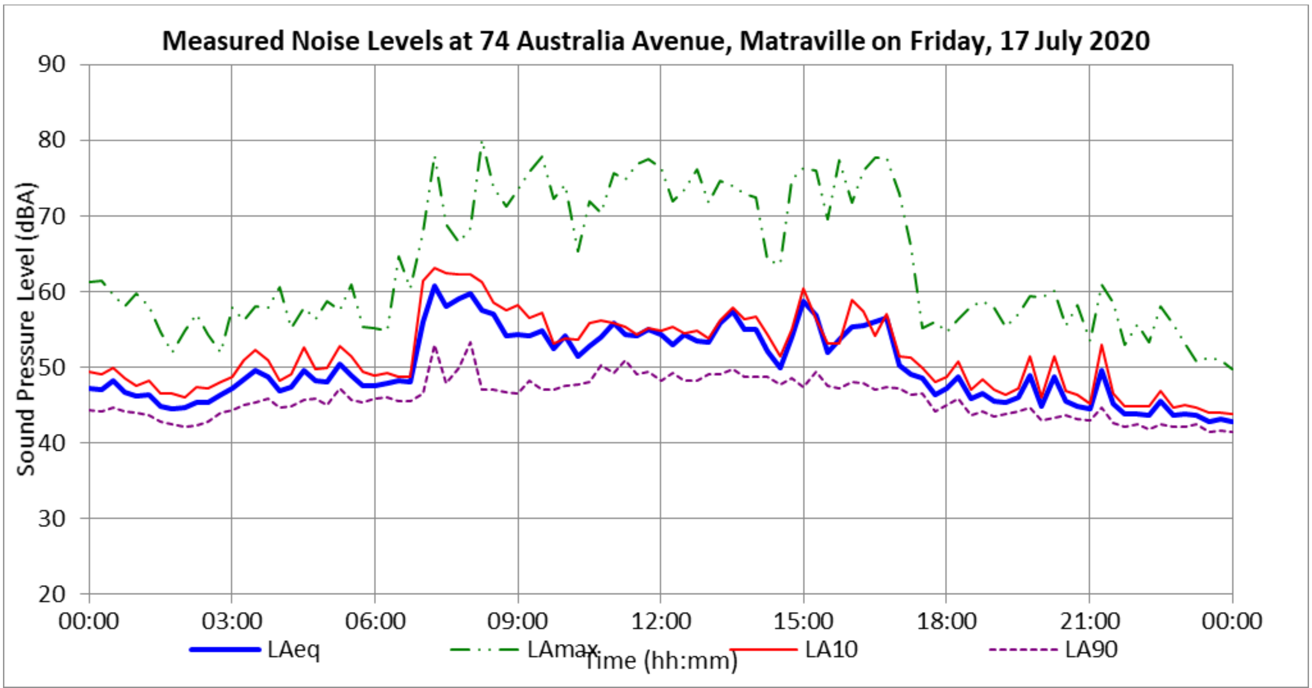
LAeq
LAmax
LA10
LA90



Measured Noise Levels at 74 Australia Avenue, Matraville on Friday, 17 July 2020
Sound Pressure Level (dBA)
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80
70
60
50
40
30
20
00:00
03:00
06:00
09:00
12:00
15:00
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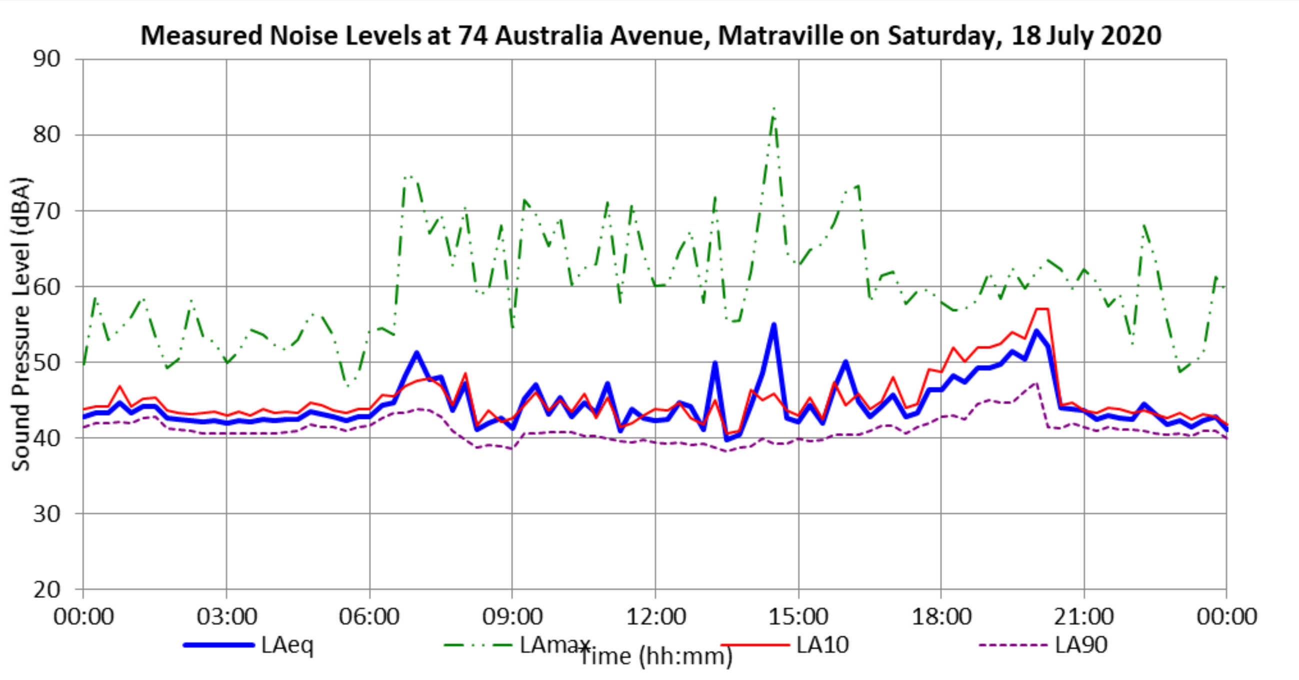
LAeq
LAmax
LA10
LA90


Measured Noise Levels at 74 Australia Avenue, Matraville on Saturday, 18 July 2020
Sound Pressure Level (dBA)
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80
70
60
50
40
30
20
00:00
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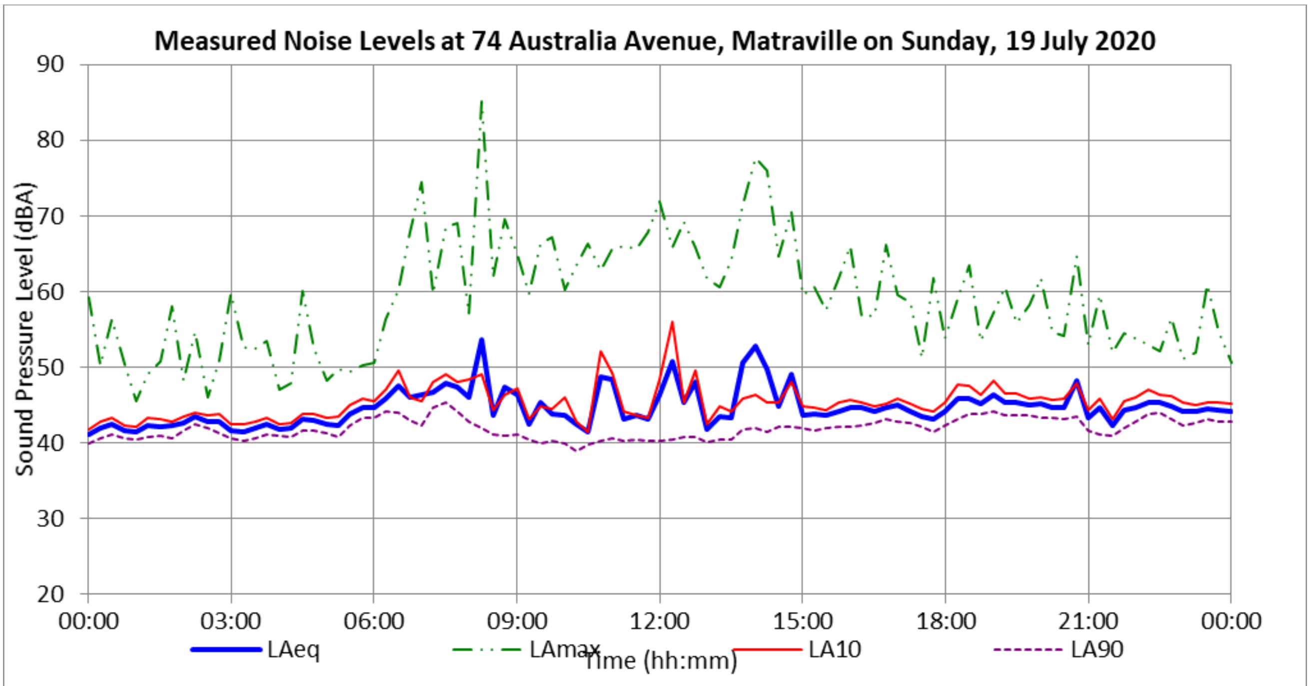
LAeq
LAmax
LA10
LA90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LAeq
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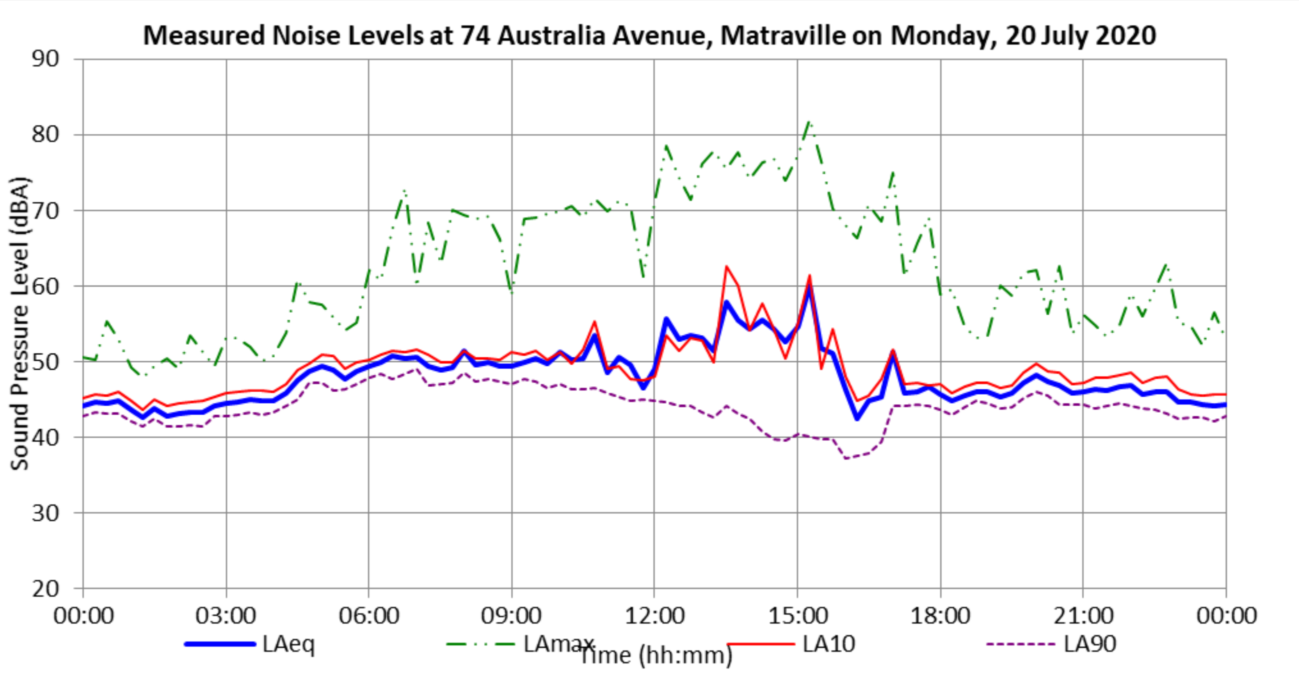
LA90



Measured Noise Levels at 74 Australia Avenue, Matraville on Monday, 20 July 2020
Sound Pressure Level (dBA)
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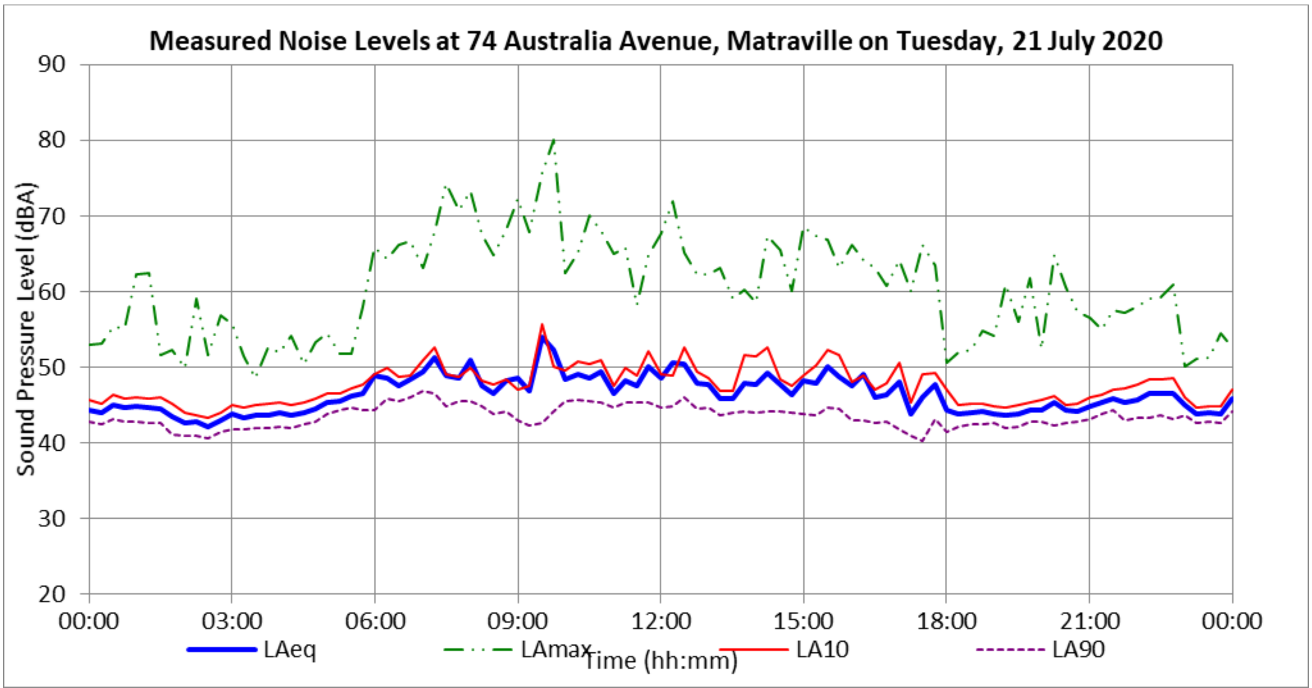
80
70
60
50
40
30
20
00:00
03:00
06:00
09:00
12:00
15:00
18:00
21:00
00:00
Time (hh:mm)
LAeq
LAmax
LA10
LA90



Measured Noise Levels at 74 Australia Avenue, Matraville on Tuesday, 21 July 2020
Sound Pressure Level (dBA)
90
80
70
60
50
40
30
20
00:00
03:00
06:00
09:00
12:00
15:00
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21:00
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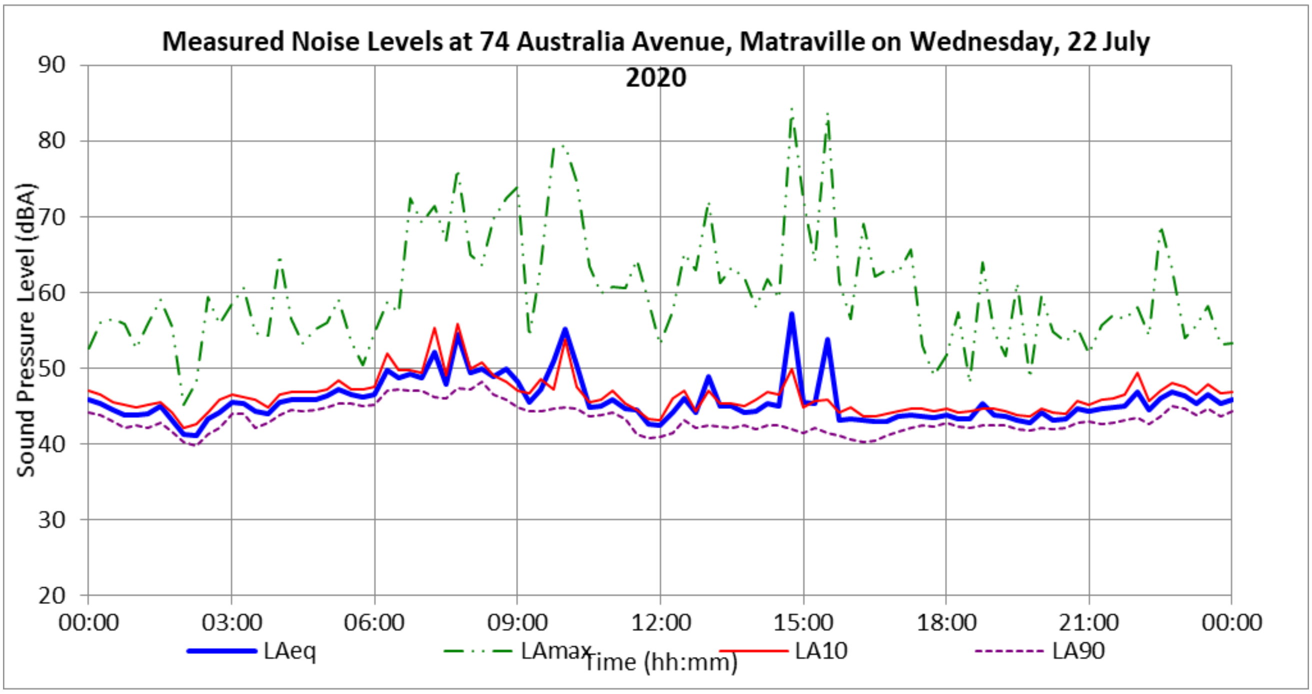
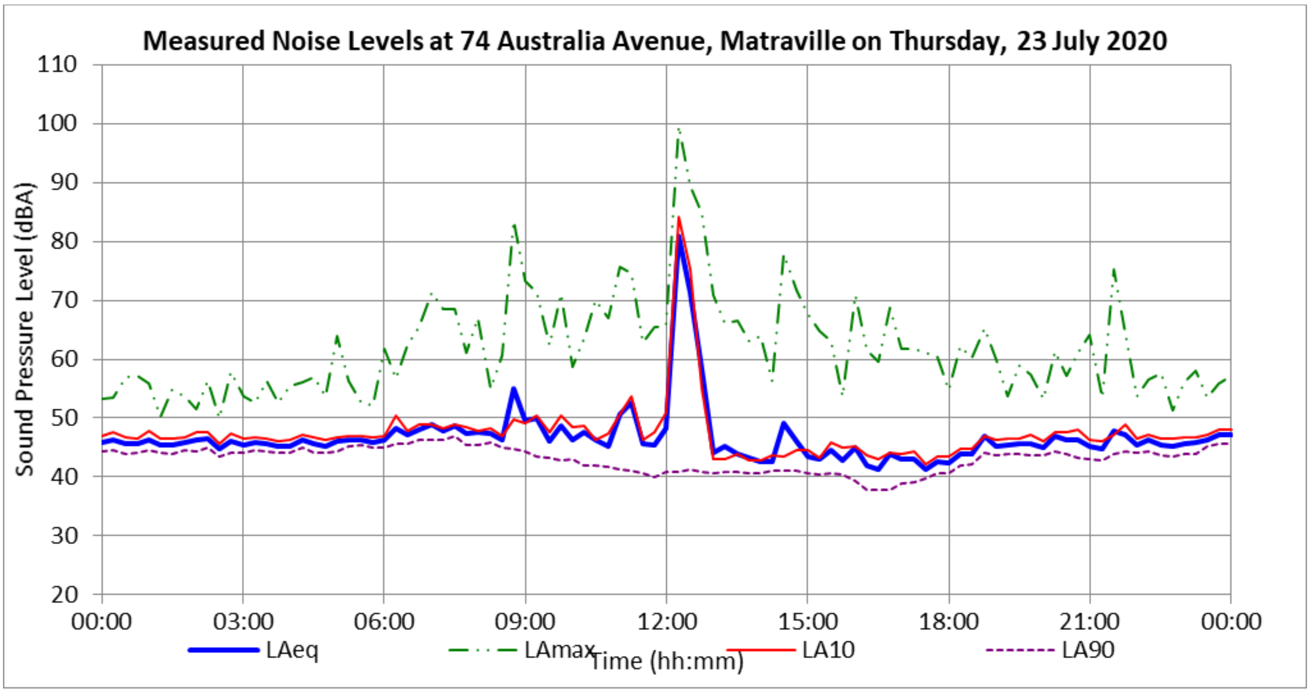
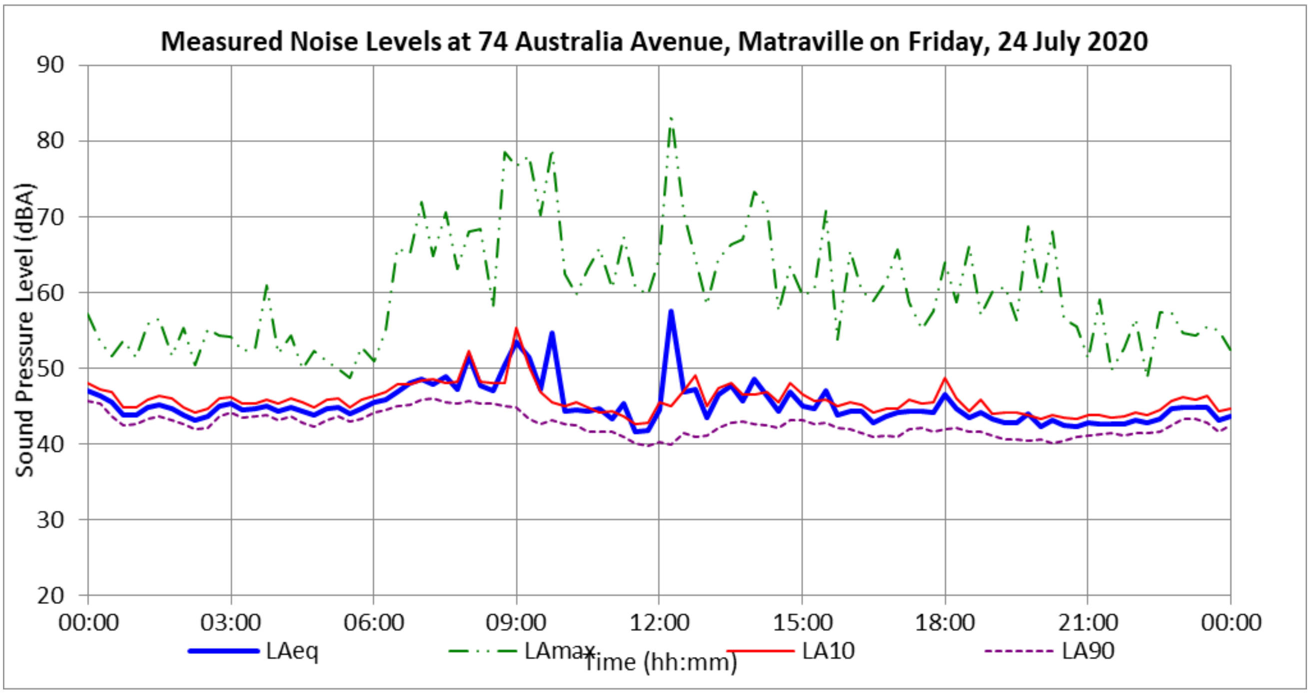
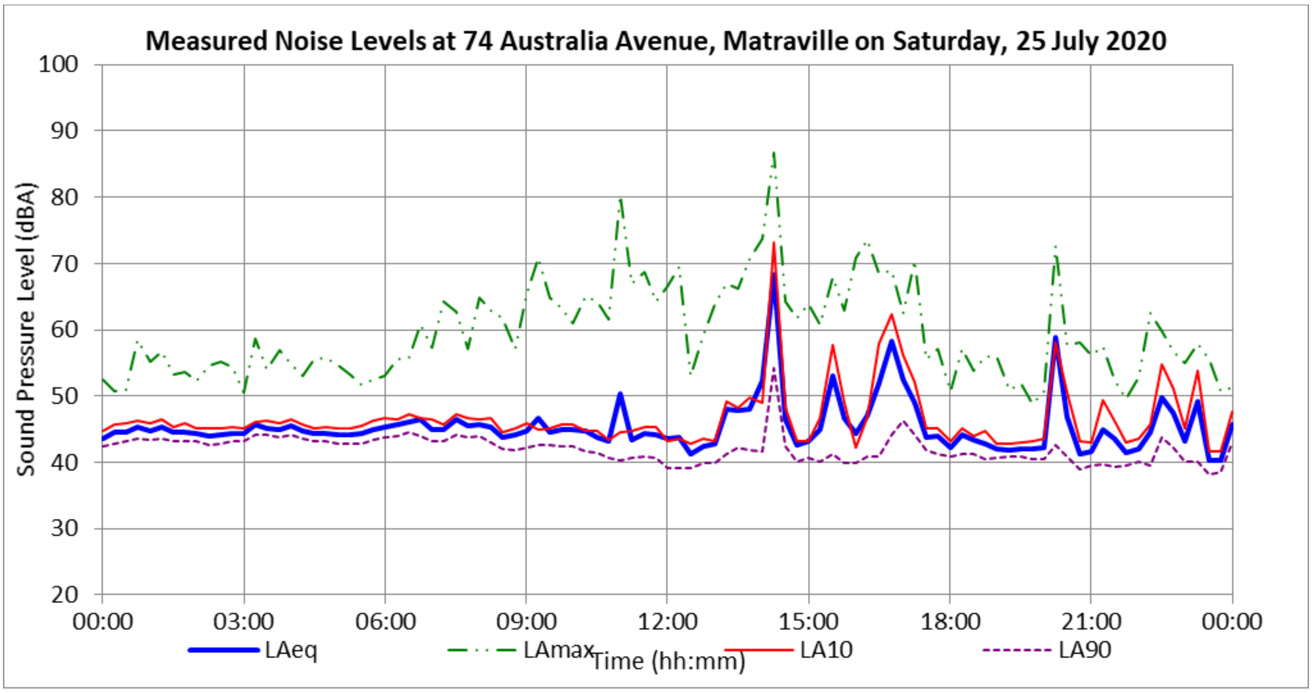
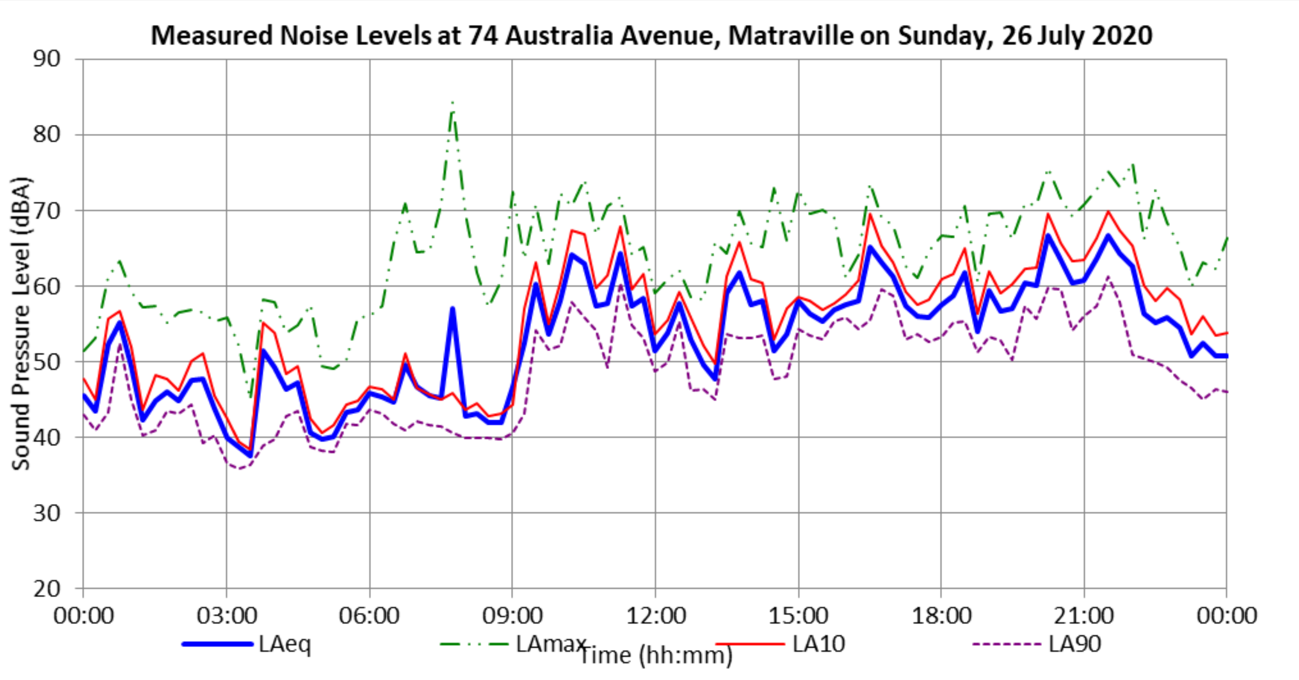
LAeq
LAmax
LA10
LA90

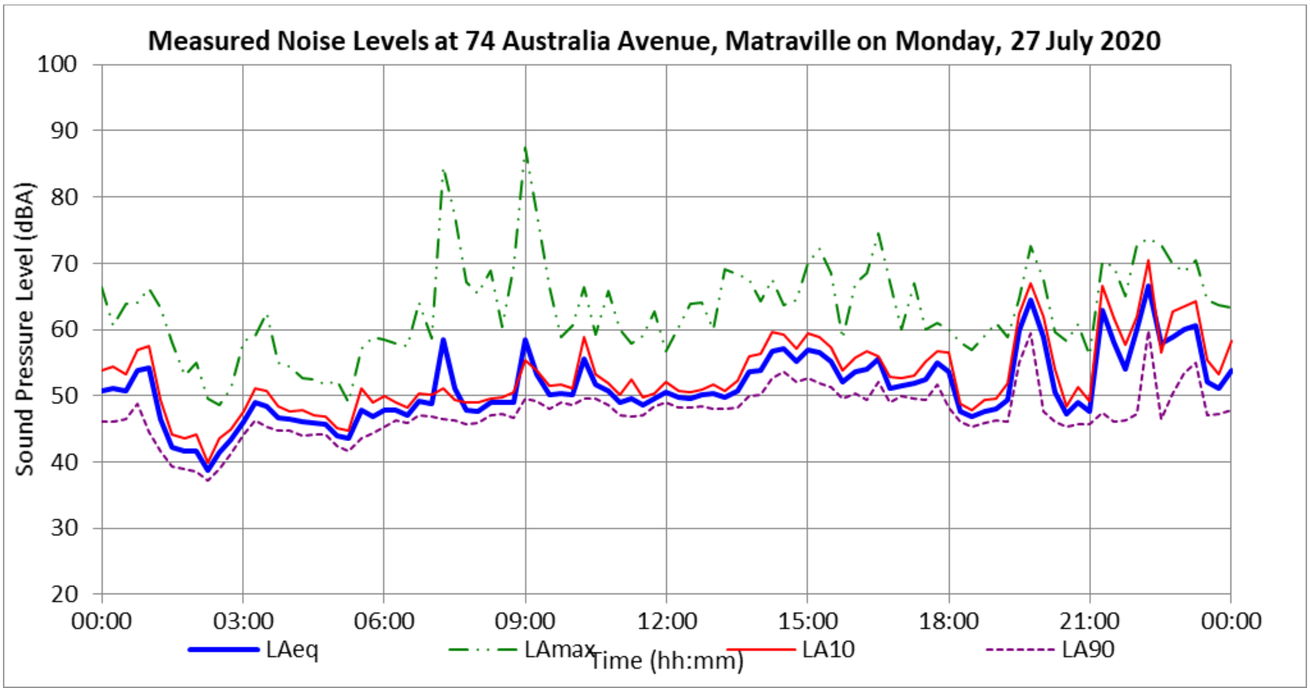

Measured Noise Levels at 74 Australia Avenue, Matraville on Wednesday, 22 July 2020
Sound Pressure Level (dBA)
90
80
70
60
50
40
30
20
00:00
03:00
06:00
09:00
12:00
15:00
18:00
21:00
00:00
Time (hh:mm)
LAeq
LAmax
LA10
LA90

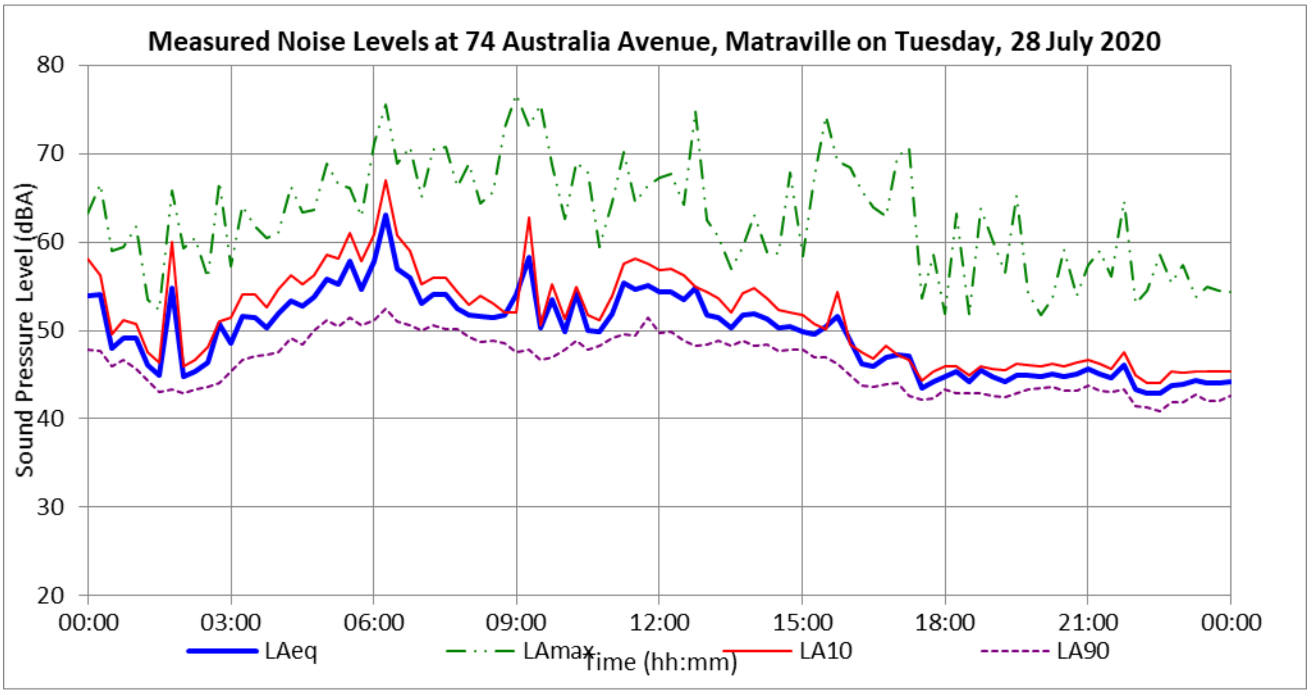

Measured Noise Levels at 74 Australia Avenue, Matraville on Thursday, 23 July 2020
Sound Pressure Level (dBA)
110
100
90
80
70
60
50
40
30
20
00:00
03:00
06:00
09:00
12:00
15:00
18:00
21:00
00:00
Time (hh:mm)
LAeq
LAmax
LA10
LA90


Measured Noise Levels at 74 Australia Avenue, Matraville on Friday, 24 July 2020
Sound Pressure Level (dBA)
20
30
40
50
60
70
80
90
00:00
03:00
06:00
09:00
12:00
15:00
18:00
21:00
00:00
Time (hh:mm)
LAeq
LAmax
LA10
LA90


Measured Noise Levels at 74 Australia Avenue, Matraville on Saturday, 25 July 2020
Sound Pressure Level (dBA)
20
30
40
50
60
70
80
90
100
00:00
03:00
06:00
09:00
12:00
15:00
18:00
21:00
00:00
Time (hh:mm)
LAeq
LAmax
LA10
LA90


Measured Noise Levels at 74 Australia Avenue, Matraville on Sunday, 26 July 2020
Sound Pressure Level (dBA)
90
80
70
60
50
40
30
20
00:00
03:00
06:00
09:00
12:00
15:00
18:00
21:00
00:00
Time (hh:mm)
LAeq
LAmax
LA10
LA90


Measured Noise Levels at 74 Australia Avenue, Matraville on Monday, 27 July 2020
Sound Pressure Level (dBA)
100
90
80
70
60
50
40
30
20
00:00
03:00
06:00
09:00
12:00
15:00
18:00
21:00
00:00
Time (hh:mm)
LAeq
LAmax
LA10
LA90

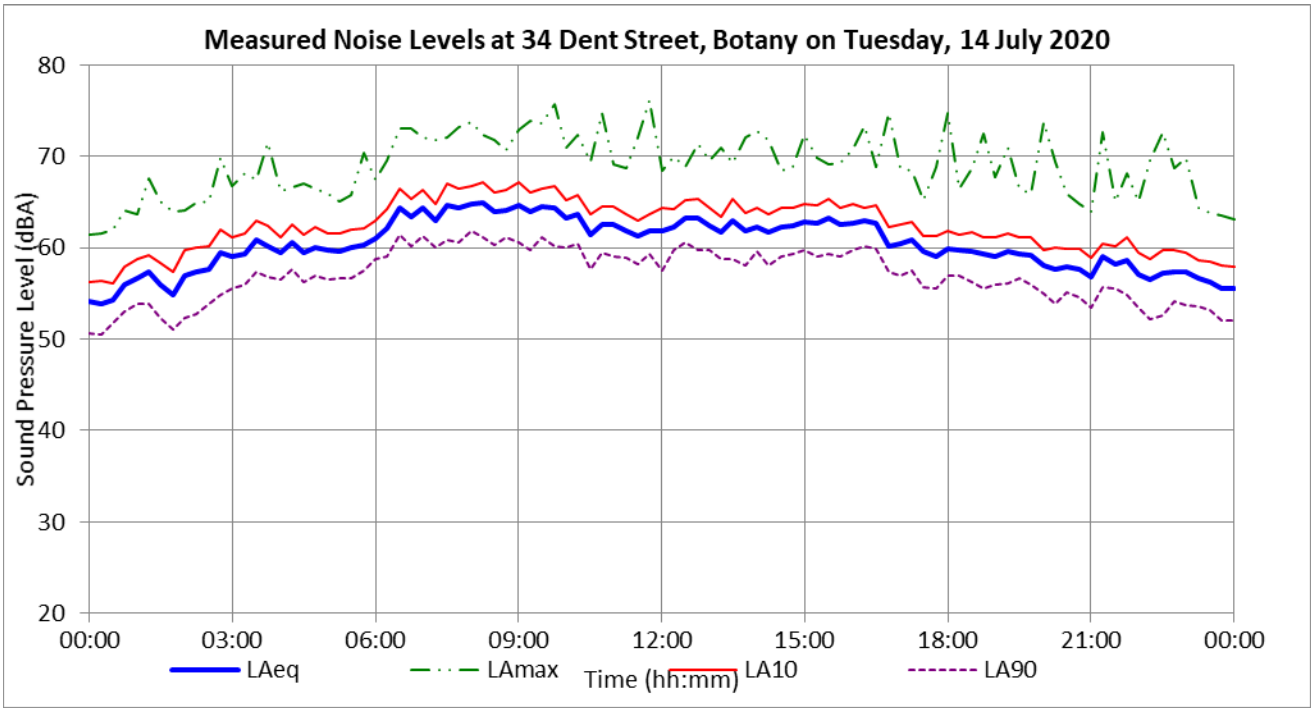

Measured Noise Levels at 74 Australia Avenue, Matraville on Tuesday, 28 July 2020
Sound Pressure Level (dBA)
80
70
60
50
40
30
20
00:00
03:00
06:00
09:00
12:00
15:00
18:00
21:00
00:00
Time (hh:mm)
LAeq
LAmax
LA10
LA90

B2 34 Dent Street, Botany

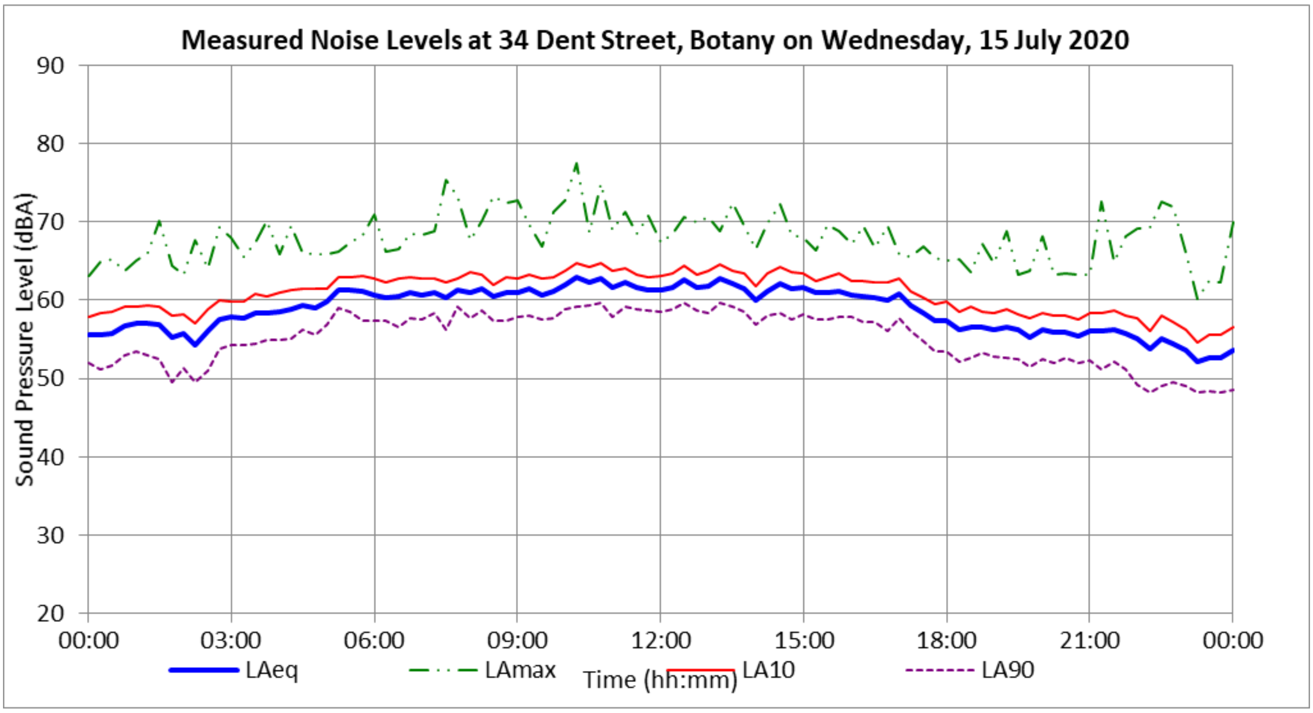
A noise logger was setup at the rear boundary of the residential receiver located at 34 Dent Street, Botany.

Figure B2: Noise logger installed at 34 Dent Street, Botany

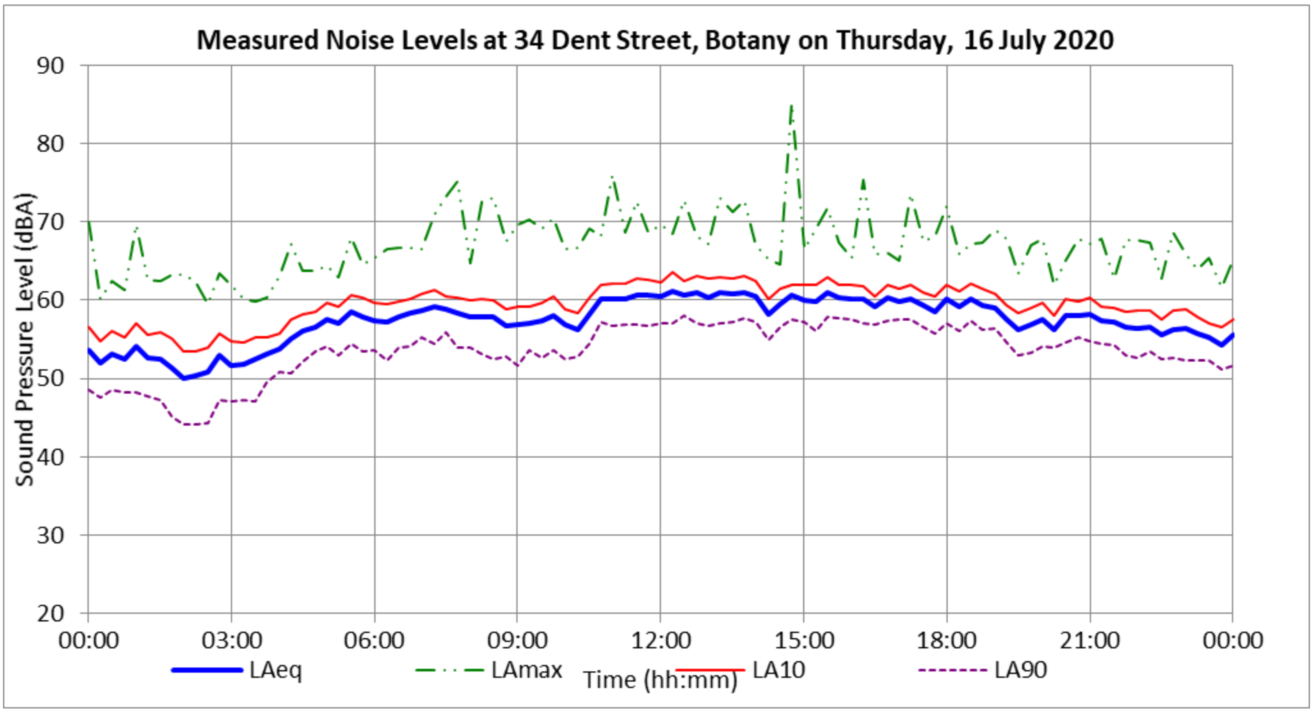
Noise levels were continuously logged in 15 minute intervals at this location using a 01dB Duo noise logger (Serial number 10315) between 13 July 2020 to 29 July 2020. The noise logger was calibrated before and after conducting the measurements and no significant drift was observed. The noise survey results are presented graphically overleaf.

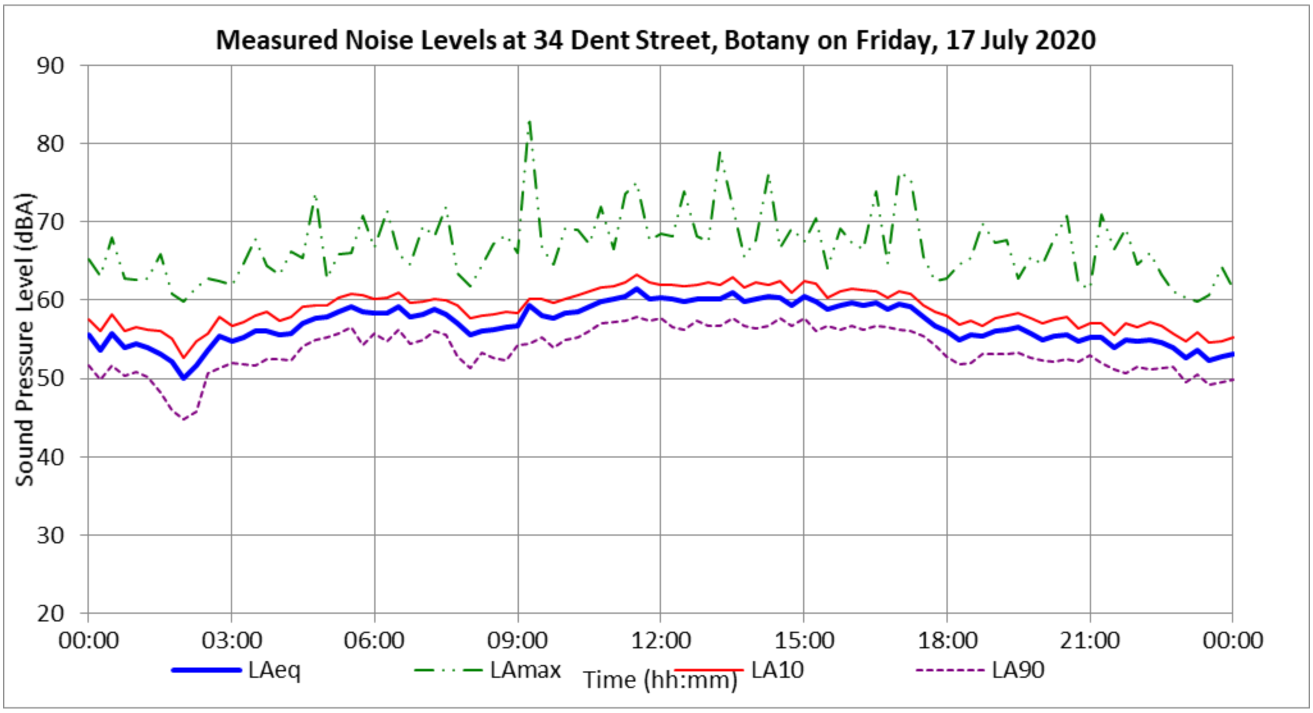


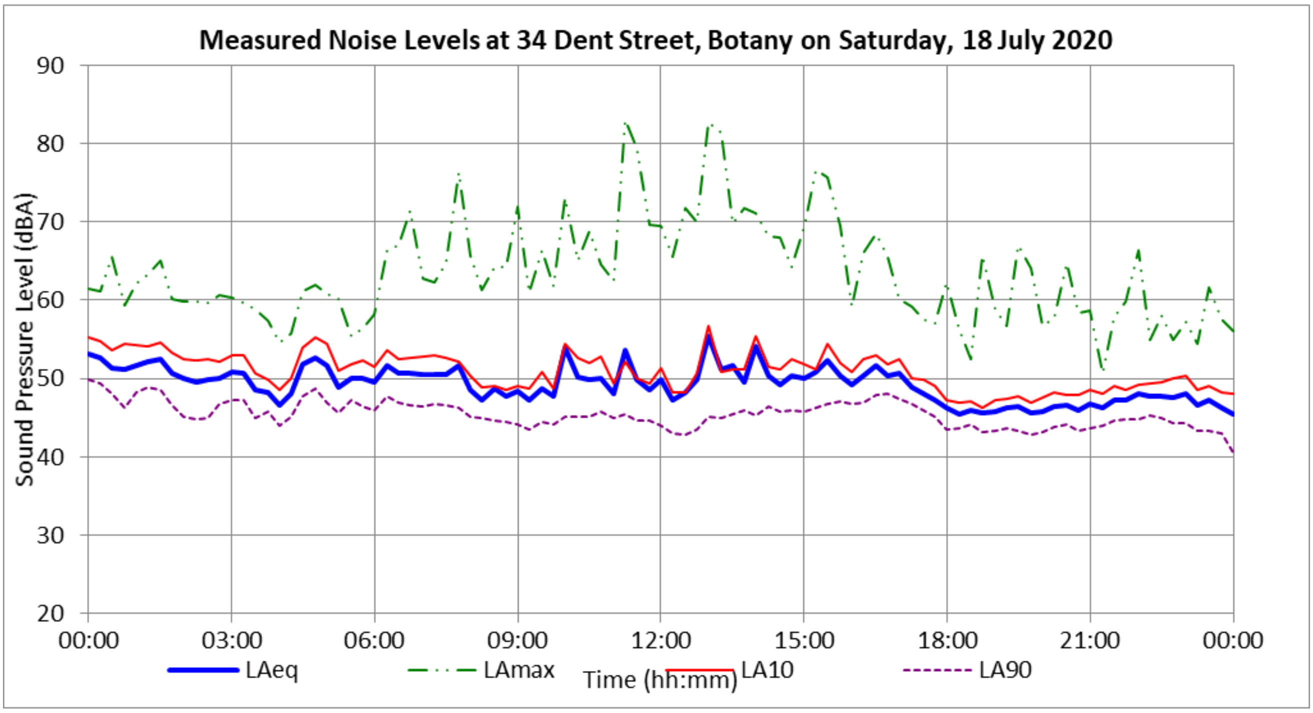
Measured Noise Levels at 34 Dent Street, Botany on Tuesday, 14 July 2020
Sound Pressure Level (dBA)
80
70
60
50
40
30
20
00:00
03:00
06:00
09:00
12:00
15:00
18:00
21:00
00:00
Time (hh:mm)
LAeq
LAmax
LA10
LA90

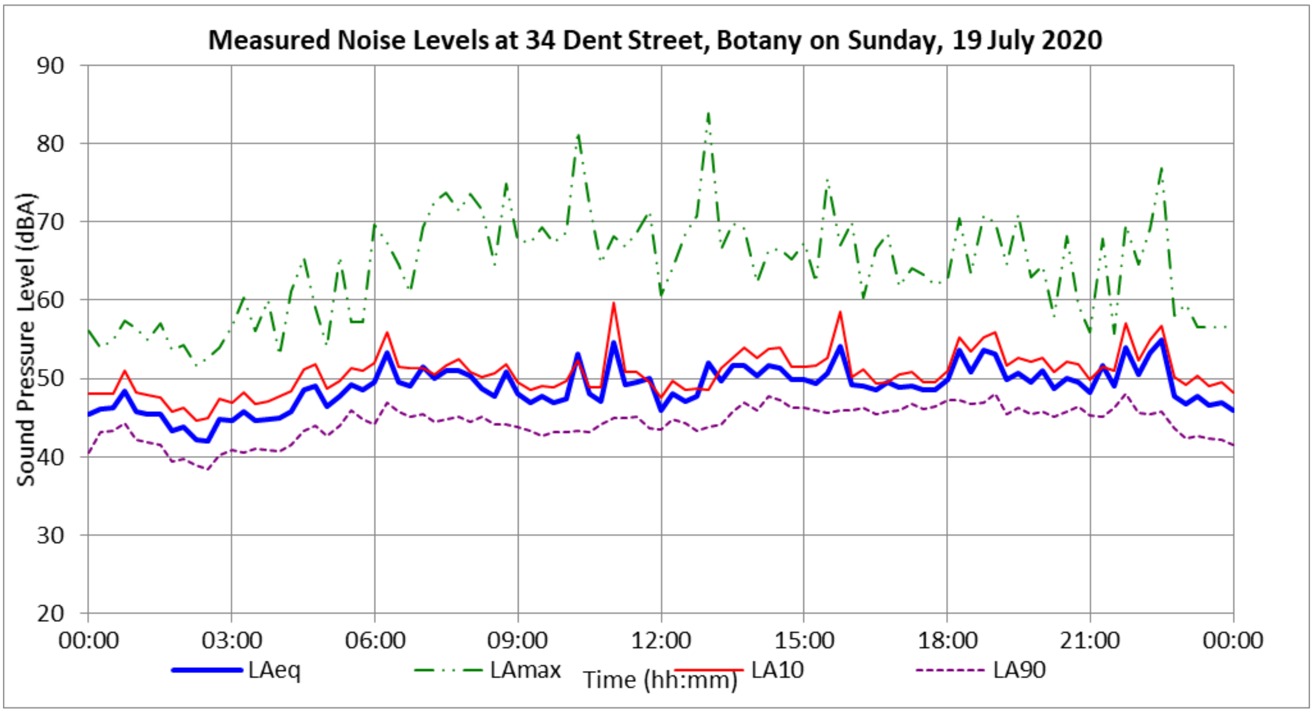


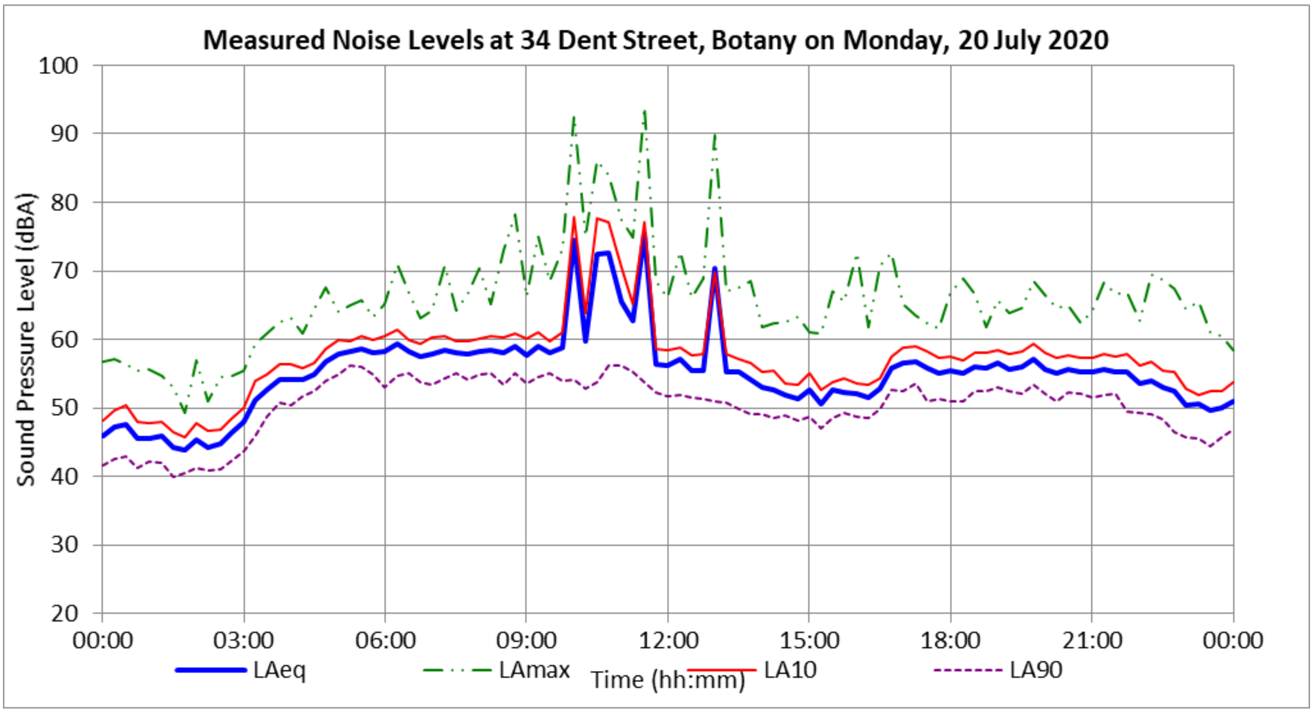
Measured Noise Levels at 34 Dent Street, Botany on Wednesday, 15 July 2020
Sound Pressure Level (dBA)
90
80
70
60
50
40
30
20
00:00
03:00
06:00
09:00
12:00
15:00
18:00
21:00
00:00
Time (hh:mm)
LAeq
LAmax
LA10
LA90

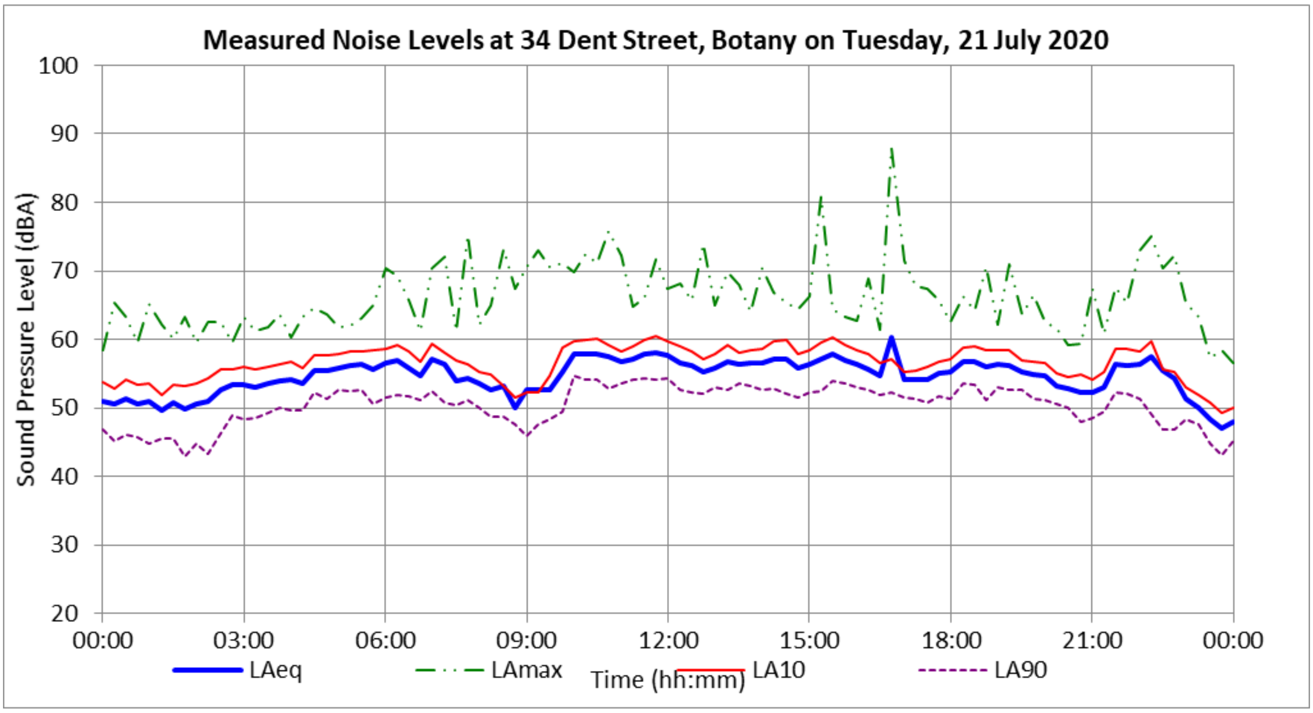

Measured Noise Levels at 34 Dent Street, Botany on Thursday, 16 July 2020
Sound Pressure Level (dBA)
90
80
70
60
50
40
30
20
00:00
03:00
06:00
09:00
12:00
15:00
18:00
21:00
00:00
Time (hh:mm)
LAeq
LAmax
LA10
LA90

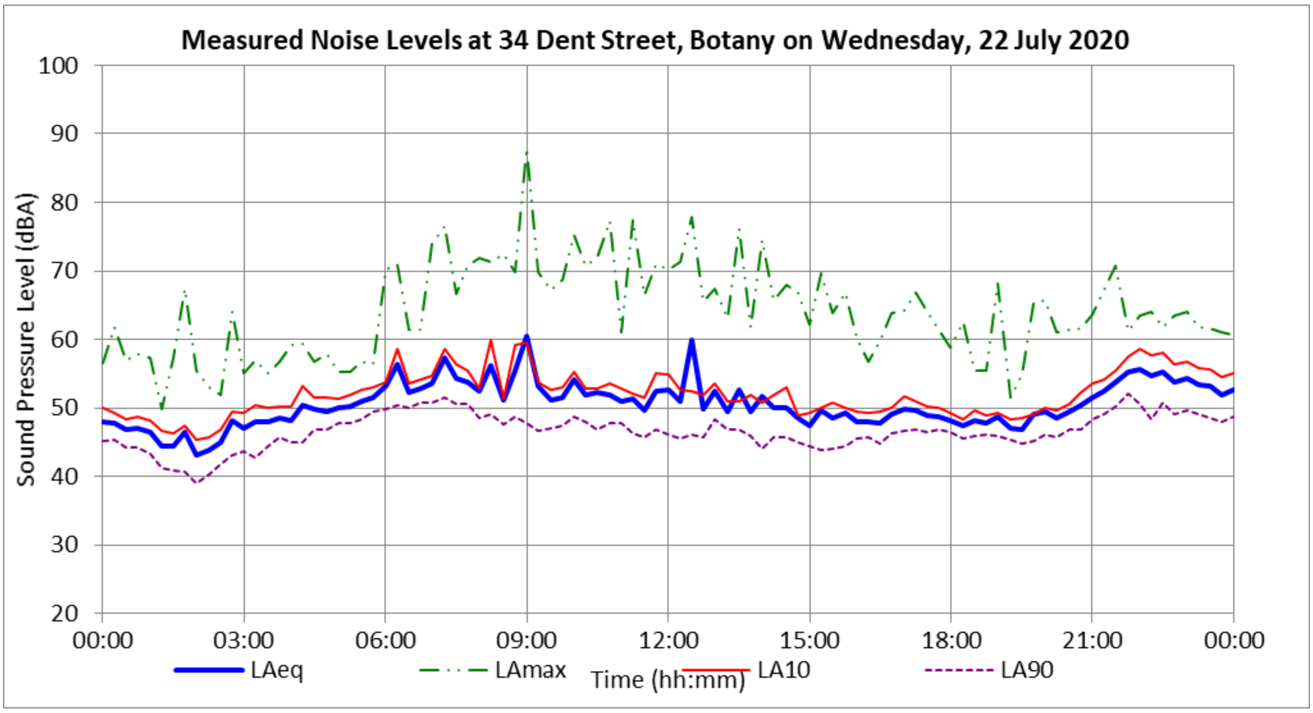

Measured Noise Levels at 34 Dent Street, Botany on Friday, 17 July 2020
Sound Pressure Level (dBA)
90
80
70
60
50
40
30
20
00:00
03:00
06:00
09:00
12:00
15:00
18:00
21:00
00:00
Time (hh:mm)
LAeq
LAmax
LA10
LA90

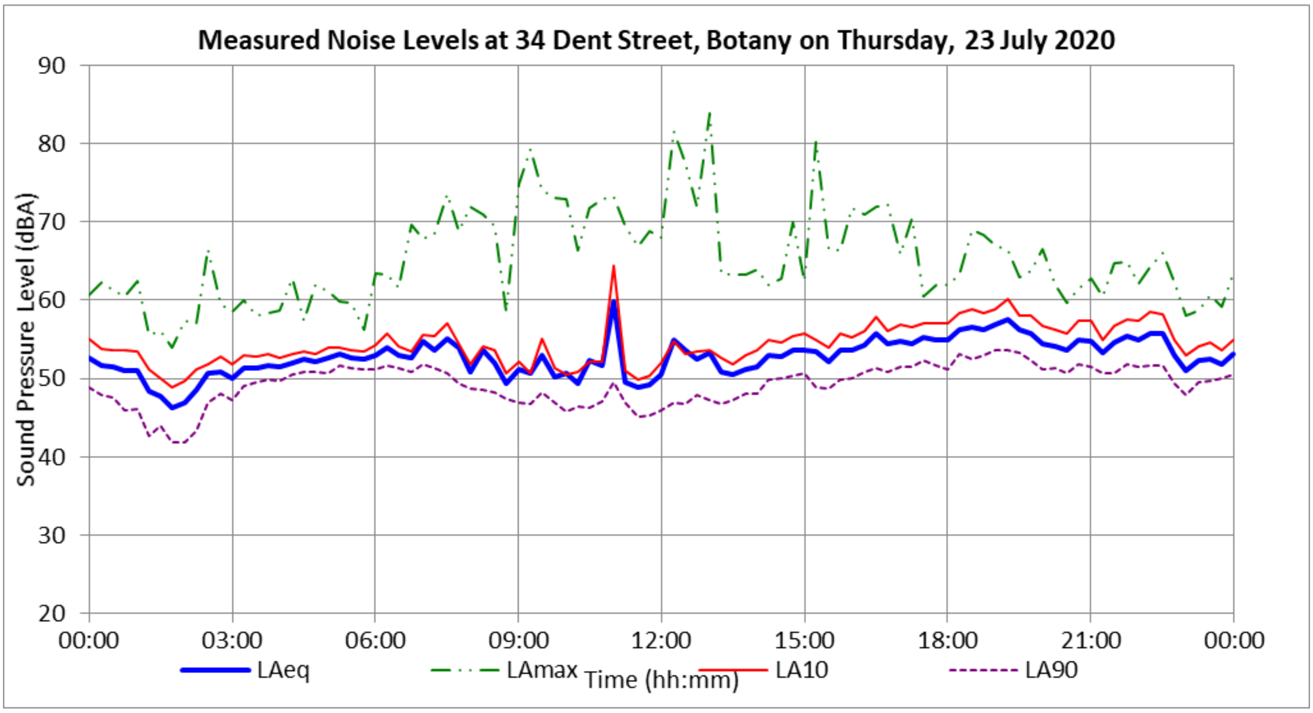

Measured Noise Levels at 34 Dent Street, Botany on Saturday, 18 July 2020
Sound Pressure Level (dBA)
90
80
70
60
50
40
30
20
00:00
03:00
06:00
09:00
12:00
15:00
18:00
21:00
00:00
Time (hh:mm)
LAeq
LAmax
LA10
LA90

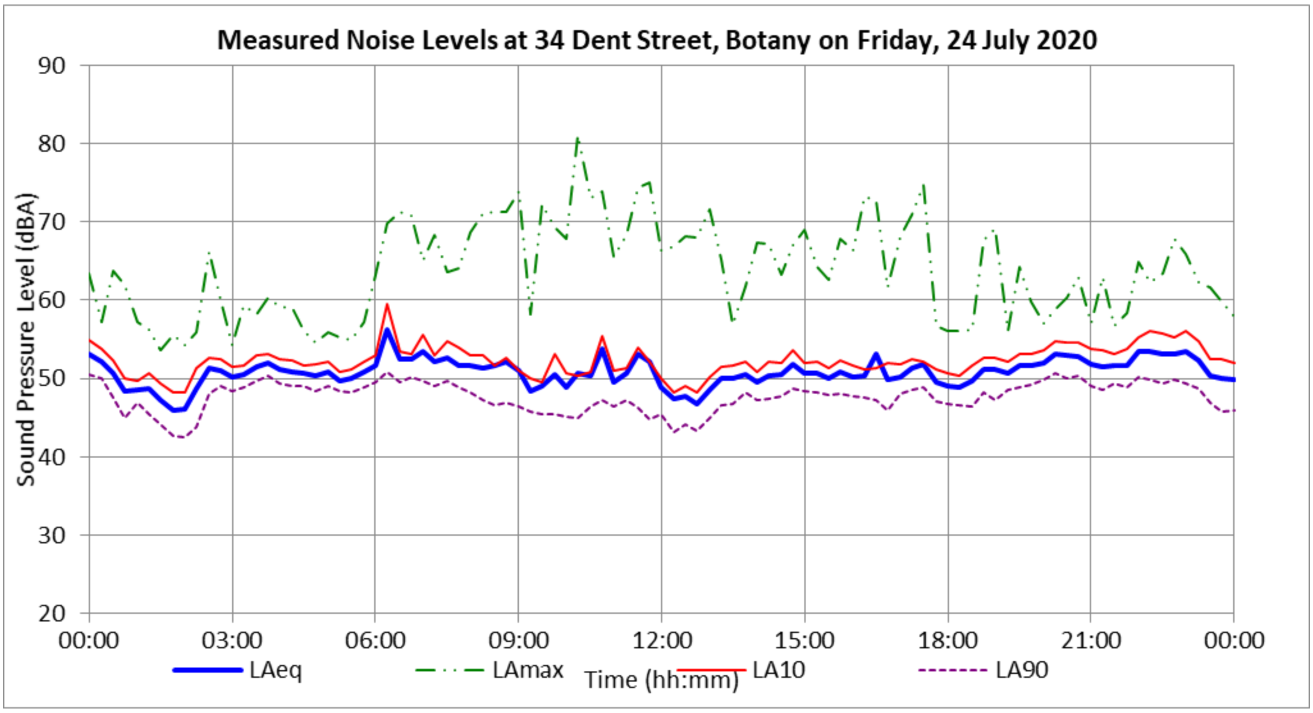

Measured Noise Levels at 34 Dent Street, Botany on Sunday, 19 July 2020
Sound Pressure Level (dBA)
90
80
70
60
50
40
30
20
00:00
03:00
06:00
09:00
12:00
15:00
18:00
21:00
00:00
Time (hh:mm)
LAeq
LAmax
LA10
LA90

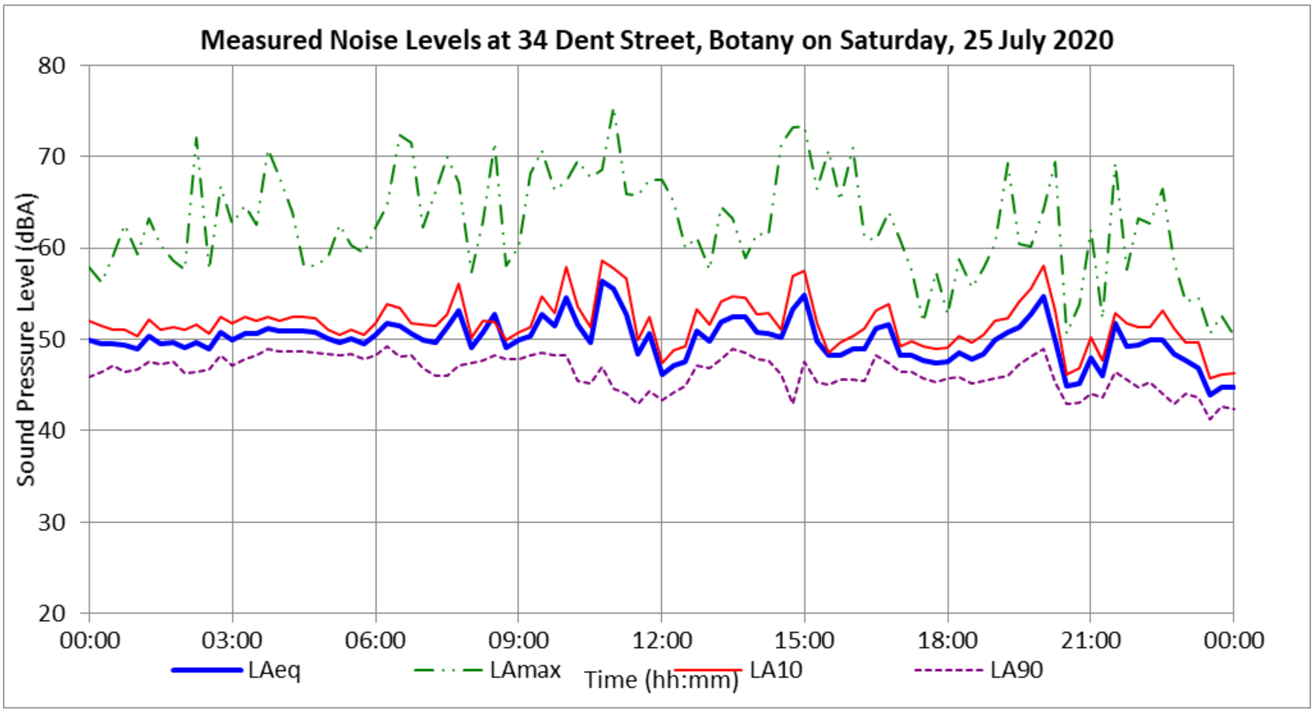

Measured Noise Levels at 34 Dent Street, Botany on Monday, 20 July 2020
Sound Pressure Level (dBA)
100
90
80
70
60
50
40
30
20
00:00
03:00
06:00
09:00
12:00
15:00
18:00
21:00
00:00
Time (hh:mm)
LAeq
LAmax
LA10
LA90

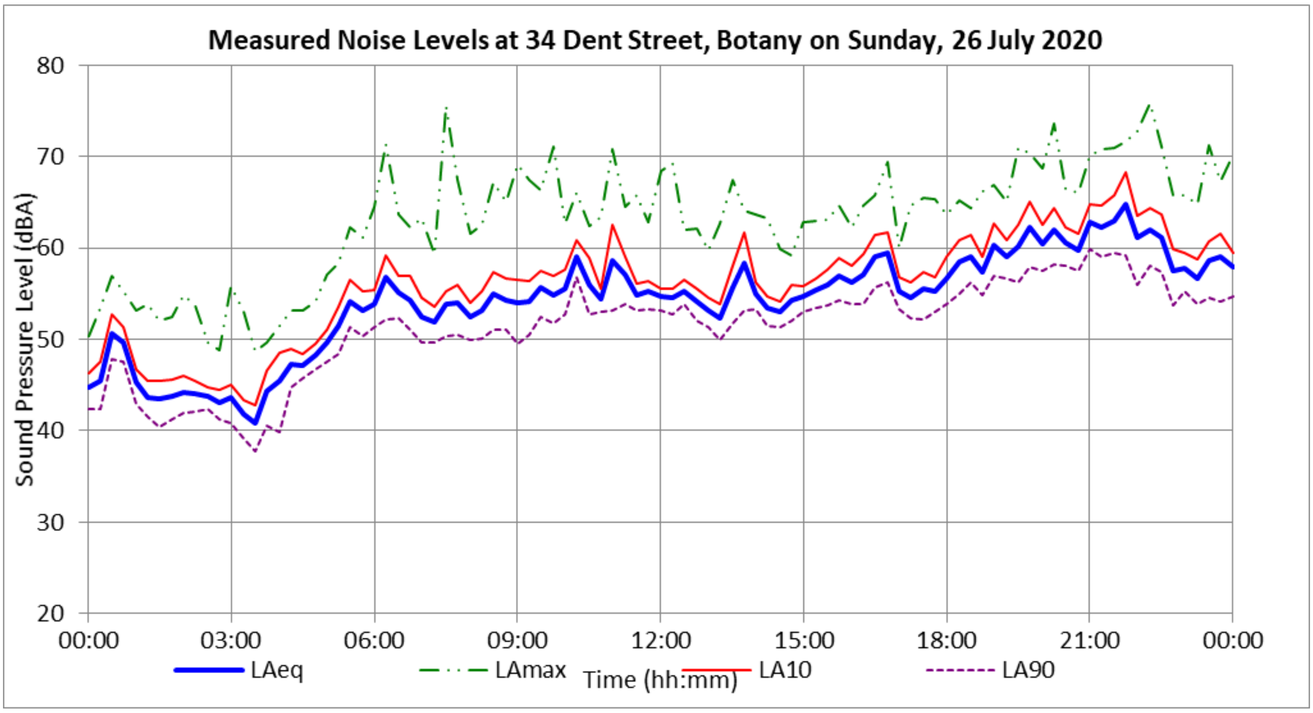

Measured Noise Levels at 34 Dent Street, Botany on Tuesday, 21 July 2020
Sound Pressure Level (dBA)
100
90
80
70
60
50
40
30
20
00:00
03:00
06:00
09:00
12:00
15:00
18:00
21:00
00:00
Time (hh:mm)
LAeq
LAmax
LA10
LA90

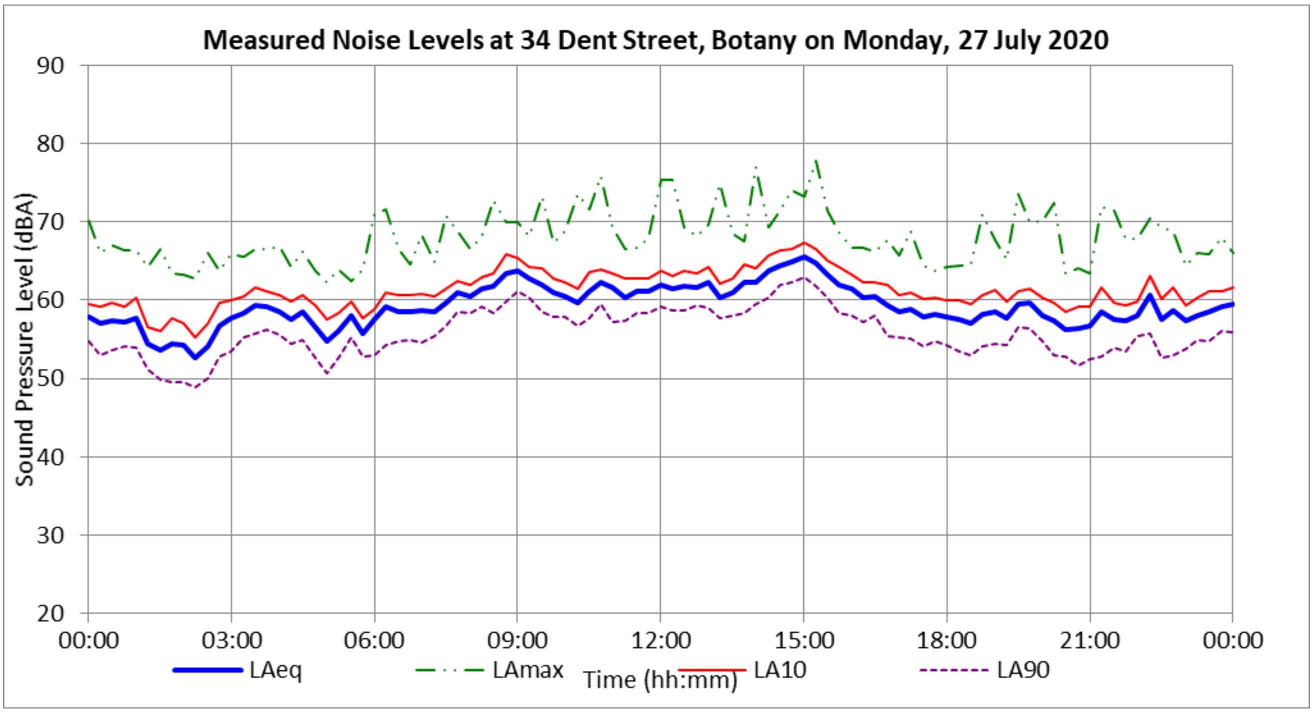

Measured Noise Levels at 34 Dent Street, Botany on Wednesday, 22 July 2020
Sound Pressure Level (dBA)
100
90
80
70
60
50
40
30
20
00:00
03:00
06:00
09:00
12:00
15:00
18:00
21:00
00:00
Time (hh:mm)
LAeq
LAmax
LA10
LA90

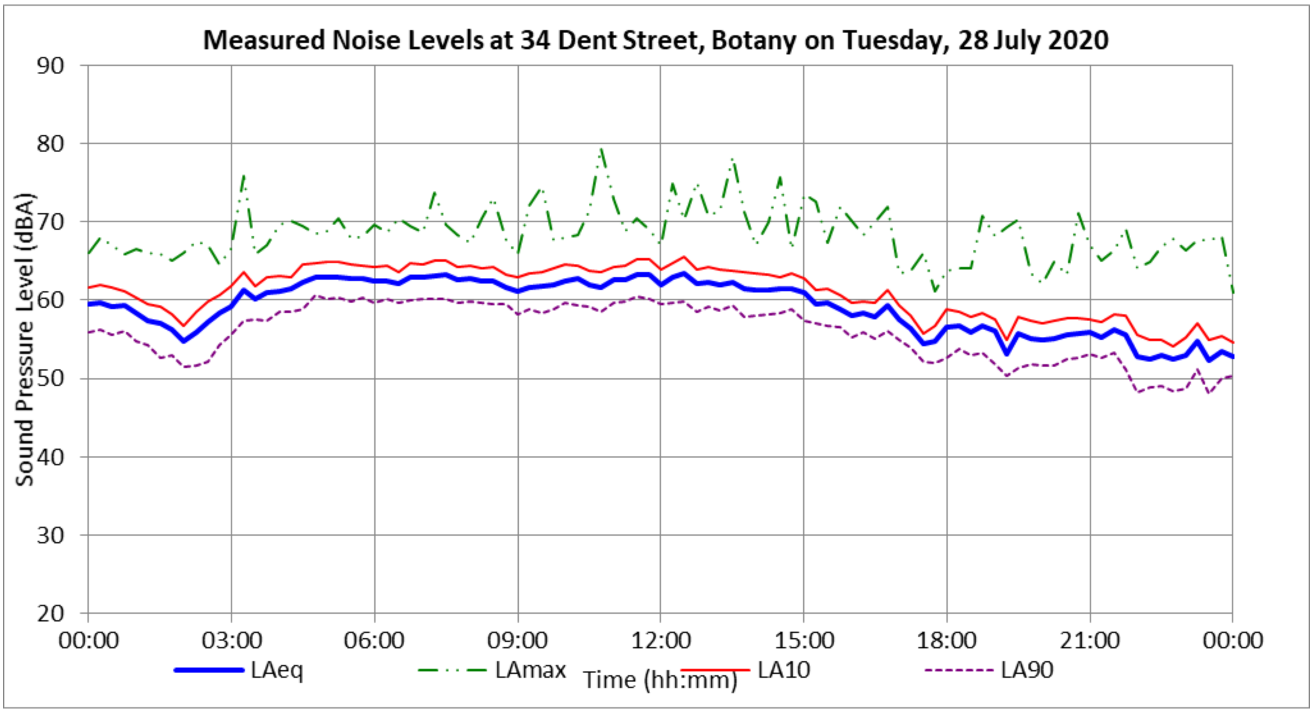

Measured Noise Levels at 34 Dent Street, Botany on Thursday, 23 July 2020
Sound Pressure Level (dBA)
90
80
70
60
50
40
30
20
00:00
03:00
06:00
09:00
12:00
15:00
18:00
21:00
00:00
Time (hh:mm)
LAeq
LAmax
LA10
LA90


Measured Noise Levels at 34 Dent Street, Botany on Friday, 24 July 2020
Sound Pressure Level (dBA)
90
80
70
60
50
40
30
20
00:00
03:00
06:00
09:00
12:00
15:00
18:00
21:00
00:00
Time (hh:mm)
LAeq
LAmax
LA10
LA90


Measured Noise Levels at 34 Dent Street, Botany on Saturday, 25 July 2020
Sound Pressure Level (dBA)
80
70
60
50
40
30
20
00:00
03:00
06:00
09:00
12:00
15:00
18:00
21:00
00:00
Time (hh:mm)
LAeq
LAmax
LA10
LA90


Measured Noise Levels at 34 Dent Street, Botany on Sunday, 26 July 2020
Sound Pressure Level (dBA)
80
70
60
50
40
30
20
00:00
03:00
06:00
09:00
12:00
15:00
18:00
21:00
00:00
Time (hh:mm)
LAeq
LAmax
LA10
LA90


Measured Noise Levels at 34 Dent Street, Botany on Monday, 27 July 2020
Sound Pressure Level (dBA)
90
80
70
60
50
40
30
20
00:00
03:00
06:00
09:00
12:00
15:00
18:00
21:00
00:00
Time (hh:mm)
LAeq
LAmax
LA10
LA90


Measured Noise Levels at 34 Dent Street, Botany on Tuesday, 28 July 2020
Sound Pressure Level (dBA)
90
80
70
60
50
40
30
20
00:00
03:00
06:00
09:00
12:00
15:00
18:00
21:00
00:00
Time (hh:mm)
LAeq
LAmax
LA10
LA90

APPENDIX C PLANT INVENTORY AND SOUND POWER LEVELS

The following inventory of large plant was provided by SICTL.

Table C1: SICTL Inventory of Large Plant

Active / Inactive	Master Asset ID	Description	Serial No	Build Year	Type	Manufacturer / OEM	Comments
A	QC01	Quay Crane	1661-1	2012	Shuttle Boom Crane	ZPMC	Height = 55m total, ~37m to ropes
A	QC02	Quay Crane	1661-2	2012	Shuttle Boom Crane	ZPMC	Height = 55m total, ~37m to ropes
A	QC03	Quay Crane	1715-1	2012	Shuttle Boom Crane	ZPMC	Height = 55m total, ~37m to ropes
A	QC04	Quay Crane	1715-2	2012	Shuttle Boom Crane	ZPMC	Height = 55m total, ~37m to ropes
A	ASC01L	Automated Stacking Crane	ASC-G1334	2013	-	Kone Cranes	Height = 24m total, ~22m to hoisting motor
A	ASC01W	Automated Stacking Crane	ASC-G1335	2013	-	Kone Cranes	Height = 24m total, ~22m to hoisting motor
A	ASC02L	Automated Stacking Crane	ASC-G1336	2013	-	Kone Cranes	Height = 24m total, ~22m to hoisting motor
A	ASC02W	Automated Stacking Crane	ASC-G1337	2013	-	Kone Cranes	Height = 24m total, ~22m to hoisting motor
A	ASC03L	Automated Stacking Crane	ASC-G1338	2013	-	Kone Cranes	Height = 24m total, ~22m to hoisting motor
A	ASC03W	Automated Stacking Crane	ASC-G1339	2013	-	Kone Cranes	Height = 24m total, ~22m to hoisting motor

A	ASC04L	Automated Stacking Crane	ASC-G1550	2015	-	Kone Cranes	Height = 24m total, ~22m to hoisting motor
A	ASC04W	Automated Stacking Crane	ASC-G1551	2015	-	Kone Cranes	Height = 24m total, ~22m to hoisting motor
A	ASC05L	Automated Stacking Crane	ASC-G1552	2015	-	Kone Cranes	Height = 24m total, ~22m to hoisting motor
A	ASC05W	Automated Stacking Crane	ASC-G1553	2015	-	Kone Cranes	Height = 24m total, ~22m to hoisting motor
A	ASC06L	Automated Stacking Crane	ASC-G1554	2015	-	Kone Cranes	Height = 24m total, ~22m to hoisting motor
A	ASC06W	Automated Stacking Crane	ASC-G1555	2015	-	Kone Cranes	Height = 24m total, ~22m to hoisting motor
A	SC01	Shuttle Carrier	4927	2013	SHC250H	Cargotec	Height ~9m to engine
A	SC02	Shuttle Carrier	4928	2013	SHC250H	Cargotec	Height ~9m to engine
A	SC03	Shuttle Carrier	4929	2013	SHC250H	Cargotec	Height ~9m to engine
A	SC04	Shuttle Carrier	4930	2013	SHC250H	Cargotec	Height ~9m to engine
A	SC05	Shuttle Carrier	4931	2013	SHC250H	Cargotec	Height ~9m to engine
A	SC06	Shuttle Carrier	4932	2013	SHC250H	Cargotec	Height ~9m to engine
A	SC07	Shuttle Carrier	4933	2013	SHC250H	Cargotec	Height ~9m to engine
A	SC08	Shuttle Carrier	4934	2013	SHC250H	Cargotec	Height ~9m to engine
A	SC11	Shuttle Carrier	5087	2014	SHC250H	Cargotec	Height ~9m to engine
A	SC12	Shuttle Carrier	5088	2014	SHC250H	Cargotec	Height ~9m to engine
A	RS01	Reach Stacker	13RS45020090	2013	SRSC45C2	Sany	Height of engine ~ 1.5m

A	RS02	Reach Stacker	13RS45020091	2013	SRSC45C2	Sany	Height of engine ~ 1.5m
	RS03	Reach Stacker	14RS45450058	2014	SRSC4545	Sany	Height of engine ~ 1.5m
	RS04	Reach Stacker	14RS45450059	2014	SRSC4545	Sany	Height of engine ~ 1.5m
A	RS05	Reach Stacker	14RS45020093	2014	SRSC45C2	Sany	Height of engine ~ 1.5m
A	RS06	Reach Stacker	14RS45020084	2014	SRSC45C2	Sany	Height of engine ~ 1.5m
A	EH01	Empty Handler	13DG1080030	2013	SDCY100K8-T	Sany	Not In Use
A	FL01	Fork Lift 16 T	13CP16010015	2013	SCP160C	Sany	Not measured
A	FL02	Fork Lift 5T	P455D 006 9888CNF	2013	C50SD / V3800T	Clark	Not measured
A	FL03	Fork Lift 2.5T	P232D 1419 9843CNF	2013	C25D	Clark	Not measured
A	FL04	Fork Lift 2.5T	P232D 1352 9843CNF	2013	C25D	Clark	Not measured
I	FL05	Fork Lift 2.5T	NA	NA	GEX25	Clark	Not measured
A	EWP01	Elevated workplatform	300171339	2013	JLG 800AJ	JLG	Not In Use
A	EWP02	Elevated workplatform	B200013419	2013	JLG324ES	JLG	Not In Use
A	TT01	Terminal Tractor	NA	2013	Terberg	Terberg	Not In Use
A	NSG 02	Reefer Generator 02 (25 Plug)	NA	NA	Rental Waterfront	NA	Not In Use

A	NSG 03	Reefer Generator 03 (25 Plug)	NA	NA	Rental Waterfront	NA	Not In Use
A	NSG 04	Reefer Generator 04(30 Plug)	NA	NA	Rental Waterfront	NA	Not In Use

Photos of each plant type referenced above are provided overleaf

Figure 3: Reach Stacker working on train

Figure 4: Shuttle Carrier in Quay Crane Area

Figure 4: Deck Lid Drop in Quay Crane Area

Figure 5: Quay Crane

Figure 7: ASC unloading container

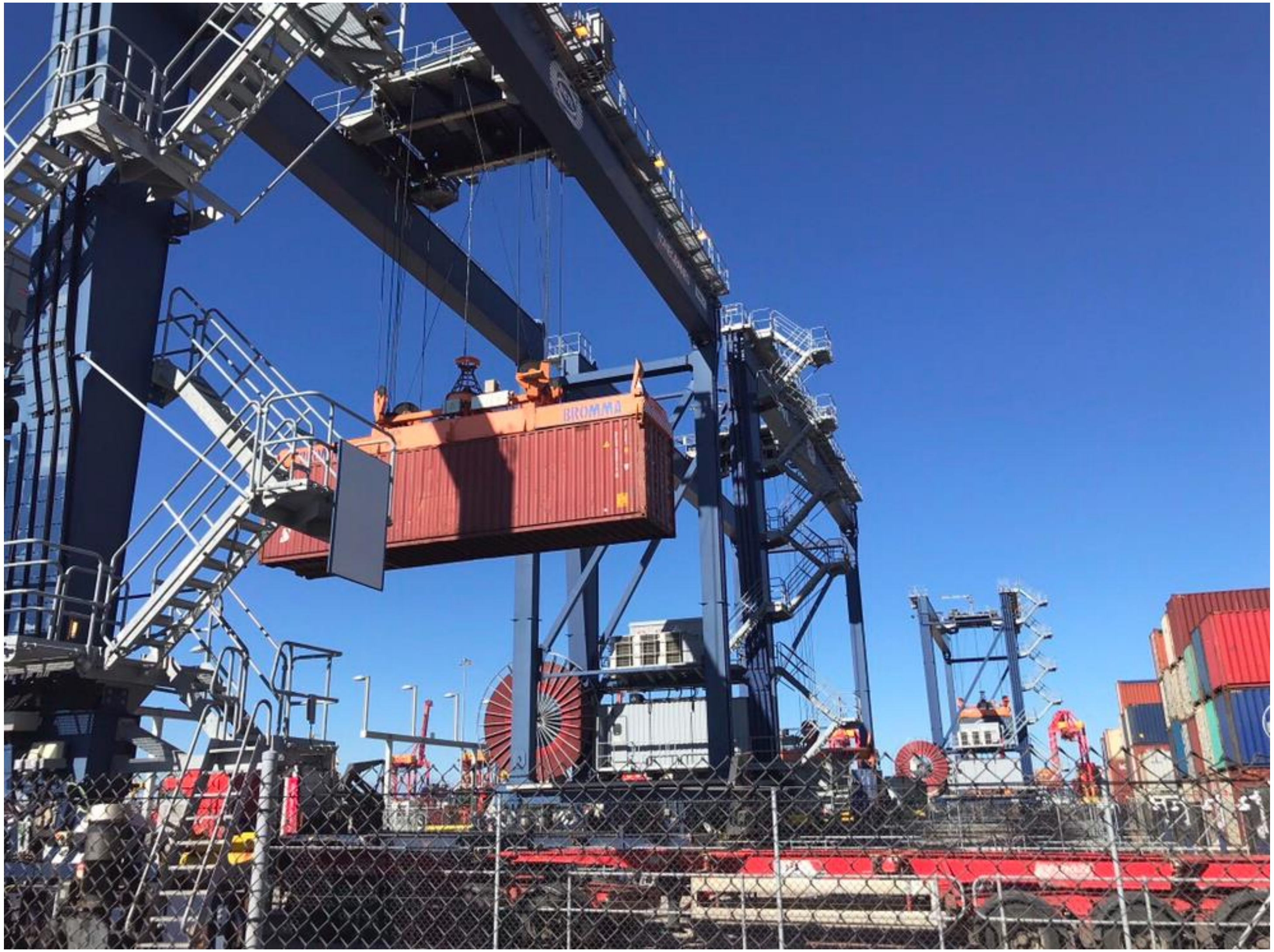


Figure 8: ASC loading container to truck

Figure 7: Rail Activity

The octave band sound power level derived for each plant item is detailed in Table C2 below.

Table C2: Octave Band Sound Power Level

	Octave Band Centre Frequency (Hz)							
Source	**63**	**125**	**250**	**500**	**1000**	**2000**	**4000**	**dBA**
ASC 001-006 Roller and Quacker	96	96	91	88	98	99	95	103
ASC Jib Spreader Movements	123	118	112	112	111	109	106	116
Quay Crane Rollers and Quacker	102	99	114	108	110	106	100	114
Quay Crane Jib Spreader Movements	122	113	115	116	117	113	106	120
Truck movement	110	106	101	98	97	95	88	102
Train locomotive (1 x locomotive)	105	103	106	108	101	94	91	108
Train locomotive idling (1 x locomotive)	112	108	106	98	96	93	89	105
Shuttle Carrier movement	117	111	109	108	104	100	96	110
Shuttle Carrier Dropping Container	133	124	120	116	113	108	105	119
Hatch Cover plate landing L_{max} Lw	135	132	127	122	118	116	109	125
Spreader attempting to engage with hatch cover plate L_{A1} Lw	110	110	116	118	117	114	108	121

	Octave Band Centre Frequency (Hz)							
Source	63	125	250	500	1000	2000	4000	dBA
Container landing L_{A1} Lw	133	131	124	119	116	114	111	123
Large Reach stacker in Train Area	122	118	116	112	107	104	96	114
Small Reach-stacker in ASC Yard	130	128	127	122	121	119	112	126

APPENDIX D SUMMARY OF MODELLING ASSUMPTIONS

SICTL has provided detailed information with regards to typical operations at the site. From that information, discussions with SICTL and our observations on site we have determined the following typical and worst-case operational scenarios for the current monitoring period. Both the site and the EPA break each day into three periods, being Day, Evening and Night. However, the EPA periods and the SICTL shift periods cover different times, with the differences explained in the table below.

Table D1: SICTL Typical and Worst Case Operating Scenarios

Area	Governing INP Period	SICTL work times within each INP period	TYPICAL Operating Scenario	WORST-CASE Operating Scenario
QUAY	Day	Part of Day shift 0700 - 1400 & Part of Evening shift 1400 - 1800	2 Quay Cranes working one ship 6 Shuttle Carriers	3 Quay Cranes working two ships 11 Shuttle Carriers
	Evening	Part of Evening shift 1800 - 2200	2 Quay Cranes working one ship 6 Shuttle Carriers	3 Quay Cranes working two ships 11 Shuttle Carriers
	Night	All of Night shift 2200 - 0600 & Part of Day shift 0600 - 0700	2 Quay Cranes working one ship 6 Shuttle Carriers	3 Quay Cranes working two ships 11 Shuttle Carriers
YARD	Day	Part of Day shift 0700 - 1400 & Part of Evening shift 1400 - 1800	12 Automated Stacking Cranes 1 Reach Stacker 38 trucks per hour	12 Automated Stacking Cranes 1 Reach Stacker, 49 trucks per hour
	Evening	Part of Evening shift 1800 - 2200	12 Automated Stacking Cranes 1 Reach Stacker 29 trucks per hour	12 Automated Stacking Cranes 1 Reach Stacker, 34 trucks per hour
	Night	All of Night shift 2200 - 0600 & Part of Day shift0600 - 0700	12 Automated Stacking Cranes 1 Reach Stacker 11 trucks per hour	12 Automated Stacking Cranes 1 Reach Stacker, 15 trucks per hour

Area	Governing INP Period	SICTL work times within each INP period	TYPICAL Operating Scenario	WORST-CASE Operating Scenario
RAIL	Day	Part of Day shift 0700 - 1400 & Part of Evening shift 1400 - 1800	2 Reach Stackers 1 Shuttle Carrier 3 trains per shift	2 Reach Stackers 1 Shuttle Carrier 4 trains per shift
	Evening	Part of Evening shift 1800 - 2200	2 Reach Stackers 1 Shuttle Carrier 3 trains per shift	2 Reach Stackers 1 Shuttle Carrier 4 trains per shift
	Night	All of Night shift 2200 - 0600 & Part of Day shift 0600 - 0700	2 Reach Stackers No Trains	2 Reach Stackers No Trains

Note that during each SICTL shift (Day, Evening and Night shift) there are a number of periods when the site is not operations, including:

- Toolbox talk 15 minutes (two Toolbox Talks fall within the EPA Night period)
- Meal break 45 minutes
- Wash up time 10 min

For some items of plant there are period during operation when noise is produced (e.g. when moving) and other times when no significant noise is produced (e.g. while waiting for another operation to be completed). The description of and duty time assumed for plant items are set out in the table below.

Table D2: Description and duration of noise generating activity for each item of plant

Plant	Noise generating activity description
Quay Area	
Quay Crane	The Quay Crane generates significant noise levels when it is (a) moving the spreader up or down; (b) landing a container and (c) when moving along the quay (parallel to the quayside). At other times whilst the crane is in use no significant noise is produced, this is typically whilst the crane awaits the next container for lifting or while the trolley cabin moves along its rails (perpendicular to the quayside). During the time each crane is in use, operations (a) and (b) account for approximately 35% of the time, whilst operation (c) accounts for around 6.6% of the time.
Shuttle Carriers	The Shuttle Carriers generate a high level of noise when in motion or engaging a container. These do not produce a high level of noise when idling, for example when waiting for a container to be readied.
ASC Area and Exchange Pad/Yard	
Automatic Stacking Cranes	The ASCs are remotely operated, they load and move containers within the ASC area. The noise producing activity of the crane occurs as it locates, lifts, moves, lowers and releases a container. This operation typically takes around 120 seconds per container.
Small Reach-Stacker	The small Reach-stacker operates for quick turnaround of containers or odd container shapes. Each movement in the yard will take approximately 20 seconds. This includes operations such as engaging the container, reversing, moving forward and placing a container onto a truck.
Trucks	Within the SICTL site, all trucks are limited to 20 km/h. Each truck movement encapsulate a defined route within the SICTL site for the loading or unloading of a truck. Loading and unloading of trucks are treated separately, as loading is significantly louder than unloading. We have assumed on average that half the trucks are delivering containers and half are picking up in any period.
Rail Area	
Large Reach-Stacker	Large Reach-stackers unload and load the containers from the container wagons. This includes reversing, moving forward, engaging a container, lifting a container, and placing a container. This operation takes approximately 30 seconds.
Shuttle Carriers	The Shuttle Carriers generate a high level of noise when in motion or engaging a container. These do not produce a high level of noise when idling, for example when waiting for a container to be readied. The noise generating activities account for around 100 seconds of the operational time per container movement.

Plant	Noise generating activity description
Locomotive	The Locomotive movement operates over 800 metres of rail on the SICTL site. A locomotives take approximately 360 seconds to enter site and come to a halt. Any shunting activities are included in this time. Speed is approximately 7-8 km/h.

Based on the above schedule Marshall Day has incorporated the following assumptions to model the typical and worst-case noise operations of the site.

Table D3: Noise model assumptions

DAY TIME TYPICAL	DAY TIME WORST CASE	EVENING TIME TYPICAL	EVENING TIME WORST CASE	NIGHT TIME TYPICAL	NIGHT TIME WORST CASE
Quay Area					
Quay Crane x 2	Quay Crane x 3	Quay Crane x 2	Quay Crane x 3	Quay Crane x 2	Quay Crane x 3
Shuttle Carrier x 6	Shuttle Carrier x 11	Shuttle Carrier x 6	Shuttle Carrier x 11	Shuttle Carrier x 6	Shuttle Carrier x 11
ASC Area and Exchange Pad/Yard					
12 x ASC Crane. 12 container movements assumed per crane per hour.	12 x ASC Crane. 16 container movements assumed per crane per hour.	12 x ASC Crane. 12 container movements assumed per crane per hour.	12 x ASC Crane. 16 container movements assumed per crane per hour.	12 x ASC Crane. 12 container movements assumed per crane per hour.	12 x ASC Crane. 16 container movements assumed per crane per hour.
1 x Reach Stacker. 16 container movements assumed per stacker per hour.	1 x Reach Stacker. 16 container movements assumed per stacker per hour.	1 x Reach Stacker. 16 container movements assumed per stacker per hour.	1 x Reach Stacker. 16 container movements assumed per stacker per hour.	1 x Reach Stacker. 16 container movements assumed per stacker per hour.	1 x Reach Stacker. 16 container movements assumed per stacker per hour.

DAY TIME TYPICAL	DAY TIME WORST CASE	EVENING TIME TYPICAL	EVENING TIME WORST CASE	NIGHT TIME TYPICAL	NIGHT TIME WORST CASE
38 Truck movements per hour. 20 container landings onto trucks per hour.	49 Truck movements per hour. 25 container landings onto trucks per hour	29 Truck movements per hour. 15 container landings onto trucks per hour.	34 Truck movements per hour. 17 container landings onto trucks per hour.	11 Truck movements per hour. 5 container landings onto trucks per hour.	15 Truck movements per hour. 7 container landings onto trucks per hour.
Rail Area					
2 x Reach Stackers. 48 container movements assumed per stacker per hour.	2 x Reach Stackers. 64 container movements assumed per stacker per hour.	2 x Reach Stackers. 48 container movements assumed per stacker per hour.	2 x Reach Stackers. 64 container movements assumed per stacker per hour.	2 x Reach Stackers. 48 container movements assumed per stacker per hour.	2 x Reach Stackers. 64 container movements assumed per stacker per hour.
1 x Shuttle Carrier. 24 container movements assumed per carrier per hour.	1 x Shuttle Carrier. 32 container movements assumed per carrier per hour.	1 x Shuttle Carrier. 24 container movements assumed per carrier per hour.	1 x Shuttle Carrier. 32 container movements assumed per carrier per hour.	No activity	No activity
1 x Train movement (includes shunting)	1 x Train movement (includes shunting)	1 x Train movement (includes shunting)	1 x Train movement (includes shunting)	No activity	No activity

APPENDIX E EPA RESPONSE LETTER

NSW EPA

Our reference: DOC14/127781
Contact: Jacqueline Roberts

Mr John Ieroklis
Environmental & Safety Compliance Engineer
Hutchison Ports Australia
PO Box 734
Botany NSW 1455

Dear John

Re: Sydney International Container Terminals
Port Botany Terminal 3 – Operational Compliance Measurements
SLR Proposed Scope of Works

The Environment Protection Authority (EPA) has reviewed correspondence from SLR Consulting Australia Pty Ltd ("SLR") dated 5 June 2014 submitted on behalf of Hutchison Ports Australia ("HPA") detailing a proposed methodology for conducting noise measurements and modelling at the Sydney International Container Terminal ("SICTL") as an alternative to conducting environmental noise monitoring at all six noise monitoring locations outlined in the SICTL environment protection licence (EPL No. 20322).

The EPA does not object to the use of a calibrated noise model in this case to demonstrate compliance with the noise limits specified on EPL No. 20322. However, it is noted that the EPA's position may change in the future due to technological, physical or operational changes in and around the licensed premises.

The following aspects of the proposed modelling approach should be addressed:

- Input Sound Power Levels (SWL) will need to be updated from time to time to reflect any deterioration in the noise performance of the plant and equipment used on site, and any additions or replacements;
- A detailed inventory must be maintained, and provided with model results, to enable tracking of plant and equipment introduction and replacement, as well as any deterioration in noise performance. This inventory should include:
  - Source noise levels (for example SWL or Sound Pressure Levels measured at a specified distance) for each individual item of plant and equipment;
  - Details, including source noise levels, of each item during each activity undertaken by that item (for example, for the ASC this includes during winching, rolling noise, movement alarms and when unloading containers to trucks); and
  - Service and replacement date and description for each item.
- Representative source heights and locations will need to be chosen carefully as they will significantly affect any barrier attenuation and the resulting predicted noise contribution of the site at both the calibration point and receiver locations. This will be especially important in the case of

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unshielded sources such as locomotive exhausts, likely to be above the 3m high barrier which is adjacent to the rail siding; and

- The methodology used, scenarios modelled and uncertainties will need to be described in detail in any noise compliance reports, so that the EPA can have confidence that the predicted noise levels at receiver locations are representative of the likely actual received noise levels.

Particular care will be needed in calibrating the model against measurements made at the proposed calibration point, which will be affected by road traffic noise from Foreshore Road as well as other sources in the area including ships in port, the existing Patrick container terminal, an adjoining construction site and Sydney Airport. The EPA requires at least two on-site calibration points which is likely to provide a more reliable result, by allowing measurements to be shielded from road traffic and airport noise and to allow the effect of local sources to be accounted for.

If you have any questions or queries in regards the above, please do not hesitate to contact Jacqueline Roberts on (02) 9995 5259.

Yours sincerely

11 July 2014

JAMES GOODWIN
Unit Head – Sydney Industry
Environment Protection Authority