

ACOUSTIC TERMINOLOGY

1 Sound Level or Noise Level

The terms 'sound' and 'noise' are almost interchangeable, except that in common usage 'noise' is often used to refer to unwanted sound.

Sound (or noise) consists of minute fluctuations in atmospheric pressure capable of evoking the sense of hearing. The human ear responds to changes in sound pressure over a very wide range. The loudest sound pressure to which the human ear responds is ten million times greater than the softest. The decibel (abbreviated as dB) scale reduces this ratio to a more manageable size by the use of logarithms.

The symbols SPL, L or LP are commonly used to represent Sound Pressure Level. The symbol LA represents A-weighted Sound Pressure Level. The standard reference unit for Sound Pressure Levels expressed in decibels is 2×10^{-5} Pa.

2 'A' Weighted Sound Pressure Level

The overall level of a sound is usually expressed in terms of dBA, which is measured using a sound level meter with an 'A-weighting' filter. This is an electronic filter having a frequency response corresponding approximately to that of human hearing.

People's hearing is most sensitive to sounds at mid frequencies (500 Hz to 4000 Hz), and less sensitive at lower and higher frequencies. Thus, the level of a sound in dBA is a good measure of the loudness of that sound. Different sources having the same dBA level generally sound about equally loud.

A change of 1 dBA or 2 dBA in the level of a sound is difficult for most people to detect, whilst a 3 dBA to 5 dBA change corresponds to a small but noticeable change in loudness. A 10 dBA change corresponds to an approximate doubling or halving in loudness. The table below lists examples of typical noise levels

Sound Pressure Level (dBA)	Typical Source	Subjective Evaluation
130	Threshold of pain	Intolerable
120	Heavy rock concert	Extremely noisy
110	Grinding on steel	
100	Loud car horn at 3 m	Very noisy
90	Construction site with pneumatic hammering	Loud
80	Kerbside of busy street	
70	Loud radio or television	
60	Department store	Moderate to quiet
50	General Office	
40	Inside private office	Quiet to very quiet
30	Inside bedroom	
20	Recording studio	Almost silent

Other weightings (eg B, C and D) are less commonly used than A-weighting. Sound Levels measured without any weighting are referred to as 'linear', and the units are expressed as dB(lin) or dB.

3 Sound Power Level

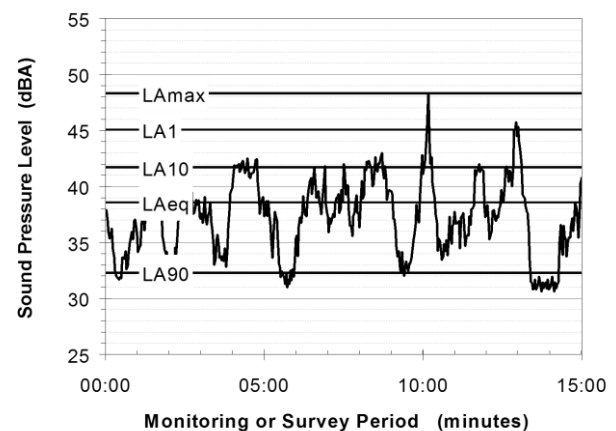
The Sound Power of a source is the rate at which it emits acoustic energy. As with Sound Pressure Levels, Sound Power Levels are expressed in decibel units (dB or dBA), but may be identified by the symbols SWL or Lw, or by the reference unit 10^{-12} W.

The relationship between Sound Power and Sound Pressure may be likened to an electric radiator, which is characterised by a power rating, but has an effect on the surrounding environment that can be measured in terms of a different parameter, temperature.

4 Statistical Noise Levels

Sounds that vary in level over time, such as road traffic noise and most community noise, are commonly described in terms of the statistical exceedance levels LAN, where LAN is the A-weighted sound pressure level exceeded for N% of a given measurement period. For example, the LA1 is the noise level exceeded for 1% of the time, LA10 the noise exceeded for 10% of the time, and so on.

The following figure presents a hypothetical 15 minute noise survey, illustrating various common statistical indices of interest.



Of particular relevance, are:

- LA1 The noise level exceeded for 1% of the 15 minute interval.
- LA10 The noise level exceeded for 10% of the 15 minute interval. This is commonly referred to as the average maximum noise level.
- LA90 The noise level exceeded for 90% of the sample period. This noise level is described as the average minimum background sound level (in the absence of the source under consideration), or simply the background level.
- LAeq The A-weighted equivalent noise level (basically the average noise level). It is defined as the steady sound level that contains the same amount of acoustical energy as the corresponding time-varying sound.

When dealing with numerous days of statistical noise data, it is sometimes necessary to define the typical noise levels at a given monitoring location for a particular time of day. A standardised method is available for determining these representative levels.

This method produces a level representing the 'repeatable minimum' LA90 noise level over the daytime and night-time measurement periods, as required by the EPA. In addition the method produces mean or 'average' levels representative of the other descriptors (LAeq, LA10, etc).

5 Tonality

Tonal noise contains one or more prominent tones (ie distinct frequency components), and is normally regarded as more offensive than 'broad band' noise.

ACOUSTIC TERMINOLOGY

6 Impulsiveness

An impulsive noise is characterised by one or more short sharp peaks in the time domain, such as occurs during hammering.

7 Frequency Analysis

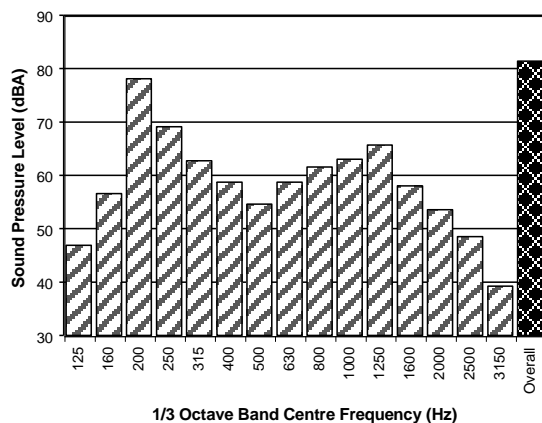
Frequency analysis is the process used to examine the tones (or frequency components) which make up the overall noise or vibration signal. This analysis was traditionally carried out using analogue electronic filters, but is now normally carried out using Fast Fourier Transform (FFT) analysers.

The units for frequency are Hertz (Hz), which represent the number of cycles per second.

Frequency analysis can be in:

- Octave bands (where the centre frequency and width of each band is double the previous band)
- 1/3 octave bands (3 bands in each octave band)
- Narrow band (where the spectrum is divided into 400 or more bands of equal width)

The following figure shows a 1/3 octave band frequency analysis where the noise is dominated by the 200 Hz band. Note that the indicated level of each individual band is less than the overall level, which is the logarithmic sum of the bands.



8 Vibration

Vibration may be defined as cyclic or transient motion. This motion can be measured in terms of its displacement, velocity or acceleration. Most assessments of human response to vibration or the risk of damage to buildings use measurements of vibration velocity. These may be expressed in terms of 'peak' velocity or 'rms' velocity.

The former is the maximum instantaneous velocity, without any averaging, and is sometimes referred to as 'peak particle velocity', or PPV. The latter incorporates 'root mean squared' averaging over some defined time period.

Vibration measurements may be carried out in a single axis or alternatively as triaxial measurements. Where triaxial measurements are used, the axes are commonly designated vertical, longitudinal (aligned toward the source) and transverse.

The common units for velocity are millimetres per second (mm/s). As with noise, decibel units can also be used, in which case the reference level should always be stated. A vibration level V , expressed in mm/s can be converted to decibels by the formula $20 \log (V/V_0)$, where V_0 is the reference level (10^{-9} m/s). Care is required in this regard, as other reference levels may be used by some organizations.

9 Human Perception of Vibration

People are able to 'feel' vibration at levels lower than those required to cause even superficial damage to the most susceptible classes of building (even though they may not be disturbed by the motion). An individual's perception of motion or response to vibration depends very strongly on previous experience and expectations, and on other connotations associated with the perceived source of the vibration. For example, the vibration that a person responds to as 'normal' in a car, bus or train is considerably higher than what is perceived as 'normal' in a shop, office or dwelling.

BASELINE NOISE SURVEY
Short Term Day Time Attended Noise Levels – October 2012

Location	Date & Time	Measured Noise Level, 15-min, dBA				Ambient Influences
		LAeq	LA90	LA10	LA1	
S1 Corryton Court Wattle Grove	31/10/12 11:55	42	33	45	53	Aircraft Flyover 37 – 42 Local Traffic Pass-by 56 – 57 Local fauna 41 – 50
S2 Goodenough St, Glenfield	31/10/12 10:45	49	37	50	62	Distant Traffic 42 - 43 Local fauna 41 - 55
S3 Buckland Road, Casula	31/10/12 12:55	58	45	53	67	Distant Traffic 44 – 46 Aircraft Flyover 65 – 67 Local fauna 47 – 48 Dog Barking 80 – 82 Train pass-by 65 – 67 Local Traffic Pass-by 56 – 57

Short Term Evening Attended Noise Levels – October 2012

Location	Date & Time	Measured Noise Level, 15-min, dBA				Ambient Influences
		LAeq	LA90	LA10	LA1	
S1 Corryton Court Wattle Grove	31/10/12 19:50	45	39	49	56	Aircraft Flyover 37 – 42 Distant Traffic 41 – 43 Residential Activity 41 - 48 Local Traffic Pass-by 44 – 59 Local fauna 39 – 51
S2 Goodenough St Glenfield	31/10/12 10:45	47	41	50	53	Distant Traffic 42 – 52 Local Traffic 50 – 64 Residential Activity 42 - 46 Local fauna 41 - 55
S3 Buckland Road Casula	31/10/12 12:55	50	40	46	63	Distant Traffic 39 – 43 Local fauna 41 – 64 Residential Activity 39 - 42 Train pass-by 44 – 64

Short Term Night-Time Attended Noise Levels – October 2012

Location	Date & Time	Measured Noise Level, 15-min, dBA				Ambient Influences
		LAeq	LA90	LA10	LA1	
S1 Corryton Court Wattle Grove	31/10/12 23:05	54	43	47	70	Aircraft Flyover 37 – 42 Local Traffic Pass-by 47 – 60 Distant Train pass-by 47 - 54 Local fauna 43 – 46
S2 Goodenough St Glenfield	31/10/12 22:30	47	48	49	56	Distant Traffic 44 – 53 Local Traffic 48 – 68 Local fauna 41 - 55
S3 Buckland Road Casula	31/10/12 22:00	61	44	50	72	Distant Traffic 44 – 45 Local fauna 45 – 49 Freight Train pass-by 51 – 82 Passenger Train 46 - 69

BASELINE NOISE SURVEY

Short Term Day Time Attended Noise Levels – January 2013

Location	Date & Time	Measured Noise Level, 15-min, dBA				Ambient Influences
		LAeq	LA90	LA10	LA1	
S1 Corryton Court Wattle Grove	31/01/13 17:30	51	42	52	63	Aircraft Flyover 37 – 42 Local Traffic Pass-by 56 – 57 Local fauna 41 – 50
S2 Goodenough St, Glenfield	31/01/13 16:57	51	46	53	60	Distant Traffic 42 - 43 Local fauna 41 - 55
S3 Buckland Road, Casula	31/01/13 16:24	52	46	52	66	Distant Traffic 44 – 46 Aircraft Flyover 65 – 67 Local fauna 47 – 48 Dog Barking 80 – 82 Train pass-by 65 – 67 Local Traffic Pass-by 56 – 57

Short Term Evening Attended Noise Levels – January 2013

Location	Date & Time	Measured Noise Level, 15-min, dBA				Ambient Influences
		LAeq	LA90	LA10	LA1	
S1 Corryton Court Wattle Grove	31/01/13 19:30	54	41	53	68	Aircraft Flyover 37 – 42 Distant Traffic 41 – 43 Residential Activity 41 - 48 Local Traffic Pass-by 44 – 59 Local fauna 39 – 51
S2 Goodenough St Glenfield	31/01/13 18:59	50	45	52	59	Distant Traffic 42 – 52 Local Traffic 50 – 64 Residential Activity 42 - 46 Local fauna 41 - 55
S3 Buckland Road Casula	31/01/13 18:26	56	47	52	71	Distant Traffic 39 – 43 Local fauna 41 – 64 Residential Activity 39 - 42 Train pass-by 44 – 64

Short Term Night-Time Attended Noise Levels – January 2013

Location	Date & Time	Measured Noise Level, 15-min, dBA				Ambient Influences
		LAeq	LA90	LA10	LA1	
S1 Corryton Court Wattle Grove	22/01/13 23:20	38	31	40	49	Local Traffic Pass-by 47 – 60 Distant Train pass-by 47 - 54 Local fauna 43 – 46
S2 Goodenough St Glenfield	22/01/13 22:46	44	37	45	53	Distant Traffic 44 – 53 Local Traffic 48 – 68 Local fauna 41 - 55
S3 Buckland Road Casula	22/01/13 22:12	51	39	47	66	Distant Traffic 44 – 45 Local fauna 45 – 49 Freight Train pass-by 51 – 82 Passenger Train 46 - 69

Appendix B

Report Number 620.10816

Page 3 of 31

BASELINE NOISE SURVEY**Short Term Day Time Attended Noise Levels – April 2013**

Location	Date & Time	Measured Noise Level, 15-min, dBA				Ambient Influences
		LAeq	LA90	LA10	LA1	
S1 Corryton Court, Wattle Grove	18/4/2013 12:18	47	35	50	58	Aircraft passby 48-57 Fauna 42-46 Distant traffic 47-49 Domestic activity 50-52
S2 Goodenough Street, Glenfield	18/4/2013 11:25	45	34	48	56	Aircraft passby 55-59 Fauna 35-39
S3 Buckland Road, Casula	18/4/2013 12:49	54	43	56	65	Excavator 49-52 M5 traffic 43-45 Aircraft passby 49-54 Electric train 60-75 Sucker truck 57-59 Reversing alarms 45-48

Short Term Evening Attended Noise Levels – April 2013

Location	Date & Time	Measured Noise Level, 15-min, dBA				Ambient Influences
		LAeq	LA90	LA10	LA1	
S1 Corryton Court, Wattle Grove	30/4/2013 21:30	39	29	42	50	Local fauna 31-32 Collector road 35-39 Rail passby 41-50 Local road 43-45 Aircraft distant 37-38
S2 Goodenough Street, Glenfield	30/4/2013 19:07	47	42	50	54	Fauna 41-42 Local traffic 45-49 Traffic Cambridge Ave 43-45 Heavy vehicle Cambridge Ave 47-50 Aircraft passby 43-49
S3 Buckland Road, Casula	30/4/2013 18:00	54	46	52	68	M5 traffic 46-48 Insect (cricket noise) 45-46 Aircraft 54-55 Train passby 55-68

Short Term Night-Time Attended Noise Levels – April 2013

Location	Date & Time	Measured Noise Level, 15-min, dBA				Ambient Influences
		LAeq	LA90	LA10	LA1	
S1 Corryton Court, Wattle Grove	30/4/2013 22:00	35	28	38	47	Fauna 28-30 Collector road 34-36 Dogs barking 33-34 Aircraft passby 35-42 Train passby 39-49
S2 Goodenough Street, Glenfield	30/4/2013 22:30	42	37	44	45	Car Cambridge ave 43-46 Truck Cambridge ave 44-51 Aircraft passby 43-48 Fauna 34-36

Appendix B

Report Number 620.10816

Page 4 of 31

BASELINE NOISE SURVEY

Location	Date & Time	Measured Noise Level, 15-min, dBA				Ambient Influences
		LAeq	LA90	LA10	LA1	
S3 Buckland Road, Casula	30/4/2013 23:06	50	37	40	65	Fauna 37-38 Dogs barking 50-52 Domestic noise 38-39 Rail passby 49-66 Distant traffic 38-39

Short Term Day Time Attended Noise Levels – July 2013

Location	Date & Time	Measured Noise Level, 15-min, dBA				Ambient Influences
		LAeq	LA90	LA10	LA1	
S1 Corryton Court, Wattle Grove	12/07/13 10:15	53	37	53	66	Fauna 38-45 Residential activity 43-48 Aircraft 45-50 Traffic 42-43
S2 Goodenough Street, Glenfield	12/07/13 11:00	46	33	48	59	Air traffic 49-50 Fauna 35-38, 42-44 Residential activity
S3 Buckland Road, Casula	12/07/13 09:40	51	47	54	59	Fauna 41-42, 53-60 Distant reversing beeper 42-43 Air traffic 46-54 Train pass-by 62-64 Distant traffic 40-41

Short Term Evening Attended Noise Levels – July 2013

Location	Date & Time	Measured Noise Level, 15-min, dBA				Ambient Influences
		LAeq	LA90	LA10	LA1	
S1 Corryton Court, Wattle Grove	25/07/13 19:25	47	40	49	56	Fauna 38-44 Air traffic 42-53 Train pass-by 47-49 Distant traffic 38-47 Traffic 41-62 Residential activity 43-47
S2 Goodenough Street, Glenfield	25/07/13 20:00	51	46	54	57	Traffic on Cambridge Avenue 44-55 Fauna 44-48 Traffic 41-54 Distant traffic 44-53 Residential activity 50-53
S3 Buckland Road, Casula	25/07/13 20:32	52	49	53	64	Distant traffic on M5 48-57 Passenger train 49-63 Fauna 48-49

Short Term Night-Time Attended Noise Levels – July 2013

Location	Date & Time	Measured Noise Level, 15-min, dBA				Ambient Influences
		LAeq	LA90	LA10	LA1	
S1 Corryton Court, Wattle Grove	24/07/13 22:29	42	32	44	54	Distant traffic 29-30 Traffic on Wattle Grove Dr 33-39 Distant train pass-by 31-45 Residential activity 33-37 Traffic on Corryton Ct 31-60
S2 Goodenough Street, Glenfield	24/07/13 23:30	43	38	45	53	Traffic on Cambridge Ave 37-44 Distant train pass-by 39-55 Fauna 35-36
S3 Buckland Road, Casula	24/07/13 23:00	45	35	45	58	Air traffic 49-59 Traffic 43-45 Train pass-by 42-64 Traffic on M5 33-45 Fauna 40-42

Short Term Day Time Attended Noise Levels – October 2013

Location	Date & Time	Measured Noise Level, 15-min, dBA				Ambient Influences
		LAeq	LA90	LA10	LA1	
S1 Corryton Court, Wattle Grove	18/10/13 11:06	48	37	51	59	Fauna 35-54 Air traffic 35-50, 60-73
S2 Goodenough Street, Glenfield	18/10/13 12:21	59	37	46	53	Air traffic 44-54 Distant traffic 41-47 Fauna 41-43, 85 (Peak)
S3 Buckland Road, Casula	18/10/13 13:49	59	44	50	72	Freight train 47-81 Traffic on M5 41-53 Fauna 41-56 Passenger 46-62 Traffic 47-52

Short Term Evening Attended Noise Levels – October 2013

Location	Date & Time	Measured Noise Level, 15-min, dBA				Ambient Influences
		LAeq	LA90	LA10	LA1	
S1 Corryton Court, Wattle Grove	17/10/13 20:00	48	35	47	60	Traffic 42-47, 72 (Peak) Distant traffic 40-47 Air traffic 37-45 Residential activity 41-52 Train 36-49 Fauna 33-36
S2 Goodenough Street, Glenfield	17/10/13 20:45	45	41	48	54	Traffic on Cambridge Ave 40-46 Traffic 41-52 Air traffic 46-53 Fauna 41-48 Residential activity 52-58 Train 42-43

Appendix B

Report Number 620.10816

Page 6 of 31

BASELINE NOISE SURVEY

Location	Date & Time	Measured Noise Level, 15-min, dBA				Ambient Influences
		LAeq	LA90	LA10	LA1	
S3 Buckland Road, Casula	17/10/13 21:18	49	37	45	63	Residential activity 34-37 Train 40-43 Fauna 30-37

Short Term Night-Time Attended Noise Levels – October 2013

Location	Date & Time	Measured Noise Level, 15-min, dBA				Ambient Influences
		LAeq	LA90	LA10	LA1	
S1 Corryton Court, Wattle Grove	17/10/13 22:05	44	36	46	54	Fauna 43-44 Train 40-50 Air traffic 45-50 Traffic 42-63
S2 Goodenough Street, Glenfield	17/10/13 22:40	50	38	46	62	Traffic 42-73 Fauna 33-35 Traffic on Cambridge Ave 33-35 Air traffic 41-44 Residential activity 39-49
S3 Buckland Road, Casula	17/10/13 23:10	52	34	43	67	Passenger train 39-57 Freight train 40-69 Fauna 38-40 Residential activity 33-35 Air traffic 41

Short Term Day Time Attended Noise Levels – January 2014

Location	Date & Time	Measured Noise Level, 15-min, dBA				Ambient Influences
		LAeq	LA90	LA10	LA1	
S1 Corryton Court, Wattle Grove	17/01/14 10:15	54	52	56	59	Fauna 49-59 Air traffic 50-52 Residential activity 50-56 Distant traffic 51-54
S2 Goodenough Street, Glenfield	17/01/14 11:03	47	36	45	61	Fauna 36-43 Residential activity 42-46 Air traffic 39-43 Residential
S3 Buckland Road, Casula	17/01/14 11:39	53	41	51	69	Passenger train 45-71 Fauna 39-45 Distant traffic 39-40, 42-45 Local traffic 45-48 Car alarm 44-49 Residential 64 (peak) Air traffic 51-61

BASELINE NOISE SURVEY

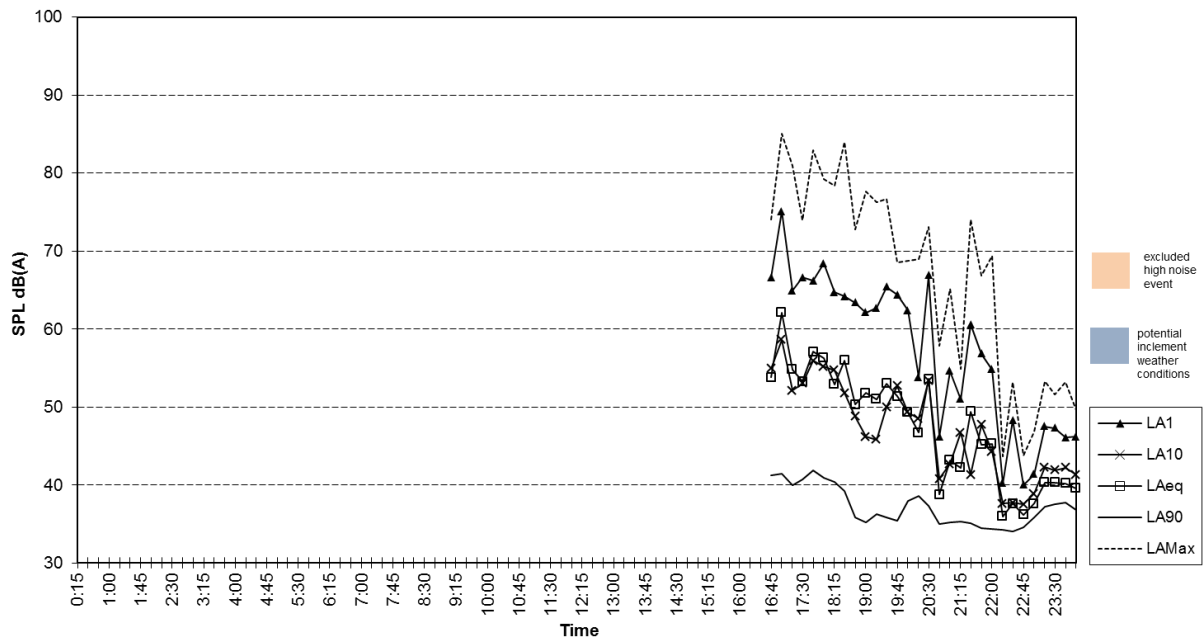
Short Term Evening Attended Noise Levels – January 2014

Location	Date & Time	Measured Noise Level, 15-min, dBA				Ambient Influences
		LAeq	LA90	LA10	LA1	
S1 Corryton Court, Wattle Grove	29/01/14 19:59	46	38	45	58	Fauna 37-46 Residential activity 45-60 Distant traffic 38-41 Local traffic 41-64 Train 38-41
S2 Goodenough Street, Glenfield	29/01/14 20:39	46	43	48	51	Traffic on Cambridge Ave 48-50 Fauna 44-46 Local traffic 46-50
S3 Buckland Road, Casula	29/01/14 21:12	52	40	47	67	Residential activity 45-50, 65 (Peak) Fauna 50-55 Passenger train 66-70

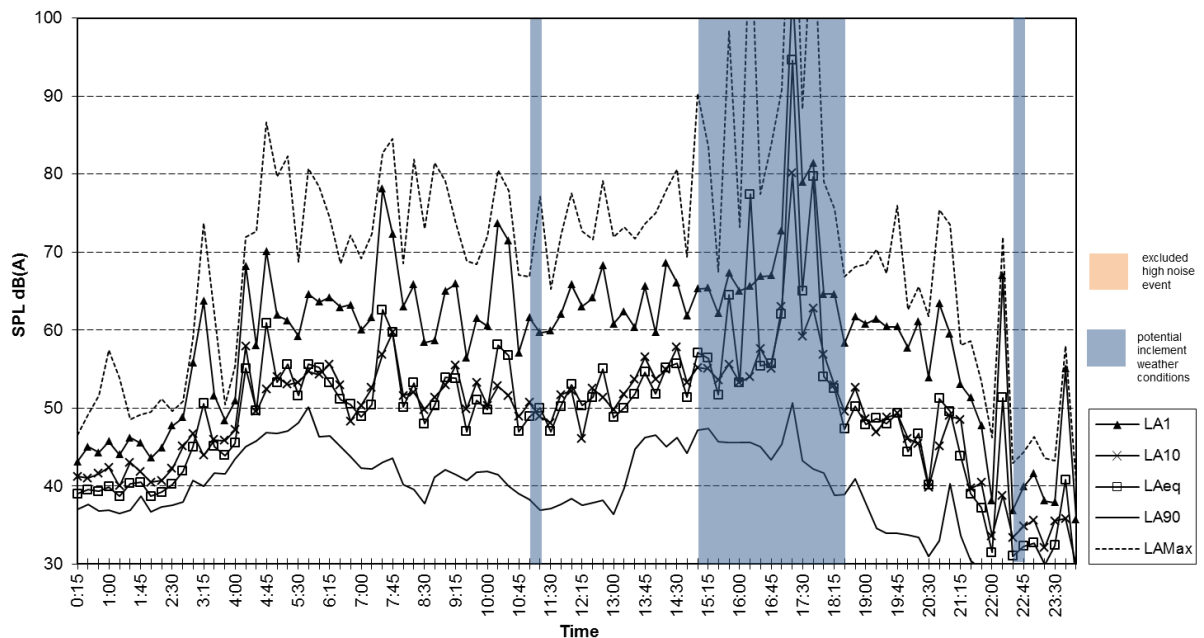
Short Term Night-Time Attended Noise Levels – January 2014

Location	Date & Time	Measured Noise Level, 15-min, dBA				Ambient Influences
		LAeq	LA90	LA10	LA1	
S1 Corryton Court, Wattle Grove	29/01/14 23:10	35	30	37	44	Distant traffic 30-32, 42 Fauna 30-32 Passenger train 33-46
S2 Goodenough Street, Glenfield	29/01/14 22:37	44	37	45	56	Traffic on Cambridge Ave 45-50 Fauna 40-42 Distant train 45-46 Air traffic 60-61
S3 Buckland Road, Casula	29/01/14 22:07	51	40	49	66	Passenger train 39-59,62-70 Residential activity 40-46 Air traffic 47-57

Location 1 - Aitape Place, Wattle Grove, NSW
Measured Noise Levels - Tuesday 2 November, 2010

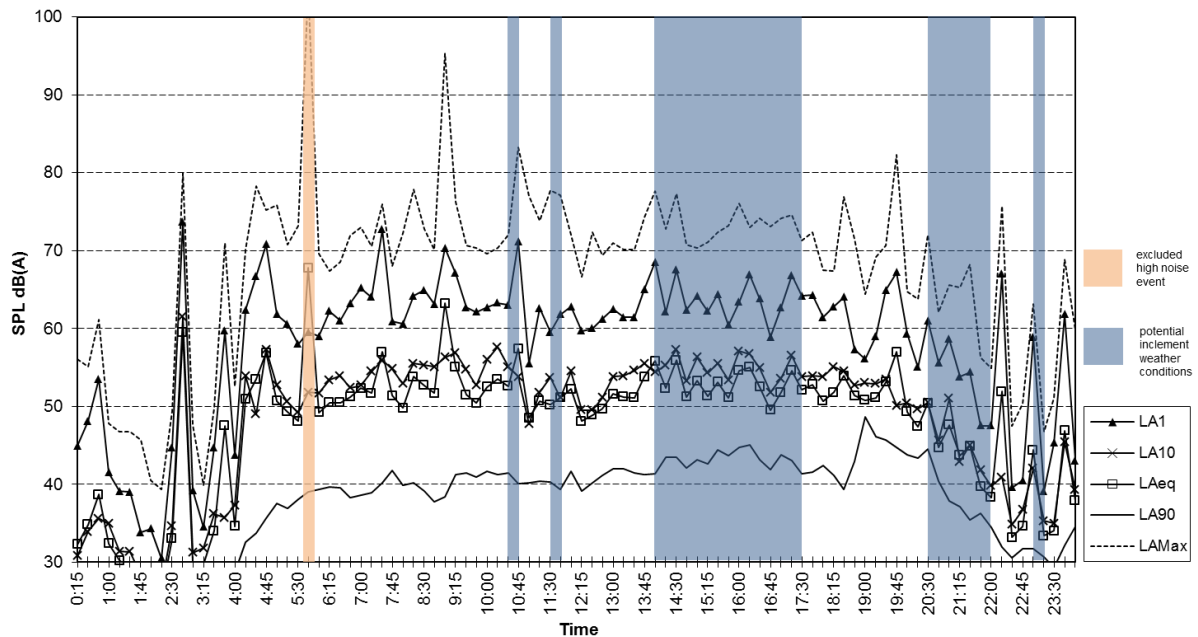


Location 1 - Aitape Place, Wattle Grove, NSW
Measured Noise Levels - Wednesday 3 November, 2010

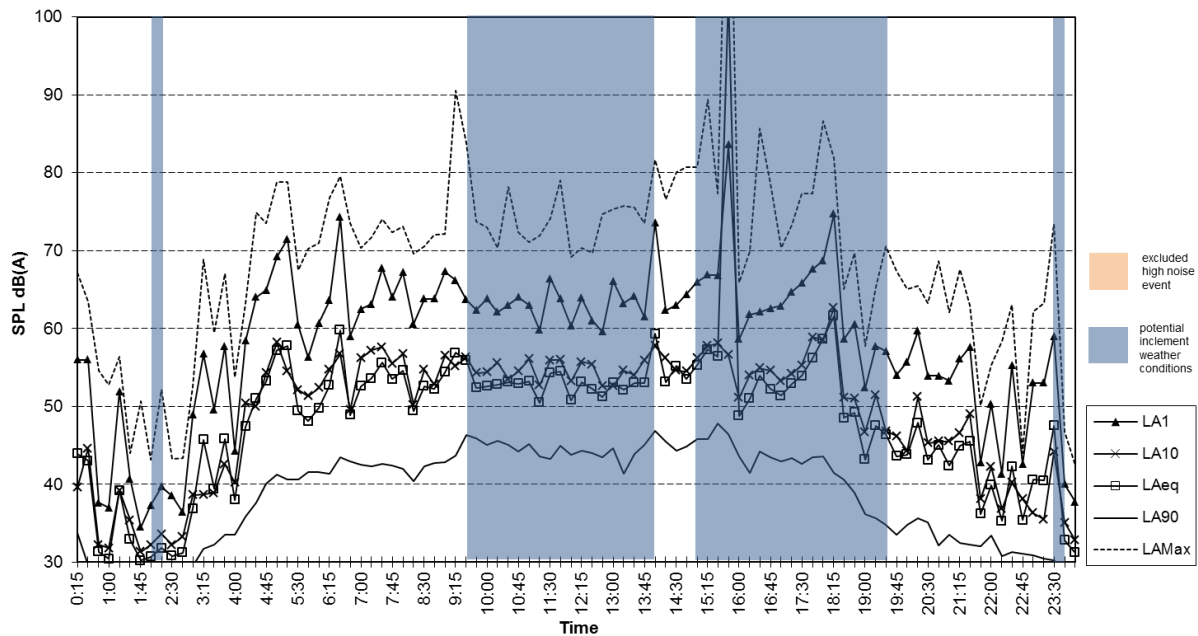


BASELINE NOISE SURVEY

Location 1 - Aitape Place, Wattle Grove, NSW
Measured Noise Levels - Thursday 4 November, 2010



Location 1 - Aitape Place, Wattle Grove, NSW
Measured Noise Levels - Friday 5 November, 2010



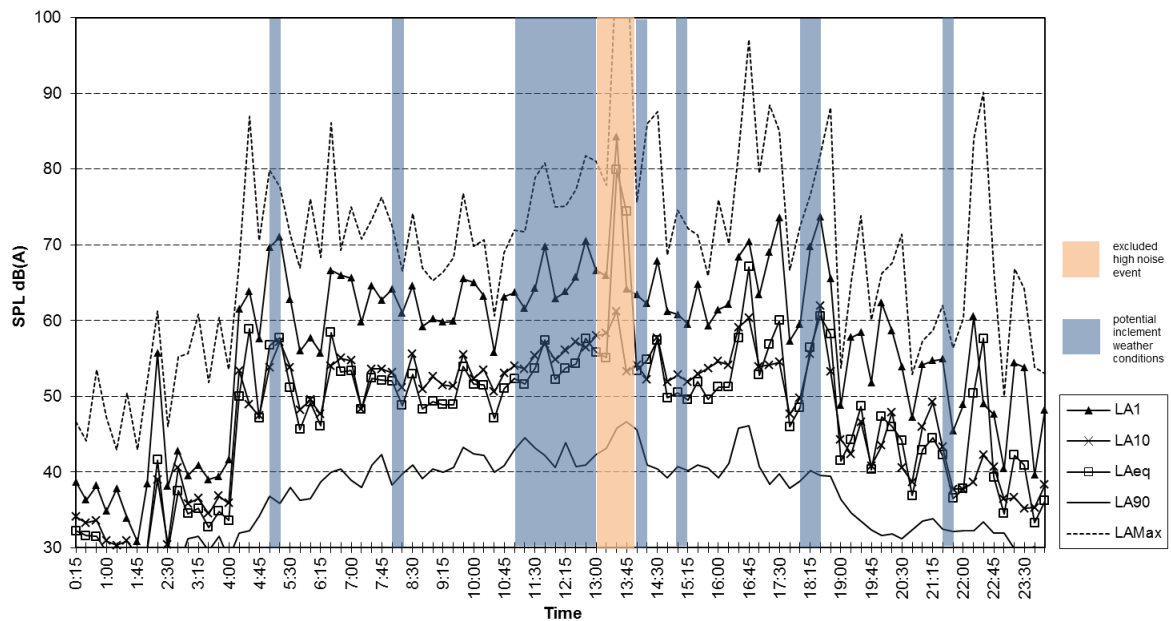
Appendix B

Report Number 620.10816

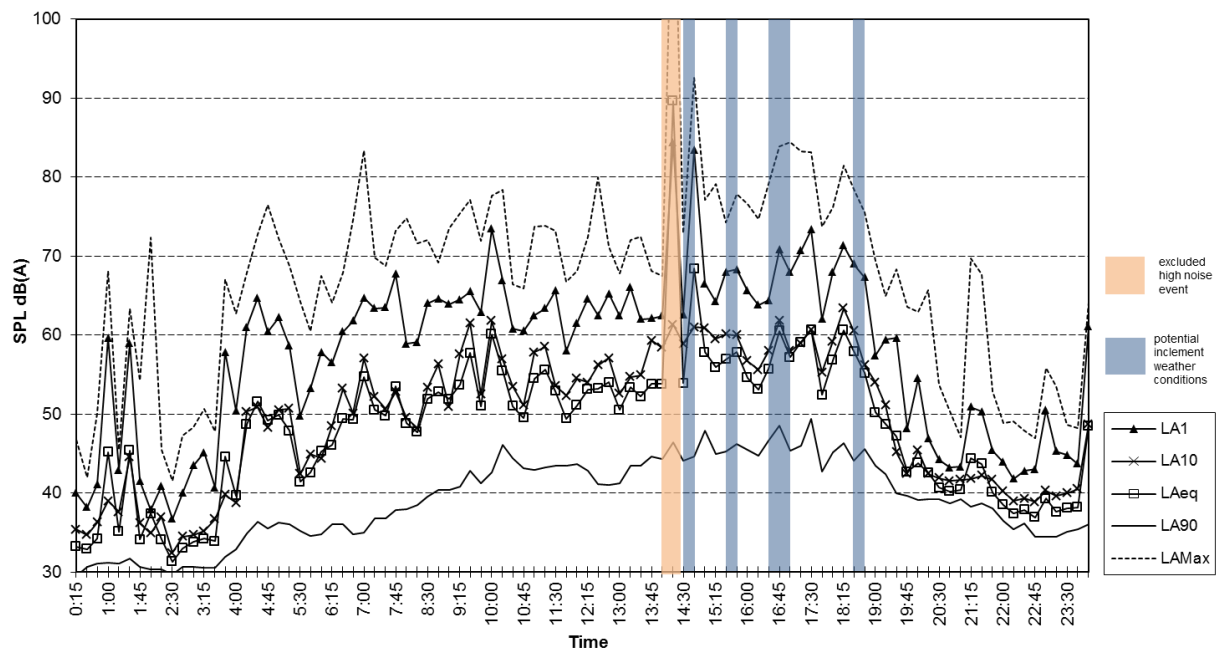
Page 10 of 31

BASELINE NOISE SURVEY

Location 1 - Aitape Place, Wattle Grove, NSW
Measured Noise Levels - Saturday 6 November, 2010



Location 1 - Aitape Place, Wattle Grove, NSW
Measured Noise Levels - Sunday 7 November 2010



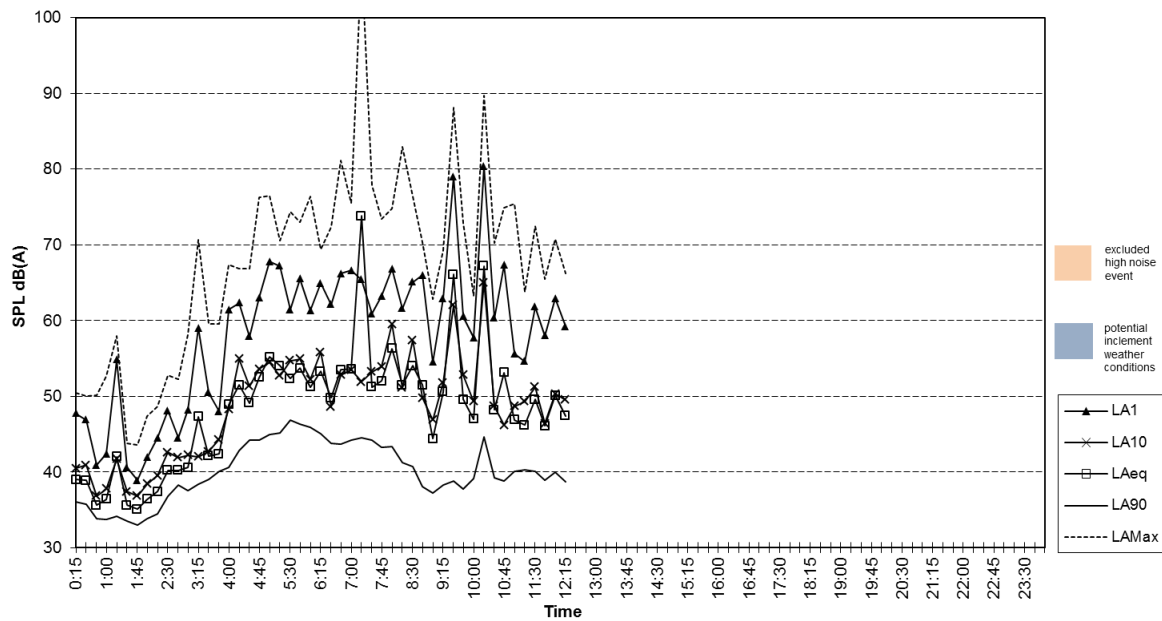
Appendix B

Report Number 620.10816

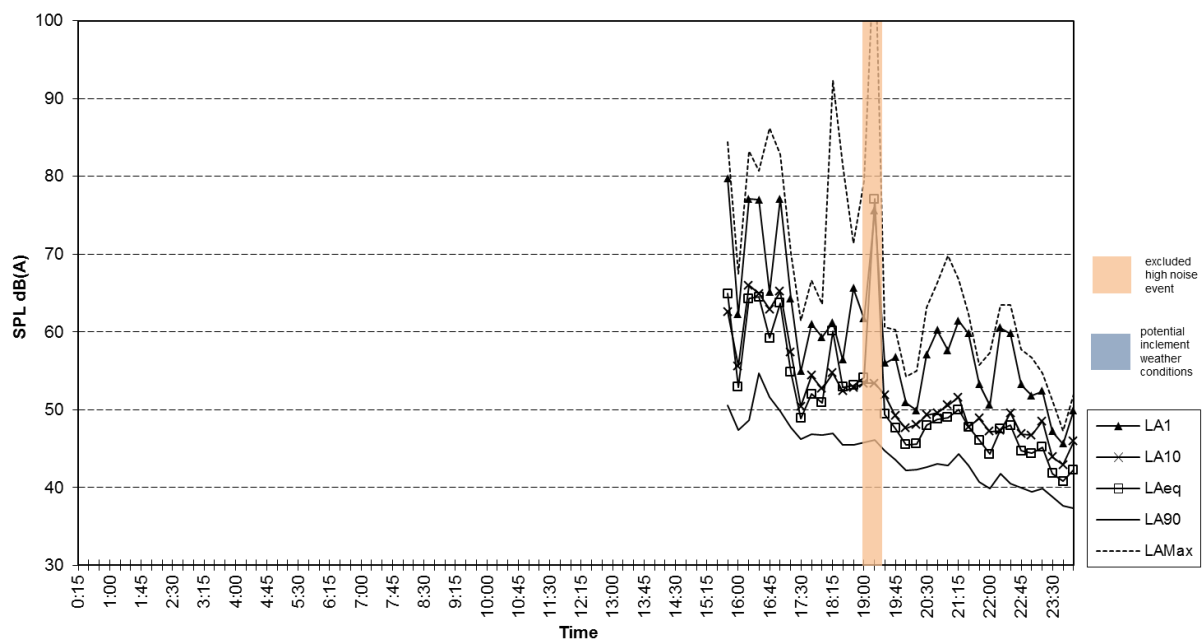
Page 11 of 31

BASELINE NOISE SURVEY

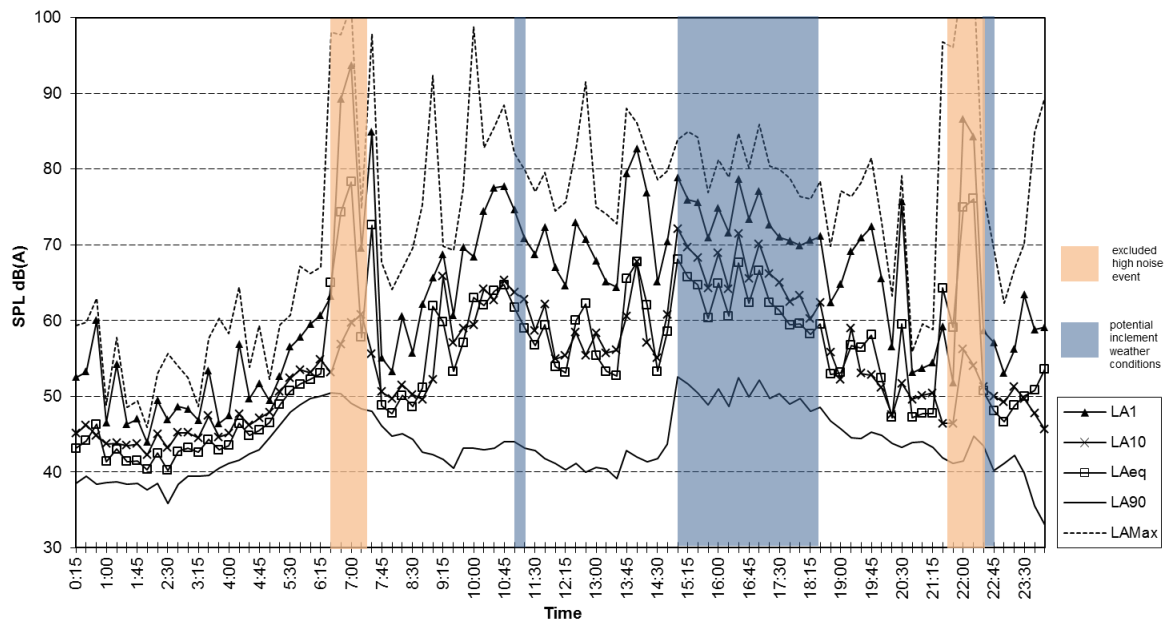
Location 1 - Aitape Place, Wattle Grove, NSW
Measured Noise Levels - Monday 8 November, 2010



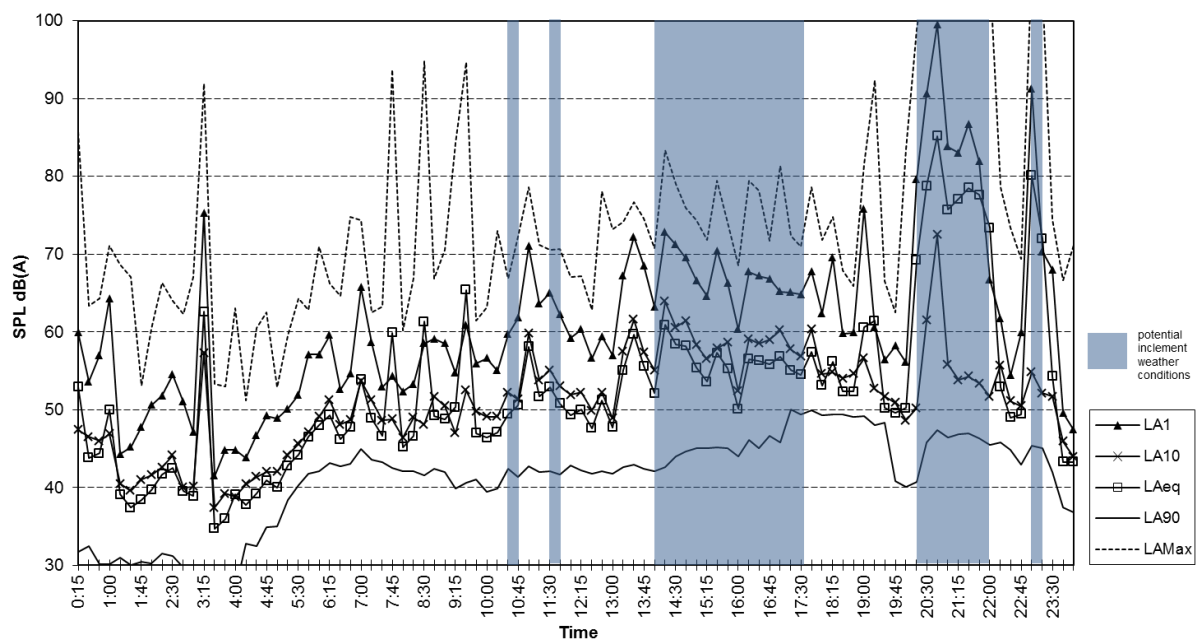
Location 2 - Goodenough Street, Glenfield
Measured Noise Levels - Tuesday 2 November, 2010



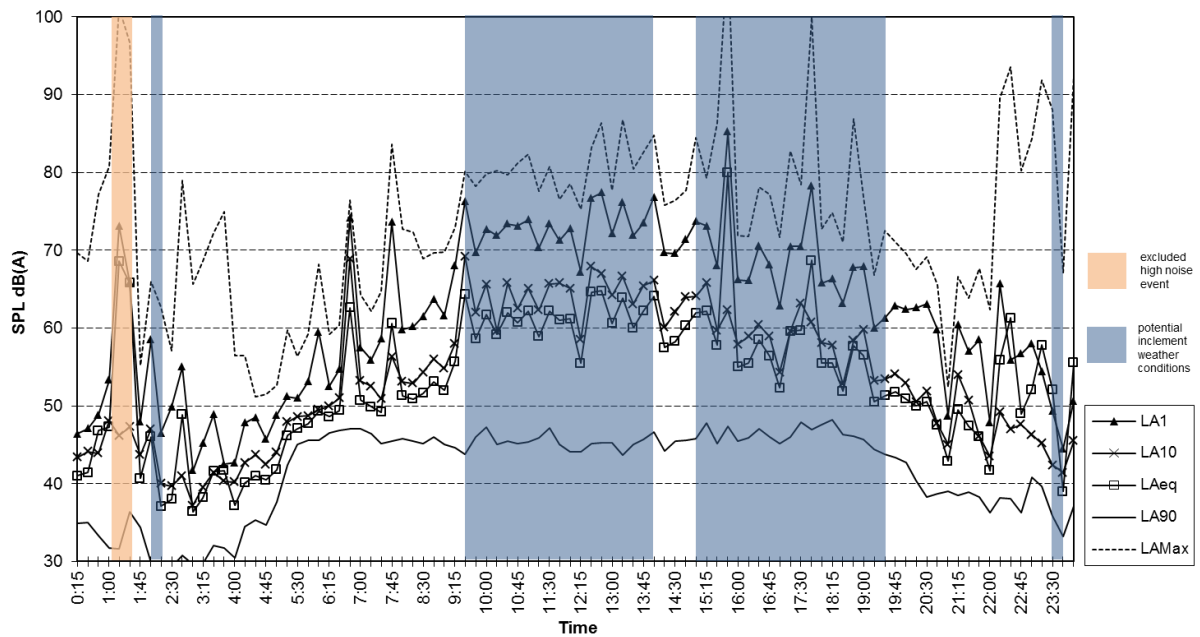
Location 2 - Goodenough Street, Glenfield
Measured Noise Levels - Wednesday 3 November, 2010



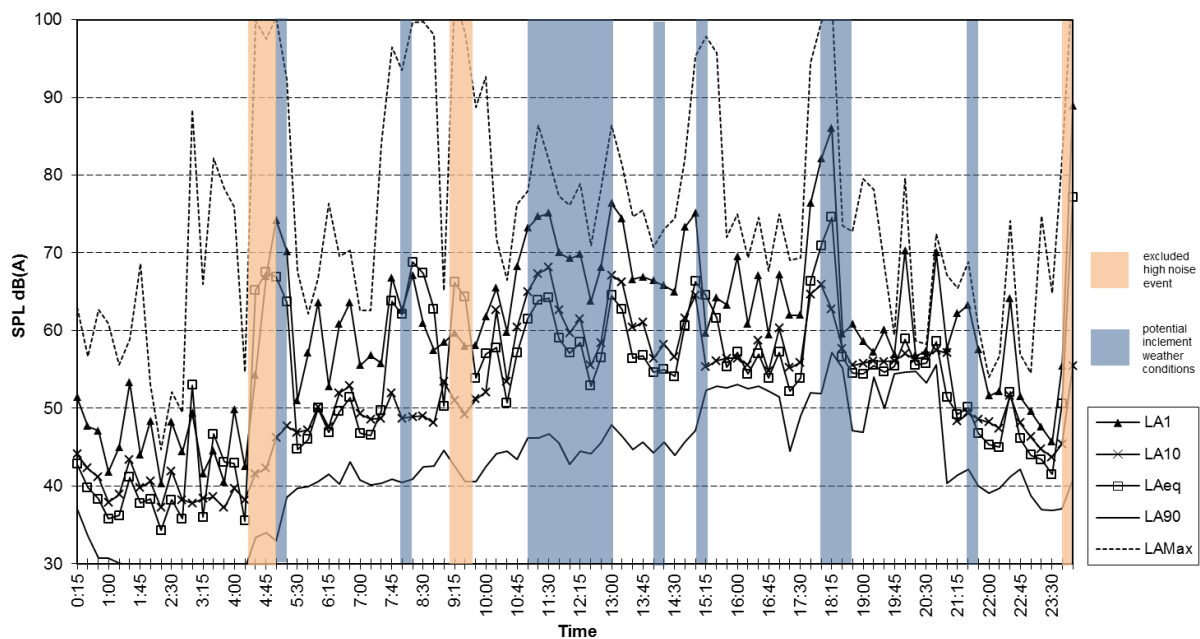
Location 2 - Goodenough Street, Glenfield
Measured Noise Levels - Thursday 4 November, 2010



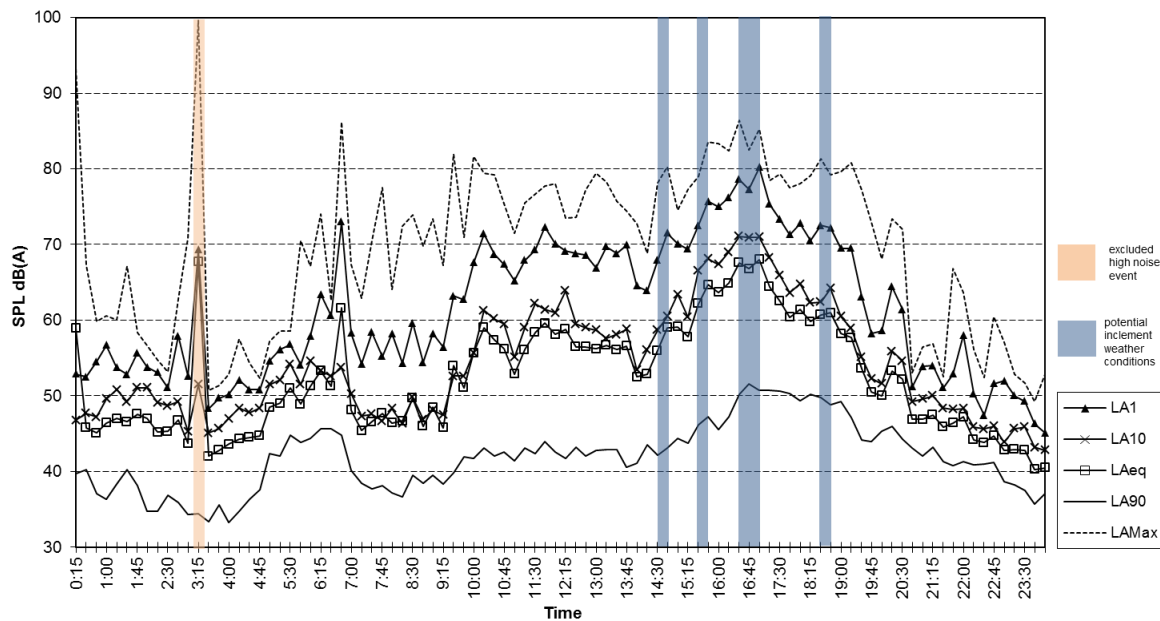
Location 2 - Goodenough Street, Glenfield
Measured Noise Levels - Friday 5 November, 2010



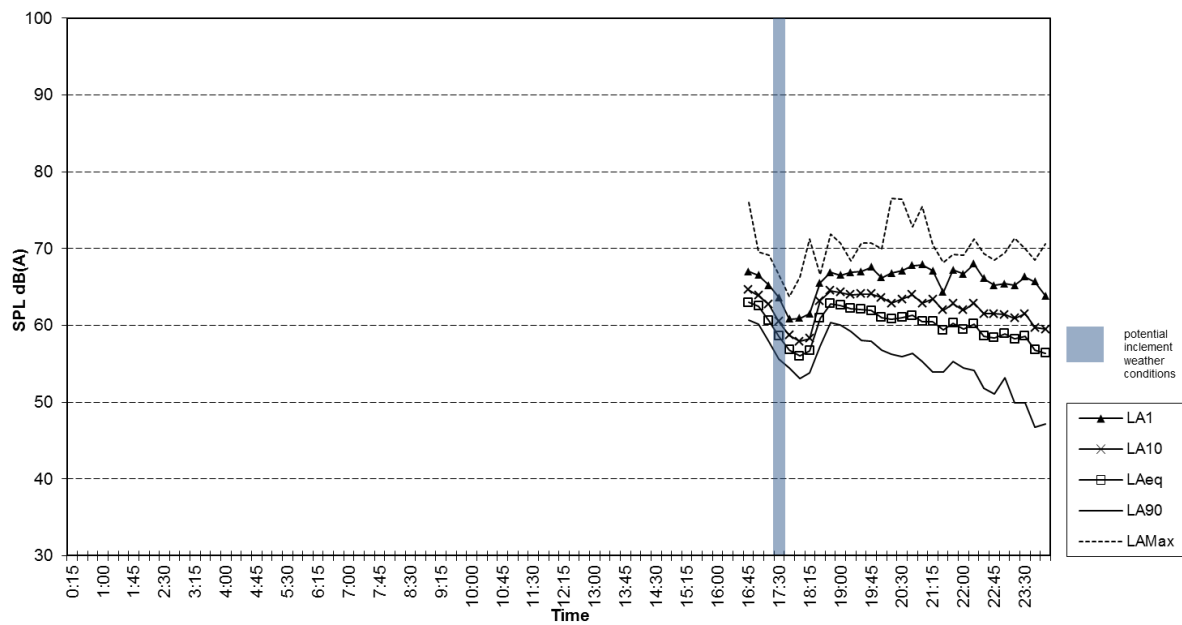
Location 2 - Goodenough Street, Glenfield
Measured Noise Levels - Saturday 6 November, 2010



Location 2 - Goodenough Street, Glenfield
Measured Noise Levels - Sunday 7 November, 2010



Location 3 - Todd Court, Wattle Grove, NSW
Measured Noise Levels - Wednesday 17 August, 2011



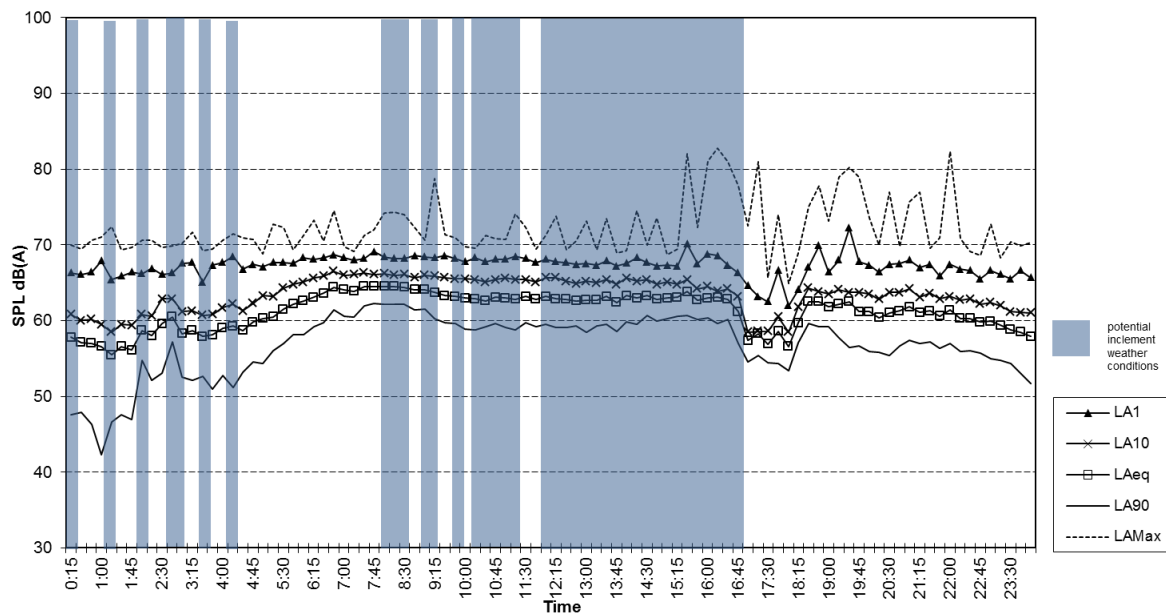
Appendix B

Report Number 620.10816

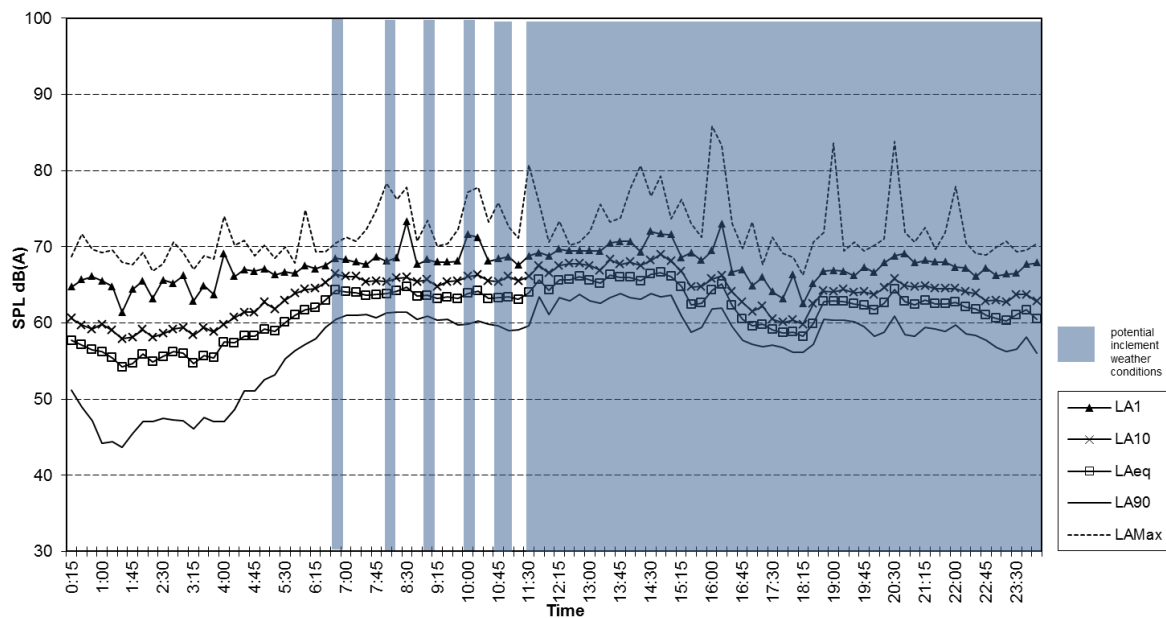
Page 15 of 31

BASELINE NOISE SURVEY

Location 3 - Todd Court, Wattle Grove, NSW
Measured Noise Levels - Thursday 18 August, 2011



Location 3 - Todd Court, Wattle Grove, NSW
Measured Noise Levels - Friday 19 August, 2011



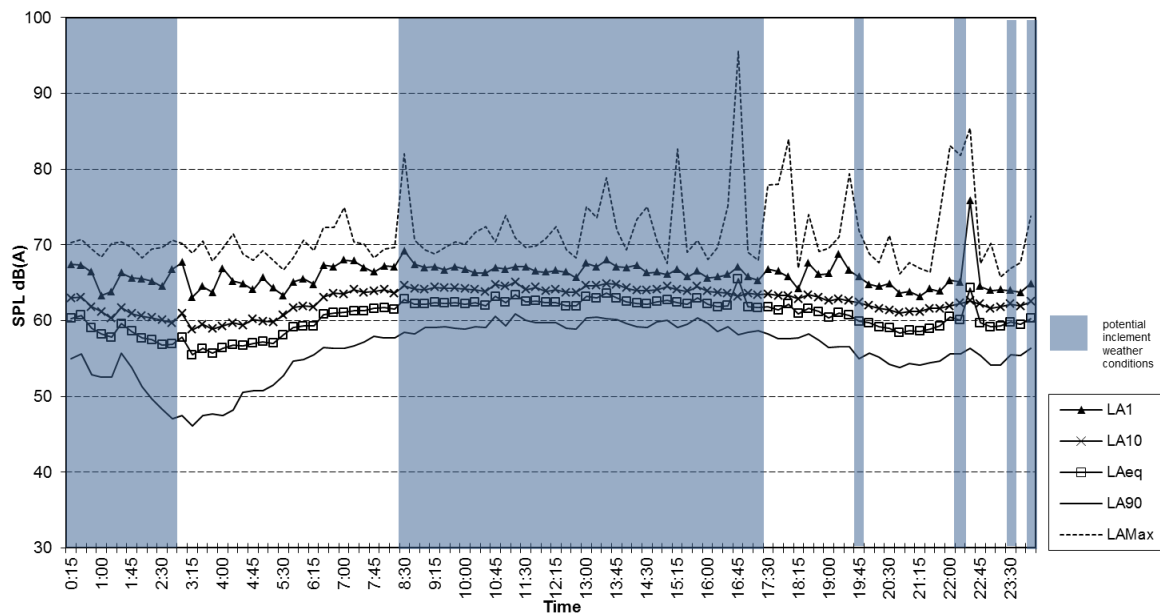
Appendix B

Report Number 620.10816

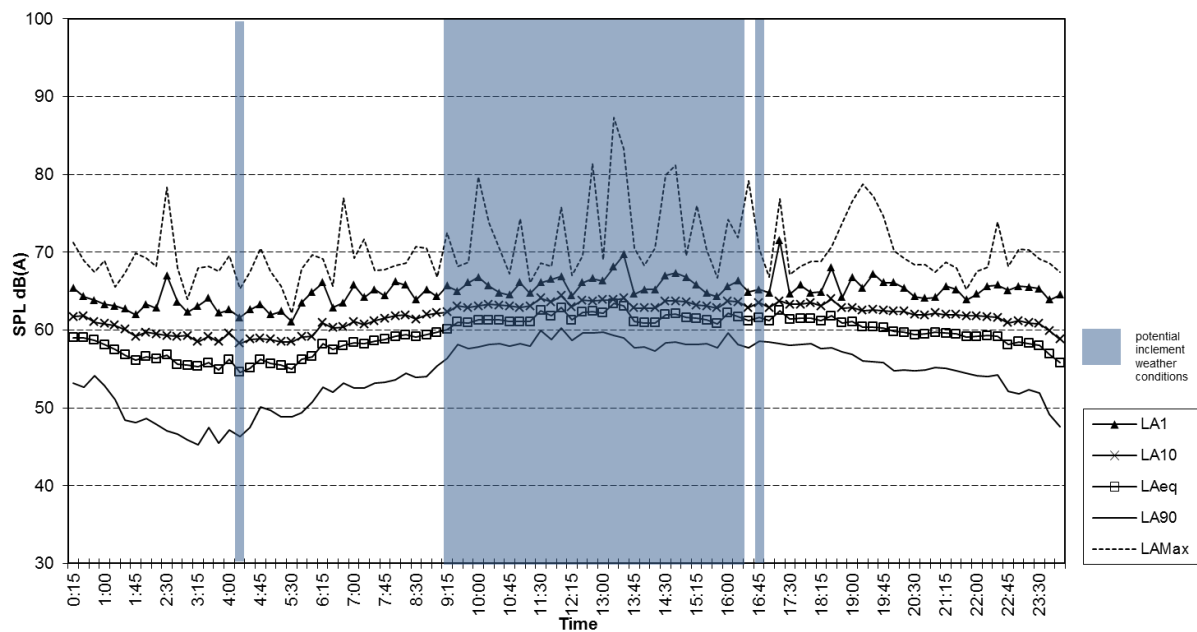
Page 16 of 31

BASELINE NOISE SURVEY

Location 3 - Todd Court, Wattle Grove, NSW
Measured Noise Levels - Saturday 20 August, 2011



Location 3 - Todd Court, Wattle Grove, NSW
Measured Noise Levels - Sunday 21 August, 2011



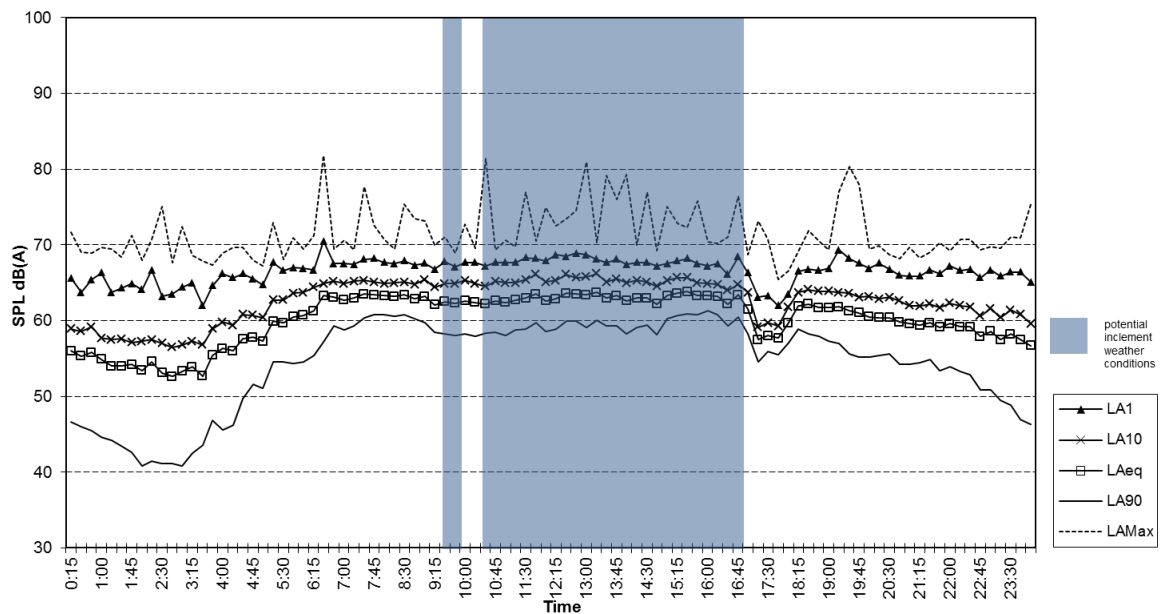
Appendix B

Report Number 620.10816

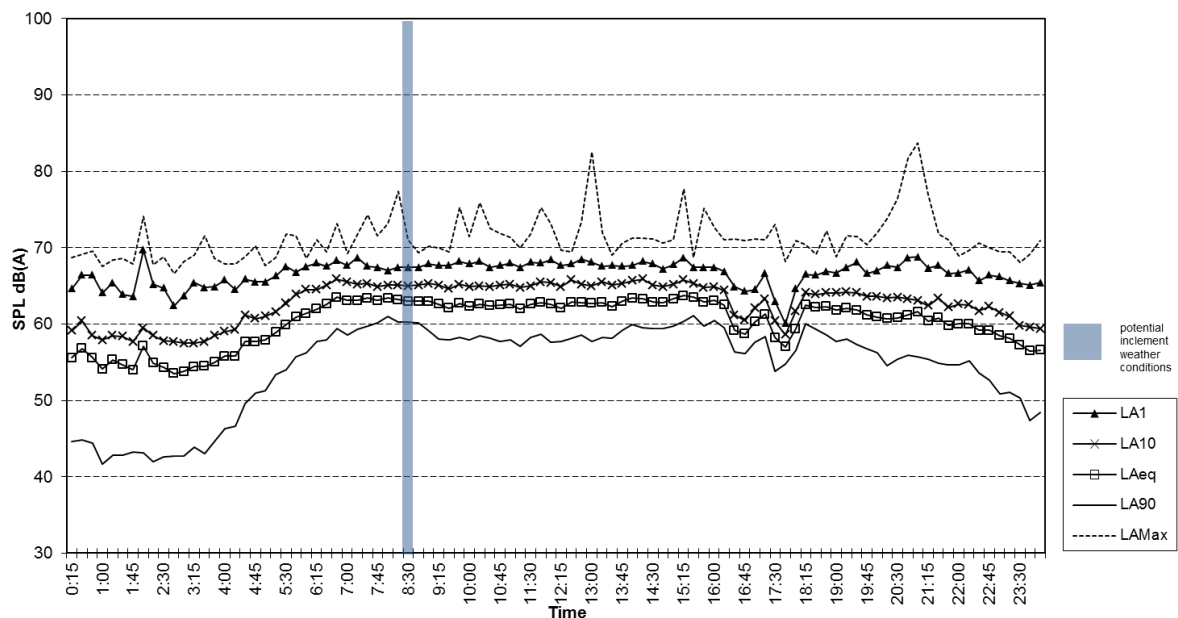
Page 17 of 31

BASELINE NOISE SURVEY

Location 3 - Todd Court, Wattle Grove, NSW
Measured Noise Levels - Monday 22 August, 2011

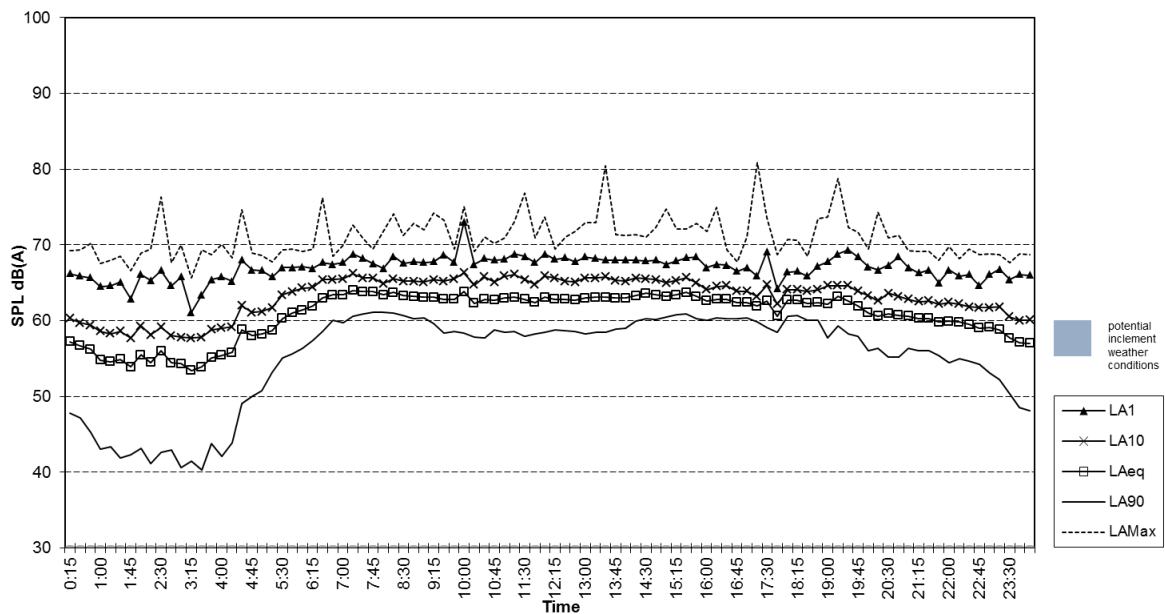


Location 3 - Todd Court, Wattle Grove, NSW
Measured Noise Levels - Tuesday 23 August, 2011

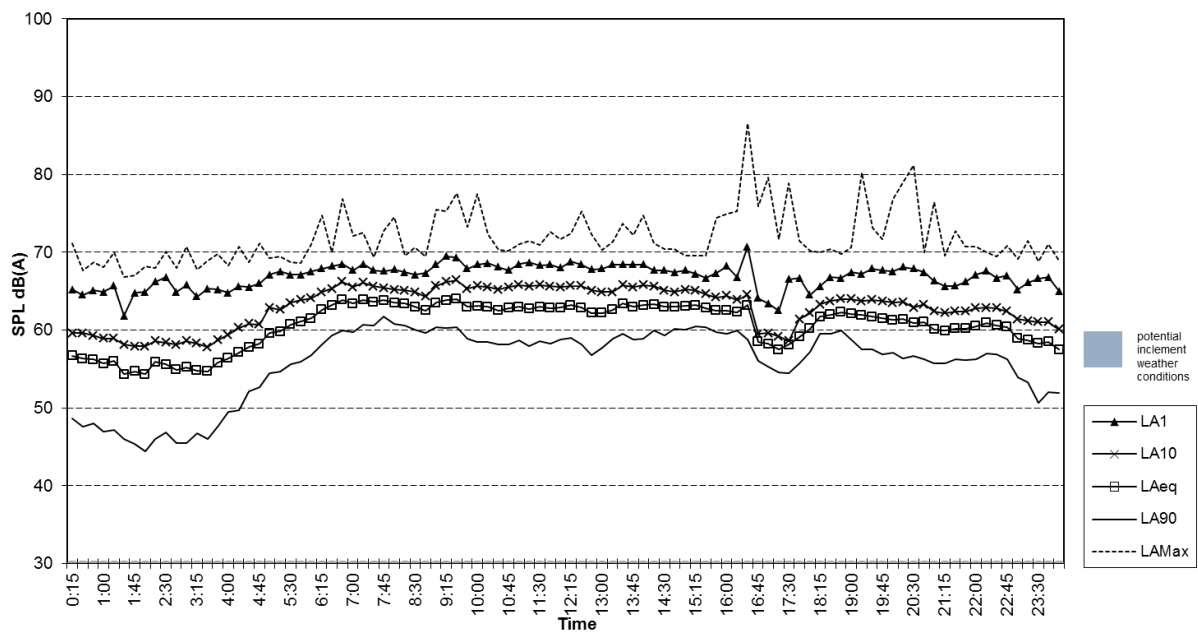


BASELINE NOISE SURVEY

Location 3 - Todd Court, Wattle Grove, NSW
Measured Noise Levels - Wednesday 24 August, 2011



Location 3 - Todd Court, Wattle Grove, NSW
Measured Noise Levels - Thursday 25 August, 2011



Appendix B

Report Number 620.10816

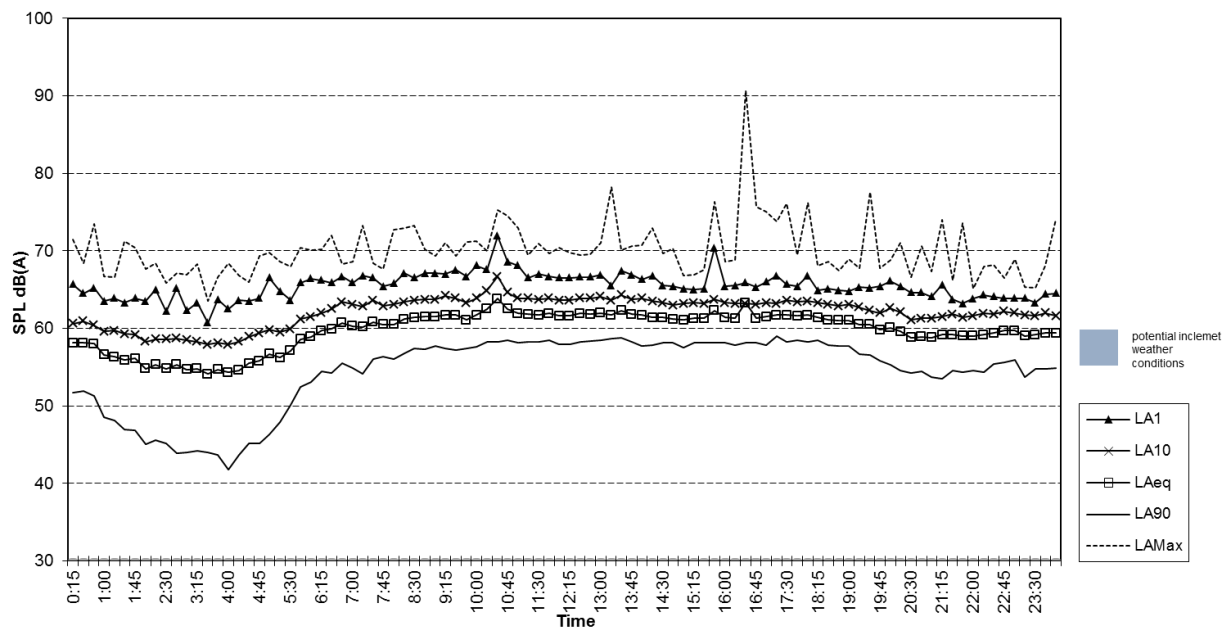
Page 19 of 31

BASELINE NOISE SURVEY

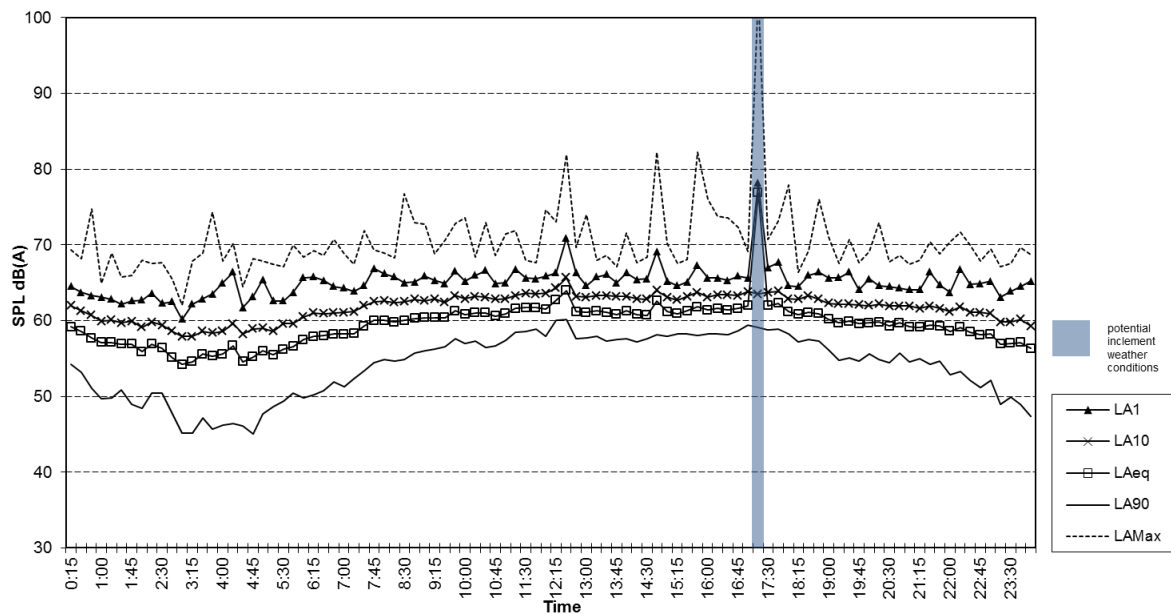
Location 3 - Todd Court, Wattle Grove, NSW
Measured Noise Levels - Friday 26 August, 2011



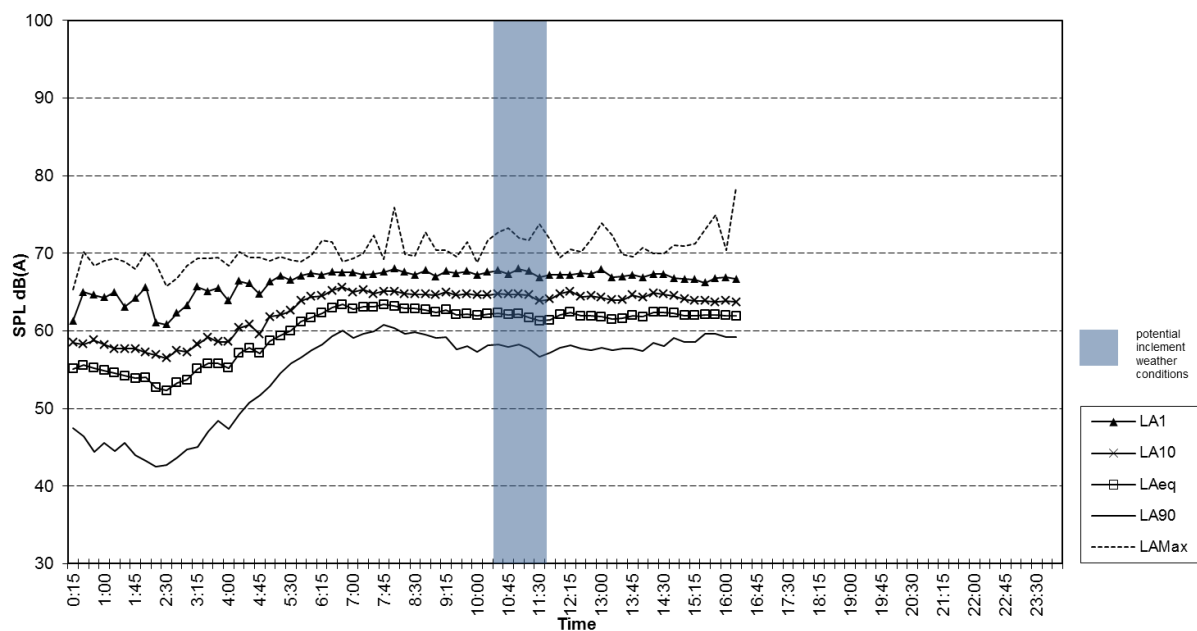
Location 3 - Todd Court, Wattle Grove, NSW
Measured Noise Levels - Saturday 27 August, 2011



Location 3 - Todd Court, Wattle Grove, NSW
Measured Noise Levels - Sunday 28 August, 2011



Location 3 - Todd Court, Wattle Grove, NSW
Measured Noise Levels - Monday 30 August, 2011



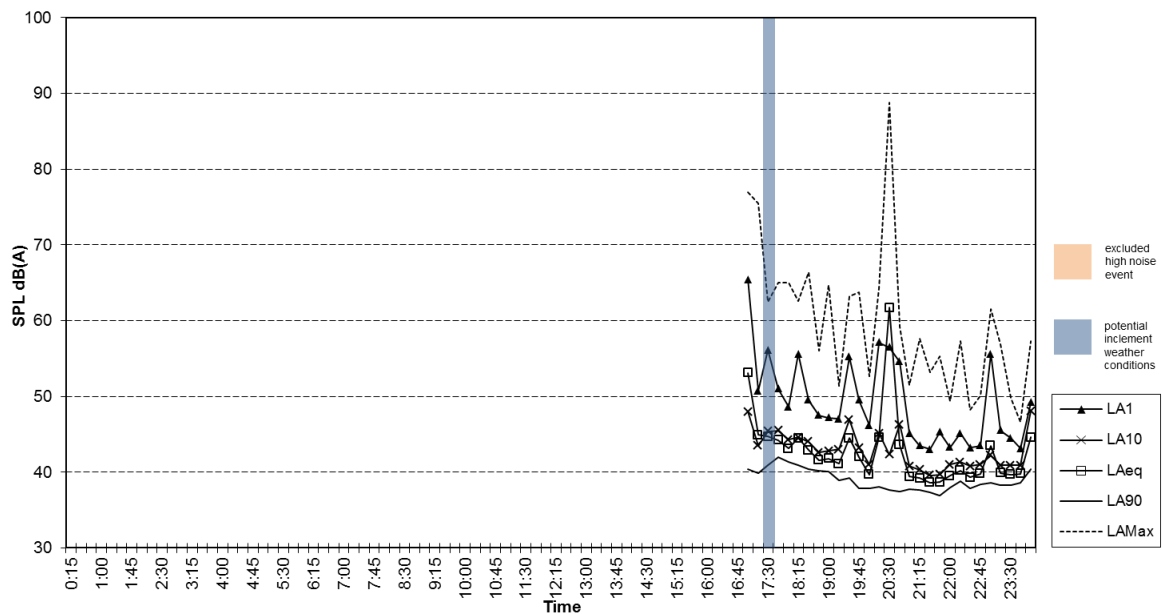
Appendix B

Report Number 620.10816

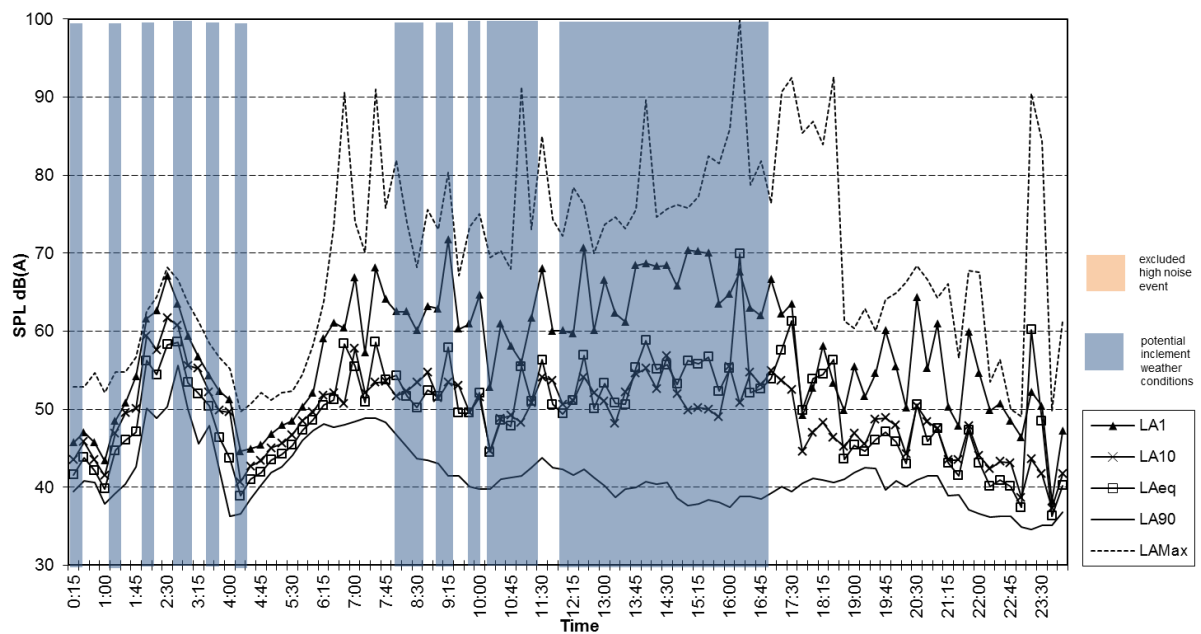
Page 21 of 31

BASELINE NOISE SURVEY

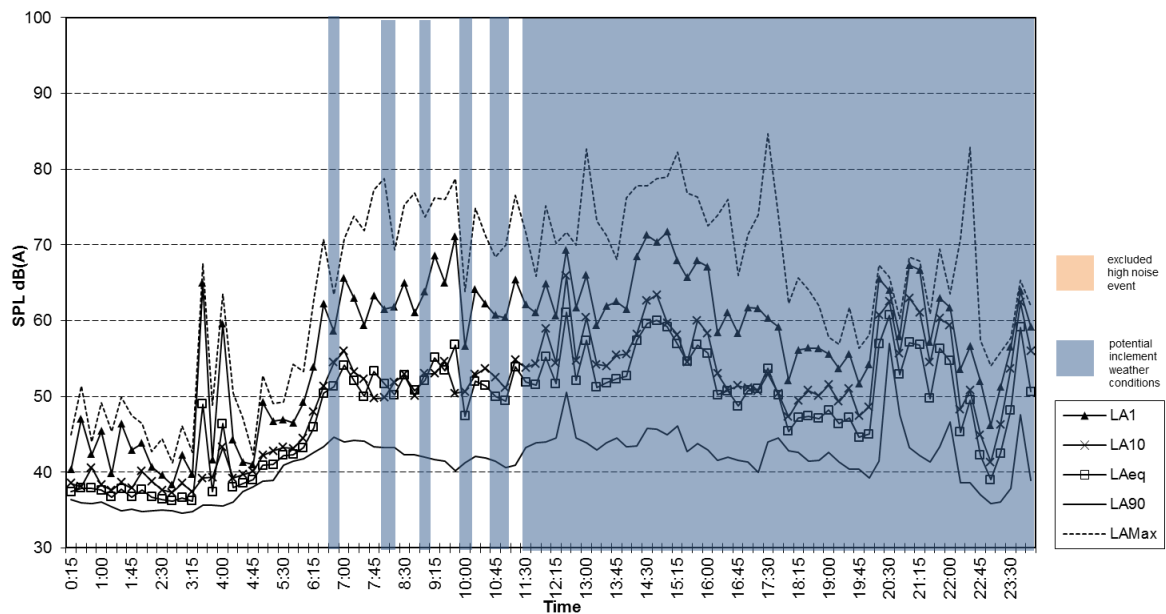
Location 4 - Corryton Court, Wattle Grove, NSW
Measured Noise Levels - Wednesday 17 August, 2011



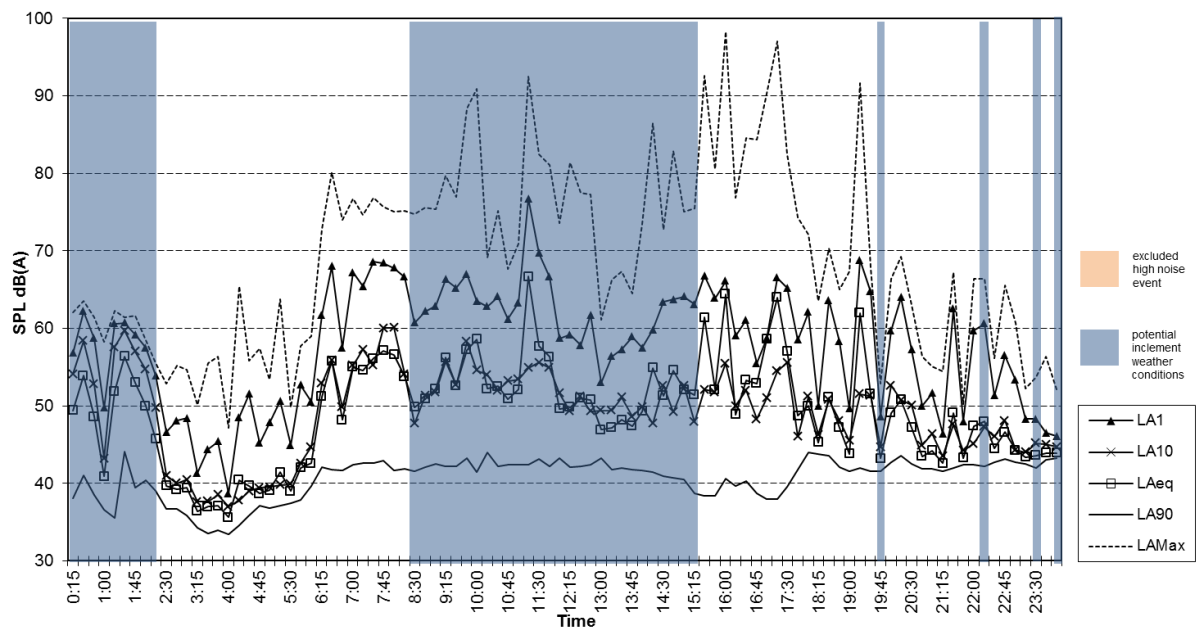
Location 4 - Corryton Court, Wattle Grove, NSW
Measured Noise Levels - Thursday 18 August, 2011



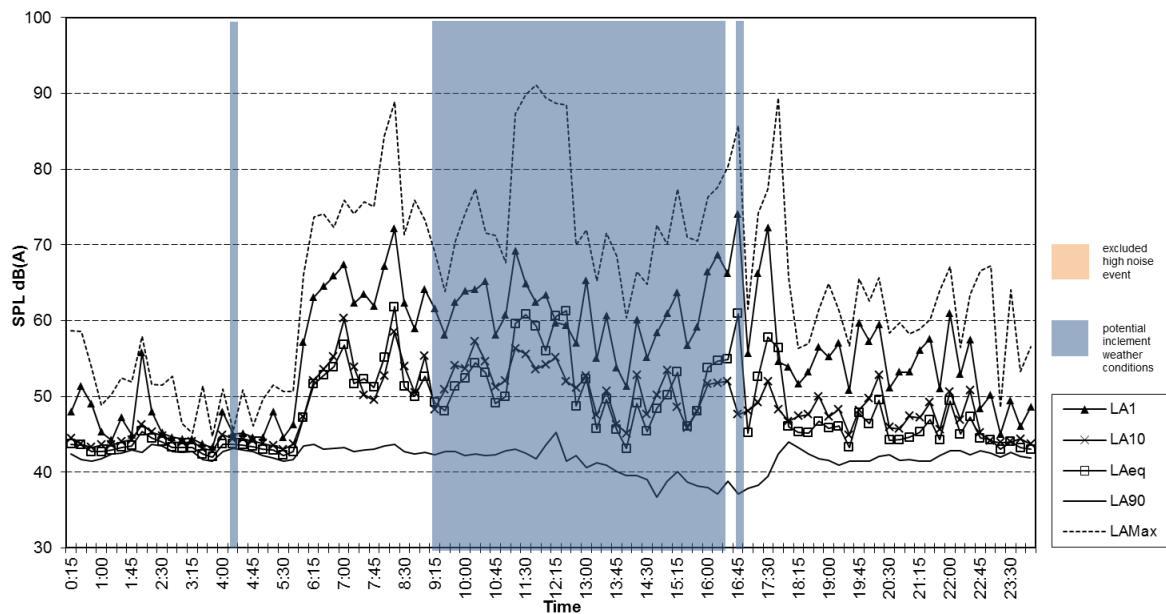
Location 4 - Corryton Court, Wattle Grove, NSW
Measured Noise Levels - Friday 19 August, 2011



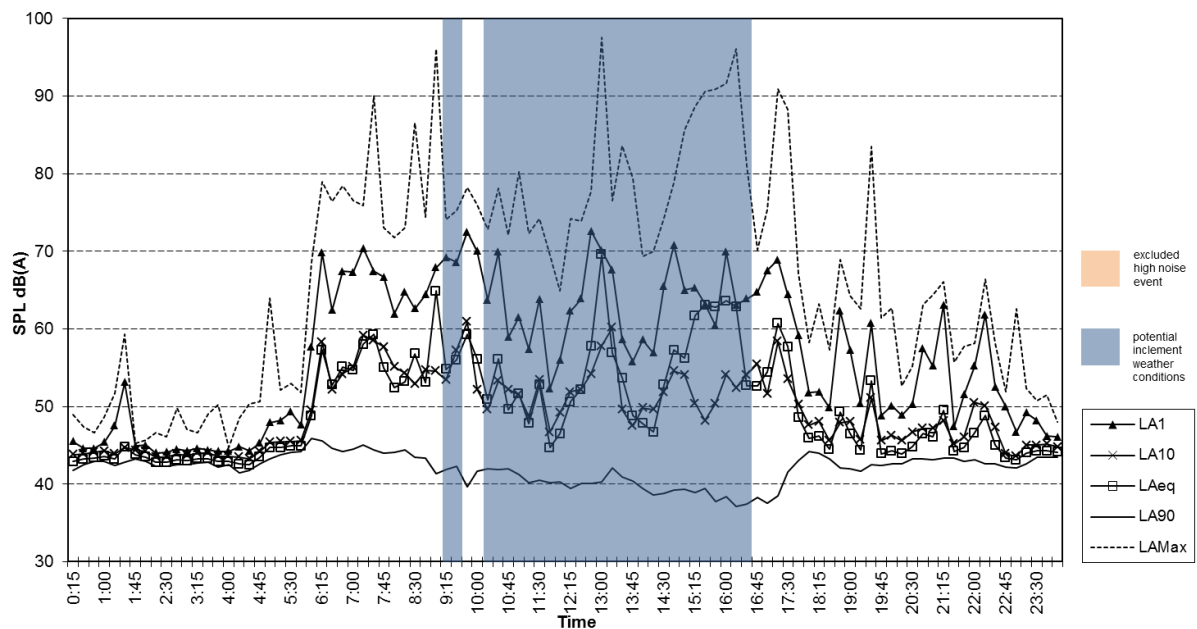
Location 4 - Corryton Court, Wattle Grove, NSW
Measured Noise Levels - Saturday 20 August, 2011



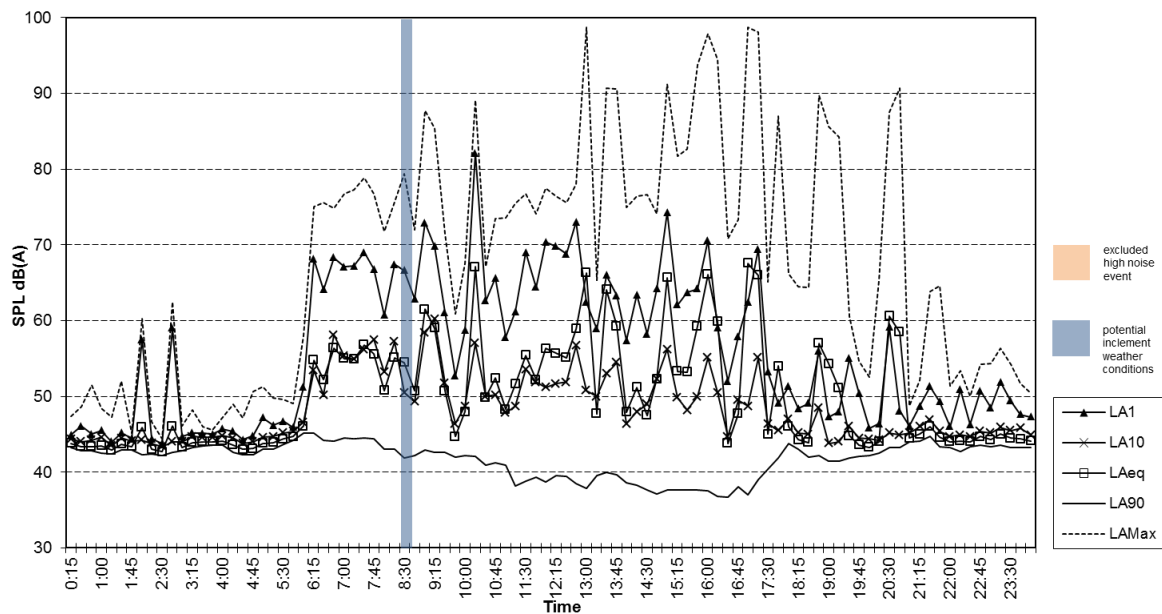
Location 4 - Corryton Court, Wattle Grove, NSW
Measured Noise Levels - Sunday 21 August, 2011



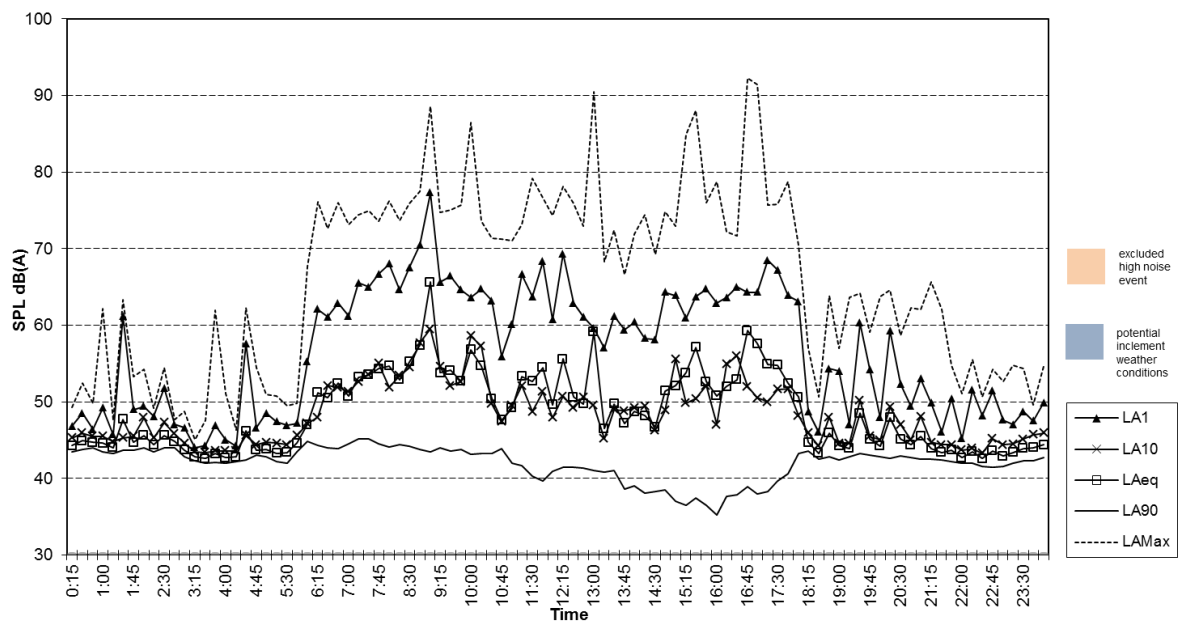
Location 4 - Corryton Court, Wattle Grove, NSW
Measured Noise Levels - Monday 22 August, 2011



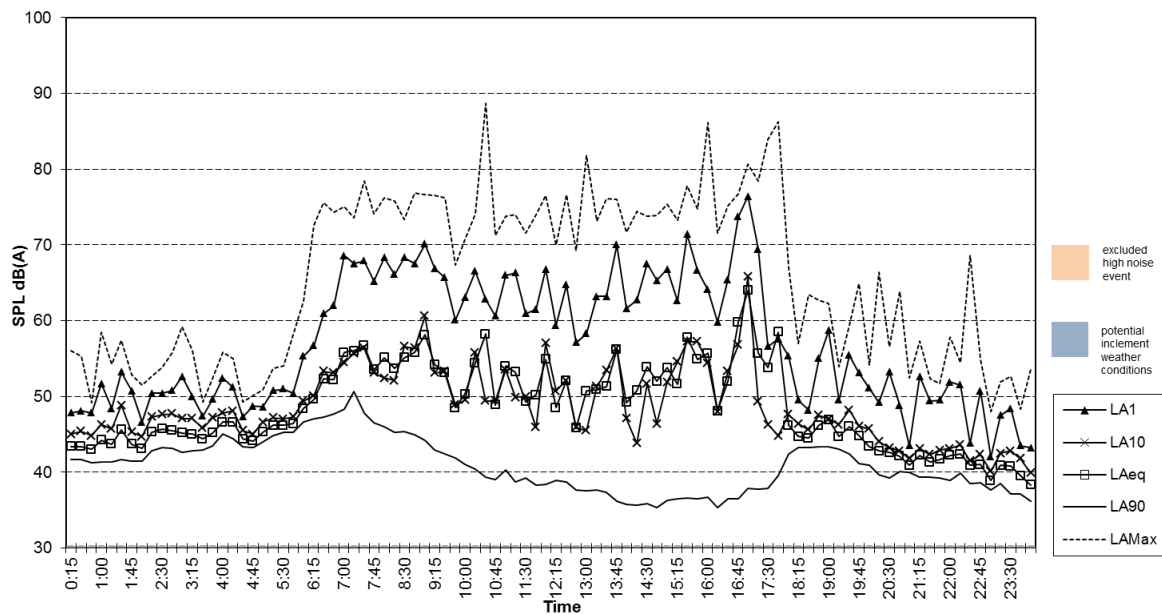
Location 4 - Corryton Court, Wattle Grove, NSW
Measured Noise Levels - Tuesday 23 August, 2011



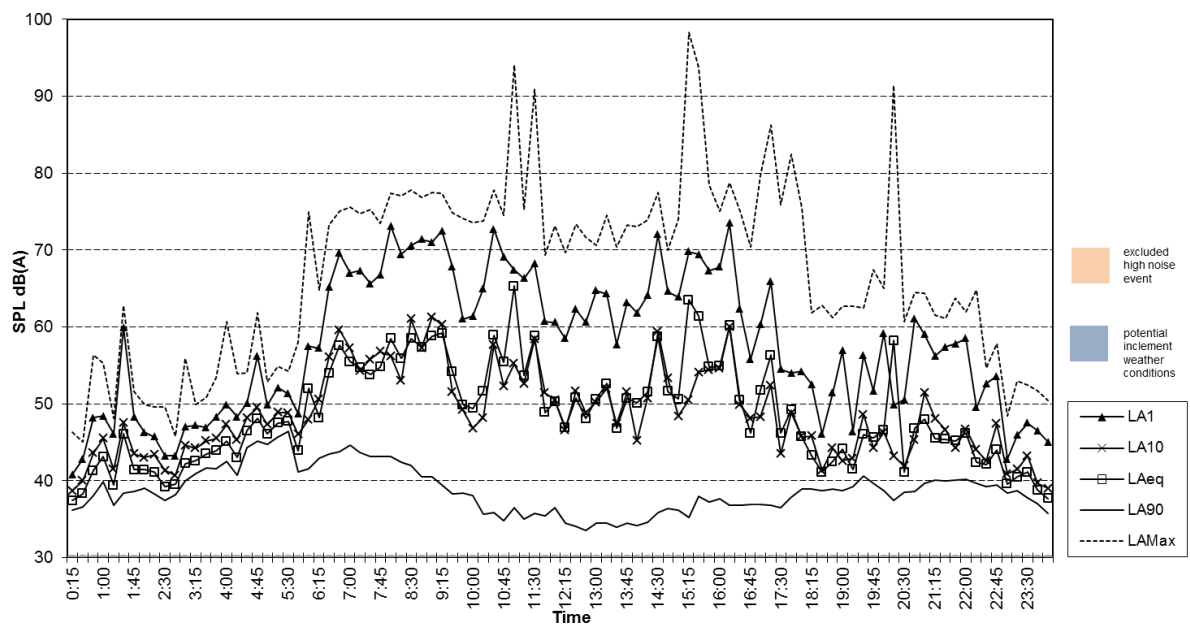
Location 4 - Corryton Court, Wattle Grove, NSW
Measured Noise Levels - Wednesday 24 August, 2011



Location 4 - Corryton Court, Wattle Grove, NSW
Measured Noise Levels - Thursday 25 August, 2011

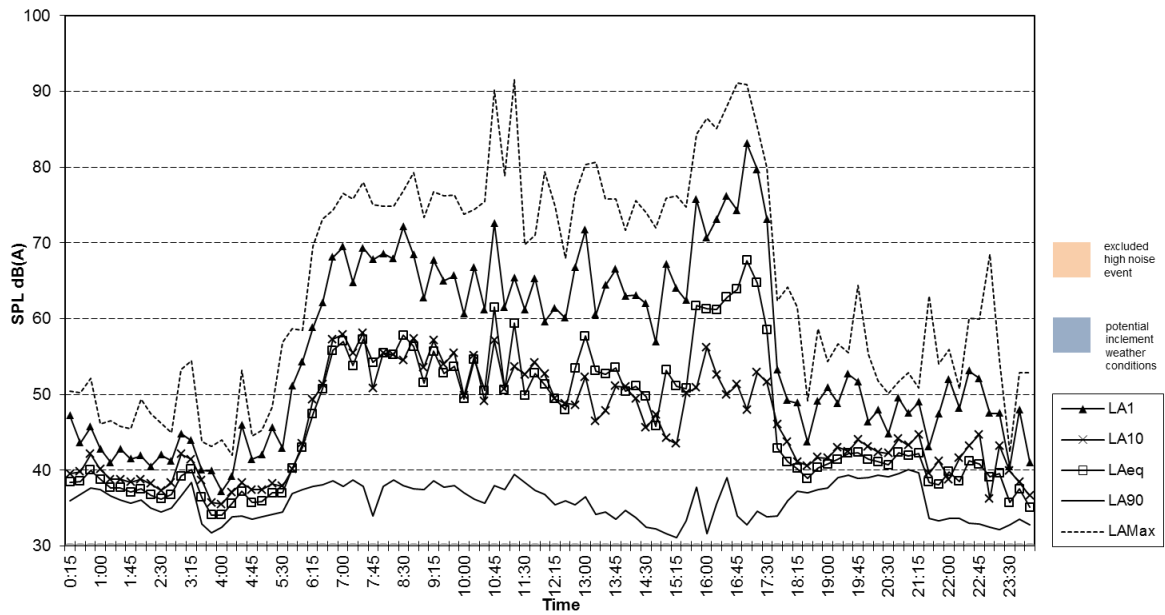


Location 4 - Corryton Court, Wattle Grove, NSW
Measured Noise Levels - Friday 26 August, 2011

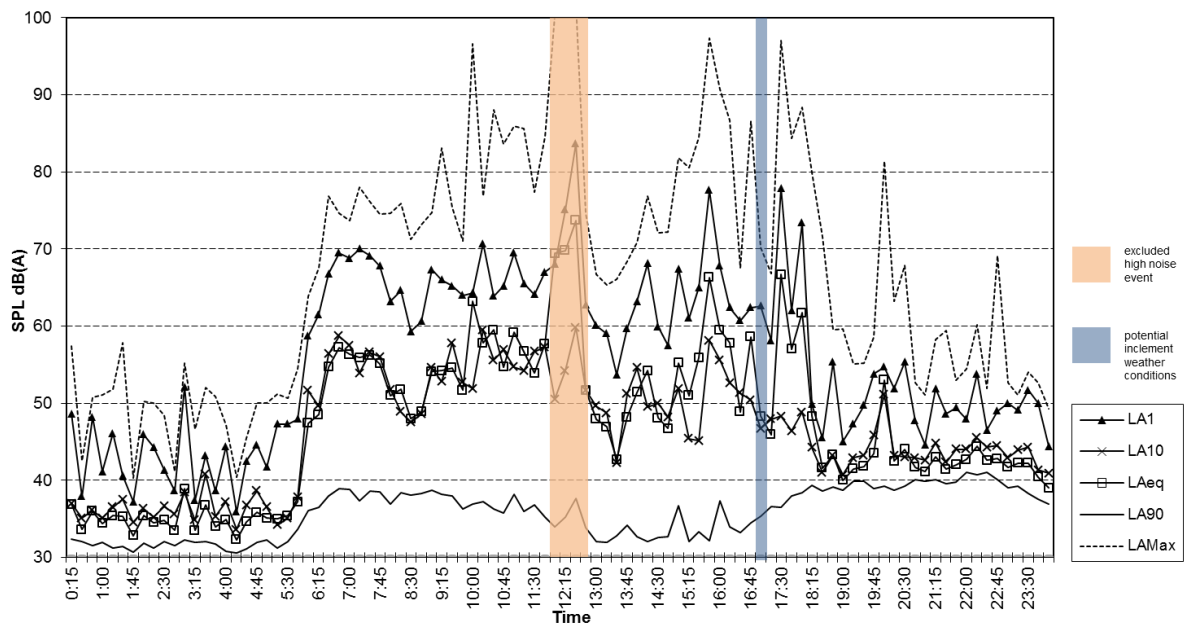


BASELINE NOISE SURVEY

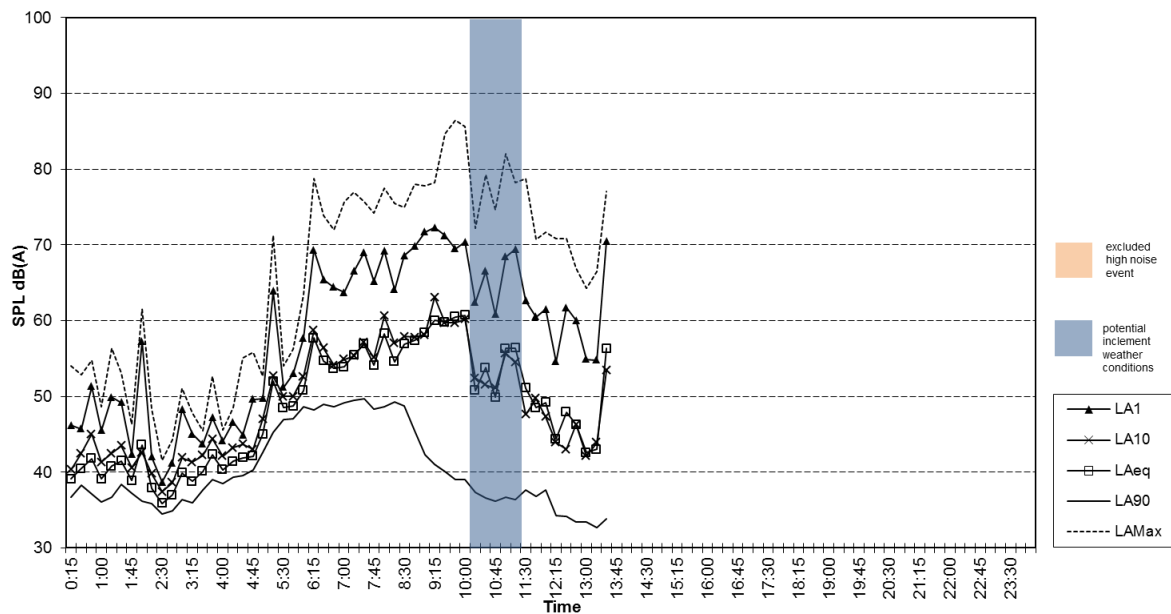
Location 4 - Corryton Court, Wattle Grove, NSW
Measured Noise Levels - Saturday 27 August, 2011



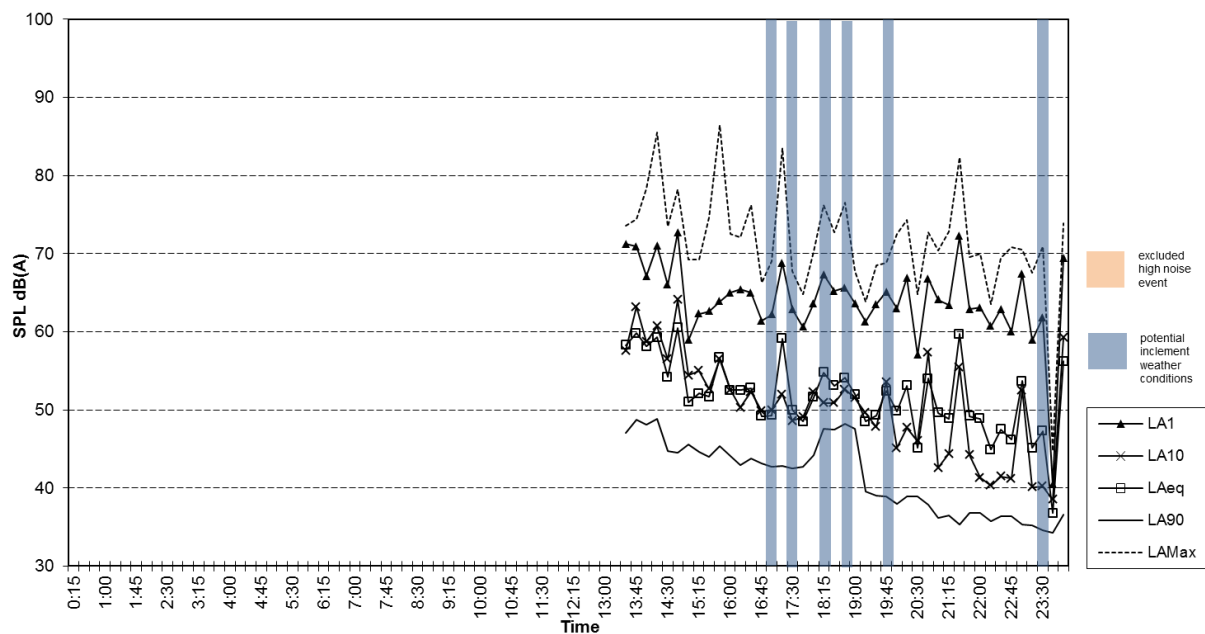
Location 4 - Corryton Court, Wattle Grove, NSW
Measured Noise Levels - Sunday 28 August, 2011



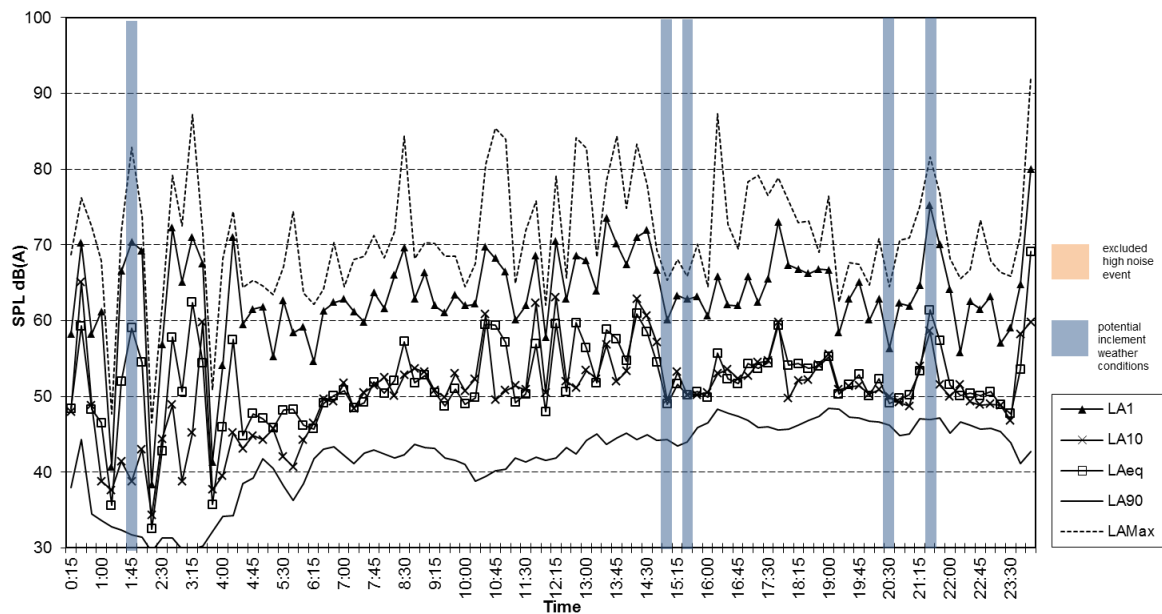
Location 4 - Corryton Court, Wattle Grove, NSW
Measured Noise Levels - Monday 29 August, 2011



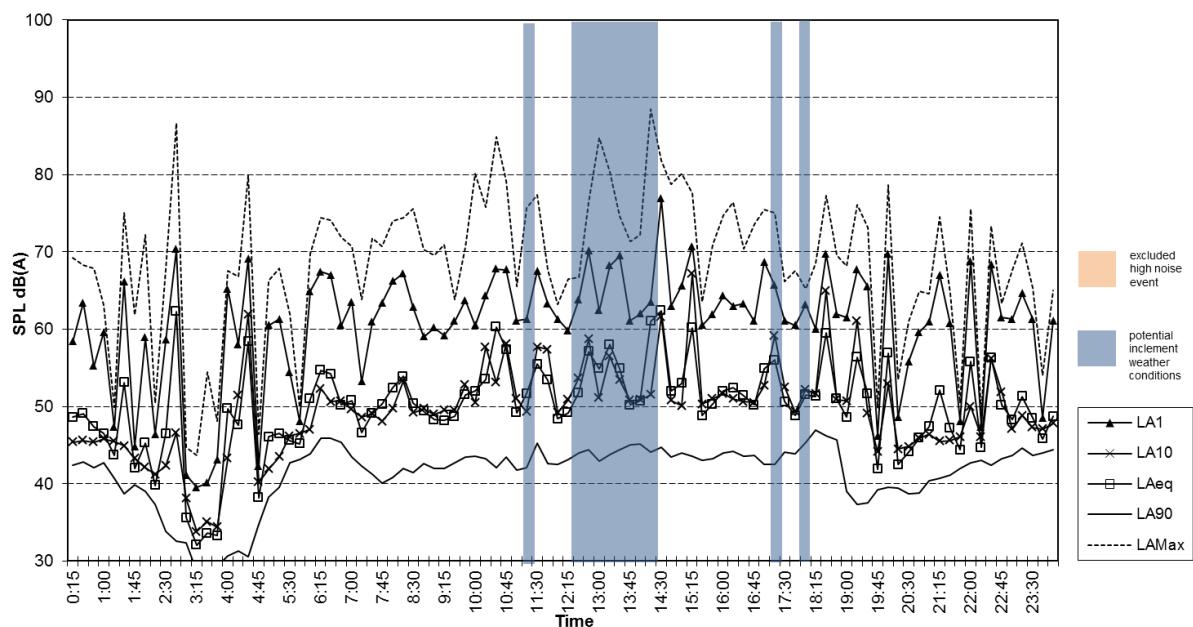
Location 5 - Buckland Road, Wattle Grove, NSW
Measured Noise Levels - Thursday 6 October, 2011



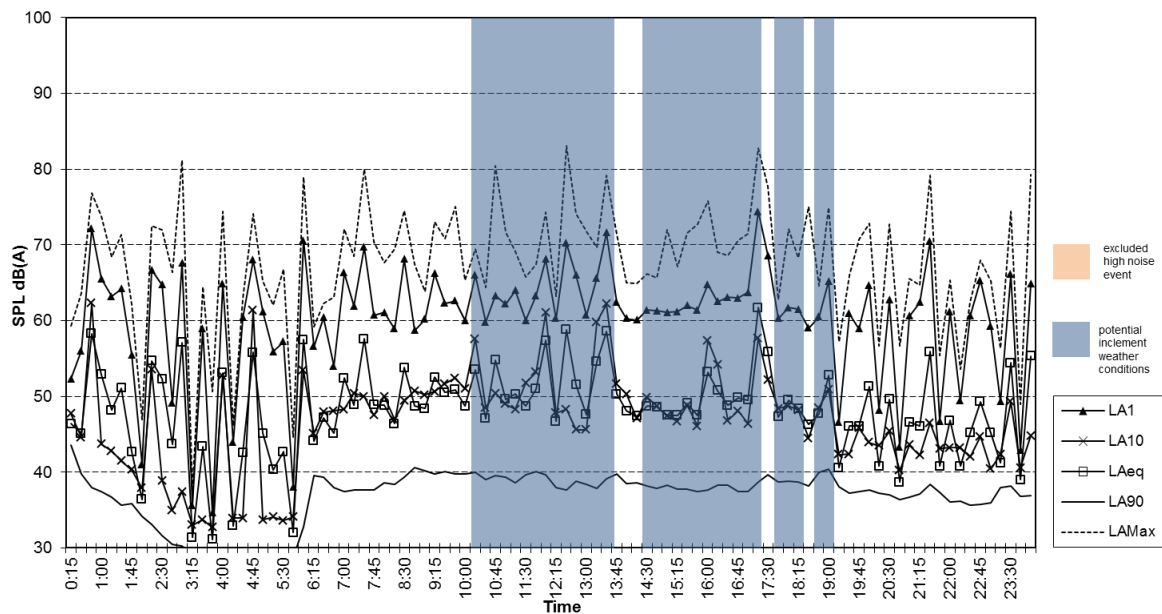
Location 5 - Buckland Road, Wattle Grove, NSW
Measured Noise Levels - Friday 7 October, 2011



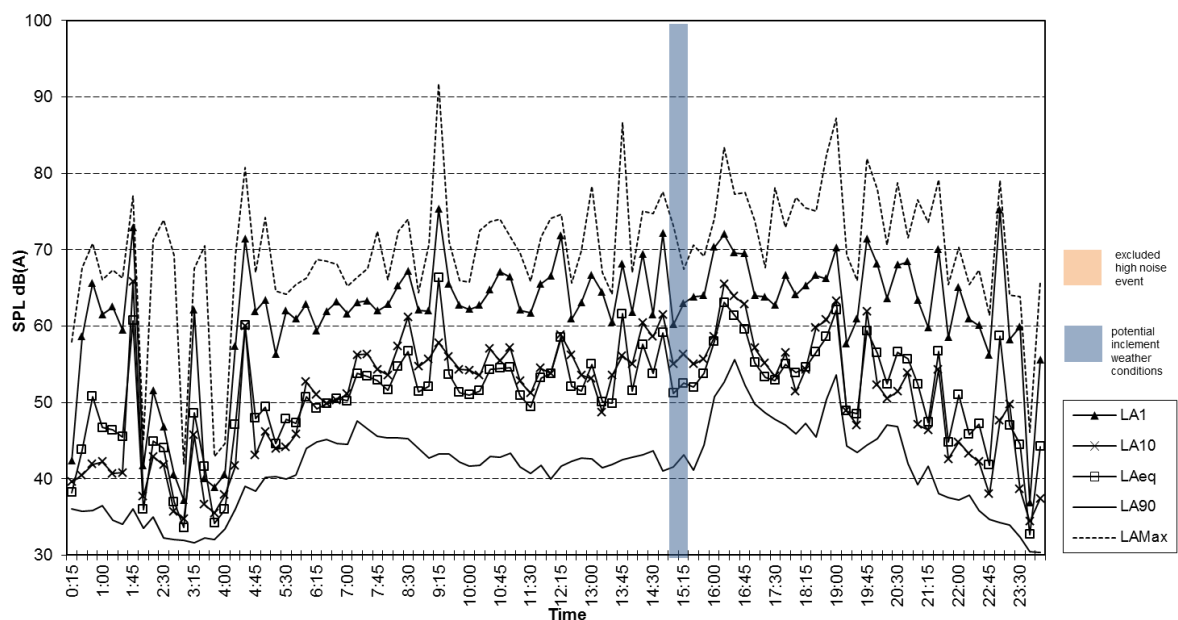
Location 5 - Buckland Road, Wattle Grove, NSW
Measured Noise Levels - Saturday 8 October, 2011



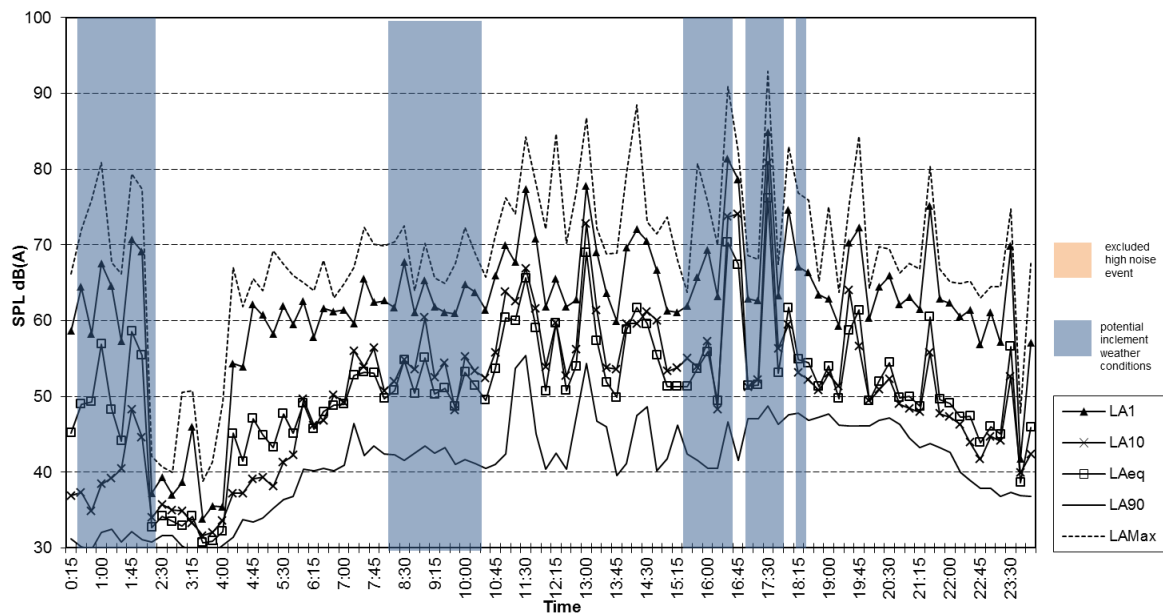
Location 5 - Buckland Road, Wattle Grove, NSW
Measured Noise Levels - Sunday 9 October, 2011



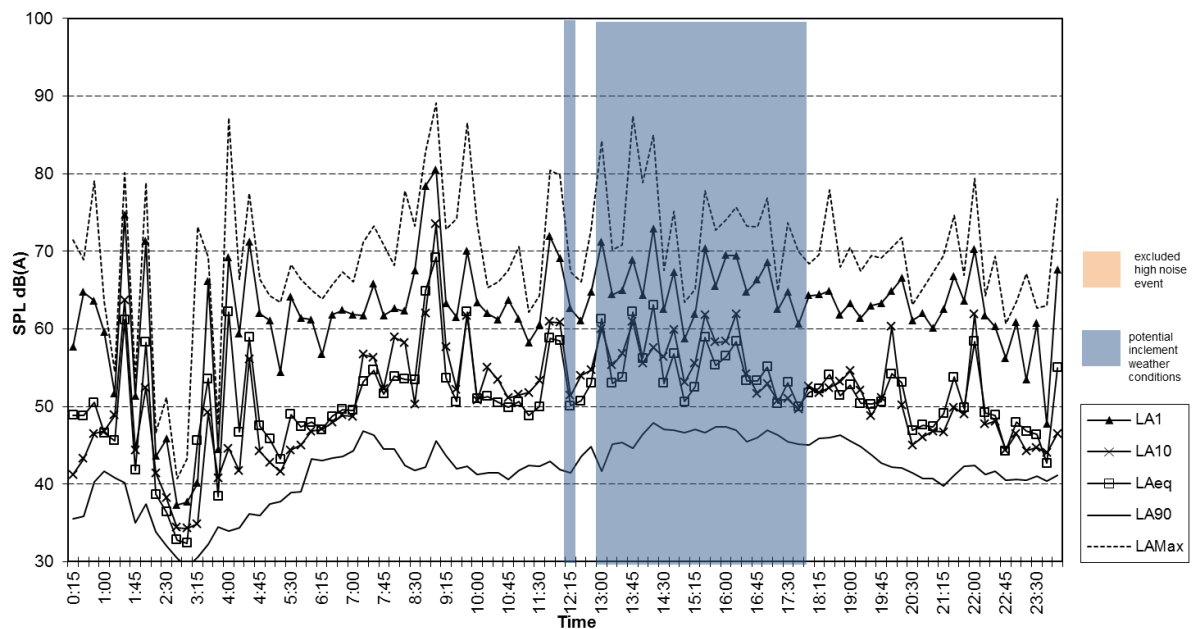
Location 5 - Buckland Road, Wattle Grove, NSW
Measured Noise Levels - Monday 10 October, 2011



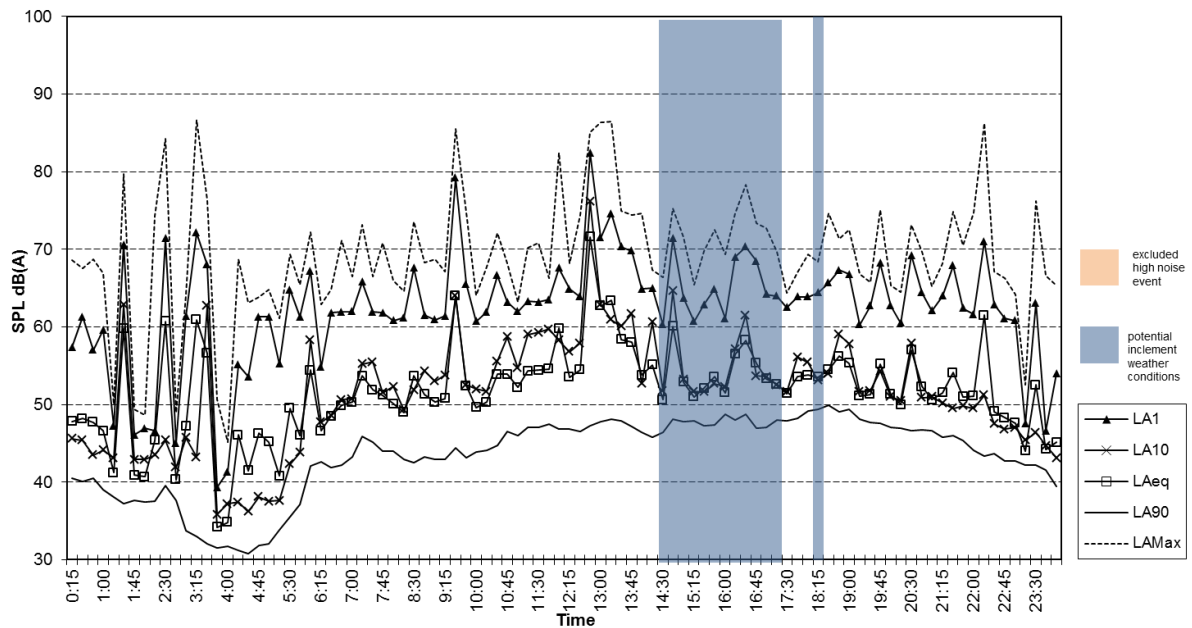
Location 5 - Buckland Road, Wattle Grove, NSW
Measured Noise Levels - Tuesday 11 October, 2011



Location 5 - Buckland Road, Wattle Grove, NSW
Measured Noise Levels - Wednesday 12 October, 2011



Location 5 - Buckland Road, Wattle Grove, NSW
Measured Noise Levels - Thursday 13 October, 2011



Location 5 - Buckland Road, Wattle Grove, NSW
Measured Noise Levels - Friday 14 October, 2011



PREDICTED NOISE LEVELS – PHASE B OPERATIONS

Phase B – Predicted Operational Noise Levels

Predicted Noise Level – Northern Rail Access Option

Receptor	LAeq(15minute) Noise Level	
	Neutral Conditions	Adverse Conditions
R1 Lakewood Crescent, Casula	38	42
R2 St Andrews Boulevard, Casula	40	43
R3 Buckland Road, Casula	42	45
R4 Dunmore Crescent, Casula	43	45
R5 Leacocks Lane, Casula	37	38
R6 Leacocks Lane, Casula	40	40
R7 Slessor Road, Casula	33	32
R8 Canterbury Road, Glenfield	28	26
R9 Ferguson Street, Glenfield	30	28
R10 Goodenough Street, Glenfield	32	30
R11 Wallcliffe Court, Wattle Grove	33	37
R12 Corryton Court, Wattle Grove	34	38
R13 Martindale Court, Wattle Grove	33	37
R14 Anzac Road, Wattle Grove	36	41
R15 Cambridge Avenue, Glenfield	31	29
R16 Guise Public School	19	18
R17 Yallum Court, Wattle Grove	35	39
R18 Church Road, Liverpool	30	35
R19 Glenwood Public School, Glenfield	26	24
R20 Glenfield Public School, Glenfield	25	23
R21 Hurlstone Agricultural School	23	21
R22 Wattle Grove Public School	32	37
R23 St Marks Coptic College, Wattle Grove	27	32
R24 Maple Grove Retirement Village, Casula	27	27
R25 All Saints Catholic College	40	40
R26 Casula High School	27	27
R27 Casula Primary School, Casula	35	38
R28 Lurnea High School	25	28
R29 St Francis Xaviers Catholic Church	23	27
R30 Impact Church Liverpool	26	31
R31 Liverpool West Public School	22	27
R32 Liverpool Public School / TAFE NSW	21	26
R33 DNSDC Site up to end 2014	52	54
R34 Glenfield Rise Development, Glenfield	30	28
R35 DNSDC Site after end 2014	35	39
R36 Playground Learning Centre Glenfield	26	34
R37 Wattle Grove Long Day Care Centre	29	24
R38 Casula Powerhouse Arts Centre	45	47

PREDICTED NOISE LEVELS – PHASE B OPERATIONS

Predicted Noise Level – Central Rail Access Option

Receptor		LAeq(15minute) Noise Level	
		Neutral Conditions	Adverse Conditions
R1	Lakewood Crescent, Casula	39	44
R2	St Andrews Boulevard, Casula	43	47
R3	Buckland Road, Casula	48	50
R4	Dunmore Crescent, Casula	48	49
R5	Leacocks Lane, Casula	39	38
R6	Leacocks Lane, Casula	38	38
R7	Slessor Road, Casula	33	32
R8	Canterbury Road, Glenfield	29	28
R9	Ferguson Street, Glenfield	31	30
R10	Goodenough Street, Glenfield	31	30
R11	Wallcliffe Court, Wattle Grove	34	39
R12	Corryton Court, Wattle Grove	34	39
R13	Martindale Court, Wattle Grove	34	39
R14	Anzac Road, Wattle Grove	37	42
R15	Cambridge Avenue, Glenfield	32	31
R16	Guisse Public School	22	22
R17	Yallum Court, Wattle Grove	35	40
R18	Church Road, Liverpool	31	36
R19	Glenwood Public School, Glenfield	27	27
R20	Glenfield Public School, Glenfield	26	25
R21	Hurlstone Agricultural School	25	25
R22	Wattle Grove Public School	32	37
R23	St Marks Coptic College, Wattle Grove	28	34
R24	Maple Grove Retirement Village, Casula	29	28
R25	All Saints Catholic College	41	41
R26	Casula High School	29	28
R27	Casula Primary School, Casula	39	41
R28	Lurnea High School	28	29
R29	St Francis Xaviers Catholic Church	25	29
R30	Impact Church Liverpool	28	34
R31	Liverpool West Public School	24	30
R32	Liverpool Public School / TAFE NSW	22	28
R33	DNSDC Site up to 2014	49	50
R34	Glenfield Rise Development, Glenfield	31	29
R35	DNSDC Site after end 2014	36	41
R36	Playground Learning Centre Glenfield	25	35
R37	Wattle Grove Long Day Care Centre	31	26
R38	Casula Powerhouse Arts Centre	50	51

PREDICTED NOISE LEVELS – PHASE B OPERATIONS

Predicted Noise Level – Southern Rail Access Option

Receptor		LAeq(15minute) Noise Level	
		Neutral Conditions	Adverse Conditions
R1	Lakewood Crescent, Casula	42	44
R2	St Andrews Boulevard, Casula	45	47
R3	Buckland Road, Casula	49	50
R4	Dunmore Crescent, Casula	49	49
R5	Leacocks Lane, Casula	41	40
R6	Leacocks Lane, Casula	40	39
R7	Slessor Road, Casula	38	37
R8	Canterbury Road, Glenfield	36	36
R9	Ferguson Street, Glenfield	39	39
R10	Goodenough Street, Glenfield	37	37
R11	Wallcliffe Court, Wattle Grove	37	40
R12	Corryton Court, Wattle Grove	36	39
R13	Martindale Court, Wattle Grove	34	38
R14	Anzac Road, Wattle Grove	38	42
R15	Cambridge Avenue, Glenfield	39	39
R16	Guisse Public School	32	32
R17	Yallum Court, Wattle Grove	38	40
R18	Church Road, Liverpool	32	36
R19	Glenwood Public School, Glenfield	37	37
R20	Glenfield Public School, Glenfield	34	34
R21	Hurlstone Agricultural School	35	35
R22	Wattle Grove Public School	35	38
R23	St Marks Coptic College, Wattle Grove	32	35
R24	Maple Grove Retirement Village, Casula	31	31
R25	All Saints Catholic College	42	41
R26	Casula High School	30	30
R27	Casula Primary School, Casula	38	40
R28	Lurnea High School	27	28
R29	St Francis Xaviers Catholic Church	25	28
R30	Impact Church Liverpool	29	33
R31	Liverpool West Public School	25	28
R32	Liverpool Public School / TAFE NSW	26	30
R33	DNSDC Site up to end 2014	54	55
R34	Glenfield Rise Development, Glenfield	38	37
R35	DNSDC Site after end 2014	36	40
R36	Playground Learning Centre Glenfield	31	35
R37	Wattle Grove Long Day Care Centre	35	35
R38	Casula Powerhouse Arts Centre	50	50

PREDICTED NOISE LEVELS – PHASE C OPERATIONS

Phase C – Predicted Operational Noise Levels

Predicted Noise Level – Northern Rail Access Option

Receptor	LAeq(15minute) Noise Level	
	Neutral Conditions	Adverse Conditions
R1 Lakewood Crescent, Casula	38	42
R2 St Andrews Boulevard, Casula	41	43
R3 Buckland Road, Casula	43	45
R4 Dunmore Crescent, Casula	44	45
R5 Leacocks Lane, Casula	37	37
R6 Leacocks Lane, Casula	40	40
R7 Slessor Road, Casula	34	32
R8 Canterbury Road, Glenfield	29	28
R9 Ferguson Street, Glenfield	31	30
R10 Goodenough Street, Glenfield	32	31
R11 Wallcliffe Court, Wattle Grove	34	39
R12 Corryton Court, Wattle Grove	34	39
R13 Martindale Court, Wattle Grove	33	38
R14 Anzac Road, Wattle Grove	36	41
R15 Cambridge Avenue, Glenfield	32	31
R16 Guise Public School	21	21
R17 Yallum Court, Wattle Grove	35	40
R18 Church Road, Liverpool	30	36
R19 Glenwood Public School, Glenfield	27	27
R20 Glenfield Public School, Glenfield	26	25
R21 Hurlstone Agricultural School	24	23
R22 Wattle Grove Public School	32	37
R23 St Marks Coptic College, Wattle Grove	27	33
R24 Maple Grove Retirement Village, Casula	28	27
R25 All Saints Catholic College	40	40
R26 Casula High School	27	27
R27 Casula Primary School, Casula	36	38
R28 Lurnea High School	26	27
R29 St Francis Xaviers Catholic Church	23	27
R30 Impact Church Liverpool	26	31
R31 Liverpool West Public School	21	27
R32 Liverpool Public School / TAFE NSW	21	27
R33 DNSDC Site up to end 2014	52	53
R34 Glenfield Rise Development, Glenfield	30	29
R35 DNSDC Site after end 2014	34	39
R36 Playground Learning Centre Glenfield	27	32
R37 Wattle Grove Long Day Care Centre	29	26
R38 Casula Powerhouse Arts Centre	46	47

PREDICTED NOISE LEVELS – PHASE C OPERATIONS

Predicted Noise Level – Central Rail Access Option

Receptor		LAeq(15minute) Noise Level	
		Neutral Conditions	Adverse Conditions
R1	Lakewood Crescent, Casula	40	45
R2	St Andrews Boulevard, Casula	44	48
R3	Buckland Road, Casula	48	50
R4	Dunmore Crescent, Casula	48	49
R5	Leacocks Lane, Casula	39	39
R6	Leacocks Lane, Casula	39	39
R7	Slessor Road, Casula	34	34
R8	Canterbury Road, Glenfield	30	30
R9	Ferguson Street, Glenfield	32	32
R10	Goodenough Street, Glenfield	32	31
R11	Wallcliffe Court, Wattle Grove	33	38
R12	Corryton Court, Wattle Grove	33	38
R13	Martindale Court, Wattle Grove	33	38
R14	Anzac Road, Wattle Grove	38	42
R15	Cambridge Avenue, Glenfield	34	33
R16	Guisse Public School	24	24
R17	Yallum Court, Wattle Grove	34	39
R18	Church Road, Liverpool	31	37
R19	Glenwood Public School, Glenfield	29	29
R20	Glenfield Public School, Glenfield	28	28
R21	Hurlstone Agricultural School	27	27
R22	Wattle Grove Public School	31	36
R23	St Marks Coptic College, Wattle Grove	28	33
R24	Maple Grove Retirement Village, Casula	29	29
R25	All Saints Catholic College	42	41
R26	Casula High School	29	29
R27	Casula Primary School, Casula	40	42
R28	Lurnea High School	28	29
R29	St Francis Xaviers Catholic Church	26	30
R30	Impact Church Liverpool	28	34
R31	Liverpool West Public School	24	31
R32	Liverpool Public School / TAFE NSW	23	29
R33	DNSDC Site up to end 2014	49	50
R34	Glenfield Rise Development, Glenfield	32	31
R35	DNSDC Site after end 2014	36	41
R36	Playground Learning Centre Glenfield	26	35
R37	Wattle Grove Long Day Care Centre	31	29
R38	Casula Powerhouse Arts Centre	50	51

PREDICTED NOISE LEVELS – PHASE C OPERATIONS

Predicted Noise Level – Southern Rail Access Option

Receptor		LAeq(15minute) Noise Level	
		Neutral Conditions	Adverse Conditions
R1	Lakewood Crescent, Casula	40	42
R2	St Andrews Boulevard, Casula	43	45
R3	Buckland Road, Casula	47	48
R4	Dunmore Crescent, Casula	47	47
R5	Leacocks Lane, Casula	37	36
R6	Leacocks Lane, Casula	37	36
R7	Slessor Road, Casula	31	29
R8	Canterbury Road, Glenfield	26	24
R9	Ferguson Street, Glenfield	28	26
R10	Goodenough Street, Glenfield	30	28
R11	Wallcliffe Court, Wattle Grove	33	37
R12	Corryton Court, Wattle Grove	34	38
R13	Martindale Court, Wattle Grove	33	37
R14	Anzac Road, Wattle Grove	37	41
R15	Cambridge Avenue, Glenfield	29	27
R16	Guisse Public School	16	15
R17	Yallum Court, Wattle Grove	35	39
R18	Church Road, Liverpool	30	35
R19	Glenwood Public School, Glenfield	24	22
R20	Glenfield Public School, Glenfield	23	21
R21	Hurlstone Agricultural School	21	19
R22	Wattle Grove Public School	32	36
R23	St Marks Coptic College, Wattle Grove	27	32
R24	Maple Grove Retirement Village, Casula	27	25
R25	All Saints Catholic College	40	39
R26	Casula High School	27	25
R27	Casula Primary School, Casula	38	39
R28	Lurnea High School	26	26
R29	St Francis Xaviers Catholic Church	23	26
R30	Impact Church Liverpool	27	32
R31	Liverpool West Public School	22	26
R32	Liverpool Public School / TAFE NSW	23	28
R33	DNSDC Site up to end 2014	54	55
R34	Glenfield Rise Development, Glenfield	27	25
R35	DNSDC Site after end 2014	35	39
R36	Playground Learning Centre Glenfield	24	33
R37	Wattle Grove Long Day Care Centre	29	22
R38	Casula Powerhouse Arts Centre	49	49

PREDICTED NOISE LEVELS – PHASE FULL BUILD OPERATIONS

Phase Full Build – Predicted Operational Noise Levels

Predicted Noise Level – Northern Rail Access Option

Receptor	LAeq(15minute) Noise Level	
	Neutral Conditions	Adverse Conditions
R1 Lakewood Crescent, Casula	42	46
R2 St Andrews Boulevard, Casula	45	48
R3 Buckland Road, Casula	47	49
R4 Dunmore Crescent, Casula	47	49
R5 Leacocks Lane, Casula	40	41
R6 Leacocks Lane, Casula	42	43
R7 Slessor Road, Casula	36	36
R8 Canterbury Road, Glenfield	32	31
R9 Ferguson Street, Glenfield	34	33
R10 Goodenough Street, Glenfield	35	34
R11 Wallcliffe Court, Wattle Grove	36	41
R12 Corryton Court, Wattle Grove	36	41
R13 Martindale Court, Wattle Grove	35	40
R14 Anzac Road, Wattle Grove	38	43
R15 Cambridge Avenue, Glenfield	35	34
R16 Guise Public School	24	23
R17 Yallum Court, Wattle Grove	37	42
R18 Church Road, Liverpool	33	38
R19 Glenwood Public School, Glenfield	30	29
R20 Glenfield Public School, Glenfield	28	28
R21 Hurlstone Agricultural School	26	25
R22 Wattle Grove Public School	34	39
R23 St Marks Coptic College, Wattle Grove	30	35
R24 Maple Grove Retirement Village, Casula	30	31
R25 All Saints Catholic College	43	43
R26 Casula High School	30	31
R27 Casula Primary School, Casula	39	42
R28 Lurnea High School	29	31
R29 St Francis Xaviers Catholic Church	26	31
R30 Impact Church Liverpool	29	35
R31 Liverpool West Public School	25	31
R32 Liverpool Public School / TAFE NSW	25	31
R33 DNSDC Site up to end 2014	58	59
R34 Glenfield Rise Development, Glenfield	33	32
R35 DNSDC Site after end 2014	37	42
R36 Playground Learning Centre Glenfield	29	36
R37 Wattle Grove Long Day Care Centre	31	29
R38 Casula Powerhouse Arts Centre	49	51

PREDICTED NOISE LEVELS – PHASE FULL BUILD OPERATIONS

Predicted Noise Level – Central Rail Access Option

Receptor		LAeq(15minute) Noise Level	
		Neutral Conditions	Adverse Conditions
R1	Lakewood Crescent, Casula	42	46
R2	St Andrews Boulevard, Casula	46	49
R3	Buckland Road, Casula	50	52
R4	Dunmore Crescent, Casula	51	51
R5	Leacocks Lane, Casula	41	41
R6	Leacocks Lane, Casula	41	41
R7	Slessor Road, Casula	36	35
R8	Canterbury Road, Glenfield	31	31
R9	Ferguson Street, Glenfield	33	33
R10	Goodenough Street, Glenfield	33	33
R11	Wallcliffe Court, Wattle Grove	35	40
R12	Corryton Court, Wattle Grove	35	40
R13	Martindale Court, Wattle Grove	35	39
R14	Anzac Road, Wattle Grove	39	44
R15	Cambridge Avenue, Glenfield	34	34
R16	Guisse Public School	25	25
R17	Yallum Court, Wattle Grove	36	41
R18	Church Road, Liverpool	32	38
R19	Glenwood Public School, Glenfield	30	30
R20	Glenfield Public School, Glenfield	29	28
R21	Hurlstone Agricultural School	28	27
R22	Wattle Grove Public School	33	38
R23	St Marks Coptic College, Wattle Grove	29	35
R24	Maple Grove Retirement Village, Casula	31	30
R25	All Saints Catholic College	44	44
R26	Casula High School	31	30
R27	Casula Primary School, Casula	42	43
R28	Lurnea High School	30	31
R29	St Francis Xaviers Catholic Church	27	31
R30	Impact Church Liverpool	30	35
R31	Liverpool West Public School	26	32
R32	Liverpool Public School / TAFE NSW	24	30
R33	DNSDC up to end 2014	50	51
R34	Glenfield Rise Development, Glenfield	33	32
R35	DNSDC after end of 2014	37	42
R36	Playground Learning Centre Glenfield	27	37
R37	Wattle Grove Long Day Care Centre	32	29
R38	Casula Powerhouse Arts Centre	53	54

PREDICTED NOISE LEVELS – PHASE FULL BUILD OPERATIONS

Predicted Noise Level – Southern Rail Access Option

Receptor		LAeq(15minute) Noise Level	
		Neutral Conditions	Adverse Conditions
R1	Lakewood Crescent, Casula	42	45
R2	St Andrews Boulevard, Casula	45	48
R3	Buckland Road, Casula	49	51
R4	Dunmore Crescent, Casula	49	50
R5	Leacocks Lane, Casula	40	40
R6	Leacocks Lane, Casula	42	41
R7	Slessor Road, Casula	34	33
R8	Canterbury Road, Glenfield	29	28
R9	Ferguson Street, Glenfield	30	29
R10	Goodenough Street, Glenfield	32	31
R11	Wallcliffe Court, Wattle Grove	36	41
R12	Corryton Court, Wattle Grove	36	41
R13	Martindale Court, Wattle Grove	36	41
R14	Anzac Road, Wattle Grove	39	44
R15	Cambridge Avenue, Glenfield	32	31
R16	Guisse Public School	18	18
R17	Yallum Court, Wattle Grove	37	42
R18	Church Road, Liverpool	32	38
R19	Glenwood Public School, Glenfield	26	25
R20	Glenfield Public School, Glenfield	25	24
R21	Hurlstone Agricultural School	23	22
R22	Wattle Grove Public School	35	40
R23	St Marks Coptic College, Wattle Grove	30	36
R24	Maple Grove Retirement Village, Casula	29	29
R25	All Saints Catholic College	43	43
R26	Casula High School	29	29
R27	Casula Primary School, Casula	40	42
R28	Lurnea High School	29	30
R29	St Francis Xaviers Catholic Church	26	29
R30	Impact Church Liverpool	29	35
R31	Liverpool West Public School	24	30
R32	Liverpool Public School / TAFE NSW	25	31
R33	DNSDC Site up to end 2014	56	58
R34	Glenfield Rise Development, Glenfield	31	30
R35	DNSDC Site after end 2014	38	43
R36	Playground Learning Centre Glenfield	32	37
R37	Wattle Grove Long Day Care Centre	26	25
R38	Casula Powerhouse Arts Centre	52	52