

Environmental Noise Report

Proposed Residential Development
Land Adjoining Hide N Seek
Stone Street
Stanford
Ashford
Kent
TN25 6DE

Date of Report: Monday 21st August 2017

Reference: 9748E Rev 0

This report may not be reproduced other than in full, except with the prior written approval of Soundtesting.co.uk Ltd

North Office
44 Canal Street
Bootle
Liverpool
L20 8QU

t 0151 933 6186
f 0151 922 7742
e info@soundtesting.co.uk

Midlands Office
4a Swan Park Business Centre
Kettlebrook
Tamworth
Staffordshire
B77 1AG

t 01827 767 227
e midlands@soundtesting.co.uk

South Office
117 Knyvett House
Watermans Business Park
The Causeway
Staines-upon-Thames
TW18 3BA

t 020 3286 2019
e south@soundtesting.co.uk



Contents

1	General Information	4
1.1	Site Address	4
1.2	Client Instructing Survey	4
1.3	Date of Noise Survey	4
1.4	Report Author	4
1.5	Report Checked	4
2	Introduction	5
2.1	An Environmental Noise Assessment	5
3	Assumptions & Limitations	5
4	Planning Policies, Guidance and Criteria	6
4.1	Planning Policy	6
4.1.1	Noise Policy Statement for England (NPSE)	6
4.1.2	National Planning Policy Framework (NPPF)	7
4.2	Criteria	7
4.2.1	BS8233:2014 Guidance on Sound Insulation and Noise Reduction for Buildings	7
4.2.2	WHO Guidelines for Community Noise	8
4.3	BS 6472-1:2008 Guide to evaluation of human exposure to vibration in buildings	8
4.4	Local Authority Criteria	8
4.5	Criteria Summary	8
5	Site Description	9
6	Noise Measurement Procedure	10
6.1	Personnel Present	10
6.2	Survey Equipment Used	10
6.3	Calibration	10
6.4	Weather Conditions	10
6.5	External Ambient Sound Measurements	11
6.6	Vibration Measurement Procedure	11
7	Results and Analysis	12
7.1	External Ambient Sound Measurement Analysis in Accordance with BS8233:2014	12
7.2	Night-time L_{AFmax} Analysis	12
7.3	Vibration Measurement Results in Accordance with BS 6472-1:2008	13
8	Recommendations	14



8.1	Glazing & Ventilation Specification for Habitable Rooms	14
8.1.1	Glazing & Ventilation Specification for Living Room Areas.....	14
8.1.2	Glazing & Ventilation Specification for Bedroom Areas	14
8.2	Notes on Ventilation	14
8.3	Calculation Methodology	14
8.4	Building Elements.....	15
8.5	Example of Estimated Performance	15
9	Conclusion.....	16
10	References	17
10.1	Drawing References	17
	Appendix.....	18
	Figure 1: Aerial View of Development Showing Monitoring Positions.....	18
	Figure 2: Picture Showing Monitoring Positions 1	19
	Measurement Results	20



1 General Information

1.1 Site Address

Proposed Residential Development
Land Adjoining Hide N Seek
Stone Street
Stanford
Ashford
Kent
TN25 6DE

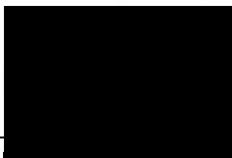
1.2 Client Instructing Survey

Mr Pawel Zablocki
Stone Street
Stanford
Ashford
Kent
TN25 6DE

1.3 Date of Noise Survey

Thursday 17th to Friday 18th August 2017

1.4 Report Author

	Name	Position	Signature	Date
Prepared by	W Wright BSc AMIOA	Acoustic Consultant		22/12/2016
For and on behalf of: Soundtesting.co.uk Ltd				

1.5 Report Checked

	Name	Position	Signature	Date
Report Checked	M S Hamer MSc MIOA	Acoustic Consultant		22/12/2016
For and on behalf of: Soundtesting.co.uk Ltd				



2 Introduction

Mr Pawel Zablocki has instructed Soundtesting.co.uk Limited to undertake an environmental noise survey in order to assess the impact of sound and vibration from the nearby railway and motorway as well as general noise within the local environment, which may have an impact on future residents of the proposed development. The proposed development site is currently open land and is to accommodate two cottages with associated works.

This report is prepared solely for Mr Pawel Zablocki. Soundtesting.co.uk Limited accepts no responsibility for its use by any third party.

2.1 An Environmental Noise Assessment

Soundtesting.co.uk Ltd has undertaken an environmental noise assessment at the above site with noise levels measured externally over a 24-hour period, consisting of a sixteen-hour day (07:00 – 23:00) and an eight-hour night (23:00 – 07:00). The measurements were carried out during a week day.

This report will state the measured noise levels, and will refer to guidance contained within BS8233:2014 and Sound Insulation and Noise Reduction for Buildings and WHO Community Noise Guidelines for recommended internal noise levels within living spaces.

3 Assumptions & Limitations

- a. All suggested specifications require a good level of workmanship and for materials to be installed as the manufacture intends. Any poor workmanship may lead to weaknesses in the sound attenuation provided by the building façade.
- b. It is assumed that the sound pressure levels measured on site during the environmental noise survey are typical of the site.
- c. It is assumed that the technical data provided by glazing and ventilation manufacturers is up to date and correct.
- d. It is assumed that drawings and information supplied by RDA Consulting Architects LLP are up to date and correct.



4 Planning Policies, Guidance and Criteria

The planning policies and criteria listed below are taken from associated relevant guidance documents, all of which should be considered for the internal and external noise and vibration levels.

4.1 Planning Policy

4.1.1 Noise Policy Statement for England (NPSE)

In March 2010 the Government issued a Noise Policy Statement for England (NPSE). The aim of this document is to “provide clarity regarding current policies and practices to enable noise management decisions to be made within the wider context, at the most appropriate level, in a cost-effective manner and in a timely fashion.”

The NPSE sets out the long term vision for Government noise policy.

Noise Policy Vision

Promote good health and a good quality of life through the effective management of noise within the context of Government policy on sustainable development.

The NPSE includes three primary aims: all interpreted by having regard to a set of shared UK principles that underpin the Government’s sustainable development strategy. The Government’s sustainable development strategy is provided in NPSE paragraph 1.8.

Noise Policy Aims

Through the effective management and control of environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development:

- *avoid significant adverse impacts on health and quality of life;*
- *mitigate and minimise adverse impacts on health and quality of life; and*
- *where possible, contribute to the improvement of health and quality of life*

The NPSE aims include the terms “significant adverse” and “adverse”

The World Health Organisation is currently applying the following established concepts from toxicology to noise impacts:

- *NOEL – No Observed Effect Level. This is the level below which no effect can be detected. In simple terms, below this level, there is no detectable effect on health and quality of life due to the noise.*
- *LOAEL – Lowest Observed Adverse Effect Level This is the level above which adverse effects on health and quality of life can be detected.*

The NPSE expands these terms leading to the concept of a Significant Observed Adverse Effect Level.

- *SOAEL – Significant Observed Adverse Effect Level. This is the level above which significant adverse effects on health and quality of life occur.*

The NPSE goes on to state that it is not possible to have a single objective noise-based measure that defines SOAEL that will be applicable to all sources of noise in all situations. Consequently, the



SOAEL is likely to be different for different noise sources, for different receptors and at different times.

4.1.2 National Planning Policy Framework (NPPF)

The National Planning Policy Framework (NPPF) set out the Government's planning policies for England and how they are expected to be applied. It provides a framework within which local authorities are to prepare local plans and use their planning powers to minimise the adverse impact of noise. It contains the following in relation to noise impacts found in Section 11, paragraph 123:

Planning policies and decisions should aim to:

- *avoid noise from giving rise to significant adverse impacts on health and quality of life as a result of new development;*
- *mitigate and reduce to a minimum other adverse impacts on health and quality of life arising from noise from new development, including through the use of conditions;*
- *recognise that development will often create some noise and existing businesses wanting to develop in continuance of their business should not have unreasonable restrictions put on them because of changes in nearby land uses since they were established; and*
- *identify and protect areas of tranquillity which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason.*

4.2 Criteria

4.2.1 BS8233:2014 Guidance on Sound Insulation and Noise Reduction for Buildings

The British Standard BS 8233:2014, Guidance on Sound Insulation and noise reduction for buildings, gives guidance on internal noise levels within dwellings, flats and rooms in residential use when unoccupied. The following criteria are for Living and Dining Rooms for daytime use and Bedrooms for night time.

Table 1: BS 8233:2014 Recommended Internal Noise Levels			
Activity	Location	07:00 to 23:00	23:00 to 07:00
Resting	Living Room	35 dB $L_{Aeq,16hour}$	-
Dining	Dining room/area	40 dB $L_{Aeq,16hour}$	-
Sleeping (daytime resting)	Bedroom	35 dB $L_{Aeq,16hour}$	30 dB $L_{Aeq,8hour}$

In addition, BS 8233 suggests, "regular individual noise events (for example, scheduled aircraft or passing trains) can cause sleep disturbance. A guideline value may be set in terms of SEL or $L_{Amax,F}$, depending on the character and number of events per night. Sporadic noise events could require separate values".



4.2.2 WHO Guidelines for Community Noise

In 1999, the WHO (World Health Organisation) published Guidelines for Community Noise, stating the following internal noise levels are applicable within dwellings.

Table 2: A Summary of the Guidance Noise Levels				
Specific Environment	Critical Health Effect (s)	L_{Aeq} (dB)	Time base (hours)*	L_{AFmax} (dB)
Outdoor living area	Serious annoyance, daytime and evening	55	16	-
	Moderate annoyance, daytime evening	50	16	-
Dwelling, indoors	Speech intelligibility and moderate annoyance, daytime and evening	35	16	-
Inside bedrooms	Sleep disturbance, night-time	30	8	45
Outside bedrooms	Sleep disturbance, window open (outdoor values)	45	8	60

* Typically taken to be daytime/evening - 07:00 – 23:00 and night time 23:00 – 07:00.

4.3 BS 6472-1:2008 Guide to evaluation of human exposure to vibration in buildings

Vibration dose value ranges which might result in various probabilities of adverse comment within residential buildings.

Table 3: BS 6472-1:2008 Vibration Dose Value Ranges.			
Place and time	Low probability of adverse comment $m.s^{-1.75}$	Adverse comment possible $m.s^{-1.75}$	Adverse probable comment $m.s^{-1.75}$
Residential buildings 16 hour day	0.2 to 0.4	0.4 to 0.8	0.8 to 1.6
Residential buildings 8 hour night	0.1 to 0.2	0.2 to 0.4	0.4 to 0.8

4.4 Local Authority Criteria

Shepway District Council have outlined their concerns regarding noise and vibration impacting on the potential residents of the proposed development as a result of the adjacent railway line. A noise and vibration assessment has been requested in the interest of protecting the “amenity of the future occupants”.

4.5 Criteria Summary

All recommendations will be made in order to meet the criteria of BS8233:2014; with reference to WHO Community Noise Guidelines.

A noise and vibration report will be produced with all recommendations made in order to meet the criteria of BS8233:2014 with reference to WHO Guidelines for Community Noise and vibration criteria of 6472-1:2008 Guide to evaluation of human exposure to vibration in buildings.



5 Site Description

The proposed development at the land adjoining 'Hide N Seek' is currently open land situated in Stanford village in the county of Kent. The land sits adjacent to the railway line at Westenhanger train station which creates the southern boundary of the site, and is located approximately 170m south of the M20 motorway. The north of the site is bound by the Hide N Seek property and the east of the site is bound by Stone Street bridge which carries traffic over the railway. The west of the site is bound by land belonging to a small row of four residential dwellings.

During site attendance, subjectively the main source of noise was road traffic most likely from the M20 motorway and occasional trains passing on the railway line to the south.



6 Noise Measurement Procedure

6.1 Personnel Present

William Wright BSc AMIOA

6.2 Survey Equipment Used

Table 4: Survey Equipment Used			
Manufacturer	Model	Serial No.	Description
Rion	NL-52	1032413	Real Time Analyser Sound Level Meter
Pulsar	Model 105	59964	Acoustic Calibrator
Vibroek	V901 Digital Seismograph	1284	VDV Transducer

6.3 Calibration

The sound level meter was calibrated with the field calibrator to a level of 94.0 dB @ 1 kHz prior to and on completion of the survey. No significant drift in calibration was observed. The meter used during the survey are precision grade class 1.

Calibration certificates are available on request.

6.4 Weather Conditions

During the daytime measurement periods the temperature averaged around 22°C, the sky was mostly cloudy with some broken sun. The wind speeds averaged approximately 4.5 m.s⁻¹ with occasional gusts which may have exceeded 5 m.s⁻¹, blowing in primarily in a southern direction. During the night time period, the temperature averaged around 13°C, with cloudy skies. There was some precipitation before the survey on Thursday morning, however there was no precipitation during the survey. The rain before the survey may have also caused the road surfaces to become wet during some of the Thursday afternoon survey period.

As the wind was blowing in a southern direction for the duration of the survey it is reasonable to presume that noise from the M20 motorway was being carried toward the site resulting in higher traffic noise levels being measured. This should result in a more robust assessment based on the measured levels and ensures that the worst-case scenario for M20 road noise has been accounted for in the glazing and ventilation specification.



6.5 External Ambient Sound Measurements

The sound level meters were set to measure L_{A90} , L_{A10} , L_{Aeq} and L_{AFmax} in 5 minute periods, as well as A-weighted 1:1 octave spectrum analysis.

Data charts can be found in the appendix.

Monitoring Position 1

A microphone was positioned at the ground floor level in the garden belonging to the existing house to the west which was closest to the railway line. It was located in line with the proposed residential dwelling façade. The microphone was set on a tripod 1.5m above the garden turf surface.

6.6 Vibration Measurement Procedure

The digital Seismograph was set to measure VDV (Vibration Dose Value) to provide 16-hour daytime and 8-hour night time VDV values in the x, y and z planes.

Monitoring Position 2

A vibration meter was positioned at the ground floor level in the garden belonging to the existing house to the west which was closest to the railway line. The transducer was levelled horizontally and buried 6 inches deep in compact soil with the x-axis aligned in parallel with the railway line and the y-axis perpendicular to it.



7 Results and Analysis

7.1 External Ambient Sound Measurement Analysis in Accordance with BS8233:2014

The following table presents the measured results from all monitoring positions.

Table 5: Measurement Results						
Monitoring position	Time Period	Time Base T (hours)	$L_{Aeq,T}$ (dB)	L_{AFmax} (dB)	L_{A90} (dB)	L_{A10} (dB)
1	Daytime	16	58.3	-	53.4	57.4
	Night time	8	51.4	51.2 – 85.0	44.7	52.1

7.2 Night-time L_{AFmax} Analysis

At position 1; the L_{AFmax} measured during the night time (23:00-07:00) has been analysed. It is noted that the maximum measured L_{AFmax} is 85.0 dB, which occurred at 23:50 during the night-time period. 80.0 L_{AFmax} dB is exceeded 2 times during the night time period.

The WAV file recordings indicate that the L_{AFmax} 85.0 dB event was from a dog barking which can be considered anomalous. The next highest L_{AFmax} event of 81.8 dB occurred at 06:55 during the Friday morning 'night-time period' and audio recordings indicate this was from the dawn chorus of birds.

The next highest L_{AFmax} event of 77.0 dB was from a passing train and will be carried forward for the assessment and specification of glazing and ventilation for the proposed residential dwellings.

The other L_{AFmax} events were a mixture of various train passes, dog barks and bird noise.

WHO Community Noise Guidelines states "For a good night sleep it is believed that indoor sound pressure should not exceed approximately 45dB L_{AFmax} more than 10 – 15 times per night (Vallet & Vernet 1991).

It should be noted that the measured sound pressure levels may have been somewhat higher than usual due to the wet ground surface (Craven & Kerry 2007).



7.3 Vibration Measurement Results in Accordance with BS 6472-1:2008

The Table below shows the vibration results for the daytime and night time periods.

Table 6: Vibration Measurement Results for Daytime and Night time period			
Daytime (07:00 to 23:00)			
Measurement Period	VDVx ($\text{m.s}^{-1.75}$)	VDVy ($\text{m.s}^{-1.75}$)	VDVz ($\text{m.s}^{-1.75}$)
07:00 – 11:10	0.028	0.031	0.029
11:10 – 23:00	0.032	0.033	0.038
Night time (23:00 to 07:00)			
Measurement Duration	VDVx ($\text{m.s}^{-1.75}$)	VDVy ($\text{m.s}^{-1.75}$)	VDVz ($\text{m.s}^{-1.75}$)
23:00 – 07:00	0.032	0.034	0.041

The results show the maximum VDV for the daytime period to be $0.038 \text{ m.s}^{-1.75}$.

The results show the maximum VDV for the night time period to be $0.041 \text{ m.s}^{-1.75}$.

These results indicate a negligible probability of adverse comment due to vibrations as they are below the lower limit of classification.



8 Recommendations

The estimated internal noise levels attributed by the external noise sources have been assessed over an average of $L_{Aeq,T}$ from the daytime and night-time survey periods and L_{AFmax} values from the night time.

8.1 Glazing & Ventilation Specification for Habitable Rooms

8.1.1 Glazing & Ventilation Specification for Living Room Areas

The glazing specification in bedrooms should consist of at least 4mm glass / 12mm void / 4mm glass double glazed unit; in well-sealed frames and without trickle vents. The ventilation can be a quality mechanical system or a passive acoustic wall vent such as Greenwoods MA3051.

8.1.2 Glazing & Ventilation Specification for Bedroom Areas

The glazing specification in bedrooms should consist of at least 10mm glass / 12mm void / 6mm glass double glazed unit; in well-sealed frames and without trickle vents. The ventilation can be a quality mechanical system or a passive acoustic window vent such as Greenwoods MA3051.

Although the calculations demonstrate that the wall vent can be installed on any façade; it is recommended where possible to avoid installing ventilation systems on the façade that face the railway line. Where possible, installing ventilation on quieter facades would be beneficial to the overall acoustic performance.

One vent has been assumed per room for the purposes of specifying the ventilation with regard to acoustics. If more than one vent is required for airflow purposes then further calculations would be necessary to ensure that the specification remains relevant.

8.2 Notes on Ventilation

The glazing and ventilation suggestions have been calculated assuming the windows are tightly closed. However it must be noted that windows are suggested to be openable to provide rapid or purge ventilation or means of escape. Noise levels in habitable rooms will exceed the recommended values with windows opened.

8.3 Calculation Methodology

The BRE Building Envelope Insulation calculator has been used for the noise break in calculations for the BS8233:2014 assessment.



Room and window dimensions are based on RDA Architects drawings.

The calculations assume the external walls to be brick and block as stated in BS8233:2014.

The calculations assume each room has a reverberation time of 0.5 seconds.

The predictions also have been calculated assuming all windows are tightly closed.

8.4 Building Elements

The following table shows the expected performance of the glazing and ventilation.

Table 6: Table showing suggested Glazing & Ventilation								
Element	Description#	$R_w/D_{n,e,w}$ (dB)	Octave Centre Frequencies (Hz)					
			SRI / $D_{n,e}$ (dB)					
			125	250	500	1k	2k	4k
Glazing	4mm/ (12)/ 4mm <i>BS 6262 2 2005</i>	29	21	15	25	36	39	31
	10mm/ (12)/ 6mm <i>BS 6262 2 2005</i>	36	25	29	34	39	37	46
Ventilation	Greenwoods MA3051	55	48	46	49	54	65	-

**The selected units or products described have been used as a guide to form part of the specification. Other similar units or products can be used provided they can achieve the given minimum acoustic performance.*

8.5 Example of Estimated Performance

The following table compares the estimated performance values with the measured values.

Table 7: Estimated performance					
Specification	Time period	Measured External		Predicted Internal	
		Average $L_{Aeq,T}$ (dB)	L_{AFmax} (dB)	$L_{Aeq,T}$ (dB)	L_{AFmax} (dB)
Glazing and Ventilation	Night time (23:00 – 07:00)	51.4	77.0	14.1	41.6
	Daytime (07:00 – 23:00)	58.3	-	26.5	-



9 Conclusion

When installing the recommended glazing and ventilation detail as discussed in the recommendations section, the recommended internal noise levels described in BS8233:2014 and World Health Organisation Guidelines for Community Noise can be achieved for internal noise levels in all habitable rooms.

Results of the vibration test show that levels are well below those that would indicate even a low probability of adverse impact as described in BS6472-1:2008.



10 References

Noise Policy Statement for England (NPSE)

National Planning Policy Framework (NPPF)

BS 8233:2014 Guidance on Sound Insulation and Noise Reduction for Buildings

BS 6472-1:2008 Guide to evaluation of human exposure to vibration in buildings

BS 6262 2 2005 Glazing for buildings

World Health Organisation Guidelines for Community Noise

BS 7445-1:2003 Description and measurement of environmental noise – Part 1: Guide to quantities and procedures

www.google.co.uk/maps

10.1 Drawing References

14.159 – 01 Site Location Plan

14.159 – 02 Proposed Site Plan

14.159 – 03 Proposed Floor Plans

14.159 – 04 Proposed Elevations



Appendix

Figure 1: Aerial View of Development Showing Monitoring Positions

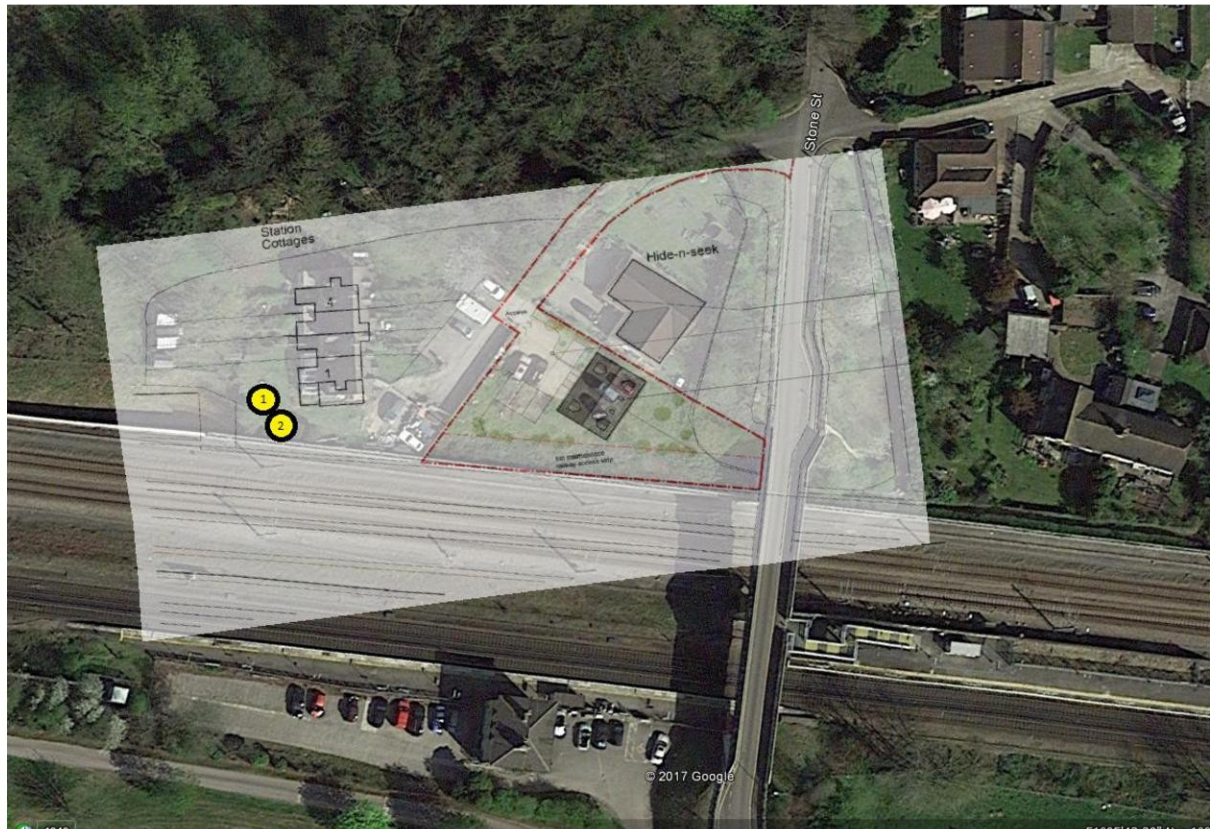




Figure 2: Picture Showing Monitoring Positions 1

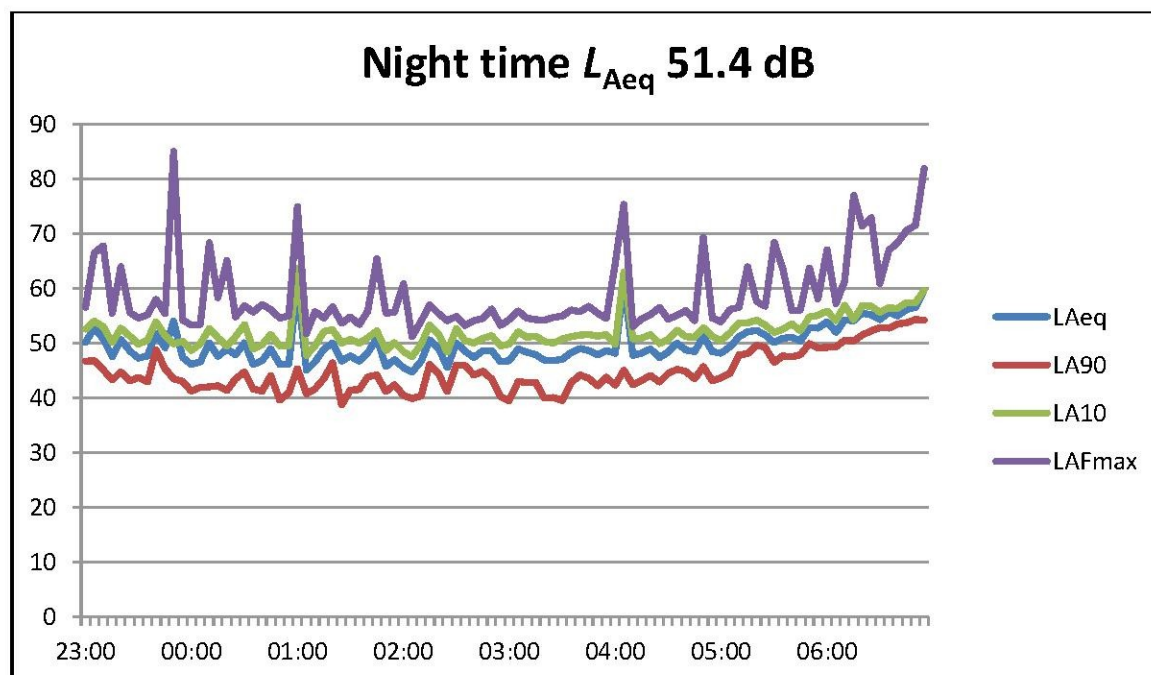
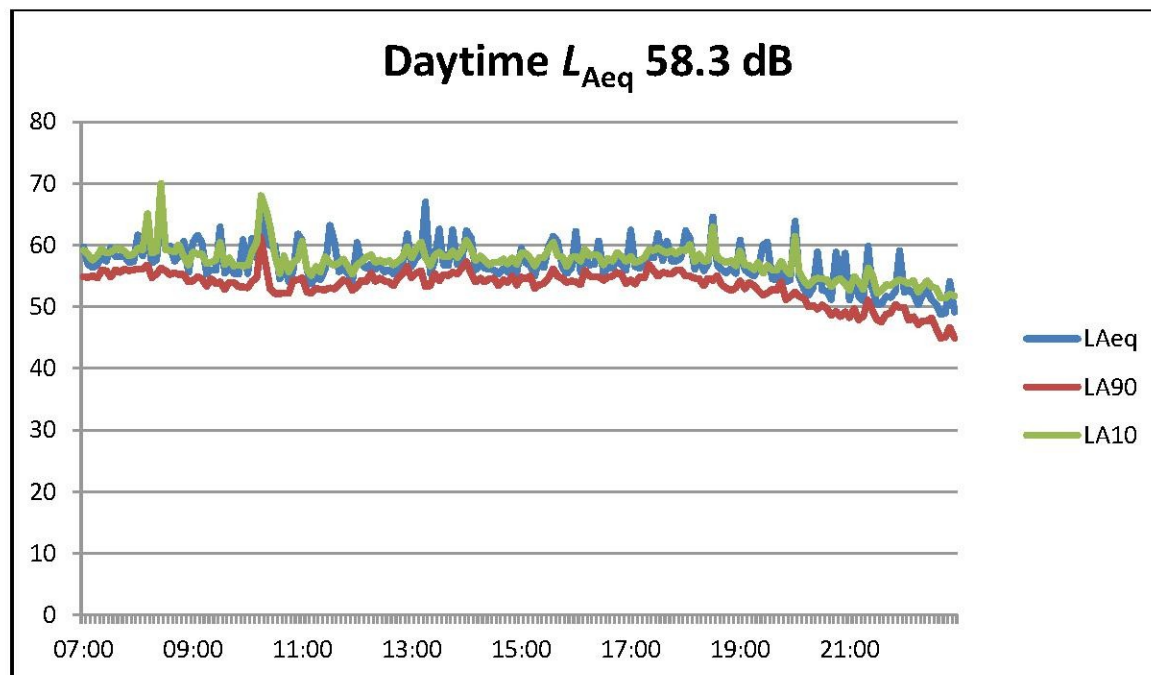




Measurement Results

Monitoring Position 1

Thursday 17th – Friday 18th August



**Un-weighted 1:1 Octave Results**