REPORT REFERENCE:

SA – 3369 / 2

INDUSTRIAL NOISE IMPACT ASSESSMENT

INSTALLATION OF KITCHEN EXTRACTION

British Standard 4142:2014

CLIENT:

Bow Capital Limited

SITE:

The Magdala

2a South Hill Park

London

NW3 2SB

SURVEY DATES:

17th – 20th September 2014

Report By

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1 EXECUTIVE SUMMARY

1.1 Instruction

Sound Advice Acoustics Ltd have been instructed by Bow Capital Limited to undertake a background noise survey at the existing premises at 2A South Hill Park, London, NW3 2SB to understand the level of impact at the existing site and set a maximum design noise criteria for any proposed kitchen extraction plant that could be installed on the site.

1.2 Scope of Report

The measurements have been undertaken in accordance with British Standard 4142:2014 and ISO 1996 – Part 2: 2007 to establish if the proposed site has a demonstrable adverse effect in terms of noise that outweigh the benefits of the development. This report aims to establish the following:

- Existing background noise levels at the closest residential façade to the site.
- Set a maximum noise level criteria for any future extract plant for this development.
- Assessment of the impact of the site operation on nearby residential properties.

1.3 Summary of Report

1.3.1 Measured Background Noise Levels

Continuous background noise measurements were undertaken between 17th – 20th September 2014 at the Assessment Position 1. The modal 1-hour day time background noise levels between 07:00 and 23:00 was found to be $L_{A90,1\ hour}$ 51dB at the assessment position and LA90, 1 hour 43 dB during night time hours 23:00 – 07:00

Daytime Equivalent Existing Background Noise Levels 7 days (07:00 – 23:00)	**Measured Levels at Assessment Position**	**$L_{A90,\ 1hour}$ 51 dB**
Night Time Equivalent Existing Background Noise Levels 7 days (23:00 – 07:00)	Measured Levels at Assessment Position	**$L_{A90,\ 1hour}$ 43 dB**

1.4 Proposed Plant Criteria

Calculations and assessments are to be made within this report to generate a maximum noise level criteria to which all plant should be selected to. The maximum noise level calculated is to be achieved at 1.0m & 10m from the units in situ with all units operating under normal load.

The following calculations have been based on the recorded LA90 background noise level over a typical 24 hour period at the measurement position 1 and include the possibility of night time operations although the kitchen extract should be switched off before 23:00 hrs.

The above calculations have demonstrated that in order to meet the criteria of +/- 0dB below the recorded background noise level, the following external noise level plant criteria should be achieved at 1.0m and 10m from all units operating at the same time under normal load.

DAYTIME 07:00 – 23:00

Octave Band Centre Frequency (Hz)										dB(A)	Comments
31.5	63	125	250	500	1.0k	2.0k	4.0k	8.0k	16.0k		
62.0	62.0	57.0	53.0	48.0	49.0	48.0	42.0	36.0	22.0	54.1	Calculated Noise Source Level @ 1.0m
42.0	42.0	37.0	33.0	28.0	29.0	28.0	22.0	16.0	2.0	34.1	Calculated Noise Source Level @ 10.0m
Sound Pressure Level at 1.0m from plant (ref 2 x 10-5 Pa)											

NIGHT TIME 23:00 – 07:00

Octave Band Centre Frequency (Hz)										dB(A)	Comments
31.5	63	125	250	500	1.0k	2.0k	4.0k	8.0k	16.0k		
55.0	58.0	47.0	46.0	40.0	42.0	37.0	36.0	35.0	13.0	46.3	Calculated Noise Source Level @ 1.0m
35.0	38.0	27.0	26.0	20.0	22.0	17.0	16.0	15.0	-7.0	26.3	Calculated Noise Source Level @ 10.0m
Sound Pressure Level at 1.0m from plant (ref 2 x 10-5 Pa)											

1.5 Conclusions

The operation of any proposed kitchen extract system has been assessed to establish if the development will have a demonstrable adverse effect in terms of noise that outweigh the benefits of the development. Measurements have been undertaken in accordance with British Standard 4142:2014 and ISO 1996 – Part 2: 2007. This report has established the existing background noise levels at the closest residential façade to the site and the assessment of the impact of the site operation on nearby residential properties. The resulting emissions from the site running on a worst case scenario show no conflict with 'low impact' criteria and give a strong indication that complaint and impact on the local amenity is unlikely, provided the recommended maximum noise levels plant criteria is achieved as detailed within this report.

The plant criteria was set as the new kitchen system is yet to be designed and it is recommended that this criteria be set as a planning condition.

2 INTRODUCTION

2.1 Instruction

Sound Advice Acoustics Ltd have been instructed by Bow Capital Limited to undertake a background noise survey at the existing premises at 2A South Hill Park, London, NW3 2SB to understand the level of impact at the existing site and set a maximum design noise criteria for any proposed kitchen extraction plant that could be installed on the site.

The purpose of this assessment is to ensure the acoustic protection of noise sensitive premises closest to the proposed kitchen extract system. Noise sensitive premises are not restricted to residential dwellings as offices can be affected by unwanted external noise. However, the residential properties directly behind the proposed kitchen extract have been identified as the nearest noise sensitive and therefore all calculations and assessments are to be made to these positions.

2.2 Ambient and Background Measurements

Therefore, this external noise assessment has been carried out in order to identify the background noise level at the nearest affected noise sensitive premises which is understood to be the residential properties directly above the existing restaurant.

External noise levels are to be recorded over, what has been considered for the site, an average / typical time period in order to assess the daytime and night time noise levels. Levels have been recorded over more than one night in order to ensure the uncertainty of measurement aspects of BS 4142 : 2014 have been satisfied and that the data recorded is representative for the purpose of a robust assessment.

2.3 Plant Proposal

At this stage, the precise details of the new kitchen extract are unknown and therefore this noise assessment has been undertaken in order to calculate a maximum noise level criteria to which all future extract plant must adhere to in order to ensure compliance with BS 4142 : 2014.

2.4 BS 4142 : 2014

British Standard 4142 : 2014 is to be adopted for the basis of this background noise level assessment. A BS 4142 : 2014 noise assessment will be carried out in order to demonstrate the existing acoustic impact the external plant currently has on the nearest affected residential and make suitable recommendations in order to demonstrate that these units will not have a significant and demonstrable adverse impact on the nearest noise sensitive premises in accordance with the National Planning Policy Framework, once remedial works are completed. BS 4142 : 2014 supersedes the 1997 version and has been developed to move more in-line with the National Planning Policy Framework 2012 (NPPF) and the Noise Policy Statement for England 2010 (NPSE).

2.5 National Planning Policy Framework & Noise Policy Statement for England 2010

References and evaluations are to be made to the National Planning Policy Framework 2012 (NPPF) and the Noise Policy Statement for England 2010 (NPSE). The purpose of this document is to include all aspects of environmental noise within assessments i.e. environmental noise, neighbour noise and neighbourhood noise.

Noise is to be considered alongside other relevant issues relating to the site and should not be considered in isolation, according to the NPSE.

There are several key phrases within the NPSE aims and these are discussed below.

"Significant adverse" and "adverse"

There are two established concepts from toxicology that are currently being applied to noise impacts, for example, by the World Health Organisation. They are:

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.*

Extending these concepts for the purpose of this NPSE leads 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.*

It is not possible to have a single objective noise-based measure that defines SOAEL that is 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. It is acknowledged that further research is required to increase our understanding of what may constitute a significant adverse impact on health and quality of life from noise. However, not having specific SOAEL values in the NPSE provides the necessary policy flexibility until further evidence and suitable guidance is available.

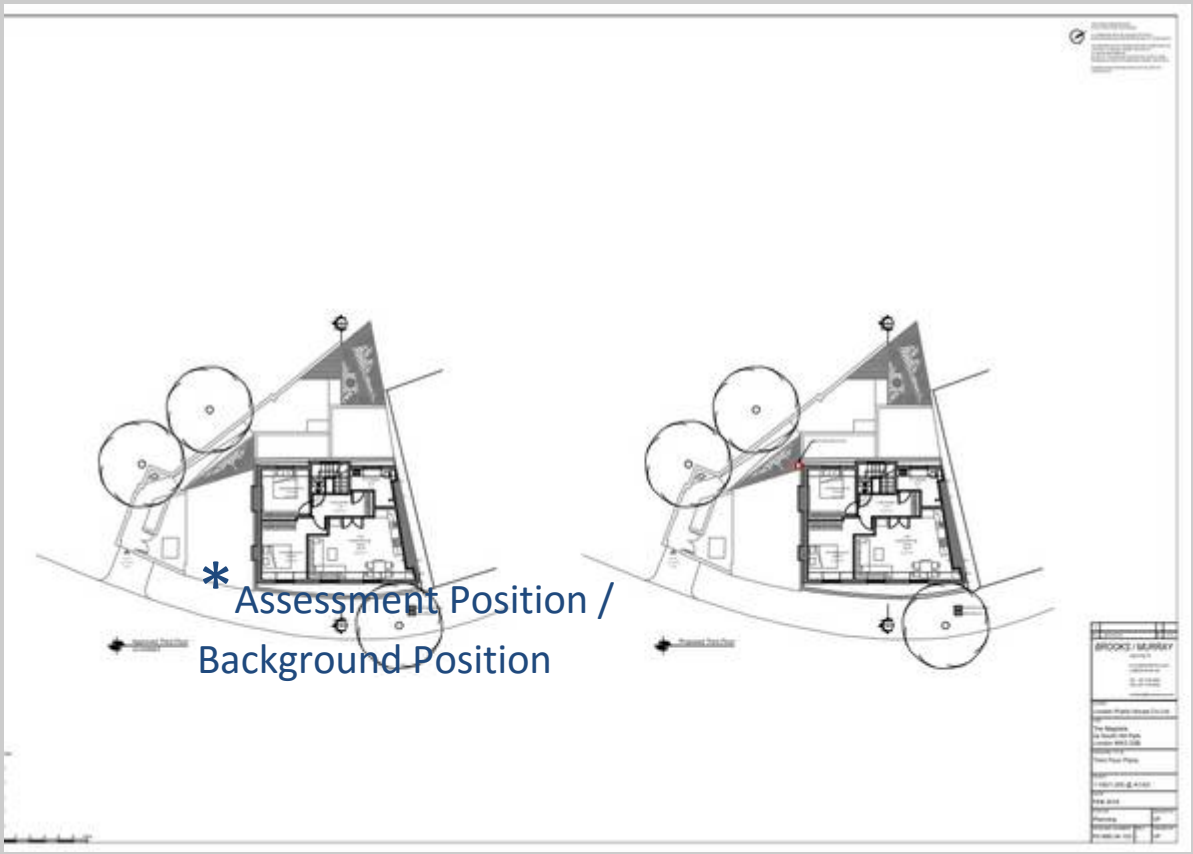
3 SITE LOCATION

3.1 Position of Site in Wider Area

The site is located in on the coast in Swanage

3.2 Assessment Position and Background Position

Continuous measurement was undertaken at the assessment position between 17th – 20th September 2014. Measurement was undertaken at roof level at the nearest noise sensitive premises / receptor in accordance with ISO1996 part 2: 2007 in free field conditions.



Assessment Position 1	Latitude:	51°33'20.10"N	Longitude:	0° 9'56.65"W	Elevation:	64m

4 BACKGROUND NOISE LEVELS

4.1 Measured Background Noise Level Results Assessment Position

07:00 – 07:00 on 28th – 29th April 2016	LAeq	LA90	Octave Band Centre Frequency (Hz)									
			31.5	63	125	250	500	1.0 k	2.0 k	4.0 k	8.0 k	16.0 k
DAYTIME MODE 07:00 - 23:00 $L_{A90\ 1\ HOUR}$ & Corresponding $L_{Aeq\ 1\ HOUR}$	58.0	51.0	66.0	66.0	61.0	57.0	52.0	53.0	52.0	46.0	40.0	26.0
NIGH TIME MODE 23:00 - 07:00 $L_{A90\ 15\ MIN}$ & Corresponding $L_{Aeq\ 15\ MIN}$	51.0	43.0	60.0	63.0	52.0	51.0	45.0	47.0	42.0	41.0	40.0	18.0

07:00 – 07:00 on 29th – 30th April 2016	LAeq	LA90	Octave Band Centre Frequency (Hz)									
			31.5	63	125	250	500	1.0 k	2.0 k	4.0 k	8.0 k	16.0 k
DAYTIME MODE 07:00 - 23:00 $L_{A90\ 1\ HOUR}$ & Corresponding $L_{Aeq\ 1\ HOUR}$	60.0	52.0	67.0	67.0	61.0	57.0	54.0	54.0	54.0	48.0	42.0	29.0
NIGH TIME MODE 23:00 - 07:00 $L_{A90\ 15\ MIN}$ & Corresponding $L_{Aeq\ 15\ MIN}$	55.0	43.0	59.0	59.0	55.0	52.0	49.0	49.0	51.0	40.0	43.0	25.0

07:00 – 07:00 on 1st – 2nd May 2016	LAeq	LA90	Octave Band Centre Frequency (Hz)									
			31.5	63	125	250	500	1.0 k	2.0 k	4.0 k	8.0 k	16.0 k
DAYTIME MODE 07:00 - 23:00 $L_{A90\ 1\ HOUR}$ & Corresponding $L_{Aeq\ 1\ HOUR}$	59.0	52.0	66.0	66.0	61.0	57.0	54.0	54.0	53.0	45.0	44.0	26.0
NIGH TIME MODE 23:00 - 07:00 $L_{A90\ 15\ MIN}$ & Corresponding $L_{Aeq\ 15\ MIN}$	56.0	44.0	60.0	61.0	55.0	50.0	48.0	49.0	52.0	47.0	40.0	20.0

Daytime Equivalent Existing Background Noise Levels 7 days (07:00 – 23:00)	Measured Levels at Assessment Position	$L_{A90,\ 1hour}$ 51 dB
Night Time Equivalent Existing Background Noise Levels 7 days (23:00 – 07:00)	Measured Levels at Assessment Position	$L_{A90,\ 1hour}$ 43 dB

5 APPARATUS

5.1 Equipment Calibration

The equipment was calibrated using a sound pressure level of 114.0 dB at an octave band centre frequency of 1000Hz with reference to 2 x 10-5 Nm-2 before and after the tests and the equipment set to have no inaccuracy greater than 0.2 dB.

All the following equipment was calibrated in accordance with the laboratory accreditation requirements of the United Kingdom Accreditation Service (UKAS) on the following dates. Calibration schedules are implemented within Sound Advice Acoustics Ltd in accordance with UKAS directive LAB 23.

5.2 Position 1 – Rear of Site

Description	Make	Type	Serial No.	Calibration Intervals	Last Calibrated	Next Due Calibration
Integrated Sound Level Meter	Norsonic	118	31471	2 YEARS	08.08.2014	08.08.2016
12.5mm Microphone (with windshield)	Norsonic	1220	41075	2 YEARS	08.08.2014	08.08.2016
Microphone Pre – Amplifier	Norsonic	1201	30327	2 YEARS	08.08.2014	08.08.2016

The noise meter was calibrated before and after the assessment period and found to be within the tolerance of the manufacturer's guidance. Full Calibration certificates are available upon request.

6 CALCULATIONS

The following calculations have been based on the recorded LA90 background noise level over a typical 24 hour period at the measurement position 1 and include the possibility of night time operations.

DAYTIME 07:00 – 23:00

Octave Band Centre Frequency (Hz)										dB(A)	Comments
31.5	63	125	250	500	1.0k	2.0k	4.0k	8.0k	16.0k		
66.0	66.0	61.0	57.0	52.0	53.0	52.0	46.0	40.0	26.0		Recorded Background Noise Levels
3	3	3	3	3	3	3	3	3	3		Reflection at Residential
5	5	5	5	5	5	5	5	5	5		BS 4142 : 2014 Corrections
7	7	7	7	7	7	7	7	7	7		LAeq - LA90
14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0		Distance Correction
0	0	0	0	0	0	0	0	0	0		Barrier Attenuation
3	3	3	3	3	3	3	3	3	3		Reflection at Source
54.0	54.0	49.0	45.0	40.0	41.0	40.0	34.0	28.0	14.0	46.0	Target Level at Residential
6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0		Reflections
14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0		Distance and Barriers
62.0	62.0	57.0	53.0	48.0	49.0	48.0	42.0	36.0	22.0	54.1	Calculated Noise Source Level @ 1.0m
42.0	42.0	37.0	33.0	28.0	29.0	28.0	22.0	16.0	2.0	34.1	Calculated Noise Source Level @ 10.0m

NIGHT TIME 23:00 – 07:00

Octave Band Centre Frequency (Hz)										dB(A)	Comments
31.5	63	125	250	500	1.0k	2.0k	4.0k	8.0k	16.0k		
60	63	52	51	45	47	42	41	40	18		Recorded Background Noise Levels
3	3	3	3	3	3	3	3	3	3		Reflection at Residential
5	5	5	5	5	5	5	5	5	5		BS 4142 : 2014 Corrections
8	8	8	8	8	8	8	8	8	8		LAeq - LA90
14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0		Distance Correction
0	0	0	0	0	0	0	0	0	0		Barrier Attenuation
3	3	3	3	3	3	3	3	3	3		Reflection at Source
47	50	39	38	32	34	29	28	27	5	38.0	Target Level at Residential
6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0		Reflections
14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0		Distance and Barriers
55.0	58.0	47.0	46.0	40.0	42.0	37.0	36.0	35.0	13.0	46.3	Calculated Noise Source Level @ 1.0m
35.0	38.0	27.0	26.0	20.0	22.0	17.0	16.0	15.0	-7.0	26.3	Calculated Noise Source Level @ 10.0m

The above calculations have demonstrated that in order to meet the criteria of -10 dB below the recorded background noise level, the following external noise level plant criteria should be achieved at 1.0m and 5.5m from all units operating at the same time under normal load.

DAYTIME 07:00 – 23:00

Octave Band Centre Frequency (Hz)										dB(A)	Comments
31.5	63	125	250	500	1.0k	2.0k	4.0k	8.0k	16.0k		
62.0	62.0	57.0	53.0	48.0	49.0	48.0	42.0	36.0	22.0	54.1	Calculated Noise Source Level @ 1.0m
42.0	42.0	37.0	33.0	28.0	29.0	28.0	22.0	16.0	2.0	34.1	Calculated Noise Source Level @ 10.0m
Sound Pressure Level at 1.0m from plant (ref 2 x 10-5 Pa)											

NIGHT TIME 23:00 – 07:00

Octave Band Centre Frequency (Hz)										dB(A)	Comments
31.5	63	125	250	500	1.0k	2.0k	4.0k	8.0k	16.0k		
55.0	58.0	47.0	46.0	40.0	42.0	37.0	36.0	35.0	13.0	46.3	Calculated Noise Source Level @ 1.0m
35.0	38.0	27.0	26.0	20.0	22.0	17.0	16.0	15.0	-7.0	26.3	Calculated Noise Source Level @ 10.0m
Sound Pressure Level at 1.0m from plant (ref 2 x 10-5 Pa)											

The above calculations have been made on the worst case scenario with the plant being positioned no closer than 5.0m (linear) to the nearest affected window.

Based on the above being achieved, the following noise assessment can be concluded.

7 BS4142:2014 NOISE ASSESSMENT

7.1 Scope of British Standard 4142:2014

In the assessment of the existing surrounding commercial premises, consideration has been given to the scope of British Standard 4142:2014, which in section 1, details applicability of this standard to rating assessing sound of an industrial and/or commercial nature. It is considered appropriate that both the background noise levels and the rating noise levels obtained fall within the scope of British Standard 4142:2014 by using outdoor sound levels to assess the effect of sound on local residents.

7.2 Terms and Definitions

Symbol	Term	Definition
AP	Assessment Position	Position externally at the façade property under investigation at which the assessment is undertaken which is usually 1m from the 1st floor bedroom window.
EP	Equivalent Position	Position at which the background noise levels are measured if there is no access to the assessment position or if source under investigation is audible.
$L_s = L_{Aeq,T}$	Specific Level	The average continuous equivalent sound pressure level of the source at the assessment position.
$L_{Ar,Tr}$	Rating Level	The average continuous equivalent sound pressure level of the source at the assessment position with a correction to account for the characteristic features.
$L_r = L_{Aeq,T}$	Residual Level	The average continuous equivalent sound pressure level at the assessment position without the source operating.
$L_{A90,T}$	Background Level	The sound pressure level that is not exceeded 90% of the time at the assessment position.
$L_a = L_{Aeq,T}$	Ambient Level	The totally encompassing sound at the assessment position including the residual and specific noise.

7.3 Assessment Position

The assessment position was established as the residential property above the site located no closer than 5.0m from any proposed Kitchen Extract.

7.4 Calculations

The specific noise levels are calculated at the assessment position located at the residential property above the site using the calculations detailed within ISO 9613 Part 1 and 2: 1996. These calculations take the manufacturers sound power levels into account for a variety of factors including source directivity, distance, atmospheric absorption, ground absorption and the effects of any barriers and determine the resultant noise levels at the assessment position.

7.5 Equivalent Position

The background noise levels were measured at the equivalent position, chosen as it most represented the closest noise sensitive façade, located within the existing yard area between 07:00 on 28th April and 07:00 on 5th May 2016.

7.6 Rating Levels (Character Correction)

It is appropriate to add a character correction where there is a new source that cannot be measured in line with BS4142:2014. There are 3 methods for approaching this.

a) Subjective method
b) Objective method (for tonality)
c) Reference method

7.7 Subjective Method

The subjective method establishes a rating penalty that is added to the specific noise level if any of the following is present at the assessment position. If a tone is expected to be present a character correction of 0 dB to 6 dB is added depending on how perceptible it is at noise sensitive locations.

BS4142:2014 – Section 9.2 Subjective Method	Perceptibility to noise sensitive facades	Correction
Tonality Ranging from not tonal to prominently tonal	Not tonal	+0
	Just perceptible	+2
	Clearly perceptible	+4
	Highly perceptible	+6

If the source is expected to be impulsive a character correction of 0 dB to 9 dB is added depending on how perceptible it is at noise sensitive locations.

BS4142:2014 – Section 9.2 Subjective Method	Perceptibility to noise sensitive facades	Correction
Impulsivity Considering both the rapidity and any overall change in sound levels	Not impulsive	+0
	Just perceptible	+3
	Clearly perceptible	+6
	Highly perceptible	+9

When the sound features are neither tonal nor impulsive, a character correction of +3 is added for the readily distinctive quality against the acoustic environment or for the intermittency of the source.

BS4142:2014 – Section 9.2 Subjective Method	Perceptibility to noise sensitive facades	Correction
Readily Distinctive	Is not present	+0
	Is present	+3
Intermittency	Is not present	+0
	Is present	+3

7.8 Assessment Criterion

The significance of the resulting noise on the residential property depends on the margin by which it exceeds the background noise levels. British Standard 4142: 2014 provides the following guidance within section 11.

Difference	Assessment of Impact
+10 dB	Indication of a significant adverse impact
+5 dB	Indication of an adverse impact
+0 dB	Indication of low impact

7.9 Noise Meter Floor

BS 4142 : 2014 suggests that Care is necessary in circumstances where background sound levels are low to ensure that self-generated and electrical noise within the measurement system does not unduly influence reported values, which might be the case if the measured background sound levels are less than 10 dB above the noise floor of the measuring system. The floor of a typical class 1 noise meter is in the region of 14 dB(A) and therefore measurements of less than 24 dB(A) should be assessed with care.

7.10 Octave Band Frequency Analysis

All calculations carried out are done so on an octave band centre frequency basis and not an overall dB(A) level. This ensures that the tonal element from any proposed plant is minimised. A large majority of manufacturer's data is supplied in the octave band centre frequency (Hz) format.

7.11 BS 4142 : 2014 Penalties

Whilst BS 4142 : 2014 allows receptor assessments to made to achieve levels equal to prevailing background noise levels, it also ensures that appropriate and more stringent penalties are applied to the specific noise level to ensure the correct level of protection for the local residents.

7.12 Assessments

7.12.1 Daytime (07:00 – 23:00)

Rating Industrial Noise affecting Mixed Industrial and Residential Areas British Standard 4142:2014 Day Time (07:00 to 23:00)			
Source	Operating Times		Source Position
Case Breakout Outlet	07:00 to 23:00 7 days per week Worst case scenario		See Plans
Assessment Position	163 Western Road, Brighton		
Background Position	At the assessment position		
Item	Calculation	Clause	Commentary
Specific Noise Level $L_{Aeq,1\ hour}$	46 dB	7	Calculated using ISO 9613:1996[3].
Tonality	+2 dB	8.1	Tonality Characteristic
Impulsivity	+3 dB	8.1	Impulsivity Characteristic
Rating Level	51 dB	9.1	The acoustic feature correction is added to the specific noise level
Background Noise Level $L_{A90,1\ hour}$	51 dB	8.1	Modal Background Noise Level (0900 – 2300)
Assessment Level	+/- 0 dB	11	The background level is subtracted from the rating level.
Conclusion BS 4142:2014[1]	+10 dB Significant Adverse Effects, +5 dB Adverse Effects, +0 dB Low Impact		
Assessment	**+/- 0dB**		
Conclusion	**The assessment level is below 'Low Adverse Impact'**		

7.12.2 Night Time (23:00 – 07:00)

Rating Industrial Noise affecting Mixed Industrial and Residential Areas British Standard 4142:2014 Day Time (23:00 to 07:00)			
Source	Operating Times		Source Position
Case Breakout Outlet	23:00 to 07:00 7 days per week Worst case scenario		See Plans
Assessment Position	163 Western Road, Brighton		
Background Position	At the assessment position		
Item	Calculation	Clause	Commentary
Specific Noise Level $L_{Aeq,1\ hour}$	38 dB	7	Calculated using ISO 9613:1996[3].
Tonality	+2 dB	8.1	Tonality Characteristic
Impulsivity	+3 dB	8.1	Impulsivity Characteristic
Rating Level	43 dB	9.1	The acoustic feature correction is added to the specific noise level
Background Noise Level $L_{A90,1\ hour}$	43 dB	8.1	Modal Background Noise Level (0900 – 2300)
Assessment Level	+/- 0 dB	11	The background level is subtracted from the rating level.
Conclusion BS 4142:2014[1]	+10 dB Significant Adverse Effects, +5 dB Adverse Effects, +0 dB Low Impact		
Assessment	**+/- 0 dB**		
Conclusion	**The assessment level is below 'Low Adverse Impact'**		

7.13 Tonal Penalty

A +2 dB penalty has been applied to the specific noise level to allow for any minor tonal elements that may be present from the proposed plant. It should be noted that the calculations made within this report have been done so in octave band centre frequency levels in order to minimise tonal element and therefore applying any more than +2 dB would not be appropriate to this assessment. To safeguard the residents from any possible unwanted noise, this penalty has been applied as an extra layer of acoustic protection.

7.14 Impulsivity Penalty

A +3 dB penalty has been applied to the specific noise level to allow for any minor impulsive elements that may be present from the proposed plant. It should be noted that the calculations made within this report have been done so with the assessment conclusion of +/- 0 dB below the background noise levels and therefore, the impulsive nature of the plant should not be audible at the nearest associated noise sensitive preceptors. To safeguard the residents from any possible unwanted noise, this penalty has been applied as an extra layer of acoustic protection.

7.15 Assessment Conclusion

It can be seen from the above assessments that with any new plant achieving the proposed maximum noise level plant criteria detailed within this report, an assessment conclusion of Low Adverse Impact could be expected. Therefore no further mitigation measures would be required if the design criteria was adhered to.

8 NPPF & NPSE

The National Planning Policy Framework 2012 (NPPF) and assessments to the Noise Policy Statement for England 2010 (NPSE) should be made in conjunction with each other. Paragraph 123 of the National Planning Policy Framework (NPPF) states the following:

Planning polices 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.

The Noise Policy Statement for England gives various levels of effect as detailed within this report.

With any proposed plant installed and operating generally inline with the requirements of the acoustic plant criteria, as detailed within this report, the development can be operated within the guidelines of the aforementioned documents and ensure a development conclusion of **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.

9 CONCLUSIONS

9.1 Summary of Report

9.1.1 Measured Background Noise Levels

Continuous background noise measurements were undertaken between 17th – 20th September 2014 at the Assessment Position 1. The modal 1-hour day time background noise levels between 07:00 and 23:00 was found to be $L_{A90,1\ hour}$ 51dB at the assessment position and LA90, 1 hour 43 dB during night time hours 23:00 – 07:00

Daytime Equivalent Existing Background Noise Levels 7 days (07:00 – 23:00)	Measured Levels at Assessment Position	$L_{A90,\ 1hour}$ 51 dB
Night Time Equivalent Existing Background Noise Levels 7 days (23:00 – 07:00)	Measured Levels at Assessment Position	$L_{A90,\ 1hour}$ 43 dB

Calculations and assessments are to be made within this report to generate a maximum noise level criteria to which all plant should be selected to. The maximum noise level calculated is to be achieved at 1.0m and 10m from the units in situ with all units operating under normal load.

The following calculations have been based on the recorded LA90 background noise level over a typical 24 hour period at the measurement position 1 and include the possibility of night time operations.

DAYTIME 07:00 – 23:00

Octave Band Centre Frequency (Hz)										dB(A)	Comments
31.5	63	125	250	500	1.0k	2.0k	4.0k	8.0k	16.0k		
62.0	62.0	57.0	53.0	48.0	49.0	48.0	42.0	36.0	22.0	54.1	Calculated Noise Source Level @ 1.0m
42.0	42.0	37.0	33.0	28.0	29.0	28.0	22.0	16.0	2.0	34.1	Calculated Noise Source Level @ 10.0m
Sound Pressure Level at 1.0m from plant (ref 2 x 10-5 Pa)											

NIGHT TIME 23:00 – 07:00

Octave Band Centre Frequency (Hz)										dB(A)	Comments
31.5	63	125	250	500	1.0k	2.0k	4.0k	8.0k	16.0k		
55.0	58.0	47.0	46.0	40.0	42.0	37.0	36.0	35.0	13.0	46.3	Calculated Noise Source Level @ 1.0m
35.0	38.0	27.0	26.0	20.0	22.0	17.0	16.0	15.0	-7.0	26.3	Calculated Noise Source Level @ 10.0m
Sound Pressure Level at 1.0m from plant (ref 2 x 10-5 Pa)											

9.2 Conclusions

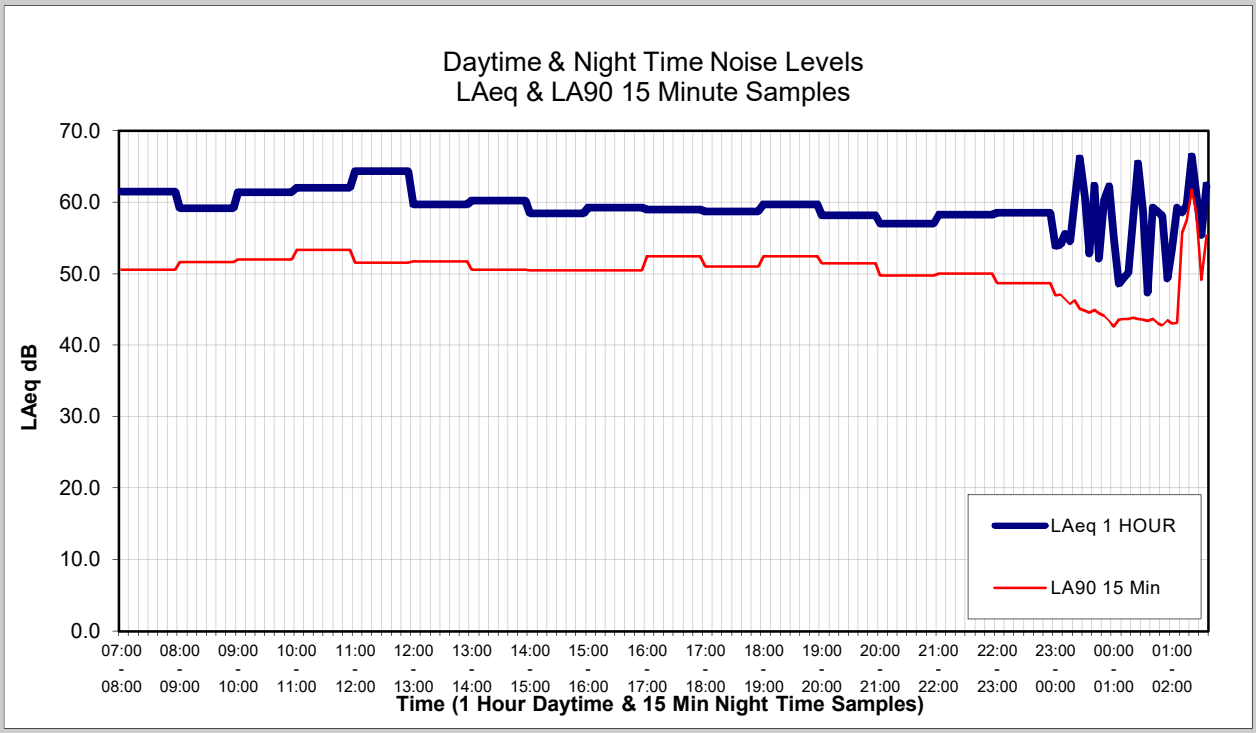
The operation of any proposed kitchen extract system has been assessed to establish if the development will have a demonstrable adverse effect in terms of noise that outweigh the benefits of the development. Measurements have been undertaken in accordance with British Standard 4142:2014 and ISO 1996 – Part 2: 2007. This report has established the existing background noise levels at the closest residential façade to the site and the assessment of the impact of the site operation on nearby residential properties. The resulting emissions from the site running on a worst case scenario show no conflict with 'low impact' criteria and give a strong indication that complaint and impact on the local amenity is unlikely, provided the recommended maximum noise levels plant criteria is achieved as detailed within this report.

The plants criteria was set as the existing system is not operational and a new kitchen system is yet to be designed.

10 APPENDIX B – BACKGROUND MEASUREMENT

10.1 07:00 – 07:00 on 17th – 18th September 2014

Date / Time	LAeq	LA90	Octave Band Centre Frequency (Hz)									
			31.5	63	125	250	500	1.0 k	2.0 k	4.0 k	8.0 k	16.0 k
DAYTIME MODE 07:00 - 23:00 $L_{A90\ 1\ HOUR}$ & Corresponding $L_{Aeq\ 1\ HOUR}$	58.0	51.0	66.0	66.0	61.0	57.0	52.0	53.0	52.0	46.0	40.0	26.0
NIGH TIME MODE 23:00 - 07:00 $L_{A90\ 15\ MIN}$ & Corresponding $L_{Aeq\ 15\ MIN}$	51.0	43.0	60.0	63.0	52.0	51.0	45.0	47.0	42.0	41.0	40.0	18.0



DAYTIME NOISE LEVELS 07:00 - 23:00

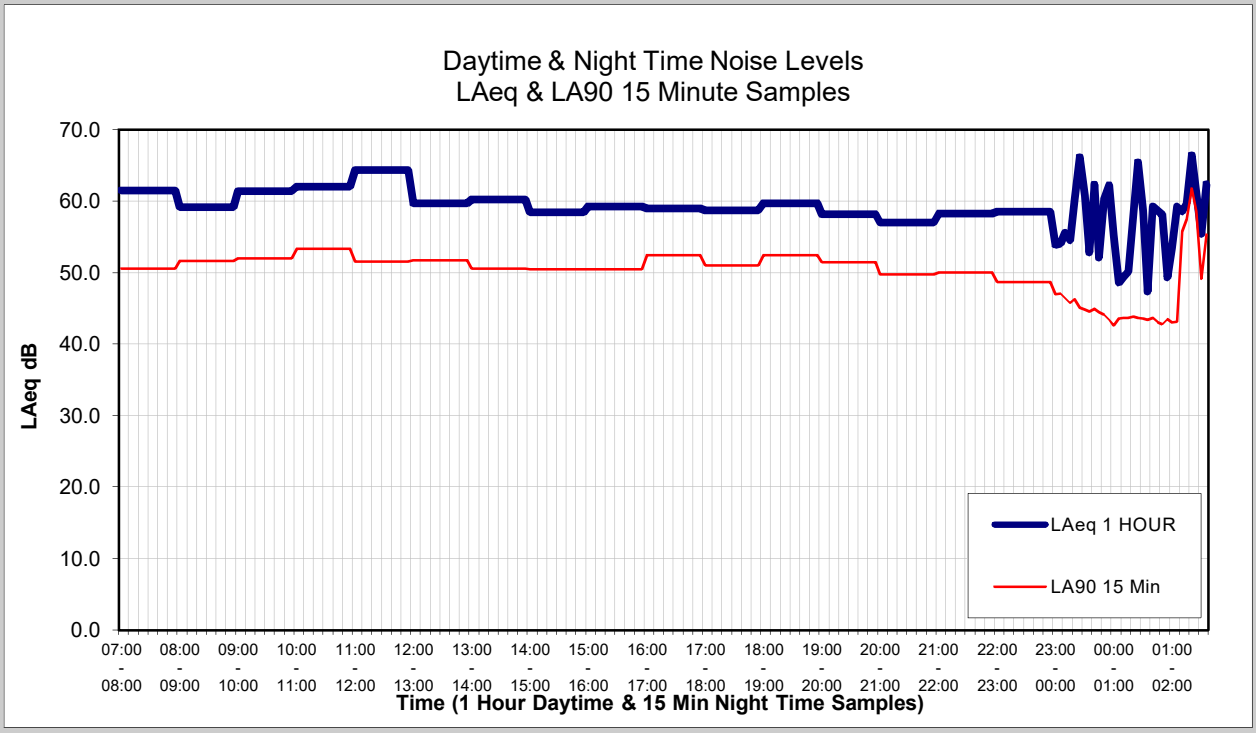
Date / Time	LAeq	LA90	Octave Band Centre Frequency (Hz)									
			31.5	63	125	250	500	1.0 k	2.0 k	4.0 k	8.0 k	16.0 k
07:00 - 08:00	58.0	50.0	66.0	66.0	58.0	56.0	53.0	53.0	52.0	45.0	40.0	26.0
08:00 - 09:00	58.0	51.0	64.0	63.0	58.0	54.0	52.0	53.0	52.0	46.0	39.0	25.0
09:00 - 10:00	59.0	50.0	64.0	66.0	59.0	56.0	52.0	53.0	53.0	47.0	41.0	28.0
10:00 - 11:00	61.0	51.0	66.0	66.0	62.0	57.0	55.0	56.0	55.0	50.0	49.0	33.0
11:00 - 12:00	59.0	51.0	66.0	66.0	60.0	57.0	53.0	54.0	53.0	48.0	41.0	29.0
12:00 - 13:00	60.0	51.0	67.0	69.0	62.0	57.0	54.0	55.0	54.0	48.0	42.0	34.0
13:00 - 14:00	63.0	57.0	66.0	69.0	64.0	60.0	57.0	58.0	56.0	53.0	48.0	37.0
14:00 - 15:00	61.0	51.0	67.0	67.0	63.0	57.0	54.0	57.0	54.0	49.0	42.0	31.0
15:00 - 16:00	62.0	51.0	65.0	65.0	62.0	58.0	56.0	57.0	57.0	49.0	45.0	29.0
16:00 - 17:00	61.0	51.0	65.0	66.0	61.0	57.0	54.0	56.0	56.0	47.0	40.0	28.0
17:00 - 18:00	59.0	51.0	66.0	67.0	61.0	58.0	54.0	54.0	53.0	46.0	40.0	27.0
18:00 - 19:00	61.0	55.0	68.0	68.0	61.0	58.0	55.0	56.0	55.0	51.0	46.0	35.0
19:00 - 20:00	58.0	50.0	66.0	67.0	60.0	56.0	52.0	53.0	53.0	46.0	39.0	26.0
20:00 - 21:00	59.0	49.0	64.0	65.0	61.0	57.0	53.0	54.0	52.0	46.0	42.0	27.0
21:00 - 22:00	57.0	48.0	64.0	64.0	60.0	55.0	51.0	52.0	51.0	44.0	37.0	25.0
22:00 - 23:00	57.0	52.0	62.0	63.0	59.0	56.0	52.0	51.0	52.0	47.0	36.0	21.0

NIGHT TIME NOISE LEVELS 23:00 - 07:00												
Date / Time	LAeq	LA90	Octave Band Centre Frequency (Hz)									
			31.5	63	125	250	500	1.0 k	2.0 k	4.0 k	8.0 k	16.0 k
23:00 - 23:15	60.0	54.0	63.0	63.0	62.0	59.0	55.0	53.0	55.0	50.0	40.0	25.0
23:15 - 23:30	53.0	46.0	60.0	59.0	54.0	51.0	48.0	48.0	47.0	38.0	31.0	18.0
23:30 - 23:45	54.0	44.0	57.0	60.0	54.0	51.0	47.0	47.0	49.0	44.0	31.0	17.0
23:45 - 00:00	55.0	44.0	59.0	62.0	58.0	53.0	51.0	50.0	47.0	41.0	33.0	17.0
00:00 - 00:15	54.0	44.0	58.0	59.0	55.0	53.0	51.0	49.0	47.0	41.0	33.0	17.0
00:15 - 00:30	51.0	44.0	56.0	57.0	54.0	50.0	45.0	47.0	44.0	36.0	30.0	18.0
00:30 - 00:45	51.0	44.0	56.0	57.0	53.0	51.0	45.0	46.0	44.0	36.0	29.0	16.0
00:45 - 01:00	62.0	44.0	62.0	67.0	64.0	58.0	56.0	58.0	55.0	48.0	40.0	23.0
01:00 - 01:15	49.0	43.0	54.0	55.0	52.0	49.0	44.0	44.0	42.0	34.0	25.0	12.0
01:15 - 01:30	50.0	44.0	57.0	56.0	52.0	50.0	45.0	46.0	43.0	35.0	27.0	14.0
01:30 - 01:45	61.0	43.0	60.0	63.0	60.0	57.0	56.0	58.0	53.0	48.0	40.0	29.0
01:45 - 02:00	59.0	43.0	61.0	61.0	60.0	55.0	53.0	55.0	52.0	46.0	38.0	21.0
02:00 - 02:15	49.0	43.0	59.0	66.0	58.0	49.0	43.0	42.0	42.0	35.0	27.0	14.0
02:15 - 02:30	59.0	43.0	64.0	62.0	63.0	56.0	54.0	55.0	52.0	46.0	37.0	21.0
02:30 - 02:45	58.0	43.0	60.0	56.0	53.0	52.0	51.0	53.0	51.0	48.0	48.0	33.0
02:45 - 03:00	52.0	43.0	55.0	55.0	52.0	50.0	45.0	47.0	46.0	41.0	35.0	33.0
03:00 - 03:15	62.0	43.0	60.0	63.0	62.0	57.0	57.0	58.0	56.0	50.0	43.0	27.0
03:15 - 03:30	56.0	43.0	60.0	58.0	55.0	53.0	52.0	50.0	48.0	46.0	44.0	21.0
03:30 - 03:45	64.0	43.0	66.0	66.0	67.0	61.0	58.0	61.0	57.0	50.0	42.0	28.0
03:45 - 04:00	48.0	43.0	55.0	54.0	52.0	48.0	42.0	43.0	42.0	35.0	30.0	18.0
04:00 - 04:15	61.0	43.0	61.0	63.0	62.0	57.0	55.0	57.0	53.0	47.0	40.0	24.0
04:15 - 04:30	45.0	43.0	51.0	51.0	50.0	48.0	41.0	40.0	36.0	27.0	19.0	10.0
04:30 - 04:45	52.0	43.0	58.0	56.0	53.0	51.0	50.0	48.0	44.0	39.0	35.0	18.0
04:45 - 05:00	50.0	43.0	58.0	57.0	57.0	51.0	45.0	44.0	42.0	36.0	29.0	16.0
05:00 - 05:15	46.0	43.0	60.0	52.0	50.0	47.0	42.0	42.0	38.0	29.0	20.0	10.0
05:15 - 05:30	49.0	43.0	57.0	57.0	52.0	49.0	44.0	44.0	42.0	36.0	32.0	16.0
05:30 - 05:45	64.0	44.0	63.0	65.0	67.0	59.0	58.0	60.0	57.0	51.0	43.0	25.0
05:45 - 06:00	54.0	44.0	56.0	59.0	54.0	51.0	48.0	49.0	48.0	44.0	39.0	22.0
06:00 - 06:15	53.0	45.0	60.0	63.0	55.0	51.0	47.0	47.0	47.0	41.0	36.0	18.0
06:15 - 06:30	61.0	46.0	65.0	67.0	62.0	57.0	56.0	56.0	54.0	48.0	40.0	24.0
06:30 - 06:45	55.0	46.0	59.0	58.0	56.0	52.0	49.0	51.0	49.0	39.0	32.0	18.0
06:45 - 07:00	57.0	48.0	61.0	64.0	60.0	53.0	51.0	52.0	50.0	43.0	37.0	23.0
23:00 - 23:15	60.0	54.0	63.0	63.0	62.0	59.0	55.0	53.0	55.0	50.0	40.0	25.0

All measurements are rounded to the nearest value

10.2 07:00 – 07:00 on 18th – 19th September 2014

Date / Time	LAeq	LA90	Octave Band Centre Frequency (Hz)									
			31.5	63	125	250	500	1.0 k	2.0 k	4.0 k	8.0 k	16.0 k
DAYTIME MODE 07:00 - 23:00 $L_{A90\ 1\ HOUR}$ & Corresponding $L_{Aeq\ 1\ HOUR}$	60.0	52.0	67.0	67.0	61.0	57.0	54.0	54.0	54.0	48.0	42.0	29.0
NIGH TIME MODE 23:00 - 07:00 $L_{A90\ 15\ MIN}$ & Corresponding $L_{Aeq\ 15\ MIN}$	55.0	43.0	59.0	59.0	55.0	52.0	49.0	49.0	51.0	40.0	43.0	25.0



DAYTIME NOISE LEVELS 07:00 - 23:00

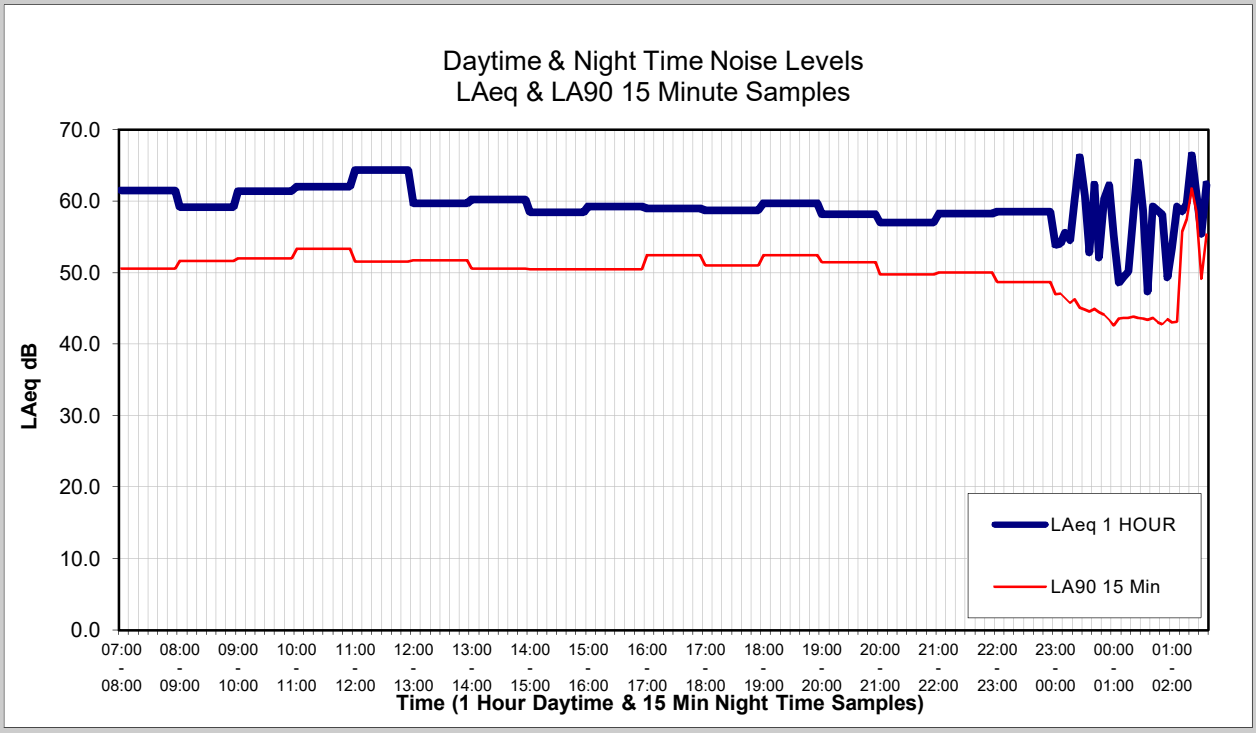
Date / Time	LAeq	LA90	Octave Band Centre Frequency (Hz)									
			31.5	63	125	250	500	1.0 k	2.0 k	4.0 k	8.0 k	16.0 k
07:00 - 08:00	60.0	50.0	65.0	67.0	61.0	58.0	54.0	55.0	54.0	48.0	42.0	29.0
08:00 - 09:00	59.0	52.0	69.0	68.0	60.0	56.0	53.0	54.0	54.0	48.0	43.0	33.0
09:00 - 10:00	60.0	52.0	67.0	68.0	60.0	56.0	53.0	54.0	54.0	48.0	42.0	29.0
10:00 - 11:00	61.0	52.0	67.0	67.0	62.0	58.0	56.0	57.0	55.0	49.0	43.0	30.0
11:00 - 12:00	61.0	52.0	67.0	68.0	64.0	60.0	55.0	56.0	55.0	50.0	43.0	31.0
12:00 - 13:00	60.0	52.0	67.0	66.0	60.0	57.0	53.0	54.0	54.0	49.0	44.0	31.0
13:00 - 14:00	60.0	52.0	70.0	67.0	62.0	58.0	54.0	54.0	54.0	48.0	42.0	28.0
14:00 - 15:00	60.0	52.0	68.0	67.0	61.0	57.0	53.0	55.0	54.0	50.0	44.0	29.0
15:00 - 16:00	60.0	52.0	65.0	66.0	61.0	57.0	54.0	55.0	54.0	49.0	45.0	29.0
16:00 - 17:00	59.0	52.0	66.0	65.0	60.0	57.0	54.0	54.0	53.0	47.0	42.0	30.0
17:00 - 18:00	59.0	52.0	64.0	65.0	63.0	59.0	55.0	54.0	53.0	46.0	39.0	27.0
18:00 - 19:00	60.0	51.0	67.0	66.0	61.0	58.0	54.0	55.0	55.0	46.0	40.0	27.0
19:00 - 20:00	60.0	51.0	66.0	66.0	61.0	57.0	53.0	53.0	55.0	49.0	42.0	28.0
20:00 - 21:00	58.0	50.0	65.0	65.0	58.0	56.0	52.0	52.0	52.0	45.0	44.0	37.0
21:00 - 22:00	57.0	49.0	62.0	64.0	59.0	56.0	52.0	53.0	50.0	43.0	37.0	23.0
22:00 - 23:00	56.0	48.0	62.0	62.0	58.0	54.0	50.0	51.0	50.0	43.0	36.0	24.0

NIGHT TIME NOISE LEVELS 23:00 - 07:00												
Date / Time	LAeq	LA90	Octave Band Centre Frequency (Hz)									
			31.5	63	125	250	500	1.0 k	2.0 k	4.0 k	8.0 k	16.0 k
23:00 - 23:15	54.0	47.0	59.0	59.0	55.0	52.0	48.0	49.0	48.0	40.0	34.0	21.0
23:15 - 23:30	57.0	48.0	63.0	65.0	59.0	53.0	50.0	51.0	51.0	46.0	44.0	29.0
23:30 - 23:45	58.0	48.0	59.0	60.0	55.0	53.0	50.0	54.0	51.0	44.0	36.0	22.0
23:45 - 00:00	60.0	45.0	60.0	62.0	62.0	58.0	55.0	56.0	53.0	47.0	42.0	30.0
00:00 - 00:15	50.0	44.0	58.0	55.0	52.0	50.0	46.0	45.0	43.0	35.0	28.0	15.0
00:15 - 00:30	59.0	45.0	64.0	67.0	62.0	56.0	54.0	53.0	51.0	46.0	51.0	30.0
00:30 - 00:45	54.0	44.0	56.0	58.0	54.0	52.0	49.0	49.0	46.0	40.0	43.0	27.0
00:45 - 01:00	61.0	44.0	64.0	65.0	65.0	57.0	55.0	57.0	54.0	47.0	42.0	26.0
01:00 - 01:15	53.0	45.0	54.0	54.0	54.0	57.0	51.0	45.0	43.0	37.0	27.0	14.0
01:15 - 01:30	48.0	43.0	52.0	50.0	51.0	50.0	44.0	44.0	39.0	29.0	20.0	10.0
01:30 - 01:45	47.0	43.0	52.0	55.0	51.0	48.0	42.0	42.0	40.0	33.0	25.0	13.0
01:45 - 02:00	60.0	44.0	65.0	65.0	66.0	58.0	55.0	55.0	54.0	49.0	43.0	32.0
02:00 - 02:15	48.0	45.0	59.0	54.0	54.0	51.0	43.0	42.0	38.0	31.0	30.0	16.0
02:15 - 02:30	67.0	45.0	65.0	66.0	65.0	59.0	57.0	59.0	56.0	64.0	59.0	33.0
02:30 - 02:45	70.0	58.0	69.0	73.0	73.0	68.0	64.0	64.0	63.0	59.0	57.0	45.0
02:45 - 03:00	55.0	48.0	65.0	69.0	65.0	56.0	48.0	46.0	47.0	44.0	39.0	25.0
03:00 - 03:15	56.0	49.0	61.0	61.0	59.0	55.0	51.0	51.0	50.0	45.0	40.0	26.0
03:15 - 03:30	60.0	48.0	60.0	63.0	63.0	56.0	54.0	56.0	53.0	47.0	40.0	25.0
03:30 - 03:45	63.0	45.0	67.0	67.0	67.0	60.0	58.0	59.0	56.0	52.0	50.0	35.0
03:45 - 04:00	63.0	43.0	61.0	63.0	64.0	58.0	58.0	59.0	57.0	50.0	43.0	25.0
04:00 - 04:15	45.0	43.0	50.0	50.0	50.0	47.0	41.0	39.0	37.0	30.0	24.0	13.0
04:15 - 04:30	64.0	43.0	61.0	64.0	65.0	59.0	57.0	59.0	57.0	54.0	47.0	31.0
04:30 - 04:45	52.0	43.0	58.0	58.0	55.0	52.0	49.0	47.0	44.0	40.0	35.0	22.0
04:45 - 05:00	63.0	43.0	58.0	61.0	63.0	57.0	58.0	60.0	57.0	50.0	41.0	24.0
05:00 - 05:15	48.0	43.0	59.0	56.0	51.0	48.0	42.0	43.0	40.0	33.0	27.0	13.0
05:15 - 05:30	59.0	44.0	60.0	62.0	59.0	54.0	52.0	55.0	52.0	45.0	37.0	20.0
05:30 - 05:45	55.0	45.0	61.0	59.0	56.0	53.0	50.0	49.0	48.0	42.0	39.0	22.0
05:45 - 06:00	53.0	46.0	55.0	56.0	55.0	52.0	47.0	49.0	46.0	37.0	31.0	16.0
06:00 - 06:15	53.0	46.0	59.0	59.0	54.0	51.0	47.0	48.0	47.0	42.0	37.0	19.0
06:15 - 06:30	56.0	50.0	60.0	60.0	55.0	54.0	49.0	50.0	50.0	45.0	38.0	20.0
06:30 - 06:45	64.0	49.0	63.0	64.0	62.0	58.0	58.0	60.0	58.0	50.0	41.0	25.0
06:45 - 07:00	54.0	47.0	59.0	59.0	55.0	52.0	48.0	49.0	48.0	40.0	34.0	21.0
23:00 - 23:15	57.0	48.0	63.0	65.0	59.0	53.0	50.0	51.0	51.0	46.0	44.0	29.0

All measurements are rounded to the nearest value

10.3 07:00 – 07:00 on 19th – 20th September 2014

Date / Time	LAeq	LA90	Octave Band Centre Frequency (Hz)									
			31.5	63	125	250	500	1.0 k	2.0 k	4.0 k	8.0 k	16.0 k
DAYTIME MODE 07:00 - 23:00 $L_{A90\ 1\ HOUR}$ & Corresponding $L_{Aeq\ 1\ HOUR}$	59.0	52.0	66.0	66.0	61.0	57.0	54.0	54.0	53.0	45.0	44.0	26.0
NIGH TIME MODE 23:00 - 07:00 $L_{A90\ 15\ MIN}$ & Corresponding $L_{Aeq\ 15\ MIN}$	56.0	44.0	60.0	61.0	55.0	50.0	48.0	49.0	52.0	47.0	40.0	20.0



DAYTIME NOISE LEVELS 07:00 - 23:00

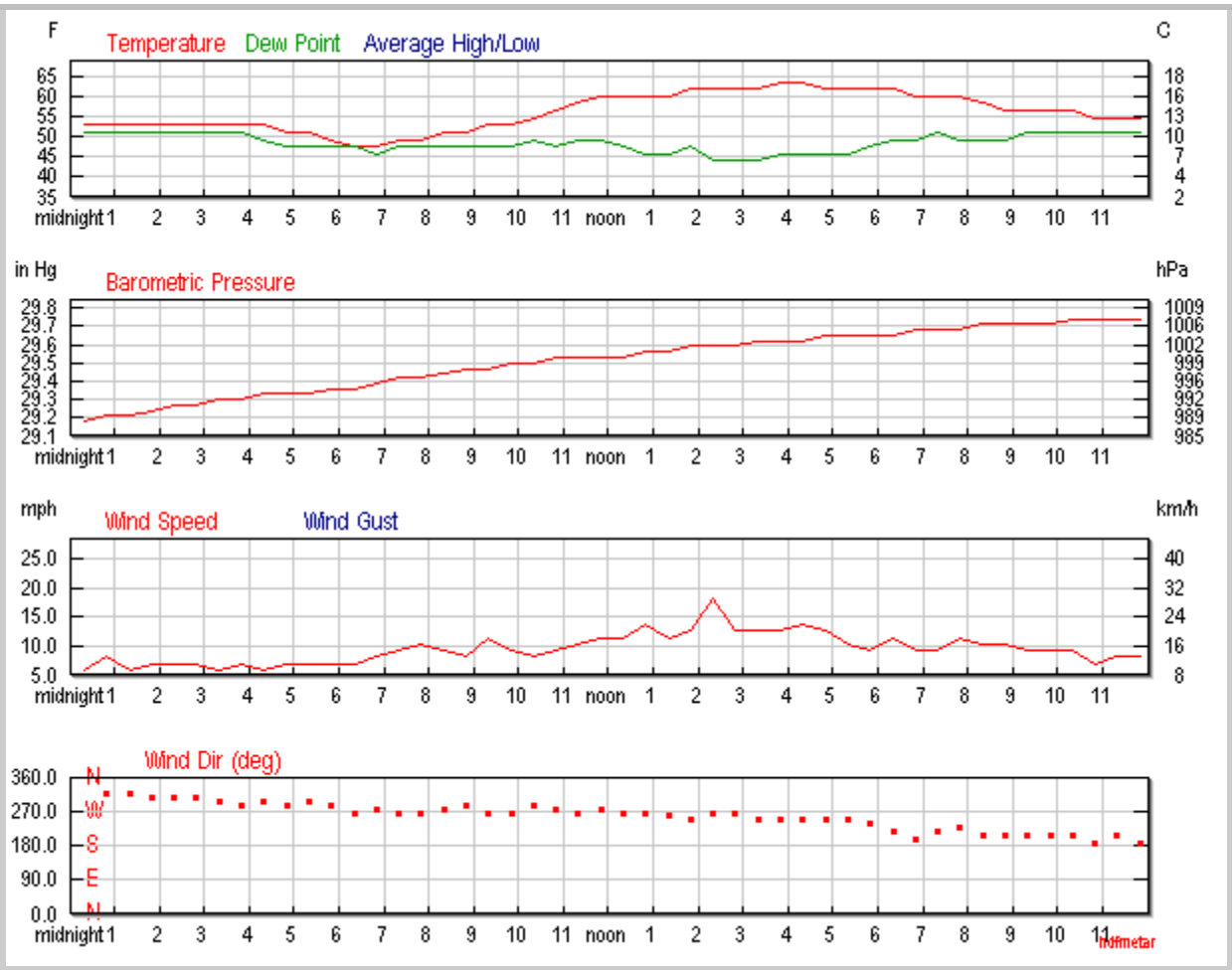
Date / Time	LAeq	LA90	Octave Band Centre Frequency (Hz)									
			31.5	63	125	250	500	1.0 k	2.0 k	4.0 k	8.0 k	16.0 k
07:00 - 08:00	62.0	51.0	66.0	67.0	62.0	57.0	55.0	57.0	56.0	51.0	43.0	31.0
08:00 - 09:00	59.0	52.0	67.0	66.0	61.0	56.0	53.0	54.0	53.0	47.0	41.0	30.0
09:00 - 10:00	61.0	52.0	71.0	72.0	61.0	57.0	54.0	56.0	56.0	51.0	47.0	33.0
10:00 - 11:00	62.0	53.0	66.0	66.0	62.0	57.0	55.0	56.0	55.0	56.0	44.0	32.0
11:00 - 12:00	64.0	52.0	67.0	67.0	62.0	59.0	55.0	57.0	57.0	60.0	44.0	31.0
12:00 - 13:00	60.0	52.0	67.0	66.0	61.0	58.0	54.0	55.0	54.0	48.0	44.0	31.0
13:00 - 14:00	60.0	51.0	66.0	66.0	61.0	57.0	54.0	56.0	54.0	48.0	42.0	29.0
14:00 - 15:00	58.0	50.0	66.0	67.0	63.0	58.0	53.0	53.0	52.0	45.0	39.0	26.0
15:00 - 16:00	59.0	51.0	65.0	66.0	62.0	57.0	54.0	54.0	53.0	46.0	39.0	25.0
16:00 - 17:00	59.0	52.0	65.0	65.0	60.0	57.0	54.0	54.0	53.0	46.0	40.0	26.0
17:00 - 18:00	59.0	51.0	64.0	66.0	61.0	58.0	54.0	54.0	53.0	46.0	40.0	26.0
18:00 - 19:00	60.0	53.0	67.0	66.0	60.0	58.0	54.0	55.0	54.0	47.0	41.0	28.0
19:00 - 20:00	58.0	52.0	65.0	66.0	60.0	57.0	53.0	53.0	52.0	45.0	39.0	26.0
20:00 - 21:00	57.0	50.0	62.0	62.0	57.0	55.0	52.0	52.0	51.0	44.0	37.0	23.0
21:00 - 22:00	58.0	50.0	62.0	62.0	59.0	57.0	54.0	54.0	52.0	45.0	37.0	23.0
22:00 - 23:00	59.0	49.0	63.0	64.0	60.0	56.0	52.0	53.0	52.0	49.0	47.0	32.0

NIGHT TIME NOISE LEVELS 23:00 - 07:00												
Date / Time	LAeq	LA90	Octave Band Centre Frequency (Hz)									
			31.5	63	125	250	500	1.0 k	2.0 k	4.0 k	8.0 k	16.0 k
23:00 - 23:15	54.0	47.0	60.0	61.0	55.0	53.0	49.0	49.0	48.0	40.0	33.0	20.0
23:15 - 23:30	54.0	47.0	60.0	58.0	56.0	53.0	50.0	49.0	47.0	39.0	33.0	19.0
23:30 - 23:45	56.0	46.0	59.0	62.0	58.0	54.0	50.0	51.0	49.0	43.0	36.0	21.0
23:45 - 00:00	55.0	46.0	61.0	60.0	56.0	52.0	48.0	49.0	49.0	44.0	37.0	24.0
00:00 - 00:15	60.0	46.0	65.0	62.0	61.0	58.0	55.0	54.0	52.0	50.0	53.0	36.0
00:15 - 00:30	66.0	45.0	68.0	70.0	69.0	62.0	61.0	62.0	59.0	53.0	47.0	31.0
00:30 - 00:45	61.0	45.0	60.0	62.0	61.0	58.0	56.0	57.0	54.0	47.0	40.0	27.0
00:45 - 01:00	53.0	45.0	60.0	58.0	55.0	51.0	48.0	47.0	45.0	44.0	38.0	20.0
01:00 - 01:15	62.0	45.0	65.0	65.0	68.0	59.0	59.0	58.0	55.0	48.0	41.0	23.0
01:15 - 01:30	52.0	45.0	55.0	57.0	54.0	52.0	48.0	47.0	45.0	38.0	31.0	19.0
01:30 - 01:45	60.0	44.0	62.0	64.0	67.0	57.0	55.0	56.0	54.0	47.0	41.0	25.0
01:45 - 02:00	62.0	43.0	60.0	61.0	61.0	56.0	57.0	59.0	56.0	49.0	41.0	24.0
02:00 - 02:15	55.0	43.0	61.0	56.0	54.0	52.0	52.0	51.0	47.0	42.0	33.0	16.0
02:15 - 02:30	49.0	44.0	55.0	58.0	56.0	50.0	43.0	43.0	42.0	35.0	27.0	14.0
02:30 - 02:45	49.0	44.0	55.0	55.0	52.0	50.0	44.0	45.0	43.0	35.0	27.0	14.0
02:45 - 03:00	50.0	44.0	56.0	56.0	52.0	50.0	45.0	46.0	44.0	36.0	30.0	18.0
03:00 - 03:15	58.0	44.0	57.0	57.0	56.0	54.0	53.0	53.0	52.0	48.0	40.0	20.0
03:15 - 03:30	66.0	44.0	65.0	68.0	69.0	60.0	60.0	62.0	59.0	52.0	44.0	27.0
03:30 - 03:45	59.0	44.0	63.0	63.0	65.0	56.0	54.0	54.0	51.0	45.0	38.0	21.0
03:45 - 04:00	47.0	43.0	53.0	53.0	51.0	49.0	42.0	43.0	40.0	31.0	24.0	16.0
04:00 - 04:15	59.0	44.0	64.0	65.0	62.0	56.0	54.0	55.0	53.0	46.0	40.0	24.0
04:15 - 04:30	59.0	43.0	59.0	62.0	59.0	55.0	54.0	55.0	52.0	45.0	37.0	19.0
04:30 - 04:45	58.0	43.0	58.0	57.0	55.0	55.0	51.0	53.0	53.0	47.0	39.0	21.0
04:45 - 05:00	49.0	44.0	56.0	55.0	51.0	50.0	44.0	45.0	42.0	34.0	27.0	26.0
05:00 - 05:15	53.0	43.0	59.0	59.0	55.0	52.0	49.0	48.0	45.0	40.0	46.0	38.0
05:15 - 05:30	59.0	43.0	62.0	63.0	65.0	55.0	54.0	55.0	52.0	45.0	37.0	20.0
05:30 - 05:45	59.0	56.0	55.0	53.0	51.0	50.0	47.0	51.0	54.0	51.0	46.0	32.0
05:45 - 06:00	60.0	58.0	57.0	53.0	51.0	50.0	48.0	53.0	55.0	52.0	48.0	34.0
06:00 - 06:15	67.0	62.0	60.0	61.0	59.0	55.0	57.0	60.0	61.0	59.0	56.0	44.0
06:15 - 06:30	61.0	59.0	61.0	60.0	53.0	51.0	50.0	54.0	57.0	54.0	50.0	37.0
06:30 - 06:45	55.0	49.0	57.0	61.0	54.0	51.0	47.0	49.0	51.0	46.0	40.0	26.0
06:45 - 07:00	54.0	47.0	60.0	61.0	55.0	53.0	49.0	49.0	48.0	40.0	33.0	20.0
23:00 - 23:15	54.0	47.0	60.0	58.0	56.0	53.0	50.0	49.0	47.0	39.0	33.0	19.0

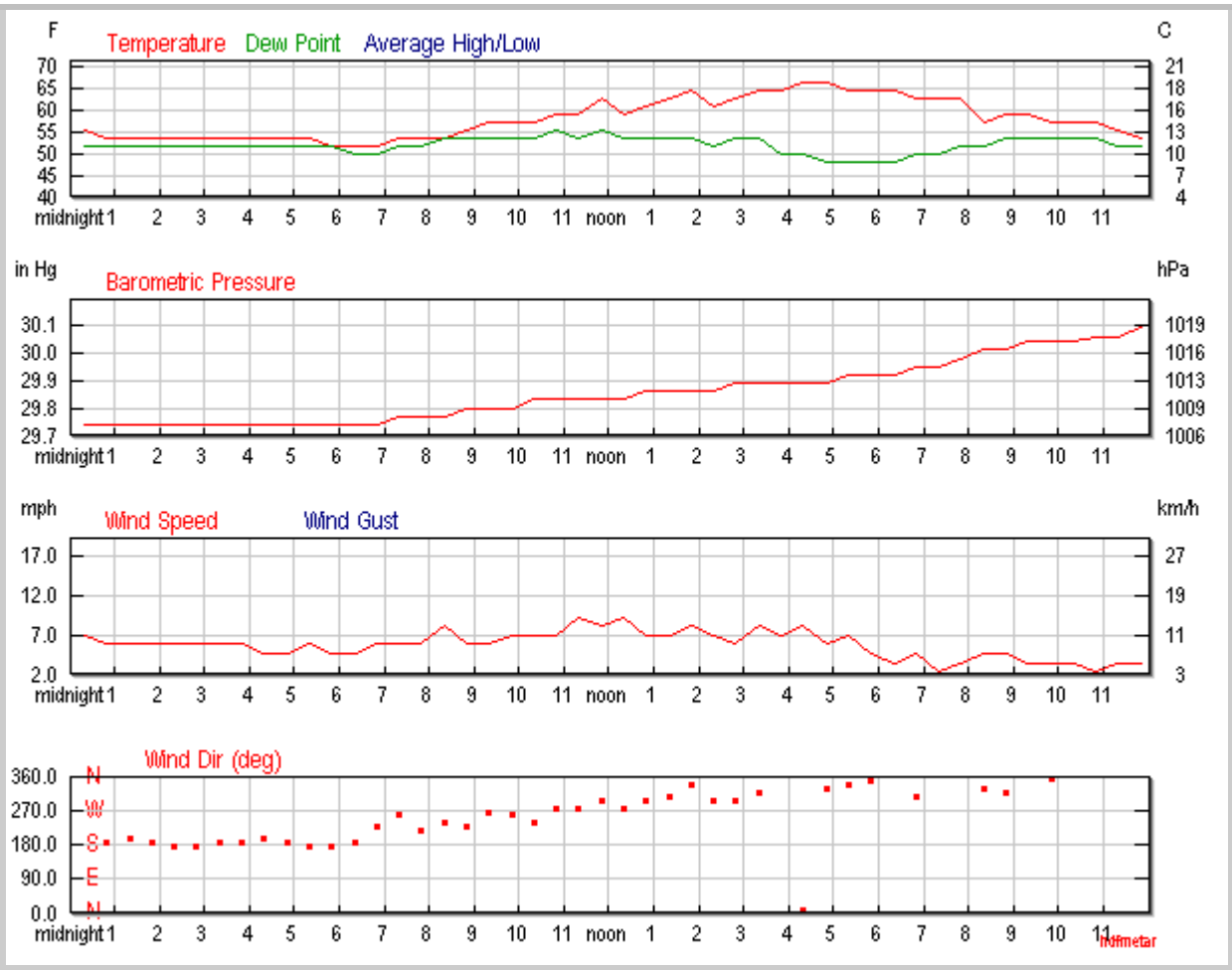
All measurements are rounded to the nearest value

11 APPENDIX A - ENVIRONMENTAL CONDITIONS

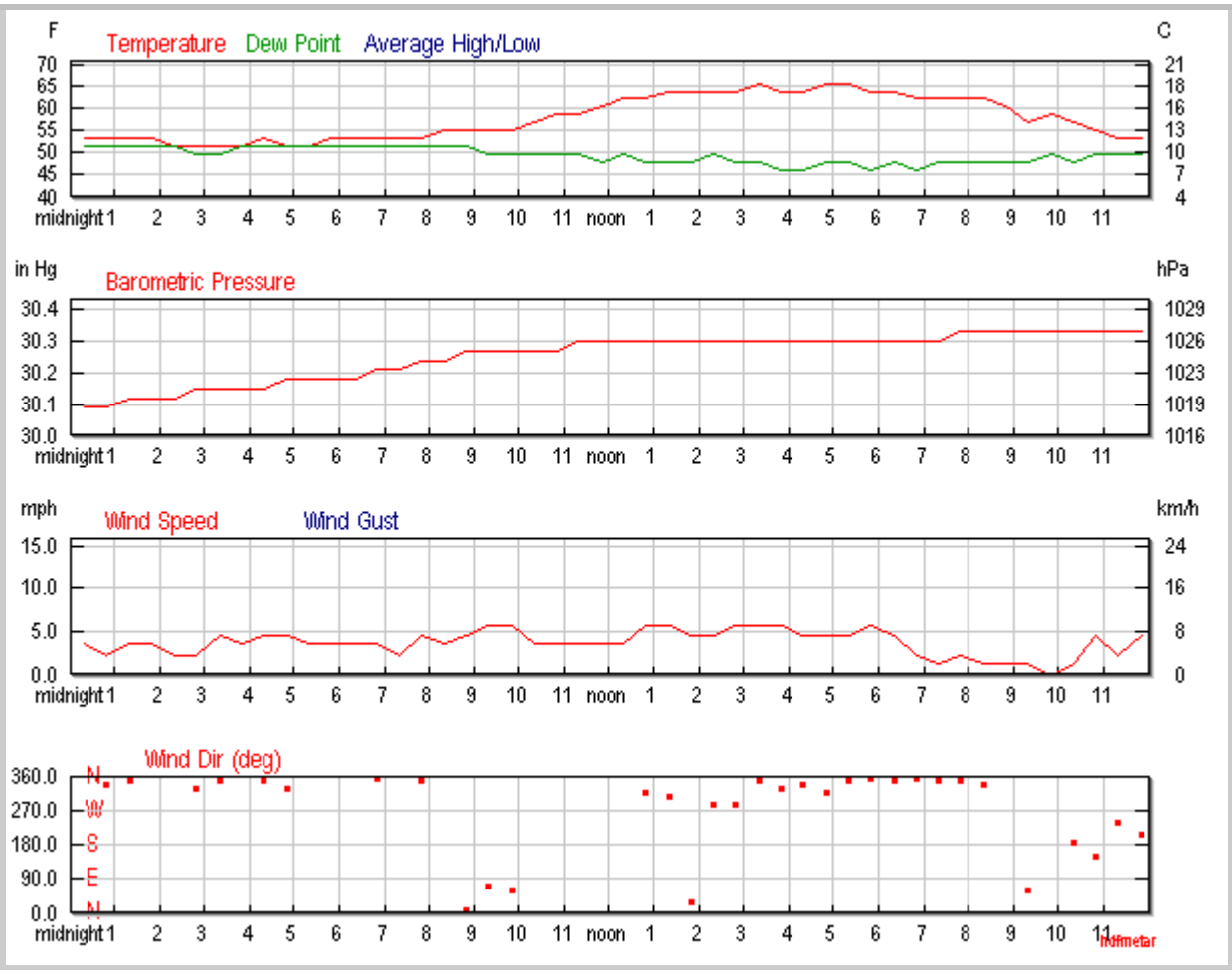
The following weather conditions have been downloaded from the nearest metrological station and data supplied by weather underground.



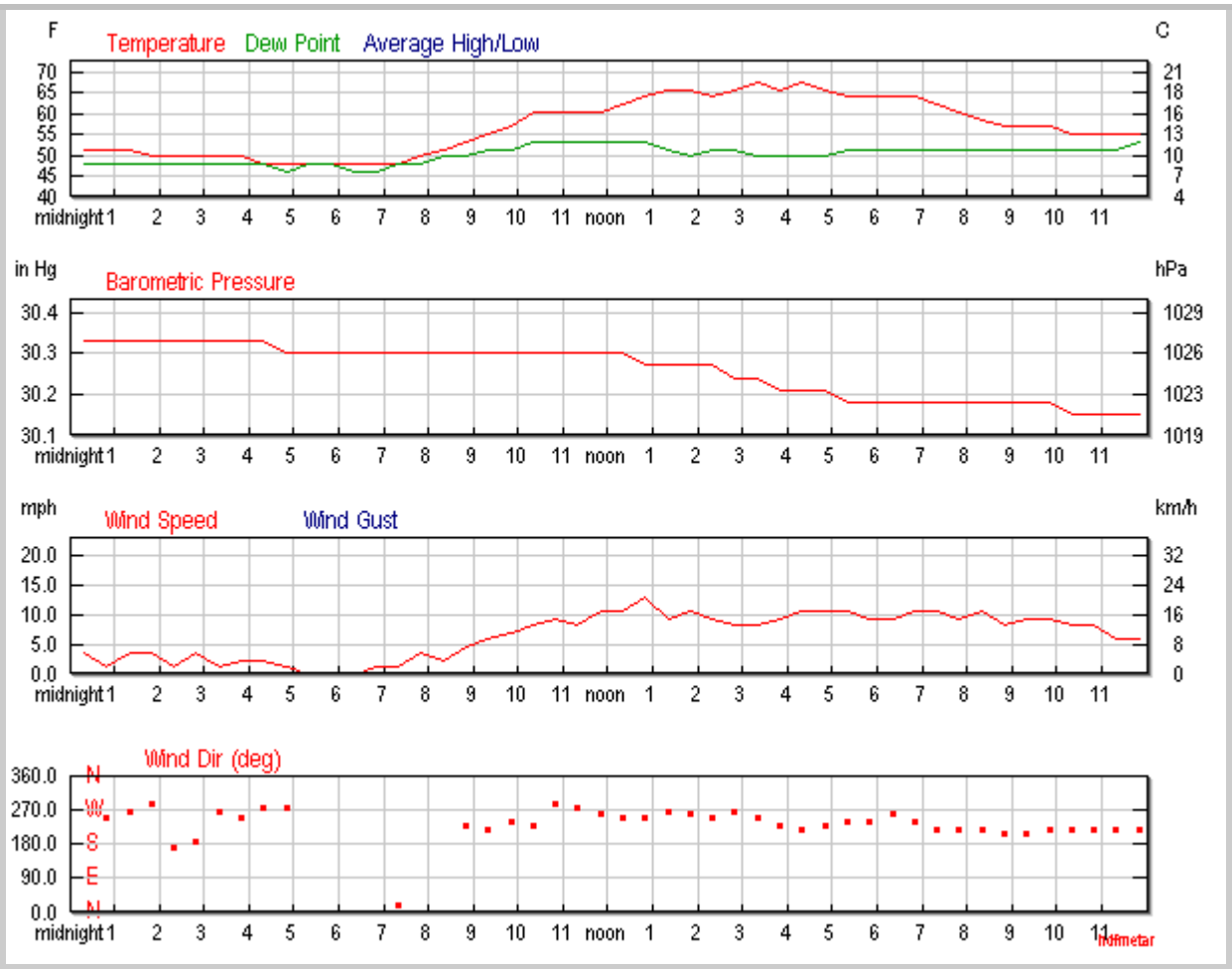
17th September 2014



18th September 2014



19th September 2014



20th September 2014

END OF REPORT