NoiseAir

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Noise Surveys Sound Insulation Testing Noise Impact Assessments Noise at Work

COVENTRY RED LIMITED T/A TIKI HUT

TIKIHUT, 54 EARLSDEN STREET, COVENTRY, CV5 6EJ

NOISE IMPACT ASSESSMENT

21st JUNE 2018

REPORT REF: P3570-R1-V1

Document Status: **VERSION 1**

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NoiseAir
THE NOISE CONTROL CENTRE

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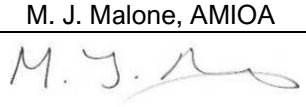
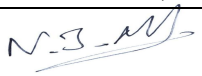
REPORT VERSION CONTROL:

Document Reference	Date	Report Prepared by	Report Checked / Authorised by
P3570-R1-DRAFT	21/06/2018	M. J. Malone, AMIOA	N. J. Malone, MIOA
			
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		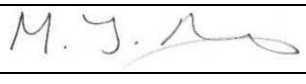	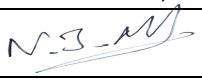

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APPENDICES

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1 INTRODUCTION

1.1.1 By instruction from Mr. Jess Kullar of Coventry Red Limited T/A Tiki Hut, NoiseAir Limited was commissioned to undertake a noise impact assessment (NIA) to an existing kitchen extract system located to the rear of the Tiki Hut property at the address 54 Earlsden Street, Coventry, CV5 6EJ in respect of the closest advised receivers.

1.1.2 At the time of writing it is understood that a proposed extension of licensing hours from 0000 hours to 0100 hours is sought for the Tiki Hut.

1.1.3 In support of the licensing extension described above NoiseAir was also requested to collect noise readings along Earlsden street, specifically in the areas of the Royal Oak and Millsy's Café Bar.

1.1.4 At the time of writing it is understood that the Royal Oak and Millsy's Café Bar operate licenses until 0100 hours and 0200 hours respectively on Friday and Saturday evenings.

1.1.5 The kitchen extract system, as previously mentioned, is located to the rear of the Tiki Hut premises and is understood to operate in the daytime hours. The nearest residential receptor to the Tiki Hut is located in a dwelling immediately above the site, the dwelling above the Tiki Hut is noted to have windows to the front of the property overlooking Earlsden Street, no windows are present to the rear of the site. A further receptor was also noted to be 25 m to the north west of the Tiki Hut property.

1.1.6 Noise from the front of the premises will be assessed with respect to the dwelling above the site (specifically the window to the front of the property.

1.1.7 Noise from the kitchen extract system will be assessed with regard to the receptor identified 25 m to the north west of the Tiki Hut.

1.1.8 This noise report has been prepared in support of a proposed planning application and assesses the results of a noise survey carried out in accordance with current guidance and includes recommendations mitigation as appropriate.

2 ASSESSMENT METHODOLOGY

2.1 Consultation and Scope of Works

2.1.1 The potential impacts of the proposed development and general principles of the assessment methodology were discussed with Frances Taylor (Environmental Health Officer) of Coventry City Council. It was agreed that an assessment for the kitchen extract system should be undertaken in accordance with the general principles outlined in BS4142:2014. Frances Taylor suggested that a minimum background sound level measurement period of 15 minutes would be sufficient for the assessment.

2.2 Noise Survey

2.2.1 As part of this assessment, NoiseAir Limited has carried out an attended noise survey to assess the current and proposed noise levels at proposed receptor locations.

2.2.2 The potential sources of noise to be considered are from the operation of an existing kitchen extract system located on to the rear of the Tiki Hut premises and noise breakout from the front of the Tiki Hut premises.

2.3 Assessment Methodology

2.3.1 An assessment is required to consider the potentially noise sensitive areas around the site. The potential impacts of the proposed sources of noise on the receivers have been assessed with reference to;

- National Planning Policy Framework (NPPF), 2012;
- Noise Policy Statement for England (NPSE), 2010;
- Planning Practice Guidance – Noise, 2014;
- British Standard 4142: 2014 Method for rating and assessing industrial and commercial sound (BS4142, 2014);

National Planning Policy Framework

2.3.2 In March 2012 the 'National Planning Policy Framework' (NPPF) was introduced as the current planning policy guidance within England. Paragraph 123 of the NPPF states:

'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 tranquility which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason.'*

Noise Policy Statement for England

2.3.3 With regard to 'adverse impacts' the NPPF refers to the 'Noise Policy Statement for England' (NPSE), which defines three categories, as follows:

'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.*

SOAEL – Significant Observed Adverse Effect Level

- *This is the level above which significant adverse effects on health and quality of life occur'.*

2.3.4 The first aim of the NPSE states that significant adverse effects on health and quality of life should be avoided. The second aim refers to the situation where the impact lies somewhere between LOAEL and SOAEL, and it requires that all reasonable steps are taken to mitigate and minimise the adverse effects of noise. However, the requirement to mitigate and minimise the adverse effects of noise does not mean that such adverse effects cannot occur.

Planning Practice Guidance

2.3.5 The Planning Practice Guidance (PPG) provides further detail about how the effect levels can be recognised. Above the NOEL noise becomes noticeable, however it has no adverse effect as it does not cause any change in behavior or attitude. Once noise crosses the LOAEL threshold it begins to have an adverse effect and consideration needs to be given to mitigating and minimising those effects, taking account of the economic and social benefits being derived from the activity causing the noise. Increasing noise exposure further might cause the SOAEL threshold to be crossed. If the exposure is above this level the planning process should be used to avoid the effect occurring by use of appropriate mitigation such as by altering the design and layout. Such decisions must be made taking account of the economic and social benefit of the activity causing the noise, but it is undesirable for such exposure to be caused. At the highest extreme the situation should be prevented from occurring regardless of the benefits which might arise. Table 1 summarises the noise exposure hierarchy.

Table 1: National Planning Practice Guidance noise exposure hierarchy

Perception	Examples of Outcomes	Increasing Effect Level	Action
Not noticeable	No effect	No Observed Effect	No specific measures required
Noticeable and not intrusive	Noise can be heard, but does not cause any change in behaviour or attitude. Can slightly affect the acoustic character of the area but not such that there is a perceived change in the quality of life.	No Observed Adverse Effect	No specific measures required
Lowest Observed Effect Level			
Noticeable and intrusive	Noise can be heard and causes small changes in behaviour and/or attitude, e.g. turning up volume of television; speaking more loudly; where there is no alternative ventilation, having to close windows for some of the time because of the noise. Potential for non-awakening sleep disturbance. Affects the acoustic character of the area such that there is a perceived change in the quality of life.	Observed Adverse Effect	Mitigate and reduce to a minimum
Significant Observed Effect Level			
Noticeable and disruptive	The noise causes a material change in behaviour and/or attitude, e.g. avoiding certain activities during periods of intrusion; where there is no alternative ventilation, having to keep windows closed most of the time because of the	Significant Observed Adverse Effect	Avoid

Table 1: National Planning Practice Guidance noise exposure hierarchy			
Perception	**Examples of Outcomes**	**Increasing Effect Level**	**Action**
	noise. Potential for sleep disturbance resulting in difficulty in getting to sleep, premature awakening and difficulty in getting back to sleep. Quality of life diminished due to change in acoustic character of the area.		
Noticeable and very disruptive	Extensive and regular changes in behaviour and/or an inability to mitigate effect of noise leading to psychological stress or physiological effects, e.g. regular sleep deprivation/awakening; loss of appetite, significant, medically definable harm, e.g. auditory and non-auditory.	Unacceptable Adverse Effect	Prevent

British Standard 4142

2.3.6 BS4142:2014 provides methods for rating and assessing sound of an industrial / commercial nature, which includes sound from industrial and manufacturing processes, fixed services plant, sound generated by the loading / unloading of goods and sound from mobile plant / vehicles associated with industrial / commercial premises (e.g. fork-lift trucks).

2.3.7 BS4142 uses various descriptors to assess the likelihood of adverse impact relating to proposed / existing industrial / commercial activities on existing or proposed noise-sensitive receivers.

2.3.8 The magnitude of impact is assessed by subtracting the measured background sound level at a location representative of the nearest noise-sensitive receiver, from the 'rating level' (the specific sound source to be introduced into the locality, corrected for acoustically distinguishing characteristics which may make it more subjectively prominent).

2.3.9 Typically, the greater the difference between the background and rating level, the greater the magnitude of impact, although BS 4142 suggests that this is should be considered in the context-of the site and surrounding being assessed.

2.3.10 As a guideline, BS4142 suggests that:

- *A difference (between the background and rating level) of around +10 dB or more is likely to be indicative of significant adverse impact, depending on context.*

- *A difference (between the background and rating level) of around +5 dB or more is likely to be indicative of adverse impact, depending on context.*
- *The lower the rating level relative to the background level, the less likely it is that the specific sound will have an adverse impact.*
- *Where the rating level does not exceed the background level, this is an indication that the specific sound will have a low impact, depending on context.*

2.3.11 BS4142:2014 requires qualified engineering consultants and technical planning professionals (e.g. Environmental Health Officers) to use a combination of quantitative assessment techniques and rational qualitative judgments to come to a reasoned conclusion.

2.3.12 Definitions;

2.3.13 BS 4142 uses several specific terms to define the various levels used in assessments, as follows:

- ***Specific sound*** *– the commercial / industrial noise source under consideration.*
- ***Residual sound*** *– the sound level at the noise-sensitive receivers in the absence of the specific sound.*
- ***Ambient sound*** *– the sound level at the noise-sensitive receivers in the presence of the specific sound (i.e. ambient = residual + specific).*
- ***Background level*** *- the sound pressure level which is exceeded by the residual sound for 90% of the measurement period.*
- ***Rating level*** *– the specific sound, corrected for acoustically distinguishing characteristics.*

2.3.14 Background level;

2.3.15 BS4142 suggests that the background level ($L_{A90,T}$) should be considered as a range of levels and not an absolute value. Background sound measurements should be normally not less than 15 minutes, the suggestion is on obtaining a level for use in assessment that is representative of typical conditions at the noise-sensitive receivers.

2.3.16 An example methodology by which this typical value may be obtained is given in BS4142. The example suggests that where monitoring of $L_{A90,15mins}$ is undertaken during periods which represent when the specific noise will be operational. After obtaining a sequence of representative results, the mode average value is considered representative of the 'typical' background level and may be adopted for the assessment.

2.3.17 Specific sound;

2.3.18 BS4142 requires that the specific sound ($L_{Aeq,T}$) is obtained over a reference period of 1 hour (daytime) and 15 mins (at night). Ideally, where possible measurements should be taken of the ambient sound and residual sound at the assessment location, with these measurements used to accurately calculate the specific sound (ambient – residual = specific).

2.3.19 Where the source (specific sound) is not yet operational, it is permissible to measure the specific sound elsewhere (or to use known manufacturers' or library data) and then model the impact of this against the known background level.

2.3.20 Rating level;

2.3.21 Once the specific sound level has been determined, this should be corrected in terms of the need to consider the subjective prominence of the impact of the sound at noise-sensitive receptors.

2.3.22 BS 4142 states that this is normally possible to carry out a subjective assessment of characteristics, based on the following correction guidelines:

- ***Tonality**: +2 dB for a 'just perceptible' tone, +4 dB for 'clearly perceptible', +6 dB for 'highly perceptible' tones.*
- ***Impulsivity**: +3 dB for 'just perceptible' impulsivity, +6 dB for 'clearly perceptible', rising to +9 dB for 'highly perceptible' impulsivity.*
- ***Intermittency**: if the on / off-time of the specific sound is readily distinctive at the noise- sensitive receivers, +3 dB.*
- ***Other sound characteristics**: up to +3 dB may be added for sound characteristics which are considered adverse to the receptor being clearly / highly perceptible. It should be noted that a correction for other sound characteristics is rare.*

2.3.23 It should be noted that where one feature is clearly perceived as dominant, it may be applicable to correct for that feature only. Where multiple features are likely to affect perception and response, each should be added arithmetically.

3 ACOUSTIC SURVEY

3.1 Acoustic Survey Details

3.1.1 On the 15th June 2018, NoiseAir Limited carried out a noise survey at the subject site.

3.1.2 Monitoring locations (ML) are shown in **Figure 1** below:

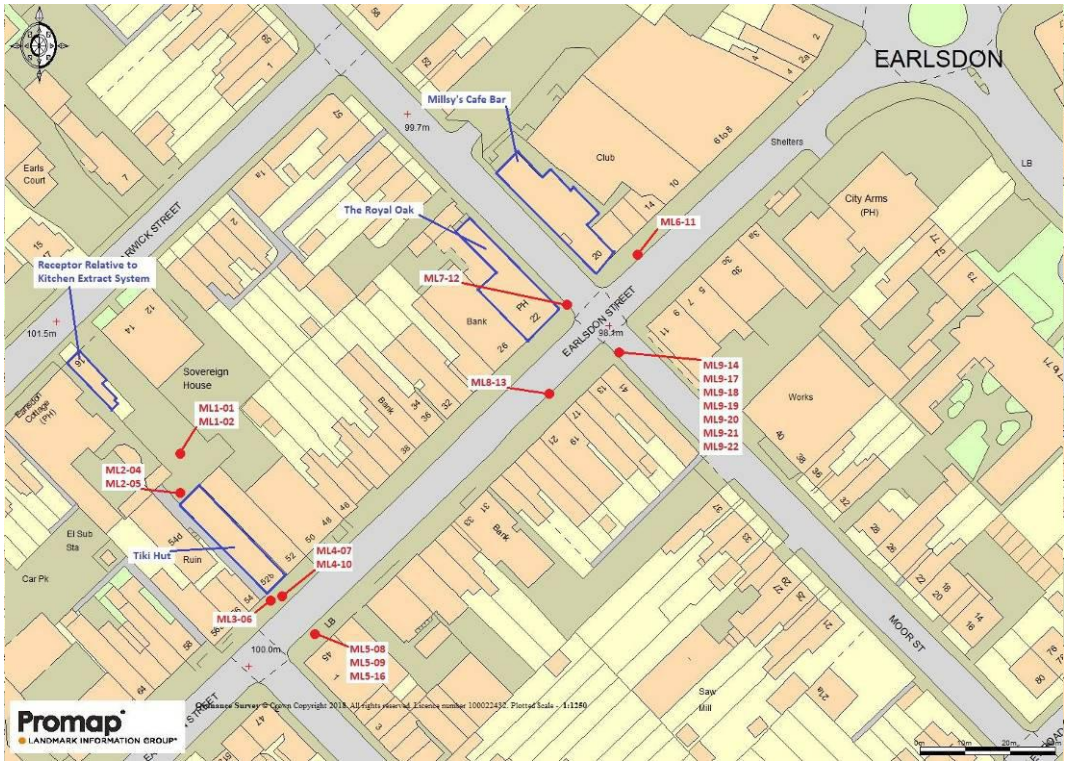


Figure 1 – Site layout plan.

3.1.3 Background noise measurements were carried out at one monitoring location. Background monitoring location results are detailed in **Table 2**, and are shown in **Figure 1**.

Table 2: Summary of Background Sound Monitoring Locations

Monitoring Location Number	Location Description	Time Period Monitored		Attended or Unattended Monitoring
		Start	End	
ML1-01	To rear of Tiki Hut, approximately equidistant between receptor and Tiki Hut.	22:49 15-06-18	23:04 15-06-18	Attended
ML1-02	To rear of Tiki Hut, approximately equidistant between receptor and Tiki Hut.	23:04 15-06--18	23:19 15-06-18	Attended

3.1.4 Monitoring Location 1 (ML1) is considered representative of the typical background noise levels at the local receptors to be considered, therefore data from this location will be adopted for the background sound levels.

3.1.5 Noise measurements were carried out at one monitoring location close to the kitchen extract system to the rear of Tiki Hut. The monitoring location results are detailed in **Table 3**, and are shown in **Figure 1**.

Table 3: Summary of Kitchen Extract Sound Monitoring Locations

Monitoring Location Number	Location Description	Time Period Monitored		Attended or Unattended Monitoring
		Start	End	
ML2-04	1 m from kitchen extract system at rear of Tiki Hut.	23:20 15-06-18	23:35 15-06-18	Attended
ML2-05	1 m from kitchen extract system at rear of Tiki Hut.	23:35 15-06-18	23:39 15-06-18	Attended

3.1.6 Monitoring Location 2 (ML2) is considered representative of the noise levels associated with the kitchen extract system to the rear of Tiki Hut at 1 m distance.

3.1.7 Noise measurements were carried out at three monitoring locations close to the entrance to Tiki Hut and also across the road in front of Tiki Hut. The monitoring location results are detailed in **Table 4**, and are shown in **Figure 1**.

Table 4: Summary of Tiki Hut Frontage Sound Monitoring Locations

Monitoring Location Number	Location Description	Time Period Monitored		Attended or Unattended Monitoring
		Start	End	
ML3-06	2 m from Tiki Hut front entrance door, off to left.	23:47 15-06-18	23:50 15-06-18	Attended
ML4-07	3 m from Tiki Hut front entrance, directly in front.	23:50 15-06-18	23:52 15-06-18	Attended
ML4-10	3 m from Tiki Hut front entrance, directly in front.	23:55 15-06-18	23:56 15-06-18	Attended
ML5-08	13 m from Tiki Hut front entrance, on opposite side of road.	23:52 15-06-18	23:55 15-06-18	Attended
ML5-09	13 m from Tiki Hut front entrance, on opposite side of road.	23:55 15-06-18	23:55 15-06-18	Attended
ML5-16	13 m from Tiki Hut front entrance, on opposite side of road.	00:40 16-06-18	00:45 16-06-18	Attended

3.1.8 Noise measurements were carried out at four monitoring locations in the vicinity of the Royal Oak and Millsy's Café Bar. The monitoring location results are detailed in **Table 5**, and are shown in **Figure 1**.

Table 5: Summary of Royal Oak and Millsy's Café Bar Vicinity Monitoring Locations

Monitoring Location Number	Location Description	Time Period Monitored		Attended or Unattended Monitoring
		Start	End	
ML6-11	6 m from the front open are seating area to the front of Millsy's Café Bar	00:06 16-06-18	00:08 16-06-181	Attended
ML7-12	15 m from the entrance to Millsy's Café Bar.	00:10 16-06-18	00:11 16-06-18	Attended
ML8-13	17 m from the entrance to the Royal Oak.	00:15 16-06-18	00:17 16-06-18	Attended
ML9-14	16 m from Millsy's Café Bar and 18 m from the Royal Oak.	00:21 16-06-18	00:36 16-06-18	Attended
ML9-17	16 m from Millsy's Café Bar and 18 m from the Royal Oak.	00:52 16-06-18	00:54 16-06-18	Attended
ML9-18	16 m from Millsy's Café Bar and 18 m from the Royal Oak.	00:54 16-06-18	01:09 16-06-18	Attended
ML9-19	16 m from Millsy's Café Bar and 18 m from the Royal Oak.	01:09 16-06-18	01:24 16-06-18	Attended
ML9-20	16 m from Millsy's Café Bar and 18 m from the Royal Oak.	01:24 16-06-18	01:39 16-06-18	Attended
ML9-21	16 m from Millsy's Café Bar and 18 m from the Royal Oak.	01:39 16-06-18	01:54 16-06-181	Attended
ML9-22	16 m from Millsy's Café Bar and 18 m from the Royal Oak.	01:54 16-06-18	02:00 16-06-18	Attended

3.1.9 The noise measurements were made using a Class 1, integrating sound level meter. In accordance with guidance, the microphone was mounted vertically on tripods 1.5 m above the ground and more than 3.5 metres from any other reflecting surfaces. Details of the SLM's can be found in **Table 6** below;

Table 6: Summary of SLM's used for survey

SLM	SLM Class	SLM Serial No.	Microphone	Microphone Serial No.	Calibrator	Calibrator Serial No.
NOR140	Class 1	1403057	NOR1225	72835	B&K4231	2482550

3.1.10 The sound level meter was calibrated to a reference level of 93.8 dB at 1kHz both before, and on completion of, the noise survey.

3.1.11 No drift in the calibration during the survey was noted.

3.1.12 On the evening of June 15th 2018, the weather conditions during the survey were as follows:

- Low winds < 0.5 m/s;
- Relative humidity of approximately 61%;
- Temperature approximately 13-16˚C; and,
- Approximately 70% cloud cover.

3.1.13 The weather conditions remained approximately consistent over the duration of the noise survey.

3.1.14 For the purpose of this assessment night time hours are taken to be 2300 hours to 0700 hours.

3.1.15 A-weighted[1] L_{eq}[2] and L_{90}[3] noise levels were measured to comply with the requirements of BS4142. A-weighted maximum sound pressure levels were also measured to provide additional information. The measured noise levels are set out in full in Appendix B.

3.2 Acoustic Survey Results, Data and Observations

Background Sound Level Survey to Rear of Tiki Hut

3.2.1 Attended noise monitoring, allows observations and detailed notes to be made of the significant noise sources which contribute to each of the measured levels. The observations identified the following:

Occasional vehicle movements: Noise from occasional vehicle movements was audible at ML1.

3.2.2 The results for ML1 during the night time period are presented in **Table 7**.

Table 7: Average Night time Sound Levels

Monitoring Location Number	Time	Duration	Measured Residual Noise Level (Figures in dB L_{Aeq})	Measured Background Noise Level (Figures in dB L_{A90})
ML1-01	22:49:00	15:00	43	41
ML1-02	23:04:02	15:00	44	41

[1] An electronic filter in a sound level meter which mimics the human ear's response to sounds at different frequencies under defined conditions.
[2] Equivalent continuous noise level; the steady sound pressure which contains an equivalent quantity of sound energy as the time-varying sound pressure levels.
[3] The noise level which is exceeded for 90% of the measurement period.

3.2.3 **Table 7** shows the night time residual and background sound level measurements ranged between 43-44 dB $L_{Aeq,15min}$ and 41 dB $L_{Aeq,15min}$. respectively. 43 dB $L_{Aeq,15mins}$ and 41 dB L_{A90} have been adopted as the typical residual and background sound levels at the residential receptor located 25 m to the north west of Tiki Hut.

Sound Levels to Kitchen Extract Equipment

3.2.4 The results for ML2 during the night time period are presented in **Table 8**.

Table 8: Average Kitchen Extract Equipment Noise Levels

Monitoring Location Number	Time	Duration	Measured Noise Level (Figures in dB L_{Aeq})
ML2-04	23:20:42	03:00	49
ML2-05	23:35:44	01:30	48

Sound Levels to front of Tiki Hut

3.2.5 Attended noise monitoring observations identified the following to the front of Tiki Hut:

Regular vehicle movements: Noise from regular vehicle movements was audible at ML3, ML4 and ML5.

Patrons of Tiki Hut and Pedestrians: Noise from patrons entering and leaving the Tiki Hut premises was audible at ML3, ML4 and ML5 along with pedestrians walking along the Earlsden Street.

Noise Break Out from Tiki Hut: Noise breakout from Tiki Hut was audible at ML3, ML4 and ML5, it should be noted that when the door was closed noise breakout was nominal.

3.2.6 The results for ML3, ML4 and ML5 are presented in **Table 9**.

Table 9: Average Sound Levels to Front of Tiki Hut

Monitoring Location Number	Time	Duration	Measured Noise Level (Figures in dB L_{Aeq})	Measured Maximum Noise Level (Figures in dB L_{Amax})
ML3-06	23:47:23	03:00	63	85
ML4-07	23:50:40	01:30	63	72
ML4-10	23:55:55	00:15	63	71
ML5-08	23:52:24	02:55	59	74
ML5-09	23:55:25	00:15	59	72

Table 9: Average Sound Levels to Front of Tiki Hut				
Monitoring Location Number	**Time**	**Duration**	**Measured Noise Level (Figures in dB L_{Aeq})**	**Measured Maximum Noise Level (Figures in dB L_{Amax})**
ML5-16	00:40:35	05:00	62	79

Sound Levels to Vicinity of the Royal Oak and Millsy's Café Bar

3.2.7 Attended noise monitoring observations identified the following to the vicinity of the Royal Oak and Millsy's Café Bar:

Regular vehicle movements: Noise from regular vehicle movements was audible at ML6, ML7, ML8 and ML9, specifically numerous taxis into the early hours.

Patrons of Tiki Hut and Pedestrians: Noise from patrons entering and leaving the Royal Oak and Millsy's Café Bar premises was audible at ML6, ML7, ML8 and ML9 along with pedestrians walking along the Earlsden Street. Crowds of people were noted to be congregating and shouting.

3.2.8 The results for ML6, ML7, ML8 and ML9 are presented in **Table 10**.

Table 10: Average Sound Levels to the Vicinity of the Royal Oak and Millsy's Café Bar				
Monitoring Location Number	**Time**	**Duration**	**Measured Noise Level (Figures in dB L_{Aeq})**	**Measured Maximum Noise Level (Figures in dB L_{Amax})**
ML6-11	00:06:37	01:20	63	75
ML7-12	00:10:10	01:00	61	71
ML8-13	00:15:49	01:59	61	77
ML9-14	00:21:13	15:00	66	66
ML9-17	00:36:16	01:46	68	79
ML9-18	00:54:30	15:00	65	83
ML9-19	01:09:33	15:00	63	85
ML9-20	01:24:35	15:00	60	76
ML9-21	01:39:38	15:00	60	73
ML9-22	01:54:40	04:01	60	71

4 ASSESSMENT

4.1 3D Sound Model for Kitchen Extract Equipment to Rear of Tiki Hut

4.1.1 Ambient noise levels to the rear of the Tiki Hut site were considered to be low when compared to the background sound levels and therefore a 3D noise model has been constructed in SoundPLAN™ to calculate the predicted sound pressure level at selected potential receiver facades. The model uses the calculation method from ISO 9613-1:1996[4] to account for the distance between the source and receiver and any screening or reflections provided by the surrounding buildings. The model is based on data collected during the survey presented in **Table 8**.

4.1.2 The night-time situation has been considered being the most conservative.

4.1.3 A noise contour plot illustrating the propagation of sound from source to receiver is given in **Figure 2** and predicted façade readings from selected receiver locations are shown in **Figure 3**.

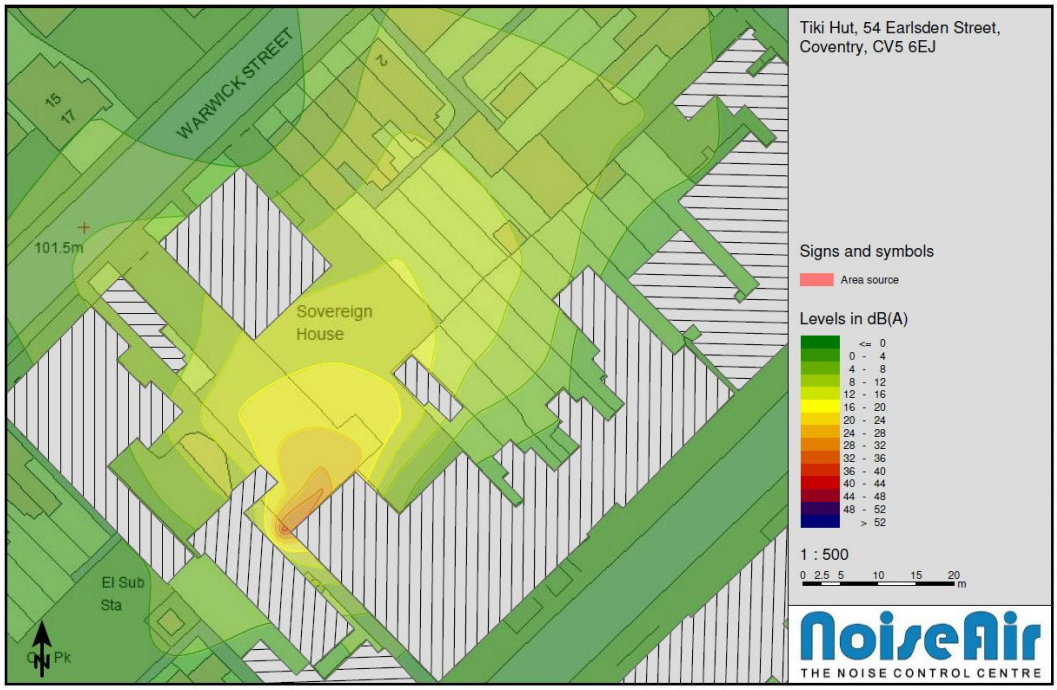


Figure 2: Noise contour plot illustration of the predicted propagation from the existing kitchen extract equipment located to the rear of Tiki Hut.

[4] ISO9613-1:1996 "Acoustics – Attenuation of sound during propagation outdoors – Part 2: General method of calculation"

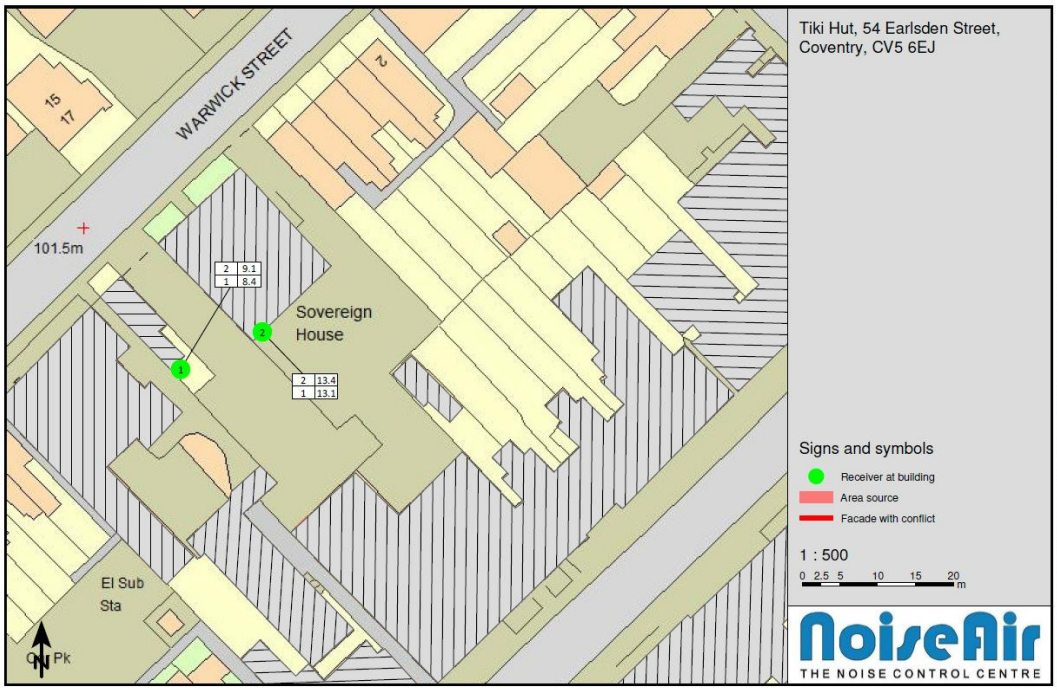


Figure 3: Predicted noise levels (Specific Sound Level) at selected receiver locations from the existing kitchen extract equipment located to the rear of Tiki Hut.

4.1.4 The predicted worst-case receiver is calculated to be at Sovereign House with a predicted facade noise level when the kitchen extract system is in use of up to 13 dB, this value has therefore been adopted for the BS4142:2014 assessment.

4.2 Noise Impact Assessment for the Kitchen Extract Equipment

4.2.1 As mentioned previously in the report the type of noise to be assessed is from air conditioning equipment which can operate on an intermittent basis and it has been confirmed by the client that the air conditioning equipment generating the proposed noise could operate in the daytime and night-time hours.

4.3 Rating level

4.3.1 As discussed in section 2, the character of the specific sound should be taken into account. Character corrections have been made based on information provided to NoiseAir by the client and by field observation.

Tonality

4.3.2 Kitchen extract equipment typically contain rotating components that are likely to produce modest tones. Often, at distances greater than 20 m these tones are not likely to be

perceivable at the receiver location. Due to the low noise levels measured no character correction has been applied for tonality.

Impulsivity

4.3.3 Impulses are associated with the sudden onset of sound such as that from quarry blasts and sonic booms at the extreme. It is considered that the sound source is not impulsive in nature and therefore no character correction has been applied.

Intermittency

4.3.4 The kitchen extract equipment is not expected to operate all of the time, potentially in any 1-hour daytime period or any 15 minute night-time period, however it is considered that any effect at the receiver location would not be 'perceptible'. Therefore, no correction has been applied for intermittency for the assessment.

4.4 Assessment

4.4.1 The BS4142 assessment for the proposed air conditioning equipment is detailed in **Table 11** below, only a night time assessment is shown as this is considered the worst case scenario.

Table 11: BS4142:2014 Daytime assessment for the proposed air conditioning equipment.

Quantity	Sound level dB(A)
	Daytime
Typical background sound level, dB L_{A90} Typical level determined in section 3.2	41
Specific sound level Predicted from 3D sound model in section 4.1	13
Character corrections	
Tonality	0
Impulsivity	0
Intermittency	0
Rating level	13
Excess rating over background level	**-28**

4.5 Context

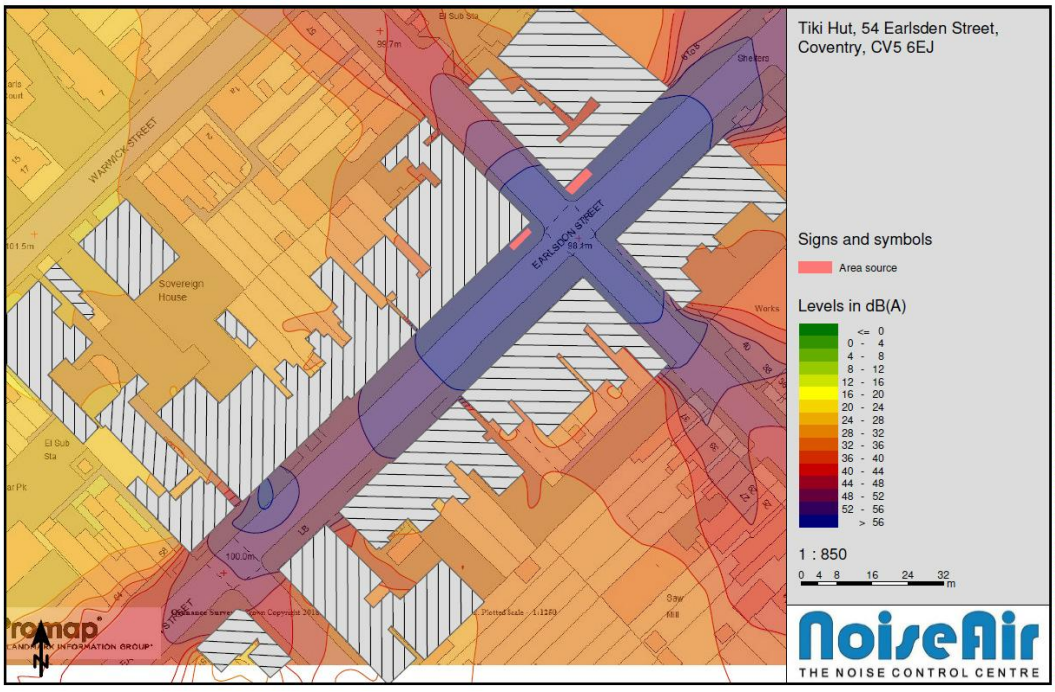
4.5.1 In this situation, the kitchen extract system has been upgraded / amended which in certain circumstances can cause adverse effects, the noise levels measured however were considered to be low and therefore it is not considered that adverse impacts are likely.

4.6 General Assessment of Noise Levels along Earlsden Street

4.7 3D Sound Model for Earlsden Street

4.7.1 Noise levels were collected along Earlsden street on the evening and early hours of 15th June and 16th June 2018, specifically in relation to general noise levels in the vicinity of the Royal Oak bar and Millsy's Café Bar, a subsequent 3D noise model has been constructed in SoundPLAN™ to calculate the predicted sound pressure level propagation along Earlsden street from the dominant noise sources. The model uses the calculation method from ISO 9613-1:1996[5] to account for the distance between the source and receiver and any screening or reflections provided by the surrounding buildings. The model is based on data collected during the survey presented in **Table 9** and **Table 10**.

4.7.2 A noise contour plot illustrating the propagation of sound from the dominant noise sources is given in **Figure 4**.



4.8 Uncertainty

[5] ISO9613-1:1996 "Acoustics – Attenuation of sound during propagation outdoors – Part 2: General method of calculation"

4.8.1 Uncertainty of measurements can have a significant effect on the outcome and findings of an assessment and therefore such constraints are documented and discussed below.

4.8.2 The SLM used was a Norsonic Class 1 SLM, it is generally recognised that Class 1 SLM's offer an uncertainty of ±1.0 dB. The instrumentation used for the survey has been calibrated by UKAS approved laboratories

4.8.3 The background and residual sound levels measured (which include busier and quieter periods) are considered low to typical for an urban area.

4.8.4 Wind speeds during the survey visits were typically less than 5 ms^{-1} and the effect of wind generated noise is not considered to have a significant impact on this assessment.

4.8.5 There is considered to be marginal uncertainty in the specific noise level as this criterion has been obtained from calculation, however it is not considered that this will have an adverse effect on the outcome of the assessment.

4.8.6 It is therefore considered that in this instance the uncertainty of the calculations may have minimal influence on the outcome of the assessment.

5 RECOMMENDATIONS

5.1 Kitchen Extract Equipment

5.1.1 We would recommend and as good engineering practice that an appropriate management plan of servicing works should be employed during the life of the kitchen extract equipment to ensure that the noise output stays within its operating criteria.

6 CONCLUSIONS

6.1.1 NoiseAir Limited has carried out a noise assessment for the existing kitchen extraction equipment located to the rear of the Tiki Hut premises at address 54 Earlsden Street, Coventry, CV5 6EJ. Noise levels have also been assessed to the front of the Tiki Hut premises with respect to the closest noise sensitive receptor being located immediately above Tiki Hut.

6.1.2 Furthermore, investigation has also been undertaken into the general noise levels and noise climate along Earlsden Street on a typical weekend evening.

6.1.3 Investigation of noise levels to the kitchen extraction system located to the rear of the Tiki Hut premises with respect to the residential dwelling located 25 m north west of the site and Sovereign House indicate an excess over rating of -28 dB during the night time.

6.1.4 This indicates that the kitchen extraction equipment assessed in this report has a low likelihood of an adverse impact to the surrounding receivers.

APPENDIX A - REPORT LIMITATIONS

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This Report is presented to Jess Kullar, in respect of Coventry Red Limited T/A Tiki Hut, commercial business and may not be used or relied on by any other person or by the client in relation to any other matters not covered specifically by the scope of this report.

Notwithstanding anything to the contrary contained in the report, NoiseAir Limited is obliged to exercise reasonable skill, care and diligence in the performance of the services required by Jess Kullar, of Coventry Red Limited T/A Tiki Hut and NoiseAir shall not be liable except to the extent that it has failed to exercise reasonable skill, care and diligence, and this report shall be read and construed accordingly.

This report has been prepared by NoiseAir Limited. No individual is personally liable in connection with the preparation of this report. By receiving this report and acting on it, the client or any other person accepts that no individual is personally liable whether in contract, tort, for breach of statutory duty or otherwise.

The conclusions and recommendations contained in this report are based upon information provided by others and upon the assumption that all relevant information has been provided by those parties from who it has been requested and that such information is accurate. Information obtained by NoiseAir Limited has not been independently verified by NoiseAir Limited unless otherwise stated in the report and should be treated accordingly.

The methodology adopted and the sources of information used by NoiseAir Limited in providing its services are outlined in this report. The work described in this report was undertaken during the dates given in Section 1 and Section 2 and is based upon the conditions encountered as detailed in Section 2 and the information available up to the said date. The scope of this report and the services are accordingly factually limited by these circumstances.

Where assessments of works or costs identified in this report are made, such assessments are based upon the information available at the time and where appropriate are subject to further investigations or information which may become available.

Where / if estimates and projects are made within this report, are made based on reasonable assumptions as of the date of this report, such statements however by their very nature involve risks and uncertainties that could cause actual results to differ materially from the results predicted. NoiseAir Limited specifically does not guarantee or warrant any estimates or projects contained in this report.

DISCLAIMER- This report was prepared by NoiseAir Limited. The material in it contains NoiseAir Limited best judgment in light of the information available at the time of preparation of this report. Any use which a third party makes of this report, or any reliance on, or decisions based on it are the responsibility of such third parties. NoiseAir Limited accept no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions taken based on this report.

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APPENDIX B - METER READINGS

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Monitoring Location 1 - To rear of Tiki Hut, approximately equidistant between receptor and Tiki Hut.						
Start time	**End time**	**L_{Aeq} (dB)**	**L_{AFmax} (dB)**	**LAF_{90} (dB)**	**LAF_{10} (dB)**	**Comments**
15/06/2018						
22:49:00	23:04:00	43.3	56.2	41.4	44.5	Attended measurement. Noise from occasional vehicle movements.
23:04:02	23:19:02	44.4	65.2	41.1	46.3	
	Overall	43.9	65.2			

Monitoring Location 2 - 1 m from kitchen extract system at rear of Tiki Hut.						
Start time	**End time**	**L_{Aeq} (dB)**	**L_{AFmax} (dB)**	**LAF_{90} (dB)**	**LAF_{10} (dB)**	**Comments**
31/05/18 - Daytime						
23:20:42	23:35:42	48.9	76.0	47.0	49.5	Attended measurement. Noise from kitchen extract system.
23:35:44	23:50:44	48.4	57.7	47.1	49.4	
	Overall	48.7	76.0			

Monitoring Location 3 - 2 m from Tiki Hut front entrance door, off to left.						
Start time	**End time**	**L_{Aeq} (dB)**	**L_{AFmax} (dB)**	**LAF_{90} (dB)**	**LAF_{10} (dB)**	**Comments**
15/06/2018						
23:47:23	23:50:23	62.8	85.0	53.4	65.2	Attended measurement. Noise from vehicle movements and pedestrians.

Monitoring Location 4 - 3 m from Tiki Hut front entrance, directly in front.						
Start time	**End time**	**L_{Aeq} (dB)**	**L_{AFmax} (dB)**	**LAF_{90} (dB)**	**LAF_{10} (dB)**	**Comments**
15/06/2018						
23:50:40	23:52:10	63.1	72.1	53.4	67.4	Attended measurement. Noise from vehicle

23:55:55	23:56:10	63.2	70.9	54.3	68.0	movements and pedestrians.

Monitoring Location 5 - 13 m from Tiki Hut front entrance, on opposite side of road.						
Start time	**End time**	**L_{Aeq} (dB)**	**L_{AFmax} (dB)**	**LAF_{90} (dB)**	**LAF_{10} (dB)**	**Comments**
15/06/2018 to 16/06/2018						
23:52:24	23:55:21	59.0	74.3	47.2	61.4	Attended measurement. Noise from vehicle movements and pedestrians.
23:55:25	23:55:40	59.0	71.5	49.0	61.4	
00:40:35	00:45:35	62.2	79.0	45.8	65.2	

Monitoring Location 6 - 6 m from the front open are seating area to the front of Millsy's Café Bar.						
Start time	**End time**	**L_{Aeq} (dB)**	**L_{AFmax} (dB)**	**LAF_{90} (dB)**	**LAF_{10} (dB)**	**Comments**
16/06/2018						
00:06:37	00:08:07	62.9	75.1	53.7	66.2	Attended measurement. Noise from vehicle movements and pedestrians.

Monitoring Location 7 - 15 m from the entrance to Millsy's Café Bar.						
Start time	**End time**	**L_{Aeq} (dB)**	**L_{AFmax} (dB)**	**LAF_{90} (dB)**	**LAF_{10} (dB)**	**Comments**
16/06/2018						
00:10:10	00:11:10	611.0	71.1	54.6	63.7	Attended measurement. Noise from vehicle movements and pedestrians.

Monitoring Location 8 - 17 m from the entrance to the Royal Oak.						
Start time	**End time**	**L_{Aeq} (dB)**	**L_{AFmax} (dB)**	**LAF_{90} (dB)**	**LAF_{10} (dB)**	**Comments**
16/06/2018						

00:15:49	00:17:48	61.1	77.1	53.9	63.0	Attended measurement. Noise from vehicle movements and pedestrians.

Monitoring Location 9 - 16 m from Millsy's Café Bar and 18 m from the Royal Oak.						
Start time	**End time**	**L_{Aeq} (dB)**	**L_{AFmax} (dB)**	**LAF_{90} (dB)**	**LAF_{10} (dB)**	**Comments**
16/06/2018						
00:21:13	00:36:13	66.3	91.0	61.7	68.3	Attended measurement. Noise from vehicle movements and pedestrians.
00:52:36	00:54:46	68.1	78.6	62.7	71.8	
00:54:30	01:09:30	64.5	82.7	66.9	59.3	
01:09:33	01:24:33	62.9	85.4	65.1	58.1	
01:24:35	01:39:35	60.4	76.3	63.3	55.0	
01:39:38	01:54:38	60.1	73.2	63.3	52.7	
01:54:40	01:58:41	60.1	70.5	63.2	53.1	

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APPENDIX C - PHOTOGRAPHS

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Plate 1 – View showing kitchen extract to rear of Tiki Hut.


Plate 2 – View showing receptor to rear of Tiki Hut.

Plate 3 – View showing front of Tiki Hut and receptor above.

Plate 4 – View showing Millsy's Café Bar and associated traffic and patrons.

APPENDIX D - GLOSSARY

A-weighted sound pressure, p_A	Value of overall sound pressure, measured in pascals (Pa), after the electrical signal derived from a microphone has been passed through an A-weighting network. *NOTE: The A-weighting network modifies the electrical response of a sound level meter with frequency in approximately the same way as the sensitivity of the human hearing system.*
A-weighted sound pressure level, L_{pA}	Quantity of A-weighted sound pressure in decibels (dBA).
Acoustic environment	Sound from all sound sources as modified by the environment [BS ISO 12913-1:2013].
Ambient sound	Totally encompassing sound in a given situation at a given time, usually composed of sound from many sources near and far. *NOTE: The ambient sound comprises the residual sound and the specific sound when present.*
Ambient sound level, $L_a = L_{Aeq,T}$ (BS4142:2014)	Equivalent continuous A-weighted sound pressure level of the totally encompassing sound in a given situation at a given time, usually from many sources near and far, at the assessment location over a given time interval, T *NOTE: The ambient sound level is a measure of the residual sound and the specific sound when present.*
Background sound	Underlying level of sound over a period, *T*, which might in part be an indication of relative quietness at a given location.
Background sound level, $L_{A90,T}$ (BS4142:2014)	A-weighted sound pressure level that is exceeded by the residual sound at the assessment location for 90% of a given time interval, T, measured using time weighting F and quoted to the nearest whole number of decibels.
Break-in	Noise transmission into a structure from outside.
Break-out	Noise transmission from inside a structure to the outside.
Cross-talk	Noise transmission between one room and another room or space via a duct or other path.
C_{tr}	Correction term applied against the sound insulation single-number values (R_w, D_w, and $D_{nT,w}$) to provide a weighting against low frequency performance. *NOTE: The reference values used within the C_{tr} calculation are based on urban traffic noise.*
Equivalent continuous A-weighted sound pressure level, $L_{Aeq,T}$	Value of the A-weighted sound pressure level in decibels (dB) of a continuous, steady sound that, within a specified time interval, T, has the same mean-squared sound pressure as the sound under consideration that varies with time.
Equivalent continuous A-weighted sound pressure level, $L_{Aeq,T}$ (BS4142:2014)	Value of the A-weighted sound pressure level in decibels of continuous steady sound that, within a specified time interval, $T = t_2 - t_1$, has the same mean-squared sound pressure as a sound that varies with time.
Equivalent sound absorption area of a room, A	Hypothetical area of a totally absorbing surface without diffraction effects, expressed in square metres (m2), which, if it were the only absorbing element in the room, would give the same reverberation time as the room under consideration
Facade level	Sound pressure level 1 m in front of the façade. *NOTE: Facade level measurements of L_{pA} are typically 1 dB to 2 dB higher than corresponding free-field measurements because of the reflection from the facade.*
Free-field level	Sound pressure level away from reflecting surfaces. *NOTE: Measurements made 1.2 m to 1.5 m above the ground and at least 3.5 m away from other reflecting surfaces are usually regarded as free-field. To minimize the effect of reflections the measuring position has to be at least 3.5 m to the side of the reflecting surface (i.e. not 3.5 m from the reflecting surface in the direction of the source). Estimates of noise from aircraft overhead usually include a correction of 2 dB*

	to allow for reflections from the ground.
Impact sound pressure level, L_i	Average sound pressure level in a specific frequency band in a room below a floor when it is excited by a standard tapping machine or equivalent.
Indoor ambient noise	Noise in a given situation at a given time, usually composed of noise from many sources, inside and outside the building, but excluding noise from activities of the occupants. *NOTE: The location(s) within the room at which the ambient indoor noise is to be measured or calculated ought to be considered.*
Measurement time interval, T_m (BS4142:2014)	Total time over which measurements are taken. *NOTE: This may consist of the sum of a number of non-contiguous, short-term measurement time intervals.*
Noise criteria	Numerical indices used to define design goals in a given space.
Noise rating, NR	Graphical method for rating a noise by comparing the noise spectrum with a family of noise rating curves.
Normalised impact sound pressure level, L_n	Impact sound pressure level normalized for a standard absorption area in the receiving room. *NOTE: Normalised impact sound pressure level is usually used to characterize the insulation of a floor in a laboratory against impact sound in a stated frequency band.*
Octave band	Band of frequencies in which the upper limit of the band is twice the frequency of the lower limit.
Percentile level, $L_{AN,T}$	A-weighted sound pressure level obtained using time-weighting "F", which is exceeded for *N*% of a specified time interval.
Reference time interval, T_r (BS4142:2014)	Specified interval over which the specific sound level is determined. *NOTE: This is 1 h during the day from 07:00 h to 23:00 h and a shorter period of 15 min at night from 23:00 h to 07:00 h.*
Residual sound (BS4142:2014)	Ambient sound remaining at the assessment location when the specific sound source is suppressed to such a degree that it does not contribute to the ambient sound.
Residual sound level, $L_r = L_{Aeq,T}$ (BS4142:2014)	Equivalent continuous A-weighted sound pressure level of the residual sound at the assessment location over a given time interval, T.
Rating level, $L_{Ar,Tr}$	Equivalent continuous A-weighted sound pressure level of the noise, plus any adjustment for the characteristic features of the noise. *NOTE: This is used in BS 7445 and BS 4142 for rating industrial noise, where the noise is the specific noise from the source under investigation.*
Reverberation time, *T*	Time that would be required for the sound pressure level to decrease by 60 dB after the sound source has stopped.
Sound exposure level, *LAE*	Level of a sound, of 1 s duration, that has the same sound energy as the actual noise event considered.
Sound level difference, *D*	Difference between the sound pressure level in the source room and the sound pressure level in the receiving room.
Sound pressure, *p*	Root-mean-square value of the variation in air pressure, measured in pascals (Pa) above and below atmospheric pressure, caused by the sound.

Sound pressure level, L_p	Quantity of sound pressure, in decibels (dB).
Sound reduction index, *R*	Laboratory measure of the sound insulating properties of a material or building element in a stated frequency band.
Specific sound level, $L_s = L_{Aeq,Tr}$ (BS4142:2014)	Equivalent continuous A-weighted sound pressure level produced by the specific sound source at the assessment location over a given reference time interval, T_r.
Specific sound source (BS4142:2014)	Sound source being assessed.
Standardised impact sound pressure level, L'_{nT}	Impact sound pressure level normalized to a reverberation time in the receiving room of 0.5 s.
Standardised level difference, D_{nT}	Difference in sound level between a pair of rooms, in a stated frequency band, normalized to a reference reverberation time of 0.5 s for dwellings.
Groundborne noise	Audible noise caused by the vibration of elements of a structure, for which the vibration propagation path from the source is partially or wholly through the ground. *NOTE Common sources of ground-borne noise include railways and heavy construction work on adjacent construction sites.*
Structure-borne noise	Audible noise caused by the vibration of elements of a structure, the source of which is within a building or structure with common elements. *NOTE Common sources of structure-borne noise include building services plant, manufacturing machinery and construction or demolition of the structure.*
Third octave band	Band of frequencies in which the upper limit of the band is 2% times the frequency of the lower limit.
Weighted level difference, D_w	Single-number quantity that characterizes airborne sound insulation between rooms, but which is not adjusted to reference conditions. *NOTE Weighted level difference is used to characterize the insulation between rooms in a building as they are. Values cannot normally be compared with measurements made under other conditions (see BS EN ISO 717-1).*
Weighted normalised impact sound pressure level, $L'_{n,w}$	Single-number quantity used to characterize the impact sound insulation of floors over a range of frequencies.
Weighted sound reduction index, R_w	Single-number quantity which characterizes the airborne sound insulating properties of a material or
Weighted standardised impact sound pressure level $L'_{nT,w}$	Single-number quantity used to characterize the impact sound insulation of floors over a range of frequencies.
Weighted standardised level difference, $D_{nT,w}$	Single-number quantity that characterizes the airborne sound insulation between rooms.

Symbols

D_w	Weighted level difference (dB)
D_{nT}	Standardized level difference (dB)
$D_{nT,w}$	Weighted standardized level difference (dB)
L_{Amax}	Maximum noise level (dB)
$L_{Ar,Tr}$	Rating level (dB)
L_n	Normalised impact sound pressure level (dB)
L'_{nT}	Standardised impact sound pressure level (dB)
$L'_{nT,w}$	Weighted standardised impact sound pressure level (dB)
$L'_{n,w}$	Weighted normalised impact sound pressure level (dB)
L_p	Sound pressure level (dB)
L_{pA}	A-weighted sound pressure level (dB)
$L_{AN,T}$	Percentile level (dB)
L_{AE}	Sound exposure level (dB)
$LAeq,T$	Equivalent continuous A-weighted sound pressure level (dB)
p	Sound pressure (Pa)
p_A	A-weighted sound pressure (dB)
$p_{A(t)}$	Instantaneous A-weighted sound pressure (Pa)

R	Sound reduction index (dB)
R_w	Weighted sound reduction index (dB)
T	Time interval (also used for reverberation time) (s)
t_0	Reference time interval (s)

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