
DR GAVIN TROTMAN

NOISE IMPACT ASSESSMENT REPORT

**CANINE DAY CARE CENTRE, WORTHENBURY,
WREXHAM**

Dr Gavin Trotman

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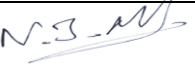
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1 INTRODUCTION

1.1.1 By instruction from Dr Gavin Trotman, ('the client'), NoiseAir was commissioned to undertake a noise impact assessment (NIA) for a proposed canine daytime care facility, to be located at land off of Mulsford Lane, Worthenbury, Wrexham LL13 0AP, herein referred to as the 'development site'.

1.1.2 This noise report has been prepared in support of a planning application for the partial change of land use to Sui Generis with erection of moveable timber field stable and fenced area for a canine day-care facility, and assesses the results of a noise survey carried out in accordance with current guidance and includes recommendations and mitigation as appropriate.

1.2 Site Description

1.2.1 At the time of writing, the development site is located on the North side of Mulsford Lane, Worthenbury, Wrexham. The development site is located in a predominantly rural / agricultural area with the closest residential receptors located approx. 325 m west of the proposed location of the canine daytime care facility, located along Mulsford Lane. Residential receptors in all other directions from the development site are located in excess of 1000 m.

1.2.2 The existing access to the proposed canine daytime care facility is approximately 80 m East of the nearest house on Mulsford Lane out of Worthenbury.

1.2.3 The land is privately owned (since 2012) and has been developed into a mixture of native woodland and woodland pastures / open grassland. Prior to 2012, the land was used for agriculture.

1.2.4 **Figure 1** shows an aerial photograph of the development site with respect to the local area and its context. The red boundary highlights the land boundary and the solid red square denotes the approx. location of the canine day-care facility.



Figure 1: Site aerial photograph.

1.3 Development Proposals

- 1.3.1 At the time of writing, proposals provided to NoiseAir detail the partial change of land use to Sui Generis with erection of moveable timber field stable and fenced area for a dog day-care facility operations.
- 1.3.2 The facility will be open Monday to Friday only. The business will operate a collection and drop-off service, where the single member of staff will collect and drop-off of dogs direct from the clients' homes. The single vehicle will use existing vehicular access to the land.
- 1.3.3 The business will offer the following services for up to a maximum of 10 dogs.
- Collection of dogs from clients' homes, approx. 08:30 – 10:00.
 - Indoor and outdoor supervised play, stimulation, and walk 10:00 - 12:00.
 - Indoor rest 12:00 – 13:30.
 - Indoor and outdoor supervised play and stimulation and walk 13:30 – 15:30.
 - Dogs are cleaned and dropped off back home 15:30 – 17:00.
- 1.3.4 The proposed development site (moveable field stable and wire fencing) will be located in the North Eastern corner of this land, approximately 325 m from the nearest residential receptor.

2 ASSESSMENT METHODOLOGY AND SCOPE OF WORKS

2.1 Planning Guidance and Noise

2.1.1 This acoustic report has been prepared in support of a proposed planning application and therefore it is considered that reference should be made to the appropriate planning guidance documentation, specifically:

- Planning Policy Wales – Edition 10 (PPW), 2018; and,
- Planning Guidance (Wales) – Technical Advice Note 11 - Noise (TAN11), 1997.

2.1.2 A summary of the relevant planning documentation and its relevance with respect to noise is provided below.

Planning Policy Wales [PPW 2018]

2.1.3 Planning Policy Wales (PPW) sets out the land use planning policies of the Welsh Government. It is supplemented by a series of Technical Advice Notes (TANs), Welsh Government Circulars, and policy clarification letters, which together with PPW provide the national planning policy framework for Wales.

2.1.4 The primary objective of PPW is to ensure that the planning system contributes towards the delivery of sustainable development and improves the social, economic, environmental and cultural well-being of Wales, as required by the Planning (Wales) Act 2015, the Well-being of Future Generations (Wales) Act 2015 and other key legislation.

2.1.5 Section 6.7 of the PPW outlines planning policy with respect to Air Quality and Noise. PPW outlines that the planning system should maximise its contribution to achieving the well-being goals, and in particular a healthier Wales, by aiming to reduce average population exposure to air and noise pollution alongside action to tackle high pollution hotspots. In doing so, it should consider the long-term effects of current and predicted levels of air and noise pollution on individuals, society and the environment and identify and pursue any opportunities to reduce, or at least, minimise population exposure to air and noise pollution, and improve soundscapes, where it is practical and feasible to do so.

2.1.6 PPW also aligns with the agent of change principle which says that a business or person responsible for introducing a change is responsible for managing that change. In practice, for example, this means a developer would have to ensure that solutions to address air

quality or noise from nearby pre-existing infrastructure, businesses or venues can be found and implemented as part of ensuring development is acceptable.

2.1.7 In proposing new development, planning authorities and developers must, therefore:

- address any implication arising as a result of its association with, or location within, air quality management areas, noise action planning priority areas or areas where there are sensitive receptors
- not create areas of poor air quality or inappropriate soundscape; and
- seek to incorporate measures which reduce overall exposure to air and noise pollution and create appropriate soundscapes.

2.1.8 Furthermore, PPW states that the potential impacts of noise pollution arising from existing development (be this commercial, industrial, transport related or cultural venues i.e. music venues, theatres or arts centres), must be fully considered to ensure the effects on new development can be adequately controlled to safeguard amenity. Any necessary measures and controls should be incorporated as part of the proposed new development. This will help to prevent the risk of restrictions or possible closure of existing premises or adverse impacts on transport infrastructure due to noise and other complaints from occupiers of new developments. It will be important that the most appropriate level of information is provided and assessment undertaken.

Technical Advice Note (Wales) - Noise [TAN 11 1997]

2.1.9 TAN 11 was introduced in 1997 and sets out guidance on the assessment of noise in Wales. It should be noted however that this document is currently under review.

2.1.10 TAN 11 sets out a series of Noise Exposure Categories (NECs) which have been derived to assist local planning authorities in their consideration of planning applications for residential development near transport related noise sources. The NECs are set out in Annex A of TAN 11.

2.1.11 Measures introduced to control the source of, or limit exposure to, noise should be proportionate and reasonable, and may include:

- engineering: reduction of noise at point of generation (e.g. using quiet machines and/or quiet methods of working); containment of noise generated (e.g. insulating buildings which house machinery and/or providing purpose-built barriers around

sites); protection of surrounding noise-sensitive buildings (e.g. improving sound insulation in these buildings and/or screening them by purpose-built barriers);

- layout: adequate distance between noise source and noise-sensitive building or area; screening by natural barriers, other buildings, or non-critical rooms in a building;
- administrative: limiting operating time of noise source; restricting activities allowed on the site; specifying an acceptable noise limit.

2.1.12 Annex B of TAN 11 outlines guidance of assessment of noise from different sources. When considering noise from industrial and commercial developments TAN 11 outlines the following guidance.

2.1.13 The likelihood of complaints about noise from industrial development can be assessed, where the Standard is appropriate, using guidance in BS 4142: 1990. Tonal or impulsive characteristics of the noise are likely to increase the scope for complaints and this is taken into account by the "rating level" defined in BS 4142. This "rating level" should be used when stipulating the level of noise that can be permitted. The likelihood of complaints is indicated by the difference between the noise from the new development (expressed in terms of the rating level) and the existing background noise. The Standard states that, 'A difference of around 10 dB or higher indicates that complaints are likely. A difference of around 5 dB is of marginal significance'. Since background noise levels vary throughout a 24 hour period it will usually be necessary to assess the acceptability of noise levels for separate periods (e.g. day and night) chosen to suit the hours of operation of the proposed development. Similar considerations apply to developments that will emit significant noise at the weekend as well as during the week. In addition, general guidance on acceptable noise levels within buildings can be found in BS 8233:1987

2.1.14 It should be noted that the British standard documents referenced in TAN 11 have been superseded, specifically BS4142 the latest main issue being in 2014, BS4142:2014 is therefore considered the appropriate assessment document for assessment of noise from commercial and industrial sites.

2.2 Methodology and Scope of Works

2.2.1 It is considered that a detailed NIA is required to assess the likely impacts of the proposed canine day care centre with respect to the existing residential receptors in the locality of the development site. The NIA presented in this report is based on site specific data collected

at the development site and assesses the likely impacts of the proposals with respect to the closest noise sensitive receptors.

2.3 Assessment Criteria

- 2.3.1 In order to achieve noise levels which are considered to be in alignment with the planning approaches and policies discussed in Section 2.1 it is considered that all efforts are made to ensure that existing residents are unlikely to be exposed to noise levels which might breach the acceptable planning criteria.
- 2.3.2 It should be noted however that planning guidance does not preclude development where some elevated noise levels are likely to be experienced in certain circumstances as long as reasonable efforts are made to mitigate and reduce such an effect.
- 2.3.3 As the NIA is to consider the potential effect of noise breakout from the proposed canine day care centre with respect to the existing residential receptors, it is considered that the NIA should be undertaken in accordance with the South Holland District Council Supplementary Planning Guidance – Location of Premises for the Boarding and Breeding of Dogs and Other Animals (1999), a summary of which is provided below.

South Holland District Council Supplementary Planning Guidance – Location of Premises for the Boarding and Breeding of Dogs and Other Animals (1999)

- 2.3.4 SPG-LPBBD provides a method for assessing sound from proposed dog boarding and breeding premises along with other animals also, it also provides a means of assessing the suitability of new proposals for noise sensitive uses (e.g. new housing) in the vicinity of boarding and breeding premises.
- 2.3.5 There is no specific guidance nor recommended noise level standards relating to animal boarding or breeding establishments. In the absence of these, reliance must be placed upon proven methods of measurement and assessment published elsewhere.
- 2.3.6 In general, a noise is liable to provoke complaints whenever it exceeds the background noise by a certain margin or when it attains a certain absolute level. Noise levels at or below the existing background level are unlikely to give rise to complaints.
- 2.3.7 This fundamental acoustic principle underpins the guidance contained in the most relevant noise control documents, BS4142:2014 and BS5228: Part 1 2009. The methodology set out in SPG-LPBBD is based on these aforementioned documents.
- 2.3.8 Operational experience shows that the distance between an animal boarding / breeding establishment and noise sensitive locations is key to the incidence of complaints. The distance

required will depend upon specific circumstances of the individual case, particularly the background sound level which exists. SPG-LPBBD provides the procedure by which one can assess whether there is an adequate separation distance for a particular proposal. It provides safeguards to this particular type of commercial operation in any given location and at the same time ensures reasonable protection to nearby noise sensitive premises.

2.3.9 SPG-LPBBD provides an assessment procedure which takes into accounts the following influences on noise impact at the receptor location:

- The background sound level at the receptor location;
- Specific factors about the location of the proposal including the types of ground and any screening between the noise source and noise sensitive receptors in the vicinity;
- The influence of prevailing wind on noise impact; and,
- Where there are already boarding and breeding establishments within the vicinity of the proposed premises and noise sensitive locations then the cumulative noise impact.

2.4 Noise Survey

2.4.1 As part of this assessment, NoiseAir has carried out a primarily unattended noise survey to measure the existing sound levels at / near the development site.

2.4.2 The primary noise sources assessed are:

- Potential canine noise breakout.

2.4.3 The above noise sources have been assessed in relation to the below identified receptors:

- Existing occupants of nearby residential property located 325 m east of the development site.

3 ACOUSTIC SURVEY

3.1 Acoustic Survey Details

- 3.1.1 NoiseAir carried out fixed position primarily unattended noise monitoring on the dates ranging from 11th October to 13th October 2020 at the development site.
- 3.1.2 Noise monitoring was undertaken at one monitoring location (ML). The noise monitoring location (ML) is shown in **Figure 2** and **Table 1** below.

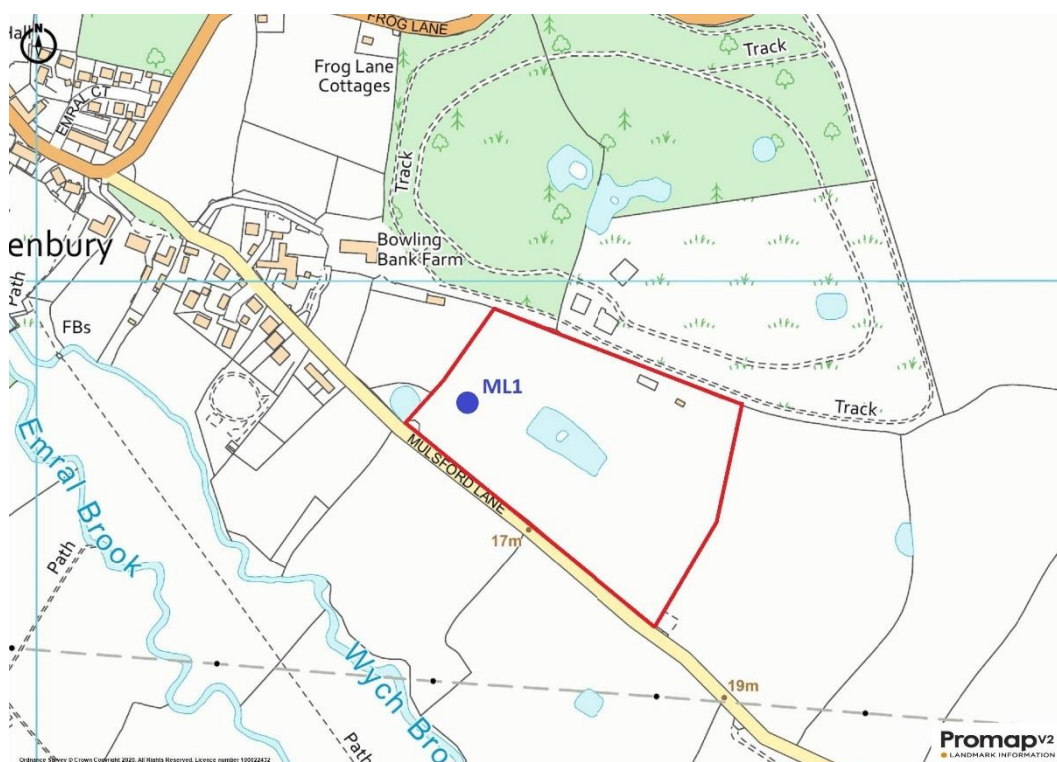


Figure 2: Noise monitoring locations.

Table 1: Summary of Noise Monitoring Locations				
Monitor Location Number	Location Description	Time Period Monitored		Attended or Unattended Monitoring
		Start	End	
ML	To the west side of the development site.	1800 11/10/20	1845 13/10/20	Unattended

- 3.1.3 The monitor location was positioned to be representative of the noise levels at the approximate location of the nearest residential receptors to the development site and so the data from this location will be used predominantly for the background sound level assessment.

- 3.1.4 The noise measurement was made using a Class 1, integrating sound level meter (SLM).
- 3.1.5 The microphone at ML1 was mounted on a tripod, at an approximate height of 1.8 m from ground level.
- 3.1.6 The acoustic equipment was calibrated to comply with Section 4.2 of BS7445-1:2003¹ before and after the noise monitoring periods.
- 3.1.7 Details of the SLM and associated field calibration can be found in **Table 2** below;

Table 2: Summary of SLM used for survey and associated field calibration						
SLM (Serial Number)	Preamp (Serial Number)	Microphone (Serial Number)	Calibrator (Serial Number)	Start Calibration	End Calibration	Drift
NOR140 (1403057)	NOR1209 (12320)	NOR1225 (72835)	B&K4231 (2431761)	-25.1 dB	-25.0 dB	0.1 dB

- 3.1.8 The weather conditions were noted to be as outlined in **Table 3** during the site visits at the start and end of the monitoring periods.

Table 3: Summary of weather conditions noted at the start and end of the monitoring duration.		
	11 th October 2020	13 th October 2020
Roads (Wet / Dry)	Dry	Dry
Temperature (°C)	11	12
Wind speed (ms ⁻¹)	<0.5	<0.5
Cloud Cover (Approx. %)	100	100
Humidity (%)	72	86

- 3.1.9 The weather conditions remained approximately consistent over the duration of the noise survey with typical temperature fluctuations over night and daytime hours.

¹ BS7445-2003 "Description and measurement of environmental noise – Part 1: Guide to quantities and procedures.

- 3.1.10 A-weighted² L_{eq} ³ noise levels were measured to comply with the requirements of SPG-LPBB. A-weighted L_{90} ⁴ and L_{Amax} ⁵ were also measured to provide additional information. The measured noise levels are set out in full in Appendix B.
- 3.1.11 Attending the development site at the start and end of the survey monitoring period provided opportunity for observations and detailed notes to be made of the significant noise sources which contribute to each of the measured levels.

Monitoring Location

Occasional Farm Traffic Noise: Noise originating from the occasional farm vehicles passing the site location. Vehicles were noted to be tractors and similar agricultural vehicles.

Occasional Vehicles Passing: Occasional cars and vans were noted to be audible when passing the development site along Mulsford Lane.

3.2 Background Sound Levels

- 3.2.1 Data is shown in **Figure 3** detailing a level vs. time graph of the recorded L_{Amax} , L_{Aeq} and L_{A90} sound level over 15-minute time periods for ML1 for over the entire measurement period.

² An electronic filter in a sound level meter which mimics the human ear's response to sounds at different frequencies under defined conditions.

³ Equivalent continuous noise level; the steady sound pressure which contains an equivalent quantity of sound energy as the time-varying sound pressure levels.

⁴ The noise level which is exceeded for 90% of the measurement period.

⁵ The instantaneous maximum noise level recorded for a measurement period.

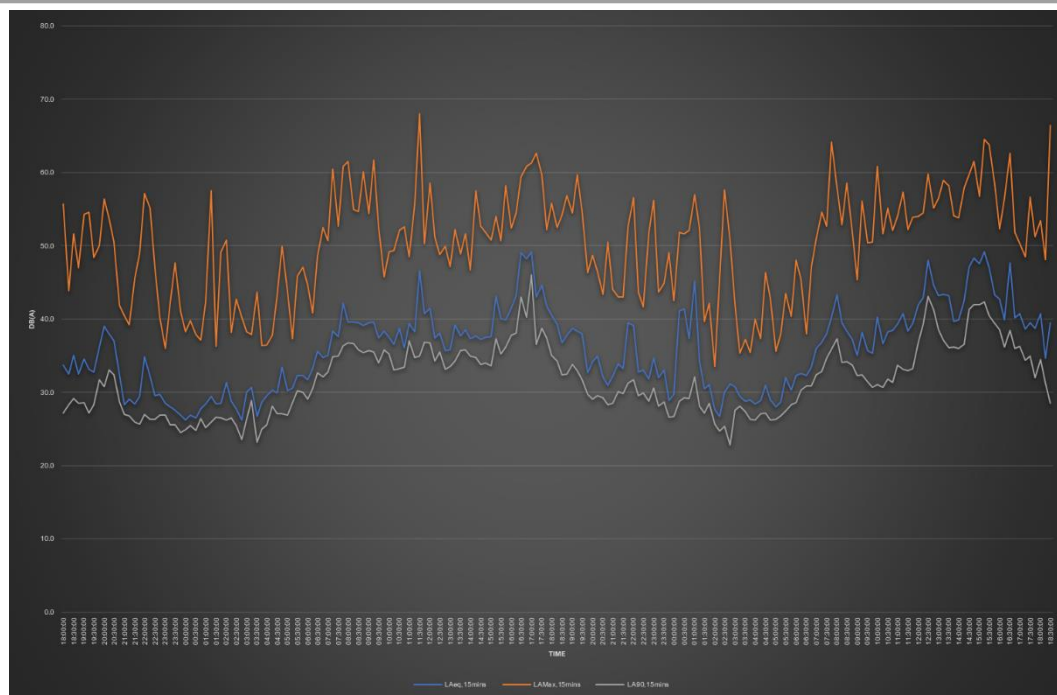


Figure 3: Level vs. time graph showing L_{Amax} , L_{Aeq} and L_{A90} sound levels – ML.

3.2.2 The results for the monitoring location during the daytime and night-time periods are presented in **Table 4**. It has been advised that the canine daycare facility is to operate during the daytime hours (0830 to 1700 hours) on weekdays and therefore the background sound levels included within the dataset have been restricted to those measured between 0800 to 1700 hours.

Table 4: Average Measured Daytime Noise Levels			
Monitoring Location	Time	Measured Noise Level	
		dB $L_{Aeq,1hour}$	dB $L_{A90,1hour}$
ML	0800-1700	36.3 – 47.2	31.3 – 41.1

3.2.3 Data analyses has been performed on the background sound levels in order to determine typical values required for a NIA. A histogram showing the distribution of existing $L_{A90,1hour}$ sound levels for the proposed operating hours of the canine day care facility is presented in **Figure 4** for ML1. The data shows a typical distribution for a rural area during the stated hours.

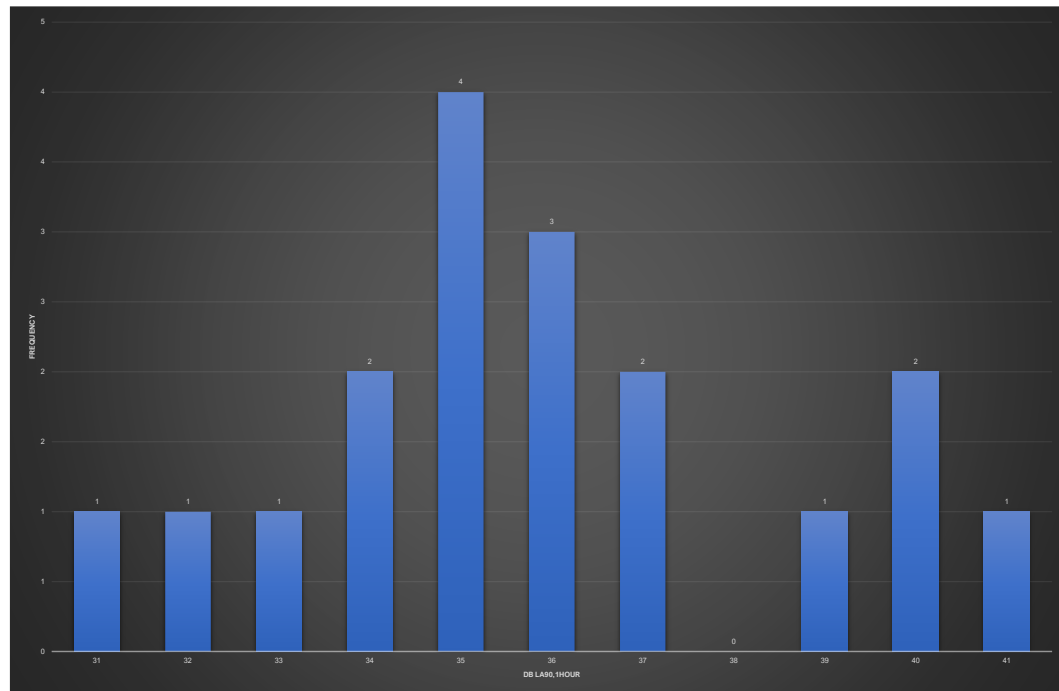


Figure 4: Histogram showing frequency distribution of $L_{A90,1\text{hour}}$ noise readings at ML1 – Between 0800 and 1700 hours.

- 3.2.4 **Figure 4** above, shows the daytime background sound level ranged between 31 dB L_{A90} and 41 dB. For the selected period at ML1, a background L_{A90} sound level of 35 dB has been adopted for this assessment, being a typical value and being selected mode average value of the dataset obtained.

4 NOISE IMPACT ASSESSMENT

- 4.1.1 Data collected from the development site over approx. two days has provided a robust dataset from which to determine a typical background sound level.
- 4.1.2 As discussed in Section 2 of this report assessment of the proposed canine day care facility is to be undertaken in accordance with SPG-LPBBD 1999.
- 4.1.3 The level of noise from the proposed dogs has been determined in accordance with Section 2 and Figure D1 of SPG-LPBBD along with the provided typical spectrum for a dog barking at 10 m distance. It has been advised by the client that up to 10 no. dogs will be at the canine day care facility at any one time, in accordance with SPG-LPBBD it is generally considered that up to 60% of dogs are likely to bark at any one time and therefore noise breakout levels will be based on up to 6 no. dogs barking simultaneously.
- 4.1.4 In order to calculate the effects of screening and noise propagation over distance a 3D sound model has been constructed.

4.2 3D Sound Model

- 4.2.1 A 3D sound model has been constructed in SoundPLAN™ to calculate the predicted sound pressure levels at selected potential receiver facades. The model uses the calculation method from ISO 9613-2:1996⁶ 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 and calibrated against information provided in Section 2 and Figure D1 of SPG-LPBBD.
- 4.2.2 The 3D noise model specifically includes the noise sources as outlined in **Table 5**:

Table 5: Summary of Dog Barking Noise Adopted for 3D Sound Model								
Noise Source	Source Type	Frequency*						LwA dB
		125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	LpA	
Dog Barking	Point Source (6 no.)	26.0*	38.5*	60.9*	63.1*	55.4*	65.6**	97
* Lp level at 10 m distance.								
* LpA level at 10 m distance.								

⁶ ISO9613-2:1996 "Acoustics – Attenuation of sound during propagation outdoors – Part 2: General method of calculation"

- 4.2.3 A noise contour plot illustrating the propagation of sound from source to receptor during the day ($L_{Aeq,1hour}$) is given in **Figure 5**.

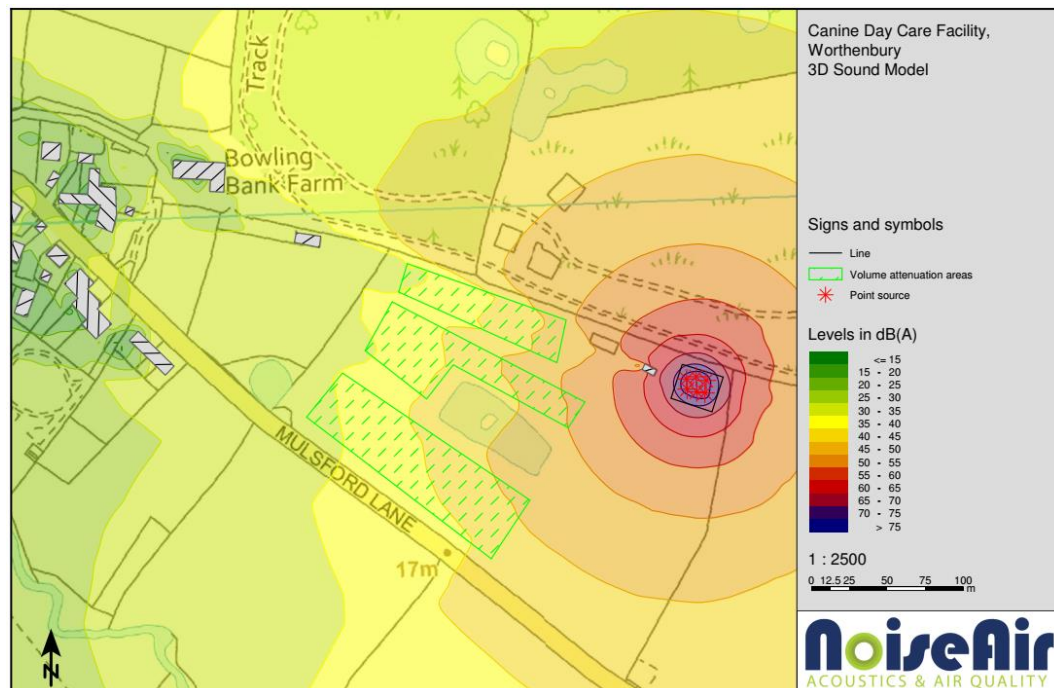


Figure 5: Noise contour plot illustration of the predicted dog barking noise propagation to the existing residential receptors during the daytime – $L_{Aeq,1hour}$

- 4.2.4 Predicted façade readings have also been calculated. **Figure 6**, presented below, details the predicted façade noise levels at the nearby residential receptor locations investigated.

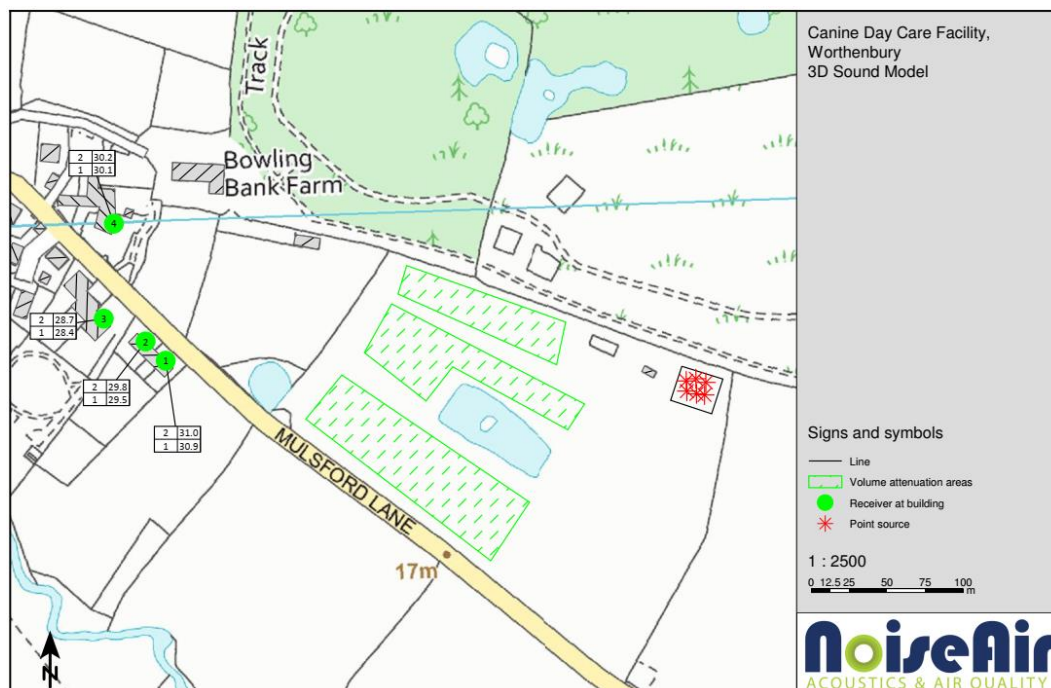


Figure 6: Illustration of the 3D sound model façade noise levels.

4.2.5 **Table 6** below details the predicted noise levels at each façade receptor location.

Table 6: Summary of predicted façade sound levels from 3D sound model		
Façade Receptor Number.	Floor	Calculated Noise Level (Figures in dB L _{Aeq,T})
1	GF	30.9
	1.FL	31.0
2	GF	29.5
	1.FL	29.8
3	GF	28.4
	1.FL	28.7
4	GF	30.1
	1.FL	30.2

4.3 SPG-LPBBD Assessment

- 4.3.1 The SPG-LPBBD assessment for the proposed canine day care facility with respect to the nearest noise sensitive receptors is detailed in **Table 7** for the proposed operating hours.

Table 7: Summary of SPG-LPBBD for the proposed canine day care centre at the development site			
Receptor	Background Sound Level dB(A)	Sound level dB(A)	
		Specific Sound Level	Excess of Rating over Background
1	35	31	-4
2	35	30	-5
3	35	29	-6
4	35	30	-5

4.4 Context

- 4.4.1 **Table 7** indicates that it is unlikely that noise breakout from dogs barking at the proposed canine day care facility are to exceed the prevailing background sound level. It is also noted that the local area, being located in a rural location with farm buildings and land in the nearby area, occasional dog barking noise breakout from the locality already occurs on an occasional basis. Given that the proposed canine day care facility is to operate during the daytime hours only and the calculated specific sound level from dogs barking being below the prevailing background sound level at the nearby receptor locations **it is considered that the proposed facility will likely have a low impact.**

4.5 Uncertainty

- 4.5.1 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.
- 4.5.2 The SLM used was 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

-
- 4.5.3 The sound levels measured (which include busier and quieter periods) are considered to be typical for a rural area.
- 4.5.4 It is however noted that background sound levels have been obtained close to the development site, the closest noise sensitive receptors are located in closer proximity to Mulsford Lane than ML1 and therefore background sound levels are considered to be conservative i.e. lower than that likely experienced to the front facades of the nearby properties.
- 4.5.5 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.
- 4.5.6 It is acknowledged that the SPG-LPBBD assessment has been undertaken without the specific sound source details however given all considerations uncertainty of the measurements and assessments are unlikely to affect the outcome.

5 CONCLUSIONS

- 5.1.1 NoiseAir has carried out a noise impact assessment with respect to a proposed canine day care facility to be located at land off of Mulsford Lane, Worthenbury, Wrexham LL13 0AP.
- 5.1.2 At the time of writing, proposals provided to NoiseAir detail the partial change of land use to Sui Generis with erection of moveable timber field stable and fenced area for a dog day-care facility operations.
- 5.1.3 As part of this assessment, NoiseAir has carried out a primarily unattended noise survey to complete an NIA with respect to likely noise breakout from the development site.
- 5.1.4 The primary noise sources assessed are:
- Potential canine noise breakout.
- 5.1.5 The above noise sources have been assessed in relation to the below identified receptors:
- Existing occupants of nearby residential property located 325 m east of the development site.
- 5.1.6 Given that the proposed canine day care facility is to operate during the daytime hours only and the calculated specific sound level from dogs barking being below the prevailing background sound level at the nearby receptor locations (outlined in detail in Section 4) **it is considered that the proposed facility will likely have a low impact.**

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APPENDIX A - REPORT LIMITATIONS

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This Report is presented to Dr Gavin Trotman 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.

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APPENDIX B – METER READINGS

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ML1

Start Date	Start Time	Duration	LAeq	LAFMax	LA90
dd/mm/yyyy	hh:mm:ss	hh:mm:ss	dB	dB	dB
11/10/2020	18:00:00	00:15:00	33.7	55.7	27.2
11/10/2020	18:15:00	00:15:00	32.5	43.9	28.3
11/10/2020	18:30:00	00:15:00	35.1	51.6	29.2
11/10/2020	18:45:00	00:15:00	32.5	47.0	28.5
11/10/2020	19:00:00	00:15:00	34.6	54.3	28.6
11/10/2020	19:15:00	00:15:00	33.2	54.6	27.2
11/10/2020	19:30:00	00:15:00	32.8	48.4	28.3
11/10/2020	19:45:00	00:15:00	36.2	50.0	31.7
11/10/2020	20:00:00	00:15:00	39.0	56.4	30.8
11/10/2020	20:15:00	00:15:00	38.0	53.7	33.1
11/10/2020	20:30:00	00:15:00	37.0	50.5	32.4
11/10/2020	20:45:00	00:15:00	32.4	41.9	28.7
11/10/2020	21:00:00	00:15:00	28.3	40.5	27.0
11/10/2020	21:15:00	00:15:00	29.1	39.2	26.8
11/10/2020	21:30:00	00:15:00	28.4	45.6	26.0
11/10/2020	21:45:00	00:15:00	29.5	49.0	25.7
11/10/2020	22:00:00	00:15:00	34.9	57.1	27.0
11/10/2020	22:15:00	00:15:00	32.2	55.2	26.3
11/10/2020	22:30:00	00:15:00	29.6	47.0	26.3
11/10/2020	22:45:00	00:15:00	29.7	40.3	26.9
11/10/2020	23:00:00	00:15:00	28.5	36.0	26.9
11/10/2020	23:15:00	00:15:00	28.0	42.3	25.6
11/10/2020	23:30:00	00:15:00	27.6	47.7	25.6
11/10/2020	23:45:00	00:15:00	26.9	41.0	24.5
12/10/2020	00:00:00	00:15:00	26.2	38.3	24.9
12/10/2020	00:15:00	00:15:00	26.9	39.8	25.5
12/10/2020	00:30:00	00:15:00	26.5	37.9	24.8
12/10/2020	00:45:00	00:15:00	27.8	37.1	26.4
12/10/2020	01:00:00	00:15:00	28.4	42.4	25.2
12/10/2020	01:15:00	00:15:00	29.5	57.5	26.0
12/10/2020	01:30:00	00:15:00	28.4	36.3	26.6
12/10/2020	01:45:00	00:15:00	28.5	49.2	26.5
12/10/2020	02:00:00	00:15:00	31.4	50.8	26.2
12/10/2020	02:15:00	00:15:00	28.8	38.2	26.5
12/10/2020	02:30:00	00:15:00	27.8	42.7	25.5
12/10/2020	02:45:00	00:15:00	26.2	40.3	23.6
12/10/2020	03:00:00	00:15:00	30.0	38.3	26.3
12/10/2020	03:15:00	00:15:00	30.7	37.9	28.9
12/10/2020	03:30:00	00:15:00	26.7	43.7	23.2
12/10/2020	03:45:00	00:15:00	28.7	36.4	25.0
12/10/2020	04:00:00	00:15:00	29.6	36.5	25.6
12/10/2020	04:15:00	00:15:00	30.3	37.8	28.1
12/10/2020	04:30:00	00:15:00	29.9	43.3	27.1
12/10/2020	04:45:00	00:15:00	33.4	49.9	27.1
12/10/2020	05:00:00	00:15:00	30.2	43.7	26.9
12/10/2020	05:15:00	00:15:00	30.6	37.3	28.6
12/10/2020	05:30:00	00:15:00	32.3	45.9	30.2
12/10/2020	05:45:00	00:15:00	32.3	47.1	30.0
12/10/2020	06:00:00	00:15:00	31.7	44.6	29.1

Start Date	Start Time	Duration	LAeq	LAFMax	LA90
dd/mm/yyyy	hh:mm:ss	hh:mm:ss	dB	dB	dB
12/10/2020	06:15:00	00:15:00	33.3	40.8	30.5
12/10/2020	06:30:00	00:15:00	35.6	48.6	32.7
12/10/2020	06:45:00	00:15:00	34.8	52.5	32.1
12/10/2020	07:00:00	00:15:00	35.1	50.7	32.8
12/10/2020	07:15:00	00:15:00	38.4	60.5	34.9
12/10/2020	07:30:00	00:15:00	37.6	52.7	35.0
12/10/2020	07:45:00	00:15:00	42.2	60.8	36.4
12/10/2020	08:00:00	00:15:00	39.6	61.5	36.8
12/10/2020	08:15:00	00:15:00	39.6	55.0	36.7
12/10/2020	08:30:00	00:15:00	39.5	54.7	35.8
12/10/2020	08:45:00	00:15:00	39.1	60.1	35.4
12/10/2020	09:00:00	00:15:00	39.5	54.4	35.7
12/10/2020	09:15:00	00:15:00	39.6	61.7	35.5
12/10/2020	09:30:00	00:15:00	37.4	52.6	34.0
12/10/2020	09:45:00	00:15:00	38.4	45.8	35.8
12/10/2020	10:00:00	00:15:00	37.5	49.2	35.2
12/10/2020	10:15:00	00:15:00	36.6	49.4	33.1
12/10/2020	10:30:00	00:15:00	38.8	52.1	33.3
12/10/2020	10:45:00	00:15:00	36.1	52.6	33.4
12/10/2020	11:00:00	00:15:00	39.4	48.5	37.0
12/10/2020	11:15:00	00:15:00	38.3	55.7	34.8
12/10/2020	11:30:00	00:15:00	46.6	68.0	35.0
12/10/2020	11:45:00	00:15:00	40.7	50.3	36.9
12/10/2020	12:00:00	00:15:00	41.5	58.6	36.8
12/10/2020	12:15:00	00:15:00	37.4	51.2	34.3
12/10/2020	12:30:00	00:15:00	38.1	48.8	35.5
12/10/2020	12:45:00	00:15:00	35.7	49.9	33.2
12/10/2020	13:00:00	00:15:00	35.8	47.2	33.5
12/10/2020	13:15:00	00:15:00	39.2	52.2	34.3
12/10/2020	13:30:00	00:15:00	37.7	48.9	35.7
12/10/2020	13:45:00	00:15:00	38.6	51.6	35.8
12/10/2020	14:00:00	00:15:00	37.3	46.7	35.0
12/10/2020	14:15:00	00:15:00	37.7	57.5	34.8
12/10/2020	14:30:00	00:15:00	37.2	52.7	33.8
12/10/2020	14:45:00	00:15:00	37.5	51.8	34.0
12/10/2020	15:00:00	00:15:00	37.6	50.8	33.6
12/10/2020	15:15:00	00:15:00	43.1	54.0	37.3
12/10/2020	15:30:00	00:15:00	40.1	50.7	35.2
12/10/2020	15:45:00	00:15:00	39.9	58.2	36.2
12/10/2020	16:00:00	00:15:00	41.5	52.4	37.8
12/10/2020	16:15:00	00:15:00	43.2	54.5	38.1
12/10/2020	16:30:00	00:15:00	49.1	59.4	43.0
12/10/2020	16:45:00	00:15:00	48.2	60.8	40.3
12/10/2020	17:00:00	00:15:00	49.2	61.3	46.1
12/10/2020	17:15:00	00:15:00	43.0	62.6	36.6
12/10/2020	17:30:00	00:15:00	44.6	59.7	38.8
12/10/2020	17:45:00	00:15:00	41.8	52.2	37.4
12/10/2020	18:00:00	00:15:00	40.6	55.8	35.1
12/10/2020	18:15:00	00:15:00	39.3	52.5	34.3
12/10/2020	18:30:00	00:15:00	36.8	54.2	32.4

Start Date	Start Time	Duration	LAeq	LAFMax	LA90
dd/mm/yyyy	hh:mm:ss	hh:mm:ss	dB	dB	dB
12/10/2020	18:45:00	00:15:00	37.8	56.9	32.5
12/10/2020	19:00:00	00:15:00	38.8	54.5	33.8
12/10/2020	19:15:00	00:15:00	38.4	59.7	33.0
12/10/2020	19:30:00	00:15:00	38.0	54.7	31.7
12/10/2020	19:45:00	00:15:00	32.7	46.3	29.7
12/10/2020	20:00:00	00:15:00	34.2	48.7	29.1
12/10/2020	20:15:00	00:15:00	35.0	46.5	29.6
12/10/2020	20:30:00	00:15:00	32.1	43.4	29.3
12/10/2020	20:45:00	00:15:00	31.0	50.5	28.3
12/10/2020	21:00:00	00:15:00	32.2	44.1	28.5
12/10/2020	21:15:00	00:15:00	33.9	43.0	30.1
12/10/2020	21:30:00	00:15:00	33.3	43.0	29.8
12/10/2020	21:45:00	00:15:00	39.5	52.6	31.3
12/10/2020	22:00:00	00:15:00	39.1	56.6	31.7
12/10/2020	22:15:00	00:15:00	32.8	43.7	29.6
12/10/2020	22:30:00	00:15:00	33.1	41.7	29.9
12/10/2020	22:45:00	00:15:00	31.8	51.7	28.8
12/10/2020	23:00:00	00:15:00	34.7	56.2	30.6
12/10/2020	23:15:00	00:15:00	32.0	43.7	28.1
12/10/2020	23:30:00	00:15:00	33.1	44.9	28.7
12/10/2020	23:45:00	00:15:00	28.9	49.1	26.6
13/10/2020	00:00:00	00:15:00	29.7	42.5	26.7
13/10/2020	00:15:00	00:15:00	41.1	51.8	28.8
13/10/2020	00:30:00	00:15:00	41.4	51.6	29.3
13/10/2020	00:45:00	00:15:00	37.3	52.1	29.2
13/10/2020	01:00:00	00:15:00	45.2	57.0	32.1
13/10/2020	01:15:00	00:15:00	34.3	52.4	28.1
13/10/2020	01:30:00	00:15:00	30.5	39.7	27.2
13/10/2020	01:45:00	00:15:00	31.1	42.2	28.5
13/10/2020	02:00:00	00:15:00	27.7	33.5	25.7
13/10/2020	02:15:00	00:15:00	26.7	45.6	24.7
13/10/2020	02:30:00	00:15:00	30.0	57.6	25.4
13/10/2020	02:45:00	00:15:00	31.2	50.7	22.8
13/10/2020	03:00:00	00:15:00	30.8	42.1	27.6
13/10/2020	03:15:00	00:15:00	29.5	35.3	28.1
13/10/2020	03:30:00	00:15:00	28.8	37.2	27.4
13/10/2020	03:45:00	00:15:00	29.0	35.4	26.3
13/10/2020	04:00:00	00:15:00	28.4	40.0	26.2
13/10/2020	04:15:00	00:15:00	28.9	37.3	27.1
13/10/2020	04:30:00	00:15:00	31.0	46.3	27.2
13/10/2020	04:45:00	00:15:00	29.0	42.8	26.2
13/10/2020	05:00:00	00:15:00	28.0	35.6	26.3
13/10/2020	05:15:00	00:15:00	28.7	38.0	26.8
13/10/2020	05:30:00	00:15:00	32.0	43.5	27.5
13/10/2020	05:45:00	00:15:00	30.3	40.4	28.3
13/10/2020	06:00:00	00:15:00	32.3	48.0	28.6
13/10/2020	06:15:00	00:15:00	32.6	45.5	30.3
13/10/2020	06:30:00	00:15:00	32.3	38.0	30.9
13/10/2020	06:45:00	00:15:00	33.4	47.1	30.9
13/10/2020	07:00:00	00:15:00	36.0	51.0	32.4

Start Date	Start Time	Duration	LAeq	LAFMax	LA90
dd/mm/yyyy	hh:mm:ss	hh:mm:ss	dB	dB	dB
13/10/2020	07:15:00	00:15:00	36.9	54.6	32.9
13/10/2020	07:30:00	00:15:00	38.0	52.7	34.7
13/10/2020	07:45:00	00:15:00	40.3	64.2	35.9
13/10/2020	08:00:00	00:15:00	43.3	57.9	37.3
13/10/2020	08:15:00	00:15:00	39.5	52.9	34.1
13/10/2020	08:30:00	00:15:00	38.4	58.6	34.2
13/10/2020	08:45:00	00:15:00	37.2	51.8	33.7
13/10/2020	09:00:00	00:15:00	35.1	45.4	32.3
13/10/2020	09:15:00	00:15:00	38.2	56.1	32.4
13/10/2020	09:30:00	00:15:00	35.7	50.4	31.5
13/10/2020	09:45:00	00:15:00	35.3	50.5	30.7
13/10/2020	10:00:00	00:15:00	40.3	60.8	31.1
13/10/2020	10:15:00	00:15:00	36.7	51.6	30.7
13/10/2020	10:30:00	00:15:00	38.3	55.2	31.8
13/10/2020	10:45:00	00:15:00	38.5	52.1	31.4
13/10/2020	11:00:00	00:15:00	39.3	54.0	33.7
13/10/2020	11:15:00	00:15:00	40.7	57.3	33.2
13/10/2020	11:30:00	00:15:00	38.4	52.2	33.0
13/10/2020	11:45:00	00:15:00	39.4	53.9	33.3
13/10/2020	12:00:00	00:15:00	42.0	54.0	36.9
13/10/2020	12:15:00	00:15:00	42.9	54.5	39.3
13/10/2020	12:30:00	00:15:00	48.0	59.8	43.1
13/10/2020	12:45:00	00:15:00	44.6	55.2	41.3
13/10/2020	13:00:00	00:15:00	43.2	56.5	38.6
13/10/2020	13:15:00	00:15:00	43.4	58.9	37.1
13/10/2020	13:30:00	00:15:00	43.2	58.2	36.1
13/10/2020	13:45:00	00:15:00	39.7	54.1	36.2
13/10/2020	14:00:00	00:15:00	39.9	53.8	36.0
13/10/2020	14:15:00	00:15:00	42.5	57.9	36.6
13/10/2020	14:30:00	00:15:00	47.1	59.7	41.3
13/10/2020	14:45:00	00:15:00	48.3	61.5	42.0
13/10/2020	15:00:00	00:15:00	47.6	56.8	42.0
13/10/2020	15:15:00	00:15:00	49.2	64.5	42.4
13/10/2020	15:30:00	00:15:00	47.0	63.8	40.5
13/10/2020	15:45:00	00:15:00	43.3	58.4	39.4
13/10/2020	16:00:00	00:15:00	42.7	52.3	38.6
13/10/2020	16:15:00	00:15:00	39.9	56.5	36.2
13/10/2020	16:30:00	00:15:00	47.7	62.6	38.5
13/10/2020	16:45:00	00:15:00	40.2	51.8	36.0
13/10/2020	17:00:00	00:15:00	40.7	50.3	36.3
13/10/2020	17:15:00	00:15:00	38.7	48.5	34.4
13/10/2020	17:30:00	00:15:00	39.5	56.7	35.0
13/10/2020	17:45:00	00:15:00	38.8	51.3	32.0
13/10/2020	18:00:00	00:15:00	40.7	53.4	34.5
13/10/2020	18:15:00	00:15:00	34.7	48.1	31.3
13/10/2020	18:30:00	00:10:00	39.5	66.4	28.5

APPENDIX C - 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. <i>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.</i>
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. <i>NOTE: The ambient sound comprises the residual sound and the specific sound when present.</i>
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 <i>NOTE: The ambient sound level is a measure of the residual sound and the specific sound when present.</i>
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. <i>NOTE: The reference values used within the C_{tr} calculation are based on urban traffic noise.</i>
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 (m ²), 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. <i>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.</i>
Free-field level	Sound pressure level away from reflecting surfaces. <i>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.</i>

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. <i>NOTE: The location(s) within the room at which the ambient indoor noise is to be measured or calculated ought to be considered.</i>
Measurement time interval, T_m (BS4142:2014)	Total time over which measurements are taken. <i>NOTE: This may consist of the sum of a number of non-contiguous, short-term measurement time intervals.</i>
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. <i>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.</i>
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. <i>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.</i>
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_{A,r,T_r}	Equivalent continuous A-weighted sound pressure level of the noise, plus any adjustment for the characteristic features of the noise. <i>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.</i>
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, L_{AE}	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, $L_s = L_{Aeq,T_r}$ (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. <i>NOTE Common sources of ground-borne noise include railways and heavy construction work on adjacent construction sites.</i>
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. <i>NOTE Common sources of structure-borne noise include building services plant, manufacturing machinery and construction or demolition of the structure.</i>
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. <i>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).</i>
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)
$L_{Ar,Tt}$	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)
$L_{Aeq,T}$	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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