Hawkins environmental

Acoustic Impact Assessment:

Hursley Road, Chandlers Ford

Draper Tools Ltd

13th March 2026

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V3	13th March 2026	Minor Amendments	William Bettridge BSc	Nick Hawkins MSc MIOA MIAQM

This report has been prepared by Hawkins Environmental Limited for the sole purpose of assisting in gaining planning consent for the proposed development described in the introduction of this report.

This report has been prepared by Hawkins Environmental Limited with all reasonable skill, care and diligence, and taking account of the manpower and resources devoted to it by agreement with the client. Information reported herein is based on the interpretation of data collected and has been accepted in good faith as being accurate and valid.

This assessment takes into account the prevailing conditions at the time of the report and assesses the impact of the development (if applicable) using data provided to Hawkins Environmental Limited by third parties. The report is designed to assist the developer in refining the designs for the proposed development and to demonstrate to agents of the Local Planning Authority that the proposed development is suited to its location. This should be viewed as a risk assessment and does not infer any guarantee that the site will remain suitable in future, nor that there will not be any complaints either from users of the development or from impacts emanating from the development site itself.

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1. INTRODUCTION

1.1. Overview

Hawkins Environmental Limited has been instructed by Draper Tools Ltd to undertake an acoustic impact assessment for the Change of Use of the rear of the existing warehouse on the development site from use Class B8 to Indoor Sport, recreation and Fitness use Class E(d) and co-working office facilities use Class E(g)(i). At ground floor level, the proposed scheme includes the construction of 6no. padel tennis courts within the existing warehouse envelope. The site is situated along Hursley Road in Chandlers Ford, located within the Borough of Eastleigh, Hampshire.

1.1.1. Criteria

During the planning process, it has been identified that the site may require a noise assessment to determine whether noise emissions from the proposed 6no. padel courts would be in line with permitted levels. Consequently, a noise survey was conducted to characterise the noise climate of the site and the impact of the proposed new plant has been assessed.

The assessment adheres to the principles of Government planning policy in relation to noise, specifically enacted by the *National Planning Policy Framework (NPPF), the National Planning Practice Guidance (NPPG) on Noise* and *the Noise Policy Statement for England (NPSE).*

All sound measurements were conducted in accordance with BS 7445-2: 1991 *'Description and measurement of environmental noise Part 2: Guide to the acquisition of data pertinent to land use'*. The assessment of plant sound has been assessed in accordance with British Standard BS 4142:2014+A1:2019 *'Methods for rating and assessing industrial and commercial sound'.*

1.2. The Nature, Measurement and Effect of Noise

Noise is often defined as sound that is undesired by the recipient. Whilst it is impossible to measure nuisance caused by noise directly, it is possible to measure the loudness of that noise. 'Loudness' is related to both sound pressure and frequency, both of which can be measured. The human ear is sensitive to a wide range of sound levels. The sound pressure level of the threshold of pain is over a million times that of the quietest audible sound. In order to reduce the relative magnitudes of the numbers involved, a logarithmic scale of decibels (dB) is normally used, based on a reference level of the lowest audible sound.

The response of the human ear is not constant over all frequencies. It is therefore usual to weight the measured frequencies to approximate the human response. The resulting 'A' weighted decibel, dB(A), has been shown to correlate closely to the subjective human response.

When related to changes in noise, a change of ten decibels from say 60 dB(A) to 70 dB(A) would represent a doubling in 'loudness'. Similarly, a decrease in noise from 70 dB(A) to 60 dB(A) would represent a halving in 'loudness'. A change of 3 dB(A) is generally considered to be just perceptible. **Table 1.1** details typical noise levels. A glossary of acoustic terms can be found in **Appendix 1**.

Table 1.1: Typical Noise Levels

Approximate Noise Level (dB(A))	Example
0	Limit of hearing
30	Rural area at night
40	Library
50	Quiet office
60	Normal conversation at 1 m
70	In car noise without radio
80	Household vacuum cleaner at 1 m
100	Pneumatic drill at 1 m
120	Threshold of pain

1.3. Site Description

The application site sits within an established B8 warehouse building that is currently operated by Draper Tools. The whole of the Draper Tools site is henceforth described as the 'wider site' with the 'application site'. The wider site covers an area of approximately 4.83 hectares and is located within the urban area of Chandler's Ford of flat topography and benefits from vehicular access via Hursley Road (B3043) to the east. It contains a large warehouse building of a commercial character. The wider site is bounded by trees and hedgerows, providing a good degree of visual screening. The building is surrounded by hardstanding that provides vehicular circulation and extensive car parking areas.

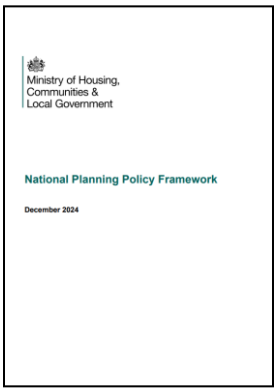
The proposed scheme will see the change of use of the rear warehouse from Storage and Distribution Use Class B8 to Indoor Sport, Recreation and Fitness Use Class E(d) and co-working office facilities Use Class E(g)(i). At ground floor level the proposal involves the construction of 6no. padel tennis courts within the existing warehouse, supported by welfare and changing facilities, whilst at mezzanine level a co-working facility is proposed, with a mix of open-plan and cellular offices and meeting rooms. It is understood that the padel courts will be in operation between 6am and 10pm Monday to Friday, and 8am to 8pm on the weekends.

A location plan of the proposed site can be seen in **Figure 1.1**.

Figure 1.1: Site Location Plan

2. NATIONAL & LOCAL PLANNING POLICY

2.1. National Planning Policy Framework (2024)


Ministry of Housing, Communities & Local Government

National Planning Policy Framework

December 2024

The National Planning Policy Framework (NPPF) was first published on the 27th March 2012 and revised July 2018, February 2019, July 2021, September 2023, December 2023 with the latest version published in December 2024.

The NPPF outlines the Government's planning policies for England and determines how they should be applied. It provides a framework within which Local Planning Authorities are required to prepare their own locally-prepared plans, where both the policies within the NPPF and the local plan are material planning considerations against which planning decisions are determined. These distinctive local and neighbourhood plans should be interpreted and applied in order to meet the needs and priorities of their communities.

The NPPF notes *"The purpose of the planning system is to contribute to the achievement of sustainable development, including the provision of homes, commercial development, and supporting infrastructure in a sustainable manner"* (Paragraph 7). The NPPF notes sustainable development should be delivered with three main dimensions: economic; social and environmental (Paragraph 8).

The NPPF supports a presumption in favour of development, unless the adverse impacts of that development outweighs the benefits it notes "*that sustainable development is pursued in a positive way, at the heart of the Framework is a presumption in favour of sustainable development*" (Paragraph 10).

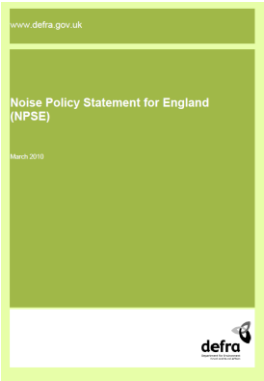
The NPPF states that in the planning system *"Planning policies and decisions should contribute to and enhance the natural and local environment by… e) preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability. Development should, wherever possible, help to improve local environmental conditions such as air and water quality, taking into account relevant information such as river basin management plans"* (Paragraph 187).

Paragraph 198 of the NPPF talks specifically about noise stating that *"Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development. In doing so they should: a) mitigate and reduce to a minimum potential adverse impacts resulting from noise from new development – and avoid noise giving rise to significant adverse impacts on health and the quality of life; b) identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason…"*

Specifically in relation to noise from existing commercial premises, Paragraph 200 of the NPPF notes: *"Planning policies and decisions should ensure that new development can be integrated effectively with existing businesses and community facilities (such as places of worship, pubs, music venues and sports clubs). Existing businesses and facilities should not have unreasonable restrictions placed on them as a result of development permitted after they were established. Where the operation of an existing business or community facility could have a significant adverse effect on new development (including changes of use) in its vicinity, the applicant (or*

'agent of change') should be required to provide suitable mitigation before the development has been completed".

2.2. Noise Policy Statement for England (2010)



The Noise Policy Statement for England (NPSE) provides further guidance on the interpretation of Section 123 of the NPPF and states that: *"Within the context of sustainable development:*

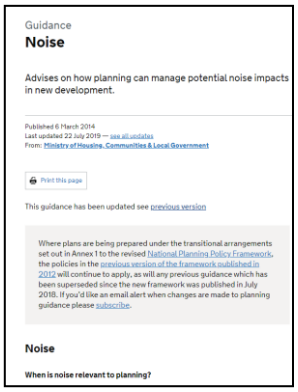
- avoid significant adverse impacts on health and quality of life;
- mitigate and minimise adverse impacts on health and quality of life; and
- where possible contribute to the improvement of health and quality of life."

NPSE introduces established concepts originally from the field of toxicology that are now being applied to noise impacts. They are:

- **NOEL – No Observed Effect Level** - This is the level of noise 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 of noise 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.

NPSE goes on to state that *"it is not possible to have a single objective noise-based measure that defines SOAEL that is applicable to all sources of noise in all situations. Consequently, the SOAEL is likely to be different for different noise sources, for different receptors and at different times. It is acknowledged that further research is required to increase our understanding of what may constitute a significant adverse impact on health and quality of life from noise. However, not having specific SOAEL values in the NPSE provides the necessary policy flexibility until further evidence and suitable guidance is available."*

2.3. Planning Practice Guidance



The Planning Practice Guidance was launched on 6th March 2014 and provides additional guidance and interpretation to the Government's strategic policies, outlined within the NPPF, in a web-based resource. This is updated regularly.

The NPPG provides more guidance on the assessment of noise for planning purposes and builds on the concepts of NOEL, LOAEL and SOAEL introduced in NPSE to establish whether noise is a factor that needs to be taken into account. It states*: "Local planning authorities' plan-making and decision taking should take account of the acoustic environment and in doing so consider:*

- *whether or not a significant adverse effect is occurring or likely to occur;*
- *whether or not an adverse effect is occurring or likely to occur; and*
- *whether or not a good standard of amenity can be achieved.*

In line with the Explanatory Note of the Noise Policy Statement for England, this would include identifying whether the overall effect of the noise exposure (including the impact during the construction phase wherever applicable) is, or would be, above or below the significant observed adverse effect level and the lowest observed adverse effect level for the given situation."

However, it goes into more detail about the subjective nature of noise and how the results of any assessment must be treated flexibly and pragmatically. The guidance states: *"The subjective nature of noise means that there is not a simple relationship between noise levels and the impact on those affected. This will depend on how various factors combine in any particular situation. These factors include:*

- *the source and absolute level of the noise together with the time of day it occurs. Some types and level of noise will cause a greater adverse effect at night than if they occurred during the day – this is because people tend to be more sensitive to noise at night as they are trying to sleep. The adverse effect can also be greater simply because there is less background noise at night;*
- *for non-continuous sources of noise, the number of noise events, and the frequency and pattern of occurrence of the noise;*
- *the spectral content of the noise (ie whether or not the noise contains particular high or low-frequency content) and the general character of the noise (ie whether or not the noise contains particular tonal characteristics or other particular features). The local topology and topography should also be taken into account along with the existing and, where appropriate, the planned character of the area.*

More specific factors to consider when relevant include:

- *the cumulative impacts of more than one source of noise;*
- *whether any adverse internal effects can be completely removed by closing windows and, in the case of new residential development, if the proposed mitigation relies on windows being kept closed most of the time (and the effect this may have on living conditions). In both cases a suitable alternative means of ventilation is likely to be necessary. Further information on ventilation can be found in the Building Regulations.*
- *In cases where existing noise sensitive locations already experience high noise levels, a development that is expected to cause even a small increase in the overall noise level may result in a significant adverse effect occurring even though little to no change in behaviour would be likely to occur.*
- *Noise Action Plans (where these exist), and, in particular the Important Areas identified through the process associated with the Environmental Noise Directive and corresponding regulations should be taken into account. Defra's website has information on Noise Action Plans and Important Areas. Local authority environmental health departments will also be able to provide information about Important Areas.*
- *the effect of noise on wildlife. Noise can adversely affect wildlife and ecosystems. Particular consideration needs to be given to the potential effects of noisy development on international, national and locally designated sites of importance for biodiversity;*
- *where external amenity spaces are an intrinsic part of the overall design, the acoustic environment of those spaces should be considered so that they can be enjoyed as intended.*

- *some commercial developments including restaurants, hot food takeaways, night clubs and public houses can have particular impacts, not least because activities are often at their peak in the evening and late at night. Local planning authorities will wish to bear in mind not only the noise that is generated within the premises but also the noise that may be made by customers in the vicinity".*

Table 2.1 shows examples of the noise hierarchy (adapted from the PPG) and shows that that the aim is to identify where the overall effect of the noise exposure falls in relation to SOAEL, LOAEL and NOEL. The implication of the advice is that only noise that is 'noticeable and very disruptive' would be considered unacceptable and therefore, should be prevented. The inference, therefore, is that all other outcomes can be acceptable, depending upon the specific circumstances and level of mitigation.

Table 2.1: Noise Exposure Hierarchy

Perception	Examples of outcomes	Increasing effect level	Action	
Not noticeable	No Effect	No Observed Effect	No specific measures required	Low Noise Level
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 Adverse Effect Level				
Noticeable and intrusive	Noise can be heard and causes small changes in behaviour and/or attitude, eg turning up the 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. The potential for some reported 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	Increasing Noise Levels ↓
Significant Observed Adverse Effect Level				
Noticeable and disruptive	The noise causes a material change in behaviour and/or attitude, eg 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 noise. The potential for sleep disturbance resulting in difficulty in getting to sleep, premature awakening and difficulty in getting back to sleep.	Significant Observed Adverse Effect	Avoid	
Noticeable and very disruptive	Extensive and regular changes in behaviour and/or an inability to mitigate the effect of noise leading to psychological stress or physiological effects, eg regular sleep deprivation/awakening; loss of appetite, significant, medically definable harm, eg auditory and non-auditory	Unacceptable Adverse Effect	Prevent	High Noise Level

3. ASSESSMENT METHODOLOGY & GUIDANCE

3.1. World Health Organisation Guidelines for Community Noise (1999)

The 1999 World Health Organisation (WHO) guidance *"Guidelines for Community Noise"*, provides recommendations on maximum internal and external noise levels in a range of situations. The WHO guidelines are a consequence of a comprehensive review of the scientific evidence in relation to community noise exposure and the health and social aspects of such exposure. Whilst not adopted policy, the recommendations within the WHO Guidelines are often quoted and form the basis of the recommendations within BS 8233 and other similar guidance. A summary of the noise criteria can be seen in **Table 3.1**.

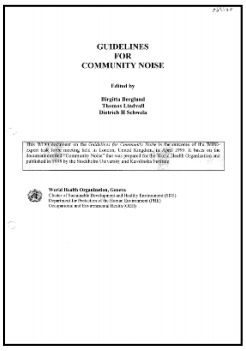

GUIDELINES
FOR
COMMUNITY NOISE

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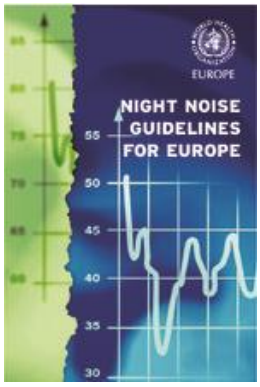
Table 3.1: Summary of Noise Criteria: WHO

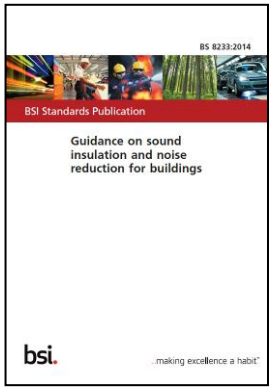
Residential Environment	Critical Heath Effect	L_{Aeq}	L_{AFmax}	Time Base
Outdoor living area	Serious annoyance, daytime and evening	55	-	07:00-23:00
	Moderate annoyance, daytime and evening	50	-	07:00-23:00
Dwelling, indoors	Speech intelligibility and moderate annoyance, daytime and evening	35	-	07:00-23:00
Inside bedrooms	Sleep disturbance, night-time	30	45	23:00-07:00
Outside bedrooms	Sleep disturbance, window open (outdoor values)	45	60	23:00-07:00

3.2. WHO Night Noise Guidelines for Europe (2009)

In 2009, the World Health Organisation published the *"Night Noise Guidelines for Europe"* as a partial update and extension to the *"Guidelines for Community Noise*", specifically in relation to development on the scientific evidence of night noise exposure. The 2009 guidance suggests that a *"$L_{night,outside}$ of 40 dB should be the target of the night noise guideline (NNG) to protect the public, including the most vulnerable groups such as children, the chronically ill and the elderly"*. However, since that target would be impossible to achieve in many situations, a *"$L_{night,outside}$ value of 55 dB is recommended as an interim target for the countries where the NNG cannot be achieved in the short term for various reasons, and where policy-makers choose to adopt a stepwise approach"*.



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



Originally published in 1999, the 2014 edition of BS 8233, significantly updates the guidance in light of the policy changes as a result of the advent of the NPPF and the withdrawal of PPG 24. The 2014 edition of BS 8233 sees a change in the title of the Standard, moving from a *'Code of Practice'* to *'Guidance'*, as the text '*largely comprises guidance that does not support claims of compliance'*.

BS 8233:2014 indicates that to control external noise ingress into a proposed development, a number of planning stages should occur as follows:

a) *"Assess the site, identify significant existing and potential noise sources, measure or estimate noise levels, and evaluate layout options.*

b) *Determine design noise levels for spaces in and around the building(s).*

c) *Determine sound insulation of the building envelope, including the ventilation strategy".*

BS 8233:2014 suggests design noise levels for various types of building. The recommended noise levels for dwelling houses, flats and rooms in residential use (when unoccupied) can be seen in **Table 3.1** below. This is replicated from Table 4 of Section 7.7.2 of BS 8233:2014. The guidance suggests that *"In general, for steady external noise sources, it is desirable that the internal ambient noise level does not exceed the guideline values"*. The noise levels in **Table 3.2** are marginally different to those published in BS 8233:1999 *'Sound insulation and noise reduction for buildings – Code of practice'*, but are based on the existing guidance from the current World Health Organisation (WHO) "Guidelines on Community Noise".

Table 3.2: Summary of Noise Criteria: BS 8233: 2014

Activity	Location	07:00 To 23:00	23:00 To 07:00
Resting	Living room	35 dB $L_{Aeq.16hour}$	-
Dining	Dining room/area	40 dB $L_{Aeq.16hour}$	-
Sleeping	Bedroom	35 dB $L_{Aeq.16hour}$	30 dB $L_{Aeq.8hour}$

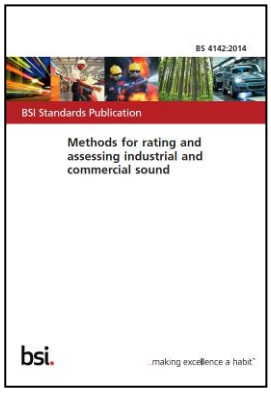
When considering the noise level criteria considered in **Table 3.1**, the following points should be noted:

- BS 8233: 2014 suggests that the above criteria should be adopted flexibly and that *"where development is considered necessary or desirable... the internal target level may be relaxed by up to 5 dB and reasonable internal conditions still achieved".*
- The noise levels quoted above are annual averages and *"do not need to be achieved in all circumstances"* e.g. New Year's Eve or fireworks night.
- The noise levels in **Table 3.1** are *"for steady external noise sources"* such as traffic noise or plant noise. This is a departure from the 1999 version of BS 8233, where the recommended internal noise levels were irrespective of the external noise source and therefore included the suggestion that in order to achieve *"reasonable"* noise levels within bedrooms at night, L_{AFmax} noise levels should not

exceed 45 dB. Whilst this has been omitted from the 2014 version of BS 8233, it does state that *"Regular individual noise events (for example, scheduled aircraft or passing trains) can cause sleep disturbance. A guideline value may be set in terms of SEL or $L_{Amax,F}$, depending on the character and number of events per night. Sporadic noise events could require separate values."* Therefore, at sites which may be affected by individual noise events, it is more appropriate to use the guidance contained within the WHO *"Guidelines on Community Noise"* which suggest that good sleep will not generally be affected if internal levels of L_{AFmax} 45 dB are not exceeded more than 10-15 times per night.

- BS 8233:2014 notes that if the design of the building is "relying on closed windows to meet the guide values, there needs to be appropriate alternative ventilation that does not compromise the facade insulation or resulting noise level".
- BS 8233 provides guidance for noise in gardens and outdoor amenity space. It suggests that "it is desirable that the external noise level does not exceed 50 dB $L_{Aeq,T}$, with an upper guideline value of 55 dB $L_{Aeq,T}$ which would be acceptable in noisier environments." The guidance does go on to say that these guideline values are not achievable in all circumstances and in some areas, "such as city centres or urban areas adjoining the strategic transport network, a compromise between elevated noise levels and other factors, such as the convenience of living in these locations or making efficient use of land resources to ensure development needs can be met, might be warranted. In such a situation, development should be designed to achieve the lowest practicable levels in these external amenity spaces, but should not be prohibited."

3.4. BS 4142:2014+A1:2019 'Methods for Rating and Assessing Industrial and Commercial Sound'



British Standard BS 4142:2014+A1:2019 *"Methods for rating and assessing industrial and commercial sound"* provides a method for the measurement and rating of industrial noise or noise of an industrial nature and background noise levels outside dwellings in mixed residential and industrial areas. The rating level (defined in the BS) is used to rate the industrial noise source outside residential dwellings (this is defined as the "specific noise source").

The procedure defined in BS 4142 for predicting the likelihood of complaints is based on establishing the difference between the rating level and the background level outside the residential property of interest. The greater the difference the greater the likelihood of complaints and more specifically:

- *"A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context;*
- *A difference of around +5 dB is likely to be an indication of an adverse impact, depending on the context;*
- *The lower the rating level is relative to the measured background sound level, the less likely it is that the specific sound source will have an adverse impact or a significant adverse impact. Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact, depending on the context.*

- *Adverse impacts include, but are not limited to, annoyance and sleep disturbance. Not all adverse impacts will lead to complaints and not every complaint is proof of an adverse impact."*

The guidance goes on to state that *"where background sound levels and rating levels are low, absolute levels might be as, or more, relevant than the margin by which the rating level exceeds the background. This is especially true at night."* Consequently, when considering the impact of a BS 4142 assessment, it is often also necessary to consider the absolute noise levels experienced at the receptor location in relation to BS 8233 and World Health Organisation guidelines.

3.5. BS 4142:2014+A1:2019 Technical Note (2020)

In March 2020, Acoustic and Noise Consultants (the ANC) published a guidance note to accompany BS 4142.

The Technical Note states *"remain concerns for some users of BS 4142 and this guidance is designed to assist readers with a reasonable interpretation and application of BS 4142 as a whole"*. It notes *"In the production of this guidance, the ANC Working Group (WG) has reviewed BS 4142 and attempted to address any content regarded as ambiguous"*. Consequently, whilst not an official guidance document, the Technical Note provides advice of the interpretation of BS 4142 and provides examples of best practice with regards to the application of the BS.

The following sub-sections contain clarifications from the Technical Note that are particularly pertinent to this assessment.

3.5.1. Internal Noise Levels

The Technical Note notes "*BS 4142 'is not intended to be applied to the assessment of indoor sound levels' (Subclause 1.3) and cannot, therefore, be used for façade design. Whilst BS 4142 can be used to assist in the determination of the likelihood of an adverse or significant adverse impact, guidance on internal design criteria and mitigation is provided elsewhere".* The Technical Note goes on to state that in conjunction with BS 4142, the use of BS 8233 may be appropriate to determine internal noise levels "*although recognition should be given to the associated scope and/or limitations".*

3.5.2. Introduction of a New Noise-Sensitive Receptors

One of the major short-comings of BS 4142 is the lack of differentiation between the assessment of new noise sources verses the assessment of new noise-sensitive receptors. Subclause 8.5 of BS 4142 states *"Where a new noise-sensitive receptor is introduced and there is extant industrial and/or commercial sound, it ought to be recognized that the industrial and/or commercial sound forms a component of the acoustic environment. In such circumstances other guidance and criteria in addition to or alternative to this standard can also inform the appropriateness of both introducing a new noise-sensitive receptor and the extent of required noise mitigation".*

The Technical Note clarifies this position by noting "*where BS 4142 is used in this situation, its fundamental principles, in terms of what constitutes the residual, background and specific sources, should not be compromised. Where other standards or guidance document are used, care should be taken with regard to their own stated scope or limitations. Examples of such guidance might include:*

- *BS8233: 2014 where an industrial/commercial sound source is constant and new residential development is proposed nearby;*

- *Elements of ProPG where the impact of regular night time maximum sound events is the critical consideration;*
- *DMRB where impacts relate solely to changes to vehicular movements within or around a site; or*
- *BS 5228 where activities are temporary and of a similar nature to the construction activities considered by that Standard.*

These documents, or others, may help to inform the contextual elements of a BS 4142 assessment or help where a numerical assessment fully in accordance with BS 4142 may not be possible".

In this regard the Technical Note that when assessing new noise-sensitive receptors close to commercial noise sources, it may not be possible to use BS 4142 as difficulties in disaggregating *"legitimate commercial residual sources to the background sound level could potentially lead to unrepresentatively adverse outcomes"*. Consequently, *"alternative guidance and standards should be referenced, although care should be taken not to apply them beyond their own stated scope or limitations"*. It goes on to note that *"different approaches might be adopted depending on whether the industrial/commercial source is continuous or intermittent, whether there are ancillary sources present, or where one particular industrial/commercial premises dominates"*.

3.5.3. Background Sound Levels

BS 4142 does not provide a definitive method for calculating or determining a background sound level. The Technical Note does not provide a definitive method either, but does provide more clarification. It notes *"it was the view of the WG that it is not always appropriate to define a singular background sound level for use in an assessment. In such cases, a range of values over one or more time periods may be more appropriate. An assessment should generally focus on the sound levels measured during the period of greatest interest, which may be the quietest part of the night, or the time period relating to a complaint. Determining the period of greatest interest should be judged on a case-by-case basis"*.

The Note points out that "*it is important that the established background sound level is representative of typical conditions*". It goes on to provide a number of examples whereby time history, histogram and cumulative distribution data is presented, along with the range of values selected by the WG as being representative. *"These examples are included to illustrate the range of views in the WG as to how best to identify representative background sound levels for particular datasets and serve to highlight the sensitivity of the outcome to individual interpretations of measurement data. It must be remembered that there are no 'correct' answers, only judgement and justification. In many instances, additional information beyond that presented in these examples would be required to inform the judgement of representative levels".*

3.5.4. Context

The criteria used to determine the acceptability of an impact with BS 4142 talks about the requirement to consider "*context*". However, BS 4142 does not provide much detail as to what one might consider in relation to context.

BS 4142 notes that absolute levels of sound can be of significance, where residual values are both high and low. In particular, BS 4142 notes that absolute levels may be as, or more, important than relative outcomes where background and rating levels are low, but does not provide further commentary.

The Technical Note points out that "*BS 4142 does not indicate how the initial estimate of impact should be adjusted when background and rating levels are low, only that the absolute levels may be more important than*

the difference between the two values. It is likely that where the background and rating levels are low, the absolute levels might suggest a more acceptable outcome than would otherwise be suggested by the difference between the values. For example a situation might be considered acceptable where a rating level of 30dB is 10dB above a background sound level of 20dB, i.e. an initial estimate of a significant adverse impact is modified by the low rating and background sound levels.

There may be situations where the opposite is true, and it is for the assessor to justify any modifications to the initial estimate of impact.

BS 4142 does not define 'low' in the context of background sound levels nor rating levels. The note to the Scope of the 1997 version of BS 4142 defined very low background sound levels as being less than about 30 dB L_{A90}, and low rating levels as being less than about 35 dB $L_{Ar,Tr}$.

The WG suggest that similar values would not be unreasonable in the context of BS 4142, but that the assessor should make a judgement and justify it where appropriate".

The Technical Note suggests other areas one might consider when looking at context:

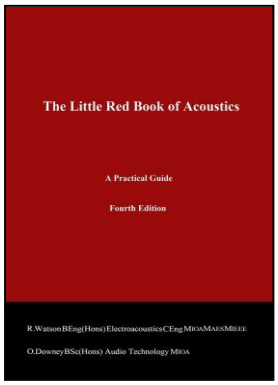
- *"character of a particular neighbourhood;*
- *former uses at or close to a site;*
- *legitimacy of the industrial use, e.g. planning permissions or environmental permits;*
- *implementation of best practicable means for a given process or activity; or*
- *local convention or perceptions".*

It goes on to provide two examples:

"For example; a former industrial use may be less relevant if it ceased 10 years previously, than a use that ceased within the previous six months. Setting out the context in this way is important so that the reader is fully aware of the point being made".

"For example; a coffee shop with drive thru facility located adjacent to a fairly busy road with traffic lights and constant stop/start traffic, with residential properties nearby. In these circumstances the noise climate is unlikely to change in any perceptible way due to the addition of vehicles moving and idling in the drive thru area. However, during the evening, the gaps in the general traffic could reduce the background sound level sufficiently that an adverse or significant adverse impact is suggested. An intermittency correction could also be considered appropriate. In this example, the assessor might legitimately take the view that the context is at odds with the initial (numerical) assessment, and substantially adjust the conclusions of the assessment on the basis of the context".

3.6. The Little Red Book of Acoustics (4th ed.) (2024)



First published in 2007, *'The Little Red Book of Acoustics: A Practical Guide'* remains an industry-standard textbook. Appreciated by professionals and beginners alike for being clear and straightforward, the book has also been included in recommended reading lists for Institute of Acoustics accredited courses.

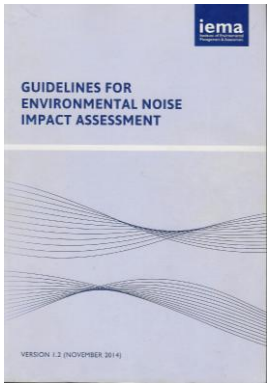
The 4th edition of the book was published in September 2004 and includes recent updates to standards such as BS 8233 and BS 4142, in addition to presenting a new method to assess and determine the representative background sound levels as part of a BS 4142 assessment.

The book recognises that BS 4142 does not give a single fixed method for assessing the representative background sound level and proposes the *'LRB Method'* which considers a modal approach with a distribution threshold criterion.

The LRB Method requires each of the background sound level integer values to be counted. The analysis of the candidate values for the background sound level first starts with the candidate with the highest number of occurrences. If there are multiple values with the same number of occurrences, then the analysis will first consider the lowest of these candidate values.

Each candidate value is tested based on whether or not there is less than or equal to 45% of the data below the candidate value. If the candidate value features more than 45% of the data below the candidate value, then it should be rejected. Once the candidate value features less than or equal to 45% of the data below the candidate value, then it should be accepted as the representative background sound level.

3.7. IEMA Guidelines for Environmental Noise Assessment (2014)



The 2014 IEMA *"Guidelines for Environmental Noise Assessment*" address the key principles of noise impact assessment and are applicable to all development proposals where noise effects may occur. The guidance provides advice with regards to the collection of baseline noise data, prediction of noise levels and how noise should be assessed.

Whilst the guidance contains a great deal of technical guidance for the noise practitioner, it also provides guidance on the assessment of significance, which is replicated later in this chapter.

The IEMA Guidelines provides guidance on how to assess the effects and significance of developments, but it stops short of providing specific assessment criteria which developments should achieve. The guidance instead suggests that the methodology adopted should be selected on a site by site basis with reference to relevant national and local standards, since the guidance recognises that the effect associated with a particular noise impact will be dependent on a number of factors including but not limited to the sensitivity of the receptor, frequency and duration of the noise source and time of day.

When describing the magnitude of the noise effect, the IEMA guide does not suggest a definitive method but does give a number of examples of ways of describing and determining the magnitude. One such example, which has been used in this assessment, is set out in **Table 3.2** below.

Table 3.2: Magnitude of Change in Noise Levels

Long Term Impact Magnitude	Sound Level Change dB $L_{Aeq,T}$ (positive or negative) T= 16 hour day or 8 hour night
Negligible	≥ 0 dB and < 3 dB
Minor	≥ 3 dB and < 5 dB
Moderate	≥ 5 dB and < 10 dB
Major	≥ 10 dB

3.8. Sports England AGP Acoustics (2015)

The Artificial Grass Pitch (AGP) Acoustics – Planning Implications – [Sport England 2015] document brings together relevant noise guidelines and UK planning policies for the assessment of noise from Artificial Grass Pitches and other sports facilities. It identifies the noise implications of the associated sound sources and recommends mitigation measures to limit adverse impacts upon noise sensitive receptors.

Although not explicitly applicable to padel courts, the associated noise sources can be similar to the types of sport played on AGPs (shouting and impact of balls against courtside barriers).

The Guidance considers two ways to assess the impact of sports facilities:

1. The **Absolute** noise level – in line with the WHO *"Guidelines for Community Noise";* and
2. The **Relative** noise level – in line with the IEMA *"Guidelines for Environmental Noise Assessment*".

The **Absolute** noise level criteria endorses the internal criteria put forward in the WHO *"Guidelines for Community Noise"*, which states the maximum recommended internal noise level should be 35 dB $L_{Aeq,16hours}$. Assuming a 15 dB attenuation for an open window, the document therefore suggests the following criteria when considering noise from sports facilities:

The noise level outside a residential property during the daytime at about 1 metre from facades of living spaces should not exceed 50 dB L_{Aeq}; and

Noise levels in gardens should not exceed 50 dB $L_{Aeq,1hour}$.

The Guidance notes that whilst the WHO level is stipulated over a 16-hour daytime period, it may be more appropriate to consider sport noise over a typical one-hour period.

However, the Guidance is keen to point out that *"exceedance of the WHO guideline values does not necessarily imply significant noise impact and indeed, it may be that significant impacts do not occur until much higher levels of noise exposure are reached"*. It goes on to note that *"therefore it is not necessarily the case that where these levels are exceeded, the noise will adversely affect nearby residential properties"*.

Consequently, it is often recommended to consider the **Relative** criteria, where it is necessary to compare the noise from the sports facilities against the existing noise climate. A change in noise levels of less than 3 dB is noted to be the minimum perceptible change under normal conditions. Therefore, the Guidance suggests that any increase in the absolute noise levels as a consequence of the sports facility of less than 3 dB is likely to be negligible, as per the IEMA Guidelines, regardless of the absolute level of sports noise.

4. SOUND MEASUREMENT STUDY

4.1. Overview

In order to determine the extent to which the site is affected by sound, a detailed sound measurement study has been carried out on the proposed development site. Sound measurements have been carried out in order to determine the background sound levels for the day and night time periods.

All noise monitoring was conducted using a Norsonic 140 sound level meter, which conforms to BS EN IEC 61672-1: 2003 as a Class 1 precision measurement system. A Norsonic 1251 field calibrator was used before and after the measurement periods in order to ensure that the equipment had remained within reasonable calibration limits (+/- 0.5 dB).

All of the equipment used has been calibrated in accordance with the procedures set out in BS EN IEC 61672-2: 2003 and for the electrical testing of frequency filters as set out in BS EN IEC 61260. The equipment was calibrated at Campbell Associates Limited, in Great Dunmow, Essex. Campbell Associates Limited meets the laboratory accreditation requirements of the United Kingdom Accreditation Service (UKAS Lab No. 0789). Sound level meters are laboratory calibrated every two years, with field calibrators laboratory calibrated every twelve months. **Appendix 2** summarises the equipment used including serial numbers and calibration certificates.

All noise monitoring has been conducted in accordance with the guidance set out in BS 7445-2: 1991 *'Description and measurement of environmental noise Part 2: Guide to the acquisition of data pertinent to land use*'. This standard details information that should be recorded in addition to the actual measured levels such as meteorological data, and a description of the noise source itself.

The baseline noise survey was conducted between 13th and 15th January 2026. The noise monitoring was conducted by Mathew Vaughan of Hawkins Environmental Limited. Mathew is a Member of the Institute of Acoustics and holds a Masters of Science in Applied Acoustics from Solent University.

Weather conditions were conducive to successful monitoring. **Table 4.1** summarises the weather conditions during the measurement period.

Table 4.1: Summary of Weather Conditions during the Sound Measurements

General Description	The measurement periods were warm, with some sunshine during the day with light winds.
Windspeed	Over the measurement period, the average windspeed was around 1 m/s, with peak windspeeds around 3 m/s
Temperature	Highs of 11˚C, lows of -2˚C.
Precipitation	Scattered showers and light rain was observed between 5pm and 7pm on the 13th and between 4:50pm and 5:50pm on the 14th with heavier rainfall after midnight on the 15th. The critical morning and evening periods for this assessment on the 13th and 14th were unaffected and are considered representative of typical receptor conditions.

4.2. Baseline Sound Levels

Noise from recreational activities such as tennis and padel fall outside of the scope of BS 4142:2014+A1:2019 *'Methods for rating and assessing industrial and commercial sound'* which typically requires the determination of background sound levels at a location representative of the potentially affected receptors. However, since the sources of noise which are being assessed are related to people and recreational activities, this falls outside of the scope of BS 4142:2014+A1:2019.

It is considered appropriate to apply the principles of the 2014 *'Guidelines for Environmental Noise Impact Assessment'* to sources of noise which may fall outside the scope of BS 4142. In accordance with the IEMA guidelines, the ambient sound levels of the receptor without the contribution of the proposed scheme (at present) is compared against the predicted ambient sound level with the contribution of the proposed sources of noise. This comparison provides a value of change in decibels where an impact magnitude may be derived. The impact magnitude provides an indication of acceptability of the proposed scheme, however context must be considered.

Ambient sound measurements of the site - without the proposed padel courts - were conducted at a location within the proposed development site in line with the nearest residential receptors as marked on **Figure 4.1**. It is considered that the ambient noise measurements conducted at this location will be representative of the surrounding dwellings, without the contribution of the existing tennis courts. The sound monitoring location was considered to be a freefield location. The nearest noise sensitive receptors are also marked on **Figure 4.1.** The full 24-hour period of noise measurement data is detailed in **Appendix 3** and **Figure 4.2** below. During the weekday operational period (6am to 10pm), the lowest $L_{Aeq.1hour}$ was measured to be 42.5 dB(A).

Table 4.2: Summary of the Sound Level Measurements

Period (hours)	Measured Freefield Sound Level, dB			
	$L_{Aeq.T}$	Range $L_{Aeq.15mins}$	Range $L_{Amax.15mins}$	Range $L_{A90.15mins}$
7am to 11pm	49.9	57.7 – 49.2	86.5 – 54.6	55.5 – 47.6
11pm to 7am	45.8	57.8 – 42.1	88.6 – 46.9	56.4 – 40.7

Figure 4.1: Noise Measurement Location

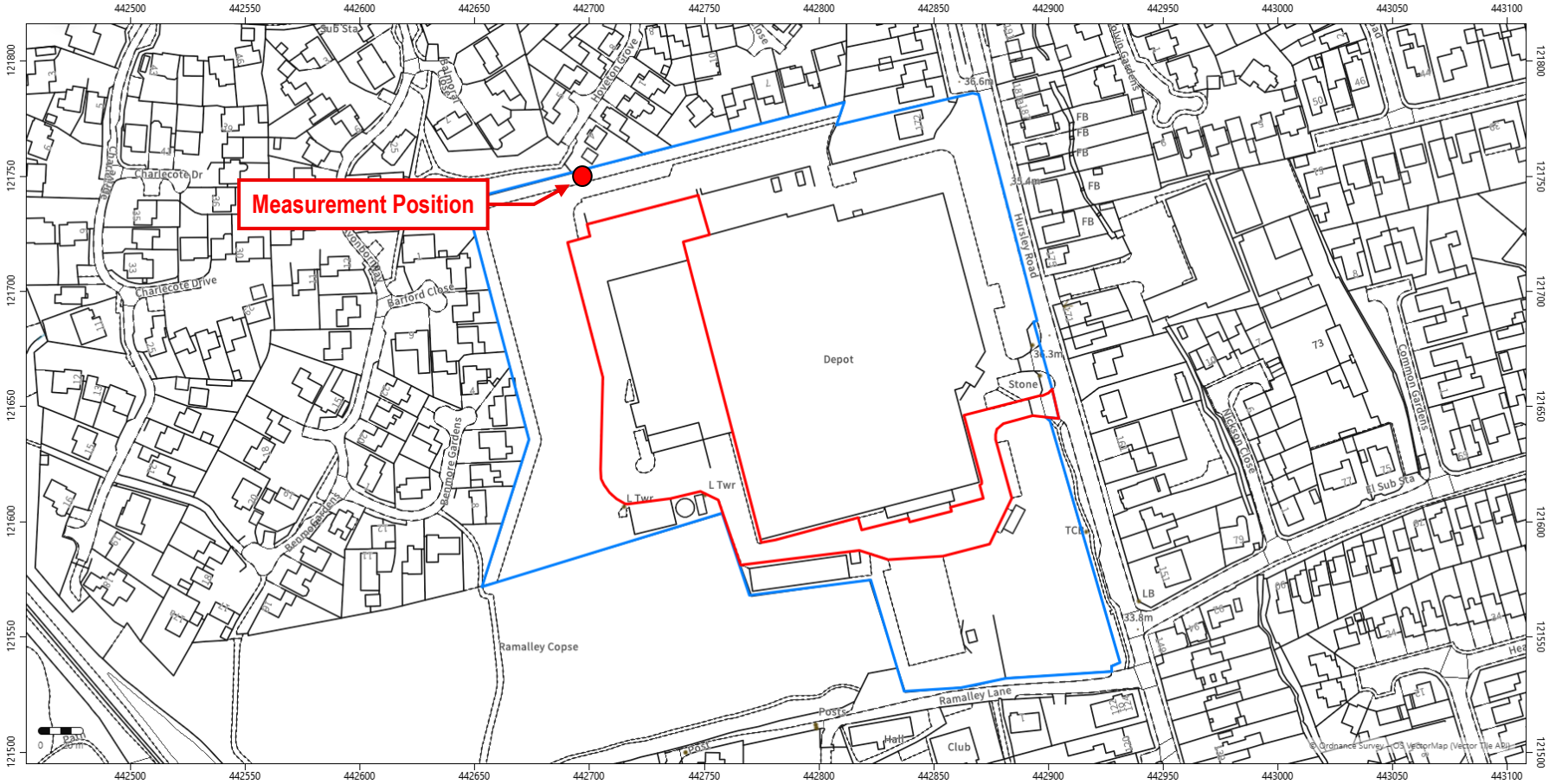
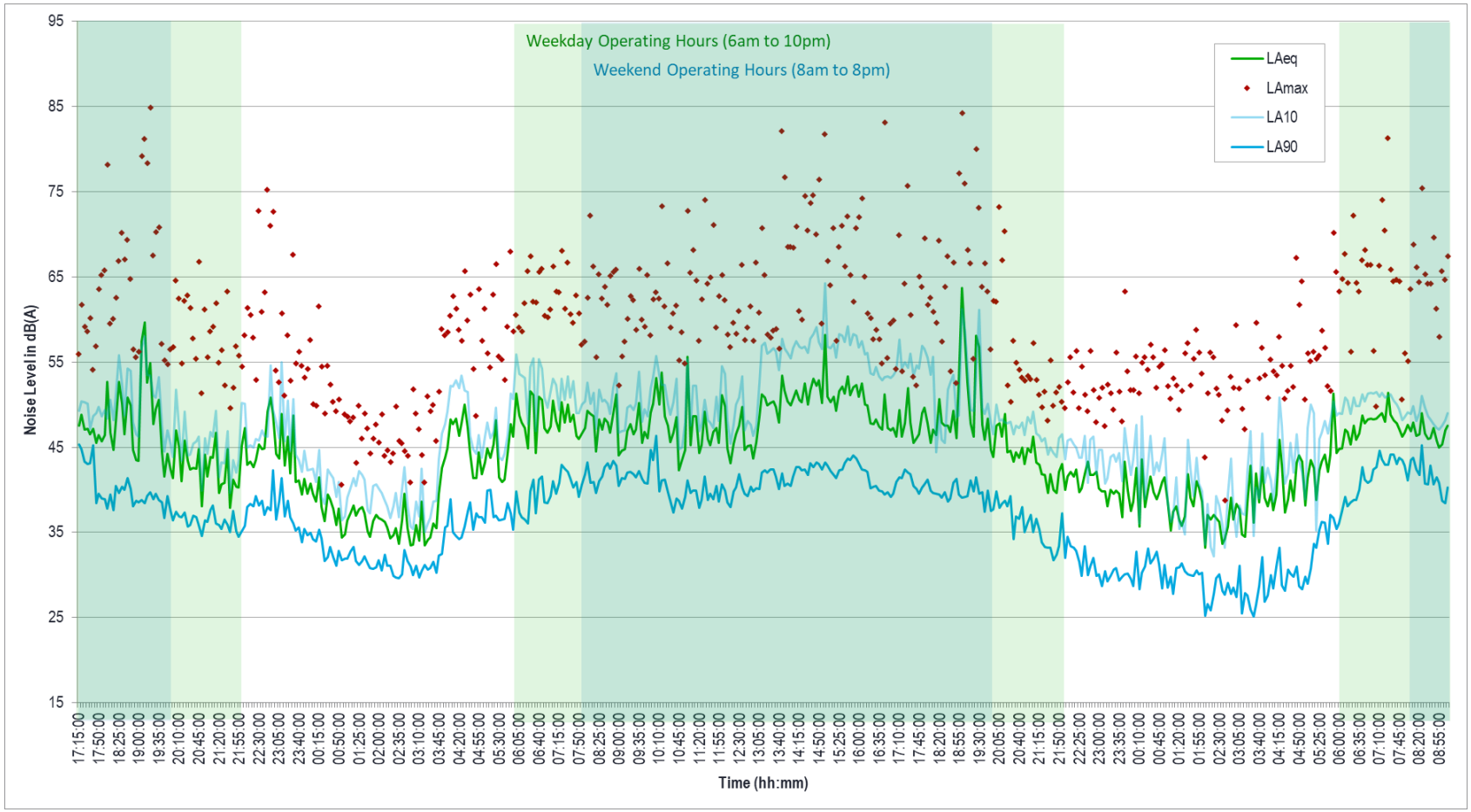


Figure 4.2: Noise Measurements (48hr Measurement)



4.3. Background Sound Levels

The background sound levels have been calculated in accordance with BS 4142:2014, which represents the most up-to-date guidance on the subject. Prior to the publication of the 2014 version of BS 4142, acousticians would use the lowest measured background sound levels; however, BS 4142: 2014 provides substantially more guidance on the determination of background sound levels. Section 8.1 of BS 4142: 2014 states that "*for this purpose, the objective is not simply to ascertain a lowest measured background sound level, but rather to quantify what is typical during particular time periods. Among other considerations, diurnal patterns can have a major influence on background sound levels and, for example, the middle of the night can be distinctly different (and potentially of lesser importance) compared to the start or end of the night-time period for sleep purposes*". The guidance goes on to say that *"a representative level ought to account for the range of background sound levels and ought not automatically to be assumed to be either the minimum or modal value"*.

In order to determine the background sound levels for the day and night-time periods, the background sound levels have been analysed over the appropriate time periods, i.e. 15 minutes for night-time (11 pm to 7 am) and 1 hour for the daytime periods (7 am to 11 pm). **Figure 4.3** details the distribution of the background sound levels as described in BS 4142: 2014 for the operational hours between 6 am and 10 pm.

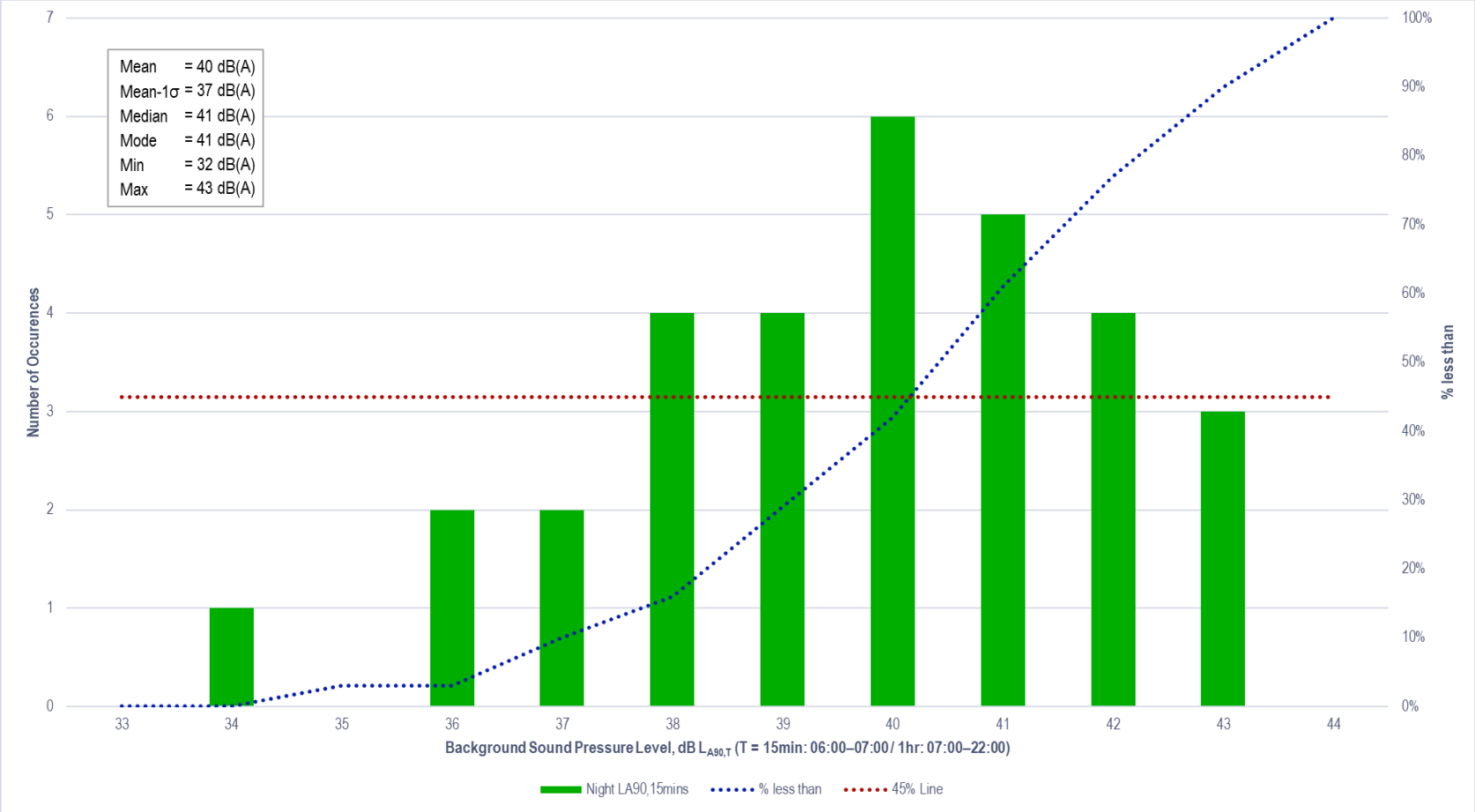
It can be seen from **Figure 4.3** that during the day, the $L_{A90.1hour}$ ranged from 34 dB to 43 dB. The value with the highest number of occurrences is 40 dB $L_{A90.1hour}$. Given that less than 45% of the data is below this value, 40 dB(A) would be accepted as the representative background sound level during the operational hours between 6am and 10pm.

A summary of the background sound levels are presented below in **Table 4.3**.

Table 4.3: Summary of the Background Sound Level Analysis

Period (Hours)	Representative Background Sound Level, dB(A)
Operational Hours (06:00 – 22:00)	40

Figure 4.3: Distribution of Operating Time (06:00 – 22:00) L_{A90} Sound Levels



5. WEEKEND SOUND MEASUREMENT STUDY

5.1. Overview

In order to determine the extent to which the site is affected by sound, and after discussion with the Andre Pires, the Pollution Control Manager at Eastleigh Borough Council, since the padel courts will be operational at the weekend, albeit with reduced hours, an additional weekend sound measurement study has been carried out on the proposed development site.

All noise monitoring was conducted using a Norsonic 140 sound level meter, which conforms to BS EN IEC 61672-1: 2003 as a Class 1 precision measurement system. A Norsonic 1251 field calibrator was used before and after the measurement periods in order to ensure that the equipment had remained within reasonable calibration limits (+/- 0.5 dB).

All of the equipment used has been calibrated in accordance with the procedures set out in BS EN IEC 61672-2: 2003 and for the electrical testing of frequency filters as set out in BS EN IEC 61260. The equipment was calibrated at Campbell Associates Limited, in Great Dunmow, Essex. Campbell Associates Limited meets the laboratory accreditation requirements of the United Kingdom Accreditation Service (UKAS Lab No. 0789). Sound level meters are laboratory calibrated every two years, with field calibrators laboratory calibrated every twelve months. **Appendix 2** summarises the equipment used including serial numbers and calibration certificates.

All noise monitoring has been conducted in accordance with the guidance set out in BS 7445-2: 1991 *'Description and measurement of environmental noise Part 2: Guide to the acquisition of data pertinent to land use*'. This standard details information that should be recorded in addition to the actual measured levels such as meteorological data, and a description of the noise source itself.

This additional weekend noise survey was conducted on this site between Friday the 6th and Monday the 9th March 2026. The noise monitoring was conducted by William Bettridge of Hawkins Environmental Limited.

Weather conditions were conducive to successful monitoring. **Table 5.1** summarises the weather conditions during the measurement period.

Table 5.1: Summary of Weather Conditions during the Sound Measurements

General Description	The measurement periods were overcast, with some fog during the day with light winds.
Windspeed	Over the measurement period, the average windspeed was around 2 m/s, with peak windspeeds around 5 m/s .
Temperature	Highs of 9˚C, lows of 6˚C.
Precipitation	No precipitation observed.

5.2. Baseline Sound Levels

Ambient sound measurements of the site - without the proposed padel courts - were conducted at a location within the proposed development site, in line with the nearest residential receptors as marked on **Figure 5.1**. It is considered that the ambient noise measurements conducted at this location will be representative of the

surrounding dwellings. The sound monitoring location was considered to be a freefield location. The nearest noise sensitive receptors are also marked on **Figure 5.1.** The noise measurement data is detailed in **Appendix 3**, **Figure 5.2** and **Figure 5.3** below.

The summary of sound measurements over the weekend period during operation hours of the proposed development (8am-8pm), can be seen below in **Table 5.2** for both Saturday 7th March 2026 and Sunday 8th March 2026.

Table 5.2: Summary of the Sound Level Measurements

Period (hours)	Measured Freefield Sound Level, dB				
	$L_{Aeq.T}$	Lowest $L_{Aeq.1hour}$	Range $L_{Aeq.15mins}$	Range $L_{Amax.15mins}$	Range $L_{A90.15mins}$
8am to 8pm - Saturday (07/03/26)	44.3	41.3	38.0 – 54.5	42.4 – 79.0	36.1 – 42.7
8am to 8pm - Sunday (08/03/26)	41.7	39.9	35.5 – 49.3	42.2 – 65.8	33.0 – 38.9

Figure 5.1: Noise Measurement Location

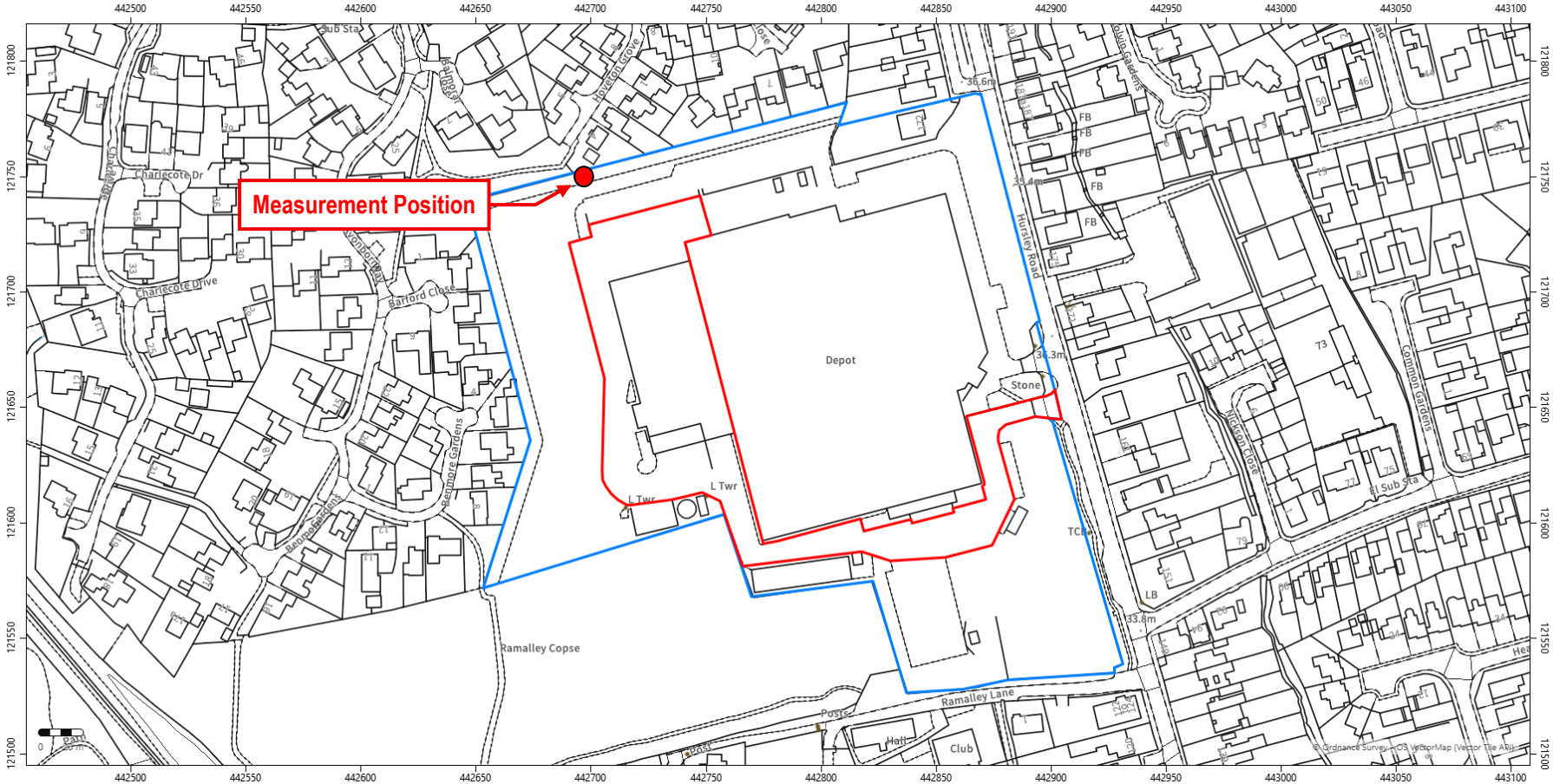


Figure 5.2: Noise Measurements (24hr Measurement – Saturday 7th March 2026)

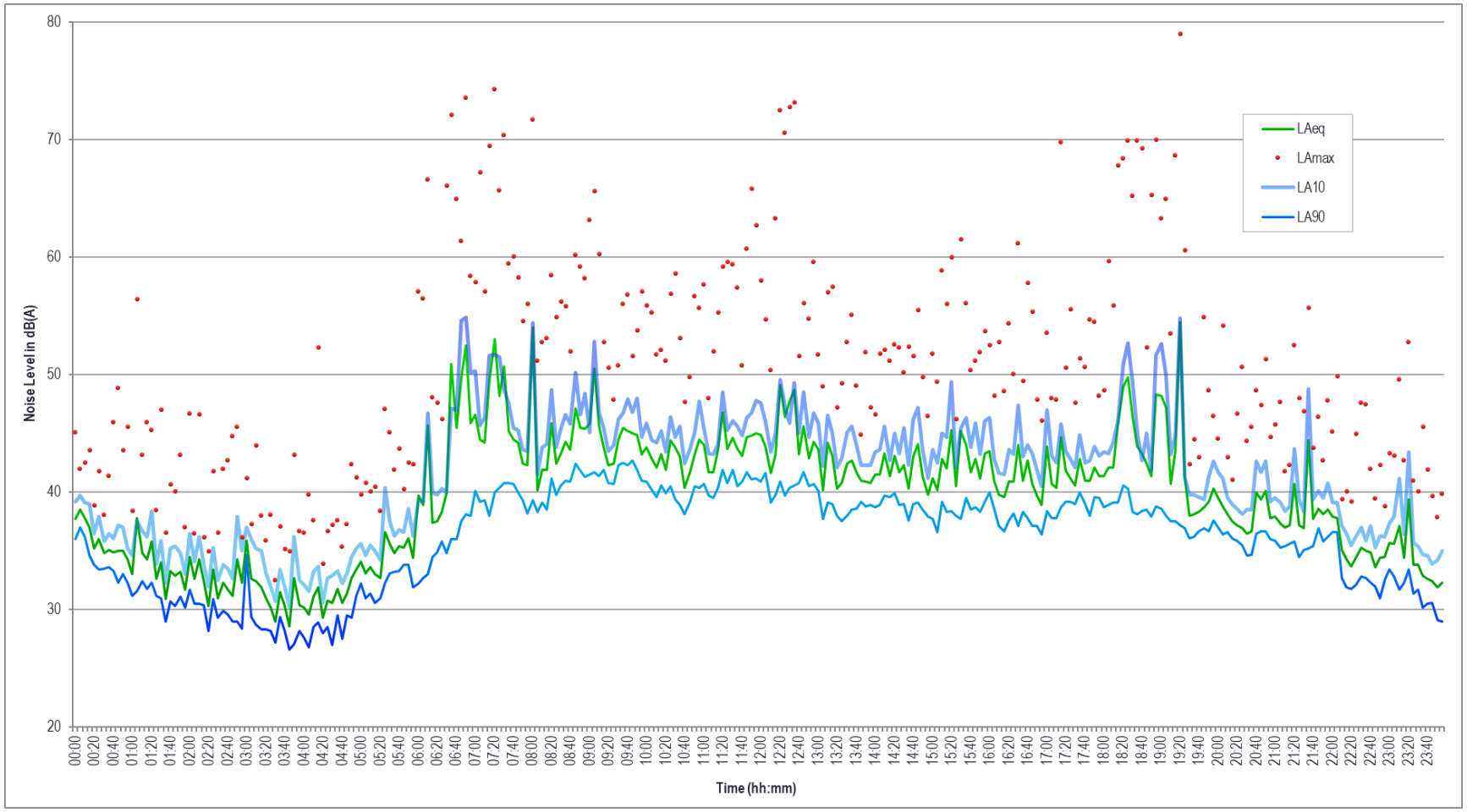
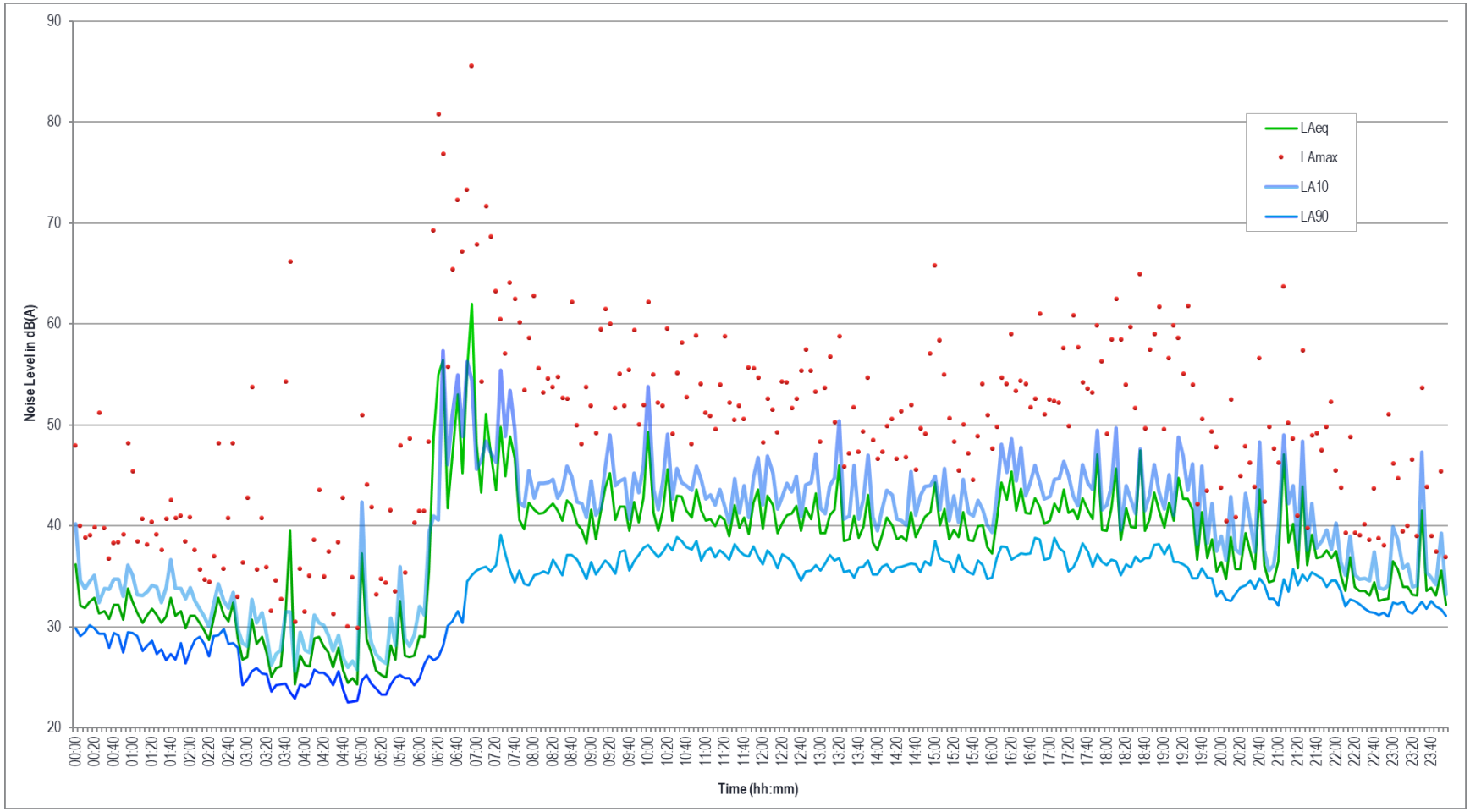


Figure 5.3: Noise Measurements (24hr Measurement – Sunday 8th March 2026)



5.3. Background Sound Levels

The background sound levels have been calculated in accordance with BS 4142:2014, which represents the most up-to-date guidance on the subject. Prior to the publication of the 2014 version of BS 4142, acousticians would use the lowest measured background sound levels; however, BS 4142: 2014 provides substantially more guidance on the determination of background sound levels. Section 8.1 of BS 4142: 2014 states that "*for this purpose, the objective is not simply to ascertain a lowest measured background sound level, but rather to quantify what is typical during particular time periods. Among other considerations, diurnal patterns can have a major influence on background sound levels and, for example, the middle of the night can be distinctly different (and potentially of lesser importance) compared to the start or end of the night-time period for sleep purposes*". The guidance goes on to say that *"a representative level ought to account for the range of background sound levels and ought not automatically to be assumed to be either the minimum or modal value"*.

Figure 5.4 and **Figure 5.5** detail the distribution of the background sound levels as described in BS 4142: 2014 for the operational hours between 8am and 8 pm, for both the 7th and 8th, respectively.

It can be seen from **Figure 5.4** that during the day, the $L_{A90.1hour}$ ranged from 37 dB to 42 dB. The value with the highest number of occurrences is 39 dB $L_{A90.1hour}$. Given that less than 45% of the data is below this value, 39 dB(A) would be accepted as the representative background sound level during the operational hours between 8am and 8pm on the Saturday 7th.

It can be seen from **Figure 5.5** that during the day, the $L_{A90.1hour}$ ranged from 36 dB to 38 dB. The value with the highest number of occurrences is 36 dB $L_{A90.1hour}$. Given that less than 45% of the data is below this value, 36 dB(A) would be accepted as the representative background sound level during the operational hours between 8am and 8pm on the Sunday 8th.

A summary of the background sound levels are presented below in **Table 5.3**.

Table 5.3: Summary of the Background Sound Level Analysis

Operational Period (Hours)	Representative Background Sound Level, dB(A)
Saturday 7th March (08:00 – 20:00)	39
Sunday 8th March (08:00 – 20:00)	36

Figure 5.4: Distribution of Operating Time (08:00 – 20:00) L_{A90} Sound Levels – Saturday 7th March 2026

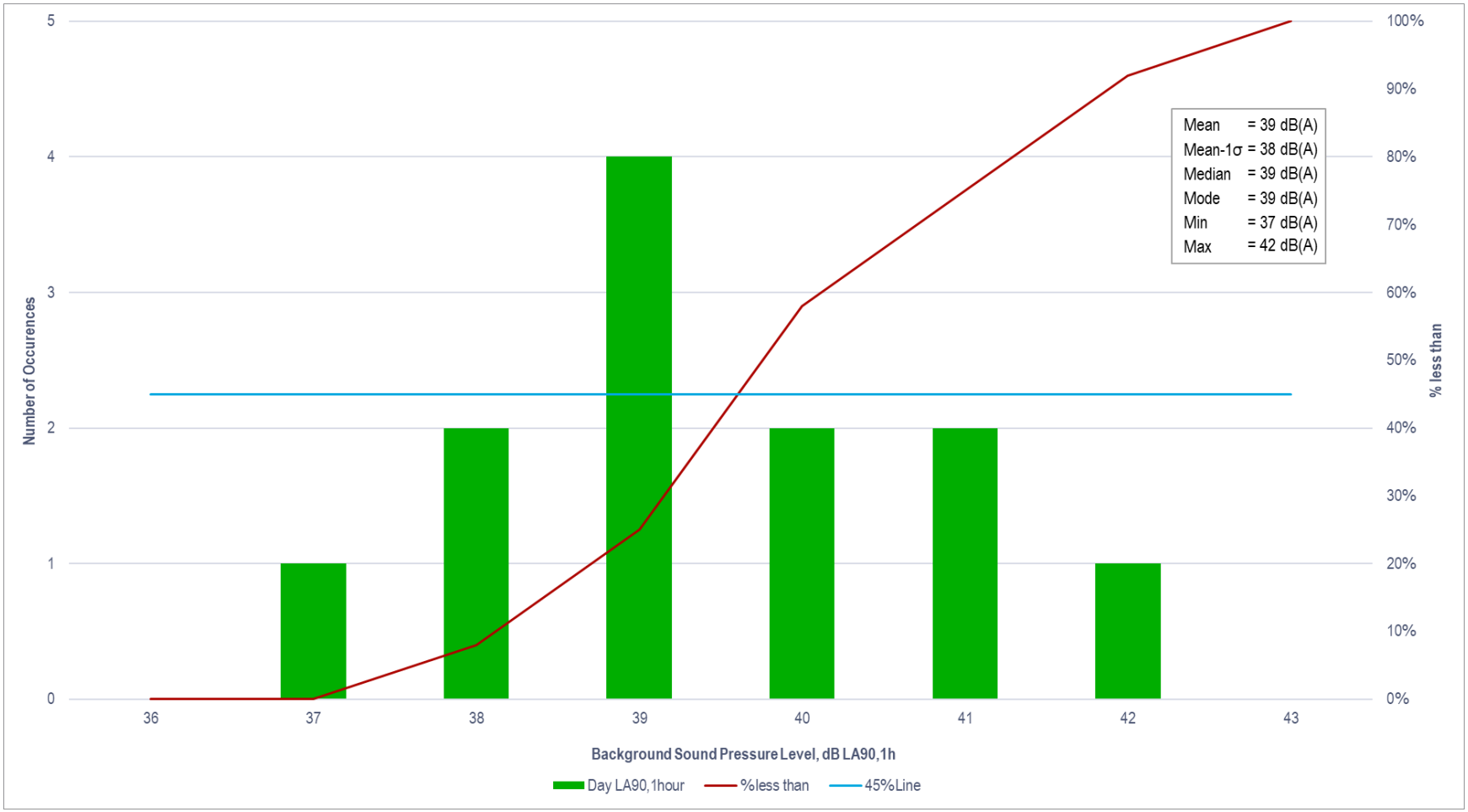
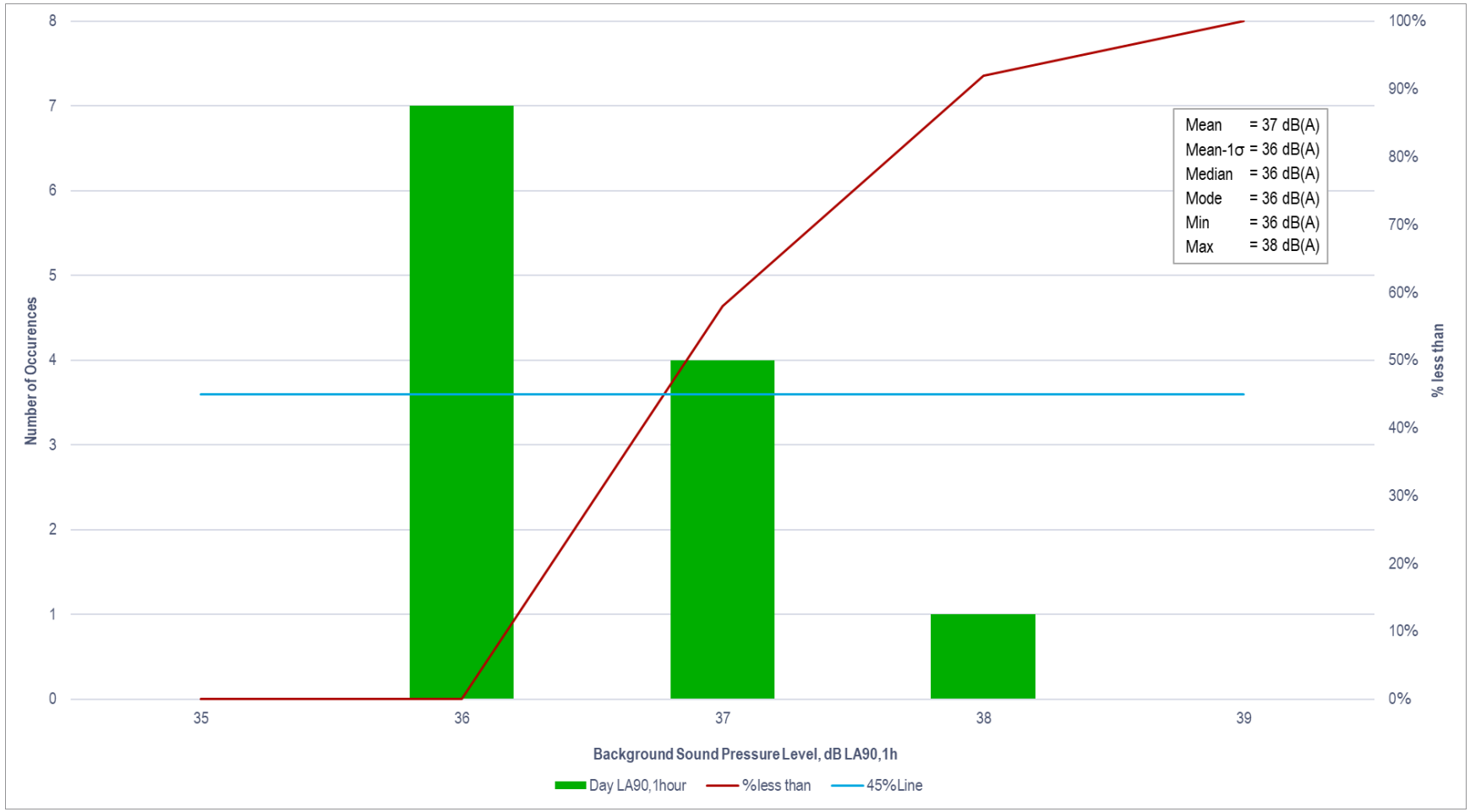


Figure 5.5: Distribution of Operating Time (08:00 – 20:00) L_{A90} Sound Levels – Sunday 8th March 2026



6. IMPACT OF THE PADEL COURTS

6.1. Overview

The assessment is carried out in accordance with the 2014 IEMA *'Guidelines for Environmental Noise Impact Assessment'* in addition to the 2015 Sports England *'The Artificial Grass Pitch (AGP) Acoustics – Planning Implications'*.

6.2. Proposed Padel Courts

It is proposed to create 6no. padel courts within the existing warehouse envelope. The padel courts and proposed co-working facility will be configured as per **Figure 6.1** below.

Figure 6.1: Proposed Site Layout

6.3. Padel Court Source Data

6.3.1. Overview

A sound survey was undertaken by Hawkins Environmental Limited at Chichester Racquets & Fitness Club on the morning of the 8th November 2024.

All noise monitoring was conducted using a Norsonic 140 sound level meter, which conforms to BS EN IEC 61672-1: 2003 as a Class 1 precision measurement system. A Norsonic 1251 field calibrator was used before and after the measurement periods in order to ensure that the equipment had remained within reasonable calibration limits (+/- 0.5 dB).

All of the equipment used has been calibrated in accordance with the procedures set out in BS EN IEC 61672-2: 2003 and for the electrical testing of frequency filters as set out in BS EN IEC 61260. The equipment was calibrated at Campbell Associates Limited, in Great Dunmow, Essex. Campbell Associates Limited meets the laboratory accreditation requirements of the United Kingdom Accreditation Service (UKAS Lab No. 0789). Sound level meters are laboratory calibrated every two years, with field calibrators laboratory calibrated every twelve months. **Appendix 2** summarises the equipment used including serial numbers and calibration certificates.

All noise monitoring has been conducted in accordance with the guidance set out in BS 7445-2: 1991 *'Description and measurement of environmental noise Part 2: Guide to the acquisition of data pertinent to land use*'. This standard details information that should be recorded in addition to the actual measured levels such as meteorological data, and a description of the noise source itself. Weather conditions were conducive to successful monitoring.

The noise monitoring was conducted by Nick Hawkins of Hawkins Environmental Limited. Nick is a Member of the Institute of Acoustics and holds the Institute of Acoustic's Certificate of Competence in Environmental Noise Measurement.

Noise measurements were conducted at two locations, one 3m to the centre line entrance, the other 5m from the screened end. **Figure 6.2** and **Figure 6.3** shows the location of the noise measurements.

Figure 6.2: Noise Measurement Location (3D View)

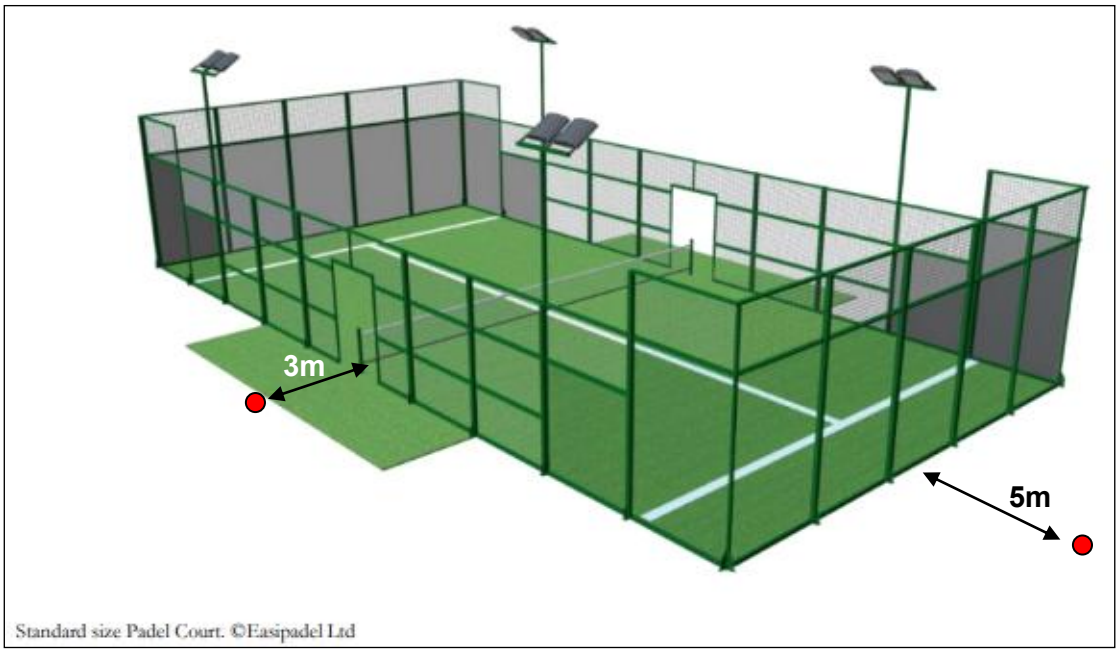
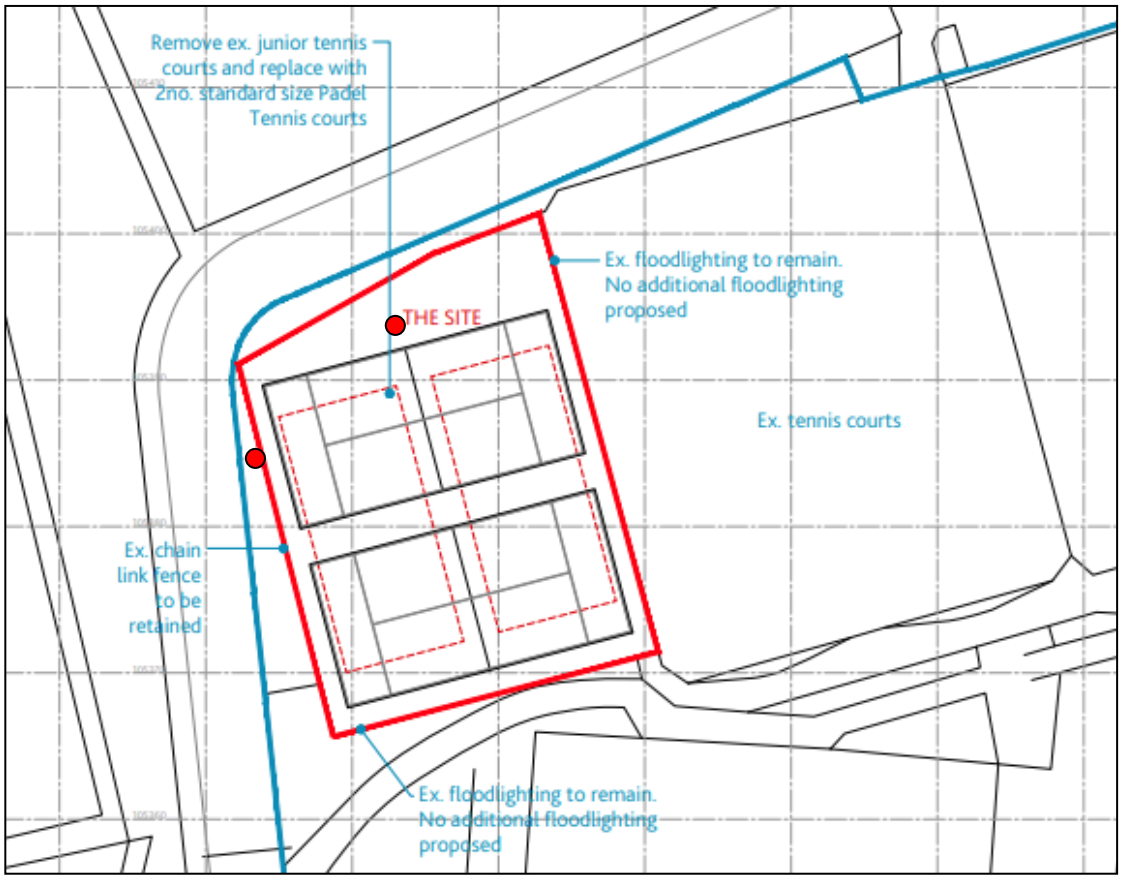


Figure 6.3: Noise Measurement Location (Plan)



6.3.2. Characterisation of Noise Levels

Noise from padel courts can broadly characterised by the following sources:

- Noise from the padel hitting the ball;
- Noise from the ball hitting the back or side walls;
- Noise from the ball hitting the centre net or the side netting; and
- Noise from competitors, e.g talking or shouting.

During the period of observation, a number of retired gentlemen were observed playing padel. Four players were on the court at any one time. It was clear that the players observed were experienced players. Play has fairly fast pace and near constant. Rallies lasted typically 3-5 shots in close succession, followed by a short period of inactivity. On average, when playing, there were around 12 hits of the ball per minute from a court. During the measured survey at Chichester Racquets & Fitness Club, both of their padel courts were in operation.

Padel courts are 20m long and 10m wide. At each end there are 3m high glass walls along the full width. These walls extend for 2m along the side of the court (at each end) at 3m in height, with a further 2m high wall for a further 2m. The sides of the court are surrounded by netting to a height of 4m. In padel, players may play the ball of the back and side walls, as one can do in squash.

6.3.3. Noise Measurement Survey Results

The following noise survey results have all been normalised to sound pressure levels at 5m.

The noise survey has indicated that noise levels emanating from the longer end of the court are higher than those from the short end of the court, due to the glass wall around each end of the court, which acts as a noise barrier. Noise measurements have indicated that at 5m, noise from the padel court is 56.4 dB $L_{Aeq.T}$ from the longer end and 51.5 dB $L_{Aeq.T}$ from the shorter end. These levels include corrections for residual noise, although includes noise from the second court behind the main court. Therefore, these levels could be considered representative of two courts.

Noise from padel courts are not continuous and are characterised but spikes in noise levels caused by the padel hitting the ball, or the ball hitting the back or side walls, or from people talking/shouting. **Figure 6.4** shows a time history of padel noise at 5m from the centre line for a typical five-minute period. The graph shows that L_{Amax} noise levels are highly variable.

During the measurement of noise levels, the following observations were made:

- Noise from the ball/padel contact was highly variable, depending on the strength of the contact. The L_{Amax} noise level associated with hitting a ball was typically in excess of 56 dB(A) at 5m from the centre line, with around half of the hits in the region of 62-65 dB(A) L_{Amax}. However, particularly hard hits where generally between 70 and 77 dB(A) L_{Amax}. The loudest L_{Amax} noise level directly attributed to a padel hitting a ball was 78.0 dB(A) L_{Amax} at 5m from the centre line.
- When observed from the side of the court, noise events caused by the ball hitting the centre net, the rear/side walls, the ground or the side netting are all significantly lower in volume and less frequent than noise caused by the ball/padel contact.

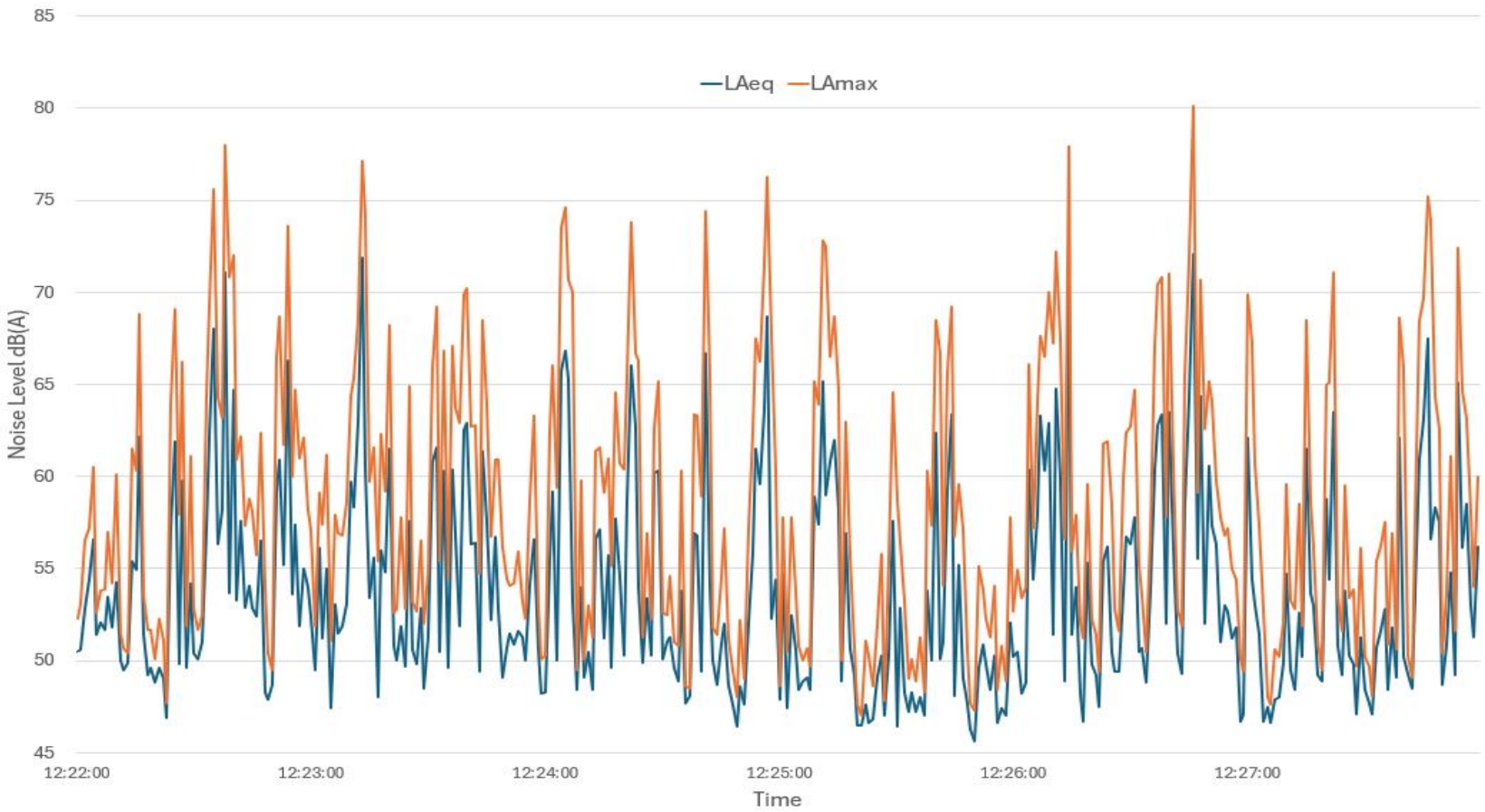
- Noise directly coming from the players, via talking, through raised voices or from shouting, whilst typically less than noise from the ball/padel contact, did have the potential to be higher. The highest L_{Amax} noise level measured during the noise monitoring period was 82.6 dB(A) - this was caused by one of the competitors reacting to losing a point. However, noise events of this magnitude was not common.
- Noise measurements conducted at the end of the court yielded significantly lower noise levels, due to the shielding impacts of the glass wall around the end of the court. Typical L_{Amax} events caused by the ball/padel contact were less than 65 dB(A) at 5m from the end, with most ball/padel contact less than 60 dB(A).
- At the measurement location at the end of the courts, behind the back wall, interactions between the balls and the back wall were more easily observed. The noise of the ball hitting the back wall was typically between 60 dB(A) and 64 dB(A) at 5m.

Statistical analysis of the L_{Amax} noise levels (measured over 1 second internals) has been undertaken. **Table 6.1** shows the results of this analysis.

Table 6.1: Statistical Analysis of L_{Amax} Noise Events

Parameter	L_{Amax} in dB(A) 5m from Centre Line	L_{Amax} in dB(A) 5m from End
Maximum	82.6	73.1
99.5th Percentile	77.2	67.9
99th Percentile	76.4	65.2
95th Percentile	71.9	62.3
90th Percentile	69.6	60.9
80th Percentile	66.3	59.3
70th Percentile	64.0	58.1
60th Percentile	61.6	57.2
50th Percentile	59.6	56.5

Figure 6.4: Typical Padel Noise Time History



6.3.4. Determination of the Receptor Sound Levels

Using the data of an existing padel court operating at maximum capacity with 4 players, the receptor sound levels of the activity as proposed at the proposed padel courts can be determined. Calculations have been made using SoundPLAN and the ISO 9613-2:2024 calculation methodology.

Within SoundPLAN, a single court was first modelled with a receptor from the long and short-ends of the padel court, to replicate the measurement positions when the source data was collected. After calibrating the sound power level of the effective area source to the measurement positions, which replicate the positions of 'P1' and 'P2', the padel court is modelled. The modelled padel court was subsequently duplicated with the courts arranged to reflect the final layout and number of padel courts.

The padel courts are proposed to be located within one of the existing warehouses. For the purposes of the modelling, it is assumed that the external fabric of the warehouse will have a minimum sound reduction of 10 dB(A).

Based on all courts being occupied with four players per court, which is representative of a worst-case scenario, it has been calculated that using the source data by Hawkins Environmental Limited, the freefield activity noise level, excluding the existing ambient noise, is estimated to be as in **Table 6.2** below. **Figure 6.5** below presents the noise model and receptor locations of the model. **Figure 6.6** presents the noise emission contours of the proposed padel courts during a worst-case operating scenario.

Table 6.2: Cumulative Receptor Sound Level Results from SoundPLAN

Receptor	Receptor ID	Location	Ambient $L_{Aeq,T}$	Maxima L_{AFmax}
1 Barford Close	1	Facade	27.1	47.1
	2	External Amenity	32.1	52.1
2 Barford Close	3	Facade	33.1	53.1
	4	External Amenity	35.1	55.1
3 Barford Close	5	Facade	33.8	53.8
	6	External Amenity	35.7	55.7
3 Hoveton Grove	7	Facade	22.9	42.9
	8	External Amenity	33.6	53.6
4 Barford Close	9	Facade	33.5	53.5
	10	External Amenity	35.6	55.6
4 Benmore Gardens	11	Facade	33.2	53.2
	12	External Amenity	33.7	53.7
4 Hoveton Grove	13	Facade	35.2	55.2
	14	External Amenity	36.4	56.4
5 Benmore Gardens	15	Facade	33.1	53.1
	16	External Amenity	34.7	54.7

Receptor	Receptor ID	Location	Ambient $L_{Aeq,T}$	Maxima L_{AFmax}
6 Benmore Gardens	17	Facade	31.8	51.8
	18	External Amenity	33.3	53.3
9 Boynton Close	19	Facade	30.6	50.6
	20	External Amenity	29.6	49.6

Note: The L_{Amax} predictions have been conducted using the 99th percentile of noise measurement data. All sound levels are free field sound levels.

Figure 6.5: Location of Noise Receptors (Proposed)

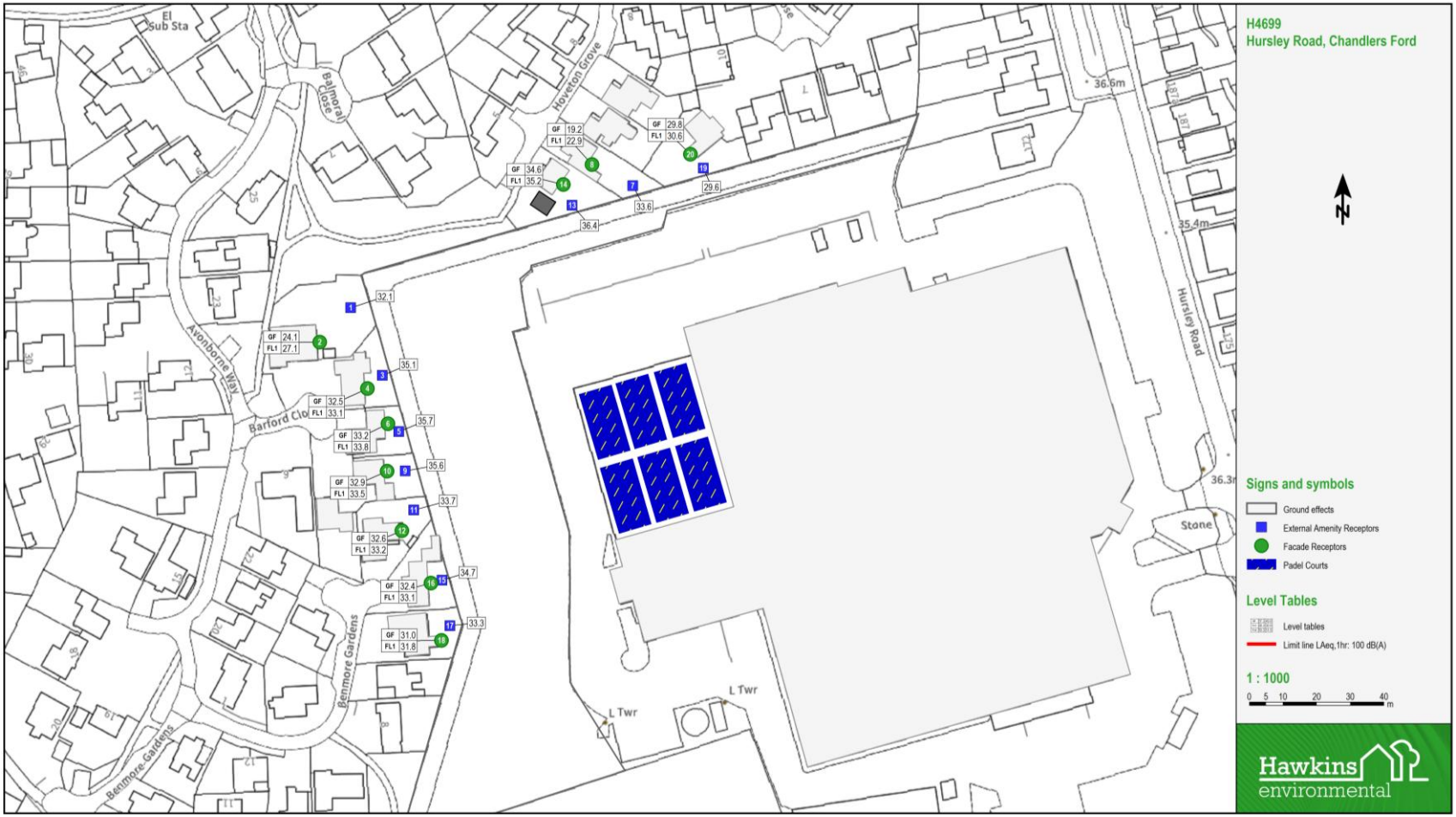
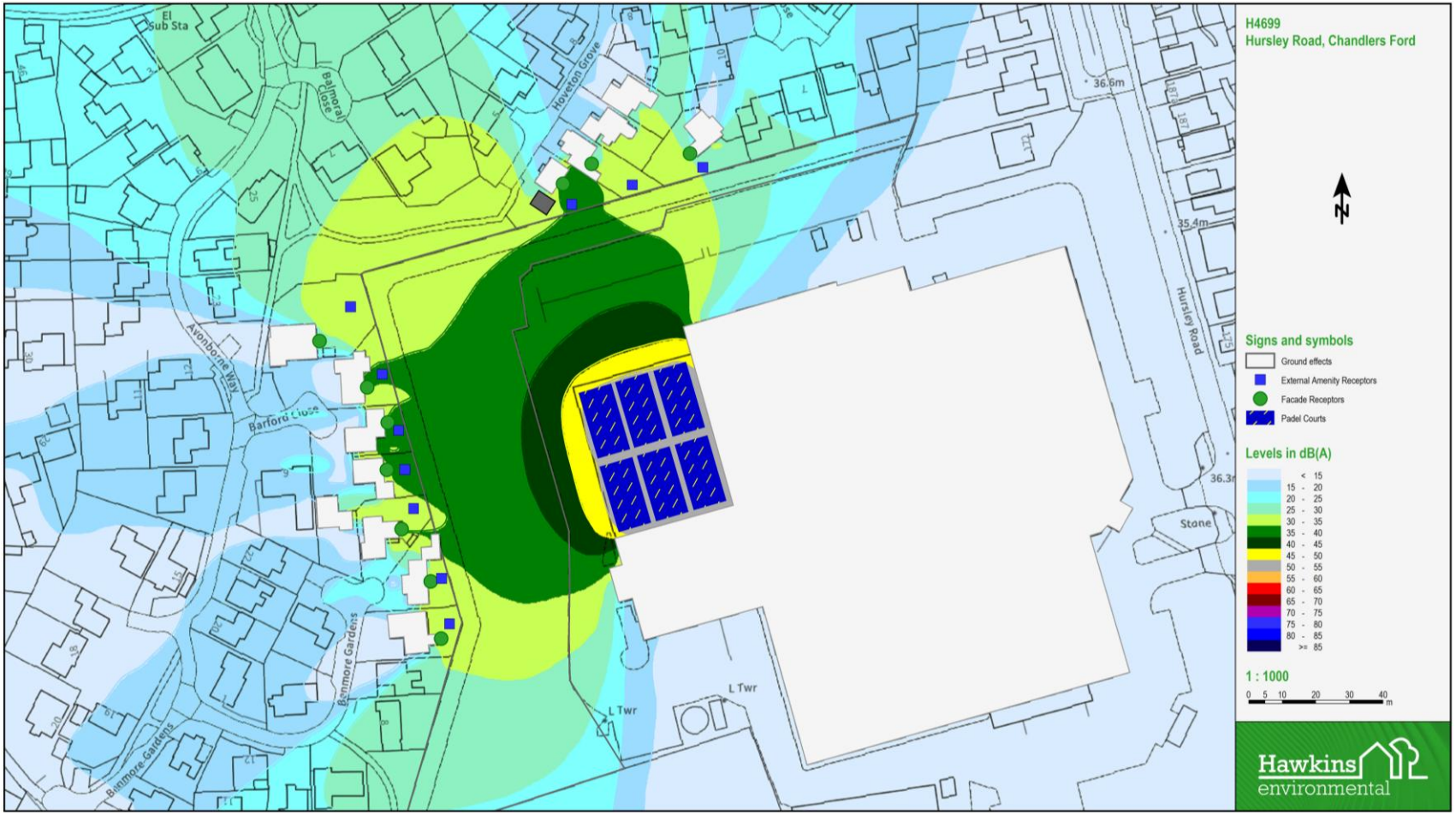


Figure 6.6: Noise Model Contours – Proposed Site Layout – Worst Case Single Hour



6.4. Adherence to Sound Criteria

The *Artificial Grass Pitch (AGP) Acoustics – Planning Implications* document published by Sport England in 2015 considers two ways to assess the impact of sports facilities:

1. The **Absolute** noise level – in line with the WHO *"Guidelines for Community Noise";* and
2. The **Relative** noise level – in line with the IEMA *"Guidelines for Environmental Noise Assessment*".

6.4.1. Absolute Noise Levels (Sports England)

When considering the acceptability on absolute noise levels in relation to the 2015 Sports England *'The Artificial Grass Pitch (AGP) Acoustics – Planning Implications'*, the following criteria applies:

1. The noise level outside a residential property during the daytime at about 1 metre from facades of living spaces and within gardens should not exceed 50 dB $L_{Aeq,1hour}$; and,
2. Noise levels in gardens should not exceed 50 dB $L_{Aeq,1hour}$.

Table 6.3 presents a comparison of the predicted ambient sound levels to the above criteria. The assessment demonstrates that, under a worst-case single-hour operating scenario, the predicted ambient noise levels are in excess of 10 dB below the relevant criteria set out in the Sport England (2015) *'Artificial Grass Pitch Acoustics Guidance'* and the WHO *'Guidelines for Community Noise'*.

Table 6.3: Absolute Noise Level Criteria Comparison

	Criteria dB $L_{Aeq,1hr}$	Predicted dB $L_{Aeq,1hr}$	Difference
Facades (at 1m)	50	33.8	**-16.2**
External Amenity	50	36.4	**-13.6**

The predictions assume all proposed padel courts operating concurrently at full capacity, with four players per court, and therefore represent robust worst-case operating conditions. The calculations also assume just 10 dB(A) of attenuation for the fabric of the existing warehouse. Notwithstanding this conservative assessment approach, the calculated sound levels at the nearest noise-sensitive receptors remain comfortably within acceptable limits. Accordingly, it can be determined that the proposed padel courts would be acceptable in accordance with the 2015 Sports England *'The Artificial Grass Pitch (AGP) Acoustics – Planning Implications'* criteria. Therefore, this is a positive indication that the levels of noise created by the use of the padel courts would be acceptable.

6.4.2. Relative Noise Levels (IEMA)

When considering the acceptability on relative noise levels in relation to the 2015 Sports England *'The Artificial Grass Pitch (AGP) Acoustics – Planning Implications'*, the assessment should consider the acceptability in relation to the 2014 IEMA *"Guidelines for Environmental Noise Assessment"*. **Table 6.4** presents the activity as well as the ambient sound levels at the nearest noise sensitive receptor. A comparison of the existing and

proposed ambient sound pressure levels provides an indication of acceptability of the proposed scheme in regard to noise, based on the criteria contained within the 2014 IEMA *"Guidelines for Environmental Noise Assessment"*.

It is understood that the padel courts will be in operation between 6am and 10pm Monday to Friday, and 8am to 8pm on the weekends. During the working week, the single hour period with the lowest ambient sound level was identified to be 42.5 $L_{Aeq.1hour}$. On a Saturday it was marginally lower at 41.3 $L_{Aeq.1hour}$, with the lowest ambient sound level was identified to be 39.9 dB $L_{Aeq,1hour}$ between 2pm and 3pm on Sunday 8th March 2026. Subsequently, this sound level has been used in the analysis in order to represent at worst-case scenario, seen below in **Table 6.4.**

Table 6.4: Cumulative Receptor Sound Level Analysis

Receptor	Location	Activity $L_{Aeq,1hr}$	Existing $L_{Aeq,1hr}$	Cumulative $L_{Aeq,1hr}$	Difference $L_{Aeq,1hr}$
1 Barford Close	Facade	27.1	39.9	40.1	+0.2
	Ext. Amenity	32.1	39.9	40.6	+0.7
2 Barford Close	Facade	33.1	39.9	40.7	+0.8
	Ext. Amenity	35.1	39.9	41.1	+1.2
3 Barford Close	Facade	33.8	39.9	40.9	+1.0
	Ext. Amenity	35.7	39.9	41.3	+1.4
3 Hoveton Grove	Facade	22.9	39.9	40.0	+0.1
	Ext. Amenity	33.6	39.9	40.8	+0.9
4 Barford Close	Facade	33.5	39.9	40.8	+0.9
	Ext. Amenity	35.6	39.9	41.3	+1.4
4 B'more Gardens	Facade	33.2	39.9	40.7	+0.8
	Ext. Amenity	33.7	39.9	40.8	+0.9
4 Hoveton Grove	Facade	35.2	39.9	41.2	+1.3
	Ext. Amenity	36.4	39.9	41.5	+1.6
5 B'more Gardens	Facade	33.1	39.9	40.7	+0.8
	Ext. Amenity	34.7	39.9	41.0	+1.1
6 B'more Gardens	Facade	31.8	39.9	40.5	+0.6
	Ext. Amenity	33.3	39.9	40.8	+0.9
9 Boynton Close	Facade	30.6	39.9	40.4	+0.5
	Ext. Amenity	29.6	39.9	40.3	+0.4

The difference between the existing and proposed ambient noise levels will see only a marginal increase in ambient noise levels at the nearest noise sensitive receptor during a worst-case single hour period where all six of the proposed padel courts are used at their maximum capacity with four players per court during the quietest 1-hour period of existing ambient noise. According to the IEMA Guidelines, this increase would be considered *"negligible".* Under the IEMA Guidelines, a *"negligible"* impact would be considered insignificant.

7. IMPACT OF ROAD TRAFFIC NOISE

A Transport Statement Technical Note prepared by Ridge identifies that, during the AM and PM peak periods, the maximum anticipated development-generated traffic would equate to 29 additional vehicle movements within the busiest single hour attributable solely to the proposed development. This is inclusive of the proposed office and padel court uses.

Baseline noise monitoring undertaken at the representative measurement location identified a lowest measured weekday hour of 42.5 dB $L_{Aeq,1hr}$ over the operating hours between 6am and 10pm, in particular, this sound level was captured between 9pm and 10pm, representing a conservative worst-case residual sound environment for impact assessment purposes.

Based on the predicted trip generation, the peak-hour traffic contribution was modelled assuming:

- 29 additional vehicle movements per hour,
- An average vehicle speed of 16 km/h, representative of low-speed local access roads and site access conditions, and
- A source–receiver separation distance of approximately 37 metres between the likely traffic route and the monitoring position.

Using standard road traffic noise propagation assumptions and point/line source approximation, the predicted $L_{Aeq,1hr}$ contribution from the additional peak-hour traffic movements at the measurement location is calculated to be approximately 42.1 dB(A).

The cumulative noise level was derived using logarithmic energetic summation of the baseline ambient sound level and the predicted development-generated traffic contribution, in accordance with standard acoustic assessment methodology. Using a baseline level of 42.5 dB(A) and a development contribution of 42.1 dB(A), this results in a predicted cumulative $L_{Aeq,1hr}$ of 45.3 dB(A) during the worst-case assessment scenario, defined as the coincidence of:

- maximum development traffic generation, and
- lowest measured residual background sound level.

The assessment indicates a worst-case increase in road traffic noise of approximately 2.8 dB during the peak hour scenario. In acoustic terms, this change is at or below the lower bound of perceptibility for the majority of receptors under typical environmental conditions. In accordance with the IEMA Guidelines for Environmental Noise Impact Assessment (2014), changes of less than 3 dB are classified as negligible in magnitude and are not considered significant in environmental impact terms.

It is noted that the assessed peak hour represents a conservative worst-case scenario, as traffic flows during the most sensitive operational periods (including early morning, daytime and evening) are anticipated to be lower than peak hour flows with only up to 13 trips estimated between 6am and 7am. The comparison of peak-hour development traffic against the lowest measured ambient noise levels therefore provides a precautionary assessment framework that is robust and conservative by design.

On this basis, the predicted increase in road traffic noise associated with the proposed development is assessed as negligible, with no material adverse effects identified. Accordingly, traffic-generated noise would not constitute a material environmental constraint on the acceptability of the proposed development. Matters relating to plant noise, building breakout, internal sound insulation and early-morning operational activity are recognised as separate considerations and can be appropriately addressed through detailed acoustic assessment and planning conditions, as required by the Local Planning Authority.

8. PLANT NOISE LIMITS

At this stage in the design process, the noise output of specific items of plant has yet to be determined; therefore it is not possible to provide a full and detailed assessment of the likely impact of plant noise. As a consequence, environmental noise limits for plant associated with the development should be set to protect the amenity of nearby noise sensitive premises, as well as future residents of the development itself in accordance with BS 4142: 2014 *'Methods for rating and assessing industrial and commercial sound'.*

Prior to the publication of the 2014 version of BS 4142, acousticians would use the lowest measured background noise levels; however, BS 4142: 2014 provides substantially more guidance on the determination of background noise levels. Section 8.1 of BS 4142: 2014 states that *"for this purpose, the objective is not simply to ascertain a lowest measured background sound level, but rather to quantify what is typical during particular time periods. Among other considerations, diurnal patterns can have a major influence on background sound levels and, for example, the middle of the night can be distinctly different (and potentially of lesser importance) compared to the start or end of the night-time period for sleep purposes"*. The guidance goes on to say that *"a representative level ought to account for the range of background sound levels and ought not automatically to be assumed to be either the minimum or modal value"*.

To ensure that an adverse impact as a consequence of plant noise is unlikely, it recommended that the Rating noise level from the plant is below background noise level, i.e. the Rating noise level should be no more than 36 dB(A) during the operational hours of the development at the closest residential property. This background noise level was measured on a Sunday. Higher background noise levels were measured on a Saturday and on a typical weekday, so if plant is not operational on a Sunday, alterative design targets may be appropriate. The Rating noise level is the predicted cumulative noise level from all plant at the receptor location and should include penalties for tonality, impulsivity and/or intermittency if appropriate. The lower the Rating level is relative to the measured background sound level, the less likely it is that the specific sound source will have an adverse impact or a significant adverse impact.

It should be noted that it is anticipated that the proposed scheme will utilise the existing plant serving the building. Therefore, additional items of plant are not anticipated. The above limits should apply to potential new plant installations.

9. PARTY WALL SOUND INSULATION DESIGN

9.1. Internal Noise Criteria

In accordance with BS 8233:2014 and WHO guideline principles, the proposed office use should achieve internal ambient noise levels of 45–50 dB(A) under typical operational conditions, consistent with accepted criteria for general office accommodation and open-plan office environments.

Preliminary assessment indicates that the reverberant sound level within the padel hall at the separating construction is of the order of $L_{Aeq,T} \approx 63$ dB(A). On a simple level-difference basis, achieving internal office noise levels of 45–50 dB(A) would therefore require a minimum level difference of approximately 13–18 dB across the separating construction. However, this simplified approach does not account for flanking transmission, structural coupling, spectral content, or the impulsive characteristics of padel activity noise (ball impacts, impulsive reflections, and player movement), and therefore cannot be relied upon as a design criterion in isolation.

9.2. BS 8233 Sound Insulation Performance Matrix

BS 8233 provides a sound insulation performance matrix for selecting appropriate separating constructions based on:

- Source room activity noise level: High
- Privacy requirement: Moderate
- Sensitivity of receiving room: Medium (office use)

Based on this matrix, the appropriate minimum design performance is considered to be $R_w \geq 42$ dB (minimum sound reduction index)

This value represents the minimum acceptable acoustic design target. For robustness, uncertainty control, and resilience to flanking transmission and impact-dominated noise sources, a design target of R_w 45–50 dB is considered acoustically prudent and appropriate for this type of mixed-use arrangement.

9.3. Indicative Party Wall Construction

A suitable separating wall construction capable of achieving this performance could comprise, for example:

- Independent twin-stud wall system, minimum 2 × 70 mm metal or timber studs, fully structurally decoupled;
- 50–75 mm mineral wool acoustic insulation (≥ 45 kg/m³ density) within each stud zone;
- Double layer 15 mm acoustic plasterboard to both sides;
- Staggered board joints and fully sealed perimeters;

Such a construction is capable of achieving $R_w \approx 45$–50 dB when correctly detailed and installed, subject to workmanship quality and flanking control.

9.4. Mezzanine Floor and Flanking Transmission Control

In addition to the party wall, it is essential that the mezzanine party floor construction achieves adequate airborne sound insulation performance and is not structurally rigidly coupled to the padel hall structure.

Particular attention must be given to flanking transmission pathways, including:

- Structural steel continuity between spaces
- Beam and column bearing details
- Continuous floor slabs and edge connections
- Service penetrations and ductwork
- Ceiling void bypass paths
- Façade and roof structural continuity

Without appropriate detailing, these elements can dominate transmission performance even where the separating wall itself meets the design R_w criterion.

9.5. Internal Office Acoustic Environment and Comfort

With the above separating constructions and flanking mitigation measures in place, intrusive airborne noise from the padel courts would be effectively controlled and reduced to acceptable levels within the office accommodation.

It should be noted that BS 8233 does not define internal acoustic design targets for offices, and therefore reference is typically made to accepted industry guidance (e.g. BCO Guide to Specification, WHO guidance), which indicates that comfortable ambient noise levels within office environments are generally in the range of 45–50 dB(A).

Achievement of these levels may require internal acoustic treatment, including:

- Acoustic ceiling systems;
- Wall absorption panels;
- Reverberation time (RT_{60}) control;
- Acoustic zoning and layout design;
- Control of building services noise.

These measures address acoustic comfort, speech privacy, and cognitive performance, not solely regulatory compliance.

9.6. Structure-Borne Noise and Vibration Isolation

It is essential that the padel courts are structurally isolated from the office structure to prevent structure-borne noise and vibration transmission, particularly from:

- Heavy footfall loading;

- Ball impacts on court floors and rear glazed panels;
- Other player movements and any impulsive loading;

Without proper structural isolation, these sources can induce impulsive structure-borne sound and vibration into slabs, beams and frames, which may result in re-radiated noise within the adjacent proposed office use and cannot be controlled by airborne sound insulation alone.

Mitigation measures should include, where practicable:

- Resilient isolation layers beneath court floors;
- Floating floor systems or resilient matting;
- Isolated support frames for court glazing;
- Resilient structural bearings at interfaces;
- Discontinuous structural connections between padel structures and office framing.

These measures are critical for controlling low-frequency vibration transmission and impulsive structure-borne noise pathways.

10. OVERALL CONCLUSIONS AND RECOMMENDATIONS

This acoustic assessment demonstrates that the proposed development is acceptable in noise impact terms when assessed against relevant UK guidance, including BS 4142:2014+A1:2019, BS 8233:2014, WHO guidance and the IEMA Guidelines for Environmental Noise Impact Assessment. Predicted noise from padel court activity results in negligible changes to the existing ambient noise environment at the nearest noise-sensitive receptors, with external sound levels remaining comfortably within accepted guidance values. Similarly, the predicted increase in road traffic noise associated with development traffic generation is negligible and below the threshold of perceptibility, and therefore does not constitute a material environmental noise impact.

Plant noise impacts can be robustly controlled through the application of BS 4142–compliant noise limits, such that the cumulative Rating Level from any new plant does not exceed the representative background sound levels of 36 dB $L_{Ar,Tr}$ at the nearest residential receptors, ensuring a low-impact outcome and protecting residential amenity.

Internally, acoustic amenity within the proposed office accommodation can be appropriately safeguarded through BS 8233–compliant sound insulation design, including a minimum party wall performance of Rw ≥ 42 dB (with a preferred target of 45–50 dB), effective flanking transmission control, and structural isolation of the padel courts to prevent structure-borne noise and vibration. Subject to these measures, the development is not predicted to give rise to adverse or significant adverse noise impacts and is therefore considered acoustically acceptable in planning terms, capable of achieving a good standard of amenity for both existing receptors and future occupants.

Appendix 1
Glossary of Acoustic Terms

Appendix 1: Glossary of Acoustic Terms

Decibel (dB)	This is a tenth (deci) of a bel. Decibel can be a measure of the magnitude of sound, changes in sound level and a measure of sound insulation. Decibels are not an absolute unit of measurement but are an expression of the ratio between two quantities expressed in logarithmic form.
dB(A)	A-weighted decibels, i.e. decibel level incorporating a frequency weighting (A-weighting), which differentiates between sounds of different frequency (pitch) in a similar way to the human ear. Measurements in dB(A) broadly agree with people's assessment of loudness.
Freefield	A situation in which the radiation from a sound source is completely unaffected by the presence of any reflecting boundaries.
Hertz (Hz)	Unit of frequency, equal to one cycle per second. The frequency of sound waves refers to the number of pressure fluctuations per second. Frequency is related to the pitch of a sound.
$L_{Aeq,T}$	The equivalent steady sound level in dB(A) containing the same acoustic energy as the actual fluctuating sound level over the given period, T. For example, daytime noise is generally measured over a 16 hour period, so T is 16 hours. $L_{Aeq,T}$ can be measured directly with an integrating sound level meter.
L_{A10}	The 'A'-weighted sound pressure level of the residual noise in decibels exceeded for 10 percent of a given time and is the $L_{A10.T}$. The L_{A10} is used to describe the levels of road traffic noise at a particular location.
L_{A50}	The 'A'-weighted sound pressure level of the residual noise in decibels exceeded for 50 percent of a given time and is the $L_{A50.T}$.
L_{A90}	The 'A'-weighted sound pressure level of the residual noise in decibels exceeded for 90 percent of a given time and is the $L_{A90.T}$. The L_{A90} is used to describe the background noise levels at a particular location.
L_{Amax}	The 'A'-weighted maximum sound pressure level measured over a measurement period.
R_w (or SRI)	The weighted sound reduction index as a single number laboratory measured rating used to describe the sound insulation of building elements.

Appendix 2
Schedule of Equipment

Appendix 2: Schedule of Equipment

Hawkins Noise Kit 1 - Equipment Set 3056:

Equipment Type	Manufacturer	Serial Number	Calibration Certification Number	Calibration Type	Date of Last Calibration Check	Date of Next Calibration Check
Nor-140 Type 1 Sound Level Meter	Norsonic	1403056	U49327	UKAS Calibration: 0789	22nd November 2024	November 2026
Nor-1209 Pre-amplifier	Norsonic	12528	49326	UKAS Calibration: 0789	22nd November 2024	November 2026
Nor-1225 Microphone	Norsonic	98361	49326	UKAS Calibration: 0789	22nd November 2024	November 2026
Nor-1251 Sound Calibrator	Norsonic	31233	U50977	UKAS Calibration: 0789	14th May 2025	May 2026
Nor-1284 Dehumidifier	Norsonic	222	Not Applicable			
Nor- 1212 Weather Protection Kit	Norsonic	Not Applicable				
Nor1408A/10 Extension Cable	Norsonic/Lemo	Not Applicable				

Laboratory Location
Campbell Associates Ltd
5b Chelmsford Road Industrial Estate
GREAT DUNMOW, Essex, GB-CM6 1HD
Phone 01371 871030

ilac-MRA UKAS CALIBRATION 0789 CALIBRATION

Certificate of Calibration and Conformance

Certificate number: **U49327**

Test Object: **Sound Level Meter, BS EN IEC 61672-1:2003 Class 1**

Producer: **Norsonic AS.**
Type: **140**
Serial number: **1403056**
Customer: **Hawkins Environmental**
Address: **The Square, Basing View, Basingstoke, Hampshire. RG21 4EB.**
Contact Person: **Nick Hawkins**
Order No:

Introduction:
Calibration has been performed as set out in CA Technical Procedures which are based on the procedures for periodic verification of sound level meters as per the **Test Object** listed above. Results and conformance statement are overleaf and detailed results, where appropriate, are provided in the attached Measurement Report.

Tested:	*Producer*	*Type*	*Serial No*	*Certificate No*
Microphone	Norsonic	1225	98361	49326
Calibrator*	Norsonic	1255	125525262	U49325
Preamplifier	Norsonic	1209	12528	Included

* The calibrator was complete with any required coupler for the microphone specified.

Additional items that have also been submitted for verification:
Wind shield N/A
Attenuator N/A
Extension cable N/A
These items have been taken into account wherever appropriate.

Instruction Manual: Im140_1Ed8R0En Firmware Version: v2.1.670 The test object is a single channel instrument.

Conditions	*Pressure kPa*	*Temperature °C*	*Humidity %RH*
Reference conditions	101.325	23	50
Measurement conditions	100.04 ±0.05	23.00 ±0.25	35.08 ±1.3

Calibration Dates:

Received date:	15/11/2024	Reviewed date:	22/11/2024
Calibration date:	22/11/2024	Issued date:	22/11/2024

Technicians: (Electronic certificate)

Calibrated by: *Palaniwel Marappan B.Eng (Hons), M.Sc*

Reviewed by: *Darren Batten*

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Doc ref: Slm-Cert-Master-V3-07

Page 1 of 2

Certificate of Calibration and Conformance

Continuation of Certificate number: **U49327**

The statements of conformance and observation notes detailed in this certificate are made with reference to the following standards in respect of the calibration of the test object.

Manufactured:	**BS EN IEC 61672-1:2003**
Periodic Tests:	**BS EN IEC 61672-3:2006**
Pattern Evaluation:	**BS EN IEC 61672-2:2003**

Conformance:
From markings on the sound level meter or by reference to the manufacturer's published literature it has been determined that the instrument submitted for verification was originally manufactured to the listed standard and similarly that the associated sound calibrator conforms to the BS EN IEC 60942 standard.

Measurement Summary:

Indication at the calibration check frequency - IEC61672-3 Ed.1 #9	Passed
Self-generated noise - IEC 61672-3 Ed.1 #10.2	Passed
Acoustical signal tests of a frequency weighting - IEC 61672-3 Ed.1 #11	Passed
Electrical signal tests of frequency weightings - IEC 61672-3 Ed.1 #12	Passed
Frequency weightings: A Network - IEC 61672-3 Ed.1 #12.3	Passed
Frequency weightings: C Network - IEC 61672-3 Ed.1 #12.3	Passed
Frequency weightings: Z Network - IEC 61672-3 Ed.1 #12.3	Passed
Frequency and time weightings at 1 kHz IEC 61672-3 Ed.1 #13	Passed
Level linearity on the reference level range - IEC 61672-3 Ed.1 #14	Passed
Toneburst response - IEC 61672-3 Ed.1 #16	Passed
Peak C sound level - IEC 61672-3 Ed.1 #17	Passed
Overload indication - IEC 61672-3 Ed.1 #18	Passed

Comments
Correct level with associated calibrator is 113.9dB(A).

Statement of Conformance
The sound level meter submitted has successfully completed the periodic tests of the standard listed for the environmental conditions under which the tests were performed. As public evidence(1) was available, from an independent testing organisation responsible for approving the results of pattern evaluation tests performed in accordance with the manufacturer's standard to demonstrate that the model of sound level meter fully conformed to the requirements of the said standard, the sound level meter submitted for testing conforms to the relevant class of the said standard.
(1 - evidence is held on file at the calibration laboratory)

Observations
The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor k = 2, providing a coverage probability of approximately 95 %. The uncertainty evaluation has been carried out in accordance with UKAS requirements. Details of the uncertainty for each measurement are available from the Calibration Laboratory upon request. Details of the sources of corrections and their associated uncertainties that relate to this verification are contained within the test report accompanying this certificate.

Decision Rule
Basic Meter Function - The decision rules will be applied in accordance with the procedure as described in BS EN 61672-3:2006.

This certificate relates only to the items tested above.

** End of Certificate **

Laboratory Location
Campbell Associates Ltd
5b Chelmsford Road Industrial Estate
GREAT DUNMOW, Essex, GB-CM6 1HD
Phone 01371 871030

CALIBRATION

Certificate of Calibration

Certificate number: **49326**

Test Object: **Measurement Microphone**

Producer: **Norsonic AS.**
Type: **1225**
Serial number: **98361**
Customer: **Hawkins Environmental**
Address: **The Square, Basing View,**
Basingstoke, Hampshire. RG21 4EB.
Contact Person: **Nick Hawkins**
Order No:

Measurement Results	Sensitivity (dB re 1V/Pa)	Sensitivity (mV/Pa)	Capacitance (pF)
Measurement 1	*-25.89*	*50.75*	*26.27*
Measurement 2	*-25.88*	*50.82*	*26.46*
Measurement 3	*-25.89*	*50.77*	*26.50*
Result (Average):	***-25.89***	***50.78***	***26.41***
Expanded Uncertainty:	0.10		2.02
Degree of Freedom:	>100		>100
Coverage Factor:	2		2

The stated sensitivity is the pressure sensitivity at 250Hz, S_{250}, and is valid at reference conditions. The following correction factors have been applied during the measurement:
Pressure:uncertainty dB/kPa Temperature:-0.005 dB/°C Humidity:0 dB/%RH

Conditions	*Pressure kPa*	*Temperature °C*	*Humidty %RH*
Reference conditions	101.325	23	50
Measurement conditions	99.974 ± 0.041	22.9 ± 0.2	35.8 ± 1.3

The calibration test report shown on the next page gives details of the response at other frequencies relative to this 250 Hz reference sensitivity. Results ≥100 Hz are obtained using an electrostatic actuator as described in BS EN 61094-6 and those below 100 Hz are obtained in a reference pressure chamber. Detailed results are available from the calibration laboratory upon request.

The reported expanded uncertainty of measurements is based on a standard uncertainty multiplied by the coverage factor of k=2, providing a coverage probability of approximately 95%. Where the degrees of freedom are insufficient to maintain this confidence level, the coverage factor is increased to maintain this confidence level.

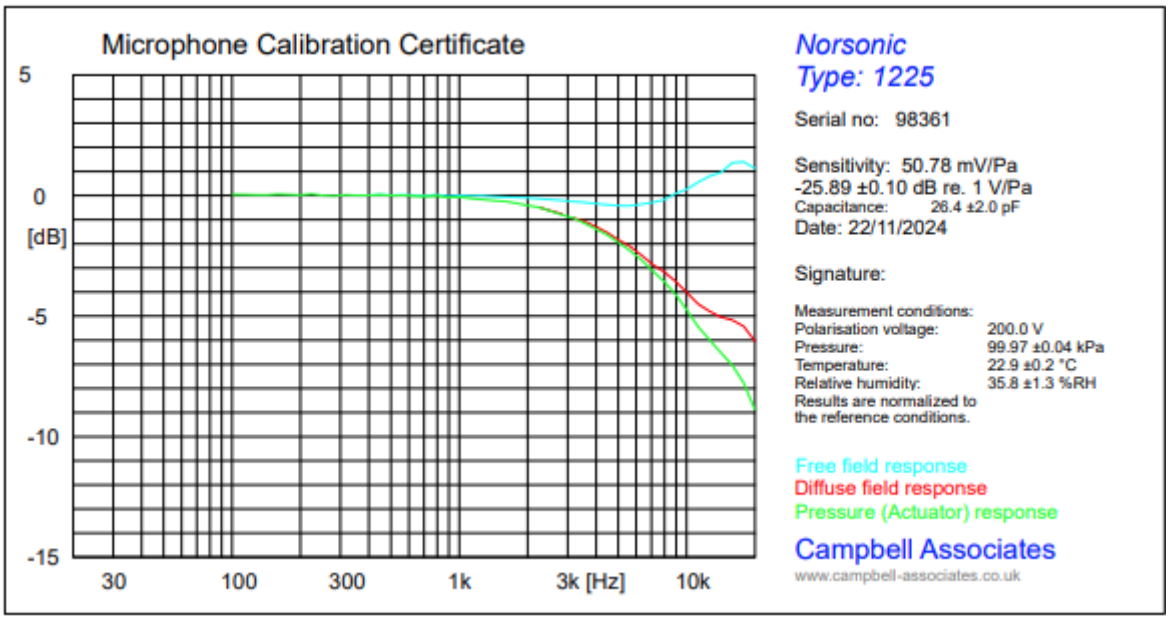
Calibration Dates:

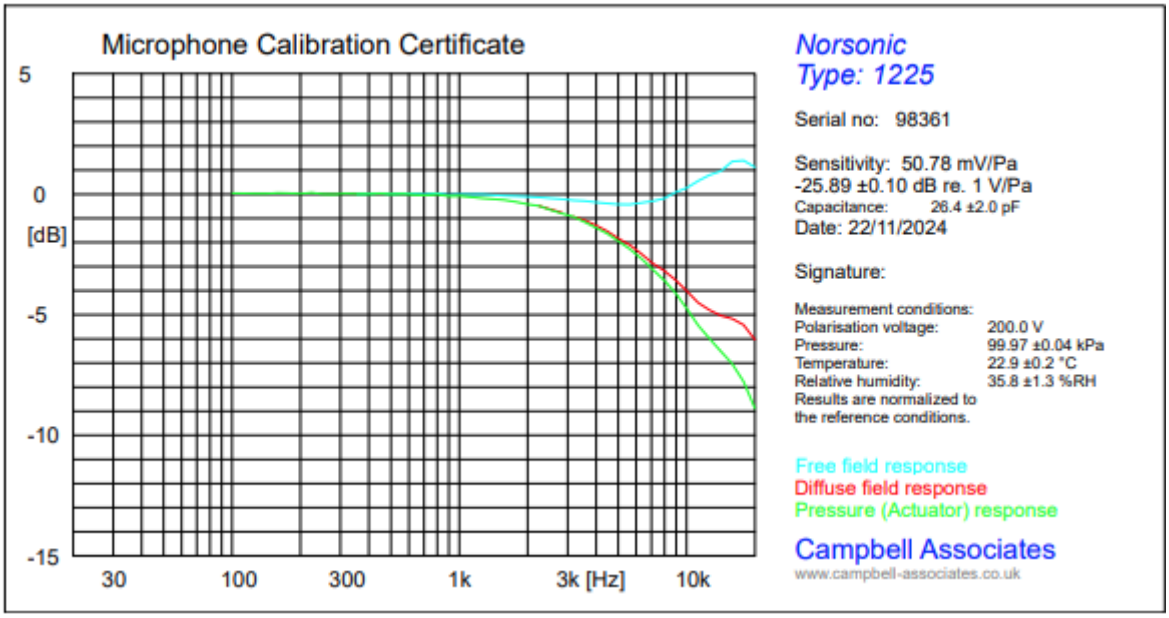
Received date:	15/11/2024	Reviewed date:	22/11/2024
Calibration date:	22/11/2024	Issued date:	22/11/2024

Technicians: (Electronic certificate)
Calibrated by: *Palanivel Marappan B.Eng (Hons), M.Sc*
Reviewed by: *Darren Batten*

This certificate is issued in accordance with the CA Quality Management system. It provides traceability of measurement to recognized national standards, and to the units of measurement realized at the National Physical Laboratory or other recognized national standards laboratories. This certificate may not be reproduced other than in full, except with the prior written approval of the issuing laboratory.

Doc ref: Mic-V6-Cert-Master-V3-05


Microphone Calibration Certificate
5
0
[dB]
-5
-10
-15
30
100
300
1k
3k [Hz]
10k
Norsonic
Type: 1225
Serial no: 98361
Sensitivity: 50.78 mV/Pa
-25.89 ±0.10 dB re. 1 V/Pa
Capacitance: 26.4 ±2.0 pF
Date: 22/11/2024
Signature:
Measurement conditions:
Polarisation voltage: 200.0 V
Pressure: 99.97 ±0.04 kPa
Temperature: 22.9 ±0.2 °C
Relative humidity: 35.8 ±1.3 %RH
Results are normalized to the reference conditions.
Free field response
Diffuse field response
Pressure (Actuator) response
Campbell Associates
www.campbell-associates.co.uk


Microphone Calibration Certificate
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Campbell Associates
www.campbell-associates.co.uk

Laboratory Location
Campbell Associates Ltd
5b Chelmsford Road Industrial Estate
GREAT DUNMOW, Essex, GB-CM6 1HD
Phone 01371 871030

Certificate of Calibration

Certificate number: **U50977**

Test Object: **Sound Calibrator**

Producer: **Norsonic AS.**
Type: **1251**
Serial number: **31233**
Customer: **Hawkins Environmental**
Address: **The Square, Basing View, Basingstoke, Hampshire, RG21 4EB**
Contact Person: **Nick Hawkins**
Order No:

Measurement Results	Level dB	Level Stability dB	Frequency Hz	Distortion %
Measurement 1	114.00	0.04	1000.59	0.35
Measurement 2	114.00	0.05	1000.59	0.35
Measurement 3	113.99	0.04	1000.59	0.35
Result (Average):	**114.00**	**0.04**	**1000.59**	**0.35**
Expanded Uncertainty:	0.1	0.02	1	0.1
Degree of Freedom:	>100	>100	>100	>100
Coverage Factor:	2	2	2	2

The stated level is relative to 20µPa. The level is traceable to National Standards. The stated level is valid at reference conditions. The following correction factors have been applied during the measurement
Pres:0.0005 dB/kPa Temp:0.003 dB/°C Humi:0 dB/%RH Load volume: 0.0003 dB/mm3

Conditions	*Pressure kPa*	*Temperature °C*	*Humidity %RH*
Reference conditions	101.325	23	50
Measurement conditions	101.534 ±0.042	22.4 ±0.1	41.4 ±1.3

The reported expanded uncertainty of measurements is based on a standard uncertainty multiplied by the coverage factor of k=2, providing a level of confidence of approximately 95%. Where the degrees of freedom are insufficient to maintain this confidence level, the coverage factor is increased to maintain this confidence level. The uncertainty has been determined in accordance with UKAS requirements.

Records: K:\C A\Calibration\Nor-1504\Nor-1018 CalCal\Current Year\NOR1251_31233_M1.nmf

Preconditioning
The equipment was preconditioned for more than 4 hours in the specified calibration environment.

Method
Calibration has been performed as set out in the current version of CA Technical procedure TP01

Calibration Dates:

Received date:	13/05/2025	Reviewed date:	14/05/2025
Calibration date:	14/05/2025	Issued date:	14/05/2025

Technicians: (Electronic certificate)
Calibrated by: *Arjun Jaiya*
Reviewed by: *Lauren Chitty*

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Doc ref: Calb-V6-Cert-Master-V3-09

Page 1 of 2

Certificate of Calibration

Continuation of Certificate number: **U50977**

Reference Microphone: WSM8 (A) - GRAS-40AG.147852

Measurements

The calibrator has been tested as described in the following annexes to BS EN IEC60942:2003 Sound Calibrators; B3.4 for sound pressure level, B3.5 for frequency, B3.6 for total distortion and A4.4 for short term stability of the pressure level.

Instruments and Program

A complete list of instruments, hardware and software that have been used for this calibration is available from the calibration laboratory

Comments

Statement of Calibration

The sound calibrator has been shown to conform to the class 1 requirements for periodic testing, described in annex B of BS EN IEC 60942:2003 for the sound pressure levels and frequencies stated, for the environmental conditions under which the tests were performed. However, as public evidence was not available, from a testing organisation responsible for pattern approval, to demonstrate that the model of sound calibrator conformed to the requirements for pattern evaluation described in annex A of BS EN IEC 60942:2003, no general statement of conclusion can be made about conformance of the sound calibrator to the requirements of BS EN IEC 60942:2003.

Notes:

The sound pressure level generated by the calibrator in its ½ inch configuration was measured five times and averaged by a WS2P working standard microphone for class 1 or 2 devices or a LS2P reference microphone for class 0 or LS devices as specified in the International Standard BS EN 61094-4. The results of three replications and the mean of the measurements obtained are given in the measurement results table of this certificate. The frequency and distortion were measured in a similar manner. The figures in BOLD are the final results; a small correction factor may need to be added to the sound pressure level quoted here if the device is used to calibrate a sound level meter that is fitted with a free field response microphone. See manufacturer's handbooks for full details of this and other corrections that may be applicable.

Observations:

Decision Rule:

The decision rules have been applied in accordance with the procedure as described in BS EN 60942:2003

This certificate relates only to the items tested above.

** End of Certificate **

Appendix 3
Summary of Sound Measurements

Appendix 3: Summary of Sound Measurements

Time	L_{Aeq}	L_{Amax}	L_{A10}	L_{A50}	L_{A90}
Tuesday 13th January 2026					
17:00	47.0	65.2	49.2	45.0	42.4
18:00	49.1	78.2	50.6	44.1	39.4
19:00	52.9	84.9	50.6	42.8	38.7
20:00	43.7	66.8	45.6	39.6	36.4
21:00	42.5	63.3	44.1	39.0	36.2
22:00	46.5	75.2	47.6	42.4	38.0
23:00	44.7	67.6	46.8	41.4	36.8
Wednesday 14th January 2026					
00:00	38.4	61.5	40.7	36.1	32.9
01:00	36.8	49.9	39.9	34.5	31.7
02:00	36.0	49.8	38.7	33.9	31.0
03:00	38.4	58.9	39.7	34.4	31.3
04:00	46.7	65.7	49.7	41.3	36.2
05:00	44.7	68.0	46.7	41.1	37.3
06:00	49.2	67.4	52.5	43.9	38.7
07:00	48.3	68.1	51.2	45.0	40.9
08:00	48.4	72.2	50.8	45.5	42.0
09:00	47.0	66.0	49.3	44.9	41.7
10:00	49.2	73.3	50.6	44.4	40.2
11:00	48.7	74.0	49.6	43.5	39.6
12:00	47.2	66.4	49.4	43.1	39.9
13:00	50.4	82.1	55.3	52.6	41.4
14:00	51.5	76.4	57.1	55.1	42.4
15:00	52.7	81.8	58.1	55.6	42.8
16:00	49.3	83.1	54.5	53.2	40.8
17:00	48.2	75.7	55.0	49.7	40.9
18:00	48.5	77.2	50.4	48.2	39.8
19:00	55.7	84.2	52.5	45.0	39.3
20:00	45.7	73.2	47.9	43.1	37.4
21:00	42.6	57.2	46.0	39.2	34.4
22:00	41.6	56.3	44.5	37.2	32.0
23:00	39.9	63.3	43.5	34.4	30.3
Thursday 15th January 2026					
00:00	40.5	57.6	43.4	33.9	31.2
01:00	38.7	58.8	39.3	30.6	30.0
02:00	36.5	56.1	37.1	27.8	28.1
03:00	39.4	59.6	40.0	31.5	27.7
04:00	41.8	67.2	43.5	35.1	29.8
05:00	44.5	70.2	46.3	38.0	33.9
06:00	47.0	72.2	50.2	44.9	39.4
07:00	48.4	81.3	50.4	47.4	43.4
08:00	46.9	75.4	48.7	45.7	42.1
09:00	46.2	65.7	47.9	43.9	38.6
Saturday 7th March 2026					
00:00	36.2	48.9	37.4	35.5	34.1
01:00	34.1	56.4	35.3	32.5	31.1
02:00	32.7	46.7	34.4	31.6	29.8

Time	L_{Aeq}	L_{Amax}	L_{A10}	L_{A50}	L_{A90}
03:00	31.8	44.0	33.6	30.5	28.7
04:00	31.3	52.3	32.9	30.4	28.5
05:00	34.7	47.1	36.5	33.9	32.3
06:00	46.6	73.6	44.9	38.3	35.3
07:00	47.6	74.3	47.6	42.2	39.7
08:00	46.5	71.7	46.6	42.4	40.4
09:00	45.5	65.6	46.5	43.3	41.7
10:00	43.0	58.6	44.9	41.8	39.9
11:00	44.2	65.8	45.6	42.7	40.9
12:00	45.8	73.2	46.6	42.6	40.6
13:00	42.0	57.5	43.9	40.7	38.6
14:00	42.1	55.5	44.1	40.9	38.9
15:00	42.8	61.5	44.8	40.9	38.3
16:00	41.3	61.2	43.3	39.8	37.7
17:00	42.0	69.8	43.7	40.9	38.9
18:00	45.7	70.0	46.3	41.2	38.9
19:00	46.1	79.0	44.1	39.2	37.2
20:00	38.4	54.2	40.1	37.5	36.1
21:00	39.1	55.7	40.5	37.5	35.6
22:00	35.3	49.9	36.8	34.6	32.9
23:00	34.9	52.8	36.6	33.1	31.3
Sunday 8th March 2026					
00:00	32.6	51.2	34.7	31.2	29.2
01:00	31.4	45.4	33.9	29.9	27.8
02:00	30.7	48.2	31.8	29.4	28.1
03:00	31.2	66.2	29.3	26.1	24.5
04:00	26.9	43.6	28.2	25.9	24.3
05:00	30.1	51.0	30.3	26.1	24.4
06:00	54.1	85.6	46.1	35.6	29.4
07:00	46.8	71.7	47.6	40.1	35.8
08:00	41.2	62.8	43.6	39.0	35.9
09:00	42.0	61.5	44.2	39.5	36.5
10:00	43.6	62.2	45.3	40.4	37.8
11:00	41.0	58.8	43.0	39.6	37.4
12:00	41.3	57.5	44.0	39.3	36.2
13:00	41.1	58.8	43.4	38.9	36.0
14:00	39.9	57.1	42.2	38.4	35.9
15:00	40.4	65.8	42.3	38.4	36.2
16:00	42.3	61.0	44.8	39.8	37.3
17:00	42.4	60.9	44.5	39.4	37.0
18:00	42.5	65.0	43.7	38.9	36.7
19:00	41.1	61.8	43.0	37.7	35.7
20:00	37.8	56.6	39.3	35.2	33.6
21:00	40.5	63.7	41.2	36.1	34.5
22:00	34.5	51.1	35.8	33.5	32.2
23:00	35.6	53.7	36.9	33.2	32.0