Planning Noise Assessment:
Egremont, Urban Fitness Gym,

May 2023






Experts in noise and vibration assessment and management

Document Control

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Job Number	14018A-20

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Document Status and Review Schedule

Report No.	Date	Status	Reviewed by
14018A-20-R01-01	25 May 2023	Final	Will Martin (Technical Director)

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1 Introduction

1.1 Noise Consultants Ltd (NCL) has been commissioned by Copeland Council (CC) to carry out a noise assessment in connection with a recent planning application[1] to vary planning conditions in respect of Units 5 and 6 of Ennerdale Mill, Bridge Road, Egremont. (the 'Site').

1.2 NCL has worked jointly with CC and the current site operator (Urban Fitness & Performance Gym (UFPG)), to consider noise impacts associated with the proposed condition variation. In evaluating the noise impacts associated with the proposed condition variation, consideration has also been given to noise complaints associated with the existing operation.

1.3 This report details the results of a site inspection, noise survey, assessment, outcomes and recommendations with regards to relevant national and local policy and guidance, as detailed in **Appendix A1**.

Existing Site and Permitted Use

1.4 As shown in **Figure 1**, the Site lies within the Ennerdale Mill Business Park. The previous use of the Site was industrial (bus depot) and some noise with industrial and transport characteristics is expected to have been present.

Extant Permission

1.5 The use of the Site as a gym is permitted under the an extant planning permission[2]. A noise assessment for this application was not requested by CC. Noise-related planning conditions are summarised below:

> *4. The use hereby permitted must not be open to the public/customers outside the following times:*
>
> *Monday – Friday: 05:30 - 21:00;*
>
> *Saturday – Sunday, including Bank Holidays: 08:00 - 20:00.*
>
> *5. Except for in emergencies the roller shutter doors must remain closed at all times.*
>
> *6. No exercise by users of the gym shall take place outside of the building on any of the land edged in red on the approved plan 'Site and Location Plan Existing, Scale 1:200, drawing No 19/0239/01, received by the Local Planning Authority on the 29th September 2020', at any time*

[1] Copeland Council. Planning application ref: PP-11477614, Variation Of Condition 5 (Roller Shutter Doors) & Variation of Condition 6 (Exercise Outside The Building) Of Planning Approval 4/20/2387/0F1 Change Of Use From Bus Garage & Workshop To Gym.

[2] Copeland Council. Planning application ref: 4/20/2387/0F1, Change Of Use From Bus Garage And Workshop To Gym. Approved 16 December 2020

Site Description and Environs

1.6 All existing gym activities take place within a large open plan space with the premises, located to the western boundary of the Site. The building is a steel portal frame type building. The roof and walls comprise thermal insulated cladding, without windows. Two thermally insulated sectional overhead doors on are located to the western elevation.

1.7 Car parking is provided to the building frontage and adjacent to the western site boundary. Photos showing the external layout of the Site are provided in **Appendix A3, Figure 3.** Industrial land uses are located immediately to the north, comprising several steel portal frame type buildings and external service yard areas. Open fields and the A595 are located to the south and west.

1.8 The nearest noise-sensitive receptors (NSRs) are located immediately to the west of the Site (adjacent to the Site entrance), and ~145m to the north.

1.9 In the absence of any noise from the Site or nearby industrial uses, the noise climate comprises distant road traffic, birdsong, distant aircraft, lowing cattle, barking dogs, and occasional walkers using public footpaths passing the Site.

Training Area, Gym Equipment, Amplified Music and Gym Users

1.10 Photos of the internal layout of the gym are provided in **Appendix A3, Figure 4.** Area for several activities including free-weights area, function, cardiovascular, and resistance areas are provided.

1.11 The gym and equipment incorporate several effective impact noise mitigation including;

- impact flooring to the entire training area;
- all weights training equipment include;
    - bumper plates (weights fabricated with a rubber exterior); and,
    - impact pads (to stop metal to metal impact noise when weights are dropped (Appendix A3, Figure 5).

1.12 A personal computer (PC) provides an audio source to a small mixer, both located at the reception desk. The output of the mixer is fed to a rack-mounted dBX DriveRack® PA2 loudspeaker management system (**Appendix A3, Figure 6**). With a microphone connected to this unit (it was not clear if one was), non-intrusive automatic EQ, and feedback elimination is possible. The unit also has a limiting option. NCL understand that the unit can be configured remotely, but were not provided any detail on its current configuration.

1.13 The audio output is fed several loudspeakers; 1no. ported cabinet loudspeaker at ~3.5m height in each corner of gym (**Appendix A3, Figure 7)**, and at least one ported sub-woofer in a corner of the training area away from the shutter doors. No speakers are located external to the building.

1.14 It was noted during the survey that the vast majority of gym users wore in-ear or over-ear headphones to listen to music throughout their training session. Occasional talking between customers was noted, but the level of amplified music was sufficiently low for a conversation to take place without the need for raised voices.

Complaints Associated with Existing Use

1.15 Formal complaints have been received by CC in relation to current operations, from nearby resident(s) concerning with the level of amplified music break-out from the gym. NCL understand that the residents noted that on some occasions, music, particularly low frequency bass was clearly audible within their property, even with windows and doors closed.

1.16 NCL understand that noise associated with cars arriving/departing the Site was not a significant cause for concern, despite the UFPG operating from 05:30hrs Monday-Friday.

1.17 Maximum music noise levels within the gym are understood to have been set at a level approved by a previous Environmental Health practitioner from CC. Details of this arrangement are unknown, however it is clear that the need for adequate control of amplified music is warranted to avoid significant adverse impacts on nearby properties.

Proposed Use

- The current planning application requests the removal / variation of Conditions 5 and 6 to facilitate the following operational requirements: Opening of the sectional overhead shutter doors in “very hot” weather conditions to facilitate the control of overheating during daytime working hours (daytime working hours are not well defined by the applicant in their planning submission); and
- Outdoor training classes to take place:
    - Typically, between 16:00-19:00hrs on weekdays;
    - in the designated external training area (shown in **Figure 1**), as far away as possible from the nearest and most exposed NSRs;

The operator has committed to there being no amplified music when the roller shutters are open. In respect of outdoor PT sessions the operator has committed to no use of loudspeakers or other source of music anywhere within the Site boundary at any time during external PT sessions. The operator has not committed to limiting the number of people that can attend a training session, however the available space would likely limit attendance to around 15 people.

1.18 No changes to the approved operating hours are requested.

Scope of Assessment

1.19 Noise from vehicles arriving / departing the Site is not currently a noise concern, and no change to the scope or details of the approved hours of use are proposed.

1.20 UFPG were requested to facilitate a trial run of outdoor training sessions in the proposed outdoor training area, well in advance of the survey, however it did not take place on the agreed survey date. The intention was to assess its likely noise impact directly, rather than through assumptions and calculations that may introduce an element of uncertainty.

1.21 This report therefore assesses noise emissions from within the Gym, both with and without amplified music, with the shutter doors open, with qualitative consideration given to noise issues from the use of the proposed external training area.

Notes

1.22 A glossary of acoustic terminology used in this report is provided in **Section 6.**

Figure 1: Site Location, Environs, Noise Measurement and Assessment Locations

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2 Noise Survey

Survey Details

2.1 A sound survey was undertaken by NCL on the morning of Sunday 26h March 2023.

2.2 Noise monitoring was undertaken using fully calibrated Class 1 instrumentation as defined in BS EN 61672-1:2013[3], and calibrated to traceable standards within 2 years of the surveys. Prior to and following the noise measurements, acoustic field-calibration of the sound level meters and microphones used in the survey was performed using an acoustic calibrator that itself had been calibrated within the preceding 12 months. No significant drift (i.e. >0.1dB) in the field-calibrated noise level was observed. Measurement microphones were fitted with suitable windshields for the duration of the noise monitoring and the sound level meters were time synchronised. Details of the instrumentation used is summarised in **Appendix A2**. Calibration certificates can be provided on request.

2.3 All noise measurements were conducted, where possible, in accordance with BS 7445-1:2003[4] and supplemented by detailed observations of the sound climate at each monitoring location.

Local Conditions

2.4 It was not feasible to safely deploy a weather monitoring station in any suitably open land that is representative of the wider area. Nevertheless, the observed weather was dry and mild (4-6 Deg. C), with generally clear skies, and a steady and calm (<1m/s) breeze from the north-east. Noise levels were therefore measured downwind of the A595.

2.5 There were no known traffic management measures (road restrictions and works, speed limits etc.) in place on nearby roads during the survey.

2.6 The local and weather conditions were therefore considered acceptable for the purpose of the survey and subsequent assessment.

Survey Methodology

2.7 For the purpose of this assessment, noise levels were measured at two locations, as shown in **Figure 1** and described in **Measurements at** LT1 were taken under free-field conditions (i.e. the sound level meter (SLM) was positioned at least 3.5m from all surrounding reflective surfaces other than the ground).

2.8 The measurement location inside the gym is shown in **Figure 1,** which was 1m from one shutter door, at a height of 1.4m above ground.

2.9 Table 1. Photos of the measurement locations are shown in **Appendix A3**.

[3] BS EN 61672-1:2013 'Electroacoustics. Sound level meters Specifications' (2013)
[4] BS EN 7445-1:2003 'Description and measurement of environmental noise. Guide to quantities and procedures' (2003)

2.10 Measurements at LT1 were taken under free-field conditions (i.e. the sound level meter (SLM) was positioned at least 3.5m from all surrounding reflective surfaces other than the ground).

2.11 The measurement location inside the gym is shown in **Figure 1,** which was 1m from one shutter door, at a height of 1.4m above ground.

Table 1: Description of Noise Survey Measurement Locations

Location	Description	Purpose
LT1	Part-attended, free-field measurement, 1.4 m above local ground, adjacent to rear garden of dwelling.	To measure baseline and operational noise levels.
IANL	Part-attended, reverberant measurement approx. 1.0m from left hand side (looking outwards from gym) shutter door	To measure internal noise levels, particularly music.

2.12 To quantify and characterise the underlying (baseline) noise climate at nearby receptors, the baseline survey commenced before the gym was operating. Location LT1 was selected as being representative of the nearest and most exposed dwellings and rear gardens to the Site.

2.13 Upon commencement of gym operations, noise levels were measured at LT1 as follows:

- Music played over the in-house PA system at a level noted by one of the proprietors in attendance as being the "typical level" (referred to as Reference Level 1[5] (Ref 1))
    - With both roller shutter doors closed
    - With both shutter doors open to a height of 1.8m above the threshold (indicated by the proprietor as being a suitable aperture for ventilation purposes)
- Supplementary measurements with music played over the in-house PA system at slightly higher level noted by the gym receptionist as being "about as high as it normally gets" (Reference Level 2[6] (Ref 2)) with roller shutter doors closed.
- Concurrent measurement of the internal reverberant sound level was undertaken

2.14 This approach provides a means of:

- quantifying the underlying (baseline) noise climate (in terms of the L_{Aeq} and L_{A90} noise descriptors) at the nearest receptors
- quantifying the ambient noise levels with music played over the in-house PA system and all other source of environmental noise (in terms of the L_{Aeq} and L_{A90} noise descriptors)
- calculating the specific music noise level at the receptors (MNL, in terms of the L_{Aeq} noise descriptor) attributable to the Development

[5] The PC was set to 100% volume output, and the mixer to around -35dB. Access to the dBX DriveRack® PA2 was not available
[6] The PC was set to 100% volume output, and the mixer to around -30dB. Access to the dBX DriveRack® PA2 was not available

2.15 Based on the above the MNL was compared to the baseline noise climate and other contextual factors in accordance with pertinent standards and guidance.

2.16 Towards the end of the survey an opportunity arose to witness noise levels within a bathroom at the front of one of the dwellings to the west of the Site with music playing at Reference Level 2 and with the shutter doors closed.

Survey Observations and Analysis

Baseline Noise Climate

2.17 The baseline noise climate at LT1 was measured between 07:16-08:02hrs, and can be characterised as distant road traffic and birdsong, with occasional walkers (and often their dogs) and distant running water. A proprietor arrived at ~07:30hrs to open up the Site.

2.18 Baseline noise levels measured in the absence of noise from the arriving vehicle are summarised in **Table 2** and were:

- 44 - 47 dB $L_{Aeq,5min}$ (46 dB $L_{Aeq,15min}$);
- with backgrounds of 40 - 41 dB $L_{A90,5min}$ (40 dB $L_{A90,15min}$)

2.19 The measured third-octave band noise baseline ($L_{A90,15min}$, $L_{A90,15min}$) noise levels are shown in Appendix A4, Figure 12**Error! Reference source not found.**.

Operational Noise

2.20 Measurement data has been used to calculate the Music Noise Level (MNL) at LT1. The results are summarised in **Table 2**.

2.21 This MNL was calculated by logarithmically subtracting the ambient noise 'without music' from the ambient noise level 'with music'. Where the two values are relatively close this can introduce potential uncertainty. Therefore in such cases, checks were conducted by calculating the MNL from 1/3 octave bands which were visibly prominent above the background (L_{A90}) sound level.

2.22 The IANL measurements, within the gym with amplified music playing, show very low levels of sound in the 25-40Hz region. Therefore, any measurements at receptors in this range has been discounted and was considered to be associated with off-site sources.

Ref 1 - 68 dB $L_{Aeq,T}$ IANL within the gym (Shutter Doors Closed)

2.23 **Faint amplified music** from the gym **was discernible against the underlying noise climate** at LT1 and around the broader eastern curtilage of dwellings adjacent to the Site. Determining the artist, song and lyrics was **generally not possible**, due to the music being comparable in level and predominantly masked by other environmental noise.

2.24 The calculated MNL at LT1 was 38 dB L_{Aeq} which is 2dB lower than the background (L_{A90}) sound level measured between 07:00-08:00hrs.

2.25 Third-octave measured data is provided in **Appendix A4**, **Figure 12**[7]. The figure indicates that the MNL (L_{eq}) is above the background sound level from 25 to 200Hz. The L_{Aeq} in the 1/3 octave bands 50 – 200Hz is 35 dB L_{Aeq} which compares favourably with the L_{Aeq} value calculated above.

2.26 Whilst faintly discernible, the overall level of amplified music was **judged to be broadly acceptable** at the nearest dwellings.

Ref 1 - 68 dB $L_{Aeq,T}$ IANL within the gym (Shutter Doors Open)

2.27 With both **shutter doors open**, music was **clearly audible and songs and lyrics identifiable** at LT1 and the surrounding area, owing to the reduced building envelope sound insulation of the gym building. The sound levels **were judged to be subjectively unacceptable**.

2.28 The calculated MNL at LT1 was 45 dB $L_{Aeq,T}$, which is 5dB higher than the background (L_{A90}) sound level measured between 07:00-08:00hrs.

2.29 Spectral analysis (**Appendix A4, Figure 13**) indicates that music is above the background sound level in all third-octaves, up to 2.5kHz.

Ref 2 – 73 dB $L_{Aeq,T}$ IANL within the gym (Shutter Doors Closed)

2.30 Faint amplified music from the gym was discernible against the underlying noise climate at LT1, and it was just possible to identify the artist/song and lyrics, and was judged to be subjectively unacceptable externally.

2.31 The calculated music MNL at LT1 was 45 dB L_{Aeq}, which is 7dB higher than under Ref 1 levels (coinciding with an increase on the main mixer fader). The MNL was 5dB above the background (L_{A90}) sound level measured between 07:00-08:00hrs.

2.32 Third-octave measured data is provided in **Appendix A4, Figure 12**[7]. The figure indicates that the MNL (L_{eq}) is above the background sound levels from 25 to 400Hz and 630 to 2kHz.

2.33 The L_{Aeq} in the 1/3 octave bands 50 – 400Hz and 630 to 2kHZ is 46 dB L_{Aeq} which again compares favourably with the L_{Aeq} value calculated above

[8] Bracketed values compare the L_{Aeq} value with the measured baseline L_{Aeq}, and L_{A90}'s with music against the background L_{A90}.

Within residents property - Ref 2 -– 73 dB $L_{Aeq,T}$ IANL within the gym, (+5 dB, Shutter Doors Closed)

2.34 Towards the end of the survey an opportunity arose to witness noise levels within a bathroom at the front of one of the dwellings to the west of the Site. The property had an unobstructed direct line of sight to the gym.

Noise Break-out Without Music (Shutter Doors Open)

2.35 In the absence of music noise and with the shutter doors open, infrequent and faint impact noise from a limited number of weights machines was audible against the underlying noise climate. There was no change in the character or level of sound, and overall sound levels were **judged to be acceptable.**

Table 2: Summary of Measured Noise Levels and Calculated MNL at LT1.

Condition			Measured Noise Levels and Calculated MNL[8]		
Site Operation	Gym Noise Level ($dBL_{Aeq,T}$)	Shutter Doors	Ambient ($dBL_{Aeq,T}$)	MNL, ($dBL_{Aeq,T}$)	Background ($dBL_{A90,T}$)
Baseline (Site not operating)	-	n/a	46	-	40
Amplified music within gym at level Ref1	68	Closed	47	35	42
		Open	48	45	45
Amplified music within gym at level Ref2	73	Closed	48	46	46

[8] Bracketed values compare the L_{Aeq} value with the measured baseline L_{Aeq}, and L_{A90}'s with music against the background L_{A90}.

3 Assessment

Noise Guidance

3.1 There are no specific national (or local with respect to CC) guidance or standards that provide a commonly accepted and well rehearsed methodology for the assessment of amplified music from gyms. Nevertheless, there are several documents of significant relevance, as follows, which are see summarised in detail in **Appendix A1**:

- ProPG: Gym Acoustics Guidance (GAG, March 2023)
- IOA Good Practice Guide on the Control of Noise from Pubs and Clubs (IOA GPG)
- Noise Act Research NANR 163 - Noise from Pubs and Clubs Phase II (2006) (NANR 163)
- BS 8233:2014 BS 8233:2014 Guidance on Sound Insulation and Noise Reduction for Buildings

3.2 The recently produced GAG (**Appendix A1)** provides guidance on the control of noise from gyms, and is intended for gym owners, operators, designers and Local Planning Authorities (LPA). It covers a wide range of topics, including the sources, effects, and mitigation of gym associated noise and vibration, as well as guidance on legal requirements, such as planning conditions and policy considerations.

Relevant Noise & Vibration Assessment Standards and Guidelines

ProPG: Gym Acoustics Guidance (GAG, March 2023)

3.3 The recently produced GAG (**Appendix A1)** provides guidance on the control of noise from gyms, and is intended for gym owners, operators, and designers, Local Planning Authorities (LPA). It covers a wide range of topics, including the sources, effects, and mitigation of gym associated noise and vibration, as well as guidance on legal requirements, such as planning conditions and policy considerations.

3.4 The main focus of the GAG is noise transmission from a gym to sensitive receptors within the same building, but the GAG does provide useful guidance in relation to internal sound criteria for gym activity, including music.

3.5 The GAG “G-Curves” provide 1/3 octaves sound spectra envelope which is described as a single figure. The guidance advises that the internal values in **Table 3** will not be suitable in all settings, particularly where the background noise is particularly low, or high. The guidance advises that levels below the upper values tended to avoid significantly adverse impacts (SOAEL) occurring and higher levels than these should generally be avoided, but this is highly dependent on context.

Table 3: GAG G-Curves (See Appendix G): Guidance Internal Airborne Sound Target Criteria for Gym Activity – Residential Areas

Receptor Type	Airborne Sound (e.g., music) $L_{eq,T}$ (31.5Hz to 8kHz)
Residential Areas	G15-G25 (day) G10-G20 (night)

Outcome

3.6 At Reference Level 2, with shutter doors closed, within habitable rooms of a nearby property, amplified music was barely audible on an open window basis. Consequently, determining compliance with the GAG G-Curves was exceptionally difficult as the level difference between the background and MNL within the property was sufficiently small enough that the MNL could not be determined. However, very low audibility is a positive indication that the amplified music is not at an unacceptable level, and is likely below G15.

IOA Good Practice Guide on the Control of Noise from Pubs and Clubs (IOA GPG)

3.7 **Appendix A4**, **Figure 12** shows the calculated MNL with shutter doors closed is above the background sound level in some third-octaves, and therefore exceeds the draft noise criteria (**Appendix A1**, **Table 9**) of this guidance. Greater exceedances occur for Ref 2 levels (and above) with shutter doors closed. This aligns with survey observations, where music noise was barely discernible inside noise sensitive spaces of one NSR.

Outcome

3.8 The draft criteria has been exceeded at low frequencies, however, the MNL at Ref 1 levels is low with the shutter doors closed, which was judged to be acceptable.

Noise Act Research NANR 163 - Noise from Pubs and Clubs Phase II (2006) (NANR 163)

3.9 **Appendix A1, Table 10** describes the outcomes of research to determine the acceptability of amplified music within a residential setting in the absence of significant masking sound. The table provides a semantic scale associated with internal levels of sound exposure.. A sound level of 17 dB $L_{Aeq,5min}$ was determined to be 'clearly acceptable'. Assuming that a partially open window provides 13 dB(A) sound attenuation, this corresponds to a external free-field sound level of 30 dB $L_{Aeq,5min}$. For this Site the MNL is consistently above this external level, however it should be noted that there is a 31dB(A) difference between a level that would be considered 'clearly acceptable' and one that was 'clearly unacceptable'. Notably an internal sound level of 31dB(A) would be considered 'just acceptable', which is consistent with an external free-field level of 44dB(A).

3.10 Under Ref 1 and Ref 2 music noise levels and with shutter doors closed, the calculated external MNL was 35 dB L_{Aeq} and 46 dB L_{Aeq} respectively. With regards to the Semantic Descriptors of **Appendix A1, Table 10**, the equivalent absolute internal music noise on a windows open basis would be:

- 7dB(A) below "just acceptable" under Ref 1 music levels; and,

- 1dB(A) below “just unacceptable” under Ref 2 music levels.

3.11 The assessment under Ref 2 levels conflicts with out subjective assessment which found that music was barely audible within habitable rooms of a nearby dwelling, and is due in part to masking by other environmental noise.

Outcome

3.12 Our subjective opinion aligns well with the NANR163 assessment, although external noise levels were deemed unacceptable externally at Ref 2 levels.

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

3.13 BS 8233:2014 provides guidance for the control of noise in and around buildings. It is applicable to the design of new buildings, or refurbished buildings undergoing a change of use. It is not strictly to be used when assessing how new commercial development may affect existing residential areas. However it is often cited in terms of providing suitable levels of residential amenity.

3.14 BS 8233:2014 provides guideline values that it is desirable not to exceed during daytime and night-time periods and apply to noise without a specific character, such as road and rail traffic. These values are generally considered to represent the LOAEL. A 5dB relaxation of the values is suggested where new development is considered necessary or desirable and reasonable internal conditions still achieved.

3.15 BS 8233:2014 suggests that where the source of noise being considered has distinguishable characteristics, lower values may be more appropriate. The GAG also recognises BS 8233:2014 criteria, but does not acknowledge these values as being entirely appropriate for assessment of music.

Internal Amenity

3.16 Assuming that a partially open window provides a 13dB reduction to noise ingress, the estimated resulting internal MNL would be:

- 25 dB L_{Aeq} Under Ref 1 levels; and,
- 32 dB L_{Aeq} Under Ref 2;

3.17 These are below the internal guideline values of BS 8233:2014 for living areas and bedrooms during the day.

External Amenity

3.18 Under Ref 1 and Ref 2 music noise levels and with shutter doors closed, the calculated MNL was 35 dB L_{Aeq} and 46 dB L_{Aeq} respectively. These are below the lower guideline values of 50 dB $L_{Aeq,T}$

advocated in BS 8233:2014. However its is noted that these BS8233 criteria are for 'steady noise sources' without specific character, previously termed "anonymous noise".

Outcome

3.19 The results of the survey and calculation, and observations made at the nearest residents property indicate music noise levels are below the guideline values of BS 8233:2014 internally. As noted, music was just audible within a nearby property and supports the opinion that, particularly under Ref 1 levels, music is at or below LOAEL.

3.20 Externally, at Ref 1 levels the MNL of 35 dB $L_{Aeq,T}$ was well below 50dB$L_{Aeq,T}$, and the cumulative sound level (including other ambient noise) of 47 dB $L_{Aeq,T}$ was likewise below 50dB$L_{Aeq,T}$.. At Ref 2 levels, the MNL of 45 dB $L_{Aeq,T}$ was still below 50 dB $L_{Aeq,T}$ and likewise the cumulative level of 48 dB $L_{Aeq,T}$.

Change in Noise Level and Character

Closed Shutters

3.21 At Ref 1 levels, the baseline ambient sound level ($L_{Aeq,T}$) increased by 1 dB. At Ref 2 levels, a 3 dB increase was observed (2.6 dB), which is potentially significant.

3.22 At Ref 1 levels, background (L_{A90}) sound levels increase by 2 dB, which is considered a small change. At Ref 2 levels, the background sound level increased by 6dB, which is considered potentially significant, given that music was identifiable.

3.23 Further increases in the IANL above Ref 2 levels would likely result music being clearly perceptible and therefore unacceptable.

Open Shutters

3.24 Noise level changes with shutters doors open were comparable to those measure at Ref 2 levels with shutters closed. Songs were easily identifiable, and were considered unacceptable.

Summary and Assessment Outcome (Amplified Music)

3.25 The outcomes of various assessments considered are summarised in the following table.

Table 4: Assessment Summary (Amplified Music)

Assessment Method	Internal Space	Assessment Period	Threshold Range	Threshold Exceeded / Assessment Outcome
ProPG: GAG	Living Room / Bedroom	Daytime (07:00-23:00hrs)	G15-G25 (day)	Likely below G15 at Ref 1 or Ref 2 levels
	Bedroom	Night-time (23:00-07:00hrs)	G10-G20 (night)	
IOA GPG	Living Room / Bedroom	Daytime (07:00-23:00hrs)	L_{Aeq} (EN) should not exceed L_{A90} (WEN) And L_{10} (EN) should	Draft criteria exceeded. Music potentially audible,

Assessment Method	Internal Space	Assessment Period	Threshold Range	Threshold Exceeded / Assessment Outcome
	Bedroom	Night-time (23:00-07:00hrs)	not exceed L_{90} (WEN) in any 1/3 octave band between 40 and 160Hz.	particularly at Ref 2 levels
NANR 163	Living Room / Bedroom	Daytime (07:00-23:00hrs)	Sliding scale of acceptability	7dB(A) below "just acceptable" under Ref 1 music levels; and , 1dB(A) below "just unacceptable" under Ref 2 music levels
	Bedroom	Night-time (23:00-07:00hrs)		
BS 8233:2014	Living Room / Bedroom	Daytime (07:00-23:00hrs)	35-40 dB $L_{Aeq,16hr}$	Barely audible internally at Ref 2 levels, and below 35dB L_{Aeq} (calculated on windows open basis – not measured).
	Garden		50-55dB $L_{Aeq,16hr}$	Music audible at Ref 1 (38 dB $L_{Aeq,T}$.) Considered reasonably acceptable. Songs identifiable at Ref 2 levels. Cumulative noise level just below 50 dB L_{Aeq}
Change in noise levels	Garden	Daytime (07:00-23:00)	>+3 in the L_{Aeq} or L_{A90} potentially significant	Small changes at Ref 1. Significant changes at Ref 2.

Outcome of Assessment of Amplified Music – Ref 1 (Shutter Doors Closed)

3.26 In qualitative terms, music from the existing use is faintly audible outside the NSRs, and barely audible internally.

3.27 In quantitative terms it is unlikely that Ref 1 levels (internal) would exceed the G-Curve thresholds found in the most recent guidance (ProPG GAG). The draft criteria of the IOA GPG would be slightly exceeded at low frequencies, however, the MNL at Ref 1 levels is low with the shutter doors closed, which was judged to be acceptable. By reference to NANR 163 the assessment indicates internal MNLs would be below "just acceptable" on a windows open basis. Small increases of in the external cumulative sounds levels were identified at NSRs. Internal MNLs are well below the BS 8233:2014 thresholds, albeit these relate to "anonymous" sound.

3.28 On balance, it is considered that the music noise impact falls just above LOAEL but is just acceptable. Nevertheless, national policy requires noise levels above the LOAEL (and below the SOAL) to be minimised. Therefore, noise reduction, control, mitigation, and management measures are required. Such measures are considered in the following section.

Outcome of Assessment of Amplified Music– Ref 2 (Shutter Doors Closed)

3.29 In qualitative terms, music from the existing use is audible outside the NSRs with songs identifiable. The music however remains barely audible internally.

3.30 In quantitative terms, it is unlikely that Ref 2 levels (internal) would exceed the G-Curve thresholds found in ProPG GAG. The draft criteria of the IOA GPG would be slightly exceeded in more third-octaves than under Ref 1 levels. By reference to NANR163 the assessment indicates internal MNLs would be rated below "just unacceptable" on a windows open basis. Increases of overall levels of MNL outside the NSRs is at least 3dB. Internal noise levels are below the BS 8233:2014 thresholds and were judged to be acceptable. The cumulative external noise level is just below the 50 dB LAeq advocated by BS 8233 for rear gardens, albeit is criteria relates to "anonymous" sound.

3.31 Overall, given the contextual and qualitative factors, it is considered that music at Ref 2 levels results is an unacceptable noise impact externally. National policy requires such noise levels above to be avoided.

3.32 The main source of noise break out was via the closed shutter doors. Therefore, in the absence of additional mitigation to the building envelope of the gym, the indoor ambient noise level with the gym should be limited to 68 dB $L_{Aeq,5min}$.

Outcome of Assessment of Amplified Music – Ref 1 (Shutter Doors Open)

3.33 The assessment indicates that noise impact with shutter doors open to a height of 1.8m above the threshold, and the MNL music would be comparable to that associated with Ref 2 levels and the doors closed. In both cases music noise levels would be considered unacceptable, and therefore should be avoided.

Noise Break-out Without Music and Shutter Doors Open

3.34 In the absence of music noise and with the shutter doors open, noise from within the gym was limited to subjectively faint and infrequent metallic impact noise from a limited number of machines. This can easily be reduced and mitigated almost entirely using impact machine washers. The residual noise from wihtin the gym would be practially negligible at the NSRs, based on site observationsduring the survey.

3.35 It was noted that during the survey, there were around 8 users within the gym, which is unlikely to be full capacity. Consequently, higher noise levels may arise from small groups of gym users talking loudly within the gym and with shutter doors open.

3.36 It is unrealistic to expect gym users to be silent, and this human element is inherently difficult to predict. Nevertheless, with appropriate management and control measures in place, noise break-out can be minimised and expected to be acceptable for the majority of the time.

4 Noise Mitigation and Control

Amplified Music

Absolute Levels

4.1 The following music noise levels are recommended (as measured at IANL), provided that shutter doors are closed:

- ≤63 dB $L_{Aeq,5min}$ before 07:00hrs (to assist in ensuring inaudibility within habitable rooms at night; and,
- ≤68 dB $L_{Aeq,5min}$ between 07:00 and 21:00 Mon-Friday and 07:00 - 20:00hrs all other days (to align with the approved operating hours).

Control Measures

4.2 The following control measures are recommended to provide suitable residential amenity at NSRs and in so doing minimise the likelihood of complaints. Where appropriate and reasonable, some or all of the measures could be secured by a suitably worded planning condition

- No loudspeakers to be used externally at any time.
- Installation of a tamper proof automatic sound limiter/compressor as part of the PA system.
- Limiter thresholds to be set to an approved level witnessed by an environmental health practitioner.
- An interlock should be provided in relation to the shutter doors such that once opened music noise is automatically reduced significantly.
- Changes to the PA system or loudspeaker locations should not occur without recalibration of the noise limiter/compressor.

Gym Equipment

4.3 Gym equipment is not a significant source of noise. Nevertheless, the following measures are recommended to minimise noise emission from gym equipment, particularly when the shutter doors are open;

- all gym equipment should be well maintained;
- impact resistant flooring should be retained, be well maintained and made good where necessary;
- resistance impact machine washers (as shown in **Appendix A3, Figure 11**) are installed on relevant weight machines;

Ventilation and cooling

4.4 The assessment indicates that unacceptable noise impact would result with amplified music and shutter doors open, justifying the need for extant condition 5 and ongoing noise control.

4.5 However, it is noted that the planning application specifically requests that shutter doors are allowed to be open to aid the control of overheating during warmer periods, and without amplified music within the gym. Under these conditions, noise levels at the nearest dwellings should be at an acceptable level, although it is noted that the gym was not at full capacity during the noise survey and no event was taking place.

4.6 Based on the assessment above being a general rule the following measures are recommended:

- Shutter doors not to be raised more than 2m above the threshold and only when necessary for cooling purposes;
- Shutter doors to remain closed before 08:00hrs and after 20:00hrs, and only when necessary for cooling purposes;
- Shutter doors to be closed when an outside training session is taking place.

4.7 Considering the noise risk in relation to gym activity (with no amplified music) the operator should consider minimising reliance on opening the shutter doors by providing openable elements (louvres / dampers) in the eastern elevation of the building to maximise cross ventilation.

4.8 The use of large portable fans used to enhance air flow within the gym should also be considered, and care taken when they are used to ensure that they do not unduly affect nearby NSRs.

4.9 New items of ventilation and cooling plant would likely be the lowest risk approach in obviating the need for opening the shutter doors at all. New plant and equipment should be carefully selected and located based on the findings of a detailed noise assessment, which can be secure by condition.

Shutter Doors

4.10 Noise break-out from the gym results from a combination of shutter doors and thermal insulated cladding.

4.11 The existing insulated shutter doors are considered to provide a reasonable levels of sound insulation. Improvements to the roller shutter doors could provide some noise reduction benefits at NSRs but significant overall improvement would also require the wall and rood cladding to be enhanced by way of plasterboard internal wall linings or similar.

External Training

4.12 The noise level of training sessions can vary significantly, depending on the number of participants, the type of exercises and the equipment used. Clearly, in this setting outdoor training sessions

should not include amplified music. The use of a megaphones and whistles during outdoor fitness classes must also be avoided.

4.13 It was not been possible to measure and assess noise impact from the proposed external training area directly. There are no reliable sources of information relating to the range of activities that may take place, but it is envisaged that some degree of vocal encouragement occur.

4.14 The gym operator did not facilitate an external training session at the Site requested for this assessment, and consequently, it is not possible to assess the associated noise impact without significant uncertainty. In the absence of obtaining reliable real-world data for use in the assessment, alternative approaches may be considered. For example, under section 72 of the Town and Country Planning Act 1990 the local planning authority may grant planning permission for a specified temporary period. Circumstances where a temporary permission may be appropriate include where trial runs are necessary or better suited to assess noise effects, and where it is expected that the planning circumstances will change in a particular way at the end of that period. Adopting this approach would permit external training sessions for a temporary period so that noise impacts may be considered and assessed, and its future long-term feasibility be robustly determined.

4.15 Therefore, it is recommended that external training sessions are, as proposed, restricted to weekdays, one class at a time, initially for a temporary period, which is secured by a suitably worded planning condition. A restriction in the times between which they take place should also be secured by condition.

Events

4.16 NCL understand UFPG occasionally hold events, although timings, duration, and purpose of the events that might be held is unknown. Some events may be considered Regulated Entertainment under the provisions of the Temporary Event Notice (TEN) scheme.

4.17 A TEN license is a separate legal requirement under the Licensing Act 2003, which regulates the provision of “entertainment[9]” in the UK. The purpose of a TEN is to ensure that temporary events adhere to specific licensing regulations, irrespective of any planning conditions that may be in place. These can include restrictions on the number of people attending the event, the hours during which regulated entertainment can take place, etc. It's important to note that certain limitations and conditions apply to TEN licenses, including restrictions on the number of TENs that can be applied for in one calendar year. In England, the need for a Temporary Event Notice (TEN) cannot be replaced by a planning condition in its entirety. Planning conditions focus on matters such as land use, building regulations, environmental impact, or development permissions, but do not grant permission for alcohol sales or provision of regulated entertainment. Whilst planning conditions can sometimes be imposed on a premises to control the use of the land, they typically do not cover the authorization for the provision of regulated entertainment at temporary events.

[9] Examples of Regulated Entertainment include but are not limited to, music (live or recorded), and indoor sporting event

4.18 Therefore, even if a planning condition exists, a separate TEN license could still be necessary to provide regulated entertainment for some events.

4.19 Therefore, the LPA should formalise a view in whether to authorise some events by way of a TEN.

Noise Management Plan (NMP)

4.20 The NMP submitted with the application should be updated, in due course, and secured by condition if pursuant to planning approval, as necessary.

4.21 The NMP should consider the needs of all affected stakeholders, and as a minimum include;

- **A description of the site and likely noise emissions**: This should include the source of the noise, the times and days when the noise is most noticeable, and the impact of the noise on people and the environment.
- **A list of noise control measures**: These measures should be specific and where necessary quantifiable, and should be designed to reduce the noise levels to an acceptable level.
- **A realistic and achievable timeline**: For implementing any additional or future noise control measures.
- **A monitoring and/or review plan** outlining how the noise emissions from the Site will be monitored to ensure that the noise control measures are effective.
- **Formalise a complaints and resolution procedure and reporting** to document and kept on record, along with the response, immediate actions and long term actions in an incident book. The complaints procedure should therefore include;
    - Who is responsible for managing incoming complaints;
    - Details of the formalised process for recieving complaints by sensitive receivers located in the vicinity;
    - How the complainant will be kept informed;
    - Retention of soft copies of any complaints received and their responses for a period of six years, whilst being cognisant of the latest GDPR regulations and appropriate steps to protect individuals' sensitive data, and should be made available to the LPA within a time frame to be agreed.
    - Details of the investigation/resolution process.

Sample Conditions

4.22 Paragraph 54 of the NPPF states:

> *"Local Planning Authorities should consider whether otherwise unacceptable development could be made acceptable through the use of conditions"*

4.23 Paragraph 56 of the NPPF states planning conditions should only be imposed where they are:

- necessary;
- relevant to planning and;
- to the development to be permitted;
- enforceable;
- precise, and;
- reasonable in all other respects.

4.24 Care should be taken when considering using conditions that prevent any permitted development from beginning until the condition has been complied with. Such conditions should only be used where the local planning authority is satisfied that the requirements of the condition (including the timing of compliance) are so fundamental to the development permitted that it would have been otherwise necessary to refuse the whole permission. A condition precedent that does not meet the legal and policy tests may be found to be unlawful by the courts and therefore cannot be enforced by the local planning authority if it is breached.

4.25 Therefore, in light of the assessment outcome, and the recommendations contained in this report, the following Conditions are suggested.

Table 5: Suggested Planning Conditions

Noise Sources	Condition Type	Example Wording	Justification / Reasoning
Other potentially significant sources	Perpetual Condition	Unless otherwise agree with the LPA, no loudspeakers, megaphone or whistles are permitted externally, at any time.	To secure ongoing control of music and other significant sources for the life of the approved development.
Shutter Doors		In respect of the control of overheating: 1. Shutter doors must not be raised more than 2m and only when necessary for cooling purposes 2. Shutter doors to remain closed before 08:00hrs and after 20:00hrs; 3. Shutter doors to be closed when an outside training session is taking place	To secure ongoing control of noise break-out for the life of the approved development.
Gym Equipment		All gym equipment should be well maintained, and existing impact resistant flooring should be retained, be well maintained, and replaced with comparable products where necessary.	General noise mitigation

Noise Sources	Condition Type	Example Wording	Justification / Reasoning
Amplified Music	Within 3 months of approval	An Electronic Sound Level Attenuation System otherwise known as an acoustic limiter/compressor shall be fitted before the amplifier in the signal chain with the thresholds of the limiter set on all channels. The sound attenuation device shall be installed within 3 months of the date of this planning decision, and set by a suitably qualified acoustician/sound engineer and with input from an Environmental Health Practitioner from the LPA. The device shall be and secured so that it cannot be overridden or tampered with by persons other than the appointed sound system engineers/acoustic consultant. The sound attenuation device shall not be altered without prior agreement with the LPA or Environmental Health Service. The specification of the Sound Level Attenuation System shall be submitted to and approved by the LPA	To ensure the music noise levels are brought under control within a timely manner.
All / General		A Noise Management Plan (NMP) shall be submitted to and approved by the LPA within 3 months of the date of this planning decision. The NMP shall include as a minimum, written details of the following information; 1. Organisational responsibility for noise control 2. Hours of operation of the gym 3. Details of the planning conditions controlling noise/ 4. Details of all health and fitness activities that will be undertaken and any activities that will be restricted and/or prohibited. 5. Details of how the operational noise impact will be managed on a day-to-day basis. 6. A plan showing the layout of the health and fitness studio area and proposed activity zones. The plan will include details of the noise insulation and isolation mitigation measures included within each activity zone, corresponding any noise mitigation and reduction measures. 7. Specification details of all noise insulation and isolation materials installed within each activity area, corresponding with the proposals in the Acoustics Report reference. 8. Details of community liaison and complaints logging, investigation, and reporting. 9. Details, method and procedure for reviews of the NMP.	To formalise the ongoing need for noise management, control, and complaints handling

Noise Sources	Condition Type	Example Wording	Justification / Reasoning
Outdoor Training	Time limited / Temporary	The use of the external training area; 1. is permitted for a period no longer than 3 months from a date to be agreed with the LPA, and no less than 30days in advance. Within this period, noise from the use of the external training area shall be witnessed and assessed at the nearest noise-sensitive receptors by a suitably qualified acoustician and/or LPA; 2. is restricted to weekdays (excluding bank holidays) only, and between the hours of 16:00 - 19:00hrs; and, 3. is restricted to one class at any one time. The assessment methodology in (1) above shall be agreed in advance with the LPA, and the assessment used to determine if the use and timings of the external training area shall continue, subject to approval by the LPA.	To facilitate the assessment of noise from, and the feasibility of the ongoing use of the proposed external training areas

5 Conclusions

5.1 Noise Consultants Ltd (NCL) has been commissioned by Copeland Council (CC) to carry out a noise assessment in connection with a recent planning application from Urban Fitness & Performance Gym (UFPG) to vary planning conditions in respect of Units 5 and 6 of Ennerdale Mill, Bridge Road, Egremont. (the 'Site'). In evaluating the noise impacts associated with the proposed condition variation, consideration has also been given to noise complaints associated with the existing operation.

5.2 Historically the Site has been subject to noise complaints from nearby residents in relation to amplified music noise. Importantly it is noted that the planning application is specifically requesting that the applicant be allowed to open the shutter doors, with music turned off to aid the control of overheating during warmer periods.

5.3 The measurement and assessment of music from the gym has been based on internal noise levels considered as typical/high by the gym operator. Based on subjective observations and supported by guidance, it was concluded that with shutter doors closed no unacceptable noise impact would likely occur with music set to 'typical' (Ref 1) levels. However noise impacts were considered unacceptable at higher levels (i.e. around Ref 2 or higher), with shutter doors closed. Therefore mitigation has been proposed by way of a noise limiter to ensure that internal sound levels are maintained at a level which is consistent with providing suitable levels of residential amenity at nearby NSRs.

5.4 With music set to 'typical' (Ref 1) levels and with the shutter doors open, the noise impacts at NSRs was considered to be unacceptable. Therefore if shutter doors were to be left open, no amplified music noise would be permissible. Noise break-out from the gym in the absence of amplified music and with shutter doors open was considered unlikely to result in unacceptable noise impact provided the premises are properly managed. A number of mitigation options have been discussed to help mitigate noise impacts in the context of assisting in the control of overheating during warmer periods.

5.5 Sample planning conditions have been provided and are intended to secure any measures considered necessary through the planning system.

6 Glossary

dB	Decibel. The logarithmically scaled measurement unit of sound.
A-weighting	Frequency weighting applied to measured sound in order to account for the relative loudness perceived by the human ear.
$L_{Aeq,T}$	A-weighted equivalent continuous sound level over a given time period. It is the sound level of a steady sound that has the same energy as a fluctuating sound over the same time period.
$L_{A10,T}$	The A-weighted sound level exceeded for 10% of the measurement period. It is widely used as a descriptor of road traffic noise.
$L_{A90,T}$	The A-weighted sound level exceeded for 90% of the measurement period. Often referred to as the background sound level.
L_{Amax}	The A-weighted maximum recorded noise level during a measurement period.
Ambient sound level, $L_a = L_{Aeq,T}$	The A-weighted equivalent continuous sound level of the totally encompassing sound for a given situation and time interval, T.
Residual sound level	The A-weighted equivalent continuous ambient sound level remaining when the specific sound level has decreased to a degree in which it does not contribute to the ambient sound level.
Specific sound level, $L_s = L_{Aeq,Tr}$	The A-weighted equivalent continuous sound pressure level produced by the specific sound source at the reference location over a reference time interval, T
Rating level, $L_{Ar,Tr}$	The specific sound level plus any adjustment for the characteristic features of the sound.

A1 Relevant Policy and Guidance

National Noise Policy

Noise Policy Statement for England (NPSE, 2010)

A1.1 The Noise Policy Statement for England (NPSE, 2010) sets out the Government's Noise Policy Vision to:

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

A1.2 This long-term vision is supported by three Noise Policy Aims that can be delivered through effective management and control of environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development. These aims are to:

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

A1.3 The explanatory note to the NPSE sets out 'effect levels' which are aligned to the Policy Aims. Drawing upon established concepts from toxicology, the NPSE defines the following noise effect levels:

- NOEL - 'No Observed Effect Level';
- LOAEL - 'Lowest Observed Adverse Effect Level'; and
- SOAEL - 'Significant Observed Adverse Effect Level'.

A1.4 The explanatory note describes SOAEL as the effect level above which significant adverse effects on health and quality of life occur, aligning this level with the first policy aim.

A1.5 LOAEL is described as the level at which adverse effects begin and the second aim of the NPSE refers to a situation where the effect lies somewhere between LOAEL and SOAEL. It requires that all reasonable steps should be taken to mitigate and minimise adverse effects on health and quality of life while also taking into account the guiding principles of sustainable development (paragraph 1.8 of the NPSE) however this does not mean that such adverse effects cannot occur.

A1.6 NOEL is described as a level of noise exposure below which no effect can be detected. In simple terms, below this level, there is no detectable effect on health and quality of life.

A1.7 The third aim seeks, where possible, to positively improve health and quality of life through the pro-active management of noise while also taking into account the guiding principles of sustainable

development, recognising that there will be opportunities for such measures to be taken and that they will deliver potential benefits to society.

A1.8 The protection of quiet places and quiet times as well as the enhancement of the acoustic environment will assist with delivering this aim.

A1.9 NPSE states that it is not possible have a single, numerical definition of the SOAEL that is applicable to all sources of noise in all situations, since the SOAEL is likely to be different for different noise sources, for different receptors and at different times.

National Planning Policy

National Planning Policy Framework (NPPF, 2021)

A1.10 The National Planning Policy Framework (NPPF, 2021) sets out the Government's planning policies for England and how these should be applied. The NPPF provides a framework within which locally-prepared plans for housing and other development can be produced.

A1.11 The NPPF must be taken into account in the preparation of local and neighbourhood plans, and is a material consideration in planning decisions. Paragraph 54 of the National Planning Policy Framework states;

A1.12 "Local Planning Authorities should consider whether otherwise unacceptable development could be made acceptable through the use of conditions".

A1.13 Paragraph 56 states:

"Planning conditions should only be imposed where they are:

- *necessary;*
- *relevant to planning and;*
- *to the development to be permitted;*
- *enforceable;*
- *precise and;*
- *reasonable in all other respects."*

A1.14 Whether it is appropriate for the Local Planning Authority to impose a condition on a grant of planning permission will depend on the specifics of the case.

A1.15 In relation to noise, it states:

"174. Planning policies and decisions should contribute to and enhance the natural local environment by: …

- *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; and …."*

A1.16 The NPPF includes policy which makes reference to 'significant adverse impacts on health and quality of life', as per the NPSE. NPPF policy states:

"185. 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:

- *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;*
- *identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason; and…"*

Planning Practice Guidance – Noise (PPG-Noise, 2014)

A1.17 The Planning Practice Guidance (PPG-Noise, 2014) provides further detail about how the effects of noise can be described in terms of perception and outcomes. It aligns this to increasing effect levels as defined in the NPSE. In addition, the PPG-Noise adds a fourth term and corresponding effect level:

- UAEL – 'Unacceptable Adverse Effect Level'.

A1.18 This effect level is higher than the significant adverse effect on health and quality of life (SOAEL) and requires that unacceptable adverse effects are to be prevented. In PPG-Noise, prevention is not in the context of Government policy on sustainable development. **Table 6** presents the noise exposure hierarchy described in PPG-Noise.

A1.19 This noise exposure hierarchy is based on the principle that once noise or vibration becomes perceptible, the effect on people and other receptors increases as the level increases. PPG-Noise presents example outcomes to help characterise these effects using non-technical language. In general terms, an observed adverse effect is characterised as a perceived change in quality of life for occupants of a building or a perceived change in the acoustic character of an area, whereas a significant observed adverse effect disrupts activities.

A1.20 PPG-Noise also provides guidance in terms of what factors may influence whether noise could become a concern, and how adverse effects of noise can be mitigated. Examples of mitigation provided include:

- *"engineering: reducing the noise generated at source and/or containing the noise generated;*
- *layout: where possible, optimising the distance between the source and noise-sensitive receptors and/or incorporating good design to minimise noise transmission through the use of screening by natural or purpose built barriers, or other buildings;*
- *using planning conditions/obligations to restrict activities allowed on the site at certain times and/or specifying permissible noise levels differentiating as appropriate between different times of day, such as evenings and late at night, and;*
- *mitigating the impact on areas likely to be affected by noise including through noise insulation when the impact is on a building".*

A1.21 In the case of residential development, PPG-Noise also states that the impact of noise can be "*partially off-set*" if occupants have access to:

- *"a relatively quiet façade (containing windows to habitable rooms) as part of their dwelling, and/or;*
- *a relatively quiet external amenity space for their sole use, (e.g. a garden or balcony). Although the existence of a garden or balcony is generally desirable, the intended benefits will be reduced with increasing noise exposure and could be such that significant adverse effects occur, and/or;*
- *a relatively quiet, protected, nearby external amenity space for sole use by a limited group of residents as part of the amenity of their dwellings, and/or;*
- *a relatively quiet, protected, external publicly accessible amenity space (e.g. a public park or a local green space designated because of its tranquility) that is nearby (e.g. within 5 minutes walking distance)".*

Table 6: Planning Practice Guidance – Noise Exposure Hierarchy

Perception	Examples of Outcomes	Increasing Effect Level	Action
Not noticeable	No Effect	No Observed Effect	No specific measures required
Noticeable and not intrusive	Noise can be heard, but does not cause any change in behaviour or attitude. Can slightly affect the acoustic character of the area but not such that there is a perceived change in the quality of life.	No Observed Adverse Effect	No specific measures required
Lowest Observed Adverse Effect Level			
Noticeable and intrusive	Noise can be heard and causes small changes in behaviour and/or attitude, e.g. turning up volume of television; speaking more loudly; where there is no alternative ventilation, having to close windows for some of the time because of the noise. Potential for 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
Significant Observed Adverse Effect Level			
Noticeable and disruptive	The noise causes a material change in behaviour and/or attitude, e.g. avoiding certain activities during periods of intrusion; where there is no alternative ventilation, having to keep windows closed most of the time because of the noise. Potential for sleep disturbance resulting in difficulty in getting to sleep, premature awakening and difficulty in getting back to sleep. Quality of life diminished due to change in acoustic character of the area.	Significant Observed Adverse Effect	Avoid
Noticeable and very disruptive	Extensive and regular changes in behaviour and/or an inability to mitigate effect of noise leading to psychological stress or physiological effects, e.g. regular sleep deprivation/awakening; loss of appetite, significant, medically definable harm, e.g. auditory and non-auditory	Unacceptable Adverse Effect	Prevent

Local Policy

Copeland Local Plan 2013-2028 (Adopted December 2013)

A1.22 This document provides the Council's policies and proposals for the Core Strategy and Development Management, and together with the Site Allocations and Policies Plan, form the principal components of the Copeland Local Plan.

A1.23 Note that the Development Plan Documents (DPDs) are the statutory parts of the Plan, requiring Public Examination, while the Supplementary Planning Documents (SPDs) and Neighbourhood Plans apply the statutory Borough-wide planning policies in more detail.

A1.24 There are no specific policy or SPD's that contain noise related guidance.

Standards, Guidance and Regulatory Measures

ProPG: Gym Acoustics Guidance (GAG, March 2023)

A1.25 ProPG: Gym Acoustic Guidance (GAG) provides guidance on the control of noise from gyms. The document is intended for gym owners, operators, and designers, and Local Authorities and it covers a wide range of topics, including:

- The sources of noise from gyms
- The effects of noise from gyms
- Measures that can be taken to control noise from gyms
- The legal requirements for noise control from gyms

A1.26 The GAG begins by discussing the sources of noise from gyms, which include:

- Exercise equipment
- Music
- Talking and shouting
- Impact from dropping weights

A1.27 The GAG then discusses the effects of noise from gyms, which can include:

- Annoyance
- Irritation
- Sleep disturbance
- Hearing damage

A1.28 The GAG provides a number of measures that can be taken to control noise from gyms, including:

- Using quieter exercise equipment
- Turning down the volume of music
- Asking people to keep their voices down
- Providing soundproofing

A1.29 The GAG concludes by emphasizing the importance of taking steps to control noise from gyms, as noise can have a significant impact on the health and well-being of gym users and surrounding sensetive receptors.

A1.30 The GAG acknowledges that there are three common approaches when assessing noise and vibration impacts; the assessment of absolute noise levels, the assessment of the change in noise level, and the relative effect. The assessment methodology adopted can influence the effective ness of the assessment.

A1.31 Table 1 of the GAG (reproduced below), provides assessment metrics and guidance on target thresholds that exist in current standards which have some relevance to the assessment and control of noise from Fitness and Exercise Spaces, but are not specifically intended to be applied to assess sound from music or recreational activities are provided.

Table 7: Reference Assessment Threshold Ranges for Airborne Noise from current guidance or standards

British Standard, Guidance and Research	Internal Space	Assessment Period	Threshold Range
BS 8233:2014	Living Room / Bedroom	Daytime (07:00-23:00hrs)	35-40 dB $L_{Aeq,16hr}$
	Bedroom	Night-time (23:00-07:00hrs)	35-40 dB $L_{Aeq,8hr}$
Noise Rating NR	Living Room / Bedroom	Daytime (07:00-23:00hrs)	20-30
	Bedroom	Night-time (23:00-07:00hrs)	15-20
Low Frequency Noise Rating Criterion (LFNR	Living Room / Bedroom	Daytime (07:00-23:00hrs)	25-30
	Bedroom	Night-time (23:00-07:00hrs)	20-25
NANR45 - Low Frequency (LF) Noise Assessment Protocol 2011	Living Room / Bedroom	Daytime (07:00-23:00hrs)	Above 1/3 Octave above LF criterion curve thresholds by more than 5dB in any 1/3 Octave band
	Bedroom	Night-time (23:00-07:00hrs)	above 1/3 Octave above LF criterion curve threshold in any 1/3 octave band
BS 4142:2014 Relative Type Approach	Living Room / Bedroom	Daytime (07:00-23:00hrs)	Internal $L_{Ar,Tr} - L_{A90,T}$ = 0 to +5
	Bedroom	Night-time (23:00-07:00hrs)	Internal $L_{Ar,Tr} - L_{A90,T}$ = -5 to 0

British Standard, Guidance and Research	Internal Space	Assessment Period	Threshold Range
WHO Guidelines for Community Noise (1999)	Bedroom	Night-time (23:00-07:00hrs)	Internally: 45 dB L_{AFmax}
European WHO Environmental Night Noise (2009)	Bedrooms (Night, 8 hrs, yearly)	Night-time (23:00-07:00hrs)	Externally: L_{night} 45 dB to 50 dB (interim)
	Bedroom		Internally:35 dB L_{AFmax}

A1.32 The GAG recognises that the values in the table above will not be suitable in all settings, particularly where the background noise is particularly low. Equally where background levels are higher, more relaxed criteria may be appropriate.

A1.33 Instead, the GAG proposes guideline criteria for the setting internal noise criteria, whilst being mindful of the locality and context. This guideline framework is called the “G-Curves”, and provides a way to reference sound spectra data in a single figure (in a similar way to Noise Rating (NR)), but the reference is in 1/3 octaves to provide improved resolution. The proposed values are based on the experience of the contributing bodies (Institute of Acoustics, Association of Noise Consultants and Chartered Institute of Environmental Health)

A1.34 The GAG proposes guideline criteria for the setting internal noise criteria, whilst being mindful of the locality and context. This guideline framework is called the “G-Curves”, and provides a way to reference sound spectra data in a single figure (in a similar way to Noise Rating (NR)), but the reference is in 1/3 octaves to provide improved resolution. The proposed values are based on the experience of the contributing bodies (Institute of Acoustics, Association of Noise Consultants and Chartered Institute of Environmental Health)

A1.35 The GAG proposes guideline criteria for the setting internal noise criteria (**Figure 2**Figure 2), whilst being mindful of the locality and context, and is called the “G-Curves”, and provides a way to reference sound spectra data in a single figure (in a similar way to Noise Rating (NR)), but the reference is in 1/3 octaves to provide improved resolution. The proposed values are based on the experience of the contributing bodies (Institute of Acoustics, Association of Noise Consultants and Chartered Institute of Environmental Health). The guideline target criteria are reproduced in the **Table 8**.

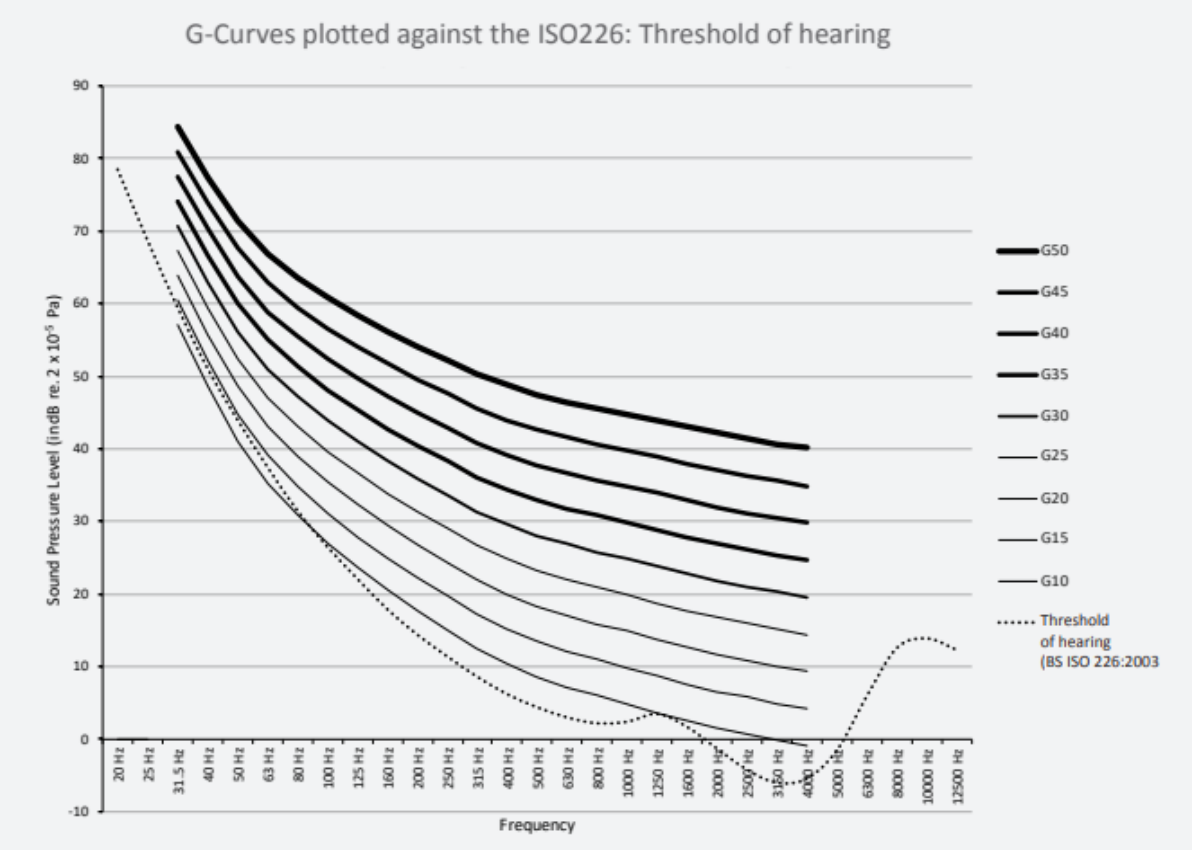
Table 8: GAG: Guidance Internal Sound Target Criteria for Gym Activity – Residential & Other Areas (Extract)

Receptor Type	Airborne Sound (e.g., music) $L_{eq,T}$ (31.5Hz to 8kHz)	Heavy Impact Sound $L_{max,F}$ (31.5Hz to 8kHz)
Commercial Offices	G25-G35	G35-G45
Retail Areas	G30-G45	G35-G50
Residential Areas	G15-G25 (day) G10-G20 (night)	G20-G25 (day) G15-G20 (night

A1.36 The Working Group generally found in their experience that levels below the upper values tended to avoid significantly adverse impacts (SOAEL) occurring and higher levels than these should generally be avoided, but this is highly dependent on context.

A1.37 The threshold of hearing, as defined in ISO 226:2003 '*Acoustics — Normal equal-loudness-level contours*', is not proposed as a target noise criteria. However, if achieved, it can be taken as a positive indication of no adverse effect (NOEL).

Figure 2: Third-octave G-Curves Plotted Against the Threshold of Hearing (ISO 226:2003)



IOA Good Practice Guide on the Control of Noise from Pubs and Clubs

A1.38 In 1996, the Institute of Acoustics (IOA) established a working group to produce guidance and criteria on the control of noise from pubs and clubs. The group was unable to produce a formal Code of Practice because industry representatives withdrew.

A1.39 Whilst the initial drafts of the Good Practice Guide proposed objective assessment criteria within an Annex, they were not published within the final version of the Good Practice Guide (2003).

A1.40 The final version of the Good Practice Guide (2003) suggests that music noise should be inaudible, whereby noise is considered to be inaudible when:

"it is at a sufficiently low level such that is not recognizable as emanating from the source in question and it does not alter the perception of the ambient noise environment that would prevail in the absence of the source in question".

Draft Criteria

A1.41 From a practical perspective it is necessary to work to objective criteria, and criteria were proposed within the Draft Annex of the Good Practice Guide. These criteria are described below in Table 9 with EN representing 'with entertainment noise' and WEN representing 'without entertainment noise'.

Table 9: IoA Good Practice Guide for Pubs and Clubs – Draft Criteria

Venue	Suggested Regulation	Outcome if Criteria met
Entertainment < 30 times/year*	$L_{Aeq,15mins}$ (EN) should not exceed L_{A90} (WEN) by more than 5dB	EN will generally be audible but not overly obtrusive inside the noise sensitive property
Entertainment > 30 times/year*	L_{Aeq} (EN) should not exceed L_{A90} (WEN) by more than 5dB and the L_{10} (EN) should not exceed L_{90} (WEN) by more than 5dB in any 1/3 octave band between 40 and 160Hz.	EN will generally be audible but not overly obtrusive inside the noise sensitive property
Entertainment > once / week or continues beyond 2300hrs.	L_{Aeq} (EN) should not exceed L_{A90} (WEN) And L_{10} (EN) should not exceed L_{90} (WEN) in any 1/3 octave band between 40 and 160Hz.	EN will be virtually inaudible inside noise sensitive property

A1.42 The proposed criteria described above relate to an assessment at 1 metre from the facade of noise sensitive premises and consequently relate to entertainment noise emissions to atmosphere. This approach results in an assessment that is independent of the sound insulation afforded by the building envelope of the sensitive properties, which can vary greatly between properties.

A1.43 Importantly such an approach does not readily lend itself to an assessment in structurally attached buildings. In such cases the background noise level cannot usually be obtained without intrusive surveys within properties which may not be entertained by the residents. Therefore, in order to adopt the above approach for structurally connected premises estimates of internal background (L_{A90}) noise levels would be required. This approach is also necessary for developments that have not yet

been built or existing developments where the change of use is likely to change the internal noise levels.

A1.44 As discussed above the criteria proposed in the draft were not endorsed by the IOA and were excluded from the final version of the document.

NANR 163 - Noise from Pubs and Clubs Phase II (2006)

A1.45 Another source of useful information is NANR 163 - Noise from Pubs and Clubs Phase II (2006) which was conducted by Capita Symonds and BRE on behalf of Defra to inform the recent revisions to the Noise Act 1996.

A1.46 The key findings were:

- The majority of the members of the public reported the ability to tolerate a modest degree of intrusive audible entertainment noise in their home late at night for a "one-off" occurrence (i.e., occurring at intervals of less than six months), and that the onset of audibility of the entertainment noise did not equate to a threshold of acceptability for intrusive entertainment noise;
- The majority of Environmental Health Practitioners (EHPs) also reported that a modest degree of intrusive entertainment noise from a "one-off" occurrence was acceptable, and that the onset of audibility of the entertainment noise did not equate to a threshold of acceptability for intrusive entertainment noise in such circumstances;
- EHPs also reported that a lesser degree of intrusive entertainment noise was acceptable for more regular occurrences (i.e., once a week), and that for either scenario the onset of audibility of the entertainment noise did not equate to a threshold for enforcement action for intrusive entertainment noise in such circumstances; and,
- The noise metric that provided the best overall prediction of subjective ratings of all the entertainment noise types tested by ordinary members of the public was the Absolute L_{Aeq}.

A1.47 **Table 10** presents an informative extract from the research in terms of the levels of entertainment noise which were considered acceptable or otherwise, based upon 30 subjects.

Table 10: Table 4 from DEFRA Report – Semantic Descriptor and Associated Value of Acceptability

Semantic Descriptor	Score	Absolute $L_{Aeq,5min}$
Clearly acceptable	1	17.0
	2	20.4
	3	23.8

Semantic Descriptor	Score	Absolute $L_{Aeq,5min}$
	4	27.2
Just acceptable	5	30.6
Just unacceptable	6	34.0
	7	37.4
	8	40.8
	9	44.2
Clearly unacceptable	10	47.5

British Standard BS 8233:2014 'Guidance on Sound Insulation and Noise Reduction for Buildings' and World Health Organisation 'Guidelines for Community Noise'

A1.48 BS 8233:2014 provides guidance for the control of noise in and around buildings of different uses. It is applicable to the design of new buildings, or refurbished buildings undergoing a change of use.

Internal Amenity (Habitable Rooms)

A1.49 in respect to dwellings and habitable residential spaces, Table 4 of BS 8233:2014 provides guideline values that it is desirable not to exceed during daytime and night-time periods. These guideline values are reproduced in **Table 11**, and apply to noise without a specific character, such as road and rail traffic. BS 8233:2014 suggests that where the source of noise being considered has distinguishable characteristics, lower values may be more appropriate.

Table 11: Indoor Ambient Noise Levels for Residential Dwellings

Location	Daytime Guideline (07:00-23:00hrs)	Night-time Guideline (23:00-07:00hrs)
Living Room	35 dB $L_{Aeq,\ 16hr}$	-
Dining Room / Area	40 dB $L_{Aeq,\ 16hr}$	-
Bedroom	35 dB $L_{Aeq,\ 16hr}$	30 dB $L_{Aeq,\ 8hr}$
Rear Gardens	Desirable: ≤50 dB $L_{Aeq,16hr}$ Upper Limit: ≤55 dB $L_{Aeq,16hr}$	

A1.50 The internal noise requirements are not intended to be met with open windows, although BS 8223:2014 states that the internal noise levels should take account of the proposed ventilation strategy.

A1.51 BS 8233:2014 also notes that: “Where development is considered necessary or desirable, despite external noise levels above WHO guidelines, the internal target levels may be relaxed by up to 5 dB and reasonable internal conditions still achieved”.

A1.52 BS 8233:2014 does not provide specific guidance on noise levels for regular individual noise events, such as passing trains, which can cause sleep disturbance. Guidance on suitable noise levels for individual events is provided in ProPG, which states:

‘In most circumstances in noise-sensitive rooms at night (e.g. bedrooms) good acoustic design can be used so that individual noise events do not normally exceed 45 dB $L_{Amax,F}$ more than 10 times a night. However, where it is not reasonably practicable to achieve this guideline then the judgement of acceptability will depend not only on the maximum noise levels but also on factors such as source, number, distribution, predictability and regularity of noise events’.

External Amenity (Private Rear Gardens)

6.1 BS 8233 sets a desirable daytime (07:00-23:00hrs) noise level of 50 dB $L_{Aeq,16hr}$ with an upper guideline value of 55 dB $L_{Aeq,16hr}$ which would be acceptable in noisier areas for traditional external amenity areas such as private gardens. Where higher noise levels existing BS 8233 states:

“However, it is also recognised that these guideline values are not achievable in all circumstances where development might be desirable. In higher noise 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.

In high-noise areas, consideration should be given to protecting these areas by screening or building design to achieve the lowest practicable levels. Achieving levels of 55 dB $L_{Aeq,T}$ or less might not be possible at the outer edge of these areas, but should be achievable in some areas of the space.”

British Standard 4142:2014+A1:2019 ‘Methods for rating and assessing industrial and commercial sound’

A1.53 BS 4142:2014+A1:2019 is used to rate and assess sound of an industrial nature including but not limited to assessing sound from proposed, new, modified or additional sources of industrial sound or commercial noise of an industrial character, such as;

- sound from industrial and manufacturing processes;
- sound from fixed installations which comprise mechanical and electrical plant and equipment;
- sound from the loading and unloading of goods and materials at industrial and/or commercial premises;

- sound from mobile plant and vehicles that is an intrinsic part of the overall sound emanating from premises or processes, such as that from fork-lift trucks, or that from train or ship movements on or around an industrial and/or commercial site.

A1.54 The determination of noise amounting to a nuisance is beyond the scope of this British Standard, and is not intended to be applied to any of the following:

- recreational activities, including all forms of motorsport;
- music and other entertainment;
- shooting grounds;
- construction and demolition;
- domestic animals;
- people;
- public address systems for speech; and,
- other sources falling within the scopes of other standards or guidance.

A1.55 The standard contains guidance on the monitoring and assessment of industrial and commercial sound sources (including fixed installations comprising mechanical and electrical plant and equipment) affecting sensitive receptors.

A1.56 The methodology relies on comparing the operational rating level, $L_{Ar,Tr}$, with the background sound level, $L_{A90,T}$ (i.e. the level that would be present without the development) over a representative time period. BS 4142:2014+A1:2019 provides guidance on the measurement of background sound, the determination of specific sound and calculation of the rating level.

A1.57 Certain acoustic features can increase the significance of impact over that expected from a basic comparison between the specific sound level and the background sound level. A character correction should be added to the specific sound level to obtain the rating level, where such features are present at the assessment location. This can be approached in three ways; however, the subjective method is considered appropriate for this assessment. This states that the specific sound level should be corrected if a tone, impulse or other characteristic occurs, or is expected to be present for new sound sources.

Tonality

6.2 A tonal correction between 0 and +6 dB can be applied for sounds that range from not tonal to prominently tonal. Several methodologies are presented in BS 4142:2014+A1:2019 in order to determine the appropriate correction to be applied. **Table 12** presents the subjective assessment method corrections for tonal sounds.

Table 12: Subjective Method – Rating Level Corrections for Tonal Sounds

Subjective assessment of sound source at the receptor	Correction
The tone is just perceptible at the receptor	+2 dB
The tone is clearly perceptible at the receptor	+4 dB
The tone is highly perceptible at the receptor	+6 dB

Impulsivity

A1.58 An impulsivity correction of up to +9 dB can be applied for sound that is highly impulsive, considering both the rapidity of the change in sound level and the overall change in sound level. **Table 13** presents the subjective method corrections for impulsive sounds.

Table 13: Subjective Method – Rating Level Corrections for Impulsive Sounds

Subjective assessment of sound source at the receptor	Correction
Impulsivity is just perceptible at the receptor	+3 dB
Impulsivity is clearly perceptible at the receptor	+6 dB
Impulsivity is highly perceptible at the receptor	+9 dB

Intermittency

A1.59 A 3 dB penalty can be applied where the specific sound has identifiable on/off conditions (intermittent operation) which are readily distinctive against the residual acoustic environment.

Other Sound Characteristics

A1.60 Where the specific sound has characteristics that do not fall into the tonal, impulsive or intermittent categories but are otherwise readily distinguishable against the residual acoustic environment, a penalty of 3 dB can be applied.

Assessment Methodology

A1.61 BS 4142:2014+A1:2019 assessment methodology also states that:

- *"Typically, the higher the rating level is above the background sound level the greater the magnitude of impact;*
- *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; and*

- *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."*

A2 Survey Instrumentation

Table 14: Survey Instrumentation and Dates of Last Calibration

Purpose	Type	Make	Model	Serial	Date of Last Calibration
Noise Measurements	Sound Level Meter	Rion	NL-52	0687043	07/03/2022
				1009670	26/01/2023
				1176453	26/07/2021
Acoustic Calibration	Acoustic Calibrator	Brüel and Kjær	Type 4231	34212937	26/01/2023

A3 Referenced Photos

Figure 3: Exterior Views of Car Park, Western Elevation of UFPG building

Figure 4: Internal View of UFPG (Facing West, and Shutter Doors)

Figure 5: Existing weights equipment impact pads

Figure 6: Rack-mounted dBX DriveRack® PA2 loudspeaker management system

Figure 7: Column mounted loudspeakers

Figure 8: Noise Measurment Location LT1.

Figure 9: Mixer Settings, Reference Level 1

Figure 10: Mixer Settings, Reference Level 2

Figure 11: Example installation of impact machine washers

A4 Measured Sound Levels

Figure 12: Measured Sound Levels, LT1 (Doors closed)

Figure 13: Measured Sound Levels, LT1, Doors Open/Closed (Ref 1)