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Environmental Noise Impact Assessment Report for Planning

Ariel Hotel, 118 Bath Road, Heathrow

Report Reference 20432.ENIA-RPT.01

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Report Title	Environmental Noise Impact Assessment Report for Planning
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EXECUTIVE SUMMARY

Environmental noise surveys and a noise impact assessment has been undertaken for the Proposed Development at Ariel Hotel, 118 Bath Road, Heathrow.

An initial appraisal of the site determined road traffic noise from the surrounding roads, and aircraft movements from Heathrow, to be the dominant sources affecting the site.

Noise levels measured on site are shown in below:

Measurement Position	Period	Ambient Sound Level $L_{Aeq,\,T}$ (dB)	10th Highest Maximum Night-time Noise Level L_{AFmax} (dB)
1	Daytime 07:00-23:00	68	--
	Night-time 23:00-07:00	61	86.2
2	Daytime 07:00-23:00	66	--
	Night-time 23:00-07:00	60	84.5
3	Daytime 07:00-23:00	61	--
	Night-time 23:00-07:00	54	80.3

Noise impacts on the proposed development have been assessed against the guidance presented in 'Professional Practice Guidance on Planning and Noise' (ProPG), BS 8233:2014, as well as Local and National Planning Policy Guidelines.

When assessed against the initial risk assessment criteria of ProPG, it has been found that the development site falls within the 'medium-high' risk category during both daytime and night-time with regards to adverse effects from noise, when considered in the absence of mitigation proposals.

Calculations have been undertaken to provide a suitable glazing specification to facilitate the proposed use of the site. Minimum octave band sound reduction index values required for all glazed elements are shown in the table below:

Glazing Type	Octave band centre frequency SRI, dB						R_w ($C;C_{tr}$)
	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	
Type 1 – Main building, South Side	26	38	46	50	55	60	48 (-3;-8)
Type 2 – Main building, North Side	23	35	43	47	52	57	45 (-3;-8)
Type 3 – Apart-Hotel Windows	25	23	37	41	42	43	38 (-2;-6)

Passive background ventilation can be provided by mechanical ventilation for the hotel extension. Due to the high noise levels present, acoustic trickle vents would not be suitable.

Purge ventilation (as defined in ADF) would be provided via openable windows.

CONTENTS

LIST OF ATTACHMENTS

1 INTRODUCTION

ES Acoustics Ltd has been commissioned by R Ariel Heathrow Opco Limited to undertake an environmental noise survey and noise impact assessment for the proposed extension and apart-hotel development at the Ariel Hotel, 118 Bath Road, Heathrow.

The purpose of this report is to address the concerns of the local authority with regards to environmental noise control;

- Reviewing appropriate National and Local Planning Policy, and Good Practice Guidance relevant to the Proposed Development;
- Measuring current spectral noise levels incident on the Proposed Development site via environmental noise surveys;
- Preparing an initial site risk assessment in accordance with ProPG: Professional Practice Guidance on Planning and Noise as it relates to the worst-case potential proposal for residential use;
- Undertaking an acoustic assessment of the external building fabric requirements and where appropriate provide outline mitigation advice; and

2 PROPOSED DEVELOPMENT

2.1 Site Description

The application site is located in the London Borough of Hillingdon, and directly overlooks Heathrow Airport to the south. It is bounded on the south and west by Bath Road and High Street Harlington respectively. To the north of the site lie residential properties.

The site boundary is outlined in Figure 1-2 below:

Figure 1 Proposed development site

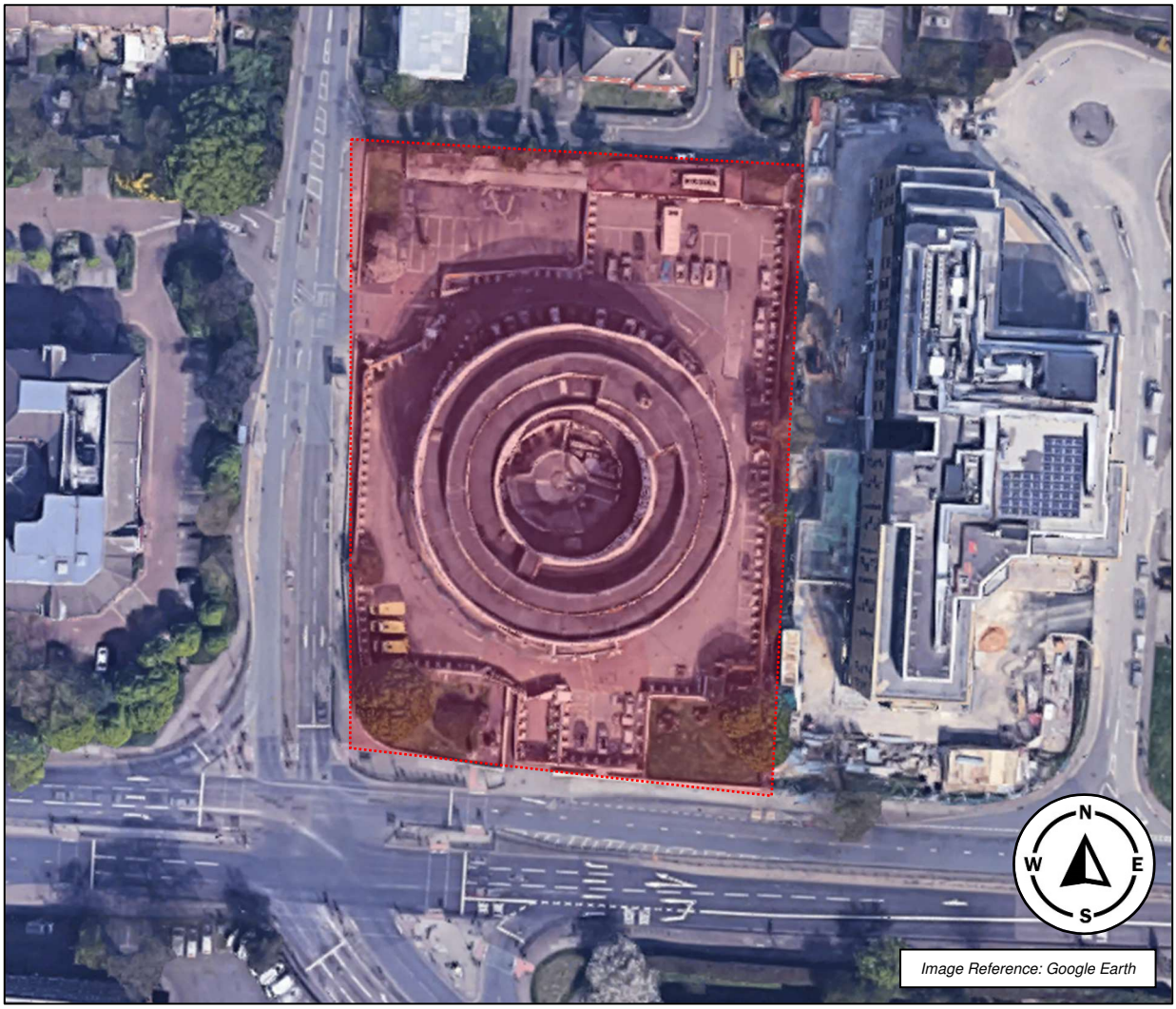


Figure 2 Proposed development site

2.2 Proposal

The proposed development will include the addition of two storeys above the existing hotel building, providing 113 new hotel rooms (a total of 299 hotel rooms), and the erection of a new apart-hotel building comprising 98 apart-hotel rooms, including façade enhancements and associated works.

Proposed areas of development for the site are shown in the figure below:

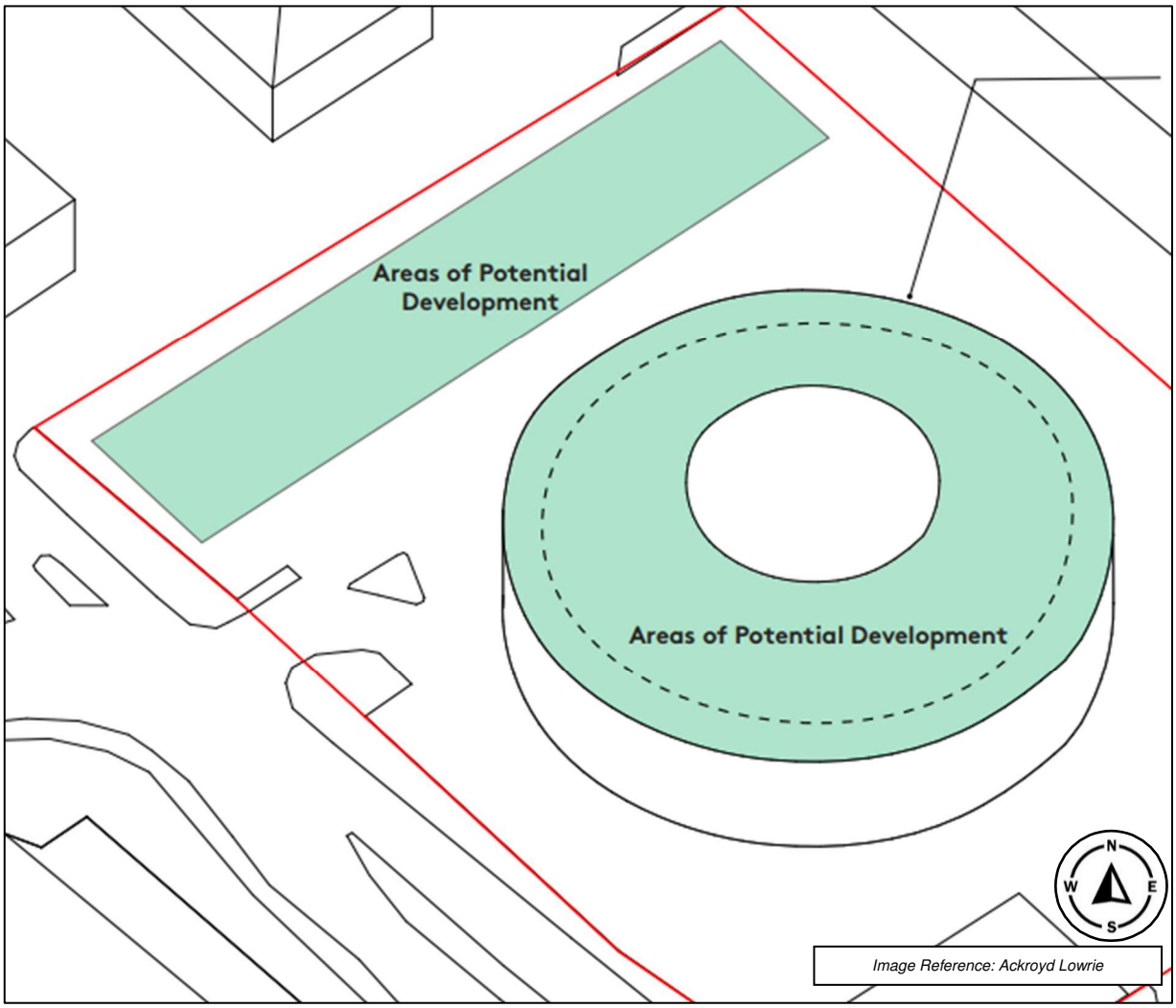


Figure 3 Proposed development areas for the site

3 RELEVANT POLICY AND GUIDANCE

This section of the report presents the key planning policy and guidance relevant for the assessment of noise for a development such as this where residential use is included.

3.1 National Policy

3.1.1 National Planning Policy Framework (NPPF)

The National Planning Policy Framework (NPPF) superseded and replaced Planning Policy Guidance Note 24 (PPG24), which previously covered issues relating to noise and planning in England.

The paragraphs relating to noise state:

174. 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

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:

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; […]

187. 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.

3.1.2 Noise Policy Statement for England (NPSE)

The Noise Policy Statement for England (NPSE) was developed by DEFRA and published in March 2010. The long-term vision of the Government noise policy is to '*Promote good health and good quality of life*

through the effective management of noise within the context of Government policy on sustainable development.'

The NPSE vision noted above is supported by the following aims:

Through the effective management and control of environmental, neighbour and neighbourhood noise within the context of Government policy on 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*

The NPSE outlines observed effect levels relating to the above, as follows:

- *No observed effect level (NOEL): this is the level of noise exposure below which no effect at all on health or quality of life can be detected;*
- *Lowest observed adverse effect level (LOAEL): this is the level of noise exposure above which adverse effects on health and quality of life can be detected;*
- *Significant observed adverse effect level (SOAEL): This is the level of noise exposure above which significant adverse effects on health and quality of life occur;*

Noise effect levels are not set at absolute noise level targets, but instead vary depending on the context and character of the noise and site-specific factors which may impact on the severity of the effect. The NPSE states:

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

3.1.3 National Planning Practice Guidance (NPPG)

The NPPG provides practical guidance on how the NPPF should be applied as well as and guidance on the factors influencing whether noise may be a concern at the planning stage and how adverse effects can be mitigated. The table below summarises the effect levels presented within the NPSE, as follows:

Response	Examples of Outcomes	Increasing Effect Level	Action
Not present	No Effect	No Observed Effect	No specific measures required
Present and not intrusive	Noise can be heard, but does not cause any change in behaviour, attitude or other physiological response. Can slightly affect the acoustic character of the area but not such that there is a change in the quality of life.	No Observed Adverse Effect	No specific Measures required
Present and intrusive	Noise can be heard and causes small changes in behaviour, attitude or other physiological response, 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 small actual or perceived change in the quality of life.	Observed Adverse Effect	Mitigate & reduce to a minimum
Present and disruptive	The noise causes a material change in behaviour, attitude or other physiological response, 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
Present and very disruptive	Extensive and regular changes in behaviour, attitude or other physiological response and/or an inability to mitigate effect of noise leading to psychological stress, e.g. regular sleep deprivation/awakening; loss of appetite, significant, medically definable harm, e.g. auditory and non-auditory	Unacceptable Adverse Effect	Prevent

Table 1 Noise exposure hierarchy

3.2 Local Policy

3.2.1 London Borough of Hillingdon Local Plan Part 2

Policy DME 5: Hotels and Visitor Accommodation

The Council will support a range of visitor accommodation, conference and related uses in accessible sustainable locations, as defined in the Site Allocations and Designations document, subject to:

i) A high standard of building and site design, including landscaping and placement of signage that makes a positive contribution to London Borough of Hillingdon Local Plan Part 2 - Development Management Policies 13 local amenity and the streetscape;

ii) Provision of an accessible layout and rooms in accordance with Policy DME 6: Accessible Hotels and Visitor Accommodation; and

iii) No adverse impact on nearby land uses or on the amenity of either adjoining occupants or proposed occupants by virtue of noise, lighting, emissions, privacy, overlooking, any other potential nuisance, parking or traffic congestion.

3.2.2 London Borough of Hillingdon SPG, Planning Obligations July 2014

Noise

5.15 As stated in Hillingdon's SPD on Noise, the Council exercises its land use planning controls to seek the physical separation of noise and noise sensitive development. Planning obligations may be applied if separation or planning conditions cannot be used to control or reduce noise levels or to mitigate the impact of noise.

The Mayor's Ambient Noise Strategy and Hillingdon's Noise SPD provide guidance on noise issues and assessments as part of planning applications.

5.16 This section provides guidance on planning obligations for noise that have not been accommodated as part of an integrated approach to address transportation and accessibility issues.

Qualifying Developments

5.17 The Council's Noise SPD sets out requirements to be considered in the assessment of noise. Planning obligations may be sought in the following circumstances:

- *Where a development would cause nearby residential development to be affected by noise exposure categories B – D and/or Table 2 (Residential Noise Criteria) as outlined in the Noise SPD to be exceeded;*
- *Where a development would cause exceedences of 60 LAeqTdB upper limit as outlined in Noise SPD for schools and hospitals;*
- *Where there would be exceedences of internal noise criteria for school and offices as outlined in Table 3 of the Noise SPD;*
- *To mitigate impacts on the character of an area, of sites of importance for nature conservation or to ensure the welfare of livestock or other animals;*
- *Where there would be exceedence of noise limits prescribed in Annex 2 of Mineral Policy Statement 2 (MPS 2);*
- *To control noise at source where planning conditions or other statutory licences are not applicable; and*
- *As a result of a noise measurement survey or noise management plan.*

Type of Obligations Sought

5.18 Planning obligations to address noise and vibration issues may include the following:

- *Measures to reduce noise at source such as vehicle fleet selection, quiet bleepers and other administrative or work place practices.*
- *Mitigation measures such as noise barriers and sound insulation of residential properties and other noise sensitive receptors*
- *Provision of off-site landscaped buffers*

• Road and other surfaces incorporating provision of quieter surfaces such as porous asphalt

• The preparation and implementation of noise management plans.

5.19 These noise control measures should complement noise control measures available through normal planning and other statutory procedures. In certain cases monitoring may be required to ensure standards can be met and maintained. As such contributions towards the establishment and ongoing maintenance of this may be required if necessary.

3.2.3 London Boroughs of: Hillingdon; Hounslow; Richmond upon Thames, SPG, Development Control for Noise Generating and Noise Sensitive Development, April 2016

5.1 STAGE 1 – SITE NOISE ASSESSMENT

An initial noise site assessment should be conducted by a competent noise practitioner at the earliest opportunity, preferably before any planning application is submitted. The noise assessment should seek to determine the appropriate Noise Risk Category (NRC figure 2) of the site, without proposed mitigation, prior to development. This assessment should include the acoustic effect of any site features that will remain (e.g. retained buildings, changes in ground level) and exclude the acoustic effect of any site features that will not remain (e.g. buildings to be demolished, fences and barriers to be removed) if development proceeds. The initial site risk assessment should not include any new noise mitigation measures that may be proposed as part of a subsequent planning application.

The site noise assessment may be based on measurement or prediction (or a combination) as appropriate, and should aim to describe noise levels during at least a typical worst case 24 hour period. The assessment should include the combined free-field noise level from all sources of transport noise that affect the site. In the case where industrial or commercial noise is present but not "dominant" (i.e. where the effect would not be rated as adverse if a BS4142:2014 assessment was to be carried out), its contribution may be included in the noise level used to establish the appropriate NRC (and if included, this should be clearly stated). Where industrial/commercial noise is considered to be "dominant" then the NRC approach should not be used for the industrial or commercial noise and regard should be had to the guidance in BS4142:2014.

It should be stressed that the allocated NRC is not the basis for the eventual recommendation to the decision maker. The NRC approach is intended to give the developer, the noise practitioner, and the decision maker an indication only of the likely suitability of the site for new residential development from a noise perspective. Figure 2 summarises the Initial Site Assessment and includes indicative noise levels for each of the four NRCs derived from current guidance documents and experience as well as a description of the potential effect of noise were no further noise mitigation to take place as well as additional pre-planning application guidance.

*Note, Figure 2 as referenced above is presented in Table 4 of this report under section 3.3.3.

5.2 STAGE 2 - INTERNAL DESIGN NOISE LEVELS

The Boroughs will normally seek to achieve the design noise levels contained in Table 4 of BS8233:2014 in all noise sensitive rooms. It should be noted that the acoustic integrity of the building envelope will be compromised in the event windows are opened for ventilation purposes, typically reducing the insulation to no more than 10 to 15 dB(A). The use of good acoustic design should aspire to achieve the internal design levels in noise sensitive rooms with windows partially open, although on certain sites the Boroughs may agree to assess the proposal assuming windows are closed. In many sites classified as NRC 0 then it should be possible to achieve the design noise levels with windows open.

*Note, the values discussed above are presented in Table 3 of this report under Section 3.3.2.

3.3 Best Practice and Guidance

Note, the following guidance does not specifically refer to hotel use, and is focused on residential requirements. In the absence of specific requirements for the hotel the following will be considered as a worst-case scenario for performance requirements.

3.3.1 World Health Organization (WHO) Guidelines

WHO Guidelines for Community Noise (1999) provides guideline values for community noise in specific environments. This has since been supplemented by WHO Environmental Noise Guidelines for European Region (WHO, Regional office for Europe, 2018).

The WHO guideline values most relevant to new residential development are outlined in the table below:

Specific Environment	Critical Health Effects	$L_{Aeq,\,T}$ [dB]	L_{Afmax} [dB]
Dwelling, indoors	Speech intelligibility and moderate annoyance, daytime and evening	35	n/a
	Sleep disturbance night-time	30	45

Table 2 Guideline Values from WHO Guidelines for Community Noise (1999)

The effects of noise in dwellings are typically sleep disturbance, annoyance and speech interference. For bedrooms the critical effect is sleep disturbance. Indoor guideline values for bedrooms at night are 30dB L_{Aeq} for continuous noise and 45dB L_{Amax} for single sound events, but the guidance also notes that lower noise levels may be disturbing depending on the nature of the noise source.

3.3.2 BS 8233:2014 'Guidance on sound insulation and noise reduction for buildings'

Table 4 of BS 8233:2014 (reproduced below) provides guidance on recommended internal ambient noise levels in residential spaces based on World Health Organisation (WHO) research.

Room	Daytime (07:00-23:00)	Night-time (23:00-07:00)
Living Room	≤ 35 dB $L_{Aeq,16hr}$	N/A
Dining Room	≤ 40 dB $L_{Aeq,16hr}$	N/A
Bedroom	≤ 35 dB $L_{Aeq,16hr}$	≤ 30 dB $L_{Aeq,8hr}$

Table 3 BS 8233:2014 indoor ambient noise levels for dwellings

The following notes should be considered alongside the levels presented above:

- *The levels presented above are for steady external noise sources without a specific character. Noise is considered to have a specific character if it contains features such as a distinguishable, discrete and continuous tone, is irregular enough to attract attention, or has strong low-frequency content, in which case lower noise limits might be appropriate*
- *The levels are based on annual average data and do not have to be achieved in all circumstances e.g. it is normal to exclude occasional events, such as fireworks night or New Year's Eve*
- *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*
- *If relying on closed windows to meet the guide values, there needs to be an appropriate alternative ventilation that does not compromise the façade insulation or the resulting noise level*
- *The levels outlined above are not applicable under "purge ventilation" conditions as defined by Approved Document F of the Building Regulations, as this should only occur occasionally e.g. to remove odour from painting or burnt food). However, the levels above should be achieved whilst providing sufficient background ventilation, either via passive or mechanical methods*

It should be noted that the 2014 version of BS 8233:2014 does not include any specific requirement for maximum instantaneous noise levels (L_{max}) within dwellings. However, methodology for the assessment of maximum noise levels is included in ProPG (Section 3.3.3) and referenced in WHO guidelines above.

For hotel use, many hotels have their own specific requirements for internal noise levels, and for internal acoustics. While these are not provided in this instance, BS8233:2014 provides some guidance on typical target values for hotel noise levels.

Period	Noise Level
Daytime (07:00 – 23:00 hrs)	30-40 dB $L_{Aeq,1hr}$
Night-time (23:00 – 07:00 hrs)	25-35 dB $L_{Aeq,1hr}$
Night-time (23:00 – 07:00 hrs)	45-55 dB L_{Amax}

Table 4 Indoor ambient noise level ranges for hotel bedrooms – BS8233:2014

The values in Table 4 are in most cases commensurate to residential requirements, with additional focus on short time windows which would be relevant for noise in areas with intermittent background noise, but a less onerous target figure for both average and maximum noise levels received.

3.3.3 ProPG: Professional Practise Guidance on Planning and Noise

While not applicable to hotel use, the following is relevant for the worst-case scenario of residential occupation.

ProPG was published to provide practitioners with guidance and a recommended approach for the assessment of noise impact on residential developments during the planning stage.

The guidance can be seen as the missing link between the current NPPF and its predecessor, PPG24 (Planning Policy Guidance 24: Planning and Noise), which provided a prescriptive method for assessing sites for residential development but without the nuance of the key elements described in ProPG.

The guidance seeks to assist in the delivery of sustainable development by promoting good health and wellbeing through the effective management of noise and encourage a good acoustic design in and around proposed new residential development whilst considering national policy on planning and noise.

The recommend approach for assessment is summarised below:

- *Stage 1 – an initial noise risk assessment of the proposed development site*
- *Stage 2 – a systematic consideration of four key elements:*
    - *Element 1 – Demonstrating a "Good Acoustic Design Process" (including feasibility of reducing or relocating existing noise sources, site orientation and building layout and appropriate constructions methods to meet performance requirements);*
    - *Element 2 – Observing internal "Noise Level Guidelines" (as presented in Section 3.3.1 of this report, with additional consideration of individual noise events which should normally not exceed L_{AFmax} 45 dB more than 10 times in bedrooms at night);*
    - *Element 3 – Undertaking an "External Amenity Area Noise Assessment" (ProPG aligns with BS 8233:2014 and suggests that noise levels in external amenity areas should ideally not be above $L_{Aeq,16hr}$ 50-55dB. However, there is an acceptance that these guideline values may not be achievable in all circumstances where development might be desirable, and in such situations, development should be designed to achieve the lowest practicable noise levels in these external amenity spaces but should not be prohibited.); and*
    - *Element 4 – Consideration of "other relevant issues" (including compliance with national and local policy, acoustic design vs unintended adverse consequences, acoustic design vs wider planning objectives)*

To help consider noise at a site at an early stage an initial noise risk assessment should assess the Noise Risk Category of the site to help provide an indication of the likely suitability of the site for new residential development from a noise perspective. The table below sets out the indicative noise levels for the Noise Risk Categories and a description of the potential effect of noise were no further noise mitigation to take place as well as additional guidance.

Noise Risk Category	Potential Effect if Unmitigated	Pre-Planning Application Guidance
0- Negligible $L_{Aeq,16hr}$ < 50dB $L_{Aeq,8hr}$ < 40dB	No adverse effect	These noise levels indicate that the development site is likely to be acceptable from a noise perspective, and the application need not normally be delayed on noise grounds.
1- Low $L_{Aeq,16hr}$ 50-60dB $L_{Aeq,8hr}$ 40-50dB	Increasing risk of adverse effect ↓	At low noise levels, the site is likely to be acceptable from a noise perspective provided that a good acoustic design process is followed and is demonstrated in an ADS which confirms how the adverse impacts of noise will be mitigated and minimised in the finished development.
2- Medium $L_{Aeq,16hr}$ 60-70dB $L_{Aeq,8hr}$ 50-60dB		As noise levels increase, the site is likely to be less suitable from a noise perspective and any subsequent application may be refused unless a good acoustic design process is followed and is demonstrated in an ADS which confirms how the adverse impacts of noise will be mitigated and minimised, and which clearly demonstrate that a significant adverse noise impact will be avoided in the finished development.
3- High $L_{Aeq,16hr}$ >70dB $L_{Aeq,8hr}$ >60dB		High noise levels indicate that there is an increased risk that development may be refused on noise grounds. This risk may be reduced by following a good acoustic design process that is demonstrated in a detailed ADS. Applicants are strongly advised to seek expert advice.

Table 5 ProPG Stage 1 Site Noise Risk Assessment

Notes on Table 5 ProPG Stage 1 Site Noise Risk Assessment:

- *Indicative noise levels should be assessed without inclusion of the acoustic effect of any scheme specific noise mitigation measures.*
- *Indicative noise levels are the combined free-field noise level from all sources of transport noise and may also include industrial/commercial noise where this is present but is "not dominant".*
- *$L_{Aeq,16hr}$ is for daytime 0700 – 2300, $L_{Aeq,8hr}$ is for night-time 2300 – 0700.*
- *An indication that there may be more than 10 noise events at night (2300 – 0700) with $L_{Amax,F}$ > 60 dB means the site should not be regarded as negligible risk.*

Whilst the assessment outlined in this report does not necessarily constitute a full assessment in accordance with the ProPG, the assessment methodology and criteria used have been based on the principals and guidance outlined in the ProPG document.

4 ENVIRONMENTAL NOISE SURVEY

4.1 Measurement Location and Procedure

An initial appraisal of the site determined that road traffic noise from surrounding roads, in addition to significant contribution from Heathrow Airport, were the primary sources of noise in the area.

Noise surveys were undertaken on the site as shown in the figure below:

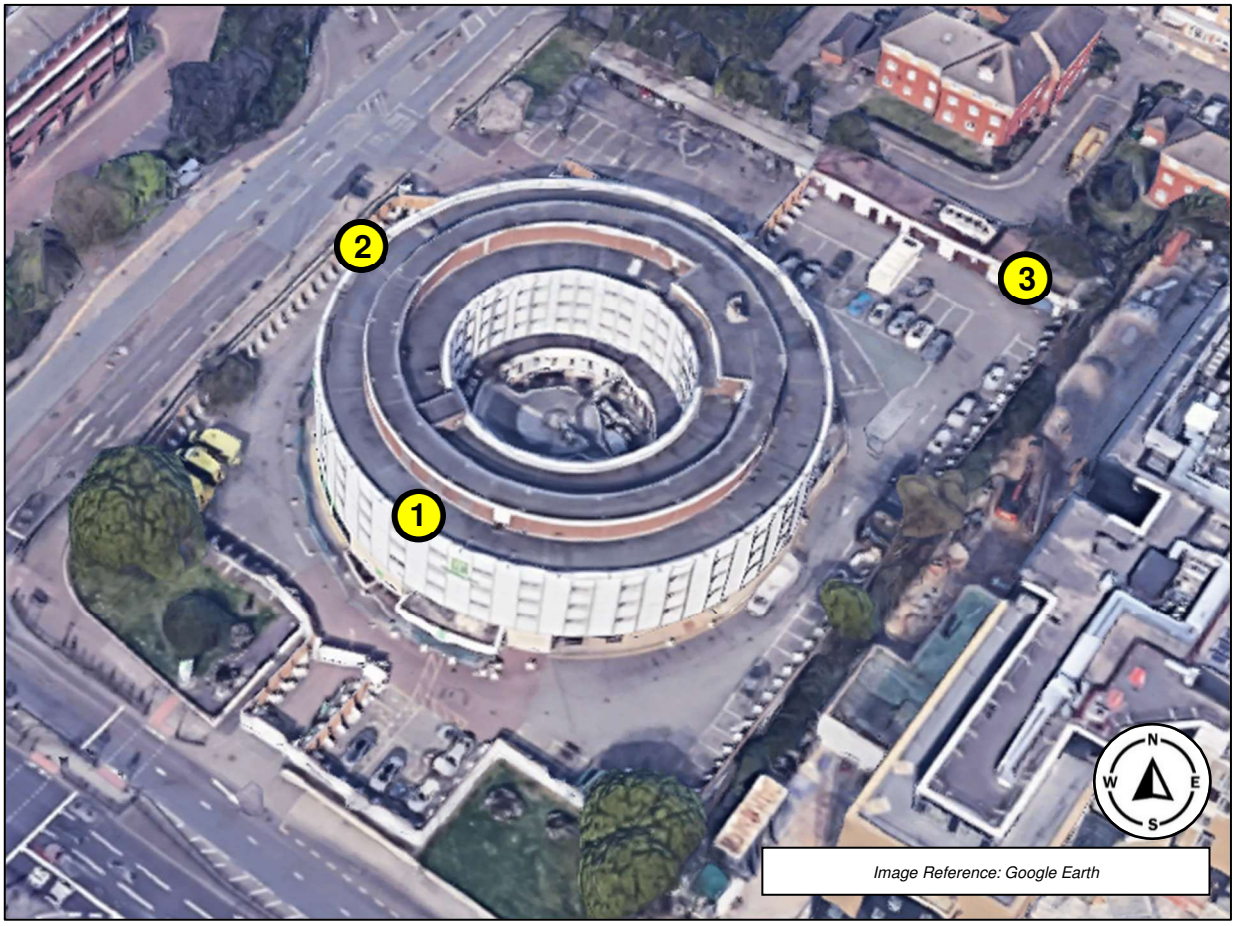


Figure 4 Noise survey measurement locations

The locations were chosen to collect data representative of the levels expected on the site due to all nearby sources with a focus on noise emissions from the airport use.

The measurement procedure complied with ISO 1996-2:2017 Acoustics '*Description, measurement and assessment of environmental noise - Part 2: Determination of environmental noise levels'*, with automated monitoring undertaken between 11:15 on 15/06/2023 to 10:45 on 21/06/2023.

The extended period was chosen for the survey in order to ensure that a representative data set was captured with regards to noise from the airport. This ensured that on at least one day of the survey airport movements were occurring using the runway closest to the site, to capture a worst-case scenario.

The key acoustic descriptors measured for this assessment are as follows:

- *$L_{Aeq,T}$ (the continuous equivalent A-weighted noise level over a given time period, T);*
- *$L_{AFMax,T}$, the maximum sound level over each measurement period;*
- *$L_{A90,T}$ (the noise level exceeded for 90% of the measurement period T, referred to as the 'background' noise level).*

4.2 Measurement Equipment

The table below presents the equipment used for the baseline noise surveys. The equipment calibration was verified before and after use and no abnormalities were observed.

Equipment	Make and Model	Serial Number
Sound Level Meter	Svantek 977 Class 1 Sound Level Meter	34191
Microphone Capsule	Svantek MK 255	77747
Microphone Preamplifier	Svantek SV 12L	32446
Sound Level Meter	Convergence Instruments NSRT MK3 Type 1 Sound Level Meter and Data Logger	APPUhF062fc1KhlgS2BxHD
Sound Level Meter	Convergence Instruments NSRT MK3 Type 1 Sound Level Meter and Data Logger	CPt+rtUYU9+dKLnA76jxND
Calibrator	Svantek SV36	122255

Table 6 Survey Equipment

4.3 Weather Conditions

Weather conditions during the automated monitoring were generally dry with light winds and therefore suitable for the measurement of environmental noise.

Measurements of temperature and wind speed were undertaken over a 15-minute period on both the installation and collection visits as reported in the table below. Additional data on precipitation has been sourced from local weather stations for the course of the survey. A summary of the weather data is reported in the table below:

Description	Installation Date 15/06/2023	Collection Date 21/06/2023
Temperature (º Celsius)	26	21
Wind speed (m/s)	3.3*	3*
Wind direction	W	SE
Precipitation	0mm	0mm
Presence of damp roads/wet ground	None	None
Cloud cover (Oktas**)	0 ◯	4 ◑
Presence of fog/snow/ice	None	None

Table 7 Weather conditions
***measured during the site visit using a handheld anemometer, maximum speed measured over 15-minute period during the site visit using a handheld anemometer**
****An okta is a unit of measurement used to describe the amount of cloud cover at any given location. Sky conditions are estimated in terms of how many eighths of the sky are covered in cloud, ranging from 0 oktas (completely clear sky) through to 8 oktas (completely overcast)**

4.4 Heathrow Flight Patterns

In order to ensure that the data captured by the survey was sufficiently robust, runway alternation plans for Heathrow Airport have been consulted prior to the survey. This document is attached in Appendix D.

From this document, we can confirm that the Northern runway, closest to the site, was used from 15:00-last departure from 15/06/2023 until 18/06/2023. For the remainder of the survey, the Northern runway was used between 06:00-15:00. This is denoted by code “27R”.

The document does not define the times considered to be “night-time” as this would also be dependent upon the last departure of the day. However, conventionally “night-time” in planning is considered to be from 23:00-07:00. From this, it is deemed reasonable to consider the “night-time” movements to be from 23:00, until the first morning time referenced at 06:00.

Date (week commencing)	06:00 - 15:00	15:00-last departure
12 Jun	27L	27R
19 Jun	27R	27L

Table 8 Heathrow North Runway Daytime Arrivals

According to the same document, night-time landing references on the North runway are 09L and 27R.

Date (week commencing)	Runway to be used (primary)	Alternative (secondary)
12 Jun	27L	09R
19 Jun	09L	27R

Table 9 Heathrow North Runway Night-time Arrivals

4.5 Survey Results

Time histories of the survey results are presented in Appendix B1 to B3 for Noise Measurement Positions 1 to 3 respectively. A summary of the measurement results is presented in the tables below:

Measurement Position	Period	Ambient Sound Level $L_{Aeq,\,T}$ (dB)	10th Highest Maximum Night-time Noise Level L_{AFmax} (dB)
1	Daytime 07:00-23:00	68	--
	Night-time 23:00-07:00	61	86.2
2	Daytime 07:00-23:00	66	--
	Night-time 23:00-07:00	60	84.5
3	Daytime 07:00-23:00	61	--
	Night-time 23:00-07:00	54	80.3

Table 10 Measured noise levels – Averaged Throughout Survey

Survey Date	Period	Ambient Sound Level, Position 1 $L_{Aeq,\ T}$ (dB)	10th Highest Maximum Night-time Noise Level L_{AFmax} (dB)	Ambient Sound Level, Position 2 $L_{Aeq,\ T}$ (dB)	10th Highest Maximum Night-time Noise Level L_{AFmax} (dB)	Ambient Sound Level, Position 3 $L_{Aeq,\ T}$ (dB)	10th Highest Maximum Night-time Noise Level L_{AFmax} (dB)
15/06/2023 – 16/06/2023	Daytime 11:00-23:00	63.3	--	62.2	--	55.8	--
	Night-time 23:00-07:00	59.4	73.7	58.3	71.5	50.3	67.1
16/06/2023 – 17/06/2023	Daytime 07:00-23:00	65.6	--	63.8	--	56.2	--
	Night-time 23:00-07:00	59.5	78.0	58.5	74.9	49.6	66.3
17/06/2023 – 18/06/2023	Daytime 07:00-23:00	64.2	--	62.6	--	58.1	--
	Night-time 23:00-07:00	59.4	75.3	58.1	74.6	49	64.2
18/06/2023 – 19/06/2023	Daytime 07:00-23:00	67.1	--	64.8	--	60	--
	Night-time 23:00-07:00	60.4	76.5	59.1	74.8	51.6	70.1
19/06/2023 – 20/06/2023	Daytime 07:00-23:00	70.7	--	68.2	--	64.9	--
	Night-time 23:00-07:00	62.9	81.9	60.9	77.5	57.8	74.4
20/06/2023 – 21/06/2023	Daytime 07:00-23:00	70.4	--	68.3	--	63.9	--
	Night-time 23:00-07:00	64.1	80.3	62.2	80.0	56.6	74.5
21/06/2023	Daytime 07:00-11:00	65.2	--	64.4	--	57.7	--

Table 11 Measured noise levels – Daily

Average noise levels considering hours where North runway was in predominant use for landing.

Measurement Position	Period	Ambient Sound Level $L_{Aeq,\ T}$ (dB)	10th Highest Maximum Night-time Noise Level L_{AFmax} (dB)
1	15:00-23:00 15-18/06/23	63.9	--
	06:00-15:00 19-21/06/23	65	--
	23:00-06:00 19-21/06/23	62.5	85.1
2	15:00-23:00 15-18/06/23	62.1	--
	06:00-15:00 19-21/06/23	63.3	--
	23:00-06:00 19-21/06/23	60.7	84.5
3	15:00-23:00 15-18/06/23	55.8	--
	06:00-15:00 19-21/06/23	59.7	--
	23:00-06:00 19-21/06/23	56.0	80.2

Table 12 Measured noise levels – Times where North Runway was in predominant use for landings

Analysis of the time history data shows elevated noise levels from 15:00-23:00 on the 19/06/2023 and 20/06/2023. While departure information is limited from Heathrow, the timings provide the inverse of the landing periods. It is therefore assumed that for this period the North runway is being used for departures, which would explain the elevated noise levels as shown in Table 11.

Measurement Position	Period	Ambient Sound Level $L_{Aeq,\ T}$ (dB)
1	15:00-23:00 19-20/06/23	72.9
2	15:00-23:00 19-20/06/23	70.6
3	15:00-23:00 19-20/06/23	66.4

Table 13 Measured noise levels – Times where North Runway was in presumed use for departures

As shown in Table 13, noise levels during the presumed departures from the North Runway are elevated above the average daytime noise levels. It should however be considered that as demonstrated these levels do not persist for any single full daytime period. As such, the full daytime periods for the days noted above would be considered representative of the realistic worst-case scenario for aircraft movements affecting the site.

Furthermore, there is a direct correlation between noise levels to the rear of the site and those affecting the south/west façades. Considering that the primary noise source of concern is aircraft noise from the south, the spectral values for aircraft noise measured are corrected by 6dB as a robust nominal reduction for the specification of glazing for the Apart-Hotel to the rear of the site. This is a lesser reduction than is observed through the survey, in order to present a robust assessment.

4.6 Values For External Fabric Specification

The L_{eq} spectra considered in the assessment for the main building extension are shown in Table 14 below.

Scenario	Measured Sound Pressure Level, dB, at Octave Band Centre Frequency								
	63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz	dB(A)
Daytime	72	69	68	65	64	60	52	41	68
Night-time	63	62	60	58	58	53	46	36	62
19th-20th Daytime	75	71	70	68	66	63	56	44	71

Table 14 Spectral noise levels considered for glazing specification – main building extension.

The L_{max} spectra used for the assessment of the main building extension is shown in Table 15.

Scenario	Measured Sound Pressure Level, dB, at Octave Band Centre Frequency								
	63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz	dB(A)
10th Highest Night-time L_{max}	78	88	87	78	85	77	66	56	86

Table 15 Spectral L_{max} noise levels considered for glazing specification – main building extension.

The L_{eq} spectra considered in the assessment for the Apart-Hotel construction are shown in Table 16 below.

Scenario	Measured Sound Pressure Level, dB, at Octave Band Centre Frequency								
	63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz	dB(A)
Daytime	66	63	62	59	58	54	46	35	62
Night-time	57	56	54	52	52	47	40	30	56
19th-20th Daytime	69	66	64	62	60	57	50	38	65

Table 16 Spectral noise levels considered for glazing specification – new Apart-Hotel building to rear.

The L_{max} spectra used for the assessment of the Apart-Hotel is shown in Table 17.

Scenario	Measured Sound Pressure Level, dB, at Octave Band Centre Frequency								
	63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz	dB(A)
10th Highest Night-time L_{max}	72	82	81	72	79	71	60	50	80

Table 17 Spectral L_{max} noise levels considered for glazing specification – new Apart-Hotel building to rear.

5 INITIAL SITE RISK ASSESSMENT

5.1 Stage 1 Risk Assessment

Although more relevant to residential use, the below assessment is intended to give an indication for the worst-case scenario for the use of the site.

Based on the automated noise measurements undertaken on site, an initial site risk assessment has been undertaken in accordance with the guidance presented in ProPG as shown in the table below:

Period	**Noise Level at 1m from Façade dB $L_{Aeq,T}$**	**Noise Risk Category dB $L_{Aeq,T}$**
Daytime 07:00-23:00	62 – 71	3-High
Night-time 23:00-23:00	58 – 64	3-High

Table 18 Stage 1 risk assessment – Main Building

Period	**Noise Level at 1m from Façade dB $L_{Aeq,T}$**	**Noise Risk Category dB $L_{Aeq,T}$**
Daytime 07:00-23:00	56 – 65	2-Medium
Night-time 23:00-23:00	49 – 58	2-Medium

Table 19 Stage 1 risk assessment – Apart-Hotel Building

Noise levels for daytime and night-time are within the “medium-high” noise risk category for the site, with reduced risk at the Apart-Hotel building to the rear of the site as shown in Table 19. This is commensurate to expectations for the site, considering the close proximity to the airport to the south.

The acoustic design advice provided within the following sections would ensure that noise impacts are sufficiently mitigated against to ensure ‘no adverse effect on health and quality of life’. The design and specifications would ensure that the internal noise level targets outlined in BS 8233:2014 are achieved and a good internal noise climate is provided for future occupants.

6 GLAZING AND VENTILATION

A scheme of suitable noise mitigation measures to protect the proposed extension and new development against external noise relates principally to the sound insulation performance of elements of the overall external building envelope. The composite acoustic performance required of any portion of the building envelope will depend on its location relative to the principal noise sources around the site and the nature of the spaces behind it (noise criteria, size, room finishes, etc.).

The following sections describe the proposed design measures to achieve the internal ambient noise level criteria.

6.1 Currently Proposed Non-Glazed External Building Fabric Construction

The exact specification for the non-glazed external building fabric is not known at the time of writing. From the nature of the construction, it is assumed that a lightweight construction will be used. A typical specification for such a construction has been considered at this stage of the assessment as shown in the table below. This represents a nominal performance and will be updated should an alternative construction be proposed for the development.

Glazing Type	Octave band centre frequency SRI, dB							R_w
	63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	
Single 150mm frame construction with 2 no. plasterboard internal linings, or similar, 10mm calcium silicate board, with insulated thermal panel and 9mm cladding	17	36	44	51	56	58	60	54

Table 20 Previously Issued Non-Glazed Fabric Performances

6.2 Glazing Specifications

Calculations have been undertaken to determine a suitable glazing specification for the development, assuming that the non-glazed building envelope provides the minimum sound insulation performances noted in Section 6.1.

Calculations have been undertaken for the following sample rooms within the development due to the varying ratios of glazing to non-glazing, room dimensions and room absorption characteristics:

- Main hotel extension outward facing rooms
- Ground floor studio rooms for Apart-Hotel

The results of the calculations are shown in Appendix C. Minimum octave band sound reduction index (SRI) values required for glazed elements to be installed are shown in the table below:

Glazing Type	Octave band centre frequency SRI, dB						R_w ($C;C_{tr}$)
	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	
Type 1 – Main building, South Side	26	38	46	50	55	60	48 (-3;-8)
Type 2 – Main building, North Side	23	35	43	47	52	57	45 (-3;-8)
Type 3 – Apart-Hotel Windows	25	23	37	41	42	43	38 (-2;-6)

Table 21 Glazing specification

The performance is specified for the whole window unit including the frame. Sole glass performance data would not demonstrate compliance with this specification. The nominated glazing supplier should verify that their proposed window system meets the attenuation figures shown at each centre frequency band.

Note, glazing type 2 is derived from type 1, with a 3dB correction for mild screening provided by the building for windows on the North side of the main hotel building.

An example glazing configuration capable of providing the level of sound insulation required is shown below:

Glazing Type	Calculated Sound Insulation Requirement for Glazing	Example Window Construction Capable of Achieving the Sound Insulation Requirement
Type 1	48 (-3;-8)	16mm laminated glass / 20mm air gap / 10mm laminated glass
Type 3	38 (-2;-6)	10mm glass / 12mm air gap / 6mm glass

Table 22 Example glazing type

6.3 Background Ventilation

As noise levels in the area are objectively high, and the required glazing specification for the hotel rooms is significant, it would be recommended that background ventilation be provided by mechanical ventilation.

6.4 Purge Ventilation

The only time windows will be required to be open for the purpose of ventilation will be for occasional 'purge' ventilation. With respect to noise levels during purge ventilation conditions, ProPG states the following:

'…the internal noise level guidelines are generally not applicable under 'purge ventilation' conditions as defined by Building Control Approved Document F, as this should only occur occasionally (e.g. to remove odour from painting and decorating or from burnt food).'

It is therefore not considered necessary to further consider noise levels during purge ventilation conditions. Using windows for this purpose is unlikely to result in any significant adverse effects due to the limited time the window would be open, with the occupant having full control over the open condition.

7 PLANT NOISE EMISSION LIMITS

Due to the variations in the representative background noise levels across the site, noise emission limits for new plant and equipment would depend on the proposed installation location of the plant.

Typically, we would recommend that noise emissions from new plant installations are 10dB below the representative background noise level to ensure a low likelihood of adverse impact.

Therefore, a range of levels have been provided as noise limits for external plant until specific plant and installations locations are known:

Period	**Representative Background Sound Level** **dB L_{A90}**	**Maximum plant noise rating level** **dB $L_{Ar,Tr}$**
Daytime (07:00-23:00)	53 – 61	43 – 51
Night-time (23:00-07:00)	45 – 57	35 – 47

Table 23 Noise limits for external plant

The noise levels in Table 23 are indicative of representative background levels as they were measured across the site, with the greater figures being recorded to the South, and lower figures recorded to the North of the site.

Plant noise emission limits apply to the cumulative noise level from all proposed items of plant operating at their standard duty and are applicable at 1 metre from the window of the nearest noise sensitive receptors.

At this point in the design, the exact details of the proposed units and proposed installation locations are unknown. When detailed information regarding new plant and equipment is available, a more detailed noise assessment should be undertaken based on the specific plant to be installed, its location and acoustic feature corrections. Note that suitable attenuation measures should be specified (e.g. acoustic screening or acoustic attenuators) where required to comply with these noise emission limits.

Please note that plant noise limits are in terms of 'rating level' as defined in BS 4142:2014+A1:2019. Therefore, if acoustic features, such as tones, impulsivity or intermittence are present a correction will need to be applied and the actual 'specific noise level' produced by any plant / equipment will need to be lower than the values above.

8 CONCLUSION

An environmental noise survey has been undertaken at the site of the Proposed Development at Ariel Hotel, 118 Bath Road, Heathrow.

Based on the results of the noise survey, a noise impact assessment considering relevant planning policy and guidance has been undertaken.

This assessment has concluded that adverse effects are unlikely to occur at the proposed development if appropriate mitigation measures are implemented, for which the specified external building fabric has been provided.

Provisional plant noise emissions criteria have been proposed for guidance in the specification of any fixed mechanical plant as it is developed, and can be reviewed once plant proposals are put forward for the development.

APPENDIX A

ACOUSTIC TERMINOLOGY

Decibel scale - dB

The decibel (dB) is a relative unit of measurement used in acoustics. The dB is a logarithmic ratio between a measured level and a reference level of 0 dB (i.e the threshold of human hearing). Simply put, the decibel compresses the wide range of sounds we hear into more manageable numbers.

Addition of noise from several sources

Sound produced by multiple sound sources are added logarithmically e.g. power ratio of 2 = 3dB, power ratio of 10 = 10dB. Therefore, two equally intense sound sources operating simultaneously produce a sound level which is 3dB higher than a single source e.g. 60dB + 60dB = 63dB.

Subjective impression of noise

Human response to sound is highly individualized and often based on psychological factors such as emotion and expectation. Sensitivity to sound typically depends on the loudness, pitch, duration of the occurrence, and time of occurrence (e.g. a sound source could cause annoyance during the night where it would not during the day). The following table is a guide to explain increases or decreases in sound levels for many scenarios.

Change in sound level	Change in perceived loudness
1 dB	Imperceptible
3 dB	Just barely perceptible
6 dB	Clearly noticeable
10 dB	About twice as loud

'A' Weighted Frequency Filter - dB(A)

The human ear is not equally sensitive in all frequencies. The A-weighting filter was devised to take this into account when undertaking noise measurements and allows a sound level meter to replicate the human ears response to sound.

$L_{Aeq, T}$

Sound can fluctuate widely over a given period. L_{Aeq} is the A-weighted equivalent continuous sound level, with T denoting the time period over which the fluctuating sound levels were averaged e.g. $L_{Aeq,16h}$ is the equivalent continuous noise level over an 16 hour period.

L_{A90}

A-weighted sound level exceeded for 90% of the measurement period, calculated via statistical analysis. The L_{A90} descriptor is typically used to establish background sound levels for noise impact assessments

L_{A10}

A-weighted sound level exceeded for 10% of the measurement period, calculated via statistical analysis.

L_{AFmax}

A-weighted sound level maximum sound pressure level that has been measured over a given time period

Octave Bands

APPENDIX A

ACOUSTIC TERMINOLOGY

The audio or frequency spectrum of the human ear is in the range of 20Hz to 20 kHz. The spectrum tells how the energy of the sound signal is distributed in frequency. Octave bands divides the audio spectrum into 10 equal parts. The International Standards Organisation defines the centre frequency of these bands as 31.5Hz, 63 Hz, 125 Hz, 250 Hz, 500 Hz, 1kHz, 2kHz, 4kHz, 8kHz and 16kHz.

Noise Rating (NR) Curves

A method of rating noise using a set of curves relating octave band sound pressure levels. Typically used for building services systems within offices

Airborne sound

Sound radiated from a source into the surrounding air e.g. musical instruments, tv/radio, machinery/equipment. Airborne sound insulation refers to the reduction or attenuation of airborne sound, usually via a solid partition between a source and receiver.

Impact sound

Sound resulting from the impact between colliding objects, e.g. footfall impact upon a floor. Impact sound insulation refers to the resistance of a floor to the transmission of impact sound, typically via the installation of a 'resilient layer'

Flanking sound

The transmission of airborne sound between two adjacent rooms by paths other than via the separating partition between the rooms, e.g. the abutment point of a wall and floor.

Structure-borne noise

Noise caused by the vibration of elements of a structure. This can result in reradiated noise, whereby the vibrating element transmits airborne sound into a space e.g. vibration caused by mechanical plant installed within a plant room which is not adequately isolated from the structure, or construction/demolition work in an adjacent building.

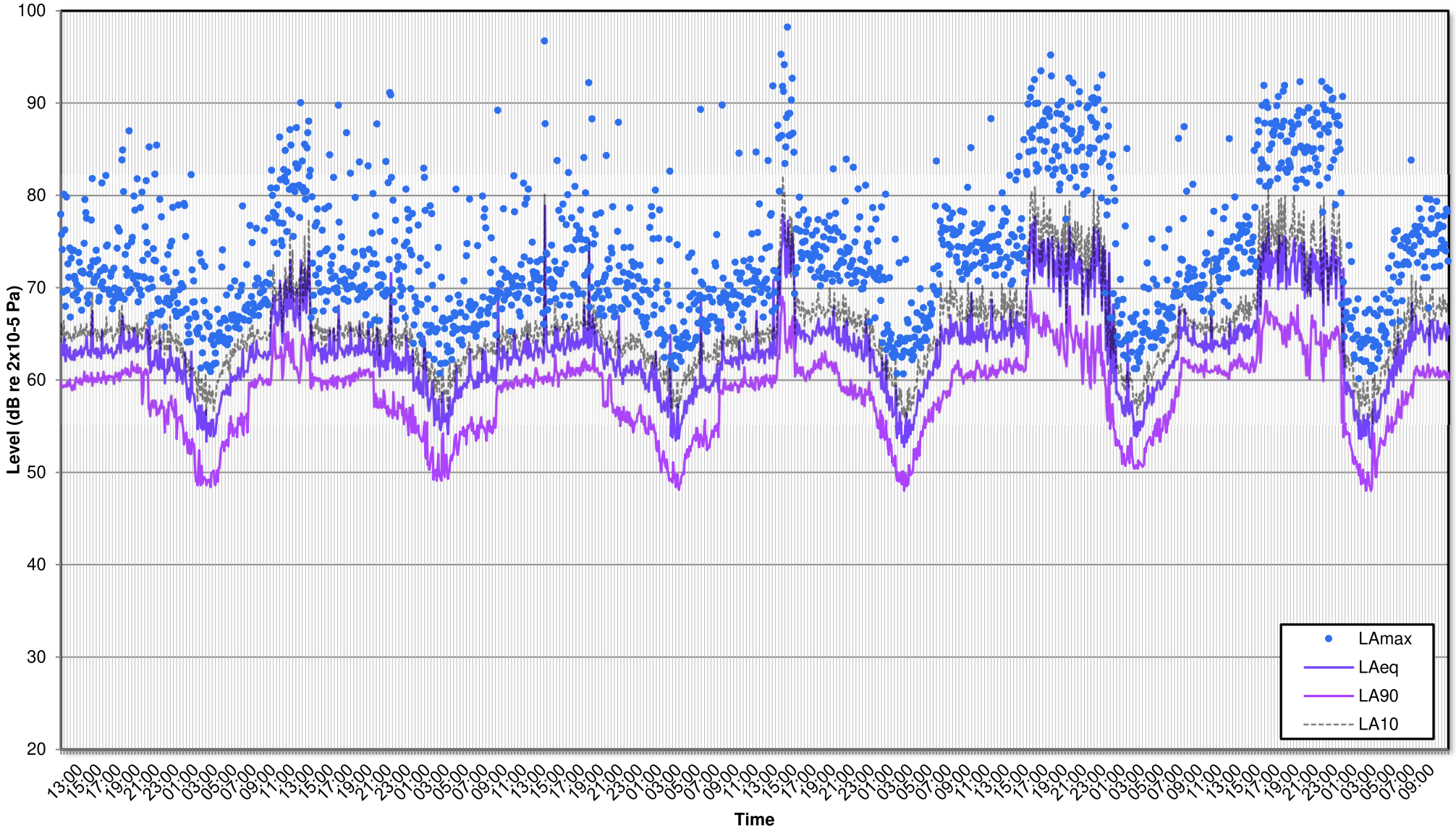
Reverberant sound

Sound in an enclosed space (usually a room), which results from repeated reflections at the boundaries. Reverberation time is the time taken for a steady sound level in an enclosed space to decay by 60dB, measured from the moment the sound source is switched off. A example of a typically reverberant space would be a classic church. Absorptive materials can be used to reduce reflections and reverberation times.

APPENDIX B1

ENVIRONMENTAL NOISE TIME HISTORY

20432.ENIA-RPT.01
Noise Monitoring Position 1
11:05 on 15th June to 10:45 on 21st June 2023

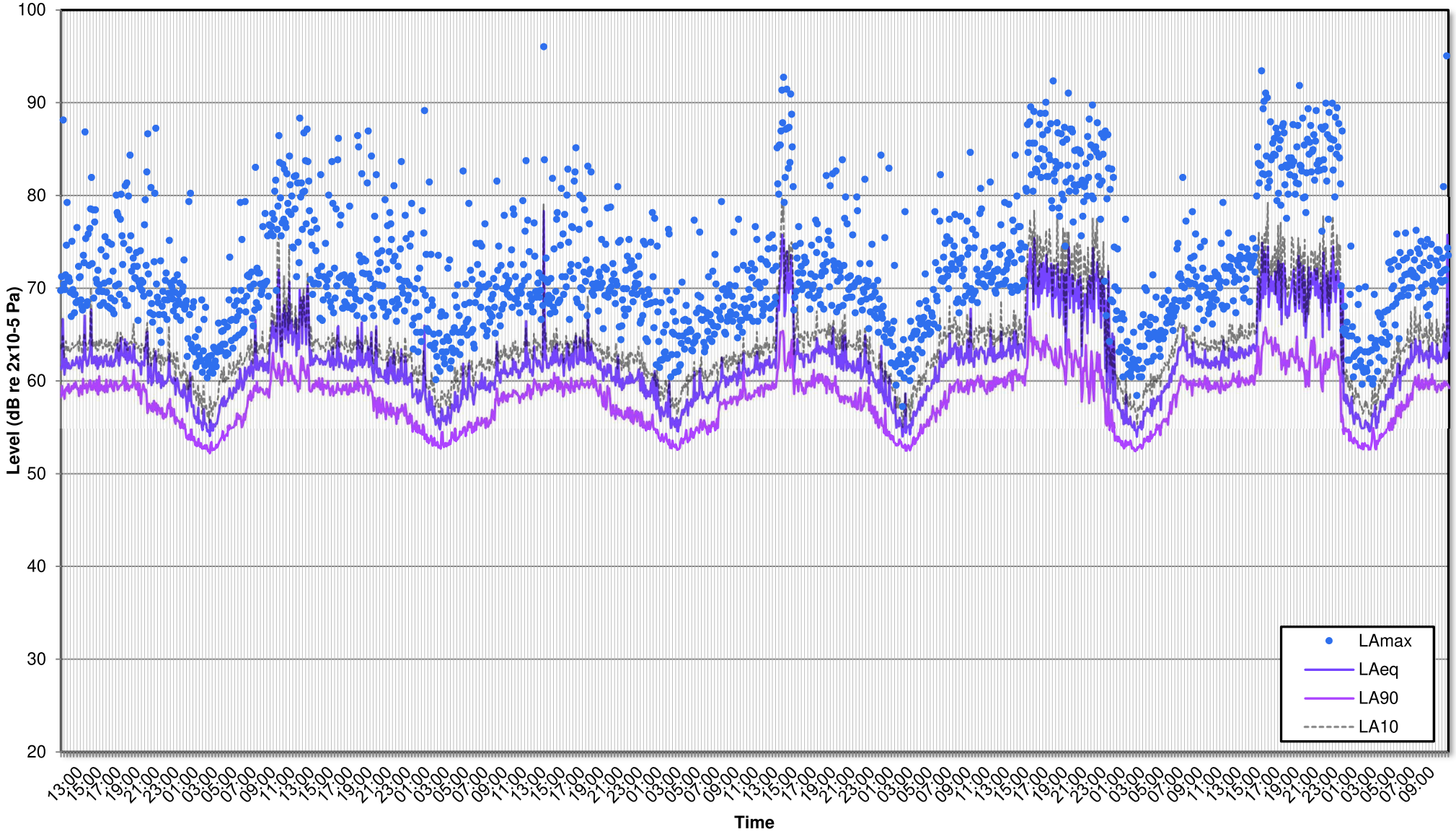


APPENDIX B2

ENVIRONMENTAL NOISE TIME HISTORY

es acoustics

20432.ENIA-RPT.01
Noise Monitoring Position 2
11:05 on 15th June to 10:45 on 21st June 2023



APPENDIX B3

ENVIRONMENTAL NOISE TIME HISTORY

20432.ENIA-RPT.01
Noise Monitoring Position 3
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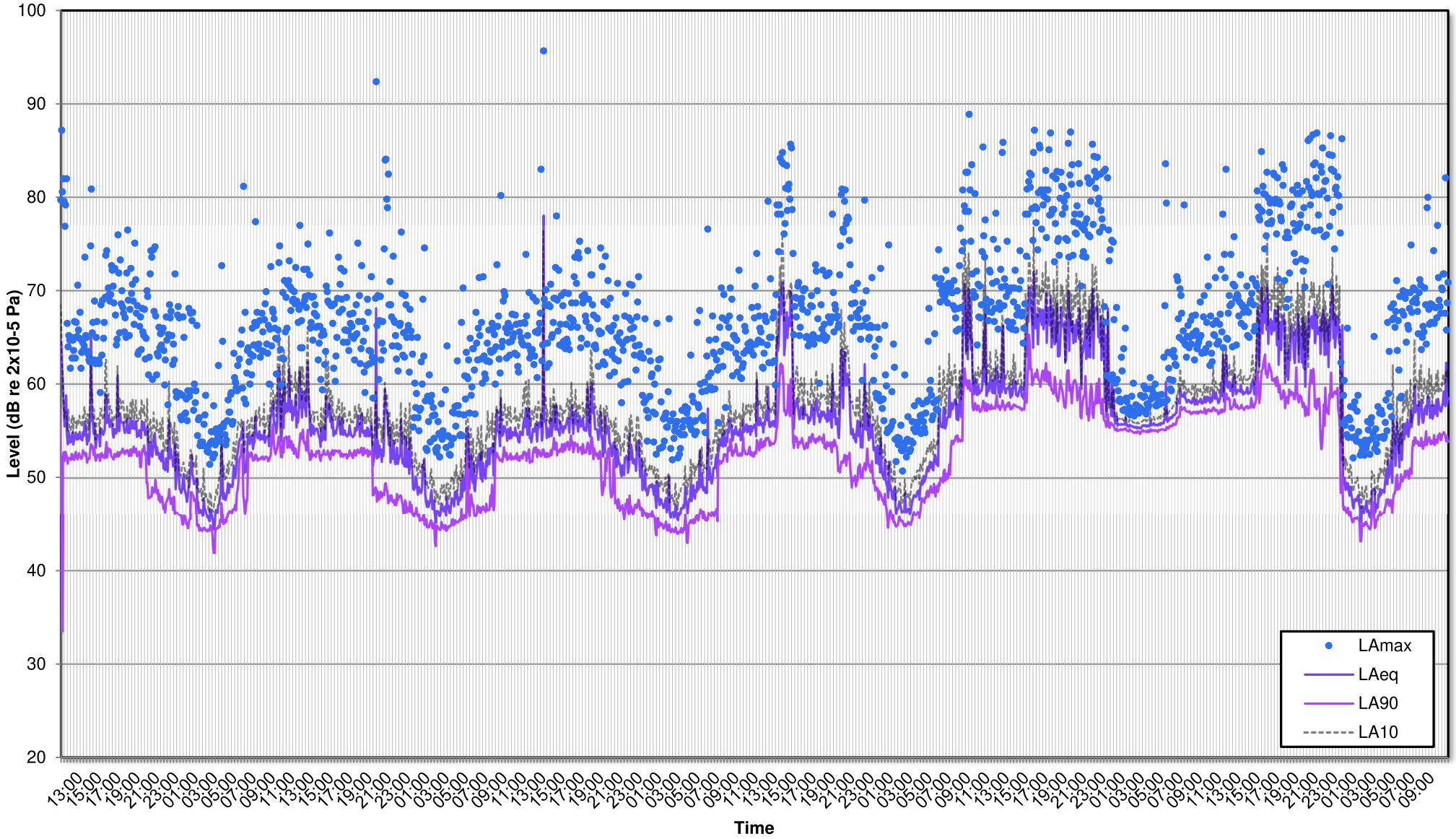

APPENDIX C

OUTDOOR-INDOOR GLAZING CALCULATIONS

Outdoor To Indoor Sound Transmission (v9.0.24)

Program copyright Marshall Day Acoustics 2017
Margin of error is generally within ±3 dB
- Key No. 6586
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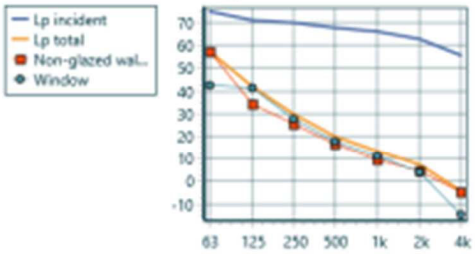
Job No.: 20432 Initials:D.Arkley
Date:10/07/2023
File Name:daytime leq.inz
Comment:



Source	Octave Band Centre Frequency (Hz) 63	125	250	500	1k	2k	4k	Overall dBA
Incident sound level (freefield)	75.0	71.0	70.0	68.0	66.0	63.0	56.0	71
Path								
Element 1 , STL	-17	-36	-44	-51	-56	-58	-60	
Facade Shape factor Level diff.	0	0	0	0	0	0	0	
Insertion Loss	0	0	0	0	0	0	0	
Area(+10LogA) [7.0 m²]	8	8	8	8	8	8	8	
Element sound level contribution	57	34	25	16	9	4	-5	32
Element 2 , STL	-28	-26	-38	-46	-50	-55	-66	
Facade Shape factor Level diff.	0	0	0	0	0	0	0	
Insertion Loss	0	0	0	0	0	0	0	
Area(+10LogA) [3.0 m²]	5	5	5	5	5	5	5	
Element sound level contribution	43	41	28	18	12	4	-15	27
Receiver								
Room volume(-10LogV) [39 m3]	-16	-16	-16	-16	-16	-16	-16	
Reverberation time (s)	0.4	0.4	0.4	0.4	0.4	0.4	0.4	
RT (+10LogT)	-4.0	-4.0	-4.0	-4.0	-4.0	-4.0	-4.0	
Equation Constant	11	11	11	11	11	11	11	
Room sound level	58	42	30	20	14	7	-4	33
Level difference								LpAinc - LpARev,T0
D2m,nT	20	31	42	50	55	58	62	37

** Element descriptions:
#1: Non-glazed wall
#2: Window

APPENDIX C

OUTDOOR-INDOOR GLAZING CALCULATIONS

Outdoor To Indoor Sound Transmission (v9.0.24)

Program copyright Marshall Day Acoustics 2017
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- Key No. 6586
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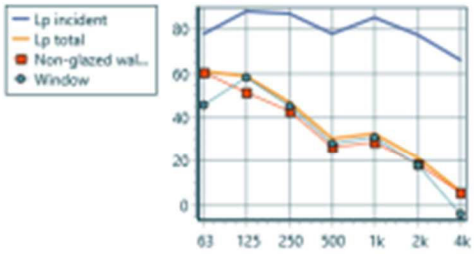
Job No.: 20432 Initials:D.Arkley
Date:10/07/2023
File Name:Night-time max.inz
Comment:



Source	Octave Band Centre Frequency (Hz) 63	125	250	500	1k	2k	4k	Overall dBA
Incident sound level (freefield)	78.0	88.0	87.0	78.0	85.0	77.0	66.0	87
Path								
Element 1 , STL	-17	-36	-44	-51	-56	-58	-60	
Facade Shape factor Level diff.	0	0	0	0	0	0	0	
Insertion Loss	0	0	0	0	0	0	0	
Area(+10LogA) [7.0 m^2]	8	8	8	8	8	8	8	
Element sound level contribution	60	51	42	26	28	18	5	40
Element 2 , STL	-28	-26	-38	-46	-50	-55	-66	
Facade Shape factor Level diff.	0	0	0	0	0	0	0	
Insertion Loss	0	0	0	0	0	0	0	
Area(+10LogA) [3.0 m^2]	5	5	5	5	5	5	5	
Element sound level contribution	46	58	45	28	31	18	-4	43
Receiver								
Room volume(-10LogV) [39 m3]	-16	-16	-16	-16	-16	-16	-16	
Reverberation time (s)	0.4	0.4	0.4	0.4	0.4	0.4	0.4	
RT (+10LogT)	-4.0	-4.0	-4.0	-4.0	-4.0	-4.0	-4.0	
Equation Constant	11	11	11	11	11	11	11	
Room sound level	61	59	47	30	33	21	6	45
Level difference								LpAinc - LpARev,T0
D2m,nT	20	31	42	50	54	58	62	41

** Element descriptions:
#1: Non-glazed wall
#2: Window

APPENDIX C

OUTDOOR-INDOOR GLAZING CALCULATIONS

Outdoor To Indoor Sound Transmission (v9.0.24)

Program copyright Marshall Day Acoustics 2017
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- Key No. 6586
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Job No.: 20432 Initials:D.Arkley
Date:10/07/2023
File Name:aparthotel daytime leq.inz
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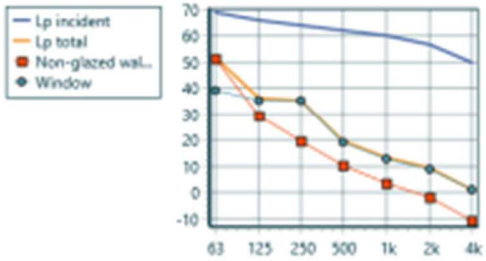


	Octave Band Centre Frequency (Hz)							
Source	63	125	250	500	1k	2k	4k	Overall dBA
Incident sound level (freefield)	69.0	66.0	64.0	62.0	60.0	57.0	50.0	65
Path								
Element 1 , STL	-17	-36	-44	-51	-56	-58	-60	
Facade Shape factor Level diff.	0	0	0	0	0	0	0	
Insertion Loss	0	0	0	0	0	0	0	
Area(+10LogA) [8.3 m²]	9	9	9	9	9	9	9	
Element sound level contribution	52	30	20	11	4	-1	-10	26
Element 2 , STL	-24	-25	-23	-37	-41	-42	-43	
Facade Shape factor Level diff.	0	0	0	0	0	0	0	
Insertion Loss	0	0	0	0	0	0	0	
Area(+10LogA) [2.4 m²]	4	4	4	4	4	4	4	
Element sound level contribution	39	35	35	19	13	9	1	28
Receiver								
Room volume(-10LogV) [46 m3]	-17	-17	-17	-17	-17	-17	-17	
Reverberation time (s)	0.4	0.4	0.4	0.4	0.4	0.4	0.4	
RT (+10LogT)	-4.0	-4.0	-4.0	-4.0	-4.0	-4.0	-4.0	
Equation Constant	11	11	11	11	11	11	11	
Room sound level	52	36	35	20	14	9	1	30
Level difference								LpAinc - LpARev,T0
D2m,nT	19	32	31	44	49	50	51	34

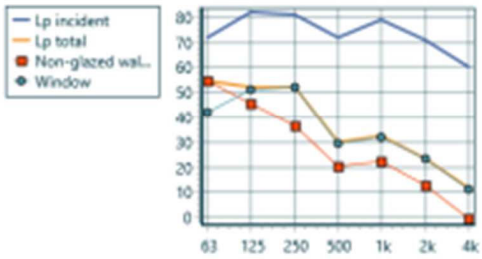
** Element descriptions:
#1: Non-glazed wall
#2: Window

APPENDIX C

OUTDOOR-INDOOR GLAZING CALCULATIONS

Outdoor To Indoor Sound Transmission (v9.0.24)

Program copyright Marshall Day Acoustics 2017
Margin of error is generally within ±3 dB
- Key No. 6586
Job Name: Ariel Hotel, Heathrow
Job No.: 20432 Initials:D.Arkley
Date:10/07/2023
File Name:aparthotel Night-time max.inz
Comment:



Source	Octave Band Centre Frequency (Hz) 63	125	250	500	1k	2k	4k	Overall dBA
Incident sound level (freefield)	72.0	82.0	81.0	72.0	79.0	71.0	60.0	81
Path								
Element 1 , STL	-17	-36	-44	-51	-56	-58	-60	
Facade Shape factor Level diff.	0	0	0	0	0	0	0	
Insertion Loss	0	0	0	0	0	0	0	
Area(+10LogA) [8.3 m^2]	9	9	9	9	9	9	9	
Element sound level contribution	55	46	37	21	23	13	0	34
Element 2 , STL	-24	-25	-23	-37	-41	-42	-43	
Facade Shape factor Level diff.	0	0	0	0	0	0	0	
Insertion Loss	0	0	0	0	0	0	0	
Area(+10LogA) [2.4 m^2]	4	4	4	4	4	4	4	
Element sound level contribution	42	51	52	29	32	23	11	44
Receiver								
Room volume(-10LogV) [46 m3]	-17	-17	-17	-17	-17	-17	-17	
Reverberation time (s)	0.4	0.4	0.4	0.4	0.4	0.4	0.4	
RT (+10LogT)	-4.0	-4.0	-4.0	-4.0	-4.0	-4.0	-4.0	
Equation Constant	11	11	11	11	11	11	11	
Room sound level	55	52	52	30	33	23	11	45
Level difference								LpAinc - LpARev,T0
D2m,nT	19	32	31	44	49	50	51	35

** Element descriptions:
#1: Non-glazed wall
#2: Window

APPENDIX D
HEATHROW LANDING SCHEDULE

es acoustics

Runway alternation programme – 2023 landings

For the communities living beneath the flight paths used by incoming aircraft, runway alternation provides predictable periods of noise relief.

At its heart, runway alternation is straightforward: for part of the day we use one runway for landings and the other for take-offs. Halfway through the day we switch over. If you were living or working under an incoming flight path during the morning, you're unlikely to be under one during the afternoon. And vice versa.

To help our neighbours plan ahead, we produce this annual schedule of runway alternation. Although we do our best to adhere to the programme, it's not always possible. Sometimes delays mean some arrivals can land out of the alternation pattern, or occasionally we have to suspend runway alternation due to bad weather or emergency repairs to one of the runways.

Day-time runway alternation

Day-time runway alternation happens only when we're on what's known as 'westerly operations'. During westerly operations the wind usually blows from the west and aircraft arrive from the east over London. Westerly operations account for about 70% of the year at Heathrow.

At Heathrow, 'day-time' runs from 06:00 till the last aircraft departs at the end of the day. The halfway point – the time when we switch runways – is 15:00.

Day-time runway codes

The day-time schedule uses the runway codes 27R and 27L.

27R = aircraft approaching the northern runway from the east
27L = aircraft approaching the southern runway from the east

Day-time runway alternation

Date (week commencing)	06:00 - 15:00	15:00 until last departure
2 Jan	27R	27L
9 Jan	27L	27R
16 Jan	27R	27L
23 Jan	27L	27R
30 Jan	27R	27L
6 Feb	27L	27R
13 Feb	27R	27L
20 Feb	27L	27R
27 Feb	27R	27L
6 Mar	27L	27R
13 Mar	27R	27L
20 Mar	27L	27R
27 Mar	27R	27L
3 Apr	27L	27R
10 Apr	27R	27L
17 Apr	27L	27R
24 Apr	27R	27L
1 May	27L	27R
8 May	27R	27L
15 May	27L	27R
22 May	27R	27L
29 May	27L	27R
5 Jun	27R	27L
12 Jun	27L	27R
19 Jun	27R	27L
26 Jun	27L	27R

Date (week commencing)	06:00 - 15:00	15:00 until last departure
3 Jul	27R	27L
10 Jul	27L	27R
17 Jul	27R	27L
24 Jul	27L	27R
31 Jul	27R	27L
7 Aug	27L	27R
14 Aug	27R	27L
21 Aug	27L	27R
28 Aug	27R	27L
4 Sep	27L	27R
11 Sep	27R	27L
18 Sep	27L	27R
25 Sep	27R	27L
2 Oct	27L	27R
9 Oct	27R	27L
16 Oct	27L	27R
23 Oct	27R	27L
30 Oct	27L	27R
6 Nov	27R	27L
13 Nov	27L	27R
20 Nov	27R	27L
27 Nov	27L	27R
4 Dec	27R	27L
11 Dec	27L	27R
18 Dec	27R	27L
25 Dec	27L	27R

Please note: We are able to use both runways for arrivals between 06:00 and 07:00 because this hour is the busiest time of day for arrivals into Heathrow.

Heathrow

APPENDIX D
HEATHROW LANDING SCHEDULE

es acoustics

Runway alternation programme – 2023 landings

Night-time runway alternation

Since so few aircraft take off or land at night, there's more scope for runway alternation. It doesn't matter whether aircraft are coming in to land from the east or the west, we can still alternate runways.

That flexibility gives us the ability to operate night-time runway alternation on a four-weekly cycle.

- **Week 1**: Aircraft fly in from the west to land on the northern runway
- **Week 2**: Aircraft fly in from the east to land on the northern runway
- **Week 3**: Aircraft fly in from the west to land on the southern runway
- **Week 4**: Aircraft fly in from the east to land on the southern runway.

Since weather conditions could interfere with this pattern, we always specify a primary and a secondary (alternative) runway in our schedule. The secondary runway is not actually a different runway. It's the primary runway approached from the opposite direction.

Night-time runway codes

The night-time schedule uses the runway codes 09L, 27R, 09R and 27L.

09L = aircraft approaching the northern runway from the west
27R = aircraft approaching the northern runway from the east
09R = aircraft approaching the southern runway from the west
27L = aircraft approaching the southern runway from the east

Night-time runway alternation (from after the last departure until 06:00am)

Date (week commencing)	Runway to be used (primary)	Alternative (secondary)
2 Jan	09L	27R
9 Jan	27R	09L
16 Jan	09R *	27L *
23 Jan	27L *	09R *
30 Jan	09L	27R
6 Feb	27R	09L
13 Feb	09R	27L
20 Feb	27L	09R
27 Feb	09L	27R
6 Mar	27R	09L
13 Mar	09R	27L
20 Mar	27L	09R
27 Mar	09L	27R
3 Apr	27R	09L
10 Apr	09R	27L
17 Apr	27L	09R
24 Apr	09L	27R
1 May	27R	09L
8 May	09R	27L
15 May	27L	09R
22 May	09L	27R
29 May	27R	09L
5 Jun	09R	27L
12 Jun	27L	09R
19 Jun	09L	27R
26 Jun	27R	09L

Date (week commencing)	Runway to be used (primary)	Alternative (secondary)
3 Jul	09R	27L
10 Jul	27L	09R
17 Jul	09L	27R
24 Jul	27R	09L
31 Jul	09R	27L
7 Aug	27L	09R
14 Aug	09L	27R
21 Aug	27R	09L
28 Aug	09R	27L
4 Sep	27L	09R
11 Sep	09L	27R
18 Sep	27R	09L
25 Sep	09R	27L
2 Oct	27L	09R
9 Oct	09L	27R
16 Oct	27R	09L
23 Oct	09R	27L
30 Oct	27L	09R
6 Nov	09L	27R
13 Nov	27R	09L
20 Nov	09R	27L
27 Nov	27L	09R
4 Dec	09L	27R
11 Dec	27R	09L
18 Dec	09R	27L
25 Dec	27L	09R

* De-alternation to the northern runway may be required overnight during southern runway repairs.

Please note: There is a transitional period from a Sunday to Monday morning – this means that Monday morning flights before 06:00 will still be following the previous week's runway pattern.

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