EASTERLY ALTERNATION INFRASTRUCTURE PROJECT

RESPONSE TO LONDON BOROUGH OF HILLINGDON ON NOISE MATTERS, JULY 2025

CONTENTS

Appendices

1. Introduction

1.1.1 This document provides a response to questions received from LB Hillingdon on 24 June 2025 in a document which formed a review of the Noise impacts of the planning application for works to enable full runway alternation when operating easterly departures. In particular, the document provided a review of the Noise chapter and appendices provided as part of the Environmental Statement accompanying Heathrow's application for those works, which was submitted in October 2024.

1.1.2 The Borough Council's review raised 31 'Questions / Clarifications' and these are responded to one by one in the table set out in Section 2.

2. Response to LB Hillingdon review

ID	LBH Question/Clarification	Heathrow Response
1	Construction: Construction Noise: Noise Metrics: It is noted that the time periods proposed for the $L_{Aeq,T}$ assessments do not align with the BS 5228-1 time periods so it is recommended that this is amended (e.g. $L_{Aeq,5.5hr}$ for night-time should be replaced by $L_{Aeq,1hr}$).	The night-time assessment period for identifying potential significant effects in the 'ABC method' of BS5228-1[1] is 23:00 – 07:00 (8 hours) as shown in Section E.3.2 / Table E.1 and reproduced in Table 7.12 of the ES. This assessment methodology has been supplemented with 5.5 hour assessment period of 23:00 – 04:30 to reflect the period when night-time construction works are forecast to occur based on the indicative construction programme and working methods. This is also the period of the night during which there is reduced aircraft activity and hence the use of a reduced 5.5 hour assessment period is considered a conservative approach. Section E.4 / Table E.2 of BS5228-1 includes a 1 hour averaging period, however this is in the context of "*thresholds used to determine the eligibility for noise insulation and temporary rehousing*", rather than in the context of identifying significant effects. At the planning stage the level of detail in working methods was not, and is still not, sufficiently detailed to allow for 1-hour assessments. Heathrow propose that construction noise is managed through a Section 61 process overseen by London Borough of Hillingdon (LBH) under the Control of Pollution Act 1974, which will allow a more granular assessment of any necessary mitigation to be developed by agreement at that time.
2	Construction: Construction Noise: Assessment Methodology: Paragraph 7.5.23 infers that the "number of receptors affected" could alter the significance of the effect which requires clarification as to why.	As noted in paragraph 7.5.23 of the ES, where likely significant effects are identified, the number of receptors affected is "*discussed to provide context to the effects*". The number of receptors affected provides important context to the scale of the identified effect. It has not been used to alter the reported significance of the effect.

[1] British Standards Institution (2014). *BS 5228-1:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites: Part 1 – Noise*. London: BSI.

ID	LBH Question/Clarification	Heathrow Response
3	Residential Receptors – Likely Significant Effects: The use of a 1 dB increase (adverse) above the proposed SOAEL is agreed to be conservative approach and is therefore considered acceptable. It is, however, unclear as to what the justification is for the use a 1 dB decrease (beneficial) being significant.	Minor changes in noise (1.0 - 1.9dB) above the SOAEL are treated as likely significant effects for both increases and decreases. The noise exposure hierarchy table in Planning Practice Guidance Noise (PPG-N[2]) notes that between the LOAEL and SOAEL noise exposure is “present and intrusive”, “causes small changes in behaviour” and “affects the acoustic character of the area such that there is a small actual or perceived change in the quality of life”. PPG-N notes that noise exposure above the SOAEL is “present and disruptive”, “causes a material change in behaviour” and notes “Quality of life diminished due to change in acoustic character of the area.” This increased effect on people’s health and quality of life from noise above SOAEL means that smaller noise changes above SOAEL (increases and decreases) can lead to a likely significant effect. As noted in the ES, this is consistent with PPG-N which states "In cases where existing noise sensitive locations already experience high noise levels, a development that is expected to cause even a small increase in the overall noise level may result in a significant adverse effect occurring even though little to no change in behaviour would be likely to occur." Whilst this statement specifically mentions noise increases, the context of the statement and the noise exposure hierarchy table described above makes clear that the same would be true of noise decreases. This approach is also consistent with other noise assessment methodologies such as the Design Manual for Roads and Bridges (DMRB[3]) which notes that noise changes (increases or decreases) of 1.0dB or more would result in a likely significant effect. Heathrow is confident that the assessment of effects that is documented within the ES complies with the requirements of the EIA Regulations and provides sufficient information for LBH to reach a reasoned conclusion on the likely significant effects of the proposed development on the environment and to decide the application.

[2] Ministry of Housing, Communities and Local Government, Ministry of Housing, Communities & Local Government (2018 to 2021) and Department for Levelling Up, Housing and Communities (2019). Noise. [online] Available at: https://www.gov.uk/guidance/noise--2 (Accessed June 2025)
[3] Standards for Highways (2020). Design Manual for Roads and Bridges. LA 111 - Noise and Vibration. [online] Available at: https://www.standardsforhighways.co.uk/search/cc8cfcf7-c235-4052-8d32-d5398796b364 (Accessed June 2025).

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4	Non-Residential Noise Sensitive Receptors: Where uses include night-time operation (e.g. Hospices, Nursing Homes, Hotels, etc), it is essential that night-time criteria as well as daytime criteria be considered. It is unclear why "commercial non-residential receptors, namely hotels and offices" are considered differently to some other commercial uses e.g. sound recording and broadcast studios so it is recommended that this be discussed. In the case of hotels, it would be appropriate to consider night-time criteria which does not appear to be covered by the current proposals. The values presented in Table 7.23 (Non-residential noise-sensitive receptor types, and absolute 'lower'	**Night-time assessment of hospitals, hospices, nursing homes and hotels** A night-time assessment of noise sensitive non-residential receptors that include night-time operation (hospitals, hospices, nursing homes and hotels) has been undertaken within the ES and reported where relevant. It is summarised below. The construction noise assessment provided within the ES considers night-time effects at hospitals, hospices, nursing homes and hotels using the methodology described in paragraphs 7.5.19 to 7.5.23. No night-time significant effects are identified other than a night-time likely significant effect during the 09L airfield works for the Thistle London Heathrow Terminal 5. This is included in the summary of effects in paragraph 7.8.50 and Table 7.52. For air and ground noise, the assessment methodology includes a night-time assessment for hospitals, hospices, nursing homes and hotels[4]. For ground noise, it is reported that no likely significant effects are concluded for these receptors during the night-time (see paragraphs 7.8.279, 7.8.288, 7.8.298 and 7.8.306). For air noise, paragraph 7.5.99 notes that whilst an assessment of night-time effects for hospitals, hospices, nursing homes and hotels was undertaken, the reporting focusses on daytime effects as it is during daytime periods that changes in aircraft noise due to the Proposed Development main occur. In fact, nowhere is there a receptor that experiences a night-time significant effect that is not also subject to significant effects during the day. *"The assessment has focussed on changes in daytime noise exposure as it is during the day that the Proposed Development has the greatest impact on the distribution of aircraft noise around the Airport. However, the daytime and night-time 'lower' assessment thresholds from Table 7.23 have both been applied in identifying receptors."* The assessment methodology for non-residential receptors in Section 7.5 notes that night-time likely significant effects are initially identified for receptors that both exceed the lower assessment thresholds in Table 7.23 (and Section 9 of Appendix 7.5 for hotels) of the ES and experience at least a 'moderate' noise change of 3dB or greater.

[4] Table 7.23 includes night-time screening criteria of 50dB$L_{Aeq,8h}$ for "Hospitals and other healthcare settings". Footnote 133 to this table notes that this includes CM03HI (hospital/hospice) and RI01 (nursing homes). The night-time lower assessment thresholds for hotels of 45dB$L_{Aeq,8h}$ is specified in Section 9 (Assessment of Hotels and Offices Uses) of Appendix 7.5 of the ES.

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	assessment thresholds) require justification as to the internal noise levels that the external noise criteria are aiming to achieve and hence the assumed sound level difference from external to internal for consideration. In the case of "Places of meeting for religious worship", the "Assumed Ventilation and Cooling Strategy" is stated as "Closed windows". Since closed windows would not provide ventilation or cooling, further explanation of this approach is required.	Following this methodology, no night-time likely significant effects are identified for hospitals, hospices, nursing homes or hotels due to aircraft air noise. This can be seen in Figure 7.28 of the ES which shows that there are no areas within the 45dB$L_{Aeq,8h}$ contour that experience a noise change of 'moderate' or greater (other than a small area within the airport boundary). In conclusion, a night-time assessment of noise sensitive non-residential receptors that include night-time operation (hospitals, hospices, nursing homes and hotels) has been undertaken and reported where relevant in the ES for all sources of noise. The ES identifies that no likely significant effects would occur other than a temporary night-time construction noise likely significant effect during the 09L airfield works for the Thistle London Heathrow Terminal 5. This is reported in the summary of effects in Table 7.52. The information provided therefore is sufficient for LBH to decide the application taking into account the assessment of effects related to these receptors. **Hotels and offices** It is not the case that hotels and offices are considered differently to sound recording and broadcast studios. Sound recording and broadcast studios are assessed using the same approach, with lower assessment thresholds for these receptor types identified in Table 7.23 and the upper assessment threshold defined in paragraph 7.5.94 of the ES. However, no broadcast studios or sound recording studios have been identified as experiencing likely significant effects based on the defined assessment methodology and hence no effects are reported in the ES. **Assessment thresholds** As noted in paragraph 7.5.97, the lower assessment thresholds are defined with regard to standards and guidance documents BS8233[5], HTM-08-01[6], Building Bulletin 93[7], and BCO[8]. As noted in paragraphs 7.5.92 to 7.5.94 the upper

[5] British Standards Institution (2014). BS 8233: 2014 Guidance on sound insulation and noise reduction for buildings. London: BSI
[6] Department of Health (2013) Health Technical Memorandum 08-01: Acoustics. [online] Available at: https://www.england.nhs.uk/wp-content/uploads/2021/05/HTM_08-01.pdf (Accessed June 2025).
[7] Department for Education (2015). BB93: Acoustic Design of Schools – Performance Standards. [online] Available at: https://www.gov.uk/government/publications/bb93-acoustic-design-of-schools-performancestandards (Accessed June 2025).
[8] British Council for Offices (2019) Guide to specification - Best practice for offices. London: British Council for Offices.

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assessment threshold is defined with regard to Government aviation noise policy (paragraph 3.37 of the Aviation Policy Framework[9]).

Where guidance specifies a range of indoor noise levels, professional judgement has been used to select a value within the range based on the anticipated sensitivity of the receptor to noise intrusion and the resulting external noise level criteria.

Where guidance specifies indoor noise levels, these have been converted to outdoor free-field level depending on the assumed ventilation and cooling strategy. For naturally ventilated spaces a reduction of 15dB is assumed and with closed windows a reduction of 25dB is assumed. However, for purpose-built performing arts spaces and recording studios it is reasonable to expect that these receptors would have significantly higher existing insulation performance. This leads to the following assumed internal noise levels at the lower assessment thresholds which are in line with relevant standards and guidance documents as described below the table:

Receptor type	Daytime (07:00 – 23:00)	Night-time
Large and small auditoria; concert halls; sound recording and broadcast studios and theatres	35dBL_{AFmax} or 25dB$L_{Aeq,16h}$[a]	35dBL_{AFmax} or 25dB$L_{Aeq,8h}$[a]
Places of meeting for religious worship	30dB$L_{Aeq,16h}$[b]	N/A
Courts; cinemas and lecture theatres	35dB$L_{Aeq,16h}$[c]	N/A
Museums; libraries; and community halls	40dB$L_{Aeq,16h}$[d]	N/A

[9] Department for Transport (2013). Aviation Policy Framework. [online] Available at: https://www.gov.uk/government/publications/aviation-policy-framework (Accessed June 2025).

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Hospitals and other healthcare settings	40dB$L_{Aeq,16h}$[e]	35dB$L_{Aeq,16h}$[e]
Schools; colleges; and registered nurseries	35dB$L_{Aeq,16h}$[f]	N/A
Hotels	35dB$L_{Aeq,16h}$[g]	30dB$L_{Aeq,8h}$[g]
Offices	40dB$L_{Aeq,16h}$[h]	N/A

a - the assessment threshold for auditoria, concert halls, theatres and sound recording and broadcast studios has been informed by guidance for "good" conditions for indoor ambient sound levels for concert halls and theatres (25dB$L_{Aeq,T}$) and recording studios (20dB$L_{Aeq,T}$) from British Standard 8233:1999 Sound insulation and noise reduction for buildings – code of practice[10]. Whilst this standard has been replaced by the 2014 version[5], it contains guidance on noise levels that are not contained in the 2014 version and are still considered relevant and appropriate for application in this assessment. Given the specific sensitivity of recording studios to the ingress of noise, it is assumed that any such receptor would have a building shell (including windows and ventilation penetrations) that would reduce external levels by at least 25-30dB. It is assumed that these spaces would have equal sensitivity during the day as when occupied at night.

b - the assessment threshold for places of worship has been informed by guidance from British Standard 8233:2014 which recommends that indoor noise levels should not normally exceed 30-35dB$L_{Aeq,T}$ for listening in places of worship.

c - British Standard 8233:2014 does not provide guidance on indoor noise levels for courts, but the required activities and sensitivity to noise are considered to be similar to those of work requiring concentration of executive offices, for which a recommended range of 35-40dB$L_{Aeq,T}$ is provided. Lecture theatres are considered to have a similar sensitivity to noise as courts by reference to both BS8233 but also Building Bulletin 93 Acoustic design of schools: performance standards (BB93). Whilst not applicable to further education premises, BB93 criteria are often adopted / adapted for

[10] British Standards Institution (1999). BS 8233: 1999 Guidance on sound insulation and noise reduction for buildings. London: BSI.

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		this setting. Internal design criteria for cinemas in respect of external noise might typically be NR30Leq (~35 $dBL_{Aeq,T}$) or less, however these uses tend to be purpose built with noise constraints in mind. d - the assessment threshold for museums and libraries has been informed by guidance from British Standard 8233:2014 which recommends that indoor noise levels should not normally exceed 40-50dBLAeq,T for study and work requiring concentration in libraries, galleries and museums. Community halls have also been evaluated in the same way and are considered likely to be naturally ventilated. Where more sensitive uses are envisaged within a community hall, the propensity for closed windows and alternative means of ventilation and cooling were anticipated. e - the assessment threshold for hospitals have been informed by the criteria for noise intrusion from external sources for “Single-bed ward, single-bed recovery areas and on-call room, relatives’ overnight stay” in HTM 08-01 of 40$dBL_{Aeq,1h}$ for daytime and 35$dBL_{Aeq,1h}$ for night-time. f - recommended limits for indoor noise levels for schools are provided in Building Bulletin 93 Acoustic design of schools: performance standards. The assessment threshold for schools has been informed by the internal ambient noise level limit of 35$dBL_{Aeq,30min}$ and 40$dBL_{Aeq,30min}$ for naturally ventilated and non-naturally ventilated new build classrooms respectively, representing external levels of 55-60 $dBL_{Aeq,T}$. A precautionary lower external screening value was adopted to encompass the potential for shorter-term effects associated with alternation and the use of the $L_{Aeq,30min}$ metric in BB93. Note also, that the internal criteria are also conservative because the schools are already existing and BB93 allows a 5dB in relation to the refurbishment of existing schools (i.e. 40$dBL_{Aeq,30min}$ and 45dB $_{Aeq,30min}$ for naturally ventilated and non-naturally ventilated classrooms respectively). g - British Standard 8233:2014 states that “the recommendations for ambient noise in hotel bedrooms are similar to those for living accommodation” and recommends for dwellings that internal ambient noise levels do not exceed 35$dBL_{Aeq,16h}$ in areas of rest during the daytime and 30$dBL_{Aeq,8h}$ in bedrooms during the night-time. h - the assessment criteria for offices has been informed by guidance from British Standard 8233:2014 which recommends that indoor noise levels should not normally exceed 35-40$dBL_{Aeq,T}$ for work requiring concentration in executive offices. Similarly, BCO suggests an internal noise criterion of NR35 (~40$dBL_{Aeq,T}$) for cellular offices in respect of external noise intrusion and building services noise respectively, resulting in the potential for a combined level of 43$dBL_{Aeq,T}$. **Places of worship – cooling and ventilation**

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		In respect of 'Places for religious worship' these premises are assumed to comprise two use cases having distinct acoustic requirements; prayer and worship areas with more onerous noise criteria but used for relatively short periods and other ancillary spaces used for longer periods but with less onerous noise criteria. In respect of the more onerous criteria (30dB$L_{Aeq,T}$) it is assumed that the spaces can be ventilated / cooled before and after activity by purge ventilation, therefore an assumption of closed windows is justified in the context of the more onerous use case. Furthermore, the consideration of ventilation and cooling is less relevant for places of worship, which tend to be older buildings, and less prone to overheating.
5	Parks and Open Spaces – Noise and Amenity: In Table 7.24 Stepped Assessment Methodology for Parks and Open Spaces, under "Impact of Proposed Development" it is recommended that the description of "Intermediate" be revised to "between 25% and 50% of the receptor area". Under "Assessment", it is unclear how a "change of 3-5 dB" being considered a likely significant effect differs from "a change of greater than 5 dB" being	The description of intermediate is taken from the methodology as referenced in the footnote to Table 7.24[11]. In practice the applied methodology would apply "Intermediate" to be "between 25% and 50% of the receptor area" as implied by the definitions of "Localised" and "Wide". However, there are no receptors identified in the assessment where the area affected is forecast to be "Intermediate" as can be seen in Table A7.5.67 and A7.5.68 of Appendix 7.5 of the ES. The difference between the "3-5dB" and "greater than 5 dB" criteria leading to likely significant effects is described in Table 7.24 which notes that (emphasis added): "Where overall summer average noise exposure is found to change by 3 - 5 dB this **may be considered** a likely significant effect with a change of greater than 5 dB **considered** a likely significant effect." This means that, for receptors screened into the assessment, changes of 3-5dB may lead to a likely significant effect, but the final assessment of significance is dependent on the application of additional factors as subsequently explained in Table 7.24. Changes of 5dB or greater are considered to lead to likely significant effects, regardless of additional factors. This approach to assessing 3-5dB change is demonstrated in paragraphs 7.8.255 and 7.8.258 in the ES which describe that Manor House Grounds is initially identified as having a potential likely significant effect due to a summer average noise change of 4dB, but the assessment concludes no likely significant effect when considering the

[11] *The Sizewell C Project, Volume 4 Southern Park and Ride, Chapter 8 Amenity and Recreation* (2020). [online] Available at: https://infrastructure.planninginspectorate.gov.uk/wpcontent/ipc/uploads/projects/EN010012/EN010012-002014-SZC_Bk6_ES_V4_Ch8_Amenity_and_Recreation.pdf (Accessed June 2025)

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	considered a likely significant effect.	additional factors of existing ambient noise sources and the level of aircraft noise forecast to occur due to the Proposed Development. Heathrow is confident that the assessment of effects that is documented within the ES is sufficient for LBH to decide the application.
6	Modelling Methodology: It should be noted that ISO 9613-2 has recently been updated from the 1996 version referenced to a 2024 version which was published on 30 January 2024. While it is acknowledged that modelling work may have commenced prior to this change, it is recommended that, as a minimum, some comparative modelling be undertaken to compare the results from the two versions of the standard.	The 2024 version of ISO 9613-2 was addressed in footnote 83 of the ES. As the footnote explains, a revision of ISO 9613-2 was published in January 2024. However, the revised Standard was only incorporated within the noise modelling software in June 2024. Because modelling to inform the ES had commenced long before this, incorporation of the updated software could not be used. Furthermore, the 1996 version is still relevant because of the reference to it within the Environmental Noise Directive (END) legislation. The new software does not yet have that status. The ISO 9613-2 methodology was used for the ground noise assessment, so any changes to this methodology would only affect the ground noise assessment. The assessment principally relies on noise change to identify new significant effects on health and quality of life and likely significant effects due to noise increases and decreases. As any methodological changes would be applied to calculations for both the 'with alternation' and 'without alternation' scenarios, the relative magnitude of noise change, and therefore the scale and location of identified effects are not expected to change significantly with the 2024 version. The key changes of relevance to the assessment in the 2024 version relate to attenuation terms for ground absorption and barrier effects, so the areas most likely to be affected by changes in methodology are those in Longford Village near the noise barrier. No significant effects on health and quality of life or adverse likely significant effects were identified for any receptors in Longford Village and only a significant beneficial effect was identified for a single residential property at night-time. No significant effects on health and quality of life or likely significant effects (adverse or beneficial) were predicted for any other receptor within the ground noise study area. Any changes in assessment results due to changes in calculation methodology are therefore not expected to change the scale of the effects identified, particularly in the context of this application where ground noise effects are limited compared to air noise effects. It should be noted that the 2024 version of ISO 9613-2 is currently under review by ISO Technical Committee 43/SC1 Working Group 56 "*Quality assurance of noise calculation methods implemented in software*" in terms of its accuracy

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		of implementation within modelling software. This is important as whilst the Standard has been revised there is currently no consensus on its implementation. For the reasons described above, it is therefore not considered necessary for comparative modelling to be undertaken and the information provided within the ES is sufficient for LBH to undertake their EIA and make their decision. In line with Action 9A of the NAP Heathrow are developing a Ground Noise Management Plan (GNMP). As part of GNMP measurements are being planned at receptors in Longford this year to support the formulation of the plan. As part of the GNMP it is proposed that these measures are carried out routinely and immediately after the introduction of Easterly Alternation. These measurements can be used to demonstrate and evidence the actual impacts of ground noise and noise-induced vibration of the Proposed Development. Noise effects in Longford principally arise from air noise rather than ground noise. However, whilst any additional eligibility under the QNS on account of ground noise is considered unlikely, any potential for actual ground noise effects to extend the area that qualifies already under the QNS would be captured and responded to as part of this work.
7	Operational: Aircraft Noise Induced Vibration: The approach proposed is considered appropriate. It would however be useful to include a reference to the investigations and measurements previously carried out by Heathrow Airport in a conservatory at the far end of Myrtle Avenue.	Details of the measurements made in the conservatory at Myrtle Avenue are contained in the report appended to this response. The report concludes that: *"Thus only at properties of the order of 500m from a runway threshold are likely to experience vibration in the "Adverse comment possible" range, and then only in lightweight structures such as a conservatory."* This is consistent with the methodology in the ES of identifying receptors within 500m of the nominal start of roll location on Runway 09L as experiencing likely significant effects and suggests this is a conservative approach.
8	Quieter Neighbourhood Support (QNS) Sound Insulation Schemes: The full contribution up to a	Full details of the QNS Residential Insulation Scheme are provided in Section 4 of Appendix 17.2 of the ES. That section notes that each property will be independently assessed to determine the insulation measures that will be most effective, noting that the scheme will incorporate some or all of the following:

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	maximum of £34,000 per dwellings requires some further information e.g. what £34,000 currently covers (particularly because it is used as a mitigation to avoid significant effects), whether this value increases over time in line with inflations, and what the scheme covers in terms of replacement of noise insulation measures and regularity.	- The supply and installation of replacement primary windows or secondary glazing and external doors. - The supply and installation of acoustically attenuated ventilation in eligible rooms. - The Installation of an acoustic quilt within the roof void. - Upgrading of ceilings within eligible rooms where practicable to provide an increased level of acoustic attenuation. The scale of expenditure per property is set out in Heathrow's Noise Action Plan and scrutinised through that process. For the majority of eligible properties, the limit of £34,000 will be sufficient to provide the full cost of insulation for all eligible rooms. To date the average spend per property has been between approximately £11,000 and £18,000 depending on area and property type. This cost covers the survey and inspection work required, scaffolding, new acoustically specified windows and doors, ventilation system, loft insulation and ceiling overboarding where required. Should the expenditure required go beyond the limit of £34,000, this will be referred to Heathrow's Prioritisation Panel as a special case for determination. The limit of £34,000 per dwelling is adjusted for inflation and subject to periodic review and uplift by Heathrow. Where the dwelling has already been treated with acoustic glazing (double or secondary) or ventilation, Heathrow's assessors will determine whether it remains effective or requires replacement under the scheme.
9	Home Relocation Assistance Scheme (HRAS): As above, further information is required on what £20,000 currently covers, and whether this value increases over time in line with inflation.	The relocation assistance scheme applies to residential properties around Heathrow that are within the 2019 69 dB L_{Aeq} noise contour who wish to take the opportunity to move. Where the Proposed Development results in a residential dwelling being exposed to a summer average daytime noise exposure level of 69 dB LAeq,16hr but outside of the HRAS eligibility boundary (which is based on a 2019 contour) eligibility to HRAS will be extended. Eligible homeowners receive a payment made to their solicitor for moving cost such as stamp duty. To be eligible for the scheme, applicants must meet these criteria: - Own the property when applying. (If they currently live elsewhere, it must be the only property they own in the UK.) - Plan to move to a quieter area outside the boundaries of the scheme.

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		- Not retain a beneficial interest in, or right of occupation to, the property after moving. - Residents must have owned or be living in the property prior to 31 December 2022. Long-term tenants (with at least three years remaining on their lease) may also be eligible for assistance if the property they are renting is being sold. However, short-term tenants are not eligible for the scheme. On completion of the sale of the property, eligible homeowners will receive a lump sum of £10,000 plus 1% of the sale price of the property (totalling up to a maximum of £20,000). This will be subject to Land Registry checks and monies will be sent via BACS transfer to the homeowner's solicitors within four weeks of completion. There is only one payment per property. The HRAS was updated as part of the Quieter Neighbourhood Support (QNS) programme review and will be reviewed as part of that process but will not be routinely adjusted for inflation. The number of eligible properties is relatively low and the scheme has been running for a couple of decades now. As the ES notes at paragraphs 7.8.97 and 7.8.98 and Appendix 7.5 Table A7.5.20, whilst residential properties in Poyle would be removed from the 69 dB $L_{Aeq,16hr}$ contour, approximately 100 properties in Cranford and Stanwell Moor would be newly exposed above 69 dB $L_{Aeq,16hr}$ due to the Proposed Development. All people and properties that are forecast to be exposed to levels above 69 dB $L_{Aeq,16hr}$ in 2028 due the Proposed Development fall within the 2019 69 dB $L_{Aeq,16hr}$ contour that underpins the HRAS. As such it is expected that all residential receptors exposed to levels of 69 dB LAeq,16hr in 2028 would be eligible for support under this scheme subject to the conditions of the scheme. Due to the proximity of the 2028 69 dB $L_{Aeq,16hr}$ with Proposed Development contour to the 2019 HRAS scheme 69 dB $L_{Aeq,16hr}$ contour, provision has been made to extend the eligibility the HRAS scheme in the event that dwellings become exposed to levels above 69 dB $L_{Aeq,16hr}$ due to the Proposed Development and fall beyond current 2019-based eligibility boundary.
10	Construction Phase: Regarding paragraph 7.7.23, consideration of short-term temporary rehousing may be appropriate depending on the predicted construction phase noise levels so it is	Heathrow will commit to standard provisions for providing short-term temporary accommodation for residents affected by construction noise if certain trigger levels are met. It is proposed that this commitment is secured through section 106 obligation.

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	recommended that it not be discounted.	
11	Additional Mitigation Measures: The financial contributions towards noise insulation described in Table 7.31 should include details of the level of works that £3,000 and up to £12,000 are likely to provide to a recipient for context. Similarly, details of what the "bespoke insulation and ventilation" for schools is likely to include for the cap of £2.5m should be provided for context. Regarding Easterly Alternation Noise Mitigation Package for Noise Induced Vibration, examples of the level of works that £10,000 are likely to provide to a recipient should be included for context. Regarding Easterly Alternation Noise Mitigation Package for Parks and Gardens, it is unclear what the financial contribution of up to £250,000 will mean in terms of "enhancement" and hence additional details should be provided.	The cost and recommended insulation solutions will vary from property to property, however, some indicative examples are given below. Properties eligible for the £3,000 scheme are exposed to between 54-60dB$L_{Aeq,16h}$ and would be likely to meet internal criteria from BS8233 with standard glazing (i.e. existing glass retained but double-glazed unit), loft insulation and enhanced ventilation. This is in line with a £3,000 contribution which could cover, for example, surveys and installation of a ventilation product and 50m^2 loft insulation. Properties eligible for the £12,000 scheme are exposed to between 60-63dB$L_{Aeq,16h}$ and would be expected to meet internal criteria from BS8233 with replacement windows, loft insulation and enhanced ventilation. This is in line with a £12,000 contribution which could cover, for example, surveys and installation of a ventilation product, bathroom/kitchen ventilation, 50m^2 of loft insulation and up to 8 units of secondary glazing. As these contributions are therefore in line with the typical costs required to meet the internal criteria of BS8233, the level of contribution is proportionate to the noise impacts for these noise exposures below SOAEL. With the case of schools, the precise works assessed to be needed will vary depending on the size of school buildings, existing insulation performance and other building fabric parameters. Based on Heathrow's experience of providing insulation (upgraded windows and ventilation) to over 40 schools: - the cost of upgraded windows can range from approximately £6,000 to £900,000; and - the cost of ventilation can range from approximately £70,000 to £1.5million. Heathrow are confident, therefore, that it will be possible to provide upgraded windows and ventilation for the majority of types of schools within the £2.5million cap. As noted in Table 7.31, the additional funding of £10,000 for the Noise Induced Vibration mitigation package is to provide households with assistance towards the costs of mitigating the effects of noise induced vibration and will be most effective for dwellings with lightweight structures attached to their main residence. The types of work will be confirmed following an independent survey and assessment and will vary depending on the property. An example could be strengthening of reinforcing structural elements such as raised floors.

ID	LBH Question/Clarification	Heathrow Response
		See response to ID28 for the Parks and Gardens query
12	Table 7.32 "Calculated night-time construction noise levels for Wright Way noise barrier construction works" references façade noise levels in terms of $L_{Aeq,5.5hr}$. In line with BS 5228, it is recommended that the time period of L_{Aeq} be referenced to 1hr for night-time works.	See response to ID1
13	Given that UAEL is predicted to be exceeded at Receptor 5 for four nights, consideration of an offer of short-term temporary rehousing (i.e. hotel accommodation) should be given in these instances.	Heathrow will commit to providing short-term temporary accommodation for residents affected by construction noise if certain trigger levels are met. It is proposed that this commitment is secured through the section 106 obligation.
14	Table 7.34 "Predicted night-time noise levels for Phases 1, 2 and 3 new airfield infrastructure construction works" references façade noise levels in terms of $L_{Aeq,5.5hr}$. In line with BS 5228, it is recommended that the time period of L_{Aeq} be	See response to ID1

ID	LBH Question/Clarification	Heathrow Response
	referenced to 1hr for night-time works.	
15	Construction Phase: Construction Noise – 09R/27L Redundant Pavement Removal (Night-time): As noted above, it is recommended that the time period of L_{Aeq} be referenced to 1hr for night-time works.	See response to ID1
16	Summary of Construction Phase Noise Assessment: The summary should also include that there are exceedances of the UAEL at Receptor 5 for four nights.	The ES makes clear that there are short periods of UAEL exceedances at receptor 5 (four nights in total), see Graphic 7.2 and paragraph 7.8.5. The summary in paragraph 7.8.50 does not intend to reproduce the detail of the assessment but summarises the effects in terms of the NPSE aims and the identification of EIA likely significant effects, which includes receptor 5.
17	Assessment in Accordance with NPSE – Daytime Exposure: Details of what £34,000 would cover for the QNS in 2024 terms should be sought, along with a commitment for an annual inflationary increase. Regarding paragraphs 7.8.93 and 7.8.94, it is unclear whether reducing noise	See response to ID8 with regard to the QNS £34,000 limit. In terms of meeting the second aim of the Noise Policy Statement for England (NPSE[12]) there is nothing in the NPSE or its explanatory note that suggests meeting the second aim relies exclusively on noise reductions alone (with no

[12] Department for Environment, Food & Rural Affairs (2010). Noise Policy Statement for England. [online] Available at: https://www.gov.uk/government/publications/noise-policy-statement-for-england (Accessed June 2025).

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	levels for some people while increasing noise levels for others meets the spirit of the second aim of the NPSE of mitigation and minimising the adverse impacts on health and quality of life between the LOAEL and the SOAEL. In addition, some of the net decrease in this band is due to some people moving to the above SOAEL band. Some justification around this approach should be provided.	noise increase) rather than a reduction in total adverse impacts. In the Air Navigation Guidance (ANG[13]) the UK Government stated at paragraph 3.4 and 3.5: *"As stated in section 1.2(a) of this guidance, one of the government's three key environmental objectives is to limit and, where possible, reduce the number of people in the UK significantly affected by adverse impacts from aircraft noise.* *For the purpose of assessing airspace changes, the government wishes the CAA to interpret this objective to mean that the total adverse effects on people as a result of aviation noise should be limited and, where possible, reduced, rather than the absolute number of people in any particular noise contour."* Whilst this is in the context of assessing airspace change, the concept of "limit and, where possible, reduce" is in line with the NPSE second aim to "mitigate and minimise"[14], and the clarification provided in the ANG makes clear that this should be interpreted in the context of the totality of adverse effects rather than looking at increases and decreases separately. This is then further emphasised in the Government's Overarching Aviation Noise Policy Statement[15] (emphasis added): *"The government's overall policy on aviation noise is to balance the economic and consumer benefits of aviation against their social and health implications in line with the International Civil Aviation Organisation's Balanced*

[13] Department for Transport and Civil Aviation Authority (2017). UK Air Navigation Guidance. [online] Available at: https://www.gov.uk/government/publications/uk-air-navigation-guidance-2017 (Accessed June 2025).

[1414] The link between the NPSE concepts of mitigating and minimising and UK Government aviation noise objective concepts of limiting and reducing is also provided in the Overarching Aviation Noise Policy Statement Policy Paper which states "In circumstances where there is an increase in total adverse effects, "limit" would mean to mitigate and minimise adverse effects, in line with the Noise Policy Statement for England."

[15] Department for Transport (2023). Overarching Aviation Noise Policy. [online] Available at: https://www.gov.uk/government/publications/aviation-noise-policy-statement/overarching-aviation-noise-policy (Accessed June 2025).

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		Approach to Aircraft Noise Management. This should take into account the local and national context of both passenger and freight operations, and recognise the additional health impacts of night flights. *The impact of aviation noise must be mitigated as much as is practicable and realistic to do so, limiting, and where possible reducing,* ***the total adverse impacts*** *on health and quality of life from aviation noise."* The point raised regarding the second aim of the NPSE was examined at the previous inquiry[16] and the Inspector found at para 1064 that the mitigation and minimisation of noise between LOAEL and SOAEL is achieved by measures other than noise insulation (the range of other measures which Heathrow takes to limit noise) and the second aim of the NPSE was met. This includes the provision of predictable respite through runway alternation on easterly operations as a result of the Proposed Development which itself is a mitigation according to the ANPS. The fact that the application would also achieve noise reductions for more people than the number of people who experience a noise increase (see ES Tables 7.43 and 7.45) also helps to confirm that the aims of the NPSE are met. As set out in the Planning Statement, these characteristics were known to the Inspector and Secretary of State in 2017 when the application was examined against the same NPSE tests and found to comply (IR paras. 1080 and 1122).
18	Assessment in Accordance with NPSE – Night-time Exposure: As above re: QNS and questioning whether reducing noise levels for some people while increasing noise levels for others meets the spirit of the second aim of the NPSE. Table 7.41 appears to be incorrectly formatted with levels of "55-57" shown as being between "LOAEL to SOAEL" and	This is a presentational error and has not affected the assessment. The results of the assessment as per the data presented is unaffected and from this LBH are already able to take an informed view in deciding the application.

[16] Department for Communities and Local Government (2017), Enabling works to allow implementation of full runway alternation during easterly operations Decision Letter APP/R5510/A/14/2225774

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	therefore requires correction.	
19	Assessment in Accordance with the NPSE – Conclusion: The above elements are not covered in the conclusion and it is recommended that they should be. Bullet point 3 states that "Although the number of people exposed to air noise above the daytime and night-time SOAEL is forecast to increase due to the Proposed Development in 2028, the increase is much smaller and most of these receptors are already eligible or will become eligible for a funded scheme of insulation under Heathrow's QNS RIS". It is recommended that some context be added to this e.g. what is the increase much smaller than. Additionally, demonstrated that the sound insulation scheme will avoid the significant effect is all cases is required.	The "much smaller" wording in bullet point 3 is in reference to the immediately preceding 2 bullet points, i.e. the quantum of the increase in the number of people exposed above the daytime and night-time SOAEL is much smaller than the quantum of the decrease in the number of people exposed between the LOAEL and SOAEL. It has been accepted in previous airport planning applications that providing noise insulation will avoid significant adverse effects on health and quality of life above SOAEL and will mitigate and minimise adverse effects on health and quality of life between LOAEL and SOAEL. For example, the appeal decision letter for the previous Easterly Alternation application[16] states at paragraph 1087: *"Against this background I consider that the proffered mitigation between SOAEL and UAEL is consistent with the APF and would be sufficient to avoid significant observed adverse effects."* More recently, the Luton DCO decision letter[17] states at paragraph 500: *"The Secretary of State therefore agrees that the increased harm would ultimately be offset by noise insulation following rollout, which would satisfy the requirements of the NPSE, NPPF, PPGN and Policy LLP38 in the longer term to avoid effects above SOAEL and mitigate or minimise effects between LOAEL and SOAEL"* It can therefore be concluded that where noise insulation is provided it can be demonstrated to avoid significant effects on health and quality of life above SOAEL and mitigate and minimise adverse effects on health and quality of life above LOAEL. Noise insulation for the adverse likely significant effects identified below 54dB$L_{Aeq,16h}$ is addressed in response to ID20. The extent to which impacts fall to be directly mitigated is to be assessed in the light of government policy. It is for the ES to forecast effects and describe the measures envisaged to avoid, prevent or reduce and, if possible, offset adverse likely significant effects. However, it is policy which determines the extent to which effects must be mitigated,

[17] Department for Transport (2025), Application for the Proposed London Luton Airport Expansion Development Consent Order Decision Letter

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		guided by the aims of the NPSE. These matters are addressed extensively in the ES and in the Planning Statement, both of which establish that the mitigation package offered exceeds the requirements of government policy.
20	Likely Significant Effects – Daytime: Under Table 7.44, LSE-D07 includes a "very high" number of the population (15,500) who will experience "Exposure between proposed LOAEL and SOAEL and a 'moderate' 3 dB – 5.9 dB increase" but will have limited availability to noise insulation funding or, in the case of 12,100, will have no availability to noise insulation funding. Regarding paragraph 7.8.155, there is potential that on some days there will be a need for "having to keep windows closed most of the time". As such, additional sound insulation provision should be considered for this area.	Table 7.44 of the ES clearly shows that there will be a proportion of the population in Cranford and North Hyde for which likely significant effects (due to noise change) are identified that will not be eligible for noise insulation. This population are exposed to levels of noise just above the LOAEL (51.0 to 53.9dB) and whilst they would not be eligible for noise insulation they would experience predictable respite which would mitigate the adverse effects. It would not be proportionate or sustainable to provide noise insulation at such low exposures. There is no airport insulation scheme in the UK that provides insulation below 54dB$L_{Aeq,16h,}$ including major airport expansions such as the recently consented Luton DCO where the economic benefits of these projects allow for more expansive noise insulation programmes to be sustainable. Other airport expansion applications, such as London City Airport and Bristol Airport do not provide insulation below 57dB$L_{Aeq,16h}$. It should also be noted that at these lower external noise levels, the effectiveness of sound insulation is likely to be very limited. A typical household construction (without a noise insulation package) would likely provide around a 25 dB reduction[18], meaning that properties exposed between 51 and 54dB$L_{Aeq,16h}$ would experience internal noise levels of around 26 to 29dB$L_{Aeq,16h}$ which is already below the target internal criteria in British Standard 8233[5] of 30 to 35dB$L_{Aeq,16h}$ during the daytime. As such, the provision of additional insulation would have very limited effectiveness and is not considered sustainable. This is entirely consistent with the second aim of the NPSE which policy makes clear must be considered within the context of sustainable development. The Explanatory Note to the NPSE states at paragraph 2.24 (emphasis added): *"The second aim of the NPSE refers to the situation where the impact 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*

[18] Building Research Establishment (2020), A review of insulation standards, building regulations and controls related to airport noise insulation schemes. Final Report. For the Independent Commission on Civil Aviation Noise

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		life while also taking into account the guiding principles of sustainable development (paragraph 1.8). ***This does not mean that such adverse effects cannot occur.****"* It is also entirely consistent with the findings of the 2017 decision, in which the Inspector found, and the Secretaries of State agreed that: - it would be disproportionate to expect Heathrow to change its airport wide insulation policy generally, or to offer a different package to those affected by easterly alternation (para. 1079); and - likely significant environmental effects are different from the significant effects on health and the quality of life referenced in the NPSE and it is not inappropriate that some significant environmental effects are not directly mitigated (para. 1064). The 12,000 referred to in the question are those who do experience an increase of at least 3dB but whose noise exposure would remain less than 54dB$L_{Aeq,16h}$ (see Table 7.43). The paragraph then suggests that, whilst they don't qualify for noise insulation, they will need to keep their windows closed "*most of the time*". However, that observation comes from the PPG, it applies across the wide spectrum LOAEL to SOAEL and those in the 51-54 dB$L_{Aeq,16h}$ category are at the lowest end of that. The paragraph misquotes the PPG and the Noise Assessment (para 7.8.155) which are clear that this condition may only be necessary "*some of the time*". That is even more the case here as properties are affected by easterly alternation only c. 10-14% of the time. To put that into further context, aviation policy[19] regards 54dB$L_{Aeq,16h}$ as the approximate onset of significant community annoyance (para 3.17) (the concept of which was endorsed by the 2017 Inspector at DL para. 1119). This point is made in the Planning Statement at paras. 8.2.12 and 8.2.28. The PS also records that the 2017 Inspector found that the mitigation and minimisation of noise between LOAEL and SOAEL is achieved by measures other than noise insulation (the range of other measures which Heathrow takes to limit noise) and the second aim of the NPSE is met (para. 1064)
21	Operational Phase: Annoyance, Sleep Disturbance and	It is not possible to accurately calculate the number of people who will become highly annoyed or highly sleep disturbed as the exposure-response relationships can only be used to predict the percentage likelihood of a population being either highly annoyed or highly sleep disturbed for a given noise exposure. These relationships can then be

[19] Department for Transport (2017). UK Airspace Policy: A Framework for the Design and use of Airspace. [online] Available at: https://www.gov.uk/government/publications/uk-airspace-policy-a-framework-for-thedesign-and-use-of-airspace (Accessed June 2025).

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	Monetised Outcomes: Annoyance: The number of people 'highly annoyed' is predicted to be lower with development than without, i.e. is beneficial, which is obviously positive. However, it would be useful to understand the number of people who will become 'highly annoyed' as a result of the proposed development.	applied across a population within a study area to provide a statistical estimate of the total number of highly annoyed or highly sleep disturbed people within that population. As noise exposure increases, the likelihood of being highly annoyed or sleep disturbed increases and as noise exposure decreases, the likelihood decreases, but there is no trigger point above which an individual will become highly annoyed or highly sleep disturbed. The exposure-response relationships are derived from large scale studies and are not intended to be used to predict changes in high annoyance/high sleep disturbance at an individual level. This broad principle is explained by UK Government in the Air Navigation Guidance[13] as follows (paragraph 3.5): *"There is no one threshold at which all individuals are considered to be significantly adversely affected by noise. It is possible to set a Lowest Observed Adverse Effect Level (LOAEL) that is regarded as the point at which adverse effects begin to be seen on a community basis. As noise exposure increases above this level, so will the likelihood of experiencing an adverse effect. In line with this increase in risk, the proportion of the population likely to be significantly affected can be expected to grow as the noise level increases over the LOAEL."* It is considered that sufficient information has been provided for the informative appraisal of health impacts by the presentation of the change in total number of people highly annoyed and total number of people highly sleep disturbed as well as the change in number of people experiencing adverse effects on health and quality of life (between LOAEL and SOAEL) and the number of people experience significant adverse effects on health and quality of life (above SOAEL).
22	Operational Phase: Annoyance, Sleep Disturbance and Monetised Outcomes: Sleep Disturbance: Again, the reduction in the number of people 'highly sleep disturbed' is positive but it would be useful to understand the number of people who will become 'highly sleep disturbed' as	See response to ID22.

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	a result of the proposed development.	
23	Operational Phase: Annoyance, Sleep Disturbance and Monetised Outcomes: Monetised Outcomes: The TAG analysis effectively assumes 'symmetry' so a 1dB beneficial decrease exactly offsets a 1dB adverse increase. It is unclear whether there is evidence for this, particularly in the short to medium term.	The TAG methodology is a Department for Transport (DfT) methodology and further information on the methodology and its evidence base is provided in the DfT's Guide to WebTAG Noise Appraisal for non-experts[20]. As noted in the ES, TAG is not a comprehensive assessment of noise impacts and the monetised outcomes are presented only as informative appraisals. It is not the case that the TAG analysis assumes symmetry, as the exposure response relationships that are used in the methodology are not linear.
24	Operational Phase: Aircraft Air Noise – Non-Residential Noise Sensitive Receptors: As noted above, the justification for excluding hotels and offices on the basis that they are commercial enterprises does not make sense when compared with other receptor types such as Theatres, Cinemas, and Sound recording and broadcast studios which	It is not the case that hotels and offices are excluded from the assessment. Hotels and offices have been fully assessed, and the detailed results are presented in Section 9 of Appendix 7.5 of the ES. The outcome of the assessment for hotels and offices is summarised in Table 7.53 of the ES.

[20] Department for Transport (2017), Guide to WebTAG Noise Appraisal for non-experts. [online] Available at: Guide to WebTAG noise appraisal for non-experts (Accessed June 2025)

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	would also be commercial enterprises. As such, it is recommended that hotels and offices be included within the assessment.	
25	Operational Phase: Aircraft Air Noise – Non-Residential Noise Sensitive Receptors: Place of Meeting for Religious Worship: Holy Angels Anglican Church and St Christopher Roman Catholic Church are forecast to experience a 'moderate' adverse impact (significant) but no mitigation appears to be being offered to minimise this impact. As noted previously, the assumed ventilation strategy and cooling strategy for these spaces is "Closed Windows" which does not provide ventilation or cooling.	Whilst these two places of worship are identified as experiencing a likely significant effect, it is on a precautionary basis because: - the noise change is only just within the 'moderate' change category of 3-5.9dB (they experience an increase of 3.1 and 3.2dB); and - the resulting noise exposure of around 59dB$L_{Aeq,16h}$ for both places of worship is sufficiently below the upper assessment threshold of 63dB$L_{Aeq,16h.}$ As noted in paragraph 7.8.204 in the ES, these places of worship are not eligible for noise insulation under Heathrow's Community Buildings Scheme as they fall below the 63dB$L_{Aeq,16h}$ threshold at which Government expects airport operators to offer acoustic insulation to noise-sensitive buildings. It is therefore not considered a proportionate or sustainable approach to provide noise insulation to these receptors. This is entirely consistent with the findings of the 2017 decision, in which the Inspector found, and the Secretaries of State agreed that: - it would be disproportionate to expect Heathrow to change its airport wide insulation policy generally, or to offer a different package to those affected by easterly alternation (para. 1079); and - likely significant environmental effects are different from the significant effects on health and the quality of life referenced in the NPSE and it is not inappropriate that some significant environmental effects are not directly mitigated (para. 1064). See response to ID4 with respect to the assumed ventilation and cooling strategy.
26	Operational Phase: Aircraft Air Noise – Non-Residential Noise	See response to ID4

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	Sensitive Receptors: Hospitals, Nursing Homes and Hospices: No adverse likely significant effects are reported and hence no comments other than that these should also be assessed for night-time noise as well as daytime.	
27	Operational Phase: Aircraft Air Noise – Non-Residential Noise Sensitive Receptors: Schools including Registered Nurseries: It is noted that a number of schools will experience levels of up to 60-61 dB $L_{Aeq,8hr}$ (alternation period) but will not be eligible for sound insulation. Paragraph 7.8.233 states that "At such levels, internal noise conditions are likely to be below 40 dB $L_{Aeq,30min}$ assuming standard façade and roof construction, and a closed window. In other words, no bespoke acoustic insulation measures would be necessary to achieve suitable internal noise conditions for classrooms." The reference to 40 dB	The schools being referred to (De Lacey Day Nursery, Wolf Fields Primary School, Sybil Elgar School, Clifton Primary School and Havelock Primary School) all experience a summer average daytime noise exposure of less than 54dB$L_{Aeq,16h,}$ which is significantly below the 63dB$L_{Aeq,16h}$ threshold above which the Government expects airport operators to offer acoustic insulation to noise-sensitive buildings. They are therefore not eligible for noise insulation under Heathrow's Community Buildings Scheme. They are also below the Easterly Alternation Noise Mitigation Package eligibility for schools of a 54dB$L_{Aeq,16h}$ with a 3dB increase. With regard to the use of $L_{Aeq,30min}$, refer to response to ID4 for justification of assessment thresholds and metrics. As noted in response to ID4, the lower assessment threshold for the schools assessment is derived from the internal noise criteria of 35dB$L_{Aeq,30min}$ for new builds, though it is noted that this is a highly conservative approach as the schools are already existing and the outdoor to indoor noise reduction assumes natural ventilation for which BB93 allows a 5dB reduction in the internal noise level limit (i.e. 40dB$L_{Aeq,30min}$ for new build schools and 45dB$L_{Aeq,30min}$ for refurbished schools). Adverse likely significant effects are identified for these schools based on exceedance of the lower assessment threshold and a noise increase of greater than 3dB. Additional context is then provided using the alternation period $L_{Aeq,8h}$ metric and a discussion of likely internal noise levels with reference to the 40dB$L_{Aeq,30min}$ criteria which is relevant for existing schools. This additional context notes that even in the worst-case alternation period (which would occur 10 – 14% of the time), no bespoke acoustic insulation measures would be necessary to achieve suitable internal

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	$L_{Aeq,30min}$ relates to the Building Bulletin 93 (BB93) "'upper limit' for indoor ambient noise levels in nursery, primary and secondary school rooms class and teaching rooms for refurbished schools." It is unclear why the more relaxed refurbishment criterion has been assumed as opposed to the standard criterion for new schools of 35 dB $L_{Aeq,30min}$. Additionally, it is inappropriate to compare L_{Aeq} levels averaged over 8 hours with a criterion averaged over 30 minutes since the $L_{Aeq,30min}$ criteria stated in BB93 should assume a worst case 30-minute period over that day. On this basis, further work/justification is required for schools and registered nurseries to demonstrate that appropriate mitigation measures will be adopted. The assumption that windows would be closed windows also requires further consideration as	noise conditions for classrooms. For the remaining 86-90% of the time internal noise conditions without insulation would be even lower. It is therefore not considered a proportionate or sustainable approach to provide noise insulation to these receptors. This is entirely consistent with the findings of the 2017 decision. In terms of external noise conditions, this is taken into account in the lower assessment threshold for schools of 50dB$L_{Aeq,16h}$ which is an external noise level and is consistent with the external noise criteria in the referenced guidance[21].

[21] Institute of Acoustics and Association of Noise Consultants (2015), Acoustics of Schools: a design guide

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	unless a mechanical ventilation system is proposed for schools, windows would need to be opened for both ventilation and cooling. External areas in schools should also be considered. Guidance states "For new schools, 60 dB $L_{Aeq,30min}$ should be regarded as an upper limit for external noise at the boundary of external areas used for formal and informal outdoor teaching and recreation " and "Noise levels in unoccupied playgrounds, playing fields and other outdoor areas should not exceed 55 dB $L_{Aeq,30min}$ and there should be at least one area suitable for outdoor teaching activities where noise levels are below 50 dB $L_{Aeq,30min}$".	
28	Operational Phase: Aircraft Air Noise – Parks and Open Spaces – Noise and Amenity: The mitigation package of £250k is proposed "towards enhancing these parks in other ways". It is unclear	Paragraph 8.2.67 of the Planning Statement acknowledges that the impact on these parks and open spaces cannot be mitigated and that the £250,000 is for compensatory enhancements. It also notes that improvements could be made to landscaping, biodiversity or facilities, but that enhancements would be agreed with the planning authorities, in consultation with their communities. *"For the impact of new overflights on the 3 open spaces at Harlington / Cranford, Heathrow recognises that the impact cannot be mitigated and the contribution of £250,000 is intended instead to fund compensatory enhancements to the parks (to be agreed with the planning authorities, in consultation with their communities). Those parks would be newly*

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	how this could be used and is unlikely to help mitigate the increased noise levels in these parks.	*affected by overflights for c.10-14% of the time but unaffected for the remainder. With the funds offered, improvements to landscaping, biodiversity or facilities would enhance enjoyment of the park throughout the year."* Heathrow's proposed offer of up to a total of £250,000 to fund enhancements at Berkeley Meadows, Avenue Park and Cranford Park is explained in the ES at paras. 7.8.253-60, based on the analysis of impacts set out in Tables 7.47-50. These are the only parks / open spaces identified as likely to experience significant adverse effects from easterly alternation. Apart from the mitigation measures which Heathrow takes to limit all noise impacts, and the fact that the adverse effects would be experienced only c.10-14% of the time (during alternated easterly operations), further mitigation is not practical. Accordingly, the financial offer is made to compensate for the adverse effects. There is no policy obligation on Heathrow to do this, and it was not a feature of the financial package which was found acceptable by the Inspector and Secretary of State in 2017. It is promoted as a proportionate payment in the expectation that the Borough Council will be able to identify worthwhile projects in the parks (which adjoin each other) to enhance the experience of park users, to compensate for the effects of easterly alternation, which will be experienced by park users for limited periods of time. The nature of easterly alternation is such that periods of easterly operations and alternation during an easterly day will be publicised on Heathrow's web-site and known in advance. Park users could choose to time their visits to avoid the effect if they wish. A figure of up to £250,000 could fund significant enhancements consistent with those made as part of the Cranford Park Project in 2023 or those lottery funded enhancements currently being undertaken. It would be for LBH to determine how best to spend the money, but Heathrow would wish to be assured that the funds would be used for park enhancements and delivered within a reasonable timescale.
29	Operational Phase: Aircraft Ground Noise: Southwest Quadrant Receptors – Daytime Effects: Paragraph 7.8.301 states "All residential receptors which fall between the daytime LOAEL and SOAEL are forecast to experience a 'moderate' increase in daytime ground noise exposure due to the Proposed Development." It	This is typographical error and should read (emphasis added): *"**No** residential receptors which fall between the daytime LOAEL and SOAEL are forecast to experience a 'moderate' increase in daytime ground noise exposure due to the Proposed Development."* All changes in daytime ground noise exposure are forecast to be either 'negligible' or 'no change'. In addition, it does not change any of the information provided that would allow LBH to decide the application.

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	is questioned whether this should be considered as a significant effect.	
30	Operational Phase Noise Induced Vibration: It is unclear whether Littlebrook Nursery, within 500m of aircraft start of roll, will be eligible for any noise mitigation package. This should be confirmed.	As noted in the ES (for example in Table 7.31) Littlebrook Nursery is eligible for the Quieter Neighbourhood Support Community Buildings Scheme. As a result, the commitment to offer noise insulation to Littlebrook Nursey is included in the draft section 106 Heads of Terms at paragraph 3.10.1. Works provided under this package of mitigation will be capped at a total value of £2.5 million per school with the actual amount offered to be determined following independent survey and assessment.
31	Clarification around Fleet mix and transition is required with evidence to be produced to demonstrate the current assumptions are accurate.	The assessment made is underpinned by forecasts which were prepared in 2023. The 2028 forecast central to the noise assessment therefore considers changes in fleet mix brought about by aircraft retirements during the Covid-19 pandemic and orders placed by airlines. The noise assessment is therefore informed by a recent view of the expected fleet mix within the current 480,000 cap and airport infrastructure. Recognising the fleet forecasting assumptions are prone to change, Heathrow proposes to update the noise assessments prior to operation to capture the most up to date fleet mix and to ensure that receptors eligible for any noise insulation schemes are identified. This commitment is proposed to be secured by s106 obligation. In 2024 Heathrow established a Fleet Forecasting Forum (FFF) as part of its Noise Action Plan. The FFF benefits from input from the aircraft manufacturers, Heathrow's top 10 airlines by movement and technical experts to predict the pace of future technology and likely take up at Heathrow. The updated forecast for this purpose will be guided by the FFF. Following the implementation of Easterly Alternation, a further assessment will be carried out to identify the actual impact of the Proposed Development. This post-implementation assessment will again reconfirm eligibility to each noise insulation scheme and will be based on actual airport operations. This commitment is proposed to be secured via a s106 obligation.

Appendix A – Vibration Report

VIBRATION FROM DEPARTING AIRCRAFT

Report of a Vibration and Noise Survey

September 2011

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1 INTRODUCTION

This report presents the result of an investigation into the question of whether or not vibration is caused by departing aircraft at Heathrow.

A combined noise and vibration survey was carried out in the vicinity of the eastern end of runway 27L.

Vibration is oscillatory motion of a solid body or medium which may be perceived by the tactile sense. The motion may be transmitted from source to receiver entirely through a solid (or liquid) medium, but it may also manifest itself as secondary motion of a structure induced by airborne noise, usually of low frequencies. Human beings may also describe low frequency noise itself as vibration, even though it is reaching them through air and not through a solid medium. Although true vibration is perceived by the tactile sense, it may cause rattling or creaking which is perceived as audible sound. Vibration of a building surface will also radiate sound into adjacent air, and be heard as audible sound if it occurs at frequencies within the audible range (approximately 20Hz- 20kHz).

2 THE SURVEY

Because vibration is an effect perceived by the tactile sense, it is necessary to measure on surfaces in contact with human beings, and although in theory vibration could be found in the ground outside a house, human response to vibration will tend to occur as a result of the vibration of the structure of a house. Thus, whereas noise surveys are conventionally carried out in an external location, on this occasion the surveys were carried out inside houses.

The area close to the airport perimeter near the eastern end of runway 27L at Heathrow is relatively open, consisting of the A30 road, on the south side of which are houses with largely flat, mostly grassed, land between.

A preliminary survey was carried out at 445 Hatton Road. This is an unoccupied semi-detached house on the extended runway centreline, 750m east of the runway threshold. The main house was fitted with full secondary glazing. Access to the conservatory was not possible. No significant vibration or low frequency noise was measured or observed inside the main house.

A second location was identified at 32 Myrtle Avenue, 475m from the runway threshold, 130m to the south of the extended runway centreline. This house was occupied and access to a conservatory at the rear was available. The conservatory was glazed with sealed unit glazing and had a raised floor. Significant low frequency noise was audible during departures on 27L and the conservatory structure was induced to vibrate so as to cause creaking of the

structure. The occupants reported that their dining table, in a room adjacent to and with open access to the conservatory, was on occasions felt to vibrate.

The two locations are shown in Figure 1. The Myrtle Avenue location, as well as being closer to the runway, is also likely to be nearer to the peak azimuth in the directivity pattern of an aero engine, which tends to be cardiod in shape.

Figure 1 Survey Locations

The measurement location at 32 Myrtle Avenue is shown in Figure 2.

Measurements were made to record three-axis vibration in the floor plus simultaneous unweighted airborne sound using a four-channel digital logger.

The instruments used were:

Rion NL-31 Class 1 Sound Level Meter

2 x Rion PV 87 high sensitivity accelerometers DIN 45669-2 Mounting plate
Rion DA-20 Digital Recorder

The vibration and sound signals were recorded as WAV files on the DA-20 which were post-processed in the laboratory to yield data in both the time domain and the frequency domain.

Figure 2 Measurement location at 32 Myrtle Avenue

Recordings were made between 15.00h and 17.00h when the airport was on westerly departures from 27L.

3 RESULTS

The results are presented in terms of airborne sound level and floor vibration in the time domain, and sample spectra of peaks from the time domain traces. The time domain recording of vibration was also subject to W_b weighting as per BS 6472-1 : 2008, "Guide to evaluation of human exposure to vibration in buildings"

The floor vibration was some three times greater in the vertial axis than in the two horizontal axes, and therefore only vertical vibration results are presented here.

Figure 3 shows an example plot of airborne noise in the time domain, both in terms of the A-weighted overall sound level and the values of the 1/3 octave bands centred on 20Hz and 25Hz.

Figure 4 shows airborne noise spectra for five typical events. Figure 5 shows vertical floor vibration velocity for the same events. Figure 6 shows the velocity spectra for the events, and Figure 7 shows the fifth spectrum as W_b weighted acceleration as per BS 6472-1:2008.

The aircraft types were identified using webtrak.

It is clear that the most significant frequencies are the 1/3 octave bands cented on 20Hz and 25Hz. There is negligible perceptible vibration below this range.

In terms of Vibration Dose Value as defined in BS 6472-1:2008, the $VDV_{b,day}$ assuming that the vibration recorded for the period 1500-1700 is typical for the 8 hours for which departures on 27L normally occur in one (westerly) day is 0.43 $ms^{-1.75}$. This is just into the “Adverse comment possible” range of Table 1 of BS6472.

4 CONCLUSIONS

The conclusions of the survey are that low frequency airborne noise from departing aircraft induces structural vibration in the lightweight building, the conservatory, in which the survey was conducted.

According to the assessment procedure given in BS 6472-1:2008, the floor vibration in the conservatory is at the low end of the “Adverse comment possible range”. Only one location was measured and it is likely that other locations may be slightly higher. It is also likely that in room with more substantial floors than the raised floor of the conservatory vibration will be lower.

Airborne noise was observed to cause creaking of the conservatory structure as a result of secondary vibration. The occupants of the house reported that their dining table was on occasions felt to vibrate.

There was no evidence of ground-transmitted vibration as opposed to secondary vibration induced by airborne low frequency sound.

The measuring location was 475m from the runway threshold. There is an access taxiway used by some aircraft some 100m west of the threshold, and it may be assumed that the peak noise levels occur some 650m from the survey location. It way also be assumed that the noise source is approximately a point source, and taking account of ground effects etc will decay at the rate of some 10dB per doubling of distance (one third the vibration amplitude). Thus only at properties of the order of 500m from a runway threshold are likely to experience vibration in the “Adverse comment possible” range, and then only in lightweight structures such as a conservatory.

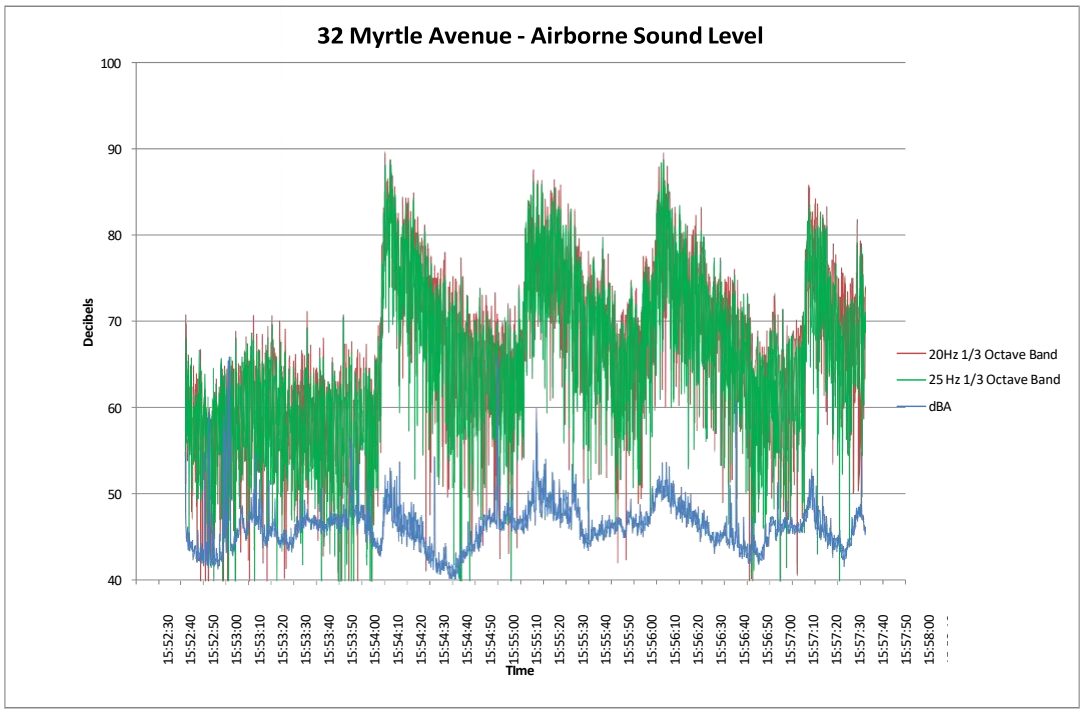

Figure 3 Airborne noise in the time domain

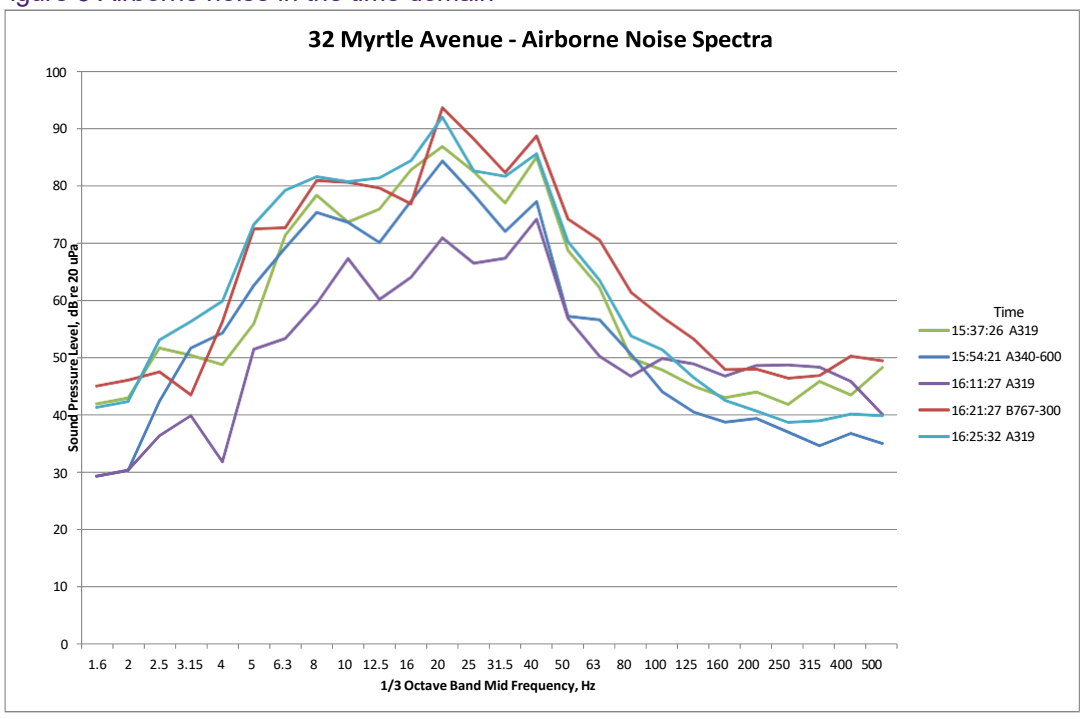

Figure 4 Typical Airborne Noise Spectra

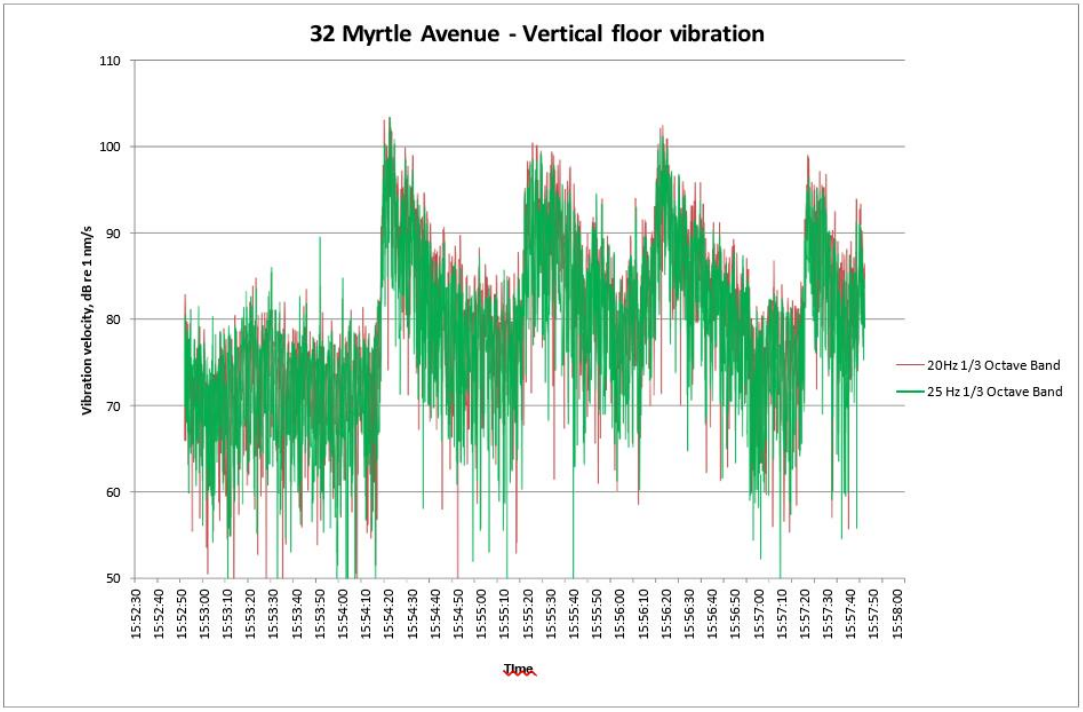

Figure 5 Vibration in the time domain

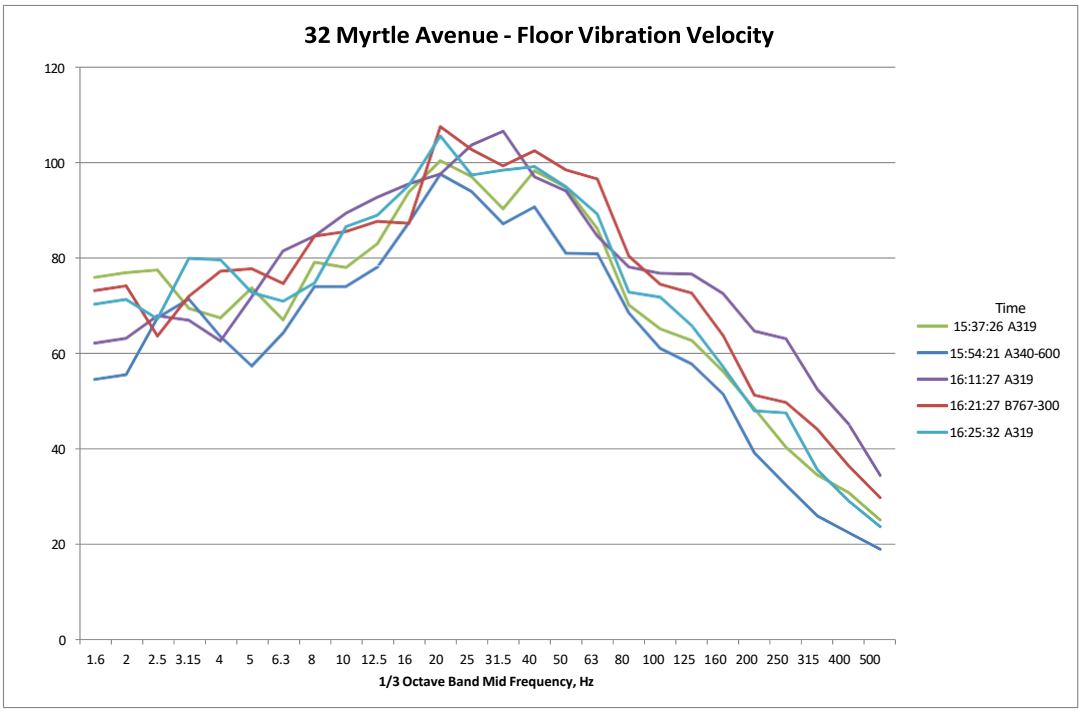

Figure 6 Typical Vibration spectra - vertical velocity

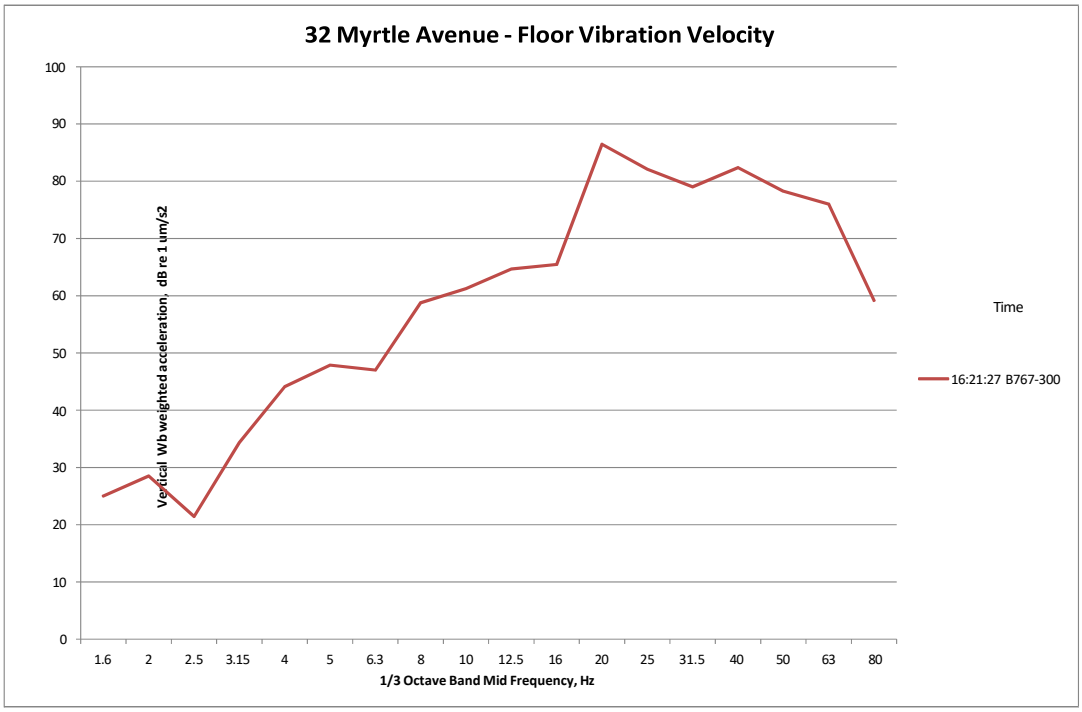

Figure 7 Sample spectrum as Wb weighted acceleration (BS 6472- 1:2008)